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Data Validation Report for CH2M Hill Plateau Remediation Company

VSR10-019
Project CPP 200 Area

Chemical & Radiochemical Validation - Level C

Validation Performed By: Carl Schlosser **Date:** 6-01-2010

Validation Reviewed By: Cheryl A. Schlosser **Date:** 6-01-2010

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Date: 01 June 2010
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: CPP 200 Area
Subject: Volatile Organics - Sample Data Group (SDG) WSCF20091170

INTRODUCTION

This memorandum presents the results of data validation for SDG WSCF20091170 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
B22V32	11/12/2009	Soil	C	8260

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 and 2-butanone. These eight analytes were non-detects in sample B22V32 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 and 2-butanone. These eight analytes were non-detects in sample B22V32 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 WSCF20091170 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: WSCF20091170	Reviewer: AQA	Project: CPP 200 Area	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	UJ	B22V32	Non-represented MS/MSD and LCS data

Comments: None

Appendix 3

Annotated Laboratory Reports

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-025
Sample # W09GR00995
Client ID: B22V32 GPP WSCF

Matrix: SOIL

Group #: WSCF20091170
Department: Organic
Sampled: 11/12/09
Received: 11/12/09

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	< 0.830	ug/kg			1.00	0.83		11/17/09
Trichloroethene	79-01-6	LA-523-455	U	< 0.170	ug/kg			1.00	0.17		11/17/09
Benzene	71-43-2	LA-523-455	U	< 0.830	ug/kg			1.00	0.83		11/17/09
Toluene	108-88-3	LA-523-455	U	< 0.830	ug/kg			1.00	0.83		11/17/09
Chlorobenzene	108-90-7	LA-523-455	U	< 0.830	ug/kg			1.00	0.83		11/17/09
1,1-Dichloroethane	75-34-3	LA-523-455	U	< 0.830	ug/kg			1.00	0.83		11/17/09
Ethylbenzene	100-41-4	LA-523-455	U	< 0.830	ug/kg			1.00	0.83		11/17/09
Styrene	100-42-5	LA-523-455	U	< 0.830	ug/kg			1.00	0.83		11/17/09
cis-1,3-Dichloropropene	10061-01-5	LA-523-455	U	< 0.830	ug/kg	UJ		1.00	0.83		11/17/09
trans-1,3-Dichloropropene	10061-02-6	LA-523-455	U	< 0.830	ug/kg	UJ		1.00	0.83		11/17/09
1,2-Dichloroethane	107-06-2	LA-523-455	U	< 0.830	ug/kg			1.00	0.83		11/17/09
4-Methyl-2-Pentanone	108-10-1	LA-523-455	U	< 0.830	ug/kg	UJ		1.00	0.83		11/17/09
Dibromochloromethane	124-48-1	LA-523-455	U	< 0.830	ug/kg			1.00	0.83		11/17/09
Tetrachloroethene	127-18-4	LA-523-455	U	< 0.830	ug/kg			1.00	0.83		11/17/09
Xylenes (total)	1330-20-7	LA-523-455	U	< 0.830	ug/kg			1.00	0.83		11/17/09
1,2-Dichloroethene(Total)	540-59-0	LA-523-455	U	< 0.830	ug/kg			1.00	0.83		11/17/09
Carbon tetrachloride	56-23-5	LA-523-455	U	< 0.830	ug/kg			1.00	0.83		11/17/09
2-Hexanone	591-78-6	LA-523-455	U	< 0.830	ug/kg	UJ		1.00	0.83		11/17/09
Acetone	67-64-1	LA-523-455	U	< 0.830	ug/kg	UJ		1.00	0.83		11/17/09
Chloroform	67-66-3	LA-523-455	U	< 0.830	ug/kg			1.00	0.83		11/17/09
1,1,1-Trichloroethane	71-55-6	LA-523-455	U	< 0.830	ug/kg			1.00	0.83		11/17/09
Bromomethane	74-83-9	LA-523-455	U	< 0.830	ug/kg			1.00	0.83		11/17/09
Chloromethane	74-87-3	LA-523-455	U	< 0.830	ug/kg	<5		1.00	0.83		11/17/09
Chloroethane	75-00-3	LA-523-455	U	< 0.830	ug/kg	6-01-2010		1.00	0.83		11/17/09

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

B - The analyte < the RDL but > = the IDL/MDL (inorg)
D - Analyte was identified at a secondary dilution factor
E - Analyte is an estimate, has potentially larger errors(inorg)
U - Analyzed for but not detected above limiting criteria(inorg)

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

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

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-025
Sample # W09GR00995
Client ID: B22V32 GPP WSCF

Matrix: SOIL

Group #: WSCF20091170
Department: Organic
Sampled: 11/12/09
Received: 11/12/09

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
Vinyl chloride	75-01-4	LA-523-455	U	< 0.830	ug/kg			1.00	0.83		11/17/09
Methylenechloride	75-09-2	LA-523-455	U	< 0.830	ug/kg			1.00	0.83		11/17/09
Carbon disulfide	75-15-0	LA-523-455	U	< 0.830	ug/kg	UJ		1.00	0.83		11/17/09
Bromoform	75-25-2	LA-523-455	U	< 0.830	ug/kg			1.00	0.83		11/17/09
Bromodichloromethane	75-27-4	LA-523-455	U	< 0.830	ug/kg	UJ		1.00	0.83		11/17/09
1,2-Dichloropropane	78-87-5	LA-523-455	U	< 0.830	ug/kg			1.00	0.83		11/17/09
2-Butanone	78-93-3	LA-523-455	U	< 0.830	ug/kg	UJ		1.00	0.83		11/17/09
1,1,2-Trichloroethane	79-00-5	LA-523-455	U	< 0.830	ug/kg			1.00	0.83		11/17/09
1,1,2,2-Tetrachloroethane	79-34-5	LA-523-455	U	< 0.830	ug/kg			1.00	0.83		11/17/09
Trichloromonofluoromethane	75-69-4	LA-523-455	U	< 0.830	ug/kg			1.00	0.83		11/17/09
trans-1,2-Dichloroethylene	156-60-5	LA-523-455	U	< 0.830	ug/kg			1.00	0.83		11/17/09
cis-1,2-Dichloroethylene	156-59-2	LA-523-455	U	< 0.830	ug/kg			1.00	0.83		11/17/09

LS
6-01-2010

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)
D - Analyte was identified at a secondary dilution factor
E - Analyte is an estimate, has potentially larger errors(inorg)
U - Analyzed for but not detected above limiting criteria(inorg)

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

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

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Attachment 2
Narrative
WSCF20091170

Introduction

Three (3) S&GRP samples were received at the WSCF Laboratory on November 12, 2009. The samples were analyzed for the analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *Statement of Work (SOW), Modification No. 2 to Agreement 36587, Release 3, "FH WSCF ANALYTICAL SERVICES FOR GROUNDWATER."*

The narrative (Attachment 2) will address sample characteristics, analyses requested and general information in performance of the analytical methods. A Data Summary Report (Attachment 3) includes analytical results, a comment report detailing method abnormalities, tentatively identified peaks if applicable, method references, and Laboratory QC information as applicable. Copies of the chain of custody and sample receipt documentation are included as Attachment 4.

It should be noted that the attached chain of custody was stamped "ICED" by the WSCF Laboratory Sample Custodian during sample receiving, indicating the presence of ice in the transport container.

The following generic data qualifiers (i.e., B, D, and J) may be applicable to this report, as appropriate

- **B** – Sample results with a concentration greater than the MDL but less than the PQL are B flagged (applies to inorganic and wetchem analyses), as appropriate.
- **D** – Sample results are D flagged if dilution(s) were required, as appropriate.
- **J** – Sample results with a concentration greater than the MDL but less than the PQL are J flagged (applies to organic analyses), as appropriate.

Analytical Methodology for Requested Analyses

Refer to *WSCF Method References Report,* pages 14 through 16, for a complete listing of approved analytical methods.

Inorganic Comments

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

- Batch QC analyzed on sample# W0901033 (B22V40 from work group # 20091211)
    - MS/MSD outside normal laboratory limits. Sample results were "N" Flagged.

All other QC controls are within the established limits.

Anions – Hold time requirements for this analysis were met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 20 through 21 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W0901033 (B22V40 from work group # 20091211)
    - Phosphate – Matrix Spike Duplicate slightly outside of laboratory limits. Sample results were "N" flagged.

All other QC controls are within the established limits.

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

All QC controls are within the established limits.

Hexavalent Chromium – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 23 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. See page 24 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W0901072 (B22RJ9 from work group # 20091234)
    - Iron – exceeded spiking levels by a factor of 4. Spike recoveries are not valid.
    - Estimated Boron results due to iron interference. Sample results were "E" flagged.

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

- Batch QC analyzed on sample# W0900956 (B22VR4 from work group # 20091137)
    - Vanadium, Cobalt, Uranium, Beryllium, and Thorium - contamination was detected in the Blank and was evaluated. Affected sample results in this batch were "C" Flagged.
    - Aluminum and Manganese MSD recoveries below 70%. RPDs are greater than 20%. Sample results were "N" flagged.

All other QC controls are within the established limits.

Organic Comments

Sample concentrations are corrected for moisture content 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. See page 36 for QC details. Analytical Note(s):

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. See pages 38 through 43 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W0901005 (B22V37 from work group # 20091176)
    - 2-Fluorophenol LCS is a little high at 114% recovery. No system problems an all MS/MSD recoveries were good.

All other 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 37 for QC details. Analytical Note(s):

All QC controls are within the established limits.

VOA – 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. See pages 44 through 46 for QC details. Analytical Note(s):

- B22V33 – Analyses of this Methanol Blank sample and its associated high concentration VOA samples were not required.

All QC controls are within the established limits.

Radiochemistry Comments

Rad Chem – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike (Matrix Spikes apply only to Technetium), Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 51 through 58 for QC details. Analytical Note(s):

- Gross Alpha, Strontium-89/90 – Duplicate Relative Percent Differences (RPD) exceeded established laboratory limits. The RPD criterion does not apply to results near or below the minimum detectable activity. No flags issued.

- The Pu-239 LCS recovery is high at 126.12 but within the statement of work range of 70-130%.

- Uranium-233/234 and Uranium-235 prep blanks are detected but are less than 2 times the MDA.

All other QC controls are within the established limits.

We 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 contained in this data package has been authorized by the Analytical Laboratory Manager (or designee) and the Client Services representative as verified by the following signatures.

Scot L. Fitzgerald
WSCF Analytical Laboratory Manager

Richard F Barker 1/12/10
Richard Barker
WSCF Client Services

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F10-025-029

COLLECTOR: Kauer, Renee 12/28/09

COMPANY CONTACT: DYEKMAN, DL

TELEPHONE NO.: 373-2530

PROJECT COORDINATOR: DYEKMAN, DL

PRICE CODE: 8N

DATA TURNAROUND: 45 Days / 45 Days

SAMPLING LOCATION: C7514 (299-E24-25); I-045

PROJECT DESIGNATION: 200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)

SAF NO.: F10-025

AIR QUALITY: ☐

ICE CHEST NO.:

FIELD LOGBOOK NO.: HNF-N-491.5 Pg 18

ACTUAL SAMPLE DEPTH: 90 to 92.5

COA: 302117ES10

METHOD OF SHIPMENT: GOVERNMENT VEHICLE

SHIPPED TO: Waste Sampling & Characterization 20091170

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=Vegetation
W=Water
WI=Wipe
X=Other

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B22V54

PRESERVATION			Cool~4C	Cool~4C	None	Cool~4C	Cool~4C	Cool~4C	None	None
TYPE OF CONTAINER			aG/S	aG	G/P	G/P	G/P	G	Square Bottle - Poly	G/P
NO. OF CONTAINER(S)			3	1	1	1	1	1	1	1
VOLUME			40mL	250mL	120mL	120mL	120mL	60mL	500mL	120mL
SAMPLE ANALYSIS			SEE ITEM (1) IN SPECIAL INSTRUCTIONS ✓	SEE ITEM (2) IN SPECIAL INSTRUCTIONS ✓	SEE ITEM (3) IN SPECIAL INSTRUCTIONS ✓	Chromium Hex - 7196; ✓	SEE ITEM (4) IN SPECIAL INSTRUCTIONS ✓	Total Cyanide - 9014; ✓	SEE ITEM (5) IN SPECIAL INSTRUCTIONS ✓	SEE ITEM (6) IN SPECIAL INSTRUCTIONS ✓
SAMPLE NO.	**MATRIX***	**SAMPLE DATE**	**SAMPLE TIME**							
B22V34	SOIL	11-12-09	0817	✓	✓	✓	✓	✓	✓	✓

W096R00994

ICED

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

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Ed Kauer	11-12-09 1500	MD Kessler	11-12-09 1500

SPECIAL INSTRUCTIONS
SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

ORIGINAL

ICED

LABORATORY SECTION — RECEIVED BY — TITLE — DATE/TIME

FINAL SAMPLE DISPOSITION — DISPOSAL METHOD — DISPOSED BY — DATE/TIME

A-6003-618(01/06)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F10-02S-029	PAGE 2 OF 2
COLLECTOR Kauk, Romo	**COMPANY CONTACT** DYEKMAN, DL	**TELEPHONE NO.** 373-2530	**PROJECT COORDINATOR** DYEKMAN, DL	**PRICE CODE** 8N	**DATA TURNAROUND**
SAMPLING LOCATION C7514 (299-E24-25); I-045	**PROJECT DESIGNATION** 200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)		**SAF NO.** F10-025	**AIR QUALITY** ☐	**45 Days / 45 Days**
ICE CHEST NO.	**FIELD LOGBOOK NO.** HNE-N-491-5 PS18	**ACTUAL SAMPLE DEPTH** 90 to 92.5	**COA** 302117ES10	**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.
** 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)Alcohols, Glycols, & Ketones - 8015 {Ethylene glycol, Diethyl ether}
(2)Semi-VOA - 8270B (TCL); Semi-VOA - 8270B (Add-On) {Tributyl phosphate, 3+4 Methylphenol (cresol, m+p)} TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range}
(3)ICP/MS - 200.8 (TAL) {Aluminum, Antimony, Barium, Chromium, Cobalt, Cadmium, Copper, Zinc, Manganese, Nickel, Vanadium, Silver} ICP/MS - 200.8 (Add-on) {Arsenic, Lead, Strontium, Thallium, Beryllium, Thorium, Uranium, Selenium} ICP Metals - 6010B (TAL) {Iron} ICP Metals - 6010B (Add-On) {Boron, Lithium} 200.8_HG - ICPMS {Mercury}
(4)IC Anions - 300.0 {Phosphorus in phosphate, Chloride, Nitrogen in Nitrite, Fluoride, Nitrogen in Nitrate, Sulfate} Cations (IC) - 300.7 {Nitrogen in ammonium}
(5)Gamma Spectroscopy {Europium-155, Cesium-137, Europium-154, Europium-152, Cobalt-60} Gamma Spec - Add-on {Antimony-125}
(6)Gross Alpha {Gross alpha} Gross Beta {Gross beta} Americium-241; Technetium-99 {Technetium-99} Isotopic Uranium {Uranium-233/234, Uranium-235, Uranium-238} Isotopic Plutonium; Strontium-89,90 -- Total Sr;

Original

A-6003-618(01/06)

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F10-025-027

COLLECTOR
Kauer, Romo

COMPANY CONTACT
DYEKMAN, DL

TELEPHONE NO.
373-2530

PROJECT COORDINATOR
DYEKMAN, DL

PRICE CODE 8N

DATA TURNAROUND
45 Days / 45 Days

AIR QUALITY ☐

SAMPLING LOCATION
C7514 (299-E24-25); I-045

PROJECT DESIGNATION
200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)

SAF NO.
F10-025

ICE CHEST NO.

FIELD LOGBOOK NO. Pg 18
HNF-N-491-5

ACTUAL SAMPLE DEPTH
96-97.5

COA
302117ES10

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=Vegetation
W=Water
WI=Wipe
X=Other

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B22V54

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

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B22V32 995	SOIL	11-12-09	0817	✓	✓

ICED

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

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Ed Kauer	11-12-09 1500	MD Kessler	11-12-09 1500

SPECIAL INSTRUCTIONS
SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

ORIGINAL

ICED

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

A-6003-618(01/06)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F10-025-027	PAGE 2 OF 2
COLLECTOR Kawle Romo	**COMPANY CONTACT** DYEKMAN, DL	**TELEPHONE NO.** 373-2530	**PROJECT COORDINATOR** DYEKMAN, DL	**PRICE CODE** 8N	**DATA TURNAROUND**
SAMPLING LOCATION C7514 (299-E24-25); I-045	**PROJECT DESIGNATION** 200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)		**SAF NO.** F10-025	**AIR QUALITY** ☐	**45 Days / 45 Days**
ICE CHEST NO.	**FIELD LOGBOOK NO.** HNF-N-481-5 PG 18	**ACTUAL SAMPLE DEPTH** 90 to 92.5	**COA** 302117ES10	**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.
** 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 (LOW LEVEL); VOA - 5035/8260 (LOW LEVEL) - (Add-On) {Trichloromonofluoromethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene}
(2)VOA - 5035/8260 (HIGH LEVEL); VOA - 5035/8260 (HIGH LEVEL) - (Add-On) {Trichloromonofluoromethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene}

ORIGINAL

A-6003-618(01/06)

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F10-025-028

COLLECTOR
Kinzer, Romo

COMPANY CONTACT
DYEKMAN, DL

TELEPHONE NO.
373-2530

PROJECT COORDINATOR
DYEKMAN, DL

PRICE CODE 8N

DATA TURNAROUND
45 Days / 45 Days

AIR QUALITY ☐

SAMPLING LOCATION
C7514 (299-E24-25); I-045

PROJECT DESIGNATION
200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)

SAF NO.
F10-025

ICE CHEST NO.

FIELD LOGBOOK NO. P518
HNF-N-491-5

ACTUAL SAMPLE DEPTH
90-92.5

COA
302117ES10

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=Vegetation
W=Water
WI=Wipe
X=Other

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B22V54

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

ICED

ICED

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B22V33	SOIL	11-17-09	0917	✓
W096R00996				

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

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Ed Kinzer	11/17/09 1500	MD Kessler	11-17-09 1500

SPECIAL INSTRUCTIONS

** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to 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 (TCL); VOA - 5035/8260 - (Add-On)
{Trichloromonofluoromethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene}

ORIGINAL

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: CPP 200 Area			DATA PACKAGE: VSR10-019		
VALIDATOR: Carl Schloesslin		LAB: WSCF		DATE: 6-01-2010	
			SDG: WSCF20091170		
ANALYSES PERFORMED					
SW-846 8260 X		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)
SAMPLES/MATRIX Soil sample B22V32					

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. Eight 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: WSCF20091170
Matrix: SOLID
Test: VOA Ground Water Protection

Sample Date: 11/09/09
Receive Date:11/09/09

Lab ID: W09GR00957
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	39.270	116.000	% Recov	63.000	117.000				11/17/09
MS	Benzene	71-43-2	39.930	118.000	% Recov	75.000	129.000				11/17/09
MS	4-Bromofluorobenzene(Surr)	460-00-4	70.520	104.000	% Recov	75.000	125.000				11/17/09
MS	Chlorobenzene	108-90-7	38.700	115.000	% Recov	79.000	119.000				11/17/09
MS	1,2-Dichloroethane-d4(Surr)	17060-07-0	80.240	119.000	% Recov	75.000	125.000				11/17/09
MS	Toluene-d8(Surr)	2037-26-5	68.700	102.000	% Recov	75.000	125.000				11/17/09
MS	Toluene	108-88-3	40.180	119.000	% Recov	76.000	120.000				11/17/09
MS	Trichloroethene	79-01-6	38.450	114.000	% Recov	73.000	123.000				11/17/09
MSD	1,1-Dichloroethene	75-35-4	38.460	117.000	% Recov	63.000	117.000				11/17/09
MSD	Benzene	71-43-2	38.270	116.000	% Recov	75.000	129.000				11/17/09
MSD	4-Bromofluorobenzene(Surr)	460-00-4	65.360	99.300	% Recov	75.000	125.000				11/17/09
MSD	Chlorobenzene	108-90-7	38.750	118.000	% Recov	79.000	119.000				11/17/09
MSD	1,2-Dichloroethane-d4(Surr)	17060-07-0	76.670	117.000	% Recov	75.000	125.000				11/17/09
MSD	Toluene-d8(Surr)	2037-26-5	64.640	98.300	% Recov	75.000	125.000				11/17/09
MSD	Toluene	108-88-3	39.380	120.000	% Recov	76.000	120.000				11/17/09
MSD	Trichloroethene	79-01-6	38.590	117.000	% Recov	73.000	123.000				11/17/09
SPK-RPD	1,1-Dichloroethene	75-35-4	117.000		RPD			0.858	20.000		11/17/09
SPK-RPD	Benzene	71-43-2	116.000		RPD			1.709	20.000		11/17/09
SPK-RPD	4-Bromofluorobenzene(Surr)	460-00-4	99.300		RPD			4.624	20.000		11/17/09
SPK-RPD	Chlorobenzene	108-90-7	118.000		RPD			2.575	20.000		11/17/09
SPK-RPD	1,2-Dichloroethane-d4(Surr)	17060-07-0	117.000		RPD			1.695	20.000		11/17/09
SPK-RPD	Toluene-d8(Surr)	2037-26-5	98.300		RPD			3.694	20.000		11/17/09
SPK-RPD	Toluene	108-88-3	120.000		RPD			0.837	20.000		11/17/09
SPK-RPD	Trichloroethene	79-01-6	117.000		RPD			2.597	20.000		11/17/09

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Organic

SDG Number: WSCF20091170
Matrix: SOLID
Test: VOA Ground Water Protection

Sample Date: 11/12/09
Receive Date:11/12/09

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W09GR00995											
BATCH QC ASSOCIATED WITH SAMPLE											
SURR	4-Bromofluorobenzene(Surr)	460-00-4	43.280	104.000	% Recov	75.000	125.000				11/17/09
SURR	1,2-Dichloroethane-d4(Surr)	17060-07-0	47.600	114.000	% Recov	75.000	125.000				11/17/09
SURR	Toluene-d8(Surr)	2037-26-5	42.700	102.000	% Recov	80.000	126.000				11/17/09
BATCH QC											
BLANK	1,1-Dichloroethane	75-34-3	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	1,1,1-Trichloroethane	71-55-6	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	1,1,2-Trichloroethane	79-00-5	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	1,1,2,2-Tetrachloroethane	79-34-5	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	1,1-Dichloroethene	75-35-4	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	1,2-Dichloroethane	107-06-2	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	1,2-Dichloroethene(Total)	540-59-0	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	2-Hexanone	591-78-6	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	4-Methyl-2-Pentanone	108-10-1	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	Acetone	67-64-1	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	Bromodichloromethane	75-27-4	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	Benzene	71-43-2	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	4-Bromofluorobenzene(Surr)	460-00-4	52.890	106.000	% Recov	75.000	125.000				11/17/09
BLANK	Bromoform	75-25-2	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	Carbon disulfide	75-15-0	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	Carbon tetrachloride	56-23-5	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	Dibromochloromethane	124-48-1	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	Chloroform	67-66-3	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	Chlorobenzene	108-90-7	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	cis-1,2-Dichloroethylene	156-59-2	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	cis-1,3-Dichloropropene	10061-01-5	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	Chloroethane	75-00-3	< 1.0	n/a	ug/Kg					U	11/17/09

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Organic

SDG Number: WSCF20091170
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	1,2-Dichloroethane-d4(Surr)	17060-07-0	59.180	118.000	% Recov	75.000	125.000				11/17/09
BLANK	trans-1,2-Dichloroethylene	156-60-5	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	1,2-Dichloropropane	78-87-5	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	Ethylbenzene	100-41-4	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	Bromomethane	74-83-9	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	Chloromethane	74-87-3	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	2-Butanone	78-93-3	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	Methylenechloride	75-09-2	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	Tetrachloroethene	127-18-4	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	Styrene	100-42-5	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	Xylenes (total)	1330-20-7	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	Toluene-d8(Surr)	2037-26-5	50.920	102.000	% Recov	80.000	126.000				11/17/09
BLANK	Toluene	108-88-3	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	trans-1,3-Dichloropropene	10061-02-6	< 1.0	n/a	ug/Kg					U	11/17/09
BLANK	Trichloromonofluoromethane	75-69-4	< 1.0	n/a	ug/Kg	0.000	5.000			U	11/17/09
BLANK	Trichloroethene	79-01-6	< 0.20	n/a	ug/Kg					U	11/17/09
BLANK	Vinyl chloride	75-01-4	< 1.0	n/a	ug/Kg					U	11/17/09
LCS	1,1-Dichloroethene	75-35-4	27.090	108.000	% Recov	75.000	125.000				11/17/09
LCS	Benzene	71-43-2	29.020	116.000	% Recov	75.000	125.000				11/17/09
LCS	4-Bromofluorobenzene(Surr)	460-00-4	53.930	108.000	% Recov	75.000	125.000				11/17/09
LCS	Chlorobenzene	108-90-7	29.600	118.000	% Recov	75.000	125.000				11/17/09
LCS	1,2-Dichloroethane-d4(Surr)	17060-07-0	59.430	119.000	% Recov	75.000	125.000				11/17/09
LCS	Toluene-d8(Surr)	2037-26-5	49.750	99.500	% Recov	80.000	126.000				11/17/09
LCS	Toluene	108-88-3	29.880	120.000	% Recov	75.000	125.000				11/17/09
LCS	Trichloroethene	79-01-6	27.700	111.000	% Recov	75.000	125.000				11/17/09

Date: 01 June 2010
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: CPP 200 Area
Subject: Semivolatile Organics - Sample Data Group (SDG) WSCF20091170

INTRODUCTION

This memorandum presents the results of data validation for SDG WSCF20091170 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
B22V34	11/12/2009	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 B22V34 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 B22V34 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 with the following exceptions. The bis(2-ethylhexyl)phthalate, pentachlorophenol, TPH-D and kerosene MDLs for sample B22V34 were > the CRDLs.

- **Completeness**

SDG WSCF20091170 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 B22V34 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: WSCF20091170	Reviewer: AQA	Project: CPP 200 Area	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Tributyl phosphate	UJ	B22V34	Non-represented MS/MSD and LCS data

Comments: None

Appendix 3

Annotated Laboratory Reports

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-025
Sample # W09GR00994
Client ID: B22V34 GPP WSCF

Matrix: SOIL

Group #: WSCF20091170
Department: Organic
Sampled: 11/12/09
Received: 11/12/09

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
Alcohols, Glycols - 8015 Prep											**11/16/09**
Alcohols, Glycols - 8015											
Diethyl ether	60-29-7	Organics	U	< 5.00e+03	ug/kg			1.00	5.0e+03		11/16/09
Ethylene glycol	107-21-1	Organics	U	< 5.00e+03	ug/kg			1.00	5.0e+03		11/16/09
NWTPH-D TPH Diesel Range (Wa) Prep											**11/17/09**
NWTPH-D TPH Diesel Range (Wa)											
Total Pet. Hydrocarbons Diesel	TPHDIESEL	LA-523-493	U	< 5.10	mg/kg			1.00	5.1		11/19/09
Kerosene	TPHKEROSENE	LA-523-493	U	< 5.10	mg/kg			1.00	5.1		11/19/09
SW-846 8270C Semi-Vols Prep											**11/17/09**
SW-846 8270C Semi-Vols											
4-Nitrophenol	100-02-7	LA-523-456	U	< 340	ug/kg			1.00	3.4e+02		11/18/09
1,4-Dichlorobenzene	106-46-7	LA-523-456	U	< 260	ug/kg			1.00	2.6e+02		11/18/09
Phenol	108-95-2	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
1,2,4-Trichlorobenzene	120-82-1	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
2,4-Dinitrotoluene	121-14-2	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
Pyrene	129-00-0	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
4-Chloro-3-methylphenol	59-50-7	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
N-Nitrosodi-n-dipropylamine	621-64-7	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
Acenaphthene	83-32-9	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
Pentachlorophenol	87-86-5	LA-523-456	U	< 410	ug/kg			1.00	4.1e+02		11/18/09
2-Chlorophenol	95-57-8	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
4-Nitroaniline	100-01-6	LA-523-456	U	< 290	ug/kg			1.00	2.9e+02		11/18/09
4-Bromophenylphenyl ether	101-55-3	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
2,4-Dimethylphenol	105-67-9	LA-523-456	U	< 230	ug/kg			1.00	2.3e+02		11/18/09
4-Chloroaniline	106-47-8	LA-523-456	U	< 290	ug/kg			1.00	2.9e+02		11/18/09

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

B - The analyte < the RDL but >= the IDL/MDL (inorg)
D - Analyte was identified at a secondary dilution factor
E - Analyte is an estimate, has potentially larger errors(inorg)
U - Analyzed for but not detected above limiting criteria(inorg)

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

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

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-025
Sample # W09GR00994
Client ID: B22V34 GPP WSCF

Matrix: SOIL

Group #: WSCF20091170
Department: Organic
Sampled: 11/12/09
Received: 11/12/09

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		11/18/09
Bis(2-chloroethyl) ether	111-44-4	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
Bis(2-Chloroethoxy)methane	111-91-1	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
Bis(2-ethylhexyl) phthalate	117-81-7	LA-523-456	U	< 410	ug/kg			1.00	4.1e+02		11/18/09
Di-n-octylphthalate	117-84-0	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
Hexachlorobenzene	118-74-1	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
Anthracene	120-12-7	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
2,4-Dichlorophenol	120-83-2	LA-523-456	U	< 170	ug/kg			1.00	1.7e+02		11/18/09
Dimethyl phthalate	131-11-3	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
Dibenzofuran	132-64-9	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
Benzo(ghi)perylene	191-24-2	LA-523-456	U	< 330	ug/kg			1.00	3.3e+02		11/18/09
Indeno(1,2,3-cd)pyrene	193-39-5	LA-523-456	U	< 340	ug/kg			1.00	3.4e+02		11/18/09
Benzo(b)fluoranthene	205-99-2	LA-523-456	U	< 210	ug/kg			1.00	2.1e+02		11/18/09
Fluoranthene	206-44-0	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
Benzo(k)fluoranthene	207-08-9	LA-523-456	U	< 210	ug/kg			1.00	2.1e+02		11/18/09
Acenaphthylene	208-96-8	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
Chrysene	218-01-9	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
Benzo(a)pyrene	50-32-8	LA-523-456	U	< 230	ug/kg			1.00	2.3e+02		11/18/09
2,4-Dinitrophenol	51-28-5	LA-523-456	U	< 640	ug/kg			1.00	6.4e+02		11/18/09
Dibenz[a,h]anthracene	53-70-3	LA-523-456	U	< 340	ug/kg			1.00	3.4e+02		11/18/09
4,6-Dinitro-2-methylphenol	534-52-1	LA-523-456	U	< 340	ug/kg			1.00	3.4e+02		11/18/09
1,3-Dichlorobenzene	541-73-1	LA-523-456	U	< 280	ug/kg			1.00	2.8e+02		11/18/09
Benzo(a)anthracene	56-55-3	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
2,6-Dinitrotoluene	606-20-2	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
4-Chlorophenylphenyl ether	7005-72-3	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09

MDL=Minimum Detection Limit
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DF=Dilution Factor

B - The analyte < the RDL but > = the IDL/MDL (inorg)
D - Analyte was identified at a secondary dilution factor
E - Analyte is an estimate, has potentially larger errors(inorg)
U - Analyzed for but not detected above limiting criteria(inorg)

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

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

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-025
Sample # W09GR00994
Client ID: B22V34 GPP WSCF

Matrix: SOIL

Group #: WSCF20091170
Department: Organic
Sampled: 11/12/09
Received: 11/12/09

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
Hexachlorocyclopentadiene	77-47-4	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
Isophorone	78-59-1	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
Diethylphthalate	84-66-2	LA-523-456	U	< 220	ug/kg			1.00	2.2e+02		11/18/09
Di-n-butylphthalate	84-74-2	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
Phenanthrene	85-01-8	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
Butylbenzylphthalate	85-68-7	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
N-Nitrosodiphenylamine	86-30-6	LA-523-456	U	< 170	ug/kg			1.00	1.7e+02		11/18/09
Fluorene	86-73-7	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
Carbazole	86-74-8	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
Hexachlorobutadiene	87-68-3	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
2-Nitroaniline	88-74-4	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
2-Nitrophenol	88-75-5	LA-523-456	U	< 170	ug/kg			1.00	1.7e+02		11/18/09
Naphthalene	91-20-3	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
2-Methylnaphthalene	91-57-6	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
2-Chloronaphthalene	91-58-7	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
3,3'-Dichlorobenzidine	91-94-1	LA-523-456	U	< 340	ug/kg			1.00	3.4e+02		11/18/09
2-Methylphenol (cresol, o-)	95-48-7	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
1,2-Dichlorobenzene	95-50-1	LA-523-456	U	< 230	ug/kg			1.00	2.3e+02		11/18/09
2,4,5-Trichlorophenol	95-95-4	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
Nitrobenzene	98-95-3	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
3-Nitroaniline	99-09-2	LA-523-456	U	< 190	ug/kg			1.00	1.9e+02		11/18/09
3 & 4 Methylphenol Total	65794-96-9	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
Hexachloroethane	67-72-1	LA-523-456	U	< 260	ug/kg			1.00	2.6e+02		11/18/09
2,4,6-Trichlorophenol	88-06-2	LA-523-456	U	< 150	ug/kg			1.00	1.5e+02		11/18/09
Tributyl phosphate	126-73-8	LA-523-456	U	< 150	ug/kg	UJ	LS 6-01-2010	1.00	1.5e+02		11/18/09

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

B - The analyte < the RDL but >= the IDL/MDL (inorg)
D - Analyte was identified at a secondary dilution factor
E - Analyte is an estimate, has potentially larger errors(inorg)
U - Analyzed for but not detected above limiting criteria(inorg)

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

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

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Attachment 2
Narrative
WSCF20091170

Introduction

Three (3) S&GRP samples were received at the WSCF Laboratory on November 12, 2009. The samples were analyzed for the analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *Statement of Work (SOW), Modification No. 2 to Agreement 36587, Release 3, "FH WSCF ANALYTICAL SERVICES FOR GROUNDWATER."*

The narrative (Attachment 2) will address sample characteristics, analyses requested and general information in performance of the analytical methods. A Data Summary Report (Attachment 3) includes analytical results, a comment report detailing method abnormalities, tentatively identified peaks if applicable, method references, and Laboratory QC information as applicable. Copies of the chain of custody and sample receipt documentation are included as Attachment 4.

It should be noted that the attached chain of custody was stamped "ICED" by the WSCF Laboratory Sample Custodian during sample receiving, indicating the presence of ice in the transport container.

The following generic data qualifiers (i.e., B, D, and J) may be applicable to this report, as appropriate

- **B** – Sample results with a concentration greater than the MDL but less than the PQL are B flagged (applies to inorganic and wetchem analyses), as appropriate.
- **D** – Sample results are D flagged if dilution(s) were required, as appropriate.
- **J** – Sample results with a concentration greater than the MDL but less than the PQL are J flagged (applies to organic analyses), as appropriate.

Analytical Methodology for Requested Analyses

Refer to *WSCF Method References Report,* pages 14 through 16, for a complete listing of approved analytical methods.

Inorganic Comments

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

- Batch QC analyzed on sample# W0901033 (B22V40 from work group # 20091211)
    - MS/MSD outside normal laboratory limits. Sample results were "N" Flagged.

All other QC controls are within the established limits.

Anions – Hold time requirements for this analysis were met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 20 through 21 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W0901033 (B22V40 from work group # 20091211)
    - Phosphate – Matrix Spike Duplicate slightly outside of laboratory limits. Sample results were "N" flagged.

All other QC controls are within the established limits.

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

All QC controls are within the established limits.

Hexavalent Chromium – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 23 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. See page 24 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W0901072 (B22RJ9 from work group # 20091234)
    - Iron – exceeded spiking levels by a factor of 4. Spike recoveries are not valid.
    - Estimated Boron results due to iron interference. Sample results were "E" flagged.

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

- Batch QC analyzed on sample# W0900956 (B22VR4 from work group # 20091137)
    - Vanadium, Cobalt, Uranium, Beryllium, and Thorium - contamination was detected in the Blank and was evaluated. Affected sample results in this batch were "C" Flagged.
    - Aluminum and Manganese MSD recoveries below 70%. RPDs are greater than 20%. Sample results were "N" flagged.

All other QC controls are within the established limits.

Organic Comments

Sample concentrations are corrected for moisture content 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. See page 36 for QC details. Analytical Note(s):

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. See pages 38 through 43 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W0901005 (B22V37 from work group # 20091176)
    - 2-Fluorophenol LCS is a little high at 114% recovery. No system problems an all MS/MSD recoveries were good.

All other 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 37 for QC details. Analytical Note(s):

All QC controls are within the established limits.

VOA – 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. See pages 44 through 46 for QC details. Analytical Note(s):

- B22V33 – Analyses of this Methanol Blank sample and its associated high concentration VOA samples were not required.

All QC controls are within the established limits.

Radiochemistry Comments

Rad Chem – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike (Matrix Spikes apply only to Technetium), Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 51 through 58 for QC details. Analytical Note(s):

- Gross Alpha, Strontium-89/90 – Duplicate Relative Percent Differences (RPD) exceeded established laboratory limits. The RPD criterion does not apply to results near or below the minimum detectable activity. No flags issued.

- The Pu-239 LCS recovery is high at 126.12 but within the statement of work range of 70-130%.

- Uranium-233/234 and Uranium-235 prep blanks are detected but are less than 2 times the MDA.

All other QC controls are within the established limits.

We 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 contained in this data package has been authorized by the Analytical Laboratory Manager (or designee) and the Client Services representative as verified by the following signatures.

Scot L. Fitzgerald
WSCF Analytical Laboratory Manager

Richard F Barker 1/12/10
Richard Barker
WSCF Client Services

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F10-025-029

COLLECTOR: Kauer, Renee 12/28/09

COMPANY CONTACT: DYEKMAN, DL

TELEPHONE NO.: 373-2530

PROJECT COORDINATOR: DYEKMAN, DL

PRICE CODE: 8N

DATA TURNAROUND: 45 Days / 45 Days

SAMPLING LOCATION: C7514 (299-E24-25); I-045

PROJECT DESIGNATION: 200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)

SAF NO.: F10-025

AIR QUALITY: ☐

ICE CHEST NO.:

FIELD LOGBOOK NO.: HNF-N-491.5 Pg 18

ACTUAL SAMPLE DEPTH: 90 to 92.5

COA: 302117ES10

METHOD OF SHIPMENT: GOVERNMENT VEHICLE

SHIPPED TO: Waste Sampling & Characterization 20091170

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=Vegetation
W=Water
WI=Wipe
X=Other

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B22V54

PRESERVATION			Cool~4C	Cool~4C	None	Cool~4C	Cool~4C	Cool~4C	None	None
TYPE OF CONTAINER			aG/S	aG	G/P	G/P	G/P	G	Square Bottle - Poly	G/P
NO. OF CONTAINER(S)			3	1	1	1	1	1	1	1
VOLUME			40mL	250mL	120mL	120mL	120mL	60mL	500mL	120mL
SAMPLE ANALYSIS			SEE ITEM (1) IN SPECIAL INSTRUCTIONS ✓	SEE ITEM (2) IN SPECIAL INSTRUCTIONS ✓	SEE ITEM (3) IN SPECIAL INSTRUCTIONS ✓	Chromium Hex - 7196; ✓	SEE ITEM (4) IN SPECIAL INSTRUCTIONS ✓	Total Cyanide - 9014; ✓	SEE ITEM (5) IN SPECIAL INSTRUCTIONS ✓	SEE ITEM (6) IN SPECIAL INSTRUCTIONS ✓
SAMPLE NO.	**MATRIX***	**SAMPLE DATE**	**SAMPLE TIME**							
B22V34	SOIL	11-12-09	0817	✓	✓	✓	✓	✓	✓	✓

W096R00994

ICED

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

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Ed Kauer	11-12-09 1500	MD Kessler	11-12-09 1500

SPECIAL INSTRUCTIONS
SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

ORIGINAL

ICED

LABORATORY SECTION — RECEIVED BY — TITLE — DATE/TIME

FINAL SAMPLE DISPOSITION — DISPOSAL METHOD — DISPOSED BY — DATE/TIME

A-6003-618(01/06)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F10-02S-029	PAGE 2 OF 2
COLLECTOR Kauk, Romo	**COMPANY CONTACT** DYEKMAN, DL	**TELEPHONE NO.** 373-2530	**PROJECT COORDINATOR** DYEKMAN, DL	**PRICE CODE** 8N	**DATA TURNAROUND**
SAMPLING LOCATION C7514 (299-E24-25); I-045	**PROJECT DESIGNATION** 200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)		**SAF NO.** F10-025	**AIR QUALITY** ☐	**45 Days / 45 Days**
ICE CHEST NO.	**FIELD LOGBOOK NO.** HNE-N-491-5 PS18	**ACTUAL SAMPLE DEPTH** 90 to 92.5	**COA** 302117ES10	**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.
** 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)Alcohols, Glycols, & Ketones - 8015 {Ethylene glycol, Diethyl ether}
(2)Semi-VOA - 8270B (TCL); Semi-VOA - 8270B (Add-On) {Tributyl phosphate, 3+4 Methylphenol (cresol, m+p)} TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range}
(3)ICP/MS - 200.8 (TAL) {Aluminum, Antimony, Barium, Chromium, Cobalt, Cadmium, Copper, Zinc, Manganese, Nickel, Vanadium, Silver} ICP/MS - 200.8 (Add-on) {Arsenic, Lead, Strontium, Thallium, Beryllium, Thorium, Uranium, Selenium} ICP Metals - 6010B (TAL) {Iron} ICP Metals - 6010B (Add-On) {Boron, Lithium} 200.8_HG - ICPMS {Mercury}
(4)IC Anions - 300.0 {Phosphorus in phosphate, Chloride, Nitrogen in Nitrite, Fluoride, Nitrogen in Nitrate, Sulfate} Cations (IC) - 300.7 {Nitrogen in ammonium}
(5)Gamma Spectroscopy {Europium-155, Cesium-137, Europium-154, Europium-152, Cobalt-60} Gamma Spec - Add-on {Antimony-125}
(6)Gross Alpha {Gross alpha} Gross Beta {Gross beta} Americium-241; Technetium-99 {Technetium-99} Isotopic Uranium {Uranium-233/234, Uranium-235, Uranium-238} Isotopic Plutonium; Strontium-89,90 -- Total Sr;

Original

A-6003-618(01/06)

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F10-025-027

COLLECTOR
Kauer, Romo

COMPANY CONTACT
DYEKMAN, DL

TELEPHONE NO.
373-2530

PROJECT COORDINATOR
DYEKMAN, DL

PRICE CODE 8N

DATA TURNAROUND
45 Days / 45 Days

AIR QUALITY ☐

SAMPLING LOCATION
C7514 (299-E24-25); I-045

PROJECT DESIGNATION
200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)

SAF NO.
F10-025

ICE CHEST NO.

FIELD LOGBOOK NO. Pg 18
HNF-N-491-5

ACTUAL SAMPLE DEPTH
96-97.5

COA
302117ES10

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=Vegetation
W=Water
WI=Wipe
X=Other

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B22V54

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

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B22V32 995	SOIL	11-12-09	0817	✓	✓

ICED

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

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Ed Kauer	11-12-09 1500	MD Kessler	11-12-09 1500

SPECIAL INSTRUCTIONS
SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

ORIGINAL

ICED

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

A-6003-618(01/06)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F10-025-027	PAGE 2 OF 2
COLLECTOR Kawle Romo	**COMPANY CONTACT** DYEKMAN, DL	**TELEPHONE NO.** 373-2530	**PROJECT COORDINATOR** DYEKMAN, DL	**PRICE CODE** 8N	**DATA TURNAROUND**
SAMPLING LOCATION C7514 (299-E24-25); I-045	**PROJECT DESIGNATION** 200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)		**SAF NO.** F10-025	**AIR QUALITY** ☐	**45 Days / 45 Days**
ICE CHEST NO.	**FIELD LOGBOOK NO.** HNF-N-481-5 PG 18	**ACTUAL SAMPLE DEPTH** 90 to 92.5	**COA** 302117ES10	**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.
** 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 (LOW LEVEL); VOA - 5035/8260 (LOW LEVEL) - (Add-On) {Trichloromonofluoromethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene}
(2)VOA - 5035/8260 (HIGH LEVEL); VOA - 5035/8260 (HIGH LEVEL) - (Add-On) {Trichloromonofluoromethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene}

ORIGINAL

A-6003-618(01/06)

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F10-025-028

COLLECTOR
Kinzer, Romo

COMPANY CONTACT
DYEKMAN, DL

TELEPHONE NO.
373-2530

PROJECT COORDINATOR
DYEKMAN, DL

PRICE CODE 8N

DATA TURNAROUND
45 Days / 45 Days

AIR QUALITY ☐

SAMPLING LOCATION
C7514 (299-E24-25); I-045

PROJECT DESIGNATION
200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)

SAF NO.
F10-025

ICE CHEST NO.

FIELD LOGBOOK NO. P518
HNF-N-491-5

ACTUAL SAMPLE DEPTH
90-92.5

COA
302117ES10

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=Vegetation
W=Water
WI=Wipe
X=Other

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B22V54

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

ICED

ICED

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B22V33	SOIL	11-17-09	0917	✓
W096R00996				

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

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Ed Kinzer	11/17/09 1500	MD Kessler	11-17-09 1500

SPECIAL INSTRUCTIONS

** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to 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 (TCL); VOA - 5035/8260 - (Add-On)
{Trichloromonofluoromethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene}

ORIGINAL

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: CPP 200 Area			DATA PACKAGE: VSR10-019		
VALIDATOR: Carl Schloesslin		LAB: WSCF		DATE: 6-01-2010	
			SDG: WSCF20091170		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270 X		SW-846 8270 (TCLP)
SAMPLES/MATRIX Soil sample B22V34					

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:

2-Fluorophenol surrogate recovery in the LCS = 114% - no effect on field sample data

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:

Bis(2-ethylhexyl)phthalate CRDL = 330 ug/kg. B22V34 MDL = 410 ug/kg.
Pentachlorophenol CRDL = 330 ug/kg. B22V34 MDL = 410 ug/kg.

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: CPP 200 Area			DATA PACKAGE: VSR10-019		
VALIDATOR: Carl Schloesslin		LAB: WSCF		DATE: 6-01-2010	
			SDG: WSCF20091170		
ANALYSES PERFORMED					
8015 X	8021	8141	8151	8315	8310
		WTPH-HCID	WTPH-G	WTPH-D X	
SAMPLES/MATRIX: Soil sample B22V34					

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:

TPH-D and kerosene MDLs for sample B22V34 (both 5.1 mg/kg) slightly above the CRDL of 5 mg/kg.

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: WSCF20091170
Matrix: SOLID
Test: Alcohols, Glycols - 8015

Sample Date: 11/09/09
Receive Date:11/09/09

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W09GR00956											
BATCH QC ASSOCIATED WITH SAMPLE											
DUP	2-Bromoethanol	540-51-2	14400		RPD			20.000	25.000		11/16/09
DUP	Diethyl ether	60-29-7	<5000		RPD			n/a	25.000	U	11/16/09
DUP	Ethylene glycol	107-21-1	<5000		RPD			n/a	25.000	U	11/16/09
MS	2-Bromoethanol	540-51-2	13900	78.977	% Recov	70.000	125.000				11/16/09
MS	Diethyl ether	60-29-7	3200	89.762	% Recov	75.000	125.000				11/16/09
MS	Ethylene glycol	107-21-1	6100	109.515	% Recov	75.000	125.000				11/16/09
MSD	2-Bromoethanol	540-51-2	13600	77.273	% Recov	70.000	125.000				11/16/09
MSD	Diethyl ether	60-29-7	3230	90.603	% Recov	75.000	125.000				11/16/09
MSD	Ethylene glycol	107-21-1	6200	111.311	% Recov	75.000	125.000				11/16/09
SPK-RPD	2-Bromoethanol	540-51-2	77.273		RPD			2.181	20.000		11/16/09
SPK-RPD	Diethyl ether	60-29-7	90.603		RPD			0.933	20.000		11/16/09
SPK-RPD	Ethylene glycol	107-21-1	111.311		RPD			1.627	20.000		11/16/09
BATCH QC											
BLANK	2-Bromoethanol	540-51-2	18100	102.841	% Recov	75.000	125.000				11/16/09
BLANK	Diethyl ether	60-29-7	<5000	n/a	ug/Kg	0.000	10.000			U	11/16/09
BLANK	Ethylene glycol	107-21-1	<5000	n/a	ug/Kg	0.000	5.000			U	11/16/09
LCS	2-Bromoethanol	540-51-2	18500	105.114	% Recov	70.000	130.000				11/16/09
LCS	Diethyl ether	60-29-7	2940	82.468	% Recov	70.000	130.000				11/16/09
LCS	Ethylene glycol	107-21-1	5600	100.539	% Recov	70.000	130.000				11/16/09

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Organic

SDG Number: WSCF20091170
Matrix: SOLID
Test: NWTPH-D TPH Diesel Range (Wa)

Sample Date: 11/12/09
Receive Date:11/12/09

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W09GR00994											
BATCH QC ASSOCIATED WITH SAMPLE											
MS	ortho-Terphenyl Surr	84-15-1	21.662	105.000	% Recov	70.000	130.000				11/19/09
MS	Total Pet. Hydrocarbons Diesel	TPHDIESEL	103.85	101.000	% Recov	75.000	125.000				11/19/09
MSD	ortho-Terphenyl Surr	84-15-1	19.210	93.500	% Recov	70.000	130.000				11/19/09
MSD	Total Pet. Hydrocarbons Diesel	TPHDIESEL	98.304	95.700	% Recov	75.000	125.000				11/19/09
SPK-RPD	ortho-Terphenyl Surr	84-15-1	93.500		RPD			11.587	20.000		11/19/09
SPK-RPD	Total Pet. Hydrocarbons Diesel	TPHDIESEL	95.700		RPD			5.389	20.000		11/19/09
SURR	ortho-Terphenyl Surr	84-15-1	21.355	104.000	% Recov	70.000	130.000				11/19/09
BATCH QC											
BLANK	Kerosene	TPHKEROSENE	< 5.0	n/a	ug/Kg					U	11/19/09
BLANK	ortho-Terphenyl Surr	84-15-1	17.441	87.200	% Recov	70.000	130.000				11/19/09
BLANK	Total Pet. Hydrocarbons Diesel	TPHDIESEL	< 5.0	n/a	ug/Kg					U	11/19/09
LCS	ortho-Terphenyl Surr	84-15-1	20.770	104.000	% Recov	70.000	130.000				11/19/09
LCS	Total Pet. Hydrocarbons Diesel	TPHDIESEL	106.26	106.000	% Recov	80.000	120.000				11/19/09

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Organic

SDG Number: WSCF20091170
Matrix: SOLID
Test: SW-846 8270C Semi-Vols

Sample Date: 11/12/09
Receive Date:11/12/09

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W09GR00994											
BATCH QC ASSOCIATED WITH SAMPLE											
SURR	2-Fluorophenol(Surr)	367-12-4	3779.1	91.900	% Recov	72.000	120.000				11/18/09
SURR	2-Fluorobiphenyl(Surr)	321-60-8	3906.2	94.900	% Recov	66.000	122.000				11/18/09
SURR	Nitrobenzene-d5(Surr)	4165-60-0	3820.1	92.900	% Recov	63.000	125.000				11/18/09
SURR	Phenol-d5(Surr)	4165-62-2	3615.4	87.900	% Recov	66.000	124.000				11/18/09
SURR	2,4,6-Tribromophenol(Surr)	118-79-6	3515.8	85.500	% Recov	49.000	120.000				11/18/09
SURR	Terphenyl-d14(Surr)	98904-43-9	3978.5	96.700	% Recov	58.000	128.000				11/18/09
Lab ID: W09GR01005											
BATCH QC ASSOCIATED WITH SAMPLE											
MS	1,2,4-Trichlorobenzene	120-82-1	5866.6	95.500	% Recov	75.000	121.000				11/18/09
MS	1,4-Dichlorobenzene	106-46-7	5694.2	92.700	% Recov	68.000	121.000				11/18/09
MS	2,4-Dinitrotoluene	121-14-2	5808.6	94.600	% Recov	66.000	113.000				11/18/09
MS	2-Fluorophenol(Surr)	367-12-4	3946.9	96.400	% Recov	72.000	120.000				11/18/09
MS	Acenaphthene	83-32-9	5980.2	97.400	% Recov	69.000	125.000				11/18/09
MS	4-Chloro-3-methylphenol	59-50-7	5885.6	95.800	% Recov	68.000	116.000				11/18/09
MS	2-Chlorophenol	95-57-8	6051.5	98.500	% Recov	65.000	124.000				11/18/09
MS	N-Nitrosodi-n-dipropylamine	621-64-7	5949.6	96.900	% Recov	69.000	127.000				11/18/09
MS	2-Fluorobiphenyl(Surr)	321-60-8	3973.7	97.000	% Recov	66.000	122.000				11/18/09
MS	Phenol	108-95-2	6124.1	99.700	% Recov	71.000	122.000				11/18/09
MS	Nitrobenzene-d5(Surr)	4165-60-0	3938.8	96.200	% Recov	63.000	125.000				11/18/09
MS	4-Nitrophenol	100-02-7	5544.6	90.300	% Recov	55.000	113.000				11/18/09
MS	Pentachlorophenol	87-86-5	5207.8	84.800	% Recov	50.000	113.000				11/18/09
MS	Phenol-d5(Surr)	4165-62-2	3902.9	95.300	% Recov	66.000	124.000				11/18/09
MS	Pyrene	129-00-0	6517.3	106.000	% Recov	67.000	125.000				11/18/09
MS	2,4,6-Tribromophenol(Surr)	118-79-6	3791.5	92.600	% Recov	49.000	120.000				11/18/09
MS	Terphenyl-d14(Surr)	98904-43-9	4224.2	103.000	% Recov	58.000	128.000				11/18/09

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Organic

SDG Number: WSCF20091170
Matrix: SOLID
Test: SW-846 8270C Semi-Vols

Sample Date: 11/13/09
Receive Date:11/13/09

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
MSD	1,2,4-Trichlorobenzene	120-82-1	6165.2	101.000	% Recov	75.000	121.000				11/18/09
MSD	1,4-Dichlorobenzene	106-46-7	5972.2	97.400	% Recov	68.000	121.000				11/18/09
MSD	2,4-Dinitrotoluene	121-14-2	6140.8	100.000	% Recov	66.000	113.000				11/18/09
MSD	2-Fluorophenol(Surr)	367-12-4	4272.4	104.000	% Recov	72.000	120.000				11/18/09
MSD	Acenaphthene	83-32-9	6202.7	101.000	% Recov	69.000	125.000				11/18/09
MSD	4-Chloro-3-methylphenol	59-50-7	6312.1	103.000	% Recov	68.000	116.000				11/18/09
MSD	2-Chlorophenol	95-57-8	6341.7	103.000	% Recov	65.000	124.000				11/18/09
MSD	N-Nitrosodi-n-dipropylamine	621-64-7	6308.7	103.000	% Recov	69.000	127.000				11/18/09
MSD	2-Fluorobiphenyl(Surr)	321-60-8	4114.0	101.000	% Recov	66.000	122.000				11/18/09
MSD	Phenol	108-95-2	6590.4	107.000	% Recov	71.000	122.000				11/18/09
MSD	Nitrobenzene-d5(Surr)	4165-60-0	4221.6	103.000	% Recov	63.000	125.000				11/18/09
MSD	4-Nitrophenol	100-02-7	5868.9	95.700	% Recov	55.000	113.000				11/18/09
MSD	Pentachlorophenol	87-86-5	5635.2	91.900	% Recov	50.000	113.000				11/18/09
MSD	Phenol-d5(Surr)	4165-62-2	4174.5	102.000	% Recov	66.000	124.000				11/18/09
MSD	Pyrene	129-00-0	6408.0	104.000	% Recov	67.000	125.000				11/18/09
MSD	2,4,6-Tribromophenol(Surr)	118-79-6	4205.1	103.000	% Recov	49.000	120.000				11/18/09
MSD	Terphenyl-d14(Surr)	98904-43-9	4130.0	101.000	% Recov	58.000	128.000				11/18/09
SPK-RPD	1,2,4-Trichlorobenzene	120-82-1	101.000		RPD			5.598	20.000		11/18/09
SPK-RPD	1,4-Dichlorobenzene	106-46-7	97.400		RPD			4.945	20.000		11/18/09
SPK-RPD	2,4-Dinitrotoluene	121-14-2	100.000		RPD			5.550	20.000		11/18/09
SPK-RPD	2-Fluorophenol(Surr)	367-12-4	104.000		RPD			7.585	20.000		11/18/09
SPK-RPD	Acenaphthene	83-32-9	101.000		RPD			3.629	20.000		11/18/09
SPK-RPD	4-Chloro-3-methylphenol	59-50-7	103.000		RPD			7.243	20.000		11/18/09
SPK-RPD	2-Chlorophenol	95-57-8	103.000		RPD			4.467	20.000		11/18/09
SPK-RPD	N-Nitrosodi-n-dipropylamine	621-64-7	103.000		RPD			6.103	20.000		11/18/09
SPK-RPD	2-Fluorobiphenyl(Surr)	321-60-8	101.000		RPD			4.040	20.000		11/18/09
SPK-RPD	Phenol	108-95-2	107.000		RPD			7.063	20.000		11/18/09
SPK-RPD	Nitrobenzene-d5(Surr)	4165-60-0	103.000		RPD			6.827	20.000		11/18/09
SPK-RPD	4-Nitrophenol	100-02-7	95.700		RPD			5.806	20.000		11/18/09
SPK-RPD	Pentachlorophenol	87-86-5	91.900		RPD			8.036	20.000		11/18/09

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Organic

SDG Number: WSCF20091170
Matrix: SOLID
Test: SW-846 8270C Semi-Vols

Sample Date: 11/13/09
Receive Date:11/13/09

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
SPK-RPD	Phenol-d5(Surr)	4165-62-2	102.000		RPD			6.792	20.000		11/18/09
SPK-RPD	Pyrene	129-00-0	104.000		RPD			1.905	20.000		11/18/09
SPK-RPD	2,4,6-Tribromophenol(Surr)	118-79-6	103.000		RPD			10.634	20.000		11/18/09
SPK-RPD	Terphenyl-d14(Surr)	98904-43-9	101.000		RPD			1.961	20.000		11/18/09

BATCH QC

BLANK	1,2-Dichlorobenzene	95-50-1	< 220	n/a	ug/Kg					U	11/18/09
BLANK	1,2,4-Trichlorobenzene	120-82-1	< 150	n/a	ug/Kg					U	11/18/09
BLANK	1,3-Dichlorobenzene	541-73-1	< 270	n/a	ug/Kg					U	11/18/09
BLANK	1,4-Dichlorobenzene	106-46-7	< 250	n/a	ug/Kg					U	11/18/09
BLANK	2,4-Dichlorophenol	120-83-2	< 170	n/a	ug/Kg					U	11/18/09
BLANK	2,4-Dinitrotoluene	121-14-2	< 150	n/a	ug/Kg					U	11/18/09
BLANK	2,4,5-Trichlorophenol	95-95-4	< 150	n/a	ug/Kg					U	11/18/09
BLANK	2,4,6-Trichlorophenol	88-06-2	< 150	n/a	ug/Kg					U	11/18/09
BLANK	2,4-Dimethylphenol	105-67-9	< 230	n/a	ug/Kg					U	11/18/09
BLANK	2,6-Dinitrotoluene	606-20-2	< 150	n/a	ug/Kg					U	11/18/09
BLANK	2-Chloronaphthalene	91-58-7	< 150	n/a	ug/Kg					U	11/18/09
BLANK	2-Fluorophenol(Surr)	367-12-4	3661.8	91.500	% Recov	72.000	120.000				11/18/09
BLANK	2-Methylnaphthalene	91-57-6	< 150	n/a	ug/Kg					U	11/18/09
BLANK	2-Methylphenol (cresol, o-)	95-48-7	< 150	n/a	ug/Kg					U	11/18/09
BLANK	2-Nitroaniline	88-74-4	< 150	n/a	ug/Kg					U	11/18/09
BLANK	2-Nitrophenol	88-75-5	< 170	n/a	ug/Kg					U	11/18/09
BLANK	3 & 4 Methylphenol Total	65794-96-9	< 150	n/a	ug/Kg					U	11/18/09
BLANK	3-Nitroaniline	99-09-2	< 190	n/a	ug/Kg					U	11/18/09
BLANK	4,6-Dinitro-2-methylphenol	534-52-1	< 330	n/a	ug/Kg					U	11/18/09
BLANK	4-Bromophenylphenyl ether	101-55-3	< 150	n/a	ug/Kg					U	11/18/09
BLANK	4-Chlorophenylphenyl ether	7005-72-3	< 150	n/a	ug/Kg					U	11/18/09
BLANK	Acenaphthene	83-32-9	< 150	n/a	ug/Kg					U	11/18/09
BLANK	Acenaphthylene	208-96-8	< 150	n/a	ug/Kg					U	11/18/09
BLANK	Anthracene	120-12-7	< 150	n/a	ug/Kg					U	11/18/09

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Organic

SDG Number: WSCF20091170
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	Bis(2-chloroethyl) ether	111-44-4	< 150	n/a	ug/Kg					U	11/18/09
BLANK	Benzo(a)anthracene	56-55-3	< 150	n/a	ug/Kg					U	11/18/09
BLANK	Benzo(b)fluoranthene	205-99-2	< 200	n/a	ug/Kg					U	11/18/09
BLANK	Benzo(ghi)perylene	191-24-2	< 320	n/a	ug/Kg					U	11/18/09
BLANK	Benzo(a)pyrene	50-32-8	< 230	n/a	ug/Kg					U	11/18/09
BLANK	Bis(2-Chloroethoxy)methane	111-91-1	< 150	n/a	ug/Kg					U	11/18/09
BLANK	Bis(2-ethylhexyl) phthalate	117-81-7	< 400	n/a	ug/Kg					U	11/18/09
BLANK	Bis(2-chloro-1-methylethyl)eth	108-60-1	< 150	n/a	ug/Kg					U	11/18/09
BLANK	Benzo(k)fluoranthene	207-08-9	< 200	n/a	ug/Kg					U	11/18/09
BLANK	Butylbenzylphthalate	85-68-7	< 150	n/a	ug/Kg					U	11/18/09
BLANK	Carbazole	86-74-8	< 150	n/a	ug/Kg					U	11/18/09
BLANK	4-Chloroaniline	106-47-8	< 280	n/a	ug/Kg					U	11/18/09
BLANK	4-Chloro-3-methylphenol	59-50-7	< 150	n/a	ug/Kg					U	11/18/09
BLANK	2-Chlorophenol	95-57-8	< 150	n/a	ug/Kg					U	11/18/09
BLANK	Chrysene	218-01-9	< 150	n/a	ug/Kg					U	11/18/09
BLANK	3,3'-Dichlorobenzidine	91-94-1	< 330	n/a	ug/Kg					U	11/18/09
BLANK	Dibenz[a,h]anthracene	53-70-3	< 330	n/a	ug/Kg					U	11/18/09
BLANK	Dibenzofuran	132-64-9	< 150	n/a	ug/Kg					U	11/18/09
BLANK	Di-n-butylphthalate	84-74-2	< 150	n/a	ug/Kg					U	11/18/09
BLANK	Diethylphthalate	84-66-2	< 210	n/a	ug/Kg					U	11/18/09
BLANK	Dimethyl phthalate	131-11-3	< 150	n/a	ug/Kg					U	11/18/09
BLANK	2,4-Dinitrophenol	51-28-5	< 620	n/a	ug/Kg					U	11/18/09
BLANK	Di-n-octylphthalate	117-84-0	< 150	n/a	ug/Kg					U	11/18/09
BLANK	N-Nitrosodi-n-dipropylamine	621-64-7	< 150	n/a	ug/Kg					U	11/18/09
BLANK	2-Fluorobiphenyl(Surr)	321-60-8	3730.4	93.300	% Recov	66.000	122.000				11/18/09
BLANK	Fluorene	86-73-7	< 150	n/a	ug/Kg					U	11/18/09
BLANK	Fluoranthene	206-44-0	< 150	n/a	ug/Kg					U	11/18/09
BLANK	Hexachlorobenzene	118-74-1	< 150	n/a	ug/Kg					U	11/18/09
BLANK	Hexachlorobutadiene	87-68-3	< 150	n/a	ug/Kg					U	11/18/09
BLANK	Hexachlorocyclopentadiene	77-47-4	< 150	n/a	ug/Kg					U	11/18/09

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Organic

SDG Number: WSCF20091170
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	Hexachloroethane	67-72-1	< 250	n/a	ug/Kg					U	11/18/09
BLANK	Indeno(1,2,3-cd)pyrene	193-39-5	< 330	n/a	ug/Kg					U	11/18/09
BLANK	Isophorone	78-59-1	< 150	n/a	ug/Kg					U	11/18/09
BLANK	Phenol	108-95-2	< 150	n/a	ug/Kg					U	11/18/09
BLANK	Naphthalene	91-20-3	< 150	n/a	ug/Kg					U	11/18/09
BLANK	Nitrobenzene-d5(Surr)	4165-60-0	3651.8	91.300	% Recov	63.000	125.000				11/18/09
BLANK	Nitrobenzene	98-95-3	< 150	n/a	ug/Kg					U	11/18/09
BLANK	4-Nitrophenol	100-02-7	< 330	n/a	ug/Kg					U	11/18/09
BLANK	4-Nitroaniline	100-01-6	< 280	n/a	ug/Kg					U	11/18/09
BLANK	N-Nitrosodiphenylamine	86-30-6	< 170	n/a	ug/Kg					U	11/18/09
BLANK	Pentachlorophenol	87-86-5	< 400	n/a	ug/Kg					U	11/18/09
BLANK	Phenanthrene	85-01-8	< 150	n/a	ug/Kg					U	11/18/09
BLANK	Phenol-d5(Surr)	4165-62-2	3465.2	86.600	% Recov	66.000	124.000				11/18/09
BLANK	Pyrene	129-00-0	< 150	n/a	ug/Kg					U	11/18/09
BLANK	Tributyl phosphate	126-73-8	< 150	n/a	ug/Kg					U	11/18/09
BLANK	2,4,6-Tribromophenol(Surr)	118-79-6	3238.9	81.000	% Recov	49.000	120.000				11/18/09
BLANK	Terphenyl-d14(Surr)	98904-43-9	3981.6	99.500	% Recov	58.000	128.000				11/18/09
LCS	1,2,4-Trichlorobenzene	120-82-1	6288.5	105.000	% Recov	76.000	118.000				11/18/09
LCS	1,4-Dichlorobenzene	106-46-7	6295.2	105.000	% Recov	68.000	121.000				11/18/09
LCS	2,4-Dinitrotoluene	121-14-2	6302.7	105.000	% Recov	68.000	112.000				11/18/09
LCS	2-Fluorophenol(Surr)	367-12-4	4543.7	114.000	% Recov	50.000	110.000				11/18/09
LCS	Acenaphthene	83-32-9	6451.2	108.000	% Recov	75.000	121.000				11/18/09
LCS	4-Chloro-3-methylphenol	59-50-7	6473.8	108.000	% Recov	68.000	117.000				11/18/09
LCS	2-Chlorophenol	95-57-8	6565.1	109.000	% Recov	84.000	114.000				11/18/09
LCS	N-Nitrosodi-n-dipropylamine	621-64-7	6523.4	109.000	% Recov	76.000	119.000				11/18/09
LCS	2-Fluorobiphenyl(Surr)	321-60-8	4316.2	108.000	% Recov	58.000	109.000				11/18/09
LCS	Phenol	108-95-2	6786.7	113.000	% Recov	80.000	113.000				11/18/09
LCS	Nitrobenzene-d5(Surr)	4165-60-0	4307.5	108.000	% Recov	60.000	118.000				11/18/09
LCS	4-Nitrophenol	100-02-7	6003.6	100.000	% Recov	42.000	123.000				11/18/09
LCS	Pentachlorophenol	87-86-5	6093.6	102.000	% Recov	55.000	120.000				11/18/09

WSCF ANALYTICAL LABORATORY QC REPORT

Department: **Organic**

SDG Number: WSCF20091170
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	Phenol-d5(Surr)	4165-62-2	4331.9	108.000	% Recov	59.000	116.000				11/18/09
LCS	Pyrene	129-00-0	6895.2	115.000	% Recov	67.000	122.000				11/18/09
LCS	2,4,6-Tribromophenol(Surr)	118-79-6	4310.9	108.000	% Recov	60.000	120.000				11/18/09
LCS	Terphenyl-d14(Surr)	98904-43-9	4497.4	112.000	% Recov	60.000	120.000				11/18/09

Date: 01 June 2010
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: CPP 200 Area
Subject: Inorganics - Sample Data Group (SDG) WSCF20091170

INTRODUCTION

This memorandum presents the results of data validation for SDG WSCF20091170 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
B22V34	11/12/2009	Soil	C	6010B & 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 with the following exceptions. The Be, Co, Th, U and V laboratory blank results were > the MDLs. The Be result for sample B22V34 was a detect <5X the blank result and should be qualified as a non-detect estimate and flagged "UJ." The Co, Th, U and V results for sample B22V34 were detects >5X the blank results and should not be qualified.

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 exception. The MSD recovery for Mn was < the lower acceptance limit. The Mn result for sample B22V34 was a detect and should be qualified as an estimate and flagged "J."

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

- **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 Al RPD was > the upper acceptance limit. The Al result for sample B22V34 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.

- **Completeness**

SDG WSCF20091170 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: WSCF20091170	Reviewer: AQA	Project: CPP 200 Area	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Be	UJ	B22V34	Laboratory blank contamination
Mn	J	B22V34	High MSD recovery
Al	J	B22V34	Poor MS/MSD precision

Comments: None

Appendix 3

Annotated Laboratory Reports

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-025
Sample # W09GR00994
Client ID: B22V34 GPP WSCF

Matrix: SOIL

Group #: WSCF20091170
Department: Inorganic
Sampled: 11/12/09
Received: 11/12/09

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
~~**Anions by Ion Chromatography Prep**~~											~~**11/24/09**~~
Anions by Ion Chromatography											
Fluoride	16984-48-8	LA-533-410	DU	< 1.48	mg/kg			49.18	1.5		11/24/09
Chloride	16887-00-6	LA-533-410	BD	4.42	mg/kg			49.18	2.1		11/24/09
Nitrogen in Nitrite	NO2-N	LA-533-410	DU	< 0.885	mg/kg			49.18	0.89		11/24/09
Nitrogen in Nitrate	NO3-N	LA-533-410	D	14.5	mg/kg			49.18	1.5		11/24/09
Phosphate (P) by IC	PO4-P	LA-533-410	DNU	< 3.44	mg/kg			49.18	3.4		11/24/09
Sulfate	14808-79-8	LA-533-410	BD	7.37	mg/kg			49.18	3.2		11/24/09
Cyanide											
Cyanide	57-12-5	LA-695-402	U	< 0.200	mg/kg			1.00	0.20		12/01/09
Hexavalent Chromium Prep											**11/23/09**
Hexavalent Chromium											
~~Hexavalent Chromium~~	~~18540-29-9~~	~~LA-265-403~~	~~U~~	~~< 0.100~~	~~mg/kg~~			~~1.00~~	~~0.10~~		~~11/24/09~~
ICP Metals Analysis, Grd H20 P Prep											**12/04/09**
ICP Metals Analysis, Grd H20 P											
Iron	7439-89-6	LA-505-411		1.38e+04	mg/kg			98.41	1.8		12/06/09
Lithium	7439-93-2	LA-505-411		12.0	mg/kg			98.41	0.39		12/06/09
Boron	7440-42-8	LA-505-411	BE	7.86	mg/kg			98.41	1.9		12/06/09
ICP-200.8 MS All possible meta Prep											**11/23/09**
ICP-200.8 MS All possible meta											
Aluminum	7429-90-5	LA-505-412	N	5.06e+03	mg/kg	J		0.99	4.95		11/24/09
Manganese	7439-96-5	LA-505-412	N	208	mg/kg	J		0.99	0.0989		11/24/09
Nickel	7440-02-0	LA-505-412		8.07	mg/kg			0.99	0.198		11/24/09
Silver	7440-22-4	LA-505-412	U	< 0.0989	mg/kg	<5		0.99	0.0989		11/24/09
Antimony	7440-36-0	LA-505-412	U	< 0.297	mg/kg	6-01-2010		0.99	0.297		11/24/09

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

B - The analyte < the RDL but > = the IDL/MDL (inorg)
D - Analyte was identified at a secondary dilution factor
E - Analyte is an estimate, has potentially larger errors(inorg)
U - Analyzed for but not detected above limiting criteria(inorg)

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

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

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-025
Sample # W09GR00994
Client ID: B22V34 GPP WSCF

Matrix: SOIL

Group #: WSCF20091170
Department: Inorganic
Sampled: 11/12/09
Received: 11/12/09

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
Barium	7440-39-3	LA-505-412		46.2	mg/kg			0.99	0.198		11/24/09
Beryllium	7440-41-7	LA-505-412		0.173	mg/kg	UJ		0.99	0.0495		11/24/09
Cadmium	7440-43-9	LA-505-412	U	< 0.0989	mg/kg			0.99	0.0989		11/24/09
Chromium	7440-47-3	LA-505-412		8.41	mg/kg			0.99	0.495		11/24/09
Cobalt	7440-48-4	LA-505-412		3.76	mg/kg			0.99	0.0495		11/24/09
Copper	7440-50-8	LA-505-412		8.52	mg/kg			0.99	0.0989		11/24/09
Vanadium	7440-62-2	LA-505-412		17.8	mg/kg			0.99	0.198		11/24/09
Zinc	7440-66-6	LA-505-412		24.8	mg/kg			0.99	0.791		11/24/09
Lead	7439-92-1	LA-505-412		3.60	mg/kg			0.99	0.0989		11/24/09
Mercury	7439-97-6	LA-505-412	U	< 0.0495	mg/kg			0.99	0.0495		11/24/09
Thorium	7440-29-1	LA-505-412		4.13	mg/kg			0.99	0.0989		11/24/09
Uranium	7440-61-1	LA-505-412	C	2.84	mg/kg			0.99	0.0495		11/24/09
Arsenic	7440-38-2	LA-505-412		3.02	mg/kg			0.99	0.396		11/24/09
Selenium	7782-49-2	LA-505-412		0.520	mg/kg			0.99	0.297		11/24/09
Thallium	7440-28-0	LA-505-412	U	< 0.0989	mg/kg			0.99	0.0989		11/24/09
Strontium	7440-24-6	LA-505-412		24.4	mg/kg			0.99	0.0989		11/24/09
~~**Nitrogen in ammonium Prep**~~											~~11/24/09~~
Nitrogen in ammonium											
Nitrogen in ammonium	NH4-N	LA-503-401	DNU	< 8.46	mg/kg			49.18	8.46		11/24/09
Total solids											
Total solids	TS	LA-519-412		97.3	Percent			1.00	0.0		11/17/09

LS
6-01-2010

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)
D - Analyte was identified at a secondary dilution factor
E - Analyte is an estimate, has potentially larger errors(inorg)
U - Analyzed for but not detected above limiting criteria(inorg)

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

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

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Attachment 2
Narrative
WSCF20091170

Introduction

Three (3) S&GRP samples were received at the WSCF Laboratory on November 12, 2009. The samples were analyzed for the analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *Statement of Work (SOW), Modification No. 2 to Agreement 36587, Release 3, "FH WSCF ANALYTICAL SERVICES FOR GROUNDWATER."*

The narrative (Attachment 2) will address sample characteristics, analyses requested and general information in performance of the analytical methods. A Data Summary Report (Attachment 3) includes analytical results, a comment report detailing method abnormalities, tentatively identified peaks if applicable, method references, and Laboratory QC information as applicable. Copies of the chain of custody and sample receipt documentation are included as Attachment 4.

It should be noted that the attached chain of custody was stamped "ICED" by the WSCF Laboratory Sample Custodian during sample receiving, indicating the presence of ice in the transport container.

The following generic data qualifiers (i.e., B, D, and J) may be applicable to this report, as appropriate

- **B** – Sample results with a concentration greater than the MDL but less than the PQL are B flagged (applies to inorganic and wetchem analyses), as appropriate.
- **D** – Sample results are D flagged if dilution(s) were required, as appropriate.
- **J** – Sample results with a concentration greater than the MDL but less than the PQL are J flagged (applies to organic analyses), as appropriate.

Analytical Methodology for Requested Analyses

Refer to *WSCF Method References Report,* pages 14 through 16, for a complete listing of approved analytical methods.

Inorganic Comments

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

- Batch QC analyzed on sample# W0901033 (B22V40 from work group # 20091211)
    - MS/MSD outside normal laboratory limits. Sample results were "N" Flagged.

All other QC controls are within the established limits.

Anions – Hold time requirements for this analysis were met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 20 through 21 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W0901033 (B22V40 from work group # 20091211)
    - Phosphate – Matrix Spike Duplicate slightly outside of laboratory limits. Sample results were "N" flagged.

All other QC controls are within the established limits.

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

All QC controls are within the established limits.

Hexavalent Chromium – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 23 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. See page 24 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W0901072 (B22RJ9 from work group # 20091234)
    - Iron – exceeded spiking levels by a factor of 4. Spike recoveries are not valid.
    - Estimated Boron results due to iron interference. Sample results were "E" flagged.

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

- Batch QC analyzed on sample# W0900956 (B22VR4 from work group # 20091137)
    - Vanadium, Cobalt, Uranium, Beryllium, and Thorium - contamination was detected in the Blank and was evaluated. Affected sample results in this batch were "C" Flagged.
    - Aluminum and Manganese MSD recoveries below 70%. RPDs are greater than 20%. Sample results were "N" flagged.

All other QC controls are within the established limits.

Organic Comments

Sample concentrations are corrected for moisture content 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. See page 36 for QC details. Analytical Note(s):

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. See pages 38 through 43 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W0901005 (B22V37 from work group # 20091176)
    - 2-Fluorophenol LCS is a little high at 114% recovery. No system problems an all MS/MSD recoveries were good.

All other 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 37 for QC details. Analytical Note(s):

All QC controls are within the established limits.

VOA – 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. See pages 44 through 46 for QC details. Analytical Note(s):

- B22V33 – Analyses of this Methanol Blank sample and its associated high concentration VOA samples were not required.

All QC controls are within the established limits.

Radiochemistry Comments

Rad Chem – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike (Matrix Spikes apply only to Technetium), Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 51 through 58 for QC details. Analytical Note(s):

- Gross Alpha, Strontium-89/90 – Duplicate Relative Percent Differences (RPD) exceeded established laboratory limits. The RPD criterion does not apply to results near or below the minimum detectable activity. No flags issued.

- The Pu-239 LCS recovery is high at 126.12 but within the statement of work range of 70-130%.

- Uranium-233/234 and Uranium-235 prep blanks are detected but are less than 2 times the MDA.

All other QC controls are within the established limits.

We 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 contained in this data package has been authorized by the Analytical Laboratory Manager (or designee) and the Client Services representative as verified by the following signatures.

Scot L. Fitzgerald
WSCF Analytical Laboratory Manager

Richard F Barker 1/12/10
Richard Barker
WSCF Client Services

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F10-025-029

COLLECTOR: Kauer, Renee 12/28/09

COMPANY CONTACT: DYEKMAN, DL

TELEPHONE NO.: 373-2530

PROJECT COORDINATOR: DYEKMAN, DL

PRICE CODE: 8N

DATA TURNAROUND: 45 Days / 45 Days

SAMPLING LOCATION: C7514 (299-E24-25); I-045

PROJECT DESIGNATION: 200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)

SAF NO.: F10-025

AIR QUALITY: ☐

ICE CHEST NO.:

FIELD LOGBOOK NO.: HNF-N-491.5 Pg 18

ACTUAL SAMPLE DEPTH: 90 to 92.5

COA: 302117ES10

METHOD OF SHIPMENT: GOVERNMENT VEHICLE

SHIPPED TO: Waste Sampling & Characterization 20091170

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=Vegetation
W=Water
WI=Wipe
X=Other

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B22V54

PRESERVATION			Cool~4C	Cool~4C	None	Cool~4C	Cool~4C	Cool~4C	None	None
TYPE OF CONTAINER			aG/S	aG	G/P	G/P	G/P	G	Square Bottle - Poly	G/P
NO. OF CONTAINER(S)			3	1	1	1	1	1	1	1
VOLUME			40mL	250mL	120mL	120mL	120mL	60mL	500mL	120mL
SAMPLE ANALYSIS			SEE ITEM (1) IN SPECIAL INSTRUCTIONS ✓	SEE ITEM (2) IN SPECIAL INSTRUCTIONS ✓	SEE ITEM (3) IN SPECIAL INSTRUCTIONS ✓	Chromium Hex - 7196; ✓	SEE ITEM (4) IN SPECIAL INSTRUCTIONS ✓	Total Cyanide - 9014; ✓	SEE ITEM (5) IN SPECIAL INSTRUCTIONS ✓	SEE ITEM (6) IN SPECIAL INSTRUCTIONS ✓
SAMPLE NO.	**MATRIX***	**SAMPLE DATE**	**SAMPLE TIME**							
B22V34	SOIL	11-12-09	0817	✓	✓	✓	✓	✓	✓	✓

W096R00994

ICED

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

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Ed Kauer	11-12-09 1500	MD Kessler	11-12-09 1500

SPECIAL INSTRUCTIONS
SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

ORIGINAL

ICED

LABORATORY SECTION — RECEIVED BY — TITLE — DATE/TIME

FINAL SAMPLE DISPOSITION — DISPOSAL METHOD — DISPOSED BY — DATE/TIME

A-6003-618(01/06)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F10-02S-029	PAGE 2 OF 2
COLLECTOR Kauk, Romo	**COMPANY CONTACT** DYEKMAN, DL	**TELEPHONE NO.** 373-2530	**PROJECT COORDINATOR** DYEKMAN, DL	**PRICE CODE** 8N	**DATA TURNAROUND**
SAMPLING LOCATION C7514 (299-E24-25); I-045	**PROJECT DESIGNATION** 200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)		**SAF NO.** F10-025	**AIR QUALITY** ☐	**45 Days / 45 Days**
ICE CHEST NO.	**FIELD LOGBOOK NO.** HNF-N-491-5 P518	**ACTUAL SAMPLE DEPTH** 90 to 92.5	**COA** 302117ES10	**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.
** 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)Alcohols, Glycols, & Ketones - 8015 {Ethylene glycol, Diethyl ether}
(2)Semi-VOA - 8270B (TCL); Semi-VOA - 8270B (Add-On) {Tributyl phosphate, 3+4 Methylphenol (cresol, m+p)} TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range}
(3)ICP/MS - 200.8 (TAL) {Aluminum, Antimony, Barium, Chromium, Cobalt, Cadmium, Copper, Zinc, Manganese, Nickel, Vanadium, Silver} ICP/MS - 200.8 (Add-on) {Arsenic, Lead, Strontium, Thallium, Beryllium, Thorium, Uranium, Selenium} ICP Metals - 6010B (TAL) {Iron} ICP Metals - 6010B (Add-On) {Boron, Lithium} 200.8_HG - ICPMS {Mercury}
(4)IC Anions - 300.0 {Phosphorus in phosphate, Chloride, Nitrogen in Nitrite, Fluoride, Nitrogen in Nitrate, Sulfate} Cations (IC) - 300.7 {Nitrogen in ammonium}
(5)Gamma Spectroscopy {Europium-155, Cesium-137, Europium-154, Europium-152, Cobalt-60} Gamma Spec - Add-on {Antimony-125}
(6)Gross Alpha {Gross alpha} Gross Beta {Gross beta} Americium-241; Technetium-99 {Technetium-99} Isotopic Uranium {Uranium-233/234, Uranium-235, Uranium-238} Isotopic Plutonium; Strontium-89,90 -- Total Sr;

Original

A-6003-618(01/06)

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F10-025-027

COLLECTOR
Kauer, Romo

COMPANY CONTACT
DYEKMAN, DL

TELEPHONE NO.
373-2530

PROJECT COORDINATOR
DYEKMAN, DL

PRICE CODE 8N

DATA TURNAROUND
45 Days / 45 Days

AIR QUALITY ☐

SAMPLING LOCATION
C7514 (299-E24-25); I-045

PROJECT DESIGNATION
200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)

SAF NO.
F10-025

ICE CHEST NO.

FIELD LOGBOOK NO. Pg 18
HNF-N-491-5

ACTUAL SAMPLE DEPTH
96-97.5

COA
302117ES10

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=Vegetation
W=Water
WI=Wipe
X=Other

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B22V54

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

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B22V32 995	SOIL	11-12-09	0817	✓	✓

ICED

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

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Ed Kauer	11-12-09 1500	MD Kessler	11-12-09 1500

SPECIAL INSTRUCTIONS
SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

ORIGINAL

ICED

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

A-6003-618(01/06)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F10-025-027	PAGE 2 OF 2
COLLECTOR Kawle Romo	**COMPANY CONTACT** DYEKMAN, DL	**TELEPHONE NO.** 373-2530	**PROJECT COORDINATOR** DYEKMAN, DL	**PRICE CODE** 8N	**DATA TURNAROUND**
SAMPLING LOCATION C7514 (299-E24-25); I-045	**PROJECT DESIGNATION** 200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)		**SAF NO.** F10-025	**AIR QUALITY** ☐	**45 Days / 45 Days**
ICE CHEST NO.	**FIELD LOGBOOK NO.** HNF-N-481-5 PG 18	**ACTUAL SAMPLE DEPTH** 90 to 92.5	**COA** 302117ES10	**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.
** 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 (LOW LEVEL); VOA - 5035/8260 (LOW LEVEL) - (Add-On) {Trichloromonofluoromethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene}
(2)VOA - 5035/8260 (HIGH LEVEL); VOA - 5035/8260 (HIGH LEVEL) - (Add-On) {Trichloromonofluoromethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene}

ORIGINAL

A-6003-618(01/06)

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F10-025-028

COLLECTOR
Kinney, Romo

COMPANY CONTACT
DYEKMAN, DL

TELEPHONE NO.
373-2530

PROJECT COORDINATOR
DYEKMAN, DL

PRICE CODE 8N

DATA TURNAROUND
45 Days / 45 Days

AIR QUALITY ☐

SAMPLING LOCATION
C7514 (299-E24-25); I-045

PROJECT DESIGNATION
200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)

SAF NO.
F10-025

ICE CHEST NO.

FIELD LOGBOOK NO. P518
HNF-N-491-5

ACTUAL SAMPLE DEPTH
90-92.5

COA
302117ES10

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=Vegetation
W=Water
WI=Wipe
X=Other

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B22V54

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

ICED

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B22V33	SOIL	11-17-09	0917	✓
W096R00996				

ICED

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

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Ed Kaner	11/17/09 1500	MD Kessler	11-17-09 1500

SPECIAL INSTRUCTIONS

** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to 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 (TCL); VOA - 5035/8260 - (Add-On)
{Trichloromonofluoromethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene}

ORIGINAL

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: CPP 200 Area			DATA PACKAGE: VSR10-019		
VALIDATOR: Carl Schloesslin		LAB: WSCF		DATE: 6-01-2010	
			SDG: WSCF20091170		
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 B22V34					

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:

MB detections (mg/kg): Be 0.059, Co 0.050, Th 0.11, U 0.11 & V 0.23

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:

Mn MSD %R = 69%

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:

Al MS/MSD RPD = 38%

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: None

Appendix 6

Additional Documentation Requested By Client

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20091170
Matrix: SOLID
Test: ICP Metals Analysis, Grd H20 P

Sample Date: 11/30/09
Receive Date:11/30/09

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W09GR01072											
BATCH QC ASSOCIATED WITH SAMPLE											
MS	Boron	7440-42-8	94.18	95.131	% Recov	75.000	125.000				12/06/09
MS	Iron	7439-89-6	-790	-797.980	% Recov	75.000	125.000		•		12/06/09
MS	Lithium	7439-93-2	52.71	105.420	% Recov	70.000	130.000				12/06/09
MSD	Boron	7440-42-8	93.68	94.626	% Recov	75.000	125.000				12/06/09
MSD	Iron	7439-89-6	-730	-737.374	% Recov	75.000	125.000		•		12/06/09
MSD	Lithium	7439-93-2	50.39	100.780	% Recov	75.000	125.000				12/06/09
SPK-RPD	Boron	7440-42-8	94.626		RPD			0.532	20.000		12/06/09
SPK-RPD	Iron	7439-89-6	-737.374		RPD			-7.895	20.000 •		12/06/09
SPK-RPD	Lithium	7439-93-2	100.780		RPD			4.500	20.000		12/06/09
BATCH QC											
BLANK	Boron	7440-42-8	<1.9e-2	n/a	ug/mL					U	12/06/09
BLANK	Iron	7439-89-6	<1.8e-2	n/a	ug/mL					U	12/06/09
BLANK	Lithium	7439-93-2	<4e-3	n/a	ug/mL					U	12/06/09
LCS	Boron	7440-42-8	128.5	111.739	% Recov	45.000	156.000				12/06/09
LCS	Iron	7439-89-6	18570	138.582	% Recov	47.000	152.000				12/06/09
LCS	Lithium	7439-93-2	115.3	115.531	% Recov	80.000	120.000				12/06/09

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20091170
Matrix: SOLID
Test: ICP-200.8 MS All possible meta

Sample Date: 11/09/09
Receive Date:11/09/09

Lab ID: W09GR00956
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	176.3	88.150	% Recov	70.000	130.000				11/24/09
MS	Aluminum	7429-90-5	2057	102.850	% Recov	70.000	130.000				11/24/09
MS	Arsenic	7440-38-2	189.85	94.925	% Recov	70.000	130.000				11/24/09
MS	Barium	7440-39-3	180.02	90.010	% Recov	70.000	130.000				11/24/09
MS	Beryllium	7440-41-7	173	87.400	% Recov	70.000	130.000				11/24/09
MS	Cadmium	7440-43-9	181.1	90.550	% Recov	70.000	130.000				11/24/09
MS	Cobalt	7440-48-4	176.11	88.055	% Recov	70.000	130.000				11/24/09
MS	Chromium	7440-47-3	176.62	88.310	% Recov	70.000	130.000				11/24/09
MS	Copper	7440-50-8	163.18	81.590	% Recov	70.000	130.000				11/24/09
MS	Mercury	7439-97-6	1.76	88.000	% Recov	70.000	130.000				11/24/09
MS	Manganese	7439-96-5	171	85.500	% Recov	70.000	130.000				11/24/09
MS	Nickel	7440-02-0	165.45	82.725	% Recov	70.000	130.000				11/24/09
MS	Lead	7439-92-1	181.86	90.930	% Recov	70.000	130.000				11/24/09
MS	Antimony	7440-36-0	183.25	91.625	% Recov	70.000	130.000				11/24/09
MS	Selenium	7782-49-2	185.34	92.670	% Recov	70.000	130.000				11/24/09
MS	Strontium	7440-24-6	188.98	94.490	% Recov	70.000	130.000				11/24/09
MS	Thorium	7440-29-1	195	97.500	% Recov	70.000	130.000				11/24/09
MS	Thallium	7440-28-0	182.5	91.250	% Recov	70.000	130.000				11/24/09
MS	Uranium	7440-61-1	192	96.000	% Recov	70.000	130.000				11/24/09
MS	Vanadium	7440-62-2	175.65	87.825	% Recov	70.000	130.000				11/24/09
MS	Zinc	7440-66-6	177.74	88.870	% Recov	70.000	130.000				11/24/09
MSD	Silver	7440-22-4	166.2	83.100	% Recov	70.000	130.000				11/24/09
MSD	Aluminum	7429-90-5	1399	69.950	% Recov	70.000	130.000				11/24/09
MSD	Arsenic	7440-38-2	171.25	85.625	% Recov	70.000	130.000				11/24/09
MSD	Barium	7440-39-3	167.02	83.510	% Recov	70.000	130.000				11/24/09
MSD	Beryllium	7440-41-7	172	87.300	% Recov	70.000	130.000				11/24/09

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20091170
Matrix: SOLID
Test: ICP-200.8 MS All possible meta

Sample Date: 11/09/09
Receive Date:11/09/09

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
MSD	Cadmium	7440-43-9	171.6	85.800	% Recov	70.000	130.000				11/24/09
MSD	Cobalt	7440-48-4	166.81	83.405	% Recov	70.000	130.000				11/24/09
MSD	Chromium	7440-47-3	165.02	82.510	% Recov	70.000	130.000				11/24/09
MSD	Copper	7440-50-8	152.18	76.090	% Recov	70.000	130.000				11/24/09
MSD	Mercury	7439-97-6	1.75	87.500	% Recov	70.000	130.000				11/24/09
MSD	Manganese	7439-96-5	137.9	68.950	% Recov	70.000	130.000		•		11/24/09
MSD	Nickel	7440-02-0	155.35	77.675	% Recov	70.000	130.000				11/24/09
MSD	Lead	7439-92-1	174.36	87.180	% Recov	70.000	130.000				11/24/09
MSD	Antimony	7440-36-0	172.45	86.225	% Recov	70.000	130.000				11/24/09
MSD	Selenium	7782-49-2	172.74	86.370	% Recov	70.000	130.000				11/24/09
MSD	Strontium	7440-24-6	180.18	90.090	% Recov	70.000	130.000				11/24/09
MSD	Thorium	7440-29-1	194	97.000	% Recov	70.000	130.000				11/24/09
MSD	Thallium	7440-28-0	173.7	86.850	% Recov	70.000	130.000				11/24/09
MSD	Uranium	7440-61-1	190	95.000	% Recov	70.000	130.000				11/24/09
MSD	Vanadium	7440-62-2	157.05	78.525	% Recov	70.000	130.000				11/24/09
MSD	Zinc	7440-66-6	163.94	81.970	% Recov	70.000	130.000				11/24/09
SPK-RPD	Silver	7440-22-4	83.100		RPD			5.898	20.000		11/24/09
SPK-RPD	Aluminum	7429-90-5	69.950		RPD			38.079	20.000 •		11/24/09
SPK-RPD	Arsenic	7440-38-2	85.625		RPD			10.302	20.000		11/24/09
SPK-RPD	Barium	7440-39-3	83.510		RPD			7.492	20.000		11/24/09
SPK-RPD	Beryllium	7440-41-7	87.300		RPD			0.115	20.000		11/24/09
SPK-RPD	Cadmium	7440-43-9	85.800		RPD			5.387	20.000		11/24/09
SPK-RPD	Cobalt	7440-48-4	83.405		RPD			5.424	20.000		11/24/09
SPK-RPD	Chromium	7440-47-3	82.510		RPD			6.791	20.000		11/24/09
SPK-RPD	Copper	7440-50-8	76.090		RPD			6.976	20.000		11/24/09
SPK-RPD	Mercury	7439-97-6	87.500		RPD			0.570	20.000		11/24/09
SPK-RPD	Manganese	7439-96-5	68.950		RPD			21.431	20.000 •		11/24/09
SPK-RPD	Nickel	7440-02-0	77.675		RPD			6.297	20.000		11/24/09
SPK-RPD	Lead	7439-92-1	87.180		RPD			4.211	20.000		11/24/09
SPK-RPD	Antimony	7440-36-0	86.225		RPD			6.073	20.000		11/24/09

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20091170
Matrix: SOLID
Test: ICP-200.8 MS All possible meta

Sample Date: 11/09/09
Receive Date:11/09/09

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
SPK-RPD	Selenium	7782-49-2	86.370		RPD			7.038	20.000		11/24/09
SPK-RPD	Strontium	7440-24-6	90.090		RPD			4.768	20.000		11/24/09
SPK-RPD	Thorium	7440-29-1	97.000		RPD			0.514	20.000		11/24/09
SPK-RPD	Thallium	7440-28-0	86.850		RPD			4.941	20.000		11/24/09
SPK-RPD	Uranium	7440-61-1	95.000		RPD			1.047	20.000		11/24/09
SPK-RPD	Vanadium	7440-62-2	78.525		RPD			11.181	20.000		11/24/09
SPK-RPD	Zinc	7440-66-6	81.970		RPD			8.078	20.000		11/24/09

BATCH QC

BLANK	Silver	7440-22-4	<0.1	n/a	ug/L					U	11/24/09
BLANK	Aluminum	7429-90-5	<5	n/a	ug/L					U	11/24/09
BLANK	Arsenic	7440-38-2	<0.4	n/a	ug/L					U	11/24/09
BLANK	Barium	7440-39-3	<0.2	n/a	ug/L					U	11/24/09
BLANK	Beryllium	7440-41-7	.05921	0.059	ug/L	0.000					11/24/09
BLANK	Cadmium	7440-43-9	<0.1	n/a	ug/L					U	11/24/09
BLANK	Cobalt	7440-48-4	5e-2	0.050	ug/L						11/24/09
BLANK	Chromium	7440-47-3	<0.5	n/a	ug/L					U	11/24/09
BLANK	Copper	7440-50-8	<0.1	n/a	ug/L					U	11/24/09
BLANK	Mercury	7439-97-6	<5e-2	n/a	ug/L					U	11/24/09
BLANK	Manganese	7439-96-5	<0.1	n/a	ug/L					U	11/24/09
BLANK	Nickel	7440-02-0	<0.2	n/a	ug/L					U	11/24/09
BLANK	Lead	7439-92-1	<0.1	n/a	ug/L					U	11/24/09
BLANK	Antimony	7440-36-0	<0.3	n/a	ug/L					U	11/24/09
BLANK	Selenium	7782-49-2	<0.3	n/a	ug/L					U	11/24/09
BLANK	Strontium	7440-24-6	<0.1	n/a	ug/L					U	11/24/09
BLANK	Thorium	7440-29-1	0.1105	0.111	ug/L						11/24/09
BLANK	Thallium	7440-28-0	<0.1	n/a	ug/L					U	11/24/09
BLANK	Uranium	7440-61-1	0.108	0.108	ug/L						11/24/09
BLANK	Vanadium	7440-62-2	0.23	0.230	ug/L						11/24/09
BLANK	Zinc	7440-66-6	<0.8	n/a	ug/L					U	11/24/09

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20091170
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
LCS	Silver	7440-22-4	89.45	88.564	% Recov	81.000	128.000				11/24/09
LCS	Aluminum	7429-90-5	6082	73.632	% Recov	47.000	122.000				11/24/09
LCS	Arsenic	7440-38-2	112.6	85.303	% Recov	78.000	124.000				11/24/09
LCS	Barium	7440-39-3	255.4	80.063	% Recov	77.000	119.000				11/24/09
LCS	Beryllium	7440-41-7	89.5	89.300	% Recov	78.000	118.000				11/24/09
LCS	Cadmium	7440-43-9	59.18	88.992	% Recov	75.000	127.000				11/24/09
LCS	Cobalt	7440-48-4	61.08	83.557	% Recov	75.000	124.000				11/24/09
LCS	Chromium	7440-47-3	57.41	78.752	% Recov	67.000	119.000				11/24/09
LCS	Copper	7440-50-8	53.21	77.679	% Recov	68.000	122.000				11/24/09
LCS	Mercury	7439-97-6	6.69	80.797	% Recov	72.000	117.000				11/24/09
LCS	Manganese	7439-96-5	374.1	82.583	% Recov	72.000	123.000				11/24/09
LCS	Nickel	7440-02-0	45.99	82.716	% Recov	73.000	123.000				11/24/09
LCS	Lead	7439-92-1	111.1	85.462	% Recov	77.000	125.000				11/24/09
LCS	Antimony	7440-36-0	112.9	125.166	% Recov	65.000	203.000				11/24/09
LCS	Selenium	7782-49-2	144.6	89.814	% Recov	82.000	129.000				11/24/09
LCS	Strontium	7440-24-6	47.89	88.033	% Recov	77.000	118.000				11/24/09
LCS	Thorium	7440-29-1	362	96.277	% Recov	79.000	108.000				11/24/09
LCS	Thallium	7440-28-0	118.5	89.098	% Recov	55.000	130.000				11/24/09
LCS	Uranium	7440-61-1	360	95.745	% Recov	84.000	110.000				11/24/09
LCS	Vanadium	7440-62-2	66.31	79.892	% Recov	65.000	122.000				11/24/09
LCS	Zinc	7440-66-6	147.8	83.503	% Recov	75.000	130.000				11/24/09

Date: 01 June 2010
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: CPP 200 Area
Subject: General Chemistry - Sample Data Group (SDG) WSCF20091170

INTRODUCTION

This memorandum presents the results of data validation for SDG WSCF20091170 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
B22V34	11/12/2009	Soil	C	See note 1

1 – 7196 (hexavalent chromium); 300.0 (chloride, fluoride, nitrate, nitrite, phosphate and sulfate); 350.1 (ammonia) and 9014 (total cyanide)

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
- Hexavalent chromium – analysis within 30 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 with the following exception. Sample B22V34 was analyzed for total cyanide beyond the holding time but within 2X the holding time. The total cyanide result for this sample was a non-detect and should be qualified as an estimate and flagged "UJ."

- **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 exception. The MS recovery for ammonia was < the lower acceptance limit but ≥30%. The nitrogen in ammonium result for sample B22V34 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 ammonia was not provided in the SAP.

- **Completeness**

SDG WSCF20091170 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 nitrogen in ammonia result for sample B22V34 as an estimate was due a matrix spike recovery infraction. A minor deficiency leading to qualification of the cyanide result for sample B22V34 as an estimate was due a holding time infraction.

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			
SDG: WSCF20091170	Reviewer: AQA	Project: CPP 200 Area	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Cyanide	UJ	B22V34	Analysis beyond the holding time but within 2X the holding time
N in ammonium	UJ	B22V34	Low MS recovery

Comments: None

Appendix 3

Annotated Laboratory Reports

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-025
Sample # W09GR00994
Client ID: B22V34 GPP WSCF

Matrix: SOIL

Group #: WSCF20091170
Department: Inorganic
Sampled: 11/12/09
Received: 11/12/09

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
Anions by Ion Chromatography Prep											**11/24/09**
Anions by Ion Chromatography											
Fluoride	16984-48-8	LA-533-410	DU	< 1.48	mg/kg			49.18	1.5		11/24/09
Chloride	16887-00-6	LA-533-410	BD	4.42	mg/kg			49.18	2.1		11/24/09
Nitrogen in Nitrite	NO2-N	LA-533-410	DU	< 0.885	mg/kg			49.18	0.89		11/24/09
Nitrogen in Nitrate	NO3-N	LA-533-410	D	14.5	mg/kg			49.18	1.5		11/24/09
Phosphate (P) by IC	PO4-P	LA-533-410	DNU	< 3.44	mg/kg			49.18	3.4		11/24/09
Sulfate	14808-79-8	LA-533-410	BD	7.37	mg/kg			49.18	3.2		11/24/09
Cyanide											
Cyanide	57-12-5	LA-695-402	U	< 0.200	mg/kg	UJ		1.00	0.20		12/01/09
Hexavalent Chromium Prep											**11/23/09**
Hexavalent Chromium											
Hexavalent Chromium	18540-29-9	LA-265-403	U	< 0.100	mg/kg			1.00	0.10		11/24/09
~~**ICP Metals Analysis, Grd H20 P Prep**~~											~~**12/04/09**~~
ICP Metals Analysis, Grd H20 P											
Iron	7439-89-6	LA-505-411		1.38e+04	mg/kg			98.41	1.8		12/06/09
Lithium	7439-93-2	LA-505-411		12.0	mg/kg			98.41	0.39		12/06/09
Boron	7440-42-8	LA-505-411	BE	7.86	mg/kg			98.41	1.9		12/06/09
ICP-200.8 MS All possible meta Prep											**11/23/09**
ICP-200.8 MS All possible meta											
Aluminum	7429-90-5	LA-505-412	N	5.06e+03	mg/kg			0.99	4.95		11/24/09
Manganese	7439-96-5	LA-505-412	N	208	mg/kg			0.99	0.0989		11/24/09
Nickel	7440-02-0	LA-505-412		8.07	mg/kg	<5		0.99	0.198		11/24/09
Silver	7440-22-4	LA-505-412	U	< 0.0989	mg/kg	6-01-2010		0.99	0.0989		11/24/09
~~Antimony~~	~~7440-36-0~~	~~LA-505-412~~	~~U~~	~~< 0.297~~	~~mg/kg~~			~~0.99~~	~~0.297~~		~~11/24/09~~

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

B - The analyte < the RDL but > = the IDL/MDL (inorg)
D - Analyte was identified at a secondary dilution factor
E - Analyte is an estimate, has potentially larger errors(inorg)
U - Analyzed for but not detected above limiting criteria(inorg)

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

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

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-025
Sample # W09GR00994
Client ID: B22V34 GPP WSCF

Matrix: SOIL

Group #: WSCF20091170
Department: Inorganic
Sampled: 11/12/09
Received: 11/12/09

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
Barium	7440-39-3	LA-505-412		46.2	mg/kg			0.99	0.198		11/24/09
Beryllium	7440-41-7	LA-505-412		0.173	mg/kg			0.99	0.0495		11/24/09
Cadmium	7440-43-9	LA-505-412	U	< 0.0989	mg/kg			0.99	0.0989		11/24/09
Chromium	7440-47-3	LA-505-412		8.41	mg/kg			0.99	0.495		11/24/09
Cobalt	7440-48-4	LA-505-412		3.76	mg/kg			0.99	0.0495		11/24/09
Copper	7440-50-8	LA-505-412		8.52	mg/kg			0.99	0.0989		11/24/09
Vanadium	7440-62-2	LA-505-412		17.8	mg/kg			0.99	0.198		11/24/09
Zinc	7440-66-6	LA-505-412		24.8	mg/kg			0.99	0.791		11/24/09
Lead	7439-92-1	LA-505-412		3.60	mg/kg			0.99	0.0989		11/24/09
Mercury	7439-97-6	LA-505-412	U	< 0.0495	mg/kg			0.99	0.0495		11/24/09
Thorium	7440-29-1	LA-505-412		4.13	mg/kg			0.99	0.0989		11/24/09
Uranium	7440-61-1	LA-505-412	C	2.84	mg/kg			0.99	0.0495		11/24/09
Arsenic	7440-38-2	LA-505-412		3.02	mg/kg			0.99	0.396		11/24/09
Selenium	7782-49-2	LA-505-412		0.520	mg/kg			0.99	0.297		11/24/09
Thallium	7440-28-0	LA-505-412	U	< 0.0989	mg/kg			0.99	0.0989		11/24/09
Strontium	7440-24-6	LA-505-412		24.4	mg/kg			0.99	0.0989		11/24/09
Nitrogen in ammonium Prep											**11/24/09**
Nitrogen in ammonium											
Nitrogen in ammonium	NH4-N	LA-503-401	DNU	< 8.46	mg/kg	UJ		49.18	8.46		11/24/09
Total solids											
Total solids	TS	LA-519-412		97.3	Percent			1.00	0.0		11/17/09

LS
6-01-2010

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)
D - Analyte was identified at a secondary dilution factor
E - Analyte is an estimate, has potentially larger errors(inorg)
U - Analyzed for but not detected above limiting criteria(inorg)

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

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

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Attachment 2
Narrative
WSCF20091170

Introduction

Three (3) S&GRP samples were received at the WSCF Laboratory on November 12, 2009. The samples were analyzed for the analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *Statement of Work (SOW), Modification No. 2 to Agreement 36587, Release 3, "FH WSCF ANALYTICAL SERVICES FOR GROUNDWATER."*

The narrative (Attachment 2) will address sample characteristics, analyses requested and general information in performance of the analytical methods. A Data Summary Report (Attachment 3) includes analytical results, a comment report detailing method abnormalities, tentatively identified peaks if applicable, method references, and Laboratory QC information as applicable. Copies of the chain of custody and sample receipt documentation are included as Attachment 4.

It should be noted that the attached chain of custody was stamped "ICED" by the WSCF Laboratory Sample Custodian during sample receiving, indicating the presence of ice in the transport container.

The following generic data qualifiers (i.e., B, D, and J) may be applicable to this report, as appropriate

- **B** – Sample results with a concentration greater than the MDL but less than the PQL are B flagged (applies to inorganic and wetchem analyses), as appropriate.
- **D** – Sample results are D flagged if dilution(s) were required, as appropriate.
- **J** – Sample results with a concentration greater than the MDL but less than the PQL are J flagged (applies to organic analyses), as appropriate.

Analytical Methodology for Requested Analyses

Refer to *WSCF Method References Report,* pages 14 through 16, for a complete listing of approved analytical methods.

Inorganic Comments

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

- Batch QC analyzed on sample# W0901033 (B22V40 from work group # 20091211)
    - MS/MSD outside normal laboratory limits. Sample results were "N" Flagged.

All other QC controls are within the established limits.

Anions – Hold time requirements for this analysis were met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 20 through 21 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W0901033 (B22V40 from work group # 20091211)
    - Phosphate – Matrix Spike Duplicate slightly outside of laboratory limits. Sample results were "N" flagged.

All other QC controls are within the established limits.

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

All QC controls are within the established limits.

Hexavalent Chromium – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 23 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. See page 24 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W0901072 (B22RJ9 from work group # 20091234)
    - Iron – exceeded spiking levels by a factor of 4. Spike recoveries are not valid.
    - Estimated Boron results due to iron interference. Sample results were "E" flagged.

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

- Batch QC analyzed on sample# W0900956 (B22VR4 from work group # 20091137)
    - Vanadium, Cobalt, Uranium, Beryllium, and Thorium - contamination was detected in the Blank and was evaluated. Affected sample results in this batch were "C" Flagged.
    - Aluminum and Manganese MSD recoveries below 70%. RPDs are greater than 20%. Sample results were "N" flagged.

All other QC controls are within the established limits.

Organic Comments

Sample concentrations are corrected for moisture content 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. See page 36 for QC details. Analytical Note(s):

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. See pages 38 through 43 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W0901005 (B22V37 from work group # 20091176)
    - 2-Fluorophenol LCS is a little high at 114% recovery. No system problems an all MS/MSD recoveries were good.

All other 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 37 for QC details. Analytical Note(s):

All QC controls are within the established limits.

VOA – 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. See pages 44 through 46 for QC details. Analytical Note(s):

- B22V33 – Analyses of this Methanol Blank sample and its associated high concentration VOA samples were not required.

All QC controls are within the established limits.

Radiochemistry Comments

Rad Chem – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike (Matrix Spikes apply only to Technetium), Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 51 through 58 for QC details. Analytical Note(s):

- Gross Alpha, Strontium-89/90 – Duplicate Relative Percent Differences (RPD) exceeded established laboratory limits. The RPD criterion does not apply to results near or below the minimum detectable activity. No flags issued.

- The Pu-239 LCS recovery is high at 126.12 but within the statement of work range of 70-130%.

- Uranium-233/234 and Uranium-235 prep blanks are detected but are less than 2 times the MDA.

All other QC controls are within the established limits.

We 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 contained in this data package has been authorized by the Analytical Laboratory Manager (or designee) and the Client Services representative as verified by the following signatures.

Scot L. Fitzgerald
WSCF Analytical Laboratory Manager

Richard F Barker 1/12/10
Richard Barker
WSCF Client Services

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F10-025-029

COLLECTOR: Kauer, Renee 12/28/09

COMPANY CONTACT: DYEKMAN, DL

TELEPHONE NO.: 373-2530

PROJECT COORDINATOR: DYEKMAN, DL

PRICE CODE: 8N

DATA TURNAROUND: 45 Days / 45 Days

SAMPLING LOCATION: C7514 (299-E24-25); I-045

PROJECT DESIGNATION: 200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)

SAF NO.: F10-025

AIR QUALITY: ☐

ICE CHEST NO.:

FIELD LOGBOOK NO.: HNF-N-491.5 Pg 18

ACTUAL SAMPLE DEPTH: 90 to 92.5

COA: 302117ES10

METHOD OF SHIPMENT: GOVERNMENT VEHICLE

SHIPPED TO: Waste Sampling & Characterization 20091170

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=Vegetation
W=Water
WI=Wipe
X=Other

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B22V54

PRESERVATION			Cool~4C	Cool~4C	None	Cool~4C	Cool~4C	Cool~4C	None	None
TYPE OF CONTAINER			aG/S	aG	G/P	G/P	G/P	G	Square Bottle - Poly	G/P
NO. OF CONTAINER(S)			3	1	1	1	1	1	1	1
VOLUME			40mL	250mL	120mL	120mL	120mL	60mL	500mL	120mL
SAMPLE ANALYSIS			SEE ITEM (1) IN SPECIAL INSTRUCTIONS ✓	SEE ITEM (2) IN SPECIAL INSTRUCTIONS ✓	SEE ITEM (3) IN SPECIAL INSTRUCTIONS ✓	Chromium Hex - 7196; ✓	SEE ITEM (4) IN SPECIAL INSTRUCTIONS ✓	Total Cyanide - 9014; ✓	SEE ITEM (5) IN SPECIAL INSTRUCTIONS ✓	SEE ITEM (6) IN SPECIAL INSTRUCTIONS ✓
SAMPLE NO.	**MATRIX***	**SAMPLE DATE**	**SAMPLE TIME**							
B22V34	SOIL	11-12-09	0817	✓	✓	✓	✓	✓	✓	✓

W096R00994

ICED

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

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Ed Kauer	11-12-09 1500	MD Kessler	11-12-09 1500

SPECIAL INSTRUCTIONS
SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

ORIGINAL

ICED

LABORATORY SECTION — RECEIVED BY — TITLE — DATE/TIME

FINAL SAMPLE DISPOSITION — DISPOSAL METHOD — DISPOSED BY — DATE/TIME

A-6003-618(01/06)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F10-02S-029	PAGE 2 OF 2
COLLECTOR Kauk, Romo	**COMPANY CONTACT** DYEKMAN, DL	**TELEPHONE NO.** 373-2530	**PROJECT COORDINATOR** DYEKMAN, DL	**PRICE CODE** 8N	**DATA TURNAROUND**
SAMPLING LOCATION C7514 (299-E24-25); I-045	**PROJECT DESIGNATION** 200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)		**SAF NO.** F10-025	**AIR QUALITY** ☐	**45 Days / 45 Days**
ICE CHEST NO.	**FIELD LOGBOOK NO.** HNE-N-491-5 P518	**ACTUAL SAMPLE DEPTH** 90 to 92.5	**COA** 302117ES10	**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.
** 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)Alcohols, Glycols, & Ketones - 8015 {Ethylene glycol, Diethyl ether}
(2)Semi-VOA - 8270B (TCL); Semi-VOA - 8270B (Add-On) {Tributyl phosphate, 3+4 Methylphenol (cresol, m+p)} TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range}
(3)ICP/MS - 200.8 (TAL) {Aluminum, Antimony, Barium, Chromium, Cobalt, Cadmium, Copper, Zinc, Manganese, Nickel, Vanadium, Silver} ICP/MS - 200.8 (Add-on) {Arsenic, Lead, Strontium, Thallium, Beryllium, Thorium, Uranium, Selenium} ICP Metals - 6010B (TAL) {Iron} ICP Metals - 6010B (Add-On) {Boron, Lithium} 200.8_HG - ICPMS {Mercury}
(4)IC Anions - 300.0 {Phosphorus in phosphate, Chloride, Nitrogen in Nitrite, Fluoride, Nitrogen in Nitrate, Sulfate} Cations (IC) - 300.7 {Nitrogen in ammonium}
(5)Gamma Spectroscopy {Europium-155, Cesium-137, Europium-154, Europium-152, Cobalt-60} Gamma Spec - Add-on {Antimony-125}
(6)Gross Alpha {Gross alpha} Gross Beta {Gross beta} Americium-241; Technetium-99 {Technetium-99} Isotopic Uranium {Uranium-233/234, Uranium-235, Uranium-238} Isotopic Plutonium; Strontium-89,90 -- Total Sr;

Original

A-6003-618(01/06)

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F10-025-027

COLLECTOR
Kauer, Romo

COMPANY CONTACT
DYEKMAN, DL

TELEPHONE NO.
373-2530

PROJECT COORDINATOR
DYEKMAN, DL

PRICE CODE 8N

DATA TURNAROUND
45 Days / 45 Days

AIR QUALITY ☐

SAMPLING LOCATION
C7514 (299-E24-25); I-045

PROJECT DESIGNATION
200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)

SAF NO.
F10-025

ICE CHEST NO.

FIELD LOGBOOK NO. Pg 18
HNF-N-491-5

ACTUAL SAMPLE DEPTH
96-97.5

COA
302117ES10

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=Vegetation
W=Water
WI=Wipe
X=Other

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B22V54

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

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B22V32 995	SOIL	11-12-09	0817	✓	✓

ICED

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

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Ed Kauer	11-12-09 1500	MD Kessler	11-12-09 1500

SPECIAL INSTRUCTIONS
SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

ORIGINAL

ICED

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

A-6003-618(01/06)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F10-025-027	PAGE 2 OF 2
COLLECTOR Kawle Romo	**COMPANY CONTACT** DYEKMAN, DL	**TELEPHONE NO.** 373-2530	**PROJECT COORDINATOR** DYEKMAN, DL	**PRICE CODE** 8N	**DATA TURNAROUND**
SAMPLING LOCATION C7514 (299-E24-25); I-045	**PROJECT DESIGNATION** 200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)		**SAF NO.** F10-025	**AIR QUALITY** ☐	**45 Days / 45 Days**
ICE CHEST NO.	**FIELD LOGBOOK NO.** HNF-N-481-5 PG 18	**ACTUAL SAMPLE DEPTH** 90 to 92.5	**COA** 302117ES10	**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.
** 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 (LOW LEVEL); VOA - 5035/8260 (LOW LEVEL) - (Add-On) {Trichloromonofluoromethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene}
(2)VOA - 5035/8260 (HIGH LEVEL); VOA - 5035/8260 (HIGH LEVEL) - (Add-On) {Trichloromonofluoromethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene}

ORIGINAL

A-6003-618(01/06)

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F10-025-028

COLLECTOR
Kinzer, Romo

COMPANY CONTACT
DYEKMAN, DL

TELEPHONE NO.
373-2530

PROJECT COORDINATOR
DYEKMAN, DL

PRICE CODE 8N

DATA TURNAROUND
45 Days / 45 Days

AIR QUALITY ☐

SAMPLING LOCATION
C7514 (299-E24-25); I-045

PROJECT DESIGNATION
200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)

SAF NO.
F10-025

ICE CHEST NO.

FIELD LOGBOOK NO. P518
HNF-N-491-5

ACTUAL SAMPLE DEPTH
90-92.5

COA
302117ES10

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=Vegetation
W=Water
WI=Wipe
X=Other

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B22V54

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

ICED

ICED

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B22V33	SOIL	11-17-09	0917	✓
W096R00996				

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

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Ed Kinzer	11/17/09 1500	MD Kessler	11-17-09 1500

SPECIAL INSTRUCTIONS

** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to 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 (TCL); VOA - 5035/8260 - (Add-On)
{Trichloromonofluoromethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene}

ORIGINAL

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: CPP 200 Area			DATA PACKAGE: VSR10-019		
VALIDATOR: Carl Schloesslin		LAB: WSCF		DATE: 6-01-2010	
			SDG: WSCF20091170		
ANALYSES PERFORMED					
Anions/IC X	TOC	TOX	TPH-418.1	Oil and Grease	Alkalinity
Ammonia X	BOD/COD	Chloride	Chromium-VI X	pH	NO_3/NO_2
Sulfate	TDS	TKN	Phosphate	Total CN X	Sulfide

SAMPLES/MATRIX Soil sample B22V34

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 = 73%

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:

Sample B22V34 analyzed for total cyanide 20 days after collection (HT = 14 days).

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

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20091170
Matrix: SOLID
Test: Ammonia (N) by IC

Sample Date: 11/20/09
Receive Date:11/20/09

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W09GR01033											
BATCH QC ASSOCIATED WITH SAMPLE											
DUP	Ammonia (N) by IC	7664-41-7	<8.561042		RPD			n/a	20.000	U	11/24/09
MS	Ammonia (N) by IC	7664-41-7	0.364718	72.944	% Recov	80.000	120.000		*		11/24/09
MSD	Ammonia (N) by IC	7664-41-7	0.37304	74.608	% Recov	80.000	120.000		*		11/24/09
SPK-RPD	Ammonia (N) by IC	7664-41-7	74.608		RPD			2.255	20.000		11/24/09
BATCH QC											
BLANK	Ammonia (N) by IC	7664-41-7	<0.172	n/a	mg/L	0.000	0.002			U	11/24/09
BLANK	Ammonia (N) by IC	7664-41-7	<0.172	n/a	mg/L	0.000	0.002			U	11/24/09
LCS	Ammonia (N) by IC	7664-41-7	102.364	102.364	% Recov	80.000	120.000				11/24/09

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20091170
Matrix: SOLID
Test: Anions by Ion Chromatography

Sample Date: 11/20/09
Receive Date:11/20/09

Lab ID: W09GR01033
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	2.765		RPD			n/a	20.000		11/24/09
DUP	Fluoride	16984-48-8	<1.493949		RPD			n/a	20.000	U	11/24/09
DUP	Nitrogen in Nitrite	NO2-N	<0.896369		RPD			n/a	20.000	U	11/24/09
DUP	Nitrogen in Nitrate	NO3-N	3.595		RPD			6.877	20.000		11/24/09
DUP	Phosphate (P) by IC	PO4-P	<3.485881		RPD			n/a	20.000	U	11/24/09
DUP	Sulfate	14808-79-8	13.228		RPD			9.353	20.000		11/24/09
MS	Chloride	16887-00-6	0.976696	98.160	% Recov	80.000	120.000				11/24/09
MS	Fluoride	16984-48-8	0.442211	86.708	% Recov	80.000	120.000				11/24/09
MS	Nitrogen in Nitrite	NO2-N	0.487091	98.006	% Recov	80.000	120.000				11/24/09
MS	Nitrogen in Nitrate	NO3-N	0.452712	100.603	% Recov	80.000	120.000				11/24/09
MS	Phosphate (P) by IC	PO4-P	0.781406	80.807	% Recov	80.000	120.000				11/24/09
MS	Sulfate	14808-79-8	1.78187	89.094	% Recov	80.000	120.000				11/24/09
MSD	Chloride	16887-00-6	0.941899	94.663	% Recov	80.000	120.000				11/24/09
MSD	Fluoride	16984-48-8	0.44163	86.594	% Recov	80.000	120.000				11/24/09
MSD	Nitrogen in Nitrite	NO2-N	0.4658	93.722	% Recov	80.000	120.000				11/24/09
MSD	Nitrogen in Nitrate	NO3-N	0.453115	100.692	% Recov	80.000	120.000				11/24/09
MSD	Phosphate (P) by IC	PO4-P	0.764356	79.044	% Recov	80.000	120.000				11/24/09
MSD	Sulfate	14808-79-8	1.789937	89.497	% Recov	80.000	120.000				11/24/09
SPK-RPD	Chloride	16887-00-6	94.663		RPD			3.627	20.000		11/24/09
SPK-RPD	Fluoride	16984-48-8	86.594		RPD			0.132	20.000		11/24/09
SPK-RPD	Nitrogen in Nitrite	NO2-N	93.722		RPD			4.469	20.000		11/24/09
SPK-RPD	Nitrogen in Nitrate	NO3-N	100.692		RPD			0.088	20.000		11/24/09
SPK-RPD	Phosphate (P) by IC	PO4-P	79.044		RPD			2.206	20.000		11/24/09
SPK-RPD	Sulfate	14808-79-8	89.497		RPD			0.451	20.000		11/24/09

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20091170
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	<4.3e-2	n/a	mg/L	0.000	0.030			U	11/24/09
BLANK	Chloride	16887-00-6	<4.3e-2	n/a	mg/L	0.000	0.030			U	11/24/09
BLANK	Fluoride	16984-48-8	<3e-2	n/a	mg/L	0.000	0.030			U	11/24/09
BLANK	Fluoride	16984-48-8	<3e-2	n/a	mg/L	0.000	0.030			U	11/24/09
BLANK	Nitrogen in Nitrite	NO2-N	<1.8e-2	n/a	mg/L	0.000	0.020			U	11/24/09
BLANK	Nitrogen in Nitrite	NO2-N	<1.8e-2	n/a	mg/L	0.000	0.020			U	11/24/09
BLANK	Nitrogen in Nitrate	NO3-N	<3.1e-2	n/a	mg/L	0.000	0.040			U	11/24/09
BLANK	Nitrogen in Nitrate	NO3-N	<3.1e-2	n/a	mg/L	0.000	0.040			U	11/24/09
BLANK	Phosphate (P) by IC	PO4-P	<7e-2	n/a	mg/L	0.000	0.200			U	11/24/09
BLANK	Phosphate (P) by IC	PO4-P	<7e-2	n/a	mg/L	0.000	0.200			U	11/24/09
BLANK	Sulfate	14808-79-8	<6.6e-2	n/a	mg/L	0.000	0.200			U	11/24/09
BLANK	Sulfate	14808-79-8	<6.6e-2	n/a	mg/L	0.000	0.200			U	11/24/09
LCS	Chloride	16887-00-6	187.99	94.467	% Recov	80.000	120.000				11/24/09
LCS	Fluoride	16984-48-8	96.659	94.764	% Recov	80.000	120.000				11/24/09
LCS	Nitrogen in Nitrite	NO2-N	97.846	98.437	% Recov	80.000	120.000				11/24/09
LCS	Nitrogen in Nitrate	NO3-N	90.779	100.978	% Recov	80.000	120.000				11/24/09
LCS	Phosphate (P) by IC	PO4-P	184.536	95.417	% Recov	80.000	120.000				11/24/09
LCS	Sulfate	14808-79-8	371.191	92.798	% Recov	80.000	120.000				11/24/09

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20091170
Matrix: SOLID
Test: Cyanide by Midi/Spectrophotom

Sample Date: 11/09/09
Receive Date:11/09/09

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W09GR00956											
BATCH QC ASSOCIATED WITH SAMPLE											
MS	Cyanide by Midi/Spectrophotom	57-12-5	1.8	90.000	% Recov	75.000	125.000				12/01/09
MSD	Cyanide by Midi/Spectrophotom	57-12-5	1.82	91.000	% Recov	75.000	125.000				12/01/09
SPK-RPD	Cyanide by Midi/Spectrophotom	57-12-5	91.000		RPD			1.105	20.000		12/01/09
BATCH QC											
BLANK	Cyanide by Midi/Spectrophotom	57-12-5	< 0.2	n/a	ug/L	-4.000	4.000			U	12/01/09
LCS	Cyanide by Midi/Spectrophotom	57-12-5	53.2	97.258	% Recov	85.000	115.000				12/01/09

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20091170
Matrix: SOLID
Test: Hexavalent chromium

Sample Date: 11/11/09
Receive Date:11/11/09

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W09GR00974											
BATCH QC ASSOCIATED WITH SAMPLE											
DUP	Hexavalent chromium	18540-29-9	0.10		RPD			n/a	15.000		11/24/09
MS	Hexavalent chromium	18540-29-9	17.8	92.228	% Recov	75.000	125.000				11/24/09
MS	Hexavalent chromium	18540-29-9	471	85.018	% Recov	75.000	125.000				11/24/09
MSD	Hexavalent chromium	18540-29-9	16.4	93.182	% Recov	75.000	125.000				11/24/09
SPK-POST	Hexavalent chromium	18540-29-9	0.0583	109.176	% Recov	75.000	125.000				11/24/09
SPK-RPD	Hexavalent chromium	18540-29-9	93.182		RPD			1.029	20.000		11/24/09
BATCH QC											
BLNK-PREP	Hexavalent chromium	18540-29-9	< 0.10	n/a	ug/g	0.000	2.000			U	11/24/09
LCS	Hexavalent chromium	18540-29-9	18.2	91.919	% Recov	80.000	120.000				11/24/09

Date: 01 June 2010
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: CPP 200 Area
Subject: Radiochemical - Sample Data Groups (SDGs) H4082 and WSCF20091170

INTRODUCTION

This memorandum presents the results of data validation for SDG H4082 prepared by Eberline Services and SDG WSCF20091170 prepared by WSCF Analytical Laboratories. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B22V37	11/13/2009	Soil	C	See note 1
B22V28	11/09/2009	Soil	C	See note 1
B22VR4	11/09/2009	Soil	C	See note 1
B22V31	11/10/2009	Soil	C	See note 1
B22V34	11/12/2009	Soil	C	See note 2

1 – C-14, Ni-63, Np-237, I-129, Isotopic-Th and Tritium
2 – C-14, Ni-63, Np-237, I-129, Isotopic-Th, Tritium, Am-241, Isotopic-Pu, Isotopic-U, Tc-99, Sr-89/90, Gross alpha, Gross beta and Gamma Spectrometry

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 samples were 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 with the following exceptions.

For SDG WSCF20091170, the U-233/234 and U-235 laboratory blank results were > the minimum detectable concentrations (MDCs). The U-233/234 result for sample B22V34 was a detect >5X the blank result and should not be qualified. The U-235 result for sample B22V34 was a detect <5X the blank result and should be qualified as an estimate and flagged "J."

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 H4082, MS analyses were not performed for tritium and C-14. The tritium and C-14 results for samples B22V37, B22V28, B22VR4, B22V31 and B22V34 were non-detects and should be qualified as estimates and flagged "UJ."

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 with the following exceptions.

The C-14 MDCs for samples B22V37, B22V28, B22VR4, B22V31 and B22V34 were > the CRDL.

It should be noted that the Np-237 result for sample B22V34 was a non-detect with a large uncertainty value that does not accurately reflect the reported MDC. The actual MDC is most likely > the CRDL.

It should also be noted that gross alpha/beta CRDLs were not provided in the SAP.

- **Completeness**

SDGs H4082 and WSCF20091170 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 results as estimates were due to laboratory blank infractions and lack of MS analyses for tritium and C-14. See the table in Appendix 2 for a listing of all affected sample results.

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: H4082 & WSCF20091170	Reviewer: AQA	Project: CPP 200 Area	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Tritium C-14	UJ	B22V37, B22V28, B22VR4, B22V31, B22V34	Lack of MS data
U-235	J	B22V34	Laboratory blank contamination

Comments: None

Appendix 3

Annotated Laboratory Reports

REVISION 1

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP H4082

7515-001 B22V37

DATA SHEET

SDG	7515	Client/Case no	CHPRC	SDG H4082	
Contact	N. Joseph Verville	Contract	No. 33677		
Lab sample id	R911075-01	Client sample id	B22V37		
Dept sample id	7515-001	Location/Matrix	C7514(299E2425);I-070	SOLID	
Received	11/19/09	Collected/Weight	11/13/09 09:50	196 g	
% solids	97.2	Custody/SAF No	F10-025-001	F10-025	

ANALYTE		CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	UJ	10028-17-8	0.545	3.9	6.70	400	U	H
Carbon 14	UJ	14762-75-5	2.86	3.5	5.77	50.0	U	C
Nickel 63		13981-37-8	-1.70	2.5	4.35	30.0	U	NI_L
Iodine 129		15046-84-1	-1.02	1.3	1.56	5.00	U	I
Thorium 228		14274-82-9	0.559	0.28	0.267	1.00		TH
Thorium 230		14269-63-7	0.802	0.49	0.643	1.00		TH
Thorium 232		TH-232	0.698	0.28	0.267	1.00		TH
Neptunium 237		13994-20-2	0	0.081	0.310	1.00	U	NP

200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)

LS
6-01-2010

DATA SHEETS
Page 1
SUMMARY DATA SECTION
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Lab id	EBRLNE
Protocol	CHPRC
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	02/11/10

REVISION 1

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP H4082

7515-002 B22V28

DATA SHEET

SDG	7515	Client/Case no	CHPRC	SDG_H4082	
Contact	N. Joseph Verville	Contract	No. 33677		
Lab sample id	R911075-02	Client sample id	B22V28		
Dept sample id	7515-002	Location/Matrix	C7514(299E2425);I-006	SOLID	
Received	11/19/09	Collected/Weight	11/09/09 10:58	167 g	
% solids	97.3	Custody/SAF No	F10-025-009	F10-025	

ANALYTE		CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	UJ	10028-17-8	0.397	4.7	8.13	400	U	H
Carbon 14	UJ	14762-75-5	0.567	3.6	6.12	50.0	U	C
Nickel 63		13981-37-8	-1.57	2.2	3.80	30.0	U	NI_L
Iodine 129		15046-84-1	-0.420	1.2	1.63	5.00	U	I
Thorium 228		14274-82-9	0.856	0.34	0.252	1.00		TH
Thorium 230		14269-63-7	0.592	0.46	0.628	1.00	U	TH
Thorium 232		TH-232	0.691	0.33	0.252	1.00		TH
Neptunium 237		13994-20-2	0.041	0.17	0.317	1.00	U	NP

200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)

LS
6-01-2010

DATA SHEETS
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SUMMARY DATA SECTION
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Lab id	EBRLNE
Protocol	CHPRC
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	02/11/10

REVISION 1

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP H4082

7515-003 B22VR4

DATA SHEET

SDG	7515	Client/Case no	CHPRC	SDG_H4082	
Contact	N. Joseph Verville	Contract	No. 33677		
Lab sample id	R911075-03	Client sample id	B22VR4		
Dept sample id	7515-003	Location/Matrix	C7514(299E2425);I-006D	SOLID	
Received	11/19/09	Collected/Weight	11/09/09 10:58	155 g	
% solids	97.2	Custody/SAF No	F10-025-013	F10-025	

ANALYTE		CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	UJ	10028-17-8	0.199	3.6	6.13	400	U	H
Carbon 14	UJ	14762-75-5	-0.372	3.0	5.15	50.0	U	C
Nickel 63		13981-37-8	-0.592	2.1	3.68	30.0	U	NI_L
Iodine 129		15046-84-1	-0.543	1.1	1.53	5.00	U	I
Thorium 228		14274-82-9	0.486	0.28	0.332	1.00		TH
Thorium 230		14269-63-7	1.00	0.49	0.639	1.00		TH
Thorium 232		TH-232	0.555	0.28	0.265	1.00		TH
Neptunium 237		13994-20-2	0	0.093	0.140	1.00	U	NP

200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)

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6-01-2010

DATA SHEETS
Page 3
SUMMARY DATA SECTION
Page 13

Lab id	EBRLNE
Protocol	CHPRC
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	02/11/10

REVISION 1

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP H4082

7515-004 B22V31

DATA SHEET

SDG	7515	Client/Case no	CHPRC	SDG_H4082	
Contact	N. Joseph Verville	Contract	No. 33677		
Lab sample id	R911075-04	Client sample id	B22V31		
Dept sample id	7515-004	Location/Matrix	C7514(299E2425);I-016	SOLID	
Received	11/19/09	Collected/Weight	11/10/09 07:50	139 g	
% solids	97.2	Custody/SAF No	F10-025-017	F10-025	

ANALYTE		CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	UJ	10028-17-8	1.60	4.2	7.05	400	U	H
Carbon 14	UJ	14762-75-5	2.36	3.2	5.32	50.0	U	C
Nickel 63		13981-37-8	-1.49	2.1	3.60	30.0	U	NI_L
Iodine 129		15046-84-1	-1.05	1.3	1.78	5.00	U	I
Thorium 228		14274-82-9	1.02	0.45	0.424	1.00		TH
Thorium 230		14269-63-7	1.46	0.63	0.784	1.00		TH
Thorium 232		TH-232	1.06	0.45	0.339	1.00		TH
Neptunium 237		13994-20-2	0	0.11	0.421	1.00	U	NP

200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)

LS
6-01-2010

Lab id	EBRLNE
Protocol	CHPRC
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	02/11/10

REVISION 1

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP H4082

7515-005 B22V34

DATA SHEET

SDG	7515	Client/Case no	CHPRC	SDG_H4082	
Contact	N. Joseph Verville	Contract	No. 33677		
Lab sample id	R911075-05	Client sample id	B22V34		
Dept sample id	7515-005	Location/Matrix	C7514(299E2425);I-045	SOLID	
Received	11/19/09	Collected/Weight	11/12/09 08:17	124 g	
% solids	97.2	Custody/SAF No	F10-025-026	F10-025	

ANALYTE		CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	UJ	10028-17-8	-2.74	4.1	7.31	400	U	H
Carbon 14	UJ	14762-75-5	0.729	3.2	5.44	50.0	U	C
Nickel 63		13981-37-8	0.630	2.3	3.92	30.0	U	NI_L
Iodine 129		15046-84-1	-0.161	1.1	1.55	5.00	U	I
Thorium 228		14274-82-9	0.747	0.42	0.398	1.00		TH
Thorium 230		14269-63-7	1.08	0.59	0.734	1.00		TH
Thorium 232		TH-232	0.747	0.34	0.317	1.00		TH
Neptunium 237		13994-20-2	-4.68	9.4	0.357	1.00	U	NP

200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)

LS
6-01-2010

Lab id	EBRLNE
Protocol	CHPRC
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	02/11/10

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-025
Sample # W09GR00994
Client ID: B22V34 GPP WSCF

Matrix: SOIL

Group #: WSCF20091170
Department: Radiochemistry
Sampled: 11/12/09
Received: 11/12/09

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	0.0390	pCi/g	+-0.0312	pCi/g	1.00	0.045		12/03/09
Am-243 tracer by AEA	AM243	LA-508-471		4.00	pCi/g			1.00	0.023		12/03/09
Gamma Energy Analysis-grd H2O											
Antimony-125	14234-35-6	LA-508-481	U	0.0166	pCi/g	+-0.0204	pCi/g	1.00	0.035		11/19/09
Cobalt-60	10198-40-0	LA-508-481	U	-3.46e-03	pCi/g	+-8.21e-03	pCi/g	1.00	0.014		11/19/09
Cesium-137	10045-97-3	LA-508-481	U	-4.81e-03	pCi/g	+-8.02e-03	pCi/g	1.00	0.013		11/19/09
Europium-152	14683-23-9	LA-508-481	U	8.86e-04	pCi/g	+-8.86e-03	pCi/g	1.00	0.036		11/19/09
Europium-154	15585-10-1	LA-508-481	U	7.59e-03	pCi/g	+-0.0314	pCi/g	1.00	0.046		11/19/09
Europium-155	14391-16-3	LA-508-481	U	0.0518	pCi/g	+-0.0427	pCi/g	1.00	0.053		11/19/09
Gross Alpha on Alpha Plateau											
Gross alpha on alpha plateau	12587-46-1	LA-508-415		1.30	pCi/g	+-0.845	pCi/g	1.00	1.2		12/06/09
Gross Alpha/Gross Beta (AB32)											
Gross beta	12587-47-2	LA-508-415		6.60	pCi/g	+-1.25	pCi/g	1.00	1.3		12/04/09
Plutonium Isotopics by AEA											
Plutonium-238	13981-16-3	LA-508-471	U	9.40e-03	pCi/g	+-0.0264	pCi/g	1.00	0.046		12/03/09
Pu-239/240 by AEA	PU-239/240	LA-508-471		9.40e-03	pCi/g	+-8.74e-03	pCi/g	1.00	5.1e-03		12/03/09
Pu-242	13982-10-0	LA-508-471		5.90	pCi/g			1.00	0.014		12/03/09
Strontium 89/90											
Strontium-89/90	SR-RAD	LA-508-415		1.30	pCi/g	+-1.00	pCi/g	1.00	0.46		12/15/09
Sr-85 Tracer by Beta Counting	SR85	LA-508-415		72.0	Percent			1.00	0.0		12/15/09
TC99 by Liquid Scin.											
Tc-99 by Liquid Scin.	14133-76-7	LA-508-421		0.400	pCi/g	+-0.180	pCi/g	1.00	0.30		12/17/09
Uranium Isotopics by AEA											
Uranium-233/234	U-233/234	LA-508-471		0.900	pCi/g	+-0.243	pCi/g	1.00	0.014		12/03/09

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

B - The analyte < the RDL but > = the IDL/MDL (inorg)
D - Analyte was identified at a secondary dilution factor
E - Analyte is an estimate, has potentially larger errors(inorg)
U - Analyzed for but not detected above limiting criteria(inorg)

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

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

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-025
Sample # W09GR00994
Client ID: B22V34 GPP WSCF

Matrix: SOIL

Group #: WSCF20091170
Department: Radiochemistry
Sampled: 11/12/09
Received: 11/12/09

Test Performed	CAS #	Method	RQ	Result	Unit		TP Err	Unit	DF	MDL	PQL	Analysis Date
Uranium-235	15117-96-1	LA-508-471		0.0530	pCi/g	J	+-0.0260	pCi/g	1.00	0.019		12/03/09
Uranium-238	U-238	LA-508-471		1.00	pCi/g		+-0.270	pCi/g	1.00	0.014		12/03/09
U-232 tracer by AEA	U232	LA-508-471		3.90	pCi/g				1.00	0.041		12/03/09

LS
6-01-2010

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)
D - Analyte was identified at a secondary dilution factor
E - Analyte is an estimate, has potentially larger errors(inorg)
U - Analyzed for but not detected above limiting criteria(inorg)

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

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

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

REVISION 1

1.0 GENERAL

CH2M Hill Plateau Remediation Company (CHPRC) Sample Delivery Group H4082 was composed of five solid (soil) samples designated under SAF No. F10-025 with a Project Designation of: 200-PW-2 OU Characterization Vadose Zone – Soil ("L" Well).

The samples were received as stated on the chain-of-custody documents. Any discrepancies are noted on the Eberline Analytical 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 Iodine-129 Analysis

No problems were encountered during the course of the analyses.

2.5 Isotopic Thorium Analysis

No problems were encountered during the course of the analyses.

2.5 Neptunium-237 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."

N. Joseph Verville
Client Services Manager

2/17/10
Date

 REVISION 1

Problem and Discrepancy Report

Eberline

SDG H4082

---

1. The data package has the following issues:

a) Lab sample summary, SAF # is incorrect. It appears as F10-026 and should be F10-025.

Resolution: *Provide correction.*

Lab Response: **Corrected SAF on Lab Sample Summary and other pages.**

b) Narrative, Thorium, Please discuss RPD out of limits of Th-228 and Th-232.

Resolution: *Provide discussion.*

Lab Response: **According to the DOE Quality Systems for Analytical Services, Revision 2.5, November 2009, Page D-32, the DER must be less than or equal to 3. "When either the DER or the RPD pass, than the duplicate is acceptable." In this case, the RPDs were greater than 25%, however the DERs were all less than 3.**

Please correct the issues and resubmit the hard copy data package.

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F10-025-001	PAGE 1 OF 1

COLLECTOR KAUER	**COMPANY CONTACT** DYEKMAN, DL	**TELEPHONE NO.** 373-2530	**PROJECT COORDINATOR** DYEKMAN, DL
PRICE CODE 8N	**DATA TURNAROUND** 45 Days / 45 Days	**AIR QUALITY** ☐	
SAMPLING LOCATION C7514 (299-E24-25); I-070	**PROJECT DESIGNATION** 200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)	**SAF NO.** F10-025	
ICE CHEST NO. GWS - 112	**FIELD LOGBOOK NO.** HNF-N-591-5 PS19	**ACTUAL SAMPLE DEPTH** 140.4 to 142.9	**COA** 302117ES10
METHOD OF SHIPMENT FEDERAL EXPRESS			
SHIPPED TO Eberline Services	**OFFSITE PROPERTY NO.** SEE PTR H4082 (7515)	**BILL OF LADING/AIR BILL NO.** SEE PTR 7981495 15800	

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

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B22VD6

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	
B22V37	SOIL	11-13-09	0950	✓

CHAIN OF POSSESSION / SIGN/ PRINT NAMES

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Ed Kauer	11-13-09 1122	MO-413-R2	11-13-09 1122
SSU-R2	NOV 18 2009 0830	DW Brotherton	NOV 18 2009 0830
DW Brotherton	NOV 18 2009 1430	FED EX	
FED EX		F. NUNTAWATANA	11/19/09 0930

SPECIAL INSTRUCTIONS
** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
(1)Carbon-14; Nickel-63; Neptunium-237; Iodine-129; Isotopic Thorium {Thorium-232} Tritium - H3;

ORIGINAL

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

A-6003-618(01/06)

REVISION 1

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F10-025-009	PAGE 1 OF 1

COLLECTOR Kirolz Romo	**COMPANY CONTACT** DYEKMAN, DL	**TELEPHONE NO.** 373-2530	**PROJECT COORDINATOR** DYEKMAN, DL
PRICE CODE 8N	**DATA TURNAROUND** 45 Days / 45 Days	**AIR QUALITY** ☐	
SAMPLING LOCATION C7514 (299-E24-25); I-006	**PROJECT DESIGNATION** 200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)	**SAF NO.** F10-025	
ICE CHEST NO. GWS-112	**FIELD LOGBOOK NO.** HNF-N-491-15 pg 15	**ACTUAL SAMPLE DEPTH** 9.9 to 12.4	**COA** 302117ES10
METHOD OF SHIPMENT FEDERAL EXPRESS			
SHIPPED TO Eberline Services	**OFFSITE PROPERTY NO.** SEE PTR H4082 (7515)	**BILL OF LADING/AIR BILL NO.** SEE PTR 7981495 15800	

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

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B22V96

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	
B22V28	SOIL	11-6-09	1058	✓

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

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Eil Kirwan Edw Rkam 11-6-09		M0473 SSU-R2 NOV 1 2009	1415
SSU-R2	NOV 1 8 2009	DW Brotherton	NOV 1 8 2009
DW Brotherton	NOV 1 8 2009		
FED EX		M. MATSUMAN	11/19/09 0930

SPECIAL INSTRUCTIONS
** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
(1)Carbon-14; Nickel-63; Neptunium-237; Iodine-129; Isotopic Thorium {Thorium-232} Tritium - H3;

ORIGINAL

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

A-6003-618(01/06)

REVISION 1

43

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F10-025-013	PAGE 1 OF 1

COLLECTOR Kauer, Romo	**COMPANY CONTACT** DYEKMAN, DL	**TELEPHONE NO.** 373-2530	**PROJECT COORDINATOR** DYEKMAN, DL
PRICE CODE 8N	**DATA TURNAROUND** 45 Days / 45 Days	**AIR QUALITY** ☐	
SAMPLING LOCATION C7514 (299-E24-25); I-006D	**PROJECT DESIGNATION** 200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)	**SAF NO.** F10-025	
ICE CHEST NO. GWS-112	**FIELD LOGBOOK NO.** HNF-N-491-5 pg 15	**ACTUAL SAMPLE DEPTH** 9.9 to 12.4	**COA** 302117ES10
METHOD OF SHIPMENT FEDERAL EXPRESS			
SHIPPED TO Eberline Services	**OFFSITE PROPERTY NO.** SEE PTR H4082(7515)	**BILL OF LADING/AIR BILL NO.** SEE PTR 7981495 15800	

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

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B22V96

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
B22VR4	SOIL	11-9-09	1058

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

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Ed Kauer, Romo	11-9-09	Romo 413 SSU-R2 NOV 09 2009	1445
SSU-R2	NOV 18 2009 0800	DW Brotherton	NOV 18 2009 0800
DW Brotherton	NOV 18 2009 1420		
FED EX		HF-NATALIE FIAN	11/19/09 0920

SPECIAL INSTRUCTIONS
** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
(1)Carbon-14; Nickel-63; Neptunium-237; Iodine-129; Isotopic Thorium {Thorium-232} Tritium - H3;

ORIGINAL

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

A-6003-618(01/06)

REVISION 1

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F10-025-017	PAGE 1 OF 1

(43)

COLLECTOR	COMPANY CONTACT	TELEPHONE NO.	PROJECT COORDINATOR	PRICE CODE 8N	DATA TURNAROUND
Kauer, Romo	DYEKMAN, DL	373-2530	DYEKMAN, DL	AIR QUALITY ☐	45 Days / 45 Days
SAMPLING LOCATION	**PROJECT DESIGNATION**		**SAF NO.**		
C7514 (299-E24-25); I-016	200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)		F10-025		
ICE CHEST NO.	**FIELD LOGBOOK NO.**	**ACTUAL SAMPLE DEPTH**	**COA**	**METHOD OF SHIPMENT**	
GWS-112	HNF-N-491-5 Pg 16	31.4 to 33.9	302117ES10	FEDERAL EXPRESS	
SHIPPED TO	**OFFSITE PROPERTY NO.**		**BILL OF LADING/AIR BILL NO.**		
Eberline Services	SEE PTR	H4082 (7515)	SEE PTR	7981495 15800	

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

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B22V53

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	
B22V31	SOIL	11-10-09	0750	✓

CHAIN OF POSSESSION / SIGN/ PRINT NAMES

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Ed Kauer, Romo	11-10-09 1445	W413 SSUR-2	11/10/09 1445
SSU-R2	NOV 18 2009 0800	DW Brotherton	NOV 18 2009 0800
DW Brotherton	NOV 18 2009	FED EX	
FED EX		JF Matthews	11/13/09 0920

SPECIAL INSTRUCTIONS
** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
(1)Carbon-14; Nickel-63; Neptunium-237; Iodine-129; Isotopic Thorium {Thorium-232} Tritium - H3;

ORIGINAL

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

A-6003-618(01/06)

REVISION 1

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F10-025-026	PAGE 1 OF 1

COLLECTOR	COMPANY CONTACT	TELEPHONE NO.	PROJECT COORDINATOR	PRICE CODE 8N	DATA TURNAROUND
Kaver, Romo	DYEKMAN, DL	373-2530	DYEKMAN, DL		43
SAMPLING LOCATION	**PROJECT DESIGNATION**		**SAF NO.**	**AIR QUALITY** ☐	45 Days / 45 Days
C7514 (299-E24-25); I-045	200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)		F10-025		
ICE CHEST NO.	**FIELD LOGBOOK NO.**	**ACTUAL SAMPLE DEPTH**	**COA**	**METHOD OF SHIPMENT**	
GWS-112	HNF-N-491-5 PS 18	90 to 92.5	302117ES10	FEDERAL EXPRESS	
SHIPPED TO	**OFFSITE PROPERTY NO.**		**BILL OF LADING/AIR BILL NO.**		
Eberline Services	SEE PTR	H4082 (7515)	SEE PTR	7981495 15800	

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

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B22V54

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	✓
B22V34	SOIL	11-12-09	0817	✓

CHAIN OF POSSESSION / SIGN/ PRINT NAMES

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Ed Kisner 11-12-09	1125	MO413 SSUR2	11/12/09 1125
SSU-R2	NOV 18 2009 08:00	DW Brotherton	NOV 18 2009 08:00
DW Brotherton	NOV 18 2009 16:00	FED EX	
FED EX		M. WATANABE	11/19/09 0930

SPECIAL INSTRUCTIONS
** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
(1)Carbon-14; Nickel-63; Neptunium-237; Iodine-129; Isotopic Thorium {Thorium-232} Tritium - H3;

ORIGINAL

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

A-6003-618(01/06)

REVISION 1

Attachment 2
Narrative
WSCF20091170

Introduction

Three (3) S&GRP samples were received at the WSCF Laboratory on November 12, 2009. The samples were analyzed for the analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *Statement of Work (SOW), Modification No. 2 to Agreement 36587, Release 3, "FH WSCF ANALYTICAL SERVICES FOR GROUNDWATER."*

The narrative (Attachment 2) will address sample characteristics, analyses requested and general information in performance of the analytical methods. A Data Summary Report (Attachment 3) includes analytical results, a comment report detailing method abnormalities, tentatively identified peaks if applicable, method references, and Laboratory QC information as applicable. Copies of the chain of custody and sample receipt documentation are included as Attachment 4.

It should be noted that the attached chain of custody was stamped "ICED" by the WSCF Laboratory Sample Custodian during sample receiving, indicating the presence of ice in the transport container.

The following generic data qualifiers (i.e., B, D, and J) may be applicable to this report, as appropriate

- **B** – Sample results with a concentration greater than the MDL but less than the PQL are B flagged (applies to inorganic and wetchem analyses), as appropriate.
- **D** – Sample results are D flagged if dilution(s) were required, as appropriate.
- **J** – Sample results with a concentration greater than the MDL but less than the PQL are J flagged (applies to organic analyses), as appropriate.

Analytical Methodology for Requested Analyses

Refer to *WSCF Method References Report,* pages 14 through 16, for a complete listing of approved analytical methods.

Inorganic Comments

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

- Batch QC analyzed on sample# W0901033 (B22V40 from work group # 20091211)
    - MS/MSD outside normal laboratory limits. Sample results were "N" Flagged.

All other QC controls are within the established limits.

Anions – Hold time requirements for this analysis were met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 20 through 21 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W0901033 (B22V40 from work group # 20091211)
    - Phosphate – Matrix Spike Duplicate slightly outside of laboratory limits. Sample results were "N" flagged.

All other QC controls are within the established limits.

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

All QC controls are within the established limits.

Hexavalent Chromium – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 23 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. See page 24 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W0901072 (B22RJ9 from work group # 20091234)
    - Iron – exceeded spiking levels by a factor of 4. Spike recoveries are not valid.
    - Estimated Boron results due to iron interference. Sample results were "E" flagged.

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

- Batch QC analyzed on sample# W0900956 (B22VR4 from work group # 20091137)
    - Vanadium, Cobalt, Uranium, Beryllium, and Thorium - contamination was detected in the Blank and was evaluated. Affected sample results in this batch were "C" Flagged.
    - Aluminum and Manganese MSD recoveries below 70%. RPDs are greater than 20%. Sample results were "N" flagged.

All other QC controls are within the established limits.

Organic Comments

Sample concentrations are corrected for moisture content 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. See page 36 for QC details. Analytical Note(s):

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. See pages 38 through 43 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W0901005 (B22V37 from work group # 20091176)
    - 2-Fluorophenol LCS is a little high at 114% recovery. No system problems an all MS/MSD recoveries were good.

All other 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 37 for QC details. Analytical Note(s):

All QC controls are within the established limits.

VOA – 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. See pages 44 through 46 for QC details. Analytical Note(s):

- B22V33 – Analyses of this Methanol Blank sample and its associated high concentration VOA samples were not required.

All QC controls are within the established limits.

Radiochemistry Comments

Rad Chem – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike (Matrix Spikes apply only to Technetium), Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 51 through 58 for QC details. Analytical Note(s):

- Gross Alpha, Strontium-89/90 – Duplicate Relative Percent Differences (RPD) exceeded established laboratory limits. The RPD criterion does not apply to results near or below the minimum detectable activity. No flags issued.

- The Pu-239 LCS recovery is high at 126.12 but within the statement of work range of 70-130%.

- Uranium-233/234 and Uranium-235 prep blanks are detected but are less than 2 times the MDA.

All other QC controls are within the established limits.

We 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 contained in this data package has been authorized by the Analytical Laboratory Manager (or designee) and the Client Services representative as verified by the following signatures.

Scot L. Fitzgerald
WSCF Analytical Laboratory Manager

Richard F Barker 1/12/10
Richard Barker
WSCF Client Services

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F10-025-029

COLLECTOR: Kauer, Renee 12/28/09

COMPANY CONTACT: DYEKMAN, DL

TELEPHONE NO.: 373-2530

PROJECT COORDINATOR: DYEKMAN, DL

PRICE CODE: 8N

DATA TURNAROUND: 45 Days / 45 Days

SAMPLING LOCATION: C7514 (299-E24-25); I-045

PROJECT DESIGNATION: 200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)

SAF NO.: F10-025

AIR QUALITY: ☐

ICE CHEST NO.:

FIELD LOGBOOK NO.: HNF-N-491.5 Pg 18

ACTUAL SAMPLE DEPTH: 90 to 92.5

COA: 302117ES10

METHOD OF SHIPMENT: GOVERNMENT VEHICLE

SHIPPED TO: Waste Sampling & Characterization 20091170

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=Vegetation
W=Water
WI=Wipe
X=Other

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B22V54

PRESERVATION			Cool~4C	Cool~4C	None	Cool~4C	Cool~4C	Cool~4C	None	None
TYPE OF CONTAINER			aG/S	aG	G/P	G/P	G/P	G	Square Bottle - Poly	G/P
NO. OF CONTAINER(S)			3	1	1	1	1	1	1	1
VOLUME			40mL	250mL	120mL	120mL	120mL	60mL	500mL	120mL
SAMPLE ANALYSIS			SEE ITEM (1) IN SPECIAL INSTRUCTIONS ✓	SEE ITEM (2) IN SPECIAL INSTRUCTIONS ✓	SEE ITEM (3) IN SPECIAL INSTRUCTIONS ✓	Chromium Hex - 7196; ✓	SEE ITEM (4) IN SPECIAL INSTRUCTIONS ✓	Total Cyanide - 9014; ✓	SEE ITEM (5) IN SPECIAL INSTRUCTIONS ✓	SEE ITEM (6) IN SPECIAL INSTRUCTIONS ✓
SAMPLE NO.	**MATRIX***	**SAMPLE DATE**	**SAMPLE TIME**							
B22V34	SOIL	11-12-09	0817	✓	✓	✓	✓	✓	✓	✓

W096R00994

ICED

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

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Ed Kauer	11-12-09 1500	MD Kessler	11-12-09 1500

SPECIAL INSTRUCTIONS
SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

ORIGINAL

ICED

LABORATORY SECTION — RECEIVED BY — TITLE — DATE/TIME

FINAL SAMPLE DISPOSITION — DISPOSAL METHOD — DISPOSED BY — DATE/TIME

A-6003-618(01/06)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F10-02S-029	PAGE 2 OF 2
COLLECTOR Kauk, Romo	**COMPANY CONTACT** DYEKMAN, DL	**TELEPHONE NO.** 373-2530	**PROJECT COORDINATOR** DYEKMAN, DL	**PRICE CODE** 8N	**DATA TURNAROUND**
SAMPLING LOCATION C7514 (299-E24-25); I-045	**PROJECT DESIGNATION** 200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)		**SAF NO.** F10-025	**AIR QUALITY** ☐	**45 Days / 45 Days**
ICE CHEST NO.	**FIELD LOGBOOK NO.** HNF-N-491-5 P518	**ACTUAL SAMPLE DEPTH** 90 to 92.5	**COA** 302117ES10	**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.
** 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)Alcohols, Glycols, & Ketones - 8015 {Ethylene glycol, Diethyl ether}
(2)Semi-VOA - 8270B (TCL); Semi-VOA - 8270B (Add-On) {Tributyl phosphate, 3+4 Methylphenol (cresol, m+p)} TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range}
(3)ICP/MS - 200.8 (TAL) {Aluminum, Antimony, Barium, Chromium, Cobalt, Cadmium, Copper, Zinc, Manganese, Nickel, Vanadium, Silver} ICP/MS - 200.8 (Add-on) {Arsenic, Lead, Strontium, Thallium, Beryllium, Thorium, Uranium, Selenium} ICP Metals - 6010B (TAL) {Iron} ICP Metals - 6010B (Add-On) {Boron, Lithium} 200.8_HG - ICPMS {Mercury}
(4)IC Anions - 300.0 {Phosphorus in phosphate, Chloride, Nitrogen in Nitrite, Fluoride, Nitrogen in Nitrate, Sulfate} Cations (IC) - 300.7 {Nitrogen in ammonium}
(5)Gamma Spectroscopy {Europium-155, Cesium-137, Europium-154, Europium-152, Cobalt-60} Gamma Spec - Add-on {Antimony-125}
(6)Gross Alpha {Gross alpha} Gross Beta {Gross beta} Americium-241; Technetium-99 {Technetium-99} Isotopic Uranium {Uranium-233/234, Uranium-235, Uranium-238} Isotopic Plutonium; Strontium-89,90 -- Total Sr;

Original

A-6003-618(01/06)

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F10-025-027

COLLECTOR
Kauer, Romo

COMPANY CONTACT
DYEKMAN, DL

TELEPHONE NO.
373-2530

PROJECT COORDINATOR
DYEKMAN, DL

PRICE CODE 8N

DATA TURNAROUND
45 Days / 45 Days

AIR QUALITY ☐

SAMPLING LOCATION
C7514 (299-E24-25); I-045

PROJECT DESIGNATION
200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)

SAF NO.
F10-025

ICE CHEST NO.

FIELD LOGBOOK NO. Pg 18
HNF-N-491-5

ACTUAL SAMPLE DEPTH
96-97.5

COA
302117ES10

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=Vegetation
W=Water
WI=Wipe
X=Other

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B22V54

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

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B22V32 995	SOIL	11-12-09	0817	✓	✓

ICED

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

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Ed Kauer	11-12-09 1500	MD Kessler	11-12-09 1500

SPECIAL INSTRUCTIONS
SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

ORIGINAL

ICED

LABORATORY SECTION RECEIVED BY | TITLE | DATE/TIME

FINAL SAMPLE DISPOSITION DISPOSAL METHOD | DISPOSED BY | DATE/TIME

A-6003-618(01/06)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F10-025-027	PAGE 2 OF 2
COLLECTOR Kawle Romo	**COMPANY CONTACT** DYEKMAN, DL	**TELEPHONE NO.** 373-2530	**PROJECT COORDINATOR** DYEKMAN, DL	**PRICE CODE** 8N	**DATA TURNAROUND**
SAMPLING LOCATION C7514 (299-E24-25); I-045	**PROJECT DESIGNATION** 200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)		**SAF NO.** F10-025	**AIR QUALITY** ☐	**45 Days / 45 Days**
ICE CHEST NO.	**FIELD LOGBOOK NO.** HNF-N-481-5 PG 18	**ACTUAL SAMPLE DEPTH** 90 to 92.5	**COA** 302117ES10	**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.
** 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 (LOW LEVEL); VOA - 5035/8260 (LOW LEVEL) - (Add-On) {Trichloromonofluoromethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene}
(2)VOA - 5035/8260 (HIGH LEVEL); VOA - 5035/8260 (HIGH LEVEL) - (Add-On) {Trichloromonofluoromethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene}

ORIGINAL

A-6003-618(01/06)

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F10-025-028

COLLECTOR
Kinzer, Romo

COMPANY CONTACT
DYEKMAN, DL

TELEPHONE NO.
373-2530

PROJECT COORDINATOR
DYEKMAN, DL

PRICE CODE 8N

DATA TURNAROUND
45 Days / 45 Days

AIR QUALITY ☐

SAMPLING LOCATION
C7514 (299-E24-25); I-045

PROJECT DESIGNATION
200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)

SAF NO.
F10-025

ICE CHEST NO.

FIELD LOGBOOK NO. P518
HNF-N-491-5

ACTUAL SAMPLE DEPTH
90-92.5

COA
302117ES10

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=Vegetation
W=Water
WI=Wipe
X=Other

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B22V54

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

ICED

ICED

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B22V33	SOIL	11-17-09	0917	✓
W096R00996				

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

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Ed Kinzer	11/17/09 1500	MD Kessler	11-17-09 1500

SPECIAL INSTRUCTIONS

** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to 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 (TCL); VOA - 5035/8260 - (Add-On)
{Trichloromonofluoromethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene}

ORIGINAL

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: CPP 200 Area			DATA PACKAGE: VSR10-019		
VALIDATOR: Carl Schloesslin		LAB: Eberline and WSCF		DATE: 6-01-2010	
			SDG: H4082 & WSCF20091170		
ANALYSES PERFORMED					
Gross Alpha/Beta X	Strontium-90 X	Technetium-99 X	Alpha Spectroscopy X	Gamma Spectroscopy X	
Total Uranium	Radium-22	Tritium X	Carbon-14 X	Nickel-63 X	

SAMPLES/MATRIX Soil samples

SDG H4082: B22V37, B22V28, B22VR4, B22V31, B22V34
SDG WSCF20091170: B22V34

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:

WSCF20091170 MB Detects: U-233/234 0.024 pCi/g, U-235 0.011 pCi/g

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: None

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:

H4082: Matrix spikes not performed for H-3 and C-14 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:

H4082

B22V37 C-14 MDC = 5.77 pCi/g (CRDL = 5), B22V28 C-14 MDC = 6.12, B22VR4 C-14 MDC = 5.15, B22V31 C-14 MDC = 5.32, B22V34 C-14 MDC = 5.44.

The Np-237 result for sample B22V34 is -4.68 +/- 9.4 pCi/g (2-sigma) with an MDC of 0.36 pCi/g. The large uncertainty with the non-detect result implies that the actual MDC is approximately 16 pCi/g (MDC for a non-detect result is approximately 3.3 x 1-sigma uncertainty). The Np-237 CRDL is 1 pCi/g. There is no explanation in the data package for the large uncertainty and low MDC values other than some generic language stating that the reported MDC may not be a good estimate of the "real" MDC.

Appendix 6

Additional Documentation Requested By Client

REVISION 1

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP H4082

7515-007 Method Blank

METHOD BLANK

SDG	7515	Client/Case no	CHPRC	SDG_H4082	
Contact	N. Joseph Verville	Contract	No. 33677		
Lab sample id	R911075-07	Client sample id	Method Blank		
Dept sample id	7515-007	Material/Matrix		SOLID	
		SAF No	F10-025		

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	-0.242	4.3	7.44	400	U	H
Carbon 14	14762-75-5	1.44	3.8	6.37	50.0	U	C
Nickel 63	13981-37-8	-1.09	1.9	3.38	30.0	U	NI_L
Iodine 129	15046-84-1	-0.555	1.2	1.58	5.00	U	I
Thorium 228	14274-82-9	0.041	0.17	0.316	1.00	U	TH
Thorium 230	14269-63-7	0.247	0.41	0.729	1.00	U	TH
Thorium 232	TH-232	0	0.082	0.315	1.00	U	TH
Neptunium 237	13994-20-2	0	0.075	0.113	1.00	U	NP

QC-BLANK #71600

Lab id	EBRLNE
Protocol	CHPRC
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	02/11/10

REVISION 1

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP H4082

7515-006

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7515
Contact N. Joseph Verville

Client/Case no CHPRC SDG H4082
Contract No. 33677

Lab sample id R911075-06
Dept sample id 7515-006

Client sample id Lab Control Sample
Material/Matrix SOLID
SAF No F10-025

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	970	22	7.28	400		H	1130	45	86	86-114	80-120
Carbon 14	3330	67	15.4	50.0		C	3190	130	104	83-117	80-120
Nickel 63	227	6.2	3.32	30.0		NI_L	262	10	87	84-116	80-120
Iodine 129	128	3.8	1.63	5.00		I	127	5.1	101	70-130	80-120
Thorium 230	23.1	3.1	0.822	1.00		TH	22.7	0.91	102	75-125	80-120
Neptunium 237	6.56	1.0	0.105	1.00		NP	5.96	0.24	110	64-136	80-120

QC-LCS #71599

Lab id EBRLNE
Protocol CHPRC
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 02/11/10

REVISION 1

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP H4082

7515-008 B22V37

DUPLICATE

SDG	7515			Client/Case no	CHPRC SDG H4082
Contact	N. Joseph Verville			Contract	No. 33677
	DUPLICATE		ORIGINAL		
Lab sample id	R911075-08	Lab sample id	R911075-01	Client sample id	B22V37
Dept sample id	7515-008	Dept sample id	7515-001	Location/Matrix	C7514(299E2425);I-070 SOLID
		Received	11/19/09	Collected/Weight	11/13/09 09:50 196 g
% solids	97.2	% solids	97.2	Custody/SAF No	F10-025-001 F10-025

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	-1.87	3.8	6.76	400	U	H	0.545	3.9	6.70	U	-		0.9
Carbon 14	1.06	3.4	5.71	50.0	U	C	2.86	3.5	5.77	U	-		0.7
Nickel 63	-1.47	2.2	3.87	30.0	U	NI_L	-1.70	2.5	4.35	U	-		0.1
Iodine 129	-0.639	1.4	1.95	5.00	U	I	-1.02	1.3	1.56	U	-		0.4
Thorium 228	0.917	0.47	0.351	1.00		TH	0.559	0.28	0.267		49	113	1.3
Thorium 230	0.641	0.46	0.776	1.00	U	TH	0.802	0.49	0.643		22	141	0.5
Thorium 232	0.366	0.28	0.350	1.00		TH	0.698	0.28	0.267		62	113	1.7
Neptunium 237	0	0.068	0.103	1.00	U	NP	0	0.081	0.310	U	-		0

QC-DUP#1 71601

200-PW-2 OU Characterization Vadose Zone - Soil ("L" Well)

DUPLICATES
Page 1
SUMMARY DATA SECTION
Page 10

Lab id	EBRLNE
Protocol	CHPRC
Version	Ver 1.0
Form	DVD-DUP
Version	3.06
Report date	02/11/10

REVISION 1

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP H4082

Test NP Matrix SOLID
SDG 7515
Contact N. Joseph Verville

LAB METHOD SUMMARY

NEPTUNIUM IN SOLIDS
ALPHA SPECTROSCOPY

Client CHPRC
Contract No. 33677
Contract SDG H4082

RESULTS

LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	CLIENT SAMPLE ID	Neptunium 237
Preparation batch 7232-030					
R911075-01			7515-001	B22V37	U
R911075-02			7515-002	B22V28	U
R911075-03			7515-003	B22VR4	U
R911075-04			7515-004	B22V31	U
R911075-05			7515-005	B22V34	U
R911075-06			7515-006	Lab Control Sample	ok
R911075-07			7515-007	Method Blank	U
R911075-08			7515-008	Duplicate (R911075-01)	- U
Nominal values and limits from method				RDLs (pCi/g)	1.00

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 7232-030			2σ prep error 14.8 % Reference Lab Notebook No. 7232 pg. 30													
R911075-01			B22V37	0.310	0.500			64		113			25	12/08/09	12/08	SS-031
R911075-02			B22V28	0.317	0.500			60		113			29	12/08/09	12/08	SS-032
R911075-03			B22VR4	0.140	0.500			50		113			29	12/08/09	12/08	SS-033
R911075-04			B22V31	0.421	0.500			47		113			28	12/08/09	12/08	SS-034
R911075-05			B22V34	0.357	0.500			56		113			26	12/08/09	12/08	SS-035
R911075-06			Lab Control Sample	0.105	0.500			60		113				12/08/09	12/08	SS-036
R911075-07			Method Blank	0.113	0.500			56		114				12/08/09	12/08	SS-038
R911075-08			Duplicate (R911075-01)	0.103	0.500			66		114			25	12/08/09	12/08	SS-042
Nominal values and limits from method				1.00	0.500			30-110		100			180			

PROCEDURES	REFERENCE	NP237_LLE_PLATE_AEA
	SPP-070	Soil Dissolution, < 1.0g Aliquot, rev 1
	CP-930	Neptunium from Solids and Water by Extraction Chromatography, rev 5
	CP-008	Heavy Element Electroplating, rev 13

AVERAGES ± 2 SD FOR 8 SAMPLES
MDA 0.233 ± 0.262
YIELD 57 ± 13

Lab id EBRLNE
Protocol CHPRC
Version Ver 1.0
Form DVD-LMS
Version 3.06
Report date 02/11/10

REVISION 1

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP H4082

Test TH Matrix SOLID
SDG 7515
Contact N. Joseph Verville

LAB METHOD SUMMARY

THORIUM, ISOTOPIC IN SOLIDS

ALPHA SPECTROSCOPY

Client CHPRC
Contract No. 33677
Contract SDG H4082

RESULTS

LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	CLIENT SAMPLE ID	Thorium 228	Thorium 230	Thorium 232
Preparation batch 7232-030							
R911075-01			7515-001	B22V37	0.559	0.802	0.698
R911075-02			7515-002	B22V28	0.856	U	0.691
R911075-03			7515-003	B22VR4	0.486	1.00	0.555
R911075-04			7515-004	B22V31	1.02	1.46	1.06
R911075-05			7515-005	B22V34	0.747	1.08	0.747
R911075-06			7515-006	Lab Control Sample		ok	
R911075-07			7515-007	Method Blank	U	U	U
R911075-08			7515-008	Duplicate (R911075-01)	ok	ok U	ok
Nominal values and limits from method				RDLs (pCi/g)	1.00	1.00	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 7232-030			2σ prep error 8.0 %	Reference Lab Notebook No. 7232 pg. 30												
R911075-01			B22V37	0.643	0.250			89		150			21	12/04/09	12/04	SS-028
R911075-02			B22V28	0.628	0.250			92		150			25	12/04/09	12/04	SS-029
R911075-03			B22VR4	0.639	0.250			95		150			25	12/04/09	12/04	SS-030
R911075-04			B22V31	0.784	0.250			89		150			24	12/04/09	12/04	SS-031
R911075-05			B22V34	0.734	0.250			91		150			22	12/04/09	12/04	SS-032
R911075-06			Lab Control Sample	0.822	0.250			66		150				12/04/09	12/04	SS-033
R911075-07			Method Blank	0.729	0.250			95		150				12/04/09	12/08	SS-031
R911075-08			Duplicate (R911075-01)	0.776	0.250			86		151			21	12/04/09	12/04	SS-053
Nominal values and limits from method				1.00	0.250			30-110		150			180			

PROCEDURES	REFERENCE	THISO_IE_PLATE_AEA
	SPP-071	Soil Dissolution, > 1.0g Aliquot, rev 1
	CP-900	Thorium in Water and Dissolved Solid Samples by Extraction Chromatography, rev 5
	CP-008	Heavy Element Electroplating, rev 13

AVERAGES ± 2 SD FOR 8 SAMPLES
MDA 0.719 ± 0.149
YIELD 88 ± 19

Lab id EBRLNE
Protocol CHPRC
Version Ver 1.0
Form DVD-LMS
Version 3.06
Report date 02/11/10

REVISION 1

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP H4082

Test I Matrix SOLID
SDG 7515
Contact N. Joseph Verville

LAB METHOD SUMMARY

IODINE 129 IN SOLIDS
GAMMA SPECTROSCOPY

Client CHPRC
Contract No. 33677
Contract SDG H4082

RESULTS

LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	CLIENT SAMPLE ID	Iodine 129	
Preparation batch 7232-030						
R911075-01			7515-001	B22V37	U	
R911075-02			7515-002	B22V28	U	
R911075-03			7515-003	B22VR4	U	
R911075-04			7515-004	B22V31	U	
R911075-05			7515-005	B22V34	U	
R911075-06			7515-006	Lab Control Sample	ok	
R911075-07			7515-007	Method Blank	U	
R911075-08			7515-008	Duplicate (R911075-01)	-	U
Nominal values and limits from method				RDLs (pCi/g)	5.00	

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 7232-030			2σ prep error 19.4 % Reference Lab Notebook No. 7232 pg. 30													
R911075-01			B22V37	1.56	1.00			60		600			31	12/12/09	12/14	GRB-220
R911075-02			B22V28	1.63	1.00			84		400			35	12/12/09	12/14	GRB-221
R911075-03			B22VR4	1.53	1.00			89		400			35	12/12/09	12/14	GRB-222
R911075-04			B22V31	1.78	1.00			69		400			34	12/12/09	12/14	GRB-223
R911075-05			B22V34	1.55	1.00			86		400			32	12/12/09	12/14	GRB-224
R911075-06			Lab Control Sample	1.63	1.00			98		400				12/12/09	12/14	GRB-225
R911075-07			Method Blank	1.58	1.00			95		400				12/12/09	12/14	GRB-227
R911075-08			Duplicate (R911075-01)	1.95	1.00			56		400			31	12/12/09	12/14	GRB-228
Nominal values and limits from method				5.00	1.00			40-110		300			180			

Lab id EBRLNE
Protocol CHPRC
Version Ver 1.0
Form DVD-LMS
Version 3.06
Report date 02/11/10

REVISION 1

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP H4082

LAB METHOD SUMMARY, cont.

IODINE 129 IN SOLIDS

GAMMA SPECTROSCOPY

Test	I
Matrix	SOLID
SDG	7515
Contact	N. Joseph Verville

Client	CHPRC
Contract	No. 33677
Contract	SDG H4082

PROCEDURES	REFERENCE	I129_SEP_LEPS_GS
	SPP-070	Soil Dissolution, < 1.0g Aliquot, rev 1
	SPP-062	Sample Aliquoting, rev 1
	CP-024	Iodine-129, Sample Dissolution, rev 8
	CP-530	Iodine-129 Purification, rev 6
	CP-008	Heavy Element Electroplating, rev 13

AVERAGES ± 2 SD	MDA	1.65	±	0.288
FOR 8 SAMPLES	YIELD	80	±	32

Lab id	EBRLNE
Protocol	CHPRC
Version	Ver 1.0
Form	DVD-LMS
Version	3.06
Report date	02/11/10

REVISION 1

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP H4082

Test C Matrix SOLID
SDG 7515
Contact N. Joseph Verville

LAB METHOD SUMMARY

CARBON 14 IN SOLIDS

LIQUID SCINTILLATION COUNTING

Client CHPRC
Contract No. 33677
Contract SDG H4082

RESULTS

LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	CLIENT SAMPLE ID	Carbon 14	
Preparation batch 7232-030						
R911075-01			7515-001	B22V37	U	
R911075-02			7515-002	B22V28	U	
R911075-03			7515-003	B22VR4	U	
R911075-04			7515-004	B22V31	U	
R911075-05			7515-005	B22V34	U	
R911075-06			7515-006	Lab Control Sample	ok	
R911075-07			7515-007	Method Blank	U	
R911075-08			7515-008	Duplicate (R911075-01)	-	U

Nominal values and limits from method RDLs (pCi/g) 50.0

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 7232-030			2σ prep error 10.0 % Reference Lab Notebook No. 7232 pg. 30													
R911075-01			B22V37	5.77	0.224			100		50			19	12/02/09	12/02	LSC-006
R911075-02			B22V28	6.12	0.206			100		50			23	12/02/09	12/02	LSC-006
R911075-03			B22VR4	5.15	0.247			100		50			23	12/02/09	12/02	LSC-006
R911075-04			B22V31	5.32	0.240			100		50			22	12/02/09	12/02	LSC-006
R911075-05			B22V34	5.44	0.229			100		50			20	12/02/09	12/02	LSC-006
R911075-06			Lab Control Sample	15.4	0.200			100		10				12/02/09	12/03	LSC-006
R911075-07			Method Blank	6.37	0.200			100		50				12/02/09	12/02	LSC-006
R911075-08			Duplicate (R911075-01)	5.71	0.224			100		50			19	12/02/09	12/02	LSC-006
Nominal values and limits from method				50.0	0.200					10			180			

PROCEDURES REFERENCE C14_COX_LSC
CP-251 Tritium/Carbon-14 Oxidation, rev 11

AVERAGES ± 2 SD MDA 6.91 ± 6.91
FOR 8 SAMPLES YIELD 100 ± 0

Lab id EBRLNE
Protocol CHPRC
Version Ver 1.0
Form DVD-LMS
Version 3.06
Report date 02/11/10

REVISION 1

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP H4082

Test H Matrix SOLID
SDG 7515
Contact N. Joseph Verville

LAB METHOD SUMMARY

TRITIUM IN SOLIDS

LIQUID SCINTILLATION COUNTING

Client CHPRC
Contract No. 33677
Contract SDG H4082

RESULTS

LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	CLIENT SAMPLE ID	Tritium	
Preparation batch 7232-030						
R911075-01			7515-001	B22V37	U	
R911075-02			7515-002	B22V28	U	
R911075-03			7515-003	B22VR4	U	
R911075-04			7515-004	B22V31	U	
R911075-05			7515-005	B22V34	U	
R911075-06			7515-006	Lab Control Sample	ok	
R911075-07			7515-007	Method Blank	U	
R911075-08			7515-008	Duplicate (R911075-01)	-	U

Nominal values and limits from method RDLs (pCi/g) 400

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 7232-030			2σ prep error 10.0 % Reference Lab Notebook No. 7232 pg. 30													
R911075-01			B22V37	6.70	0.224			100		50			19	12/02/09	12/02	LSC-007
R911075-02			B22V28	8.13	0.206			100		50			23	12/02/09	12/02	LSC-007
R911075-03			B22VR4	6.13	0.247			100		50			23	12/02/09	12/02	LSC-007
R911075-04			B22V31	7.05	0.240			100		50			22	12/02/09	12/02	LSC-007
R911075-05			B22V34	7.31	0.229			100		50			20	12/02/09	12/02	LSC-007
R911075-06			Lab Control Sample	7.28	0.200			100		50				12/02/09	12/03	LSC-007
R911075-07			Method Blank	7.44	0.200			100		50				12/02/09	12/02	LSC-007
R911075-08			Duplicate (R911075-01)	6.76	0.224			100		50			19	12/02/09	12/02	LSC-007
Nominal values and limits from method				400	0.200					25			180			

PROCEDURES REFERENCE TRITIUM_COX_LSC
CP-251 Tritium/Carbon-14 Oxidation, rev 11

AVERAGES ± 2 SD MDA 7.10 ± 1.19
FOR 8 SAMPLES YIELD 100 ± 0

Lab id EBRLNE
Protocol CHPRC
Version Ver 1.0
Form DVD-LMS
Version 3.06
Report date 02/11/10

REVISION 1

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP H4082

Test NI L Matrix SOLID
SDG 7515
Contact N. Joseph Verville

LAB METHOD SUMMARY

NICKEL 63 IN SOLIDS

LIQUID SCINTILLATION COUNTING

Client CHPRC
Contract No. 33677
Contract SDG H4082

RESULTS

LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	CLIENT SAMPLE ID	Nickel 63	
Preparation batch 7232-030						
R911075-01			7515-001	B22V37	U	
R911075-02			7515-002	B22V28	U	
R911075-03			7515-003	B22VR4	U	
R911075-04			7515-004	B22V31	U	
R911075-05			7515-005	B22V34	U	
R911075-06			7515-006	Lab Control Sample	ok	
R911075-07			7515-007	Method Blank	U	
R911075-08			7515-008	Duplicate (R911075-01)	-	U
Nominal values and limits from method				RDLs (pCi/g)	30.0	

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 7232-030			2σ prep error 11.2 % Reference Lab Notebook No. 7232 pg. 30													
R911075-01			B22V37	4.35	0.500			68		50			26	12/09/09	12/09	LSC-004
R911075-02			B22V28	3.80	0.500			77		50			30	12/09/09	12/09	LSC-004
R911075-03			B22VR4	3.68	0.500			80		50			30	12/09/09	12/09	LSC-004
R911075-04			B22V31	3.60	0.500			81		50			29	12/09/09	12/09	LSC-004
R911075-05			B22V34	3.92	0.500			75		50			27	12/09/09	12/09	LSC-004
R911075-06			Lab Control Sample	3.32	0.500			87		50				12/09/09	12/09	LSC-004
R911075-07			Method Blank	3.38	0.500			86		50				12/09/09	12/09	LSC-004
R911075-08			Duplicate (R911075-01)	3.87	0.500			76		50			26	12/09/09	12/09	LSC-004
Nominal values and limits from method				30.0	0.500			40-110		25			180			

PROCEDURES	REFERENCE	NI63_LSC
	SPP-070	Soil Dissolution, < 1.0g Aliquot, rev 1
	CP-281	Nickel-63 Purification By Extraction Chromatography, rev 5

AVERAGES ± 2 SD FOR 8 SAMPLES
MDA 3.74 ± 0.656
YIELD 79 ± 12

Lab id EBRLNE
Protocol CHPRC
Version Ver 1.0
Form DVD-LMS
Version 3.06
Report date 02/11/10

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Radiochemistry

SDG Number: WSCF20091170
Matrix: SOLID
Test: Americium by AEA

Sample Date: 11/12/09
Receive Date:11/12/09

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W09GR00994											
BATCH QC ASSOCIATED WITH SAMPLE											
DUP	Americium-241	14596-10-2	U1e-2		RPD			n/a	20.000		12/03/09
DUP	Am-243 tracer by AEA	AM243	3.993	87.210	% Recov	30.000	105.000				12/03/09
SURR	Am-243 tracer by AEA	AM243	4	91.630	% Recov	30.000	105.000				12/03/09
BATCH QC											
BLANK	Americium-241	14596-10-2	U1.2e-2	n/a	pCi/g	-10.000	1000.000				12/03/09
8LANK	Am-243 tracer by AEA	AM243	3.993	74.320	% Recov	30.000	105.000				12/03/09
LCS	Americium-241	14596-10-2	12.49	105.401	% Recov	80.000	120.000				12/03/09
LCS	Am-243 tracer by AEA	AM243	11.7	82.120	% Recov	30.000	105.000				12/03/09

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Radiochemistry

SDG Number: WSCF20091170
Matrix: SOLID
Test: Gamma Energy Analysis-grd H2O

Sample Date: 11/12/09
Receive Date:11/12/09

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W09GR00994											
BATCH QC ASSOCIATED WITH SAMPLE											
DUP	Cobalt-60	10198-40-0	U5.001e-3		RPD			n/a	20.000		12/01/09
DUP	Cesium-137	10045-97-3	U4.696e-3		RPD			n/a	20.000		12/01/09
DUP	Europium-152	14683-23-9	U-3.372e-3		RPD			n/a	20.000		12/01/09
DUP	Europium-154	15585-10-1	U-2.49e-2		RPD			n/a	20.000		12/01/09
DUP	Europium-155	14391-16-3	U6.682e-2		RPD			n/a	20.000		12/01/09
DUP	Antimony-125	14234-35-6	U2.653e-2		RPD			n/a	20.000		12/01/09
BATCH QC											
BLANK	Cobalt-60	10198-40-0	U-8.132e-4	n/a	pCi/g	-10.000	1000.000				11/19/09
BLANK	Cesium-137	10045-97-3	U-3.18e-3	n/a	pCi/g	-10.000	1000.000				11/19/09
BLANK	Europium-152	14683-23-9	U4.183e-3	n/a	pCi/g	-10.000	1000.000				11/19/09
BLANK	Europium-154	15585-10-1	U4.049e-3	n/a	pCi/g	-10.000	1000.000				11/19/09
BLANK	Europium-155	14391-16-3	U6.245e-3	n/a	pCi/g	-10.000	1000.000				11/19/09
BLANK	Antimony-125	14234-35-6	U-1.405e-3	n/a	pCi/g	-10.000	1000.000				11/19/09
LCS	Cobalt-60	10198-40-0	10140	102.012	% Recov	80.000	120.000				11/19/09
LCS	Cesium-137	10045-97-3	6140	101.656	% Recov	80.000	120.000				11/19/09

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Radiochemistry

SDG Number: WSCF20091170
Matrix: SOLID
Test: Gross Alpha on Alpha Plateau

Sample Date: 11/12/09
Receive Date: 11/12/09

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W09GR00994											
BATCH QC ASSOCIATED WITH SAMPLE											
DUP	Gross alpha on alpha plateau	12587-46-1	2.1		RPD			47.059	20.000 *		12/06/09
BATCH QC											
BLANK	Gross alpha on alpha plateau	12587-46-1-ap	U-5.4e-01	n/a	pCi/g	-2.000	2.000				12/06/09
LCS	Gross alpha on alpha plateau	12587-46-1-ap	6.42	98.769	% Recov	80.000	120.000				12/06/09

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Radiochemistry

SDG Number: WSCF20091170
Matrix: SOLID
Test: Gross Alpha/Gross Beta (AB32)

Sample Date: 11/12/09
Receive Date:11/12/09

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W09GR00994											
BATCH QC ASSOCIATED WITH SAMPLE											
DUP	Gross beta	12587-47-2	6.8		RPD			2.985	20.000		12/04/09
BATCH QC											
BLANK	Gross beta	12587-47-2	U-4.6E-01	n/a	pCi/g	-10.000	10.000				12/04/09
LCS	Gross beta	12587-47-2	26.6	118.962	% Recov	80.000	120.000				12/04/09

WSCF ANALYTICAL LABORATORY QC REPORT

Department: **Radiochemistry**

SDG Number: WSCF20091170
Matrix: SOLID
Test: Plutonium Isotopics by AEA

Sample Date: 11/12/09
Receive Date:11/12/09

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W09GR00994											
BATCH QC ASSOCIATED WITH SAMPLE											
DUP	Plutonium-238	13981-16-3	U-1.9e-3		RPD			n/a	20.000		12/03/09
DUP	Pu-239/240 by AEA	PU-239/240	U1.9e-3		RPD			n/a	20.000		12/03/09
DUP	Pu-242	13982-10-0	5.9	80.789	% Recov	30.000	105.000				12/03/09
SURR	Pu-242	13982-10-0	5.915	82.960	% Recov	30.000	105.000				12/03/09
BATCH QC											
BLANK	Plutonium-238	13981-16-3	U2e-2	n/a	pCi/g	-10.000	1000.000				12/03/09
BLANK	Pu-239/240 by AEA	PU-239/240	U4e-3	n/a	pCi/g	-10.000	1000.000				12/03/09
BLANK	Pu-242	PU242	5.903	39.820	% Recov	30.000	105.000				12/03/09
LCS	Pu-239/240 by AEA	PU-239/240	16.2	126.119	% Recov	80.000	120.000				12/03/09
LCS	Pu-242	PU242	17.3	67.530	% Recov	30.000	105.000				12/03/09

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Radiochemistry

SDG Number: WSCF20091170
Matrix: SOLID
Test: Strontium 89/90

Sample Date: 11/12/09
Receive Date:11/12/09

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W09GR00994											
BATCH QC ASSOCIATED WITH SAMPLE											
DUP	Sr-85 Tracer by Beta Counting	SR85	69.7	69.700	% Recov	30.000	105.000				12/15/09
DUP	Strontium-89/90	SR-RAD	2.0		RPD			42.424	20.000 *		12/15/09
SURR	Sr-85 Tracer by Beta Counting	SR85	72	72.000	% Recov	30.000	105.000				12/15/09
BATCH QC											
BLANK	Sr-85 Tracer by Beta Counting	SR85	83.3	83.300	% Recov	30.000	105.000				12/15/09
BLANK	Strontium-89/90	10098-97-2	U-1.6	n/a	pCi/g	-10.000	300.000				12/15/09
LCS	Sr-85 Tracer by Beta Counting	SR85	85.9	85.900	% Recov	30.000	105.000				12/15/09
LCS	Strontium-89/90	10098-97-2	70.8	101.871	% Recov	80.000	120.000				12/15/09

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Radiochemistry

SDG Number: WSCF20091170
Matrix: SOLID
Test: TC99 by Liquid Scin.

Sample Date: 11/09/09
Receive Date:11/09/09

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W09GR00956											
BATCH QC ASSOCIATED WITH SAMPLE											
DUP	Tc-99 by Liquid Scin.	14133-76-7	U0.2		RPD			n/a	20.000		12/17/09
MS	Tc-99 by Liquid Scin.	14133-76-7	100.2	100.200	% Recov	75.000	125.000				12/17/09
BATCH QC											
BLANK	Tc-99 by Liquid Scin.	14133-76-7	U0.3	n/a	pCi/g	-10.000	1000.000				12/17/09
LCS	Tc-99 by Liquid Scin.	14133-76-7	9.9	100.000	% Recov	80.000	120.000				12/17/09

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Radiochemistry

SDG Number: WSCF20091170
Matrix: SOLID
Test: Uranium Isotopics by AEA

Sample Date: 11/12/09
Receive Date:11/12/09

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W09GR00994											
BATCH QC ASSOCIATED WITH SAMPLE											
DUP	U-232 tracer by AEA	U232	3.847	91.170	% Recov	30.000	105.000				12/03/09
DUP	Uranium-233/234	U-233/234	1		RPD			10.526	20.000		12/03/09
DUP	Uranium-235	15117-96-1	5.7e-2		RPD			7.273	20.000		12/03/09
DUP	Uranium-238	U-238	1		RPD			0.000	20.000		12/03/09
SURR	U-232 tracer by AEA	U232	3.854	86.840	% Recov	30.000	105.000				12/03/09
BATCH QC											
BLANK	U-232 tracer by AEA	U232	3.847	58.900	% Recov	30.000	105.000				12/03/09
BLANK	Uranium-233/234	13966-29-5	2.4e-2	0.024	pCi/g	-10.000	1000.000				12/03/09
BLANK	Uranium-235	15117-96-1	1.1e-2	0.011	pCi/g	-10.000	1000.000				12/03/09
BLANK	Uranium-238	24678-82-8	U2.6e-3	n/a	pCi/g	-10.000	1000.000				12/03/09
LCS	U-232 tracer by AEA	U232	11.27	80.460	% Recov	30.000	105.000				12/03/09
LCS	Uranium-238	24678-82-8	18.64	98.338	% Recov	80.000	120.000				12/03/09