CHPRC - REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
02/23/2011	
3. Project No.	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
VSR11-024		Scot Fitzgerald	Analytical Support Group	2753/373-7495

17. Comment Submittal Approval	10. Agreement With Indicated Comment Disposition(s)	11. CLOSED
Date / Organization Manager (optional) (print and sign)	Scot Fitzgerald — Reviewer/Point of Contact (print and sign) 02/23/2011 — Date Author/Originator (print and sign)	Scot Fitzgerald — Reviewer/Point of Contact (print and sign) 2/23/2011 — Date Author/Originator (print and sign)

12. Item	13a. Comments	13b. Basis	13c. Recommendation	14. Reviewer Concurrence Required (Y or N)	15. Disposition (provide justification if **NOT** accepted)	16. Status
	No Issues noted.					

REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
02/24/2011	
3. Project No.	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
VSR11-024, Data Validation Report for CHPRC - Project 100 RI/FS, Chemical & Radiological Validation - Level C	S&GRP Sample Data Groups (SDGs); SL1005, WSCF103223 & WSCF103314	JA Edwards	Environmental Quality Assurance (EQA)	2420 Stevens Rm. 345 376-4324

17. Comment Submittal Approval	10. Agreement With Indicated Comment Disposition(s)	11. CLOSED
Date: ____ Organization Manager (optional) (print and sign): ____	JA Edwards (JAEdwards) Reviewer/Point of Contact (print and sign)	JA Edwards (JAEdwards) Reviewer/Point of Contact (print and sign)
	Date: 02/28/2010	Date: 02/28/2010
	Author/Originator (print and sign): ____	Author/Originator (print and sign): ____

12. Item	13a. Comments	13b. Basis	13c. Recommendation	14. Reviewer Concurrence Required (Y or N)	15. Disposition (provide justification if **NOT** accepted)	16. Status
1	(page 105) Data Quality Objectives Holding Times and Sample Preservation *"The holding time requirement for hexavalent chromium is analysis within 24 hours of sample collection. Sample preservation requires chilling to 4 degrees Celsius.* *The samples were analyzed within the prescribed holding time and properly preserved."* (pages 113-116 of 172) WSCF Analytical Results Report for B29FM2, B29C63, B29FN1, & B29C72 did not indicate time of analysis. The COC's indicated the date and time that the hexavalent chromium (IV) in water when samples were collected.	DOE/RL-96-68, HASQARD, Volume 4, Laboratory Technical Requirements, 5.3.1 Data Reporting Documentation DATA QUALITY OBJECTIVES does not include information to reflect the time of analysis to validate that analysis was performed within 24-hours of sample collection.	Suggest including the time, along with the date, for 'time-sensitive' analyses such as hexavalent chromium (IV) in water. Verify that for the hexavalent chromium (IV) in water samples were analyzed within 24-hours of sample collection.	Y	Not accepted. WSCF reports have never included extraction or analysis times, only dates. In this situation, the validator has to assume that the compliance of HT statement in the laboratory case narrative is correct.	Closed

Documents:
DOE/RL-2010-69, Rev. 0, *Sampling and Analysis Plan for the 100-NR-2 Operable Unit River Pore Water Investigation*, November 2010
GRP-GD-002, Rev. 0, Change 0, *Data Validation for Radiochemical Analyses*, August 2010
GRP-GD-003, Rev. 0, Change 0, *Data Validation for Chemical Analyses*, August 2010

ANALYTICAL QUALITY ASSOCIATES, INC.
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Albuquerque, NM 87123
505-299-5201
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Data Validation Report for CH2M Hill Plateau Remediation Company

VSR11-024
Project 100 RI/FS

Chemical & Radiochemical Validation - Level C

Validation Performed By: Carl Schlosser **Date:** 2-21-2011

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Date: 21 February 2011
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: 100 RI/FS
Subject: Semivolatile Organics - Sample Data Groups (SDGs) WSCF103223 and WSCF103314

INTRODUCTION

This memorandum presents the results of data validation for SDGs WSCF103223 and WSCF103314 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
B29C63	12/04/2010	Water	C	WTPH-D
B29C72	12/09/2010	Water	C	WTPH-D

Data validation was conducted in accordance with the CHPRC validation statement of work and the Sampling and Analysis Plan for the 100-NR-2 Operable Unit River Pore Water Investigation, DOE/RL-2010-69, Rev. 0 (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 WTPH-D are extraction within 14 days of sample collection and analysis within 40 days of sample extraction. Sample preservation requires chilling to 4 degrees Celsius and acid preservation with hydrochloric acid to pH <2.

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

- **Blanks**

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

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 80% to 120%.

Surrogates

All surrogate recoveries were acceptable.

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

All MS/MSD recoveries were acceptable.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, 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 ±20%. The 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 (or <5X the laboratory reporting limits for analytes not listed in the SAP) with differences <1X the required detection limits no precision infraction occurred.

MS/MSD Samples

All MS/MSD relative percent difference values were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **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**

SDGs WSCF103223 and WSCF103314 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

None found.

REFERENCES

GRP-GD-003, Rev. 0, Change 0, *Data Validation for Chemical Analyses*, August 2010.

DOE/RL-2010-69, Rev. 0, *Sampling and Analysis Plan for the 100-NR-2 Operable Unit River Pore Water Investigation*, November 2010.

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, but 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 RL. 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.

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

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

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **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			
SDGs: WSCF103223 & WSCF103314	Reviewer: AQA	Project: 100 RI/FS	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
WTPH-D	None	N/A	N/A

Comments: None

Appendix 3

Annotated Laboratory Reports

WSCF Analytical Results Report

Attention Michael Neely
Department Organic, Semivolatiles

Group # WSCF103223

Sample # 103223003
SAF# F11-012
Sample ID B29C63

Matrix WATER
Sampled 12/04/10
Received 12/05/10

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Prep for Water										**12/07/10**
TPHDWA										
Diesel	TPHDIESEL	LA-523-493	U	<70		ug/L	1	70	100	12/10/10
Kerosene	TPHKEROSEN	LA-523-493	U	<70		ug/L	1	70	100	12/10/10

MDL = Minimum Detection
RQ = Result Qualifier
TP Err = Total Propagated
DF = Dilution Factor
+ - Indicates more than nine qualifier

B - Analyte was detected in both the BLANK and SAMPLE
D - Analyte was reported at a secondary diltution factor.
E - The calibration exceeds the calibration range (GC/MS).
J - Analyte < lowest calibration but >= MDL.
N - Presumed evidence based on MS library search(GC/MS only)

T - MS/MSD recovery outside control limits(GC/MS only).
U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.
PQL is equivalent to Estimated Quantitation Limit (EQL)

WSCF Analytical Results Report

Attention Michael Neely
Department Organic, Semivolatiles

Group # WSCF103314

Sample # 103314003
SAF# F11-012
Sample ID B29C72

Matrix WATER
Sampled 12/09/10
Received 12/10/10

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Prep for Water										**12/15/10**
TPHDWA										
Diesel	TPHDIESEL	LA-523-493	U	<80		ug/L	1	80	100	12/20/10
Kerosene	TPHKEROSEN	LA-523-493	U	<80		ug/L	1	80	100	12/20/10

MDL = Minimum Detection
RQ = Result Qualifier
TP Err = Total Propagated
DF = Dilution Factor
+ - Indicates more than nine qualifier

B - Analyte was detected in both the BLANK and SAMPLE
D - Analyte was reported at a secondary diltution factor.
E - The calibration exceeds the calibration range (GC/MS).
J - Analyte < lowest calibration but >= MDL.
N - Presumed evidence based on MS library search(GC/MS only)

T - MS/MSD recovery outside control limits(GC/MS only).
U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.
PQL is equivalent to Estimated Quantitation Limit (EQL)

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Attachment 2
Narrative
WSCF103223

Introduction

Three (3) S&GRP samples were received at the WSCF Laboratory on December 5, 2010. 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 not stamped "ICED" by the WSCF Laboratory Sample Custodian during sample receiving. However, based on procedure LO-090-403 form "NOTICE OF IMPROPER SAMPLE SUBMITTAL" was not submitted and was not stamped "NOT ICED". No anomaly was noted during sample receipt.

The following generic data qualifiers (i.e., B, D, U 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 wet chemical 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.
- **U** – Analyzed for but not detected above limiting criteria. Relative Percent Difference (RPD) values associated with an analyte qualified with a "U" are not applicable.

Analytical Methodology for Requested Analyses

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

Inorganic Comments

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

- Batch QC 170685 analyzed on sample# B29FM2 (103223001)

All applicable QC controls are within the established limits.

Attachment 2
Narrative
WSCF103223

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. Analytical Note(s):

- Batch QC 170950 analyzed on sample# B27X48 (103155002)

All applicable QC controls are within the established limits.

Organic Comments

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. Analytical Note(s):

- Batch QC 170835 analyzed on sample# B281C8 (103218016)
  - Due to the co-elution of analytes for TPHD-WA (DRO) and kerosene analysis, samples are spiked and evaluated for TPHD only.

All applicable 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 Tritium), Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- Tracers are used to determine chemical yield. RPD is monitored in sample duplicate and is not required for tracer recovery per SOW.
- Tritium:
  - Batch QC 171067 analyzed on sample# B284R7 (103238003)

All applicable QC controls are within the established limits.

- Strontium-89/90:
  - Batch QC 172476 analyzed on sample# B286K3 (103309006)

All applicable 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 electronic signatures shown on the WSCF ANALYTICAL RESULTS REPORT.

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-012-047	PAGE 1 OF 1
COLLECTOR: KB Hulse	COMPANY CONTACT: RADLOFF, AW	TELEPHONE NO.: 376-4554	PROJECT COORDINATOR: RADLOFF, AW	PRICE CODE: 7N	DATA TURNAROUND: 45 Days / 45 Days
SAMPLING LOCATION: N Transect 2	PROJECT DESIGNATION: 100-N Up-Welling - Pore Water Sampling		SAF NO.: F11-012	AIR QUALITY: ☐	
ICE CHEST NO.: GWS-189-01	FIELD LOGBOOK NO.: HNF-N-507-11	ACTUAL SAMPLE DEPTH: N/A	COA: 3001086510	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)

13223

SPECIAL HANDLING AND/OR STORAGE: This sample has been subsampled from the bulk sample B29C48

PRESERVATION	Cool-4C
HOLDING TIME	24 Hours
TYPE OF CONTAINER	aG
NO. OF CONTAINER(S)	1
VOLUME	125mL
SAMPLE ANALYSIS	Chromium Hex - 7196; (F)

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B29FM2 1	WATER	12-4-10	1040	X

ORIGINAL

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM: KB Hulse	DATE/TIME: 12-5-10 0915	RECEIVED BY/STORED IN: [signature]	DATE/TIME: 12/5/10 0915
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

** Field NCOs are to filter the Hexavalent Chromium sample in the field prior to shipment to the laboratory.

** Sample date and time recorded on COCs and labels reflect date and time bulk sample was collected.

** The CACN for WSCF Analytical is currently being determined. Once the CACN is established it will be distributed for use by the laboratory.

** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.

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

A-6003-618 (REV 2)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-012-062	PAGE 1 OF 1
COLLECTOR: KB Hulse	COMPANY CONTACT: RADLOFF, AW	TELEPHONE NO.: 376-4554	PROJECT COORDINATOR: RADLOFF, AW	PRICE CODE: 7N	DATA TURNAROUND: 45 Days / 45 Days
SAMPLING LOCATION: N Transect 2	PROJECT DESIGNATION: 100-N Up-Welling - Pore Water Sampling		SAF NO.: F11-012	AIR QUALITY: ☐	
ICE CHEST NO.: GWS-188-01	FIELD LOGBOOK NO.: HNF-N-507-11	ACTUAL SAMPLE DEPTH: N/A	COA: 300108E10	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: Waste Sampling & Characterization	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*	POSSIBLE SAMPLE HAZARDS/ REMARKS	PRESERVATION	HNO3 to pH <2
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	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)	HOLDING TIME	6 Months
		TYPE OF CONTAINER	G/P
		NO. OF CONTAINER(S)	1
		VOLUME	60mL
	SPECIAL HANDLING AND/OR STORAGE: This sample has been subsampled from the bulk sample B29C48	SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS (F)

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B29J48	W WATER	12-4-10	1040	X

☐ ORIGINAL

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM: KB Hulse	DATE/TIME: 12-5-10 0725	RECEIVED BY/STORED IN: [illegible]	DATE/TIME: 12/5/10 0725
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

** Field NCOs are to filter this ICP/MS - 200.8 (100 Area RI/FS) sample in the field prior to preservation and shipment to the laboratory.

** Sample date and time recorded on COCs and labels reflect date and time bulk sample was collected.

** The CACN for WSCF Analytical is currently being determined. Once the CACN is established it will be distributed for use by the laboratory.
** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
(1) ICP/MS - 200.8 (100 Area RI/FS); ICP/MS - 200.8 (Add-on 100 Area RI/FS) {Uranium}; 200.8_HG - ICPMS (100 Area RI/FS) {Mercury};

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

A-6003-613 (REV 2)

Sample Receipt

Chain of Custody

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-012-017	PAGE 1 OF 1
COLLECTOR: KB Hulse	COMPANY CONTACT: RADLOFF, AW	TELEPHONE NO.: 376-4554	PROJECT COORDINATOR: RADLOFF, AW	PRICE CODE: 7N	DATA TURNAROUND: 45 Days / 45 Days
SAMPLING LOCATION: N Transect 2	PROJECT DESIGNATION: 100-N Up-Welling - Pore Water Sampling		SAF NO.: F11-012	AIR QUALITY: ☐	
ICE CHEST NO.: GWS-189-01	FIELD LOGBOOK NO.: HNF-N-507-11	ACTUAL SAMPLE DEPTH: N/A	COA: 300108ES10	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: This sample has been subsampled from the bulk sample B29C48

PRESERVATION	HCl to pH <2/Cool=4C	HNO3 to pH <2	Cool=4C	HNO3 to pH <2	None
HOLDING TIME	14/40 Days	6 Months	24 Hours	6 Months	6 Months
TYPE OF CONTAINER	aG	G/P	aG	G/P	G
NO. OF CONTAINER(S)	1	1	1	1	1
VOLUME	1L	60mL	125mL	1L	125mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	Chromium Hex - 7196;	Strontium-89,90 - Total Sr;	Tritium - Ion Ex.

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME					
B29C63	WATER	12-4-10	1040	X	X	X	X	X

ORIGINAL

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM: KB Hulse	DATE/TIME: 12-5-10 0705	RECEIVED BY/STORED IN: [signature]	DATE/TIME: 12/5/10 0725	** Sample date and time recorded on COCs and labels reflect date and time bulk sample was collected.
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	** The CACN for WSCF Analytical is currently being determined. Once the CACN is established it will be distributed for use by the laboratory.
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	(1) TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range};
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	(2) ICP/MS - 200.8 (100 Area RI/FS); ICP/MS - 200.8 (Add-on 100 Area RI/FS) {Uranium}; 200.8_HG - ICPMS (100 Area RI/FS) {Mercury};
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	

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

A-6003-618 (REV 2)

Attachment 2
Narrative
WSCF103314

Introduction

Samples were received at the WSCF laboratory as referenced on the WSCF SAF Number Cross Reference table included in the final report. 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 not stamped "ICED" by the WSCF Laboratory Sample Custodian during sample receiving. However, based on procedure LO-090-403 form "NOTICE OF IMPROPER SAMPLE SUBMITTAL" was not submitted and was not stamped "NOT ICED". No anomaly was noted during sample receipt.

The following generic data qualifiers (i.e., B, D, U 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 wet chemical 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.
- **U** – Analyzed for but not detected above limiting criteria. Relative Percent Difference (RPD) values associated with an analyte qualified with a "U" are not applicable.

Analytical Methodology for Requested Analyses

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

Inorganic Comments

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

- All applicable QC controls are within the established limits.

Attachment 2
Narrative
WSCF103314

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. Analytical Note(s):

- All applicable QC controls are within the established limits.

Organic Comments

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. Analytical Note(s):

- Due to the co-elution of analytes for TPHD-WA (DRO) and kerosene analysis, samples are spiked and evaluated for TPHD only.
  - All applicable 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 Tritium), Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

Tracers are used to determine chemical yield. RPD is monitored in sample duplicate and is not required for tracer recovery per SOW.

- Strontium-89/90:
  - All applicable QC controls are within the established limits.
- Tritium:
  - The LCS recovery was low, but within the 70 – 130% range allowed in the SOW.
    - All other applicable 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 electronic signatures shown on the WSCF ANALYTICAL RESULTS REPORT.

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-012-056	PAGE 1 OF 1
COLLECTOR: Scales	COMPANY CONTACT: RADLOFF, AW	TELEPHONE NO.: 376-4554	PROJECT COORDINATOR: RADLOFF, AW	PRICE CODE: 7N	DATA TURNAROUND: 45 Days / 45 Days
SAMPLING LOCATION: N Transect 10	PROJECT DESIGNATION: 100-N Up-Welling - Pore Water Sampling		SAF NO.: F11-012	AIR QUALITY: ☐	
ICE CHEST NO.	FIELD LOGBOOK NO.: HNFN-507-11	ACTUAL SAMPLE DEPTH: N/A	COA: 300108ES10	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)

103314

SPECIAL HANDLING AND/OR STORAGE: This sample has been subsampled from the bulk sample B29C57

F10-012-011

PRESERVATION	Cool~4C
HOLDING TIME	24 Hours
TYPE OF CONTAINER	aG
NO. OF CONTAINER(S)	1
VOLUME	125mL
SAMPLE ANALYSIS	Chromium Hex - 7196; (F)

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B29FN1	WATER	12-9-10	1245	X

ORIGINAL

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM: T Scales	DATE/TIME: 12-10-10 08:55	RECEIVED BY/STORED IN: K Breazeale	DATE/TIME: 12/10/10 08:55
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

** Field NCOs are to filter the Hexavalent Chromium sample in the field prior to shipment to the laboratory.

** Sample date and time recorded on COCs and labels reflect date and time bulk sample was collected.

** The CACN for WSCF Analytical is currently being determined. Once the CACN is established it will be distributed for use by the laboratory.

** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.

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

A-6003-618 (REV 2)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-012-071	PAGE 1 OF 1
COLLECTOR: Scales	COMPANY CONTACT: RADLOFF, AW	TELEPHONE NO.: 376-4554	PROJECT COORDINATOR: RADLOFF, AW	PRICE CODE: 7N	DATA TURNAROUND: 45 Days / 45 Days
SAMPLING LOCATION: N Transect 10	PROJECT DESIGNATION: 100-N Up-Welling - Pore Water Sampling		SAF NO.: F11-012	AIR QUALITY: ☐	
ICE CHEST NO.	FIELD LOGBOOK NO.: HNF-N-507-11	ACTUAL SAMPLE DEPTH: N/A	COA: 300108ES10	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
This sample has been subsampled from the bulk sample B29C57
F10-012-011

PRESERVATION	HNO3 to pH <2
HOLDING TIME	6 Months
TYPE OF CONTAINER	G/P
NO. OF CONTAINER(S)	1
VOLUME	60mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS (F)

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B29J57	2 WATER	12-9-10	1245	X

ORIGINAL

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM: J Scales	DATE/TIME: 12-10-10 08:55	RECEIVED BY/STORED IN: Brazale A Baza	DATE/TIME: 12/10/10 8:55
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

** Field NCOs are to filter this ICP/MS - 200.8 (100 Area RI/FS) sample in the field prior to preservation and shipment to the laboratory.

** Sample date and time recorded on COCs and labels reflect date and time bulk sample was collected.

** The CACN for WSCF Analytical is currently being determined. Once the CACN is established it will be distributed for use by the laboratory.
** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
(1) ICP/MS - 200.8 (100 Area RI/FS); ICP/MS - 200.8 (Add-on 100 Area RI/FS) {Uranium}; 200.8_HG - ICPMS (100 Area RI/FS) {Mercury};

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

A-6003-618 (REV 2)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-012-026	PAGE 1 OF 1
COLLECTOR: Scales	COMPANY CONTACT: RADLOFF, AW	TELEPHONE NO.: 376-4554	PROJECT COORDINATOR: RADLOFF, AW	PRICE CODE: 7N	DATA TURNAROUND: 45 Days / 45 Days
SAMPLING LOCATION: N Transect 10	PROJECT DESIGNATION: 100-N Up-Welling - Pore Water Sampling		SAF NO.: F11-012	AIR QUALITY: ☐	
ICE CHEST NO.	FIELD LOGBOOK NO.: HNF-N-507-11	ACTUAL SAMPLE DEPTH: N/A	COA: 300108ES10	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: This sample has been subsampled from the bulk sample B29C57 F11-012-011

PRESERVATION	HCl to pH <2/Cool~4C	HNO3 to pH <2	Cool~4C	HNO3 to pH <2	None
HOLDING TIME	14/40 Days	6 Months	24 Hours	6 Months	6 Months
TYPE OF CONTAINER	aG	G/P	aG	G/P	G
NO. OF CONTAINER(S)	4	1	1	1	1
VOLUME	1L	60mL	125mL	1L	125mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	Chromium Hex - 7199;	Strontium-89,90 – Total Sr;	Tritium - Ion Ex;

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME					
B29C72 3	WATER	12-9-10	1245	X	X	X	X	X

FINAL

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM: J Scales	DATE/TIME: 12-10-10 08:55	RECEIVED BY/STORED IN: K. Breuzeale	DATE/TIME: 12/10/10 08:55
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

** Sample date and time recorded on COCs and labels reflect date and time bulk sample was collected.

** The CACN for WSCF Analytical is currently being determined. Once the CACN is established it will be distributed for use by the laboratory.
** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
(1) TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range};
(2) ICP/MS - 200.8 (100 Area RI/FS); ICP/MS - 200.8 (Add-on 100 Area RI/FS) {Uranium}; 200.8_HG - ICPMS (100 Area RI/FS) {Mercury};

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

A-6003-618 (REV 2)

Appendix 5

Data Validation Supporting Documentation

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: 100 RI/FS			DATA PACKAGE: VSR11-024		
VALIDATOR: Carl Schloesslin		LAB: WSCF		DATE: 2-21-2011	
			SDG: WSCF103223, WSCF103314		
ANALYSES PERFORMED					
8015	8021	8141	8151	8315	
		WTPH-HCID	WTPH-G	WTPH-D X	

SAMPLES/MATRIX: Water samples

SDG WSCF103223: B29C63
SDG WSCF103314: B29C72

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:

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

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

7. COMPOUND IDENTIFICATION, 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

8. SAMPLE CLEANUP (Levels D and E)

Fluorisil ® (or other absorbent) cleanup performed? ..... Yes No N/A

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

Check recoveries acceptable?..... 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

Quality Control Report

Attention Michael Neely
Department Organic, Semivolatiles

Group # WSCF103223

QC Batch 170835
Associated Samples 103223003

Test Extractable Diesel and Petroleum

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #43477**							
Diesel	TPHDIESEL		<80	ug/L					U	12/10/10
Kerosene	TPHKEROSE		<80	ug/L					U	12/10/10
LCS			**QC Sample #43478**							
Diesel	TPHDIESEL		2400	ug/L	95.3	65 - 128				12/10/10
MS			**QC Sample #43479**							
			Original 103218016							
Diesel	TPHDIESEL		2100	ug/L	91.1	73 - 123				12/10/10
MSD			**QC Sample #43480**							
			Original 103218016					**Paired**	**43479**	
Diesel	TPHDIESEL		2300	ug/L	96.7	73 - 123	6.00	20		12/10/10

Quality Control Report

Attention Michael Neely
Department Organic, Semivolatiles

Group # WSCF103223

QC Batch 170835
Associated Samples 103223003

Test Extractable Diesel and Petroleum

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
SAMPLE			**Sample #103223003**							
o-Terphenyl	84-15-1				92.6	70 - 130				12/10/10
BLANK			**QC Sample #43477**							
o-Terphenyl	84-15-1				81.2	70 - 130				12/10/10
LCS			**QC Sample #43478**							
o-Terphenyl	84-15-1				102.4	70 - 130				12/10/10
MS			**QC Sample #43479**							
			Original	**103218016**						
o-Terphenyl	84-15-1				88.2	70 - 130				12/10/10
MSD			**QC Sample #43480**							
			Original	**103218016**					**Paired**	**43479**
o-Terphenyl	84-15-1				104.6	70 - 130	17.00	20		12/10/10

Quality Control Report

Attention Michael Neely
Department Organic, Semivolatiles

Group # WSCF103314

QC Batch 172142
Associated Samples 103314003

Test Extractable Diesel and Petroleum

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #44097**							
Diesel	TPHDIESEL		<80	ug/L					U	12/20/10
Kerosene	TPHKEROSE		<80	ug/L					U	12/20/10
LCS			**QC Sample #44098**							
Diesel	TPHDIESEL		2500	ug/L	100.2	65 - 128				12/20/10
MS			**QC Sample #44099**							
			Original 103335002							
Diesel	TPHDIESEL		2200	ug/L	93.8	73 - 123				12/20/10
MSD			**QC Sample #44100**							
			Original 103335002					**Paired**	**44099**	
Diesel	TPHDIESEL		2300	ug/L	97.3	73 - 123	3.70	20		12/20/10

Quality Control Report

Attention Michael Neely
Department Organic, Semivolatiles

Group # WSCF103314

QC Batch 172142
Associated Samples 103314003

Test Extractable Diesel and Petroleum

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
SAMPLE			**Sample #103314003**							
o-Terphenyl	84-15-1				93.9	70 - 130				12/20/10
BLANK			**QC Sample #44097**							
o-Terphenyl	84-15-1				108.7	70 - 130				12/20/10
LCS			**QC Sample #44098**							
o-Terphenyl	84-15-1				104.4	70 - 130				12/20/10
MS			**QC Sample #44099**							
			Original	**103335002**						
o-Terphenyl	84-15-1				86.8	70 - 130				12/20/10
MSD			**QC Sample #44100**							
			Original	**103335002**					**Paired**	**44099**
o-Terphenyl	84-15-1				99.9	70 - 130	14.00	20		12/20/10

Date: 21 February 2011
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: 100 RI/FS
Subject: PAHs - Sample Data Group (SDG) SL1005

INTRODUCTION

This memorandum presents the results of data validation for SDG SL1005 prepared by TestAmerica. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Method
B29C88	11/22/2010	Water	C	8310
B29C89	11/21/2010	Water	C	8310

Data validation was conducted in accordance with the CHPRC validation statement of work and the Sampling and Analysis Plan for the 100-NR-2 Operable Unit River Pore Water Investigation, DOE/RL-2010-69, Rev. 0 (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 PAHs are extraction within 14 days of sample collection and analysis within 40 days of sample extraction. Sample preservation requires chilling to 4 degrees Celsius.

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

- **Blanks**

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

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

All equipment blank results were acceptable with the following exception. Fluorene was detected in equipment blank B29C88.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 80% to 120%.

Surrogates

All surrogate recoveries were acceptable.

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

All MS/MSD recoveries were acceptable with the following exceptions. The MS recovery for acenaphthene and the MS and MSD recoveries for naphthalene were below the lower acceptance limits. The acenaphthene and naphthalene results for samples B29C88 and B29C89 were non-detects and should be qualified as estimated and flagged "UJ."

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 ±20%. When duplicate RPDs exceed the limits and have associated results <5X the SAP required detection limits (or <5X the laboratory

reporting limits for analytes not listed in the SAP) with differences <1X the required detection limits no precision infraction occurred.

MS/MSD Samples

All MS/MSD relative percent difference values were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **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 SL1005 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 MS/MSD recovery infractions. See the table in Appendix 2 for a listing of all affected sample results.

REFERENCES

GRP-GD-003, Rev. 0, Change 0, *Data Validation for Chemical Analyses*, August 2010.

DOE/RL-2010-69, Rev. 0, *Sampling and Analysis Plan for the 100-NR-2 Operable Unit River Pore Water Investigation*, November 2010.

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, but 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 RL. 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.

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

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

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **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

PAHs Data Qualification Summary			
SDG: SL1005	Reviewer: AQA	Project: 100 RI/FS	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Acenaphthene	UJ	B29C88, B29C89	Low MS recovery
Naphthalene	UJ	B29C88, B29C89	Low MS/MSD recoveries

Comments: None

Appendix 3

Annotated Laboratory Reports

CH2M Hill Plateau Remediation DOE RL

Client Sample ID: B29C88

HPLC

Lot-Sample #...: F0K240586-001 **Work Order #...:** MAKDR1AC **Matrix.....:** WATER
Date Sampled...: 11/22/10 **Date Received..:** 11/24/10
Prep Date.....: 11/30/10 **Analysis Date..:** 12/05/10
Prep Batch #...: 0334153
Dilution Factor: 1 **Method.....:** SW846 8310

PARAMETER		RESULT	REPORTING LIMIT	UNITS	MDL
Acenaphthene	UJ	ND	5.0	ug/L	0.65
Acenaphthylene		ND	5.0	ug/L	0.40
Anthracene		ND	1.0	ug/L	0.020
Benzo(a)anthracene		ND	1.0	ug/L	0.063
Benzo(b)fluoranthene		ND	1.0	ug/L	0.051
Benzo(k)fluoranthene		ND	1.0	ug/L	0.074
Benzo(ghi)perylene		ND	1.0	ug/L	0.16
Benzo(a)pyrene		ND	1.0	ug/L	0.075
Chrysene		ND	1.0	ug/L	0.035
Dibenz(a,h)anthracene		ND	1.0	ug/L	0.15
Fluoranthene		ND	1.0	ug/L	0.18
Fluorene		**0.18 J,S**	**1.0**	**ug/L**	**0.071**
Indeno(1,2,3-cd)pyrene		ND	1.0	ug/L	0.14
Naphthalene	UJ	ND	5.0	ug/L	0.20
Phenanthrene		ND	1.0	ug/L	0.048
Pyrene		ND	1.0	ug/L	0.083

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
p-Terphenyl	68	(60 - 98)

NOTE(S):

J Estimated result. Result is less than RL.

S Positive analyte detection appears questionable during spectral confirmation.

LS
2-21-2011

CH2M Hill Plateau Remediation DOE RL

Client Sample ID: B29C89

HPLC

Lot-Sample #...: F0K240586-002 Work Order #...: MAKD41AC Matrix.....: WATER
Date Sampled...: 11/21/10 Date Received..: 11/24/10
Prep Date.....: 11/30/10 Analysis Date..: 12/06/10
Prep Batch #...: 0334153
Dilution Factor: 1 Method.....: SW846 8310

PARAMETER		RESULT	REPORTING LIMIT	UNITS	MDL
Acenaphthene	UJ	ND	5.0	ug/L	0.65
Acenaphthylene		ND	5.0	ug/L	0.40
Anthracene		ND	1.0	ug/L	0.020
Benzo(a)anthracene		ND	1.0	ug/L	0.063
Benzo(b)fluoranthene		ND	1.0	ug/L	0.051
Benzo(k)fluoranthene		ND	1.0	ug/L	0.074
Benzo(ghi)perylene		ND	1.0	ug/L	0.16
Benzo(a)pyrene		ND	1.0	ug/L	0.075
Chrysene		ND	1.0	ug/L	0.035
Dibenz(a,h)anthracene		ND	1.0	ug/L	0.15
Fluoranthene		ND	1.0	ug/L	0.18
Fluorene		ND	1.0	ug/L	0.071
Indeno(1,2,3-cd)pyrene		ND	1.0	ug/L	0.14
Naphthalene	UJ	ND	5.0	ug/L	0.20
Phenanthrene		ND	1.0	ug/L	0.048
Pyrene		ND	1.0	ug/L	0.083

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
p-Terphenyl	84	(60 - 98)

LS
2-21-2011

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

CASE NARRATIVE

CH2MHill Plateau Remediation Company
P.O. Box 1600
MS B3-60
Richland, Washington 99352
December 30, 2010
Attention: Mike Neely

TestAmerica Laboratories, Inc.

SDG	: SL1005
Number of Samples	: two samples
Sample Matrix	: Water
Data Deliverable	: Summary
Date SDG Closed	: November 24, 2010

II. Introduction

On November 24, 2010, two water samples were received by TestAmerica - St. Louis for chemical analysis. The samples were received within temperature criteria. See the COC and CUR forms for documentation of any variations on receipt conditions and temperature. Upon receipt, the samples were given laboratory Ids to correspond with specific client Ids. Please refer to the Sample Summary sheets attached to this case narrative. This report is incomplete without the narrative.

The following SAFs are associated with this SDG: F11-012

III. Analytical Results/ Methodology

The analytical results for this report are presented by analytical test. Each set of data includes sample identification information, analytical results and the appropriate detection limits. All results are based upon samples as they were received, i.e. wet weight, unless otherwise noted on the data sheets. See the attached Methods Summary Form for the methods used in this SDG.

MS/MSD/Dup analysis was done per the client requirements. Analytical batches that did not contain matrix QC were analyzed with a LCS/LCS duplicate.

Deviation from Request: None

IV. Definitions

QCBLK-	Quality Control Blank, Method Blank
QCLCS-	Quality Control Laboratory Control Sample, Blank Spike
DUP-	Laboratory Duplicate
MS-	Matrix Spike
MSD-	Matrix Spike Duplicate

The term "Detection Limit" used in the analytical data report refers to either the lab's standard reporting limits or contractually required reporting limits, whichever is applicable.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

CH2M Hill Plateau Remediation Company TestAmerica Laboratories, Inc.
December 30, 2010
SDG: SL1005

The following data qualifiers may be applicable to the results in this report, as appropriate.

- **B** – For inorganic analyses, the sample result is greater than the MDL but less than the RL.
- **B** – For organic analyses, Method Blank contamination. The Method Blank contains the target analyte at a concentration above the MDL.
- **J** – For organic analyses, the sample is estimated and less than the RL.
- **C** – For inorganic analyses, Method Blank contamination. The Method Blank contains the target analyte at a concentration above the MDL.
- **D** – For all analyses, the sample result was obtained from the analysis of a dilution.
- **N** – For inorganics and GC analyses, the spike/spike duplicate recoveries are outside QC limits.
- **T** – For GCMS analyses, the spike/spike duplicate recoveries are outside QC limits.

PAHs

Batch: 0334153

To perform an MS/MSD on a sample for organic extractables, the laboratory requires 3 liters of sample. Due to receiving less than the required three liters, the laboratory performed the MS/MSD extraction using half volume.
Affected Samples:
F0K240586 (1): B29C88
F0K240586 (2): B29C89

The target analyte Fluorene detected in the associated sample was given the "S" qualifier. The "S" was used to designate positive analyte detection on the primary column that appeared questionable during spectral confirmation.
Affected Samples:
F0K240586 (1): B29C88

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

Reviewed and approved:

Michael Franks
St. Louis Project Manager

SDG# SL1005

SL1005

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F11-012-042	PAGE 1 OF 1

COLLECTOR: Joe Scales CUR 371	COMPANY CONTACT: RADLOFF, AW	TELEPHONE NO.: 376-4554	PROJECT COORDINATOR: RADLOFF, AW	PRICE CODE: 7N; DATA TURNAROUND: 45 Days / 45 Days
SAMPLING LOCATION: EB AW 11/23/10	PROJECT DESIGNATION: 100-N Up-Welling - Pore Water Sampling		SAF NO.: F11-012	AIR QUALITY: ☐
ICE CHEST NO.: GWS-181-01	FIELD LOGBOOK NO.: HNF-N-507-15/42	ACTUAL SAMPLE DEPTH: N/A	COA: 300108ES10	METHOD OF SHIPMENT: FEDERAL EXPRESS
SHIPPED TO: TestAmerica St. Louis	OFFSITE PROPERTY NO.: SEE PTR		BILL OF LADING/AIR BILL NO.: ~~SEE PTR~~ 7941 4693 9388 AW 11/23/10	

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
This sample has been subsampled from the bulk sample B29C58

PRESERVATION	Cool~4C
HOLDING TIME	14/40 Days
TYPE OF CONTAINER	aG
NO. OF CONTAINER(S)	2
VOLUME	1L
SAMPLE ANALYSIS	PAHs - 8310;

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B29C88	WATER	11/22/10	0745	X

CHAIN OF POSSESSION	DATE/TIME	SIGN/ PRINT NAMES: RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM: Scales	11/22/10 1450	SSU- 1	11/22/10 1450
RELINQUISHED BY/REMOVED FROM: SSU #1	11/23/10 1035	L.D. WALL / L.D. Wall	11/23/10 1035
RELINQUISHED BY/REMOVED FROM: L.D. WALL / L.D. Wall	11/23/10 1400	FEDEX	
RELINQUISHED BY/REMOVED FROM: Fed EX		RECEIVED BY/STORED IN: NICHOLAS OWENS	11/24/10 1020
RELINQUISHED BY/REMOVED FROM		RECEIVED BY/STORED IN	
RELINQUISHED BY/REMOVED FROM		RECEIVED BY/STORED IN	
RELINQUISHED BY/REMOVED FROM		RECEIVED BY/STORED IN	

SPECIAL INSTRUCTIONS

** Sample date and time recorded on COCs and labels reflect date and time bulk sample was collected.

** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.

ORIGINAL

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

A-6003-618 (REV 2)

CH2MHill Plateau Remediation Company SL1005	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F11-012-043	PAGE 1 OF 1

COLLECTOR	COMPANY CONTACT	TELEPHONE NO.	PROJECT COORDINATOR	PRICE CODE 7N	DATA TURNAROUND
K. Patterson / EAS	RADLOFF, AW	376-4554	RADLOFF, AW	AIR QUALITY ☐	45 Days / 45 Days
SAMPLING LOCATION	**PROJECT DESIGNATION**		**SAF NO.**		
T100N1A-1	100-N Up-Welling - Pore Water Sampling		F11-012		
ICE CHEST NO.	**FIELD LOGBOOK NO.**	**ACTUAL SAMPLE DEPTH**	**COA**	**METHOD OF SHIPMENT**	
GWS-181-01	HNF-N-507-15/40	Probe#1 12" BGS Probe#2 11" BGS	300108ES10	FEDERAL EXPRESS	
SHIPPED TO	**OFFSITE PROPERTY NO.**		**BILL OF LADING/AIR BILL NO.**		
TestAmerica St. Louis	SEE PTR		~~SEE PTR~~ 7941 4693 9388		

LW 11/23/10

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
This sample has been subsampled from the bulk sample B29C59

PRESERVATION	Cool~4C
HOLDING TIME	14/40 Days
TYPE OF CONTAINER	aG
NO. OF CONTAINER(S)	2
VOLUME	1L
SAMPLE ANALYSIS	PAHs - 8310;

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B29C89	WATER	11/21/10	0913	✓

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
K. Patterson	11/21/10 2000	SSU #1	11/21/10 2000
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
SSU #1	11/23/10 1035	L.D. WALL LD Wall	11/23/10 1035
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
L.D. WALL LD Wall	11/23/10 1400	FEDEX	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Fed Ex		NICHOLAS OWENS	11/24/10 1020
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

** Sample date and time recorded on COCs and labels reflect date and time bulk sample was collected.

** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.

ORIGINAL

TRANSFERRED FROM COC# F11-012-013

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

A-6003-618 (REV 2)

Appendix 5

Data Validation Supporting Documentation

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100 RI/FS			DATA PACKAGE: VSR11-024		
VALIDATOR: Carl Schloesslin		LAB: TestAmerica		DATE: 2-21-2011	
			SDG: SL1005		
ANALYSES PERFORMED					
SW-846 8081	SW-846 8081 (TCLP)	SW-846 8082	SW-846 8081 (TCLP)	SW-846 8310 X	
SAMPLES/MATRIX Water samples B29C88, B29C89					

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 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

DDT and endrin breakdowns acceptable? ..... Yes No N/A

Comments:

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:

Equipment Blank B29C88 Hit: Fluorene 0.18 ug/L

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

Surrogates analyzed? ..... Yes No N/A

Surrogate 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:

Acenaphthene MS %R = 78%, Naphthalene MS/MSD %Rs = 79%/76%

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. SYSTEM PERFORMANCE (Levels D and E)

Chromatographic performance acceptable?..... Yes No N/A

Positive results resolved acceptably?..... 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

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

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)

Fluorisil ® (or other absorbent) cleanup performed? ..... Yes No N/A

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

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

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

METHOD BLANK REPORT

HPLC

Client Lot #...: SL1005 **Work Order #...:** MAMH81AA **Matrix.....:** WATER
MB Lot-Sample #: F0K300000-153

Prep Date.....: 11/30/10
Analysis Date..: 12/05/10 **Prep Batch #...:** 0334153
Dilution Factor: 1

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Acenaphthene	ND	5.0	ug/L	SW846 8310
Acenaphthylene	ND	5.0	ug/L	SW846 8310
Anthracene	ND	1.0	ug/L	SW846 8310
Benzo(a)anthracene	ND	1.0	ug/L	SW846 8310
Benzo(b)fluoranthene	ND	1.0	ug/L	SW846 8310
Benzo(k)fluoranthene	ND	1.0	ug/L	SW846 8310
Benzo(ghi)perylene	ND	1.0	ug/L	SW846 8310
Benzo(a)pyrene	ND	1.0	ug/L	SW846 8310
Chrysene	ND	1.0	ug/L	SW846 8310
Dibenz(a,h)anthracene	ND	1.0	ug/L	SW846 8310
Fluoranthene	ND	1.0	ug/L	SW846 8310
Fluorene	ND	1.0	ug/L	SW846 8310
Indeno(1,2,3-cd)pyrene	ND	1.0	ug/L	SW846 8310
Naphthalene	ND	5.0	ug/L	SW846 8310
Phenanthrene	ND	1.0	ug/L	SW846 8310
Pyrene	ND	1.0	ug/L	SW846 8310

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
p-Terphenyl	88	(60 - 98)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE DATA REPORT

HPLC

Client Lot #...: SL1005 Work Order #...: MAMH81AC Matrix.....: WATER
LCS Lot-Sample#: F0K300000-153
Prep Date.....: 11/30/10 Analysis Date..: 12/05/10
Prep Batch #...: 0334153
Dilution Factor: 1

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCENT RECOVERY	METHOD
Acenaphthene	20.0	16.3	ug/L	82	SW846 8310
Acenaphthylene	40.0	32.9	ug/L	82	SW846 8310
Anthracene	2.00	1.68	ug/L	84	SW846 8310
Benzo(a)anthracene	2.00	1.77	ug/L	88	SW846 8310
Benzo(b)fluoranthene	4.00	3.62	ug/L	90	SW846 8310
Benzo(k)fluoranthene	2.00	1.79	ug/L	90	SW846 8310
Benzo(ghi)perylene	4.00	3.90	ug/L	97	SW846 8310
Benzo(a)pyrene	2.00	1.81	ug/L	90	SW846 8310
Chrysene	2.00	1.77	ug/L	88	SW846 8310
Dibenz(a,h)anthracene	4.00	3.68	ug/L	92	SW846 8310
Fluoranthene	4.00	3.46	ug/L	87	SW846 8310
Fluorene	4.00	3.32	ug/L	83	SW846 8310
Indeno(1,2,3-cd)pyrene	2.00	1.76	ug/L	88	SW846 8310
Naphthalene	20.0	15.9	ug/L	80	SW846 8310
Phenanthrene	2.00	1.72	ug/L	86	SW846 8310
Pyrene	2.00	1.80	ug/L	90	SW846 8310

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
p-Terphenyl	88	(56 - 108)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

MATRIX SPIKE SAMPLE DATA REPORT

HPLC

Client Lot #...: SL1005 Work Order #...: MAKD41AD-MS Matrix.....: WATER
MS Lot-Sample #: F0K240586-002 MAKD41AE-MSD
Date Sampled...: 11/21/10 Date Received..: 11/24/10
Prep Date.....: 11/30/10 Analysis Date..: 12/06/10
Prep Batch #...: 0334153
Dilution Factor: 1

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD
Acenaphthene	ND	38.1	29.6	ug/L	78		SW846 8310
	ND	39.5	31.7	ug/L	80	6.6	SW846 8310
Acenaphthylene	ND	76.2	63.5	ug/L	83		SW846 8310
	ND	79.0	65.8	ug/L	83	3.6	SW846 8310
Anthracene	ND	3.81	3.20	ug/L	84		SW846 8310
	ND	3.95	3.34	ug/L	84	4.2	SW846 8310
Benzo(a)anthracene	ND	3.81	3.26	ug/L	86		SW846 8310
	ND	3.95	3.35	ug/L	85	2.5	SW846 8310
Benzo(b)fluoranthene	ND	7.62	6.55	ug/L	86		SW846 8310
	ND	7.90	6.76	ug/L	86	3.2	SW846 8310
Benzo(k)fluoranthene	ND	3.81	3.26	ug/L	86		SW846 8310
	ND	3.95	3.38	ug/L	85	3.4	SW846 8310
Benzo(ghi)perylene	ND	7.62	7.12	ug/L	93		SW846 8310
	ND	7.90	7.37	ug/L	93	3.5	SW846 8310
Benzo(a)pyrene	ND	3.81	3.46	ug/L	91		SW846 8310
	ND	3.95	3.56	ug/L	90	3.0	SW846 8310
Chrysene	ND	3.81	3.25	ug/L	85		SW846 8310
	ND	3.95	3.34	ug/L	85	2.8	SW846 8310
Dibenz(a,h)anthracene	ND	7.62	6.80	ug/L	89		SW846 8310
	ND	7.90	6.94	ug/L	88	2.1	SW846 8310
Fluoranthene	ND	7.62	6.72	ug/L	88		SW846 8310
	ND	7.90	6.89	ug/L	87	2.6	SW846 8310
Fluorene	ND	7.62	6.24	ug/L	82		SW846 8310
	ND	7.90	6.42	ug/L	81	2.8	SW846 8310
Indeno(1,2,3-cd)pyrene	ND	3.81	3.12	ug/L	82		SW846 8310
	ND	3.95	3.36	ug/L	85	7.3	SW846 8310
Naphthalene	ND	38.1	30.0	ug/L	79		SW846 8310
	ND	39.5	30.2	ug/L	76	0.63	SW846 8310
Phenanthrene	ND	3.81	3.17	ug/L	83		SW846 8310
	ND	3.95	3.32	ug/L	84	4.5	SW846 8310
Pyrene	ND	3.81	3.36	ug/L	88		SW846 8310
	ND	3.95	3.44	ug/L	87	2.5	SW846 8310

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
p-Terphenyl	84	(60 - 98)
	84	(60 - 98)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

Date: 21 February 2011
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: 100 RI/FS
Subject: Inorganics - Sample Data Groups (SDGs) WSCF103223 and WSCF103314

INTRODUCTION

This memorandum presents the results of data validation for SDGs WSCF103223 and WSCF103314 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
B29J48	12/04/2010	Water	C	200.8
B29C63	12/04/2010	Water	C	200.8
B29J57	12/09/2010	Water	C	200.8
B29C72	12/09/2010	Water	C	200.8

Data validation was conducted in accordance with the CHPRC validation statement of work and the Sampling and Analysis Plan for the 100-NR-2 Operable Unit River Pore Water Investigation, DOE/RL-2010-69, Rev. 0 (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 requires acid preservation with nitric acid to pH <2.

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

- **Blanks**

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

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 80% to 120%. 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.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, field split sample results, and ICP serial dilution 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 ±20%. The 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 (or <5X the laboratory reporting limits for analytes not listed in the SAP) with differences <1X the required detection limits no precision infraction occurred. The serial dilution limits are ones specified by the DV procedure.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

ICP Serial Dilution Samples

ICS serial dilution data was not included in the data package. Sample results should not be qualified based on this.

- **ICP-MS Internal Standards**

The analysis of ICP-MS internal standards is used to determine the existences and magnitude of instrument drift and physical interferences. The criteria for evaluation of internal standard results apply to all samples (including QC) analyzed during the analytical run, beginning with the calibration.

ICP-MS internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **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**

SDGs WSCF103223 and WSCF103314 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

None found.

REFERENCES

GRP-GD-003, Rev. 0, Change 0, *Data Validation for Chemical Analyses*, August 2010.

DOE/RL-2010-69, Rev. 0, *Sampling and Analysis Plan for the 100-NR-2 Operable Unit River Pore Water Investigation*, November 2010.

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, but 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 RL. 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.

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

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

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **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			
SDGs: WSCF103223 & WSCF103314	Reviewer: AQA	Project: 100 RI/FS	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Inorganics	None	N/A	N/A

Comments: None

Appendix 3

Annotated Laboratory Reports

WSCF Analytical Results Report

Attention Michael Neely
Department Inorganic

Group # WSCF103223

Sample # 103223002
SAF# F11-012
Sample ID B29J48

Matrix WATER
Sampled 12/04/10
Received 12/05/10

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
ICPMS Prep										**12/13/10**
ICP-MS										
Aluminum	7429-90-5	LA-505-412	BD	10.2		ug/L	2	10	200	12/13/10
Manganese	7439-96-5	LA-505-412	BD	1.87		ug/L	2	0.20	2.0	12/13/10
Nickel	7440-02-0	LA-505-412	BD	0.751		ug/L	2	0.40	4.0	12/13/10
Silver	7440-22-4	LA-505-412	UD	<0.20		ug/L	2	0.20	2.0	12/13/10
Antimony	7440-36-0	LA-505-412	UD	<0.60		ug/L	2	0.60	6.0	12/13/10
Barium	7440-39-3	LA-505-412	D	37.4		ug/L	2	0.40	4.0	12/13/10
Beryllium	7440-41-7	LA-505-412	UD	<0.10		ug/L	2	0.10	1.0	12/13/10
Cadmium	7440-43-9	LA-505-412	UD	<0.20		ug/L	2	0.20	2.0	12/13/10
Chromium	7440-47-3	LA-505-412	UD	<1.0		ug/L	2	1.0	10	12/13/10
Cobalt	7440-48-4	LA-505-412	BD	0.438		ug/L	2	0.10	0.50	12/13/10
Copper	7440-50-8	LA-505-412	BD	0.410		ug/L	2	0.20	2.0	12/13/10
Vanadium	7440-62-2	LA-505-412	BD	3.28		ug/L	2	0.40	4.0	12/13/10
Zinc	7440-66-6	LA-505-412	BD	2.16		ug/L	2	1.6	10	12/13/10
Lead	7439-92-1	LA-505-412	UD	<0.20		ug/L	2	0.20	2.0	12/13/10
Mercury	7439-97-6	LA-505-412	UD	<0.10		ug/L	2	0.10	0.40	12/13/10
Thallium	7440-28-0	LA-505-412	UD	<0.10		ug/L	2	0.10	1.0	12/13/10
Uranium	7440-61-1	LA-505-412	D	2.96		ug/L	2	0.10	0.40	12/13/10

MDL = Minimum Detection
RQ = Result Qualifier
TP Err = Total Propagated
DF = Dilution Factor
+ - Indicates more than nine qualifier

B - Analyte < the PQL(or EQL)but >= the IDL/MDL(Inorganic)
C - Analyte was found in the Associated Blank. (Inorganic)
D - Analyte was reported at a secondary diltution factor.
E - Analyte is an estimate, see comment section.
N - MS and/or MSD recovery outside control limits.

U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.
PQL is equivalent to Estimated Quantitation Limit (EQL)

WSCF Analytical Results Report

Attention Michael Neely
Department Inorganic

Group # WSCF103223

Sample # 103223002
SAF# F11-012
Sample ID B29J48

Matrix WATER
Sampled 12/04/10
Received 12/05/10

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Arsenic	7440-38-2	LA-505-412	BD	1.43		ug/L	2	0.80	8.0	12/13/10
Selenium	7782-49-2	LA-505-412	BD	1.20		ug/L	2	0.60	6.0	12/13/10

MDL = Minimum Detection
RQ = Result Qualifier
TP Err = Total Propagated
DF = Dilution Factor
+ - Indicates more than nine qualifier

B - Analyte < the PQL(or EQL)but >= the IDL/MDL(Inorganic)
C - Analyte was found in the Associated Blank. (Inorganic)
D - Analyte was reported at a secondary diltution factor.
E - Analyte is an estimate, see comment section.
N - MS and/or MSD recovery outside control limits.

U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.
PQL is equivalent to Estimated Quantitation Limit (EQL)

WSCF Analytical Results Report

Attention Michael Neely
Department Inorganic

Group # WSCF103223

Sample # 103223003
SAF# F11-012
Sample ID B29C63

Matrix WATER
Sampled 12/04/10
Received 12/05/10

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
~~**Cr(VI)**~~										~~**12/05/10**~~
~~**Cr(VI)**~~										
~~Hexavalent chromium~~	~~18540-29-9~~	~~LA-265-403~~	~~U~~	~~<0.0020~~		~~mg/L~~	~~1~~	~~0.0020~~	~~0.0050~~	~~12/05/10~~
ICPMS Prep										**12/13/10**
ICP-MS										
Aluminum	7429-90-5	LA-505-412	BD	144		ug/L	2	10	200	12/13/10
Manganese	7439-96-5	LA-505-412	D	27.4		ug/L	2	0.20	2.0	12/13/10
Nickel	7440-02-0	LA-505-412	BD	0.914		ug/L	2	0.40	4.0	12/13/10
Silver	7440-22-4	LA-505-412	UD	<0.20		ug/L	2	0.20	2.0	12/13/10
Antimony	7440-36-0	LA-505-412	UD	<0.60		ug/L	2	0.60	6.0	12/13/10
Barium	7440-39-3	LA-505-412	D	41.9		ug/L	2	0.40	4.0	12/13/10
Beryllium	7440-41-7	LA-505-412	UD	<0.10		ug/L	2	0.10	1.0	12/13/10
Cadmium	7440-43-9	LA-505-412	UD	<0.20		ug/L	2	0.20	2.0	12/13/10
Chromium	7440-47-3	LA-505-412	UD	<1.0		ug/L	2	1.0	10	12/13/10
Cobalt	7440-48-4	LA-505-412	UD	<0.10		ug/L	2	0.10	0.50	12/13/10
Copper	7440-50-8	LA-505-412	BD	0.727		ug/L	2	0.20	2.0	12/13/10
Vanadium	7440-62-2	LA-505-412	BD	3.82		ug/L	2	0.40	4.0	12/13/10
Zinc	7440-66-6	LA-505-412	BD	2.39		ug/L	2	1.6	10	12/13/10
Lead	7439-92-1	LA-505-412	BD	0.388		ug/L	2	0.20	2.0	12/13/10

MDL = Minimum Detection
RQ = Result Qualifier
TP Err = Total Propagated
DF = Dilution Factor
+ - Indicates more than nine qualifier

B - Analyte < the PQL(or EQL)but >= the IDL/MDL(Inorganic)
C - Analyte was found in the Associated Blank. (Inorganic)
D - Analyte was reported at a secondary diltution factor.
E - Analyte is an estimate, see comment section.
N - MS and/or MSD recovery outside control limits.

U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.
PQL is equivalent to Estimated Quantitation Limit (EQL)

LS
2-21-2011

WSCF Analytical Results Report

Attention Michael Neely
Department Inorganic

Group # WSCF103223

Sample # 103223003
SAF# F11-012
Sample ID B29C63

Matrix WATER
Sampled 12/04/10
Received 12/05/10

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Mercury	7439-97-6	LA-505-412	UD	<0.10		ug/L	2	0.10	0.40	12/13/10
Thallium	7440-28-0	LA-505-412	UD	<0.10		ug/L	2	0.10	1.0	12/13/10
Uranium	7440-61-1	LA-505-412	D	2.97		ug/L	2	0.10	0.40	12/13/10
Arsenic	7440-38-2	LA-505-412	BD	1.61		ug/L	2	0.80	8.0	12/13/10
Selenium	7782-49-2	LA-505-412	UD	<0.60		ug/L	2	0.60	6.0	12/13/10

MDL = Minimum Detection
RQ = Result Qualifier
TP Err = Total Propagated
DF = Dilution Factor
+ - Indicates more than nine qualifier

B - Analyte < the PQL(or EQL)but >= the IDL/MDL(Inorganic)
C - Analyte was found in the Associated Blank. (Inorganic)
D - Analyte was reported at a secondary diltution factor.
E - Analyte is an estimate, see comment section.
N - MS and/or MSD recovery outside control limits.

U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.
PQL is equivalent to Estimated Quantitation Limit (EQL)

WSCF Analytical Results Report

Attention Michael Neely
Department Inorganic

Group # WSCF103314

Sample # 103314002
SAF# F11-012
Sample ID B29J57

Matrix WATER
Sampled 12/09/10
Received 12/10/10

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
ICPMS Prep										**12/13/10**
ICP-MS										
Aluminum	7429-90-5	LA-505-412	BD	17.3		ug/L	2	10	200	12/13/10
Manganese	7439-96-5	LA-505-412	D	5.46		ug/L	2	0.20	2.0	12/13/10
Nickel	7440-02-0	LA-505-412	BD	0.558		ug/L	2	0.40	4.0	12/13/10
Silver	7440-22-4	LA-505-412	UD	<0.20		ug/L	2	0.20	2.0	12/13/10
Antimony	7440-36-0	LA-505-412	UD	<0.60		ug/L	2	0.60	6.0	12/13/10
Barium	7440-39-3	LA-505-412	D	28.8		ug/L	2	0.40	4.0	12/13/10
Beryllium	7440-41-7	LA-505-412	UD	<0.10		ug/L	2	0.10	1.0	12/13/10
Cadmium	7440-43-9	LA-505-412	UD	<0.20		ug/L	2	0.20	2.0	12/13/10
Chromium	7440-47-3	LA-505-412	BD	3.59		ug/L	2	1.0	10	12/13/10
Cobalt	7440-48-4	LA-505-412	D	1.29		ug/L	2	0.10	0.50	12/13/10
Copper	7440-50-8	LA-505-412	BD	0.699		ug/L	2	0.20	2.0	12/13/10
Vanadium	7440-62-2	LA-505-412	D	4.22		ug/L	2	0.40	4.0	12/13/10
Zinc	7440-66-6	LA-505-412	BD	4.47		ug/L	2	1.6	10	12/13/10
Lead	7439-92-1	LA-505-412	BD	0.220		ug/L	2	0.20	2.0	12/13/10
Mercury	7439-97-6	LA-505-412	UD	<0.10		ug/L	2	0.10	0.40	12/13/10
Thallium	7440-28-0	LA-505-412	UD	<0.10		ug/L	2	0.10	1.0	12/13/10
Uranium	7440-61-1	LA-505-412	D	2.98		ug/L	2	0.10	0.40	12/13/10

MDL = Minimum Detection
RQ = Result Qualifier
TP Err = Total Propagated
DF = Dilution Factor
+ - Indicates more than nine qualifier

B - Analyte < the PQL(or EQL)but >= the IDL/MDL(Inorganic)
C - Analyte was found in the Associated Blank. (Inorganic)
D - Analyte was reported at a secondary diltution factor.
E - Analyte is an estimate, see comment section.
N - MS and/or MSD recovery outside control limits.

U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.
PQL is equivalent to Estimated Quantitation Limit (EQL)

WSCF Analytical Results Report

Attention Michael Neely
Department Inorganic

Group # WSCF103314

Sample # 103314002
SAF# F11-012
Sample ID B29J57

Matrix WATER
Sampled 12/09/10
Received 12/10/10

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Arsenic	7440-38-2	LA-505-412	BD	1.52		ug/L	2	0.80	8.0	12/13/10
Selenium	7782-49-2	LA-505-412	BD	0.747		ug/L	2	0.60	6.0	12/13/10

MDL = Minimum Detection
RQ = Result Qualifier
TP Err = Total Propagated
DF = Dilution Factor
+ - Indicates more than nine qualifier

B - Analyte < the PQL(or EQL)but >= the IDL/MDL(Inorganic)
C - Analyte was found in the Associated Blank. (Inorganic)
D - Analyte was reported at a secondary diltution factor.
E - Analyte is an estimate, see comment section.
N - MS and/or MSD recovery outside control limits.

U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.
PQL is equivalent to Estimated Quantitation Limit (EQL)

WSCF Analytical Results Report

Attention Michael Neely
Department Inorganic

Group # WSCF103314

Sample # 103314003
SAF# F11-012
Sample ID B29C72

Matrix WATER
Sampled 12/09/10
Received 12/10/10

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
~~**Cr(VI)**~~										~~**12/10/10**~~
Cr(VI)										
~~Hexavalent chromium~~	~~18540-29-9~~	~~LA-265-403~~	~~U~~	~~<0.0020~~		~~mg/L~~	~~1~~	~~0.0020~~	~~0.0050~~	~~12/10/10~~
ICPMS Prep										**12/13/10**
ICP-MS										
Aluminum	7429-90-5	LA-505-412	BD	114		ug/L	2	10	200	12/13/10
Manganese	7439-96-5	LA-505-412	D	21.0		ug/L	2	0.20	2.0	12/13/10
Nickel	7440-02-0	LA-505-412	BD	0.585		ug/L	2	0.40	4.0	12/13/10
Silver	7440-22-4	LA-505-412	UD	<0.20		ug/L	2	0.20	2.0	12/13/10
Antimony	7440-36-0	LA-505-412	UD	<0.60		ug/L	2	0.60	6.0	12/13/10
Barium	7440-39-3	LA-505-412	D	31.8		ug/L	2	0.40	4.0	12/13/10
Beryllium	7440-41-7	LA-505-412	UD	<0.10		ug/L	2	0.10	1.0	12/13/10
Cadmium	7440-43-9	LA-505-412	UD	<0.20		ug/L	2	0.20	2.0	12/13/10
Chromium	7440-47-3	LA-505-412	BD	3.78		ug/L	2	1.0	10	12/13/10
Cobalt	7440-48-4	LA-505-412	BD	0.104		ug/L	2	0.10	0.50	12/13/10
Copper	7440-50-8	LA-505-412	BD	1.23		ug/L	2	0.20	2.0	12/13/10
Vanadium	7440-62-2	LA-505-412	D	4.77		ug/L	2	0.40	4.0	12/13/10
Zinc	7440-66-6	LA-505-412	BD	6.06		ug/L	2	1.6	10	12/13/10
Lead	7439-92-1	LA-505-412	BD	0.664		ug/L	2	0.20	2.0	12/13/10

MDL = Minimum Detection
RQ = Result Qualifier
TP Err = Total Propagated
DF = Dilution Factor
+ - Indicates more than nine qualifier

B - Analyte < the PQL(or EQL)but >= the IDL/MDL(Inorganic)
C - Analyte was found in the Associated Blank. (Inorganic)
D - Analyte was reported at a secondary diltution factor.
E - Analyte is an estimate, see comment section.
N - MS and/or MSD recovery outside control limits.

U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.
PQL is equivalent to Estimated Quantitation Limit (EQL)

LS
2-21-2011

WSCF Analytical Results Report

Attention Michael Neely
Department Inorganic

Group # WSCF103314

Sample # 103314003
SAF# F11-012
Sample ID B29C72

Matrix WATER
Sampled 12/09/10
Received 12/10/10

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Mercury	7439-97-6	LA-505-412	UD	<0.10		ug/L	2	0.10	0.40	12/13/10
Thallium	7440-28-0	LA-505-412	UD	<0.10		ug/L	2	0.10	1.0	12/13/10
Uranium	7440-61-1	LA-505-412	D	3.09		ug/L	2	0.10	0.40	12/13/10
Arsenic	7440-38-2	LA-505-412	BD	1.35		ug/L	2	0.80	8.0	12/13/10
Selenium	7782-49-2	LA-505-412	BD	1.13		ug/L	2	0.60	6.0	12/13/10

MDL = Minimum Detection
RQ = Result Qualifier
TP Err = Total Propagated
DF = Dilution Factor
+ - Indicates more than nine qualifier

B - Analyte < the PQL(or EQL)but >= the IDL/MDL(Inorganic)
C - Analyte was found in the Associated Blank. (Inorganic)
D - Analyte was reported at a secondary diltution factor.
E - Analyte is an estimate, see comment section.
N - MS and/or MSD recovery outside control limits.

U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.
PQL is equivalent to Estimated Quantitation Limit (EQL)

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Attachment 2
Narrative
WSCF103223

Introduction

Three (3) S&GRP samples were received at the WSCF Laboratory on December 5, 2010. 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 not stamped "ICED" by the WSCF Laboratory Sample Custodian during sample receiving. However, based on procedure LO-090-403 form "NOTICE OF IMPROPER SAMPLE SUBMITTAL" was not submitted and was not stamped "NOT ICED". No anomaly was noted during sample receipt.

The following generic data qualifiers (i.e., B, D, U 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 wet chemical 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.
- **U** – Analyzed for but not detected above limiting criteria. Relative Percent Difference (RPD) values associated with an analyte qualified with a "U" are not applicable.

Analytical Methodology for Requested Analyses

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

Inorganic Comments

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

- Batch QC 170685 analyzed on sample# B29FM2 (103223001)

All applicable QC controls are within the established limits.

Attachment 2
Narrative
WSCF103223

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. Analytical Note(s):

- Batch QC 170950 analyzed on sample# B27X48 (103155002)

All applicable QC controls are within the established limits.

Organic Comments

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. Analytical Note(s):

- Batch QC 170835 analyzed on sample# B281C8 (103218016)
  - Due to the co-elution of analytes for TPHD-WA (DRO) and kerosene analysis, samples are spiked and evaluated for TPHD only.

All applicable 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 Tritium), Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- Tracers are used to determine chemical yield. RPD is monitored in sample duplicate and is not required for tracer recovery per SOW.
- Tritium:
  - Batch QC 171067 analyzed on sample# B284R7 (103238003)

All applicable QC controls are within the established limits.

- Strontium-89/90:
  - Batch QC 172476 analyzed on sample# B286K3 (103309006)

All applicable 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 electronic signatures shown on the WSCF ANALYTICAL RESULTS REPORT.

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-012-047	PAGE 1 OF 1
COLLECTOR: KB Hulse	COMPANY CONTACT: RADLOFF, AW	TELEPHONE NO.: 376-4554	PROJECT COORDINATOR: RADLOFF, AW	PRICE CODE: 7N	DATA TURNAROUND: 45 Days / 45 Days
SAMPLING LOCATION: N Transect 2	PROJECT DESIGNATION: 100-N Up-Welling - Pore Water Sampling		SAF NO.: F11-012	AIR QUALITY: ☐	
ICE CHEST NO.: GWS-189-01	FIELD LOGBOOK NO.: HNF-N-507-11	ACTUAL SAMPLE DEPTH: N/A	COA: 300108E510	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)

13223

SPECIAL HANDLING AND/OR STORAGE: This sample has been subsampled from the bulk sample B29C48

PRESERVATION	Cool-4C
HOLDING TIME	24 Hours
TYPE OF CONTAINER	aG
NO. OF CONTAINER(S)	1
VOLUME	125mL
SAMPLE ANALYSIS	Chromium Hex - 7196; (F)

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B29FM2 1	WATER	12-4-10	1040	X

ORIGINAL

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM: KB Hulse	DATE/TIME: 12-5-10 0915	RECEIVED BY/STORED IN: [signature]	DATE/TIME: 12/5/10 0915
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

** Field NCOs are to filter the Hexavalent Chromium sample in the field prior to shipment to the laboratory.

** Sample date and time recorded on COCs and labels reflect date and time bulk sample was collected.

** The CACN for WSCF Analytical is currently being determined. Once the CACN is established it will be distributed for use by the laboratory.

** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.

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

A-6003-618 (REV 2)

Sample Receipt

Chain of Custody

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-012-062	PAGE 1 OF 1
COLLECTOR: KB Hulse	COMPANY CONTACT: RADLOFF, AW	TELEPHONE NO.: 376-4554	PROJECT COORDINATOR: RADLOFF, AW	PRICE CODE: 7N	DATA TURNAROUND: 45 Days / 45 Days
SAMPLING LOCATION: N Transect 2	PROJECT DESIGNATION: 100-N Up-Welling - Pore Water Sampling		SAF NO.: F11-012	AIR QUALITY: ☐	
ICE CHEST NO.: GWS-188-01	FIELD LOGBOOK NO.: HNF-N-507-11	ACTUAL SAMPLE DEPTH: N/A	COA: 300108E10	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: Waste Sampling & Characterization	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*	POSSIBLE SAMPLE HAZARDS/ REMARKS		
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	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)	PRESERVATION	HNO_3 to pH <2
		HOLDING TIME	6 Months
		TYPE OF CONTAINER	G/P
		NO. OF CONTAINER(S)	1
		VOLUME	0mL
	SPECIAL HANDLING AND/OR STORAGE: This sample has been subsampled from the bulk sample B29C48	SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS (F)

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B29J48	W WATER	12-4-10	1040	X

ORIGINAL

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM: KB Hulse	DATE/TIME: 12-5-10 0725	RECEIVED BY/STORED IN: [signature]	DATE/TIME: 12/5/10 0725
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

** Field NCOs are to filter this ICP/MS - 200.8 (100 Area RI/FS) sample in the field prior to preservation and shipment to the laboratory.

** Sample date and time recorded on COCs and labels reflect date and time bulk sample was collected.

** The CACN for WSCF Analytical is currently being determined. Once the CACN is established it will be distributed for use by the laboratory.
** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
(1) ICP/MS - 200.8 (100 Area RI/FS); ICP/MS - 200.8 (Add-on 100 Area RI/FS) {Uranium}; 200.8_HG - ICPMS (100 Area RI/FS) {Mercury};

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

A-6003-613 (REV 2)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-012-017	PAGE 1 OF 1
COLLECTOR: KB Hulse	COMPANY CONTACT: RADLOFF, AW	TELEPHONE NO.: 376-4554	PROJECT COORDINATOR: RADLOFF, AW	PRICE CODE: 7N	DATA TURNAROUND: 45 Days / 45 Days
SAMPLING LOCATION: N Transect 2	PROJECT DESIGNATION: 100-N Up-Welling - Pore Water Sampling		SAF NO.: F11-012	AIR QUALITY: ☐	
ICE CHEST NO.: GWS-189-01	FIELD LOGBOOK NO.: HNF-N-507-11	ACTUAL SAMPLE DEPTH: N/A	COA: 300108ES10	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: This sample has been subsampled from the bulk sample B29C48

PRESERVATION	HCl to pH <2/Cool=4C	HNO3 to pH <2	Cool=4C	HNO3 to pH <2	None
HOLDING TIME	14/40 Days	6 Months	24 Hours	6 Months	6 Months
TYPE OF CONTAINER	aG	G/P	aG	G/P	G
NO. OF CONTAINER(S)	1	1	1	1	1
VOLUME	1L	60mL	125mL	1L	125mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	Chromium Hex - 7196;	Strontium-89,90 - Total Sr;	Tritium - Ion Ex.

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME					
B29C63	WATER	12-4-10	1040	X	X	X	X	X

ORIGINAL

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM: KB Hulse	DATE/TIME: 12-5-10 0705	RECEIVED BY/STORED IN: [signature]	DATE/TIME: 12/5/10 0725	** Sample date and time recorded on COCs and labels reflect date and time bulk sample was collected.
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	** The CACN for WSCF Analytical is currently being determined. Once the CACN is established it will be distributed for use by the laboratory.
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	(1) TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range};
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	(2) ICP/MS - 200.8 (100 Area RI/FS); ICP/MS - 200.8 (Add-on 100 Area RI/FS) {Uranium}; 200.8_HG - ICPMS (100 Area RI/FS) {Mercury};
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	

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

A-6003-618 (REV 2)

Attachment 2
Narrative
WSCF103314

Introduction

Samples were received at the WSCF laboratory as referenced on the WSCF SAF Number Cross Reference table included in the final report. 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 not stamped "ICED" by the WSCF Laboratory Sample Custodian during sample receiving. However, based on procedure LO-090-403 form "NOTICE OF IMPROPER SAMPLE SUBMITTAL" was not submitted and was not stamped "NOT ICED". No anomaly was noted during sample receipt.

The following generic data qualifiers (i.e., B, D, U 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 wet chemical 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.
- **U** – Analyzed for but not detected above limiting criteria. Relative Percent Difference (RPD) values associated with an analyte qualified with a "U" are not applicable.

Analytical Methodology for Requested Analyses

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

Inorganic Comments

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

- All applicable QC controls are within the established limits.

Attachment 2
Narrative
WSCF103314

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. Analytical Note(s):

- All applicable QC controls are within the established limits.

Organic Comments

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. Analytical Note(s):

- Due to the co-elution of analytes for TPHD-WA (DRO) and kerosene analysis, samples are spiked and evaluated for TPHD only.
  - All applicable 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 Tritium), Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

Tracers are used to determine chemical yield. RPD is monitored in sample duplicate and is not required for tracer recovery per SOW.

- Strontium-89/90:
  - All applicable QC controls are within the established limits.
- Tritium:
  - The LCS recovery was low, but within the 70 – 130% range allowed in the SOW.
    - All other applicable 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 electronic signatures shown on the WSCF ANALYTICAL RESULTS REPORT.

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-012-056	PAGE 1 OF 1
COLLECTOR: Scales	COMPANY CONTACT: RADLOFF, AW	TELEPHONE NO.: 376-4554	PROJECT COORDINATOR: RADLOFF, AW	PRICE CODE: 7N	DATA TURNAROUND: 45 Days / 45 Days
SAMPLING LOCATION: N Transect 10	PROJECT DESIGNATION: 100-N Up-Welling - Pore Water Sampling		SAF NO.: F11-012	AIR QUALITY: ☐	
ICE CHEST NO.	FIELD LOGBOOK NO.: HNFN-507-11	ACTUAL SAMPLE DEPTH: N/A	COA: 300108ES10	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)

103314

SPECIAL HANDLING AND/OR STORAGE: This sample has been subsampled from the bulk sample B29C57

F10-012-011

PRESERVATION	Cool~4C
HOLDING TIME	24 Hours
TYPE OF CONTAINER	aG
NO. OF CONTAINER(S)	1
VOLUME	125mL
SAMPLE ANALYSIS	Chromium Hex - 7196; (F)

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B29FN1	WATER	12-9-10	1245	X

ORIGINAL

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM: T Scales	DATE/TIME: 12-10-10 08:55	RECEIVED BY/STORED IN: K Breazeale	DATE/TIME: 12/10/10 08:55
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

** Field NCOs are to filter the Hexavalent Chromium sample in the field prior to shipment to the laboratory.

** Sample date and time recorded on COCs and labels reflect date and time bulk sample was collected.

** The CACN for WSCF Analytical is currently being determined. Once the CACN is established it will be distributed for use by the laboratory.

** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.

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

A-6003-618 (REV 2)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-012-071	PAGE 1 OF 1
COLLECTOR: Scales	COMPANY CONTACT: RADLOFF, AW	TELEPHONE NO.: 376-4554	PROJECT COORDINATOR: RADLOFF, AW	PRICE CODE: 7N	DATA TURNAROUND: 45 Days / 45 Days
SAMPLING LOCATION: N Transect 10	PROJECT DESIGNATION: 100-N Up-Welling - Pore Water Sampling		SAF NO.: F11-012	AIR QUALITY: ☐	
ICE CHEST NO.	FIELD LOGBOOK NO.: HNF-N-507-11	ACTUAL SAMPLE DEPTH: N/A	COA: 300108ES10	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
This sample has been subsampled from the bulk sample B29C57
F10-012-011

PRESERVATION	HNO3 to pH <2
HOLDING TIME	6 Months
TYPE OF CONTAINER	G/P
NO. OF CONTAINER(S)	1
VOLUME	60mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS (F)

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B29J57	2 WATER	12-9-10	1245	X

☐ ORIGINAL

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM: J Scales	DATE/TIME: 12-10-10 08:55	RECEIVED BY/STORED IN: Brazale A Baza	DATE/TIME: 12/10/10 8:55
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

** Field NCOs are to filter this ICP/MS - 200.8 (100 Area RI/FS) sample in the field prior to preservation and shipment to the laboratory.

** Sample date and time recorded on COCs and labels reflect date and time bulk sample was collected.

** The CACN for WSCF Analytical is currently being determined. Once the CACN is established it will be distributed for use by the laboratory.
** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
(1) ICP/MS - 200.8 (100 Area RI/FS); ICP/MS - 200.8 (Add-on 100 Area RI/FS) {Uranium}; 200.8_HG - ICPMS (100 Area RI/FS) {Mercury};

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

A-6003-618 (REV 2)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-012-026	PAGE 1 OF 1
COLLECTOR: Scales	COMPANY CONTACT: RADLOFF, AW	TELEPHONE NO.: 376-4554	PROJECT COORDINATOR: RADLOFF, AW	PRICE CODE: 7N	DATA TURNAROUND: 45 Days / 45 Days
SAMPLING LOCATION: N Transect 10	PROJECT DESIGNATION: 100-N Up-Welling - Pore Water Sampling		SAF NO.: F11-012	AIR QUALITY: ☐	
ICE CHEST NO.	FIELD LOGBOOK NO.: HNF-N-507-11	ACTUAL SAMPLE DEPTH: N/A	COA: 300108ES10	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: This sample has been subsampled from the bulk sample B29C57 F11-012-011

PRESERVATION	HCl to pH <2/Cool~4C	HNO3 to pH <2	Cool~4C	HNO3 to pH <2	None
HOLDING TIME	14/40 Days	6 Months	24 Hours	6 Months	6 Months
TYPE OF CONTAINER	aG	G/P	aG	G/P	G
NO. OF CONTAINER(S)	4	1	1	1	1
VOLUME	1L	60mL	125mL	1L	125mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	Chromium Hex - 7199;	Strontium-89,90 – Total Sr;	Tritium - Ion Ex;

SAMPLE NO.		MATRIX*	SAMPLE DATE	SAMPLE TIME					
B29C72	3	WATER	12-9-10	1245	X	X	X	X	X

FINAL

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM: J Scales	DATE/TIME: 12-10-10 08:55	RECEIVED BY/STORED IN: K. Breazeale	DATE/TIME: 12/10/10 08:55
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

** Sample date and time recorded on COCs and labels reflect date and time bulk sample was collected.

** The CACN for WSCF Analytical is currently being determined. Once the CACN is established it will be distributed for use by the laboratory.

** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.

(1) TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range};

(2) ICP/MS - 200.8 (100 Area RI/FS); ICP/MS - 200.8 (Add-on 100 Area RI/FS) {Uranium}; 200.8_HG - ICPMS (100 Area RI/FS) {Mercury};

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

A-6003-618 (REV 2)

Appendix 5

Data Validation Supporting Documentation

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100 RI/FS			DATA PACKAGE: VSR11-024		
VALIDATOR: Carl Schloesslin		LAB: WSCF		DATE: 2-21-2011	
			SDG: WSCF103223, WSCF103314		
ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg		EPA 200.8 X	

SAMPLES/MATRIX Water samples

SDG WSCF103223: B29J48, B29C63
SDG WSCF103314: B29J57, B29C72

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:

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

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

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

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

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

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

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

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

Comments: None

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

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

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

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

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

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

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

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

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

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

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

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

Comments: None

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. 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:

7. HOLDING TIMES (all levels)

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

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

Comments: None

8. 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

Quality Control Report

Attention Michael Neely
Department Inorganic

Group # WSCF103223

QC Batch 170950
Associated Samples 103223002, 103223003

Test ICP-2008 MS All possible metal

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #43827**							
Aluminum	7429-90-5		<5.0	ug/L					U	12/13/10
Manganese	7439-96-5		<0.10	ug/L					U	12/13/10
Nickel	7440-02-0		<0.20	ug/L					U	12/13/10
Silver	7440-22-4		<0.10	ug/L					U	12/13/10
Antimony	7440-36-0		<0.30	ug/L					U	12/13/10
Barium	7440-39-3		<0.20	ug/L					U	12/13/10
Beryllium	7440-41-7		<0.050	ug/L					U	12/13/10
Cadmium	7440-43-9		<0.10	ug/L					U	12/13/10
Chromium	7440-47-3		<0.50	ug/L					U	12/13/10
Cobalt	7440-48-4		<0.050	ug/L					U	12/13/10
Copper	7440-50-8		<0.10	ug/L					U	12/13/10
Vanadium	7440-62-2		<0.20	ug/L					U	12/13/10
Zinc	7440-66-6		<0.80	ug/L					U	12/13/10
Lead	7439-92-1		<0.10	ug/L					U	12/13/10
Mercury	7439-97-6		<0.050	ug/L					U	12/13/10
Thallium	7440-28-0		<0.050	ug/L					U	12/13/10
Uranium	7440-61-1		<0.050	ug/L					U	12/13/10
Arsenic	7440-38-2		<0.40	ug/L					U	12/13/10
Selenium	7782-49-2		<0.30	ug/L					U	12/13/10

Quality Control Report

Attention Michael Neely
Department Inorganic

Group # WSCF103223

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
LCS			**QC Sample #43828**							
Aluminum	7429-90-5		375	ug/L	93.7	85 - 115				12/13/10
Manganese	7439-96-5		38.7	ug/L	96.8	85 - 115				12/13/10
Nickel	7440-02-0		38.7	ug/L	96.8	85 - 115				12/13/10
Silver	7440-22-4		39.8	ug/L	99.6	85 - 115				12/13/10
Antimony	7440-36-0		37.8	ug/L	94.4	85 - 115				12/13/10
Barium	7440-39-3		38.8	ug/L	97	85 - 115				12/13/10
Beryllium	7440-41-7		37.5	ug/L	93.8	85 - 115				12/13/10
Cadmium	7440-43-9		37.6	ug/L	93.9	85 - 115				12/13/10
Chromium	7440-47-3		39.2	ug/L	98.1	85 - 115				12/13/10
Cobalt	7440-48-4		38.4	ug/L	96.1	85 - 115				12/13/10
Copper	7440-50-8		38.6	ug/L	96.5	85 - 115				12/13/10
Vanadium	7440-62-2		38.3	ug/L	95.6	85 - 115				12/13/10
Zinc	7440-66-6		37.4	ug/L	93.5	85 - 115				12/13/10
Lead	7439-92-1		40.4	ug/L	101	85 - 115				12/13/10
Mercury	7439-97-6		1.81	ug/L	90.6	85 - 115				12/13/10
Thallium	7440-28-0		40.0	ug/L	99.9	85 - 115				12/13/10
Uranium	7440-61-1		41.4	ug/L	103.4	85 - 115				12/13/10
Arsenic	7440-38-2		37.7	ug/L	94.3	85 - 115				12/13/10
Selenium	7782-49-2		34.0	ug/L	85	85 - 115				12/13/10
MS			**QC Sample #43829**							
			Original 103155002							
Aluminum	7429-90-5		374	ug/L	93.6	70 - 130				12/13/10
Manganese	7439-96-5		37.9	ug/L	94.7	70 - 130				12/13/10

Quality Control Report

Attention Michael Neely
Department Inorganic

Group # WSCF103223

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Nickel	7440-02-0		37.7	ug/L	94.2	70 - 130				12/13/10
Silver	7440-22-4		38.2	ug/L	95.6	70 - 130				12/13/10
Antimony	7440-36-0		38.4	ug/L	96	70 - 130				12/13/10
Barium	7440-39-3		38.0	ug/L	95.1	70 - 130				12/13/10
Beryllium	7440-41-7		38.6	ug/L	96.6	70 - 130				12/13/10
Cadmium	7440-43-9		37.7	ug/L	94.3	70 - 130				12/13/10
Chromium	7440-47-3		38.7	ug/L	96.8	70 - 130				12/13/10
Cobalt	7440-48-4		37.6	ug/L	94	70 - 130				12/13/10
Copper	7440-50-8		36.7	ug/L	91.7	70 - 130				12/13/10
Vanadium	7440-62-2		37.9	ug/L	94.8	70 - 130				12/13/10
Zinc	7440-66-6		36.8	ug/L	92.1	70 - 130				12/13/10
Lead	7439-92-1		40.4	ug/L	101.1	70 - 130				12/13/10
Mercury	7439-97-6		1.85	ug/L	92.6	70 - 130				12/13/10
Thallium	7440-28-0		40.5	ug/L	101.2	70 - 130				12/13/10
Uranium	7440-61-1		42.8	ug/L	107.1	70 - 130				12/13/10
Arsenic	7440-38-2		36.9	ug/L	92.3	70 - 130				12/13/10
Selenium	7782-49-2		33.4	ug/L	83.4	70 - 130				12/13/10
MSD			**QC Sample #43830**							
			Original 103155002						**Paired 43829**	
Aluminum	7429-90-5		360	ug/L	90	70 - 130	3.90	20		12/13/10
Manganese	7439-96-5		36.4	ug/L	91.1	70 - 130	3.90	20		12/13/10
Nickel	7440-02-0		35.6	ug/L	89	70 - 130	5.70	20		12/13/10
Silver	7440-22-4		37.5	ug/L	93.8	70 - 130	1.90	20		12/13/10
Antimony	7440-36-0		38.0	ug/L	95.1	70 - 130	0.90	20		12/13/10
Barium	7440-39-3		37.2	ug/L	93	70 - 130	2.20	20		12/13/10

Quality Control Report

Attention Michael Neely
Department Inorganic

Group # WSCF103223

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Beryllium	7440-41-7		37.1	ug/L	92.6	70 - 130	4.20	20		12/13/10
Cadmium	7440-43-9		36.5	ug/L	91.2	70 - 130	3.30	20		12/13/10
Chromium	7440-47-3		37.0	ug/L	92.4	70 - 130	4.70	20		12/13/10
Cobalt	7440-48-4		35.8	ug/L	89.4	70 - 130	5.00	20		12/13/10
Copper	7440-50-8		35.0	ug/L	87.5	70 - 130	4.70	20		12/13/10
Vanadium	7440-62-2		35.8	ug/L	89.6	70 - 130	5.60	20		12/13/10
Zinc	7440-66-6		34.4	ug/L	86.1	70 - 130	6.70	20		12/13/10
Lead	7439-92-1		39.4	ug/L	98.5	70 - 130	2.60	20		12/13/10
Mercury	7439-97-6		1.78	ug/L	89.2	70 - 130	3.70	20		12/13/10
Thallium	7440-28-0		39.9	ug/L	99.8	70 - 130	1.40	20		12/13/10
Uranium	7440-61-1		41.9	ug/L	104.7	70 - 130	2.30	20		12/13/10
Arsenic	7440-38-2		37.0	ug/L	92.4	70 - 130	0.10	20		12/13/10
Selenium	7782-49-2		33.8	ug/L	84.5	70 - 130	1.30	20		12/13/10

Quality Control Report

Attention Michael Neely
Department Inorganic

Group # WSCF103314

QC Batch 170950
Associated Samples 103314002, 103314003

Test ICP-2008 MS All possible metal

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #43827**							
Aluminum	7429-90-5		<5.0	ug/L					U	12/13/10
Manganese	7439-96-5		<0.10	ug/L					U	12/13/10
Nickel	7440-02-0		<0.20	ug/L					U	12/13/10
Silver	7440-22-4		<0.10	ug/L					U	12/13/10
Antimony	7440-36-0		<0.30	ug/L					U	12/13/10
Barium	7440-39-3		<0.20	ug/L					U	12/13/10
Beryllium	7440-41-7		<0.10	ug/L					U	12/13/10
Cadmium	7440-43-9		<0.10	ug/L					U	12/13/10
Chromium	7440-47-3		<0.50	ug/L					U	12/13/10
Cobalt	7440-48-4		<0.050	ug/L					U	12/13/10
Copper	7440-50-8		<0.10	ug/L					U	12/13/10
Vanadium	7440-62-2		<0.20	ug/L					U	12/13/10
Zinc	7440-66-6		<0.80	ug/L					U	12/13/10
Lead	7439-92-1		<0.10	ug/L					U	12/13/10
Mercury	7439-97-6		<0.050	ug/L					U	12/13/10
Thallium	7440-28-0		<0.050	ug/L					U	12/13/10
Uranium	7440-61-1		<0.050	ug/L					U	12/13/10
Arsenic	7440-38-2		<0.40	ug/L					U	12/13/10
Selenium	7782-49-2		<0.30	ug/L					U	12/13/10

Quality Control Report

Attention Michael Neely
Department Inorganic

Group # WSCF103314

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
LCS			**QC Sample #43828**							
Aluminum	7429-90-5		375	ug/L	93.7	85 - 115				12/13/10
Manganese	7439-96-5		38.7	ug/L	96.8	85 - 115				12/13/10
Nickel	7440-02-0		38.7	ug/L	96.8	85 - 115				12/13/10
Silver	7440-22-4		39.8	ug/L	99.6	85 - 115				12/13/10
Antimony	7440-36-0		37.8	ug/L	94.4	85 - 115				12/13/10
Barium	7440-39-3		38.8	ug/L	97	85 - 115				12/13/10
Beryllium	7440-41-7		37.5	ug/L	93.8	85 - 115				12/13/10
Cadmium	7440-43-9		37.6	ug/L	93.9	85 - 115				12/13/10
Chromium	7440-47-3		39.2	ug/L	98.1	85 - 115				12/13/10
Cobalt	7440-48-4		38.4	ug/L	96.1	85 - 115				12/13/10
Copper	7440-50-8		38.6	ug/L	96.5	85 - 115				12/13/10
Vanadium	7440-62-2		38.3	ug/L	95.6	85 - 115				12/13/10
Zinc	7440-66-6		37.4	ug/L	93.5	85 - 115				12/13/10
Lead	7439-92-1		40.4	ug/L	101	85 - 115				12/13/10
Mercury	7439-97-6		1.81	ug/L	90.6	85 - 115				12/13/10
Thallium	7440-28-0		40.0	ug/L	99.9	85 - 115				12/13/10
Uranium	7440-61-1		41.4	ug/L	103.4	85 - 115				12/13/10
Arsenic	7440-38-2		37.7	ug/L	94.3	85 - 115				12/13/10
Selenium	7782-49-2		34.0	ug/L	85	85 - 115				12/13/10
MS			**QC Sample #43829**							
			Original 103155002							
Aluminum	7429-90-5		374	ug/L	93.6	70 - 130				12/13/10
Manganese	7439-96-5		37.9	ug/L	94.7	70 - 130				12/13/10

Quality Control Report

Attention Michael Neely
Department Inorganic

Group # WSCF103314

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Nickel	7440-02-0		37.7	ug/L	94.2	70 - 130				12/13/10
Silver	7440-22-4		38.2	ug/L	95.6	70 - 130				12/13/10
Antimony	7440-36-0		38.4	ug/L	96	70 - 130				12/13/10
Barium	7440-39-3		38.0	ug/L	95.1	70 - 130				12/13/10
Beryllium	7440-41-7		38.6	ug/L	96.6	70 - 130				12/13/10
Cadmium	7440-43-9		37.7	ug/L	94.3	70 - 130				12/13/10
Chromium	7440-47-3		38.7	ug/L	96.8	70 - 130				12/13/10
Cobalt	7440-48-4		37.6	ug/L	94	70 - 130				12/13/10
Copper	7440-50-8		36.7	ug/L	91.7	70 - 130				12/13/10
Vanadium	7440-62-2		37.9	ug/L	94.8	70 - 130				12/13/10
Zinc	7440-66-6		36.8	ug/L	92.1	70 - 130				12/13/10
Lead	7439-92-1		40.4	ug/L	101.1	70 - 130				12/13/10
Mercury	7439-97-6		1.85	ug/L	92.6	70 - 130				12/13/10
Thallium	7440-28-0		40.5	ug/L	101.2	70 - 130				12/13/10
Uranium	7440-61-1		42.8	ug/L	107.1	70 - 130				12/13/10
Arsenic	7440-38-2		36.9	ug/L	92.3	70 - 130				12/13/10
Selenium	7782-49-2		33.4	ug/L	83.4	70 - 130				12/13/10
MSD			**QC Sample #43830**							
			Original 103155002						**Paired 43829**	
Aluminum	7429-90-5		360	ug/L	90	70 - 130	3.90	20		12/13/10
Manganese	7439-96-5		36.4	ug/L	91.1	70 - 130	3.90	20		12/13/10
Nickel	7440-02-0		35.6	ug/L	89	70 - 130	5.70	20		12/13/10
Silver	7440-22-4		37.5	ug/L	93.8	70 - 130	1.90	20		12/13/10
Antimony	7440-36-0		38.0	ug/L	95.1	70 - 130	0.90	20		12/13/10
Barium	7440-39-3		37.2	ug/L	93	70 - 130	2.20	20		12/13/10

Quality Control Report

Attention Michael Neely
Department Inorganic

Group # WSCF103314

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Beryllium	7440-41-7		37.1	ug/L	92.6	70 - 130	4.20	20		12/13/10
Cadmium	7440-43-9		36.5	ug/L	91.2	70 - 130	3.30	20		12/13/10
Chromium	7440-47-3		37.0	ug/L	92.4	70 - 130	4.70	20		12/13/10
Cobalt	7440-48-4		35.8	ug/L	89.4	70 - 130	5.00	20		12/13/10
Copper	7440-50-8		35.0	ug/L	87.5	70 - 130	4.70	20		12/13/10
Vanadium	7440-62-2		35.8	ug/L	89.6	70 - 130	5.60	20		12/13/10
Zinc	7440-66-6		34.4	ug/L	86.1	70 - 130	6.70	20		12/13/10
Lead	7439-92-1		39.4	ug/L	98.5	70 - 130	2.60	20		12/13/10
Mercury	7439-97-6		1.78	ug/L	89.2	70 - 130	3.70	20		12/13/10
Thallium	7440-28-0		39.9	ug/L	99.8	70 - 130	1.40	20		12/13/10
Uranium	7440-61-1		41.9	ug/L	104.7	70 - 130	2.30	20		12/13/10
Arsenic	7440-38-2		37.0	ug/L	92.4	70 - 130	0.10	20		12/13/10
Selenium	7782-49-2		33.8	ug/L	84.5	70 - 130	1.30	20		12/13/10

Date: 21 February 2011
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: 100 RI/FS
Subject: General Chemistry - Sample Data Groups (SDGs) WSCF103223 and WSCF103314

INTRODUCTION

This memorandum presents the results of data validation for SDGs WSCF103223 and WSCF103314 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
B29FM2	12/04/2010	Water	C	7196A (Cr VI)
B29C63	12/04/2010	Water	C	7196A (Cr VI)
B29FN1	12/09/2010	Water	C	7196A (Cr VI)
B29C72	12/09/2010	Water	C	7196A (Cr VI)

Data validation was conducted in accordance with the CHPRC validation statement of work and the Sampling and Analysis Plan for the 100-NR-2 Operable Unit River Pore Water Investigation, DOE/RL-2010-69, Rev. 0 (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 hexavalent chromium is analysis within 24 hours of sample collection. Sample preservation requires chilling to 4 degrees Celsius.

The samples were 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 validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results and laboratory control sample results. According to the SAP, the matrix spike sample accuracy limits are 80% to 120% and the laboratory control sample accuracy limits are ones specified by the DV procedure.

Matrix Spike Samples

All MS recoveries were acceptable.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

- **Precision**

Precision is evaluated by reviewing 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 ±20%. When duplicate RPDs exceed the limits and have associated results <5X the SAP required detection limits (or <5X the laboratory reporting limits for analytes not listed in the SAP) with differences <1X the required detection limits no precision infraction occurred.

Laboratory Duplicate Samples

All laboratory duplicate results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **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**

SDGs WSCF103223 and WSCF103314 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

None found.

REFERENCES

GRP-GD-003, Rev. 0, Change 0, *Data Validation for Chemical Analyses*, August 2010.

DOE/RL-2010-69, Rev. 0, *Sampling and Analysis Plan for the 100-NR-2 Operable Unit River Pore Water Investigation*, November 2010.

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, but 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 RL. 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.

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

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

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

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

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

Appendix 2

Summary of Data Qualification

General Chemistry Data Qualification Summary			
SDGs: WSCF103223 & WSCF103314	Reviewer: AQA	Project: 100 RI/FS	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Hexavalent chromium	None	N/A	N/A

Comments: None

Appendix 3

Annotated Laboratory Reports

WSCF Analytical Results Report

Attention Michael Neely
Department Inorganic

Group # WSCF103223

Sample # 103223001
SAF# F11-012
Sample ID B29FM2

Matrix WATER
Sampled 12/04/10
Received 12/05/10

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Cr(VI)										**12/05/10**
Cr(VI)										
Hexavalent chromium	18540-29-9	LA-265-403	U	<0.0020		mg/L	1	0.0020	0.0050	12/05/10

MDL = Minimum Detection
RQ = Result Qualifier
TP Err = Total Propagated
DF = Dilution Factor
+ - Indicates more than nine qualifier

B - Analyte < the PQL(or EQL)but >= the IDL/MDL(Inorganic)
C - Analyte was found in the Associated Blank. (Inorganic)
D - Analyte was reported at a secondary diltution factor.
E - Analyte is an estimate, see comment section.
N - MS and/or MSD recovery outside control limits.

U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.
PQL is equivalent to Estimated Quantitation Limit (EQL)

WSCF Analytical Results Report

Attention Michael Neely
Department Inorganic

Group # WSCF103223

Sample # 103223003
SAF# F11-012
Sample ID B29C63

Matrix WATER
Sampled 12/04/10
Received 12/05/10

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Cr(VI)										**12/05/10**
Cr(VI)										
Hexavalent chromium	18540-29-9	LA-265-403	U	<0.0020		mg/L	1	0.0020	0.0050	12/05/10
ICPMS Prep										**12/13/10**
ICP-MS										
Aluminum	7429-90-5	LA-505-412	BD	144		ug/L	2	10	200	12/13/10
Manganese	7439-96-5	LA-505-412	D	27.4		ug/L	2	0.20	2.0	12/13/10
Nickel	7440-02-0	LA-505-412	BD	0.914		ug/L	2	0.40	4.0	12/13/10
Silver	7440-22-4	LA-505-412	UD	<0.20		ug/L	2	0.20	2.0	12/13/10
Antimony	7440-36-0	LA-505-412	UD	<0.60		ug/L	2	0.60	6.0	12/13/10
Barium	7440-39-3	LA-505-412	D	41.9		ug/L	2	0.40	4.0	12/13/10
Beryllium	7440-41-7	LA-505-412	UD	<0.10		ug/L	2	0.10	1.0	12/13/10
Cadmium	7440-43-9	LA-505-412	UD	<0.20		ug/L	2	0.20	2.0	12/13/10
Chromium	7440-47-3	LA-505-412	UD	<1.0		ug/L	2	1.0	10	12/13/10
Cobalt	7440-48-4	LA-505-412	UD	<0.10		ug/L	2	0.10	0.50	12/13/10
Copper	7440-50-8	LA-505-412	BD	0.727		ug/L	2	0.20	2.0	12/13/10
Vanadium	7440-62-2	LA-505-412	BD	3.82		ug/L	2	0.40	4.0	12/13/10
Zinc	7440-66-6	LA-505-412	BD	2.39		ug/L	2	1.6	10	12/13/10
Lead	7439-92-1	LA-505-412	BD	0.388		ug/L	2	0.20	2.0	12/13/10

MDL = Minimum Detection
RQ = Result Qualifier
TP Err = Total Propagated
DF = Dilution Factor
+ - Indicates more than nine qualifier

B - Analyte < the PQL(or EQL)but >= the IDL/MDL(Inorganic)
C - Analyte was found in the Associated Blank. (Inorganic)
D - Analyte was reported at a secondary diltution factor.
E - Analyte is an estimate, see comment section.
N - MS and/or MSD recovery outside control limits.

U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.
PQL is equivalent to Estimated Quantitation Limit (EQL)

LS
2-21-2011

WSCF Analytical Results Report

Attention Michael Neely
Department Inorganic

Group # WSCF103314

Sample # 103314001
SAF# F11-012
Sample ID B29FN1

Matrix WATER
Sampled 12/09/10
Received 12/10/10

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Cr(VI)										**12/10/10**
Cr(VI)										
Hexavalent chromium	18540-29-9	LA-265-403	U	<0.0020		mg/L	1	0.0020	0.0050	12/10/10

MDL = Minimum Detection
RQ = Result Qualifier
TP Err = Total Propagated
DF = Dilution Factor
+ - Indicates more than nine qualifier

B - Analyte < the PQL(or EQL)but >= the IDL/MDL(Inorganic)
C - Analyte was found in the Associated Blank. (Inorganic)
D - Analyte was reported at a secondary diltution factor.
E - Analyte is an estimate, see comment section.
N - MS and/or MSD recovery outside control limits.

U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.
PQL is equivalent to Estimated Quantitation Limit (EQL)

WSCF Analytical Results Report

Attention Michael Neely
Department Inorganic

Group # WSCF103314

Sample # 103314003
SAF# F11-012
Sample ID B29C72

Matrix WATER
Sampled 12/09/10
Received 12/10/10

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Cr(VI)										**12/10/10**
Cr(VI)										
Hexavalent chromium	18540-29-9	LA-265-403	U	<0.0020		mg/L	1	0.0020	0.0050	12/10/10
ICPMS Prep										**12/13/10**
ICP-MS										
Aluminum	7429-90-5	LA-505-412	BD	114		ug/L	2	10	200	12/13/10
Manganese	7439-96-5	LA-505-412	D	21.0		ug/L	2	0.20	2.0	12/13/10
Nickel	7440-02-0	LA-505-412	BD	0.585		ug/L	2	0.40	4.0	12/13/10
Silver	7440-22-4	LA-505-412	UD	<0.20		ug/L	2	0.20	2.0	12/13/10
Antimony	7440-36-0	LA-505-412	UD	<0.60		ug/L	2	0.60	6.0	12/13/10
Barium	7440-39-3	LA-505-412	D	31.8		ug/L	2	0.40	4.0	12/13/10
Beryllium	7440-41-7	LA-505-412	UD	<0.10		ug/L	2	0.10	1.0	12/13/10
Cadmium	7440-43-9	LA-505-412	UD	<0.20		ug/L	2	0.20	2.0	12/13/10
Chromium	7440-47-3	LA-505-412	BD	3.78		ug/L	2	1.0	10	12/13/10
Cobalt	7440-48-4	LA-505-412	BD	0.104		ug/L	2	0.10	0.50	12/13/10
Copper	7440-50-8	LA-505-412	BD	1.23		ug/L	2	0.20	2.0	12/13/10
Vanadium	7440-62-2	LA-505-412	D	4.77		ug/L	2	0.40	4.0	12/13/10
Zinc	7440-66-6	LA-505-412	BD	6.06		ug/L	2	1.6	10	12/13/10
Lead	7439-92-1	LA-505-412	BD	0.664		ug/L	2	0.20	2.0	12/13/10

MDL = Minimum Detection
RQ = Result Qualifier
TP Err = Total Propagated
DF = Dilution Factor
+ - Indicates more than nine qualifier

B - Analyte < the PQL(or EQL)but >= the IDL/MDL(Inorganic)
C - Analyte was found in the Associated Blank. (Inorganic)
D - Analyte was reported at a secondary diltution factor.
E - Analyte is an estimate, see comment section.
N - MS and/or MSD recovery outside control limits.

U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.
PQL is equivalent to Estimated Quantitation Limit (EQL)

LS
2-21-2011

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Attachment 2
Narrative
WSCF103223

Introduction

Three (3) S&GRP samples were received at the WSCF Laboratory on December 5, 2010. 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 not stamped "ICED" by the WSCF Laboratory Sample Custodian during sample receiving. However, based on procedure LO-090-403 form "NOTICE OF IMPROPER SAMPLE SUBMITTAL" was not submitted and was not stamped "NOT ICED". No anomaly was noted during sample receipt.

The following generic data qualifiers (i.e., B, D, U 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 wet chemical 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.
- **U** – Analyzed for but not detected above limiting criteria. Relative Percent Difference (RPD) values associated with an analyte qualified with a "U" are not applicable.

Analytical Methodology for Requested Analyses

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

Inorganic Comments

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

- Batch QC 170685 analyzed on sample# B29FM2 (103223001)

All applicable QC controls are within the established limits.

Attachment 2
Narrative
WSCF103223

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. Analytical Note(s):

- Batch QC 170950 analyzed on sample# B27X48 (103155002)

All applicable QC controls are within the established limits.

Organic Comments

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. Analytical Note(s):

- Batch QC 170835 analyzed on sample# B281C8 (103218016)
  - Due to the co-elution of analytes for TPHD-WA (DRO) and kerosene analysis, samples are spiked and evaluated for TPHD only.

All applicable 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 Tritium), Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- Tracers are used to determine chemical yield. RPD is monitored in sample duplicate and is not required for tracer recovery per SOW.
- Tritium:
  - Batch QC 171067 analyzed on sample# B284R7 (103238003)

All applicable QC controls are within the established limits.

- Strontium-89/90:
  - Batch QC 172476 analyzed on sample# B286K3 (103309006)

All applicable 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 electronic signatures shown on the WSCF ANALYTICAL RESULTS REPORT.

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-012-047	PAGE 1 OF 1
COLLECTOR: KB Hulse	COMPANY CONTACT: RADLOFF, AW	TELEPHONE NO.: 376-4554	PROJECT COORDINATOR: RADLOFF, AW	PRICE CODE: 7N	DATA TURNAROUND: 45 Days / 45 Days
SAMPLING LOCATION: N Transect 2	PROJECT DESIGNATION: 100-N Up-Welling - Pore Water Sampling		SAF NO.: F11-012	AIR QUALITY: ☐	
ICE CHEST NO.: GWS-189-01	FIELD LOGBOOK NO.: HNF-N-507-11	ACTUAL SAMPLE DEPTH: N/A	COA: 3001088510	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)

13223

SPECIAL HANDLING AND/OR STORAGE: This sample has been subsampled from the bulk sample B29C48

PRESERVATION	Cool-4C
HOLDING TIME	24 Hours
TYPE OF CONTAINER	aG
NO. OF CONTAINER(S)	1
VOLUME	125mL
SAMPLE ANALYSIS	Chromium Hex - 7196; (F)

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B29FM2	WATER	12-4-10	1040	X

ORIGINAL

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM: KB Hulse	DATE/TIME: 12-5-10 0915	RECEIVED BY/STORED IN: [signature]	DATE/TIME: 12/5/10 0915
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

** Field NCOs are to filter the Hexavalent Chromium sample in the field prior to shipment to the laboratory.

** Sample date and time recorded on COCs and labels reflect date and time bulk sample was collected.

** The CACN for WSCF Analytical is currently being determined. Once the CACN is established it will be distributed for use by the laboratory.

** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.

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

A-6003-618 (REV 2)

Sample Receipt

Chain of Custody

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-012-062	PAGE 1 OF 1
COLLECTOR: KB Hulse	COMPANY CONTACT: RADLOFF, AW	TELEPHONE NO.: 376-4554	PROJECT COORDINATOR: RADLOFF, AW	PRICE CODE: 7N	DATA TURNAROUND: 45 Days / 45 Days
SAMPLING LOCATION: N Transect 2	PROJECT DESIGNATION: 100-N Up-Welling - Pore Water Sampling		SAF NO.: F11-012	AIR QUALITY: ☐	
ICE CHEST NO.: GWS-188-01	FIELD LOGBOOK NO.: HNF-N-507-11	ACTUAL SAMPLE DEPTH: N/A	COA: 300108E10	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: Waste Sampling & Characterization	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*	POSSIBLE SAMPLE HAZARDS/ REMARKS		
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	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)	PRESERVATION	HNO_3 to pH <2
		HOLDING TIME	6 Months
		TYPE OF CONTAINER	G/P
		NO. OF CONTAINER(S)	1
		VOLUME	0mL
	SPECIAL HANDLING AND/OR STORAGE: This sample has been subsampled from the bulk sample B29C48	SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS (F)

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B29J48	W WATER	12-4-10	1040	X

☐ ORIGINAL

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM: KB Hulse	DATE/TIME: 12-5-10 0725	RECEIVED BY/STORED IN: [illegible]	DATE/TIME: 12/5/10 0725	** Field NCOs are to filter this ICP/MS - 200.8 (100 Area RI/FS) sample in the field prior to preservation and shipment to the laboratory.
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	** Sample date and time recorded on COCs and labels reflect date and time bulk sample was collected.
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	** The CACN for WSCF Analytical is currently being determined. Once the CACN is established it will be distributed for use by the laboratory.
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	(1) ICP/MS - 200.8 (100 Area RI/FS); ICP/MS - 200.8 (Add-on 100 Area RI/FS) {Uranium}; 200.8_HG - ICPMS (100 Area RI/FS) {Mercury};
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	

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

A-6003-613 (REV 2)

Sample Receipt

Chain of Custody

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-012-017	PAGE 1 OF 1
COLLECTOR: KB Hulse	COMPANY CONTACT: RADLOFF, AW	TELEPHONE NO.: 376-4554	PROJECT COORDINATOR: RADLOFF, AW	PRICE CODE: 7N	DATA TURNAROUND: 45 Days / 45 Days
SAMPLING LOCATION: N Transect 2	PROJECT DESIGNATION: 100-N Up-Welling - Pore Water Sampling		SAF NO.: F11-012	AIR QUALITY: ☐	
ICE CHEST NO.: GWS-189-01	FIELD LOGBOOK NO.: HNF-N-507-11	ACTUAL SAMPLE DEPTH: N/A	COA: 300108ES10	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: This sample has been subsampled from the bulk sample B29C48

PRESERVATION	HCl to pH <2/Cool=4C	HNO3 to pH <2	Cool=4C	HNO3 to pH <2	None
HOLDING TIME	14/40 Days	6 Months	24 Hours	6 Months	6 Months
TYPE OF CONTAINER	aG	G/P	aG	G/P	G
NO. OF CONTAINER(S)	1	1	1	1	1
VOLUME	1L	60mL	125mL	1L	125mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	Chromium Hex - 7196;	Strontium-89,90 - Total Sr;	Tritium - Ion Ex.

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME					
B29C63	WATER	12-4-10	1040	X	X	X	X	X

ORIGINAL

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM: KB Hulse	DATE/TIME: 12-5-10 0705	RECEIVED BY/STORED IN: [signature]	DATE/TIME: 12/5/10 0925	** Sample date and time recorded on COCs and labels reflect date and time bulk sample was collected.
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	** The CACN for WSCF Analytical is currently being determined. Once the CACN is established it will be distributed for use by the laboratory.
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	(1) TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range};
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	(2) ICP/MS - 200.8 (100 Area RI/FS); ICP/MS - 200.8 (Add-on 100 Area RI/FS) {Uranium}; 200.8_HG - ICPMS (100 Area RI/FS) {Mercury};
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	

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

A-6003-618 (REV 2)

Attachment 2
Narrative
WSCF103314

Introduction

Samples were received at the WSCF laboratory as referenced on the WSCF SAF Number Cross Reference table included in the final report. 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 not stamped "ICED" by the WSCF Laboratory Sample Custodian during sample receiving. However, based on procedure LO-090-403 form "NOTICE OF IMPROPER SAMPLE SUBMITTAL" was not submitted and was not stamped "NOT ICED". No anomaly was noted during sample receipt.

The following generic data qualifiers (i.e., B, D, U 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 wet chemical 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.
- **U** – Analyzed for but not detected above limiting criteria. Relative Percent Difference (RPD) values associated with an analyte qualified with a "U" are not applicable.

Analytical Methodology for Requested Analyses

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

Inorganic Comments

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

- All applicable QC controls are within the established limits.

Attachment 2
Narrative
WSCF103314

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. Analytical Note(s):

- All applicable QC controls are within the established limits.

Organic Comments

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. Analytical Note(s):

- Due to the co-elution of analytes for TPHD-WA (DRO) and kerosene analysis, samples are spiked and evaluated for TPHD only.
  - All applicable 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 Tritium), Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

Tracers are used to determine chemical yield. RPD is monitored in sample duplicate and is not required for tracer recovery per SOW.

- Strontium-89/90:
  - All applicable QC controls are within the established limits.
- Tritium:
  - The LCS recovery was low, but within the 70 – 130% range allowed in the SOW.
    - All other applicable 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 electronic signatures shown on the WSCF ANALYTICAL RESULTS REPORT.

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-012-056	PAGE 1 OF 1
COLLECTOR: Scales	COMPANY CONTACT: RADLOFF, AW	TELEPHONE NO.: 376-4554	PROJECT COORDINATOR: RADLOFF, AW	PRICE CODE: 7N	DATA TURNAROUND: 45 Days / 45 Days
SAMPLING LOCATION: N Transect 10	PROJECT DESIGNATION: 100-N Up-Welling - Pore Water Sampling		SAF NO.: F11-012	AIR QUALITY: ☐	
ICE CHEST NO.	FIELD LOGBOOK NO.: HNFN-507-11	ACTUAL SAMPLE DEPTH: N/A	COA: 300108ES10	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)

103314

SPECIAL HANDLING AND/OR STORAGE: This sample has been subsampled from the bulk sample B29C57

F10-012-011

PRESERVATION	Cool~4C
HOLDING TIME	24 Hours
TYPE OF CONTAINER	aG
NO. OF CONTAINER(S)	1
VOLUME	125mL
SAMPLE ANALYSIS	Chromium Hex - 7196; (F)

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B29FN1 1	WATER	12-9-10	1245	X

ORIGINAL

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM: T Scales	DATE/TIME: 12-10-10 08:55	RECEIVED BY/STORED IN: K Breazeale	DATE/TIME: 12/10/10 08:55
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

** Field NCOs are to filter the Hexavalent Chromium sample in the field prior to shipment to the laboratory.

** Sample date and time recorded on COCs and labels reflect date and time bulk sample was collected.

** The CACN for WSCF Analytical is currently being determined. Once the CACN is established it will be distributed for use by the laboratory.

** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.

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

A-6003-618 (REV 2)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-012-071	PAGE 1 OF 1
COLLECTOR: Scales	COMPANY CONTACT: RADLOFF, AW	TELEPHONE NO.: 376-4554	PROJECT COORDINATOR: RADLOFF, AW	PRICE CODE: 7N	DATA TURNAROUND: 45 Days / 45 Days
SAMPLING LOCATION: N Transect 10	PROJECT DESIGNATION: 100-N Up-Welling - Pore Water Sampling		SAF NO.: F11-012	AIR QUALITY: ☐	
ICE CHEST NO.	FIELD LOGBOOK NO.: HNF-N-507-11	ACTUAL SAMPLE DEPTH: N/A	COA: 300108ES10	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
This sample has been subsampled from the bulk sample B29C57
F10-012-011

PRESERVATION	HNO3 to pH <2
HOLDING TIME	6 Months
TYPE OF CONTAINER	G/P
NO. OF CONTAINER(S)	1
VOLUME	60mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS (F)

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B29J57	2 WATER	12-9-10	1245	X

ORIGINAL

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM: J Scales	DATE/TIME: 12-10-10 08:55	RECEIVED BY/STORED IN: Brazale A Baza	DATE/TIME: 12/10/10 8:55
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

** Field NCOs are to filter this ICP/MS - 200.8 (100 Area RI/FS) sample in the field prior to preservation and shipment to the laboratory.

** Sample date and time recorded on COCs and labels reflect date and time bulk sample was collected.

** The CACN for WSCF Analytical is currently being determined. Once the CACN is established it will be distributed for use by the laboratory.
** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
(1) ICP/MS - 200.8 (100 Area RI/FS); ICP/MS - 200.8 (Add-on 100 Area RI/FS) {Uranium}; 200.8_HG - ICPMS (100 Area RI/FS) {Mercury};

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

A-6003-618 (REV 2)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-012-026	PAGE 1 OF 1
COLLECTOR: Scales	COMPANY CONTACT: RADLOFF, AW	TELEPHONE NO.: 376-4554	PROJECT COORDINATOR: RADLOFF, AW	PRICE CODE 7N	DATA TURNAROUND
SAMPLING LOCATION: N Transect 10	PROJECT DESIGNATION: 100-N Up-Welling - Pore Water Sampling		SAF NO.: F11-012	AIR QUALITY ☐	45 Days / 45 Days
ICE CHEST NO.	FIELD LOGBOOK NO.: HNF-N-507-11	ACTUAL SAMPLE DEPTH: N/A	COA: 300108ES10	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: This sample has been subsampled from the bulk sample B29C57 F11-012-011

PRESERVATION	HCl to pH <2/Cool~4C	HNO3 to pH <2	Cool~4C	HNO3 to pH <2	None
HOLDING TIME	14/40 Days	6 Months	24 Hours	6 Months	6 Months
TYPE OF CONTAINER	aG	G/P	aG	G/P	G
NO. OF CONTAINER(S)	4	1	1	1	1
VOLUME	1L	60mL	125mL	1L	125mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	Chromium Hex - 7199;	Strontium-89,90 – Total Sr;	Tritium - Ion Ex;

SAMPLE NO.		MATRIX*	SAMPLE DATE	SAMPLE TIME					
B29C72	3	WATER	12-9-10	1245	X	X	X	X	X

FINAL

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
J Scales	12-10-10 08:55	K. Breuzeale	12/10/10 08:55
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

** Sample date and time recorded on COCs and labels reflect date and time bulk sample was collected.

** The CACN for WSCF Analytical is currently being determined. Once the CACN is established it will be distributed for use by the laboratory.

** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.

(1) TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range};

(2) ICP/MS - 200.8 (100 Area RI/FS); ICP/MS - 200.8 (Add-on 100 Area RI/FS) {Uranium}; 200.8_HG - ICPMS (100 Area RI/FS) {Mercury};

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

A-6003-618 (REV 2)

Appendix 5

Data Validation Supporting Documentation

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100 RI/FS			DATA PACKAGE: VSR11-024		
VALIDATOR: Carl Schloesslin		LAB: WSCF		DATE: 2-21-2011	
			SDG: WSCF103223, WSCF103314		
ANALYSES PERFORMED					
Anions/IC	TOC	TOX	TPH-418.1	Oil and Grease	Alkalinity
Ammonia	BOD/COD	Chloride	Chromium-VI X	pH	NO_3/NO_2
Sulfate	TDS	TKN	Phosphate	Cyanide	

SAMPLES/MATRIX Water samples

SDG WSCF103223: B29FM2, B29C63
SDG WSCF103314: B29FN1, B29C72

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:

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

Spike 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: None

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

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

Quality Control Report

Attention Michael Neely
Department Inorganic

Group # WSCF103223

QC Batch 170685
Associated Samples 103223001, 103223003

Test Hexavalent chromium Discrete Analyzer

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #43233**							
Hexavalent chromium	18540-29-9		<0.0020	mg/L					U	12/05/10
LCS			**QC Sample #43235**							
Hexavalent chromium	18540-29-9		0.0496	mg/L	99.2	90 - 110				12/05/10
DUP			**QC Sample #43236**							
			Original 103223001							
Hexavalent chromium	18540-29-9	<0.0020	<0.0020	mg/L			0.00	20	U	12/05/10
MS			**QC Sample #43237**							
			Original 103223001							
Hexavalent chromium	18540-29-9	<0.0020	0.0367	mg/L	91.8	85 - 115				12/05/10

Quality Control Report

Attention Michael Neely
Department Inorganic

Group # WSCF103314

QC Batch 170938
Associated Samples 103314001, 103314003

Test Hexavalent chromium Discrete Analyzer

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #43799**							
Hexavalent chromium	18540-29-9		<0.0020	mg/L					U	12/10/10
LCS			**QC Sample #43801**							
Hexavalent chromium	18540-29-9		0.0499	mg/L	99.8	90 - 110				12/10/10
DUP			**QC Sample #43802**							
			Original 103314001							
Hexavalent chromium	18540-29-9	<0.0020	<0.0020	mg/L			15.40	20	U	12/10/10
MS			**QC Sample #43803**							
			Original 103314001							
Hexavalent chromium	18540-29-9	<0.0020	0.0447	mg/L	111.8	85 - 115				12/10/10

Date: 21 February 2011
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: 100 RI/FS
Subject: Radiochemical - Sample Data Groups (SDGs) WSCF103223 and WSCF103314

INTRODUCTION

This memorandum presents the results of data validation for SDGs WSCF103223 and WSCF103314 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
B29C63	12/04/2010	Water	C	Sr-89/90 & Tritium
B29C72	12/09/2010	Water	C	Sr-89/90 & Tritium

Data validation was conducted in accordance with the CHPRC validation statement of work and the Sampling and Analysis Plan for the 100-NR-2 Operable Unit River Pore Water Investigation, DOE/RL-2010-69, Rev. 0 (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. Sample preservation for Sr-89/90 analysis requires acid preservation with nitric acid to pH <2.

The samples were 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 validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **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 70% to 130%. The matrix spike sample accuracy limits are ones specified by the DV procedure.

Matrix Spike (MS) Samples

All MS recoveries were acceptable.

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 ±30%. When duplicate RPDs exceed the limits and have associated results <5X the MDCs the precision limits are ones specified by the DV procedure.

Laboratory Duplicate Samples

All laboratory duplicate results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

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

All reported sample MDCs with associated non-detected sample results were below the CRDLs.

- **Completeness**

SDGs WSCF103223 and WSCF103314 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

None found.

REFERENCES

GRP-GD-002, Rev. 0, Change 0, *Data Validation for Radiochemical Analyses*, August 2010.

DOE/RL-2010-69, Rev. 0, *Sampling and Analysis Plan for the 100-NR-2 Operable Unit River Pore Water Investigation*, November 2010.

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.

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

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias 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: WSCF103223 & WSCF103314	Reviewer: AQA	Project: 100 RI/FS	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Radiochemical	None	N/A	N/A

Comments: None

Appendix 3

Annotated Laboratory Reports

WSCF Analytical Results Report

Attention Michael Neely
Department Radiochemistry

Group # WSCF103223

Sample # 103223003
SAF# F11-012
Sample ID B29C63

Matrix WATER
Sampled 12/04/10
Received 12/05/10

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
H3 EICHROM										**12/14/10**
TRI-CARB LSC										
Tritium	10028-17-8	LA-508-421		260	530	pCi/L	1	210		12/18/10
SR-89/90										**12/30/10**
SR-89/90										
Strontium-89/90	SR-RAD	LA-220-406	U	-2.6	2.4	pCi/L	1	1.6		01/05/11

MDL = Minimum Detection
RQ = Result Qualifier
TP Err = Total Propagated
DF = Dilution Factor
+ - Indicates more than nine qualifier

B - Analyte was detected in both the BLANK and SAMPLE
U - Analyzed for but not detected above limiting criteria.
N - Spike Recovery is Outside Control Limits.
X,Y or Z - See comment detail and/or narrative.

WSCF Analytical Results Report

Attention Michael Neely
Department Radiochemistry

Group # WSCF103314

Sample # 103314003
SAF# F11-012
Sample ID B29C72

Matrix WATER
Sampled 12/09/10
Received 12/10/10

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
H3 EICHROM										**12/15/10**
TRI-CARB LSC										
Tritium	10028-17-8	LA-508-421		4000	840	pCi/L	1	230		12/15/10
SR-89/90										**01/06/11**
SR-89/90										
Strontium-89/90	SR-RAD	LA-220-406		18	3.7	pCi/L	1	2.1		01/13/11

MDL = Minimum Detection
RQ = Result Qualifier
TP Err = Total Propagated
DF = Dilution Factor
+ - Indicates more than nine qualifier

B - Analyte was detected in both the BLANK and SAMPLE
U - Analyzed for but not detected above limiting criteria.
N - Spike Recovery is Outside Control Limits.
X,Y or Z - See comment detail and/or narrative.

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Attachment 2
Narrative
WSCF103223

Introduction

Three (3) S&GRP samples were received at the WSCF Laboratory on December 5, 2010. 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 not stamped "ICED" by the WSCF Laboratory Sample Custodian during sample receiving. However, based on procedure LO-090-403 form "NOTICE OF IMPROPER SAMPLE SUBMITTAL" was not submitted and was not stamped "NOT ICED". No anomaly was noted during sample receipt.

The following generic data qualifiers (i.e., B, D, U 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 wet chemical 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.
- **U** – Analyzed for but not detected above limiting criteria. Relative Percent Difference (RPD) values associated with an analyte qualified with a "U" are not applicable.

Analytical Methodology for Requested Analyses

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

Inorganic Comments

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

- Batch QC 170685 analyzed on sample# B29FM2 (103223001)

All applicable QC controls are within the established limits.

Attachment 2
Narrative
WSCF103223

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. Analytical Note(s):

- Batch QC 170950 analyzed on sample# B27X48 (103155002)

All applicable QC controls are within the established limits.

Organic Comments

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. Analytical Note(s):

- Batch QC 170835 analyzed on sample# B281C8 (103218016)
  - Due to the co-elution of analytes for TPHD-WA (DRO) and kerosene analysis, samples are spiked and evaluated for TPHD only.

All applicable 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 Tritium), Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- Tracers are used to determine chemical yield. RPD is monitored in sample duplicate and is not required for tracer recovery per SOW.
- Tritium:
  - Batch QC 171067 analyzed on sample# B284R7 (103238003)

All applicable QC controls are within the established limits.

- Strontium-89/90:
  - Batch QC 172476 analyzed on sample# B286K3 (103309006)

All applicable 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 electronic signatures shown on the WSCF ANALYTICAL RESULTS REPORT.

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-012-047	PAGE 1 OF 1
COLLECTOR: KB Hulse	COMPANY CONTACT: RADLOFF, AW	TELEPHONE NO.: 376-4554	PROJECT COORDINATOR: RADLOFF, AW	PRICE CODE: 7N	DATA TURNAROUND: 45 Days / 45 Days
SAMPLING LOCATION: N Transect 2	PROJECT DESIGNATION: 100-N Up-Welling - Pore Water Sampling		SAF NO.: F11-012	AIR QUALITY: ☐	
ICE CHEST NO.: GWS-189-01	FIELD LOGBOOK NO.: HNF-N-507-11	ACTUAL SAMPLE DEPTH: N/A	COA: 300108E510	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)

13223

SPECIAL HANDLING AND/OR STORAGE: This sample has been subsampled from the bulk sample B29C48

PRESERVATION	Cool-4C
HOLDING TIME	24 Hours
TYPE OF CONTAINER	aG
NO. OF CONTAINER(S)	1
VOLUME	125mL
SAMPLE ANALYSIS	Chromium Hex - 7196; (F)

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B29FM2 1	WATER	12-4-10	1040	X

ORIGINAL

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM: KB Hulse	DATE/TIME: 12-5-10 0915	RECEIVED BY/STORED IN: [signature]	DATE/TIME: 12/5/10 0915
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

** Field NCOs are to filter the Hexavalent Chromium sample in the field prior to shipment to the laboratory.

** Sample date and time recorded on COCs and labels reflect date and time bulk sample was collected.

** The CACN for WSCF Analytical is currently being determined. Once the CACN is established it will be distributed for use by the laboratory.

** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.

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

A-6003-618 (REV 2)

Sample Receipt

Chain of Custody

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-012-062	PAGE 1 OF 1
COLLECTOR: KB Hulse	COMPANY CONTACT: RADLOFF, AW	TELEPHONE NO.: 376-4554	PROJECT COORDINATOR: RADLOFF, AW	PRICE CODE: 7N	DATA TURNAROUND: 45 Days / 45 Days
SAMPLING LOCATION: N Transect 2	PROJECT DESIGNATION: 100-N Up-Welling - Pore Water Sampling		SAF NO.: F11-012	AIR QUALITY: ☐	
ICE CHEST NO.: GWS-188-01	FIELD LOGBOOK NO.: HNF-N-507-11	ACTUAL SAMPLE DEPTH: N/A	COA: 300108E10	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: Waste Sampling & Characterization	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

MATRIX*	POSSIBLE SAMPLE HAZARDS/ REMARKS		
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	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)	PRESERVATION	HNO_3 to pH <2
		HOLDING TIME	6 Months
		TYPE OF CONTAINER	G/P
		NO. OF CONTAINER(S)	1
		VOLUME	60mL
	SPECIAL HANDLING AND/OR STORAGE: This sample has been subsampled from the bulk sample B29C48	SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS (F)

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B29J48	W WATER	12-4-10	1040	X

☐ ORIGINAL

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM: KB Hulse	DATE/TIME: 12-5-10 0725	RECEIVED BY/STORED IN: [illegible]	DATE/TIME: 12/5/10 0725	** Field NCOs are to filter this ICP/MS - 200.8 (100 Area RI/FS) sample in the field prior to preservation and shipment to the laboratory.
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	** Sample date and time recorded on COCs and labels reflect date and time bulk sample was collected.
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	** The CACN for WSCF Analytical is currently being determined. Once the CACN is established it will be distributed for use by the laboratory.
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	(1) ICP/MS - 200.8 (100 Area RI/FS); ICP/MS - 200.8 (Add-on 100 Area RI/FS) {Uranium}; 200.8_HG - ICPMS (100 Area RI/FS) {Mercury};
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	

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

A-6003-613 (REV 2)

Monday, December 06, 2010 6:26:47 AM
Page 3 of 4
ChemWare

Sample Receipt

Chain of Custody

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-012-017	PAGE 1 OF 1
COLLECTOR: KB Hulse	COMPANY CONTACT: RADLOFF, AW	TELEPHONE NO.: 376-4554	PROJECT COORDINATOR: RADLOFF, AW	PRICE CODE: 7N	DATA TURNAROUND: 45 Days / 45 Days
SAMPLING LOCATION: N Transect 2	PROJECT DESIGNATION: 100-N Up-Welling - Pore Water Sampling		SAF NO.: F11-012	AIR QUALITY: ☐	
ICE CHEST NO.: GWS-189-01	FIELD LOGBOOK NO.: HNF-N-507-11	ACTUAL SAMPLE DEPTH: N/A	COA: 300108ES10	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: This sample has been subsampled from the bulk sample B29C48

PRESERVATION	HCl to pH <2/Cool=4C	HNO3 to pH <2	Cool=4C	HNO3 to pH <2	None
HOLDING TIME	14/40 Days	6 Months	24 Hours	6 Months	6 Months
TYPE OF CONTAINER	aG	G/P	aG	G/P	G
NO. OF CONTAINER(S)	1	1	1	1	1
VOLUME	1L	60mL	125mL	1L	125mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	Chromium Hex - 7196;	Strontium-89,90 - Total Sr;	Tritium - Ion Ex.

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME					
B29C63	WATER	12-4-10	1040	X	X	X	X	X

ORIGINAL

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM: KB Hulse	DATE/TIME: 12-5-10 0705	RECEIVED BY/STORED IN: [signature]	DATE/TIME: 12/5/10 0725
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

** Sample date and time recorded on COCs and labels reflect date and time bulk sample was collected.

** The CACN for WSCF Analytical is currently being determined. Once the CACN is established it will be distributed for use by the laboratory.

** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.

(1) TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range};

(2) ICP/MS - 200.8 (100 Area RI/FS); ICP/MS - 200.8 (Add-on 100 Area RI/FS) {Uranium}; 200.8_HG - ICPMS (100 Area RI/FS) {Mercury};

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

A-6003-618 (REV 2)

Attachment 2
Narrative
WSCF103314

Introduction

Samples were received at the WSCF laboratory as referenced on the WSCF SAF Number Cross Reference table included in the final report. 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 not stamped "ICED" by the WSCF Laboratory Sample Custodian during sample receiving. However, based on procedure LO-090-403 form "NOTICE OF IMPROPER SAMPLE SUBMITTAL" was not submitted and was not stamped "NOT ICED". No anomaly was noted during sample receipt.

The following generic data qualifiers (i.e., B, D, U 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 wet chemical 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.
- **U** – Analyzed for but not detected above limiting criteria. Relative Percent Difference (RPD) values associated with an analyte qualified with a "U" are not applicable.

Analytical Methodology for Requested Analyses

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

Inorganic Comments

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

- All applicable QC controls are within the established limits.

Attachment 2
Narrative
WSCF103314

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. Analytical Note(s):

- All applicable QC controls are within the established limits.

Organic Comments

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. Analytical Note(s):

- Due to the co-elution of analytes for TPHD-WA (DRO) and kerosene analysis, samples are spiked and evaluated for TPHD only.
  - All applicable 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 Tritium), Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

Tracers are used to determine chemical yield. RPD is monitored in sample duplicate and is not required for tracer recovery per SOW.

- Strontium-89/90:
  - All applicable QC controls are within the established limits.
- Tritium:
  - The LCS recovery was low, but within the 70 – 130% range allowed in the SOW.
    - All other applicable 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 electronic signatures shown on the WSCF ANALYTICAL RESULTS REPORT.

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-012-056	PAGE 1 OF 1
COLLECTOR: Scales	COMPANY CONTACT: RADLOFF, AW	TELEPHONE NO.: 376-4554	PROJECT COORDINATOR: RADLOFF, AW	PRICE CODE: 7N	DATA TURNAROUND: 45 Days / 45 Days
SAMPLING LOCATION: N Transect 10	PROJECT DESIGNATION: 100-N Up-Welling - Pore Water Sampling		SAF NO.: F11-012	AIR QUALITY: ☐	
ICE CHEST NO.	FIELD LOGBOOK NO.: HNFN-507-11	ACTUAL SAMPLE DEPTH: N/A	COA: 300108ES10	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)

103314

SPECIAL HANDLING AND/OR STORAGE: This sample has been subsampled from the bulk sample B29C57

F10-012-011

PRESERVATION	Cool~4C
HOLDING TIME	24 Hours
TYPE OF CONTAINER	aG
NO. OF CONTAINER(S)	1
VOLUME	125mL
SAMPLE ANALYSIS	Chromium Hex - 7196; (F)

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B29FN1 1	WATER	12-9-10	1245	X

ORIGINAL

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM: T Scales	DATE/TIME: 12-10-10 08:55	RECEIVED BY/STORED IN: K Breazeale	DATE/TIME: 12/10/10 08:55
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

** Field NCOs are to filter the Hexavalent Chromium sample in the field prior to shipment to the laboratory.

** Sample date and time recorded on COCs and labels reflect date and time bulk sample was collected.

** The CACN for WSCF Analytical is currently being determined. Once the CACN is established it will be distributed for use by the laboratory.

** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.

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

A-6003-618 (REV 2)

Chain of Custody

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-012-071	PAGE 1 OF 1
COLLECTOR: Scales	COMPANY CONTACT: RADLOFF, AW	TELEPHONE NO.: 376-4554	PROJECT COORDINATOR: RADLOFF, AW	PRICE CODE: 7N	DATA TURNAROUND: 45 Days / 45 Days
SAMPLING LOCATION: N Transect 10	PROJECT DESIGNATION: 100-N Up-Welling - Pore Water Sampling		SAF NO.: F11-012	AIR QUALITY: ☐	
ICE CHEST NO.	FIELD LOGBOOK NO.: HNF-N-507-11	ACTUAL SAMPLE DEPTH: N/A	COA: 300108ES10	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
This sample has been subsampled from the bulk sample B29C57
F10-012-011

PRESERVATION	HNO3 to pH <2
HOLDING TIME	6 Months
TYPE OF CONTAINER	G/P
NO. OF CONTAINER(S)	1
VOLUME	60mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS (F)

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B29J57	2 WATER	12-9-10	1245	X

☐ ORIGINAL

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM: J Scales	DATE/TIME: 12-10-10 08:55	RECEIVED BY/STORED IN: Brazale A Baza	DATE/TIME: 12/10/10 8:55
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

** Field NCOs are to filter this ICP/MS - 200.8 (100 Area RI/FS) sample in the field prior to preservation and shipment to the laboratory.

** Sample date and time recorded on COCs and labels reflect date and time bulk sample was collected.

** The CACN for WSCF Analytical is currently being determined. Once the CACN is established it will be distributed for use by the laboratory.
** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
(1) ICP/MS - 200.8 (100 Area RI/FS); ICP/MS - 200.8 (Add-on 100 Area RI/FS) {Uranium}; 200.8_HG - ICPMS (100 Area RI/FS) {Mercury};

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

A-6003-618 (REV 2)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-012-026	PAGE 1 OF 1
COLLECTOR: Scales	COMPANY CONTACT: RADLOFF, AW	TELEPHONE NO.: 376-4554	PROJECT COORDINATOR: RADLOFF, AW	PRICE CODE: 7N	DATA TURNAROUND: 45 Days / 45 Days
SAMPLING LOCATION: N Transect 10	PROJECT DESIGNATION: 100-N Up-Welling - Pore Water Sampling		SAF NO.: F11-012	AIR QUALITY: ☐	
ICE CHEST NO.	FIELD LOGBOOK NO.: HNF-N-507-11	ACTUAL SAMPLE DEPTH: N/A	COA: 300108ES10	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: This sample has been subsampled from the bulk sample B29C57 F11-012-011

PRESERVATION	HCl to pH <2/Cool~4C	HNO3 to pH <2	Cool~4C	HNO3 to pH <2	None
HOLDING TIME	14/40 Days	6 Months	24 Hours	6 Months	6 Months
TYPE OF CONTAINER	aG	G/P	aG	G/P	G
NO. OF CONTAINER(S)	4	1	1	1	1
VOLUME	1L	60mL	125mL	1L	125mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	Chromium Hex - 7199;	Strontium-89,90 – Total Sr;	Tritium - Ion Ex;

SAMPLE NO.		MATRIX*	SAMPLE DATE	SAMPLE TIME					
B29C72	3	WATER	12-9-10	1245	X	X	X	X	X

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
J Scales	12-10-10 08:55	K. Breuzeale	12/10/10 08:55
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

** Sample date and time recorded on COCs and labels reflect date and time bulk sample was collected.

** The CACN for WSCF Analytical is currently being determined. Once the CACN is established it will be distributed for use by the laboratory.
** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
(1) TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range};
(2) ICP/MS - 200.8 (100 Area RI/FS); ICP/MS - 200.8 (Add-on 100 Area RI/FS) {Uranium}; 200.8_HG - ICPMS (100 Area RI/FS) {Mercury};

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

A-6003-618 (REV 2)

Appendix 5

Data Validation Supporting Documentation

Appendix B - Radiochemical Data Validation Checklist

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: 100 RI/FS			DATA PACKAGE: VSR11-024		
VALIDATOR: Carl Schloesslin		LAB: WSCF		DATE: 2-21-2011	
			SDG: WSCF103223, WSCF103314		
ANALYSES PERFORMED					
Gross Alpha/Beta	Strontium-90 X	Technetium-99	Alpha Spectroscopy	Gamma Spectroscopy	
Total Uranium	Radium-22	Tritium X	C-14	I-129	
SAMPLES/MATRIX Water samples SDG WSCF103223: B29C63 SDG WSCF103314: B29C72					

1. Completeness ..... ☐ N/A

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

Comments: None

2. Initial Calibration (Levels D, E) ..... ☒ N/A

Instruments/detectors calibrated? ..... Yes No N/A

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

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

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

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

Comments:

3. Continuing Calibration (Levels D, E)..... ☒ N/A

Calibration checked within required frequency? ..... Yes No N/A

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

Calibration check standards traceable? ..... Yes No N/A

Calibration check standards expired? ..... Yes No N/A

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

Comments:

4. Background Counts (Levels D, E) ..... ☒ N/A

Background Counts checked within required frequency? ..... Yes No N/A

Background Counts acceptable? ..... Yes No N/A

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

Comments:

5. Blanks (Levels B, C, D, E) ☐ N/A

Method blank analyzed within required frequency? Yes No N/A

Method blank results acceptable? Yes No N/A

Analytes detected in method blank? Yes No N/A

Field blank(s) analyzed? Yes No N/A

Field blank results acceptable? Yes No N/A

Analytes detected in field blank(s)? Yes No N/A

Transcription/Calculation Errors? (Levels D, E) Yes No N/A

Comments: None

6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E) ☐ N/A

LCS /BSS analyzed within required frequency? Yes No N/A

LCS/BSS recoveries acceptable? Yes No N/A

LCS/BSS traceable? (Levels D,E) Yes No N/A

LCS/BSS expired? (Levels D,E) Yes No N/A

LCS/BSS levels correct? (Levels D,E) Yes No N/A

Transcription/Calculation Errors? (Levels D, E) Yes No N/A

Comments: None

7. Chemical Carrier Recovery (Levels C, D, E) ..... ☐ N/A

Chemical carrier added? ..... Yes No (N/A)

Chemical recovery acceptable? ..... Yes No (N/A)

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

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

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

Comments: None

8. Tracer Recovery (Levels C, D, E) ..... ☐ N/A

Tracer added? ..... (Yes) No N/A

Tracer recovery acceptable? ..... (Yes) No N/A

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

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

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

Comments: 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: None

10. Duplicates (Levels C, D, E) ..... ☐ N/A

Duplicates Analyzed at required frequency? ..... (Yes) No N/A

RPD Values Acceptable?..... (Yes) No N/A

Transcription/Calculation Errors? (Levels D, E)..... Yes No (N/A)

Comments: None

11. Field QC Samples (Levels C, D E) ..... ☐ N/A

Field duplicate sample(s) analyzed? ..... Yes No (N/A)

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

Field split sample(s) analyzed? ..... Yes No (N/A)

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

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

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

Comments: None

12. Holding Times (All levels)

Are sample holding times acceptable? ..... (Yes) No N/A

Comments: None

13. Results and Detection Limits (All Levels) ..... ☐ N/A

Results reported for all required sample analyses? ..... (Yes) No N/A

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

Results Acceptable? (Levels D, E) ..... Yes No (N/A)

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

MDA's meet required detection limits? ..... (Yes) No N/A

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

Comments: None

Appendix 6

Additional Documentation Requested By Client

Quality Control Report

Attention Michael Neely
Department Radiochemistry

Group # WSCF103223

QC Batch 171067
Associated Samples 103223003

Test Tritium by LSC

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit		RQ	Analyzed
BLANK			**QC Sample #43916**								
Tritium	10028-17-8		-3.2	pCi/L						U	12/18/10
LCS			**QC Sample #43917**								
Tritium	10028-17-8		2900	pCi/L	91.8	80 - 120					12/18/10
DUP			**QC Sample #43918**								
			Original 103238003								
Tritium	10028-17-8		-75	pCi/L			-88.50	20	*	U	12/18/10
MS			**QC Sample #43919**								
			Original 103238003								
Tritium	10028-17-8		18000	pCi/L	85.5	75 - 125					12/18/10

Quality Control Report

Attention Michael Neely
Department Radiochemistry

Group # WSCF103223

QC Batch 172476
Associated Samples 103223003

Test Strontium 89/90 (GPC/GEA)

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit		RQ	Analyzed
BLANK			**QC Sample #44224**								
Strontium-89/90	SR-RAD		-0.17	pCi/L						U	01/05/11
LCS			**QC Sample #44225**								
Strontium-89/90	SR-RAD		87	pCi/L	93.2	80 - 120					01/05/11
DUP			**QC Sample #44226**								
			Original 103309006								
Strontium-89/90	SR-RAD		-5.8	pCi/L			-46.80	20	*	U	01/05/11

Quality Control Report

Attention Michael Neely
Department Radiochemistry

Group # WSCF103223

QC Batch 172476
Associated Samples 103223003

Test Strontium 89/90 (GPC/GEA)

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
SAMPLE			**Sample #103223003**							
Strontium-85	13967-73-2				89.5	25 - 105				01/05/11
BLANK			**QC Sample #44224**							
Strontium-85	13967-73-2				77.8	25 - 105				01/05/11
LCS			**QC Sample #44225**							
Strontium-85	13967-73-2				87.3	25 - 105				01/05/11
DUP			**QC Sample #44226**							
			Original	**103309006**						
Strontium-85	13967-73-2				97.1	25 - 105	18.20			01/05/11

Quality Control Report

Attention Michael Neely
Department Radiochemistry

Group # WSCF103314

QC Batch 171077
Associated Samples 103314003

Test Tritium by LSC

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #43924**							
Tritium	10028-17-8		-550	pCi/L					U	12/15/10
LCS			**QC Sample #43925**							
Tritium	10028-17-8		2500	pCi/L	79	80 - 120			X	12/15/10
DUP			**QC Sample #43926**							
			Original 103338003							
Tritium	10028-17-8		1900	pCi/L			5.40	20		12/15/10
MS			**QC Sample #43927**							
			Original 103338003							
Tritium	10028-17-8		18000	pCi/L	87.7	75 - 125				12/15/10

Quality Control Report

Attention Michael Neely
Department Radiochemistry

Group # WSCF103314

QC Batch 173007
Associated Samples 103314003

Test Strontium 89/90 (GPC/GEA)

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit		RQ	Analyzed
BLANK			**QC Sample #45128**								
Strontium-89/90	SR-RAD		-1.6	pCi/L						U	01/13/11
LCS			**QC Sample #45129**								
Strontium-89/90	SR-RAD		92	pCi/L	98.9	80 - 120					01/13/11
DUP			**QC Sample #45130**								
			Original 103427004								
Strontium-89/90	SR-RAD		-0.34	pCi/L			456.60	20	*	U	01/13/11

Quality Control Report

Attention Michael Neely
Department Radiochemistry

Group # WSCF103314

QC Batch 173007
Associated Samples 103314003

Test Strontium 89/90 (GPC/GEA)

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
SAMPLE			**Sample #103314003**							
Strontium-85	13967-73-2				68	25 - 105				01/13/11
BLANK			**QC Sample #45128**							
Strontium-85	13967-73-2				95.5	25 - 105				01/13/11
LCS			**QC Sample #45129**							
Strontium-85	13967-73-2				94.4	25 - 105				01/13/11
DUP			**QC Sample #45130**							
			Original 103427004							
Strontium-85	13967-73-2				84.9	25 - 105	5.40			01/13/11