CHPRC - REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
04/04/2011	
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
VSR11-038		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) 04/04/2011 Date Author/Originator (print and sign)	Scot Fitzgerald Reviewer/Point of Contact (print and sign) 04/04/2011 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 04/04/2011	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
VSR11-038, Data Validation Report for CHPRC - Project 100 Area RI/FS, Chemical and Radiochemical Validation - Level C	S&GRP Sample Data Groups (SDGs); WSCF111601, SL1040, and H4509	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 (print and sign) — Reviewer/Point of Contact (print and sign) Date: 04/04/2011 Author/Originator (print and sign): ____	JA Edwards (print and sign) — Reviewer/Point of Contact (print and sign) Date: 04/04/2011 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:

GRP-GD-003, Rev. 0, Change 0, *Data Validation for Chemical Analyses*, August 2010
DOE/RL-2009-40, Rev. 0, *Sampling and Analysis Plan for the 100-DR-1, 100-DR-2, 100-HR-1, 100-HR-2, and 100-HR-3 Operable Unit Remedial Investigation/Feasibility Study*, March 2010
TPA-CN-368, *Tri Party Agreement TPA Change Notice Form DOE/RL-2009-40 Sampling And Analysis Plan For The 100-DR-1 100-DR-2 100-HR-1 100-HR-2 And 100-HR-3 Operable Units Remedial Investigation Feasibility Study* Rev 0, June 2010
LA-523-455, *Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry*

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

Data Validation Report for CH2M Hill Plateau Remediation Company

VSR11-038
Project 100 Area RI/FS

Chemical & Radiochemical Validation - Level C

Validation Performed By: Eyda Hergenreder **Date:** 3-30-2011

Validation Reviewed By: Carl Schlosser **Date:** 3-31-2011

TABLE OF CONTENTS

Volatile Organics

Memorandum 3
Appendix 1 – Glossary of Data Reporting Qualifiers 6
Appendix 2 – Summary of Data Qualification 8
Appendix 3 – Annotated Laboratory Reports 10
Appendix 4 – Laboratory Narrative and Chain-of-Custody Documentation 17
Appendix 5 – Data Validation Supporting Documentation 24
Appendix 6 – Additional Documentation Requested By Client 31

Inorganics

Memorandum 39
Appendix 1 – Glossary of Data Reporting Qualifiers 43
Appendix 2 – Summary of Data Qualification 45
Appendix 3 – Annotated Laboratory Reports 47
Appendix 4 – Laboratory Narrative and Chain-of-Custody Documentation 50
Appendix 5 – Data Validation Supporting Documentation 55
Appendix 6 – Additional Documentation Requested By Client 62

Radiochemical

Memorandum 70
Appendix 1 – Glossary of Data Reporting Qualifiers 73
Appendix 2 – Summary of Data Qualification 75
Appendix 3 – Annotated Laboratory Reports 77
Appendix 4 – Laboratory Narrative and Chain-of-Custody Documentation 81
Appendix 5 – Data Validation Supporting Documentation 86
Appendix 6 – Additional Documentation Requested By Client 93

Date: 30 March 2011
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: 100 Area RI/FS
Subject: Volatile Organics - Sample Data Group (SDG) WSCF111601

INTRODUCTION

This memorandum presents the results of data validation for SDG WSCF111601 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
B29HP0	02/23/11	Soil	C	8260B
B29HP1	02/23/11	Soil	C	8260B

Data validation was conducted in accordance with the CHPRC validation statement of work and the Sampling and Analysis Plan for the 100-DR-1, 100-DR-2, 100-HR-1, 100-HR-2 and 100-HR-3 Operable Units Remedial Investigation/Feasibility Study, DOE/RL-2009-40, Rev. 0/TPA-CN-368 (SAP). Appendices 1 through 6 provide the following information as indicated below:

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

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

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

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

- **Blanks**

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

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

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

Surrogates

All surrogate recoveries were acceptable.

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

All MS/MSD recoveries were acceptable.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

- **Precision**

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

MS/MSD Samples

All MS/MSD relative percent difference values were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Internal Standards**

Internal standard performance criteria ensure that GC/MS sensitivity and response are stable during each analysis. Internal standards are added to all samples, including QC samples, prior to analysis.

Internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

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

All reported sample MDLs were below the CRDLs.

- **Completeness**

SDG WSCF111601 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

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

DOE/RL-2009-40, Rev. 0, *Sampling and Analysis Plan for the 100-DR-1, 100-DR-2, 100-HR-1, 100-HR-2, and 100-HR-3 Operable Units Remedial Investigation/Feasibility Study*, March 2010.

TPA-CN-368, TPA Change Notice Form for DOE/RL-2009-40, Rev. 0, June 2010

Appendix 1

Glossary of Data Reporting Qualifiers

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

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

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

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

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

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

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

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

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

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

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

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

Appendix 2

Summary of Data Qualification

Volatile Organics Data Qualification Summary			
SDG: WSCF111601	Reviewer: AQA	Project: 100 Area RI/FS	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
VOCs	None	N/A	N/A

Comments: None

Appendix 3

Annotated Laboratory Reports

WSCF Analytical Results Report

Attention Michael Neely
Department Organic, Volatiles

Group # WSCF111601

Sample # 111601001
SAF# F10-214
Sample ID B29HP0

Matrix SOIL
Sampled 02/23/11
Received 02/24/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
8260 Prep										**02/25/11**
SW-846 8260B										
1,1-Dichloroethene	75-35-4	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
Trichloroethene	79-01-6	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
Benzene	71-43-2	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
Toluene	108-88-3	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
Chlorobenzene	108-90-7	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
1,1-Dichloroethane	75-34-3	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
Ethylbenzene	100-41-4	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
Styrene	100-42-5	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
cis-1,3-Dichloropropene	10061-01-5	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
trans-1,3-Dichloropropene	10061-02-6	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
1,2-Dichloroethane	107-06-2	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
Methyl isobutyl ketone	108-10-1	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
Dibromochloromethane	124-48-1	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
Tetrachloroethene	127-18-4	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
Total Xylenes	1330-20-7	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
Total 1,2-Dichloroethene	540-59-0	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11

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 < PQL (or EQL) >= 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.
N - MS and/or MSD recovery outside control limits.
PQL is equivalent to Estimated Quantitation Limit (EQL)

WSCF Analytical Results Report

Attention Michael Neely
Department Organic, Volatiles

Group # WSCF111601

Sample # 111601001
SAF# F10-214
Sample ID B29HP0

Matrix SOIL
Sampled 02/23/11
Received 02/24/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Carbon tetrachloride	56-23-5	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
2-Hexanone	591-78-6	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
Acetone	67-64-1	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
Chloroform	67-66-3	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
1,1,1-Trichloroethane	71-55-6	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
Bromomethane	74-83-9	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
Chloromethane	74-87-3	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
Chloroethane	75-00-3	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
Vinyl chloride	75-01-4	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
Methylene chloride	75-09-2	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
Carbon disulfide	75-15-0	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
Bromoform	75-25-2	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
Bromodichloromethane	75-27-4	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
1,2-Dichloropropane	78-87-5	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
Methyl ethyl ketone	78-93-3	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
1,1,2-Trichloroethane	79-00-5	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
1,1,2,2-Tetrachloroethane	79-34-5	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11
trans-1,2-Dichloroethene	156-60-5	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11

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 < PQL (or EQL) >= 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.
N - MS and/or MSD recovery outside control limits.
PQL is equivalent to Estimated Quantitation Limit (EQL)

WSCF Analytical Results Report

Attention Michael Neely
Department Organic, Volatiles

Group # WSCF111601

Sample # 111601001
SAF# F10-214
Sample ID B29HP0

Matrix SOIL
Sampled 02/23/11
Received 02/24/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
cis-1,2-Dichloroethene	156-59-2	LA-523-455	U	<1		ug/kg	1	1	5	02/26/11

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 < PQL (or EQL) >= 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.
N - MS and/or MSD recovery outside control limits.
PQL is equivalent to Estimated Quantitation Limit (EQL)

WSCF Analytical Results Report

Attention Michael Neely
Department Organic, Volatiles

Group # WSCF111601

Sample # 111601002
SAF# F10-214
Sample ID B29HP1

Matrix SOIL
Sampled 02/23/11
Received 02/24/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
8260 Prep										**02/25/11**
SW-846 8260B										
1,1-Dichloroethene	75-35-4	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
Trichloroethene	79-01-6	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
Benzene	71-43-2	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
Toluene	108-88-3	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
Chlorobenzene	108-90-7	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
1,1-Dichloroethane	75-34-3	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
Ethylbenzene	100-41-4	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
Styrene	100-42-5	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
cis-1,3-Dichloropropene	10061-01-5	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
trans-1,3-Dichloropropene	10061-02-6	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
1,2-Dichloroethane	107-06-2	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
Methyl isobutyl ketone	108-10-1	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
Dibromochloromethane	124-48-1	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
Tetrachloroethene	127-18-4	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
Total Xylenes	1330-20-7	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
Total 1,2-Dichloroethene	540-59-0	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11

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 < PQL (or EQL) >= 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.
N - MS and/or MSD recovery outside control limits.
PQL is equivalent to Estimated Quantitation Limit (EQL)

WSCF Analytical Results Report

Attention Michael Neely
Department Organic, Volatiles

Group # WSCF111601

Sample # 111601002
SAF# F10-214
Sample ID B29HP1

Matrix SOIL
Sampled 02/23/11
Received 02/24/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Carbon tetrachloride	56-23-5	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
2-Hexanone	591-78-6	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
Acetone	67-64-1	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
Chloroform	67-66-3	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
1,1,1-Trichloroethane	71-55-6	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
Bromomethane	74-83-9	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
Chloromethane	74-87-3	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
Chloroethane	75-00-3	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
Vinyl chloride	75-01-4	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
Methylene chloride	75-09-2	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
Carbon disulfide	75-15-0	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
Bromoform	75-25-2	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
Bromodichloromethane	75-27-4	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
1,2-Dichloropropane	78-87-5	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
Methyl ethyl ketone	78-93-3	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
1,1,2-Trichloroethane	79-00-5	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
1,1,2,2-Tetrachloroethane	79-34-5	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11
trans-1,2-Dichloroethene	156-60-5	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11

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 < PQL (or EQL) >= 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.
N - MS and/or MSD recovery outside control limits.
PQL is equivalent to Estimated Quantitation Limit (EQL)

WSCF Analytical Results Report

Attention Michael Neely
Department Organic, Volatiles

Group # WSCF111601

Sample # 111601002
SAF# F10-214
Sample ID B29HP1

Matrix SOIL
Sampled 02/23/11
Received 02/24/11

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
cis-1,2-Dichloroethene	156-59-2	LA-523-455	U	<1		ug/kg	1	1	7	02/26/11

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 < PQL (or EQL) >= 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.
N - MS and/or MSD recovery outside control limits.
PQL is equivalent to Estimated Quantitation Limit (EQL)

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Attachment 2
Narrative
WSCF111601

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.

Organic Comments

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

- All applicable QC controls are within the established limits.

Narrative

Attachment 2
Narrative
WSCF111601

We certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this data package has been authorized by the Analytical Laboratory Manager (or designee) and the Client Services representative as verified by electronic signatures shown on the WSCF ANALYTICAL RESULTS REPORT.

CH2MHill Plateau Remediation Company — **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** — F10-214-096 — PAGE 1 OF 2

COLLECTOR: Kauer Romo Kauer	COMPANY CONTACT: RADLOFF, AW	TELEPHONE NO.: 376-4554	PROJECT COORDINATOR: RADLOFF, AW
SAMPLING LOCATION: C7631 (199-H2-1); 1-018	PROJECT DESIGNATION: 100 Area Remedial Investigation/Feasibility Analysis - 100-HR-3 - Sediment		SAF NO.: F10-214
ICE CHEST NO.	FIELD LOGBOOK NO.: pg 72 HNF-N-585-12	ACTUAL SAMPLE DEPTH: 99.0 - 101.5 FT	COA: 300110ES10
SHIPPED TO: Waste Sampling & Characterization	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A

PRICE CODE: 8N — AIR QUALITY: ☐ — METHOD OF SHIPMENT: GOVERNMENT VEHICLE

Data Turnaround 30 Days/30 Days

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)

111601

SPECIAL HANDLING AND/OR STORAGE

PRESERVATION	Cool <-7C and >-20C
HOLDING TIME	14 Days
TYPE OF CONTAINER	aGS
NO. OF CONTAINER(S)	5
VOLUME	40mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B29HP0	SOIL	2-23-11	0925	✓

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

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Bertram Kauer 2-23-11	1530	MO-413 SSGF1 2-23-11	1530
MO-413 SSGF1 2-24-11	0645	Rob Romo, Rob Romo 2-24-11	0645
Rob Romo, Rob Romo 2-24-11	0705	VILTIS SILVA 2/24/11	0705

SPECIAL INSTRUCTIONS: SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

ORIGINAL

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

A-6003-518 (REV 2)

Chain of Custody

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F10-214-096	PAGE 2 OF 2
COLLECTOR: Kauer Romo Kauer	COMPANY CONTACT: RADLOFF, AW	TELEPHONE NO.: 376-4554	PROJECT COORDINATOR: RADLOFF, AW	PRICE CODE: 8N	Data Turnaround 30 Days/30 Days
SAMPLING LOCATION: C7631 (199-H2-1); I-018	PROJECT DESIGNATION: 100 Area Remedial Investigation/Feasibility Analysis - 100-HR-3 - Sediment		SAF NO.: F10-214	AIR QUALITY: ☐	
ICE CHEST NO.:	FIELD LOGBOOK NO.: 9172 HNF-N-585-12	ACTUAL SAMPLE DEPTH: 99.0 - 101.5 FT	COA: 300110ES10	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: Waste Sampling & Characterization	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

SPECIAL INSTRUCTIONS

** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.☐ The CACN for all analytical work at WSCF laboratory is 401642ES20.
(1) VOA - 5035/8260 (LOW LEVEL 100 Area RI/FS) {1,1,1-Trichloroethane, 1,1,2,2-Tetrachloroethane, 1,1,2-Trichloroethane, 1,1-Dichloroethane, 1,1-Dichloroethene, 1,2-Dichloroethane, 1,2-Dichloroethene (Total), 1,2-Dichloropropane, 2-Butanone, 2-Hexanone, 4-Methyl-2-pentanone, Acetone, Benzene, Bromodichloromethane, Bromoform, Bromomethane, Carbon disulfide, Carbon tetrachloride, Chlorobenzene, Chloroethane, Chloroform, Chloromethane, cis-1,2-Dichloroethylene, cis-1,3-Dichloropropene, Dibromochloromethane, Ethylbenzene, Methylene chloride, Styrene, Tetrachloroethene, Toluene, trans-1,2-Dichloroethylene, trans-1,3-Dichloropropene, Trichloroethene, Vinyl chloride, Xylenes (total)};

☐ ORIGINAL

A-6003-618 (REV 2)

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F10-214-097

PAGE 1 OF 2

COLLECTOR: Kauer Romo Kauer

COMPANY CONTACT: RADLOFF, AW

TELEPHONE NO.: 376-4554

PROJECT COORDINATOR: RADLOFF, AW

PRICE CODE: 8N

AIR QUALITY: ☐

Data Turnaround 30 Days/30 Days

SAMPLING LOCATION: C7631 (199-H2-1); I-019

PROJECT DESIGNATION: 100 Area Remedial Investigation/Feasibility Analysis - 100-HR-3 - Sediment

SAF NO.: F10-214

ICE CHEST NO.:

FIELD LOGBOOK NO.: pg 72

ACTUAL SAMPLE DEPTH: 119.0-121.1 FT

COA: 300110ES10

METHOD OF SHIPMENT: GOVERNMENT VEHICLE

HNF-N-585-12

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 <-7C and > -20C
HOLDING TIME	14 Days
TYPE OF CONTAINER	aGs
NO. OF CONTAINER(S)	5
VOLUME	40mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B29HP1 2	SOIL	2-23-11	1055	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Benjamin Kauer 2-23-11	1530	MO-413 334F1 2-23-11	1530
MO-413 334F1 2-24-11	0645	Rob Romo, Rob Romo 2-24-11	0645
Rob Romo Rob Romo 2-24-11	0705	VILTOV 2/24/11	0705

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS

SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

ORIGINAL

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

A-6003-618 (REV 2)

Chain of Custody

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F10-214-097	PAGE 2 OF 2
COLLECTOR: Karen Romo Karen	COMPANY CONTACT: RADLOFF, AW	TELEPHONE NO.: 376-4554	PROJECT COORDINATOR: RADLOFF, AW	PRICE CODE: 8N	Data Turnaround 30 Days/30 Days
SAMPLING LOCATION: C7631 (199-H2-1); I-019	PROJECT DESIGNATION: 100 Area Remedial Investigation/Feasibility Analysis - 100-HR-3 - Sediment		SAF NO.: F10-214	AIR QUALITY: ☐	
ICE CHEST NO.	FIELD LOGBOOK NO.: 0972 HNF-N-585-12	ACTUAL SAMPLE DEPTH: 119.0-121.1 FT	COA: 300110ES10	METHOD OF SHIPMENT: GOVERNMENT VEHICLE	
SHIPPED TO: Waste Sampling & Characterization	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A		

SPECIAL INSTRUCTIONS

** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.☐ The CACN for all analytical work at WSCF laboratory is 401642ES20.
(1) VOA - 5035/8260 (LOW LEVEL 100 Area RI/FS) {1,1,1-Trichloroethane, 1,1,2,2-Tetrachloroethane, 1,1,2-Trichloroethane, 1,1-Dichloroethane, 1,1-Dichloroethene, 1,2-Dichloroethane, 1,2-Dichloroethene (Total), 1,2-Dichloropropane, 2-Butanone, 2-Hexanone, 4-Methyl-2-pentanone, Acetone, Benzene, Bromodichloromethane, Bromoform, Bromomethane, Carbon disulfide, Carbon tetrachloride, Chlorobenzene, Chloroethane, Chloroform, Chloromethane, cis-1,2-Dichloroethylene, cis-1,3-Dichloropropene, Dibromochloromethane, Ethylbenzene, Methylene chloride, Styrene, Tetrachloroethene, Toluene, trans-1,2-Dichloroethylene, trans-1,3-Dichloropropene, Trichloroethene, Vinyl chloride, Xylenes (total)};

ORIGINAL

A-6003-618 (REV 2)

Appendix 5

Data Validation Supporting Documentation

Appendix A - Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: 100 Area RI/FS			DATA PACKAGE: VSR11-038		
VALIDATOR: Eyda Hergenreder		LAB: WSCF		DATE: 03-30-2011	
			SDG: WSCF111601		
ANALYSES PERFORMED					
SW-846 8260 X		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)
SAMPLES/MATRIX Soil samples SDG WSCF111601: B29HP0, B29HP1					

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: None

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: None

9. SAMPLE CLEANUP (Levels D and E)

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

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

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

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

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

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

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

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

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

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

Comments:

Comments (attach additional sheets as necessary): None

Appendix 6

Additional Documentation Requested By Client

Quality Control Report

Attention Michael Neely
Department Organic, Volatiles

Group # WSCF111601

QC Batch 177772
Associated Samples 111601001, 111601002

Test SW-846 8260B Volatiles, separate prep

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #49849**							
1,1-Dichloroethene	75-35-4		<1	ug/kg					U	02/25/11
Trichloroethene	79-01-6		<1	ug/kg					U	02/25/11
Benzene	71-43-2		<1	ug/kg					U	02/25/11
Toluene	108-88-3		<1	ug/kg					U	02/25/11
Chlorobenzene	108-90-7		<1	ug/kg					U	02/25/11
1,1-Dichloroethane	75-34-3		<1	ug/kg					U	02/25/11
Ethylbenzene	100-41-4		<1	ug/kg					U	02/25/11
Styrene	100-42-5		<1	ug/kg					U	02/25/11
cis-1,3-Dichloropropene	10061-01-5		<1	ug/kg					U	02/25/11
trans-1,3-Dichloropropene	10061-02-6		<1	ug/kg					U	02/25/11
1,2-Dichloroethane	107-06-2		<1	ug/kg					U	02/25/11
Methyl isobutyl ketone	108-10-1		<1	ug/kg					U	02/25/11
Dibromochloromethane	124-48-1		<1	ug/kg					U	02/25/11
Tetrachloroethene	127-18-4		<1	ug/kg					U	02/25/11
Total Xylenes	1330-20-7		<1	ug/kg					U	02/25/11
Total 1,2-Dichloroethene	540-59-0		<1	ug/kg					U	02/25/11
Carbon tetrachloride	56-23-5		<1	ug/kg					U	02/25/11

Quality Control Report

Attention Michael Neely
Department Organic, Volatiles

Group # WSCF111601

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
2-Hexanone	591-78-6		<1	ug/kg					U	02/25/11
Acetone	67-64-1		<1	ug/kg					U	02/25/11
Chloroform	67-66-3		<1	ug/kg					U	02/25/11
1,1,1-Trichloroethane	71-55-6		<1	ug/kg					U	02/25/11
Bromomethane	74-83-9		<1	ug/kg					U	02/25/11
Chloromethane	74-87-3		<1	ug/kg					U	02/25/11
Chloroethane	75-00-3		<1	ug/kg					U	02/25/11
Vinyl chloride	75-01-4		<1	ug/kg					U	02/25/11
Methylene chloride	75-09-2		<1	ug/kg					U	02/25/11
Carbon disulfide	75-15-0		<1	ug/kg					U	02/25/11
Bromoform	75-25-2		<1	ug/kg					U	02/25/11
Bromodichloromethane	75-27-4		<1	ug/kg					U	02/25/11
1,2-Dichloropropane	78-87-5		<1	ug/kg					U	02/25/11
Methyl ethyl ketone	78-93-3		<1	ug/kg					U	02/25/11
1,1,2-Trichloroethane	79-00-5		<1	ug/kg					U	02/25/11
1,1,2,2-Tetrachloroethane	79-34-5		<1	ug/kg					U	02/25/11
trans-1,2-Dichloroethene	156-60-5		<1	ug/kg					U	02/25/11
cis-1,2-Dichloroethene	156-59-2		<1	ug/kg					U	02/25/11
LCS			**QC Sample #49850**							
1,1-Dichloroethene	75-35-4		26	ug/kg	102.5	50 - 131				02/25/11
Trichloroethene	79-01-6		23	ug/kg	92.6	66 - 119				02/25/11
Benzene	71-43-2		26	ug/kg	102.6	73 - 123				02/25/11

Quality Control Report

Attention Michael Neely
Department Organic, Volatiles

Group # WSCF111601

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Toluene	108-88-3		26	ug/kg	104.2	77 - 128				02/25/11
Chlorobenzene	108-90-7		28	ug/kg	110.8	81 - 126				02/25/11
1,1-Dichloroethane	75-34-3		23	ug/kg	91.1	75 - 125				02/25/11
Ethylbenzene	100-41-4		27	ug/kg	107.1	75 - 125				02/25/11
Styrene	100-42-5		25	ug/kg	98.2	75 - 125				02/25/11
trans-1,3-Dichloropropene	10061-02-6		21	ug/kg	85.9	75 - 125				02/25/11
1,2-Dichloroethane	107-06-2		26	ug/kg	103.8	75 - 125				02/25/11
1,1,1-Trichloroethane	71-55-6		26	ug/kg	103.7	75 - 125				02/25/11
Dibromochloromethane	124-48-1		26	ug/kg	104.6	75 - 125				02/25/11
Carbon disulfide	75-15-0		26	ug/kg	103.1	75 - 125				02/25/11
Bromoform	75-25-2		25	ug/kg	99.4	75 - 125				02/25/11
Bromodichloromethane	75-27-4		26	ug/kg	104.8	75 - 125				02/25/11
1,2-Dichloropropane	78-87-5		22	ug/kg	89.6	75 - 125				02/25/11
1,1,2-Trichloroethane	79-00-5		28	ug/kg	112.2	75 - 125				02/25/11
1,1,2,2-Tetrachloroethane	79-34-5		28	ug/kg	110	75 - 125				02/25/11
trans-1,2-Dichloroethene	156-60-5		20	ug/kg	79.2	75 - 125				02/25/11
cis-1,2-Dichloroethene	156-59-2		19	ug/kg	76.2	75 - 125				02/25/11
MS			**QC Sample #49851**							
			Original 111552001							
1,1-Dichloroethene	75-35-4		20	ug/kg	95.2	75 - 125				02/25/11
Trichloroethene	79-01-6		22	ug/kg	103.8	75 - 125				02/25/11
Benzene	71-43-2		23	ug/kg	108.7	75 - 125				02/25/11

Quality Control Report

Attention Michael Neely
Department Organic, Volatiles

Group # WSCF111601

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Toluene	108-88-3		24	ug/kg	113.3	75 - 125				02/25/11
Chlorobenzene	108-90-7		24	ug/kg	114.4	75 - 125				02/25/11
1,1-Dichloroethane	75-34-3		18	ug/kg	87.2	75 - 125				02/25/11
Ethylbenzene	100-41-4		23	ug/kg	108.6	75 - 125				02/25/11
Styrene	100-42-5		20	ug/kg	95.4	75 - 125				02/25/11
trans-1,3-Dichloropropene	10061-02-6		21	ug/kg	101.7	75 - 125				02/25/11
1,2-Dichloroethane	107-06-2		23	ug/kg	110.6	75 - 125				02/25/11
1,1,1-Trichloroethane	71-55-6		24	ug/kg	114.9	75 - 125				02/25/11
Dibromochloromethane	124-48-1		26	ug/kg	123.5	75 - 125				02/25/11
Carbon disulfide	75-15-0		20	ug/kg	94.1	75 - 125				02/25/11
Bromoform	75-25-2		25	ug/kg	118.8	75 - 125				02/25/11
Bromodichloromethane	75-27-4		25	ug/kg	120.1	75 - 125				02/25/11
1,2-Dichloropropane	78-87-5		21	ug/kg	100.3	75 - 125				02/25/11
1,1,2-Trichloroethane	79-00-5		26	ug/kg	124.4	75 - 125				02/25/11
1,1,2,2-Tetrachloroethane	79-34-5		25	ug/kg	121.9	75 - 125				02/25/11
trans-1,2-Dichloroethene	156-60-5		22	ug/kg	107.4	75 - 125				02/25/11
cis-1,2-Dichloroethene	156-59-2		18	ug/kg	86.2	75 - 125				02/25/11
MSD			**QC Sample #49852**							
			Original 111552001						**Paired 49851**	
1,1-Dichloroethene	75-35-4		21	ug/kg	98.9	75 - 125	3.80	30		02/25/11
Trichloroethene	79-01-6		22	ug/kg	102.2	75 - 125	1.60	30		02/25/11
Benzene	71-43-2		23	ug/kg	108.9	75 - 125	0.20	30		02/25/11

Quality Control Report

Attention Michael Neely
Department Organic, Volatiles

Group # WSCF111601

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Toluene	108-88-3		24	ug/kg	111.8	75 - 125	1.30	30		02/25/11
Chlorobenzene	108-90-7		24	ug/kg	114.2	75 - 125	0.20	30		02/25/11
1,1-Dichloroethane	75-34-3		19	ug/kg	88.1	75 - 125	1.00	30		02/25/11
Ethylbenzene	100-41-4		23	ug/kg	107.7	75 - 125	0.80	30		02/25/11
Styrene	100-42-5		20	ug/kg	93.4	75 - 125	2.10	30		02/25/11
trans-1,3-Dichloropropene	10061-02-6		21	ug/kg	99	75 - 125	2.70	30		02/25/11
1,2-Dichloroethane	107-06-2		23	ug/kg	107.8	75 - 125	2.60	30		02/25/11
1,1,1-Trichloroethane	71-55-6		24	ug/kg	114	75 - 125	0.80	30		02/25/11
Dibromochloromethane	124-48-1		25	ug/kg	117	75 - 125	5.40	30		02/25/11
Carbon disulfide	75-15-0		20	ug/kg	96.6	75 - 125	2.60	30		02/25/11
Bromoform	75-25-2		25	ug/kg	119	75 - 125	0.20	30		02/25/11
Bromodichloromethane	75-27-4		25	ug/kg	118.2	75 - 125	1.60	30		02/25/11
1,2-Dichloropropane	78-87-5		21	ug/kg	99.4	75 - 125	0.90	30		02/25/11
1,1,2-Trichloroethane	79-00-5		23	ug/kg	107.1	75 - 125	14.90	30		02/25/11
1,1,2,2-Tetrachloroethane	79-34-5		25	ug/kg	119.3	75 - 125	2.20	30		02/25/11
trans-1,2-Dichloroethene	156-60-5		22	ug/kg	102.3	75 - 125	4.90	30		02/25/11
cis-1,2-Dichloroethene	156-59-2		16	ug/kg	75.7	75 - 125	13.00	30		02/25/11
SAMPLE			**Sample #111601001**							
1,2-Dichloroethane-d4	17060-07-0				100.8	77 - 137				02/26/11
Toluene-d8	2037-26-5				92.7	78 - 122				02/26/11
4-Bromofluorobenzene	460-00-4				81.5	66 - 125				02/26/11

Quality Control Report

Attention Michael Neely
Department Organic, Volatiles

Group # WSCF111601

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
SAMPLE			**Sample #111601002**							
1,2-Dichloroethane-d4	17060-07-0				98.7	77 - 137				02/26/11
Toluene-d8	2037-26-5				92.7	78 - 122				02/26/11
4-Bromofluorobenzene	460-00-4				77.4	66 - 125				02/26/11
BLANK			**QC Sample #49849**							
1,2-Dichloroethane-d4	17060-07-0				98.8	77 - 137				02/25/11
Toluene-d8	2037-26-5				87.8	78 - 122				02/25/11
4-Bromofluorobenzene	460-00-4				81.4	66 - 125				02/25/11
LCS			**QC Sample #49850**							
1,2-Dichloroethane-d4	17060-07-0				93	77 - 137				02/25/11
Toluene-d8	2037-26-5				97.3	78 - 122				02/25/11
4-Bromofluorobenzene	460-00-4				104.4	66 - 125				02/25/11
MS			**QC Sample #49851**							
			Original 111552001							
1,2-Dichloroethane-d4	17060-07-0				93.6	77 - 137				02/25/11
Toluene-d8	2037-26-5				99.8	78 - 122				02/25/11
4-Bromofluorobenzene	460-00-4				108.7	66 - 125				02/25/11
MSD			**QC Sample #49852**							
			Original 111552001					**Paired**	**49851**	
1,2-Dichloroethane-d4	17060-07-0				92.9	77 - 137	0.80	30		02/25/11
Toluene-d8	2037-26-5				99.4	78 - 122	0.40	30		02/25/11

Quality Control Report

Attention Michael Neely
Department Organic, Volatiles

Group # WSCF111601

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
4-Bromofluorobenzene	460-00-4				107.5	66 - 125	1.10	30		02/25/11

Date: 30 March 2011
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: 100 Area RI/FS
Subject: Inorganics - Sample Data Groups (SDG) SL1040

INTRODUCTION

This memorandum presents the results of data validation for SDG SL1040 prepared by TestAmerica. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B29MD7	01/22/11	Soil	C	6010B & 7471A

Data validation was conducted in accordance with the CHPRC validation statement of work and the Sampling and Analysis Plan for the 100-DR-1, 100-DR-2, 100-HR-1, 100-HR-2 and 100-HR-3 Operable Units Remedial Investigation/Feasibility Study, DOE/RL-2009-40, Rev. 0/TPA-CN-368 (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.

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.

The Sb laboratory blank result was > the method detection limit (MDL) but < the reporting limit (RL). The Sb sample result was a detect < the RL and should be qualified as non-detect at the RL (1.3 mg/kg) and flagged "U."

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

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

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

All MS/MSD recoveries were acceptable.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exception.

The LCS recovery for Hg was above the upper acceptance limit. The sample result was a non-detect and should not be qualified.

ICP-AES Interference Check Samples (ICSs)

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

- **Precision**

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

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

ICP Serial Dilution Samples

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

- **ICP-MS Internal Standards**

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

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

- **Detection Limits**

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

All reported sample MDLs were below the CRDLs.

- **Completeness**

SDG SL1040 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

A minor deficiency leading to qualification of Sb sample result as 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-2009-40, Rev. 0, *Sampling and Analysis Plan for the 100-DR-1,100-DR-2, 100-HR-1, 100-HR-2 and 100-HR-3 Operable Units Remedial Investigation/Feasibility Study,* March 2010.

TPA-CN-368, TPA Change Notice Form for DOE/RL-2009-40, Rev. 0, June 2010

Appendix 1

Glossary of Data Reporting Qualifiers

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

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

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

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

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

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

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

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

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

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

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

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

Appendix 2

Summary of Data Qualification

Inorganic Data Qualification Summary			
SDG: SL1040	Reviewer: AQA	Project: 100 Area RI/FS	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Sb	1.3U	B29MD7	Laboratory blank contamination

Comments: None

Appendix 3

Annotated Laboratory Reports

CH2M Hill Plateau Remediation DOE RL

Client Sample ID: B29MD7

TOTAL Metals

Lot-Sample #...: F1A260564-001 Matrix.....: SOLID
Date Sampled...: 01/22/11 Date Received..: 01/26/11
% Moisture.....: 20

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1027089						
Silver	ND	1.3	mg/kg	SW846 6010B	01/27-01/28/11	MDQVL1AN
		Dilution Factor: 1		MDL.....: 0.29		
Arsenic	**1.8**	**1.3**	**mg/kg**	**SW846 6010B**	**01/27-01/28/11**	**MDQVL1AC**
		Dilution Factor: 1		MDL.....: 0.40		
Barium	**42.1**	**6.3**	**mg/kg**	**SW846 6010B**	**01/27-01/28/11**	**MDQVL1AD**
		Dilution Factor: 1		MDL.....: 0.31		
Beryllium	ND	0.63	mg/kg	SW846 6010B	01/27-01/28/11	MDQVL1AE
		Dilution Factor: 1		MDL.....: 0.21		
Cadmium	ND	0.63	mg/kg	SW846 6010B	01/27-01/28/11	MDQVL1AF
		Dilution Factor: 1		MDL.....: 0.063		
Cobalt	**4.4 B**	**6.3**	**mg/kg**	**SW846 6010B**	**01/27-01/28/11**	**MDQVL1AG**
		Dilution Factor: 1		MDL.....: 1.2		
Chromium	**8.2**	**1.3**	**mg/kg**	**SW846 6010B**	**01/27-01/28/11**	**MDQVL1AT**
		Dilution Factor: 1		MDL.....: 0.39		
Copper	**8.0**	**3.1**	**mg/kg**	**SW846 6010B**	**01/27-01/28/11**	**MDQVL1AH**
		Dilution Factor: 1		MDL.....: 0.91		
Manganese	**164**	**1.3**	**mg/kg**	**SW846 6010B**	**01/27-01/28/11**	**MDQVL1AK**
		Dilution Factor: 1		MDL.....: 0.19		
Nickel	**9.3**	**5.0**	**mg/kg**	**SW846 6010B**	**01/27-01/28/11**	**MDQVL1AL**
		Dilution Factor: 1		MDL.....: 0.28		
Lead	**2.8**	**1.3**	**mg/kg**	**SW846 6010B**	**01/27-01/28/11**	**MDQVL1AJ**
		Dilution Factor: 1		MDL.....: 0.22		
Selenium	**1.6 B**	**1.9**	**mg/kg**	**SW846 6010B**	**01/27-01/28/11**	**MDQVL1AM**
		Dilution Factor: 1		MDL.....: 0.63		
Thallium	ND	2.5	mg/kg	SW846 6010B	01/27-01/28/11	MDQVL1AP
		Dilution Factor: 1		MDL.....: 1.9		
Vanadium	**21.1**	**6.3**	**mg/kg**	**SW846 6010B**	**01/27-01/28/11**	**MDQVL1AQ**
		Dilution Factor: 1		MDL.....: 1.6		

(Continued on next page)

CH2M Hill Plateau Remediation DOE RL

Client Sample ID: B29MD7

TOTAL Metals

Lot-Sample #...: F1A260564-001 Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Zinc	25.0	6.3	mg/kg	SW846 6010B	01/27-01/28/11	MDQVL1AR
		Dilution Factor: 1		MDL.....: 2.5		
Prep Batch #...: 1027091						
Antimony 1.3U	1.2 B,C	1.3	mg/kg	SW846 6010B	01/28/11	MDQVL1AU
		Dilution Factor: 1		MDL.....: 0.25		
Prep Batch #...: 1046073						
Mercury	ND N	0.041	mg/kg	SW846 7471A	02/17-02/18/11	MDQVL1AV
		Dilution Factor: 1		MDL.....: 0.014		

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

C Method blank contamination. The associated method blank contains the target analyte at a reportable level.

N Spiked analyte recovery is outside stated control limits.

EH
03/30/11

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

CASE NARRATIVE

CH2MHill Plateau Remediation Company
P.O. Box 1600
MS B3-60
Richland, Washington 99352
February 23, 2011
Attention: Mike Neely

TestAmerica Laboratories, Inc.

SDG	: SL1040
Number of Samples	: sample
Sample Matrix	: Solid
Data Deliverable	: Summary
Date SDG Closed	: January 26, 2011

II. Introduction

On January 26, 2011, one sample was received by TestAmerica - St. Louis for chemical analysis. The samples were received within temperature criteria. See the COC and CUR forms for documentation of any variations on receipt conditions and temperature. Upon receipt, the sample was given laboratory a Id to correspond with the specific client Id. Please refer to the Sample Summary sheets attached to this case narrative. This report is incomplete without the narrative.

The following SAFs are associated with this SDG: F10-214

III. Analytical Results/ Methodology

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

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

Deviation from Request: None

IV. Definitions

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

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

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

CH2M Hill Plateau Remediation Company
February 23, 2011
SDG: SL1040

TestAmerica Laboratories, Inc.

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

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

ICP Metals

Batch: 1027089

The LLC recovery for Silver is outside the upper QC limit, indicating a potential positive bias for this analyte. This analyte was not detected in the associated sample, indicating that the samples data was not affected by this excursion. The original sample results are provided.
Affected Samples:
F1A260564 (1): B29MD7

Batch: 1027091

Antimony was detected in the method blank at a concentration above the MDL but below the RL. Antimony is qualified with a "C" flag in the associated sample.
Affected Samples:
F1A260564 (1): B29MD7

The LLC recovery for Antimony is outside the upper QC limit, indicating a potential positive bias for this analyte. This analyte was not detected in the associated sample, indicating that the sample data was not affected by this excursion. The original sample results are provided.
Affected Samples:
F1A260564 (1): B29MD7

Batch: 1046073

The MS/MSD recoveries for Mercury are outside the established QC limits. The RPD is within method acceptance criteria indicating possible matrix interference. Method performance is demonstrated by acceptable LCS recovery. This analyte has been qualified accordingly with an "N" flag in the associated samples
Affected Samples:
F1A260564 (1): B29MD7

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

CH2M Hill Plateau Remediation Company

February 23, 2011

SDG: SL1040

TestAmerica Laboratories, Inc.

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

Reviewed and approved:

Michael Franks
St. Louis Project Manager

13715 Rider Trail North Earth City, MO 63045 **tel** 314.298.8566 **fax** 314.298.8757 **www.testamericainc.com**

SDG# SEL1040

S21040

CH2MHill Plateau Remediation Company

CLM 407

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F10-214-105

PAGE 1 OF 1

COLLECTOR: Christian Cuanella	COMPANY CONTACT: RADLOFF, AW	TELEPHONE NO.: 376-4554	PROJECT COORDINATOR: RADLOFF, AW
SAMPLING LOCATION: C7699 (199-H3-9); I-017	PROJECT DESIGNATION: 100 Area Remedial Investigation/Feasibility Analysis - 100-HR-3 - Sediment		SAF NO.: F10-214
ICE CHEST NO.: GWS-108	FIELD LOGBOOK NO.: HNF-N-491-14 pg 9	ACTUAL SAMPLE DEPTH: 46.0 - 48.5 FT	COA: 300110ES10
SHIPPED TO: TestAmerica St. Louis	OFFSITE PROPERTY NO.: N/A		BILL OF LADING/AIR BILL NO.: N/A 794353714250

PRICE CODE: 8N

AIR QUALITY: ☐

Data Turnaround 30 Days/30 Days

METHOD OF SHIPMENT: GOVERNMENT VEHICLE

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=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
HOLDING TIME	6 Months
TYPE OF CONTAINER	G/P
NO. OF CONTAINER(S)	1
VOLUME	60mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B29MD7	SOIL	1/22/11	0818	–

(a)

CHAIN OF POSSESSION / SIGN/ PRINT NAMES

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
C. Christian E Cuanella	1/22/11 1315	SSUR1	1/22/11 1315
SSUR1	1-25-11 0830	CmAguilar CmAgh	1-25-11 0830
CmAguilar CmAgh	1-25-11 1400	FEDEX	
FEDEX		AB Wilson Angela Boom	~~1-25-11~~ 1-26-11 0930
			1-26-11

SPECIAL INSTRUCTIONS

** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
(1) ICP Metals - 6010 (Supertrace 100 Area RI/FS) {Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, ~~Manganese, Nickel, Selenium, Silver, Thallium, Vanadium, Zinc};~~
Mercury - 7471 - (CV) {Mercury};

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

A-6003-618 (REV 2)

Appendix 5

Data Validation Supporting Documentation

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: 100 Area RI/FS			DATA PACKAGE: VSR11-038		
VALIDATOR: Eyda Hergenreder		LAB: TestAmerica		DATE: 03-30-2011	
			SDG: SL1040		
ANALYSES PERFORMED					
SW-846/ICP X	SW-846/GFAA	SW-846/Hg X		EPA 200.8	
SAMPLES/MATRIX Soil sample SDG SL1040: B29MD7					

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:
laboratory blank hit: Sb = 0.27 mg/kg

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:

Hg LCS %R = 127%

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

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

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

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

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

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

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

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

Comments: None

6. ICP QUALITY CONTROL (Levels D and E)

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

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

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

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

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

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

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

Comments:

7. HOLDING TIMES (all levels)

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

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

Comments: None

8. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

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

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

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

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

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

Comments: None

Appendix 6

Additional Documentation Requested By Client

METHOD BLANK REPORT

TOTAL Metals

Client Lot #...: SL1040 **Matrix.....:** SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MB Lot-Sample #: F1A270000-089 **Prep Batch #...:** 1027089						
Arsenic	ND	1.0	mg/kg	SW846 6010B	01/27-01/28/11	MDREK1AA
		Dilution Factor: 1				
Barium	ND	5.0	mg/kg	SW846 6010B	01/27-01/28/11	MDREK1AC
		Dilution Factor: 1				
Beryllium	ND	0.50	mg/kg	SW846 6010B	01/27-01/28/11	MDREK1AD
		Dilution Factor: 1				
Cadmium	ND	0.50	mg/kg	SW846 6010B	01/27-01/28/11	MDREK1AE
		Dilution Factor: 1				
Chromium	ND	1.0	mg/kg	SW846 6010B	01/27-01/28/11	MDREK1AR
		Dilution Factor: 1				
Cobalt	ND	5.0	mg/kg	SW846 6010B	01/27-01/28/11	MDREK1AF
		Dilution Factor: 1				
Copper	ND	2.5	mg/kg	SW846 6010B	01/27-01/28/11	MDREK1AG
		Dilution Factor: 1				
Lead	ND	1.0	mg/kg	SW846 6010B	01/27-01/28/11	MDREK1AH
		Dilution Factor: 1				
Manganese	ND	1.0	mg/kg	SW846 6010B	01/27-01/28/11	MDREK1AJ
		Dilution Factor: 1				
Nickel	ND	4.0	mg/kg	SW846 6010B	01/27-01/28/11	MDREK1AK
		Dilution Factor: 1				
Selenium	ND	1.5	mg/kg	SW846 6010B	01/27-01/28/11	MDREK1AL
		Dilution Factor: 1				
Silver	ND	1.0	mg/kg	SW846 6010B	01/27-01/28/11	MDREK1AM
		Dilution Factor: 1				
Thallium	ND	2.0	mg/kg	SW846 6010B	01/27-01/28/11	MDREK1AN
		Dilution Factor: 1				
Vanadium	ND	5.0	mg/kg	SW846 6010B	01/27-01/28/11	MDREK1AP
		Dilution Factor: 1				
Zinc	ND	5.0	mg/kg	SW846 6010B	01/27-01/28/11	MDREK1AQ
		Dilution Factor: 1				

(Continued on next page)

METHOD BLANK REPORT

TOTAL Metals

Client Lot #...: SL1040 Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MB Lot-Sample #: F1A270000-091 Prep Batch #...: 1027091						
Antimony	**0.27 B**	**1.0**	**mg/kg**	**SW846 6010B**	**01/28/11**	**MDREQ1AA**
		Dilution Factor: 1				
MB Lot-Sample #: F1B150000-073 Prep Batch #...: 1046073						
Mercury	ND	0.033	mg/kg	SW846 7471A	02/17-02/18/11	MEE7X1AA
		Dilution Factor: 1				

NOTE(S):

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

B Estimated result. Result is less than RL.

LABORATORY CONTROL SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: SL1040 **Matrix.....:** SOLID

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
LCS Lot-Sample#: F1A270000-089 **Prep Batch #...:** 1027089							
Arsenic	109	109	mg/kg	100	SW846 6010B	01/27-01/28/11	MDREK1AT
			Dilution Factor: 1				
Barium	325	325	mg/kg	100	SW846 6010B	01/27-01/28/11	MDREK1AU
			Dilution Factor: 1				
Beryllium	92.0	98.9	mg/kg	107	SW846 6010B	01/27-01/28/11	MDREK1AV
			Dilution Factor: 1				
Cadmium	110	110	mg/kg	100	SW846 6010B	01/27-01/28/11	MDREK1AW
			Dilution Factor: 1				
Cobalt	133	128	mg/kg	96	SW846 6010B	01/27-01/28/11	MDREK1AX
			Dilution Factor: 1				
Copper	74.7	74.1	mg/kg	99	SW846 6010B	01/27-01/28/11	MDREK1A0
			Dilution Factor: 1				
Lead	152	143	mg/kg	94	SW846 6010B	01/27-01/28/11	MDREK1A1
			Dilution Factor: 1				
Manganese	443	424	mg/kg	96	SW846 6010B	01/27-01/28/11	MDREK1A2
			Dilution Factor: 1				
Nickel	109	105	mg/kg	97	SW846 6010B	01/27-01/28/11	MDREK1A3
			Dilution Factor: 1				
Selenium	207	207	mg/kg	100	SW846 6010B	01/27-01/28/11	MDREK1A4
			Dilution Factor: 1				
Silver	52.0	53.5	mg/kg	103	SW846 6010B	01/27-01/28/11	MDREK1A5
			Dilution Factor: 1				
Thallium	171	165	mg/kg	97	SW846 6010B	01/27-01/28/11	MDREK1A6
			Dilution Factor: 1				
Vanadium	110	106	mg/kg	96	SW846 6010B	01/27-01/28/11	MDREK1A7
			Dilution Factor: 1				
Zinc	299	309	mg/kg	103	SW846 6010B	01/27-01/28/11	MDREK1A8
			Dilution Factor: 1				

(Continued on next page)

LABORATORY CONTROL SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: SL1040 **Matrix.....:** SOLID

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Chromium	93.4	88.2	mg/kg	94	SW846 6010B	01/27-01/28/11	MDREK1A9
			Dilution Factor: 1				
LCS Lot-Sample#: F1A270000-091 **Prep Batch #...:** 1027091							
Antimony	50.0	41.1	mg/kg	82	SW846 6010B	01/28/11	MDREQ1AC
			Dilution Factor: 1				
LCS Lot-Sample#: F1B150000-073 **Prep Batch #...:** 1046073							
Mercury	16.3	20.7	mg/kg	127	SW846 7471A	02/17-02/18/11	MEE7X1AC
			Dilution Factor: 50				

NOTE(S):

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

MATRIX SPIKE SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: SL1040 **Matrix.....:** SOLID
Date Sampled...: 01/22/11 **Date Received..:** 01/26/11

MS Lot-Sample #: F1A260564-001 **Prep Batch #...:** 1027089
% Moisture.....: 20

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Arsenic									
	1.8	126	123	mg/kg	96		SW846 6010B	01/27-01/28/11	MDQVL1AX
	1.8	126	117	mg/kg	92	4.3	SW846 6010B	01/27-01/28/11	MDQVL1A0
			Dilution Factor: 1						
Barium									
	42.1	126	165	mg/kg	98		SW846 6010B	01/27-01/28/11	MDQVL1A1
	42.1	126	163	mg/kg	96	1.5	SW846 6010B	01/27-01/28/11	MDQVL1A2
			Dilution Factor: 1						
Beryllium									
	ND	126	131	mg/kg	104		SW846 6010B	01/27-01/28/11	MDQVL1A3
	ND	126	125	mg/kg	100	4.7	SW846 6010B	01/27-01/28/11	MDQVL1A4
			Dilution Factor: 1						
Cadmium									
	ND	126	121	mg/kg	97		SW846 6010B	01/27-01/28/11	MDQVL1A5
	ND	126	115	mg/kg	92	5.2	SW846 6010B	01/27-01/28/11	MDQVL1A6
			Dilution Factor: 1						
Chromium									
	8.2	126	127	mg/kg	95		SW846 6010B	01/27-01/28/11	MDQVL1CV
	8.2	126	122	mg/kg	91	4.1	SW846 6010B	01/27-01/28/11	MDQVL1CW
			Dilution Factor: 1						
Cobalt									
	4.4	126	121	mg/kg	93		SW846 6010B	01/27-01/28/11	MDQVL1A7
	4.4	126	116	mg/kg	89	4.6	SW846 6010B	01/27-01/28/11	MDQVL1A8
			Dilution Factor: 1						
Copper									
	8.0	126	128	mg/kg	96		SW846 6010B	01/27-01/28/11	MDQVL1A9
	8.0	126	122	mg/kg	91	4.9	SW846 6010B	01/27-01/28/11	MDQVL1CA
			Dilution Factor: 1						
Lead									
	2.8	126	120	mg/kg	93		SW846 6010B	01/27-01/28/11	MDQVL1CC
	2.8	126	114	mg/kg	89	5.2	SW846 6010B	01/27-01/28/11	MDQVL1CD
			Dilution Factor: 1						

(Continued on next page)

MATRIX SPIKE SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: SL1040 **Matrix.....:** SOLID
Date Sampled...: 01/22/11 **Date Received..:** 01/26/11

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Manganese									
	164	126	287	mg/kg	98		SW846 6010B	01/27-01/28/11	MDQVL1CE
	164	126	277	mg/kg	90	3.4	SW846 6010B	01/27-01/28/11	MDQVL1CF
			Dilution Factor: 1						
Nickel									
	9.3	126	126	mg/kg	93		SW846 6010B	01/27-01/28/11	MDQVL1CG
	9.3	126	119	mg/kg	88	5.5	SW846 6010B	01/27-01/28/11	MDQVL1CH
			Dilution Factor: 1						
Selenium									
	1.6	126	123	mg/kg	97		SW846 6010B	01/27-01/28/11	MDQVL1CJ
	1.6	126	116	mg/kg	91	5.8	SW846 6010B	01/27-01/28/11	MDQVL1CK
			Dilution Factor: 1						
Silver									
	ND	12.6	11.8	mg/kg	94		SW846 6010B	01/27-01/28/11	MDQVL1CL
	ND	12.6	11.2	mg/kg	89	5.0	SW846 6010B	01/27-01/28/11	MDQVL1CM
			Dilution Factor: 1						
Thallium									
	ND	126	114	mg/kg	91		SW846 6010B	01/27-01/28/11	MDQVL1CN
	ND	126	109	mg/kg	87	4.6	SW846 6010B	01/27-01/28/11	MDQVL1CP
			Dilution Factor: 1						
Vanadium									
	21.1	126	141	mg/kg	96		SW846 6010B	01/27-01/28/11	MDQVL1CQ
	21.1	126	135	mg/kg	91	4.4	SW846 6010B	01/27-01/28/11	MDQVL1CR
			Dilution Factor: 1						
Zinc									
	25.0	126	152	mg/kg	101		SW846 6010B	01/27-01/28/11	MDQVL1CT
	25.0	126	144	mg/kg	95	5.2	SW846 6010B	01/27-01/28/11	MDQVL1CU
			Dilution Factor: 1						

MS Lot-Sample #: F1A260564-001 **Prep Batch #...:** 1027091
% Moisture.....: 20

Antimony									
	1.2	62.8	56.5	mg/kg	88		SW846 6010B	01/28/11	MDQVL1CX
	1.2	62.8	53.3	mg/kg	83	5.7	SW846 6010B	01/28/11	MDQVL1C0
			Dilution Factor: 1						

MS Lot-Sample #: F1A260564-001 **Prep Batch #...:** 1046073
% Moisture.....: 20

(Continued on next page)

MATRIX SPIKE SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: SL1040 **Matrix.....:** SOLID
Date Sampled...: 01/22/11 **Date Received..:** 01/26/11

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Mercury									
	ND	0.209	0.161 N	mg/kg	77		SW846 7471A	02/17-02/18/11	MDQVL1C1
	ND	0.209	0.161 N	mg/kg	77	0.53	SW846 7471A	02/17-02/18/11	MDQVL1C2

Dilution Factor: 1

NOTE(S):

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

Results and reporting limits have been adjusted for dry weight.

N Spiked analyte recovery is outside stated control limits.

Date: 30 March 2011
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: 100 Area RI/FS
Subject: Radiochemical - Sample Data Group (SDG) H4509

INTRODUCTION

This memorandum presents the results of data validation for SDG H4509 prepared by Eberline Services. 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
B29C17	01/24/11	Soil	C	Tritium
B29C21	01/24/11	Soil	C	Tritium
B29YV9	01/22/11	Soil	C	Tritium

Data validation was conducted in accordance with the CHPRC validation statement of work and the Sampling and Analysis Plan for the 100-DR-1, 100-DR-2, 100-HR-1, 100-HR-2 and 100-HR-3 Operable Units Remedial Investigation/Feasibility Study, DOE/RL-2009-40, Rev. 0 (SAP). Appendices 1 through 6 provide the following information as indicated below:

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

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 180 days. There are no specific preservation requirements for radiochemical soil analysis.

The samples were analyzed within the prescribed holding time.

- **Blanks**

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

Laboratory Blanks

The laboratory blank result was acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results, laboratory control sample results, and chemical recovery factors. Chemical recovery factors are determined through use of a carrier or tracer and provide assessment of the chemical separation process that is affected by the laboratory procedure, sample matrix, and/or interference. Chemical recovery factors are used to correct sample concentration, uncertainty, and MDC results. According to the SAP, the laboratory control sample accuracy limits are 70% to 130%.

Matrix Spike (MS) Samples

MS analysis is not required for the method performed.

Laboratory Control Samples (LCSs)

The LCS recovery was 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. According to the SAP, the relative percent difference (RPD) limits are ±30%.

Laboratory Duplicate Samples

The laboratory duplicate result was acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

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

All reported sample MDCs were below the CRDL.

- **Completeness**

SDG H4509 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

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

DOE/RL-2009-40, Rev. 0, *Sampling and Analysis Plan for the 100-DR-1, 100-DR-2, 100-HR-1, 100-HR-2 and 100-HR-3 Operable Units Remedial Investigation/Feasibility Study*, March 2010.

Appendix 1

Glossary of Data Reporting Qualifiers

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

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

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

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

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

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

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

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

Appendix 2

Summary of Data Qualification

Radiochemical Data Qualification Summary			
SDG: H4509	Reviewer: AQA	Project: 100 Area RI/FS	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Radiochemical	None	N/A	N/A

Comments: None

Appendix 3

Annotated Laboratory Reports

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H4509

7408-001 B29C17

DATA SHEET

SDG	7408	Client/Case no	CHPRC	SDG_H4509
Contact	N. Joseph Verville	Contract	No. 33677	
Lab sample id	S101284-01	Client sample id	B29C17	
Dept sample id	7408-001	Location/Matrix	C7639(199-H3-9);I-021	SOLID
Received	01/27/11	Collected/Weight	01/24/11 10:42	243 g
% solids	78.9	Custody/SAF No	F10-214-071	F10-214

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	2.52	4.5	7.55	400	U	H

100 Area Remedial Investigation/Feasibility Analysis - 100-HR-3 - Sediment

Lab id	EBRLNE
Protocol	CHPRC
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	03/01/11

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H4509

7408-002 B29C21

DATA SHEET

SDG	7408	Client/Case no	CHPRC	SDG_H4509
Contact	N. Joseph Verville	Contract	No. 33677	
Lab sample id	S101284-02	Client sample id	B29C21	
Dept sample id	7408-002	Location/Matrix	C7639(199-H3-9);I-022	SOLID
Received	01/27/11	Collected/Weight	01/24/11 14:35	162 g
% solids	81.4	Custody/SAF No	F10-214-072	F10-214

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	4.61	4.2	6.75	400	U	H

100 Area Remedial Investigation/Feasibility Analysis - 100-HR-3 - Sediment

Lab id	EBRLNE
Protocol	CHPRC
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	03/01/11

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H4509

7408-003 B29YV9

DATA SHEET

SDG	7408	Client/Case no	CHPRC	SDG_H4509
Contact	N. Joseph Verville	Contract	No. 33677	
Lab sample id	S101284-03	Client sample id	B29YV9	
Dept sample id	7408-003	Location/Matrix	C7639(199-H3-9);I-018	SOLID
Received	01/27/11	Collected/Weight	01/22/11 12:00	148 g
% solids	80.4	Custody/SAF No	F10-214-138	F10-214

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	2.89	4.5	7.48	400	U	H

100 Area Remedial Investigation/Feasibility Analysis - 100-HR-3 - Sediment

Lab id	EBRLNE
Protocol	CHPRC
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	03/01/11

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

1.0 GENERAL

CH2M Hill Plateau Remediation Company (CHPRC) Sample Delivery Group H4509 was composed of three solid (soil) samples designated under SAF No. F10-214 with a project designation of: 100 Area Remedial Investigation/Feasibility Analysis – 100-HR-3 - Sediment.

The samples were received as stated on the chain-of-custody documents. Any discrepancies are noted on the Eberline Analytical Sample Receipt Checklist.

2.0 ANALYSIS NOTES

2.1 Tritium Analysis

No problems were encountered during the course of the analyses. The results for both the original and duplicate analyses were less than their respective MDA's, therefore no RPD, or statistical control limit is calculated.

3.0 Case Narrative Certification Statement

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

N. Joseph Verville
Client Services Manager

3/1/11
Date

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F10-214-071	PAGE 1 OF 1
COLLECTOR B. Kauer, Kauer, Romo	**COMPANY CONTACT** RADLOFF, AW H4509	**TELEPHONE NO.** 376-4554 (7408)	**PROJECT COORDINATOR** RADLOFF, AW	**PRICE CODE** 8N	Data Turnaround 30 Days/30 Days
SAMPLING LOCATION C7639 (199-H3-9); I-021	**PROJECT DESIGNATION** 100 Area Remedial Investigation/Feasibility Analysis - 100-HR-3 - Sediment		**SAF NO.** F10-214	**AIR QUALITY** ☐	
ICE CHEST NO. GWS-091	**FIELD LOGBOOK NO.** Pg 10 HNF-N-491-14	**ACTUAL SAMPLE DEPTH** 75.2-77.2 FT	**COA** 300110ES10	**METHOD OF SHIPMENT** FEDERAL EXPRESS	
SHIPPED TO Eberline Services	**OFFSITE PROPERTY NO.** SEE PTR		**BILL OF LADING/AIR BILL NO.** SEE PTR 7943536 82159		

MATRIX*	POSSIBLE SAMPLE HAZARDS/ REMARKS		
A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 5400.5 (1990/1993)	**PRESERVATION**	None
		HOLDING TIME	6 Months
		TYPE OF CONTAINER	G
		NO. OF CONTAINER(S)	1
		VOLUME	120mL
	SPECIAL HANDLING AND/OR STORAGE	**SAMPLE ANALYSIS**	Tritium - H3 {Tritium};

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B9C17	SOIL	1/24/11	1042	✓

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Rob Romo, Rob Romo 1-24-11	1555	MO-413 SSU-R4	1-24-11 1555
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
SSU-R4 1-25-11	0700	CM Aguilar CM Aguilar	1-25-11 0700
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
CM Aguilar CM Aguilar 1-25-11	1400	FEDEX	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
FED EX		M. MATTAU/AMAW 01/26/11	0930
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.☐ The CACN for all analytical work at WSCF laboratory is 401642ES20.

ORIGINAL

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

A-6003-618 (REV 2)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F10-214-072	PAGE 1 OF 1

COLLECTOR B. Kauer, Kauer, Romo	**COMPANY CONTACT** RADLOFF, AW H4509	**TELEPHONE NO.** 376-4554 (7408)	**PROJECT COORDINATOR** RADLOFF, AW	**PRICE CODE** 8N **AIR QUALITY** ☐
SAMPLING LOCATION C7639 (199-H3-9); I-022	**PROJECT DESIGNATION** 100 Area Remedial Investigation/Feasibility Analysis - 100-HR-3 - Sediment		**SAF NO.** F10-214	
ICE CHEST NO. GWS-091	**FIELD LOGBOOK NO.** PS 10 ~~HNF-N-~~ 491-14	**ACTUAL SAMPLE DEPTH** 100.0 – 102.0 FT	**COA** 300110ES10	**METHOD OF SHIPMENT** FEDERAL EXPRESS
SHIPPED TO Eberline Services	**OFFSITE PROPERTY NO.** SEE PTR		**BILL OF LADING/AIR BILL NO.** SEE PTR 7943536 82159	

Data Turnaround 30 Days/30 Days

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	None
HOLDING TIME	6 Months
TYPE OF CONTAINER	G
NO. OF CONTAINER(S)	1
VOLUME	120mL
SAMPLE ANALYSIS	Tritium - H3 {Tritium};

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B09C21	SOIL	1-24-11	1435	✓

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
E. Kauer	1-24-11 1555	MO-413 SSU-R4	1-24-11 1555
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
SSU-R4	1-25-11 0700	CM Aguilar	1-25-11 0700
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
CM Aguilar	1-25-11 1400	FEDEX	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
FED EX		PT-NATAWATAN	01/26/11 0930
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS
** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.☐ The CACN for all analytical work at WSCF laboratory is 401642ES20.

ORIGINAL

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

A-6003-618 (REV 2)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F10-214-138	PAGE 1 OF 1
COLLECTOR Christina Carrera	COMPANY CONTACT RADLOFF, AW H4509	TELEPHONE NO. 376-4554 (7408)	PROJECT COORDINATOR RADLOFF, AW	PRICE CODE 8N AIR QUALITY ☐	Data Turnaround 30 Days/30 Days
SAMPLING LOCATION C7639 (199-H3-9); I-018	PROJECT DESIGNATION 100 Area Remedial Investigation/Feasibility Analysis - 100-HR-3 - Sediment		SAF NO. F10-214		
ICE CHEST NO. GWS-092	FIELD LOGBOOK NO. ~~HNF-N~~-491-14 PG 9	ACTUAL SAMPLE DEPTH 51.0-53.5 FT	COA 300110ES10	METHOD OF SHIPMENT FEDERAL EXPRESS	
SHIPPED TO Eberline Services	OFFSITE PROPERTY NO. SEE PTR		BILL OF LADING/AIR BILL NO. SEE PTR 7943499 06472		

MATRIX*	POSSIBLE SAMPLE HAZARDS/ REMARKS		
A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 5400.5 (1990/1993)	PRESERVATION	None
		HOLDING TIME	6 Months
		TYPE OF CONTAINER	G
		NO. OF CONTAINER(S)	1
		VOLUME	120mL
	SPECIAL HANDLING AND/OR STORAGE	SAMPLE ANALYSIS	Tritium - H3 {Tritium};

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B[illegible]YV9	SOIL	1/22/11	1200	–

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM E. Christina E. Christina	DATE/TIME 1/22/11 1315	RECEIVED BY/STORED IN SSU R4	DATE/TIME 1/22/11 1315	** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
RELINQUISHED BY/REMOVED FROM SSU-R4	DATE/TIME JAN 24 2011 0800	RECEIVED BY/STORED IN T.A. Wallace CHRPC	DATE/TIME JAN 24 2011 0800	
RELINQUISHED BY/REMOVED FROM T.A. Wallace CHRPC	DATE/TIME JAN 24 2011 1600	RECEIVED BY/STORED IN FEDEX	DATE/TIME	
RELINQUISHED BY/REMOVED FROM FEDEX	DATE/TIME	RECEIVED BY/STORED IN F. MATHUDATAN	DATE/TIME 01/28/11 0920	
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	

ORIGINAL

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

A-6003-618 (REV 2)

Appendix 5

Data Validation Supporting Documentation

Appendix B - Radiochemical Data Validation Checklist

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: 100 Area RI/FS			DATA PACKAGE: VSR11-038		
VALIDATOR: Eyda Hergenreder		LAB: Eberline Services		DATE: 03-30-2011	
			SDG: H4509		
ANALYSES PERFORMED					
Gross Alpha/Beta	Strontium-90	Technetium-99	Alpha Spectroscopy	Gamma Spectroscopy	
Total Uranium	Radium-22	Tritium X	C-14	I-129	
SAMPLES/MATRIX Soil samples					
SDG H4509: B29C17, B29C21, B29YV9					

1. Completeness ..... ☐ N/A

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

Comments: None

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

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

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

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

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

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

Comments:

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

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

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

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

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

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

Comments:

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

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

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

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

Comments:

5. Blanks (Levels B, C, D, E) ☐ N/A

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

Method blank results acceptable? Yes No N/A

Analytes detected in method blank? Yes No N/A

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

Field blank results acceptable? Yes No N/A

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

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

Comments: None

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

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

LCS/BSS recoveries acceptable? Yes No N/A

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

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

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

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

Comments: None

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

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

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

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

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

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

Comments: None

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

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

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

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

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

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

Comments: None

9. Matrix Spikes (Levels C, D, E)..... ☐ N/A

Matrix spike analyzed?..... Yes No (N/A)

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

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

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

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

Comments: None

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

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

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

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

Comments: None

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

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

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

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

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

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

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

Comments: None

12. Holding Times (All levels)

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

Comments: None

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

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

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

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

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

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

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

Comments: None

Appendix 6

Additional Documentation Requested By Client

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H4509

7408-005 Method Blank

METHOD BLANK

SDG	7408	Client/Case no	CHPRC	SDG H4509	
Contact	N. Joseph Verville	Contract	No. 33677		
Lab sample id	S101284-05	Client sample id	Method Blank		
Dept sample id	7408-005	Material/Matrix		SOLID	
		SAF No	F10-214		

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	2.92	4.7	7.92	400	U	H

QC-BLANK #76998

METHOD BLANKS
Page 1
SUMMARY DATA SECTION
Page 7

Lab id	EBRLNE
Protocol	CHPRC
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	03/01/11

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H4509

7408-004

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7408

Contact N. Joseph Verville

Client/Case no CHPRC SDG H4509

Contract No. 33677

Lab sample id S101284-04

Dept sample id 7408-004

Client sample id Lab Control Sample

Material/Matrix SOLID

SAF No F10-214

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Tritium	1040	25	8.99	400		H	1060	42	98	84-116	80-120

QC-LCS #76997

Lab id EBRLNE

Protocol CHPRC

Version Ver 1.0

Form DVD-LCS

Version 3.06

Report date 03/01/11

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H4509

7408-006 B29C17

DUPLICATE

SDG	7408			Client/Case no	CHPRC SDG H4509
Contact	N. Joseph Verville			Contract	No. 33677
	DUPLICATE		ORIGINAL		
Lab sample id	S101284-06	Lab sample id	S101284-01	Client sample id	B29C17
Dept sample id	7408-006	Dept sample id	7408-001	Location/Matrix	C7639(199-H3-9);I-021 SOLID
		Received	01/27/11	Collected/Weight	01/24/11 10:42 243 g
% solids	78.9	% solids	78.9	Custody/SAF No	F10-214-071 F10-214

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI-FIERS	RPD %	3σ TOT	DER σ
Tritium	-0.274	4.5	7.81	400	U	H	2.52	4.5	7.55	U	-		0.9

QC-DUP#1 76999

100 Area Remedial Investigation/Feasibility Analysis - 100-HR-3 - Sediment

Lab id	EBRLNE
Protocol	CHPRC
Version	Ver 1.0
Form	DVD-DUP
Version	3.06
Report date	03/01/11

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H4509

Test H Matrix SOLID
SDG 7408
Contact N. Joseph Verville

LAB METHOD SUMMARY

TRITIUM IN SOLIDS

LIQUID SCINTILLATION COUNTING

Client CHPRC
Contract No. 33677
Contract SDG H4509

RESULTS

LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	CLIENT SAMPLE ID	Tritium	
Preparation batch 7294-047						
S101284-01			7408-001	B29C17	U	
S101284-02			7408-002	B29C21	U	
S101284-03			7408-003	B29YV9	U	
S101284-04			7408-004	Lab Control Sample	ok	
S101284-05			7408-005	Method Blank	U	
S101284-06			7408-006	Duplicate (S101284-01)	-	U

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

METHOD PERFORMANCE

LAB SAMPLE ID	RAW TEST	SUF-FIX	CLIENT SAMPLE ID	MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 7294-047			2σ prep error 10.0 % Reference Lab Notebook No. 7294 pg. 47													
S101284-01			B29C17	7.55	0.214			100		50			31	02/23/11	02/24	LSC-005
S101284-02			B29C21	6.75	0.243			100		50			31	02/23/11	02/24	LSC-005
S101284-03			B29YV9	7.48	0.217			100		50			33	02/23/11	02/24	LSC-005
S101284-04			Lab Control Sample	8.99	0.200			100		50				02/23/11	02/24	LSC-005
S101284-05			Method Blank	7.92	0.200			100		50				02/23/11	02/24	LSC-005
S101284-06			Duplicate (S101284-01)	7.81	0.209			100		50			31	02/23/11	02/24	LSC-005
Nominal values and limits from method				400	0.200					25			180			

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

AVERAGES ± 2 SD MDA 7.75 ± 1.47
FOR 6 SAMPLES YIELD 100 ± 0

Lab id EBRLNE
Protocol CHPRC
Version Ver 1.0
Form DVD-LMS
Version 3.06
Report date 03/01/11