ANALYTICAL QUALITY ASSOCIATES, INC.
616 Maxine NE
Albuquerque, NM 87123
505-299-5201
www.aqainc.net

Data Validation Report for CH2M Hill
Plateau Remediation Company

VSR10-020
Project 200 TW 1 & 2

Chemical & Radiochemical Validation - Level C

Validation Performed By: Carl Schlosser **Date:** 6-14-2010

Validation Reviewed By: Cheryl A. Schlosser **Date:** 6-14-2010

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Date: 14 June 2010
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: 200 TW 1 & 2
Subject: Volatile Organics - Sample Data Group (SDG) WSCF20080683

INTRODUCTION

This memorandum presents the results of data validation for SDG WSCF20080683 prepared by WSCF. The sample validated along with the analytical method is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B1TNP8	4/01/2008	Soil	C	8260B

Data validation was conducted in accordance with the CHPRC validation statement of work and the Sampling and Analysis Plan for the 200-BP-5 Groundwater Operable Unit Remedial Investigation/Feasibility Study, Appendix A, DOE/RL-2007-18, Rev. 1 (SAP). Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested By Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for volatile organics are analysis within 14 days of sample collection. Sample preservation requires freezing to < -7 degrees Celsius.

The sample was analyzed within the prescribed holding time and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for analysis.

Field Blanks

No field blanks were submitted for analysis.

Equipment Blanks

No equipment blanks were submitted for analysis.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the laboratory control sample accuracy limits are 50% to 150% at a minimum, and the statistical ones established by the analytical laboratory if more stringent. The matrix spike sample accuracy limits are the ones specified by the DV procedure. The limits for reported analytes not listed in the SAP are specified by the DV procedure.

Surrogates

All surrogate recoveries were acceptable.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exception. The only 8260 MS/MSD analytes reported were 1,1-dichloroethene, benzene, chlorobenzene, toluene and trichloroethene. Reported analytes not represented in the MS/MSD were cis-1,3-dichloropropene, trans-1,3-dichloropropene, 4-methyl-2-pentanone, 2-hexanone, acetone, carbon disulfide, bromodichloromethane, 2-butanone and 1-butanol. These nine analytes were non-detects in sample B1TNP8 and should be qualified as estimates and flagged "UJ."

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exception. The only 8260 LCS analytes reported were 1,1-dichloroethene, benzene, chlorobenzene, toluene and trichloroethene. Reported analytes not represented in the LCS were cis-1,3-dichloropropene, trans-1,3-dichloropropene, 4-methyl-2-pentanone, 2-hexanone, acetone, carbon disulfide, bromodichloromethane, 2-butanone and 1-butanol. These nine analytes were non-detects in sample B1TNP8 and should be qualified as estimates and flagged "UJ."

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ±30%. The RPD limits for reported analytes not listed in the SAP are specified by the DV procedure. When duplicate RPDs exceed the limits and have associated results <5X the required detection limits with differences <2X the required detection limits no precision infraction occurred.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Field Duplicate Samples

No field duplicates were submitted for analysis.

Field Split Samples

No field splits were submitted for analysis.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

All reported sample MDLs were below the CRDLs.

- **Completeness**

SDG WSCF20080683 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to non-represented QC data for multiple analytes. See the table in Appendix 2 for a listing of all affected sample results.

REFERENCES

HNF-20433, Rev. 0, *Data Validation Procedure for Chemical Analyses*, June 2004.

DOE/RL-2007-18, Rev. 1, *Sampling and Analysis Plan for the 200-BP-5 Groundwater Operable Unit Remedial Investigation/Feasibility Study, Appendix A.*

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** ─ The constituent was analyzed for and was not detected. The data should be considered usable for decision-making purposes.

- **UJ** ─ The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the MDL. The data should be considered usable for decision-making purposes.

- **J** ─ Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **UR** ─ Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** ─ Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Volatile Organics Data Qualification Summary			
SDG: WSCF20080683	Reviewer: AQA	Project: 200 TW 1 & 2	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
cis-1,3-Dichloropropene trans-1,3-Dichloropropene 4-Methyl-2-pentanone 2-Hexanone Acetone Carbon disulfide Bromodichloromethane 2-Butanone 1-Butanol	UJ	B1TNP8	Non-represented MS/MSD and LCS data

Comments: None

Appendix 3

Annotated Laboratory Reports

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F08-070
Sample # W08GR00837
Client ID: B1TNP8 TRENT WSCF

Matrix: SOIL

Group #: WSCF20080683
Department: Organic
Sampled: 04/01/08
Received: 04/01/08

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
VOA Ground Water Protection											
1,1-Dichloroethene	75-35-4	LA-523-455	U	< 1.00	ug/kg			1.00	1.0		04/09/08
Trichloroethene	79-01-6	LA-523-455	U	< 1.00	ug/kg			1.00	1.0		04/09/08
Benzene	71-43-2	LA-523-455	U	< 1.00	ug/kg			1.00	1.0		04/09/08
Toluene	108-88-3	LA-523-455	U	< 1.00	ug/kg			1.00	1.0		04/09/08
Chlorobenzene	108-90-7	LA-523-455	U	< 1.00	ug/kg			1.00	1.0		04/09/08
1,1-Dichloroethane	75-34-3	LA-523-455	U	< 1.00	ug/kg			1.00	1.0		04/09/08
Ethylbenzene	100-41-4	LA-523-455	U	< 1.00	ug/kg			1.00	1.0		04/09/08
Styrene	100-42-5	LA-523-455	U	< 1.00	ug/kg			1.00	1.0		04/09/08
cis-1,3-Dichloropropene	10061-01-5	LA-523-455	U	< 1.00	ug/kg	UJ		1.00	1.0		04/09/08
trans-1,3-Dichloropropene	10061-02-6	LA-523-455	U	< 1.00	ug/kg	UJ		1.00	1.0		04/09/08
1,2-Dichloroethane	107-06-2	LA-523-455	U	< 1.00	ug/kg			1.00	1.0		04/09/08
4-Methyl-2-Pentanone	108-10-1	LA-523-455	U	< 1.00	ug/kg	UJ		1.00	1.0		04/09/08
Dibromochloromethane	124-48-1	LA-523-455	U	< 1.00	ug/kg			1.00	1.0		04/09/08
Tetrachloroethene	127-18-4	LA-523-455	U	< 1.00	ug/kg			1.00	1.0		04/09/08
Xylenes (total)	1330-20-7	LA-523-455	U	< 1.00	ug/kg			1.00	1.0		04/09/08
1,2-Dichloroethene(Total)	540-59-0	LA-523-455	U	< 1.00	ug/kg			1.00	1.0		04/09/08
Carbon tetrachloride	56-23-5	LA-523-455	U	< 1.00	ug/kg			1.00	1.0		04/09/08
2-Hexanone	591-78-6	LA-523-455	U	< 1.00	ug/kg	UJ		1.00	1.0		04/09/08
Acetone	67-64-1	LA-523-455	U	< 1.00	ug/kg	UJ		1.00	1.0		04/09/08
Chloroform	67-66-3	LA-523-455	U	< 1.00	ug/kg			1.00	1.0		04/09/08
1,1,1-Trichloroethane	71-55-6	LA-523-455	U	< 1.00	ug/kg			1.00	1.0		04/09/08
Bromomethane	74-83-9	LA-523-455	U	< 1.00	ug/kg			1.00	1.0		04/09/08
Chloromethane	74-87-3	LA-523-455	U	< 1.00	ug/kg	LS		1.00	1.0		04/09/08
Chloroethane	75-00-3	LA-523-455	U	< 1.00	ug/kg	6-14-2010		1.00	1.0		04/09/08

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

B - The analyte < the RDL but > = the IDL/MDL (inorg)
E - Analyte is an estimate, has potentially larger errors(inorg)
N - Spike sample recovery is outside control limits.(inorg)
U - Analyzed for but not detected above limiting criteria.(org)

D - Analyte was identified at a secondary dilution factor(inorg)
J - Analyte < lowest calibration but > = MDL.(org)
U - Analyzed for but not detected above limiting criteria(inorg)

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

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F08-070
Sample # W08GR00837
Client ID: B1TNP8 TRENT WSCF

Matrix: SOIL

Group #: WSCF20080683
Department: Organic
Sampled: 04/01/08
Received: 04/01/08

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
Vinyl chloride	75-01-4	LA-523-455	U	< 1.00	ug/kg			1.00	1.0		04/09/08
Methylenechloride	75-09-2	LA-523-455	U	< 1.00	ug/kg			1.00	1.0		04/09/08
Carbon disulfide	75-15-0	LA-523-455	U	< 1.00	ug/kg	UJ		1.00	1.0		04/09/08
Bromoform	75-25-2	LA-523-455	U	< 1.00	ug/kg			1.00	1.0		04/09/08
Bromodichloromethane	75-27-4	LA-523-455	U	< 1.00	ug/kg	UJ		1.00	1.0		04/09/08
1,2-Dichloropropane	78-87-5	LA-523-455	U	< 1.00	ug/kg			1.00	1.0		04/09/08
2-Butanone	78-93-3	LA-523-455	U	< 1.00	ug/kg	UJ		1.00	1.0		04/09/08
1,1,2-Trichloroethane	79-00-5	LA-523-455	U	< 1.00	ug/kg			1.00	1.0		04/09/08
1,1,2,2-Tetrachloroethane	79-34-5	LA-523-455	U	< 1.00	ug/kg			1.00	1.0		04/09/08
1-Butanol	71-36-3	LA-523-455	U	< 100	ug/kg	UJ		1.00	1.0e+02		04/09/08
Trichloromonofluoromethane	75-69-4	LA-523-455	U	< 1.00	ug/kg			1.00	1.0		04/09/08
trans-1,2-Dichloroethylene	156-60-5	LA-523-455	U	< 1.00	ug/kg			1.00	1.0		04/09/08
cis-1,2-Dichloroethylene	156-59-2	LA-523-455	U	< 1.00	ug/kg			1.00	1.0		04/09/08

LS
6-14-2010

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

B - The analyte < the RDL but > = the IDL/MDL (inorg)
E - Analyte is an estimate, has potentially larger errors(inorg)
N - Spike sample recovery is outside control limits.(inorg)
U - Analyzed for but not detected above limiting criteria.(org)

D - Analyte was identified at a secondary dilution factor(inorg)
J - Analyte < lowest calibration but > = MDL.(org)
U - Analyzed for but not detected above limiting criteria(inorg)

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

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Attachment 2
Narrative
WSCF20080683

Introduction

Three S&GRP samples were received at the WSCF Laboratory on April 1, 2008. Two of the 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. Analysis of the high concentration VOA sample and the associated Methanol Blank (B1TNP9) were not required.

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. Additionally, a copy of the sample record sheet is 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 13, for a complete listing of approved analytical methods.

Inorganic Comments

Ammonia – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group per GRP Letter of Instruction. See page 19 for QC details. Analytical Note(s):

- Duplicate, Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1TN41 (SDG# 20080591, SAF# F08-070).
- Sample result was D flagged (dilution).
- Matrix Spike and Matrix Spike Duplicate recoveries were less than established laboratory limits. Sample result was N flagged.

All other QC controls are within the established limits.

Anions – Holding 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 20 through 21 for QC details. Analytical Note(s):

- Duplicate, Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1TN41 (SDG# 20080591, SAF# F08-070).
- 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.

Cyanide – The hold time requirement for this analysis was met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group per GRP Letter of Instruction. See page 22 for QC details. Analytical Note(s):

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 23 through 24 for QC details. Analytical Note(s):

- Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1TN41 (SDG# 20080591, SAF# F08-070).
- Lithium - Due to possible Calcium interface, the spectrum was manually checked and calculated. Sample result was E flagged (estimate).
- Aluminum, Iron and Sodium sample results exceeded spiking levels by a factor of 4. Spike recoveries are not valid. Check and high standards were analyzed to ensure sample result linearity because the sample results were greater than the calibration standard.
- No Lithium present in LCS.

All other QC controls are within the established limits.

ICP-MS Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group per the GRP Letter of Instruction. See pages 25 through 28 for QC details. Analytical Note(s):

- Barium and Manganese – Spike recoveries biased low. Sample results were N flagged.
- Antimony, Lead and Thallium – Laboratory Control Sample recoveries were less than established limits. Lead result was E flagged.

All other QC controls are within the established limits.

Organic Comments

All organic results corrected for moisture and reported on a dry weight basis.

Alcohol/Glycols - The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group per GRP Letter of Instruction. See page 35 for QC details. Analytical Note(s):

- Duplicate, Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1TNP6 (SDG# 20080639, SAF# F08-070).

All QC controls are within the established limits.

Semi-VOA – 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 GPP Letter of Instruction. See pages 36 through 41 for QC details. Analytical Note(s):

- Sample results that were less than the lowest calibration standard, however greater than the method detection limit were J flagged.

All QC controls are within the established limits.

TPHD-WA – 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 page 42 for QC details. Analytical Note(s):

- Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1TFC0 (SDG# 20080715, SAF# F08-066).

All QC controls are within the established limits.

VOA – The holding time requirement for this analysis was met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample, were analyzed with this delivery group per the GRP Letter of Instruction. See pages 43 through 45 for QC details. Analytical Note(s):

- Analysis of the high concentration VOA sample and the associated Methanol Blank (B1TNP9) were not required.

All QC controls are within the established limits.

Rad Chem – There are no hold times associated with WSCF's radiochemical methods. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 49 through 54 for QC details. Analytical Note(s):

- Strontium-85 (tracer) – Blank recovery exceeded established laboratory limits due to low sample activities. No flag issued.

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.

for William H. Baird
Scot L. Fitzgerald
WSCF Analytical Laboratory Manager

for
John E. Trechter
WSCF Client Services

Fluor Hanford Inc. 05/15/08 | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | F08-070-025 | PAGE 1 OF 2

COLLECTOR NCO SAMPLER Kevin Fitzgerald Fluor Hanford	**COMPANY CONTACT** TRENT, STEVE	**TELEPHONE NO.** 373-5869	**PROJECT COORDINATOR** WIDRIG, DL
SAMPLING LOCATION C5857, I-098	**PROJECT DESIGNATION** 200-TW-1 OU Characterization for Well 299-E33-342 - Soil		**SAF NO.** F08-070
ICE CHEST NO.	**FIELD LOGBOOK NO.** HNF-N-488-1 p. 12	**ACTUAL SAMPLE DEPTH** 189.8 - 192.3	**COA** 123163ES20
SHIPPED TO Waste Sampling & Characterization 20080683	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A

PRICE CODE 8N **DATA TURNAROUND** 45 Days / 45 Days

AIR QUALITY ☐

METHOD OF SHIPMENT GOVERNMENT VEHICLE

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

POSSIBLE SAMPLE HAZARDS/ REMARKS
Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR but are not releasable per DOE Order 5400.5 (1990/1993)

SPECIAL HANDLING AND/OR STORAGE
Radioactive Tie To B1TNP7

PRESERVATION			None	Cool~4C	Cool~4C	Cool~4C	Cool~4C	None	
TYPE OF CONTAINER			G/P	G	aG	G	G/P	Square Bottle - Poly	
NO. OF CONTAINER(S)			1	1	1	1	1	1	
VOLUME			250mL	250mL	250mL	125g	500mL	500mL	
SAMPLE ANALYSIS			SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS	SEE ITEM (4) IN SPECIAL INSTRUCTIONS	SEE ITEM (5) IN SPECIAL INSTRUCTIONS	SEE ITEM (6) IN SPECIAL INSTRUCTIONS	
SAMPLE NO.	**MATRIX***	**SAMPLE DATE**	**SAMPLE TIME**						
B1TNR0 W08GRW836	SOIL	APR 0 1 2008	0820	✓	✓	✓	✓	✓	✓
				013268	013268	013268	024875	029078	N/A

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
	APR 0 1 2008 1035	T A Frazier	4/1/08 1035

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS
SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

ICED

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

A-6003-618(01/06)

Fluor Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F08-070-025	PAGE 2 OF 2
COLLECTOR NCO SAMPLER	**COMPANY CONTACT** TRENT, STEVE	**TELEPHONE NO.** 373-5869	**PROJECT COORDINATOR** WIDRIG, DL	**PRICE CODE** 8N	**DATA TURNAROUND**
SAMPLING LOCATION C5857, I-098	**PROJECT DESIGNATION** 200-TW-1 OU Characterization for Well 299-E33-342 - Soil		**SAF NO.** F08-070	**AIR QUALITY** ☐	**45 Days / 45 Days**
ICE CHEST NO.	**FIELD LOGBOOK NO.**	**ACTUAL SAMPLE DEPTH**	**COA** 123163ES20	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	
SHIPPED TO Waste Sampling & Characterization	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

SPECIAL INSTRUCTIONS

** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
(1)ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Cobalt, Manganese, Vanadium, Zinc} ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Selenium, Strontium, Thallium, Uranium} ICP Metals - 6010B (TAL) {Aluminum, Copper, Iron, Nickel, Silver, Sodium} ICP Metals - 6010B (Add-On) {Boron, Lithium} 200.8_HG - ICPMS; Cations (IC) - 300.7 {Nitrogen in ammonium}
(2)Alcohols, Glycols, & Ketones - 8015 {Diethyl ether, Ethylene glycol}
(3)Semi-VOA - 8270B (TCL); Semi-VOA - 8270B (Add-On) {3+4 Methylphenol (cresol, m+p), Tributyl phosphate}
(4)TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - kerosene range}
(5)Cyanide (Total) - 335.2; IC Anions - 300.0 {Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphate, Sulfate}
(6)Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226} Gamma Spec - Add-on {Antimony-125, Radium-228} Isotopic Plutonium; Isotopic Uranium; Neptunium-237; Strontium-89,90 -- Total Sr; Americium-241;

A-6003-618(01/06)

Fluor Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F08-070-023	PAGE 1 OF 2

COLLECTOR	COMPANY CONTACT	TELEPHONE NO.	PROJECT COORDINATOR	PRICE CODE 8N	DATA TURNAROUND
NCO SAMPLER	TRENT, STEVE	373-5869	WIDRIG, DL	AIR QUALITY ☐	45 Days / 45 Days

SAMPLING LOCATION	PROJECT DESIGNATION	SAF NO.
C5857, I-098	200-TW-1 OU Characterization for Well 299-E33-342 - Soil	F08-070

ICE CHEST NO.	FIELD LOGBOOK NO.	ACTUAL SAMPLE DEPTH	COA	METHOD OF SHIPMENT
	HNF N. 488.1 p.12	189.8 - 192.3	123163ES20	GOVERNMENT VEHICLE

SHIPPED TO	OFFSITE PROPERTY NO.	BILL OF LADING/AIR BILL NO.
Waste Sampling & Characterization	N/A	N/A

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

POSSIBLE SAMPLE HAZARDS/ REMARKS
Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR but are not releasable per DOE Order 5400.5 (1990/1993)

SPECIAL HANDLING AND/OR STORAGE
Radioactive Tie To B1TNP7

PRESERVATION	Cool~4C	Cool <-7C and >-20C
TYPE OF CONTAINER	aGs*	aGs*
NO. OF CONTAINER(S)	3	5
VOLUME	40mL	40mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B1TNP8 837	SOIL	APR 0 1 2008	0820	✓	✓

621500 →

CHAIN OF POSSESSION	DATE/TIME	SIGN/ PRINT NAMES	DATE/TIME
RELINQUISHED BY/REMOVED FROM	APR 0 1 2008 1055	RECEIVED BY/STORED IN T A Frazier	4/1/08 1055
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS
SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

ICED

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

A-6003-618(01/06)

Fluor Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F08-070-023	PAGE 2 OF 2
COLLECTOR NCO SAMPLER	**COMPANY CONTACT** TRENT, STEVE	**TELEPHONE NO.** 373-5869	**PROJECT COORDINATOR** WIDRIG, DL	**PRICE CODE** 8N	**DATA TURNAROUND** 45 Days / 45 Days
SAMPLING LOCATION CS857, I-098	**PROJECT DESIGNATION** 200-TW-1 OU Characterization for Well 299-E33-342 - Soil		**SAF NO.** F08-070	**AIR QUALITY** ☐	
ICE CHEST NO.	**FIELD LOGBOOK NO.**	**ACTUAL SAMPLE DEPTH**	**COA** 123163ES20	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	
SHIPPED TO Waste Sampling & Characterization	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

SPECIAL INSTRUCTIONS

** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
** Analytical batch QC must be run on a sample associated with this SAF.
** All VOA samples will be collected using EPA Method 5035A.
** VOA sample bottle sets will include 3 bottles for high level analysis, 5 bottles for low level analysis, and 1 methanol process control sample.
** The laboratory is to use one of the low level VOA bottles for moisture content determination.
** VOA bottles will be labeled with an appended suffix of K, L, M, N, or P for low level and W, X, or Y for high level. These suffixes are for the purpose of providing bottle weights to the laboratories. These suffixes should not be include as part of the sample ID reported in the final data packages.
(1)VOA - 5035/8260 (HIGH LEVEL); VOA - 5035/8260 (HIGH LEVEL) - (Add-On) {1-Butanol, Trichloromonofluoromethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene}
(2)VOA - 5035/8260 (LOW LEVEL); VOA - 5035/8260 (LOW LEVEL) - (Add-On) {1-Butanol, Trichloromonofluoromethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene}

Fluor Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F08-070-024	PAGE 1 OF 1

COLLECTOR	COMPANY CONTACT	TELEPHONE NO.	PROJECT COORDINATOR	PRICE CODE	8N	DATA TURNAROUND
NCO SAMPLER	TRENT, STEVE	373-5869	WIDRIG, DL			
SAMPLING LOCATION	**PROJECT DESIGNATION**		**SAF NO.**	**AIR QUALITY**	☐	45 Days / 45 Days
C5857, I-098	200-TW-1 OU Characterization for Well 299-E33-342 - Soil		F08-070			
ICE CHEST NO.	**FIELD LOGBOOK NO.**	**ACTUAL SAMPLE DEPTH**	**COA**	**METHOD OF SHIPMENT**		
	HNF-N-488-1 pg 12	189.8-192.3	123163ES20	GOVERNMENT VEHICLE		
SHIPPED TO	**OFFSITE PROPERTY NO.**		**BILL OF LADING/AIR BILL NO.**			
Waste Sampling & Characterization	N/A		N/A			

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

POSSIBLE SAMPLE HAZARDS/ REMARKS
Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR but are not releasable per DOE Order 5400.5 (1990/1993)

SPECIAL HANDLING AND/OR STORAGE
Radioactive Tie To B1TNP7

PRESERVATION	Cool~4C
TYPE OF CONTAINER	aGs*
NO. OF CONTAINER(S)	1
VOLUME	40mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B1TNP9 339	SOIL	APR 0 1 2008	0820	✓

621960

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
[signature] APR 0 1 2008	1055	T A Frazier [signature]	4/1/08 1055
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
** Analytical batch QC must be run on a sample associated with this SAF.
** All VOA samples will be collected using EPA Method 5035A.
(1)VOA - 5035/8260 (TCL); VOA - 5035/8260 - (Add-On) {1-Butanol, Trichloromonofluoromethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene}

ICED

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

A-6003-618(01/06)

Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200 TW 1 & 2			DATA PACKAGE: VSR10-020		
VALIDATOR: Carl Schloesslin		LAB: WSCF		DATE: 6-14-2010	
			SDG: WSCF20080683		
ANALYSES PERFORMED					
SW-846 8260 X		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)
SAMPLES/MATRIX Soil sample B1TNP8					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes No N/A

Comments: None

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable? ..... Yes No N/A

Initial calibrations acceptable? ..... Yes No N/A

Continuing calibrations acceptable? ..... Yes No N/A

Standards traceable? ..... Yes No N/A

Standards expired? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments:

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E) ..... Yes No N/A

Calibration blank results acceptable? (Levels D, E) ..... Yes No N/A

Laboratory blanks analyzed? ..... Yes No N/A

Laboratory blank results acceptable? ..... Yes No N/A

Field/trip blanks analyzed? (Levels C, D, E) ..... Yes No N/A

Field/trip blank results acceptable? (Levels C, D, E) ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: None

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed? ..... Yes No N/A

Surrogate/system monitoring compound recoveries acceptable? ..... Yes No N/A

Surrogates traceable? (Levels D, E) ..... Yes No N/A

Surrogates expired? (Levels D, E) ..... Yes No N/A

MS/MSD samples analyzed? ..... Yes No N/A

MS/MSD results acceptable? ..... Yes No N/A

MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A

MS/MSD standards? (Levels D, E) ..... Yes No N/A

LCS/BSS samples analyzed? ..... Yes No N/A

LCS/BSS results acceptable? ..... Yes No N/A

Standards traceable? (Levels D, E) ..... Yes No N/A

Standards expired? (Levels D, E) ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Performance audit sample(s) analyzed? ..... Yes No N/A

Performance audit sample results acceptable? ..... Yes No N/A

Comments:

Five common compounds spiked into LCS, MS & MSD only. Nine target analytes not represented.

GC/MS ORGANIC DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed? ..... Yes No N/A

MS/MSD RPD values acceptable? ..... Yes No N/A

MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A

MS/MSD standards expired? (Levels D, E) ..... Yes No N/A

Field duplicate RPD values acceptable? ..... Yes No N/A

Field split RPD values acceptable? ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: None

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed? ..... Yes No N/A

Iinternal standard areas acceptable? ..... Yes No N/A

Internal standard retention times acceptable? ..... Yes No N/A

Standards traceable? ..... Yes No N/A

Standards expired? ..... Yes No N/A

Transcription/calculation errors? ..... Yes No N/A

Comments:

7. HOLDING TIMES (all levels)

Samples properly preserved? ..... Yes No N/A

Sample holding times acceptable? ..... Yes No N/A

Comments: None

GC/MS ORGANIC DATA VALIDATION CHECKLIST

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E) ..... Yes No N/A

Compound quantitation acceptable? (Levels D, E) ..... Yes No N/A

Results reported for all requested analyses? ..... Yes No N/A

Results supported in the raw data? (Levels D, E) ..... Yes No N/A

Samples properly prepared? (Levels D, E) ..... Yes No N/A

Laboratory properly identified and coded all TIC? (Levels D, E) ..... Yes No N/A

Detection limits meet RDL? ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: None

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed? ..... Yes No N/A

GPC check performed? ..... Yes No N/A

GPC check recoveries acceptable? ..... Yes No N/A

GPC calibration performed? ..... Yes No N/A

GPC calibration check performed? ..... Yes No N/A

GPC calibration check retention times acceptable? ..... Yes No N/A

Check/calibration materials traceable? ..... Yes No N/A

Check/calibration materials Expired? ..... Yes No N/A

Analytical batch QC given similar cleanup? ..... Yes No N/A

Transcription/Calculation Errors? ..... Yes No N/A

Comments:

Appendix 6

Additional Documentation Requested By Client

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Organic

SDG Number: WSCF20080683
Matrix: SOLID
Test: VOA Ground Water Protection

Sample Date: 04/01/08
Receive Date:04/01/08

Lab ID: W08GR00837
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	1,1-Dichloroethene	75-35-4	21.130	82.300	% Recov	63.000	117.000				04/09/08
MS	Benzene	71-43-2	25.400	99.000	% Recov	75.000	129.000				04/09/08
MS	4-Bromofluorobenzene(Surr)	460-00-4	47.630	92.800	% Recov	75.000	125.000				04/09/08
MS	Chlorobenzene	108-90-7	28.180	110.000	% Recov	79.000	119.000				04/09/08
MS	1,2-Dichloroethane-d4(Surr)	17060-07-0	56.750	111.000	% Recov	75.000	125.000				04/09/08
MS	Toluene-d8(Surr)	2037-26-5	50.450	98.300	% Recov	75.000	125.000				04/09/08
MS	Toluene	108-88-3	26.750	104.000	% Recov	76.000	120.000				04/09/08
MS	Trichloroethene	79-01-6	20.620	80.300	% Recov	73.000	123.000				04/09/08
MSD	1,1-Dichloroethene	75-35-4	20.830	87.500	% Recov	63.000	117.000				04/09/08
MSD	Benzene	71-43-2	25.050	105.000	% Recov	75.000	129.000				04/09/08
MSD	4-Bromofluorobenzene(Surr)	460-00-4	43.270	90.900	% Recov	75.000	125.000				04/09/08
MSD	Chlorobenzene	108-90-7	26.890	113.000	% Recov	79.000	119.000				04/09/08
MSD	1,2-Dichloroethane-d4(Surr)	17060-07-0	50.700	107.000	% Recov	75.000	125.000				04/09/08
MSD	Toluene-d8(Surr)	2037-26-5	48.510	102.000	% Recov	75.000	125.000				04/09/08
MSD	Toluene	108-88-3	26.340	111.000	% Recov	76.000	120.000				04/09/08
MSD	Trichloroethene	79-01-6	22.820	95.900	% Recov	73.000	123.000				04/09/08
SPK-RPD	1,1-Dichloroethene	75-35-4	87.500		RPD			6.125	20.000		04/09/08
SPK-RPD	Benzene	71-43-2	105.000		RPD			5.882	20.000		04/09/08
SPK-RPD	4-Bromofluorobenzene(Surr)	460-00-4	90.900		RPD			2.069	20.000		04/09/08
SPK-RPD	Chlorobenzene	108-90-7	113.000		RPD			2.691	20.000		04/09/08
SPK-RPD	1,2-Dichloroethane-d4(Surr)	17060-07-0	107.000		RPD			3.670	20.000		04/09/08
SPK-RPD	Toluene-d8(Surr)	2037-26-5	102.000		RPD			3.694	20.000		04/09/08
SPK-RPD	Toluene	108-88-3	111.000		RPD			6.512	20.000		04/09/08
SPK-RPD	Trichloroethene	79-01-6	95.900		RPD			17.707	20.000		04/09/08
SURR	4-Bromofluorobenzene(Surr)	460-00-4	48.220	93.900	% Recov	75.000	125.000				04/09/08
SURR	1,2-Dichloroethane-d4(Surr)	17060-07-0	56.020	109.000	% Recov	75.000	125.000				04/09/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Organic

SDG Number: WSCF20080683
Matrix: SOLID
Test: VOA Ground Water Protection

Sample Date: 04/01/08
Receive Date:04/01/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
SURR	Toluene-d8(Surr)	2037-26-5	51.160	99.700	% Recov	80.000	126.000				04/09/08
BATCH QC											
BLANK	1,1-Dichloroethane	75-34-3	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	1,1,1-Trichloroethane	71-55-6	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	1,1,2-Trichloroethane	79-00-5	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	1,1,2,2-Tetrachloroethane	79-34-5	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	1,1-Dichloroethene	75-35-4	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	1,2-Dichloroethane	107-06-2	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	1,2-Dichloroethene(Total)	540-59-0	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	1-Butanol	71-36-3	< 100	n/a	ug/Kg					U	04/09/08
BLANK	2-Hexanone	591-78-6	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	4-Methyl-2-Pentanone	108-10-1	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	Acetone	67-64-1	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	Bromodichloromethane	75-27-4	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	Benzene	71-43-2	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	4-Bromofluorobenzene(Surr)	460-00-4	48.200	96.400	% Recov	75.000	125.000				04/09/08
BLANK	Bromoform	75-25-2	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	Carbon disulfide	75-15-0	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	Carbon tetrachloride	56-23-5	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	Dibromochloromethane	124-48-1	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	Chloroform	67-66-3	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	Chlorobenzene	108-90-7	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	cis-1,2-Dichloroethylene	156-59-2	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	cis-1,3-Dichloropropene	10061-01-5	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	Chloroethane	75-00-3	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	1,2-Dichloroethane-d4(Surr)	17060-07-0	51.720	103.000	% Recov	75.000	125.000				04/09/08
BLANK	trans-1,2-Dichloroethylene	156-60-5	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	1,2-Dichloropropane	78-87-5	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	Ethylbenzene	100-41-4	< 1.0	n/a	ug/Kg					U	04/09/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Organic

SDG Number: WSCF20080683
Matrix: SOLID
Test: VOA Ground Water Protection

Sample Date:
Receive Date:

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
BLANK	Bromomethane	74-83-9	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	Chloromethane	74-87-3	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	2-Butanone	78-93-3	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	Methylenechloride	75-09-2	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	Tetrachloroethene	127-18-4	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	Styrene	100-42-5	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	Xylenes (total)	1330-20-7	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	Toluene-d8(Surr)	2037-26-5	48.980	98.000	% Recov	80.000	126.000				04/09/08
BLANK	Toluene	108-88-3	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	trans-1,3-Dichloropropene	10061-02-6	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	Trichloromonofluoromethane	75-69-4	< 1.0	n/a	ug/Kg	0.000	5.000			U	04/09/08
BLANK	Trichloroethene	79-01-6	< 1.0	n/a	ug/Kg					U	04/09/08
BLANK	Vinyl chloride	75-01-4	< 1.0	n/a	ug/Kg					U	04/09/08
LCS	1,1-Dichloroethene	75-35-4	23.480	93.900	% Recov	75.000	125.000				04/09/08
LCS	Benzene	71-43-2	25.290	101.000	% Recov	75.000	125.000				04/09/08
LCS	4-Bromofluorobenzene(Surr)	460-00-4	46.910	93.800	% Recov	75.000	125.000				04/09/08
LCS	Chlorobenzene	108-90-7	27.020	108.000	% Recov	75.000	125.000				04/09/08
LCS	1,2-Dichloroethane-d4(Surr)	17060-07-0	52.980	106.000	% Recov	75.000	125.000				04/09/08
LCS	Toluene-d8(Surr)	2037-26-5	48.750	97.500	% Recov	80.000	126.000				04/09/08
LCS	Toluene	108-88-3	26.170	105.000	% Recov	75.000	125.000				04/09/08
LCS	Trichloroethene	79-01-6	21.500	86.000	% Recov	75.000	125.000				04/09/08

Date: 14 June 2010
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: 200 TW 1 & 2
Subject: Semivolatile Organics - Sample Data Group (SDG) WSCF20080683

INTRODUCTION

This memorandum presents the results of data validation for SDG WSCF20080683 prepared by WSCF. The sample validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B1TNR0	4/01/2008	Soil	C	See note 1

1 - Semivolatile organics by 8270C, TPH diesel range by WTPH-D, and alcohols/glycols by 8015

Data validation was conducted in accordance with the CHPRC validation statement of work and the Sampling and Analysis Plan for the 200-BP-5 Groundwater Operable Unit Remedial Investigation/Feasibility Study, Appendix A, DOE/RL-2007-18, Rev. 1 (SAP). Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested By Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for semivolatile organics and WTPH-D are extraction within 14 days of sample collection and analysis within 40 days of sample extraction. The holding time requirement for alcohols/glycols is analysis within 14 days from sample collection. Sample preservation requires chilling to 4 degrees Celsius.

The sample was extracted and analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for analysis.

Field Blanks

No field blanks were submitted for analysis.

Equipment Blanks

No equipment blanks were submitted for analysis.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the laboratory control sample accuracy limits are 50% to 150% at a minimum, and the statistical ones established by the analytical laboratory if more stringent. The matrix spike sample accuracy limits are the ones specified by the DV procedure. The limits for reported analytes not listed in the SAP are specified by the DV procedure.

Surrogates

All surrogate recoveries were acceptable.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exception. Only eleven 8270C MS/MSD analytes were reported, and tributyl phosphate was not represented in the MS/MSD. The tributyl phosphate result for sample B1TNR0 was a non-detect and should be qualified as an estimate and flagged "UJ."

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exception. Only eleven 8270C LCS analytes were reported, and tributyl phosphate was not represented in the LCS. The tributyl phosphate result for sample B1TNR0 was a non-detect and should be qualified as an estimate and flagged "UJ."

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ±30%. The RPD limits for reported analytes not listed in the SAP are specified by the DV procedure. When duplicate RPDs exceed the limits and have associated results <5X the required detection limits with differences <2X the required detection limits no precision infraction occurred.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Field Duplicate Samples

No field duplicates were submitted for analysis.

Field Split Samples

No field splits were submitted for analysis.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

All reported sample MDLs were below the CRDLs.

- **Completeness**

SDG WSCF20080683 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

A minor deficiency leading to qualification of the tributyl phosphate result for sample B1TNR0 as an estimate was due to non-represented QC data.

REFERENCES

HNF-20433, Rev. 0, *Data Validation Procedure for Chemical Analyses*, June 2004.

DOE/RL-2007-18, Rev. 1, *Sampling and Analysis Plan for the 200-BP-5 Groundwater Operable Unit Remedial Investigation/Feasibility Study, Appendix A.*

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for and was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the MDL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Semivolatile Organics Data Qualification Summary			
SDG: WSCF20080683	Reviewer: AQA	Project: 200 TW 1 & 2	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Tributyl phosphate	UJ	B1TNR0	Non-represented MS/MSD and LCS data

Comments: None

Appendix 3

Annotated Laboratory Reports

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F08-070
Sample # W08GR00836
Client ID: B1TNR0 TRENT WSCF

Matrix: SOIL

Group #: WSCF20080683
Department: Organic
Sampled: 04/01/08
Received: 04/01/08

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
Alcohols, Glycols - 8015 Prep											**04/08/08**
Alcohols, Glycols - 8015											
Diethyl ether	60-29-7	Organics	U	< 5.00e+03	ug/kg			1.00	5.0e+03		04/09/08
Ethylene glycol	107-21-1	Organics	U	< 5.00e+03	ug/kg			1.00	5.0e+03		04/09/08
NWTPH-D TPH Diesel Range (Wa) Prep											**04/14/08**
NWTPH-D TPH Diesel Range (Wa)											
Total Pet. Hydrocarbons Diesel	TPHDIESEL	LA-523-493	U	< 3.10e+03	ug/kg			1.00	3.1e+03		04/16/08
Kerosene	TPHKEROSENE	LA-523-493	U	< 3.10e+03	ug/kg			1.00	3.1e+03		04/16/08
SW-846 8270C Semi-Vols Prep											**04/14/08**
SW-846 8270C Semi-Vols											
4-Nitrophenol	100-02-7	LA-523-456	U	< 210	ug/kg			1.00	2.1e+02		04/16/08
1,4-Dichlorobenzene	106-46-7	LA-523-456	U	< 250	ug/kg			1.00	2.5e+02		04/16/08
Phenol	108-95-2	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
1,2,4-Trichlorobenzene	120-82-1	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
2,4-Dinitrotoluene	121-14-2	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
Pyrene	129-00-0	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
4-Chloro-3-methylphenol	59-50-7	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
N-Nitrosodi-n-dipropylamine	621-64-7	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
Acenaphthene	83-32-9	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
Pentachlorophenol	87-86-5	LA-523-456	U	< 210	ug/kg			1.00	2.1e+02		04/16/08
2-Chlorophenol	95-57-8	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
4-Nitroaniline	100-01-6	LA-523-456	U	< 210	ug/kg			1.00	2.1e+02		04/16/08
4-Bromophenylphenyl ether	101-55-3	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
2,4-Dimethylphenol	105-67-9	LA-523-456	U	< 230	ug/kg			1.00	2.3e+02		04/16/08
4-Chloroaniline	106-47-8	LA-523-456	U	< 310	ug/kg			1.00	3.1e+02		04/16/08

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

B - The analyte < the RDL but > = the IDL/MDL (inorg)
E - Analyte is an estimate, has potentially larger errors(inorg)
N - Spike sample recovery is outside control limits.(inorg)
U - Analyzed for but not detected above limiting criteria.(org)

D - Analyte was identified at a secondary dilution factor(inorg)
J - Analyte < lowest calibration but > = MDL.(org)
U - Analyzed for but not detected above limiting criteria(inorg)

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

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F08-070
Sample # W08GR00836
Client ID: B1TNR0 TRENT WSCF

Matrix: SOIL

Group #: WSCF20080683
Department: Organic
Sampled: 04/01/08
Received: 04/01/08

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
Bis(2-chloro-1-methylethyl)eth	108-60-1	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
Bis(2-chloroethyl) ether	111-44-4	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
Bis(2-Chloroethoxy)methane	111-91-1	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
Bis(2-ethylhexyl) phthalate	117-81-7	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
Di-n-octylphthalate	117-84-0	LA-523-456	U	< 210	ug/kg			1.00	2.1e+02		04/16/08
Hexachlorobenzene	118-74-1	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
Anthracene	120-12-7	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
2,4-Dichlorophenol	120-83-2	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
Dimethyl phthalate	131-11-3	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
Dibenzofuran	132-64-9	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
Benzo(ghi)perylene	191-24-2	LA-523-456	U	< 230	ug/kg			1.00	2.3e+02		04/16/08
Indeno(1,2,3-cd)pyrene	193-39-5	LA-523-456	U	< 250	ug/kg			1.00	2.5e+02		04/16/08
Benzo(b)fluoranthene	205-99-2	LA-523-456	U	< 180	ug/kg			1.00	1.8e+02		04/16/08
Fluoranthene	206-44-0	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
Benzo(k)fluoranthene	207-08-9	LA-523-456	U	< 180	ug/kg			1.00	1.8e+02		04/16/08
Acenaphthylene	208-96-8	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
Chrysene	218-01-9	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
Benzo(a)pyrene	50-32-8	LA-523-456	U	< 210	ug/kg			1.00	2.1e+02		04/16/08
2,4-Dinitrophenol	51-28-5	LA-523-456	U	< 630	ug/kg			1.00	6.3e+02		04/16/08
Dibenz[a,h]anthracene	53-70-3	LA-523-456	U	< 270	ug/kg			1.00	2.7e+02		04/16/08
4,6-Dinitro-2-methylphenol	534-52-1	LA-523-456	U	< 230	ug/kg			1.00	2.3e+02		04/16/08
1,3-Dichlorobenzene	541-73-1	LA-523-456	U	< 270	ug/kg			1.00	2.7e+02		04/16/08
Benzo(a)anthracene	56-55-3	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
2,6-Dinitrotoluene	606-20-2	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
4-Chlorophenylphenyl ether	7005-72-3	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08

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

B - The analyte < the RDL but > = the IDL/MDL (inorg)
E - Analyte is an estimate, has potentially larger errors(inorg)
N - Spike sample recovery is outside control limits.(inorg)
U - Analyzed for but not detected above limiting criteria.(org)

D - Analyte was identified at a secondary dilution factor(inorg)
J - Analyte < lowest calibration but > = MDL.(org)
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* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F08-070
Sample # W08GR00836
Client ID: B1TNR0 TRENT WSCF

Matrix: SOIL

Group #: WSCF20080683
Department: Organic
Sampled: 04/01/08
Received: 04/01/08

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
Hexachlorocyclopentadiene	77-47-4	LA-523-456	U	< 170	ug/kg			1.00	1.7e+02		04/16/08
Isophorone	78-59-1	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
Diethylphthalate	84-66-2	LA-523-456	U	< 220	ug/kg			1.00	2.2e+02		04/16/08
Di-n-butylphthalate	84-74-2	LA-523-456	J	170	ug/kg			1.00	1.5e+02		04/16/08
Phenanthrene	85-01-8	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
Butylbenzylphthalate	85-68-7	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
N-Nitrosodiphenylamine	86-30-6	LA-523-456	U	< 170	ug/kg			1.00	1.7e+02		04/16/08
Fluorene	86-73-7	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
Carbazole	86-74-8	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
Hexachlorobutadiene	87-68-3	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
2-Nitroaniline	88-74-4	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
2-Nitrophenol	88-75-5	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
Naphthalene	91-20-3	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
2-Methylnaphthalene	91-57-6	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
2-Chloronaphthalene	91-58-7	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
3,3'-Dichlorobenzidine	91-94-1	LA-523-456	U	< 270	ug/kg			1.00	2.7e+02		04/16/08
2-Methylphenol (cresol, o-)	95-48-7	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
1,2-Dichlorobenzene	95-50-1	LA-523-456	U	< 250	ug/kg			1.00	2.5e+02		04/16/08
2,4,5-Trichlorophenol	95-95-4	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
Nitrobenzene	98-95-3	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
3-Nitroaniline	99-09-2	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
3 & 4 Methylphenol Total	65794-96-9	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
Hexachloroethane	67-72-1	LA-523-456	U	< 240	ug/kg			1.00	2.4e+02		04/16/08
2,4,6-Trichlorophenol	88-06-2	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		04/16/08
Tributyl phosphate	126-73-8	LA-523-456	U	< 150	ug/kg	UJ	LS 6-14-2010	1.00	1.5e+02		04/16/08

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

B - The analyte < the RDL but >= the IDL/MDL (inorg)
E - Analyte is an estimate, has potentially larger errors(inorg)
N - Spike sample recovery is outside control limits.(inorg)
U - Analyzed for but not detected above limiting criteria.(org)
D - Analyte was identified at a secondary dilution factor(inorg)
J - Analyte < lowest calibration but >= MDL.(org)
U - Analyzed for but not detected above limiting criteria(inorg)

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

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Attachment 2
Narrative
WSCF20080683

Introduction

Three S&GRP samples were received at the WSCF Laboratory on April 1, 2008. Two of the 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. Analysis of the high concentration VOA sample and the associated Methanol Blank (B1TNP9) were not required.

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. Additionally, a copy of the sample record sheet is 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 13, for a complete listing of approved analytical methods.

Inorganic Comments

Ammonia – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group per GRP Letter of Instruction. See page 19 for QC details. Analytical Note(s):

- Duplicate, Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1TN41 (SDG# 20080591, SAF# F08-070).
- Sample result was D flagged (dilution).
- Matrix Spike and Matrix Spike Duplicate recoveries were less than established laboratory limits. Sample result was N flagged.

All other QC controls are within the established limits.

Anions – Holding 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 20 through 21 for QC details. Analytical Note(s):

- Duplicate, Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1TN41 (SDG# 20080591, SAF# F08-070).

- 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.

Cyanide – The hold time requirement for this analysis was met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group per GRP Letter of Instruction. See page 22 for QC details. Analytical Note(s):

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 23 through 24 for QC details. Analytical Note(s):

- Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1TN41 (SDG# 20080591, SAF# F08-070).

- Lithium - Due to possible Calcium interface, the spectrum was manually checked and calculated. Sample result was E flagged (estimate).

- Aluminum, Iron and Sodium sample results exceeded spiking levels by a factor of 4. Spike recoveries are not valid. Check and high standards were analyzed to ensure sample result linearity because the sample results were greater than the calibration standard.

- No Lithium present in LCS.

All other QC controls are within the established limits.

ICP-MS Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group per the GRP Letter of Instruction. See pages 25 through 28 for QC details. Analytical Note(s):

- Barium and Manganese – Spike recoveries biased low. Sample results were N flagged.

- Antimony, Lead and Thallium – Laboratory Control Sample recoveries were less than established limits. Lead result was E flagged.

All other QC controls are within the established limits.

Organic Comments

All organic results corrected for moisture and reported on a dry weight basis.

Alcohol/Glycols - The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group per GRP Letter of Instruction. See page 35 for QC details. Analytical Note(s):

- Duplicate, Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1TNP6 (SDG# 20080639, SAF# F08-070).

All QC controls are within the established limits.

Semi-VOA – 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 GPP Letter of Instruction. See pages 36 through 41 for QC details. Analytical Note(s):

- Sample results that were less than the lowest calibration standard, however greater than the method detection limit were J flagged.

All QC controls are within the established limits.

TPHD-WA – 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 page 42 for QC details. Analytical Note(s):

- Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1TFC0 (SDG# 20080715, SAF# F08-066).

All QC controls are within the established limits.

VOA – The holding time requirement for this analysis was met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample, were analyzed with this delivery group per the GRP Letter of Instruction. See pages 43 through 45 for QC details. Analytical Note(s):

- Analysis of the high concentration VOA sample and the associated Methanol Blank (B1TNP9) were not required.

All QC controls are within the established limits.

Rad Chem – There are no hold times associated with WSCF's radiochemical methods. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 49 through 54 for QC details. Analytical Note(s):

- Strontium-85 (tracer) – Blank recovery exceeded established laboratory limits due to low sample activities. No flag issued.

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.

for William H. Baird
Scot L. Fitzgerald
WSCF Analytical Laboratory Manager

for
John E. Trechter
WSCF Client Services

Fluor Hanford Inc. 05/15/08 | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | F08-070-025 | PAGE 1 OF 2

COLLECTOR NCO SAMPLER Kevin Fitzgerald Fluor Hanford	**COMPANY CONTACT** TRENT, STEVE	**TELEPHONE NO.** 373-5869	**PROJECT COORDINATOR** WIDRIG, DL
SAMPLING LOCATION C5857, I-098	**PROJECT DESIGNATION** 200-TW-1 OU Characterization for Well 299-E33-342 - Soil		**SAF NO.** F08-070
ICE CHEST NO.	**FIELD LOGBOOK NO.** HNF-N-488-1 p. 12	**ACTUAL SAMPLE DEPTH** 189.8 - 192.3	**COA** 123163ES20
SHIPPED TO Waste Sampling & Characterization 20080683	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A

PRICE CODE 8N **DATA TURNAROUND** 45 Days / 45 Days

AIR QUALITY ☐

METHOD OF SHIPMENT GOVERNMENT VEHICLE

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

POSSIBLE SAMPLE HAZARDS/ REMARKS
Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR but are not releasable per DOE Order 5400.5 (1990/1993)

SPECIAL HANDLING AND/OR STORAGE
Radioactive Tie To B1TNP7

PRESERVATION			None	Cool~4C	Cool~4C	Cool~4C	Cool~4C	None			
TYPE OF CONTAINER			G/P	G	aG	G	G/P	Square Bottle - Poly			
NO. OF CONTAINER(S)			1	1	1	1	1	1			
VOLUME			250mL	250mL	250mL	125g	500mL	500mL			
SAMPLE ANALYSIS			SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS	SEE ITEM (4) IN SPECIAL INSTRUCTIONS	SEE ITEM (5) IN SPECIAL INSTRUCTIONS	SEE ITEM (6) IN SPECIAL INSTRUCTIONS			
SAMPLE NO.	**MATRIX***	**SAMPLE DATE**	**SAMPLE TIME**								
B1TNR0 W08GRW836	SOIL	APR 0 1 2008	0820	✓	✓	✓	✓	✓	✓		
				013268	013268	013268	024875	029078	N/A		

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
	APR 0 1 2008 1035	T A Frazier	4/1/08 1035

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS
SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

ICED

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

A-6003-618(01/06)

Fluor Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F08-070-025	PAGE 2 OF 2
COLLECTOR NCO SAMPLER	**COMPANY CONTACT** TRENT, STEVE	**TELEPHONE NO.** 373-5869	**PROJECT COORDINATOR** WIDRIG, DL	**PRICE CODE** 8N **AIR QUALITY** ☐	**DATA TURNAROUND** 45 Days / 45 Days
SAMPLING LOCATION C5857, I-098	**PROJECT DESIGNATION** 200-TW-1 OU Characterization for Well 299-E33-342 - Soil		**SAF NO.** F08-070		
ICE CHEST NO.	**FIELD LOGBOOK NO.**	**ACTUAL SAMPLE DEPTH**	**COA** 123163ES20	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	
SHIPPED TO Waste Sampling & Characterization	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

SPECIAL INSTRUCTIONS

** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
(1)ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Cobalt, Manganese, Vanadium, Zinc} ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Selenium, Strontium, Thallium, Uranium} ICP Metals - 6010B (TAL) {Aluminum, Copper, Iron, Nickel, Silver, Sodium} ICP Metals - 6010B (Add-On) {Boron, Lithium} 200.8_HG - ICPMS; Cations (IC) - 300.7 {Nitrogen in ammonium}
(2)Alcohols, Glycols, & Ketones - 8015 {Diethyl ether, Ethylene glycol}
(3)Semi-VOA - 8270B (TCL); Semi-VOA - 8270B (Add-On) {3+4 Methylphenol (cresol, m+p), Tributyl phosphate}
(4)TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - kerosene range}
(5)Cyanide (Total) - 335.2; IC Anions - 300.0 {Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphate, Sulfate}
(6)Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226} Gamma Spec - Add-on {Antimony-125, Radium-228} Isotopic Plutonium; Isotopic Uranium; Neptunium-237; Strontium-89,90 -- Total Sr; Americium-241;

A-6003-618(01/06)

Fluor Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F08-070-023	PAGE 1 OF 2
COLLECTOR NCO SAMPLER	COMPANY CONTACT TRENT, STEVE	TELEPHONE NO. 373-5869	PROJECT COORDINATOR WIDRIG, DL	PRICE CODE 8N	DATA TURNAROUND
SAMPLING LOCATION C5857, I-098	PROJECT DESIGNATION 200-TW-1 OU Characterization for Well 299-E33-342 - Soil		SAF NO. F08-070	AIR QUALITY ☐	45 Days / 45 Days
ICE CHEST NO.	FIELD LOGBOOK NO. HNF N. 488.1 p 12	ACTUAL SAMPLE DEPTH 189.8 - 192.3	COA 123163ES20	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO Waste Sampling & Characterization	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

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

POSSIBLE SAMPLE HAZARDS/ REMARKS
Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR but are not releasable per DOE Order 5400.5 (1990/1993)

SPECIAL HANDLING AND/OR STORAGE
Radioactive Tie To B1TNP7

PRESERVATION	Cool~4C	Cool <-7C and >-20C
TYPE OF CONTAINER	aGs*	aGs*
NO. OF CONTAINER(S)	3	5
VOLUME	40mL	40mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B1TNP8 837	SOIL	APR 01 2008	0820	✓	✓

621500 →

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM	DATE/TIME APR 01 2008 1055	RECEIVED BY/STORED IN T A Frazier	DATE/TIME 4/1/08 1055
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS
SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

ICED

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

A-6003-618(01/06)

Fluor Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F08-070-023	PAGE 2 OF 2
COLLECTOR NCO SAMPLER	**COMPANY CONTACT** TRENT, STEVE	**TELEPHONE NO.** 373-5869	**PROJECT COORDINATOR** WIDRIG, DL	**PRICE CODE** 8N	**DATA TURNAROUND** 45 Days / 45 Days
SAMPLING LOCATION CS857, I-098	**PROJECT DESIGNATION** 200-TW-1 OU Characterization for Well 299-E33-342 - Soil		**SAF NO.** F08-070	**AIR QUALITY** ☐	
ICE CHEST NO.	**FIELD LOGBOOK NO.**	**ACTUAL SAMPLE DEPTH**	**COA** 123163ES20	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	
SHIPPED TO Waste Sampling & Characterization	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

SPECIAL INSTRUCTIONS

** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
** Analytical batch QC must be run on a sample associated with this SAF.
** All VOA samples will be collected using EPA Method 5035A.
** VOA sample bottle sets will include 3 bottles for high level analysis, 5 bottles for low level analysis, and 1 methanol process control sample.
** The laboratory is to use one of the low level VOA bottles for moisture content determination.
** VOA bottles will be labeled with an appended suffix of K, L, M, N, or P for low level and W, X, or Y for high level. These suffixes are for the purpose of providing bottle weights to the laboratories. These suffixes should not be include as part of the sample ID reported in the final data packages.
(1)VOA - 5035/8260 (HIGH LEVEL); VOA - 5035/8260 (HIGH LEVEL) - (Add-On) {1-Butanol, Trichloromonofluoromethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene}
(2)VOA - 5035/8260 (LOW LEVEL); VOA - 5035/8260 (LOW LEVEL) - (Add-On) {1-Butanol, Trichloromonofluoromethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene}

Fluor Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F08-070-024	PAGE 1 OF 1

COLLECTOR	COMPANY CONTACT	TELEPHONE NO.	PROJECT COORDINATOR	PRICE CODE	8N	DATA TURNAROUND
NCO SAMPLER	TRENT, STEVE	373-5869	WIDRIG, DL			
SAMPLING LOCATION	**PROJECT DESIGNATION**		**SAF NO.**	**AIR QUALITY**	☐	45 Days / 45 Days
C5857, I-098	200-TW-1 OU Characterization for Well 299-E33-342 - Soil		F08-070			
ICE CHEST NO.	**FIELD LOGBOOK NO.**	**ACTUAL SAMPLE DEPTH**	**COA**	**METHOD OF SHIPMENT**		
	HNF-N-488-1 pg 12	189.8-192.3	123163ES20	GOVERNMENT VEHICLE		
SHIPPED TO	**OFFSITE PROPERTY NO.**		**BILL OF LADING/AIR BILL NO.**			
Waste Sampling & Characterization	N/A		N/A			

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

POSSIBLE SAMPLE HAZARDS/ REMARKS
Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR but are not releasable per DOE Order 5400.5 (1990/1993)

SPECIAL HANDLING AND/OR STORAGE
Radioactive Tie To B1TNP7

PRESERVATION	Cool~4C
TYPE OF CONTAINER	aGs*
NO. OF CONTAINER(S)	1
VOLUME	40mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B1TNP9 339	SOIL	APR 0 1 2008	0820	✓

621960

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
[signature] APR 0 1 2008	1055	T A Frazier [signature]	4/1/08 1055
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
** Analytical batch QC must be run on a sample associated with this SAF.
** All VOA samples will be collected using EPA Method 5035A.
(1)VOA - 5035/8260 (TCL); VOA - 5035/8260 - (Add-On) {1-Butanol, Trichloromonofluoromethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene}

ICED

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

A-6003-618(01/06)

Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200 TW 1 & 2			DATA PACKAGE: VSR10-020		
VALIDATOR: Carl Schloesslin		LAB: WSCF		DATE: 6-14-2010	
			SDG: WSCF20080683		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270 X		SW-846 8270 (TCLP)
SAMPLES/MATRIX Soil sample B1TNR0					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes (No) N/A

Comments: None

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable? ..... Yes No (N/A)

Initial calibrations acceptable? ..... Yes No (N/A)

Continuing calibrations acceptable? ..... Yes No (N/A)

Standards traceable? ..... Yes No (N/A)

Standards expired? ..... Yes No (N/A)

Calculation check acceptable? ..... Yes No (N/A)

Comments:

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E) ..... Yes No N/A

Calibration blank results acceptable? (Levels D, E) ..... Yes No N/A

Laboratory blanks analyzed? ..... Yes No N/A

Laboratory blank results acceptable? ..... Yes No N/A

Field/trip blanks analyzed? (Levels C, D, E) ..... Yes No N/A

Field/trip blank results acceptable? (Levels C, D, E) ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: None

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed? ..... Yes No N/A

Surrogate/system monitoring compound recoveries acceptable? ..... Yes No N/A

Surrogates traceable? (Levels D, E) ..... Yes No N/A

Surrogates expired? (Levels D, E) ..... Yes No N/A

MS/MSD samples analyzed? ..... Yes No N/A

MS/MSD results acceptable? ..... Yes No N/A

MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A

MS/MSD standards? (Levels D, E) ..... Yes No N/A

LCS/BSS samples analyzed? ..... Yes No N/A

LCS/BSS results acceptable? ..... Yes No N/A

Standards traceable? (Levels D, E) ..... Yes No N/A

Standards expired? (Levels D, E) ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Performance audit sample(s) analyzed? ..... Yes No N/A

Performance audit sample results acceptable? ..... Yes No N/A

Comments:

Eleven common compounds spiked into LCS, MS & MSD only. Tributyl phosphate not represented.

GC/MS ORGANIC DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed? ..... Yes No N/A

MS/MSD RPD values acceptable? ..... Yes No N/A

MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A

MS/MSD standards expired? (Levels D, E) ..... Yes No N/A

Field duplicate RPD values acceptable? ..... Yes No N/A

Field split RPD values acceptable? ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: None

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed? ..... Yes No N/A

Iinternal standard areas acceptable? ..... Yes No N/A

Internal standard retention times acceptable? ..... Yes No N/A

Standards traceable? ..... Yes No N/A

Standards expired? ..... Yes No N/A

Transcription/calculation errors? ..... Yes No N/A

Comments:

7. HOLDING TIMES (all levels)

Samples properly preserved? ..... Yes No N/A

Sample holding times acceptable? ..... Yes No N/A

Comments: None

GC/MS ORGANIC DATA VALIDATION CHECKLIST

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E) ..... Yes No N/A

Compound quantitation acceptable? (Levels D, E) ..... Yes No N/A

Results reported for all requested analyses? ..... Yes No N/A

Results supported in the raw data? (Levels D, E) ..... Yes No N/A

Samples properly prepared? (Levels D, E) ..... Yes No N/A

Laboratory properly identified and coded all TIC? (Levels D, E) ..... Yes No N/A

Detection limits meet RDL? ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: None

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed? ..... Yes No N/A

GPC check performed? ..... Yes No N/A

GPC check recoveries acceptable? ..... Yes No N/A

GPC calibration performed? ..... Yes No N/A

GPC calibration check performed? ..... Yes No N/A

GPC calibration check retention times acceptable? ..... Yes No N/A

Check/calibration materials traceable? ..... Yes No N/A

Check/calibration materials Expired? ..... Yes No N/A

Analytical batch QC given similar cleanup? ..... Yes No N/A

Transcription/Calculation Errors? ..... Yes No N/A

Comments:

GENERAL ORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200 TW 1 & 2			DATA PACKAGE: VSR10-020		
VALIDATOR: Carl Schloesslin		LAB: WSCF		DATE: 6-14-2010	
			SDG: WSCF20080683		
ANALYSES PERFORMED					
8015 X	8021	8141	8151	8315	8310
		WTPH-HCID	WTPH-G	WTPH-D X	
SAMPLES/MATRIX: Soil sample B1TNR0					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes (No) N/A

Comments: None

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

Initial calibrations acceptable? ..... Yes No (N/A)

Continuing calibrations acceptable? ..... Yes No (N/A)

Standards traceable? ..... Yes No (N/A)

Standards expired? ..... Yes No (N/A)

Calculation check acceptable? ..... Yes No (N/A)

Comments:

GENERAL ORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E) ..... Yes No N/A

Calibration blank results acceptable? (Levels D, E) ..... Yes No N/A

Laboratory blanks analyzed? ..... Yes No N/A

Laboratory blank results acceptable? ..... Yes No N/A

Field/trip blanks analyzed? (Levels C, D, E) ..... Yes No N/A

Field/trip blank results acceptable? (Levels C, D, E) ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: None

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed? ..... Yes No N/A

Surrogate/system monitoring compound recoveries acceptable? ..... Yes No N/A

Surrogates traceable? (Levels D, E) ..... Yes No N/A

Surrogates expired? (Levels D, E) ..... Yes No N/A

MS/MSD samples analyzed? ..... Yes No N/A

MS/MSD results acceptable? ..... Yes No N/A

MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A

MS/MSD standards expired? (Levels D, E) ..... Yes No N/A

LCS/BSS samples analyzed? ..... Yes No N/A

LCS/BSS results acceptable? ..... Yes No N/A

Standards traceable? (Levels D, E) ..... Yes No N/A

Standards expired? (Levels D, E) ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Performance audit sample(s) analyzed? ..... Yes No N/A

Performance audit sample results acceptable? ..... Yes No N/A

Comments: None

GENERAL ORGANIC ANALYSIS DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable? ..... Yes No N/A

Duplicate results acceptable? ..... Yes No N/A

MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A

MS/MSD standards expired? (Levels D, E) ..... Yes No N/A

Field duplicate RPD values acceptable? ..... Yes No N/A

Field split RPD values acceptable? ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: None

6. HOLDING TIMES (all levels)

Samples properly preserved? ..... Yes No N/A

Sample holding times acceptable? ..... Yes No N/A

Comments: None

GENERAL ORGANIC ANALYSIS DATA VALIDATION CHECKLIST

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Results reported for all requested analyses? ..... Yes No N/A

Rresults supported in the raw data? (Levels D, E) ..... Yes No N/A

Samples properly prepared? (Levels D, E) ..... Yes No N/A

Detection limits meet RDL? ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: None

9. SAMPLE CLEANUP (Levels D and E)

Fluoricil ® (or other aborbant) cleanup performed? ..... Yes No N/A

Lot check performed? ..... Yes No N/A

Check recoveries aceptable? ..... Yes No N/A

Check materials traceable? ..... Yes No N/A

Check materials Expired? ..... Yes No N/A

Analytical batch QC given similar cleanup? ..... Yes No N/A

Transcription/Calculation Errors? ..... Yes No N/A

Comments:

Appendix 6

Additional Documentation Requested By Client

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Organic

SDG Number: WSCF20080683
Matrix: SOLID
Test: Alcohols, Glycols - 8015

Sample Date: 03/27/08
Receive Date:03/27/08

Lab ID: W08GR00752

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	2-Bromoethanol	540-51-2	17300		RPD			1.719	25.000		04/09/08
DUP	Diethyl ether	60-29-7	<5000		RPD			n/a	25.000	U	04/09/08
DUP	Ethylene glycol	107-21-1	<5000		RPD			n/a	25.000	U	04/09/08
MS	2-Bromoethanol	540-51-2	16700	94.886	% Recov	70.000	125.000				04/09/08
MS	Diethyl ether	60-29-7	7000	98.592	% Recov	75.000	125.000				04/09/08
MS	Ethylene glycol	107-21-1	8800	80.000	% Recov	75.000	125.000				04/09/08
MSD	2-Bromoethanol	540-51-2	17300	98.295	% Recov	70.000	125.000				04/09/08
MSD	Diethyl ether	60-29-7	6500	91.549	% Recov	75.000	125.000				04/09/08
MSD	Ethylene glycol	107-21-1	10000	90.909	% Recov	75.000	125.000				04/09/08
SPK-RPD	2-Bromoethanol	540-51-2	98.295		RPD			3.529	20.000		04/09/08
SPK-RPD	Diethyl ether	60-29-7	91.549		RPD			7.408	20.000		04/09/08
SPK-RPD	Ethylene glycol	107-21-1	90.909		RPD			12.766	20.000		04/09/08

BATCH QC

BLANK	2-Bromoethanol	540-51-2	18300	103.977	% Recov	75.000	125.000				04/09/08
BLANK	Diethyl ether	60-29-7	<5000	n/a	ug/Kg	0.000	10.000			U	04/09/08
BLANK	Ethylene glycol	107-21-1	<5000	n/a	ug/Kg	0.000	5.000			U	04/09/08
LCS	2-Bromoethanol	540-51-2	17600	100.000	% Recov	70.000	130.000				04/09/08
LCS	Diethyl ether	60-29-7	6800	95.775	% Recov	70.000	130.000				04/09/08
LCS	Ethylene glycol	107-21-1	8400	76.364	% Recov	70.000	130.000				04/09/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Organic

SDG Number: WSCF20080683
Matrix: SOLID
Test: SW-846 8270C Semi-Vols

Sample Date: 04/01/08
Receive Date:04/01/08

Lab ID: W08GR00836
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	1,2,4-Trichlorobenzene	120-82-1	4158.4	99.700	% Recov	75.000	121.000				04/16/08
MS	1,4-Dichlorobenzene	106-46-7	4128.6	98.900	% Recov	68.000	121.000				04/16/08
MS	2,4-Dinitrotoluene	121-14-2	3682.8	88.300	% Recov	66.000	113.000				04/16/08
MS	2-Fluorophenol(Surr)	367-12-4	4417.8	106.000	% Recov	72.000	120.000				04/16/08
MS	Acenaphthene	83-32-9	4055.9	97.200	% Recov	69.000	125.000				04/16/08
MS	4-Chloro-3-methylphenol	59-50-7	6136.3	98.000	% Recov	68.000	116.000				04/16/08
MS	2-Chlorophenol	95-57-8	6281.0	100.000	% Recov	65.000	124.000				04/16/08
MS	N-Nitrosodi-n-dipropylamine	621-64-7	4328.0	104.000	% Recov	69.000	127.000				04/16/08
MS	2-Fluorobiphenyl(Surr)	321-60-8	4446.8	107.000	% Recov	66.000	122.000				04/16/08
MS	Phenol	108-95-2	6353.6	102.000	% Recov	71.000	122.000				04/16/08
MS	Nitrobenzene-d5(Surr)	4165-60-0	4346.6	104.000	% Recov	63.000	125.000				04/16/08
MS	4-Nitrophenol	100-02-7	5404.0	86.300	% Recov	55.000	113.000				04/16/08
MS	Pentachlorophenol	87-86-5	5980.6	95.500	% Recov	50.000	113.000				04/16/08
MS	Phenol-d5(Surr)	4165-62-2	4376.2	105.000	% Recov	66.000	124.000				04/16/08
MS	Pyrene	129-00-0	4275.5	102.000	% Recov	67.000	125.000				04/16/08
MS	2,4,6-Tribromophenol(Surr)	118-79-6	4148.3	99.400	% Recov	49.000	120.000				04/16/08
MS	Terphenyl-d14(Surr)	98904-43-9	4433.4	106.000	% Recov	58.000	128.000				04/16/08
MSD	1,2,4-Trichlorobenzene	120-82-1	4318.0	103.000	% Recov	75.000	121.000				04/16/08
MSD	1,4-Dichlorobenzene	106-46-7	4248.8	102.000	% Recov	68.000	121.000				04/16/08
MSD	2,4-Dinitrotoluene	121-14-2	3734.5	89.400	% Recov	66.000	113.000				04/16/08
MSD	2-Fluorophenol(Surr)	367-12-4	4196.6	100.000	% Recov	72.000	120.000				04/16/08
MSD	Acenaphthene	83-32-9	4165.4	99.700	% Recov	69.000	125.000				04/16/08
MSD	4-Chloro-3-methylphenol	59-50-7	6400.3	102.000	% Recov	68.000	116.000				04/16/08
MSD	2-Chlorophenol	95-57-8	6295.5	100.000	% Recov	65.000	124.000				04/16/08
MSD	N-Nitrosodi-n-dipropylamine	621-64-7	4304.5	103.000	% Recov	69.000	127.000				04/16/08
MSD	2-Fluorobiphenyl(Surr)	321-60-8	4166.2	99.700	% Recov	66.000	122.000				04/16/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Organic

SDG Number: WSCF20080683
Matrix: SOLID
Test: SW-846 8270C Semi-Vols

Sample Date: 04/01/08
Receive Date:04/01/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
MSD	Phenol	108-95-2	6431.0	103.000	% Recov	71.000	122.000				04/16/08
MSD	Nitrobenzene-d5(Surr)	4165-60-0	4080.4	97.700	% Recov	63.000	125.000				04/16/08
MSD	4-Nitrophenol	100-02-7	5418.2	86.500	% Recov	55.000	113.000				04/16/08
MSD	Pentachlorophenol	87-86-5	6235.9	99.500	% Recov	50.000	113.000				04/16/08
MSD	Phenol-d5(Surr)	4165-62-2	4155.4	99.500	% Recov	66.000	124.000				04/16/08
MSD	Pyrene	129-00-0	4514.9	108.000	% Recov	67.000	125.000				04/16/08
MSD	2,4,6-Tribromophenol(Surr)	118-79-6	3971.3	95.100	% Recov	49.000	120.000				04/16/08
MSD	Terphenyl-d14(Surr)	98904-43-9	4441.6	106.000	% Recov	58.000	128.000				04/16/08
SPK-RPD	1,2,4-Trichlorobenzene	120-82-1	103.000		RPD			3.256	20.000		04/16/08
SPK-RPD	1,4-Dichlorobenzene	106-46-7	102.000		RPD			3.086	20.000		04/16/08
SPK-RPD	2,4-Dinitrotoluene	121-14-2	89.400		RPD			1.238	20.000		04/16/08
SPK-RPD	2-Fluorophenol(Surr)	367-12-4	100.000		RPD			5.825	20.000		04/16/08
SPK-RPD	Acenaphthene	83-32-9	99.700		RPD			2.539	20.000		04/16/08
SPK-RPD	4-Chloro-3-methylphenol	59-50-7	102.000		RPD			4.000	20.000		04/16/08
SPK-RPD	2-Chlorophenol	95-57-8	100.000		RPD			0.000	20.000		04/16/08
SPK-RPD	N-Nitrosodi-n-dipropylamine	621-64-7	103.000		RPD			0.966	20.000		04/16/08
SPK-RPD	2-Fluorobiphenyl(Surr)	321-60-8	99.700		RPD			7.063	20.000		04/16/08
SPK-RPD	Phenol	108-95-2	103.000		RPD			0.976	20.000		04/16/08
SPK-RPD	Nitrobenzene-d5(Surr)	4165-60-0	97.700		RPD			6.247	20.000		04/16/08
SPK-RPD	4-Nitrophenol	100-02-7	86.500		RPD			0.231	20.000		04/16/08
SPK-RPD	Pentachlorophenol	87-86-5	99.500		RPD			4.103	20.000		04/16/08
SPK-RPD	Phenol-d5(Surr)	4165-62-2	99.500		RPD			5.379	20.000		04/16/08
SPK-RPD	Pyrene	129-00-0	108.000		RPD			5.714	20.000		04/16/08
SPK-RPD	2,4,6-Tribromophenol(Surr)	118-79-6	95.100		RPD			4.422	20.000		04/16/08
SPK-RPD	Terphenyl-d14(Surr)	98904-43-9	106.000		RPD			0.000	20.000		04/16/08
SURR	2-Fluorophenol(Surr)	367-12-4	4525.9	108.000	% Recov	72.000	120.000				04/16/08
SURR	2-Fluorobiphenyl(Surr)	321-60-8	4430.9	106.000	% Recov	66.000	122.000				04/16/08
SURR	Nitrobenzene-d5(Surr)	4165-60-0	4247.8	102.000	% Recov	63.000	125.000				04/16/08
SURR	Phenol-d5(Surr)	4165-62-2	4586.5	110.000	% Recov	66.000	124.000				04/16/08
SURR	2,4,6-Tribromophenol(Surr)	118-79-6	3786.8	90.600	% Recov	49.000	120.000				04/16/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Organic

SDG Number: WSCF20080683
Matrix: SOLID
Test: SW-846 8270C Semi-Vols

Sample Date: 04/01/08
Receive Date:04/01/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
SURR	Terphenyl-d14(Surr)	98904-43-9	4722.0	113.000	% Recov	58.000	128.000				04/16/08
BATCH QC											
BLANK	1,2-Dichlorobenzene	95-50-1	< 240	n/a	ug/Kg					U	04/16/08
BLANK	1,2,4-Trichlorobenzene	120-82-1	< 140	n/a	ug/Kg					U	04/16/08
BLANK	1,3-Dichlorobenzene	541-73-1	< 260	n/a	ug/Kg					U	04/16/08
BLANK	1,4-Dichlorobenzene	106-46-7	< 240	n/a	ug/Kg					U	04/16/08
BLANK	2,4-Dichlorophenol	120-83-2	< 140	n/a	ug/Kg					U	04/16/08
BLANK	2,4-Dinitrotoluene	121-14-2	< 140	n/a	ug/Kg					U	04/16/08
BLANK	2,4,5-Trichlorophenol	95-95-4	< 140	n/a	ug/Kg					U	04/16/08
BLANK	2,4,6-Trichlorophenol	88-06-2	< 140	n/a	ug/Kg					U	04/16/08
BLANK	2,4-Dimethylphenol	105-67-9	< 220	n/a	ug/Kg					U	04/16/08
BLANK	2,6-Dinitrotoluene	606-20-2	< 140	n/a	ug/Kg					U	04/16/08
BLANK	2-Chloronaphthalene	91-58-7	< 140	n/a	ug/Kg					U	04/16/08
BLANK	2-Fluorophenol(Surr)	367-12-4	3630.6	90.800	% Recov	72.000	120.000				04/16/08
BLANK	2-Methylnaphthalene	91-57-6	< 140	n/a	ug/Kg					U	04/16/08
BLANK	2-Methylphenol (cresol, o-)	95-48-7	< 140	n/a	ug/Kg					U	04/16/08
BLANK	2-Nitroaniline	88-74-4	< 140	n/a	ug/Kg					U	04/16/08
BLANK	2-Nitrophenol	88-75-5	< 140	n/a	ug/Kg					U	04/16/08
BLANK	3 & 4 Methylphenol Total	65794-96-9	< 140	n/a	ug/Kg					U	04/16/08
BLANK	3-Nitroaniline	99-09-2	< 140	n/a	ug/Kg					U	04/16/08
BLANK	4,6-Dinitro-2-methylphenol	534-52-1	< 220	n/a	ug/Kg					U	04/16/08
BLANK	4-Bromophenylphenyl ether	101-55-3	< 140	n/a	ug/Kg					U	04/16/08
BLANK	4-Chlorophenylphenyl ether	7005-72-3	< 140	n/a	ug/Kg					U	04/16/08
BLANK	Acenaphthene	83-32-9	< 140	n/a	ug/Kg					U	04/16/08
BLANK	Acenaphthylene	208-96-8	< 140	n/a	ug/Kg					U	04/16/08
BLANK	Anthracene	120-12-7	< 140	n/a	ug/Kg					U	04/16/08
BLANK	Bis(2-chloroethyl) ether	111-44-4	< 140	n/a	ug/Kg					U	04/16/08
BLANK	Benzo(a)anthracene	56-55-3	< 140	n/a	ug/Kg					U	04/16/08
BLANK	Benzo(b)fluoranthene	205-99-2	< 170	n/a	ug/Kg					U	04/16/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Organic

SDG Number: WSCF20080683
Matrix: SOLID
Test: SW-846 8270C Semi-Vols

Sample Date:
Receive Date:

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
BLANK	Benzo(ghi)perylene	191-24-2	< 220	n/a	ug/Kg					U	04/16/08
BLANK	Benzo(a)pyrene	50-32-8	< 200	n/a	ug/Kg					U	04/16/08
BLANK	Bis(2-Chloroethoxy)methane	111-91-1	< 140	n/a	ug/Kg					U	04/16/08
BLANK	Bis(2-ethylhexyl) phthalate	117-81-7	< 140	n/a	ug/Kg					U	04/16/08
BLANK	Bis(2-chloro-1-methylethyl)eth	108-60-1	< 140	n/a	ug/Kg					U	04/16/08
BLANK	Benzo(k)fluoranthene	207-08-9	< 170	n/a	ug/Kg					U	04/16/08
BLANK	Butylbenzylphthalate	85-68-7	< 140	n/a	ug/Kg					U	04/16/08
BLANK	Carbazole	86-74-8	< 140	n/a	ug/Kg					U	04/16/08
BLANK	4-Chloroaniline	106-47-8	< 300	n/a	ug/Kg					U	04/16/08
BLANK	4-Chloro-3-methylphenol	59-50-7	< 140	n/a	ug/Kg					U	04/16/08
BLANK	2-Chlorophenol	95-57-8	< 140	n/a	ug/Kg					U	04/16/08
BLANK	Chrysene	218-01-9	< 140	n/a	ug/Kg					U	04/16/08
BLANK	3,3'-Dichlorobenzidine	91-94-1	< 260	n/a	ug/Kg					U	04/16/08
BLANK	Dibenz[a,h]anthracene	53-70-3	< 260	n/a	ug/Kg					U	04/16/08
BLANK	Dibenzofuran	132-64-9	< 140	n/a	ug/Kg					U	04/16/08
BLANK	Di-n-butylphthalate	84-74-2	< 140	n/a	ug/Kg					U	04/16/08
BLANK	Diethylphthalate	84-66-2	< 210	n/a	ug/Kg					U	04/16/08
BLANK	Dimethyl phthalate	131-11-3	< 140	n/a	ug/Kg					U	04/16/08
BLANK	2,4-Dinitrophenol	51-28-5	< 600	n/a	ug/Kg					U	04/16/08
BLANK	Di-n-octylphthalate	117-84-0	< 200	n/a	ug/Kg					U	04/16/08
BLANK	N-Nitrosodi-n-dipropylamine	621-64-7	< 140	n/a	ug/Kg					U	04/16/08
BLANK	2-Fluorobiphenyl(Surr)	321-60-8	3790.0	94.800	% Recov	66.000	122.000				04/16/08
BLANK	Fluorene	86-73-7	< 140	n/a	ug/Kg					U	04/16/08
BLANK	Fluoranthene	206-44-0	< 140	n/a	ug/Kg					U	04/16/08
BLANK	Hexachlorobenzene	118-74-1	< 140	n/a	ug/Kg					U	04/16/08
BLANK	Hexachlorobutadiene	87-68-3	< 140	n/a	ug/Kg					U	04/16/08
BLANK	Hexachlorocyclopentadiene	77-47-4	< 160	n/a	ug/Kg					U	04/16/08
BLANK	Hexachloroethane	67-72-1	< 230	n/a	ug/Kg					U	04/16/08
BLANK	Indeno(1,2,3-cd)pyrene	193-39-5	< 240	n/a	ug/Kg					U	04/16/08
BLANK	Isophorone	78-59-1	< 140	n/a	ug/Kg					U	04/16/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Organic

SDG Number: WSCF20080683
Matrix: SOLID
Test: SW-846 8270C Semi-Vols

Sample Date:
Receive Date:

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
BLANK	Phenol	108-95-2	< 140	n/a	ug/Kg					U	04/16/08
BLANK	Naphthalene	91-20-3	< 140	n/a	ug/Kg					U	04/16/08
BLANK	Nitrobenzene-d5(Surr)	4165-60-0	3733.6	93.300	% Recov	63.000	125.000				04/16/08
BLANK	Nitrobenzene	98-95-3	< 140	n/a	ug/Kg					U	04/16/08
BLANK	4-Nitrophenol	100-02-7	< 200	n/a	ug/Kg					U	04/16/08
BLANK	4-Nitroaniline	100-01-6	< 200	n/a	ug/Kg					U	04/16/08
BLANK	N-Nitrosodiphenylamine	86-30-6	< 160	n/a	ug/Kg					U	04/16/08
BLANK	Pentachlorophenol	87-86-5	< 200	n/a	ug/Kg					U	04/16/08
BLANK	Phenanthrene	85-01-8	< 140	n/a	ug/Kg					U	04/16/08
BLANK	Phenol-d5(Surr)	4165-62-2	3729.0	93.200	% Recov	66.000	124.000				04/16/08
BLANK	Pyrene	129-00-0	< 140	n/a	ug/Kg					U	04/16/08
BLANK	Tributyl phosphate	126-73-8	< 140	n/a	ug/Kg					U	04/16/08
BLANK	2,4,6-Tribromophenol(Surr)	118-79-6	3295.7	82.400	% Recov	49.000	120.000				04/16/08
BLANK	Terphenyl-d14(Surr)	98904-43-9	3702.1	92.600	% Recov	58.000	128.000				04/16/08
LCS	1,2,4-Trichlorobenzene	120-82-1	3765.9	94.100	% Recov	76.000	118.000				04/16/08
LCS	1,4-Dichlorobenzene	106-46-7	3731.4	93.300	% Recov	68.000	121.000				04/16/08
LCS	2,4-Dinitrotoluene	121-14-2	3283.3	82.100	% Recov	68.000	112.000				04/16/08
LCS	2-Fluorophenol(Surr)	367-12-4	3571.8	89.300	% Recov	50.000	110.000				04/16/08
LCS	Acenaphthene	83-32-9	3518.0	88.000	% Recov	75.000	121.000				04/16/08
LCS	4-Chloro-3-methylphenol	59-50-7	5328.5	88.800	% Recov	68.000	117.000				04/16/08
LCS	2-Chlorophenol	95-57-8	5385.4	89.800	% Recov	84.000	114.000				04/16/08
LCS	N-Nitrosodi-n-dipropylamine	621-64-7	3746.0	93.700	% Recov	76.000	119.000				04/16/08
LCS	2-Fluorobiphenyl(Surr)	321-60-8	3517.3	87.900	% Recov	58.000	109.000				04/16/08
LCS	Phenol	108-95-2	5464.6	91.100	% Recov	80.000	113.000				04/16/08
LCS	Nitrobenzene-d5(Surr)	4165-60-0	3550.1	88.800	% Recov	60.000	118.000				04/16/08
LCS	4-Nitrophenol	100-02-7	4859.1	81.000	% Recov	42.000	123.000				04/16/08
LCS	Pentachlorophenol	87-86-5	5128.0	85.500	% Recov	55.000	120.000				04/16/08
LCS	Phenol-d5(Surr)	4165-62-2	3502.9	87.600	% Recov	59.000	116.000				04/16/08
LCS	Pyrene	129-00-0	3719.5	93.000	% Recov	67.000	122.000				04/16/08
LCS	2,4,6-Tribromophenol(Surr)	118-79-6	3247.9	81.200	% Recov	60.000	120.000				04/16/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Organic

SDG Number: WSCF20080683
Matrix: SOLID
Test: SW-846 8270C Semi-Vols

Sample Date:
Receive Date:

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
LCS	Terphenyl-d14(Surr)	98904-43-9	3584.1	89.600	% Recov	60.000	120.000				04/16/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Organic

SDG Number: WSCF20080683
Matrix: SOLID
Test: NWTPH-D TPH Diesel Range (Wa)

Sample Date: 04/01/08
Receive Date:04/01/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W08GR00836											
BATCH QC ASSOCIATED WITH SAMPLE											
SURR	ortho-Terphenyl Surr	84-15-1	20082	96.400	% Recov	70.000	130.000				04/16/08
Lab ID: W08GR00913											
BATCH QC ASSOCIATED WITH SAMPLE											
MS	ortho-Terphenyl Surr	84-15-1	22735	105.000	% Recov	70.000	130.000				04/16/08
MS	Total Pet. Hydrocarbons Diesel	TPHDIESEL	121940	113.000	% Recov	75.000	125.000				04/16/08
MSD	ortho-Terphenyl Surr	84-15-1	20881	96.200	% Recov	70.000	130.000				04/16/08
MSD	Total Pet. Hydrocarbons Diesel	TPHDIESEL	114370	105.000	% Recov	75.000	125.000				04/16/08
SPK-RPD	ortho-Terphenyl Surr	84-15-1	96.200		RPD			8.748	20.000		04/16/08
SPK-RPD	Total Pet. Hydrocarbons Diesel	TPHDIESEL	105.000		RPD			7.339	20.000		04/16/08
BATCH QC											
BLANK	Kerosene	TPHKEROSENE	< 3000	n/a	ug/Kg					U	04/16/08
BLANK	ortho-Terphenyl Surr	84-15-1	18403	92.000	% Recov	70.000	130.000				04/16/08
BLANK	Total Pet. Hydrocarbons Diesel	TPHDIESEL	< 3000	n/a	ug/Kg					U	04/16/08
LCS	ortho-Terphenyl Surr	84-15-1	20045	100.000	% Recov	70.000	130.000				04/16/08
LCS	Total Pet. Hydrocarbons Diesel	TPHDIESEL	103430	103.000	% Recov	80.000	120.000				04/16/08

Date: 14 June 2010
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: 200 TW 1 & 2
Subject: Inorganics - Sample Data Group (SDG) WSCF20080683

INTRODUCTION

This memorandum presents the results of data validation for SDG WSCF20080683 prepared by WSCF. The sample validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Method
B1TNR0	4/01/2008	Soil	C	6010 & 200.8

Data validation was conducted in accordance with the CHPRC validation statement of work and the Sampling and Analysis Plan for the 200-BP-5 Groundwater Operable Unit Remedial Investigation/Feasibility Study, Appendix A, DOE/RL-2007-18, Rev. 1 (SAP). Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested By Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirement for ICP metals are analysis within 180 days of sample collection, and the holding time requirement for mercury is analysis within 28 days of sample collection. Sample preservation for all analytes requires chilling to 4 degrees Celsius.

The samples were analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for analysis.

Field Blanks

No field blanks were submitted for analysis.

Equipment Blanks

No equipment blanks were submitted for analysis.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results and laboratory control sample results. According to the SAP, the laboratory control sample accuracy limits are ones specified by the DV procedure. The matrix spike sample accuracy limits are 70% to 130%. The limits for reported analytes not listed in the SAP are specified by the DV procedure.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions. The MSD recoveries for Ba and Mn were < the lower acceptance limit. The Ba and Mn results for sample B1TNR0 were detects and should be qualified as estimates and flagged "J."

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exceptions. The LCS recoveries for Pb, Sb and Tl were < the lower acceptance limits. The Pb result for sample B1TNR0 was a detect and should be qualified as an estimate and flagged "J." The Sb and Tl results for sample B1TNR0 were non-detects and should be qualified as estimates and flagged "UJ." From the laboratory case narrative it seems that Li was not a certified analyte in the LCS reference material. The Li result for sample B1TNR0 was a detect and should be qualified as an estimate and flagged "J" due to lack of LCS data.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ±30%. The RPD limits for reported analytes not listed in the SAP are specified by the DV procedure. When duplicate RPDs exceed

the limits and have associated results <5X the required detection limits with differences <2X the required detection limits no precision infraction occurred.

MS/MSD Samples

All MS/MSD RPD values were acceptable with the following exception. The Mn RPD was > the upper acceptance limit. The Mn result for sample B1TNR0 was a detect and should be qualified as an estimate and flagged "J."

Field Duplicate Samples

No field duplicates were submitted for analysis.

Field Split Samples

No field splits were submitted for analysis.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

All reported sample MDLs with associated non-detected sample results were below the CRDLs with the following exceptions. The Ag and B MDLs for sample B1TNR0 were greater than the CRDLs.

- **Completeness**

SDG WSCF20080683 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Several minor deficiencies leading to qualification of sample results as estimates occurred. See the table in Appendix 2 for a listing of all affected sample results.

REFERENCES

HNF-20433, Rev. 0, *Data Validation Procedure for Chemical Analyses*, June 2004.

DOE/RL-2007-18, Rev. 1, *Sampling and Analysis Plan for the 200-BP-5 Groundwater Operable Unit Remedial Investigation/Feasibility Study, Appendix A.*

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for and was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the MDL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Inorganic Data Qualification Summary			
SDG: WSCF20080683	Reviewer: AQA	Project: 200 TW 1 & 2	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Ba	J	B1TNR0	Low MSD recovery
Mn	J	B1TNR0	Low MSD recovery and poor MS/MSD precision
Pb	J	B1TNR0	Low LCS recovery
Sb & Tl	UJ	B1TNR0	Low LCS recoveries
Li	J	B1TNR0	Lack of LCS data

Comments: None

Appendix 3

Annotated Laboratory Reports

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F08-070
Sample # W08GR00836
Client ID: B1TNR0 TRENT WSCF

Matrix: SOIL

Group #: WSCF20080683
Department: Inorganic
Sampled: 04/01/08
Received: 04/01/08

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
~~**Anions by Ion Chromatography Prep**~~											~~**04/07/08**~~
Anions by Ion Chromatography											
Fluoride	16984-48-8	LA-533-410	DU	< 0.300	mg/kg			50.00	0.30		04/07/08
Chloride	16887-00-6	LA-533-410	BD	3.62	mg/kg			50.00	1.5		04/07/08
Nitrogen in Nitrite	NO2-N	LA-533-410	DU	< 0.500	mg/kg			50.00	0.50		04/07/08
Nitrogen in Nitrate	NO3-N	LA-533-410	D	27.7	mg/kg			50.00	0.25		04/07/08
Phosphate (P) by IC	PO4-P	LA-533-410	BD	< 2.00	mg/kg			50.00	2.0		04/07/08
Sulfate	14808-79-8	LA-533-410	BD	40.4	mg/kg			50.00	3.5		04/07/08
Cyanide											
~~Cyanide~~	~~57-12-5~~	~~LA-695-402~~	~~U~~	~~< 0.200~~	~~mg/kg~~			~~1.00~~	~~0.20~~		~~04/10/08~~
ICP Metals Analysis, Grd H20 P Prep											**04/09/08**
ICP Metals Analysis, Grd H20 P											
Aluminum	7429-90-5	LA-505-411		6.08e+03	mg/kg			99.33	3.0		04/09/08
Iron	7439-89-6	LA-505-411		1.88e+04	mg/kg			99.33	0.89		04/09/08
Nickel	7440-02-0	LA-505-411		13.4	mg/kg			99.33	0.40		04/09/08
Silver	7440-22-4	LA-505-411	U	< 0.497	mg/kg			99.33	0.50		04/09/08
Sodium	7440-23-5	LA-505-411		238	mg/kg			99.33	2.7		04/09/08
Copper	7440-50-8	LA-505-411		14.5	mg/kg			99.33	0.40		04/09/08
Lithium	7439-93-2	LA-505-411	E	6.90	mg/kg	J		99.33	0.40		04/09/08
Boron	7440-42-8	LA-505-411	U	< 0.795	mg/kg			99.33	0.79		04/09/08
ICP-200.8 MS All possible meta Prep											**04/09/08**
ICP-200.8 MS All possible meta											
Manganese	7439-96-5	LA-505-412	N	235	mg/kg	J		1.00	0.0999		04/11/08
Antimony	7440-36-0	LA-505-412	U	< 0.300	mg/kg	UJ	<5	1.00	0.300		04/11/08
Barium	7440-39-3	LA-505-412	N	106	mg/kg	J	6-14-2010	1.00	0.200		04/11/08

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

B - The analyte < the RDL but > = the IDL/MDL (inorg)
E - Analyte is an estimate, has potentially larger errors(inorg)
N - Spike sample recovery is outside control limits.(inorg)
U - Analyzed for but not detected above limiting criteria.(org)
D - Analyte was identified at a secondary dilution factor(inorg)
J - Analyte < lowest calibration but > = MDL.(org)
U - Analyzed for but not detected above limiting criteria(inorg)

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

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F08-070
Sample # W08GR00836
Client ID: B1TNR0 TRENT WSCF

Matrix: SOIL

Group #: WSCF20080683
Department: Inorganic
Sampled: 04/01/08
Received: 04/01/08

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
Beryllium	7440-41-7	LA-505-412		0.220	mg/kg			1.00	0.0500		04/11/08
Cadmium	7440-43-9	LA-505-412	U	< 0.0999	mg/kg			1.00	0.0999		04/11/08
Chromium	7440-47-3	LA-505-412		9.57	mg/kg			1.00	0.500		04/11/08
Cobalt	7440-48-4	LA-505-412		5.98	mg/kg			1.00	0.0500		04/11/08
Vanadium	7440-62-2	LA-505-412		28.9	mg/kg			1.00	0.200		04/11/08
Zinc	7440-66-6	LA-505-412		31.2	mg/kg			1.00	0.799		04/11/08
Lead	7439-92-1	LA-505-412	E	4.45	mg/kg	J		1.00	0.0999		04/11/08
Mercury	7439-97-6	LA-505-412	U	< 0.0500	mg/kg			1.00	0.0500		04/11/08
Uranium	7440-61-1	LA-505-412		0.430	mg/kg			1.00	0.0500		04/11/08
Arsenic	7440-38-2	LA-505-412		4.09	mg/kg			1.00	0.400		04/11/08
Selenium	7782-49-2	LA-505-412	U	< 0.300	mg/kg			1.00	0.300		04/11/08
Thallium	7440-28-0	LA-505-412	U	< 0.0999	mg/kg	UJ	<5 6-14-2010	1.00	0.0999		04/11/08
Strontium	7440-24-6	LA-505-412		31.2	mg/kg			1.00	0.0999		04/11/08
~~Nitrogen in ammonium Prep~~											~~04/07/08~~
Nitrogen in ammonium											
Nitrogen in ammonium	NH4-N	LA-503-401	DNU	< 0.200	~~mg/kg~~			50.00	0.20		04/07/08
Total solids											
~~Total solids~~	~~TS~~	~~LA-513-412~~		~~95.5~~	~~Percent~~			~~1.00~~	~~0.0~~		~~04/14/08~~

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

B - The analyte < the RDL but > = the IDL/MDL (inorg)
E - Analyte is an estimate, has potentially larger errors(inorg)
N - Spike sample recovery is outside control limits.(inorg)
U - Analyzed for but not detected above limiting criteria.(org)

D - Analyte was identified at a secondary dilution factor(inorg)
J - Analyte < lowest calibration but > = MDL.(org)
U - Analyzed for but not detected above limiting criteria(inorg)

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

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Attachment 2
Narrative
WSCF20080683

Introduction

Three S&GRP samples were received at the WSCF Laboratory on April 1, 2008. Two of the 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. Analysis of the high concentration VOA sample and the associated Methanol Blank (B1TNP9) were not required.

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. Additionally, a copy of the sample record sheet is 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 13, for a complete listing of approved analytical methods.

Inorganic Comments

Ammonia – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group per GRP Letter of Instruction. See page 19 for QC details. Analytical Note(s):

- Duplicate, Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1TN41 (SDG# 20080591, SAF# F08-070).
- Sample result was D flagged (dilution).
- Matrix Spike and Matrix Spike Duplicate recoveries were less than established laboratory limits. Sample result was N flagged.

All other QC controls are within the established limits.

Anions – Holding 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 20 through 21 for QC details. Analytical Note(s):

- Duplicate, Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1TN41 (SDG# 20080591, SAF# F08-070).
- 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.

Cyanide – The hold time requirement for this analysis was met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group per GRP Letter of Instruction. See page 22 for QC details. Analytical Note(s):

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 23 through 24 for QC details. Analytical Note(s):

- Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1TN41 (SDG# 20080591, SAF# F08-070).
- Lithium - Due to possible Calcium interface, the spectrum was manually checked and calculated. Sample result was E flagged (estimate).
- Aluminum, Iron and Sodium sample results exceeded spiking levels by a factor of 4. Spike recoveries are not valid. Check and high standards were analyzed to ensure sample result linearity because the sample results were greater than the calibration standard.
- No Lithium present in LCS.

All other QC controls are within the established limits.

ICP-MS Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group per the GRP Letter of Instruction. See pages 25 through 28 for QC details. Analytical Note(s):

- Barium and Manganese – Spike recoveries biased low. Sample results were N flagged.
- Antimony, Lead and Thallium – Laboratory Control Sample recoveries were less than established limits. Lead result was E flagged.

All other QC controls are within the established limits.

Organic Comments

All organic results corrected for moisture and reported on a dry weight basis.

Alcohol/Glycols - The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group per GRP Letter of Instruction. See page 35 for QC details. Analytical Note(s):

- Duplicate, Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1TNP6 (SDG# 20080639, SAF# F08-070).

All QC controls are within the established limits.

Semi-VOA – 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 GPP Letter of Instruction. See pages 36 through 41 for QC details. Analytical Note(s):

- Sample results that were less than the lowest calibration standard, however greater than the method detection limit were J flagged.

All QC controls are within the established limits.

TPHD-WA – 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 page 42 for QC details. Analytical Note(s):

- Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1TFC0 (SDG# 20080715, SAF# F08-066).

All QC controls are within the established limits.

VOA – The holding time requirement for this analysis was met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample, were analyzed with this delivery group per the GRP Letter of Instruction. See pages 43 through 45 for QC details. Analytical Note(s):

- Analysis of the high concentration VOA sample and the associated Methanol Blank (B1TNP9) were not required.

All QC controls are within the established limits.

Rad Chem – There are no hold times associated with WSCF's radiochemical methods. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 49 through 54 for QC details. Analytical Note(s):

- Strontium-85 (tracer) – Blank recovery exceeded established laboratory limits due to low sample activities. No flag issued.

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.

for William H. Baird
Scot L. Fitzgerald
WSCF Analytical Laboratory Manager

for
John E. Trechter
WSCF Client Services

Fluor Hanford Inc. 05/15/08 | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | F08-070-025 | PAGE 1 OF 2

COLLECTOR NCO SAMPLER Kevin Fitzgerald Fluor Hanford	**COMPANY CONTACT** TRENT, STEVE	**TELEPHONE NO.** 373-5869	**PROJECT COORDINATOR** WIDRIG, DL
SAMPLING LOCATION C5857, I-098	**PROJECT DESIGNATION** 200-TW-1 OU Characterization for Well 299-E33-342 - Soil		**SAF NO.** F08-070
ICE CHEST NO.	**FIELD LOGBOOK NO.** HNF-N-488-1 p. 12	**ACTUAL SAMPLE DEPTH** 189.8 - 192.3	**COA** 123163ES20
SHIPPED TO Waste Sampling & Characterization 20080683	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A

PRICE CODE 8N **DATA TURNAROUND** 45 Days / 45 Days

AIR QUALITY ☐

METHOD OF SHIPMENT GOVERNMENT VEHICLE

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

POSSIBLE SAMPLE HAZARDS/ REMARKS
Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR but are not releasable per DOE Order 5400.5 (1990/1993)

SPECIAL HANDLING AND/OR STORAGE
Radioactive Tie To B1TNP7

PRESERVATION	None	Cool~4C	Cool~4C	Cool~4C	Cool~4C	None					
TYPE OF CONTAINER	G/P	G	aG	G	G/P	Square Bottle - Poly					
NO. OF CONTAINER(S)	1	1	1	1	1	1					
VOLUME	250mL	250mL	250mL	125g	500mL	500mL					
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS	SEE ITEM (4) IN SPECIAL INSTRUCTIONS	SEE ITEM (5) IN SPECIAL INSTRUCTIONS	SEE ITEM (6) IN SPECIAL INSTRUCTIONS					

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME										
B1TNR0 W08GRW836	SOIL	APR 0 1 2008	0820	✓	✓	✓	✓	✓	✓				
				013268	013268	013268	024875	029078	N/A				

CHAIN OF POSSESSION | **SIGN/ PRINT NAMES**

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
	APR 0 1 2008 1035	T A Frazier	4/1/08 1035

SPECIAL INSTRUCTIONS
SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

ICED

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

A-6003-618(01/06)

Fluor Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F08-070-025	PAGE 2 OF 2
COLLECTOR NCO SAMPLER	**COMPANY CONTACT** TRENT, STEVE	**TELEPHONE NO.** 373-5869	**PROJECT COORDINATOR** WIDRIG, DL	**PRICE CODE** 8N **AIR QUALITY** ☐	**DATA TURNAROUND** 45 Days / 45 Days
SAMPLING LOCATION C5857, I-098	**PROJECT DESIGNATION** 200-TW-1 OU Characterization for Well 299-E33-342 - Soil		**SAF NO.** F08-070		
ICE CHEST NO.	**FIELD LOGBOOK NO.**	**ACTUAL SAMPLE DEPTH**	**COA** 123163ES20	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	
SHIPPED TO Waste Sampling & Characterization	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

SPECIAL INSTRUCTIONS

** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
(1)ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Cobalt, Manganese, Vanadium, Zinc} ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Selenium, Strontium, Thallium, Uranium} ICP Metals - 6010B (TAL) {Aluminum, Copper, Iron, Nickel, Silver, Sodium} ICP Metals - 6010B (Add-On) {Boron, Lithium} 200.8_HG - ICPMS; Cations (IC) - 300.7 {Nitrogen in ammonium}
(2)Alcohols, Glycols, & Ketones - 8015 {Diethyl ether, Ethylene glycol}
(3)Semi-VOA - 8270B (TCL); Semi-VOA - 8270B (Add-On) {3+4 Methylphenol (cresol, m+p), Tributyl phosphate}
(4)TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - kerosene range}
(5)Cyanide (Total) - 335.2; IC Anions - 300.0 {Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphate, Sulfate}
(6)Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226} Gamma Spec - Add-on {Antimony-125, Radium-228} Isotopic Plutonium; Isotopic Uranium; Neptunium-237; Strontium-89,90 -- Total Sr; Americium-241;

A-6003-618(01/06)

Fluor Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F08-070-023	PAGE 1 OF 2

COLLECTOR	COMPANY CONTACT	TELEPHONE NO.	PROJECT COORDINATOR	PRICE CODE 8N	DATA TURNAROUND
NCO SAMPLER	TRENT, STEVE	373-5869	WIDRIG, DL	AIR QUALITY ☐	45 Days / 45 Days

SAMPLING LOCATION	PROJECT DESIGNATION	SAF NO.
C5857, I-098	200-TW-1 OU Characterization for Well 299-E33-342 - Soil	F08-070

ICE CHEST NO.	FIELD LOGBOOK NO.	ACTUAL SAMPLE DEPTH	COA	METHOD OF SHIPMENT
	HNF N. 488.1 p.12	189.8 - 192.3	123163ES20	GOVERNMENT VEHICLE

SHIPPED TO	OFFSITE PROPERTY NO.	BILL OF LADING/AIR BILL NO.
Waste Sampling & Characterization	N/A	N/A

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

POSSIBLE SAMPLE HAZARDS/ REMARKS
Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR but are not releasable per DOE Order 5400.5 (1990/1993)

SPECIAL HANDLING AND/OR STORAGE
Radioactive Tie To B1TNP7

PRESERVATION	Cool~4C	Cool <-7C and >-20C
TYPE OF CONTAINER	aGs*	aGs*
NO. OF CONTAINER(S)	3	5
VOLUME	40mL	40mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B1TNP8 837	SOIL	APR 0 1 2008	0820	✓	✓

621500 →

CHAIN OF POSSESSION	DATE/TIME	SIGN/ PRINT NAMES	DATE/TIME
RELINQUISHED BY/REMOVED FROM	APR 0 1 2008 1055	RECEIVED BY/STORED IN T A Frazier	4/1/08 1055
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS
SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

ICED

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

A-6003-618(01/06)

Fluor Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F08-070-023	PAGE 2 OF 2
COLLECTOR NCO SAMPLER	**COMPANY CONTACT** TRENT, STEVE	**TELEPHONE NO.** 373-5869	**PROJECT COORDINATOR** WIDRIG, DL	**PRICE CODE** 8N	**DATA TURNAROUND** 45 Days / 45 Days
SAMPLING LOCATION C5857, I-098	**PROJECT DESIGNATION** 200-TW-1 OU Characterization for Well 299-E33-342 - Soil		**SAF NO.** F08-070	**AIR QUALITY** ☐	
ICE CHEST NO.	**FIELD LOGBOOK NO.**	**ACTUAL SAMPLE DEPTH**	**COA** 123163ES20	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	
SHIPPED TO Waste Sampling & Characterization	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

SPECIAL INSTRUCTIONS

** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
** Analytical batch QC must be run on a sample associated with this SAF.
** All VOA samples will be collected using EPA Method 5035A.
** VOA sample bottle sets will include 3 bottles for high level analysis, 5 bottles for low level analysis, and 1 methanol process control sample.
** The laboratory is to use one of the low level VOA bottles for moisture content determination.
** VOA bottles will be labeled with an appended suffix of K, L, M, N, or P for low level and W, X, or Y for high level. These suffixes are for the purpose of providing bottle weights to the laboratories. These suffixes should not be include as part of the sample ID reported in the final data packages.
(1)VOA - 5035/8260 (HIGH LEVEL); VOA - 5035/8260 (HIGH LEVEL) - (Add-On) {1-Butanol, Trichloromonofluoromethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene}
(2)VOA - 5035/8260 (LOW LEVEL); VOA - 5035/8260 (LOW LEVEL) - (Add-On) {1-Butanol, Trichloromonofluoromethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene}

Fluor Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F08-070-024	PAGE 1 OF 1

COLLECTOR	COMPANY CONTACT	TELEPHONE NO.	PROJECT COORDINATOR	PRICE CODE	8N	DATA TURNAROUND
NCO SAMPLER	TRENT, STEVE	373-5869	WIDRIG, DL			
SAMPLING LOCATION	**PROJECT DESIGNATION**		**SAF NO.**	**AIR QUALITY**	☐	45 Days / 45 Days
C5857, I-098	200-TW-1 OU Characterization for Well 299-E33-342 - Soil		F08-070			
ICE CHEST NO.	**FIELD LOGBOOK NO.**	**ACTUAL SAMPLE DEPTH**	**COA**	**METHOD OF SHIPMENT**		
	HNF-N-488-1 pg 12	189.8-192.3	123163ES20	GOVERNMENT VEHICLE		
SHIPPED TO	**OFFSITE PROPERTY NO.**		**BILL OF LADING/AIR BILL NO.**			
Waste Sampling & Characterization	N/A		N/A			

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

POSSIBLE SAMPLE HAZARDS/ REMARKS
Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR but are not releasable per DOE Order 5400.5 (1990/1993)

SPECIAL HANDLING AND/OR STORAGE
Radioactive Tie To B1TNP7

PRESERVATION	Cool~4C
TYPE OF CONTAINER	aGs*
NO. OF CONTAINER(S)	1
VOLUME	40mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B1TNP9 339	SOIL	APR 0 1 2008	0820	✓

621960

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
[signature] APR 0 1 2008	1055	T A Frazier [signature]	4/1/08 1055
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
** Analytical batch QC must be run on a sample associated with this SAF.
** All VOA samples will be collected using EPA Method 5035A.
(1)VOA - 5035/8260 (TCL); VOA - 5035/8260 - (Add-On) {1-Butanol, Trichloromonofluoromethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene}

ICED

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

A-6003-618(01/06)

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

ALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200 TW 1 & 2			DATA PACKAGE: VSR10-020		
VALIDATOR: Carl Schloesslin		LAB: WSCF		DATE: 6-14-2010	
			SDG: WSCF20080683		
ANALYSES PERFORMED					
SW-846/ICP X	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide	EPA 200.8 ICP/MS X	
SAMPLES/MATRIX Soil sample B1TNR0					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes (No) N/A

Comments: None

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations performed on all instruments? ..... Yes No (N/A)

Initial calibrations acceptable? ..... Yes No (N/A)

ICP interference checks acceptable? ..... Yes No (N/A)

ICV and CCV checks performed on all instruments? ..... Yes No (N/A)

ICV and CCV checks acceptable? ..... Yes No (N/A)

Standards traceable? ..... Yes No (N/A)

Standards expired? ..... Yes No (N/A)

Calculation check acceptable? ..... Yes No (N/A)

Comments:

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

ICB and CCB checks performed for all applicable analyses? (Levels D, E) ..... Yes No N/A

ICB and CCB results acceptable? (Levels D, E) ..... Yes No N/A

Laboratory blanks analyzed? ..... Yes No N/A

Laboratory blank results acceptable? ..... Yes No N/A

Field blanks analyzed? (Levels C, D, E) ..... Yes No N/A

Field blank results acceptable? (Levels C, D, E) ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: None

4. ACCURACY (Levels C, D, and E)

MS/MSD samples analyzed? ..... Yes No N/A

MS/MSD results acceptable? ..... Yes No N/A

MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A

MS/MSD standards expired? (Levels D, E) ..... Yes No N/A

LCS/BSS samples analyzed? ..... Yes No N/A

LCS/BSS results acceptable? ..... Yes No N/A

Standards traceable? (Levels D, E) ..... Yes No N/A

Standards expired? (Levels D, E) ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Performance audit sample(s) analyzed? ..... Yes No N/A

Performance audit sample results acceptable? ..... Yes No N/A

Comments:

Ba MSD %R = 68%
Mn MSD %R = 64%
Pb LCS %R = 91%
Sb LCS %R = 68%
Tl LCS %R = 90%
Li not available in LCS

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable? ..... Yes No N/A

Duplicate results acceptable? ..... Yes No N/A

MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A

MS/MSD standards expired? (Levels D, E) ..... Yes No N/A

Field duplicate RPD values acceptable? ..... Yes No N/A

Field split RPD values acceptable? ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments:

Mn MS/MSD RPD = 37%

6. ICP QUALITY CONTROL (Levels D and E)

ICP serial dilution samples analyzed? ..... Yes No N/A

ICP serial dilution %D values acceptable? ..... Yes No N/A

ICP post digestion spike required? ..... Yes No N/A

ICP post digestion spike values acceptable? ..... Yes No N/A

Standards traceable? ..... Yes No N/A

Standards expired? ..... Yes No N/A

Transcription/calculation errors? ..... Yes No N/A

Comments:

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

7. FURNACE AA QUALITY CONTROL (Levels D and E)

Duplicate injections performed as required? ..... Yes No N/A

Duplicate injection %RSD values acceptable? ..... Yes No N/A

Analytical spikes performed as required? ..... Yes No N/A

Analytical spike recoveries acceptable? ..... Yes No N/A

Standards traceable? ..... Yes No N/A

Standards expired? ..... Yes No N/A

MSA performed as required? ..... Yes No N/A

MSA results acceptable? ..... Yes No N/A

Transcription/calculation errors? ..... Yes No N/A

Comments:

8. HOLDING TIMES (all levels)

Samples properly preserved? ..... Yes No N/A

Sample holding times acceptable? ..... Yes No N/A

Comments: None

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

9. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

Results reported for all requested analyses? ..... Yes No N/A

Rresults supported in the raw data? (Levels D, E)..... Yes No N/A

Samples properly prepared? (Levels D, E) ..... Yes No N/A

Detection limits meet RDL? ..... Yes No N/A

Transcription/calculation errors? (Levels D, E)..... Yes No N/A

Comments:

Ag MDL = 0.50 mg/kg, CRDL = 0.2 mg/kg, result non-detect
B MDL = 0.79 mg/kg, CRDL = 0.2 mg/kg, result non-detect

Appendix 6

Additional Documentation Requested By Client

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20080683
Matrix: SOLID
Test: ICP Metals Analysis, Grd H20 P

Sample Date: 03/19/08
Receive Date:03/20/08

Lab ID: W08GR00694
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	188.2	95.533	% Recov	75.000	125.000				04/09/08
MS	Aluminum	7429-90-5	1951	990.355	% Recov	75.000	125.000			*	04/09/08
MS	Boron	7440-42-8	186.9	94.873	% Recov	75.000	125.000				04/09/08
MS	Copper	7440-50-8	198.016	100.516	% Recov	75.000	125.000				04/09/08
MS	Iron	7439-89-6	740	375.635	% Recov	75.000	125.000			*	04/09/08
MS	Lithium	7439-93-2	78.88	80.081	% Recov	70.000	130.000				04/09/08
MS	Sodium	7440-23-5	264	134.010	% Recov	75.000	125.000			*	04/09/08
MS	Nickel	7440-02-0	183.64	93.218	% Recov	75.000	125.000				04/09/08
MSD	Silver	7440-22-4	188.6	94.774	% Recov	75.000	125.000				04/09/08
MSD	Aluminum	7429-90-5	1284	645.226	% Recov	75.000	125.000			*	04/09/08
MSD	Boron	7440-42-8	189.2	95.075	% Recov	75.000	125.000				04/09/08
MSD	Copper	7440-50-8	198.216	99.606	% Recov	75.000	125.000				04/09/08
MSD	Iron	7439-89-6	1450	728.643	% Recov	75.000	125.000			*	04/09/08
MSD	Lithium	7439-93-2	89	89.447	% Recov	75.000	125.000				04/09/08
MSD	Sodium	7440-23-5	242	121.608	% Recov	75.000	125.000				04/09/08
MSD	Nickel	7440-02-0	190.64	95.799	% Recov	75.000	125.000				04/09/08
SPK-RPD	Silver	7440-22-4	94.774		RPD			0.798	20.000		04/09/08
SPK-RPD	Aluminum	7429-90-5	645.226		RPD			42.203	20.000 *		04/09/08
SPK-RPD	Boron	7440-42-8	95.075		RPD			0.213	20.000		04/09/08
SPK-RPD	Copper	7440-50-8	99.606		RPD			0.909	20.000		04/09/08
SPK-RPD	Iron	7439-89-6	728.643		RPD			63.935	20.000 *		04/09/08
SPK-RPD	Lithium	7439-93-2	89.447		RPD			11.050	20.000		04/09/08
SPK-RPD	Sodium	7440-23-5	121.608		RPD			9.704	20.000		04/09/08
SPK-RPD	Nickel	7440-02-0	95.799		RPD			2.731	20.000		04/09/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20080683
Matrix: SOLID
Test: ICP Metals Analysis, Grd H20 P

Sample Date:
Receive Date:

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
BATCH QC											
BLANK	Silver	7440-22-4	<5e-3	n/a	ug/mL					U	04/09/08
BLANK	Aluminum	7429-90-5	<3e-2	n/a	ug/mL					U	04/09/08
BLANK	Boron	7440-42-8	<8e-3	n/a	ug/mL					U	04/09/08
BLANK	Copper	7440-50-8	<4e-3	n/a	ug/mL					U	04/09/08
BLANK	Iron	7439-89-6	<9e-3	n/a	ug/mL					U	04/09/08
BLANK	Lithium	7439-93-2	<4e-3	n/a	ug/mL					U	04/09/08
BLANK	Sodium	7440-23-5	<2.7e-2	n/a	ug/mL					U	04/09/08
BLANK	Nickel	7440-02-0	<4e-3	n/a	ug/mL					U	04/09/08
LCS	Silver	7440-22-4	100.4	99.406	% Recov	45.000	155.000				04/09/08
LCS	Aluminum	7429-90-5	7636	92.446	% Recov	44.000	157.000				04/09/08
LCS	Boron	7440-42-8	110	95.652	% Recov	45.000	156.000				04/09/08
LCS	Copper	7440-50-8	64.65	94.380	% Recov	80.000	120.000				04/09/08
LCS	Iron	7439-89-6	14930	111.418	% Recov	47.000	152.000				04/09/08
LCS	Lithium	7439-93-2	<0.39928	n/a	% Recov	80.000	120.000			U	04/09/08
LCS	Sodium	7440-23-5	513.8	87.381	% Recov	51.000	149.000				04/09/08
LCS	Nickel	7440-02-0	53.95	97.032	% Recov	74.000	121.000				04/09/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20080683
Matrix: SOLID
Test: ICP-200.8 MS All possible meta

Sample Date: 04/01/08
Receive Date:04/01/08

Lab ID: W08GR00836
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	Arsenic	7440-38-2	183.51	91.755	% Recov	70.000	130.000				04/11/08
MS	Barium	7440-39-3	147	73.500	% Recov	70.000	130.000				04/11/08
MS	Beryllium	7440-41-7	178.98	89.490	% Recov	70.000	130.000				04/11/08
MS	Cadmium	7440-43-9	188.3	94.150	% Recov	70.000	130.000				04/11/08
MS	Cobalt	7440-48-4	178.12	89.060	% Recov	70.000	130.000				04/11/08
MS	Chromium	7440-47-3	190.83	95.415	% Recov	70.000	130.000				04/11/08
MS	Mercury	7439-97-6	1.91	95.500	% Recov	70.000	130.000				04/11/08
MS	Manganese	7439-96-5	187.8	93.900	% Recov	70.000	130.000				04/11/08
MS	Lead	7439-92-1	182.75	91.375	% Recov	70.000	130.000				04/11/08
MS	Antimony	7440-36-0	155.7	77.850	% Recov	70.000	130.000				04/11/08
MS	Selenium	7782-49-2	184.4	92.200	% Recov	70.000	130.000				04/11/08
MS	Strontium	7440-24-6	182.99	91.495	% Recov	70.000	130.000				04/11/08
MS	Thallium	7440-28-0	174.8	87.400	% Recov	70.000	130.000				04/11/08
MS	Uranium	7440-61-1	186.57	93.285	% Recov	70.000	130.000				04/11/08
MS	Vanadium	7440-62-2	185.47	92.735	% Recov	70.000	130.000				04/11/08
MS	Zinc	7440-66-6	178.99	89.495	% Recov	70.000	130.000				04/11/08
MSD	Arsenic	7440-38-2	177.81	88.905	% Recov	70.000	130.000				04/11/08
MSD	Barium	7440-39-3	135.4	67.700	% Recov	70.000	130.000		•		04/11/08
MSD	Beryllium	7440-41-7	175.28	87.640	% Recov	70.000	130.000				04/11/08
MSD	Cadmium	7440-43-9	184.2	92.100	% Recov	70.000	130.000				04/11/08
MSD	Cobalt	7440-48-4	172.72	86.360	% Recov	70.000	130.000				04/11/08
MSD	Chromium	7440-47-3	183.23	91.615	% Recov	70.000	130.000				04/11/08
MSD	Mercury	7439-97-6	1.91	95.500	% Recov	70.000	130.000				04/11/08
MSD	Manganese	7439-96-5	128.8	64.400	% Recov	70.000	130.000		•		04/11/08
MSD	Lead	7439-92-1	178.65	89.325	% Recov	70.000	130.000				04/11/08
MSD	Antimony	7440-36-0	159.4	79.700	% Recov	70.000	130.000				04/11/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20080683
Matrix: SOLID
Test: ICP-200.8 MS All possible meta

Sample Date: 04/01/08
Receive Date:04/01/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
MSD	Selenium	7782-49-2	182.3	91.150	% Recov	70.000	130.000				04/11/08
MSD	Strontium	7440-24-6	174.69	87.345	% Recov	70.000	130.000				04/11/08
MSD	Thallium	7440-28-0	171.1	85.550	% Recov	70.000	130.000				04/11/08
MSD	Uranium	7440-61-1	182.27	91.135	% Recov	70.000	130.000				04/11/08
MSD	Vanadium	7440-62-2	174.97	87.485	% Recov	70.000	130.000				04/11/08
MSD	Zinc	7440-66-6	171.99	85.995	% Recov	70.000	130.000				04/11/08
SPK-RPD	Arsenic	7440-38-2	88.905		RPD			3.155	20.000		04/11/08
SPK-RPD	Barium	7440-39-3	67.700		RPD			8.215	20.000		04/11/08
SPK-RPD	Beryllium	7440-41-7	87.640		RPD			2.089	20.000		04/11/08
SPK-RPD	Cadmium	7440-43-9	92.100		RPD			2.201	20.000		04/11/08
SPK-RPD	Cobalt	7440-48-4	86.360		RPD			3.078	20.000		04/11/08
SPK-RPD	Chromium	7440-47-3	91.615		RPD			4.064	20.000		04/11/08
SPK-RPD	Mercury	7439-97-6	95.500		RPD			0.000	20.000		04/11/08
SPK-RPD	Manganese	7439-96-5	64.400		RPD			37.271	20.000 *		04/11/08
SPK-RPD	Lead	7439-92-1	89.325		RPD			2.269	20.000		04/11/08
SPK-RPD	Antimony	7440-36-0	79.700		RPD			2.348	20.000		04/11/08
SPK-RPD	Selenium	7782-49-2	91.150		RPD			1.145	20.000		04/11/08
SPK-RPD	Strontium	7440-24-6	87.345		RPD			4.641	20.000		04/11/08
SPK-RPD	Thallium	7440-28-0	85.550		RPD			2.139	20.000		04/11/08
SPK-RPD	Uranium	7440-61-1	91.135		RPD			2.332	20.000		04/11/08
SPK-RPD	Vanadium	7440-62-2	87.485		RPD			5.826	20.000		04/11/08
SPK-RPD	Zinc	7440-66-6	85.995		RPD			3.989	20.000		04/11/08

Lab ID: W08GR00954
BATCH QC ASSOCIATED WITH SAMPLE

MS	Arsenic	7440-38-2	174.4	87.200	% Recov	70.000	130.000				04/11/08
MS	Barium	7440-39-3	181.28	90.640	% Recov	70.000	130.000				04/11/08
MS	Beryllium	7440-41-7	175.55	87.775	% Recov	70.000	130.000				04/11/08
MS	Cadmium	7440-43-9	183.4	91.700	% Recov	70.000	130.000				04/11/08
MS	Chromium	7440-47-3	184.9	92.450	% Recov	70.000	130.000				04/11/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20080683
Matrix: SOLID
Test: ICP-200.8 MS All possible meta

Sample Date: 03/19/08
Receive Date:04/08/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
MS	Mercury	7439-97-6	1.86	93.000	% Recov	70.000	130.000				04/11/08
MS	Lead	7439-92-1	181.41	90.705	% Recov	70.000	130.000				04/11/08
MS	Selenium	7782-49-2	175.5	87.750	% Recov	70.000	130.000				04/11/08
MS	Zinc	7440-66-6	175.53	87.765	% Recov	70.000	130.000				04/11/08
MSD	Arsenic	7440-38-2	179.2	89.600	% Recov	70.000	130.000				04/11/08
MSD	Barium	7440-39-3	190.08	95.040	% Recov	70.000	130.000				04/11/08
MSD	Beryllium	7440-41-7	178.95	89.475	% Recov	70.000	130.000				04/11/08
MSD	Cadmium	7440-43-9	187.5	93.750	% Recov	70.000	130.000				04/11/08
MSD	Chromium	7440-47-3	187.6	93.800	% Recov	70.000	130.000				04/11/08
MSD	Mercury	7439-97-6	1.98	99.000	% Recov	70.000	130.000				04/11/08
MSD	Lead	7439-92-1	185.11	92.555	% Recov	70.000	130.000				04/11/08
MSD	Selenium	7782-49-2	179	89.500	% Recov	70.000	130.000				04/11/08
MSD	Zinc	7440-66-6	181.23	90.615	% Recov	70.000	130.000				04/11/08
SPK-RPD	Arsenic	7440-38-2	89.600		RPD			2.715	20.000		04/11/08
SPK-RPD	Barium	7440-39-3	95.040		RPD			4.739	20.000		04/11/08
SPK-RPD	Beryllium	7440-41-7	89.475		RPD			1.918	20.000		04/11/08
SPK-RPD	Cadmium	7440-43-9	93.750		RPD			2.211	20.000		04/11/08
SPK-RPD	Chromium	7440-47-3	93.800		RPD			1.450	20.000		04/11/08
SPK-RPD	Mercury	7439-97-6	99.000		RPD			6.250	20.000		04/11/08
SPK-RPD	Lead	7439-92-1	92.555		RPD			2.019	20.000		04/11/08
SPK-RPD	Selenium	7782-49-2	89.500		RPD			1.975	20.000		04/11/08
SPK-RPD	Zinc	7440-66-6	90.615		RPD			3.195	20.000		04/11/08

BATCH QC

BLANK	Arsenic	7440-38-2	<0.4	n/a	ug/L					U	04/11/08
BLANK	Barium	7440-39-3	<0.2	n/a	ug/L					U	04/11/08
BLANK	Beryllium	7440-41-7	<5e-2	n/a	ug/L					U	04/11/08
BLANK	Cadmium	7440-43-9	<0.1	n/a	ug/L					U	04/11/08
BLANK	Cobalt	7440-48-4	<5e-2	n/a	ug/L					U	04/11/08
BLANK	Chromium	7440-47-3	<0.5	n/a	ug/L					U	04/11/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20080683
Matrix: SOLID
Test: ICP-200.8 MS All possible meta

Sample Date:
Receive Date:

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
BLANK	Mercury	7439-97-6	<5e-2	n/a	ug/L					U	04/11/08
BLANK	Manganese	7439-96-5	<0.1	n/a	ug/L					U	04/11/08
BLANK	Lead	7439-92-1	<0.1	n/a	ug/L					U	04/11/08
BLANK	Antimony	7440-36-0	<0.3	n/a	ug/L					U	04/11/08
BLANK	Selenium	7782-49-2	<0.3	n/a	ug/L					U	04/11/08
BLANK	Strontium	7440-24-6	<0.1	n/a	ug/L					U	04/11/08
BLANK	Thallium	7440-28-0	<0.1	n/a	ug/L					U	04/11/08
BLANK	Uranium	7440-61-1	<5e-2	n/a	ug/L					U	04/11/08
BLANK	Vanadium	7440-62-2	<0.2	n/a	ug/L					U	04/11/08
BLANK	Zinc	7440-66-6	<0.8	n/a	ug/L					U	04/11/08
LCS	Arsenic	7440-38-2	127.9	96.894	% Recov	75.000	134.000				04/11/08
LCS	Barium	7440-39-3	286	89.655	% Recov	87.000	121.000				04/11/08
LCS	Beryllium	7440-41-7	80.88	90.369	% Recov	70.000	153.000				04/11/08
LCS	Cadmium	7440-43-9	63.18	95.008	% Recov	95.000	124.000				04/11/08
LCS	Cobalt	7440-48-4	71.31	97.551	% Recov	88.000	119.000				04/11/08
LCS	Chromium	7440-47-3	66.5	91.221	% Recov	77.000	125.000				04/11/08
LCS	Mercury	7439-97-6	7.48	90.338	% Recov	71.000	132.000				04/11/08
LCS	Manganese	7439-96-5	435.3	96.093	% Recov	83.000	118.000				04/11/08
LCS	Lead	7439-92-1	117.9	90.692	% Recov	92.000	123.000		*		04/11/08
LCS	Antimony	7440-36-0	61.26	67.916	% Recov	114.000	260.000		*		04/11/08
LCS	Selenium	7782-49-2	162.8	101.118	% Recov	52.000	157.000				04/11/08
LCS	Strontium	7440-24-6	47.86	87.978	% Recov	68.000	123.000				04/11/08
LCS	Thallium	7440-28-0	119.5	89.850	% Recov	92.000	123.000		*		04/11/08
LCS	Uranium	7440-61-1	368.5	92.125	% Recov	81.000	125.000				04/11/08
LCS	Vanadium	7440-62-2	72.19	86.976	% Recov	81.000	122.000				04/11/08
LCS	Zinc	7440-66-6	183.8	103.842	% Recov	85.000	130.000				04/11/08

Date: 14 June 2010
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: 200 TW 1 & 2
Subject: General Chemistry - Sample Data Groups (SDGs) H3702 and WSCF20080683

INTRODUCTION

This memorandum presents the results of data validation for SDG H3702 prepared by Lionville Laboratory, Inc. and SDG WSCF20080683 prepared by WSCF Analytical Laboratories. The sample validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B1TNR0	4/01/2008	Soil	C	See note 1

1 – 300.0 (chloride, fluoride, nitrate, nitrite, phosphate and sulfate); 300.7 (N in ammonium); 335.2 (total cyanide); and 353.2 (nitrate/nitrite)

Data validation was conducted in accordance with the CHPRC validation statement of work and the Sampling and Analysis Plan for the 200-BP-5 Groundwater Operable Unit Remedial Investigation/Feasibility Study, Appendix A, DOE/RL-2007-18, Rev. 1 (SAP). Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested By Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements are as follows:

- All anions except nitrate, nitrite, and phosphate – analysis within 28 days of sample collection
- Nitrate, nitrite, and phosphate – extraction within 28 days of sample collection and analysis within 48 hours of extraction
- Ammonia – analysis within 28 days of sample collection
- Nitrate/Nitrite – analysis within 28 days of sample collection
- Total cyanide – analysis within 14 days of sample collection

Sample preservation requires chilling to 4 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for analysis.

Field Blanks

No field blanks were submitted for analysis.

Equipment Blanks

No equipment blanks were submitted for analysis.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results and laboratory control sample results. According to the SAP, the laboratory control sample accuracy limits are ones specified by the DV procedure. The matrix spike sample accuracy limits are 70% to 130%. The limits for reported analytes not listed in the SAP are specified by the DV procedure.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions. The MS and MSD recoveries for N in ammonium were < the lower acceptance limit but ≥30%. The N in ammonium result for sample B1TNR0 was a non-detect and should be qualified as an estimate and flagged "UJ."

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, laboratory duplicate sample results, field duplicate sample results, and field split sample results. These QC results provide information on

the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ±30%. The RPD limits for reported analytes not listed in the SAP are specified by the DV procedure. When duplicate RPDs exceed the limits and have associated results <5X the required detection limits with differences <2X the required detection limits no precision infraction occurred.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Laboratory Duplicate Samples

All laboratory duplicate results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for analysis.

Field Split Samples

No field splits were submitted for analysis.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

All reported sample MDLs were below the CRDLs. It should be noted that a CRDL for N in ammonium was not provided in the SAP.

- **Completeness**

SDGs H3702 and WSCF20080683 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

A minor deficiency leading to qualification of the nitrogen in ammonium result for sample B1TNR0 as an estimate was due matrix spike recovery infractions.

REFERENCES

HNF-20433, Rev. 0, *Data Validation Procedure for Chemical Analyses*, June 2004.

DOE/RL-2007-18, Rev. 1, *Sampling and Analysis Plan for the 200-BP-5 Groundwater Operable Unit Remedial Investigation/Feasibility Study, Appendix A.*

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for and was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the MDL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

General Chemistry Data Qualification Summary			
SDGs: H3702 & WSCF20080683	Reviewer: AQA	Project: 200 TW 1 & 2	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
N in ammonium	UJ	B1TNR0	Low MS & MSD recoveries

Comments: None

Appendix 3

Annotated Laboratory Reports

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 04/24/08

CLIENT: TNU-HANFORD F08-070 H3702 LVL LOT #: 0804L938
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B1TNR0	% Solids	95.9	%	0.01	1.0
		Chromium VI	0.21 u	MG/KG	0.21	1.0
		Nitrate Nitrite	22.5	MG/KG	0.49	5.0

Nitrate/Nitrite validated only

LS
6-14-2010

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F08-070
Sample # W08GR00836
Client ID: B1TNR0 TRENT WSCF

Matrix: SOIL

Group #: WSCF20080683
Department: Inorganic
Sampled: 04/01/08
Received: 04/01/08

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
Anions by Ion Chromatography Prep											**04/07/08**
Anions by Ion Chromatography											
Fluoride	16984-48-8	LA-533-410	DU	< 0.300	mg/kg			50.00	0.30		04/07/08
Chloride	16887-00-6	LA-533-410	BD	3.62	mg/kg			50.00	1.5		04/07/08
Nitrogen in Nitrite	NO2-N	LA-533-410	DU	< 0.500	mg/kg			50.00	0.50		04/07/08
Nitrogen in Nitrate	NO3-N	LA-533-410	D	27.7	mg/kg			50.00	0.25		04/07/08
Phosphate (P) by IC	PO4-P	LA-533-410	DU	< 2.00	mg/kg			50.00	2.0		04/07/08
Sulfate	14808-79-8	LA-533-410	BD	40.4	mg/kg			50.00	3.5		04/07/08
Cyanide											
Cyanide	57-12-5	LA-695-402	U	< 0.200	mg/kg			1.00	0.20		04/10/08
~~**ICP Metals Analysis, Grd H20 P Prep**~~											~~**04/09/08**~~
ICP Metals Analysis, Grd H20 P											
Aluminum	7429-90-5	LA-505-411		6.08e+03	mg/kg			99.33	3.0		04/09/08
Iron	7439-89-6	LA-505-411		1.88e+04	mg/kg			99.33	0.89		04/09/08
Nickel	7440-02-0	LA-505-411		13.4	mg/kg			99.33	0.40		04/09/08
Silver	7440-22-4	LA-505-411	U	< 0.497	mg/kg			99.33	0.50		04/09/08
Sodium	7440-23-5	LA-505-411		238	mg/kg			99.33	2.7		04/09/08
Copper	7440-50-8	LA-505-411		14.5	mg/kg			99.33	0.40		04/09/08
Lithium	7439-93-2	LA-505-411	E	6.90	mg/kg			99.33	0.40		04/09/08
Boron	7440-42-8	LA-505-411	U	< 0.795	mg/kg			99.33	0.79		04/09/08
ICP-200.8 MS All possible meta Prep											**04/09/08**
ICP-200.8 MS All possible meta											
Manganese	7439-96-5	LA-505-412	N	235	mg/kg			1.00	0.0999		04/11/08
Antimony	7440-36-0	LA-505-412	U	< 0.300	mg/kg			1.00	0.300		04/11/08
~~Barium~~	~~7440-39-3~~	~~LA-505-412~~	~~N~~	~~196~~	~~mg/kg~~			~~1.00~~	~~0.200~~		~~04/11/08~~

LS
6-14-2010

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

B - The analyte < the RDL but > = the IDL/MDL (inorg)
E - Analyte is an estimate, has potentially larger errors(inorg)
N - Spike sample recovery is outside control limits.(inorg)
U - Analyzed for but not detected above limiting criteria.(org)

D - Analyte was identified at a secondary dilution factor(inorg)
J - Analyte < lowest calibration but > = MDL.(org)
U - Analyzed for but not detected above limiting criteria(inorg)

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

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F08-070
Sample # W08GR00836
Client ID: B1TNR0 TRENT WSCF

Matrix: SOIL

Group #: WSCF20080683
Department: Inorganic
Sampled: 04/01/08
Received: 04/01/08

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
Beryllium	7440-41-7	LA-505-412		0.220	mg/kg			1.00	0.0500		04/11/08
Cadmium	7440-43-9	LA-505-412	U	< 0.0999	mg/kg			1.00	0.0999		04/11/08
Chromium	7440-47-3	LA-505-412		9.57	mg/kg			1.00	0.500		04/11/08
Cobalt	7440-48-4	LA-505-412		5.98	mg/kg			1.00	0.0500		04/11/08
Vanadium	7440-62-2	LA-505-412		28.9	mg/kg			1.00	0.200		04/11/08
Zinc	7440-66-6	LA-505-412		31.2	mg/kg			1.00	0.799		04/11/08
Lead	7439-92-1	LA-505-412	E	4.45	mg/kg			1.00	0.0999		04/11/08
Mercury	7439-97-6	LA-505-412	U	< 0.0500	mg/kg			1.00	0.0500		04/11/08
Uranium	7440-61-1	LA-505-412		0.430	mg/kg			1.00	0.0500		04/11/08
Arsenic	7440-38-2	LA-505-412		4.09	mg/kg			1.00	0.400		04/11/08
Selenium	7782-49-2	LA-505-412	U	< 0.300	mg/kg			1.00	0.300		04/11/08
Thallium	7440-28-0	LA-505-412	U	< 0.0999	mg/kg			1.00	0.0999		04/11/08
Strontium	7440-24-6	LA-505-412		31.2	mg/kg			1.00	0.0999		04/11/08
Nitrogen in ammonium Prep											**04/07/08**
Nitrogen in ammonium											
Nitrogen in ammonium	NH4-N	LA-503-401	DNU	< 0.200	mg/kg	UJ		50.00	0.20		04/07/08
Total solids											
Total solids	TS	LA-519-412		95.5	Percent			1.00	0.0		04/14/08

LS
6-14-2010

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

B - The analyte < the RDL but > = the IDL/MDL (inorg)
E - Analyte is an estimate, has potentially larger errors(inorg)
N - Spike sample recovery is outside control limits.(inorg)
U - Analyzed for but not detected above limiting criteria.(org)

D - Analyte was identified at a secondary dilution factor(inorg)
J - Analyte < lowest calibration but > = MDL.(org)
U - Analyzed for but not detected above limiting criteria(inorg)

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

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD F08-070 H3702
LVL#: 0804L938

W.O.#: 11343-606-001-9999-00
Date Received: 04-17-08

INORGANIC NARRATIVE

1. This narrative covers the analyses of 1 soil sample.

2. The sample was prepared and analyzed in accordance with the methods indicated on the attached glossary.

   LvLI is NELAP accredited by the State of Pennsylvania. For a complete list of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager. LvLI certifies that all test results meet the requirements of NELAC with any exception noted in the following statements.

3. Sample holding times as required by the method and/or contract were met.

4. The results presented in this report are derived from a sample that met LvLI's sample acceptance policy.

5. The method blanks were within the method criteria.

6. The Laboratory Control Samples (LCS) were within the laboratory control limits. The duplicate LCS for Nitrate Nitrite was within the 20% Relative Percent Difference (RPD) control limit.

7. The matrix spike recoveries were within the 75-125% control limits.

8. The replicate analyses were within the 20% RPD control limit.

9. Results for soil samples are reported on a dry weight basis.

10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Judy Storm

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

5/27/08
Date

njp\i04-938

The results presented in this report relate to the analytical testing and conditions of the samples upon receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 12 pages.

See SRC

Lionville Laboratory Use Only: 08041938

Custody Transfer Record/Lab Work Request

Page 1 of 1

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

LVLI Lionville Laboratory Inc.

Client: TNU HANFORD SAFH F08-070

Est. Final Proj. Sampling Date:

Project#: 11343-606-001-9999-00

Project Contact/Phone#:

Lionville Laboratory Project Manager: O Johnson

QC: SW846 Del: STD TAT: 30 days

Date Rec'd: 4-17-08 Date Due: 5-17-08

Refrigerator #											A						
#/Type Container	Liquid										3	1					
	Solid										1G	1					
Volume											125	1					
Preservatives												1					
ANALYSES REQUESTED →		ORGANIC							INORG		Hg	Nor					
		VOA	BNA	Pest/PCB	Herb				Metal	CN	Filter	Nor					

MATRIX CODES:	Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	Lionville Laboratory Use Only									ICR6	IW3N2				
S- Soil	001	B1TNR0	✓	✓	Soil	4/1/08	0820										x	x				
SE- Sediment																						
SO- Solid																						
SL- Sludge																						
W- Water																						
O- Oil																						
A- Air																						
DS- Drum Solids																						
DL- Drum Liquids																						
L- EP/TCLP Leachate																						
WI- Wipe																						
X- Other																						
F- Fish																						

Special Instructions:

Special Instructions:

1.
2.
3.
4.
5.
6.

Relinquished by	Received by	Date	Time
[signature]	[signature]	4/17/08	0935

Relinquished by	Received by	Date	Time

Relinquished by	Received by	Date	Time
ORIGINAL REWRITTEN		"COMPOSITE WASTE"	

010000000

Fluor Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F08-070-026	PAGE 1 OF 1

COLLECTOR	COMPANY CONTACT	TELEPHONE NO.	PROJECT COORDINATOR	PRICE CODE 8N	DATA TURNAROUND
NCO SAMPLER Kevin Patterson Fluor Hanford	TRENT, STEVE	373-5869	WIDRIG, DL	AIR QUALITY ☐	45 Days / 45 Days
SAMPLING LOCATION C5857, I-098	**PROJECT DESIGNATION** 200-TW-1 OU Characterization for Well 299-E33-342 - Soil		**SAF NO.** F08-070		
ICE CHEST NO. Guss - 6	**FIELD LOGBOOK NO.** HNF-N-484-1 pg 12	**ACTUAL SAMPLE DEPTH** 189.8-192.3	**COA** 123163ES20	**METHOD OF SHIPMENT** FEDERAL EXPRESS	
SHIPPED TO Lionville Laboratory Incorporated	**OFFSITE PROPERTY NO.** See PTR		**BILL OF LADING/AIR BILL NO.** See PTR 7984 2148 6655		

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

POSSIBLE SAMPLE HAZARDS/ REMARKS
Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR but are not releasable per DOE Order 5400.5 (1990/1993)

SPECIAL HANDLING AND/OR STORAGE
Radioactive Tie To B1TNP7

PRESERVATION	Cool~4C
TYPE OF CONTAINER	G/P
NO. OF CONTAINER(S)	1
VOLUME	125mL
SAMPLE ANALYSIS	Chromium Hex - 7196; NO2/NO3 - 353.2;

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B1TNR0	SOIL	APR 0 1 2008	0820	✓
				21875

CHAIN OF POSSESSION / **SIGN/ PRINT NAMES**

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Kevin Patterson Fluor Hanford	APR 0 1 2008	M0745 Ref #1 APR 0 1 2008	1550
M0745 Ref #1	4-16-08 0700	Ed Kraus	4-16-08 0700
Ed Kraus	4-16-08 0705	FED-X	
FED EX	4-17-08 0935		4-17-08 0935

SPECIAL INSTRUCTIONS
** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.

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

A-6003-618(01/06)

Attachment 2
Narrative
WSCF20080683

Introduction

Three S&GRP samples were received at the WSCF Laboratory on April 1, 2008. Two of the 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. Analysis of the high concentration VOA sample and the associated Methanol Blank (B1TNP9) were not required.

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. Additionally, a copy of the sample record sheet is 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 13, for a complete listing of approved analytical methods.

Inorganic Comments

Ammonia – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group per GRP Letter of Instruction. See page 19 for QC details. Analytical Note(s):

- Duplicate, Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1TN41 (SDG# 20080591, SAF# F08-070).
- Sample result was D flagged (dilution).
- Matrix Spike and Matrix Spike Duplicate recoveries were less than established laboratory limits. Sample result was N flagged.

All other QC controls are within the established limits.

Anions – Holding 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 20 through 21 for QC details. Analytical Note(s):

- Duplicate, Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1TN41 (SDG# 20080591, SAF# F08-070).
- 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.

Cyanide – The hold time requirement for this analysis was met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group per GRP Letter of Instruction. See page 22 for QC details. Analytical Note(s):

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 23 through 24 for QC details. Analytical Note(s):

- Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1TN41 (SDG# 20080591, SAF# F08-070).
- Lithium - Due to possible Calcium interface, the spectrum was manually checked and calculated. Sample result was E flagged (estimate).
- Aluminum, Iron and Sodium sample results exceeded spiking levels by a factor of 4. Spike recoveries are not valid. Check and high standards were analyzed to ensure sample result linearity because the sample results were greater than the calibration standard.
- No Lithium present in LCS.

All other QC controls are within the established limits.

ICP-MS Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group per the GRP Letter of Instruction. See pages 25 through 28 for QC details. Analytical Note(s):

- Barium and Manganese – Spike recoveries biased low. Sample results were N flagged.
- Antimony, Lead and Thallium – Laboratory Control Sample recoveries were less than established limits. Lead result was E flagged.

All other QC controls are within the established limits.

Organic Comments

All organic results corrected for moisture and reported on a dry weight basis.

Alcohol/Glycols - The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group per GRP Letter of Instruction. See page 35 for QC details. Analytical Note(s):

- Duplicate, Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1TNP6 (SDG# 20080639, SAF# F08-070).

All QC controls are within the established limits.

Semi-VOA – 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 GPP Letter of Instruction. See pages 36 through 41 for QC details. Analytical Note(s):

- Sample results that were less than the lowest calibration standard, however greater than the method detection limit were J flagged.

All QC controls are within the established limits.

TPHD-WA – 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 page 42 for QC details. Analytical Note(s):

- Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1TFC0 (SDG# 20080715, SAF# F08-066).

All QC controls are within the established limits.

VOA – The holding time requirement for this analysis was met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample, were analyzed with this delivery group per the GRP Letter of Instruction. See pages 43 through 45 for QC details. Analytical Note(s):

- Analysis of the high concentration VOA sample and the associated Methanol Blank (B1TNP9) were not required.

All QC controls are within the established limits.

Rad Chem – There are no hold times associated with WSCF's radiochemical methods. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 49 through 54 for QC details. Analytical Note(s):

- Strontium-85 (tracer) – Blank recovery exceeded established laboratory limits due to low sample activities. No flag issued.

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.

for William H. Baird
Scot L. Fitzgerald
WSCF Analytical Laboratory Manager

for
John E. Trechter
WSCF Client Services

Fluor Hanford Inc. 05/15/08 | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | F08-070-025 | PAGE 1 OF 2

COLLECTOR NCO SAMPLER	**COMPANY CONTACT** TRENT, STEVE	**TELEPHONE NO.** 373-5869	**PROJECT COORDINATOR** WIDRIG, DL	**PRICE CODE** 8N	**DATA TURNAROUND**
SAMPLING LOCATION C5857, I-098	**PROJECT DESIGNATION** 200-TW-1 OU Characterization for Well 299-E33-342 - Soil		**SAF NO.** F08-070	**AIR QUALITY** ☐	45 Days / 45 Days
ICE CHEST NO.	**FIELD LOGBOOK NO.** HNF-N-488-1 p.12	**ACTUAL SAMPLE DEPTH** 189.8 - 192.3	**COA** 123163ES20	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	
SHIPPED TO Waste Sampling & Characterization 20080683	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

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

POSSIBLE SAMPLE HAZARDS/ REMARKS
Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR but are not releasable per DOE Order 5400.5 (1990/1993)

SPECIAL HANDLING AND/OR STORAGE
Radioactive Tie To B1TNP7

PRESERVATION	None	Cool~4C	Cool~4C	Cool~4C	Cool~4C	None	
TYPE OF CONTAINER	G/P	G	aG	G	G/P	Square Bottle - Poly	
NO. OF CONTAINER(S)	1	1	1	1	1	1	
VOLUME	250mL	250mL	250mL	125g	500mL	500mL	
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS	SEE ITEM (4) IN SPECIAL INSTRUCTIONS	SEE ITEM (5) IN SPECIAL INSTRUCTIONS	SEE ITEM (6) IN SPECIAL INSTRUCTIONS	

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME								
B1TNR0 W08GRW836	SOIL	APR 0 1 2008	0820	✓	✓	✓	✓	✓	✓		
				013268	013268	013268	024875	029078	N/A		

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
	APR 0 1 2008 1035	T A Frazier	4/1/08 1035

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS
SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

ICED

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

A-6003-618(01/06)

Fluor Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F08-070-025	PAGE 2 OF 2
COLLECTOR NCO SAMPLER	**COMPANY CONTACT** TRENT, STEVE	**TELEPHONE NO.** 373-5869	**PROJECT COORDINATOR** WIDRIG, DL	**PRICE CODE** 8N **AIR QUALITY** ☐	**DATA TURNAROUND** 45 Days / 45 Days
SAMPLING LOCATION C5857, I-098	**PROJECT DESIGNATION** 200-TW-1 OU Characterization for Well 299-E33-342 - Soil		**SAF NO.** F08-070		
ICE CHEST NO.	**FIELD LOGBOOK NO.**	**ACTUAL SAMPLE DEPTH**	**COA** 123163ES20	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	
SHIPPED TO Waste Sampling & Characterization	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

SPECIAL INSTRUCTIONS

** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
(1)ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Cobalt, Manganese, Vanadium, Zinc} ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Selenium, Strontium, Thallium, Uranium} ICP Metals - 6010B (TAL) {Aluminum, Copper, Iron, Nickel, Silver, Sodium} ICP Metals - 6010B (Add-On) {Boron, Lithium} 200.8_HG - ICPMS; Cations (IC) - 300.7 {Nitrogen in ammonium}
(2)Alcohols, Glycols, & Ketones - 8015 {Diethyl ether, Ethylene glycol}
(3)Semi-VOA - 8270B (TCL); Semi-VOA - 8270B (Add-On) {3+4 Methylphenol (cresol, m+p), Tributyl phosphate}
(4)TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - kerosene range}
(5)Cyanide (Total) - 335.2; IC Anions - 300.0 {Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphate, Sulfate}
(6)Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226} Gamma Spec - Add-on {Antimony-125, Radium-228} Isotopic Plutonium; Isotopic Uranium; Neptunium-237; Strontium-89,90 -- Total Sr; Americium-241;

A-6003-618(01/06)

Fluor Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F08-070-023	PAGE 1 OF 2

COLLECTOR	COMPANY CONTACT	TELEPHONE NO.	PROJECT COORDINATOR	PRICE CODE 8N	DATA TURNAROUND
NCO SAMPLER	TRENT, STEVE	373-5869	WIDRIG, DL	AIR QUALITY ☐	45 Days / 45 Days

SAMPLING LOCATION	PROJECT DESIGNATION	SAF NO.
C5857, I-098	200-TW-1 OU Characterization for Well 299-E33-342 - Soil	F08-070

ICE CHEST NO.	FIELD LOGBOOK NO.	ACTUAL SAMPLE DEPTH	COA	METHOD OF SHIPMENT
	HNF N. 488.1 p 12	189.8 - 192.3	123163ES20	GOVERNMENT VEHICLE

SHIPPED TO	OFFSITE PROPERTY NO.	BILL OF LADING/AIR BILL NO.
Waste Sampling & Characterization	N/A	N/A

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

POSSIBLE SAMPLE HAZARDS/ REMARKS
Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR but are not releasable per DOE Order 5400.5 (1990/1993)

SPECIAL HANDLING AND/OR STORAGE
Radioactive Tie To B1TNP7

PRESERVATION	Cool~4C	Cool <-7C and >-20C	
TYPE OF CONTAINER	aGs*	aGs*	
NO. OF CONTAINER(S)	3	5	
VOLUME	40mL	40mL	
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B1TNP8 837	SOIL	APR 0 1 2008	0820	✓	✓

621500 →

CHAIN OF POSSESSION	DATE/TIME	SIGN/ PRINT NAMES	DATE/TIME
RELINQUISHED BY/REMOVED FROM	APR 0 1 2008 1055	RECEIVED BY/STORED IN T A Frazier	4/1/08 1055
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS
SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

ICED

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

A-6003-618(01/06)

Fluor Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F08-070-023	PAGE 2 OF 2
COLLECTOR NCO SAMPLER	**COMPANY CONTACT** TRENT, STEVE	**TELEPHONE NO.** 373-5869	**PROJECT COORDINATOR** WIDRIG, DL	**PRICE CODE** 8N	**DATA TURNAROUND** 45 Days / 45 Days
SAMPLING LOCATION C5857, I-098	**PROJECT DESIGNATION** 200-TW-1 OU Characterization for Well 299-E33-342 - Soil		**SAF NO.** F08-070	**AIR QUALITY** ☐	
ICE CHEST NO.	**FIELD LOGBOOK NO.**	**ACTUAL SAMPLE DEPTH**	**COA** 123163E520	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	
SHIPPED TO Waste Sampling & Characterization	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

SPECIAL INSTRUCTIONS

** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
** Analytical batch QC must be run on a sample associated with this SAF.
** All VOA samples will be collected using EPA Method 5035A.
** VOA sample bottle sets will include 3 bottles for high level analysis, 5 bottles for low level analysis, and 1 methanol process control sample.
** The laboratory is to use one of the low level VOA bottles for moisture content determination.
** VOA bottles will be labeled with an appended suffix of K, L, M, N, or P for low level and W, X, or Y for high level. These suffixes are for the purpose of providing bottle weights to the laboratories. These suffixes should not be include as part of the sample ID reported in the final data packages.
(1)VOA - 5035/8260 (HIGH LEVEL); VOA - 5035/8260 (HIGH LEVEL) - (Add-On) {1-Butanol, Trichloromonofluoromethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene}
(2)VOA - 5035/8260 (LOW LEVEL); VOA - 5035/8260 (LOW LEVEL) - (Add-On) {1-Butanol, Trichloromonofluoromethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene}

Fluor Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F08-070-024	PAGE 1 OF 1
COLLECTOR NCO SAMPLER	COMPANY CONTACT TRENT, STEVE	TELEPHONE NO. 373-5869	PROJECT COORDINATOR WIDRIG, DL	PRICE CODE 8N	DATA TURNAROUND 45 Days / 45 Days
SAMPLING LOCATION C5857, I-098	PROJECT DESIGNATION 200-TW-1 OU Characterization for Well 299-E33-342 - Soil		SAF NO. F08-070	AIR QUALITY ☐	
ICE CHEST NO.	FIELD LOGBOOK NO. HNF-N-488-1 pg 12	ACTUAL SAMPLE DEPTH 189.8-192.3	COA 123163ES20	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO Waste Sampling & Characterization	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

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

POSSIBLE SAMPLE HAZARDS/ REMARKS
Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR but are not releasable per DOE Order 5400.5 (1990/1993)

SPECIAL HANDLING AND/OR STORAGE
Radioactive Tie To B1TNP7

PRESERVATION	Cool~4C
TYPE OF CONTAINER	aGs*
NO. OF CONTAINER(S)	1
VOLUME	40mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B1TNP9 339	SOIL	APR 0 1 2008	0820	✓

621960

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
[illegible]	APR 0 1 2008 1055	T A Frazier	4/1/08 1055
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
** Analytical batch QC must be run on a sample associated with this SAF.
** All VOA samples will be collected using EPA Method 5035A.
(1)VOA - 5035/8260 (TCL); VOA - 5035/8260 - (Add-On) {1-Butanol, Trichloromonofluoromethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene}

ICED

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

A-6003-618(01/06)

Appendix 5

Data Validation Supporting Documentation

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200 TW 1 & 2			DATA PACKAGE: VSR10-020		
VALIDATOR: Carl Schloesslin		LAB: Lionville & WSCF		DATE: 6-14-2010	
			SDG: H3702 & WSCF20080683		
ANALYSES PERFORMED					
Anions/IC X	TOC	TOX	TPH-418.1	Oil and Grease	Alkalinity
Ammonia X	BOD/COD	Chloride	Chromium-VI	pH	NO_3/NO_2 X
Sulfate	TDS	TKN	Phosphate	Total CN X	Sulfide

SAMPLES/MATRIX Soil sample

SDG H3702: B1TNR0 - per VSR, validated method 353.2 (nitrate/nitrite) only for this SDG
SDG WSCF20080683: B1TNR0

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes (No) N/A

Comments: None

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations performed on all instruments? ..... Yes No (N/A)

Initial calibrations acceptable? ..... Yes No (N/A)

ICV and CCV checks performed on all instruments? ..... Yes No (N/A)

ICV and CCV checks acceptable? ..... Yes No (N/A)

Standards traceable? ..... Yes No (N/A)

Standards expired? ..... Yes No (N/A)

Calculation check acceptable? ..... Yes No (N/A)

Comments:

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

3. BLANKS (Levels B, C, D, and E)

ICB and CCB checks performed for all applicable analyses? (Levels D, E) ..... Yes No N/A

ICB and CCB results acceptable? (Levels D, E) ..... Yes No N/A

Laboratory blanks analyzed? ..... Yes No N/A

Laboratory blank results acceptable? ..... Yes No N/A

Field blanks analyzed? (Levels C, D, E) ..... Yes No N/A

Field blank results acceptable? (Levels C, D, E) ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: None

4. ACCURACY (Levels C, D, and E)

Spike samples analyzed? ..... Yes No N/A

Spike recoveries acceptable? ..... Yes No N/A

Sike standards NIST traceable? (Levels D, E) ..... Yes No N/A

Spike standards expired? (Levels D, E) ..... Yes No N/A

LCS/BSS samples analyzed? ..... Yes No N/A

LCS/BSS results acceptable? ..... Yes No N/A

Standards traceable? (Levels D, E) ..... Yes No N/A

Standards expired? (Levels D, E) ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Performance audit sample(s) analyzed? ..... Yes No N/A

Performance audit sample results acceptable? ..... Yes No N/A

Comments:

Ammonia MS %R = 37%, MSD %R = 37%

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable? ..... Yes No N/A

Duplicate results acceptable? ..... Yes No N/A

MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A

MS/MSD standards expired? (Levels D, E) ..... Yes No N/A

Field duplicate RPD values acceptable? ..... Yes No N/A

Field split RPD values acceptable? ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: None

6. HOLDING TIMES (all levels)

Samples properly preserved? ..... Yes No N/A

Sample holding times acceptable? ..... Yes No N/A

Comments: None

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

7. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

Results reported for all requested analyses? ..... Yes No N/A

Results supported in the raw data? (Levels D, E) ..... Yes No N/A

Samples properly prepared? (Levels D, E) ..... Yes No N/A

Detection limits meet RDL? ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: None

Appendix 6

Additional Documentation Requested By Client

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 04/24/08

CLIENT: TNU-HANFORD F08-070 H3702

LVL LOT #: 0804L938

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	08LVI037-MB1	Chromium VI	0.20 u	MG/KG	0.20	1.0
BLANK10	08LN3A14-MB1	Nitrate Nitrite	0.10 u	MG/KG	0.10	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 04/24/08

CLIENT: TNU-HANFORD F08-070 H3702

LVL LOT #: 0804L938

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	B1TNR0	Soluble Chromium VI	4.2	0.21u	4.2	99.2	1.0
		Insoluble Chromium VI	1200	0.21u	1170	102.6	100
		Nitrate Nitrite	66.8	22.5	49.4	89.7	10.0
BLANK10	08LVI037-MB1	Soluble Chromium VI	4.1	0.20u	4.0	101.6	1.0
		Insoluble Chromium VI	1280	0.20u	1230	103.8	100
BLANK10	08LN3A14-MB1	Nitrate Nitrite	4.8	0.10u	5.0	96.6	1.0
		Nitrate Nitrite MSD	4.7	0.10u	5.0	94.4	1.0

Lionville Laboratory, Inc.

INORGANICS DUPLICATE SPIKE REPORT 04/24/08

CLIENT: TNU-HANFORD F08-070 H3702 LVL LOT #: 0804L938
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV	%DIFF
BLANK10	08LN3A14-MB1	Nitrate Nitrite	96.6	94.4	2.3

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 04/24/08

CLIENT: TNU-HANFORD F08-070 H3702 LVL LOT #: 0804L938
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	B1TNR0	% Solids	95.9	95.6	0.31	1.0
		Chromium VI	0.21u	0.21u	NC	1.0
		Nitrate Nitrite	22.5	23.3	3.7	5.0

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20080683
Matrix: SOLID
Test: Ammonia (N) by IC

Sample Date: 03/19/08
Receive Date:03/20/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W08GR00694											
BATCH QC ASSOCIATED WITH SAMPLE											
DUP	Ammonia (N) by IC	7664-41-7	<0.2		RPD			n/a	20.000	U	04/07/08
MS	Ammonia (N) by IC	7664-41-7	0.187458	37.492	% Recov	75.000	125.000		•		04/07/08
MSD	Ammonia (N) by IC	7664-41-7	0.185434	37.087	% Recov	75.000	125.000		•		04/07/08
SPK-RPD	Ammonia (N) by IC	7664-41-7	37.087		RPD			1.086	20.000		04/07/08
BATCH QC											
BLANK	Ammonia (N) by IC	7664-41-7	<4e-3	n/a	mg/L	0.000	0.002			U	04/07/08
BLANK	Ammonia (N) by IC	7664-41-7	<4e-3	n/a	mg/L	0.000	0.002			U	04/07/08
LCS	Ammonia (N) by IC	7664-41-7	90.7239	90.724	% Recov	80.000	120.000				04/07/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20080683
Matrix: SOLID
Test: Anions by Ion Chromatography

Sample Date: 03/19/08
Receive Date:03/20/08

Lab ID: W08GR00694
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	2.3368		RPD			3.253	20.000		04/07/08
DUP	Fluoride	16984-48-8	<0.3		RPD			n/a	20.000	U	04/07/08
DUP	Nitrogen in Nitrite	NO2-N	<0.5		RPD			n/a	20.000	U	04/07/08
DUP	Nitrogen in Nitrate	NO3-N	3.388		RPD			15.779	20.000		04/07/08
DUP	Phosphate (P) by IC	PO4-P	<2		RPD			n/a	20.000	U	04/07/08
DUP	Sulfate	14808-79-8	14.0456		RPD			17.102	20.000		04/07/08
MS	Chloride	16887-00-6	0.955116	95.512	% Recov	75.000	125.000				04/07/08
MS	Fluoride	16984-48-8	0.483634	97.115	% Recov	75.000	125.000				04/07/08
MS	Nitrogen in Nitrite	NO2-N	0.485538	97.694	% Recov	75.000	125.000				04/07/08
MS	Nitrogen in Nitrate	NO3-N	0.453794	100.843	% Recov	75.000	125.000				04/07/08
MS	Phosphate (P) by IC	PO4-P	0.919476	95.085	% Recov	75.000	125.000				04/07/08
MS	Sulfate	14808-79-8	1.925564	97.251	% Recov	75.000	125.000				04/07/08
MSD	Chloride	16887-00-6	0.94428	94.428	% Recov	75.000	125.000				04/07/08
MSD	Fluoride	16984-48-8	0.479034	96.192	% Recov	75.000	125.000				04/07/08
MSD	Nitrogen in Nitrite	NO2-N	0.470814	94.731	% Recov	75.000	125.000				04/07/08
MSD	Nitrogen in Nitrate	NO3-N	0.449032	99.785	% Recov	75.000	125.000				04/07/08
MSD	Phosphate (P) by IC	PO4-P	0.925338	95.692	% Recov	75.000	125.000				04/07/08
MSD	Sulfate	14808-79-8	1.912654	96.599	% Recov	75.000	125.000				04/07/08
SPK-RPD	Chloride	16887-00-6	94.428		RPD			1.141	20.000		04/07/08
SPK-RPD	Fluoride	16984-48-8	96.192		RPD			0.955	20.000		04/07/08
SPK-RPD	Nitrogen in Nitrite	NO2-N	94.731		RPD			3.080	20.000		04/07/08
SPK-RPD	Nitrogen in Nitrate	NO3-N	99.785		RPD			1.055	20.000		04/07/08
SPK-RPD	Phosphate (P) by IC	PO4-P	95.692		RPD			0.636	20.000		04/07/08
SPK-RPD	Sulfate	14808-79-8	96.599		RPD			0.673	20.000		04/07/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20080683
Matrix: SOLID
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
BATCH QC											
BLANK	Chloride	16887-00-6	<3e-2	n/a	mg/L	0.000	0.030			U	04/07/08
BLANK	Chloride	16887-00-6	<3e-2	n/a	mg/L	0.000	0.030			U	04/07/08
BLANK	Fluoride	16984-48-8	<6e-3	n/a	mg/L	0.000	0.030			U	04/07/08
BLANK	Fluoride	16984-48-8	<6e-3	n/a	mg/L	0.000	0.030			U	04/07/08
BLANK	Nitrogen in Nitrite	NO2-N	<1e-2	n/a	mg/L	0.000	0.020			U	04/07/08
BLANK	Nitrogen in Nitrite	NO2-N	<1e-2	n/a	mg/L	0.000	0.020			U	04/07/08
BLANK	Nitrogen in Nitrate	NO3-N	<5e-3	n/a	mg/L	0.000	0.040			U	04/07/08
BLANK	Nitrogen in Nitrate	NO3-N	<5e-3	n/a	mg/L	0.000	0.040			U	04/07/08
BLANK	Phosphate (P) by IC	PO4-P	<4e-2	n/a	mg/L	0.000	0.200			U	04/07/08
BLANK	Phosphate (P) by IC	PO4-P	<4e-2	n/a	mg/L	0.000	0.200			U	04/07/08
BLANK	Sulfate	14808-79-8	<7e-2	n/a	mg/L	0.000	0.200			U	04/07/08
BLANK	Sulfate	14808-79-8	<7e-2	n/a	mg/L	0.000	0.200			U	04/07/08
LCS	Chloride	16887-00-6	197.9609	98.488	% Recov	80.000	120.000				04/07/08
LCS	Fluoride	16984-48-8	104.9652	105.387	% Recov	80.000	120.000				04/07/08
LCS	Nitrogen in Nitrite	NO2-N	99.9855	100.589	% Recov	80.000	120.000				04/07/08
LCS	Nitrogen in Nitrate	NO3-N	92.3455	102.492	% Recov	80.000	120.000				04/07/08
LCS	Phosphate (P) by IC	PO4-P	197.7525	102.251	% Recov	80.000	120.000				04/07/08
LCS	Sulfate	14808-79-8	388.7195	98.161	% Recov	80.000	120.000				04/07/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20080683
Matrix: SOLID
Test: Cyanide by Midi/Spectrophotom

Sample Date: 04/01/08
Receive Date:04/01/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W08GR00836											
BATCH QC ASSOCIATED WITH SAMPLE											
MS	Cyanide by Midi/Spectrophotom	57-12-5	1.79	89.950	% Recov	75.000	125.000				04/10/08
MSD	Cyanide by Midi/Spectrophotom	57-12-5	1.90	95.477	% Recov	75.000	125.000				04/10/08
SPK-RPD	Cyanide by Midi/Spectrophotom	57-12-5	95.477		RPD			5.961	20.000		04/10/08
BATCH QC											
BLANK	Cyanide by Midi/Spectrophotom	57-12-5	< 4	n/a	ug/L	-4.000	4.000			U	04/10/08
LCS	Cyanide by Midi/Spectrophotom	57-12-5	47.8	95.600	% Recov	85.000	115.000				04/10/08

Date: 14 June 2010
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: 200 TW 1 & 2
Subject: Radiochemical - Sample Data Groups (SDGs) H3702 and WSCF20080683

INTRODUCTION

This memorandum presents the results of data validation for SDG H3702 prepared by Eberline Services and SDG WSCF20080683 prepared by WSCF Analytical Laboratories. The sample validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B1TNR0	4/01/2008	Soil	C	See note 1

1 – C-14, Ni-63, Np-237, I-129, Isotopic-Th, Ra-226, Ra-228, Tritium and Tc-99

Data validation was conducted in accordance with the CHPRC validation statement of work and the Sampling and Analysis Plan for the 200-BP-5 Groundwater Operable Unit Remedial Investigation/Feasibility Study, Appendix A, DOE/RL-2007-18, Rev. 1 (SAP). Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested By Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 180 days, or five half-lives, whichever is shorter. There are no specific preservation requirements for radiochemical soil/solid analysis.

The sample was analyzed within the prescribed holding times.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for analysis.

Field Blanks

No field blanks were submitted for analysis.

Equipment Blanks

No equipment blanks were submitted for analysis.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results, laboratory control sample results, and chemical recovery factors. Chemical recovery factors are determined through use of a carrier or tracer and provide assessment of the chemical separation process that is affected by the laboratory procedure, sample matrix, and/or interference. Chemical recovery factors are used to correct sample concentration, uncertainty, and MDC results. According to the SAP, the laboratory control sample accuracy limits are 65% to 135% for Sr-89/90, Tc-99, tritium, and alpha spectrometry analytes, and the statistical ones established by the analytical laboratory if more stringent. The laboratory control sample accuracy limits are 70% to 130% for all other radiochemical analytes, and the statistical ones established by the analytical laboratory if more stringent. The matrix spike sample accuracy limits are the ones specified by the DV procedure. The limits for reported analytes not listed in the SAP are specified by the DV procedure.

Matrix Spike (MS) Samples

All MS recoveries were acceptable with the following exceptions.

For SDG H43702, MS analyses were not performed for tritium, C-14 and Ra-226. The tritium result for sample B1TNR0 was a non-detect and should be qualified as an estimate and flagged "UJ," and the C-14 and Ra-226 results were detects and should be qualified as estimates and flagged "J."

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

Carrier/Tracer Recovery Factors

All carrier/tracer recovery factors were acceptable.

- **Precision**

Precision is evaluated by reviewing laboratory duplicate, field duplicate, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ±35%. The RPD limits for reported analytes not listed in the SAP are specified by the DV procedure. When duplicate RPDs exceed the limits and have associated results <5X the SAP required detection limits with differences <2X the required detection limits no precision infraction occurred. When no required detection limits are provided and the sample and duplicate results are statistically equal (Duplicate Error Ratio <3) no precision infraction occurred.

Laboratory Duplicate Samples

All laboratory duplicate results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for analysis.

Field Split Samples

No field splits were submitted for analysis.

- **Detection Limits**

Reported MDCs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

All reported sample MDCs with associated non-detected sample results were below the CRDLs.

- **Completeness**

SDGs H3702 and WSCF20080683 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample B1TNR0 tritium, C-14 and Ra-226 results as estimates were due to lack of MS analyses.

REFERENCES

HNF-20434, Rev. 0, *Data Validation Procedure for Radiochemical Analyses*, June 2004.

DOE/RL-2007-18, Rev. 1, *Sampling and Analysis Plan for the 200-BP-5 Groundwater Operable Unit Remedial Investigation/Feasibility Study, Appendix A.*

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for and was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the MDC. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Radiochemical Data Qualification Summary			
SDGs: H3702 & WSCF20080683	Reviewer: AQA	Project: 200 TW 1 & 2	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Tritium	UJ	B1TNR0	Lack of MS data
C-14 & Ra-226	J	B1TNR0	Lack of MS data

Comments: None

Appendix 3

Annotated Laboratory Reports

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3702

7087-001 B1TNR0

DATA SHEET

SDG	7087	Client/Case no	Hanford	SDG_H3702	
Contact	Melissa C. Mannion	Contract	No. 33677		
Lab sample id	R804167-01	Client sample id	B1TNR0		
Dept sample id	7087-001	Location/Matrix	C5857, I-098	SOLID	
Received	04/29/08	Collected/Weight	04/01/08 08:20	157 g	
% solids	89.3	Custody/SAF No	F08-070-028	F08-070	

ANALYTE		CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	UJ	10028-17-8	0	2.5	4.28	400	U	H
Carbon 14	J	14762-75-5	16.8	2.3	3.02	50.0		C
Nickel 63		13981-37-8	-1.50	1.9	3.27	30.0	U	NI_L
Technetium 99		14133-76-7	3.98	0.30	0.288	12.0		TC
Thorium 228		14274-82-9	0.832	0.36	0.366	1.00		TH
Thorium 230		14269-63-7	0.473	0.30	0.226	1.00		TH
Thorium 232		TH-232	0.769	0.30	0.226	1.00		TH
Iodine 129		15046-84-1	0.090	0.59	1.35	2.00	U	I
Radium 226	J	13982-63-3	0.608	0.10	0.084	0.100		RA
Radium 228		15262-20-1	1.65	0.44	0.999	1.00		AC

200TW1 OU Charactrzn 299E33342-Soil

LS
6-14-2010

Lab id	EBRLNE
Protocol	Fluor
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	06/13/08

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F08-070
Sample # W08GR00836
Client ID: B1TNR0 TRENT WSCF

Matrix: SOIL

Group #: WSCF20080683
Department: Radiochemistry
Sampled: 04/01/08
Received: 04/01/08

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
Americium by AEA											
Americium-241	14596-10-2	LA-508-471	U	0.0300	pCi/g	+-0.0261	pCi/g	1.00	0.038		04/16/08
Am-243 tracer by AEA	AM243	LA-508-471		3.80	pCi/g			1.00	0.020		04/16/08
Gamma Energy Analysis-grd H2O											
Antimony-125	14234-35-6	LA-508-481	U	-5.96e-03	pCi/g	+-0.0162	pCi/g	1.00	0.027		04/03/08
Cobalt-60	10198-40-0	LA-508-481	U	0.0100	pCi/g	+-5.18e-03	pCi/g	1.00	0.010		04/03/08
Cesium-137	10045-97-3	LA-508-481	U	-3.48e-03	pCi/g	+-6.29e-03	pCi/g	1.00	0.010		04/03/08
Europium-152	14683-23-9	LA-508-481	U	0.0166	pCi/g	+-0.0233	pCi/g	1.00	0.031		04/03/08
Europium-154	15585-10-1	LA-508-481	U	8.74e-03	pCi/g	+-0.0208	pCi/g	1.00	0.031		04/03/08
Europium-155	14391-16-3	LA-508-481	U	0.0271	pCi/g	+-0.0306	pCi/g	1.00	0.051		04/03/08
Radium-226	13982-63-3	LA-508-481		0.416	pCi/g	+-0.0734	pCi/g	1.00	0.019		04/03/08
Radium-228	15262-20-1	LA-508-481		0.495	pCi/g	+-0.0904	pCi/g	1.00	0.032		04/03/08
Neptunium by AEA								Np-237 validated only			
Neptunium-237	13994-20-2	LA-508-471	U	4.00e-03	pCi/g	+-0.0180	pCi/g	1.00	0.037		05/08/08
Plutonium Isotopics by AEA											
Plutonium-238	13981-16-3	LA-508-471		0.0290	pCi/g	+-0.0186	pCi/g	1.00	0.018		04/16/08
Pu-239/240 by AEA	PU-239/240	LA-508-471	U	1.90e-03	pCi/g	+-3.84e-03	pCi/g	1.00	5.2e-03		04/16/08
Pu-242 tracer by AEA	PU242	LA-508-471		5.90	pCi/g			1.00	0.018		04/16/08
Strontium 89/90											
Strontium-89/90	SR-RAD	LA-508-415	U	-1.30	pCi/g	+-1.30	pCi/g	1.00	0.38		04/07/08
Sr-85 Tracer by Beta Counting	SR85	LA-508-415		96.6	Percent			1.00	0.0		04/07/08
Uranium Isotopics by AEA											
Uranium-233/234	U-233/234	LA-508-471		0.140	pCi/g	+-0.0490	pCi/g	1.00	5.4e-03		04/15/08
Uranium-235	15117-96-1	LA-508-471	U	6.50e-03	pCi/g	+-0.0116	pCi/g	1.00	0.020		04/15/08
Uranium-238	U-238	LA-508-471		0.120	pCi/g	+-0.0444	pCi/g	1.00	0.018		04/15/08

LS
6-14-2010

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

B - The analyte < the RDL but >= the IDL/MDL (inorg)
E - Analyte is an estimate, has potentially larger errors(inorg)
N - Spike sample recovery is outside control limits.(inorg)
U - Analyzed for but not detected above limiting criteria.(org)
D - Analyte was identified at a secondary dilution factor(inorg)
J - Analyte < lowest calibration but >= MDL.(org)
U - Analyzed for but not detected above limiting criteria(inorg)

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

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

1.0 GENERAL

Fluor Hanford Inc. (FH) Sample Delivery Group H3702 was composed of one solid (soil) sample designated under SAF No. F08-070 with a Project Designation of: 200-TW-1 OU Characterization for Well 299-E33-342 – Soil.

The sample was received as stated on the Chain-of-Custody document. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist.

2.0 ANALYSIS NOTES

2.1 Tritium Analysis

No problems were encountered during the course of the analyses.

2.2 Carbon-14 Analysis

No problems were encountered during the course of the analyses.

2.3 Nickel-63 Analysis

No problems were encountered during the course of the analyses.

2.4 Technetium-99 Analysis

No problems were encountered during the course of the analyses.

2.5 Iodine-129 Analysis

No problems were encountered during the course of the analyses.

2.6 Radium-226 Analysis

No problems were encountered during the course of the analyses.

2.7 Radium-228 Analysis

No problems were encountered during the course of the analyses.

2.8 Isotopic Thorium Analysis

No problems were encountered during the course of the analyses.

3.0 Case Narrative Certification Statement

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data obtained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

Melissa C. Mannion
Senior Program Manager

06/13/08
Date

Fluor Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F08-070-028 | PAGE 1 OF 1

COLLECTOR NCO SAMPLER	**COMPANY CONTACT** TRENT, STEVE	**TELEPHONE NO.** 373-5869	**PROJECT COORDINATOR** WIDRIG, DL
SAMPLING LOCATION C5857, I-098 ~~C-C-S~~ 4-16-08	**PROJECT DESIGNATION** 200-TW-1 OU Characterization for Well 299-E33-342 - Soil H3702 (7087)		**SAF NO.** F08-070
ICE CHEST NO. C-C-S-S-6	**FIELD LOGBOOK NO.** HNF-N-488-1 Pg 12	**ACTUAL SAMPLE DEPTH** 188 - 192.3	**COA** 123163ES20
SHIPPED TO Eberline Services	**OFFSITE PROPERTY NO.** See PTR		**BILL OF LADING/AIR BILL NO.** See PTR 7984 2148 6655

PRICE CODE 8N | **AIR QUALITY** ☐ | **DATA TURNAROUND** 45 Days / 45 Days | **METHOD OF SHIPMENT** FEDERAL EXPRESS

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

POSSIBLE SAMPLE HAZARDS/ REMARKS
Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR but are not releasable per DOE Order 5400.5 (1990/1993)

SPECIAL HANDLING AND/OR STORAGE
Radioactive Tie To B1TNP7

PRESERVATION	None
TYPE OF CONTAINER	G/P
NO. OF CONTAINER(S)	1
VOLUME	120mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME
B1TNR0	SOIL	APR 0 1 2008	0820

024875

CHAIN OF POSSESSION / **SIGN/ PRINT NAMES**

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
[illegible]	APR 1 7 2008	MCM 745 Free #1	APR 0 1 2008 1550
MCM 745 Free #1	4-16-08 0700	Ed Kraus / [illegible]	4-16-08 0700
Ed Kraus / [illegible]	4-16-08 0705	FedEx	
FedEx	4-17-08 0935	[illegible]	4-17-08 0935
[illegible]	4-22-08 1120		
UPS		[illegible]	04/24/08 10:30

SPECIAL INSTRUCTIONS

** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
(1)Carbon-14; Technetium-99 {Technetium-99} Iodine-129; TRITIUM - MIDLEVEL; Isotopic Thorium; Radium -226 {Radium-226} Nickel-63; Radium -228 {Radium-228}

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

A-6003-618(01/06)

Attachment 2
Narrative
WSCF20080683

Introduction

Three S&GRP samples were received at the WSCF Laboratory on April 1, 2008. Two of the 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. Analysis of the high concentration VOA sample and the associated Methanol Blank (B1TNP9) were not required.

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. Additionally, a copy of the sample record sheet is 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 13, for a complete listing of approved analytical methods.

Inorganic Comments

Ammonia – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group per GRP Letter of Instruction. See page 19 for QC details. Analytical Note(s):

- Duplicate, Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1TN41 (SDG# 20080591, SAF# F08-070).
- Sample result was D flagged (dilution).
- Matrix Spike and Matrix Spike Duplicate recoveries were less than established laboratory limits. Sample result was N flagged.

All other QC controls are within the established limits.

Anions – Holding 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 20 through 21 for QC details. Analytical Note(s):

- Duplicate, Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1TN41 (SDG# 20080591, SAF# F08-070).
- 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.

Cyanide – The hold time requirement for this analysis was met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group per GRP Letter of Instruction. See page 22 for QC details. Analytical Note(s):

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 23 through 24 for QC details. Analytical Note(s):

- Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1TN41 (SDG# 20080591, SAF# F08-070).
- Lithium - Due to possible Calcium interface, the spectrum was manually checked and calculated. Sample result was E flagged (estimate).
- Aluminum, Iron and Sodium sample results exceeded spiking levels by a factor of 4. Spike recoveries are not valid. Check and high standards were analyzed to ensure sample result linearity because the sample results were greater than the calibration standard.
- No Lithium present in LCS.

All other QC controls are within the established limits.

ICP-MS Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group per the GRP Letter of Instruction. See pages 25 through 28 for QC details. Analytical Note(s):

- Barium and Manganese – Spike recoveries biased low. Sample results were N flagged.
- Antimony, Lead and Thallium – Laboratory Control Sample recoveries were less than established limits. Lead result was E flagged.

All other QC controls are within the established limits.

Organic Comments

All organic results corrected for moisture and reported on a dry weight basis.

Alcohol/Glycols - The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group per GRP Letter of Instruction. See page 35 for QC details. Analytical Note(s):

- Duplicate, Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1TNP6 (SDG# 20080639, SAF# F08-070).

All QC controls are within the established limits.

Semi-VOA – 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 GPP Letter of Instruction. See pages 36 through 41 for QC details. Analytical Note(s):

- Sample results that were less than the lowest calibration standard, however greater than the method detection limit were J flagged.

All QC controls are within the established limits.

TPHD-WA – 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 page 42 for QC details. Analytical Note(s):

- Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1TFC0 (SDG# 20080715, SAF# F08-066).

All QC controls are within the established limits.

VOA – The holding time requirement for this analysis was met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample, were analyzed with this delivery group per the GRP Letter of Instruction. See pages 43 through 45 for QC details. Analytical Note(s):

- Analysis of the high concentration VOA sample and the associated Methanol Blank (B1TNP9) were not required.

All QC controls are within the established limits.

Rad Chem – There are no hold times associated with WSCF's radiochemical methods. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 49 through 54 for QC details. Analytical Note(s):

- Strontium-85 (tracer) – Blank recovery exceeded established laboratory limits due to low sample activities. No flag issued.

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.

for William H. Baird
Scot L. Fitzgerald
WSCF Analytical Laboratory Manager

for
John E. Trechter
WSCF Client Services

Fluor Hanford Inc. 05/15/08 | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | F08-070-025 | PAGE 1 OF 2

COLLECTOR NCO SAMPLER	**COMPANY CONTACT** TRENT, STEVE	**TELEPHONE NO.** 373-5869	**PROJECT COORDINATOR** WIDRIG, DL
SAMPLING LOCATION C5857, I-098	**PROJECT DESIGNATION** 200-TW-1 OU Characterization for Well 299-E33-342 - Soil		**SAF NO.** F08-070
ICE CHEST NO.	**FIELD LOGBOOK NO.** HNF-N-488-1 p. 12	**ACTUAL SAMPLE DEPTH** 189.8 - 192.3	**COA** 123163ES20
SHIPPED TO Waste Sampling & Characterization 20080683	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A

PRICE CODE 8N **DATA TURNAROUND** 45 Days / 45 Days

AIR QUALITY ☐

METHOD OF SHIPMENT GOVERNMENT VEHICLE

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

POSSIBLE SAMPLE HAZARDS/ REMARKS
Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR but are not releasable per DOE Order 5400.5 (1990/1993)

SPECIAL HANDLING AND/OR STORAGE
Radioactive Tie To B1TNP7

PRESERVATION	None	Cool~4C	Cool~4C	Cool~4C	Cool~4C	None		
TYPE OF CONTAINER	G/P	G	aG	G	G/P	Square Bottle - Poly		
NO. OF CONTAINER(S)	1	1	1	1	1	1		
VOLUME	250mL	250mL	250mL	125g	500mL	500mL		
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS	SEE ITEM (4) IN SPECIAL INSTRUCTIONS	SEE ITEM (5) IN SPECIAL INSTRUCTIONS	SEE ITEM (6) IN SPECIAL INSTRUCTIONS		

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME								
B1TNR0 W08GRW836	SOIL	APR 0 1 2008	0820	✓	✓	✓	✓	✓	✓		
				013268	013268	013268	024875	029078	N/A		

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
	APR 0 1 2008 1035	T A Frazier	4/1/08 1035

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS
SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

ICED

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

A-6003-618(01/06)

Fluor Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F08-070-025	PAGE 2 OF 2
COLLECTOR NCO SAMPLER	**COMPANY CONTACT** TRENT, STEVE	**TELEPHONE NO.** 373-5869	**PROJECT COORDINATOR** WIDRIG, DL	**PRICE CODE** 8N **AIR QUALITY** ☐	**DATA TURNAROUND** 45 Days / 45 Days
SAMPLING LOCATION C5857, I-098	**PROJECT DESIGNATION** 200-TW-1 OU Characterization for Well 299-E33-342 - Soil		**SAF NO.** F08-070		
ICE CHEST NO.	**FIELD LOGBOOK NO.**	**ACTUAL SAMPLE DEPTH**	**COA** 123163ES20	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	
SHIPPED TO Waste Sampling & Characterization	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

SPECIAL INSTRUCTIONS

** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
(1)ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Cobalt, Manganese, Vanadium, Zinc} ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Selenium, Strontium, Thallium, Uranium} ICP Metals - 6010B (TAL) {Aluminum, Copper, Iron, Nickel, Silver, Sodium} ICP Metals - 6010B (Add-On) {Boron, Lithium} 200.8_HG - ICPMS; Cations (IC) - 300.7 {Nitrogen in ammonium}
(2)Alcohols, Glycols, & Ketones - 8015 {Diethyl ether, Ethylene glycol}
(3)Semi-VOA - 8270B (TCL); Semi-VOA - 8270B (Add-On) {3+4 Methylphenol (cresol, m+p), Tributyl phosphate}
(4)TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - kerosene range}
(5)Cyanide (Total) - 335.2; IC Anions - 300.0 {Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphate, Sulfate}
(6)Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226} Gamma Spec - Add-on {Antimony-125, Radium-228} Isotopic Plutonium; Isotopic Uranium; Neptunium-237; Strontium-89,90 -- Total Sr; Americium-241;

A-6003-618(01/06)

Fluor Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F08-070-023	PAGE 1 OF 2

COLLECTOR	COMPANY CONTACT	TELEPHONE NO.	PROJECT COORDINATOR	PRICE CODE 8N	DATA TURNAROUND
NCO SAMPLER	TRENT, STEVE	373-5869	WIDRIG, DL	AIR QUALITY ☐	45 Days / 45 Days

SAMPLING LOCATION	PROJECT DESIGNATION	SAF NO.
C5857, I-098	200-TW-1 OU Characterization for Well 299-E33-342 - Soil	F08-070

ICE CHEST NO.	FIELD LOGBOOK NO.	ACTUAL SAMPLE DEPTH	COA	METHOD OF SHIPMENT
	HNF N. 488.1 p.12	189.8 - 192.3	123163ES20	GOVERNMENT VEHICLE

SHIPPED TO	OFFSITE PROPERTY NO.	BILL OF LADING/AIR BILL NO.
Waste Sampling & Characterization	N/A	N/A

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

POSSIBLE SAMPLE HAZARDS/ REMARKS
Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR but are not releasable per DOE Order 5400.5 (1990/1993)

SPECIAL HANDLING AND/OR STORAGE
Radioactive Tie To B1TNP7

PRESERVATION	Cool~4C	Cool <-7C and >-20C
TYPE OF CONTAINER	aGs*	aGs*
NO. OF CONTAINER(S)	3	5
VOLUME	40mL	40mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B1TNP8 837	SOIL	APR 01 2008	0820	✓	✓

621500 →

CHAIN OF POSSESSION	DATE/TIME	SIGN/ PRINT NAMES	DATE/TIME
RELINQUISHED BY/REMOVED FROM	APR 01 2008 1055	RECEIVED BY/STORED IN T A Frazier	4/1/08 1055
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS
SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

ICED

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

A-6003-618(01/06)

Fluor Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F08-070-023	PAGE 2 OF 2
COLLECTOR NCO SAMPLER	**COMPANY CONTACT** TRENT, STEVE	**TELEPHONE NO.** 373-5869	**PROJECT COORDINATOR** WIDRIG, DL	**PRICE CODE** 8N	**DATA TURNAROUND**
SAMPLING LOCATION C5857, I-098	**PROJECT DESIGNATION** 200-TW-1 OU Characterization for Well 299-E33-342 - Soil		**SAF NO.** F08-070	**AIR QUALITY** ☐	**45 Days / 45 Days**
ICE CHEST NO.	**FIELD LOGBOOK NO.**	**ACTUAL SAMPLE DEPTH**	**COA** 123163ES20	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	
SHIPPED TO Waste Sampling & Characterization	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

SPECIAL INSTRUCTIONS

** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
** Analytical batch QC must be run on a sample associated with this SAF.
** All VOA samples will be collected using EPA Method 5035A.
** VOA sample bottle sets will include 3 bottles for high level analysis, 5 bottles for low level analysis, and 1 methanol process control sample.
** The laboratory is to use one of the low level VOA bottles for moisture content determination.
** VOA bottles will be labeled with an appended suffix of K, L, M, N, or P for low level and W, X, or Y for high level. These suffixes are for the purpose of providing bottle weights to the laboratories. These suffixes should not be include as part of the sample ID reported in the final data packages.
(1)VOA - 5035/8260 (HIGH LEVEL); VOA - 5035/8260 (HIGH LEVEL) - (Add-On) {1-Butanol, Trichloromonofluoromethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene}
(2)VOA - 5035/8260 (LOW LEVEL); VOA - 5035/8260 (LOW LEVEL) - (Add-On) {1-Butanol, Trichloromonofluoromethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene}

Fluor Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F08-070-024	PAGE 1 OF 1

COLLECTOR	COMPANY CONTACT	TELEPHONE NO.	PROJECT COORDINATOR	PRICE CODE	8N	DATA TURNAROUND
NCO SAMPLER	TRENT, STEVE	373-5869	WIDRIG, DL			
SAMPLING LOCATION	**PROJECT DESIGNATION**		**SAF NO.**	**AIR QUALITY**	☐	45 Days / 45 Days
C5857, I-098	200-TW-1 OU Characterization for Well 299-E33-342 - Soil		F08-070			
ICE CHEST NO.	**FIELD LOGBOOK NO.**	**ACTUAL SAMPLE DEPTH**	**COA**	**METHOD OF SHIPMENT**		
	HNF-N-488-1 pg 12	189.8-192.3	123163ES20	GOVERNMENT VEHICLE		
SHIPPED TO	**OFFSITE PROPERTY NO.**		**BILL OF LADING/AIR BILL NO.**			
Waste Sampling & Characterization	N/A		N/A			

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

POSSIBLE SAMPLE HAZARDS/ REMARKS
Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR but are not releasable per DOE Order 5400.5 (1990/1993)

SPECIAL HANDLING AND/OR STORAGE
Radioactive Tie To B1TNP7

PRESERVATION	Cool~4C
TYPE OF CONTAINER	aGs*
NO. OF CONTAINER(S)	1
VOLUME	40mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B1TNP9 339	SOIL	APR 0 1 2008	0820	✓

621960

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
[signature] APR 0 1 2008	1055	T A Frazier [signature]	4/1/08 1055
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
** Analytical batch QC must be run on a sample associated with this SAF.
** All VOA samples will be collected using EPA Method 5035A.
(1)VOA - 5035/8260 (TCL); VOA - 5035/8260 - (Add-On) {1-Butanol, Trichloromonofluoromethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene}

ICED

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

A-6003-618(01/06)

Appendix 5

Data Validation Supporting Documentation

APPENDIX A

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: 200 TW 1 & 2			DATA PACKAGE: VSR10-020		
VALIDATOR: Carl Schloesslin		LAB: Eberline and WSCF		DATE: 6-14-2010	
			SDG: H3702 & WSCF20080683		
ANALYSES PERFORMED					
Gross Alpha/Beta	Strontium-90	Technetium-99 X	Alpha Spectroscopy X	Gamma Spectroscopy	
Total Uranium	Radium-226, Radium-228 X	Tritium X	Carbon-14 X	Nickel-63 X	Iodine-129 X

SAMPLES/MATRIX Soil sample

SDG H3702: B1TNR0
SDG WSCF20080683: B1TNR0 - per VSR, validated Np-237 only for this SDG

1. Completeness ..... ☐ N/A

Technical verification forms present?.....Yes (No) N/A

Comments: None

2. Initial Calibration (Levels D, E) ..... ☒ N/A

Instruments/detectors calibrated?.....Yes No N/A

Initial calibration acceptable? .....Yes No N/A

Standards NIST traceable?.....Yes No N/A

Standards Expired? .....Yes No N/A

Calculation check acceptable? .....Yes No N/A

Comments:

3. Continuing Calibration (Levels D, E) ..... ☒ N/A

Calibration checked within required frequency? ..... Yes No N/A

Calibration check acceptable? ..... Yes No N/A

Calibration check standards traceable? ..... Yes No N/A

Calibration check standards expired? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments:

4. Background Counts (Levels D, E) ..... ☒ N/A

Background Counts checked within required frequency? ..... Yes No N/A

Background Counts acceptable? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments:

5. Blanks (Levels B, C, D, E) ..... ☐ N/A

Method blank analyzed within required frequency?.....Yes No N/A
Method blank results acceptable? .....Yes No N/A
Analytes detected in method blank? .....Yes No N/A
Field blank(s) analyzed? .....Yes No N/A
Field blank results acceptable? .....Yes No N/A
Analytes detected in field blank(s)?.....Yes No N/A
Transcription/Calculation Errors? (Levels D, E).....Yes No N/A
Comments: None

6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E) ..... ☐ N/A

LCS /BSS analyzed within required frequency? .....Yes No N/A
LCS/BSS recoveries acceptable?.....Yes No N/A
LCS/BSS traceable? (Levels D,E) .....Yes No N/A
LCS/BSS expired? (Levels D,E).....Yes No N/A
LCS/BSS levels correct? (Levels D,E) .....Yes No N/A
Transcription/Calculation Errors? (Levels D, E).....Yes No N/A
Comments: None

7. Chemical Carrier Recovery (Levels C, D, E) ..... ☐ N/A

Chemical carrier added? .....Yes No N/A
Chemical recovery acceptable?.....Yes No N/A
Chemical carrier traceable? (Levels D, E).....Yes No N/A

Chemical carrier expired? (Levels D, E) .....Yes No N/A

Transcription/Calculation errors? (Levels D, E).....Yes No N/A

Comments: None

8. Tracer Recovery (Levels C, D, E) ..... ☐ N/A

Tracer added?.....Yes No N/A

Tracer recovery acceptable? .....Yes No N/A

Tracer traceable? (Levels D, E) .....Yes No N/A

Tracer expired? (Levels D, E).....Yes No N/A

Transcription/Calculation errors? (Levels D, E).....Yes No N/A

Comments:

Tracer recovery for Tc-99 lab blank = 106% - does not affect field sample data.

9. Matrix Spikes (Levels C, D, E)..... ☐ N/A

Matrix spike analyzed? .....Yes No N/A

Spike recoveries acceptable? .....Yes No N/A

Spike source traceable? (Levels D, E) .....Yes No N/A

Spike source expired? Levels D, E).....Yes No N/A

Transcription/Calculation Errors? (Levels D, E) .....Yes No N/A

Comments:

H3702: Matrix spikes not performed for H-3, C-14 and Ra-226 analyses.

10. Duplicates (Levels C, D, E) ..... ☐ N/A

Duplicates Analyzed at required frequency? ..... Yes No N/A

RPD Values Acceptable? ..... Yes No N/A

Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A

Comments: None

11. Field QC Samples (Levels C, D E) ..... ☐ N/A

Field duplicate sample(s) analyzed? ..... Yes No N/A

Field duplicate RPD values acceptable? ..... Yes No N/A

Field split sample(s) analyzed? ..... Yes No N/A

Field split RPD values acceptable? ..... Yes No N/A

Performance audit sample(s) analyzed? ..... Yes No N/A

Performance audit sample results acceptable? ..... Yes No N/A

Comments: None

12. Holding Times (All levels)

Are sample holding times acceptable? ..... Yes No N/A

Comments: None

13. Results and Detection Limits (All Levels) ☐ N/A

Results reported for all required sample analyses? Yes No N/A

Results supported in raw data?(Levels D, E) Yes No N/A

Results Acceptable? (Levels D, E) Yes No N/A

Transcription/Calculation errors? (Levels D, E) Yes No N/A

MDA's meet required detection limits? Yes No N/A

Transcription/calculation errors? (Levels D, E) Yes No N/A

Comments: None

Appendix 6

Additional Documentation Requested By Client

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3702

7087-003 **Method Blank**

METHOD BLANK

SDG	7087	Client/Case no	Hanford	SDG_H3702	
Contact	Melissa C. Mannion	Contract	No. 33677		
Lab sample id	R804167-03	Client sample id	Method Blank		
Dept sample id	7087-003	Material/Matrix		SOLID	
		SAF No	F08-070		

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	0.514	2.8	4.78	400	U	H
Carbon 14	14762-75-5	2.12	2.3	3.75	50.0	U	C
Nickel 63	13981-37-8	-1.45	1.8	3.16	30.0	U	NI_L
Technetium 99	14133-76-7	-0.005	0.14	0.486	12.0	U	TC
Thorium 228	14274-82-9	0.156	0.25	0.418	1.00	U	TH
Thorium 230	14269-63-7	0.031	0.19	0.237	1.00	U	TH
Thorium 232	TH-232	-0.031	0.062	0.237	1.00	U	TH
Iodine 129	15046-84-1	-0.273	0.58	1.32	2.00	U	I
Radium 226	13982-63-3	0	0.037	0.071	0.100	U	RA
Radium 228	15262-20-1	-0.192	0.35	0.978	1.00	U	AC

200TW1 OU Charactrzn 299E33342-Soil

QC-BLANK #65614

Lab id	EBRLNE
Protocol	Fluor
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	06/13/08

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3702

7087-002

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7087

Contact Melissa C. Mannion

Client/Case no Hanford SDG H3702

Contract No. 33677

Lab sample id R804167-02

Dept sample id 7087-002

Client sample id Lab Control Sample

Material/Matrix SOLID

SAF No F08-070

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Tritium	581	14	5.25	400		H	615	25	94	84-116	80-120
Carbon 14	1480	14	3.46	50.0		C	1600	64	92	85-115	80-120
Nickel 63	246	6.1	3.15	30.0		NI_L	266	11	92	83-117	80-120
Technetium 99	110	2.4	0.542	12.0		TC	120	4.8	92	81-119	80-120
Thorium 230	20.7	2.2	0.214	1.00		TH	21.9	0.88	95	80-120	80-120
Iodine 129	134	1.5	1.88	2.00		I	127	5.1	106	69-131	80-120
Radium 226	6.41	0.32	0.082	0.100		RA	5.58	0.22	115	70-130	80-120
Radium 228	8.88	0.66	0.967	1.00		AC	9.52	0.38	93	81-119	80-120

200TW1 OU Charactrzn 299E33342-Soil

QC-LCS #65613

Lab id EBRLNE
Protocol Fluor
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 06/13/08

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3702

7087-004 B1TNR0

DUPLICATE

SDG	7087			Client/Case no	Hanford SDG H3702
Contact	Melissa C. Mannion			Contract	No. 33677
DUPLICATE		ORIGINAL			
Lab sample id	R804167-04	Lab sample id	R804167-01	Client sample id	B1TNR0
Dept sample id	7087-004	Dept sample id	7087-001	Location/Matrix	C5857, I-098 SOLID
		Received	04/29/08	Collected/Weight	04/01/08 08:20 157 g
% solids	89.3	% solids	89.3	Custody/SAF No	F08-070-028 F08-070

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI-FIERS	RPD %	3σ TOT	DER σ
Tritium	0.729	2.5	4.32	400	U	H	0	2.5	4.28	U	-		0.4
Carbon 14	15.8	2.2	3.02	50.0		C	16.8	2.3	3.02		6	36	0.5
Nickel 63	-3.91	2.6	4.60	30.0	U	NI_L	-1.50	1.9	3.27	U	-		1.5
Technetium 99	4.08	0.36	0.489	12.0		TC	3.98	0.30	0.288		2	33	0.2
Thorium 228	0.494	0.31	0.341	1.00		TH	0.832	0.36	0.366		51	109	1.4
Thorium 230	0.522	0.31	0.235	1.00		TH	0.473	0.30	0.226		10	131	0.2
Thorium 232	0.645	0.31	0.235	1.00		TH	0.769	0.30	0.226		18	93	0.6
Iodine 129	-0.296	0.68	1.56	2.00	U	I	0.090	0.59	1.35	U	-		0.9
Radium 226	0.558	0.098	0.078	0.100		RA	0.608	0.10	0.084		9	50	0.5
Radium 228	1.66	0.44	0.989	1.00		AC	1.65	0.44	0.999		1	61	0

200TW1 OU Charactrzn 299E33342-Soil

QC-DUP#1 65615

Lab id	EBRLNE
Protocol	Fluor
Version	Ver 1.0
Form	DVD-DUP
Version	3.06
Report date	06/13/08

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3702

Test TH Matrix SOLID
SDG 7087
Contact Melissa C. Mannion

LAB METHOD SUMMARY

THORIUM, ISOTOPIC IN SOLIDS

ALPHA SPECTROSCOPY

Client Hanford
Contract No. 33677
Contract SDG H3702

RESULTS

LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	CLIENT SAMPLE ID	Thorium 230
Preparation batch 6150-050					
R804167-01			7087-001	B1TNR0	0.473
R804167-02			7087-002	Lab Control Sample	ok
R804167-03			7087-003	Method Blank	U
R804167-04			7087-004	Duplicate (R804167-01)	ok
Nominal values and limits from method 200TW1 OU Charactrzn 299E33342-Soil				RDLs (pCi/g)	1.00

METHOD PERFORMANCE

LAB SAMPLE ID	RAW TEST	SUF-FIX	CLIENT SAMPLE ID	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6150-050 2σ prep error 8.0 % Reference Lab Notebook #6150, pg. 55																
R804167-01			B1TNR0	0.366	0.250			90		174			63	06/02/08	06/03	SS-061
R804167-02			Lab Control Sample	0.214	0.250			87		186				06/02/08	06/05	SS-037
R804167-03			Method Blank	0.418	0.250			84		186				06/02/08	06/05	SS-038
R804167-04			Duplicate (R804167-01)	0.341	0.250			86		174			63	06/02/08	06/03	SS-064
Nominal values and limits from method				1.00	0.250			20-105		150			180			

PROCEDURES	REFERENCE	THISO_IE_PLATE_AEA
	SPP-061	Determination of Moisture Content in Solid Samples rev 0
	SPP-071	Soil Dissolution, > 1.0g Aliquot, rev 5
	CP-900	Thorium in Water and Dissolved Solid Samples by Extraction Chromatography, rev 1
	CP-008	Heavy Element Electroplating, rev 9

AVERAGES ± 2 SD FOR 4 SAMPLES				
MDA	0.335	±	0.173
YIELD	87	±	5

Lab id EBRLNE
Protocol Fluor
Version Ver 1.0
Form DVD-LMS
Version 3.06
Report date 06/13/08

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3702

Test AC Matrix SOLID
SDG 7087
Contact Melissa C. Mannion

LAB METHOD SUMMARY

RADIUM 228 IN SOLIDS

BETA COUNTING

Client Hanford
Contract No. 33677
Contract SDG H3702

RESULTS

LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	CLIENT SAMPLE ID	Radium 228
Preparation batch 6150-050					
R804167-01			7087-001	B1TNR0	1.65
R804167-02			7087-002	Lab Control Sample	ok
R804167-03			7087-003	Method Blank	U
R804167-04			7087-004	Duplicate (R804167-01)	ok
Nominal values and limits from method				RDLs (pCi/g)	1.00
200TW1 OU Charactrzn 299E33342-Soil					

METHOD PERFORMANCE

LAB SAMPLE ID	RAW TEST	SUF-FIX	CLIENT SAMPLE ID	MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6150-050			2σ prep error 10.4 % Reference Lab Notebook #6150, pg. 55													
R804167-01			B1TNR0	0.999	1.00			75		150			69	06/09/08	06/09	GRB-221
R804167-02			Lab Control Sample	0.967	1.00			73		150				06/09/08	06/09	GRB-222
R804167-03			Method Blank	0.978	1.00			74		150				06/09/08	06/09	GRB-223
R804167-04			Duplicate (R804167-01)	0.989	1.00			74		150			69	06/09/08	06/09	GRB-224
Nominal values and limits from method				1.00	1.00					100			180			

PROCEDURES	REFERENCE	RAISO_SEP_GPC
	SPP-071	Soil Dissolution, > 1.0g Aliquot, rev 5
	DWP-894	Sequential Separation of Actinium-228 and Radium-226 in Drinking Water (>1 Liter Aliquot), rev 0

AVERAGES ± 2 SD FOR 4 SAMPLES				
MDA	0.983	±	0.028
YIELD	74	±	2

Lab id EBRLNE
Protocol Fluor
Version Ver 1.0
Form DVD-LMS
Version 3.06
Report date 06/13/08

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3702

Test TC Matrix SOLID
SDG 7087
Contact Melissa C. Mannion

LAB METHOD SUMMARY

TECHNETIUM 99 IN SOLIDS

BETA COUNTING

Client Hanford
Contract No. 33677
Contract SDG H3702

RESULTS

LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	CLIENT SAMPLE ID	Technetium 99
Preparation batch 6150-050					
R804167-01			7087-001	B1TNR0	3.98
R804167-02			7087-002	Lab Control Sample	ok
R804167-03			7087-003	Method Blank	U
R804167-04			7087-004	Duplicate (R804167-01)	ok
Nominal values and limits from method				RDLs (pCi/g)	12.0

200TW1 OU Charactrzn 299E33342-Soil

METHOD PERFORMANCE

LAB SAMPLE ID	RAW TEST	SUF-FIX	CLIENT SAMPLE ID	MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6150-050			2σ prep error 13.2 % Reference Lab Notebook #6150, pg. 55													
R804167-01			B1TNR0	0.288	1.00			91		178			58	05/22/08	05/29	GRB-230
R804167-02			Lab Control Sample	0.542	1.00			100		50				05/22/08	05/27	GRB-232
R804167-03			Method Blank	0.486	1.00			106		50				05/22/08	05/27	GRB-222
R804167-04			Duplicate (R804167-01)	0.489	1.00			58		178			58	05/22/08	05/29	GRB-231
Nominal values and limits from method				12.0	1.00			20-105		50			180			

PROCEDURES	REFERENCE	TC99_TR_SEP_GPC
	SPP-062	Sample Aliquoting, rev 0
	CP-431	Technetium-99 Purification of Soil or Resin by Extraction Chromatography, rev 2
	CP-008	Heavy Element Electroplating, rev 9

AVERAGES ± 2 SD	MDA	0.451	± 0.224
FOR 4 SAMPLES	YIELD	89	± 43

Lab id EBRLNE
Protocol Fluor
Version Ver 1.0
Form DVD-LMS
Version 3.06
Report date 06/13/08

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3702

Test I Matrix SOLID
SDG 7087
Contact Melissa C. Mannion

LAB METHOD SUMMARY

IODINE 129 IN SOLIDS

GAMMA SPECTROSCOPY

Client Hanford
Contract No. 33677
Contract SDG H3702

RESULTS

LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	CLIENT SAMPLE ID	Iodine 129	
Preparation batch 6150-050						
R804167-01			7087-001	B1TNR0	U	
R804167-02			7087-002	Lab Control Sample	ok	
R804167-03			7087-003	Method Blank	U	
R804167-04			7087-004	Duplicate (R804167-01)	-	U
Nominal values and limits from method				RDLs (pCi/g)	2.00	
200TW1 OU Charactrzn 299E33342-Soil						

METHOD PERFORMANCE

LAB SAMPLE ID	RAW TEST	SUF-FIX	CLIENT SAMPLE ID	MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6150-050			2σ prep error 19.4 % Reference Lab Notebook #6150, pg. 55													
R804167-01			B1TNR0	1.35	1.00			59		808			65	06/05/08	06/05	XSPEC-004
R804167-02			Lab Control Sample	1.88	1.00			81		808				06/05/08	06/05	XSPEC-002
R804167-03			Method Blank	1.32	1.00			78		623				06/05/08	06/06	XSPEC-004
R804167-04			Duplicate (R804167-01)	1.56	1.00			68		623			66	06/05/08	06/06	XSPEC-002
Nominal values and limits from method				2.00	1.00			20-105		300			180			

PROCEDURES	REFERENCE	I129_SEP_LEPS_GS
	SPP-062	Sample Aliquoting, rev 0
	SPP-060	Soil Preparation, rev 0
	CP-024	Iodine-129, Sample Dissolution, rev 5
	CP-530	Iodine-129 Purification, rev 1

AVERAGES ± 2 SD FOR 4 SAMPLES				
MDA	1.53	±	0.516
YIELD	72	±	20

Lab id EBRLNE
Protocol Fluor
Version Ver 1.0
Form DVD-LMS
Version 3.06
Report date 06/13/08

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3702

Test C Matrix SOLID
SDG 7087
Contact Melissa C. Mannion

LAB METHOD SUMMARY

CARBON 14 IN SOLIDS

LIQUID SCINTILLATION COUNTING

Client Hanford
Contract No. 33677
Contract SDG H3702

RESULTS

LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	CLIENT SAMPLE ID	Carbon 14
Preparation batch 6150-050					
R804167-01			7087-001	B1TNR0	16.8
R804167-02			7087-002	Lab Control Sample	ok
R804167-03			7087-003	Method Blank	U
R804167-04			7087-004	Duplicate (R804167-01)	ok
Nominal values and limits from method				RDLs (pCi/g)	50.0

200TW1 OU Charactrzn 299E33342-Soil

METHOD PERFORMANCE

LAB SAMPLE ID	RAW TEST	SUF-FIX	CLIENT SAMPLE ID	MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6150-050			2σ prep error 10.0 % Reference Lab Notebook #6150, pg. 55													
R804167-01			B1TNR0	3.02	0.458			100		50			62	05/29/08	06/02	LSC-004
R804167-02			Lab Control Sample	3.46	0.400			100		50				05/29/08	06/02	LSC-004
R804167-03			Method Blank	3.75	0.400			100		50				05/29/08	06/02	LSC-004
R804167-04			Duplicate (R804167-01)	3.02	0.456			100		50			62	05/29/08	06/02	LSC-004
Nominal values and limits from method				50.0	0.400					10			180			

PROCEDURES REFERENCE C14_COX_LSC
CP-251 Tritium/Carbon-14 Oxidation, rev 8

AVERAGES ± 2 SD FOR 4 SAMPLES
MDA 3.31 ± 0.716
YIELD 100 ± 0

Lab id EBRLNE
Protocol Fluor
Version Ver 1.0
Form DVD-LMS
Version 3.06
Report date 06/13/08

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3702

Test H Matrix SOLID
SDG 7087
Contact Melissa C. Mannion

LAB METHOD SUMMARY

TRITIUM IN SOLIDS

LIQUID SCINTILLATION COUNTING

Client Hanford
Contract No. 33677
Contract SDG H3702

RESULTS

LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	CLIENT SAMPLE ID	Tritium	
Preparation batch 6150-050						
R804167-01			7087-001	B1TNR0	U	
R804167-02			7087-002	Lab Control Sample	ok	
R804167-03			7087-003	Method Blank	U	
R804167-04			7087-004	Duplicate (R804167-01)	-	U

Nominal values and limits from method RDLs (pCi/g) 400
200TW1 OU Charactrzn 299E33342-Soil

METHOD PERFORMANCE

LAB SAMPLE ID	RAW TEST	SUF-FIX	CLIENT SAMPLE ID	MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6150-050			2σ prep error 10.0 % Reference Lab Notebook #6150, pg. 55													
R804167-01			B1TNR0	4.28	0.458			100		50			59	05/29/08	05/30	LSC-006
R804167-02			Lab Control Sample	5.25	0.400			100		50				05/29/08	05/30	LSC-006
R804167-03			Method Blank	4.78	0.400			100		50				05/29/08	05/30	LSC-006
R804167-04			Duplicate (R804167-01)	4.32	0.456			100		50			59	05/29/08	05/30	LSC-006
Nominal values and limits from method				400	0.400					25			180			

PROCEDURES REFERENCE TRITIUM_COX_LSC
CP-251 Tritium/Carbon-14 Oxidation, rev 8

AVERAGES ± 2 SD MDA 4.66 ± 0.911
FOR 4 SAMPLES YIELD 100 ± 0

Lab id EBRLNE
Protocol Fluor
Version Ver 1.0
Form DVD-LMS
Version 3.06
Report date 06/13/08

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3702

Test NI L Matrix SOLID
SDG 7087
Contact Melissa C. Mannion

LAB METHOD SUMMARY

NICKEL 63 IN SOLIDS

LIQUID SCINTILLATION COUNTING

Client Hanford
Contract No. 33677
Contract SDG H3702

RESULTS

LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	CLIENT SAMPLE ID	Nickel 63	
Preparation batch 6150-050						
R804167-01			7087-001	B1TNR0	U	
R804167-02			7087-002	Lab Control Sample	ok	
R804167-03			7087-003	Method Blank	U	
R804167-04			7087-004	Duplicate (R804167-01)	-	U
Nominal values and limits from method				RDLs (pCi/g)	30.0	

200TW1 OU Charactrzn 299E33342-Soil

METHOD PERFORMANCE

LAB SAMPLE ID	RAW TEST	SUF-FIX	CLIENT SAMPLE ID	MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6150-050			2σ prep error 11.2 % Reference Lab Notebook #6150, pg. 55													
R804167-01			B1TNR0	3.27	0.500			92		50			57	05/28/08	05/28	LSC-004
R804167-02			Lab Control Sample	3.15	0.500			96		50				05/28/08	05/28	LSC-004
R804167-03			Method Blank	3.16	0.500			96		50				05/28/08	05/28	LSC-004
R804167-04			Duplicate (R804167-01)	4.60	0.500			67		50			57	05/28/08	05/28	LSC-004
Nominal values and limits from method				30.0	0.500			30-105		25			180			

PROCEDURES	REFERENCE	NI63_LSC
	SPP-071	Soil Dissolution, > 1.0g Aliquot, rev 5
	CP-280	Nickel-63 Purification, rev 3

AVERAGES ± 2 SD FOR 4 SAMPLES				
	MDA	3.54	±	1.41
	YIELD	88	±	28

Lab id EBRLNE
Protocol Fluor
Version Ver 1.0
Form DVD-LMS
Version 3.06
Report date 06/13/08

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3702

Test RA Matrix SOLID
SDG 7087
Contact Melissa C. Mannion

LAB METHOD SUMMARY

RADIUM 226 IN SOLIDS

RADON COUNTING

Client Hanford
Contract No. 33677
Contract SDG H3702

RESULTS

LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	CLIENT SAMPLE ID	Radium 226
Preparation batch 6150-050					
R804167-01			7087-001	B1TNR0	0.608
R804167-02			7087-002	Lab Control Sample	ok
R804167-03			7087-003	Method Blank	U
R804167-04			7087-004	Duplicate (R804167-01)	ok
Nominal values and limits from method				RDLs (pCi/g)	0.100

200TW1 OU Charactrzn 299E33342-Soil

METHOD PERFORMANCE

LAB SAMPLE ID	RAW TEST	SUF-FIX	CLIENT SAMPLE ID	MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6150-050			2σ prep error 16.4 % Reference Lab Notebook #6150, pg. 55													
R804167-01			B1TNR0	0.084	1.00			100		73			56	05/27/08	05/27	RN-011
R804167-02			Lab Control Sample	0.082	1.00			100		73				05/27/08	05/27	RN-012
R804167-03			Method Blank	0.071	1.00			100		73				05/27/08	05/27	RN-013
R804167-04			Duplicate (R804167-01)	0.078	1.00			100		73			56	05/27/08	05/27	RN-014
Nominal values and limits from method				0.100	1.00			20-105		50			180			

PROCEDURES REFERENCE 903.1_RA226_LUC
SPP-071 Soil Dissolution, > 1.0g Aliquot, rev 5
CP-881 Radium-226 in Water and Dissolved Samples, rev 1

AVERAGES ± 2 SD FOR 4 SAMPLES
MDA 0.079 ± 0.011
YIELD 100 ± 0

Lab id EBRLNE
Protocol Fluor
Version Ver 1.0
Form DVD-LMS
Version 3.06
Report date 06/13/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Radiochemistry

SDG Number: WSCF20080683
Matrix: SOLID
Test: Neptunium by AEA

Sample Date: 04/01/08
Receive Date:04/01/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W08GR00836											
BATCH QC ASSOCIATED WITH SAMPLE											
DUP	Neptunium-237	13994-20-2	U4.8e-3		RPD			n/a	25.000		05/08/08
MS	Neptunium-237	13994-20-2	97.67	97.670	% Recov	75.000	125.000				05/08/08
MSD	Neptunium-237	13994-20-2	88.4	88.400	% Recov	75.000	125.000				05/08/08
SPK-RPD	Neptunium-237	13994-20-2	88.400		% RPD			9.964	20.000		05/08/08
Lab ID: W08GR01029											
BATCH QC ASSOCIATED WITH SAMPLE											
MS	Neptunium-237	13994-20-2	97.388	97.388	% Recov	75.000	125.000				05/08/08
Lab ID: W08GR01033											
BATCH QC ASSOCIATED WITH SAMPLE											
MS	Neptunium-237	13994-20-2	92.3	92.300	% Recov	75.000	125.000				05/08/08
Lab ID: W08GR01038											
BATCH QC ASSOCIATED WITH SAMPLE											
MS	Neptunium-237	13994-20-2	105.1	105.100	% Recov	75.000	125.000				05/08/08
BATCH QC											
BLANK	Neptunium-237	13994-20-2	U8.2e-3	n/a	pCi/G	-10.000	1000.000				05/08/08
LCS	Neptunium-237	13994-20-2	11.96	93.841	% Recov	80.000	120.000				05/08/08