CHPRC - REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
08/15/2011	
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
VSR11-053		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) 08/15/2011 Date Author/Originator (print and sign)	Scot Fitzgerald Reviewer/Point of Contact (print and sign) 08/01/2011 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 08/11/2011	2. Review No.
	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
VSR11-053, Data Validation Report for CHPRC - Project Outer Area, Chemical Validation - Level C	S&GRP Sample Data Group (SDG); WSCF112290 and WSCF1112291	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 (Reviewer/Point of Contact (print and sign)); 08/11/2011 Date; Author/Originator (print and sign)	JA Edwards (Reviewer/Point of Contact (print and sign)); 08/11/2011 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
1	There were no issues found in this review	N/A	No additional items found	N	N/A	Closed

Documents:

DOE/RL-2009-60, Rev. 1, *Sampling and Analysis Plan for Selected 200-MG-1 Operable Unit Waste Sites*, January 2011
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.
616 Maxine NE
Albuquerque, NM 87123
505-299-5201
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Data Validation Report for CH2M Hill Plateau Remediation Company

VSR11-053
Project Outer Area

Chemical & Radiochemical Validation - Level C

Validation Performed By: Carl Schlosser **Date:** 8-10-2011

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Date: 10 August 2011
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: Outer Area
Subject: Semivolatile Organics - Sample Data Groups (SDGs) WSCF112290 and WSCF1112291

INTRODUCTION

This memorandum presents the results of data validation for SDGs WSCF112290 and WSCF112291 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
B2BH54	5/19/2011	Water	C	8270D, WTPH-D
B2BH28	5/19/2011	Soil	C	8270D, WTPH-D
B2BH30	5/19/2011	Soil	C	8270D, WTPH-D
B2BH36	5/19/2011	Soil	C	8270D, WTPH-D
B2BH37	5/19/2011	Soil	C	8270D, WTPH-D

Data validation was conducted in accordance with the CHPRC validation statement of work and the Sampling and Analysis Plan for Selected 200-MG-1 Operable Unit Waste Sites, DOE/RL-2009-60, Rev. 1 (SAP). Appendices 1 through 6 provide the following information as indicated below:

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

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for semivolatile organics and WTPH-D in soil are extraction within 14 days of sample collection and analysis within 40 days of sample extraction. The holding time requirements for semivolatile organics and WTP-D in water are extraction within 7 days of sample collection and analysis within 40 days of sample extraction. Sample preservation requires chilling to 4 degrees Celsius. In addition, WTPH-D in water requires 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

All equipment blank results were acceptable.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the soil matrix spike accuracy limits are 70% to 130%. The soil laboratory control sample accuracy limits are the ones specified by the DV procedure. Water accuracy limits were not provided in the SAP and are therefore specified by the DV procedure. The accuracy limits for reported analytes not listed in the SAP are specified by the DV procedure. The 8270D surrogate accuracy limits used for data validation were the statistical ones established by the analytical laboratory. The WTPH-D surrogate accuracy limits were the ones specified by the DV procedure (50% to 150%).

Surrogates

All surrogate recoveries were acceptable.

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

All MS/MSD recoveries were acceptable with the following exceptions.

For WSCF112290, the MS and MSD recoveries for TPH-D were above the upper acceptance limit. The TPH-D and kerosene results for sample B2BH54 were non-detects and should not be qualified.

For WSCF112291, the MS recovery for TPH-D was above the upper acceptance limit. The TPH-D and kerosene results for samples B2BH28, B2BH30, B2BH36 and B2BH37 were non-detects and should not be qualified.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exceptions.

For WSCF112290, the LCS recovery for TPH-D was above the upper acceptance limit. The TPH-D and kerosene results for sample B2BH54 were non-detects and should not be qualified.

For WSCF112291, the LCS recovery for TPH-D was above the upper acceptance limit. The TPH-D and kerosene results for samples B2BH28, B2BH30, B2BH36 and B2BH37 were non-detects and should not be qualified.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ±30%. The 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 reporting limits with differences <1X the water reporting limits or differences <2X the soil reporting limits no precision infraction occurred.

MS/MSD Samples

All MS/MSD relative percent difference values were acceptable.

Field Duplicate Samples

All field duplicate results were acceptable.

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 WSCF112290 and WSCF112291 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-2009-60, Rev. 1, *Sampling and Analysis Plan for Selected 200-MG-1 Operable Unit Waste Sites*, January 2011.

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: WSCF112290 & WSCF112291	Reviewer: AQA	Project: Outer Area	Page 1 of 1
Analyte(s)	**DV Flag**	**Samples Affected**	**Reason**
SVOCs	None	N/A	N/A

Comments: None

Appendix 3

Annotated Laboratory Reports

WSCF Analytical Results Report

Attention Michael Neely
Department Organic, Semivolatiles

Group # WSCF112290

Sample # 112290001
SAF# F11-055
Sample ID B2BH54

Matrix WATER
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
8270 Prep										**05/19/11**
SW-846 8270D										
Naphthalene	91-20-3	LA-523-456	U	<1		ug/L	1	1	4	05/23/11
Acenaphthylene	208-96-8	LA-523-456	U	<1		ug/L	1	1	4	05/23/11
Acenaphthene	83-32-9	LA-523-456	U	<1		ug/L	1	1	4	05/23/11
Fluorene	86-73-7	LA-523-456	U	<1		ug/L	1	1	4	05/23/11
Phenanthrene	85-01-8	LA-523-456	U	<1		ug/L	1	1	4	05/23/11
Anthracene	120-12-7	LA-523-456	U	<1		ug/L	1	1	4	05/23/11
Fluoranthene	206-44-0	LA-523-456	U	<1		ug/L	1	1	4	05/23/11
Pyrene	129-00-0	LA-523-456	U	<1		ug/L	1	1	4	05/23/11
Benzo(a)anthracene	56-55-3	LA-523-456	U	<1		ug/L	1	1	4	05/23/11
Chrysene	218-01-9	LA-523-456	U	<1		ug/L	1	1	4	05/23/11
Benzo(b)fluoranthene	205-99-2	LA-523-456	U	<1		ug/L	1	1	4	05/23/11
Benzo(k)fluoranthene	207-08-9	LA-523-456	U	<1		ug/L	1	1	4	05/23/11
Benzo(a)pyrene	50-32-8	LA-523-456	U	<1		ug/L	1	1	4	05/23/11
Indeno(1,2,3-cd)pyrene	193-39-5	LA-523-456	U	<1		ug/L	1	1	4	05/23/11
Dibenzo(a,h)anthracene	53-70-3	LA-523-456	U	<1		ug/L	1	1	4	05/23/11
Benzo(g,h,i)perylene	191-24-2	LA-523-456	U	<1		ug/L	1	1	4	05/23/11
Prep for Water										**05/20/11**

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
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 # WSCF112290

Sample # 112290001
SAF# F11-055
Sample ID B2BH54

Matrix WATER
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
TPHDWA										
Diesel	TPHDIESEL	LA-523-493	UNX	<70		ug/L	1	70	100	05/25/11
Kerosene	TPHKEROSEN	LA-523-493	U	<70		ug/L	1	70	100	05/25/11
SPE										**05/24/11**
PCBs										
Aroclor-1016	12674-11-2	LA-523-427	U	<0.09		ug/L	1	0.09	0.2	05/27/11
Aroclor-1221	11104-28-2	LA-523-427	U	<0.2		ug/L	1	0.2	0.4	05/27/11
Aroclor-1232	11141-16-5	LA-523-427	U	<0.09		ug/L	1	0.09	0.2	05/27/11
Aroclor-1242	53469-21-9	LA-523-427	U	<0.09		ug/L	1	0.09	0.2	05/27/11
Aroclor-1248	12672-29-6	LA-523-427	U	<0.09		ug/L	1	0.09	0.2	05/27/11
Aroclor-1254	11097-69-1	LA-523-427	U	<0.09		ug/L	1	0.09	0.2	05/27/11
Aroclor-1260	11096-82-5	LA-523-427	U	<0.09		ug/L	1	0.09	0.2	05/27/11

LS
8-08-2011

MDL = Minimum Detection
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TP Err = Total Propagated
DF = Dilution Factor
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B - Analyte was detected in both the BLANK and SAMPLE
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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 # WSCF112291

Sample # 112291001
SAF# F11-054
Sample ID B2BH28

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
8270 Prep										**05/23/11**
SW-846 8270D										
Naphthalene	91-20-3	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Acenaphthylene	208-96-8	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Acenaphthene	83-32-9	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Fluorene	86-73-7	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Phenanthrene	85-01-8	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Anthracene	120-12-7	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Fluoranthene	206-44-0	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Pyrene	129-00-0	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(a)anthracene	56-55-3	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Chrysene	218-01-9	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(b)fluoranthene	205-99-2	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(k)fluoranthene	207-08-9	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(a)pyrene	50-32-8	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Indeno(1,2,3-cd)pyrene	193-39-5	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Dibenzo(a,h)anthracene	53-70-3	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(g,h,i)perylene	191-24-2	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
~~**PCB Prep Solids**~~										~~**05/23/11**~~

MDL = Minimum Detection
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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)

LS
8-08-2011

WSCF Analytical Results Report

Attention Michael Neely
Department Organic, Semivolatiles

Group # WSCF112291

Sample # 112291001
SAF# F11-054
Sample ID B2BH28

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
PCBs										
Aroclor-1016	12674-11-2	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1221	11104-28-2	LA-523-427	U	<8		ug/kg	1	8	20	05/27/11
Aroclor-1232	11141-16-5	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1242	53469-21-9	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1248	12672-29-6	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1254	11097-69-1	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1260	11096-82-5	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
TPHD Prep Solids										**05/23/11**
TPHDWA										
Diesel	TPHDIESEL	LA-523-493	UNX	<4		mg/kg	1	4	5	05/25/11
Kerosene	TPHKEROSEN	LA-523-493	U	<4		mg/kg	1	4	5	05/25/11

LS
8-08-2011

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TP Err = Total Propagated
DF = Dilution Factor
+ - Indicates more than nine qualifier

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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 # WSCF112291

Sample # 112291002
SAF# F11-054
Sample ID B2BH30

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
8270 Prep										**05/23/11**
SW-846 8270D										
Naphthalene	91-20-3	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Acenaphthylene	208-96-8	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Acenaphthene	83-32-9	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Fluorene	86-73-7	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Phenanthrene	85-01-8	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Anthracene	120-12-7	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Fluoranthene	206-44-0	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Pyrene	129-00-0	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(a)anthracene	56-55-3	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Chrysene	218-01-9	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(b)fluoranthene	205-99-2	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(k)fluoranthene	207-08-9	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(a)pyrene	50-32-8	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Indeno(1,2,3-cd)pyrene	193-39-5	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Dibenzo(a,h)anthracene	53-70-3	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(g,h,i)perylene	191-24-2	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
~~**PCB Prep Solids**~~										~~**05/23/11**~~

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

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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)

LS
8-08-2011

WSCF Analytical Results Report

Attention Michael Neely
Department Organic, Semivolatiles

Group # WSCF112291

Sample # 112291002
SAF# F11-054
Sample ID B2BH30

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
PCBs										
Aroclor-1016	12674-11-2	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1221	11104-28-2	LA-523-427	U	<8		ug/kg	1	8	20	05/27/11
Aroclor-1232	11141-16-5	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1242	53469-21-9	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1248	12672-29-6	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1254	11097-69-1	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1260	11096-82-5	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
TPHD Prep Solids										**05/23/11**
TPHDWA										
Diesel	TPHDIESEL	LA-523-493	UNX	<4		mg/kg	1	4	5	05/25/11
Kerosene	TPHKEROSEN	LA-523-493	U	<4		mg/kg	1	4	5	05/25/11

LS
8-08-2011

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 # WSCF112291

Sample # 112291003
SAF# F11-054
Sample ID B2BH36

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
8270 Prep										**05/23/11**
SW-846 8270D										
Naphthalene	91-20-3	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Acenaphthylene	208-96-8	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Acenaphthene	83-32-9	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Fluorene	86-73-7	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Phenanthrene	85-01-8	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Anthracene	120-12-7	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Fluoranthene	206-44-0	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Pyrene	129-00-0	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(a)anthracene	56-55-3	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Chrysene	218-01-9	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(b)fluoranthene	205-99-2	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(k)fluoranthene	207-08-9	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(a)pyrene	50-32-8	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Indeno(1,2,3-cd)pyrene	193-39-5	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Dibenzo(a,h)anthracene	53-70-3	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(g,h,i)perylene	191-24-2	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
~~**PCB Prep Solids**~~										~~**05/23/11**~~

MDL = Minimum Detection
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B - Analyte was detected in both the BLANK and SAMPLE
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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)

LS
8-08-2011

WSCF Analytical Results Report

Attention Michael Neely
Department Organic, Semivolatiles

Group # WSCF112291

Sample # 112291003
SAF# F11-054
Sample ID B2BH36

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
PCBs										
Aroclor-1016	12674-11-2	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1221	11104-28-2	LA-523-427	U	<8		ug/kg	1	8	20	05/27/11
Aroclor-1232	11141-16-5	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1242	53469-21-9	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1248	12672-29-6	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1254	11097-69-1	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1260	11096-82-5	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
TPHD Prep Solids										**05/23/11**
TPHDWA										
Diesel	TPHDIESEL	LA-523-493	UNX	<4		mg/kg	1	4	5	05/24/11
Kerosene	TPHKEROSEN	LA-523-493	U	<4		mg/kg	1	4	5	05/24/11

LS
8-08-2011

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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 # WSCF112291

Sample # 112291004
SAF# F11-054
Sample ID B2BH37

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
8270 Prep										**05/23/11**
SW-846 8270D										
Naphthalene	91-20-3	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Acenaphthylene	208-96-8	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Acenaphthene	83-32-9	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Fluorene	86-73-7	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Phenanthrene	85-01-8	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Anthracene	120-12-7	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Fluoranthene	206-44-0	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Pyrene	129-00-0	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(a)anthracene	56-55-3	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Chrysene	218-01-9	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(b)fluoranthene	205-99-2	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(k)fluoranthene	207-08-9	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(a)pyrene	50-32-8	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Indeno(1,2,3-cd)pyrene	193-39-5	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Dibenzo(a,h)anthracene	53-70-3	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(g,h,i)perylene	191-24-2	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
PCB Prep Solids										**05/23/11**

MDL = Minimum Detection
RQ = Result Qualifier
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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)

LS
8-08-2011

WSCF Analytical Results Report

Attention Michael Neely
Department Organic, Semivolatiles

Group # WSCF112291

Sample # 112291004
SAF# F11-054
Sample ID B2BH37

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
PCBs										
Aroclor-1016	12674-11-2	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1221	11104-28-2	LA-523-427	U	<8		ug/kg	1	8	20	05/27/11
Aroclor-1232	11141-16-5	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1242	53469-21-9	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1248	12672-29-6	LA-523-427	U	<4	LS 8-08-2011	ug/kg	1	4	8	05/27/11
Aroclor-1254	11097-69-1	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1260	11096-82-5	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
TPHD Prep Solids										**05/23/11**
TPHDWA										
Diesel	TPHDIESEL	LA-523-493	UNX	<4		mg/kg	1	4	5	05/25/11
Kerosene	TPHKEROSEN	LA-523-493	U	<4		mg/kg	1	4	5	05/25/11

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
D - Analyte was reported at a secondary diltution factor.
E - The calibration exceeds the calibration range (GC/MS).
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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
WSCF112290

Introduction

A sample was received at the WSCF laboratory as referenced on the WSCF SAF Number Cross Reference table included in the final report. The sample was 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

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

- All applicable QC controls are within the established limits.

Attachment 2
Narrative
WSCF112290

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.

ICP-AES Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- All applicable QC controls are within the established limits.

ICP-MS Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- Mercury – Matrix Spike and/or Matrix Spike Duplicate recoveries are outside established laboratory limits. Affected sample results in this batch were "N" flagged.
- Vanadium – Detected in the Blank and evaluated. Affected sample results in this batch were "C" Flagged.
- Barium and Strontium – Exceeded spiking levels by a factor of 4. Spike recoveries and associated RPDs are not valid.
- All other applicable QC controls are within the established limits.

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

- All applicable QC controls are within the established limits.

Organic Comments

PCB – 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.

Semi-VOA – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- Analysis performed by 8270-PAH SIM method.
- All applicable QC controls are within the established limits.

Attachment 2
Narrative
WSCF112290

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.
    - Matrix Spike and/or Matrix Spike Duplicate recoveries are outside established laboratory limits. Affected sample results in this batch were "N" flagged.
    - The LCS Failed. Sample Issue Resolution Form SDR11-292 was generated. Sample and QC results were flagged.
    - All other applicable QC controls are within the established limits.

Radiochemistry Comments

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

- Gross Alpha / Gross Beta:
    - 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.

Narrative

Attachment 2
Narrative
WSCF112290

SAMPLE ISSUE RESOLUTION

SIR NUM	SDR11-292
REV NUM	0
DATE INITIATED	6/2/2011

SAMPLE EVENT INFORMATION

SAF NUM(S)	F11-055, I11-025
OPERABLE UNIT(S)	100-NR-2, NONE
PROJECT(S)	Outer Area, CERC11
SAMPLE EVENT TITLE(S)	200-MG-1 Waste Sites, CERC11
LABORATORY	Waste Sampling & Characterization

SAMPLING INFORMATION

NUMBER OF SAMPLES	4
SAMPLE NUMBERS	B2BH54, B2CY15, B2CY22, B2CY23
SAMPLE MATRIX	WATER
COLLECTION DATE	5/19/2011 - 5/20/2011
SDG NUM	WSCF112295, WSCF112290

ISSUE BACKGROUND

CLASS	Laboratory Issue
TYPE	Quality Control Failure
DESCRIPTION	THE TPHD LCS /MS/MSD ALL FAILED HIGH, HOWEVER, THE SAMPLES WERE ALL NON-DETECT FOR TPHD.
	LCS (154%) LIMITS 65-128% MS (176.4%) LIMITS 73-123%

DISPOSITION

DESCRIPTION	Report results as-is and flag the samples with a comment in the narrative.
	Please initiate a re-run of samples B2CY15, B2CY22, B2CY23 within hold time.
JUSTIFICATION	Submitted by: Marisol Avila Date: 6/2/2011
	Accepted by: Deb Alexander Date: 6/2/2011

4

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F11-055-001

PAGE 1 OF 2

COLLECTOR: Patterson

SAMPLING LOCATION: NPE EB 1

ICE CHEST NO.:

COMPANY CONTACT: WIDRIG, DL

TELEPHONE NO.: 376-2858

PROJECT COORDINATOR: WIDRIG, DL

PRICE CODE: 7C

DATA TURNAROUND: 15 Days / 15 Days

AIR QUALITY: ☐

PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - QC Sampling

SAF NO.: F11-055

FIELD LOGBOOK NO.: HNF-N 507-21

ACTUAL SAMPLE DEPTH: N/A

COA: 302427ES10

METHOD OF SHIPMENT: GOVERNMENT VEHICLE

ORIGINAL

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)

112290

SPECIAL HANDLING AND/OR STORAGE

PRESERVATION	Cool~4C	HCl to pH <2/Cool~4C	Cool~4C	HNO3 to pH <2	Cool~4C	Cool~4C	None	HNO3 to pH <2
HOLDING TIME	7/40 Days	7/40 Days	1 yr/1 yr	28 Days	24 Hours	28 Days/48 Hours	ASAP	6 Months
TYPE OF CONTAINER	aG	aG	aG	G/P	aG	P	P	G/P
NO. OF CONTAINER(S)	4	3	4	1	1	1	1	1
VOLUME	1L	1L	1L	500mL	500mL	250mL	60mL	500mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS	SEE ITEM (4) IN SPECIAL INSTRUCTIONS	Chromium Hex - 7196;	IC Anions - 300.0 (Nitrogen in Nitrate);	pH (Water) - 9040 (pH Measurement);	SEE ITEM (5) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME								
B2BH54	1 WATER	5/19/11	0815	✓	✓	✓	✓	✓	✓	✓	✓

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
K. Patterson	5/19/11 1300	M. Nelson	5/19/11 1300
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

LABORATORY SECTION — RECEIVED BY — TITLE — DATE/TIME

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

PRINTED ON 1/17/2011

A-6003-618 (REV 2)

Sample Receipt

Chain of Custody

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-055-001	PAGE 2 OF 2
COLLECTOR: K. Patterson	COMPANY CONTACT: WIDRIG, DL	TELEPHONE NO.: 376-2858	PROJECT COORDINATOR: WIDRIG, DL	PRICE CODE: 7C	DATA TURNAROUND: 15 Days / 15 Days
SAMPLING LOCATION: NPE EB 1	PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - QC Sampling		SAF NO.: F11-055	AIR QUALITY: [ ]	
ICE CHEST NO.	FIELD LOGBOOK NO.: HNF-N-507-21	ACTUAL SAMPLE DEPTH: N/A	COA: 302427ES10	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	ORIGINAL
SHIPPED TO: Waste Sampling & Characterization	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

SPECIAL INSTRUCTIONS

** Duplicates and equipment blanks to be collected at a frequency of 1/day of sampling. If multiple samples are collected in one day, only colllect the duplicate and equipment blank associated with the first sample of that day.

** The CACN for all analytical work at WSCF laboratory is 401910ES20.

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

** The laboratory shall report only the requested constituents of concern in all preliminary or final hardcopy data reports, or EDDs. QC results for non-requested constituents need not be reported, but samples chosen for matrix spike, and all spike compounds shall be identified in the final data report narrative. No TICs shall be reported.
(1) Semi-VOA - 8270 (TCL) {Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene};
(2) TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range};
(3) PCBs - 8082 {Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260};
(4) 200.8_HG - ICPMS {Mercury}; ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Cobalt, Copper, Manganese, Nickel, Silver, Vanadium, Zinc}; ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Selenium, Strontium, Thallium, Tin, Uranium}; ICP Metals - 6010 (Add-On) {Boron, Lithium};
(5) Gross Alpha {Gross alpha}; Gross Beta {Gross beta};

PRINTED ON 1/17/2011

A-6003-619 (REV 2)

Attachment 2
Narrative
WSCF112291

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

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

- All applicable QC controls are within the established limits.

Attachment 2
Narrative
WSCF112291

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):

- Matrix Spike and Post Spike recoveries are outside established laboratory limits. Affected sample results in this batch were "N" flagged.
- All other applicable QC controls are within the established limits.

ICP-AES Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- All applicable QC controls are within the established limits.

ICP-MS Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- All applicable QC controls are within the established limits.

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

- All applicable QC controls are within the established limits.

Organic Comments

PCB – 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.

Semi-VOA – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- Analysis performed by 8270-PAH SIM method.
- All applicable QC controls are within the established limits.

TPHD-WA – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. 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.

- The LCS did not meet laboratory acceptance criteria. Samples and QC were flagged for the failure. Sample issue resolution form SDR11-293 was generated. The results were reported as stated in the resolution.
- Diesel – Matrix Spike and/or Matrix Spike Duplicate recoveries are outside established laboratory limits. Affected sample results in this batch were "N" flagged.
- All other applicable QC controls are within the established limits.

Radiochemistry Comments

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

- Gross Alpha / Gross Beta:
  - Gross Beta – Duplicate Relative Percent Difference(s) (RPD) did not meet the established laboratory limits. Duplicate Relative Percent Difference (RPD) does not apply to results below 5X the minimum detectable activity. No flags issued.
  - 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.

Narrative

Attachment 2
Narrative
WSCF112291

SAMPLE ISSUE RESOLUTION

SIR NUM	SDR11-293
REV NUM	0
DATE INITIATED	6/2/2011

SAMPLE EVENT INFORMATION

SAF NUM(S)	F11-054
OPERABLE UNIT(S)	NONE
PROJECT(S)	Outer Area
SAMPLE EVENT TITLE(S)	200-MG-1 Waste Sites
LABORATORY	Waste Sampling & Characterization

SAMPLING INFORMATION

NUMBER OF SAMPLES	9
SAMPLE NUMBERS	B2BH28, B2BH30, B2BH32, B2BH36, B2BH37, B2BH38, B2BH40, B2BH44, B2BH48
SAMPLE MATRIX	SOIL
COLLECTION DATE	5/19/2011 - 5/23/2011
SDG NUM	WSCF112291, WSCF112305

ISSUE BACKGROUND

CLASS	Laboratory Issue
TYPE	Quality Control Failure
DESCRIPTION	The TPHD LCS failed high, however, the samples were all non-detect for TPHD. LCS (142.4%) LIMITS 70-130%

DISPOSITION

DESCRIPTION	Report results as-is and flag the samples with a comment in the narrative.
JUSTIFICATION	Submitted by: Marisol Avila Date: 6/2/2011
	Accepted by: Kelly Whitley Date:6/2/2011

A-6003-640 (03/30) 4 PAGE 1 of 1

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F11-054-001

PAGE 1 OF 2

COLLECTOR: KC Patterson CHPRC

COMPANY CONTACT: WIDRIG, DL

TELEPHONE NO.: 376-2858

PROJECT COORDINATOR: WIDRIG, DL

PRICE CODE: 8C

DATA TURNAROUND: 15 Days / 15 Days

SAMPLING LOCATION: NPE-01

PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - Soil

SAF NO.: F11-054

AIR QUALITY: ☐

ICE CHEST NO.:

FIELD LOGBOOK NO.: HNF-N-507-21

ACTUAL SAMPLE DEPTH: 0-6"

COA: 302427ES10

METHOD OF SHIPMENT: GOVERNMENT VEHICLE

ORIGINAL

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)

112291

SPECIAL HANDLING AND/OR STORAGE

PRESERVATION	Cool~4C	Cool~4C	None
HOLDING TIME	14/40 Days	28 Days	6 Months
TYPE OF CONTAINER	aG	G/P	G/P
NO. OF CONTAINER(S)	1	1	1
VOLUME	250mL	250mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS

SAMPLE NO.		MATRIX*	SAMPLE DATE	SAMPLE TIME			
B2BH28	1	SOIL	MAY 19 2011	1133	✓	✓	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
KC Patterson CHPRC	MAY 19 2011	B2 H Nelson	MAY 19 2011 1300
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

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS

SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

LABORATORY SECTION — RECEIVED BY — TITLE — DATE/TIME

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

PRINTED ON 1/17/2011

A-6003-618 (REV 2)

CH2MHill Plateau Remediation Company — **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** — **F11-054-001** — **PAGE 2 OF 2**

COLLECTOR KC Patterson CHPRC	**COMPANY CONTACT** WIDRIG, DL	**TELEPHONE NO.** 376-2858	**PROJECT COORDINATOR** WIDRIG, DL	**PRICE CODE** 8C	**DATA TURNAROUND** 15 Days / 15 Days
SAMPLING LOCATION NPE-01	**PROJECT DESIGNATION** Non Operational Area Evaluation Sampling - Soil		**SAF NO.** F11-051	**AIR QUALITY** ☐	
ICE CHEST NO.	**FIELD LOGBOOK NO.** HNF-N-303 - 21	**ACTUAL SAMPLE DEPTH** 0-6"	**COA** 302427ES10	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	**ORIGINAL**
SHIPPED TO Waste Sampling & Characterization	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

SPECIAL INSTRUCTIONS

** Sample locations will be randomly selected from the investigation area. Final location decisions will be made by the Field PAL and samplers.

** There are 11 primary sampling locations and 2 alternates. Samples NP-08 and NP-10 are preferred locations, but the alternates may be substituted for these if necessary.

** Samplers, RadCon and project personnel must walk to sampling locations as driving is prohibited in this area.

** Sampling must be performed at the soil surface and sampling coordinates must be collected via GPS.

** Duplicates and equipment blanks to be collected at a frequency of 1/day of sampling. If multiple samples are collected in one day, only colllect the duplicate and equipment blank associated with the first sample of that day.

** The CACN for all analytical work at WSCF laboratory is 401910ES20.

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

** The laboratory shall report only the requested constituents of concern in all preliminary or final hardcopy data reports, or EDDs. QC results for non-requested constituents need not be reported, but samples chosen for matrix spike, and all spike compounds shall be identified in the final data report narrative. No TICs shall be reported.
(1) 8270_SVOA_GCMS: SIM {Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene}; TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range}; PCBs - 8082 {Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260};
(2) 200.8_HG - ICPMS {Mercury}; ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Cobalt, Copper, Manganese, Nickel, Silver, Vanadium, Zinc}; ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Selenium, Strontium, Thallium, Tin, Uranium}; ICP Metals - 6010 (Add-On) {Boron, Lithium}; Chromium Hex - 7196; IC Anions - 300.0 {Nitrogen in Nitrate}; pH (Soil) - 9045 {pH Measurement};
(3) Gross Alpha {Gross alpha}; Gross Beta {Gross beta};

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Thursday, May 19, 2011 2:38:07 PM
Page 4 of 10

Sample Receipt

Chain of Custody

CH2MHill Plateau Remediation Company — **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** — F11-054-003 — PAGE 1 OF 2

COLLECTOR: KC Patterson CHPRC	COMPANY CONTACT: WIDRIG, DL	TELEPHONE NO.: 376-2858	PROJECT COORDINATOR: WIDRIG, DL
PRICE CODE: 8C	DATA TURNAROUND: 15 Days / 15 Days	SAMPLING LOCATION: NPE-02	PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - Soil
SAF NO.: F11-054	AIR QUALITY: ☐	ICE CHEST NO.	FIELD LOGBOOK NO.: HNF-N-507-21
ACTUAL SAMPLE DEPTH: 0-6"	COA: 302427E510	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	ORIGINAL
SHIPPED TO: Waste Sampling & Characterization	OFFSITE PROPERTY NO.: N/A	BILL OF LADING/AIR BILL NO.: N/A	

MATRIX*: A=Air, DI=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

PRESERVATION	Cool~4C	Cool~4C	None
HOLDING TIME	14/40 Days	28 Days	6 Months
TYPE OF CONTAINER	aG	G/P	G/P
NO. OF CONTAINER(S)	1	1	1
VOLUME	250mL	250mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS

SAMPLE NO.		MATRIX*	SAMPLE DATE	SAMPLE TIME			
B2BH30	2	SOIL	MAY 19 2011	1045	✓	✓	✓

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

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
KC Patterson CHPRC	MAY 19 2011 1300	R.C. Nelson	MAY 19 2011 1300

SPECIAL INSTRUCTIONS: SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

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

PRINTED ON 1/17/2011 — A-6003-618 (REV 2)

Chain of Custody

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F11-054-003

PAGE 2 OF 2

COLLECTOR: KC Patterson CHPRC	COMPANY CONTACT: WIDRIG, DL	TELEPHONE NO.: 376-2858	PROJECT COORDINATOR: WIDRIG, DL	PRICE CODE: 8C	DATA TURNAROUND: 15 Days / 15 Days
SAMPLING LOCATION: NPE-02	PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - Soil		SAF NO.: F11-054	AIR QUALITY: ☐	
ICE CHEST NO.	FIELD LOGBOOK NO.: HNF-N-507-21	ACTUAL SAMPLE DEPTH: 0-6"	COA: 302427ES10	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	ORIGINAL
SHIPPED TO: Waste Sampling & Characterization	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

SPECIAL INSTRUCTIONS

** Sample locations will be randomly selected from the investigation area. Final location decisions will be made by the Field PAL and samplers.

** There are 11 primary sampling locations and 2 alternates. Samples NP-08 and NP-10 are preferred locations, but the alternates may be substituted for these if necessary.

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** The CACN for all analytical work at WSCF laboratory is 401910ES20.

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

** The laboratory shall report only the requested constituents of concern in all preliminary or final hardcopy data reports, or EDDs. QC results for non-requested constituents need not be reported, but samples chosen for matrix spike, and all spike compounds shall be identified in the final data report narrative. No TICs shall be reported.
(1) 8270_SVOA_GCMS: SIM {Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene}; TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range}; PCBs - 8082 {Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260};
(2) 200.8_HG - ICPMS {Mercury}; ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Cobalt, Copper, Manganese, Nickel, Silver, Vanadium, Zinc}; ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Selenium, Strontium, Thallium, Tin, Uranium}; ICP Metals - 6010 (Add-On) {Boron, Lithium}; Chromium Hex - 7196; IC Anions - 300.0 {Nitrogen in Nitrate}; pH (Soil) 9045 {pH Measurement};
(3) Gross Alpha {Gross alpha}; Gross Beta {Gross beta};

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A-6003-618 (REV 7)

CH2MHill Plateau Remediation Company — **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** — F11-054-009 — PAGE 1 OF 2

COLLECTOR: KC Patterson, CHPRC	COMPANY CONTACT: WIDRIG, DL	TELEPHONE NO.: 376-2858	PROJECT COORDINATOR: WIDRIG, DL
PRICE CODE: 8C	DATA TURNAROUND: 15 Days / 15 Days		
SAMPLING LOCATION: NPE-05	PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - Soil		SAF NO.: F11-054
AIR QUALITY: L			
ICE CHEST NO.	FIELD LOGBOOK NO.: HNF-N-507-21	ACTUAL SAMPLE DEPTH: 0-6"	COA: 302427ES10
METHOD OF SHIPMENT: GOVERNMENT VEHICLE	ORIGINAL		
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

PRESERVATION	Cool~4C	Cool~4C	None
HOLDING TIME	14/40 Days	28 Days	6 Months
TYPE OF CONTAINER	aG	G/P	G/P
NO. OF CONTAINER(S)	1	1	1
VOLUME	250mL	250mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS

SAMPLE NO.		MATRIX*	SAMPLE DATE	SAMPLE TIME			
B2BH35	3	SOIL	MAY 19 2011	0945	✓	✓	✓

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

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
KC Patterson, CHPRC	MAY 19 2011 1300	M. Nelson M. Nelson	MAY 19 2011 1300

SPECIAL INSTRUCTIONS: SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

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

PRINTED ON 1/17/2011

R-6003-618 (REV 2)

CH2MHill Plateau Remediation Company — **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** — F11-054-009 — PAGE 2 OF 2

COLLECTOR KC Patterson CHPRC	**COMPANY CONTACT** WIDRIG, DL	**TELEPHONE NO.** 376-2858	**PROJECT COORDINATOR** WIDRIG, DL
SAMPLING LOCATION NPE-05	**PROJECT DESIGNATION** Non Operational Area Evaluation Sampling - Soil		**SAF NO.** F11-054
ICE CHEST NO.	**FIELD LOGBOOK NO.** HNF-N-507-21	**ACTUAL SAMPLE DEPTH** 0-6"	**COA** 302427ES10
SHIPPED TO Waste Sampling & Characterization	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A

PRICE CODE 8C

AIR QUALITY ☐

METHOD OF SHIPMENT GOVERNMENT VEHICLE

DATA TURNAROUND 15 Days / 15 Days

ORIGINAL

SPECIAL INSTRUCTIONS

** Sample locations will be randomly selected from the investigation area. Final location decisions will be made by the Field PAL and samplers.

** There are 11 primary sampling locations and 2 alternates. Samples NP-08 and NP-10 are preferred locations, but the alternates may be substituted for these if necessary.

** Samplers, RadCon and project personnel must walk to sampling locations as driving is prohibited in this area.

** Sampling must be performed at the soil surface and sampling coordinates must be collected via GPS.

** Duplicates and equipment blanks to be collected at a frequency of 1/day of sampling. If multiple samples are collected in one day, only collect the duplicate and equipment blank associated with the first sample of that day.

** The CACN for all analytical work at WSCF laboratory is 401910ES20.

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

** The laboratory shall report only the requested constituents of concern in all preliminary or final hardcopy data reports, or EDDs. QC results for non-requested constituents need not be reported, but samples chosen for matrix spike, and all spike compounds shall be identified in the final data report narrative. No TICs shall be reported.
(1) 8270_SVOA_GCMS: SIM {Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene}; TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range}; PCBs - 8082 {Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260};
(2) 200.8_HG - ICPMS {Mercury}; ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Cobalt, Copper, Manganese, Nickel, Silver, Vanadium, Zinc}; ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Selenium, Strontium, Thallium, Tin, Uranium}; ICP Metals - 6010 (Add-On) {Boron, Lithium}; Chromium Hex - 7196; IC Anions - 300.0 {Nitrogen in Nitrate}; pH (Soil) - 9045 {pH Measurement};
(3) Gross Alpha {Gross alpha}; Gross Beta {Gross beta};

PRINTED ON 1/17/2011 — A-6003-618 (REV 2)

Sample Receipt

Chain of Custody

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F11-054-010

PAGE 1 OF 2

COLLECTOR: KC Patterson CHPRC

COMPANY CONTACT: WIDRIG, DL

TELEPHONE NO.: 375-2858

PROJECT COORDINATOR: WIDRIG, DL

PRICE CODE: 8C

DATA TURNAROUND: 15 Days / 15 Days

SAMPLING LOCATION: NPE-05 DUP

PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - Soil

SAF NO.: F11-054

AIR QUALITY: ☐

ICE CHEST NO.:

FIELD LOGBOOK NO.: HNF-N-507-21

ACTUAL SAMPLE DEPTH: 0-6"

COA: 302427ES10

METHOD OF SHIPMENT: GOVERNMENT VEHICLE

ORIGINAL

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:

PRESERVATION	Cool~4C	Cool~4C	None
HOLDING TIME	14/40 Days	28 Days	6 Months
TYPE OF CONTAINER	aG	G/P	G/P
NO. OF CONTAINER(S)	1	1	1
VOLUME	250mL	250mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS

SAMPLE NO.		MATRIX*	SAMPLE DATE	SAMPLE TIME			
B2BH37	4	SOIL	MAY 19 2011	0945	✓	✓	✓

CHAIN OF POSSESSION / SIGN/ PRINT NAMES

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
KC Patterson CHPRC	MAY 19 2011 1300	H. Nelsonmacy	MAY 19 2011 1300
			MAY 19 2011

SPECIAL INSTRUCTIONS: SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

LABORATORY SECTION: RECEIVED BY | TITLE | DATE/TIME

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

PRINTED ON 1/17/2011

A-6003-618 (REV 2)

Chain of Custody

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-054-010	PAGE 2 OF 2
COLLECTOR: KC Patterson, CHPRC	COMPANY CONTACT: WIDRIG, DL	TELEPHONE NO.: 376-2958	PROJECT COORDINATOR: WIDRIG, DL	PRICE CODE: 8C	DATA TURNAROUND
SAMPLING LOCATION: NPE-05 DUP	PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - Soil		SAF NO.: F11-054	AIR QUALITY: ☐	15 Days / 15 Days
ICE CHEST NO.	FIELD LOGBOOK NO.: HNF-N-507-21	ACTUAL SAMPLE DEPTH: 0-6"	COA: 302427ES10	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	ORIGINAL
SHIPPED TO: Waste Sampling & Characterization	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

SPECIAL INSTRUCTIONS

** Sample locations will be randomly selected from the investigation area. Final location decisions will be made by the Field PAL and samplers.

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** Sampling must be performed at the soil surface and sampling coordinates must be collected via GPS.

** Duplicates and equipment blanks to be collected at a frequency of 1/day of sampling. If multiple samples are collected in one day, only colllect the duplicate and equipment blank associated with the first sample of that day.

** The CACN for all analytical work at WSCF laboratory is 401910ES20.

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

** The laboratory shall report only the requested constituents of concern in all preliminary or final hardcopy data reports, or EDDs. QC results for non-requested constituents need not be reported, but samples chosen for matrix spike, and all spike compounds shall be identified in the final data report narrative. No TICs shall be reported.
(1) 8270_SVOA_GCMS: SIM {Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene}; TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range}; PCBs - 8082 {Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260};
(2) 200.8_HG - ICPMS {Mercury}; ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Cobalt, Copper, Manganese, Nickel, Silver, Vanadium, Zinc}; ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Selenium, Strontium, Thallium, Tin, Uranium}; ICP Metals - 6010 (Add-On) {Boron, Lithium}; Chromium Hex - 7196; IC Anions - 300.0 {Nitrogen in Nitrate}; pH (Soil) 9045 {pH Measurement};
(3) Gross Alpha {Gross alpha}; Gross Beta {Gross beta};

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Appendix 5

Data Validation Supporting Documentation

Appendix A - Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: Outer Area			DATA PACKAGE: VSR11-053		
VALIDATOR: Carl Schloesslin		LAB: WSCF		DATE: 8-10-2011	
			SDG: WSCF112290, WSCF112291		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270 X		SW-846 8270 (TCLP)

SAMPLES/MATRIX

SDG WSCF112290 (Water): B2BH54 (equipment blank)

SDG WSCF112291 (Soil): B2BH28, B2BH30, B2BH36, B2BH37 (field duplicate of B2BH36)

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments: None

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

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

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

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

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

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

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

Comments:

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

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

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

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

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

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

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

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

Comments: None

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Comments:

Six analytes spiked into LCS/MS/MSD only - all 16 reported target analytes were represented by the six spiked analytes.

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

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

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

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

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

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

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

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

Comments: None

6. SYSTEM PERFORMANCE (Levels D and E)

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

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

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

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

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

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

Comments:

7. HOLDING TIMES (all levels)

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

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

Comments: None

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

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

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

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

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

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

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

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

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

Comments:

Note: Client instructed AQA that CRDLs in SAP only should be used for detection limit assessment and to ignore CRDLs listed in the SAFs.

9. SAMPLE CLEANUP (Levels D and E)

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

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

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

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

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

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

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

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

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

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

Comments:

Comments (attach additional sheets as necessary): None

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: Outer Area			DATA PACKAGE: VSR11-053		
VALIDATOR: Carl Schloesslin		LAB: WSCF		DATE: 8-10-2011	
			SDG: WSCF112290, WSCF112291		
ANALYSES PERFORMED					
8015	8021	8141	8151	8315	
		WTPH-HCID	WTPH-G	WTPH-D X	

SAMPLES/MATRIX:

SDG WSCF112290 (Water): B2BH54 (equipment blank)

SDG WSCF112291 (Soil): B2BH28, B2BH30, B2BH36, B2BH37 (field duplicate of B2BH36)

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:

WSCF112290: TPH-D LCS %R = 154%, MS %R = 176%, MSD %R = 169%

WSCF112291: TPH-D LCS %R = 142%, MS %R = 143%

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:

Note: Client instructed AQA that CRDLs in SAP only should be used for detection limit assessment and to ignore CRDLs listed in the SAFs.

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 # WSCF112290

QC Batch 182290
Associated Samples 112290001

Test SW-846 8270D Semivolatiles (PAHSIM)

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #56059**							
Naphthalene	91-20-3		<1	ug/L					U	05/23/11
Acenaphthylene	208-96-8		<1	ug/L					U	05/23/11
Acenaphthene	83-32-9		<1	ug/L					U	05/23/11
Fluorene	86-73-7		<1	ug/L					U	05/23/11
Phenanthrene	85-01-8		<1	ug/L					U	05/23/11
Anthracene	120-12-7		<1	ug/L					U	05/23/11
Fluoranthene	206-44-0		<1	ug/L					U	05/23/11
Pyrene	129-00-0		<1	ug/L					U	05/23/11
Benzo(a)anthracene	56-55-3		<1	ug/L					U	05/23/11
Chrysene	218-01-9		<1	ug/L					U	05/23/11
Benzo(b)fluoranthene	205-99-2		<1	ug/L					U	05/23/11
Benzo(k)fluoranthene	207-08-9		<1	ug/L					U	05/23/11
Benzo(a)pyrene	50-32-8		<1	ug/L					U	05/23/11
Indeno(1,2,3-cd)pyrene	193-39-5		<1	ug/L					U	05/23/11
Dibenzo(a,h)anthracene	53-70-3		<1	ug/L					U	05/23/11
Benzo(g,h,i)perylene	191-24-2		<1	ug/L					U	05/23/11
LCS			**QC Sample #56060**							

Quality Control Report

Attention Michael Neely
Department Organic, Semivolatiles

Group # WSCF112290

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Naphthalene	91-20-3		26	ug/L	86.1	59 - 113				05/23/11
Acenaphthene	83-32-9		26	ug/L	86.7	60 - 115				05/23/11
Fluorene	86-73-7		28	ug/L	94	61 - 116				05/23/11
Anthracene	120-12-7		28	ug/L	92.6	30 - 140				05/23/11
Pyrene	129-00-0		30	ug/L	98.9	56 - 135				05/23/11
Benzo(a)pyrene	50-32-8		26	ug/L	85.6	44 - 148				05/23/11
MS			**QC Sample #56061**							
			Original 112290001							
Naphthalene	91-20-3	<1	25	ug/L	87.6	64 - 112				05/23/11
Acenaphthene	83-32-9	<1	25	ug/L	87.5	62 - 116				05/23/11
Fluorene	86-73-7	<1	27	ug/L	95.3	65 - 112				05/23/11
Anthracene	120-12-7	<1	27	ug/L	94.1	65 - 114				05/23/11
Pyrene	129-00-0	<1	30	ug/L	106.7	67 - 123				05/23/11
Benzo(a)pyrene	50-32-8	<1	24	ug/L	86.5	52 - 129				05/23/11
MSD			**QC Sample #56062**							
			Original 112290001						**Paired 56061**	
Naphthalene	91-20-3	<1	25	ug/L	84.4	64 - 112	3.70	20		05/23/11
Acenaphthene	83-32-9	<1	25	ug/L	87.3	62 - 116	0.20	20		05/23/11
Fluorene	86-73-7	<1	28	ug/L	94.5	65 - 112	0.80	20		05/23/11
Anthracene	120-12-7	<1	26	ug/L	90.7	65 - 114	3.70	20		05/23/11
Pyrene	129-00-0	<1	30	ug/L	104.4	67 - 123	2.20	20		05/23/11
Benzo(a)pyrene	50-32-8	<1	25	ug/L	85	52 - 129	1.70	20		05/23/11

Quality Control Report

Attention Michael Neely
Department Organic, Semivolatiles

Group # WSCF112290

QC Batch 182327
Associated Samples 112290001

Test Extractable Diesel and Petroleum

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
LCS			**QC Sample #56152**							
Diesel	TPHDIESEL		3900	ug/L	154.1	65 - 128			X	05/25/11
MS			**QC Sample #56153**							
			Original 112290001							
Diesel	TPHDIESEL	<70	4200	ug/L	176.4	73 - 123			NX	05/25/11
MSD			**QC Sample #56154**							
			Original 112290001					**Paired**	**56153**	
Diesel	TPHDIESEL	<70	4100	ug/L	169.2	73 - 123	4.20	20	NX	05/25/11

Quality Control Report

Attention Michael Neely
Department Organic, Semivolatiles

Group # WSCF112290

QC Batch 182327
Associated Samples 112290001

Test Extractable Diesel and Petroleum

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #56151**							
Diesel	TPHDIESEL		<80	ug/L					UX	05/25/11
Kerosene	TPHKEROSE		<80	ug/L					U	05/25/11

Quality Control Report

Attention Michael Neely
Department Organic, Semivolatiles

Group # WSCF112290

QC Batch 182290
Associated Samples 112290001

Test SW-846 8270D Semivolatiles (PAHSIM)

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
SAMPLE			**Sample #112290001**							
Nitrobenzene-d5	4165-60-0				85.3	25 - 144				05/23/11
2-Fluorobiphenyl	321-60-8				91	52 - 113				05/23/11
Terphenyl-d14	98904-43-9				108.8	63 - 132				05/23/11
BLANK			**QC Sample #56059**							
Nitrobenzene-d5	4165-60-0				85.8	25 - 144				05/23/11
2-Fluorobiphenyl	321-60-8				83.9	52 - 113				05/23/11
Terphenyl-d14	98904-43-9				107	63 - 132				05/23/11
LCS			**QC Sample #56060**							
Nitrobenzene-d5	4165-60-0				90.8	25 - 144				05/23/11
2-Fluorobiphenyl	321-60-8				89.1	52 - 113				05/23/11
Terphenyl-d14	98904-43-9				105.3	63 - 132				05/23/11
MS			**QC Sample #56061**							
			Original 112290001							
Nitrobenzene-d5	4165-60-0				91.4	25 - 144				05/23/11
2-Fluorobiphenyl	321-60-8				93.6	52 - 113				05/23/11
Terphenyl-d14	98904-43-9				112.5	63 - 132				05/23/11
MSD			**QC Sample #56062**							
			Original 112290001					**Paired**	**56061**	

Quality Control Report

Attention Michael Neely
Department Organic, Semivolatiles

Group # WSCF112290

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Nitrobenzene-d5	4165-60-0				91	25 - 144	0.40			05/23/11
2-Fluorobiphenyl	321-60-8				96.7	52 - 113	3.30			05/23/11
Terphenyl-d14	98904-43-9				114.8	63 - 132	2.00			05/23/11

Quality Control Report

Attention Michael Neely
Department Organic, Semivolatiles

Group # WSCF112290

QC Batch 182327
Associated Samples 112290001

Test Extractable Diesel and Petroleum

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
SAMPLE			**Sample #112290001**							
o-Terphenyl	84-15-1				102.6	70 - 130				05/25/11
BLANK			**QC Sample #56151**							
o-Terphenyl	84-15-1				114.9	70 - 130				05/25/11
LCS			**QC Sample #56152**							
o-Terphenyl	84-15-1				126.9	70 - 130				05/25/11
MS			**QC Sample #56153**							
			Original 112290001							
o-Terphenyl	84-15-1				142.7	70 - 130				05/25/11
MSD			**QC Sample #56154**							
			Original 112290001					**Paired**	**56153**	
o-Terphenyl	84-15-1				130.2	70 - 130	9.20	20		05/25/11

Date: 10 August 2011
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: Outer Area
Subject: PCBs - Sample Data Groups (SDGs) WSCF112290 and WSCF1112291

INTRODUCTION

This memorandum presents the results of data validation for SDGs WSCF112290 and WSCF112291 prepared by WSCF Analytical Laboratories. A list of samples validated along with the analytical method is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Method
B2BH54	5/19/2011	Water	C	8082
B2BH28	5/19/2011	Soil	C	8082
B2BH30	5/19/2011	Soil	C	8082
B2BH36	5/19/2011	Soil	C	8082
B2BH37	5/19/2011	Soil	C	8082

Data validation was conducted in accordance with the CHPRC validation statement of work and the Sampling and Analysis Plan for Selected 200-MG-1 Operable Unit Waste Sites, DOE/RL-2009-60, Rev. 1 (SAP). Appendices 1 through 6 provide the following information as indicated below:

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

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for PCBs are extraction within 1 year of sample collection and analysis within 1 year 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.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the soil matrix spike accuracy limits are 50% to 150%. The soil laboratory control sample accuracy limits are the ones specified by the DV procedure. Water accuracy limits were not provided in the SAP and are therefore specified by the DV procedure. The surrogate accuracy limits were the ones specified by the DV procedure (30% to 150%).

Surrogates

All surrogate recoveries were acceptable.

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

All MS/MSD recoveries were acceptable. It should be noted that aroclor-1254 was the only analyte reported for the MS/MSD. Method 8082 guidance specifies aroclor-1016 and aroclor-1260 for MS/MSD analyses. No sample data are qualified as a result.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable. It should be noted that aroclor-1254 was the only analyte reported for the LCS. Method 8082A guidance specifies aroclor-1016 and aroclor-1260 for LCS analyses. No sample data are qualified as a result

- **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 ±50%. 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 reporting limits with differences <1X the water reporting limits or differences <2X the soil reporting limits no precision infraction occurred.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Field Duplicate Samples

All field duplicate results were acceptable.

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 WSCF112290 and WSCF112291 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-2009-60, Rev. 1, *Sampling and Analysis Plan for Selected 200-MG-1 Operable Unit Waste Sites*, January 2011.

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.

- **C** — This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).

- **X** — This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful. The data should be considered unusable 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

PCB Data Qualification Summary			
SDGs: WSCF112290 & WSCF112291	Reviewer: AQA	Project: Outer Area	Page 1 of 1
Analyte(s)	**DV Flag**	**Samples Affected**	**Reason**
PCBs	None	N/A	N/A

Comments: None

Appendix 3

Annotated Laboratory Reports

WSCF Analytical Results Report

Attention Michael Neely
Department Organic, Semivolatiles

Group # WSCF112290

Sample # 112290001
SAF# F11-055
Sample ID B2BH54

Matrix WATER
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
TPHDWA										
Diesel	TPHDIESEL	LA-523-493	UNX	<70		ug/L	1	70	100	05/25/11
Kerosene	TPHKEROSEN	LA-523-493	U	<70		ug/L	1	70	100	05/25/11
SPE										**05/24/11**
PCBs										
Aroclor-1016	12674-11-2	LA-523-427	U	<0.09		ug/L	1	0.09	0.2	05/27/11
Aroclor-1221	11104-28-2	LA-523-427	U	<0.2		ug/L	1	0.2	0.4	05/27/11
Aroclor-1232	11141-16-5	LA-523-427	U	<0.09		ug/L	1	0.09	0.2	05/27/11
Aroclor-1242	53469-21-9	LA-523-427	U	<0.09		ug/L	1	0.09	0.2	05/27/11
Aroclor-1248	12672-29-6	LA-523-427	U	<0.09		ug/L	1	0.09	0.2	05/27/11
Aroclor-1254	11097-69-1	LA-523-427	U	<0.09		ug/L	1	0.09	0.2	05/27/11
Aroclor-1260	11096-82-5	LA-523-427	U	<0.09		ug/L	1	0.09	0.2	05/27/11

LS
8-08-2011

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 # WSCF112291

Sample # 112291001
SAF# F11-054
Sample ID B2BH28

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
8270 Prep										**05/23/11**
SW-846 8270D										
Naphthalene	91-20-3	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Acenaphthylene	208-96-8	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Acenaphthene	83-32-9	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Fluorene	86-73-7	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Phenanthrene	85-01-8	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Anthracene	120-12-7	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Fluoranthene	206-44-0	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Pyrene	129-00-0	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(a)anthracene	56-55-3	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Chrysene	218-01-9	LA-523-456	U	<200	<5 8-08-2011	ug/kg	1	200	800	05/25/11
Benzo(b)fluoranthene	205-99-2	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(k)fluoranthene	207-08-9	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(a)pyrene	50-32-8	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Indeno(1,2,3-cd)pyrene	193-39-5	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Dibenzo(a,h)anthracene	53-70-3	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(g,h,i)perylene	191-24-2	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
PCB Prep Solids										**05/23/11**

MDL = Minimum Detection
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DF = Dilution Factor
+ - Indicates more than nine qualifier

B - Analyte was detected in both the BLANK and SAMPLE
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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 # WSCF112291

Sample # 112291001
SAF# F11-054
Sample ID B2BH28

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
PCBs										
Aroclor-1016	12674-11-2	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1221	11104-28-2	LA-523-427	U	<8		ug/kg	1	8	20	05/27/11
Aroclor-1232	11141-16-5	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1242	53469-21-9	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1248	12672-29-6	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1254	11097-69-1	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1260	11096-82-5	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
~~**TPHD Prep Solids**~~										~~**05/23/11**~~
TPHDWA										
Diesel	TPHDIESEL	LA-523-493	UNX	<4		mg/kg	1	4	5	05/25/11
~~Kerosene~~	~~TPHKEROSEN~~	~~LA-523-493~~	~~U~~	~~<4~~		~~mg/kg~~	~~1~~	~~4~~	~~5~~	~~05/25/11~~

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8-08-2011

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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 # WSCF112291

Sample # 112291002
SAF# F11-054
Sample ID B2BH30

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
8270 Prep										**05/23/11**
SW-846 8270D										
Naphthalene	91-20-3	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Acenaphthylene	208-96-8	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Acenaphthene	83-32-9	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Fluorene	86-73-7	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Phenanthrene	85-01-8	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Anthracene	120-12-7	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Fluoranthene	206-44-0	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Pyrene	129-00-0	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(a)anthracene	56-55-3	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Chrysene	218-01-9	LA-523-456	U	<200	LS 8-08-2011	ug/kg	1	200	800	05/25/11
Benzo(b)fluoranthene	205-99-2	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(k)fluoranthene	207-08-9	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(a)pyrene	50-32-8	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Indeno(1,2,3-cd)pyrene	193-39-5	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Dibenzo(a,h)anthracene	53-70-3	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(g,h,i)perylene	191-24-2	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
PCB Prep Solids										**05/23/11**

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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 # WSCF112291

Sample # 112291002
SAF# F11-054
Sample ID B2BH30

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
PCBs										
Aroclor-1016	12674-11-2	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1221	11104-28-2	LA-523-427	U	<8		ug/kg	1	8	20	05/27/11
Aroclor-1232	11141-16-5	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1242	53469-21-9	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1248	12672-29-6	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1254	11097-69-1	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1260	11096-82-5	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
~~**TPHD Prep Solids**~~										~~**05/23/11**~~
TPHDWA										
Diesel	TPHDIESEL	LA-523-493	UNX	<4		mg/kg	1	4	5	05/25/11
~~Kerosene~~	~~TPHKEROSEN~~	~~LA-523-493~~	~~U~~	~~<4~~		~~mg/kg~~	~~1~~	~~4~~	~~5~~	~~05/25/11~~

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8-08-2011

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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 # WSCF112291

Sample # 112291003
SAF# F11-054
Sample ID B2BH36

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
8270 Prep										**05/23/11**
SW-846 8270D										
Naphthalene	91-20-3	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Acenaphthylene	208-96-8	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Acenaphthene	83-32-9	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Fluorene	86-73-7	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Phenanthrene	85-01-8	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Anthracene	120-12-7	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Fluoranthene	206-44-0	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Pyrene	129-00-0	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(a)anthracene	56-55-3	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Chrysene	218-01-9	LA-523-456	U	<200	LS 8-08-2011	ug/kg	1	200	800	05/25/11
Benzo(b)fluoranthene	205-99-2	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(k)fluoranthene	207-08-9	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(a)pyrene	50-32-8	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Indeno(1,2,3-cd)pyrene	193-39-5	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Dibenzo(a,h)anthracene	53-70-3	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(g,h,i)perylene	191-24-2	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
PCB Prep Solids										**05/23/11**

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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 # WSCF112291

Sample # 112291003
SAF# F11-054
Sample ID B2BH36

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
PCBs										
Aroclor-1016	12674-11-2	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1221	11104-28-2	LA-523-427	U	<8		ug/kg	1	8	20	05/27/11
Aroclor-1232	11141-16-5	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1242	53469-21-9	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1248	12672-29-6	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1254	11097-69-1	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1260	11096-82-5	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
~~**TPHD Prep Solids**~~										~~**05/23/11**~~
TPHDWA										
Diesel	TPHDIESEL	LA-523-493	UNX	<4		mg/kg	1	4	5	05/24/11
~~Kerosene~~	~~TPHKEROSEN~~	~~LA-523-493~~	~~U~~	~~<4~~		~~mg/kg~~	~~1~~	~~4~~	~~5~~	~~05/24/11~~

LS
8-08-2011

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J - Analyte < lowest calibration but >= MDL.
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T - MS/MSD recovery outside control limits(GC/MS only).
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PQL is equivalent to Estimated Quantitation Limit (EQL)

WSCF Analytical Results Report

Attention Michael Neely
Department Organic, Semivolatiles

Group # WSCF112291

Sample # 112291004
SAF# F11-054
Sample ID B2BH37

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
8270 Prep										**05/23/11**
SW-846 8270D										
Naphthalene	91-20-3	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Acenaphthylene	208-96-8	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Acenaphthene	83-32-9	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Fluorene	86-73-7	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Phenanthrene	85-01-8	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Anthracene	120-12-7	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Fluoranthene	206-44-0	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Pyrene	129-00-0	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(a)anthracene	56-55-3	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Chrysene	218-01-9	LA-523-456	U	<200	LS 8-08-2011	ug/kg	1	200	800	05/25/11
Benzo(b)fluoranthene	205-99-2	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(k)fluoranthene	207-08-9	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(a)pyrene	50-32-8	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Indeno(1,2,3-cd)pyrene	193-39-5	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Dibenzo(a,h)anthracene	53-70-3	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
Benzo(g,h,i)perylene	191-24-2	LA-523-456	U	<200		ug/kg	1	200	800	05/25/11
PCB Prep Solids										**05/23/11**

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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 # WSCF112291

Sample # 112291004
SAF# F11-054
Sample ID B2BH37

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
PCBs										
Aroclor-1016	12674-11-2	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1221	11104-28-2	LA-523-427	U	<8		ug/kg	1	8	20	05/27/11
Aroclor-1232	11141-16-5	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1242	53469-21-9	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1248	12672-29-6	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1254	11097-69-1	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
Aroclor-1260	11096-82-5	LA-523-427	U	<4		ug/kg	1	4	8	05/27/11
~~**TPHD Prep Solids**~~										~~**05/23/11**~~
TPHDWA										
Diesel	TPHDIESEL	LA-523-493	UNX	<4		mg/kg	1	4	5	05/25/11
~~Kerosene~~	~~TPHKEROSEN~~	~~LA-523-493~~	~~U~~	~~<4~~		~~mg/kg~~	~~1~~	~~4~~	~~5~~	~~05/25/11~~

LS
8-08-2011

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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
WSCF112290

Introduction

A sample was received at the WSCF laboratory as referenced on the WSCF SAF Number Cross Reference table included in the final report. The sample was 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

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

- All applicable QC controls are within the established limits.

Attachment 2
Narrative
WSCF112290

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.

ICP-AES Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- All applicable QC controls are within the established limits.

ICP-MS Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- Mercury – Matrix Spike and/or Matrix Spike Duplicate recoveries are outside established laboratory limits. Affected sample results in this batch were "N" flagged.
- Vanadium – Detected in the Blank and evaluated. Affected sample results in this batch were "C" Flagged.
- Barium and Strontium – Exceeded spiking levels by a factor of 4. Spike recoveries and associated RPDs are not valid.
- All other applicable QC controls are within the established limits.

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

- All applicable QC controls are within the established limits.

Organic Comments

PCB – 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.

Semi-VOA – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- Analysis performed by 8270-PAH SIM method.
- All applicable QC controls are within the established limits.

Attachment 2
Narrative
WSCF112290

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.
    - Matrix Spike and/or Matrix Spike Duplicate recoveries are outside established laboratory limits. Affected sample results in this batch were "N" flagged.
    - The LCS Failed. Sample Issue Resolution Form SDR11-292 was generated. Sample and QC results were flagged.
    - All other applicable QC controls are within the established limits.

Radiochemistry Comments

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

- Gross Alpha / Gross Beta:
    - 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.

Attachment 2
Narrative
WSCF112290

SAMPLE ISSUE RESOLUTION

SIR NUM	SDR11-292
REV NUM	0
DATE INITIATED	6/2/2011

SAMPLE EVENT INFORMATION

SAF NUM(S)	F11-055, I11-025
OPERABLE UNIT(S)	100-NR-2, NONE
PROJECT(S)	Outer Area, CERC11
SAMPLE EVENT TITLE(S)	200-MG-1 Waste Sites, CERC11
LABORATORY	Waste Sampling & Characterization

SAMPLING INFORMATION

NUMBER OF SAMPLES	4
SAMPLE NUMBERS	B2BH54, B2CY15, B2CY22, B2CY23
SAMPLE MATRIX	WATER
COLLECTION DATE	5/19/2011 - 5/20/2011
SDG NUM	WSCF112295, WSCF112290

ISSUE BACKGROUND

CLASS	Laboratory Issue
TYPE	Quality Control Failure
DESCRIPTION	THE TPHD LCS /MS/MSD ALL FAILED HIGH, HOWEVER, THE SAMPLES WERE ALL NON-DETECT FOR TPHD.
	LCS (154%) LIMITS 65-128% MS (176.4%) LIMITS 73-123%

DISPOSITION

DESCRIPTION	Report results as-is and flag the samples with a comment in the narrative.
	Please initiate a re-run of samples B2CY15, B2CY22, B2CY23 within hold time.
JUSTIFICATION	Submitted by: Marisol Avila Date: 6/2/2011
	Accepted by: Deb Alexander Date: 6/2/2011

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CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F11-055-001

PAGE 1 OF 2

COLLECTOR: Patterson

SAMPLING LOCATION: NPE EB 1

ICE CHEST NO.:

COMPANY CONTACT: WIDRIG, DL

TELEPHONE NO.: 376-2858

PROJECT COORDINATOR: WIDRIG, DL

PRICE CODE: 7C

DATA TURNAROUND: 15 Days / 15 Days

AIR QUALITY: ☐

PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - QC Sampling

SAF NO.: F11-055

FIELD LOGBOOK NO.: HNF-N 507-21

ACTUAL SAMPLE DEPTH: N/A

COA: 302427ES10

METHOD OF SHIPMENT: GOVERNMENT VEHICLE

ORIGINAL

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)

112290

SPECIAL HANDLING AND/OR STORAGE

PRESERVATION	Cool~4C	HCl to pH <2/Cool~4C	Cool~4C	HNO3 to pH <2	Cool~4C	Cool~4C	None	HNO3 to pH <2
HOLDING TIME	7/40 Days	7/40 Days	1 yr/1 yr	28 Days	24 Hours	28 Days/48 Hours	ASAP	6 Months
TYPE OF CONTAINER	aG	aG	aG	G/P	aG	P	P	G/P
NO. OF CONTAINER(S)	4	3	4	1	1	1	1	1
VOLUME	1L	1L	1L	500mL	500mL	250mL	60mL	500mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS	SEE ITEM (4) IN SPECIAL INSTRUCTIONS	Chromium Hex - 7196;	IC Anions - 300.0 (Nitrogen in Nitrate);	pH (Water) - 9040 (pH Measurement);	SEE ITEM (5) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME								
B2BH54	1 WATER	5/19/11	0815	✓	✓	✓	✓	✓	✓	✓	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
K. Patterson	5/19/11 1300	M. Nelson	5/19/11 1300
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

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS

SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

LABORATORY SECTION — RECEIVED BY — TITLE — DATE/TIME

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

PRINTED ON 1/17/2011

A-6003-618 (REV 2)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-055-001	PAGE 2 OF 2
COLLECTOR K. Patterson	COMPANY CONTACT WIDRIG, DL	TELEPHONE NO. 376-2858	PROJECT COORDINATOR WIDRIG, DL	PRICE CODE 7C	DATA TURNAROUND 15 Days / 15 Days
SAMPLING LOCATION NPE EB 1	PROJECT DESIGNATION Non Operational Area Evaluation Sampling - QC Sampling		SAF NO. F11-055	AIR QUALITY [ ]	
ICE CHEST NO.	FIELD LOGBOOK NO. HNF-N-507-21	ACTUAL SAMPLE DEPTH N/A	COA 302427ES10	METHOD OF SHIPMENT GOVERNMENT VEHICLE	ORIGINAL
SHIPPED TO Waste Sampling & Characterization	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

SPECIAL INSTRUCTIONS

** Duplicates and equipment blanks to be collected at a frequency of 1/day of sampling. If multiple samples are collected in one day, only colllect the duplicate and equipment blank associated with the first sample of that day.

** The CACN for all analytical work at WSCF laboratory is 401910ES20.

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

** The laboratory shall report only the requested constituents of concern in all preliminary or final hardcopy data reports, or EDDs. QC results for non-requested constituents need not be reported, but samples chosen for matrix spike, and all spike compounds shall be identified in the final data report narrative. No TICs shall be reported.
(1) Semi-VOA - 8270 (TCL) {Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene};
(2) TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range};
(3) PCBs - 8082 {Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260};
(4) 200.8_HG - ICPMS {Mercury}; ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Cobalt, Copper, Manganese, Nickel, Silver, Vanadium, Zinc}; ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Selenium, Strontium, Thallium, Tin, Uranium}; ICP Metals - 6010 (Add-On) {Boron, Lithium};
(5) Gross Alpha {Gross alpha}; Gross Beta {Gross beta};

PRINTED ON 1/17/2011 A-6003-619 (REV 2)

Attachment 2
Narrative
WSCF112291

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

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

- All applicable QC controls are within the established limits.

Attachment 2
Narrative
WSCF112291

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):

- Matrix Spike and Post Spike recoveries are outside established laboratory limits. Affected sample results in this batch were "N" flagged.
- All other applicable QC controls are within the established limits.

ICP-AES Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- All applicable QC controls are within the established limits.

ICP-MS Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- All applicable QC controls are within the established limits.

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

- All applicable QC controls are within the established limits.

Organic Comments

PCB – 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.

Semi-VOA – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- Analysis performed by 8270-PAH SIM method.
- All applicable QC controls are within the established limits.

TPHD-WA – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. 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.

- The LCS did not meet laboratory acceptance criteria. Samples and QC were flagged for the failure. Sample issue resolution form SDR11-293 was generated. The results were reported as stated in the resolution.
- Diesel – Matrix Spike and/or Matrix Spike Duplicate recoveries are outside established laboratory limits. Affected sample results in this batch were "N" flagged.
- All other applicable QC controls are within the established limits.

Radiochemistry Comments

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

- Gross Alpha / Gross Beta:
  - Gross Beta – Duplicate Relative Percent Difference(s) (RPD) did not meet the established laboratory limits. Duplicate Relative Percent Difference (RPD) does not apply to results below 5X the minimum detectable activity. No flags issued.
  - 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.

Narrative

Attachment 2
Narrative
WSCF112291

SAMPLE ISSUE RESOLUTION

SIR NUM	SDR11-293
REV NUM	0
DATE INITIATED	6/2/2011

SAMPLE EVENT INFORMATION

SAF NUM(S)	F11-054
OPERABLE UNIT(S)	NONE
PROJECT(S)	Outer Area
SAMPLE EVENT TITLE(S)	200-MG-1 Waste Sites
LABORATORY	Waste Sampling & Characterization

SAMPLING INFORMATION

NUMBER OF SAMPLES	9
SAMPLE NUMBERS	B2BH28, B2BH30, B2BH32, B2BH36, B2BH37, B2BH38, B2BH40, B2BH44, B2BH48
SAMPLE MATRIX	SOIL
COLLECTION DATE	5/19/2011 - 5/23/2011
SDG NUM	WSCF112291, WSCF112305

ISSUE BACKGROUND

CLASS	Laboratory Issue
TYPE	Quality Control Failure
DESCRIPTION	The TPHD LCS failed high, however, the samples were all non-detect for TPHD. LCS (142.4%) LIMITS 70-130%

DISPOSITION

DESCRIPTION	Report results as-is and flag the samples with a comment in the narrative.
JUSTIFICATION	Submitted by: Marisol Avila Date: 6/2/2011
	Accepted by: Kelly Whitley Date:6/2/2011

A-6003-640 (03/30) 4 PAGE 1 of 1

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F11-054-001

PAGE 1 OF 2

COLLECTOR: KC Patterson CHPRC

COMPANY CONTACT: WIDRIG, DL

TELEPHONE NO.: 376-2858

PROJECT COORDINATOR: WIDRIG, DL

PRICE CODE: 8C

DATA TURNAROUND: 15 Days / 15 Days

SAMPLING LOCATION: NPE-01

PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - Soil

SAF NO.: F11-054

AIR QUALITY: ☐

ICE CHEST NO.:

FIELD LOGBOOK NO.: HNF-N-501-21

ACTUAL SAMPLE DEPTH: 0-6"

COA: 302427ES10

METHOD OF SHIPMENT: GOVERNMENT VEHICLE

ORIGINAL

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)

112291

SPECIAL HANDLING AND/OR STORAGE

PRESERVATION	Cool~4C	Cool~4C	None
HOLDING TIME	14/40 Days	28 Days	6 Months
TYPE OF CONTAINER	aG	G/P	G/P
NO. OF CONTAINER(S)	1	1	1
VOLUME	250mL	250mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS

SAMPLE NO.		MATRIX*	SAMPLE DATE	SAMPLE TIME			
B2BH28	1	SOIL	MAY 19 2011	1133	✓	✓	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
KC Patterson CHPRC	MAY 19 2011	BW H Nelson	MAY 19 2011 1300
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

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS

SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

LABORATORY SECTION — RECEIVED BY — TITLE — DATE/TIME

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

PRINTED ON 1/17/2011

A-6003-618 (REV 2)

CH2MHill Plateau Remediation Company — **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** — **F11-054-001** — **PAGE 2 OF 2**

COLLECTOR KC Patterson CHPRC	**COMPANY CONTACT** WIDRIG, DL	**TELEPHONE NO.** 376-2858	**PROJECT COORDINATOR** WIDRIG, DL	**PRICE CODE** 8C	**DATA TURNAROUND** 15 Days / 15 Days
SAMPLING LOCATION NPE-01	**PROJECT DESIGNATION** Non Operational Area Evaluation Sampling - Soil		**SAF NO.** F11-051	**AIR QUALITY** ☐	
ICE CHEST NO.	**FIELD LOGBOOK NO.** HNF-N-303-21	**ACTUAL SAMPLE DEPTH** 0-6"	**COA** 302427ES10	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	**ORIGINAL**
SHIPPED TO Waste Sampling & Characterization	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

SPECIAL INSTRUCTIONS

** Sample locations will be randomly selected from the investigation area. Final location decisions will be made by the Field PAL and samplers.

** There are 11 primary sampling locations and 2 alternates. Samples NP-08 and NP-10 are preferred locations, but the alternates may be substituted for these if necessary.

** Samplers, RadCon and project personnel must walk to sampling locations as driving is prohibited in this area.

** Sampling must be performed at the soil surface and sampling coordinates must be collected via GPS.

** Duplicates and equipment blanks to be collected at a frequency of 1/day of sampling. If multiple samples are collected in one day, only colllect the duplicate and equipment blank associated with the first sample of that day.

** The CACN for all analytical work at WSCF laboratory is 401910ES20.

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

** The laboratory shall report only the requested constituents of concern in all preliminary or final hardcopy data reports, or EDDs. QC results for non-requested constituents need not be reported, but samples chosen for matrix spike, and all spike compounds shall be identified in the final data report narrative. No TICs shall be reported.
(1) 8270_SVOA_GCMS: SIM {Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene}; TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range}; PCBs - 8082 {Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260};
(2) 200.8_HG - ICPMS {Mercury}; ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Cobalt, Copper, Manganese, Nickel, Silver, Vanadium, Zinc}; ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Selenium, Strontium, Thallium, Tin, Uranium}; ICP Metals - 6010 (Add-On) {Boron, Lithium}; Chromium Hex - 7196; IC Anions - 300.0 {Nitrogen in Nitrate}; pH (Soil) - 9045 {pH Measurement};
(3) Gross Alpha {Gross alpha}; Gross Beta {Gross beta};

PRINTED ON 1/17/2011 — A-6003-618 (REV 2)

Thursday, May 19, 2011 2:38:07 PM
Page 4 of 10

Sample Receipt

Chain of Custody

CH2MHill Plateau Remediation Company — **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** — F11-054-003 — PAGE 1 OF 2

COLLECTOR: KC Patterson CHPRC	COMPANY CONTACT: WIDRIG, DL	TELEPHONE NO.: 376-2858	PROJECT COORDINATOR: WIDRIG, DL
PRICE CODE: 8C	DATA TURNAROUND: 15 Days / 15 Days		
SAMPLING LOCATION: NPE-02	PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - Soil	SAF NO.: F11-054	AIR QUALITY: ☐
ICE CHEST NO.	FIELD LOGBOOK NO.: HNF-N-507-21	ACTUAL SAMPLE DEPTH: 0-6"	COA: 302427E510
METHOD OF SHIPMENT: GOVERNMENT VEHICLE	ORIGINAL		
SHIPPED TO: Waste Sampling & Characterization	OFFSITE PROPERTY NO.: N/A	BILL OF LADING/AIR BILL NO.: N/A	

MATRIX*: A=Air, DI=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

PRESERVATION	Cool~4C	Cool~4C	None
HOLDING TIME	14/40 Days	28 Days	6 Months
TYPE OF CONTAINER	aG	G/P	G/P
NO. OF CONTAINER(S)	1	1	1
VOLUME	250mL	250mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS

SAMPLE NO.		MATRIX*	SAMPLE DATE	SAMPLE TIME			
B2BH30	2	SOIL	MAY 19 2011	1045	✓	✓	✓

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM: KC Patterson CHPRC	DATE/TIME: MAY 19 2011 1300	RECEIVED BY/STORED IN: R.C. Nelson	DATE/TIME: MAY 19 2011 1300
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS: SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

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

PRINTED ON 1/17/2011 — A-6003-618 (REV 2)

Sample Receipt

Chain of Custody

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F11-054-003

PAGE 2 OF 2

COLLECTOR: KC Patterson CHPRC	COMPANY CONTACT: WIDRIG, DL	TELEPHONE NO.: 376-2858	PROJECT COORDINATOR: WIDRIG, DL	PRICE CODE: 8C	DATA TURNAROUND: 15 Days / 15 Days
SAMPLING LOCATION: NPE-02	PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - Soil		SAF NO.: F11-054	AIR QUALITY: ☐	
ICE CHEST NO.	FIELD LOGBOOK NO.: HNF-N-507-21	ACTUAL SAMPLE DEPTH: 0-6"	COA: 302427ES10	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	ORIGINAL
SHIPPED TO: Waste Sampling & Characterization	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

SPECIAL INSTRUCTIONS

** Sample locations will be randomly selected from the investigation area. Final location decisions will be made by the Field PAL and samplers.

** There are 11 primary sampling locations and 2 alternates. Samples NP-08 and NP-10 are preferred locations, but the alternates may be substituted for these if necessary.

** Samplers, RadCon and project personnel must walk to sampling locations as driving is prohibited in this area.

** Sampling must be performed at the soil surface and sampling coordinates must be collected via GPS.

** Duplicates and equipment blanks to be collected at a frequency of 1/day of sampling. If multiple samples are collected in one day, only colllect the duplicate and equipment blank associated with the first sample of that day.

** The CACN for all analytical work at WSCF laboratory is 401910ES20.

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

** The laboratory shall report only the requested constituents of concern in all preliminary or final hardcopy data reports, or EDDs. QC results for non-requested constituents need not be reported, but samples chosen for matrix spike, and all spike compounds shall be identified in the final data report narrative. No TICs shall be reported.
(1) 8270_SVOA_GCMS: SIM {Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene}; TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range}; PCBs - 8082 {Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260};
(2) 200.8_HG - ICPMS {Mercury}; ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Cobalt, Copper, Manganese, Nickel, Silver, Vanadium, Zinc}; ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Selenium, Strontium, Thallium, Tin, Uranium}; ICP Metals - 6010 (Add-On) {Boron, Lithium}; Chromium Hex - 7196; IC Anions - 300.0 {Nitrogen in Nitrate}; pH (Soil) 9045 {pH Measurement};
(3) Gross Alpha {Gross alpha}; Gross Beta {Gross beta};

PRINTED ON 1/17/2011

A-6003-618 (REV 7)

Sample Receipt

Chain of Custody

CH2MHill Plateau Remediation Company — **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** — F11-054-009 — PAGE 1 OF 2

COLLECTOR: KC Patterson, CHPRC	COMPANY CONTACT: WIDRIG, DL	TELEPHONE NO.: 376-2858	PROJECT COORDINATOR: WIDRIG, DL
PRICE CODE: 8C	DATA TURNAROUND: 15 Days / 15 Days	SAMPLING LOCATION: NPE-05	PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - Soil
SAF NO.: F11-054	AIR QUALITY: L	ICE CHEST NO.	FIELD LOGBOOK NO.: HNF-N-507-21
ACTUAL SAMPLE DEPTH: 0-6"	COA: 302427ES10	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	ORIGINAL
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

PRESERVATION	Cool~4C	Cool~4C	None
HOLDING TIME	14/40 Days	28 Days	6 Months
TYPE OF CONTAINER	aG	G/P	G/P
NO. OF CONTAINER(S)	1	1	1
VOLUME	250mL	250mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS

SAMPLE NO.		MATRIX*	SAMPLE DATE	SAMPLE TIME			
B2BH35	3	SOIL	MAY 19 2011	0945	✓	✓	✓

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM: KC Patterson, CHPRC	DATE/TIME: MAY 19 2011 1300	RECEIVED BY/STORED IN: M. Nelson M. Nelson	DATE/TIME: MAY 19 2011 1300
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS: SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

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

PRINTED ON 1/17/2011 — R-6003-618 (REV 2)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-054-009	PAGE 2 OF 2
COLLECTOR KC Patterson CHPRC	COMPANY CONTACT WIDRIG, DL	TELEPHONE NO. 376-2858	PROJECT COORDINATOR WIDRIG, DL	PRICE CODE 8C	DATA TURNAROUND 15 Days / 15 Days
SAMPLING LOCATION NPE-05	PROJECT DESIGNATION Non Operational Area Evaluation Sampling - Soil		SAF NO. F11-054	AIR QUALITY ☐	
ICE CHEST NO.	FIELD LOGBOOK NO. HNF-N-507-21	ACTUAL SAMPLE DEPTH 0-6"	COA 302427ES10	METHOD OF SHIPMENT GOVERNMENT VEHICLE	ORIGINAL
SHIPPED TO Waste Sampling & Characterization	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

SPECIAL INSTRUCTIONS

** Sample locations will be randomly selected from the investigation area. Final location decisions will be made by the Field PAL and samplers.

** There are 11 primary sampling locations and 2 alternates. Samples NP-08 and NP-10 are preferred locations, but the alternates may be substituted for these if necessary.

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** Sampling must be performed at the soil surface and sampling coordinates must be collected via GPS.

** Duplicates and equipment blanks to be collected at a frequency of 1/day of sampling. If multiple samples are collected in one day, only collect the duplicate and equipment blank associated with the first sample of that day.

** The CACN for all analytical work at WSCF laboratory is 401910ES20.

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

** The laboratory shall report only the requested constituents of concern in all preliminary or final hardcopy data reports, or EDDs. QC results for non-requested constituents need not be reported, but samples chosen for matrix spike, and all spike compounds shall be identified in the final data report narrative. No TICs shall be reported.
(1) 8270_SVOA_GCMS: SIM {Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene}; TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range}; PCBs - 8082 {Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260};
(2) 200.8_HG - ICPMS {Mercury}; ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Cobalt, Copper, Manganese, Nickel, Silver, Vanadium, Zinc}; ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Selenium, Strontium, Thallium, Tin, Uranium}; ICP Metals - 6010 (Add-On) {Boron, Lithium}; Chromium Hex - 7196; IC Anions - 300.0 {Nitrogen in Nitrate}; pH (Soil) - 9045 {pH Measurement};
(3) Gross Alpha {Gross alpha}; Gross Beta {Gross beta};

PRINTED ON 1/17/2011

A-6003-618 (REV 2)

Sample Receipt

Chain of Custody

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F11-054-010

PAGE 1 OF 2

COLLECTOR: KC Patterson CHPRC

COMPANY CONTACT: WIDRIG, DL

TELEPHONE NO.: 375-2858

PROJECT COORDINATOR: WIDRIG, DL

PRICE CODE: 8C

DATA TURNAROUND: 15 Days / 15 Days

SAMPLING LOCATION: NPE-05 DUP

PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - Soil

SAF NO.: F11-054

AIR QUALITY: ☐

ICE CHEST NO.:

FIELD LOGBOOK NO.: HNF-N-507-21

ACTUAL SAMPLE DEPTH: 0-6"

COA: 302427ES10

METHOD OF SHIPMENT: GOVERNMENT VEHICLE

ORIGINAL

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

PRESERVATION	Cool~4C	Cool~4C	None
HOLDING TIME	14/40 Days	28 Days	6 Months
TYPE OF CONTAINER	aG	G/P	G/P
NO. OF CONTAINER(S)	1	1	1
VOLUME	250mL	250mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS

SAMPLE NO.		MATRIX*	SAMPLE DATE	SAMPLE TIME			
B2BH37	4	SOIL	MAY 19 2011	0945	✓	✓	✓

CHAIN OF POSSESSION / SIGN/ PRINT NAMES

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
KC Patterson CHPRC	MAY 19 2011 1300	H. Nelsonmacy	MAY 19 2011 1300
			MAY 19 2011

SPECIAL INSTRUCTIONS: SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

LABORATORY SECTION: RECEIVED BY | TITLE | DATE/TIME

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

PRINTED ON 1/17/2011

A-6003-618 (REV 2)

Sample Receipt

Chain of Custody

CH2MHill Plateau Remediation Company — **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** — F11-054-010 — PAGE 2 OF 2

COLLECTOR KC Patterson CHPRC	**COMPANY CONTACT** WIDRIG, DL	**TELEPHONE NO.** 376-2958	**PROJECT COORDINATOR** WIDRIG, DL	**PRICE CODE** 8C	**DATA TURNAROUND**
SAMPLING LOCATION NPE-05 DUP	**PROJECT DESIGNATION** Non Operational Area Evaluation Sampling - Soil		**SAF NO.** F11-054	**AIR QUALITY** ☐	15 Days / 15 Days
ICE CHEST NO.	**FIELD LOGBOOK NO.** HNF-N-507-21	**ACTUAL SAMPLE DEPTH** 0-6"	**COA** 302427ES10	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	**ORIGINAL**
SHIPPED TO Waste Sampling & Characterization	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

SPECIAL INSTRUCTIONS

** Sample locations will be randomly selected from the investigation area. Final location decisions will be made by the Field PAL and samplers.

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(1) 8270_SVOA_GCMS: SIM {Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene}; TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range}; PCBs - 8082 {Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260};
(2) 200.8_HG - ICPMS {Mercury}; ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Cobalt, Copper, Manganese, Nickel, Silver, Vanadium, Zinc}; ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Selenium, Strontium, Thallium, Tin, Uranium}; ICP Metals - 6010 (Add-On) {Boron, Lithium}; Chromium Hex - 7196; IC Anions - 300.0 {Nitrogen in Nitrate}; pH (Soil) 9045 {pH Measurement};
(3) Gross Alpha {Gross alpha}; Gross Beta {Gross beta};

PRINTED ON 1/17/2011 — A-6003-618 (REV 7)

Appendix 5

Data Validation Supporting Documentation

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: Outer Area			DATA PACKAGE: VSR11-053		
VALIDATOR: Carl Schloesslin		LAB: WSCF		DATE: 8-10-2011	
			SDG: WSCF112290, WSCF112291		
ANALYSES PERFORMED					
SW-846 8081	SW-846 8081 (TCLP)	SW-846 8082 X	SW-846 8081 (TCLP)	SW-846 8310	

SAMPLES/MATRIX

SDG WSCF112290 (Water): B2BH54 (equipment blank)

SDG WSCF112291 (Soil): B2BH28, B2BH30, B2BH36, B2BH37 (field duplicate of B2BH36)

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: None

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:

Aroclor-1254 only spiked into LCS and MS/MSD

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:

Note: Client instructed AQA that CRDLs in SAP only should be used for detection limit assessment and to ignore CRDLs listed in the SAFs.

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

Quality Control Report

Attention Michael Neely
Department Organic, Semivolatiles

Group # WSCF112290

QC Batch 182562
Associated Samples 112290001

Test PCBs by EPA SW-846 Method 8082

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #56487**							
Aroclor-1016	12674-11-2		<0.1	ug/L					U	05/27/11
Aroclor-1221	11104-28-2		<0.2	ug/L					U	05/27/11
Aroclor-1232	11141-16-5		<0.1	ug/L					U	05/27/11
Aroclor-1242	53469-21-9		<0.1	ug/L					U	05/27/11
Aroclor-1248	12672-29-6		<0.1	ug/L					U	05/27/11
Aroclor-1254	11097-69-1		<0.1	ug/L					U	05/27/11
Aroclor-1260	11096-82-5		<0.1	ug/L					U	05/27/11
LCS			**QC Sample #56488**							
Aroclor-1254	11097-69-1		1.9	ug/L	94	70 - 130				05/27/11
MS			**QC Sample #56489**							
			Original 112290001							
Aroclor-1254	11097-69-1	<0.09	2.0	ug/L	99.8	60 - 130				05/27/11
MSD			**QC Sample #56490**							
			Original 112290001					**Paired**	**56489**	
Aroclor-1254	11097-69-1	<0.09	1.9	ug/L	98.6	60 - 130	1.20	20		05/27/11

Quality Control Report

Attention Michael Neely
Department Organic, Semivolatiles

Group # WSCF112290

QC Batch 182562
Associated Samples 112290001

Test PCBs by EPA SW-846 Method 8082

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
SAMPLE			**Sample #112290001**							
Tetrachloro-m-xylene	877-09-8				88.2	60 - 140				05/27/11
Decachlorobiphenyl	2051-24-3				106.4	60 - 140				05/27/11
BLANK			**QC Sample #56487**							
Tetrachloro-m-xylene	877-09-8				132.8	60 - 140				05/27/11
Decachlorobiphenyl	2051-24-3				74.4	60 - 140				05/27/11
LCS			**QC Sample #56488**							
Tetrachloro-m-xylene	877-09-8				68.6	60 - 140				05/27/11
Decachlorobiphenyl	2051-24-3				76.8	60 - 140				05/27/11
MS			**QC Sample #56489**							
			Original 112290001							
Tetrachloro-m-xylene	877-09-8				79.5	60 - 140				05/27/11
Decachlorobiphenyl	2051-24-3				79	60 - 140				05/27/11
MSD			**QC Sample #56490**							
			Original 112290001					**Paired 56489**		
Tetrachloro-m-xylene	877-09-8				73	60 - 140	8.50			05/27/11
Decachlorobiphenyl	2051-24-3				93.9	60 - 140	17.20			05/27/11

Quality Control Report

Attention Michael Neely
Department Organic, Semivolatiles

Group # WSCF112291

QC Batch 182348
Associated Samples 112291001, 112291002, 112291003, 112291004

Test PCBs by EPA SW-846 Method 8082

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #56240**							
Aroclor-1232	11141-16-5		<4	ug/kg					U	05/27/11
Aroclor-1242	53469-21-9		<4	ug/kg					U	05/27/11
Aroclor-1248	12672-29-6		<4	ug/kg					U	05/27/11
Aroclor-1260	11096-82-5		<4	ug/kg					U	05/27/11
LCS			**QC Sample #56241**							
Aroclor-1254	11097-69-1		80	ug/kg	100.2	75 - 128				05/27/11
MS			**QC Sample #56242**							
			Original 112291003							
Aroclor-1254	11097-69-1	<4	380	ug/kg	99.6	62 - 140				05/27/11
MSD			**QC Sample #56243**							
			Original 112291003				**Paired**		**56242**	
Aroclor-1254	11097-69-1	<4	370	ug/kg	100.4	62 - 140	0.80	30		05/27/11

Quality Control Report

Attention Michael Neely
Department Organic, Semivolatiles

Group # WSCF112291

QC Batch 182348
Associated Samples 112291001, 112291002, 112291003, 112291004

Test PCBs by EPA SW-846 Method 8082

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #56240**							
Aroclor-1016	12674-11-2		<4	ug/kg					U	05/27/11
Aroclor-1221	11104-28-2		<8	ug/kg					U	05/27/11
Aroclor-1254	11097-69-1		<4	ug/kg					U	05/27/11

Quality Control Report

Attention Michael Neely
Department Organic, Semivolatiles

Group # WSCF112291

QC Batch 182348
Associated Samples 112291001, 112291002, 112291003, 112291004

Test PCBs by EPA SW-846 Method 8082

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
SAMPLE			**Sample #112291001**							
Tetrachloro-m-xylene	877-09-8				97.2	60 - 140				05/27/11
Decachlorobiphenyl	2051-24-3				117.2	60 - 140				05/27/11
SAMPLE			**Sample #112291002**							
Tetrachloro-m-xylene	877-09-8				99.3	60 - 140				05/27/11
Decachlorobiphenyl	2051-24-3				120.6	60 - 140				05/27/11
SAMPLE			**Sample #112291003**							
Tetrachloro-m-xylene	877-09-8				97.2	60 - 140				05/27/11
Decachlorobiphenyl	2051-24-3				113	60 - 140				05/27/11
SAMPLE			**Sample #112291004**							
Tetrachloro-m-xylene	877-09-8				99.5	60 - 140				05/27/11
Decachlorobiphenyl	2051-24-3				117.3	60 - 140				05/27/11
BLANK			**QC Sample #56240**							
Tetrachloro-m-xylene	877-09-8				79.5	60 - 140				05/27/11
Decachlorobiphenyl	2051-24-3				102	60 - 140				05/27/11
LCS			**QC Sample #56241**							

Quality Control Report

Attention Michael Neely
Department Organic, Semivolatiles

Group # WSCF112291

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Tetrachloro-m-xylene	877-09-8				82.5	60 - 124				05/27/11
Decachlorobiphenyl	2051-24-3				103.3	72 - 125				05/27/11
MS			**QC Sample #56242**							
			Original	**112291003**						
Tetrachloro-m-xylene	877-09-8				99.5	51 - 120				05/27/11
Decachlorobiphenyl	2051-24-3				121.9	66 - 126				05/27/11
MSD			**QC Sample #56243**							
			Original	**112291003**				**Paired**	**56242**	
Tetrachloro-m-xylene	877-09-8				95.8	51 - 120	3.80			05/27/11
Decachlorobiphenyl	2051-24-3				124.2	66 - 126	1.90			05/27/11

Date: 10 August 2011
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: Outer Area
Subject: Inorganics - Sample Data Groups (SDGs) WSCF112290 and WSCF1112291

INTRODUCTION

This memorandum presents the results of data validation for SDGs WSCF112290 and WSCF112291 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
B2BH54	5/19/2011	Water	C	6010C & 200.8
B2BH28	5/19/2011	Soil	C	6010C & 200.8
B2BH30	5/19/2011	Soil	C	6010C & 200.8
B2BH36	5/19/2011	Soil	C	6010C & 200.8
B2BH37	5/19/2011	Soil	C	6010C & 200.8

Data validation was conducted in accordance with the CHPRC validation statement of work and the Sampling and Analysis Plan for Selected 200-MG-1 Operable Unit Waste Sites, DOE/RL-2009-60, Rev. 1 (SAP). Appendices 1 through 6 provide the following information as indicated below:

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

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

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

For SDG WSCF112290, the V laboratory blank result was > the MDL but < the RL. The V result for sample B2BH54 was a detect < the RL and should be qualified as a non-detect at the RL (4.0 ug/L) and flagged "U."

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 exceptions. Cu, V and Zn were detected in equipment blank B2BH54. The V result has been qualified as a non-detect and flagged "U" due to laboratory blank contamination.

- **Accuracy**

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

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

All MS/MSD recoveries were acceptable with the following exceptions.

For SDG WSCF112290, the MSD recoveries for Hg and U were > the upper acceptance limit. The Hg and U results for sample B2BH54 were non-detects and should not be qualified.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exception.

For SDG WSCF112291, the LCS recovery for Sb was > 170%. The Sb results for samples B2BH28, B2BH30, B2BH36 and B2BH37 were non-detects and should be qualified as unusable and flagged "UR."

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ±30%. The 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 reporting limits with differences <1X the water reporting limits or differences <2X the soil reporting limits no precision infraction occurred.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Field Duplicate Samples

All field duplicate results were acceptable.

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

- **Completeness**

SDGs WSCF112290 and WSCF112291 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 97%.

MAJOR DEFICIENCIES

A major deficiency leading to qualification of the Sb results for samples B2BH28, B2BH30, B2BH36 and B2BH37 as unusable was due to a very high LCS recovery.

MINOR DEFICIENCIES

A minor deficiency leading to qualification of the V sample result for sample B2BH54 as a non-detect was due to a laboratory blank infraction.

REFERENCES

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

DOE/RL-2009-60, Rev. 1, *Sampling and Analysis Plan for Selected 200-MG-1 Operable Unit Waste Sites*, January 2011.

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: WSCF112290 & WSCF112291	Reviewer: AQA	Project: Outer Area	Page 1 of 1
Analyte(s)	**DV Flag**	**Samples Affected**	**Reason**
Sb	**UR**	B2BH28, B2BH30, B2BH36, B2BH37	Very high LCS recovery
V	4.0U	B2BH54	Laboratory blank contamination

Comments: None

Appendix 3

Annotated Laboratory Reports

WSCF Analytical Results Report

Attention Michael Neely
Department Inorganic

Group # WSCF112290

Sample # 112290001
SAF# F11-055
Sample ID B2BH54

Matrix WATER
Sampled 05/19/11
Received 05/19/11

LS
8-08-2011

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
~~**Anions by IC**~~										~~**05/19/11**~~
Anions by IC										
Nitrate-N	NO3-N	LA-533-410	UD	<0.038		ug/mL	2	0.038		05/19/11
Cr(VI)										**05/19/11**
Cr(VI)										
~~Hexavalent chromium~~	~~18540-29-9~~	~~LA-265-403~~	~~U~~	~~<0.0020~~		~~mg/L~~	~~1~~	~~0.0020~~	~~0.0050~~	~~05/19/11~~
ICP Prep										**06/01/11**
ICP-AES										
Lithium	7439-93-2	LA-505-411	U	<5.0		ug/L	1	5.0	20	06/02/11
Boron	7440-42-8	LA-505-411	U	<13		ug/L	1	13	200	06/02/11
ICPMS Prep										**05/19/11**
ICP-MS										
Manganese	7439-96-5	LA-505-412	UD	<0.20		ug/L	2	0.20	2.0	05/22/11
Nickel	7440-02-0	LA-505-412	UD	<0.40		ug/L	2	0.40	4.0	05/22/11
Silver	7440-22-4	LA-505-412	UD	<0.20		ug/L	2	0.20	2.0	05/22/11
Antimony	7440-36-0	LA-505-412	UD	<0.60		ug/L	2	0.60	6.0	05/22/11
Barium	7440-39-3	LA-505-412	UD	<0.40		ug/L	2	0.40	4.0	05/22/11
Beryllium	7440-41-7	LA-505-412	UD	<0.10		ug/L	2	0.10	1.0	05/22/11
Cadmium	7440-43-9	LA-505-412	UD	<0.20		ug/L	2	0.20	2.0	05/22/11

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 # WSCF112290

Sample # 112290001
SAF# F11-055
Sample ID B2BH54

Matrix WATER
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Chromium	7440-47-3	LA-505-412	UD	<1.0		ug/L	2	1.0	10	05/22/11
Cobalt	7440-48-4	LA-505-412	UD	<0.10		ug/L	2	0.10	0.50	05/22/11
Copper	7440-50-8	LA-505-412	D	2.56		ug/L	2	0.20	2.0	05/22/11
Vanadium	7440-62-2	LA-505-412	BDC	0.536	4.0U	ug/L	2	0.40	4.0	05/22/11
Zinc	7440-66-6	LA-505-412	BD	5.13		ug/L	2	1.6	10	05/22/11
Lead	7439-92-1	LA-505-412	UD	<0.20		ug/L	2	0.20	2.0	05/22/11
Mercury	7439-97-6	LA-505-412	UDN	<0.10		ug/L	2	0.10	0.40	05/22/11
Strontium	7440-24-6	LA-505-412	UD	<0.20		ug/L	2	0.20	2.0	05/22/11
Thallium	7440-28-0	LA-505-412	UD	<0.10		ug/L	2	0.10	1.0	05/22/11
Tin	7440-31-5	LA-505-412	UD	<0.10		ug/L	2	0.10	1.0	05/22/11
Uranium	7440-61-1	LA-505-412	UD	<0.10		ug/L	2	0.10	0.40	05/22/11
Arsenic	7440-38-2	LA-505-412	UD	<0.80		ug/L	2	0.80	8.0	05/22/11
Selenium	7782-49-2	LA-505-412	UD	<0.60		ug/L	2	0.60	6.0	05/22/11

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8-08-2011

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 # WSCF112291

Sample # 112291001
SAF# F11-054
Sample ID B2BH28

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
~~**Anions by IC**~~										~~**05/25/11**~~
Anions by IC										
Nitrate-N	NO3-N	LA-533-410	B	1.95		mg/kg	1		5.3	05/25/11
Cr(VI) Prep										**05/25/11**
Cr(VI)										
~~Hexavalent chromium~~	~~18540-29-9~~	~~LA-265-403~~	~~UN~~	~~<0.034~~		~~ug/g~~	~~1~~	~~0.034~~	~~0.52~~	~~05/26/11~~
ICP Prep										**05/23/11**
ICP-AES										
Lithium	7439-93-2	LA-505-411		5.97		mg/kg	1	0.52	2.1	05/25/11
Boron	7440-42-8	LA-505-411	B	9.22		mg/kg	1	1.4	21	05/25/11
ICPMS Prep										**05/23/11**
ICP-MS										
Manganese	7439-96-5	LA-505-412		396		mg/kg	1	0.10	1.0	05/24/11
Nickel	7440-02-0	LA-505-412		9.22		mg/kg	1	0.21	2.1	05/24/11
Silver	7440-22-4	LA-505-412	U	<0.10		mg/kg	1	0.10	1.0	05/24/11
Antimony	7440-36-0	LA-505-412	U	<0.31	UR	mg/kg	1	0.31	3.1	05/24/11
Barium	7440-39-3	LA-505-412		162		mg/kg	1	0.21	2.1	05/24/11
Beryllium	7440-41-7	LA-505-412	B	0.351		mg/kg	1	0.10	0.51	05/24/11
Cadmium	7440-43-9	LA-505-412	U	<0.10		mg/kg	1	0.10	1.0	05/24/11

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.

LS
8-08-2011

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 # WSCF112291

Sample # 112291001
SAF# F11-054
Sample ID B2BH28

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Chromium	7440-47-3	LA-505-412		9.88		mg/kg	1	0.51	5.1	05/24/11
Cobalt	7440-48-4	LA-505-412		8.58		mg/kg	1	0.10	0.51	05/24/11
Copper	7440-50-8	LA-505-412		11.2		mg/kg	1	0.10	1.0	05/24/11
Vanadium	7440-62-2	LA-505-412		65.7		mg/kg	1	0.21	2.1	05/24/11
Zinc	7440-66-6	LA-505-412		48.4		mg/kg	1	0.82	5.1	05/24/11
Lead	7439-92-1	LA-505-412		5.35		mg/kg	1	0.10	1.0	05/24/11
Mercury	7439-97-6	LA-505-412	U	<0.051		mg/kg	1	0.051	0.21	05/24/11
Strontium	7440-24-6	LA-505-412		22.8		mg/kg	1	0.10	1.0	05/24/11
Thallium	7440-28-0	LA-505-412	U	<0.10		mg/kg	1	0.10	0.51	05/24/11
Tin	7440-31-5	LA-505-412	B	0.458		mg/kg	1	0.10	0.51	05/24/11
Uranium	7440-61-1	LA-505-412	B	0.421		mg/kg	1	0.10	0.51	05/24/11
Arsenic	7440-38-2	LA-505-412	B	2.63		mg/kg	1	0.41	4.1	05/24/11
Selenium	7782-49-2	LA-505-412	B	1.08		mg/kg	1	0.31	3.1	05/24/11

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 # WSCF112291

Sample # 112291002
SAF# F11-054
Sample ID B2BH30

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
~~**Anions by IC**~~										~~**05/25/11**~~
Anions by IC										
Nitrate-N	NO3-N	LA-533-410	B	1.55		mg/kg	1		5.2	05/25/11
Cr(VI) Prep										**05/25/11**
Cr(VI)										
~~Hexavalent chromium~~	~~18540-29-9~~	~~LA-265-403~~	~~BN~~	~~0.0922~~		~~ug/g~~	~~1~~	~~0.034~~	~~0.52~~	~~05/26/11~~
ICP Prep										**05/23/11**
ICP-AES										
Lithium	7439-93-2	LA-505-411		8.87		mg/kg	1	0.52	2.1	05/25/11
Boron	7440-42-8	LA-505-411	B	5.63		mg/kg	1	1.4	21	05/25/11
ICPMS Prep										**05/23/11**
ICP-MS										
Manganese	7439-96-5	LA-505-412		260		mg/kg	1	0.097	0.97	05/24/11
Nickel	7440-02-0	LA-505-412		11.3		mg/kg	1	0.19	1.9	05/24/11
Silver	7440-22-4	LA-505-412	U	<0.097		mg/kg	1	0.097	0.97	05/24/11
Antimony	7440-36-0	LA-505-412	U	<0.29	UR	mg/kg	1	0.29	2.9	05/24/11
Barium	7440-39-3	LA-505-412		61.0		mg/kg	1	0.19	1.9	05/24/11
Beryllium	7440-41-7	LA-505-412	B	0.260		mg/kg	1	0.097	0.48	05/24/11
Cadmium	7440-43-9	LA-505-412	U	<0.097		mg/kg	1	0.097	0.97	05/24/11

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.

LS
8-08-2011

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 # WSCF112291

Sample # 112291002
SAF# F11-054
Sample ID B2BH30

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Chromium	7440-47-3	LA-505-412		11.9		mg/kg	1	0.48	4.8	05/24/11
Cobalt	7440-48-4	LA-505-412		5.26		mg/kg	1	0.097	0.48	05/24/11
Copper	7440-50-8	LA-505-412		8.63		mg/kg	1	0.097	0.97	05/24/11
Vanadium	7440-62-2	LA-505-412		30.3		mg/kg	1	0.19	1.9	05/24/11
Zinc	7440-66-6	LA-505-412		31.5		mg/kg	1	0.77	4.8	05/24/11
Lead	7439-92-1	LA-505-412		4.40		mg/kg	1	0.097	0.97	05/24/11
Mercury	7439-97-6	LA-505-412	U	<0.048		mg/kg	1	0.048	0.19	05/24/11
Strontium	7440-24-6	LA-505-412		20.6		mg/kg	1	0.097	0.97	05/24/11
Thallium	7440-28-0	LA-505-412	U	<0.097		mg/kg	1	0.097	0.48	05/24/11
Tin	7440-31-5	LA-505-412	B	0.249		mg/kg	1	0.097	0.48	05/24/11
Uranium	7440-61-1	LA-505-412	B	0.397		mg/kg	1	0.097	0.48	05/24/11
Arsenic	7440-38-2	LA-505-412		4.01		mg/kg	1	0.39	3.9	05/24/11
Selenium	7782-49-2	LA-505-412	B	0.584		mg/kg	1	0.29	2.9	05/24/11

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 # WSCF112291

Sample # 112291003
SAF# F11-054
Sample ID B2BH36

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
~~**Anions by IC**~~										~~**05/25/11**~~
Anions by IC										
Nitrate-N	NO3-N	LA-533-410	B	1.10		mg/kg	1		5.2	05/25/11
Cr(VI) Prep										**05/25/11**
Cr(VI)										
~~Hexavalent chromium~~	~~18540-29-9~~	~~LA-265-403~~	~~UN~~	~~<0.035~~		~~ug/g~~	~~1~~	~~0.035~~	~~0.52~~	~~05/26/11~~
ICP Prep										**05/23/11**
ICP-AES										
Lithium	7439-93-2	LA-505-411		6.15		mg/kg	1	0.53	2.1	05/25/11
Boron	7440-42-8	LA-505-411	B	10.1		mg/kg	1	1.4	22	05/25/11
ICPMS Prep										**05/23/11**
ICP-MS										
Manganese	7439-96-5	LA-505-412		396		mg/kg	1	0.10	1.0	05/24/11
Nickel	7440-02-0	LA-505-412		8.88		mg/kg	1	0.21	2.1	05/24/11
Silver	7440-22-4	LA-505-412	U	<0.10		mg/kg	1	0.10	1.0	05/24/11
Antimony	7440-36-0	LA-505-412	U	<0.31	UR	mg/kg	1	0.31	3.1	05/24/11
Barium	7440-39-3	LA-505-412		93.4		mg/kg	1	0.21	2.1	05/24/11
Beryllium	7440-41-7	LA-505-412	B	0.342		mg/kg	1	0.10	0.52	05/24/11
Cadmium	7440-43-9	LA-505-412	U	<0.10		mg/kg	1	0.10	1.0	05/24/11

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.

LS
8-08-2011

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 # WSCF112291

Sample # 112291003
SAF# F11-054
Sample ID B2BH36

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Chromium	7440-47-3	LA-505-412		8.62		mg/kg	1	0.52	5.2	05/24/11
Cobalt	7440-48-4	LA-505-412		8.76		mg/kg	1	0.10	0.52	05/24/11
Copper	7440-50-8	LA-505-412		11.0		mg/kg	1	0.10	1.0	05/24/11
Vanadium	7440-62-2	LA-505-412		66.8		mg/kg	1	0.21	2.1	05/24/11
Zinc	7440-66-6	LA-505-412		47.6		mg/kg	1	0.83	5.2	05/24/11
Lead	7439-92-1	LA-505-412		5.45		mg/kg	1	0.10	1.0	05/24/11
Mercury	7439-97-6	LA-505-412	U	<0.052		mg/kg	1	0.052	0.21	05/24/11
Strontium	7440-24-6	LA-505-412		23.2		mg/kg	1	0.10	1.0	05/24/11
Thallium	7440-28-0	LA-505-412	U	<0.10		mg/kg	1	0.10	0.52	05/24/11
Tin	7440-31-5	LA-505-412	B	0.427		mg/kg	1	0.10	0.52	05/24/11
Uranium	7440-61-1	LA-505-412	B	0.430		mg/kg	1	0.10	0.52	05/24/11
Arsenic	7440-38-2	LA-505-412	B	3.00		mg/kg	1	0.42	4.2	05/24/11
Selenium	7782-49-2	LA-505-412	B	0.933		mg/kg	1	0.31	3.1	05/24/11

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 # WSCF112291

Sample # 112291004
SAF# F11-054
Sample ID B2BH37

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
~~**Anions by IC**~~										~~**05/25/11**~~
Anions by IC										
Nitrate-N	NO3-N	LA-533-410	B	1.08		mg/kg	1		5.2	05/25/11
Cr(VI) Prep										**05/25/11**
Cr(VI)										
~~Hexavalent chromium~~	~~18540-29-9~~	~~LA-265-403~~	~~BN~~	~~0.0506~~		~~ug/g~~	~~1~~	~~0.034~~	~~0.52~~	~~05/26/11~~
ICP Prep										**05/23/11**
ICP-AES										
Lithium	7439-93-2	LA-505-411		6.36		mg/kg	1	0.52	2.1	05/25/11
Boron	7440-42-8	LA-505-411	B	10.8		mg/kg	1	1.4	21	05/25/11
ICPMS Prep										**05/23/11**
ICP-MS										
Manganese	7439-96-5	LA-505-412		392		mg/kg	1	0.091	0.91	05/24/11
Nickel	7440-02-0	LA-505-412		8.53		mg/kg	1	0.18	1.8	05/24/11
Silver	7440-22-4	LA-505-412	U	<0.091		mg/kg	1	0.091	0.91	05/24/11
Antimony	7440-36-0	LA-505-412	U	<0.27	UR	mg/kg	1	0.27	2.7	05/24/11
Barium	7440-39-3	LA-505-412		88.0		mg/kg	1	0.18	1.8	05/24/11
Beryllium	7440-41-7	LA-505-412	B	0.292		mg/kg	1	0.091	0.46	05/24/11
Cadmium	7440-43-9	LA-505-412	B	0.0972		mg/kg	1	0.091	0.91	05/24/11

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.

LS
8-08-2011

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 # WSCF112291

Sample # 112291004
SAF# F11-054
Sample ID B2BH37

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Chromium	7440-47-3	LA-505-412		7.96		mg/kg	1	0.46	4.6	05/24/11
Cobalt	7440-48-4	LA-505-412		8.40		mg/kg	1	0.091	0.46	05/24/11
Copper	7440-50-8	LA-505-412		10.7		mg/kg	1	0.091	0.91	05/24/11
Vanadium	7440-62-2	LA-505-412		65.3		mg/kg	1	0.18	1.8	05/24/11
Zinc	7440-66-6	LA-505-412		47.0		mg/kg	1	0.73	4.6	05/24/11
Lead	7439-92-1	LA-505-412		5.52		mg/kg	1	0.091	0.91	05/24/11
Mercury	7439-97-6	LA-505-412	U	<0.046		mg/kg	1	0.046	0.18	05/24/11
Strontium	7440-24-6	LA-505-412		20.6		mg/kg	1	0.091	0.91	05/24/11
Thallium	7440-28-0	LA-505-412	U	<0.091		mg/kg	1	0.091	0.46	05/24/11
Tin	7440-31-5	LA-505-412	B	0.438		mg/kg	1	0.091	0.46	05/24/11
Uranium	7440-61-1	LA-505-412	B	0.447		mg/kg	1	0.091	0.46	05/24/11
Arsenic	7440-38-2	LA-505-412	B	2.73		mg/kg	1	0.37	3.7	05/24/11
Selenium	7782-49-2	LA-505-412	B	0.995		mg/kg	1	0.27	2.7	05/24/11

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
WSCF112290

Introduction

A sample was received at the WSCF laboratory as referenced on the WSCF SAF Number Cross Reference table included in the final report. The sample was 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

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

- All applicable QC controls are within the established limits.

Attachment 2
Narrative
WSCF112290

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.

ICP-AES Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- All applicable QC controls are within the established limits.

ICP-MS Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- Mercury – Matrix Spike and/or Matrix Spike Duplicate recoveries are outside established laboratory limits. Affected sample results in this batch were "N" flagged.
- Vanadium – Detected in the Blank and evaluated. Affected sample results in this batch were "C" Flagged.
- Barium and Strontium – Exceeded spiking levels by a factor of 4. Spike recoveries and associated RPDs are not valid.
- All other applicable QC controls are within the established limits.

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

- All applicable QC controls are within the established limits.

Organic Comments

PCB – 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.

Semi-VOA – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- Analysis performed by 8270-PAH SIM method.
- All applicable QC controls are within the established limits.

Attachment 2
Narrative
WSCF112290

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.
    - Matrix Spike and/or Matrix Spike Duplicate recoveries are outside established laboratory limits. Affected sample results in this batch were "N" flagged.
    - The LCS Failed. Sample Issue Resolution Form SDR11-292 was generated. Sample and QC results were flagged.
    - All other applicable QC controls are within the established limits.

Radiochemistry Comments

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

- Gross Alpha / Gross Beta:
    - 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.

Narrative

Attachment 2
Narrative
WSCF112290

SAMPLE ISSUE RESOLUTION

SIR NUM	SDR11-292
REV NUM	0
DATE INITIATED	6/2/2011

SAMPLE EVENT INFORMATION

SAF NUM(S)	F11-055, I11-025
OPERABLE UNIT(S)	100-NR-2, NONE
PROJECT(S)	Outer Area, CERC11
SAMPLE EVENT TITLE(S)	200-MG-1 Waste Sites, CERC11
LABORATORY	Waste Sampling & Characterization

SAMPLING INFORMATION

NUMBER OF SAMPLES	4
SAMPLE NUMBERS	B2BH54, B2CY15, B2CY22, B2CY23
SAMPLE MATRIX	WATER
COLLECTION DATE	5/19/2011 - 5/20/2011
SDG NUM	WSCF112295, WSCF112290

ISSUE BACKGROUND

CLASS	Laboratory Issue
TYPE	Quality Control Failure
DESCRIPTION	THE TPHD LCS /MS/MSD ALL FAILED HIGH, HOWEVER, THE SAMPLES WERE ALL NON-DETECT FOR TPHD.
	LCS (154%) LIMITS 65-128% MS (176.4%) LIMITS 73-123%

DISPOSITION

DESCRIPTION	Report results as-is and flag the samples with a comment in the narrative.
	Please initiate a re-run of samples B2CY15, B2CY22, B2CY23 within hold time.
JUSTIFICATION	Submitted by: Marisol Avila Date: 6/2/2011
	Accepted by: Deb Alexander Date: 6/2/2011

4

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F11-055-001

PAGE 1 OF 2

COLLECTOR: Patterson

SAMPLING LOCATION: NPE EB 1

ICE CHEST NO.:

COMPANY CONTACT: WIDRIG, DL

TELEPHONE NO.: 376-2858

PROJECT COORDINATOR: WIDRIG, DL

PRICE CODE: 7C

DATA TURNAROUND: 15 Days / 15 Days

AIR QUALITY: ☐

PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - QC Sampling

SAF NO.: F11-055

FIELD LOGBOOK NO.: HNF-N 507-21

ACTUAL SAMPLE DEPTH: N/A

COA: 302427ES10

METHOD OF SHIPMENT: GOVERNMENT VEHICLE

ORIGINAL

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)

112290

SPECIAL HANDLING AND/OR STORAGE

PRESERVATION	Cool~4C	HCl to pH <2/Cool~4C	Cool~4C	HNO3 to pH <2	Cool~4C	Cool~4C	None	HNO3 to pH <2
HOLDING TIME	7/40 Days	7/40 Days	1 yr/1 yr	28 Days	24 Hours	28 Days/48 Hours	ASAP	6 Months
TYPE OF CONTAINER	aG	aG	aG	G/P	aG	P	P	G/P
NO. OF CONTAINER(S)	4	3	4	1	1	1	1	1
VOLUME	1L	1L	1L	500mL	500mL	250mL	60mL	500mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS	SEE ITEM (4) IN SPECIAL INSTRUCTIONS	Chromium Hex - 7196;	IC Anions - 300.0 (Nitrogen in Nitrate);	pH (Water) - 9040 (pH Measurement);	SEE ITEM (5) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME								
B2BH54	1 WATER	5/19/11	0815	✓	✓	✓	✓	✓	✓	✓	✓

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
K. Patterson	5/19/11 1300	M. Nelson	5/19/11 1300
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

LABORATORY SECTION — RECEIVED BY — TITLE — DATE/TIME

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

PRINTED ON 1/17/2011

A-6003-618 (REV 2)

Chain of Custody

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-055-001	PAGE 2 OF 2
COLLECTOR K. Patterson	COMPANY CONTACT WIDRIG, DL	TELEPHONE NO. 376-2858	PROJECT COORDINATOR WIDRIG, DL	PRICE CODE 7C	DATA TURNAROUND 15 Days / 15 Days
SAMPLING LOCATION NPE EB 1	PROJECT DESIGNATION Non Operational Area Evaluation Sampling - QC Sampling		SAF NO. F11-055	AIR QUALITY	
ICE CHEST NO.	FIELD LOGBOOK NO. HNF-N-507-21	ACTUAL SAMPLE DEPTH N/A	COA 302427ES10	METHOD OF SHIPMENT GOVERNMENT VEHICLE	ORIGINAL
SHIPPED TO Waste Sampling & Characterization	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

SPECIAL INSTRUCTIONS

** Duplicates and equipment blanks to be collected at a frequency of 1/day of sampling. If multiple samples are collected in one day, only colllect the duplicate and equipment blank associated with the first sample of that day.

** The CACN for all analytical work at WSCF laboratory is 401910ES20.

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

** The laboratory shall report only the requested constituents of concern in all preliminary or final hardcopy data reports, or EDDs. QC results for non-requested constituents need not be reported, but samples chosen for matrix spike, and all spike compounds shall be identified in the final data report narrative. No TICs shall be reported.
(1) Semi-VOA - 8270 (TCL) {Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene};
(2) TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range};
(3) PCBs - 8082 {Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260};
(4) 200.8_HG - ICPMS {Mercury}; ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Cobalt, Copper, Manganese, Nickel, Silver, Vanadium, Zinc}; ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Selenium, Strontium, Thallium, Tin, Uranium}; ICP Metals - 6010 (Add-On) {Boron, Lithium};
(5) Gross Alpha {Gross alpha}; Gross Beta {Gross beta};

PRINTED ON 1/17/2011

A-6003-619 (REV 2)

Attachment 2
Narrative
WSCF112291

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

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

- All applicable QC controls are within the established limits.

Attachment 2
Narrative
WSCF112291

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):

- Matrix Spike and Post Spike recoveries are outside established laboratory limits. Affected sample results in this batch were "N" flagged.
- All other applicable QC controls are within the established limits.

ICP-AES Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- All applicable QC controls are within the established limits.

ICP-MS Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- All applicable QC controls are within the established limits.

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

- All applicable QC controls are within the established limits.

Organic Comments

PCB – 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.

Semi-VOA – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- Analysis performed by 8270-PAH SIM method.
- All applicable QC controls are within the established limits.

TPHD-WA – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. 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.

- The LCS did not meet laboratory acceptance criteria. Samples and QC were flagged for the failure. Sample issue resolution form SDR11-293 was generated. The results were reported as stated in the resolution.
- Diesel – Matrix Spike and/or Matrix Spike Duplicate recoveries are outside established laboratory limits. Affected sample results in this batch were "N" flagged.
- All other applicable QC controls are within the established limits.

Radiochemistry Comments

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

- Gross Alpha / Gross Beta:
  - Gross Beta – Duplicate Relative Percent Difference(s) (RPD) did not meet the established laboratory limits. Duplicate Relative Percent Difference (RPD) does not apply to results below 5X the minimum detectable activity. No flags issued.
  - 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.

Narrative

Attachment 2
Narrative
WSCF112291

SAMPLE ISSUE RESOLUTION

SIR NUM	SDR11-293
REV NUM	0
DATE INITIATED	6/2/2011

SAMPLE EVENT INFORMATION

SAF NUM(S)	F11-054
OPERABLE UNIT(S)	NONE
PROJECT(S)	Outer Area
SAMPLE EVENT TITLE(S)	200-MG-1 Waste Sites
LABORATORY	Waste Sampling & Characterization

SAMPLING INFORMATION

NUMBER OF SAMPLES	9
SAMPLE NUMBERS	B2BH28, B2BH30, B2BH32, B2BH36, B2BH37, B2BH38, B2BH40, B2BH44, B2BH48
SAMPLE MATRIX	SOIL
COLLECTION DATE	5/19/2011 - 5/23/2011
SDG NUM	WSCF112291, WSCF112305

ISSUE BACKGROUND

CLASS	Laboratory Issue
TYPE	Quality Control Failure
DESCRIPTION	The TPHD LCS failed high, however, the samples were all non-detect for TPHD. LCS (142.4%) LIMITS 70-130%

DISPOSITION

DESCRIPTION	Report results as-is and flag the samples with a comment in the narrative.
JUSTIFICATION	Submitted by: Marisol Avila Date: 6/2/2011
	Accepted by: Kelly Whitley Date:6/2/2011

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CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F11-054-001

PAGE 1 OF 2

COLLECTOR: KC Patterson CHPRC

COMPANY CONTACT: WIDRIG, DL

TELEPHONE NO.: 376-2858

PROJECT COORDINATOR: WIDRIG, DL

PRICE CODE: 8C

DATA TURNAROUND: 15 Days / 15 Days

SAMPLING LOCATION: NPE-01

PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - Soil

SAF NO.: F11-054

AIR QUALITY: ☐

ICE CHEST NO.:

FIELD LOGBOOK NO.: HNF-N-501-21

ACTUAL SAMPLE DEPTH: 0-6"

COA: 302427ES10

METHOD OF SHIPMENT: GOVERNMENT VEHICLE

ORIGINAL

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)

112291

SPECIAL HANDLING AND/OR STORAGE

PRESERVATION	Cool~4C	Cool~4C	None
HOLDING TIME	14/40 Days	28 Days	6 Months
TYPE OF CONTAINER	aG	G/P	G/P
NO. OF CONTAINER(S)	1	1	1
VOLUME	250mL	250mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS

SAMPLE NO.		MATRIX*	SAMPLE DATE	SAMPLE TIME			
B2BH28	1	SOIL	MAY 19 2011	1133	✓	✓	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
KC Patterson CHPRC	MAY 19 2011	BW H Nelson	MAY 19 2011 1300
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

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS

SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

LABORATORY SECTION — RECEIVED BY — TITLE — DATE/TIME

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

PRINTED ON 1/17/2011

A-6003-618 (REV 2)

Chain of Custody

CH2MHill Plateau Remediation Company — **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** — **F11-054-001** — **PAGE 2 OF 2**

COLLECTOR KC Patterson CHPRC	**COMPANY CONTACT** WIDRIG, DL	**TELEPHONE NO.** 376-2858	**PROJECT COORDINATOR** WIDRIG, DL	**PRICE CODE** 8C	**DATA TURNAROUND** 15 Days / 15 Days
SAMPLING LOCATION NPE-01	**PROJECT DESIGNATION** Non Operational Area Evaluation Sampling - Soil		**SAF NO.** F11-051	**AIR QUALITY** ☐	
ICE CHEST NO.	**FIELD LOGBOOK NO.** HNF-N-503-21	**ACTUAL SAMPLE DEPTH** 0-6"	**COA** 302427ES10	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	**ORIGINAL**
SHIPPED TO Waste Sampling & Characterization	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

SPECIAL INSTRUCTIONS

** Sample locations will be randomly selected from the investigation area. Final location decisions will be made by the Field PAL and samplers.

** There are 11 primary sampling locations and 2 alternates. Samples NP-08 and NP-10 are preferred locations, but the alternates may be substituted for these if necessary.

** Samplers, RadCon and project personnel must walk to sampling locations as driving is prohibited in this area.

** Sampling must be performed at the soil surface and sampling coordinates must be collected via GPS.

** Duplicates and equipment blanks to be collected at a frequency of 1/day of sampling. If multiple samples are collected in one day, only colllect the duplicate and equipment blank associated with the first sample of that day.

** The CACN for all analytical work at WSCF laboratory is 401910ES20.

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

** The laboratory shall report only the requested constituents of concern in all preliminary or final hardcopy data reports, or EDDs. QC results for non-requested constituents need not be reported, but samples chosen for matrix spike, and all spike compounds shall be identified in the final data report narrative. No TICs shall be reported.
(1) 8270_SVOA_GCMS: SIM {Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene}; TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range}; PCBs - 8082 {Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260};
(2) 200.8_HG - ICPMS {Mercury}; ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Cobalt, Copper, Manganese, Nickel, Silver, Vanadium, Zinc}; ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Selenium, Strontium, Thallium, Tin, Uranium}; ICP Metals - 6010 (Add-On) {Boron, Lithium}; Chromium Hex - 7196; IC Anions - 300.0 {Nitrogen in Nitrate}; pH (Soil) - 9045 {pH Measurement};
(3) Gross Alpha {Gross alpha}; Gross Beta {Gross beta};

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Sample Receipt

Chain of Custody

CH2MHill Plateau Remediation Company — **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** — F11-054-003 — PAGE 1 OF 2

COLLECTOR: KC Patterson CHPRC	COMPANY CONTACT: WIDRIG, DL	TELEPHONE NO.: 376-2858	PROJECT COORDINATOR: WIDRIG, DL
PRICE CODE: 8C	DATA TURNAROUND: 15 Days / 15 Days		
SAMPLING LOCATION: NPE-02	PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - Soil	SAF NO.: F11-054	AIR QUALITY: ☐
ICE CHEST NO.	FIELD LOGBOOK NO.: HNF-N-507-21	ACTUAL SAMPLE DEPTH: 0-6"	COA: 302427E510
METHOD OF SHIPMENT: GOVERNMENT VEHICLE	ORIGINAL		
SHIPPED TO: Waste Sampling & Characterization	OFFSITE PROPERTY NO.: N/A	BILL OF LADING/AIR BILL NO.: N/A	

MATRIX*: A=Air, DI=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

PRESERVATION	Cool~4C	Cool~4C	None
HOLDING TIME	14/40 Days	28 Days	6 Months
TYPE OF CONTAINER	aG	G/P	G/P
NO. OF CONTAINER(S)	1	1	1
VOLUME	250mL	250mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS

SAMPLE NO.		MATRIX*	SAMPLE DATE	SAMPLE TIME			
B2BH30	2	SOIL	MAY 19 2011	1045	✓	✓	✓

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM: KC Patterson CHPRC	DATE/TIME: MAY 19 2011/3:20	RECEIVED BY/STORED IN: R.C. Nelson Hanford	DATE/TIME: MAY 19 2011/3:20
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS: SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

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

PRINTED ON 1/17/2011 — A-6003-618 (REV 2)

Sample Receipt

Chain of Custody

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F11-054-003	PAGE 2 OF 2
COLLECTOR: KC Patterson CHPRC	COMPANY CONTACT: WIDRIG, DL	TELEPHONE NO.: 376-2858	PROJECT COORDINATOR: WIDRIG, DL	PRICE CODE: 8C
SAMPLING LOCATION: NPE-02	PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - Soil		SAF NO.: F11-054	AIR QUALITY: ☐
ICE CHEST NO.	FIELD LOGBOOK NO.: HNF-N-507-21	ACTUAL SAMPLE DEPTH: 0-6"	COA: 302427ES10	METHOD OF SHIPMENT: GOVERNMENT VEHICLE
SHIPPED TO: Waste Sampling & Characterization	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A	

DATA TURNAROUND: 15 Days / 15 Days

ORIGINAL

SPECIAL INSTRUCTIONS

** Sample locations will be randomly selected from the investigation area. Final location decisions will be made by the Field PAL and samplers.

** There are 11 primary sampling locations and 2 alternates. Samples NP-08 and NP-10 are preferred locations, but the alternates may be substituted for these if necessary.

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** The CACN for all analytical work at WSCF laboratory is 401910ES20.

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

** The laboratory shall report only the requested constituents of concern in all preliminary or final hardcopy data reports, or EDDs. QC results for non-requested constituents need not be reported, but samples chosen for matrix spike, and all spike compounds shall be identified in the final data report narrative. No TICs shall be reported.
(1) 8270_SVOA_GCMS: SIM {Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene}; TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range}; PCBs - 8082 {Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260};
(2) 200.8_HG - ICPMS {Mercury}; ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Cobalt, Copper, Manganese, Nickel, Silver, Vanadium, Zinc}; ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Selenium, Strontium, Thallium, Tin, Uranium}; ICP Metals - 6010 (Add-On) {Boron, Lithium}; Chromium Hex - 7196; IC Anions - 300.0 {Nitrogen in Nitrate}; pH (Soil) 9045 {pH Measurement};
(3) Gross Alpha {Gross alpha}; Gross Beta {Gross beta};

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Sample Receipt

Chain of Custody

CH2MHill Plateau Remediation Company — **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** — F11-054-009 — PAGE 1 OF 2

COLLECTOR: KC Patterson, CHPRC	COMPANY CONTACT: WIDRIG, DL	TELEPHONE NO.: 376-2858	PROJECT COORDINATOR: WIDRIG, DL
PRICE CODE: 8C	DATA TURNAROUND: 15 Days / 15 Days	SAMPLING LOCATION: NPE-05	PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - Soil
SAF NO.: F11-054	AIR QUALITY: L	ICE CHEST NO.	FIELD LOGBOOK NO.: HNF-N-507-21
ACTUAL SAMPLE DEPTH: 0-6"	COA: 302427ES10	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	ORIGINAL
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

PRESERVATION	Cool~4C	Cool~4C	None
HOLDING TIME	14/40 Days	28 Days	6 Months
TYPE OF CONTAINER	aG	G/P	G/P
NO. OF CONTAINER(S)	1	1	1
VOLUME	250mL	250mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS

SAMPLE NO.		MATRIX*	SAMPLE DATE	SAMPLE TIME			
B2BH35	3	SOIL	MAY 19 2011	0945	✓	✓	✓

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

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
KC Patterson CHPRC	MAY 19 2011 1300	M. Nelson M. Nelson	MAY 19 2011 1300

SPECIAL INSTRUCTIONS: SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

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

PRINTED ON 1/17/2011 — R-6003-618 (REV 2)

Chain of Custody

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-054-009	PAGE 2 OF 2
COLLECTOR KC Patterson CHPRC	COMPANY CONTACT WIDRIG, DL	TELEPHONE NO. 376-2858	PROJECT COORDINATOR WIDRIG, DL	PRICE CODE 8C	DATA TURNAROUND 15 Days / 15 Days
SAMPLING LOCATION NPE-05	PROJECT DESIGNATION Non Operational Area Evaluation Sampling - Soil		SAF NO. F11-054	AIR QUALITY ☐	
ICE CHEST NO.	FIELD LOGBOOK NO. HNF-N-507-21	ACTUAL SAMPLE DEPTH 0-6"	COA 302427ES10	METHOD OF SHIPMENT GOVERNMENT VEHICLE	ORIGINAL
SHIPPED TO Waste Sampling & Characterization	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

SPECIAL INSTRUCTIONS

** Sample locations will be randomly selected from the investigation area. Final location decisions will be made by the Field PAL and samplers.

** There are 11 primary sampling locations and 2 alternates. Samples NP-08 and NP-10 are preferred locations, but the alternates may be substituted for these if necessary.

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** Sampling must be performed at the soil surface and sampling coordinates must be collected via GPS.

** Duplicates and equipment blanks to be collected at a frequency of 1/day of sampling. If multiple samples are collected in one day, only collect the duplicate and equipment blank associated with the first sample of that day.

** The CACN for all analytical work at WSCF laboratory is 401910ES20.

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

** The laboratory shall report only the requested constituents of concern in all preliminary or final hardcopy data reports, or EDDs. QC results for non-requested constituents need not be reported, but samples chosen for matrix spike, and all spike compounds shall be identified in the final data report narrative. No TICs shall be reported.
(1) 8270_SVOA_GCMS: SIM {Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene}; TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range}; PCBs - 8082 {Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260};
(2) 200.8_HG - ICPMS {Mercury}; ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Cobalt, Copper, Manganese, Nickel, Silver, Vanadium, Zinc}; ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Selenium, Strontium, Thallium, Tin, Uranium}; ICP Metals - 6010 (Add-On) {Boron, Lithium}; Chromium Hex - 7196; IC Anions - 300.0 {Nitrogen in Nitrate}; pH (Soil) - 9045 {pH Measurement};
(3) Gross Alpha {Gross alpha}; Gross Beta {Gross beta};

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A-6003-618 (REV 2)

Sample Receipt

Chain of Custody

CH2MHill Plateau Remediation Company — **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** — F11-054-010 — PAGE 1 OF 2

COLLECTOR: KC Patterson CHPRC	COMPANY CONTACT: WIDRIG, DL	TELEPHONE NO.: 375-2858	PROJECT COORDINATOR: WIDRIG, DL
PRICE CODE: 8C	DATA TURNAROUND: 15 Days / 15 Days	SAMPLING LOCATION: NPE-05 DUP	PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - Soil
SAF NO.: F11-054	AIR QUALITY: ☐	ICE CHEST NO.	FIELD LOGBOOK NO.: HNF-N-507-21
ACTUAL SAMPLE DEPTH: 0-6"	COA: 302427ES10	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	ORIGINAL
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

PRESERVATION	Cool~4C	Cool~4C	None
HOLDING TIME	14/40 Days	28 Days	6 Months
TYPE OF CONTAINER	aG	G/P	G/P
NO. OF CONTAINER(S)	1	1	1
VOLUME	250mL	250mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME			
B2BH37	SOIL	MAY 19 2011	0945	✓	✓	✓

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

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
KC Patterson CHPRC	MAY 19 2011 1300	H. Nelsonmacy	MAY 19 2011 1300
			MAY 19 2011

SPECIAL INSTRUCTIONS: SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

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

PRINTED ON 1/17/2011 — A-6003-618 (REV 2)

Thursday, May 19, 2011 2:38:07 PM
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Chain of Custody

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-054-010	PAGE 2 OF 2
COLLECTOR: KC Patterson, CHPRC	COMPANY CONTACT: WIDRIG, DL	TELEPHONE NO.: 376-2958	PROJECT COORDINATOR: WIDRIG, DL	PRICE CODE: 8C	DATA TURNAROUND
SAMPLING LOCATION: NPE-05 DUP	PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - Soil		SAF NO.: F11-054	AIR QUALITY: ☐	15 Days / 15 Days
ICE CHEST NO.	FIELD LOGBOOK NO.: HNF-N-507-21	ACTUAL SAMPLE DEPTH: 0-6"	COA: 302427ES10	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	ORIGINAL
SHIPPED TO: Waste Sampling & Characterization	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

SPECIAL INSTRUCTIONS

** Sample locations will be randomly selected from the investigation area. Final location decisions will be made by the Field PAL and samplers.

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

** The laboratory shall report only the requested constituents of concern in all preliminary or final hardcopy data reports, or EDDs. QC results for non-requested constituents need not be reported, but samples chosen for matrix spike, and all spike compounds shall be identified in the final data report narrative. No TICs shall be reported.
(1) 8270_SVOA_GCMS: SIM {Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene}; TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range}; PCBs - 8082 {Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260};
(2) 200.8_HG - ICPMS {Mercury}; ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Cobalt, Copper, Manganese, Nickel, Silver, Vanadium, Zinc}; ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Selenium, Strontium, Thallium, Tin, Uranium}; ICP Metals - 6010 (Add-On) {Boron, Lithium}; Chromium Hex - 7196; IC Anions - 300.0 {Nitrogen in Nitrate}; pH (Soil) 9045 {pH Measurement};
(3) Gross Alpha {Gross alpha}; Gross Beta {Gross beta};

PRINTED ON 1/17/2011 A-6003-618 (REV 7)

Appendix 5

Data Validation Supporting Documentation

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: Outer Area			DATA PACKAGE: VSR11-053		
VALIDATOR: Carl Schloesslin		LAB: WSCF		DATE: 8-10-2011	
			SDG: WSCF112290, WSCF112291		
ANALYSES PERFORMED					
SW-846/ICP X	SW-846/GFAA	SW-846/Hg		EPA 200.8 X	

SAMPLES/MATRIX

SDG WSCF112290 (Water): B2BH54 (equipment blank)

SDG WSCF112291 (Soil): B2BH28, B2BH30, B2BH36, B2BH37 (field duplicate of B2BH36)

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:

WSCF112290 MB Hit: V 0.232 ug/L
EB B2BH54 Hits: Cu 2.56 ug/L, V 0.536 ug/L, Zn 5.13 ug/L

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:

WSCF112290 Hg MSD %R = 134%, U MSD %R = 129%

WSCF112291 Sb LCS %R = 172%

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:

Note: Client instructed AQA that CRDLs in SAP only should be used for detection limit assessment and to ignore CRDLs listed in the SAFs.

Appendix 6

Additional Documentation Requested By Client

Quality Control Report

Attention Michael Neely
Department Inorganic

Group # WSCF112290

QC Batch 182741
Associated Samples 112290001

Test ICP-6010 - All possible metals

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #57054**							
Lithium	7439-93-2		<5.0	ug/L					U	06/02/11
Boron	7440-42-8		<13	ug/L					U	06/02/11
LCS			**QC Sample #57055**							
Lithium	7439-93-2		563	ug/L	112.6	80 - 120				06/02/11
Boron	7440-42-8		1040	ug/L	104	80 - 120				06/02/11
MS			**QC Sample #57056**							
			Original 112154016							
Lithium	7439-93-2		529	ug/L	105.8	75 - 125				06/02/11
Boron	7440-42-8		990	ug/L	99	75 - 125				06/02/11
MSD			**QC Sample #57057**							
			Original 112154016					**Paired**	**57056**	
Lithium	7439-93-2		550	ug/L	110	75 - 125	3.90	20		06/02/11
Boron	7440-42-8		1030	ug/L	103	75 - 125	4.00	20		06/02/11

Quality Control Report

Attention Michael Neely
Department Inorganic

Group # WSCF112290

QC Batch 182291
Associated Samples 112290001

Test ICP-2008 MS All possible metal

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #56063**							
Manganese	7439-96-5		<0.10	ug/L					U	05/22/11
Nickel	7440-02-0		<0.20	ug/L					U	05/22/11
Silver	7440-22-4		<0.10	ug/L					U	05/22/11
Antimony	7440-36-0		<0.30	ug/L					U	05/22/11
Barium	7440-39-3		<0.20	ug/L					U	05/22/11
Beryllium	7440-41-7		<0.10	ug/L					U	05/22/11
Cadmium	7440-43-9		<0.10	ug/L					U	05/22/11
Chromium	7440-47-3		<0.50	ug/L					U	05/22/11
Cobalt	7440-48-4		<0.050	ug/L					U	05/22/11
Copper	7440-50-8		<0.10	ug/L					U	05/22/11
Vanadium	7440-62-2		0.232	ug/L					B	05/22/11
Zinc	7440-66-6		<0.80	ug/L					U	05/22/11
Lead	7439-92-1		<0.10	ug/L					U	05/22/11
Mercury	7439-97-6		<0.050	ug/L					U	05/22/11
Strontium	7440-24-6		<0.10	ug/L					U	05/22/11
Thallium	7440-28-0		<0.050	ug/L					U	05/22/11
Tin	7440-31-5		<0.050	ug/L					U	05/22/11
Uranium	7440-61-1		<0.050	ug/L					U	05/22/11
Arsenic	7440-38-2		<0.40	ug/L					U	05/22/11

Quality Control Report

Attention Michael Neely
Department Inorganic

Group # WSCF112290

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Selenium	7782-49-2		<0.30	ug/L					U	05/22/11
LCS			**QC Sample #56064**							
Manganese	7439-96-5		42.3	ug/L	105.8	85 - 115				05/22/11
Nickel	7440-02-0		41.1	ug/L	102.8	85 - 115				05/22/11
Silver	7440-22-4		40.9	ug/L	102.2	85 - 115				05/22/11
Antimony	7440-36-0		41.6	ug/L	104.1	85 - 115				05/22/11
Barium	7440-39-3		41.8	ug/L	104.5	85 - 115				05/22/11
Beryllium	7440-41-7		44.2	ug/L	110.5	85 - 115				05/22/11
Cadmium	7440-43-9		39.5	ug/L	98.6	85 - 115				05/22/11
Chromium	7440-47-3		42.3	ug/L	105.8	85 - 115				05/22/11
Cobalt	7440-48-4		40.8	ug/L	102.1	85 - 115				05/22/11
Copper	7440-50-8		41.0	ug/L	102.5	85 - 115				05/22/11
Vanadium	7440-62-2		42.3	ug/L	105.6	85 - 115				05/22/11
Zinc	7440-66-6		38.1	ug/L	95.3	85 - 115				05/22/11
Lead	7439-92-1		41.9	ug/L	104.7	85 - 115				05/22/11
Mercury	7439-97-6		2.05	ug/L	102.4	85 - 115				05/22/11
Strontium	7440-24-6		42.3	ug/L	105.8	85 - 115				05/22/11
Thallium	7440-28-0		40.3	ug/L	100.8	85 - 115				05/22/11
Tin	7440-31-5		42.0	ug/L	105.1	85 - 115				05/22/11
Uranium	7440-61-1		41.9	ug/L	104.8	85 - 115				05/22/11
Arsenic	7440-38-2		39.5	ug/L	98.8	85 - 115				05/22/11
Selenium	7782-49-2		36.6	ug/L	91.6	85 - 115				05/22/11
MS			**QC Sample #56065**							
			Original	**112262007**						

Quality Control Report

Attention Michael Neely
Department Inorganic

Group # WSCF112290

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Manganese	7439-96-5		38.9	ug/L	97.2	70 - 130				05/22/11
Nickel	7440-02-0		35.0	ug/L	87.4	70 - 130				05/22/11
Silver	7440-22-4		36.6	ug/L	91.4	70 - 130				05/22/11
Antimony	7440-36-0		43.0	ug/L	107.5	70 - 130				05/22/11
Barium	7440-39-3		46.8	ug/L	117	70 - 130			X	05/22/11
Beryllium	7440-41-7		39.9	ug/L	99.8	70 - 130				05/22/11
Cadmium	7440-43-9		37.7	ug/L	94.2	70 - 130				05/22/11
Chromium	7440-47-3		37.9	ug/L	94.7	70 - 130				05/22/11
Cobalt	7440-48-4		36.2	ug/L	90.6	70 - 130				05/22/11
Copper	7440-50-8		33.7	ug/L	84.2	70 - 130				05/22/11
Vanadium	7440-62-2		41.9	ug/L	104.8	70 - 130				05/22/11
Zinc	7440-66-6		31.8	ug/L	79.4	70 - 130				05/22/11
Lead	7439-92-1		44.8	ug/L	112	70 - 130				05/22/11
Mercury	7439-97-6		2.45	ug/L	122.5	70 - 130				05/22/11
Strontium	7440-24-6		118	ug/L	295	70 - 130			X	05/22/11
Thallium	7440-28-0		44.0	ug/L	110	70 - 130				05/22/11
Tin	7440-31-5		43.0	ug/L	107.4	70 - 130				05/22/11
Uranium	7440-61-1		48.6	ug/L	121.4	70 - 130				05/22/11
Arsenic	7440-38-2		42.1	ug/L	105.2	70 - 130				05/22/11
Selenium	7782-49-2		38.2	ug/L	95.5	70 - 130				05/22/11
MSD			**QC Sample #56066**							
			Original 112262007					**Paired**	**56065**	
Manganese	7439-96-5		40.6	ug/L	101.6	70 - 130	4.40	20		05/22/11
Nickel	7440-02-0		36.6	ug/L	91.5	70 - 130	4.60	20		05/22/11
Silver	7440-22-4		37.9	ug/L	94.8	70 - 130	3.70	20		05/22/11

Quality Control Report

Attention Michael Neely
Department Inorganic

Group # WSCF112290

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Antimony	7440-36-0		44.4	ug/L	111	70 - 130	3.20	20		05/22/11
Barium	7440-39-3		53.6	ug/L	134	70 - 130	13.50	20	X	05/22/11
Beryllium	7440-41-7		45.4	ug/L	113.6	70 - 130	12.90	20		05/22/11
Cadmium	7440-43-9		39.1	ug/L	97.8	70 - 130	3.80	20		05/22/11
Chromium	7440-47-3		41.2	ug/L	102.9	70 - 130	8.30	20		05/22/11
Cobalt	7440-48-4		37.9	ug/L	94.8	70 - 130	4.50	20		05/22/11
Copper	7440-50-8		35.2	ug/L	88	70 - 130	4.40	20		05/22/11
Vanadium	7440-62-2		44.1	ug/L	110.3	70 - 130	5.10	20		05/22/11
Zinc	7440-66-6		32.4	ug/L	81	70 - 130	2.00	20		05/22/11
Lead	7439-92-1		47.4	ug/L	118.5	70 - 130	5.60	20		05/22/11
Mercury	7439-97-6		2.67	ug/L	133.7	70 - 130	8.70	20	N	05/22/11
Strontium	7440-24-6		138	ug/L	345	70 - 130	15.60	20	X	05/22/11
Thallium	7440-28-0		45.9	ug/L	114.8	70 - 130	4.30	20		05/22/11
Tin	7440-31-5		44.2	ug/L	110.6	70 - 130	2.90	20		05/22/11
Uranium	7440-61-1		51.7	ug/L	129.2	70 - 130	6.20	20		05/22/11
Arsenic	7440-38-2		43.5	ug/L	108.6	70 - 130	3.20	20		05/22/11
Selenium	7782-49-2		38.6	ug/L	96.5	70 - 130	1.00	20		05/22/11

Quality Control Report

Attention Michael Neely
Department Inorganic

Group # WSCF112291

QC Batch 182343
Associated Samples 112291001, 112291002, 112291003, 112291004

Test ICP-2008 MS All possible metal

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
LCS			**QC Sample #56220**							
Manganese	7439-96-5		426	mg/kg	94.1	75 - 121				05/24/11
Nickel	7440-02-0		51.7	mg/kg	93.1	74 - 122				05/24/11
Silver	7440-22-4		101	mg/kg	100.2	83 - 127				05/24/11
Antimony	7440-36-0		155	mg/kg	171.7	62 - 205				05/24/11
Barium	7440-39-3		306	mg/kg	96	78 - 118				05/24/11
Beryllium	7440-41-7		88.9	mg/kg	99.3	77 - 120				05/24/11
Cadmium	7440-43-9		65.5	mg/kg	98.5	76 - 129				05/24/11
Chromium	7440-47-3		68.1	mg/kg	93.5	68 - 119				05/24/11
Cobalt	7440-48-4		67.4	mg/kg	92.2	77 - 122				05/24/11
Copper	7440-50-8		59.8	mg/kg	87.3	67 - 120				05/24/11
Vanadium	7440-62-2		80.4	mg/kg	96.9	67 - 122				05/24/11
Zinc	7440-66-6		161	mg/kg	90.7	73 - 131				05/24/11
Lead	7439-92-1		125	mg/kg	95.9	79 - 124				05/24/11
Mercury	7439-97-6		7.37	mg/kg	88.8	69 - 124				05/24/11
Strontium	7440-24-6		53.4	mg/kg	98.1	78 - 119				05/24/11
Thallium	7440-28-0		123	mg/kg	92.3	52 - 137				05/24/11
Tin	7440-31-5		175	mg/kg	101.3	84 - 130				05/24/11
Uranium	7440-61-1		378	mg/kg	94.4	86 - 113				05/24/11
Arsenic	7440-38-2		127	mg/kg	96	79 - 125				05/24/11

Quality Control Report

Attention Michael Neely
Department Inorganic

Group # WSCF112291

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Selenium	7782-49-2		164	mg/kg	102	82 - 133				05/24/11
MS			**QC Sample #56221**							
			Original	**112240001**						
Manganese	7439-96-5		72.9	mg/kg	78.5	70 - 130				05/24/11
Nickel	7440-02-0		82.5	mg/kg	88.8	70 - 130				05/24/11
Silver	7440-22-4		87.4	mg/kg	94.2	70 - 130				05/24/11
Antimony	7440-36-0		77.6	mg/kg	83.6	70 - 130				05/24/11
Barium	7440-39-3		87.1	mg/kg	93.8	70 - 130				05/24/11
Beryllium	7440-41-7		87.3	mg/kg	94.1	70 - 130				05/24/11
Cadmium	7440-43-9		88.3	mg/kg	95.1	70 - 130				05/24/11
Chromium	7440-47-3		86.1	mg/kg	92.7	70 - 130				05/24/11
Cobalt	7440-48-4		83.8	mg/kg	90.3	70 - 130				05/24/11
Copper	7440-50-8		67.9	mg/kg	73.2	70 - 130				05/24/11
Vanadium	7440-62-2		84.5	mg/kg	91	70 - 130				05/24/11
Zinc	7440-66-6		75.9	mg/kg	81.7	70 - 130				05/24/11
Lead	7439-92-1		89.9	mg/kg	96.8	70 - 130				05/24/11
Mercury	7439-97-6		1.82	mg/kg	98	70 - 130				05/24/11
Strontium	7440-24-6		91.9	mg/kg	99	70 - 130				05/24/11
Thallium	7440-28-0		89.3	mg/kg	96.1	70 - 130				05/24/11
Tin	7440-31-5		87.5	mg/kg	94.2	70 - 130				05/24/11
Uranium	7440-61-1		91.6	mg/kg	98.7	70 - 130				05/24/11
Arsenic	7440-38-2		88.3	mg/kg	95.1	70 - 130				05/24/11
Selenium	7782-49-2		87.6	mg/kg	94.4	70 - 130				05/24/11
MSD			**QC Sample #56222**							
			Original	**112240001**				**Paired**	**56221**	

Quality Control Report

Attention Michael Neely
Department Inorganic

Group # WSCF112291

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Manganese	7439-96-5		83.6	mg/kg	92.4	70 - 130	16.30	30		05/24/11
Nickel	7440-02-0		83.4	mg/kg	92.3	70 - 130	3.90	30		05/24/11
Silver	7440-22-4		87.1	mg/kg	96.3	70 - 130	2.20	30		05/24/11
Antimony	7440-36-0		77.5	mg/kg	85.7	70 - 130	2.50	30		05/24/11
Barium	7440-39-3		91.6	mg/kg	101.3	70 - 130	7.70	30		05/24/11
Beryllium	7440-41-7		91.3	mg/kg	101	70 - 130	7.10	30		05/24/11
Cadmium	7440-43-9		86.8	mg/kg	96	70 - 130	0.90	30		05/24/11
Chromium	7440-47-3		84.8	mg/kg	93.8	70 - 130	1.20	30		05/24/11
Cobalt	7440-48-4		82.6	mg/kg	91.3	70 - 130	1.10	30		05/24/11
Copper	7440-50-8		84.7	mg/kg	93.7	70 - 130	24.60	30		05/24/11
Vanadium	7440-62-2		83.5	mg/kg	92.4	70 - 130	1.50	30		05/24/11
Zinc	7440-66-6		74.1	mg/kg	81.9	70 - 130	0.20	30		05/24/11
Lead	7439-92-1		89.2	mg/kg	98.7	70 - 130	1.90	30		05/24/11
Mercury	7439-97-6		1.80	mg/kg	99.5	70 - 130	1.50	30		05/24/11
Strontium	7440-24-6		91.2	mg/kg	100.8	70 - 130	1.80	30		05/24/11
Thallium	7440-28-0		87.0	mg/kg	96.2	70 - 130	0.10	30		05/24/11
Tin	7440-31-5		88.4	mg/kg	97.8	70 - 130	3.80	30		05/24/11
Uranium	7440-61-1		91.1	mg/kg	100.8	70 - 130	2.10	30		05/24/11
Arsenic	7440-38-2		87.8	mg/kg	97.1	70 - 130	2.10	30		05/24/11
Selenium	7782-49-2		86.1	mg/kg	95.2	70 - 130	0.80	30		05/24/11

Quality Control Report

Attention Michael Neely
Department Inorganic

Group # WSCF112291

QC Batch 182355
Associated Samples 112291001, 112291002, 112291003, 112291004

Test ICP-6010 - All possible metals

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #56258**							
Lithium	7439-93-2		<5.0	ug/L					U	05/25/11
Boron	7440-42-8		<13	ug/L					U	05/25/11
LCS			**QC Sample #56259**							
Lithium	7439-93-2		6.64	mg/kg	78.7	48 - 119				05/25/11
Boron	7440-42-8		120	mg/kg	104.1	76 - 151				05/25/11
MS			**QC Sample #56262**							
			Original 112286001							
Lithium	7439-93-2		101	mg/kg	100.1	75 - 125				05/25/11
Boron	7440-42-8		193	mg/kg	95.5	75 - 125				05/25/11
MSD			**QC Sample #56263**							
			Original 112286001					**Paired**	**56262**	
Lithium	7439-93-2		101	mg/kg	101	75 - 125	0.90	30		05/25/11
Boron	7440-42-8		194	mg/kg	96.5	75 - 125	1.00	30		05/25/11

Quality Control Report

Attention Michael Neely
Department Inorganic

Group # WSCF112291

QC Batch 182343
Associated Samples 112291001, 112291002, 112291003, 112291004

Test ICP-2008 MS All possible metal

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #56219**							
Manganese	7439-96-5		<0.10	ug/L					U	05/24/11
Nickel	7440-02-0		<0.20	ug/L					U	05/24/11
Silver	7440-22-4		<0.10	ug/L					U	05/24/11
Antimony	7440-36-0		<0.30	ug/L					U	05/24/11
Barium	7440-39-3		<0.20	ug/L					U	05/24/11
Beryllium	7440-41-7		<0.10	ug/L					U	05/24/11
Cadmium	7440-43-9		<0.10	ug/L					U	05/24/11
Chromium	7440-47-3		<0.50	ug/L					U	05/24/11
Cobalt	7440-48-4		<0.050	ug/L					U	05/24/11
Copper	7440-50-8		<0.10	ug/L					U	05/24/11
Vanadium	7440-62-2		<0.20	ug/L					U	05/24/11
Zinc	7440-66-6		<0.80	ug/L					U	05/24/11
Lead	7439-92-1		<0.10	ug/L					U	05/24/11
Mercury	7439-97-6		<0.050	ug/L					U	05/24/11
Strontium	7440-24-6		<0.10	ug/L					U	05/24/11
Thallium	7440-28-0		<0.050	ug/L					U	05/24/11
Tin	7440-31-5		<0.050	ug/L					U	05/24/11
Uranium	7440-61-1		<0.050	ug/L					U	05/24/11
Arsenic	7440-38-2		<0.40	ug/L					U	05/24/11

Quality Control Report

Attention Michael Neely
Department Inorganic

Group # WSCF112291

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Selenium	7782-49-2		<0.30	ug/L					U	05/24/11

Date: 10 August 2011
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: Outer Area
Subject: General Chemistry - Sample Data Groups (SDGs) WSCF112290 and WSCF1112291

INTRODUCTION

This memorandum presents the results of data validation for SDGs WSCF112290 and WSCF112291 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
B2BH54	5/19/2011	Water	C	300.0, 7196A, 9040B
B2BH28	5/19/2011	Soil	C	300.0, 7196A, 9045
B2BH30	5/19/2011	Soil	C	300.0, 7196A, 9045
B2BH36	5/19/2011	Soil	C	300.0, 7196A, 9045
B2BH37	5/19/2011	Soil	C	300.0, 7196A, 9045

Data validation was conducted in accordance with the CHPRC validation statement of work and the Sampling and Analysis Plan for Selected 200-MG-1 Operable Unit Waste Sites, DOE/RL-2009-60, Rev. 1 (SAP). Appendices 1 through 6 provide the following information as indicated below:

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

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

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

- Nitrate – extraction of soils within 28 days of sample collection and analysis within 48 hours of extraction, analysis of waters within 48 hours of sample collection
- Hexavalent chromium – analysis of soils within 30 days of sample collection and analysis of waters within 24 hours of sample collection
- pH – analysis as soon as possible after sample collection

Sample preservation requires chilling to 4 degrees Celsius, except for pH in water that has no sample preservation requirement.

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

Samples B2BH28, B2BH30, B2BH36 and B2BH37 were analyzed for pH four days after sample collection. Based on professional judgment the pH results should be qualified as estimates and flagged "J."

- **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.

- **Accuracy**

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

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

All MS/MSD recoveries were acceptable with the following exceptions.

For SDG WSCF112291, the MS recovery for hexavalent Cr was < the lower acceptance limit. The hexavalent Cr results for samples B2BH28 and B2BH36 were non-detects and should be qualified as estimates and flagged "UJ." The hexavalent Cr results for samples B2BH30 and B2BH37 were detects and should be qualified as estimates and flagged "J."

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, laboratory duplicate sample results, field duplicate sample results, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ±30%. The 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 reporting limits with differences <1X the water reporting limits or differences <2X the soil reporting limits no precision infraction occurred.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Laboratory Duplicate Samples

All laboratory duplicate results were acceptable.

Field Duplicate Samples

All field duplicate results were acceptable.

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

- **Completeness**

SDGs WSCF112290 and WSCF112291 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

A minor deficiency leading to qualification of hexavalent chromium sample results as estimates was due to a matrix spike recovery infraction. Minor deficiencies leading to qualification of pH sample results as estimates were due to holding time 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-2009-60, Rev. 1, *Sampling and Analysis Plan for Selected 200-MG-1 Operable Unit Waste Sites*, January 2011.

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: WSCF112290 & WSCF112291	Reviewer: AQA	Project: Outer Area	Page 1 of 1
Analyte(s)	**DV Flag**	**Samples Affected**	**Reason**
pH	J	B2BH28, B2BH30, B2BH36, B2BH37	Analyzed beyond the holding time
Hexavalent chromium	UJ	B2BH28, B2BH36	Low MS recovery
Hexavalent chromium	J	B2BH30, B2BH37	Low MS recovery

Comments: None

Appendix 3

Annotated Laboratory Reports

WSCF Analytical Results Report

Attention Michael Neely
Department Inorganic

Group # WSCF112290

Sample # 112290001
SAF# F11-055
Sample ID B2BH54

Matrix WATER
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Anions by IC										**05/19/11**
Anions by IC										
Nitrate-N	NO3-N	LA-533-410	UD	<0.038		ug/mL	2	0.038		05/19/11
Cr(VI)										**05/19/11**
Cr(VI)										
Hexavalent chromium	18540-29-9	LA-265-403	U	<0.0020		mg/L	1	0.0020	0.0050	05/19/11
ICP Prep										**06/01/11**
ICP-AES										
Lithium	7439-93-2	LA-505-411	U	<5.0		ug/L	1	5.0	20	06/02/11
Boron	7440-42-8	LA-505-411	U	<13		ug/L	1	13	200	06/02/11
ICPMS Prep										**05/19/11**
ICP-MS										
Manganese	7439-96-5	LA-505-412	UD	<0.20		ug/L	2	0.20	2.0	05/22/11
Nickel	7440-02-0	LA-505-412	UD	<0.40		ug/L	2	0.40	4.0	05/22/11
Silver	7440-22-4	LA-505-412	UD	<0.20		ug/L	2	0.20	2.0	05/22/11
Antimony	7440-36-0	LA-505-412	UD	<0.60		ug/L	2	0.60	6.0	05/22/11
Barium	7440-39-3	LA-505-412	UD	<0.40		ug/L	2	0.40	4.0	05/22/11
Beryllium	7440-41-7	LA-505-412	UD	<0.10		ug/L	2	0.10	1.0	05/22/11
Cadmium	7440-43-9	LA-505-412	UD	<0.20		ug/L	2	0.20	2.0	05/22/11

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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 Wet Chemistry

Group # WSCF112290

Sample # 112290001
SAF# F11-055
Sample ID B2BH54

Matrix WATER
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
pH										**05/20/11**
pH										
pH	PH	LA-212-402		5.80		unitless	1	0.010		05/20/11

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

B - Analyte < the RDL but >= the IDL/MDL.
C - Analyte was found in the Associated Blank. (Inorganic)
D - Analyte was reported at a secondary diltution factor.
N - MS and/or MSD sample recovery outside control limits.
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.
PQL is equivalent to Estimated Quantitation Limit (EQL)

WSCF Analytical Results Report

Attention Michael Neely
Department Inorganic

Group # WSCF112291

Sample # 112291001
SAF# F11-054
Sample ID B2BH28

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Anions by IC										**05/25/11**
Anions by IC										
Nitrate-N	NO3-N	LA-533-410	B	1.95		mg/kg	1		5.3	05/25/11
Cr(VI) Prep										**05/25/11**
Cr(VI)										
Hexavalent chromium	18540-29-9	LA-265-403	UN	<0.034	UJ	ug/g	1	0.034	0.52	05/26/11
ICP Prep										**05/23/11**
ICP-AES										
Lithium	7439-93-2	LA-505-411		5.97		mg/kg	1	0.52	2.1	05/25/11
Boron	7440-42-8	LA-505-411	B	9.22		mg/kg	1	1.4	21	05/25/11
ICPMS Prep										**05/23/11**
ICP-MS										
Manganese	7439-96-5	LA-505-412		396		mg/kg	1	0.10	1.0	05/24/11
Nickel	7440-02-0	LA-505-412		9.22		mg/kg	1	0.21	2.1	05/24/11
Silver	7440-22-4	LA-505-412	U	<0.10		mg/kg	1	0.10	1.0	05/24/11
Antimony	7440-36-0	LA-505-412	U	<0.31		mg/kg	1	0.31	3.1	05/24/11
Barium	7440-39-3	LA-505-412		162		mg/kg	1	0.21	2.1	05/24/11
Beryllium	7440-41-7	LA-505-412	B	0.351		mg/kg	1	0.10	0.51	05/24/11
Cadmium	7440-43-9	LA-505-412	U	<0.10		mg/kg	1	0.10	1.0	05/24/11

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.

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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 # WSCF112291

Sample # 112291002
SAF# F11-054
Sample ID B2BH30

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Anions by IC										**05/25/11**
Anions by IC										
Nitrate-N	NO3-N	LA-533-410	B	1.55		mg/kg	1		5.2	05/25/11
Cr(VI) Prep										**05/25/11**
Cr(VI)										
Hexavalent chromium	18540-29-9	LA-265-403	BN	0.0922	J	ug/g	1	0.034	0.52	05/26/11
ICP Prep										**05/23/11**
ICP-AES										
Lithium	7439-93-2	LA-505-411		8.87		mg/kg	1	0.52	2.1	05/25/11
Boron	7440-42-8	LA-505-411	B	5.63		mg/kg	1	1.4	21	05/25/11
ICPMS Prep										**05/23/11**
ICP-MS										
Manganese	7439-96-5	LA-505-412		260		mg/kg	1	0.097	0.97	05/24/11
Nickel	7440-02-0	LA-505-412		11.3		mg/kg	1	0.19	1.9	05/24/11
Silver	7440-22-4	LA-505-412	U	<0.097		mg/kg	1	0.097	0.97	05/24/11
Antimony	7440-36-0	LA-505-412	U	<0.29		mg/kg	1	0.29	2.9	05/24/11
Barium	7440-39-3	LA-505-412		61.0		mg/kg	1	0.19	1.9	05/24/11
Beryllium	7440-41-7	LA-505-412	B	0.260		mg/kg	1	0.097	0.48	05/24/11
Cadmium	7440-43-9	LA-505-412	U	<0.097		mg/kg	1	0.097	0.97	05/24/11

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.

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8-08-2011

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 # WSCF112291

Sample # 112291003
SAF# F11-054
Sample ID B2BH36

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Anions by IC										**05/25/11**
Anions by IC										
Nitrate-N	NO3-N	LA-533-410	B	1.10		mg/kg	1		5.2	05/25/11
Cr(VI) Prep										**05/25/11**
Cr(VI)										
Hexavalent chromium	18540-29-9	LA-265-403	UN	<0.035	UJ	ug/g	1	0.035	0.52	05/26/11
ICP Prep										**05/23/11**
ICP-AES										
Lithium	7439-93-2	LA-505-411		6.15		mg/kg	1	0.53	2.1	05/25/11
Boron	7440-42-8	LA-505-411	B	10.1		mg/kg	1	1.4	22	05/25/11
ICPMS Prep										**05/23/11**
ICP-MS										
Manganese	7439-96-5	LA-505-412		396		mg/kg	1	0.10	1.0	05/24/11
Nickel	7440-02-0	LA-505-412		8.88		mg/kg	1	0.21	2.1	05/24/11
Silver	7440-22-4	LA-505-412	U	<0.10		mg/kg	1	0.10	1.0	05/24/11
Antimony	7440-36-0	LA-505-412	U	<0.31		mg/kg	1	0.31	3.1	05/24/11
Barium	7440-39-3	LA-505-412		93.4		mg/kg	1	0.21	2.1	05/24/11
Beryllium	7440-41-7	LA-505-412	B	0.342		mg/kg	1	0.10	0.52	05/24/11
Cadmium	7440-43-9	LA-505-412	U	<0.10		mg/kg	1	0.10	1.0	05/24/11

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.

LS
8-08-2011

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 # WSCF112291

Sample # 112291004
SAF# F11-054
Sample ID B2BH37

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Anions by IC										**05/25/11**
Anions by IC										
Nitrate-N	NO3-N	LA-533-410	B	1.08		mg/kg	1		5.2	05/25/11
Cr(VI) Prep										**05/25/11**
Cr(VI)										
Hexavalent chromium	18540-29-9	LA-265-403	BN	0.0506 J		ug/g	1	0.034	0.52	05/26/11
ICP Prep										**05/23/11**
ICP-AES										
Lithium	7439-93-2	LA-505-411		6.36		mg/kg	1	0.52	2.1	05/25/11
Boron	7440-42-8	LA-505-411	B	10.8		mg/kg	1	1.4	21	05/25/11
ICPMS Prep										**05/23/11**
ICP-MS										
Manganese	7439-96-5	LA-505-412		392		mg/kg	1	0.091	0.91	05/24/11
Nickel	7440-02-0	LA-505-412		8.53		mg/kg	1	0.18	1.8	05/24/11
Silver	7440-22-4	LA-505-412	U	<0.091		mg/kg	1	0.091	0.91	05/24/11
Antimony	7440-36-0	LA-505-412	U	<0.27		mg/kg	1	0.27	2.7	05/24/11
Barium	7440-39-3	LA-505-412		88.0		mg/kg	1	0.18	1.8	05/24/11
Beryllium	7440-41-7	LA-505-412	B	0.292		mg/kg	1	0.091	0.46	05/24/11
Cadmium	7440-43-9	LA-505-412	B	0.0972		mg/kg	1	0.091	0.91	05/24/11

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.

LS
8-08-2011

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 Wet Chemistry

Group # WSCF112291

Sample # 112291001
SAF# F11-054
Sample ID B2BH28

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Total Residue										**05/25/11**
Total Residue										
Percent Solids	%SOLIDS	LA-519-412		95		percent	1			05/25/11
pH on Solids										**05/23/11**
pH on Solids										
pH	PH	LA-212-411		7.06 J		unitless	1	0.010	0.50	05/23/11

LS
8-08-2011

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

B - Analyte < the RDL but >= the IDL/MDL.
C - Analyte was found in the Associated Blank. (Inorganic)
D - Analyte was reported at a secondary diltution factor.
N - MS and/or MSD sample recovery outside control limits.
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.
PQL is equivalent to Estimated Quantitation Limit (EQL)

WSCF Analytical Results Report

Attention Michael Neely
Department Wet Chemistry

Group # WSCF112291

Sample # 112291002
SAF# F11-054
Sample ID B2BH30

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Total Residue										**05/25/11**
Total Residue										
Percent Solids	%SOLIDS	LA-519-412		97		percent	1			05/25/11
pH on Solids										**05/23/11**
pH on Solids										
pH	PH	LA-212-411		7.42 J		unitless	1	0.010	0.50	05/23/11

LS
8-08-2011

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

B - Analyte < the RDL but >= the IDL/MDL.
C - Analyte was found in the Associated Blank. (Inorganic)
D - Analyte was reported at a secondary diltution factor.
N - MS and/or MSD sample recovery outside control limits.
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.
PQL is equivalent to Estimated Quantitation Limit (EQL)

WSCF Analytical Results Report

Attention Michael Neely
Department Wet Chemistry

Group # WSCF112291

Sample # 112291003
SAF# F11-054
Sample ID B2BH36

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Total Residue										**05/25/11**
Total Residue										
Percent Solids	%SOLIDS	LA-519-412		95		percent	1			05/25/11
pH on Solids										**05/23/11**
pH on Solids										
pH	PH	LA-212-411		6.88 J		unitless	1	0.010	0.50	05/23/11

LS
8-08-2011

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

B - Analyte < the RDL but >= the IDL/MDL.
C - Analyte was found in the Associated Blank. (Inorganic)
D - Analyte was reported at a secondary diltution factor.
N - MS and/or MSD sample recovery outside control limits.
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.
PQL is equivalent to Estimated Quantitation Limit (EQL)

WSCF Analytical Results Report

Attention Michael Neely
Department Wet Chemistry

Group # WSCF112291

Sample # 112291004
SAF# F11-054
Sample ID B2BH37

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Total Residue										**05/25/11**
Total Residue										
Percent Solids	%SOLIDS	LA-519-412		95		percent	1			05/25/11
pH on Solids										**05/23/11**
pH on Solids										
pH	PH	LA-212-411		6.84 J		unitless	1	0.010	0.50	05/23/11

LS
8-08-2011

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

B - Analyte < the RDL but >= the IDL/MDL.
C - Analyte was found in the Associated Blank. (Inorganic)
D - Analyte was reported at a secondary diltution factor.
N - MS and/or MSD sample recovery outside control limits.
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.
PQL is equivalent to Estimated Quantitation Limit (EQL)

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Attachment 2
Narrative
WSCF112290

Introduction

A sample was received at the WSCF laboratory as referenced on the WSCF SAF Number Cross Reference table included in the final report. The sample was 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

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

- All applicable QC controls are within the established limits.

Attachment 2
Narrative
WSCF112290

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.

ICP-AES Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- All applicable QC controls are within the established limits.

ICP-MS Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- Mercury – Matrix Spike and/or Matrix Spike Duplicate recoveries are outside established laboratory limits. Affected sample results in this batch were "N" flagged.
- Vanadium – Detected in the Blank and evaluated. Affected sample results in this batch were "C" Flagged.
- Barium and Strontium – Exceeded spiking levels by a factor of 4. Spike recoveries and associated RPDs are not valid.
- All other applicable QC controls are within the established limits.

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

- All applicable QC controls are within the established limits.

Organic Comments

PCB – 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.

Semi-VOA – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- Analysis performed by 8270-PAH SIM method.
- All applicable QC controls are within the established limits.

Attachment 2
Narrative
WSCF112290

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.
    - Matrix Spike and/or Matrix Spike Duplicate recoveries are outside established laboratory limits. Affected sample results in this batch were "N" flagged.
    - The LCS Failed. Sample Issue Resolution Form SDR11-292 was generated. Sample and QC results were flagged.
    - All other applicable QC controls are within the established limits.

Radiochemistry Comments

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

- Gross Alpha / Gross Beta:
    - 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.

Narrative

Attachment 2
Narrative
WSCF112290

SAMPLE ISSUE RESOLUTION

SIR NUM	SDR11-292
REV NUM	0
DATE INITIATED	6/2/2011

SAMPLE EVENT INFORMATION

SAF NUM(S)	F11-055, I11-025
OPERABLE UNIT(S)	100-NR-2, NONE
PROJECT(S)	Outer Area, CERC11
SAMPLE EVENT TITLE(S)	200-MG-1 Waste Sites, CERC11
LABORATORY	Waste Sampling & Characterization

SAMPLING INFORMATION

NUMBER OF SAMPLES	4
SAMPLE NUMBERS	B2BH54, B2CY15, B2CY22, B2CY23
SAMPLE MATRIX	WATER
COLLECTION DATE	5/19/2011 - 5/20/2011
SDG NUM	WSCF112295, WSCF112290

ISSUE BACKGROUND

CLASS	Laboratory Issue
TYPE	Quality Control Failure
DESCRIPTION	THE TPHD LCS /MS/MSD ALL FAILED HIGH, HOWEVER, THE SAMPLES WERE ALL NON-DETECT FOR TPHD.
	LCS (154%) LIMITS 65-128% MS (176.4%) LIMITS 73-123%

DISPOSITION

DESCRIPTION	Report results as-is and flag the samples with a comment in the narrative.
	Please initiate a re-run of samples B2CY15, B2CY22, B2CY23 within hold time.
JUSTIFICATION	Submitted by: Marisol Avila Date: 6/2/2011
	Accepted by: Deb Alexander Date: 6/2/2011

4

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F11-055-001

PAGE 1 OF 2

COLLECTOR: Patterson

SAMPLING LOCATION: NPE EB 1

ICE CHEST NO.:

COMPANY CONTACT: WIDRIG, DL

TELEPHONE NO.: 376-2858

PROJECT COORDINATOR: WIDRIG, DL

PRICE CODE: 7C

DATA TURNAROUND: 15 Days / 15 Days

AIR QUALITY: ☐

PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - QC Sampling

SAF NO.: F11-055

FIELD LOGBOOK NO.: HNF-N 507-21

ACTUAL SAMPLE DEPTH: N/A

COA: 302427ES10

METHOD OF SHIPMENT: GOVERNMENT VEHICLE

ORIGINAL

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)

112290

SPECIAL HANDLING AND/OR STORAGE

PRESERVATION	Cool~4C	HCl to pH <2/Cool~4C	Cool~4C	HNO3 to pH <2	Cool~4C	Cool~4C	None	HNO3 to pH <2
HOLDING TIME	7/40 Days	7/40 Days	1 yr/1 yr	28 Days	24 Hours	28 Days/48 Hours	ASAP	6 Months
TYPE OF CONTAINER	aG	aG	aG	G/P	aG	P	P	G/P
NO. OF CONTAINER(S)	4	3	4	1	1	1	1	1
VOLUME	1L	1L	1L	500mL	500mL	250mL	60mL	500mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS	SEE ITEM (4) IN SPECIAL INSTRUCTIONS	Chromium Hex - 7196;	IC Anions - 300.0 (Nitrogen in Nitrate);	pH (Water) - 9040 (pH Measurement);	SEE ITEM (5) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME								
B2BH54	1 WATER	5/19/11	0815	✓	✓	✓	✓	✓	✓	✓	✓

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
K. Patterson	5/19/11 1300	M. Nelson	5/19/11 1300
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

LABORATORY SECTION — RECEIVED BY — TITLE — DATE/TIME

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

PRINTED ON 1/17/2011

A-6003-618 (REV 2)

Sample Receipt

Chain of Custody

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-055-001	PAGE 2 OF 2
COLLECTOR K. Patterson	COMPANY CONTACT WIDRIG, DL	TELEPHONE NO. 376-2858	PROJECT COORDINATOR WIDRIG, DL	PRICE CODE 7C	DATA TURNAROUND 15 Days / 15 Days
SAMPLING LOCATION NPE EB 1	PROJECT DESIGNATION Non Operational Area Evaluation Sampling - QC Sampling		SAF NO. F11-055	AIR QUALITY	
ICE CHEST NO.	FIELD LOGBOOK NO. HNF-N-507-21	ACTUAL SAMPLE DEPTH N/A	COA 302427ES10	METHOD OF SHIPMENT GOVERNMENT VEHICLE	ORIGINAL
SHIPPED TO Waste Sampling & Characterization	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

SPECIAL INSTRUCTIONS

** Duplicates and equipment blanks to be collected at a frequency of 1/day of sampling. If multiple samples are collected in one day, only colllect the duplicate and equipment blank associated with the first sample of that day.

** The CACN for all analytical work at WSCF laboratory is 401910ES20.

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

** The laboratory shall report only the requested constituents of concern in all preliminary or final hardcopy data reports, or EDDs. QC results for non-requested constituents need not be reported, but samples chosen for matrix spike, and all spike compounds shall be identified in the final data report narrative. No TICs shall be reported.
(1) Semi-VOA - 8270 (TCL) {Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene};
(2) TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range};
(3) PCBs - 8082 {Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260};
(4) 200.8_HG - ICPMS {Mercury}; ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Cobalt, Copper, Manganese, Nickel, Silver, Vanadium, Zinc}; ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Selenium, Strontium, Thallium, Tin, Uranium}; ICP Metals - 6010 (Add-On) {Boron, Lithium};
(5) Gross Alpha {Gross alpha}; Gross Beta {Gross beta};

PRINTED ON 1/17/2011 A-6003-619 (REV 2)

Attachment 2
Narrative
WSCF112291

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

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

- All applicable QC controls are within the established limits.

Attachment 2
Narrative
WSCF112291

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):

- Matrix Spike and Post Spike recoveries are outside established laboratory limits. Affected sample results in this batch were "N" flagged.
- All other applicable QC controls are within the established limits.

ICP-AES Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- All applicable QC controls are within the established limits.

ICP-MS Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- All applicable QC controls are within the established limits.

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

- All applicable QC controls are within the established limits.

Organic Comments

PCB – 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.

Semi-VOA – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- Analysis performed by 8270-PAH SIM method.
- All applicable QC controls are within the established limits.

TPHD-WA – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. 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.

- The LCS did not meet laboratory acceptance criteria. Samples and QC were flagged for the failure. Sample issue resolution form SDR11-293 was generated. The results were reported as stated in the resolution.
- Diesel – Matrix Spike and/or Matrix Spike Duplicate recoveries are outside established laboratory limits. Affected sample results in this batch were "N" flagged.
- All other applicable QC controls are within the established limits.

Radiochemistry Comments

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

- Gross Alpha / Gross Beta:
  - Gross Beta – Duplicate Relative Percent Difference(s) (RPD) did not meet the established laboratory limits. Duplicate Relative Percent Difference (RPD) does not apply to results below 5X the minimum detectable activity. No flags issued.
  - 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.

Narrative

Attachment 2
Narrative
WSCF112291

SAMPLE ISSUE RESOLUTION

SIR NUM	SDR11-293
REV NUM	0
DATE INITIATED	6/2/2011

SAMPLE EVENT INFORMATION

SAF NUM(S)	F11-054
OPERABLE UNIT(S)	NONE
PROJECT(S)	Outer Area
SAMPLE EVENT TITLE(S)	200-MG-1 Waste Sites
LABORATORY	Waste Sampling & Characterization

SAMPLING INFORMATION

NUMBER OF SAMPLES	9
SAMPLE NUMBERS	B2BH28, B2BH30, B2BH32, B2BH36, B2BH37, B2BH38, B2BH40, B2BH44, B2BH48
SAMPLE MATRIX	SOIL
COLLECTION DATE	5/19/2011 - 5/23/2011
SDG NUM	WSCF112291, WSCF112305

ISSUE BACKGROUND

CLASS	Laboratory Issue
TYPE	Quality Control Failure
DESCRIPTION	The TPHD LCS failed high, however, the samples were all non-detect for TPHD. LCS (142.4%) LIMITS 70-130%

DISPOSITION

DESCRIPTION	Report results as-is and flag the samples with a comment in the narrative.
JUSTIFICATION	Submitted by: Marisol Avila Date: 6/2/2011
	Accepted by: Kelly Whitley Date:6/2/2011

A-6003-640 (03/30) 4 PAGE 1 of 1

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F11-054-001

PAGE 1 OF 2

COLLECTOR: KC Patterson CHPRC

COMPANY CONTACT: WIDRIG, DL

TELEPHONE NO.: 376-2858

PROJECT COORDINATOR: WIDRIG, DL

PRICE CODE: 8C

DATA TURNAROUND: 15 Days / 15 Days

SAMPLING LOCATION: NPE-01

PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - Soil

SAF NO.: F11-054

AIR QUALITY: ☐

ICE CHEST NO.:

FIELD LOGBOOK NO.: HNF-N-501-21

ACTUAL SAMPLE DEPTH: 0-6"

COA: 302427ES10

METHOD OF SHIPMENT: GOVERNMENT VEHICLE

ORIGINAL

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)

112291

SPECIAL HANDLING AND/OR STORAGE

PRESERVATION	Cool~4C	Cool~4C	None
HOLDING TIME	14/40 Days	28 Days	6 Months
TYPE OF CONTAINER	aG	G/P	G/P
NO. OF CONTAINER(S)	1	1	1
VOLUME	250mL	250mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS

SAMPLE NO.		MATRIX*	SAMPLE DATE	SAMPLE TIME			
B2BH28	1	SOIL	MAY 19 2011	1133	✓	✓	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
KC Patterson CHPRC	MAY 19 2011	BW H Nelson	MAY 19 2011 1300
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

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS

SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

LABORATORY SECTION — RECEIVED BY — TITLE — DATE/TIME

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

PRINTED ON 1/17/2011

A-6003-618 (REV 2)

CH2MHill Plateau Remediation Company — **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** — **F11-054-001** — **PAGE 2 OF 2**

COLLECTOR KC Patterson CHPRC	**COMPANY CONTACT** WIDRIG, DL	**TELEPHONE NO.** 376-2858	**PROJECT COORDINATOR** WIDRIG, DL	**PRICE CODE** 8C	**DATA TURNAROUND** 15 Days / 15 Days
SAMPLING LOCATION NPE-01	**PROJECT DESIGNATION** Non Operational Area Evaluation Sampling - Soil		**SAF NO.** F11-051	**AIR QUALITY** ☐	
ICE CHEST NO.	**FIELD LOGBOOK NO.** HNF-N-303 - 21	**ACTUAL SAMPLE DEPTH** 0-6"	**COA** 302427ES10	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	**ORIGINAL**
SHIPPED TO Waste Sampling & Characterization	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

SPECIAL INSTRUCTIONS

** Sample locations will be randomly selected from the investigation area. Final location decisions will be made by the Field PAL and samplers.

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** Duplicates and equipment blanks to be collected at a frequency of 1/day of sampling. If multiple samples are collected in one day, only colllect the duplicate and equipment blank associated with the first sample of that day.

** The CACN for all analytical work at WSCF laboratory is 401910ES20.

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

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(1) 8270_SVOA_GCMS: SIM {Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene}; TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range}; PCBs - 8082 {Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260};
(2) 200.8_HG - ICPMS {Mercury}; ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Cobalt, Copper, Manganese, Nickel, Silver, Vanadium, Zinc}; ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Selenium, Strontium, Thallium, Tin, Uranium}; ICP Metals - 6010 (Add-On) {Boron, Lithium}; Chromium Hex - 7196; IC Anions - 300.0 {Nitrogen in Nitrate}; pH (Soil) - 9045 {pH Measurement};
(3) Gross Alpha {Gross alpha}; Gross Beta {Gross beta};

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Thursday, May 19, 2011 2:38:07 PM
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Sample Receipt

Chain of Custody

CH2MHill Plateau Remediation Company — **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** — F11-054-003 — PAGE 1 OF 2

COLLECTOR: KC Patterson CHPRC	COMPANY CONTACT: WIDRIG, DL	TELEPHONE NO.: 376-2858	PROJECT COORDINATOR: WIDRIG, DL
PRICE CODE: 8C	DATA TURNAROUND: 15 Days / 15 Days		
SAMPLING LOCATION: NPE-02	PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - Soil	SAF NO.: F11-054	AIR QUALITY: ☐
ICE CHEST NO.	FIELD LOGBOOK NO.: HNF-N-507-21	ACTUAL SAMPLE DEPTH: 0-6"	COA: 302427E510
METHOD OF SHIPMENT: GOVERNMENT VEHICLE	ORIGINAL		
SHIPPED TO: Waste Sampling & Characterization	OFFSITE PROPERTY NO.: N/A	BILL OF LADING/AIR BILL NO.: N/A	

MATRIX*: A=Air, DI=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

PRESERVATION	Cool~4C	Cool~4C	None
HOLDING TIME	14/40 Days	28 Days	6 Months
TYPE OF CONTAINER	aG	G/P	G/P
NO. OF CONTAINER(S)	1	1	1
VOLUME	250mL	250mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS

SAMPLE NO.		MATRIX*	SAMPLE DATE	SAMPLE TIME			
B2BH30	2	SOIL	MAY 19 2011	1045	✓	✓	✓

CHAIN OF POSSESSION — **SIGN/ PRINT NAMES** — **SPECIAL INSTRUCTIONS**: SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
KC Patterson CHPRC	MAY 19 2011 1300	R.C. Nelson	MAY 19 2011 1300

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

PRINTED ON 1/17/2011 — A-6003-618 (REV 2)

Chain of Custody

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F11-054-003	PAGE 2 OF 2
COLLECTOR: KC Patterson CHPRC	COMPANY CONTACT: WIDRIG, DL	TELEPHONE NO.: 376-2858	PROJECT COORDINATOR: WIDRIG, DL	PRICE CODE: 8C
SAMPLING LOCATION: NPE-02	PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - Soil		SAF NO.: F11-054	AIR QUALITY: ☐
ICE CHEST NO.	FIELD LOGBOOK NO.: HNF-N-507-21	ACTUAL SAMPLE DEPTH: 0-6"	COA: 302427ES10	METHOD OF SHIPMENT: GOVERNMENT VEHICLE
SHIPPED TO: Waste Sampling & Characterization	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A	

DATA TURNAROUND: 15 Days / 15 Days

ORIGINAL

SPECIAL INSTRUCTIONS

** Sample locations will be randomly selected from the investigation area. Final location decisions will be made by the Field PAL and samplers.

** There are 11 primary sampling locations and 2 alternates. Samples NP-08 and NP-10 are preferred locations, but the alternates may be substituted for these if necessary.

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

** The laboratory shall report only the requested constituents of concern in all preliminary or final hardcopy data reports, or EDDs. QC results for non-requested constituents need not be reported, but samples chosen for matrix spike, and all spike compounds shall be identified in the final data report narrative. No TICs shall be reported.
(1) 8270_SVOA_GCMS: SIM {Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene}; TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range}; PCBs - 8082 {Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260};
(2) 200.8_HG - ICPMS {Mercury}; ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Cobalt, Copper, Manganese, Nickel, Silver, Vanadium, Zinc}; ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Selenium, Strontium, Thallium, Tin, Uranium}; ICP Metals - 6010 (Add-On) {Boron, Lithium}; Chromium Hex - 7196; IC Anions - 300.0 {Nitrogen in Nitrate}; pH (Soil) 9045 {pH Measurement};
(3) Gross Alpha {Gross alpha}; Gross Beta {Gross beta};

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Sample Receipt

Chain of Custody

CH2MHill Plateau Remediation Company — **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** — F11-054-009 — PAGE 1 OF 2

COLLECTOR: KC Patterson CHPRC	COMPANY CONTACT: WIDRIG, DL	TELEPHONE NO.: 376-2858	PROJECT COORDINATOR: WIDRIG, DL
PRICE CODE: 8C	DATA TURNAROUND: 15 Days / 15 Days		
SAMPLING LOCATION: NPE-05	PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - Soil		SAF NO.: F11-054
AIR QUALITY: L			
ICE CHEST NO.	FIELD LOGBOOK NO.: HNF-N-507-21	ACTUAL SAMPLE DEPTH: 0-6"	COA: 302427ES10
METHOD OF SHIPMENT: GOVERNMENT VEHICLE	ORIGINAL		
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

PRESERVATION	Cool~4C	Cool~4C	None
HOLDING TIME	14/40 Days	28 Days	6 Months
TYPE OF CONTAINER	aG	G/P	G/P
NO. OF CONTAINER(S)	1	1	1
VOLUME	250mL	250mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS

SAMPLE NO.		MATRIX*	SAMPLE DATE	SAMPLE TIME			
B2BH35	3	SOIL	MAY 19 2011	0945	✓	✓	✓

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

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
KC Patterson CHPRC	MAY 19 2011 1300	M. Nelson M. Nelson	MAY 19 2011 1300

SPECIAL INSTRUCTIONS: SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

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

PRINTED ON 1/17/2011 — R-6003-618 (REV 2)

CH2MHill Plateau Remediation Company — **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** — F11-054-009 — PAGE 2 OF 2

COLLECTOR KC Patterson CHPRC	**COMPANY CONTACT** WIDRIG, DL	**TELEPHONE NO.** 376-2858	**PROJECT COORDINATOR** WIDRIG, DL
SAMPLING LOCATION NPE-05	**PROJECT DESIGNATION** Non Operational Area Evaluation Sampling - Soil		**SAF NO.** F11-054
ICE CHEST NO.	**FIELD LOGBOOK NO.** HNF-N-507-21	**ACTUAL SAMPLE DEPTH** 0-6"	**COA** 302427ES10
SHIPPED TO Waste Sampling & Characterization	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A

PRICE CODE 8C

AIR QUALITY ☐

METHOD OF SHIPMENT GOVERNMENT VEHICLE

DATA TURNAROUND 15 Days / 15 Days

ORIGINAL

SPECIAL INSTRUCTIONS

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(1) 8270_SVOA_GCMS: SIM {Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene}; TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range}; PCBs - 8082 {Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260};
(2) 200.8_HG - ICPMS {Mercury}; ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Cobalt, Copper, Manganese, Nickel, Silver, Vanadium, Zinc}; ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Selenium, Strontium, Thallium, Tin, Uranium}; ICP Metals - 6010 (Add-On) {Boron, Lithium}; Chromium Hex - 7196; IC Anions - 300.0 {Nitrogen in Nitrate}; pH (Soil) - 9045 {pH Measurement};
(3) Gross Alpha {Gross alpha}; Gross Beta {Gross beta};

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Sample Receipt

Chain of Custody

CH2MHill Plateau Remediation Company — **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** — F11-054-010 — PAGE 1 OF 2

COLLECTOR: KC Patterson CHPRC

COMPANY CONTACT: WIDRIG, DL

TELEPHONE NO.: 375-2858

PROJECT COORDINATOR: WIDRIG, DL

PRICE CODE: 8C

DATA TURNAROUND: 15 Days / 15 Days

SAMPLING LOCATION: NPE-05 DUP

PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - Soil

SAF NO.: F11-054

AIR QUALITY: ☐

ICE CHEST NO.:

FIELD LOGBOOK NO.: HNF-N-507-21

ACTUAL SAMPLE DEPTH: 0-6"

COA: 302427ES10

METHOD OF SHIPMENT: GOVERNMENT VEHICLE

ORIGINAL

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

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PRESERVATION	Cool~4C	Cool~4C	None
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TYPE OF CONTAINER	aG	G/P	G/P
NO. OF CONTAINER(S)	1	1	1
VOLUME	250mL	250mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS

SAMPLE NO.		MATRIX*	SAMPLE DATE	SAMPLE TIME			
B2BH37	4	SOIL	MAY 19 2011	0945	✓	✓	✓

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

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
KC Patterson CHPRC	MAY 19 2011 1300	M. Nelsonmacy	MAY 19 2011 1300
			MAY 19 2011

SPECIAL INSTRUCTIONS: SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

LABORATORY SECTION — RECEIVED BY — TITLE — DATE/TIME

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

PRINTED ON 1/17/2011

A-6003-618 (REV 2)

Chain of Custody

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-054-010	PAGE 2 OF 2
COLLECTOR: KC Patterson, CHPRC	COMPANY CONTACT: WIDRIG, DL	TELEPHONE NO.: 376-2958	PROJECT COORDINATOR: WIDRIG, DL	PRICE CODE: 8C	DATA TURNAROUND
SAMPLING LOCATION: NPE-05 DUP	PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - Soil		SAF NO.: F11-054	AIR QUALITY: ☐	15 Days / 15 Days
ICE CHEST NO.	FIELD LOGBOOK NO.: HNF-N-507-21	ACTUAL SAMPLE DEPTH: 0-6"	COA: 302427ES10	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	ORIGINAL
SHIPPED TO: Waste Sampling & Characterization	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

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(2) 200.8_HG - ICPMS {Mercury}; ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Cobalt, Copper, Manganese, Nickel, Silver, Vanadium, Zinc}; ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Selenium, Strontium, Thallium, Tin, Uranium}; ICP Metals - 6010 (Add-On) {Boron, Lithium}; Chromium Hex - 7196; IC Anions - 300.0 {Nitrogen in Nitrate}; pH (Soil) 9045 {pH Measurement};
(3) Gross Alpha {Gross alpha}; Gross Beta {Gross beta};

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Appendix 5

Data Validation Supporting Documentation

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: Outer Area			DATA PACKAGE: VSR11-053		
VALIDATOR: Carl Schloesslin		LAB: WSCF		DATE: 8-10-2011	
			SDG: WSCF112290, WSCF112291		
ANALYSES PERFORMED					
Anions/IC X	TOC	TOX	TPH-418.1	Oil and Grease	Alkalinity
Ammonia	BOD/COD	Chloride	Chromium-VI X	pH X	NO_3/NO_2
Sulfate	TDS	TKN	Phosphate	Cyanide	

SAMPLES/MATRIX

SDG WSCF112290 (Water): B2BH54 (equipment blank)

SDG WSCF112291 (Soil): B2BH28, B2BH30, B2BH36, B2BH37 (field duplicate of B2BH36)

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:

WSCF112291: Cr(VI) MS %R = 24%

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:

Samples B2BH28, B2BH30, B2BH36, B2BH37 analyzed for pH 4 days after sample collection.

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:

Note: Client instructed AQA that CRDLs in SAP only should be used for detection limit assessment and to ignore CRDLs listed in the SAFs.

Appendix 6

Additional Documentation Requested By Client

Quality Control Report

Attention Michael Neely
Department Inorganic

Group # WSCF112290

QC Batch 182310
Associated Samples 112290001

Test Anions by Ion Chromatography (Water)

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #56092**							
Nitrate-N	NO3-N		<9.7E-3	ug/mL					U	05/19/11
LCS			**QC Sample #56093**							
Nitrate-N	NO3-N		0.900	ug/mL	101.7	90 - 110				05/19/11
DUP			**QC Sample #56094**							
			Original 112290001							
Nitrate-N	NO3-N	<0.038	<0.038	ug/mL			0.00	20	UD	05/19/11
MS			**QC Sample #56095**							
			Original 112290001							
Nitrate-N	NO3-N	<0.038	0.904	ug/mL	101.1	80 - 120			D	05/19/11
MSD			**QC Sample #56096**							
			Original 112290001					**Paired**	**56095**	
Nitrate-N	NO3-N	<0.038	0.928	ug/mL	103.8	80 - 120	2.60	20	D	05/19/11

Quality Control Report

Attention Michael Neely
Department Inorganic

Group # WSCF112290

QC Batch 182318
Associated Samples 112290001

Test Hexavalent chromium Discrete Analyzer

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
LCS			**QC Sample #56132**							
Hexavalent chromium	18540-29-9		0.0490	mg/L	98	90 - 110				05/19/11
BLANK			**QC Sample #56133**							
Hexavalent chromium	18540-29-9		<0.0020	mg/L					U	05/19/11
DUP			**QC Sample #56134**							
			Original 112292005							
Hexavalent chromium	18540-29-9		0.0270	mg/L			1.10	20		05/19/11
MS			**QC Sample #56135**							
			Original 112292005							
Hexavalent chromium	18540-29-9		0.0417	mg/L	104.2	85 - 115				05/19/11

Quality Control Report

Attention Michael Neely
Department Wet Chemistry

Group # WSCF112290

QC Batch 182326
Associated Samples 112290001

Test pH Direct Measurement (W)

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
LCS			**QC Sample #56148**							
pH	PH		8.01	unitless	100.2	98.75 - 101.25				05/20/11
DUP			**QC Sample #56149**							
			Original 112290001							
pH	PH	5.80	5.72	unitless			1.40	20		05/20/11
LCS			**QC Sample #56150**							
pH	PH		8.01	unitless	100.2	98.75 - 101.25				05/20/11

Quality Control Report

Attention Michael Neely
Department Wet Chemistry

Group # WSCF112291

QC Batch 182373
Associated Samples 112291001, 112291002, 112291003, 112291004

Test Soil And Waste pH Measurement

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
LCS			**QC Sample #56299**							
pH	PH		7.96	unitless	99.6	98.75 - 101.25				05/23/11
DUP			**QC Sample #56300**							
			Original 112291001							
pH	PH	7.06	7.01	unitless			0.70	30		05/23/11
LCS			**QC Sample #56301**							
pH	PH		8.01	unitless	100.1	98.75 - 101.25				05/23/11

Quality Control Report

Attention Michael Neely
Department Inorganic

Group # WSCF112291

QC Batch 182611
Associated Samples 112291001, 112291002, 112291003, 112291004

Test Anions by Ion Chromatography (Solid)

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit		RQ	Analyzed
BLANK			**QC Sample #56630**								
Nitrate-N	NO3-N		<9.7E-3	ug/mL						U	05/25/11
LCS			**QC Sample #56631**								
Nitrate-N	NO3-N		0.878	ug/mL	99.2	90 - 110					05/25/11
MS			**QC Sample #56632**								
			Original	**112305001**							
Nitrate-N	NO3-N		22.0	mg/kg	98	80 - 120					05/25/11
MSD			**QC Sample #56633**								
			Original	**112305001**					**Paired**	**56632**	
Nitrate-N	NO3-N		22.8	mg/kg	101.6	80 - 120	3.60	30			05/25/11
DUP			**QC Sample #56634**								
			Original	**112305001**							
Nitrate-N	NO3-N		1.36	mg/kg			18.20	30		B	05/25/11

Quality Control Report

Attention Michael Neely
Department Inorganic

Group # WSCF112291

QC Batch 182650
Associated Samples 112291001, 112291002, 112291003, 112291004

Test Hexavalent chromium

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #56751**							
Hexavalent chromium	18540-29-9		<0.10	ug/g					U	05/26/11
LCS			**QC Sample #56752**							
Hexavalent chromium	18540-29-9		3.93	ug/g	99.2	80 - 120				05/26/11
DUP			**QC Sample #56753**							
			Original 112291001							
Hexavalent chromium	18540-29-9	<0.034	<0.034	ug/g			0.50	30	U	05/26/11
MS			**QC Sample #56754**							
			Original 112291001							
Hexavalent chromium	18540-29-9	<0.034	0.936	ug/g	23.7	75 - 125			N	05/26/11
PSTSPK			**QC Sample #56755**							
Hexavalent chromium	18540-29-9		0.0348	ug/g	65.4	85 - 115			N	05/26/11
IMS			**QC Sample #56756**							
			Original 112291001							
Hexavalent chromium	18540-29-9	<0.034	243	ug/g	75.2	75 - 125			D	05/26/11

Date: 10 August 2011
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: Outer Area
Subject: Radiochemical - Sample Data Groups (SDGs) WSCF112290 and WSCF1112291

INTRODUCTION

This memorandum presents the results of data validation for SDGs WSCF112290 and WSCF112291 prepared by WSCF Analytical Laboratories. A list of samples validated along with the analytical method is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B2BH54	5/19/2011	Water	C	Gross αβ
B2BH28	5/19/2011	Soil	C	Gross αβ
B2BH30	5/19/2011	Soil	C	Gross αβ
B2BH36	5/19/2011	Soil	C	Gross αβ
B2BH37	5/19/2011	Soil	C	Gross αβ

Data validation was conducted in accordance with the CHPRC validation statement of work and the Sampling and Analysis Plan for Selected 200-MG-1 Operable Unit Waste Sites, DOE/RL-2009-60, Rev. 1 (SAP). Appendices 1 through 6 provide the following information as indicated below:

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

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 180 days. Sample preservation for water samples requires acid preservation with nitric acid to pH <2. There are no specific preservation requirements for radiochemical soil analysis.

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

All equipment blank results were acceptable.

- **Accuracy**

Accuracy is evaluated by reviewing laboratory control sample results. The laboratory control sample accuracy limits are ones specified by the DV procedure.

Matrix Spike (MS) Samples

MS analysis is not required for the analytical method performed.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

Carrier/Tracer Recovery Factors

Chemical/tracer recovery factors are not applicable to the analytical method performed.

- **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. The relative percent difference (RPD) limits are specified by the DV procedure. 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

All field duplicate results were acceptable.

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.

Gross alpha and gross beta CRDLs were not provided in the SAP.

- **Completeness**

SDGs WSCF112290 and WSCF112291 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-2009-60, Rev. 1, *Sampling and Analysis Plan for Selected 200-MG-1 Operable Unit Waste Sites*, January 2011.

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: WSCF112290 & WSCF112291	Reviewer: AQA	Project: Outer Area	Page 1 of 1
Analyte(s)	**DV Flag**	**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 # WSCF112290

Sample # 112290001
SAF# F11-055
Sample ID B2BH54

Matrix WATER
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Alpha/Beta Prep										**05/23/11**
Gross Alpha/Beta										
Gross Alpha	12587-46-1	LA-508-415	U	-0.084	.77	pCi/L	1	1.5		05/26/11
Gross Beta	12587-47-2	LA-508-415	U	1.6	1.5	pCi/L	1	2.5		05/31/11

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 # WSCF112291

Sample # 112291001
SAF# F11-054
Sample ID B2BH28

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Alpha/Beta Prep										**05/25/11**
Gross Alpha/Beta										
Gross Alpha	12587-46-1	LA-508-415	U	1.1	.79	pCi/g	1	1.2		06/02/11
Gross Beta	12587-47-2	LA-508-415		3.7	.99	pCi/g	1	1.3		06/02/11

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 # WSCF112291

Sample # 112291002
SAF# F11-054
Sample ID B2BH30

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Alpha/Beta Prep										**05/25/11**
Gross Alpha/Beta										
Gross Alpha	12587-46-1	LA-508-415	U	0.96	.76	pCi/g	1	1.2		06/02/11
Gross Beta	12587-47-2	LA-508-415		3.1	.95	pCi/g	1	1.3		06/02/11

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 # WSCF112291

Sample # 112291003
SAF# F11-054
Sample ID B2BH36

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Alpha/Beta Prep										**05/25/11**
Gross Alpha/Beta										
Gross Alpha	12587-46-1	LA-508-415		1.5	.86	pCi/g	1	1.3		06/02/11
Gross Beta	12587-47-2	LA-508-415		3.0	.95	pCi/g	1	1.3		06/02/11

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 # WSCF112291

Sample # 112291004
SAF# F11-054
Sample ID B2BH37

Matrix SOIL
Sampled 05/19/11
Received 05/19/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Alpha/Beta Prep										**05/25/11**
Gross Alpha/Beta										
Gross Alpha	12587-46-1	LA-508-415	U	0.17	.66	pCi/g	1	1.3		06/02/11
Gross Beta	12587-47-2	LA-508-415		3.8	1	pCi/g	1	1.3		06/02/11

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
WSCF112290

Introduction

A sample was received at the WSCF laboratory as referenced on the WSCF SAF Number Cross Reference table included in the final report. The sample was 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

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

- All applicable QC controls are within the established limits.

Attachment 2
Narrative
WSCF112290

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.

ICP-AES Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- All applicable QC controls are within the established limits.

ICP-MS Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- Mercury – Matrix Spike and/or Matrix Spike Duplicate recoveries are outside established laboratory limits. Affected sample results in this batch were "N" flagged.
- Vanadium – Detected in the Blank and evaluated. Affected sample results in this batch were "C" Flagged.
- Barium and Strontium – Exceeded spiking levels by a factor of 4. Spike recoveries and associated RPDs are not valid.
- All other applicable QC controls are within the established limits.

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

- All applicable QC controls are within the established limits.

Organic Comments

PCB – 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.

Semi-VOA – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- Analysis performed by 8270-PAH SIM method.
- All applicable QC controls are within the established limits.

Attachment 2
Narrative
WSCF112290

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.
    - Matrix Spike and/or Matrix Spike Duplicate recoveries are outside established laboratory limits. Affected sample results in this batch were "N" flagged.
    - The LCS Failed. Sample Issue Resolution Form SDR11-292 was generated. Sample and QC results were flagged.
    - All other applicable QC controls are within the established limits.

Radiochemistry Comments

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

- Gross Alpha / Gross Beta:
    - 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.

Attachment 2
Narrative
WSCF112290

SAMPLE ISSUE RESOLUTION

SIR NUM	SDR11-292
REV NUM	0
DATE INITIATED	6/2/2011

SAMPLE EVENT INFORMATION

SAF NUM(S)	F11-055, I11-025
OPERABLE UNIT(S)	100-NR-2, NONE
PROJECT(S)	Outer Area, CERC11
SAMPLE EVENT TITLE(S)	200-MG-1 Waste Sites, CERC11
LABORATORY	Waste Sampling & Characterization

SAMPLING INFORMATION

NUMBER OF SAMPLES	4
SAMPLE NUMBERS	B2BH54, B2CY15, B2CY22, B2CY23
SAMPLE MATRIX	WATER
COLLECTION DATE	5/19/2011 - 5/20/2011
SDG NUM	WSCF112295, WSCF112290

ISSUE BACKGROUND

CLASS	Laboratory Issue
TYPE	Quality Control Failure
DESCRIPTION	THE TPHD LCS /MS/MSD ALL FAILED HIGH, HOWEVER, THE SAMPLES WERE ALL NON-DETECT FOR TPHD.
	LCS (154%) LIMITS 65-128% MS (176.4%) LIMITS 73-123%

DISPOSITION

DESCRIPTION	Report results as-is and flag the samples with a comment in the narrative.
	Please initiate a re-run of samples B2CY15, B2CY22, B2CY23 within hold time.
JUSTIFICATION	Submitted by: Marisol Avila Date: 6/2/2011
	Accepted by: Deb Alexander Date: 6/2/2011

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F11-055-001

PAGE 1 OF 2

COLLECTOR: Patterson

SAMPLING LOCATION: NPE EB 1

ICE CHEST NO.:

COMPANY CONTACT: WIDRIG, DL

TELEPHONE NO.: 376-2858

PROJECT COORDINATOR: WIDRIG, DL

PRICE CODE: 7C

DATA TURNAROUND: 15 Days / 15 Days

AIR QUALITY: ☐

PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - QC Sampling

SAF NO.: F11-055

FIELD LOGBOOK NO.: HNF-N 507-21

ACTUAL SAMPLE DEPTH: N/A

COA: 302427ES10

METHOD OF SHIPMENT: GOVERNMENT VEHICLE

ORIGINAL

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)

112290

SPECIAL HANDLING AND/OR STORAGE

PRESERVATION	Cool~4C	HCl to pH <2/Cool~4C	Cool~4C	HNO3 to pH <2	Cool~4C	Cool~4C	None	HNO3 to pH <2
HOLDING TIME	7/40 Days	7/40 Days	1 yr/1 yr	28 Days	24 Hours	28 Days/48 Hours	ASAP	6 Months
TYPE OF CONTAINER	aG	aG	aG	G/P	aG	P	P	G/P
NO. OF CONTAINER(S)	4	3	4	1	1	1	1	1
VOLUME	1L	1L	1L	500mL	500mL	250mL	60mL	500mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS	SEE ITEM (4) IN SPECIAL INSTRUCTIONS	Chromium Hex - 7196;	IC Anions - 300.0 (Nitrogen in Nitrate);	pH (Water) - 9040 (pH Measurement);	SEE ITEM (5) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME								
B2BH54	1 WATER	5/19/11	0815	✓	✓	✓	✓	✓	✓	✓	✓

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
K. Patterson	5/19/11 1300	M. Nelson	5/19/11 1300
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

LABORATORY SECTION — RECEIVED BY — TITLE — DATE/TIME

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

PRINTED ON 1/17/2011

A-6003-618 (REV 2)

Sample Receipt

Chain of Custody

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F11-055-001	PAGE 2 OF 2
COLLECTOR K. Patterson	COMPANY CONTACT WIDRIG, DL	TELEPHONE NO. 376-2858	PROJECT COORDINATOR WIDRIG, DL	PRICE CODE 7C	DATA TURNAROUND 15 Days / 15 Days
SAMPLING LOCATION NPE EB 1	PROJECT DESIGNATION Non Operational Area Evaluation Sampling - QC Sampling		SAF NO. F11-055	AIR QUALITY ☐	
ICE CHEST NO.	FIELD LOGBOOK NO. HNF-N-507-21	ACTUAL SAMPLE DEPTH N/A	COA 302427ES10	METHOD OF SHIPMENT GOVERNMENT VEHICLE	ORIGINAL
SHIPPED TO Waste Sampling & Characterization	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A		

SPECIAL INSTRUCTIONS

** Duplicates and equipment blanks to be collected at a frequency of 1/day of sampling. If multiple samples are collected in one day, only colllect the duplicate and equipment blank associated with the first sample of that day.

** The CACN for all analytical work at WSCF laboratory is 401910ES20.

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

** The laboratory shall report only the requested constituents of concern in all preliminary or final hardcopy data reports, or EDDs. QC results for non-requested constituents need not be reported, but samples chosen for matrix spike, and all spike compounds shall be identified in the final data report narrative. No TICs shall be reported.
(1) Semi-VOA - 8270 (TCL) {Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene};
(2) TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range};
(3) PCBs - 8082 {Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260};
(4) 200.8_HG - ICPMS {Mercury}; ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Cobalt, Copper, Manganese, Nickel, Silver, Vanadium, Zinc}; ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Selenium, Strontium, Thallium, Tin, Uranium}; ICP Metals - 6010 (Add-On) {Boron, Lithium};
(5) Gross Alpha {Gross alpha}; Gross Beta {Gross beta};

PRINTED ON 1/17/2011 A-6003-619 (REV 2)

Attachment 2
Narrative
WSCF112291

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

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

- All applicable QC controls are within the established limits.

Attachment 2
Narrative
WSCF112291

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):

- Matrix Spike and Post Spike recoveries are outside established laboratory limits. Affected sample results in this batch were "N" flagged.
- All other applicable QC controls are within the established limits.

ICP-AES Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- All applicable QC controls are within the established limits.

ICP-MS Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- All applicable QC controls are within the established limits.

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

- All applicable QC controls are within the established limits.

Organic Comments

PCB – 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.

Semi-VOA – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- Analysis performed by 8270-PAH SIM method.
- All applicable QC controls are within the established limits.

TPHD-WA – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. 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.

- The LCS did not meet laboratory acceptance criteria. Samples and QC were flagged for the failure. Sample issue resolution form SDR11-293 was generated. The results were reported as stated in the resolution.
- Diesel – Matrix Spike and/or Matrix Spike Duplicate recoveries are outside established laboratory limits. Affected sample results in this batch were "N" flagged.
- All other applicable QC controls are within the established limits.

Radiochemistry Comments

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

- Gross Alpha / Gross Beta:
  - Gross Beta – Duplicate Relative Percent Difference(s) (RPD) did not meet the established laboratory limits. Duplicate Relative Percent Difference (RPD) does not apply to results below 5X the minimum detectable activity. No flags issued.
  - 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.

Narrative

Attachment 2
Narrative
WSCF112291

SAMPLE ISSUE RESOLUTION

SIR NUM	SDR11-293
REV NUM	0
DATE INITIATED	6/2/2011

SAMPLE EVENT INFORMATION

SAF NUM(S)	F11-054
OPERABLE UNIT(S)	NONE
PROJECT(S)	Outer Area
SAMPLE EVENT TITLE(S)	200-MG-1 Waste Sites
LABORATORY	Waste Sampling & Characterization

SAMPLING INFORMATION

NUMBER OF SAMPLES	9
SAMPLE NUMBERS	B2BH28, B2BH30, B2BH32, B2BH36, B2BH37, B2BH38, B2BH40, B2BH44, B2BH48
SAMPLE MATRIX	SOIL
COLLECTION DATE	5/19/2011 - 5/23/2011
SDG NUM	WSCF112291, WSCF112305

ISSUE BACKGROUND

CLASS	Laboratory Issue
TYPE	Quality Control Failure
DESCRIPTION	The TPHD LCS failed high, however, the samples were all non-detect for TPHD. LCS (142.4%) LIMITS 70-130%

DISPOSITION

DESCRIPTION	Report results as-is and flag the samples with a comment in the narrative.
JUSTIFICATION	Submitted by: Marisol Avila Date: 6/2/2011
	Accepted by: Kelly Whitley Date:6/2/2011

A-6003-640 (03/30) 4 PAGE 1 of 1

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F11-054-001

PAGE 1 OF 2

COLLECTOR: KC Patterson CHPRC

COMPANY CONTACT: WIDRIG, DL

TELEPHONE NO.: 376-2858

PROJECT COORDINATOR: WIDRIG, DL

PRICE CODE: 8C

DATA TURNAROUND: 15 Days / 15 Days

SAMPLING LOCATION: NPE-01

PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - Soil

SAF NO.: F11-054

AIR QUALITY: ☐

ICE CHEST NO.:

FIELD LOGBOOK NO.: HNF-N-501-21

ACTUAL SAMPLE DEPTH: 0-6"

COA: 302427ES10

METHOD OF SHIPMENT: GOVERNMENT VEHICLE

ORIGINAL

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)

112291

SPECIAL HANDLING AND/OR STORAGE

PRESERVATION	Cool~4C	Cool~4C	None
HOLDING TIME	14/40 Days	28 Days	6 Months
TYPE OF CONTAINER	aG	G/P	G/P
NO. OF CONTAINER(S)	1	1	1
VOLUME	250mL	250mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME			
B2BH28	SOIL	MAY 19 2011	1133	✓	✓	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
KC Patterson CHPRC	MAY 19 2011	B.W. H. Nelson	MAY 19 2011 1300

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS

SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

LABORATORY SECTION — RECEIVED BY — TITLE — DATE/TIME

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

PRINTED ON 1/17/2011

A-6003-618 (REV 2)

CH2MHill Plateau Remediation Company — **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** — **F11-054-001** — **PAGE 2 OF 2**

COLLECTOR KC Patterson CHPRC	**COMPANY CONTACT** WIDRIG, DL	**TELEPHONE NO.** 376-2858	**PROJECT COORDINATOR** WIDRIG, DL	**PRICE CODE** 8C	**DATA TURNAROUND** 15 Days / 15 Days
SAMPLING LOCATION NPE-01	**PROJECT DESIGNATION** Non Operational Area Evaluation Sampling - Soil		**SAF NO.** F11-051	**AIR QUALITY** ☐	
ICE CHEST NO.	**FIELD LOGBOOK NO.** HNF-N-303-21	**ACTUAL SAMPLE DEPTH** 0-6"	**COA** 302427ES10	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	**ORIGINAL**
SHIPPED TO Waste Sampling & Characterization	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

SPECIAL INSTRUCTIONS

** Sample locations will be randomly selected from the investigation area. Final location decisions will be made by the Field PAL and samplers.

** There are 11 primary sampling locations and 2 alternates. Samples NP-08 and NP-10 are preferred locations, but the alternates may be substituted for these if necessary.

** Samplers, RadCon and project personnel must walk to sampling locations as driving is prohibited in this area.

** Sampling must be performed at the soil surface and sampling coordinates must be collected via GPS.

** Duplicates and equipment blanks to be collected at a frequency of 1/day of sampling. If multiple samples are collected in one day, only colllect the duplicate and equipment blank associated with the first sample of that day.

** The CACN for all analytical work at WSCF laboratory is 401910ES20.

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

** The laboratory shall report only the requested constituents of concern in all preliminary or final hardcopy data reports, or EDDs. QC results for non-requested constituents need not be reported, but samples chosen for matrix spike, and all spike compounds shall be identified in the final data report narrative. No TICs shall be reported.
(1) 8270_SVOA_GCMS: SIM {Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene}; TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range}; PCBs - 8082 {Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260};
(2) 200.8_HG - ICPMS {Mercury}; ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Cobalt, Copper, Manganese, Nickel, Silver, Vanadium, Zinc}; ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Selenium, Strontium, Thallium, Tin, Uranium}; ICP Metals - 6010 (Add-On) {Boron, Lithium}; Chromium Hex - 7196; IC Anions - 300.0 {Nitrogen in Nitrate}; pH (Soil) - 9045 {pH Measurement};
(3) Gross Alpha {Gross alpha}; Gross Beta {Gross beta};

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Chain of Custody

CH2MHill Plateau Remediation Company — **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** — F11-054-003 — PAGE 1 OF 2

COLLECTOR: KC Patterson CHPRC	COMPANY CONTACT: WIDRIG, DL	TELEPHONE NO.: 376-2858	PROJECT COORDINATOR: WIDRIG, DL
PRICE CODE: 8C	DATA TURNAROUND: 15 Days / 15 Days	SAMPLING LOCATION: NPE-02	PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - Soil
SAF NO.: F11-054	AIR QUALITY: ☐	ICE CHEST NO.	FIELD LOGBOOK NO.: HNF-N-507-21
ACTUAL SAMPLE DEPTH: 0-6"	COA: 302427E510	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	ORIGINAL
SHIPPED TO: Waste Sampling & Characterization	OFFSITE PROPERTY NO.: N/A	BILL OF LADING/AIR BILL NO.: N/A	

MATRIX*: A=Air, DI=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

PRESERVATION	Cool~4C	Cool~4C	None
HOLDING TIME	14/40 Days	28 Days	6 Months
TYPE OF CONTAINER	aG	G/P	G/P
NO. OF CONTAINER(S)	1	1	1
VOLUME	250mL	250mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS

SAMPLE NO.		MATRIX*	SAMPLE DATE	SAMPLE TIME			
B2BH30	2	SOIL	MAY 19 2011	1045	✓	✓	✓

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

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
KC Patterson CHPRC	MAY 19 2011 1300	R.C. Nelson Hanford	MAY 19 2011 1300

SPECIAL INSTRUCTIONS: SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

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

PRINTED ON 1/17/2011 — A-6003-618 (REV 2)

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F11-054-003

PAGE 2 OF 2

COLLECTOR: KC Patterson CHPRC	COMPANY CONTACT: WIDRIG, DL	TELEPHONE NO.: 376-2858	PROJECT COORDINATOR: WIDRIG, DL	PRICE CODE: 8C	DATA TURNAROUND: 15 Days / 15 Days
SAMPLING LOCATION: NPE-02	PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - Soil		SAF NO.: F11-054	AIR QUALITY: ☐	
ICE CHEST NO.	FIELD LOGBOOK NO.: HNF-N-507-21	ACTUAL SAMPLE DEPTH: 0-6"	COA: 302427ES10	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	ORIGINAL
SHIPPED TO: Waste Sampling & Characterization	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

SPECIAL INSTRUCTIONS

** Sample locations will be randomly selected from the investigation area. Final location decisions will be made by the Field PAL and samplers.

** There are 11 primary sampling locations and 2 alternates. Samples NP-08 and NP-10 are preferred locations, but the alternates may be substituted for these if necessary.

** Samplers, RadCon and project personnel must walk to sampling locations as driving is prohibited in this area.

** Sampling must be performed at the soil surface and sampling coordinates must be collected via GPS.

** Duplicates and equipment blanks to be collected at a frequency of 1/day of sampling. If multiple samples are collected in one day, only colllect the duplicate and equipment blank associated with the first sample of that day.

** The CACN for all analytical work at WSCF laboratory is 401910ES20.

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

** The laboratory shall report only the requested constituents of concern in all preliminary or final hardcopy data reports, or EDDs. QC results for non-requested constituents need not be reported, but samples chosen for matrix spike, and all spike compounds shall be identified in the final data report narrative. No TICs shall be reported.
(1) 8270_SVOA_GCMS: SIM {Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene}; TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range}; PCBs - 8082 {Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260};
(2) 200.8_HG - ICPMS {Mercury}; ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Cobalt, Copper, Manganese, Nickel, Silver, Vanadium, Zinc}; ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Selenium, Strontium, Thallium, Tin, Uranium}; ICP Metals - 6010 (Add-On) {Boron, Lithium}; Chromium Hex - 7196; IC Anions - 300.0 {Nitrogen in Nitrate}; pH (Soil) 9045 {pH Measurement};
(3) Gross Alpha {Gross alpha}; Gross Beta {Gross beta};

PRINTED ON 1/17/2011

A-6003-618 (REV 7)

Sample Receipt

Chain of Custody

CH2MHill Plateau Remediation Company — **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** — F11-054-009 — PAGE 1 OF 2

COLLECTOR: KC Patterson, CHPRC	COMPANY CONTACT: WIDRIG, DL	TELEPHONE NO.: 376-2858	PROJECT COORDINATOR: WIDRIG, DL
PRICE CODE: 8C	DATA TURNAROUND: 15 Days / 15 Days	SAMPLING LOCATION: NPE-05	PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - Soil
SAF NO.: F11-054	AIR QUALITY: L	ICE CHEST NO.	FIELD LOGBOOK NO.: HNF-N-507-21
ACTUAL SAMPLE DEPTH: 0-6"	COA: 302427ES10	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	ORIGINAL
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

PRESERVATION	Cool~4C	Cool~4C	None
HOLDING TIME	14/40 Days	28 Days	6 Months
TYPE OF CONTAINER	aG	G/P	G/P
NO. OF CONTAINER(S)	1	1	1
VOLUME	250mL	250mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS

SAMPLE NO.		MATRIX*	SAMPLE DATE	SAMPLE TIME			
B2BH35	3	SOIL	MAY 19 2011	0945	✓	✓	✓

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

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
KC Patterson CHPRC	MAY 19 2011 1300	M. Nelson M. Nelson	MAY 19 2011 1300

SPECIAL INSTRUCTIONS: SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

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

PRINTED ON 1/17/2011 — R-6003-618 (REV 2)

CH2MHill Plateau Remediation Company — **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** — F11-054-009 — PAGE 2 OF 2

COLLECTOR KC Patterson CHPRC	**COMPANY CONTACT** WIDRIG, DL	**TELEPHONE NO.** 376-2858	**PROJECT COORDINATOR** WIDRIG, DL
SAMPLING LOCATION NPE-05	**PROJECT DESIGNATION** Non Operational Area Evaluation Sampling - Soil		**SAF NO.** F11-054
ICE CHEST NO.	**FIELD LOGBOOK NO.** HNF-N-507-21	**ACTUAL SAMPLE DEPTH** 0-6"	**COA** 302427ES10
SHIPPED TO Waste Sampling & Characterization	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A

PRICE CODE 8C

AIR QUALITY ☐

METHOD OF SHIPMENT GOVERNMENT VEHICLE

DATA TURNAROUND 15 Days / 15 Days

ORIGINAL

SPECIAL INSTRUCTIONS

** Sample locations will be randomly selected from the investigation area. Final location decisions will be made by the Field PAL and samplers.

** There are 11 primary sampling locations and 2 alternates. Samples NP-08 and NP-10 are preferred locations, but the alternates may be substituted for these if necessary.

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** Sampling must be performed at the soil surface and sampling coordinates must be collected via GPS.

** Duplicates and equipment blanks to be collected at a frequency of 1/day of sampling. If multiple samples are collected in one day, only collect the duplicate and equipment blank associated with the first sample of that day.

** The CACN for all analytical work at WSCF laboratory is 401910ES20.

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

** The laboratory shall report only the requested constituents of concern in all preliminary or final hardcopy data reports, or EDDs. QC results for non-requested constituents need not be reported, but samples chosen for matrix spike, and all spike compounds shall be identified in the final data report narrative. No TICs shall be reported.
(1) 8270_SVOA_GCMS: SIM {Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene}; TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range}; PCBs - 8082 {Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260};
(2) 200.8_HG - ICPMS {Mercury}; ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Cobalt, Copper, Manganese, Nickel, Silver, Vanadium, Zinc}; ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Selenium, Strontium, Thallium, Tin, Uranium}; ICP Metals - 6010 (Add-On) {Boron, Lithium}; Chromium Hex - 7196; IC Anions - 300.0 {Nitrogen in Nitrate}; pH (Soil) - 9045 {pH Measurement};
(3) Gross Alpha {Gross alpha}; Gross Beta {Gross beta};

PRINTED ON 1/17/2011 — A-6003-618 (REV 2)

Sample Receipt

Chain of Custody

CH2MHill Plateau Remediation Company — **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** — F11-054-010 — PAGE 1 OF 2

COLLECTOR: KC Patterson CHPRC	COMPANY CONTACT: WIDRIG, DL	TELEPHONE NO.: 375-2858	PROJECT COORDINATOR: WIDRIG, DL
PRICE CODE: 8C	DATA TURNAROUND: 15 Days / 15 Days	SAMPLING LOCATION: NPE-05 DUP	PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - Soil
SAF NO.: F11-054	AIR QUALITY: ☐	ICE CHEST NO.	FIELD LOGBOOK NO.: HNF-N-507-21
ACTUAL SAMPLE DEPTH: 0-6"	COA: 302427ES10	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	ORIGINAL
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

PRESERVATION	Cool~4C	Cool~4C	None
HOLDING TIME	14/40 Days	28 Days	6 Months
TYPE OF CONTAINER	aG	G/P	G/P
NO. OF CONTAINER(S)	1	1	1
VOLUME	250mL	250mL	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME			
B2BH37	SOIL	MAY 19 2011	0945	✓	✓	✓

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

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
KC Patterson CHPRC	MAY 19 2011 1300	H. Nelson	MAY 19 2011 1300
			MAY 19 2011

SPECIAL INSTRUCTIONS: SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

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

PRINTED ON 1/17/2011 — A-6003-618 (REV 2)

Chain of Custody

CH2MHill Plateau Remediation Company — **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** — F11-054-010 — PAGE 2 OF 2

COLLECTOR: KC Patterson, CHPRC	COMPANY CONTACT: WIDRIG, DL	TELEPHONE NO.: 376-2958	PROJECT COORDINATOR: WIDRIG, DL
PRICE CODE: 8C	DATA TURNAROUND: 15 Days / 15 Days		
SAMPLING LOCATION: NPE-05 DUP	PROJECT DESIGNATION: Non Operational Area Evaluation Sampling - Soil		SAF NO.: F11-054
AIR QUALITY: ☐			
ICE CHEST NO.	FIELD LOGBOOK NO.: HNF-N-507-21	ACTUAL SAMPLE DEPTH: 0-6"	COA: 302427ES10
METHOD OF SHIPMENT: GOVERNMENT VEHICLE	ORIGINAL		
SHIPPED TO: Waste Sampling & Characterization	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A

SPECIAL INSTRUCTIONS

** Sample locations will be randomly selected from the investigation area. Final location decisions will be made by the Field PAL and samplers.

** There are 11 primary sampling locations and 2 alternates. Samples NP-08 and NP-10 are preferred locations, but the alternates may be substituted for these if necessary.

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** The CACN for all analytical work at WSCF laboratory is 401910ES20.

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

** The laboratory shall report only the requested constituents of concern in all preliminary or final hardcopy data reports, or EDDs. QC results for non-requested constituents need not be reported, but samples chosen for matrix spike, and all spike compounds shall be identified in the final data report narrative. No TICs shall be reported.
(1) 8270_SVOA_GCMS: SIM {Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene}; TPH-DieselKerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range}; PCBs - 8082 {Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260};
(2) 200.8_HG - ICPMS {Mercury}; ICP/MS - 200.8 (TAL) {Antimony, Barium, Cadmium, Chromium, Cobalt, Copper, Manganese, Nickel, Silver, Vanadium, Zinc}; ICP/MS - 200.8 (Add-on) {Arsenic, Beryllium, Lead, Selenium, Strontium, Thallium, Tin, Uranium}; ICP Metals - 6010 (Add-On) {Boron, Lithium}; Chromium Hex - 7196; IC Anions - 300.0 {Nitrogen in Nitrate}; pH (Soil) 9045 {pH Measurement};
(3) Gross Alpha {Gross alpha}; Gross Beta {Gross beta};

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Appendix 5

Data Validation Supporting Documentation

Appendix B - Radiochemical Data Validation Checklist

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: Outer Area			DATA PACKAGE: VSR11-053		
VALIDATOR: Carl Schloesslin		LAB: WSCF		DATE: 8-10-2011	
			SDG: WSCF112290, WSCF112291		
ANALYSES PERFORMED					
Gross Alpha/Beta X	Strontium-90	Technetium-99	Alpha Spectroscopy	Gamma Spectroscopy	
Total Uranium	Radium-22	Tritium	C-14	I-129	

SAMPLES/MATRIX

SDG WSCF112290 (Water): B2BH54 (equipment blank)

SDG WSCF112291 (Soil): B2BH28, B2BH30, B2BH36, B2BH37 (field duplicate of B2BH36)

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:

No gross alpha beta CRDLs provided in the SAP.

Appendix 6

Additional Documentation Requested By Client

Quality Control Report

Attention Michael Neely
Department Radiochemistry

Group # WSCF112290

QC Batch 182286
Associated Samples 112290001

Test Gross Alpha/Gross Beta

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit		RQ	Analyzed
BLANK			**QC Sample #56039**								
Gross Alpha	12587-46-1		0.17	pCi/L						U	05/31/11
Gross Beta	12587-47-2		1.6	pCi/L						U	05/31/11
LCS			**QC Sample #56040**								
Gross Alpha	12587-46-1		74	pCi/L	90.6	80 - 120					05/31/11
Gross Beta	12587-47-2		250	pCi/L	117.9	80 - 120					05/31/11
DUP			**QC Sample #56041**								
			Original 112290001								
Gross Alpha	12587-46-1	-0.084	1.0	pCi/L			236.70	20	*	U	05/31/11
Gross Beta	12587-47-2	1.6	1.4	pCi/L			13.30	20		U	05/31/11

Quality Control Report

Attention Michael Neely
Department Radiochemistry

Group # WSCF112291

QC Batch 182563
Associated Samples 112291001, 112291002, 112291003, 112291004

Test Gross Alpha/Gross Beta

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit		RQ	Analyzed
BLANK			**QC Sample #56491**								
Gross Alpha	12587-46-1		0.042	pCi/g						U	06/02/11
Gross Beta	12587-47-2		0.46	pCi/g						U	06/02/11
LCS			**QC Sample #56492**								
Gross Alpha	12587-46-1		35	pCi/g	85.5	80 - 120					06/02/11
Gross Beta	12587-47-2		120	pCi/g	111.4	80 - 120					06/02/11
DUP			**QC Sample #56493**								
			Original 112291002								
Gross Alpha	12587-46-1	0.96	0.65	pCi/g			38.50	30	*	UX	06/02/11
Gross Beta	12587-47-2	3.1	2.2	pCi/g			30.80	30	*	X	06/02/11