# REVIEW COMMENT RECORD (RCR)

| 1. Date | 2. Review No. |
|---|---|
| 04/26/2011 | |
| 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 |
|---|---|---|---|---|
| VSR11-043, Data Validation Report for CHPRC - Project 200 Area SGRP, Chemical and Radiochemical Validation - Level C | S&GRP Sample Data Groups (SDGs); WSCF100568, WSCF100628, WSCF100685, WSCF101545, WSCF101611, WSCF101801, and WSCF101903 | JA Edwards | Environmental Quality Assurance (EQA) | 2420 Stevens Rm. 345 376-4324 |

| 17. Comment Submittal Approval | 10. Agreement With Indicated Comment Disposition(s) | 11. CLOSED |
|---|---|---|
| Date / Organization Manager (optional) (print and sign) | JA Edwards / Reviewer/Point of Contact (print and sign) | JA Edwards / Reviewer/Point of Contact (print and sign) |
| | 04/26/2011 Date | 04/26/2011 Date |
| | Author/Originator (print and sign) | Author/Originator (print and sign) |

| 12. Item | 13a. Comments | 13b. Basis | 13c. Recommendation | 14. Reviewer Concurrence Required (Y or N) | 15. Disposition (provide justification if **NOT** accepted) | 16. Status |
|---|---|---|---|---|---|---|
| 1 | There were no issues found in this review | N/A | No additional items found | N | N/A | Closed |

Documents:

HNF-20433, Rev.0, *Data Validation Procedure for Chemical Analyses*, June 2004
HNF-20434, Rev.0, *Data Validation Procedure for Radiochemical Analyses*, June 2004
DOE/RL-2009-95, Rev. 0, *Sampling and Analysis Plan for Eleven ARRA Wells to Support the 200 West Groundwater Treatment System in FY 2010*, October 2009
GRP-GD-002, Rev. 0, Change 0, *Data Validation for Radiochemical Analyses*, August 2010
GRP-GD-003, Rev. 0, Change 0, *Data Validation for Chemical Analyses*, August 2010
LA-265-403: Hexavalent Chromium Anaysis By Spectrophotometer or Discrete Analyzer, D-4, 03/30/10
LA-505-412: Inductively Coupled Plasma-Mass Spectrometry (ICP/MS) for Trace Elements in Water and Solids, H-2, 04/11/2011
LA-523-455, *Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry*
LA-508-421: Operation of the Tri-Carb Model 2500TR Liquid Scintillation Analyzer, D-3, 05/12/10

# CHPRC - REVIEW COMMENT RECORD (RCR)

| 1. Date | 2. Review No. |
|---|---|
| 04/25/2011 | |
| 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 |
|---|---|---|---|---|
| VSR11-043 | | Scot Fitzgerald | Analytical Support Group | 2753/373-7495 |

**17. Comment Submittal Approval**

Date

Organization Manager (optional) (print and sign)

**10. Agreement With Indicated Comment Disposition(s)**

Scot Fitzgerald

Reviewer/Point of Contact (print and sign)

04/25/2011

Date

Author/Originator (print and sign)

**11. CLOSED**

Scot Fitzgerald

Reviewer/Point of Contact (print and sign)

04/25/2011

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. | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

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

## VSR11-043
## Project 200 Area SGRP

## Chemical & Radiochemical Validation - Level C

**Validation Performed By:** Eyda Hergenreder Eyda Hergenreder **Date:** 4-18-2011

**Validation Reviewed By:** Carl Schlosser **Date:** 4-21-2011

# TABLE OF CONTENTS


## Volatile Organics

Memorandum 3
Appendix 1 – Glossary of Data Reporting Qualifiers 8
Appendix 2 – Summary of Data Qualification 10
Appendix 3 – Annotated Laboratory Reports 13
Appendix 4 – Laboratory Narrative and Chain-of-Custody Documentation 24
Appendix 5 – Data Validation Supporting Documentation 38
Appendix 6 – Additional Documentation Requested By Client 45

## Inorganics

Memorandum 61
Appendix 1 – Glossary of Data Reporting Qualifiers 64
Appendix 2 – Summary of Data Qualification 66
Appendix 3 – Annotated Laboratory Reports 68
Appendix 4 – Laboratory Narrative and Chain-of-Custody Documentation 71
Appendix 5 – Data Validation Supporting Documentation 76
Appendix 6 – Additional Documentation Requested By Client 83

## General Chemistry

Memorandum 87
Appendix 1 – Glossary of Data Reporting Qualifiers 90
Appendix 2 – Summary of Data Qualification 92
Appendix 3 – Annotated Laboratory Reports 94
Appendix 4 – Laboratory Narrative and Chain-of-Custody Documentation 103
Appendix 5 – Data Validation Supporting Documentation 130
Appendix 6 – Additional Documentation Requested By Client 136

## Radiochemical

Memorandum 145
Appendix 1 – Glossary of Data Reporting Qualifiers 148
Appendix 2 – Summary of Data Qualification 150
Appendix 3 – Annotated Laboratory Reports 152
Appendix 4 – Laboratory Narrative and Chain-of-Custody Documentation 155
Appendix 5 – Data Validation Supporting Documentation 160
Appendix 6 – Additional Documentation Requested By Client 167

Date: 18 April 2011
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: 200 Area SGRP
Subject: Volatile Organics - Sample Data Groups (SDGs) WSCF100685, WSCF101611 and WSCF101801

## INTRODUCTION

This memorandum presents the results of data validation for SDGs WSCF100685, WSCF101611 and WSCF101801 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 |
|---|---|---|---|---|
| B24134 | 04/06/10 | Water | C | 8260B |
| B24136 | 04/06/10 | Water | C | 8260B |
| B24JJ9 | 07/08/10 | Water | C | 8260B |
| B24JH2 | 07/22/10 | Water | C | 8260B |
| B24JJ8 | 07/22/10 | Water | C | 8260B |

Data validation was conducted in accordance with the CHPRC validation statement of work and the Sampling and Analysis Plan for Eleven ARRA Wells to Support the 200 West Groundwater Treatment System in FY 2010, DOE/RL-2009-95, Rev. 0 (SAP). Appendices 1 through 6 provide the following information as indicated below:

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

## DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for volatile organics are analysis within 14 days of sample collection. Sample preservation requires chilling to 4 degrees Celsius and acid preservation with hydrochloric or sulfuric acid to pH <2.

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

- **Blanks**

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

**Laboratory Blanks**

All laboratory blank results were acceptable.

**Trip Blanks**

No trip blanks were submitted for validation.

**Field Blanks**

No field blanks were submitted for validation.

**Equipment Blanks**

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 80% to 120%. The limits for reported analytes not listed in the SAP are specified by the DV procedure.

**Surrogates**

All surrogate recoveries were acceptable.

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

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

For all SDGs, the only 8260B MS/MSD analytes reported were 1,1-dichloroethene, benzene, chlorobenzene, toluene and trichloroethene. Reported analytes not represented in the MS/MSDs were cis-1,3-dichloropropene, trans-1,3-dichloropropene, methyl isobutyl ketone, 2-hexanone, acetone, carbon disulfide, bromodichloromethane and methyl ethyl ketone. All sample results for these non-represented analytes were non-detects and should be qualified as estimates and flagged “UJ.”

For SDG WSCF100685, the MS and MSD recoveries for 1,1-dichloroethene, trichloroethene and benzene were below the lower acceptance limit. The carbon tetrachloride results for samples B24134 and B24136 and the chloroform result for sample B24136 were detects and should be

qualified as estimates and flagged "J." All other sample results associated with these MS/MSD analytes were non-detects and should be qualified as estimates and flagged “UJ.” See the table in Appendix 2 for listing of all sample results.

For SDG WSCF101611, the MS and MSD recoveries for trichloroethene were below the lower acceptance limit. The trichloroethene result for sample B24JJ9 was a detect and should be qualified as estimate and flagged "J." All other sample results associated with trichloroethene were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for listing of all sample results.

For SDG WSCF101801, the MS and MSD recoveries for 1,1-dichloroethene were below the lower acceptance limit but ≥20%. The chloroform results for samples B24JH2 and B24JJ8 were detects and should be qualified as estimates and flagged "J." All other sample results associated with 1,1-dichloroethene were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for listing of all sample results.

**Laboratory Control Samples (LCSs)**

All LCS recoveries were acceptable with the following exceptions.

For all SDGs, the only 8260B LCS analytes reported were 1,1-dichloroethene, benzene, chlorobenzene, toluene and trichloroethene. Reported analytes not represented in the LCSs were cis-1,3-dichloropropene, trans-1,3-dichloropropene, methyl isobutyl ketone, 2-hexanone, acetone, carbon disulfide, bromodichloromethane and methyl ethyl ketone. All sample results for these non-represented analytes were non-detects and should be qualified as estimates and flagged “UJ.”

For SDG WSCF100685, the LCS recoveries for 1,1-dichloroethene and trichloroethene were below the lower acceptance limit. The carbon tetrachloride results for samples B24134 and B24136 and the chloroform result for sample B24136 were detects and should be qualified as estimates and flagged "J." All other sample results associated with 1,1-dichloroethene and trichloroethane were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for listing of all sample results.

For SDG WSCF101611, the LCS recoveries for trichloroethene, benzene and toluene were below the lower acceptance limits. The trichloroethene and carbon tetrachloride results for sample B24JJ9 were detects and should be qualified as estimates and flagged "J." All other associated results for sample B24JJ9 were non-detects and should be qualified as estimates and flagged “UJ.”

For SDG WSCF101801, the LCS recoveries for 1,1-dichloroethene and trichloroethene were below the lower acceptance limits. The chloroform and carbon tetrachloride results for samples B24JH2 and B24JJ8 were detects and should be qualified as estimates and flagged "J." All other associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for listing of all affected sample results.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ±20%. The limits for reported analytes not listed in the SAP are specified by the DV procedure.

**MS/MSD Samples**

All MS/MSD relative percent difference values were acceptable.

**Field Duplicate Samples**

No field duplicates were submitted for validation.

**Field Split Samples**

No field splits were submitted for validation.

- **Detection Limits**

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

- **Completeness**

SDGs WSCF100685, WSCF101611 and WSCF101801 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

**MAJOR DEFICIENCIES**

None found.

**MINOR DEFICIENCIES**

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

**REFERENCES**

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

DOE/RL-2009-95, Rev. 0, *Sampling and Analysis Plan for Eleven ARRA Wells to Support the 200 West Groundwater Treatment System in FY 2010*, October 2009.

# 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: WSCF100685<br>WSCF101611<br>WSCF101801 | Reviewer: AQA | Project:<br>200 Area SGRP | |
| **Analyte(s)** | **Qualifier** | **Samples Affected** | **Reason** |
| cis-1,3-dichloropropene<br>trans-1,3-dichloropropene<br>methyl isobutyl ketone<br>2-hexanone<br>acetone<br>carbon disulfide<br>bromodichloromethane<br>methyl ethyl ketone | UJ | B24134, B24136,<br>B24JJ9, B24JH2,<br>B24JJ8 | Non-represented<br>MS/MSD and LCS data |
| carbon tetrachloride | J | B24134, B24136,<br>B24JJ9 | Low MS/MSD and LCS<br>recoveries |
| chloroform | J | B24136, B24JH2<br>B24JJ8 | Low MS/MSD and LCS<br>recoveries |
| chloroform | UJ | B24134 | Low MS/MSD and LCS<br>recoveries |
| benzene | UJ | B24134, B24136 | Low MS/MSD recoveries |
| 1,1-dichloroethene<br>1,1-dichloroethane<br>1,2-dichloroethane<br>total 1,2-dichloroethene<br>bromomethane<br>chloromethane<br>chloroethane<br>vinyl chloride<br>methylene chloride<br>bromoform<br>1,2-dichloropropane | UJ | B24134, B24136<br>B24JH2, B24JJ8 | Low MS/MSD and LCS<br>recoveries |
| dibromochloromethane<br>tetrachloroethene<br>1,1,1-trichloroethane<br>1,1,2-trichloroethane<br>1,1,2,2-tetrachloroethane | UJ | B24134, B24136,<br>B24JJ9 | Low MS/MSD and LCS<br>recoveries |
| trichloroethene | J | B24JJ9 | Low MS/MSD and LCS<br>recoveries |
| trichloroethene | UJ | B24134, B24136, | Low MS/MSD and LCS<br>recoveries |

| | | | |
|---|---|---|---|
| benzene<br>toluene<br>ethylbenzene<br>styrene<br>total xylene | UJ | B24JJ9 | Low LCS recoveries |
| carbon tetrachloride | J | B24JH2, B24JJ8 | Low LCS recovery |
| trichloroethene<br>dibromochloromethane<br>tetrachloroethene<br>1,1,1-trichloroethane<br>1,1,2-trichloroethane<br>1,1,2,2-tetrachloroethane | UJ | B24JH2, B24JJ8 | Low LCS recovery |

Comments: None

# Appendix 3

Annotated Laboratory Reports

## WSCF Analytical Results Report

**Attention** Michael Neely
**Department** Organic, Volatiles

**Group #** WSCF100685

**Sample #** 100685001
**SAF#** F10-065
**Sample ID** B24134

**Matrix** WATER
**Sampled** 04/06/10
**Received** 04/06/10

| Test Performed | CAS # | | Method | RQ | Result | TP Err | Units | DF | MDL | PQL | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **8260 Prep** | | | | | | | | | | | **04/07/10** |
| **SW-846 8260B** | | | | | | | | | | | |
| 1,1-Dichloroethene | 75-35-4 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Trichloroethene | 79-01-6 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Benzene | 71-43-2 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Toluene | 108-88-3 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Chlorobenzene | 108-90-7 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| 1,1-Dichloroethane | 75-34-3 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Ethylbenzene | 100-41-4 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Styrene | 100-42-5 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| cis-1,3-Dichloropropene | 10061-01-5 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| trans-1,3-Dichloropropene | 10061-02-6 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| 1,2-Dichloroethane | 107-06-2 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Methyl isobutyl ketone | 108-10-1 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Dibromochloromethane | 124-48-1 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Tetrachloroethene | 127-18-4 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Total Xylenes | 1330-20-7 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Total 1,2-Dichloroethene | 540-59-0 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |

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

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

T - MS and/or MSD sample recovery outside control limits.
U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.

## WSCF Analytical Results Report

**Attention** Michael Neely
**Department** Organic, Volatiles

**Group #** WSCF100685

**Sample #** 100685001
**SAF#** F10-065
**Sample ID** B24134

**Matrix** WATER
**Sampled** 04/06/10
**Received** 04/06/10

| Test Performed | CAS # | | Method | RQ | Result | TP Err | Units | DF | MDL | PQL | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Carbon tetrachloride | 56-23-5 | J | LA-523-455 | | 110 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| 2-Hexanone | 591-78-6 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Acetone | 67-64-1 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Chloroform | 67-66-3 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| 1,1,1-Trichloroethane | 71-55-6 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Bromomethane | 74-83-9 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Chloromethane | 74-87-3 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Chloroethane | 75-00-3 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Vinyl chloride | 75-01-4 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Methylene chloride | 75-09-2 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Carbon disulfide | 75-15-0 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Bromoform | 75-25-2 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Bromodichloromethane | 75-27-4 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| 1,2-Dichloropropane | 78-87-5 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Methyl ethyl ketone | 78-93-3 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| 1,1,2-Trichloroethane | 79-00-5 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| 1,1,2,2-Tetrachloroethane | 79-34-5 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |

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

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

T - MS and/or MSD sample recovery outside control limits.
U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.

## WSCF Analytical Results Report

**Attention** Michael Neely
**Department** Organic, Volatiles

**Group #** WSCF100685

**Sample #** 100685002
**SAF#** F10-065
**Sample ID** B24136

**Matrix** WATER
**Sampled** 04/06/10
**Received** 04/06/10

| Test Performed | CAS # | | Method | RQ | Result | TP Err | Units | DF | MDL | PQL | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **8260 Prep** | | | | | | | | | | | **04/07/10** |
| **SW-846 8260B** | | | | | | | | | | | |
| 1,1-Dichloroethene | 75-35-4 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Trichloroethene | 79-01-6 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Benzene | 71-43-2 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Toluene | 108-88-3 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Chlorobenzene | 108-90-7 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| 1,1-Dichloroethane | 75-34-3 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Ethylbenzene | 100-41-4 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Styrene | 100-42-5 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| cis-1,3-Dichloropropene | 10061-01-5 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| trans-1,3-Dichloropropene | 10061-02-6 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| 1,2-Dichloroethane | 107-06-2 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Methyl isobutyl ketone | 108-10-1 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Dibromochloromethane | 124-48-1 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Tetrachloroethene | 127-18-4 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Total Xylenes | 1330-20-7 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Total 1,2-Dichloroethene | 540-59-0 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |

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

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

T - MS and/or MSD sample recovery outside control limits.
U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.

## WSCF Analytical Results Report

**Attention** Michael Neely
**Department** Organic, Volatiles

**Group #** WSCF100685

**Sample #** 100685002
**SAF#** F10-065
**Sample ID** B24136

**Matrix** WATER
**Sampled** 04/06/10
**Received** 04/06/10

| Test Performed | CAS # | | Method | RQ | Result | TP Err | Units | DF | MDL | PQL | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Carbon tetrachloride | 56-23-5 | J | LA-523-455 | | 120 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| 2-Hexanone | 591-78-6 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Acetone | 67-64-1 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Chloroform | 67-66-3 | J | LA-523-455 | J | 1.4 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| 1,1,1-Trichloroethane | 71-55-6 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Bromomethane | 74-83-9 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Chloromethane | 74-87-3 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Chloroethane | 75-00-3 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Vinyl chloride | 75-01-4 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Methylene chloride | 75-09-2 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Carbon disulfide | 75-15-0 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Bromoform | 75-25-2 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Bromodichloromethane | 75-27-4 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| 1,2-Dichloropropane | 78-87-5 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| Methyl ethyl ketone | 78-93-3 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| 1,1,2-Trichloroethane | 79-00-5 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |
| 1,1,2,2-Tetrachloroethane | 79-34-5 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 04/07/10 |

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

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

T - MS and/or MSD sample recovery outside control limits.
U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.

## WSCF Analytical Results Report

**Attention** Michael Neely
**Department** Organic, Volatiles

**Group #** WSCF101611

**Sample #** 101611001
**SAF#** F10-065
**Sample ID** B24JJ9

**Matrix** WATER
**Sampled** 07/08/10
**Received** 07/08/10

| Test Performed | CAS # | | Method | RQ | Result | TP Err | Units | DF | MDL | PQL | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **8260 Prep** | | | | | | | | | | | **07/12/10** |
| **SW-846 8260B** | | | | | | | | | | | |
| 1,1-Dichloroethene | 75-35-4 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| Trichloroethene | 79-01-6 | J | LA-523-455 | J | 1.6 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| Benzene | 71-43-2 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| Toluene | 108-88-3 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| Chlorobenzene | 108-90-7 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| 1,1-Dichloroethane | 75-34-3 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| Ethylbenzene | 100-41-4 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| Styrene | 100-42-5 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| cis-1,3-Dichloropropene | 10061-01-5 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| trans-1,3-Dichloropropene | 10061-02-6 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| 1,2-Dichloroethane | 107-06-2 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| Methyl isobutyl ketone | 108-10-1 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| Dibromochloromethane | 124-48-1 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| Tetrachloroethene | 127-18-4 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| Total Xylenes | 1330-20-7 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| Total 1,2-Dichloroethene | 540-59-0 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/12/10 |

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

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

T - MS and/or MSD sample recovery outside control limits.
U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.

## WSCF Analytical Results Report

**Attention** Michael Neely
**Department** Organic, Volatiles

**Group #** WSCF101611

**Sample #** 101611001
**SAF#** F10-065
**Sample ID** B24JJ9

**Matrix** WATER
**Sampled** 07/08/10
**Received** 07/08/10

| Test Performed | CAS # | | Method | RQ | Result | TP Err | Units | DF | MDL | PQL | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Carbon tetrachloride | 56-23-5 | J | LA-523-455 | | 65 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| 2-Hexanone | 591-78-6 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| Acetone | 67-64-1 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| Chloroform | 67-66-3 | | LA-523-455 | J | 2.3 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| 1,1,1-Trichloroethane | 71-55-6 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| Bromomethane | 74-83-9 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| Chloromethane | 74-87-3 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| Chloroethane | 75-00-3 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| Vinyl chloride | 75-01-4 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| Methylene chloride | 75-09-2 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| Carbon disulfide | 75-15-0 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| Bromoform | 75-25-2 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| Bromodichloromethane | 75-27-4 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| 1,2-Dichloropropane | 78-87-5 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| Methyl ethyl ketone | 78-93-3 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| 1,1,2-Trichloroethane | 79-00-5 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/12/10 |
| 1,1,2,2-Tetrachloroethane | 79-34-5 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/12/10 |

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

B - Analyte was detected in both the BLANK and SAMPLE
D - Analyte was reported at a secondary diltution factor.
E - The calibration exceeds the calibration range (GC/MS).
J - Analyte < lowest calibration but >= MDL.
N - Presumptive compound based on MS Library search.
T - MS and/or MSD sample recovery outside control limits.
U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.

## WSCF Analytical Results Report

**Attention** Michael Neely
**Department** Organic, Volatiles

**Group #** WSCF101801

**Sample #** 101801001
**SAF#** F10-065
**Sample ID** B24JH2

**Matrix** WATER
**Sampled** 07/22/10
**Received** 07/22/10

| Test Performed | CAS # | | Method | RQ | Result | TP Err | Units | DF | MDL | PQL | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **8260 Prep** | | | | | | | | | | | **07/27/10** |
| **SW-846 8260B** | | | | | | | | | | | |
| 1,1-Dichloroethene | 75-35-4 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Trichloroethene | 79-01-6 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Benzene | 71-43-2 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Toluene | 108-88-3 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Chlorobenzene | 108-90-7 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| 1,1-Dichloroethane | 75-34-3 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Ethylbenzene | 100-41-4 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Styrene | 100-42-5 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| cis-1,3-Dichloropropene | 10061-01-5 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| trans-1,3-Dichloropropene | 10061-02-6 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| 1,2-Dichloroethane | 107-06-2 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Methyl isobutyl ketone | 108-10-1 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Dibromochloromethane | 124-48-1 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Tetrachloroethene | 127-18-4 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Total Xylenes | 1330-20-7 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Total 1,2-Dichloroethene | 540-59-0 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |

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

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

T - MS and/or MSD sample recovery outside control limits.
U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.

## WSCF Analytical Results Report

**Attention** Michael Neely
**Department** Organic, Volatiles

**Group #** WSCF101801

**Sample #** 101801001
**SAF#** F10-065
**Sample ID** B24JH2

**Matrix** WATER
**Sampled** 07/22/10
**Received** 07/22/10

| Test Performed | CAS # | | Method | RQ | Result | TP Err | Units | DF | MDL | PQL | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Carbon tetrachloride | 56-23-5 | J | LA-523-455 | | 12 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| 2-Hexanone | 591-78-6 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Acetone | 67-64-1 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Chloroform | 67-66-3 | J | LA-523-455 | J | 1.5 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| 1,1,1-Trichloroethane | 71-55-6 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Bromomethane | 74-83-9 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Chloromethane | 74-87-3 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Chloroethane | 75-00-3 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Vinyl chloride | 75-01-4 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Methylene chloride | 75-09-2 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Carbon disulfide | 75-15-0 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Bromoform | 75-25-2 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Bromodichloromethane | 75-27-4 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| 1,2-Dichloropropane | 78-87-5 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Methyl ethyl ketone | 78-93-3 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| 1,1,2-Trichloroethane | 79-00-5 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| 1,1,2,2-Tetrachloroethane | 79-34-5 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |

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

B - Analyte was detected in both the BLANK and SAMPLE
D - Analyte was reported at a secondary diltution factor.
E - The calibration exceeds the calibration range (GC/MS).
J - Analyte < lowest calibration but >= MDL.
N - Presumptive compound based on MS Library search.
T - MS and/or MSD sample recovery outside control limits.
U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.

## WSCF Analytical Results Report

**Attention** Michael Neely
**Department** Organic, Volatiles

**Group #** WSCF101801

**Sample #** 101801002
**SAF#** F10-065
**Sample ID** B24JJ8

**Matrix** WATER
**Sampled** 07/22/10
**Received** 07/22/10

| Test Performed | CAS # | | Method | RQ | Result | TP Err | Units | DF | MDL | PQL | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **8260 Prep** | | | | | | | | | | | **07/27/10** |
| **SW-846 8260B** | | | | | | | | | | | |
| 1,1-Dichloroethene | 75-35-4 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Trichloroethene | 79-01-6 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Benzene | 71-43-2 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Toluene | 108-88-3 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Chlorobenzene | 108-90-7 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| 1,1-Dichloroethane | 75-34-3 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Ethylbenzene | 100-41-4 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Styrene | 100-42-5 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| cis-1,3-Dichloropropene | 10061-01-5 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| trans-1,3-Dichloropropene | 10061-02-6 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| 1,2-Dichloroethane | 107-06-2 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Methyl isobutyl ketone | 108-10-1 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Dibromochloromethane | 124-48-1 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Tetrachloroethene | 127-18-4 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Total Xylenes | 1330-20-7 | | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Total 1,2-Dichloroethene | 540-59-0 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |

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

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

T - MS and/or MSD sample recovery outside control limits.
U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.

## WSCF Analytical Results Report

**Attention** Michael Neely
**Department** Organic, Volatiles

**Group #** WSCF101801

**Sample #** 101801002
**SAF#** F10-065
**Sample ID** B24JJ8

**Matrix** WATER
**Sampled** 07/22/10
**Received** 07/22/10

| Test Performed | CAS # | | Method | RQ | Result | TP Err | Units | DF | MDL | PQL | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Carbon tetrachloride | 56-23-5 | J | LA-523-455 | | 13 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| 2-Hexanone | 591-78-6 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Acetone | 67-64-1 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Chloroform | 67-66-3 | J | LA-523-455 | J | 1.5 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| 1,1,1-Trichloroethane | 71-55-6 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Bromomethane | 74-83-9 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Chloromethane | 74-87-3 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Chloroethane | 75-00-3 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Vinyl chloride | 75-01-4 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Methylene chloride | 75-09-2 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Carbon disulfide | 75-15-0 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Bromoform | 75-25-2 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Bromodichloromethane | 75-27-4 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| 1,2-Dichloropropane | 78-87-5 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| Methyl ethyl ketone | 78-93-3 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| 1,1,2-Trichloroethane | 79-00-5 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |
| 1,1,2,2-Tetrachloroethane | 79-34-5 | UJ | LA-523-455 | U | <1 | | ug/L | 1 | 1 | 5 | 07/27/10 |

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

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

T - MS and/or MSD sample recovery outside control limits.
U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.

# Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

## Narrative

Attachment 2
**Narrative**
WSCF100685

**Introduction**

Two (2) S&GRP samples were received at the WSCF Laboratory on April 6th, 2010. The samples were analyzed for the analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *Statement of Work (SOW), Modification No. 2 to Agreement 36587, Release 3, "FH WSCF ANALYTICAL SERVICES FOR GROUNDWATER."*

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

It should be noted that the attached chain of custody was not stamped "ICED" by the WSCF Laboratory Sample Custodian during sample receiving. However, based on procedure LO-090-403 form "NOTICE OF IMPROPER SAMPLE SUBMITTAL" was not submitted and was not stamped "NOT ICED". No anomaly was noted during sample receipt.

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

- **B** – Sample results with a concentration greater than the MDL but less than the PQL are B flagged (applies to inorganic and wet chemical analyses), as appropriate.
- **D** – Sample results are D flagged if dilution(s) were required, as appropriate.
- **J** – Sample results with a concentration greater than the MDL but less than the PQL are J flagged (applies to organic analyses), as appropriate.
- **U** – Analyzed for but not detected above limiting criteria. Relative Percent Difference (RPD) values associated with an analyte qualified with a "U" are not applicable.

**Analytical Methodology for Requested Analyses**

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

**Inorganic Comments**

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

- Batch QC 108975 analyzed on sample# B23DV8 (100690009)

All QC controls are within the established limits.

1

**ICP-MS Metals** – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Technetium-99 is analyzed without prep therefore there is no Matrix Spike or Matrix Spike Duplicate with analysis. Analytical Note(s):

- Batch QC 109376 analyzed on sample# B24BY8 (100610006)
    - Vanadium contamination was detected in the Blank and was evaluated. No sample results in this batch were affected.
- Batch QC 115380 analyzed on the Blank and Laboratory Control Sample

All other QC controls are within the established limits.

**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):

- Batch QC 109075 analyzed on sample# B24120 (100682001)

All QC controls are within the established limits.

**Radiochemistry Comments**

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

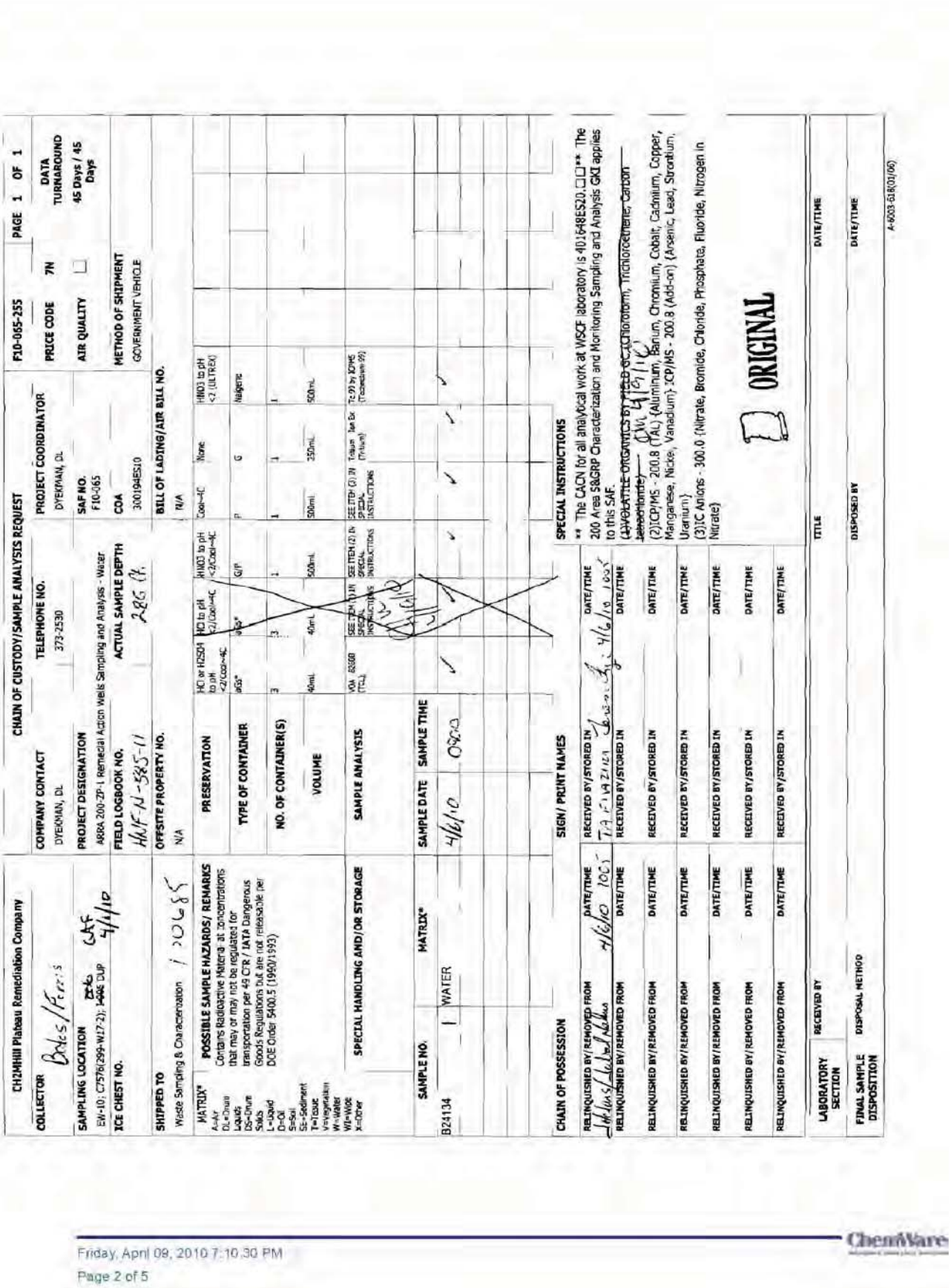
Rad Chem requested to be performed included: Tritium by LSC.

- Tritium:
    - Batch QC 108684 analyzed on sample# B230L4 (100677012)
        - Duplicate Relative Percent Difference (RPD) did not meet the established laboratory limits. However, the analyst reviewed and approved the batch.

    All other QC controls are within the established limits.

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

## Sample Receipt



CH2MHILL Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F10-065-255 — PAGE 1 OF 1

COLLECTOR: Boles/Ferris

COMPANY CONTACT: DYEKMAN, DL — TELEPHONE NO.: 373-2530 — PROJECT COORDINATOR: DYEKMAN, DL

PRICE CODE: 7N — DATA TURNAROUND: 45 Days / 45 Days

SAMPLING LOCATION: EW-10; C7576(299-W17-2); 2466 DUP — PROJECT DESIGNATION: ARRA 200-ZP-1 Remedial Action Wells Sampling and Analysis - Water — SAF NO.: F10-065

AIR QUALITY: ☐ — METHOD OF SHIPMENT: GOVERNMENT VEHICLE

ICE CHEST NO.: — FIELD LOGBOOK NO.: HNF-N-585-11 — ACTUAL SAMPLE DEPTH: 285 ft. — COA: 300194ES10

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=Well 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) | PRESERVATION | HCl or H2SO4 to pH <2/Cool~4C | HCl to pH <2/Cool~4C | HNO3 to pH <2/Cool~4C | Cool~4C | None | HNO3 to pH <2 (ULTREX) |
|---|---|---|---|---|---|---|---|---|
| | | TYPE OF CONTAINER | 95S* | 95S* | GI* | P | G | Nalgene |
| | | NO. OF CONTAINER(S) | 3 | 3 | 1 | 1 | 1 | 1 |
| | | VOLUME | 40mL | 40mL | 500mL | 500mL | 250mL | 500mL |
| | SPECIAL HANDLING AND/OR STORAGE | SAMPLE ANALYSIS | VOA 8260B (TCL) | SEE ITEM (1) IN SPECIAL INSTRUCTIONS | SEE ITEM (2) IN SPECIAL INSTRUCTIONS | SEE ITEM (3) IN SPECIAL INSTRUCTIONS | Tritium Jun Ex (Tritium) | 7c-99 by ICP/MS (Technetium-99) |
| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME | | | | | |
| B24134 | WATER | 4/6/10 | 0900 | ✓ | ✓ | ✓ | ✓ | ✓ |

SIGN/ PRINT NAMES

CHAIN OF POSSESSION

| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
|---|---|---|---|
| [illegible] | 4/6/10 1005 | [illegible] | 4/6/10 1005 |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |

SPECIAL INSTRUCTIONS

** The CACN for all analytical work at WSCF laboratory is 401648ES20.☐☐** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.

(1)VOLATILE ORGANICS BY GC/MS (Chloroform, Trichloroethene, Carbon Tetrachloride)

(2)ICP/MS - 200.8 (TAL) (Aluminum, Barium, Chromium, Cobalt, Cadmium, Copper, Manganese, Nickle, Vanadium); ICP/MS - 200.8 (Add-on) (Arsenic, Lead, Strontium, Uranium)

(3)IC Anions - 300.0 (Nitrate, Bromide, Chloride, Phosphate, Fluoride, Nitrogen in Nitrate)

ORIGINAL

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

A-6003-618(01/06)

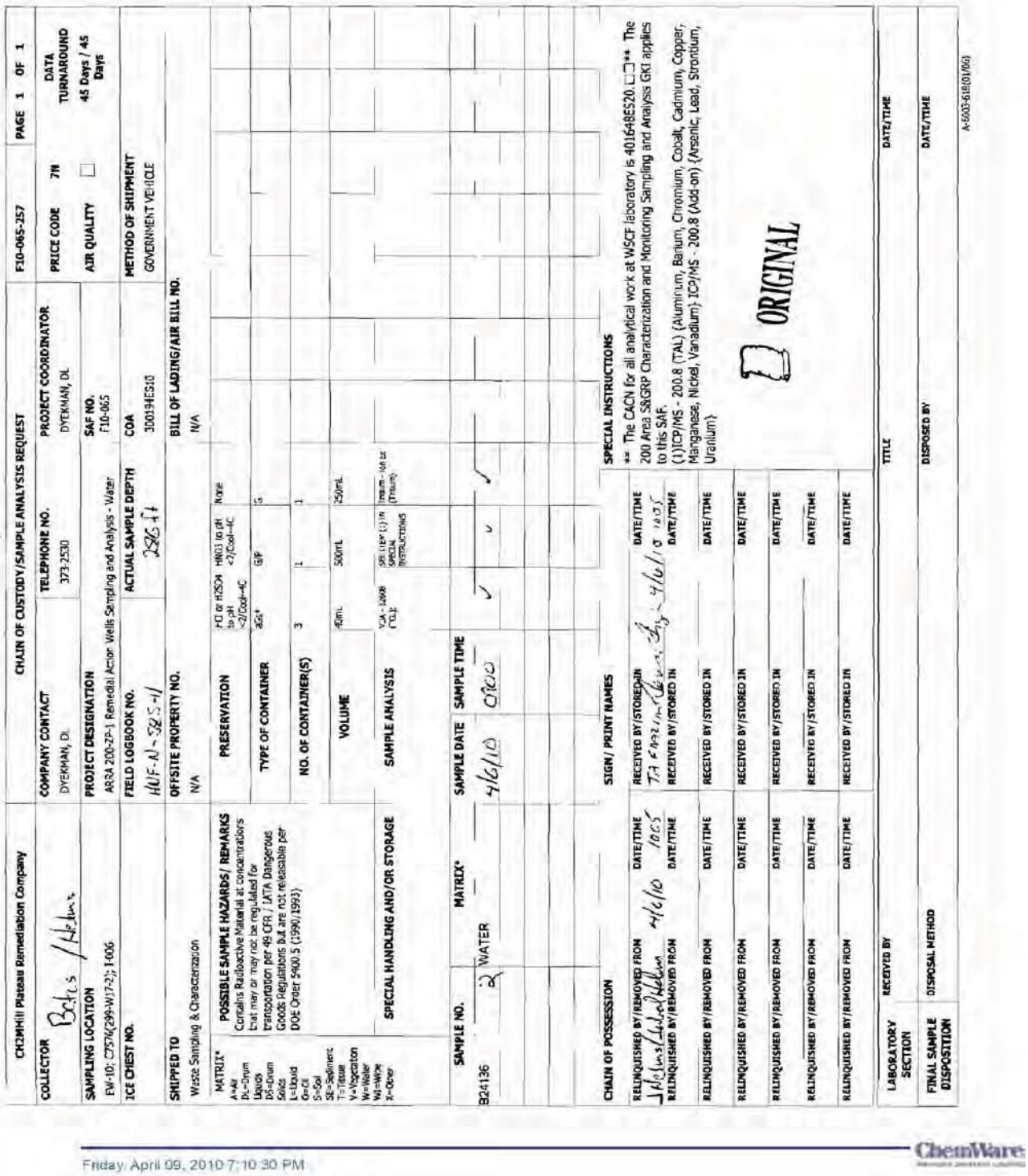
Friday, April 09, 2010 7:10:30 PM

Page 2 of 5

ChemWare

## Sample Receipt

### Chain of Custody



CHEMHILL Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F10-065-257

PAGE 1 OF 1

COLLECTOR: Bates / Helm

COMPANY CONTACT: DYEKMAN, DL

TELEPHONE NO.: 373-2530

PROJECT COORDINATOR: DYEKMAN, DL

PRICE CODE: 7N

DATA TURNAROUND: 45 Days / 45 Days

SAMPLING LOCATION: EW-10; C7574(299-W17-2); I-006

PROJECT DESIGNATION: ARRA 200-ZP-1 Remedial Actor Wells Sampling and Analysis - Water

SAF NO.: F10-065

AIR QUALITY: ☐

ICE CHEST NO.: HUF-AL-525-1

FIELD LOGBOOK NO.: 25674

ACTUAL SAMPLE DEPTH

COA: 300194E510

METHOD OF SHIPMENT: GOVERNMENT VEHICLE

SHIPPED TO: Waste Sampling & Characterization

OFFSITE PROPERTY NO.: N/A

BILL OF LADING/AIR BILL NO.: N/A

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

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

PRESERVATION: HCl or H2SO4 to pH <2/Cool-4C; HNO3 to pH <2/Cool-4C; None

TYPE OF CONTAINER: 4Gs*; G/P; S

NO. OF CONTAINER(S): 3; 1; 1

VOLUME: 40mL; 500mL; 250mL

SAMPLE ANALYSIS: VOA - 8260 (TCL); SEE LIST (1) IN SPECIAL INSTRUCTIONS; mum - Nitrate (Tritium)

SPECIAL HANDLING AND/OR STORAGE

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME |
|---|---|---|---|
| B24136 | W WATER | 4/6/10 | 0900 |

CHAIN OF POSSESSION

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS

** The CACN for all analytical work at WSCF laboratory is 401648E520.☐☐** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
(1)ICP/MS - 200.8 (TAL) (Aluminum, Barium, Chromium, Cobalt, Cadmium, Copper, Manganese, Nickel, Vanadium); ICP/MS - 200.8 (Add-on) (Arsenic, Lead, Strontium, Uranium)

ORIGINAL

| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
|---|---|---|---|
| Helm/Lockard/Helm | 4/6/10 1015 | TA Bates/Helm | 4/6/10 1015 |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |

LABORATORY SECTION: RECEIVED BY — TITLE — DATE/TIME

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

A-6003-618(01/06)

ChemWare

Friday, April 09, 2010 7:10:30 PM

Page 3 of 5

## Sample Receipt

### Chain of Custody

**Medley, Heather A**

**From:** Widrig, Dana L
**Sent:** Friday, April 09, 2010 10:05 AM
**To:** Medley, Heather A; Ayres, Doris E; Dyekman, Dale L
**Cc:** ^CPP Sample Management; Fitzgerald, Scot L; Avila, Marisol; Barker, Richard L; Beebe, Kevin L; Budzeck, Richard H (Rick); Frazier, Teresa A; Johnston, Jill C; Kessler, Mitchel D; Kon, Susan L; Sims, Vic T; Trechter, John E Jr; Westberg, Richard A
**Subject:** RE: 100685 B24134 VOA (2 sets of VOA vials, with two different lists of analytes
**Attachments:** FW: 100685 B24134 VOA (2 sets of VOA vials, with two different lists of analytes

Heather – Please perform 8260 TCL on the attached sample and cancel headspace VOA analysis.

Thanks,

Dana

**From:** Medley, Heather A
**Sent:** Friday, April 09, 2010 9:11 AM
**To:** Widrig, Dana L; Ayres, Doris E; Dyekman, Dale L
**Cc:** ^CPP Sample Management; Fitzgerald, Scot L; Avila, Marisol; Barker, Richard L; Beebe, Kevin L; Budzeck, Richard H (Rick); Frazier, Teresa A; Johnston, Jill C; Kessler, Mitchel D; Kon, Susan L; Sims, Vic T; Trechter, John E Jr; Westberg, Richard A
**Subject:** RE: 100685 B24134 VOA (2 sets of VOA vials, with two different lists of analytes

May I cross off the request for the headspace VOA analysis? We will resend the sample receipt information with the changes. I haven't heard which VOA analysis the project would like reported so we logged the TCL VOAs.

**From:** Medley, Heather A
**Sent:** Tuesday, April 06, 2010 4:18 PM
**To:** Widrig, Dana L; Ayres, Doris E; Dyekman, Dale L
**Cc:** ^CPP Sample Management; Fitzgerald, Scot L; Avila, Marisol; Barker, Richard L; Beebe, Kevin L; Budzeck, Richard H (Rick); Frazier, Teresa A; Johnston, Jill C; Kessler, Mitchel D; Kon, Susan L; Sims, Vic T; Trechter, John E Jr; Westberg, Richard A
**Subject:** RE: 100685 B24134 VOA (2 sets of VOA vials, with two different lists of analytes

We need to know which VOA service list to log?

**From:** Widrig, Dana L
**Sent:** Tuesday, April 06, 2010 2:49 PM
**To:** Medley, Heather A; Ayres, Doris E; Dyekman, Dale L
**Cc:** ^CPP Sample Management; Fitzgerald, Scot L; Avila, Marisol; Barker, Richard L; Beebe, Kevin L; Budzeck, Richard H (Rick); Frazier, Teresa A; Johnston, Jill C; Kessler, Mitchel D; Kon, Susan L; Sims, Vic T; Trechter, John E Jr; Westberg, Richard A
**Subject:** RE: 100685 B24134 VOA (2 sets of VOA vials, with two different lists of analytes

Heather,

This should be aGs – not aGs*. Please note this for future chains that come in with this bottle type noted. It is incorrect on the COCs. Please document on an IRF –

Thanks,

1

## Sample Receipt

### Chain of Custody

Dana

**From:** Medley, Heather A
**Sent:** Tuesday, April 06, 2010 2:30 PM
**To:** Widrig, Dana L; Ayres, Doris E; Dyekman, Dale L
**Cc:** ^CPP Sample Management; Fitzgerald, Scot L; Avila, Marisol; Barker, Richard L; Beebe, Kevin L; Budzeck, Richard H (Rick); Frazier, Teresa A; Johnston, Jill C; Kessler, Mitchel D; Kori, Susan L; Sims, Vic T; Trechter, John E Jr; Westberg, Richard A
**Subject:** FW: 100685 B24134 VOA (2 sets of VOA vials, with two different lists of analytes
**Importance:** High

Please clarify which VOA analysis is needed 8260 or head space? Normally the headspace analysis is for the 24 hour TAT sample.

**From:** Frazier, Teresa A
**Sent:** Tuesday, April 06, 2010 1:52 PM
**To:** Medley, Heather A
**Subject:** 100685 B24134 VOA (2 sets of VOA vials, with two different lists of analytes

***This email contains confidential and privileged material for the sole use of the intended recipient. Any review, use, distribution or disclosure by others is strictly prohibited. If you received this message in error, please notify the sender immediately and delete all copies of this message.***

2

Attachment 2
**Narrative**
WSCF101611

## Introduction

One (1) S&GRP sample was received at the WSCF Laboratory on July 8, 2010. The sample was analyzed for the analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *Statement of Work (SOW), Modification No. 2 to Agreement 36587, Release 3, "FH WSCF ANALYTICAL SERVICES FOR GROUNDWATER."*

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

It should be noted that the attached chain of custody was not stamped "ICED" by the WSCF Laboratory Sample Custodian during sample receiving. However, based on procedure LO-090-403 form "NOTICE OF IMPROPER SAMPLE SUBMITTAL" was not submitted and was not stamped "NOT ICED". No anomaly was noted during sample receipt.

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

- **B** – Sample results with a concentration greater than the MDL but less than the PQL are B flagged (applies to inorganic and wet chemical analyses), as appropriate.
- **D** – Sample results are D flagged if dilution(s) were required, as appropriate.
- **J** – Sample results with a concentration greater than the MDL but less than the PQL are J flagged (applies to organic analyses), as appropriate.
- **U** – Analyzed for but not detected above limiting criteria. Relative Percent Difference (RPD) values associated with an analyte qualified with a "U" are not applicable.

## Analytical Methodology for Requested Analyses

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

## Inorganic Comments

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

- Batch QC 142878 analyzed on sample# B24JJ9 (101611001)

All QC controls are within the established limits.

Attachment 2
**Narrative**
WSCF101611

**ICP-MS Metals** – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Technetium-99 is analyzed without prep therefore there is no Matrix Spike or Matrix Spike Duplicate with analysis. Analytical Note(s):

- Batch QC 145176 analyzed on sample# B25PT5 (101600014)
- Batch QC 152022

All QC controls are within the established limits.

**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):

- Batch QC 142904 analyzed on sample# B25X35 (101605001)

All QC controls are within the established limits.

**Radiochemistry Comments**

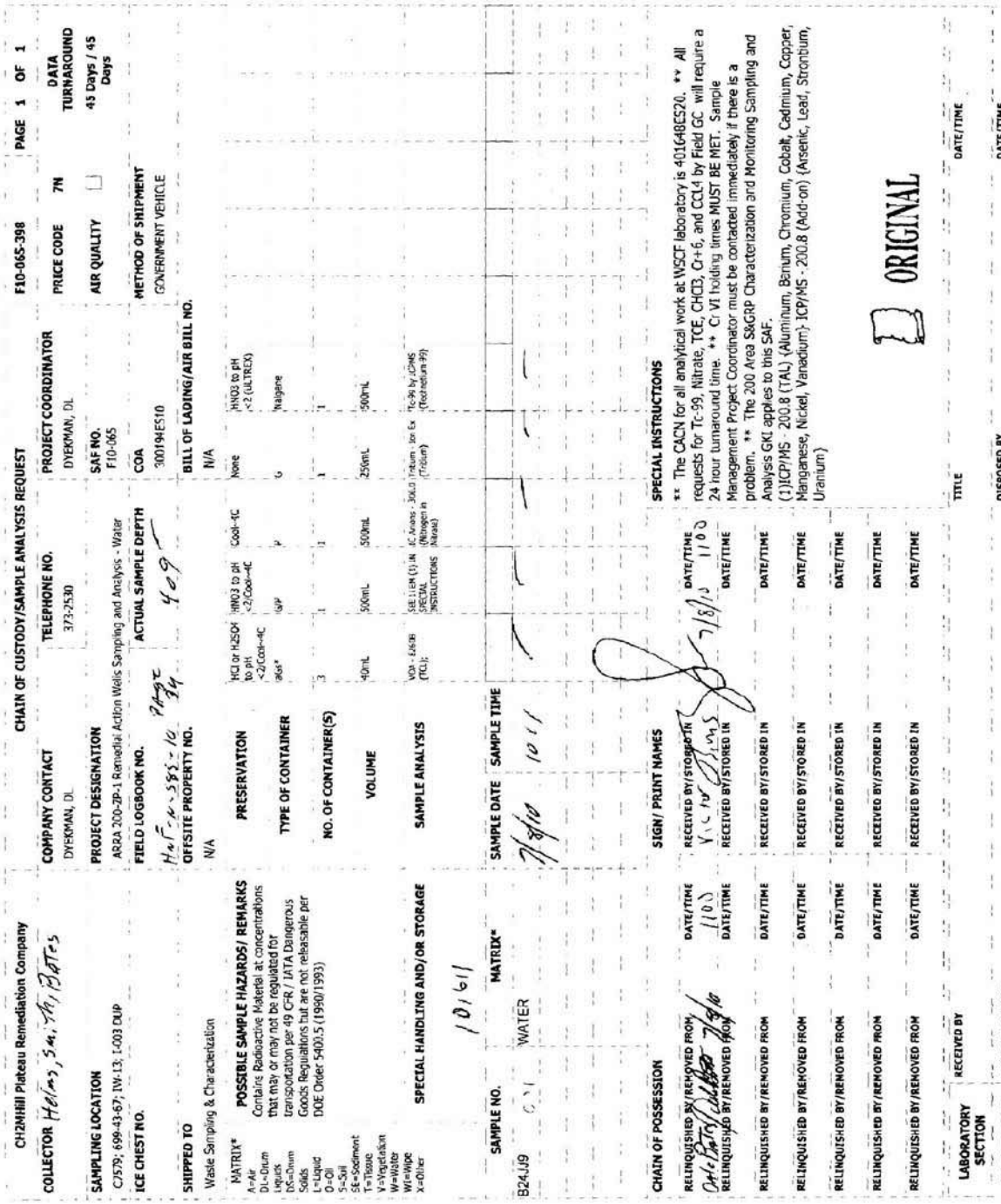
**Rad Chem** – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike (Matrix Spikes apply only to Tritium), Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- Tritium:
    - Batch QC 145087 analyzed on sample# B259T3 (101593007)

    All QC controls are within the established limits.

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

## Sample Receipt



CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F10-065-398

PAGE 1 OF 1

COLLECTOR: Helms, Sam; Bates

COMPANY CONTACT: DYEKMAN, DL

TELEPHONE NO.: 373-2530

PROJECT COORDINATOR: DYEKMAN, DL

PRICE CODE: 7N

DATA TURNAROUND: 45 Days / 45 Days

SAMPLING LOCATION: C7579; 699-43-67; IW-13; L-003 DUP

PROJECT DESIGNATION: ARRA 200-ZP-1 Remedial Action Wells Sampling and Analysis - Water

SAF NO.: F10-065

AIR QUALITY: ☐

ICE CHEST NO.:

FIELD LOGBOOK NO.: Half-n-385-10

ACTUAL SAMPLE DEPTH: 409

COA: 300194ES10

METHOD OF SHIPMENT: GOVERNMENT VEHICLE

SHIPPED TO: Waste Sampling & Characterization

OFFSITE PROPERTY NO.: N/A

BILL OF LADING/AIR BILL NO.: N/A

MATRIX*: A=Air, DL=Drum Liquids, DS=Drum Solids, L=Liquid, O=Oil, S=Soil, SE=Sediment, T=Tissue, V=Vegetation, W=Waste, 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)

PRESERVATION: HCl or H2SO4 to pH <2;Cool=4C | HNO3 to pH <2;Cool=4C | Cool=4C

TYPE OF CONTAINER: glas* | poly | P | G | None | HNO3 to pH <2 (ULTREX) | Nalgene | HNO3 to pH <2 (ULTREX)

NO. OF CONTAINER(S): 3 | 1 | 1 | 1 | 1 | 1

VOLUME: 40mL | 500mL | 500mL | 250mL | 500mL

SAMPLE ANALYSIS: VOA - 8260 (TCL); | SEE ITEM (3) IN SPECIAL INSTRUCTIONS | IC Anions - 300.0 (Nitrogen in Nitrate) | Tritium - Jor Ex (Tritium) | Tc-99 by LSCMS (Technetium-99)

SPECIAL HANDLING AND/OR STORAGE: 10611

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME |
|---|---|---|---|
| B24JJ9 | WATER | 7/8/10 | 1011 |

CHAIN OF POSSESSION

SIGN/ PRINT NAMES

RELINQUISHED BY/REMOVED FROM — DATE/TIME — RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME — RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME — RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME — RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME — RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME — RECEIVED BY/STORED IN — DATE/TIME

LABORATORY SECTION RECEIVED BY — TITLE — DATE/TIME

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

SPECIAL INSTRUCTIONS

** The CACN for all analytical work at WSCF laboratory is 401648ES20. ** All requests for Tc-99, Nitrate, TCE, CHCl3, Cr+6, and CCl4 by Field GC will require a 24 hour turnaround time. ** Cr VI holding times MUST BE MET. Sample Management Project Coordinator must be contacted immediately if there is a problem. ** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
(1)ICP/MS - 200.8 (TAL) (Aluminum, Barium, Chromium, Cobalt, Cadmium, Copper, Manganese, Nickel, Vanadium); ICP/MS - 200.8 (Add-on) (Arsenic, Lead, Strontium, Uranium)

ORIGINAL

A 6003 6/8(01/06)

Friday, July 23, 2010 7:03:09 PM

Page 2 of 2

ChemWare

## Narrative

Attachment 2
**Narrative**
WSCF101801

**Introduction**

Two (2) S&GRP samples were received at the WSCF Laboratory on July 22, 2010. The samples were analyzed for the analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *Statement of Work (SOW), Modification No. 2 to Agreement 36587, Release 3, "FH WSCF ANALYTICAL SERVICES FOR GROUNDWATER."*

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

It should be noted that the attached chain of custody was not stamped "ICED" by the WSCF Laboratory Sample Custodian during sample receiving. However, based on procedure LO-090-403 form "NOTICE OF IMPROPER SAMPLE SUBMITTAL" was not submitted and was not stamped "NOT ICED". No anomaly was noted during sample receipt.

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

- **B** – Sample results with a concentration greater than the MDL but less than the PQL are B flagged (applies to inorganic and wet chemical analyses), as appropriate.
- **D** – Sample results are D flagged if dilution(s) were required, as appropriate.
- **J** – Sample results with a concentration greater than the MDL but less than the PQL are J flagged (applies to organic analyses), as appropriate.
- **U** – Analyzed for but not detected above limiting criteria. Relative Percent Difference (RPD) values associated with an analyte qualified with a "U" are not applicable.

**Analytical Methodology for Requested Analyses**

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

**Inorganic Comments**

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

- Batch QC 145695 analyzed on sample# B25FT7 (101797001)

All QC controls are within the established limits.

Attachment 2
**Narrative**
WSCF101801

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

- Batch QC 148380 analyzed on sample# B26767 (101799008)
    - Chromium - was detected in the Blank and was evaluated. Affected sample results in this batch were "C" Flagged.

All other QC controls are within the established limits.

**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):

- Batch QC 146279 analyzed on sample# B24JH2 (101801001)

All QC controls are within the established limits.

**Radiochemistry Comments**

**Rad Chem** – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike (Matrix Spikes apply only to Technetium & Tritium), Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- Rad Chem requested to be performed included: Tritium and Technetium-99 by LSC.
- Technetium-99:
    - Batch QC 150092 analyzed on sample# B26901 (101787009)

All QC controls are within the established limits.

- Tritium:
    - Batch QC 148375 analyzed on sample# B26F29 (101793001)

All QC controls are within the established limits.

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

2

**CH2MHill Plateau Remediation Company**

**CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**

F10-065-381 PAGE 1 OF 1

COLLECTOR: Heiny, Bean, Bates

| COMPANY CONTACT | TELEPHONE NO. | PROJECT COORDINATOR | PRICE CODE | DATA TURNAROUND |
|---|---|---|---|---|
| DYEKMAN, DL | 373-2530 | DYEKMAN, DL | 7N | 45 Days / 45 Days |

SAMPLING LOCATION: C7578; 699-45-67; IW-11; I-003

PROJECT DESIGNATION: ARRA 200-ZP-1 Remedial Action Wells Sampling and Analysis - Water

SAF NO.: F10-065

AIR QUALITY: ☐

ICE CHEST NO.:

FIELD LOGBOOK NO.: HNF-N-585-10 Page 38

ACTUAL SAMPLE DEPTH: 348.1

COA: 300194ES10

METHOD OF SHIPMENT: GOVERNMENT VEHICLE

SHIPPED TO: Waste Sampling & Characterization

OFFSITE PROPERTY NO.: N/A

BILL OF LADING/AIR BILL NO.: N/A

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

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

101801

**SPECIAL HANDLING AND/OR STORAGE**

| | | | | |
|---|---|---|---|---|
| PRESERVATION | HCl or H2SO4 to pH <2/Cool~4C | HNO3 to pH <2/Cool~4C | None | |
| TYPE OF CONTAINER | aG6* | G/P | G | |
| NO. OF CONTAINER(S) | 3 | 1 | 1 | |
| VOLUME | 40mL | 500mL | 250mL | |
| SAMPLE ANALYSIS | VOA - 8260 (TCL); | See ITEM (1) IN SPECIAL INSTRUCTIONS | Tritium - 906.0 (Tritium) | |
| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME | |
| B24JH2 | WATER | 7/22/10 | 1314 | |

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

| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
|---|---|---|---|
| [signature] 7/22/10 | 1420 | [signature] 7-22-10 | 1420 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

** The CACN for all analytical work at WSCF laboratory is 401648ES20. ** All requests for Tc-99, Nitrate, TCE, CHCl3, Cr+6, and CCL4 by Field GC will require a 24 hour turnaround time. ** Cr VI holding times MUST BE MET. Sample Management Project Coordinator must be contacted immediately if there is a problem. ** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
(1)ICP/MS - 200.8 (TAL) {Aluminum, Barium, Chromium, Cobalt, Cadmium, Copper, Manganese, Nickel, Vanadium} ICP/MS - 200.8 (Add-on) {Arsenic, Lead, Strontium, Uranium}

☐ ORIGINAL

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

A-6003-618(01/06)

**CH2MHill Plateau Remediation Company** — **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** — **F10-065-397** — **PAGE 1 OF 1**

COLLECTOR: Helms, Rose, Bates

| COMPANY CONTACT | TELEPHONE NO. | PROJECT COORDINATOR | PRICE CODE | DATA TURNAROUND |
|---|---|---|---|---|
| DYEKMAN, DL | 373-2530 | DYEKMAN, DL | 7N | 45 Days / 45 Days |

| SAMPLING LOCATION | PROJECT DESIGNATION | SAF NO. | AIR QUALITY |
|---|---|---|---|
| C7578; 699-45-67; IW-11; I-003 DUP | ARRA 200-ZP-1 Remedial Action Wells Sampling and Analysis - Water | F10-065 | |

| ICE CHEST NO. | FIELD LOGBOOK NO. | ACTUAL SAMPLE DEPTH | COA | METHOD OF SHIPMENT |
|---|---|---|---|---|
| | HNF-N-585-10 Page 34 | 340.1' | 300194ES10 | GOVERNMENT VEHICLE |

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

MATRIX*: A=Air; DL=Drum Liquids; DS=Drum Solids; L=Liquid; O=Oil; S=Soil; SE=Sediment; T=Tissue; V=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 | HCl or H2SO4 to pH <2/Cool~4C | HNO3 to pH <2/Cool~4C | Cool~4C | None | HNO3 to pH <2 (ULTREX) |
| TYPE OF CONTAINER | aGs* | G/P | P | G | Nalgene |
| NO. OF CONTAINER(S) | 3 | 1 | 1 | 1 | 1 |
| VOLUME | 40mL | 500mL | 500mL | 250mL | 500mL |
| SAMPLE ANALYSIS | VOA - 8260B (TCL); | SEE ITEM (1) IN SPECIAL INSTRUCTIONS | IC Anions - 300.0 (Nitrogen in Nitrate) | Tritium - Ion Ex (Tritium) | Tc-99 by ICPMS (Technetium-99) |

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME |
|---|---|---|---|
| B24JJ8 | 2 WATER | 7/22/10 | 1319 |

**CHAIN OF POSSESSION**

| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
|---|---|---|---|
| Dale Mateson 7/22/10 | 1420 | MD Kessler 7/22/10 | 1420 |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |

**SPECIAL INSTRUCTIONS**

** The CACN for all analytical work at WSCF laboratory is 401648ES20. ** All requests for Tc-99, Nitrate, TCE, CHCl3, Cr+6, and CCl4 by Field GC will require a 24 hour turnaround time. ** Cr VI holding times MUST BE MET. Sample Management Project Coordinator must be contacted immediatey if there is a problem. ** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
(1)ICP/MS - 200.8 (TAL) {Aluminum, Barium, Chromium, Cobalt, Cadmium, Copper, Manganese, Nickel, Vanadium} ICP/MS - 200.8 (Add-on) {Arsenic, Lead, Strontium, Uranium}

ORIGINAL

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

A-6003-618(01/06)

ChemWare

# Appendix 5

Data Validation Supporting Documentation

## Appendix A - Chemical Data Validation Checklist

| VALIDATION LEVEL: | A | B | (C) | D | E |
|---|---|---|---|---|---|
| PROJECT: 200 Area SGRP | | | DATA PACKAGE: VSR11-043 | | |
| VALIDATOR: Eyda Hergenreder | | LAB: WSCF | | DATE: 04-18-2011 | |
| | | | SDG: WSCF100685, WSCF101611, WSCF101801 | | |
| ANALYSES PERFORMED | | | | | |
| SW-846 8260 X | | SW-846 8260 (TCLP) | SW-846 8270 | | SW-846 8270 (TCLP) |
| | | | | | |

SAMPLES/MATRIX Water samples

SDG WSCF100685: B24134, B24136

SDG WSCF101611: B24JJ9

SDG WSCF101801: B24JH2, B24JJ8

### 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:

SDG WSCF100685: 1,1-dichloroethene MS/MSD %R = 77%/76%; LCS %R = 76%; trichloroethene MS/MSD %R = 76%/76%; LCS %R = 76%; benzene MS/MSD %R = 75%/79%

SDG WSCF101611: trichloroethene MS/MSD %R = 76%/79%; LCS %R = 77%; benzene LCS %R = 77%; toluene LCS %R = 76%

SDG WSCF101801: 1,1-dichloroethene MS/MSD %R = 78%/77%; LCS %R = 77%; trichloroethene LCS %R = 77%

**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

**Attention** Michael Neely
**Department** Organic, Volatiles

**Group #** WSCF100685

**QC Batch** 109075
**Associated Samples** 100685001, 100685002

**Test** SW-846 8260B Volatiles, separate prep

| Analyte | CAS # | Original Found | QC Found | Units | % Recov Limits | RPD | RPD Limit | RQ | Analyzed |
|---|---|---|---|---|---|---|---|---|---|
| **BLANK** | | | **QC Sample #26391** | | | | | | |
| 1,1-Dichloroethene | 75-35-4 | | <1 | ug/L | | | | U | 04/07/10 |
| Trichloroethene | 79-01-6 | | <1 | ug/L | | | | U | 04/07/10 |
| Benzene | 71-43-2 | | <1 | ug/L | | | | U | 04/07/10 |
| Toluene | 108-88-3 | | <1 | ug/L | | | | U | 04/07/10 |
| Chlorobenzene | 108-90-7 | | <1 | ug/L | | | | U | 04/07/10 |
| 1,1-Dichloroethane | 75-34-3 | | <1 | ug/L | | | | U | 04/07/10 |
| Ethylbenzene | 100-41-4 | | <1 | ug/L | | | | U | 04/07/10 |
| Styrene | 100-42-5 | | <1 | ug/L | | | | U | 04/07/10 |
| cis-1,3-Dichloropropene | 10061-01-5 | | <1 | ug/L | | | | U | 04/07/10 |
| trans-1,3-Dichloropropene | 10061-02-6 | | <1 | ug/L | | | | U | 04/07/10 |
| 1,2-Dichloroethane | 107-06-2 | | <1 | ug/L | | | | U | 04/07/10 |
| Methyl isobutyl ketone | 108-10-1 | | <1 | ug/L | | | | U | 04/07/10 |
| Dibromochloromethane | 124-48-1 | | <1 | ug/L | | | | U | 04/07/10 |
| Tetrachloroethene | 127-18-4 | | <1 | ug/L | | | | U | 04/07/10 |
| Total Xylenes | 1330-20-7 | | <1 | ug/L | | | | U | 04/07/10 |
| Total 1,2-Dichloroethene | 540-59-0 | | <1 | ug/L | | | | U | 04/07/10 |
| Carbon tetrachloride | 56-23-5 | | <1 | ug/L | | | | U | 04/07/10 |

**Attention** Michael Neely
**Department** Organic, Volatiles

**Group #** WSCF100685

| Analyte | CAS # | Original Found | QC Found | Units | % Recov | Limits | RPD | RPD Limit | RQ | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| 2-Hexanone | 591-78-6 | | <1 | ug/L | | | | | U | 04/07/10 |
| Acetone | 67-64-1 | | <1 | ug/L | | | | | U | 04/07/10 |
| Chloroform | 67-66-3 | | <1 | ug/L | | | | | U | 04/07/10 |
| 1,1,1-Trichloroethane | 71-55-6 | | <1 | ug/L | | | | | U | 04/07/10 |
| Bromomethane | 74-83-9 | | <1 | ug/L | | | | | U | 04/07/10 |
| Chloromethane | 74-87-3 | | <1 | ug/L | | | | | U | 04/07/10 |
| Chloroethane | 75-00-3 | | <1 | ug/L | | | | | U | 04/07/10 |
| Vinyl chloride | 75-01-4 | | <1 | ug/L | | | | | U | 04/07/10 |
| Methylene chloride | 75-09-2 | | <1 | ug/L | | | | | U | 04/07/10 |
| Carbon disulfide | 75-15-0 | | <1 | ug/L | | | | | U | 04/07/10 |
| Bromoform | 75-25-2 | | <1 | ug/L | | | | | U | 04/07/10 |
| Bromodichloromethane | 75-27-4 | | <1 | ug/L | | | | | U | 04/07/10 |
| 1,2-Dichloropropane | 78-87-5 | | <1 | ug/L | | | | | U | 04/07/10 |
| Methyl ethyl ketone | 78-93-3 | | <1 | ug/L | | | | | U | 04/07/10 |
| 1,1,2-Trichloroethane | 79-00-5 | | <1 | ug/L | | | | | U | 04/07/10 |
| 1,1,2,2-Tetrachloroethane | 79-34-5 | | <1 | ug/L | | | | | U | 04/07/10 |
| **LCS** | | | **QC Sample #26392** | | | | | | | |
| 1,1-Dichloroethene | 75-35-4 | | 19 | ug/L | 76.4 | 75 - 125 | | | | 04/07/10 |
| Trichloroethene | 79-01-6 | | 19 | ug/L | 76.3 | 75 - 125 | | | | 04/07/10 |
| Benzene | 71-43-2 | | 20 | ug/L | 80.1 | 75 - 125 | | | | 04/07/10 |
| Toluene | 108-88-3 | | 20 | ug/L | 80.4 | 75 - 125 | | | | 04/07/10 |
| Chlorobenzene | 108-90-7 | | 21 | ug/L | 85.6 | 75 - 125 | | | | 04/07/10 |

**Attention** Michael Neely
**Department** Organic, Volatiles

**Group #** WSCF100685

| Analyte | CAS # | Original Found | QC Found | Units | % Recov | Limits | RPD | RPD Limit | RQ | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| **MS** | | | **QC Sample #26393** | | | | | | | |
| | | | **Original 100682001** | | | | | | | |
| 1,1-Dichloroethene | 75-35-4 | 19 | | ug/L | 77.4 | 75 - 125 | | | | 04/07/10 |
| Trichloroethene | 79-01-6 | 19 | | ug/L | 75.6 | 75 - 125 | | | | 04/07/10 |
| Benzene | 71-43-2 | 19 | | ug/L | 75.3 | 75 - 125 | | | | 04/07/10 |
| Toluene | 108-88-3 | 21 | | ug/L | 85 | 75 - 125 | | | | 04/07/10 |
| Chlorobenzene | 108-90-7 | 21 | | ug/L | 85.9 | 75 - 125 | | | | 04/07/10 |
| **MSD** | | | **QC Sample #26394** | | | | | | | |
| | | | **Original 100682001** | | | | | **Paired** | **26393** | |
| 1,1-Dichloroethene | 75-35-4 | 19 | | ug/L | 76.3 | 75 - 125 | 1.40 | 20 | | 04/07/10 |
| Trichloroethene | 79-01-6 | 19 | | ug/L | 75.8 | 75 - 125 | 0.30 | 20 | | 04/07/10 |
| Benzene | 71-43-2 | 20 | | ug/L | 79.4 | 75 - 125 | 5.30 | 20 | | 04/07/10 |
| Toluene | 108-88-3 | 22 | | ug/L | 89 | 75 - 125 | 4.60 | 20 | | 04/07/10 |
| Chlorobenzene | 108-90-7 | 23 | | ug/L | 93.6 | 75 - 125 | 8.60 | 20 | | 04/07/10 |

## Quality Control Report

**Attention** Michael Neely
**Department** Organic, Volatiles

**Group #** WSCF100685

**QC Batch** 109075
**Associated Samples** 100685001, 100685002

**Test** SW-846 8260B Volatiles, separate prep

| Analyte | CAS # | Original Found | QC Found | Units | % Recov | Limits | RPD | RPD Limit | RQ | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| **SAMPLE** | | | **Sample #100685001** | | | | | | | |
| 1,2-Dichloroethane-d4 | 17060-07-0 | | | | 98.8 | 75 - 125 | | | | 04/07/10 |
| Toluene-d8 | 2037-26-5 | | | | 105.8 | 75 - 125 | | | | 04/07/10 |
| 4-Bromofluorobenzene | 460-00-4 | | | | 82 | 75 - 125 | | | | 04/07/10 |
| **SAMPLE** | | | **Sample #100685002** | | | | | | | |
| 1,2-Dichloroethane-d4 | 17060-07-0 | | | | 100.6 | 75 - 125 | | | | 04/07/10 |
| Toluene-d8 | 2037-26-5 | | | | 106.8 | 75 - 125 | | | | 04/07/10 |
| 4-Bromofluorobenzene | 460-00-4 | | | | 83.6 | 75 - 125 | | | | 04/07/10 |
| **BLANK** | | | **QC Sample #26391** | | | | | | | |
| 1,2-Dichloroethane-d4 | 17060-07-0 | | | | 97.7 | 75 - 125 | | | | 04/07/10 |
| Toluene-d8 | 2037-26-5 | | | | 105.4 | 75 - 125 | | | | 04/07/10 |
| 4-Bromofluorobenzene | 460-00-4 | | | | 85.4 | 75 - 125 | | | | 04/07/10 |
| **LCS** | | | **QC Sample #26392** | | | | | | | |
| 1,2-Dichloroethane-d4 | 17060-07-0 | | | | 93.8 | 75 - 125 | | | | 04/07/10 |
| Toluene-d8 | 2037-26-5 | | | | 102.4 | 75 - 125 | | | | 04/07/10 |

## Quality Control Report

**Attention** Michael Neely
**Department** Organic, Volatiles

**Group #** WSCF100685

| Analyte | CAS # | Original Found | QC Found | Units | % Recov | Limits | RPD | RPD Limit | RQ | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| 4-Bromofluorobenzene | 460-00-4 | | | | 85.4 | 75 - 125 | | | | 04/07/10 |
| **MS** | | | **QC Sample #26393** | | | | | | | |
| | | | **Original 100682001** | | | | | | | |
| 1,2-Dichloroethane-d4 | 17060-07-0 | | | | 97.4 | 75 - 125 | | | | 04/07/10 |
| Toluene-d8 | 2037-26-5 | | | | 103.8 | 75 - 125 | | | | 04/07/10 |
| 4-Bromofluorobenzene | 460-00-4 | | | | 84 | 75 - 125 | | | | 04/07/10 |
| **MSD** | | | **QC Sample #26394** | | | | | | | |
| | | | **Original 100682001** | | | | | **Paired** | **26393** | |
| 1,2-Dichloroethane-d4 | 17060-07-0 | | | | 96.7 | 75 - 125 | 0.70 | 20 | | 04/07/10 |
| Toluene-d8 | 2037-26-5 | | | | 104.2 | 75 - 125 | 0.40 | 20 | | 04/07/10 |
| 4-Bromofluorobenzene | 460-00-4 | | | | 85.8 | 75 - 125 | 2.10 | 20 | | 04/07/10 |

## Quality Control Report

**Attention** Michael Neely
**Department** Organic, Volatiles

**Group #** WSCF101611

**QC Batch** 142904
**Associated Samples** 101611001

**Test** SW-846 8260B Volatiles, separate prep

| Analyte | CAS # | Original Found | QC Found | Units | % Recov Limits | RPD | RPD Limit | RQ | Analyzed |
|---|---|---|---|---|---|---|---|---|---|
| **BLANK** | | | **QC Sample #33090** | | | | | | |
| 1,1-Dichloroethene | 75-35-4 | | <1 | ug/L | | | | U | 07/12/10 |
| Trichloroethene | 79-01-6 | | <1 | ug/L | | | | U | 07/12/10 |
| Benzene | 71-43-2 | | <1 | ug/L | | | | U | 07/12/10 |
| Toluene | 108-88-3 | | <1 | ug/L | | | | U | 07/12/10 |
| Chlorobenzene | 108-90-7 | | <1 | ug/L | | | | U | 07/12/10 |
| 1,1-Dichloroethane | 75-34-3 | | <1 | ug/L | | | | U | 07/12/10 |
| Ethylbenzene | 100-41-4 | | <1 | ug/L | | | | U | 07/12/10 |
| Styrene | 100-42-5 | | <1 | ug/L | | | | U | 07/12/10 |
| cis-1,3-Dichloropropene | 10061-01-5 | | <1 | ug/L | | | | U | 07/12/10 |
| trans-1,3-Dichloropropene | 10061-02-6 | | <1 | ug/L | | | | U | 07/12/10 |
| 1,2-Dichloroethane | 107-06-2 | | <1 | ug/L | | | | U | 07/12/10 |
| Methyl isobutyl ketone | 108-10-1 | | <1 | ug/L | | | | U | 07/12/10 |
| Dibromochloromethane | 124-48-1 | | <1 | ug/L | | | | U | 07/12/10 |
| Tetrachloroethene | 127-18-4 | | <1 | ug/L | | | | U | 07/12/10 |
| Total Xylenes | 1330-20-7 | | <1 | ug/L | | | | U | 07/12/10 |
| Total 1,2-Dichloroethene | 540-59-0 | | <1 | ug/L | | | | U | 07/12/10 |
| Carbon tetrachloride | 56-23-5 | | <1 | ug/L | | | | U | 07/12/10 |

**Attention** Michael Neely
**Department** Organic, Volatiles

**Group #** WSCF101611

| Analyte | CAS # | Original Found | QC Found | Units | % Recov | Limits | RPD | RPD Limit | RQ | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| 2-Hexanone | 591-78-6 | | <1 | ug/L | | | | | U | 07/12/10 |
| Acetone | 67-64-1 | | <1 | ug/L | | | | | U | 07/12/10 |
| Chloroform | 67-66-3 | | <1 | ug/L | | | | | U | 07/12/10 |
| 1,1,1-Trichloroethane | 71-55-6 | | <1 | ug/L | | | | | U | 07/12/10 |
| Bromomethane | 74-83-9 | | <1 | ug/L | | | | | U | 07/12/10 |
| Chloromethane | 74-87-3 | | <1 | ug/L | | | | | U | 07/12/10 |
| Chloroethane | 75-00-3 | | <1 | ug/L | | | | | U | 07/12/10 |
| Vinyl chloride | 75-01-4 | | <1 | ug/L | | | | | U | 07/12/10 |
| Methylene chloride | 75-09-2 | | <1 | ug/L | | | | | U | 07/12/10 |
| Carbon disulfide | 75-15-0 | | <1 | ug/L | | | | | U | 07/12/10 |
| Bromoform | 75-25-2 | | <1 | ug/L | | | | | U | 07/12/10 |
| Bromodichloromethane | 75-27-4 | | <1 | ug/L | | | | | U | 07/12/10 |
| 1,2-Dichloropropane | 78-87-5 | | <1 | ug/L | | | | | U | 07/12/10 |
| Methyl ethyl ketone | 78-93-3 | | <1 | ug/L | | | | | U | 07/12/10 |
| 1,1,2-Trichloroethane | 79-00-5 | | <1 | ug/L | | | | | U | 07/12/10 |
| 1,1,2,2-Tetrachloroethane | 79-34-5 | | <1 | ug/L | | | | | U | 07/12/10 |
| **LCS** | | | **QC Sample #33091** | | | | | | | |
| 1,1-Dichloroethene | 75-35-4 | | 24 | ug/L | 96.6 | 75 - 125 | | | | 07/12/10 |
| Trichloroethene | 79-01-6 | | 19 | ug/L | 77.3 | 75 - 125 | | | | 07/12/10 |
| Benzene | 71-43-2 | | 19 | ug/L | 76.8 | 75 - 125 | | | | 07/12/10 |
| Toluene | 108-88-3 | | 19 | ug/L | 76.3 | 75 - 125 | | | | 07/12/10 |
| Chlorobenzene | 108-90-7 | | 20 | ug/L | 79.7 | 75 - 125 | | | | 07/12/10 |

## Quality Control Report

**Attention** Michael Neely
**Department** Organic, Volatiles

**Group #** WSCF101611

| Analyte | CAS # | Original Found | QC Found | Units | % Recov | Limits | RPD | RPD Limit | RQ | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| **MS** | | | **QC Sample #33092** | | | | | | | |
| | | | **Original 101605001** | | | | | | | |
| 1,1-Dichloroethene | 75-35-4 | 25 | | ug/L | 99.5 | 75 - 125 | | | | 07/12/10 |
| Trichloroethene | 79-01-6 | 19 | | ug/L | 75.8 | 75 - 125 | | | | 07/12/10 |
| Benzene | 71-43-2 | 20 | | ug/L | 80.6 | 75 - 125 | | | | 07/12/10 |
| Toluene | 108-88-3 | 21 | | ug/L | 83.3 | 75 - 125 | | | | 07/12/10 |
| Chlorobenzene | 108-90-7 | 22 | | ug/L | 87 | 75 - 125 | | | | 07/12/10 |
| **MSD** | | | **QC Sample #33093** | | | | | | | |
| | | | **Original 101605001** | | | | | **Paired** | **33092** | |
| 1,1-Dichloroethene | 75-35-4 | 24 | | ug/L | 97.8 | 75 - 125 | 1.70 | 20 | | 07/12/10 |
| Trichloroethene | 79-01-6 | 20 | | ug/L | 78.9 | 75 - 125 | 4.00 | 20 | | 07/12/10 |
| Benzene | 71-43-2 | 20 | | ug/L | 81.6 | 75 - 125 | 1.20 | 20 | | 07/12/10 |
| Toluene | 108-88-3 | 21 | | ug/L | 82.1 | 75 - 125 | 1.50 | 20 | | 07/12/10 |
| Chlorobenzene | 108-90-7 | 22 | | ug/L | 88.8 | 75 - 125 | 2.00 | 20 | | 07/12/10 |

## Quality Control Report

**Attention** Michael Neely
**Department** Organic, Volatiles

**Group #** WSCF101611

**QC Batch** 142904
**Associated Samples** 101611001

**Test** SW-846 8260B Volatiles, separate prep

| Analyte | CAS # | Original Found | QC Found | Units | % Recov | Limits | RPD | RPD Limit | RQ | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| **SAMPLE** | | | **Sample #101611001** | | | | | | | |
| 1,2-Dichloroethane-d4 | 17060-07-0 | | | | 110.3 | 75 - 125 | | | | 07/12/10 |
| Toluene-d8 | 2037-26-5 | | | | 117.2 | 75 - 125 | | | | 07/12/10 |
| 4-Bromofluorobenzene | 460-00-4 | | | | 103.7 | 75 - 125 | | | | 07/12/10 |
| **BLANK** | | | **QC Sample #33090** | | | | | | | |
| 1,2-Dichloroethane-d4 | 17060-07-0 | | | | 107.4 | 75 - 125 | | | | 07/12/10 |
| Toluene-d8 | 2037-26-5 | | | | 115.4 | 75 - 125 | | | | 07/12/10 |
| 4-Bromofluorobenzene | 460-00-4 | | | | 104.1 | 75 - 125 | | | | 07/12/10 |
| **LCS** | | | **QC Sample #33091** | | | | | | | |
| 1,2-Dichloroethane-d4 | 17060-07-0 | | | | 107.2 | 75 - 125 | | | | 07/12/10 |
| Toluene-d8 | 2037-26-5 | | | | 115.9 | 75 - 125 | | | | 07/12/10 |
| 4-Bromofluorobenzene | 460-00-4 | | | | 104 | 75 - 125 | | | | 07/12/10 |
| **MS** | | | **QC Sample #33092** | | | | | | | |
| | | | **Original 101605001** | | | | | | | |
| 1,2-Dichloroethane-d4 | 17060-07-0 | | | | 107.6 | 75 - 125 | | | | 07/12/10 |
| Toluene-d8 | 2037-26-5 | | | | 117.3 | 75 - 125 | | | | 07/12/10 |

## Quality Control Report

**Attention** Michael Neely
**Department** Organic, Volatiles

**Group #** WSCF101611

| Analyte | CAS # | Original Found | QC Found | Units | % Recov | Limits | RPD | RPD Limit | RQ | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| 4-Bromofluorobenzene | 460-00-4 | | | | 103.8 | 75 - 125 | | | | 07/12/10 |
| **MSD** | | | **QC Sample #33093** | | | | | | | |
| | | | **Original 101605001** | | | | | | **Paired 33092** | |
| 1,2-Dichloroethane-d4 | 17060-07-0 | | | | 108.4 | 75 - 125 | 0.70 | 20 | | 07/12/10 |
| Toluene-d8 | 2037-26-5 | | | | 116.8 | 75 - 125 | 0.40 | 20 | | 07/12/10 |
| 4-Bromofluorobenzene | 460-00-4 | | | | 103.8 | 75 - 125 | 0.00 | 20 | | 07/12/10 |

**Attention** Michael Neely
**Department** Organic, Volatiles

**Group #** WSCF101801

**QC Batch** 146279
**Associated Samples** 101801001, 101801002

**Test** SW-846 8260B Volatiles, separate prep

| Analyte | CAS # | Original Found | QC Found | Units | % Recov Limits | RPD | RPD Limit | RQ | Analyzed |
|---|---|---|---|---|---|---|---|---|---|
| **BLANK** | | | **QC Sample #34162** | | | | | | |
| 1,1-Dichloroethene | 75-35-4 | | <1 | ug/L | | | | U | 07/27/10 |
| Trichloroethene | 79-01-6 | | <1 | ug/L | | | | U | 07/27/10 |
| Benzene | 71-43-2 | | <1 | ug/L | | | | U | 07/27/10 |
| Toluene | 108-88-3 | | <1 | ug/L | | | | U | 07/27/10 |
| Chlorobenzene | 108-90-7 | | <1 | ug/L | | | | U | 07/27/10 |
| 1,1-Dichloroethane | 75-34-3 | | <1 | ug/L | | | | U | 07/27/10 |
| Ethylbenzene | 100-41-4 | | <1 | ug/L | | | | U | 07/27/10 |
| Styrene | 100-42-5 | | <1 | ug/L | | | | U | 07/27/10 |
| cis-1,3-Dichloropropene | 10061-01-5 | | <1 | ug/L | | | | U | 07/27/10 |
| trans-1,3-Dichloropropene | 10061-02-6 | | <1 | ug/L | | | | U | 07/27/10 |
| 1,2-Dichloroethane | 107-06-2 | | <1 | ug/L | | | | U | 07/27/10 |
| Methyl isobutyl ketone | 108-10-1 | | <1 | ug/L | | | | U | 07/27/10 |
| Dibromochloromethane | 124-48-1 | | <1 | ug/L | | | | U | 07/27/10 |
| Tetrachloroethene | 127-18-4 | | <1 | ug/L | | | | U | 07/27/10 |
| Total Xylenes | 1330-20-7 | | <1 | ug/L | | | | U | 07/27/10 |
| Total 1,2-Dichloroethene | 540-59-0 | | <1 | ug/L | | | | U | 07/27/10 |
| Carbon tetrachloride | 56-23-5 | | <1 | ug/L | | | | U | 07/27/10 |

**Attention** Michael Neely
**Department** Organic, Volatiles

**Group #** WSCF101801

| Analyte | CAS # | Original Found | QC Found | Units | % Recov | Limits | RPD | RPD Limit | RQ | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| 2-Hexanone | 591-78-6 | | <1 | ug/L | | | | | U | 07/27/10 |
| Acetone | 67-64-1 | | <1 | ug/L | | | | | U | 07/27/10 |
| Chloroform | 67-66-3 | | <1 | ug/L | | | | | U | 07/27/10 |
| 1,1,1-Trichloroethane | 71-55-6 | | <1 | ug/L | | | | | U | 07/27/10 |
| Bromomethane | 74-83-9 | | <1 | ug/L | | | | | U | 07/27/10 |
| Chloromethane | 74-87-3 | | <1 | ug/L | | | | | U | 07/27/10 |
| Chloroethane | 75-00-3 | | <1 | ug/L | | | | | U | 07/27/10 |
| Vinyl chloride | 75-01-4 | | <1 | ug/L | | | | | U | 07/27/10 |
| Methylene chloride | 75-09-2 | | <1 | ug/L | | | | | U | 07/27/10 |
| Carbon disulfide | 75-15-0 | | <1 | ug/L | | | | | U | 07/27/10 |
| Bromoform | 75-25-2 | | <1 | ug/L | | | | | U | 07/27/10 |
| Bromodichloromethane | 75-27-4 | | <1 | ug/L | | | | | U | 07/27/10 |
| 1,2-Dichloropropane | 78-87-5 | | <1 | ug/L | | | | | U | 07/27/10 |
| Methyl ethyl ketone | 78-93-3 | | <1 | ug/L | | | | | U | 07/27/10 |
| 1,1,2-Trichloroethane | 79-00-5 | | <1 | ug/L | | | | | U | 07/27/10 |
| 1,1,2,2-Tetrachloroethane | 79-34-5 | | <1 | ug/L | | | | | U | 07/27/10 |
| **LCS** | | | **QC Sample #34163** | | | | | | | |
| 1,1-Dichloroethene | 75-35-4 | | 19 | ug/L | 76.5 | 75 - 125 | | | | 07/27/10 |
| Trichloroethene | 79-01-6 | | 19 | ug/L | 77.3 | 75 - 125 | | | | 07/27/10 |
| Benzene | 71-43-2 | | 22 | ug/L | 86.6 | 75 - 125 | | | | 07/27/10 |
| Toluene | 108-88-3 | | 22 | ug/L | 86.7 | 75 - 125 | | | | 07/27/10 |
| Chlorobenzene | 108-90-7 | | 22 | ug/L | 86.9 | 75 - 125 | | | | 07/27/10 |

**Attention** Michael Neely
**Department** Organic, Volatiles

**Group #** WSCF101801

| Analyte | CAS # | Original Found | QC Found | Units | % Recov | Limits | RPD | RPD Limit | RQ | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| **MS** | | | **QC Sample #34164** | | | | | | | |
| | | | **Original 101801001** | | | | | | | |
| 1,1-Dichloroethene | 75-35-4 | <1 | 20 | ug/L | 78.4 | 75 - 125 | | | | 07/27/10 |
| Trichloroethene | 79-01-6 | <1 | 21 | ug/L | 83.4 | 75 - 125 | | | | 07/27/10 |
| Benzene | 71-43-2 | <1 | 22 | ug/L | 88.1 | 75 - 125 | | | | 07/27/10 |
| Toluene | 108-88-3 | <1 | 23 | ug/L | 91.4 | 75 - 125 | | | | 07/27/10 |
| Chlorobenzene | 108-90-7 | <1 | 22 | ug/L | 89.2 | 75 - 125 | | | | 07/27/10 |
| **MSD** | | | **QC Sample #34165** | | | | | | | |
| | | | **Original 101801001** | | | | | **Paired** | **34164** | |
| 1,1-Dichloroethene | 75-35-4 | <1 | 19 | ug/L | 76.6 | 75 - 125 | 2.30 | 20 | | 07/27/10 |
| Trichloroethene | 79-01-6 | <1 | 20 | ug/L | 80.6 | 75 - 125 | 3.40 | 20 | | 07/27/10 |
| Benzene | 71-43-2 | <1 | 22 | ug/L | 87.8 | 75 - 125 | 0.30 | 20 | | 07/27/10 |
| Toluene | 108-88-3 | <1 | 23 | ug/L | 91.4 | 75 - 125 | 0.00 | 20 | | 07/27/10 |
| Chlorobenzene | 108-90-7 | <1 | 23 | ug/L | 90.3 | 75 - 125 | 1.20 | 20 | | 07/27/10 |

## Quality Control Report

**Attention** Michael Neely
**Department** Organic, Volatiles

**Group #** WSCF101801

**QC Batch** 146279
**Associated Samples** 101801001, 101801002

**Test** SW-846 8260B Volatiles, separate prep

| Analyte | CAS # | Original Found | QC Found | Units | % Recov | Limits | RPD | RPD Limit | RQ | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| **SAMPLE** | | | **Sample #101801001** | | | | | | | |
| 1,2-Dichloroethane-d4 | 17060-07-0 | | | | 102.2 | 75 - 125 | | | | 07/27/10 |
| Toluene-d8 | 2037-26-5 | | | | 104 | 75 - 125 | | | | 07/27/10 |
| 4-Bromofluorobenzene | 460-00-4 | | | | 104.3 | 75 - 125 | | | | 07/27/10 |
| **SAMPLE** | | | **Sample #101801002** | | | | | | | |
| 1,2-Dichloroethane-d4 | 17060-07-0 | | | | 103.1 | 75 - 125 | | | | 07/27/10 |
| Toluene-d8 | 2037-26-5 | | | | 104.1 | 75 - 125 | | | | 07/27/10 |
| 4-Bromofluorobenzene | 460-00-4 | | | | 103.9 | 75 - 125 | | | | 07/27/10 |
| **BLANK** | | | **QC Sample #34162** | | | | | | | |
| 1,2-Dichloroethane-d4 | 17060-07-0 | | | | 100.5 | 75 - 125 | | | | 07/27/10 |
| Toluene-d8 | 2037-26-5 | | | | 103.2 | 75 - 125 | | | | 07/27/10 |
| 4-Bromofluorobenzene | 460-00-4 | | | | 104.8 | 75 - 125 | | | | 07/27/10 |
| **LCS** | | | **QC Sample #34163** | | | | | | | |
| 1,2-Dichloroethane-d4 | 17060-07-0 | | | | 103 | 75 - 125 | | | | 07/27/10 |
| Toluene-d8 | 2037-26-5 | | | | 104.6 | 75 - 125 | | | | 07/27/10 |

## Quality Control Report

**Attention** Michael Neely
**Department** Organic, Volatiles

**Group #** WSCF101801

| Analyte | CAS # | Original Found | QC Found | Units | % Recov | Limits | RPD | RPD Limit | RQ | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| 4-Bromofluorobenzene | 460-00-4 | | | | 104.4 | 75 - 125 | | | | 07/27/10 |
| **MS** | | | **QC Sample #34164** | | | | | | | |
| | | | **Original 101801001** | | | | | | | |
| 1,2-Dichloroethane-d4 | 17060-07-0 | | | | 102.5 | 75 - 125 | | | | 07/27/10 |
| Toluene-d8 | 2037-26-5 | | | | 104.4 | 75 - 125 | | | | 07/27/10 |
| 4-Bromofluorobenzene | 460-00-4 | | | | 103.4 | 75 - 125 | | | | 07/27/10 |
| **MSD** | | | **QC Sample #34165** | | | | | | | |
| | | | **Original 101801001** | | | | | **Paired** | **34164** | |
| 1,2-Dichloroethane-d4 | 17060-07-0 | | | | 103.4 | 75 - 125 | 0.90 | 20 | | 07/27/10 |
| Toluene-d8 | 2037-26-5 | | | | 104.1 | 75 - 125 | 0.30 | 20 | | 07/27/10 |
| 4-Bromofluorobenzene | 460-00-4 | | | | 104.2 | 75 - 125 | 0.80 | 20 | | 07/27/10 |

Date: 18 April 2011
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: 200 Area SGRP
Subject: Inorganics - Sample Data Group (SDG) WSCF101801

## INTRODUCTION

This memorandum presents the results of data validation for SDG WSCF101801 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 |
|---|---|---|---|---|
| B24JH2 | 07/22/10 | Water | C | 200.8 |
| B24JJ8 | 07/22/10 | Water | C | 200.8 |

Data validation was conducted in accordance with the CHPRC validation statement of work and the Sampling and Analysis Plan for Eleven ARRA Wells to Support the 200 West Groundwater Treatment System in FY 2010, DOE/RL-2009-95, Rev. 0 (SAP). Appendices 1 through 6 provide the following information as indicated below:

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

## DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirement for ICP metals are analysis within 180 days of sample collection. Sample preservation requires chilling to 4 degrees Celsius and acid preservation with nitric acid to pH <2.

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

- **Blanks**

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

**Laboratory Blanks**

All laboratory blank results were acceptable with the following exception.

The Cr laboratory blank result was > the method detection limit (MDL) but < the reporting limit (RL). The Cr results for samples B24JH2 and B24JJ8 were detects < the RL and should be qualified as non-detects at the RL (10 µg/L) 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 and laboratory control sample results. According to the SAP, the matrix spike sample and laboratory control sample accuracy limits are 80% to 120%. The limits for reported analytes not listed in the SAP are specified by the DV procedure.

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

All MS/MSD recoveries were acceptable.

**Laboratory Control Samples (LCSs)**

All LCS recoveries were acceptable.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ±20%. 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.

- **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 WSCF101801 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 Cr results for samples B24JH2 and B24JJ8 as non-detects was due to a laboratory blank infraction.

**REFERENCES**

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

DOE/RL-2009-95, Rev. 0, *Sampling and Analysis Plan for Eleven ARRA Wells to Support the 200 West Groundwater Treatment System in FY 2010*, October 2009.

# 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: WSCF101801 | Reviewer: AQA | Project:<br>200 Area SGRP | Page 1 of 1 |
| **Analyte(s)** | **Qualifier** | **Samples Affected** | **Reason** |
| Cr | 10U | B24JH2, B24JJ8 | Laboratory blank contamination |

Comments: None

# Appendix 3

Annotated Laboratory Reports

## WSCF Analytical Results Report

**Attention** Michael Neely
**Department** Inorganic

**Group #** WSCF101801

**Sample #** 101801001
**SAF#** F10-065
**Sample ID** B24JH2

**Matrix** WATER
**Sampled** 07/22/10
**Received** 07/22/10

| Test Performed | | CAS # | Method | RQ | Result | TP Err | Units | DF | MDL | PQL | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **ICPMS Prep** | | | | | | | | | | | **08/03/10** |
| **ICP-MS** | | | | | | | | | | | |
| Aluminum | | 7429-90-5 | LA-505-412 | UD | <10 | | ug/L | 2 | 10 | 200 | 08/03/10 |
| Manganese | | 7439-96-5 | LA-505-412 | D | 33.3 | | ug/L | 2 | 0.20 | 2.0 | 08/03/10 |
| Nickel | | 7440-02-0 | LA-505-412 | UD | <0.40 | | ug/L | 2 | 0.40 | 4.0 | 08/03/10 |
| Barium | | 7440-39-3 | LA-505-412 | D | 43.6 | | ug/L | 2 | 0.40 | 4.0 | 08/03/10 |
| Cadmium | | 7440-43-9 | LA-505-412 | UD | <0.20 | | ug/L | 2 | 0.20 | 2.0 | 08/03/10 |
| Chromium | 10U | 7440-47-3 | LA-505-412 | BDC | 5.54 | | ug/L | 2 | 1.0 | 10 | 08/03/10 |
| Cobalt | | 7440-48-4 | LA-505-412 | BD | 0.367 | | ug/L | 2 | 0.10 | 0.50 | 08/03/10 |
| Copper | | 7440-50-8 | LA-505-412 | UD | <0.20 | | ug/L | 2 | 0.20 | 2.0 | 08/03/10 |
| Vanadium | | 7440-62-2 | LA-505-412 | D | 18.8 | | ug/L | 2 | 0.40 | 4.0 | 08/03/10 |
| Lead | | 7439-92-1 | LA-505-412 | UD | <0.20 | | ug/L | 2 | 0.20 | 2.0 | 08/03/10 |
| Strontium | | 7440-24-6 | LA-505-412 | D | 261 | | ug/L | 2 | 0.20 | 2.0 | 08/03/10 |
| Uranium | | 7440-61-1 | LA-505-412 | D | 1.17 | | ug/L | 2 | 0.10 | 0.40 | 08/03/10 |
| Arsenic | | 7440-38-2 | LA-505-412 | BD | 1.60 | | ug/L | 2 | 0.80 | 8.0 | 08/03/10 |

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

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

U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.

## WSCF Analytical Results Report

**Attention** Michael Neely
**Department** Inorganic

**Group #** WSCF101801

**Sample #** 101801002
**SAF#** F10-065
**Sample ID** B24JJ8

**Matrix** WATER
**Sampled** 07/22/10
**Received** 07/22/10

| Test Performed | | CAS # | Method | RQ | Result | TP Err | Units | DF | MDL | PQL | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Anions by IC** | | | | | | | | | | | **07/23/10** |
| **Anions by IC** | | | | | | | | | | | |
| Nitrate-N | | NO3-N | LA-533-410 | D | 28.6 | | ug/mL | 10 | 0.31 | 1.0 | 07/23/10 |
| **ICPMS Prep** | | | | | | | | | | | **08/03/10** |
| **ICP-MS** | | | | | | | | | | | |
| Aluminum | | 7429-90-5 | LA-505-412 | UD | <10 | | ug/L | 2 | 10 | 200 | 08/03/10 |
| Manganese | | 7439-96-5 | LA-505-412 | D | 34.2 | | ug/L | 2 | 0.20 | 2.0 | 08/03/10 |
| Nickel | | 7440-02-0 | LA-505-412 | UD | <0.40 | | ug/L | 2 | 0.40 | 4.0 | 08/03/10 |
| Barium | | 7440-39-3 | LA-505-412 | D | 43.8 | | ug/L | 2 | 0.40 | 4.0 | 08/03/10 |
| Cadmium | | 7440-43-9 | LA-505-412 | UD | <0.20 | | ug/L | 2 | 0.20 | 2.0 | 08/03/10 |
| Chromium | 10U | 7440-47-3 | LA-505-412 | BDC | 5.83 | | ug/L | 2 | 1.0 | 10 | 08/03/10 |
| Cobalt | | 7440-48-4 | LA-505-412 | BD | 0.406 | | ug/L | 2 | 0.10 | 0.50 | 08/03/10 |
| Copper | | 7440-50-8 | LA-505-412 | UD | <0.20 | | ug/L | 2 | 0.20 | 2.0 | 08/03/10 |
| Vanadium | | 7440-62-2 | LA-505-412 | D | 19.3 | | ug/L | 2 | 0.40 | 4.0 | 08/03/10 |
| Lead | | 7439-92-1 | LA-505-412 | UD | <0.20 | | ug/L | 2 | 0.20 | 2.0 | 08/03/10 |
| Strontium | | 7440-24-6 | LA-505-412 | D | 259 | | ug/L | 2 | 0.20 | 2.0 | 08/03/10 |
| Uranium | | 7440-61-1 | LA-505-412 | D | 1.17 | | ug/L | 2 | 0.10 | 0.40 | 08/03/10 |
| Arsenic | | 7440-38-2 | LA-505-412 | BD | 1.26 | | ug/L | 2 | 0.80 | 8.0 | 08/03/10 |

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

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

U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.

# Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

## Narrative

Attachment 2
**Narrative**
WSCF101801

**Introduction**

Two (2) S&GRP samples were received at the WSCF Laboratory on July 22, 2010. The samples were analyzed for the analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *Statement of Work (SOW), Modification No. 2 to Agreement 36587, Release 3, "FH WSCF ANALYTICAL SERVICES FOR GROUNDWATER."*

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

It should be noted that the attached chain of custody was not stamped "ICED" by the WSCF Laboratory Sample Custodian during sample receiving. However, based on procedure LO-090-403 form "NOTICE OF IMPROPER SAMPLE SUBMITTAL" was not submitted and was not stamped "NOT ICED". No anomaly was noted during sample receipt.

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

- **B** – Sample results with a concentration greater than the MDL but less than the PQL are B flagged (applies to inorganic and wet chemical analyses), as appropriate.
- **D** – Sample results are D flagged if dilution(s) were required, as appropriate.
- **J** – Sample results with a concentration greater than the MDL but less than the PQL are J flagged (applies to organic analyses), as appropriate.
- **U** – Analyzed for but not detected above limiting criteria. Relative Percent Difference (RPD) values associated with an analyte qualified with a "U" are not applicable.

**Analytical Methodology for Requested Analyses**

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

**Inorganic Comments**

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

- Batch QC 145695 analyzed on sample# B25FT7 (101797001)

All QC controls are within the established limits.

1

Attachment 2
**Narrative**
WSCF101801

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

- Batch QC 148380 analyzed on sample# B26767 (101799008)
    - Chromium - was detected in the Blank and was evaluated. Affected sample results in this batch were "C" Flagged.

All other QC controls are within the established limits.

**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):

- Batch QC 146279 analyzed on sample# B24JH2 (101801001)

All QC controls are within the established limits.

**Radiochemistry Comments**

**Rad Chem** – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike (Matrix Spikes apply only to Technetium & Tritium), Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- Rad Chem requested to be performed included: Tritium and Technetium-99 by LSC.
- Technetium-99:
    - Batch QC 150092 analyzed on sample# B26901 (101787009)

All QC controls are within the established limits.

- Tritium:
    - Batch QC 148375 analyzed on sample# B26F29 (101793001)

All QC controls are within the established limits.

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

2

**CH2MHill Plateau Remediation Company**

**CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**

F10-065-381 PAGE 1 OF 1

COLLECTOR Heiny, Bean, Bates

COMPANY CONTACT: DYEKMAN, DL | TELEPHONE NO.: 373-2530 | PROJECT COORDINATOR: DYEKMAN, DL | PRICE CODE: 7N | DATA TURNAROUND: 45 Days / 45 Days | AIR QUALITY: ☐

SAMPLING LOCATION: C7578; 699-45-67; IW-11; I-003

PROJECT DESIGNATION: ARRA 200-ZP-1 Remedial Action Wells Sampling and Analysis - Water | SAF NO.: F10-065

ICE CHEST NO.

FIELD LOGBOOK NO.: HNF-N-585-10 Page 38 | ACTUAL SAMPLE DEPTH: 348.1 | COA: 300194ES10 | METHOD OF SHIPMENT: GOVERNMENT VEHICLE

SHIPPED TO: Waste Sampling & Characterization

OFFSITE PROPERTY NO.: N/A | BILL OF LADING/AIR BILL NO.: N/A

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

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

101801

**SPECIAL HANDLING AND/OR STORAGE**

| | | | |
|---|---|---|---|
| PRESERVATION | HCl or H2SO4 to pH <2/Cool~4C | HNO3 to pH <2/Cool~4C | None |
| TYPE OF CONTAINER | aG6* | G/P | G |
| NO. OF CONTAINER(S) | 3 | 1 | 1 |
| VOLUME | 40mL | 500mL | 250mL |
| SAMPLE ANALYSIS | VOA - 8260B (TCL); | See ITEM (1) IN SPECIAL INSTRUCTIONS | Tritium - 906.0 (Tritium) |

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME |
|---|---|---|---|
| B24JH2 | WATER | 7/22/10 | 1314 |

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

| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
|---|---|---|---|
| [illegible] 7/22/10 | 1420 | [illegible] 7-22-10 | 1420 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

** The CACN for all analytical work at WSCF laboratory is 401648ES20. ** All requests for Tc-99, Nitrate, TCE, CHCl3, Cr+6, and CCL4 by Field GC will require a 24 hour turnaround time. ** Cr VI holding times MUST BE MET. Sample Management Project Coordinator must be contacted immediately if there is a problem. ** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
(1)ICP/MS - 200.8 (TAL) {Aluminum, Barium, Chromium, Cobalt, Cadmium, Copper, Manganese, Nickel, Vanadium} ICP/MS - 200.8 (Add-on) {Arsenic, Lead, Strontium, Uranium}

☐ ORIGINAL

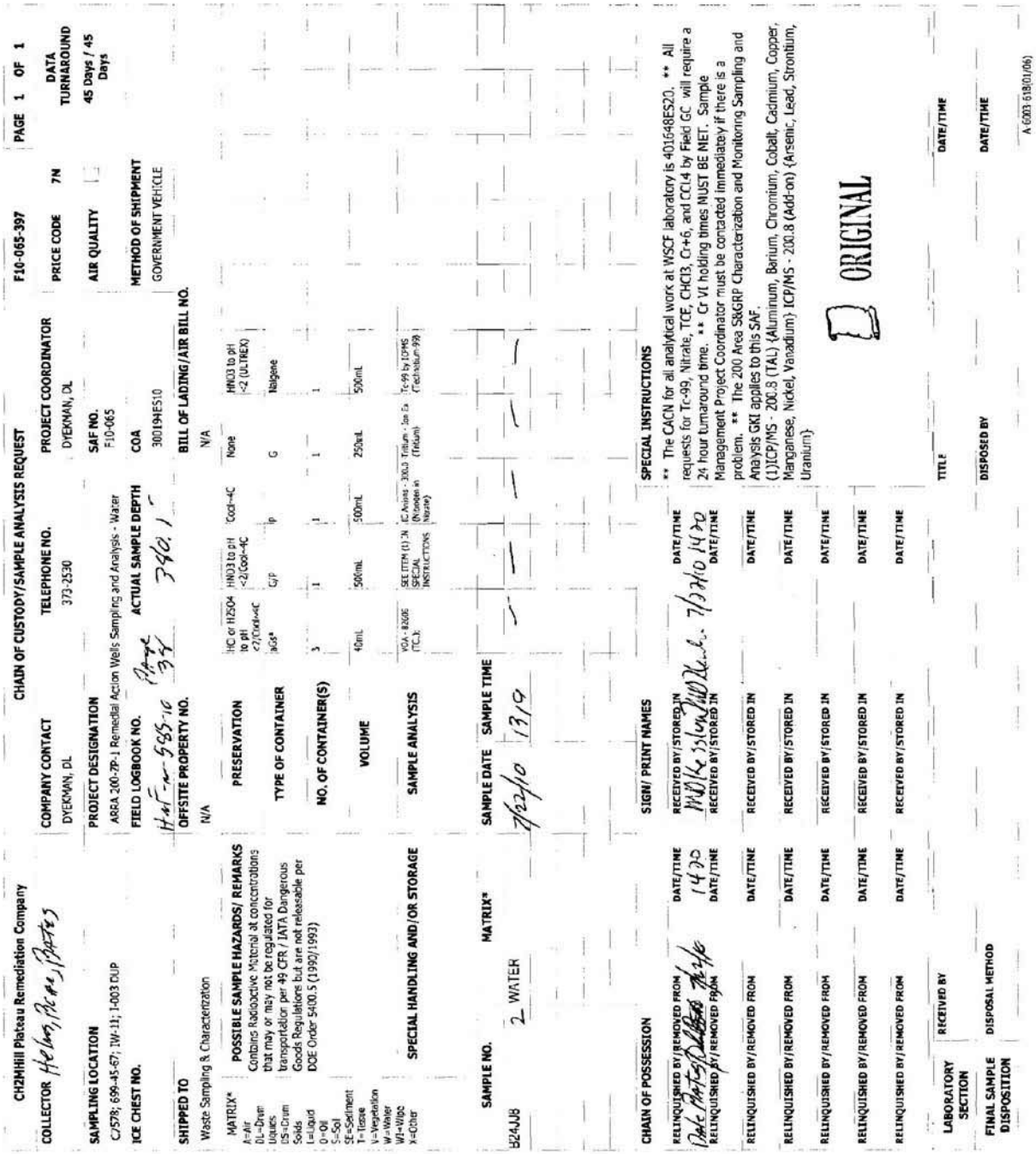
LABORATORY SECTION | RECEIVED BY | TITLE | DATE/TIME

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

A-6003-618(01/06)

## Sample Receipt

### Chain of Custody



CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F10-065-397

PAGE 1 OF 1

COLLECTOR: Heather Peters

COMPANY CONTACT: DYEKMAN, DL

TELEPHONE NO.: 373-2530

PROJECT COORDINATOR: DYEKMAN, DL

PRICE CODE: 7N

DATA TURNAROUND: 45 Days / 45 Days

SAMPLING LOCATION: C/S78; 699-45-67; TW-11; 1-003 DUP

PROJECT DESIGNATION: ARRA 200-ZP-1 Remedial Action Wells Sampling and Analysis - Water

SAF NO.: F10-065

AIR QUALITY

ICE CHEST NO.

FIELD LOGBOOK NO.: HNF-N-595-16

ACTUAL SAMPLE DEPTH: 340.1

COA: 300194ES10

METHOD OF SHIPMENT: GOVERNMENT VEHICLE

SHIPPED TO: Waste Sampling & Characterization

OFFSITE PROPERTY NO.: N/A

BILL OF LADING/AIR BILL NO.: N/A

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

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

PRESERVATION: HCl or H2SO4 to pH <2/Cool=4C; HNO3 to pH <2/Cool=4C; Cool=4C; None; HNO3 to pH <2 (ULTREX)

TYPE OF CONTAINER: VOA*; G/P; P; G; Nalgene

NO. OF CONTAINER(S): 3; 1; 1; 1; 1

VOLUME: 40mL; 500mL; 500mL; 250mL; 500mL

SAMPLE ANALYSIS: VOA - 8260 (TCL); SEE ITEM (1) IN SPECIAL INSTRUCTIONS; IC Anions - 300.0 Tritium - Ion Ex (Nitrate in Water); Tc-99 by ICPMS (Technetium-99)

SPECIAL HANDLING AND/OR STORAGE

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME |
|---|---|---|---|
| B24VJ8 | 2 WATER | 7/22/10 | 1310 |

CHAIN OF POSSESSION

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS

** The CACN for all analytical work at WSCF laboratory is 401648ES20. ** All requests for Tc-99, Nitrate, TCE, CHCl3, Cr+6, and CCl4 by Field GC will require a 24 hour turnaround time. ** Cr VI holding times MUST BE MET. Sample Management Project Coordinator must be contacted immediately if there is a problem. ** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF. (1)ICP/MS - 200.8 (TAL) {Aluminum, Barium, Chromium, Cobalt, Cadmium, Copper, Manganese, Nickel, Vanadium} ICP/MS - 200.8 (Add-on) {Arsenic, Lead, Strontium, Uranium}

RELINQUISHED BY/REMOVED FROM: Heather Peters — DATE/TIME: 7/23/10 1430

RECEIVED BY/STORED IN: Mike Skwarek — DATE/TIME: 7/23/10 1430

RELINQUISHED BY/REMOVED FROM — DATE/TIME

RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME

RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME

RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME

RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME

RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME

RECEIVED BY/STORED IN — DATE/TIME

LABORATORY SECTION: RECEIVED BY — TITLE — DATE/TIME

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

ORIGINAL

A 6093 618(01/06)

Thursday, July 22, 2010 7:23:20 PM

Page 3 of 3

ChemWare

# Appendix 5

Data Validation Supporting Documentation

| VALIDATION LEVEL: | A | B | (C) | D | E |
|---|---|---|---|---|---|
| PROJECT: 200 Area SGRP | | | DATA PACKAGE: VSR11-043 | | |
| VALIDATOR: Eyda Hergenreder | | LAB: WSCF | | DATE: 04-18-2011 | |
| | | | SDG: WSCF101801 | | |
| ANALYSES PERFORMED | | | | | |
| SW-846/ICP | SW-846/GFAA | SW-846/Hg | | EPA 200.8 X | |
| | | | | | |
| SAMPLES/MATRIX Water samples<br>SDG WSCF101801: B24JH2, B24JJ8 | | | | | |

**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 result for Cr = 1.57 ug/L

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

| | | | |
|---|---|---|---|
| MS/MSD samples analyzed? | (Yes) | No | N/A |
| MS/MSD results acceptable? | (Yes) | No | N/A |
| MS/MSD standards NIST traceable? (Levels D, E) | Yes | No | (N/A) |
| MS/MSD standards expired? (Levels D, E) | Yes | No | (N/A) |
| LCS/BSS samples analyzed? | (Yes) | No | N/A |
| LCS/BSS results acceptable? | (Yes) | No | N/A |
| Standards traceable? (Levels D, E) | Yes | No | (N/A) |
| Standards expired? (Levels D, E) | Yes | No | (N/A) |
| Transcription/calculation errors? (Levels D, E) | Yes | No | (N/A) |
| Performance audit sample(s) analyzed? | Yes | No | (N/A) |
| Performance audit sample results acceptable? | Yes | No | (N/A) |

Comments: None

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

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

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

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

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

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

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

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

Comments: None

**6. ICP QUALITY CONTROL (Levels D and E)**

| | | | |
|---|---|---|---|
| ICP serial dilution samples analyzed? | Yes | No | N/A |
| ICP serial dilution %D values acceptable? | Yes | No | N/A |
| ICP post digestion spike required? | Yes | No | N/A |
| ICP post digestion spike values acceptable? | Yes | No | N/A |
| Standards traceable? | Yes | No | N/A |
| Standards expired? | Yes | No | N/A |
| Transcription/calculation errors? | Yes | No | N/A |

Comments:

**7. HOLDING TIMES (all levels)**

| | | | |
|---|---|---|---|
| Samples properly preserved? | (Yes) | No | N/A |
| Sample holding times acceptable? | (Yes) | No | N/A |

Comments: None

**8. RESULT QUANTITATION AND DETECTION LIMITS (all levels)**

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

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

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

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

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

Comments: None

# Appendix 6

Additional Documentation Requested By Client

## Quality Control Report

**Attention** Michael Neely
**Department** Inorganic

**Group #** WSCF101801

**QC Batch** 148380
**Associated Samples** 101801001, 101801002

**Test** ICP-2008 MS All possible metal

| Analyte | CAS # | Original Found | QC Found | Units | % Recov | Limits | RPD | RPD Limit | RQ | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| **BLANK** | | | **QC Sample #34722** | | | | | | | |
| Aluminum | 7429-90-5 | | <5.0 | ug/L | | | | | U | 08/03/10 |
| Manganese | 7439-96-5 | | <0.10 | ug/L | | | | | U | 08/03/10 |
| Nickel | 7440-02-0 | | <0.20 | ug/L | | | | | U | 08/03/10 |
| Barium | 7440-39-3 | | <0.20 | ug/L | | | | | U | 08/03/10 |
| Cadmium | 7440-43-9 | | <0.10 | ug/L | | | | | U | 08/03/10 |
| Chromium | 7440-47-3 | | 1.57 | ug/L | | | | | B | 08/03/10 |
| Cobalt | 7440-48-4 | | <0.050 | ug/L | | | | | U | 08/03/10 |
| Copper | 7440-50-8 | | <0.10 | ug/L | | | | | U | 08/03/10 |
| Vanadium | 7440-62-2 | | <0.20 | ug/L | | | | | U | 08/03/10 |
| Lead | 7439-92-1 | | <0.10 | ug/L | | | | | U | 08/03/10 |
| Strontium | 7440-24-6 | | <0.10 | ug/L | | | | | U | 08/03/10 |
| Uranium | 7440-61-1 | | <0.050 | ug/L | | | | | U | 08/03/10 |
| Arsenic | 7440-38-2 | | <0.40 | ug/L | | | | | U | 08/03/10 |
| **LCS** | | | **QC Sample #34723** | | | | | | | |
| Aluminum | 7429-90-5 | | 401 | ug/L | 100.2 | 85 - 115 | | | | 08/03/10 |
| Manganese | 7439-96-5 | | 41.3 | ug/L | 103.2 | 85 - 115 | | | | 08/03/10 |
| Nickel | 7440-02-0 | | 40.7 | ug/L | 101.7 | 85 - 115 | | | | 08/03/10 |
| Barium | 7440-39-3 | | 40.2 | ug/L | 100.6 | 85 - 115 | | | | 08/03/10 |

**Attention** Michael Neely
**Department** Inorganic

**Group #** WSCF101801

| Analyte | CAS # | Original Found | QC Found | Units | % Recov | Limits | RPD | RPD Limit | RQ | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| Cadmium | 7440-43-9 | | 40.0 | ug/L | 99.9 | 85 - 115 | | | | 08/03/10 |
| Chromium | 7440-47-3 | | 42.0 | ug/L | 105 | 85 - 115 | | | | 08/03/10 |
| Cobalt | 7440-48-4 | | 40.7 | ug/L | 101.8 | 85 - 115 | | | | 08/03/10 |
| Copper | 7440-50-8 | | 41.0 | ug/L | 102.6 | 85 - 115 | | | | 08/03/10 |
| Vanadium | 7440-62-2 | | 40.9 | ug/L | 102.2 | 85 - 115 | | | | 08/03/10 |
| Lead | 7439-92-1 | | 40.0 | ug/L | 100 | 85 - 115 | | | | 08/03/10 |
| Strontium | 7440-24-6 | | 40.3 | ug/L | 100.8 | 85 - 115 | | | | 08/03/10 |
| Uranium | 7440-61-1 | | 40.5 | ug/L | 101.2 | 85 - 115 | | | | 08/03/10 |
| Arsenic | 7440-38-2 | | 40.4 | ug/L | 101.1 | 85 - 115 | | | | 08/03/10 |
| **MS** | | | **QC Sample #34724** | | | | | | | |
| | | | **Original 101799008** | | | | | | | |
| Aluminum | 7429-90-5 | | 388 | ug/L | 96.9 | 70 - 130 | | | | 08/03/10 |
| Manganese | 7439-96-5 | | 39.0 | ug/L | 97.4 | 70 - 130 | | | | 08/03/10 |
| Nickel | 7440-02-0 | | 39.0 | ug/L | 97.5 | 70 - 130 | | | | 08/03/10 |
| Barium | 7440-39-3 | | 38.3 | ug/L | 95.7 | 70 - 130 | | | | 08/03/10 |
| Cadmium | 7440-43-9 | | 37.9 | ug/L | 94.6 | 70 - 130 | | | | 08/03/10 |
| Chromium | 7440-47-3 | | 38.6 | ug/L | 96.5 | 70 - 130 | | | | 08/03/10 |
| Cobalt | 7440-48-4 | | 38.9 | ug/L | 97.3 | 70 - 130 | | | | 08/03/10 |
| Copper | 7440-50-8 | | 38.6 | ug/L | 96.6 | 70 - 130 | | | | 08/03/10 |
| Vanadium | 7440-62-2 | | 39.4 | ug/L | 98.4 | 70 - 130 | | | | 08/03/10 |
| Lead | 7439-92-1 | | 37.9 | ug/L | 94.8 | 70 - 130 | | | | 08/03/10 |
| Strontium | 7440-24-6 | | 38.1 | ug/L | 95.2 | 70 - 130 | | | | 08/03/10 |
| Uranium | 7440-61-1 | | 38.4 | ug/L | 96 | 70 - 130 | | | | 08/03/10 |
| Arsenic | 7440-38-2 | | 37.7 | ug/L | 94.3 | 70 - 130 | | | | 08/03/10 |

**Attention** Michael Neely
**Department** Inorganic

**Group #** WSCF101801

| Analyte | CAS # | Original Found | QC Found | Units | % Recov | Limits | RPD | RPD Limit | RQ | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| **MSD** | | | **QC Sample #34725** | | | | | | | |
| | | | **Original 101799008** | | | | | | **Paired 34724** | |
| Aluminum | 7429-90-5 | | 385 | ug/L | 96.3 | 70 - 130 | 0.60 | 20 | | 08/03/10 |
| Manganese | 7439-96-5 | | 38.3 | ug/L | 95.8 | 70 - 130 | 1.70 | 20 | | 08/03/10 |
| Nickel | 7440-02-0 | | 37.9 | ug/L | 94.8 | 70 - 130 | 2.80 | 20 | | 08/03/10 |
| Barium | 7440-39-3 | | 37.9 | ug/L | 94.8 | 70 - 130 | 0.90 | 20 | | 08/03/10 |
| Cadmium | 7440-43-9 | | 37.2 | ug/L | 93.1 | 70 - 130 | 1.60 | 20 | | 08/03/10 |
| Chromium | 7440-47-3 | | 37.7 | ug/L | 94.3 | 70 - 130 | 2.30 | 20 | | 08/03/10 |
| Cobalt | 7440-48-4 | | 38.1 | ug/L | 95.3 | 70 - 130 | 2.10 | 20 | | 08/03/10 |
| Copper | 7440-50-8 | | 38.4 | ug/L | 96 | 70 - 130 | 0.60 | 20 | | 08/03/10 |
| Vanadium | 7440-62-2 | | 38.6 | ug/L | 96.4 | 70 - 130 | 2.10 | 20 | | 08/03/10 |
| Lead | 7439-92-1 | | 37.2 | ug/L | 92.9 | 70 - 130 | 2.00 | 20 | | 08/03/10 |
| Strontium | 7440-24-6 | | 37.6 | ug/L | 93.9 | 70 - 130 | 1.40 | 20 | | 08/03/10 |
| Uranium | 7440-61-1 | | 37.4 | ug/L | 93.5 | 70 - 130 | 2.60 | 20 | | 08/03/10 |
| Arsenic | 7440-38-2 | | 38.1 | ug/L | 95.3 | 70 - 130 | 1.10 | 20 | | 08/03/10 |

Date: 18 April 2011
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: 200 Area SGRP
Subject: General Chemistry - Sample Data Groups (SDGs) WSCF100568, WSCF100628, WSCF100685, WSCF101545, WSCF101611, WSCF101801 and WSCF101903

## INTRODUCTION

This memorandum presents the results of data validation for SDGs WSCF100568, WSCF100628, WSCF100685, WSCF101545, WSCF101611, WSCF101801 and WSCF101903 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 |
|---|---|---|---|---|
| B23CD6 | 03/23/10 | Water | C | 7196A (Cr VI) |
| B23F96 | 03/23/10 | Water | C | 7196A (Cr VI) |
| B23CF0 | 03/31/10 | Water | C | 7196A (Cr VI) |
| B24134 | 04/06/10 | Water | C | 300.0 |
| B24JX7 | 06/30/10 | Water | C | 7196A (Cr VI) |
| B24JJ9 | 07/08/10 | Water | C | 300.0 |
| B24JJ8 | 07/22/10 | Water | C | 300.0 |
| B24K06 | 07/28/10 | Water | C | 7196A (Cr VI) |

Data validation was conducted in accordance with the CHPRC validation statement of work and the Sampling and Analysis Plan for Eleven ARRA Wells to Support the 200 West Groundwater Treatment System in FY 2010, DOE/RL-2009-95, Rev. 0 (SAP). Appendices 1 through 6 provide the following information as indicated below:

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

## DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for hexavalent chromium and anions are analyses within 24 hours of sample collection. Sample preservation requires chilling to 4 degrees Celsius.

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

- **Blanks**

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

**Laboratory Blanks**

All laboratory blank results were acceptable.

**Trip Blanks**

No trip blanks were submitted for validation.

**Field Blanks**

No field blanks were submitted for validation.

**Equipment Blanks**

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results and laboratory control sample results. According to the SAP, the matrix spike sample and laboratory control sample accuracy limits for anions and the laboratory control sample accuracy limit for Cr (IV) are 80% to 120%. The matrix spike sample accuracy limits Cr (IV) 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.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, laboratory duplicate sample results, field duplicate sample results, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ±20%. When duplicate RPDs exceed the limits and have associated results <5X the reporting limits with difference <1X the required detection limits no precision infraction occurred.

**MS/MSD Samples**

All MS/MSD RPD values were acceptable.

**Laboratory Duplicate Samples**

All laboratory duplicate results were acceptable.

**Field Duplicate Samples**

No field duplicates were submitted for validation.

**Field Split Samples**

No field splits were submitted for validation.

- **Detection Limits**

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

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

- **Completeness**

SDGs WSCF100568, WSCF100628, WSCF100685, WSCF101545, WSCF101611, WSCF101801 and WSCF101903 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

**MAJOR DEFICIENCIES**

None found.

**MINOR DEFICIENCIES**

None found.

**REFERENCES**

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

DOE/RL-2009-95, Rev. 0, *Sampling and Analysis Plan for Eleven ARRA Wells to Support the 200 West Groundwater Treatment System in FY 20100*, October 2009.

# Appendix 1

# Glossary of Data Reporting Qualifiers

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

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

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

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

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

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

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

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

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

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

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

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

# Appendix 2

# Summary of Data Qualification

| General Chemistry Data Qualification Summary | | | |
|---|---|---|---|
| SDGs: WSCF100568, WSCF100628, WSCF100685, WSCF101545, WSCF101611, WSCF101801, WSCF101903 | Reviewer: AQA | Project: 200 Area SGRP | Page 1 of 1 |
| **Analyte(s)** | **Qualifier** | **Samples Affected** | **Reason** |
| Cr(VI) & Anions | None | N/A | N/A |

Comments: None

# Appendix 3

Annotated Laboratory Reports

## WSCF Analytical Results Report

**Attention** Michael Neely
**Department** Inorganic

**Group #** WSCF100568

**Sample #** 100568001
**SAF#** F10-065
**Sample ID** B23CD6

**Matrix** WATER
**Sampled** 03/23/10
**Received** 03/23/10

| Test Performed | CAS # | Method | RQ | Result | TP Err | Units | DF | MDL | PQL | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| **Cr(VI)** | | | | | | | | | | **03/23/10** |
| **Cr(VI)** | | | | | | | | | | |
| Hexavalent chromium | 18540-29-9 | LA-265-403 | U | <0.0020 | | mg/L | 1 | 0.0020 | 0.0050 | 03/23/10 |

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

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

U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.

## WSCF Analytical Results Report

**Attention** Michael Neely
**Department** Inorganic

**Group #** WSCF100568

**Sample #** 100568002
**SAF#** F10-065
**Sample ID** B23F96

**Matrix** WATER
**Sampled** 03/23/10
**Received** 03/23/10

| Test Performed | CAS # | Method | RQ | Result | TP Err | Units | DF | MDL | PQL | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| **Cr(VI)** | | | | | | | | | | **03/23/10** |
| **Cr(VI)** | | | | | | | | | | |
| Hexavalent chromium | 18540-29-9 | LA-265-403 | U | <0.0020 | | mg/L | 1 | 0.0020 | 0.0050 | 03/23/10 |

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

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

U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.

## WSCF Analytical Results Report

**Attention** Michael Neely
**Department** Inorganic

**Group #** WSCF100628

**Sample #** 100628001
**SAF#** F10-065
**Sample ID** B23CF0

**Matrix** WATER
**Sampled** 03/31/10
**Received** 03/31/10

| Test Performed | CAS # | Method | RQ | Result | TP Err | Units | DF | MDL | PQL | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| **Cr(VI)** | | | | | | | | | | **03/31/10** |
| **Cr(VI)** | | | | | | | | | | |
| Hexavalent chromium | 18540-29-9 | LA-265-403 | U | <0.0020 | | mg/L | 1 | 0.0020 | 0.0050 | 03/31/10 |

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

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

U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.

## WSCF Analytical Results Report

**Attention** Michael Neely
**Department** Inorganic

**Group #** WSCF100685

**Sample #** 100685001
**SAF#** F10-065
**Sample ID** B24134

**Matrix** WATER
**Sampled** 04/06/10
**Received** 04/06/10

| Test Performed | CAS # | Method | RQ | Result | TP Err | Units | DF | MDL | PQL | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| **Anions by IC** | | | | | | | | | | **04/06/10** |
| **Anions by IC** | | | | | | | | | | |
| Fluoride | 16984-48-8 | LA-533-410 | BD | 0.317 | | ug/mL | 2 | 0.060 | 0.40 | 04/06/10 |
| Chloride | 16887-00-6 | LA-533-410 | D | 26.7 | | ug/mL | 2 | 0.086 | 0.80 | 04/06/10 |
| Nitrite-N | NO2-N | LA-533-410 | UD | <0.036 | | ug/mL | 2 | 0.036 | 0.20 | 04/06/10 |
| Bromide | 24959-67-9 | LA-533-410 | UD | <0.090 | | ug/mL | 2 | 0.090 | 1.0 | 04/06/10 |
| Nitrate-N | NO3-N | LA-533-410 | D | 0.443 | | ug/mL | 2 | 0.062 | 0.20 | 04/06/10 |
| Phosphate-P | PO4-P | LA-533-410 | UD | <0.14 | | ug/mL | 2 | 0.14 | 0.80 | 04/06/10 |
| **ICPMS Prep** | | | | | | | | | | **04/08/10** |
| **ICP-MS** | | | | | | | | | | |
| Aluminum | 7429-90-5 | LA-505-412 | UD | <10 | | ug/L | 2 | 10 | 200 | 04/11/10 |
| Manganese | 7439-96-5 | LA-505-412 | D | 33.5 | | ug/L | 2 | 0.20 | 2.0 | 04/11/10 |
| Nickel | 7440-02-0 | LA-505-412 | BD | 0.728 | | ug/L | 2 | 0.40 | 4.0 | 04/11/10 |
| Barium | 7440-39-3 | LA-505-412 | D | 40.6 | | ug/L | 2 | 0.40 | 4.0 | 04/11/10 |
| Cadmium | 7440-43-9 | LA-505-412 | UD | <0.20 | | ug/L | 2 | 0.20 | 2.0 | 04/11/10 |
| Chromium | 7440-47-3 | LA-505-412 | UD | <1.0 | | ug/L | 2 | 1.0 | 10 | 04/11/10 |
| Cobalt | 7440-48-4 | LA-505-412 | BD | 0.149 | | ug/L | 2 | 0.10 | 0.50 | 04/11/10 |
| Copper | 7440-50-8 | LA-505-412 | BD | 0.279 | | ug/L | 2 | 0.20 | 2.0 | 04/11/10 |
| Vanadium | 7440-62-2 | LA-505-412 | D | 23.3 | | ug/L | 2 | 0.40 | 4.0 | 04/11/10 |

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

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

U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.

## WSCF Analytical Results Report

**Attention** Michael Neely
**Department** Inorganic

**Group #** WSCF101545

**Sample #** 101545001
**SAF#** F10-065
**Sample ID** B24JX7

**Matrix** WATER
**Sampled** 06/30/10
**Received** 07/01/10

| Test Performed | CAS # | Method | RQ | Result | TP Err | Units | DF | MDL | PQL | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| **Cr(VI)** | | | | | | | | | | **07/01/10** |
| **Cr(VI)** | | | | | | | | | | |
| Hexavalent chromium | 18540-29-9 | LA-265-403 | U | <0.0020 | | mg/L | 1 | 0.0020 | 0.0050 | 07/01/10 |

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

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

U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.

## WSCF Analytical Results Report

**Attention** Michael Neely
**Department** Inorganic

**Group #** WSCF101611

**Sample #** 101611001
**SAF#** F10-065
**Sample ID** B24JJ9

**Matrix** WATER
**Sampled** 07/08/10
**Received** 07/08/10

| Test Performed | CAS # | Method | RQ | Result | TP Err | Units | DF | MDL | PQL | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| **Anions by IC** | | | | | | | | | | **07/08/10** |
| **Anions by IC** | | | | | | | | | | |
| Nitrate-N | NO3-N | LA-533-410 | D | 11.8 | | ug/mL | 10 | 0.31 | 1.0 | 07/08/10 |
| **ICPMS Prep** | | | | | | | | | | **07/23/10** |
| **ICP-MS** | | | | | | | | | | |
| Aluminum | 7429-90-5 | LA-505-412 | UD | <10 | | ug/L | 2 | 10 | 200 | 07/26/10 |
| Manganese | 7439-96-5 | LA-505-412 | D | 10.5 | | ug/L | 2 | 0.20 | 2.0 | 07/26/10 |
| Nickel | 7440-02-0 | LA-505-412 | BD | 0.414 | | ug/L | 2 | 0.40 | 4.0 | 07/26/10 |
| Barium | 7440-39-3 | LA-505-412 | D | 54.3 | | ug/L | 2 | 0.40 | 4.0 | 07/26/10 |
| Cadmium | 7440-43-9 | LA-505-412 | UD | <0.20 | | ug/L | 2 | 0.20 | 2.0 | 07/26/10 |
| Chromium | 7440-47-3 | LA-505-412 | D | 13.0 | | ug/L | 2 | 1.0 | 10 | 07/26/10 |
| Cobalt | 7440-48-4 | LA-505-412 | UD | <0.10 | | ug/L | 2 | 0.10 | 0.50 | 07/26/10 |
| Copper | 7440-50-8 | LA-505-412 | UD | <0.20 | | ug/L | 2 | 0.20 | 2.0 | 07/26/10 |
| Vanadium | 7440-62-2 | LA-505-412 | D | 25.9 | | ug/L | 2 | 0.40 | 4.0 | 07/26/10 |
| Lead | 7439-92-1 | LA-505-412 | UD | <0.20 | | ug/L | 2 | 0.20 | 2.0 | 07/26/10 |
| Strontium | 7440-24-6 | LA-505-412 | D | 261 | | ug/L | 2 | 0.20 | 2.0 | 07/26/10 |
| Uranium | 7440-61-1 | LA-505-412 | D | 1.85 | | ug/L | 2 | 0.10 | 0.40 | 07/26/10 |
| Arsenic | 7440-38-2 | LA-505-412 | BD | 1.85 | | ug/L | 2 | 0.80 | 8.0 | 07/26/10 |

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

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

U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.

## WSCF Analytical Results Report

**Attention** Michael Neely
**Department** Inorganic

**Group #** WSCF101801

**Sample #** 101801002
**SAF#** F10-065
**Sample ID** B24JJ8

**Matrix** WATER
**Sampled** 07/22/10
**Received** 07/22/10

| Test Performed | CAS # | Method | RQ | Result | TP Err | Units | DF | MDL | PQL | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| **Anions by IC** | | | | | | | | | | **07/23/10** |
| **Anions by IC** | | | | | | | | | | |
| Nitrate-N | NO3-N | LA-533-410 | D | 28.6 | | ug/mL | 10 | 0.31 | 1.0 | 07/23/10 |
| **ICPMS Prep** | | | | | | | | | | **08/03/10** |
| **ICP-MS** | | | | | | | | | | |
| Aluminum | 7429-90-5 | LA-505-412 | UD | <10 | | ug/L | 2 | 10 | 200 | 08/03/10 |
| Manganese | 7439-96-5 | LA-505-412 | D | 34.2 | | ug/L | 2 | 0.20 | 2.0 | 08/03/10 |
| Nickel | 7440-02-0 | LA-505-412 | UD | <0.40 | | ug/L | 2 | 0.40 | 4.0 | 08/03/10 |
| Barium | 7440-39-3 | LA-505-412 | D | 43.8 | | ug/L | 2 | 0.40 | 4.0 | 08/03/10 |
| Cadmium | 7440-43-9 | LA-505-412 | UD | <0.20 | | ug/L | 2 | 0.20 | 2.0 | 08/03/10 |
| Chromium | 7440-47-3 | LA-505-412 | BDC | 5.83 | | ug/L | 2 | 1.0 | 10 | 08/03/10 |
| Cobalt | 7440-48-4 | LA-505-412 | BD | 0.406 | | ug/L | 2 | 0.10 | 0.50 | 08/03/10 |
| Copper | 7440-50-8 | LA-505-412 | UD | <0.20 | | ug/L | 2 | 0.20 | 2.0 | 08/03/10 |
| Vanadium | 7440-62-2 | LA-505-412 | D | 19.3 | | ug/L | 2 | 0.40 | 4.0 | 08/03/10 |
| Lead | 7439-92-1 | LA-505-412 | UD | <0.20 | | ug/L | 2 | 0.20 | 2.0 | 08/03/10 |
| Strontium | 7440-24-6 | LA-505-412 | D | 259 | | ug/L | 2 | 0.20 | 2.0 | 08/03/10 |
| Uranium | 7440-61-1 | LA-505-412 | D | 1.17 | | ug/L | 2 | 0.10 | 0.40 | 08/03/10 |
| Arsenic | 7440-38-2 | LA-505-412 | BD | 1.26 | | ug/L | 2 | 0.80 | 8.0 | 08/03/10 |

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

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

U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.

## WSCF Analytical Results Report

**Attention** Michael Neely
**Department** Inorganic

**Group #** WSCF101903

**Sample #** 101903001
**SAF#** F10-065
**Sample ID** B24K06

**Matrix** WATER
**Sampled** 07/28/10
**Received** 07/28/10

| Test Performed | CAS # | Method | RQ | Result | TP Err | Units | DF | MDL | PQL | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| **Cr(VI)** | | | | | | | | | | **07/28/10** |
| **Cr(VI)** | | | | | | | | | | |
| Hexavalent chromium | 18540-29-9 | LA-265-403 | B | 0.00440 | | mg/L | 1 | 0.0020 | 0.0050 | 07/28/10 |

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

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

U - Analyzed for but not detected above limiting criteria.
X,Y or Z - See comment detail and/or narrative.

# Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

## Narrative

Attachment 2
**Narrative**
WSCF100568

**Introduction**

Two (2) S&GRP samples were received at the WSCF Laboratory on March 23rd 2010. The samples were analyzed for the analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *Statement of Work (SOW), Modification No. 2 to Agreement 36587, Release 3, "FH WSCF ANALYTICAL SERVICES FOR GROUNDWATER."*

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

It should be noted that the attached chain of custody was not stamped "ICED" by the WSCF Laboratory Sample Custodian during sample receiving. However, based on procedure LO-090-403 form "NOTICE OF IMPROPER SAMPLE SUBMITTAL" was not submitted and was not stamped "NOT ICED". No anomaly was noted during sample receipt.

The following generic data qualifiers (i.e., B, D, 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,* pages for a complete listing of approved analytical methods.

**Inorganic Comments**

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

- Batch QC 105276 analyzed on sample# B23CD6

All QC controls are within the established limits.

1

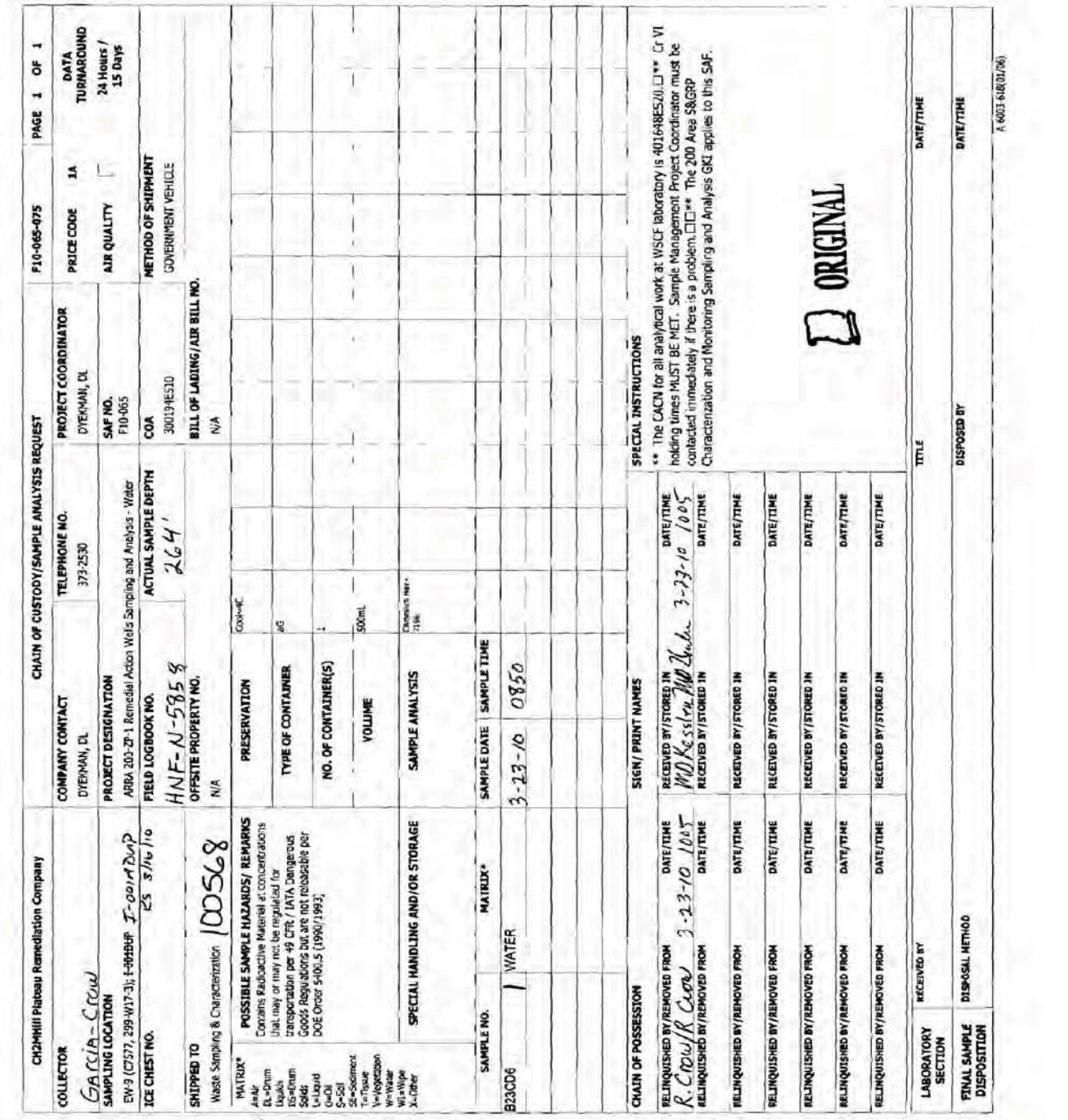
## Narrative

Attachment 2
**Narrative**
WSCF100568

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.

2

## Sample Receipt



CH2MHill Plateau Remediation Company — CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST — F10-065-075 — PAGE 1 OF 1

COLLECTOR: GARCIA-Crow
COMPANY CONTACT: DYEKMAN, DL
TELEPHONE NO.: 373-2530
PROJECT COORDINATOR: DYEKMAN, DL
PRICE CODE: 1A
DATA TURNAROUND: 24 Hours / 15 Days

SAMPLING LOCATION: EW-9 (C7577, 299-W17-3); EW-10 (C7578); EW-DUP
PROJECT DESIGNATION: ARRA 200-ZP-1 Remedial Action Wells Sampling and Analysis - Water
SAF NO.: F10-065
AIR QUALITY: ☐

ICE CHEST NO.: ES 3/26/10
FIELD LOGBOOK NO.: HNF-N-585-8
ACTUAL SAMPLE DEPTH: 264'
COA: 300194E510
METHOD OF SHIPMENT: GOVERNMENT VEHICLE

SHIPPED TO: Waste Sampling & Characterization 100568
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).

PRESERVATION: Cool=4C
TYPE OF CONTAINER: AG
NO. OF CONTAINER(S): 1
VOLUME: 500mL

SPECIAL HANDLING AND/OR STORAGE: Chemistry Hold 72hr

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME |
|---|---|---|---|
| B23CD6 | 1 WATER | 3-23-10 | 0850 |

SPECIAL INSTRUCTIONS

** The CACN for all analytical work at WSCF laboratory is 401648ES20. ☐** Cr VI holding times MUST BE MET. Sample Management Project Coordinator must be contacted immediately if there is a problem. ☐☐** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.

ORIGINAL

CHAIN OF POSSESSION

SIGN/ PRINT NAMES

| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
|---|---|---|---|
| R. Crow/R Crow | 3-23-10 1005 | WDKessler/WD Kessler | 3-23-10 1005 |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |

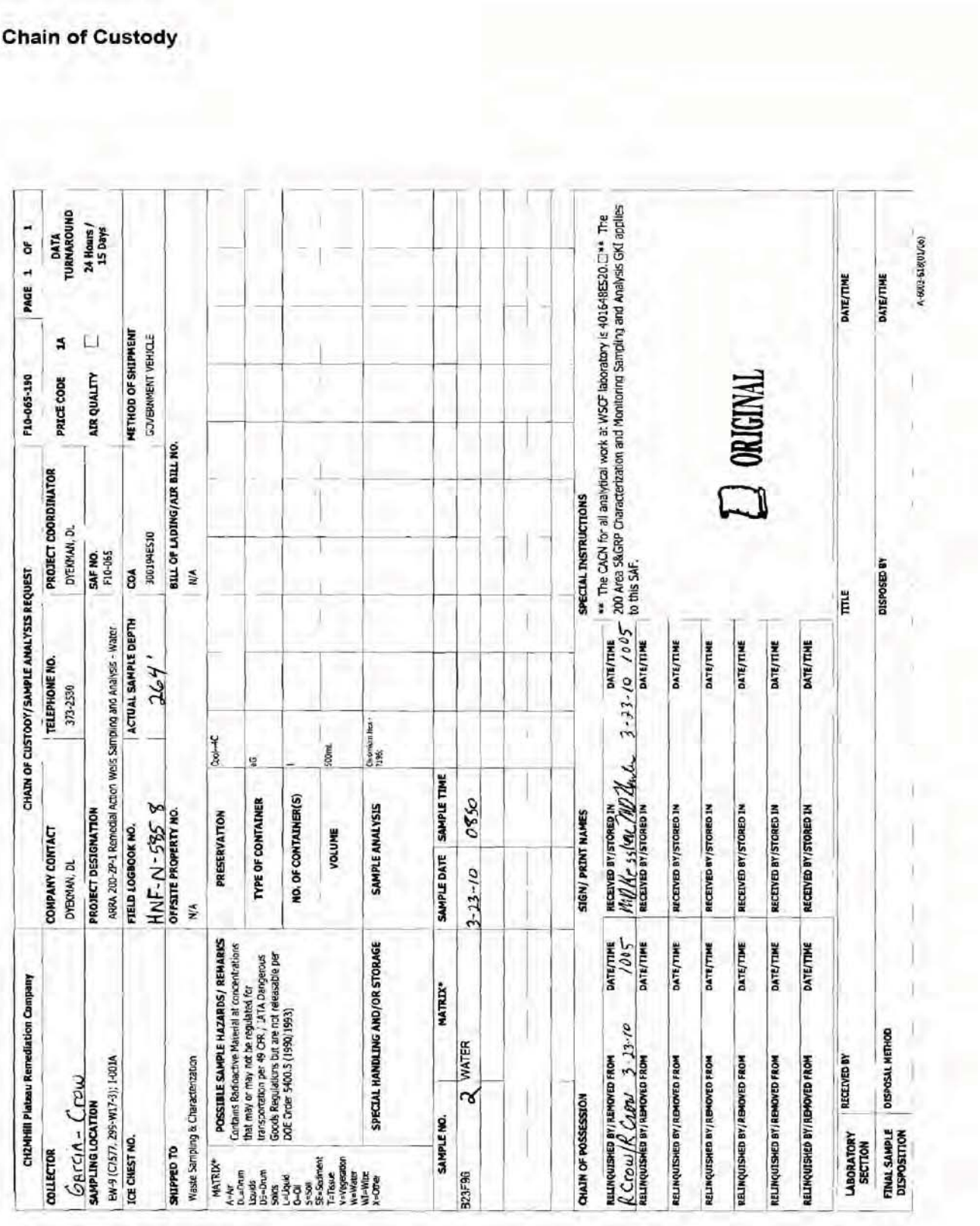
LABORATORY SECTION — RECEIVED BY — TITLE — DATE/TIME

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

A 6003 618 (01/06)

## Sample Receipt

### Chain of Custody



CH2MHill Plateau Remediation Company — CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST — F10-065-190 — PAGE 1 OF 1

COLLECTOR: Garcia - Crow
COMPANY CONTACT: DYEKMAN, DL
TELEPHONE NO.: 373-2530
PROJECT COORDINATOR: DYEKMAN, DL
PRICE CODE: 1A
DATA TURNAROUND: 24 Hours / 15 Days
SAMPLING LOCATION: EW-9 (C1577, 295-W17-31); I-100A
PROJECT DESIGNATION: ARRA 200-ZP-1 Remedial Action Wells Sampling and Analysis - Water
SAF NO.: F10-065
AIR QUALITY: ☐
ICE CHEST NO.:
FIELD LOGBOOK NO.: HNF-N-585 8
ACTUAL SAMPLE DEPTH: 264'
COA: 300194ES10
METHOD OF SHIPMENT: GOVERNMENT VEHICLE
SHIPPED TO: Waste Sampling & Characterization
OFFSITE PROPERTY NO.: N/A
BILL OF LADING/AIR BILL NO.: N/A

MATRIX* A=Air D=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SD=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)

PRESERVATION: Cool-4C
TYPE OF CONTAINER: VG
NO. OF CONTAINER(S): 1
VOLUME: 500ml
SPECIAL HANDLING AND/OR STORAGE: Dangerous Rea - 1196

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME | SAMPLE ANALYSIS |
|---|---|---|---|---|
| B23F98 | 2 WATER | 3-23-10 | 0950 | |

CHAIN OF POSSESSION — SIGN/ PRINT NAMES — SPECIAL INSTRUCTIONS

** The CACN for all analytical work at WSCF laboratory is 40164BES20.☐** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.

| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
|---|---|---|---|
| R Crow/R Garcia 3-23-10 | 1005 | Miller 3-23-10 | 1005 |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |

ORIGINAL

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

A-6003-518(01/00)

Tuesday, March 23, 2010 7:11:21 PM
Page 3 of 3
ChemWare

## Narrative

Attachment 2
**Narrative**
WSCF100628

**Introduction**

One (1) S&GRP sample was received at the WSCF Laboratory on March 31st, 2010. The sample was analyzed for the analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *Statement of Work (SOW), Modification No. 2 to Agreement 36587, Release 3, "FH WSCF ANALYTICAL SERVICES FOR GROUNDWATER."*

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

It should be noted that the attached chain of custody was not stamped "ICED" by the WSCF Laboratory Sample Custodian during sample receiving. However, based on procedure LO-090-403 form "NOTICE OF IMPROPER SAMPLE SUBMITTAL" was not submitted and was not stamped "NOT ICED". No anomaly was noted during sample receipt.

The following generic data qualifiers (i.e., B, D, 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,* pages for a complete listing of approved analytical methods.

**Inorganic Comments**

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

All QC controls are within the established limits.

1

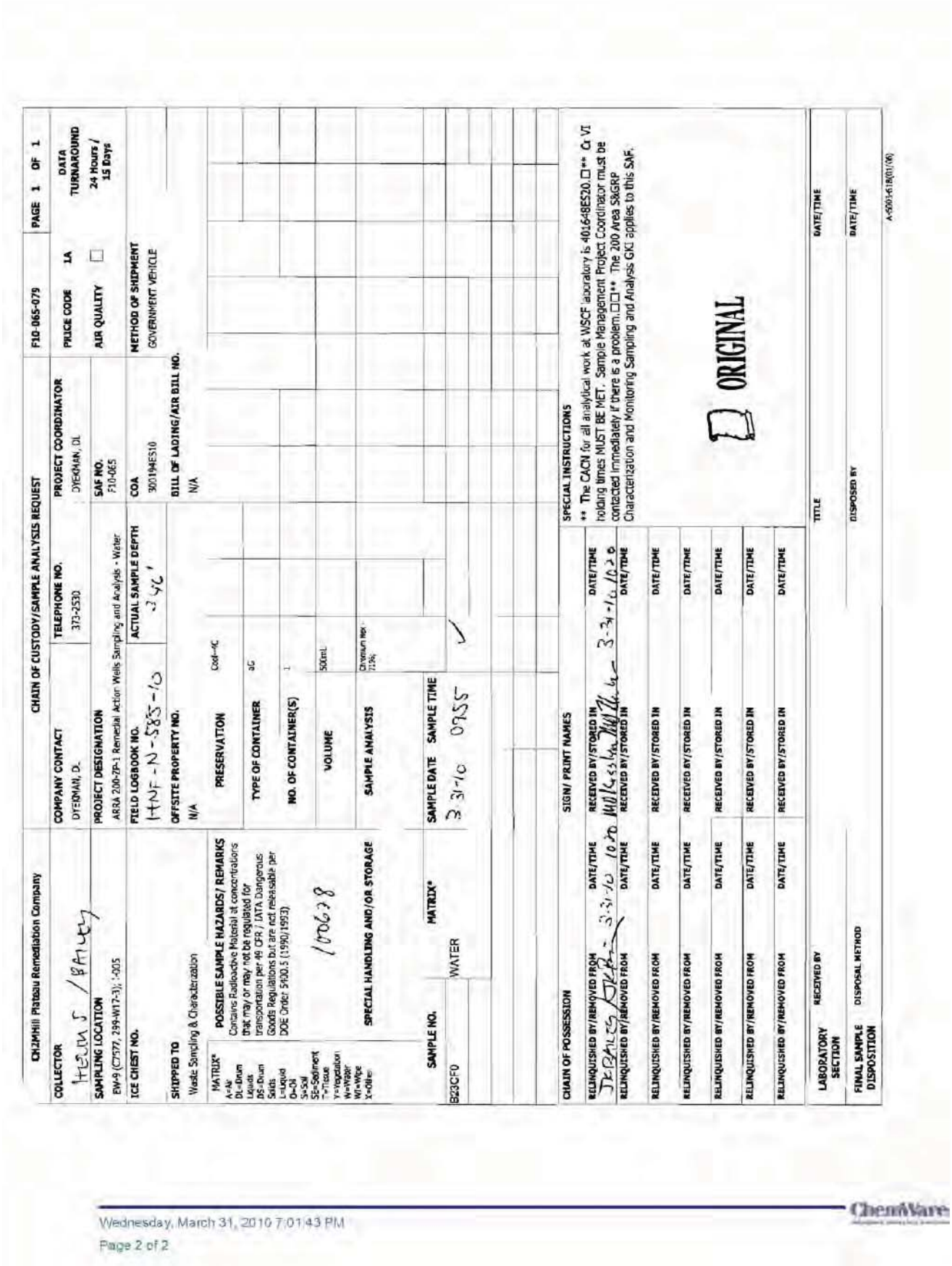
## Narrative

Attachment 2
**Narrative**
WSCF100628

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.

2

## Sample Receipt



CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F10-065-079 PAGE 1 OF 1

COLLECTOR: TREVOR S / BAILEY
COMPANY CONTACT: DYEKMAN, DL
TELEPHONE NO.: 373-2530
PROJECT COORDINATOR: DYEKMAN, DL
PRICE CODE: 1A
DATA TURNAROUND: 24 Hours / 15 Days
SAMPLING LOCATION: EW-9 (C7572, 299-W17-31); 1-005
PROJECT DESIGNATION: ARRA 200-ZP-1 Remedial Action Wells Sampling and Analysis - Water
SAF NO.: F10-065
AIR QUALITY: ☐
ICE CHEST NO.:
FIELD LOGBOOK NO.: 1HNF-N-585-10
ACTUAL SAMPLE DEPTH: 342'
COA: 300194ES10
METHOD OF SHIPMENT: GOVERNMENT VEHICLE
SHIPPED TO: Waste Sampling & Characterization
OFFSITE PROPERTY NO.: N/A
BILL OF LADING/AIR BILL NO.: N/A

MATRIX* A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil SI=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)

PRESERVATION: Cool-4C
TYPE OF CONTAINER: AG
NO. OF CONTAINER(S): 1
VOLUME: 500mL
SAMPLE ANALYSIS: Chromium (VI) (7196)

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME |
|---|---|---|---|
| B23CF0 | WATER | 3/31/10 | 0955 |

SPECIAL HANDLING AND/OR STORAGE

SPECIAL INSTRUCTIONS: ** The CACN for all analytical work at WSCF laboratory is 401648ES20.☐** Cr VI holding times MUST BE MET. Sample Management Project Coordinator must be contacted immediately if there is a problem.☐☐** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.

ORIGINAL

CHAIN OF POSSESSION

SIGN/ PRINT NAMES

| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
|---|---|---|---|
| TREVOR S BAILEY | 3/31/10 1030 | [illegible] | 3-31-10 1030 |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |

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

A-6003-618(01/06)

Wednesday, March 31, 2010 7:01:43 PM
Page 2 of 2

ChemWare

## Narrative

Attachment 2
**Narrative**
WSCF100685

**Introduction**

Two (2) S&GRP samples were received at the WSCF Laboratory on April 6th, 2010. The samples were analyzed for the analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *Statement of Work (SOW), Modification No. 2 to Agreement 36587, Release 3, "FH WSCF ANALYTICAL SERVICES FOR GROUNDWATER."*

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

It should be noted that the attached chain of custody was not stamped "ICED" by the WSCF Laboratory Sample Custodian during sample receiving. However, based on procedure LO-090-403 form "NOTICE OF IMPROPER SAMPLE SUBMITTAL" was not submitted and was not stamped "NOT ICED". No anomaly was noted during sample receipt.

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

- **B** – Sample results with a concentration greater than the MDL but less than the PQL are B flagged (applies to inorganic and wet chemical analyses), as appropriate.
- **D** – Sample results are D flagged if dilution(s) were required, as appropriate.
- **J** – Sample results with a concentration greater than the MDL but less than the PQL are J flagged (applies to organic analyses), as appropriate.
- **U** – Analyzed for but not detected above limiting criteria. Relative Percent Difference (RPD) values associated with an analyte qualified with a "U" are not applicable.

**Analytical Methodology for Requested Analyses**

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

**Inorganic Comments**

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

- Batch QC 108975 analyzed on sample# B23DV8 (100690009)

All QC controls are within the established limits.

1

**ICP-MS Metals** – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Technetium-99 is analyzed without prep therefore there is no Matrix Spike or Matrix Spike Duplicate with analysis. Analytical Note(s):

- Batch QC 109376 analyzed on sample# B24BY8 (100610006)
    - Vanadium contamination was detected in the Blank and was evaluated. No sample results in this batch were affected.
- Batch QC 115380 analyzed on the Blank and Laboratory Control Sample

All other QC controls are within the established limits.

**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):

- Batch QC 109075 analyzed on sample# B24120 (100682001)

All QC controls are within the established limits.

**Radiochemistry Comments**

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

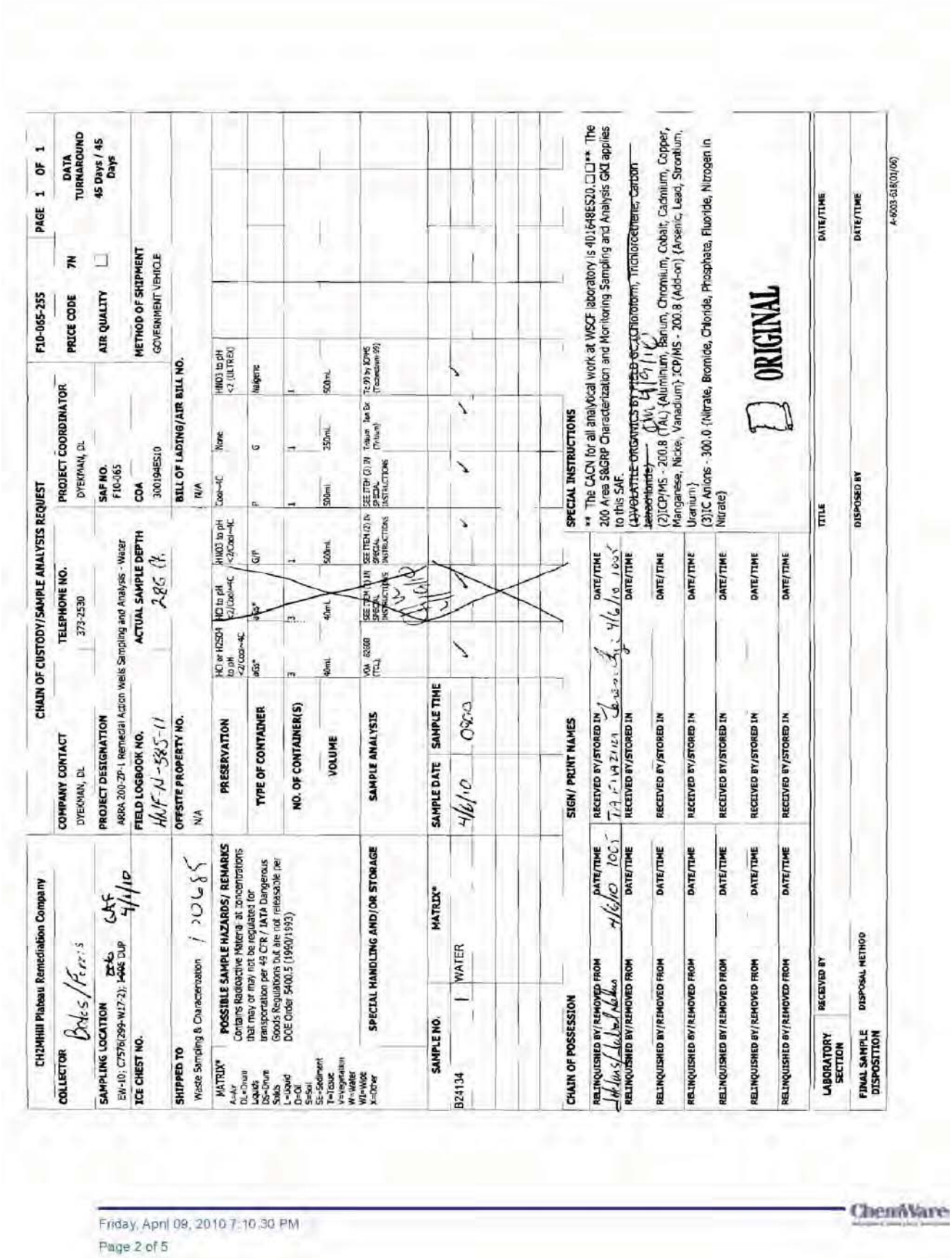
Rad Chem requested to be performed included: Tritium by LSC.

- Tritium:
    - Batch QC 108684 analyzed on sample# B230L4 (100677012)
        - Duplicate Relative Percent Difference (RPD) did not meet the established laboratory limits. However, the analyst reviewed and approved the batch.

    All other QC controls are within the established limits.

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

## Sample Receipt



CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F10-065-255 — PAGE 1 OF 1

COLLECTOR: Boles/Ferris

COMPANY CONTACT: DYEKMAN, DL — TELEPHONE NO.: 373-2530 — PROJECT COORDINATOR: DYEKMAN, DL

PRICE CODE: 7N — DATA TURNAROUND: 45 Days / 45 Days

SAMPLING LOCATION: EW-10; C7576(299-W17-2); 2446 DUP — PROJECT DESIGNATION: ARRA 200-ZP-1 Remedial Action Wells Sampling and Analysis - Water — SAF NO.: F10-065

AIR QUALITY: ☐ — METHOD OF SHIPMENT: GOVERNMENT VEHICLE

ICE CHEST NO.: — FIELD LOGBOOK NO.: HNF-N-585-11 — ACTUAL SAMPLE DEPTH: 285 ft. — COA: 300194ES10

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=Well, 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)

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME | SPECIAL HANDLING AND/OR STORAGE | PRESERVATION | TYPE OF CONTAINER | NO. OF CONTAINER(S) | VOLUME | SAMPLE ANALYSIS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | HCl or H2SO4 to pH <2/Cool~4C | #6S* | 3 | 40mL | VOA 8260B (TCL) | HCl to pH <2/Cool~4C | #6S* | 3 | 40mL | SEE ITEM (1) IN SPECIAL INSTRUCTIONS | HNO3 to pH <2/Cool~4C | P | 1 | 500mL | SEE ITEM (2) IN SPECIAL INSTRUCTIONS | Cool~4C | None | P | 1 | 500mL | SEE ITEM (3) IN SPECIAL INSTRUCTIONS | HNO3 to pH <2 (ULTREX) | G | 1 | 500mL | 7t-99 by ICP/MS (Tc/Uranium-99) |
| B24134 | WATER | 4/6/10 | 0900 | | ✓ | | | | | ✓ | | | | | ✓ | | | | | ✓ | | | | | | ✓ | | | | |

CHAIN OF POSSESSION — SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS

** The CACN for all analytical work at WSCF laboratory is 401648ES20.☐☐** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.

(1)VOLATILE ORGANICS BY METHOD 8260 (Chloroform, Trichloroethene, Carbon tetrachloride)

(2)ICP/MS - 200.8 (TAL) (Aluminum, Barium, Chromium, Cobalt, Cadmium, Copper, Manganese, Nickle, Vanadium); ICP/MS - 200.8 (Add-on) (Arsenic, Lead, Strontium, Uranium)

(3)IC Anions - 300.0 (Nitrate, Bromide, Chloride, Phosphate, Fluoride, Nitrogen in Nitrate)

ORIGINAL

| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
|---|---|---|---|
| [illegible] | 4/6/10 1005 | [illegible] | 4/6/10 1005 |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |

LABORATORY SECTION: RECEIVED BY — TITLE — DATE/TIME

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

A-6003-618(01/06)

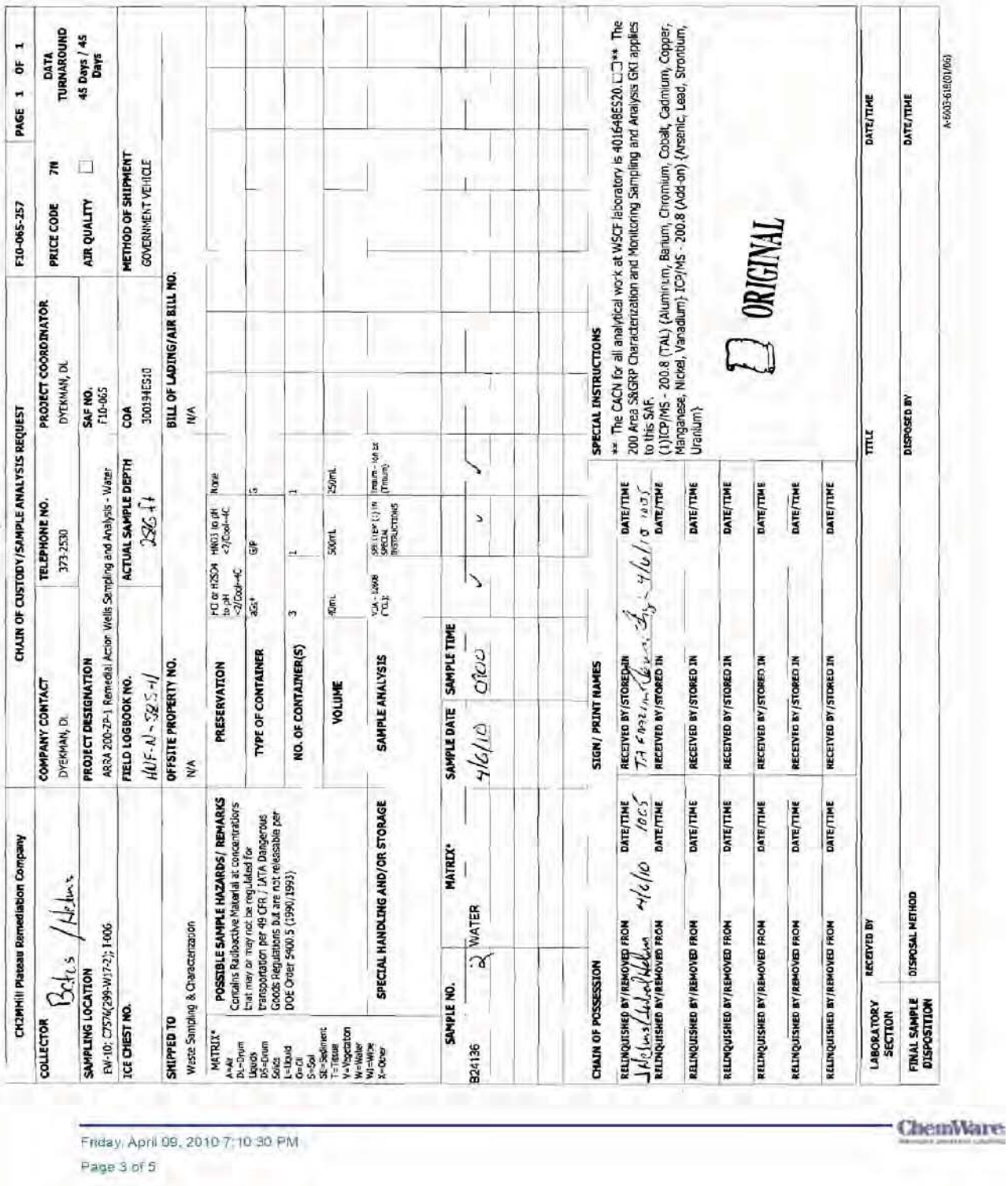
ChemWare

Friday, April 09, 2010 7:10:30 PM

Page 2 of 5

## Sample Receipt

### Chain of Custody



CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F10-065-257

PAGE 1 OF 1

COLLECTOR: Bates / Helm

COMPANY CONTACT: DYEKMAN, DL

TELEPHONE NO.: 373-2530

PROJECT COORDINATOR: DYEKMAN, DL

PRICE CODE: 7N

DATA TURNAROUND: 45 Days / 45 Days

SAMPLING LOCATION: EW-10; C7574(299-W17-2); I-006

PROJECT DESIGNATION: ARRA 200-ZP-1 Remedial Actior Wells Sampling and Analysis - Water

SAF NO.: F10-065

AIR QUALITY: ☐

ICE CHEST NO.: HUF-AL-525-1

FIELD LOGBOOK NO.: 300194ES10

ACTUAL SAMPLE DEPTH: 326.4 ft

COA: 300194ES10

METHOD OF SHIPMENT: GOVERNMENT VEHICLE

SHIPPED TO: Waste Sampling & Characterization

OFFSITE PROPERTY NO.: N/A

BILL OF LADING/AIR BILL NO.: N/A

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

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

PRESERVATION: HCl or H2SO4 to pH <2/Cool~4C; HNO3 to pH <2/Cool~4C; None

TYPE OF CONTAINER: 4Oz*; G/P; S

NO. OF CONTAINER(S): 3; 1; 1

VOLUME: 40mL; 500mL; 250mL

SAMPLE ANALYSIS: VOA - 8260 (TCL); SPECIAL INSTRUCTIONS; Trium - Alpha (Thorium)

SPECIAL HANDLING AND/OR STORAGE

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME |
|---|---|---|---|
| B24136 | W WATER | 4/6/10 | 0900 |

CHAIN OF POSSESSION

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS

** The CACN for all analytical work at WSCF laboratory is 401648E520.☐☐** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
(1)ICP/MS - 200.8 (TAL) (Aluminum, Barium, Chromium, Cobalt, Cadmium, Copper, Manganese, Nickel, Vanadium); ICP/MS - 200.8 (Add-on) (Arsenic, Lead, Strontium, Uranium)

ORIGINAL

| | | | |
|---|---|---|---|
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |

LABORATORY SECTION: RECEIVED BY — TITLE — DATE/TIME

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

A-6003-618(01/06)

Friday, April 09, 2010 7:10:30 PM

Page 3 of 5

ChemWare

## Sample Receipt

### Chain of Custody

**Medley, Heather A**

**From:** Widrig, Dana L
**Sent:** Friday, April 09, 2010 10:05 AM
**To:** Medley, Heather A; Ayres, Doris E; Dyekman, Dale L
**Cc:** ^CPP Sample Management; Fitzgerald, Scot L; Avila, Marisol; Barker, Richard L; Beebe, Kevin L; Budzeck, Richard H (Rick); Frazier, Teresa A; Johnston, Jill C; Kessler, Mitchel D; Kon, Susan L; Sims, Vic T; Trechter, John E Jr; Westberg, Richard A
**Subject:** RE: 100685 B24134 VOA (2 sets of VOA vials, with two different lists of analytes
**Attachments:** FW: 100685 B24134 VOA (2 sets of VOA vials, with two different lists of analytes

Heather – Please perform 8260 TCL on the attached sample and cancel headspace VOA analysis.

Thanks,

Dana

**From:** Medley, Heather A
**Sent:** Friday, April 09, 2010 9:11 AM
**To:** Widrig, Dana L; Ayres, Doris E; Dyekman, Dale L
**Cc:** ^CPP Sample Management; Fitzgerald, Scot L; Avila, Marisol; Barker, Richard L; Beebe, Kevin L; Budzeck, Richard H (Rick); Frazier, Teresa A; Johnston, Jill C; Kessler, Mitchel D; Kon, Susan L; Sims, Vic T; Trechter, John E Jr; Westberg, Richard A
**Subject:** RE: 100685 B24134 VOA (2 sets of VOA vials, with two different lists of analytes

May I cross off the request for the headspace VOA analysis? We will resend the sample receipt information with the changes. I haven't heard which VOA analysis the project would like reported so we logged the TCL VOAs.

**From:** Medley, Heather A
**Sent:** Tuesday, April 06, 2010 4:18 PM
**To:** Widrig, Dana L; Ayres, Doris E; Dyekman, Dale L
**Cc:** ^CPP Sample Management; Fitzgerald, Scot L; Avila, Marisol; Barker, Richard L; Beebe, Kevin L; Budzeck, Richard H (Rick); Frazier, Teresa A; Johnston, Jill C; Kessler, Mitchel D; Kon, Susan L; Sims, Vic T; Trechter, John E Jr; Westberg, Richard A
**Subject:** RE: 100685 B24134 VOA (2 sets of VOA vials, with two different lists of analytes

We need to know which VOA service list to log?

**From:** Widrig, Dana L
**Sent:** Tuesday, April 06, 2010 2:49 PM
**To:** Medley, Heather A; Ayres, Doris E; Dyekman, Dale L
**Cc:** ^CPP Sample Management; Fitzgerald, Scot L; Avila, Marisol; Barker, Richard L; Beebe, Kevin L; Budzeck, Richard H (Rick); Frazier, Teresa A; Johnston, Jill C; Kessler, Mitchel D; Kon, Susan L; Sims, Vic T; Trechter, John E Jr; Westberg, Richard A
**Subject:** RE: 100685 B24134 VOA (2 sets of VOA vials, with two different lists of analytes

Heather,

This should be aGs – not aGs*. Please note this for future chains that come in with this bottle type noted. It is incorrect on the COCs. Please document on an IRF –

Thanks,

1

## Sample Receipt

### Chain of Custody

Dana

**From:** Medley, Heather A
**Sent:** Tuesday, April 06, 2010 2:30 PM
**To:** Widrig, Dana L; Ayres, Doris E; Dyekman, Dale L
**Cc:** ^CPP Sample Management; Fitzgerald, Scot L; Avila, Marisol; Barker, Richard L; Beebe, Kevin L; Budzeck, Richard H (Rick); Frazier, Teresa A; Johnston, Jill C; Kessler, Mitchel D; Kori, Susan L; Sims, Vic T; Trechter, John E Jr; Westberg, Richard A
**Subject:** FW: 100685 B24134 VOA (2 sets of VOA vials, with two different lists of analytes
**Importance:** High

Please clarify which VOA analysis is needed 8260 or head space? Normally the headspace analysis is for the 24 hour TAT sample.

**From:** Frazier, Teresa A
**Sent:** Tuesday, April 06, 2010 1:52 PM
**To:** Medley, Heather A
**Subject:** 100685 B24134 VOA (2 sets of VOA vials, with two different lists of analytes

***This email contains confidential and privileged material for the sole use of the intended recipient. Any review, use, distribution or disclosure by others is strictly prohibited. If you received this message in error, please notify the sender immediately and delete all copies of this message.***

2

## Narrative

Attachment 2
**Narrative**
WSCF101545

**Introduction**

One (1) S&GRP sample was received at the WSCF Laboratory on July 1, 2010. The sample was analyzed for the analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *Statement of Work (SOW), Modification No. 2 to Agreement 36587, Release 3, "FH WSCF ANALYTICAL SERVICES FOR GROUNDWATER."*

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

It should be noted that the attached chain of custody was not stamped "ICED" by the WSCF Laboratory Sample Custodian during sample receiving. However, based on procedure LO-090-403 form "NOTICE OF IMPROPER SAMPLE SUBMITTAL" was not submitted and was not stamped "NOT ICED". No anomaly was noted during sample receipt.

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

- **B** – Sample results with a concentration greater than the MDL but less than the PQL are B flagged (applies to inorganic and wet chemical analyses), as appropriate.
- **D** – Sample results are D flagged if dilution(s) were required, as appropriate.
- **J** – Sample results with a concentration greater than the MDL but less than the PQL are J flagged (applies to organic analyses), as appropriate.
- **U** – Analyzed for but not detected above limiting criteria. Relative Percent Difference (RPD) values associated with an analyte qualified with a "U" are not applicable.

**Analytical Methodology for Requested Analyses**

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

**Inorganic Comments**

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

- Batch QC 141777 analyzed on sample# B24JX7 (101545001)
  - Relative Percent Difference (RPD) values associated with an analyte qualified with a "U" are not applicable.

1

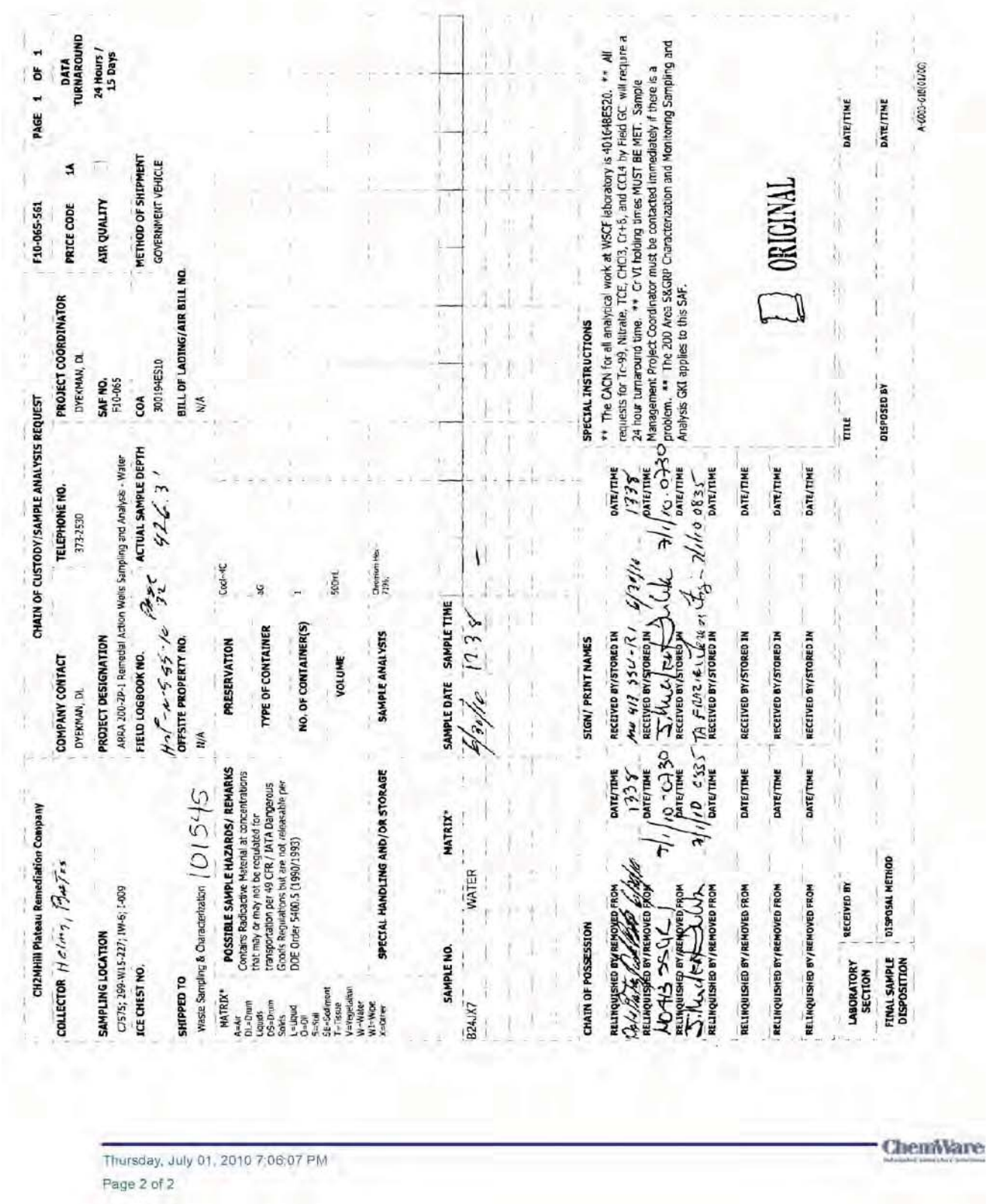
## Narrative

Attachment 2
**Narrative**
WSCF101545

All QC controls are within the established limits.

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

## Sample Receipt



CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F10-065-561 PAGE 1 OF 1

COLLECTOR Helms, Bates

COMPANY CONTACT: DYEKMAN, DL

TELEPHONE NO.: 373-2530

PROJECT COORDINATOR: DYEKMAN, DL

PRICE CODE: 1A

DATA TURNAROUND: 24 Hours / 15 Days

SAMPLING LOCATION: C7575; 299-W15-227; UW-6; 1-009

PROJECT DESIGNATION: ARRA 200-ZP-1 Remedial Action Wells Sampling and Analysis - Water

SAF NO.: F10-065

AIR QUALITY:

ICE CHEST NO.:

FIELD LOGBOOK NO.: HNF-N-455-10 Page 32

ACTUAL SAMPLE DEPTH: 426.3'

COA: 300194ES10

METHOD OF SHIPMENT: GOVERNMENT VEHICLE

SHIPPED TO: Waste Sampling & Characterization 101545

OFFSITE PROPERTY NO.: N/A

BILL OF LADING/AIR BILL NO.: N/A

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

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

PRESERVATION: Cool~4C

TYPE OF CONTAINER: 3G

NO. OF CONTAINER(S): 1

VOLUME: 500mL

SAMPLE ANALYSIS: Chromium Hex 7196

SPECIAL INSTRUCTIONS

** The CACN for all analytical work at WSCF laboratory is 401648ES20. ** All requests for Tc-99, Nitrate, TCE, CHCl3, Cr+6, and CCL4 by Field GC will require a 24 hour turnaround time. ** Cr VI holding times MUST BE MET. Sample Management Project Coordinator must be contacted immediately if there is a problem. ** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME |
|---|---|---|---|
| B24JX7 | WATER | 6/29/10 | 1738 |

CHAIN OF POSSESSION

SIGN/ PRINT NAMES

RELINQUISHED BY/REMOVED FROM — DATE/TIME — RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME — RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME — RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME — RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME — RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME — RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME — RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME — RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME — RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME — RECEIVED BY/STORED IN — DATE/TIME

LABORATORY SECTION: RECEIVED BY — TITLE — DATE/TIME

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

ORIGINAL

A-6003-618 (01/10)

ChemWare

Thursday, July 01, 2010 7:06:07 PM

Page 2 of 2

## Narrative

Attachment 2
**Narrative**
WSCF101611

**Introduction**

One (1) S&GRP sample was received at the WSCF Laboratory on July 8, 2010. The sample was analyzed for the analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *Statement of Work (SOW), Modification No. 2 to Agreement 36587, Release 3, "FH WSCF ANALYTICAL SERVICES FOR GROUNDWATER."*

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

It should be noted that the attached chain of custody was not stamped "ICED" by the WSCF Laboratory Sample Custodian during sample receiving. However, based on procedure LO-090-403 form "NOTICE OF IMPROPER SAMPLE SUBMITTAL" was not submitted and was not stamped "NOT ICED". No anomaly was noted during sample receipt.

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

- **B** – Sample results with a concentration greater than the MDL but less than the PQL are B flagged (applies to inorganic and wet chemical analyses), as appropriate.
- **D** – Sample results are D flagged if dilution(s) were required, as appropriate.
- **J** – Sample results with a concentration greater than the MDL but less than the PQL are J flagged (applies to organic analyses), as appropriate.
- **U** – Analyzed for but not detected above limiting criteria. Relative Percent Difference (RPD) values associated with an analyte qualified with a "U" are not applicable.

**Analytical Methodology for Requested Analyses**

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

**Inorganic Comments**

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

- Batch QC 142878 analyzed on sample# B24JJ9 (101611001)

All QC controls are within the established limits.

Attachment 2
**Narrative**
WSCF101611

**ICP-MS Metals** – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Technetium-99 is analyzed without prep therefore there is no Matrix Spike or Matrix Spike Duplicate with analysis. Analytical Note(s):

- Batch QC 145176 analyzed on sample# B25PT5 (101600014)
- Batch QC 152022

All QC controls are within the established limits.

**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):

- Batch QC 142904 analyzed on sample# B25X35 (101605001)

All QC controls are within the established limits.

**Radiochemistry Comments**

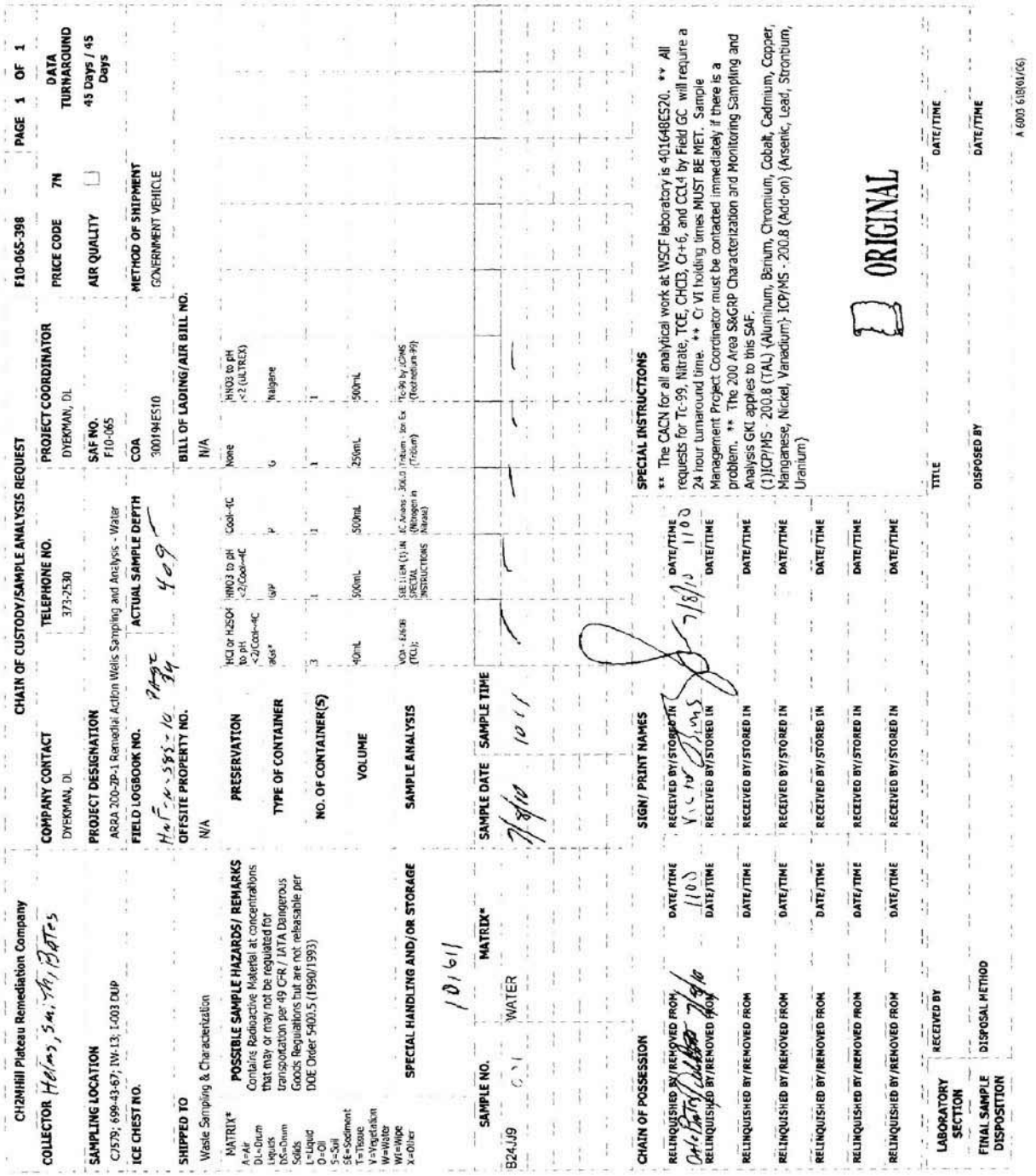
**Rad Chem** – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike (Matrix Spikes apply only to Tritium), Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- Tritium:
    - Batch QC 145087 analyzed on sample# B259T3 (101593007)

    All QC controls are within the established limits.

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

## Sample Receipt



CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F10-065-398

PAGE 1 OF 1

COLLECTOR: Helms, Sam; Bates

COMPANY CONTACT: DYEKMAN, DL

TELEPHONE NO.: 373-2530

PROJECT COORDINATOR: DYEKMAN, DL

PRICE CODE: 7N

DATA TURNAROUND: 45 Days / 45 Days

SAMPLING LOCATION: C7579; 699-43-67; IW-13; 1403 DUP

PROJECT DESIGNATION: ARRA 200-ZP-1 Remedial Action Wells Sampling and Analysis - Water

SAF NO.: F10-065

AIR QUALITY: ☐

ICE CHEST NO.:

FIELD LOGBOOK NO.: Hanford 385-10

ACTUAL SAMPLE DEPTH: 409

COA: 300194ES10

METHOD OF SHIPMENT: GOVERNMENT VEHICLE

SHIPPED TO: Waste Sampling & Characterization

OFFSITE PROPERTY NO.: N/A

BILL OF LADING/AIR BILL NO.: N/A

MATRIX*: A=Air, DL=Drum Liquids, DS=Drum Solids, L=Liquid, O=Oil, S=Soil, SE=Sediment, T=Tissue, V=Vegetation, W=Waste, 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)

PRESERVATION: HCl or H2SO4 to pH <2/Cool=4C; HNO3 to pH <2/Cool=4C; Cool=4C

TYPE OF CONTAINER: Glass*; VOA - 524/8260 (TCL); SEE ITEM (3) IN SPECIAL INSTRUCTIONS; AC Anions - 300.0 (Nitrogen in Nitrate); Tritium - Jor Ex (Tritium); Tc-99 by LSCMS (Technetium-99)

NO. OF CONTAINER(S): 3; 1; 1; 1; 1; 1

VOLUME: 40mL; 500mL; 500mL; 250mL; 500mL

SPECIAL HANDLING AND/OR STORAGE: 10611

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME |
|---|---|---|---|
| B24JJ9 | WATER | 7/8/10 | 1011 |

CHAIN OF POSSESSION

SIGN/ PRINT NAMES

RELINQUISHED BY/REMOVED FROM — DATE/TIME — RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME — RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME — RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME — RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME — RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME — RECEIVED BY/STORED IN — DATE/TIME

LABORATORY SECTION — RECEIVED BY — TITLE — DATE/TIME

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

SPECIAL INSTRUCTIONS

** The CACN for all analytical work at WSCF laboratory is 401648ES20. ** All requests for Tc-99, Nitrate, TCE, CHCl3, Cr+6, and CCl4 by Field GC will require a 24 hour turnaround time. ** Cr VI holding times MUST BE MET. Sample Management Project Coordinator must be contacted immediately if there is a problem. ** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
(1)ICP/MS - 200.8 (TAL) {Aluminum, Barium, Chromium, Cobalt, Cadmium, Copper, Manganese, Nickel, Vanadium}; ICP/MS - 200.8 (Add-on) {Arsenic, Lead, Strontium, Uranium}

ORIGINAL

A 6003 6/8(01/06)

Friday, July 23, 2010 7:03:09 PM

Page 2 of 2

ChemWare

## Narrative

Attachment 2
**Narrative**
WSCF101801

**Introduction**

Two (2) S&GRP samples were received at the WSCF Laboratory on July 22, 2010. The samples were analyzed for the analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *Statement of Work (SOW), Modification No. 2 to Agreement 36587, Release 3, "FH WSCF ANALYTICAL SERVICES FOR GROUNDWATER."*

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

It should be noted that the attached chain of custody was not stamped "ICED" by the WSCF Laboratory Sample Custodian during sample receiving. However, based on procedure LO-090-403 form "NOTICE OF IMPROPER SAMPLE SUBMITTAL" was not submitted and was not stamped "NOT ICED". No anomaly was noted during sample receipt.

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

- **B** – Sample results with a concentration greater than the MDL but less than the PQL are B flagged (applies to inorganic and wet chemical analyses), as appropriate.
- **D** – Sample results are D flagged if dilution(s) were required, as appropriate.
- **J** – Sample results with a concentration greater than the MDL but less than the PQL are J flagged (applies to organic analyses), as appropriate.
- **U** – Analyzed for but not detected above limiting criteria. Relative Percent Difference (RPD) values associated with an analyte qualified with a "U" are not applicable.

**Analytical Methodology for Requested Analyses**

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

**Inorganic Comments**

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

- Batch QC 145695 analyzed on sample# B25FT7 (101797001)

All QC controls are within the established limits.

1

## Narrative

Attachment 2
**Narrative**
WSCF101801

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

- Batch QC 148380 analyzed on sample# B26767 (101799008)
    - Chromium - was detected in the Blank and was evaluated. Affected sample results in this batch were "C" Flagged.

All other QC controls are within the established limits.

**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):

- Batch QC 146279 analyzed on sample# B24JH2 (101801001)

All QC controls are within the established limits.

**Radiochemistry Comments**

**Rad Chem** – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike (Matrix Spikes apply only to Technetium & Tritium), Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- Rad Chem requested to be performed included: Tritium and Technetium-99 by LSC.
- Technetium-99:
    - Batch QC 150092 analyzed on sample# B26901 (101787009)

All QC controls are within the established limits.

- Tritium:
    - Batch QC 148375 analyzed on sample# B26F29 (101793001)

All QC controls are within the established limits.

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

**CH2MHill Plateau Remediation Company**

**CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**

F10-065-381 PAGE 1 OF 1

COLLECTOR Heiny, Bean, Bates

COMPANY CONTACT: DYEKMAN, DL | TELEPHONE NO.: 373-2530 | PROJECT COORDINATOR: DYEKMAN, DL | PRICE CODE: 7N | DATA TURNAROUND: 45 Days / 45 Days

SAMPLING LOCATION: C7578; 699-45-67; IW-11; I-003

PROJECT DESIGNATION: ARRA 200-ZP-1 Remedial Action Wells Sampling and Analysis - Water | SAF NO.: F10-065 | AIR QUALITY: ☐

ICE CHEST NO.

FIELD LOGBOOK NO.: HNF-N-585-10 Page 38 | ACTUAL SAMPLE DEPTH: 348.1 | COA: 300194ES10 | METHOD OF SHIPMENT: GOVERNMENT VEHICLE

SHIPPED TO: Waste Sampling & Characterization

OFFSITE PROPERTY NO.: N/A | BILL OF LADING/AIR BILL NO.: N/A

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

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

101801

**SPECIAL HANDLING AND/OR STORAGE**

| PRESERVATION | HCl or H2SO4 to pH <2/Cool~4C | HNO3 to pH <2/Cool~4C | None |
|---|---|---|---|
| TYPE OF CONTAINER | aGs* | G/P | G |
| NO. OF CONTAINER(S) | 3 | 1 | 1 |
| VOLUME | 40mL | 500mL | 250mL |
| SAMPLE ANALYSIS | VOA - 8260B (TCL); | See ITEM (1) IN SPECIAL INSTRUCTIONS | Tritium - 906.0 (Tritium) |

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME |
|---|---|---|---|
| B24JH2 | WATER | 7/22/10 | 1314 |

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

| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
|---|---|---|---|
| [illegible] 7/22/10 | 1420 | [illegible] 7-22-10 | 1420 |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |

**SPECIAL INSTRUCTIONS**

** The CACN for all analytical work at WSCF laboratory is 401648ES20. ** All requests for Tc-99, Nitrate, TCE, CHCl3, Cr+6, and CCL4 by Field GC will require a 24 hour turnaround time. ** Cr VI holding times MUST BE MET. Sample Management Project Coordinator must be contacted immediately if there is a problem. ** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
(1)ICP/MS - 200.8 (TAL) {Aluminum, Barium, Chromium, Cobalt, Cadmium, Copper, Manganese, Nickel, Vanadium} ICP/MS - 200.8 (Add-on) {Arsenic, Lead, Strontium, Uranium}

☐ ORIGINAL

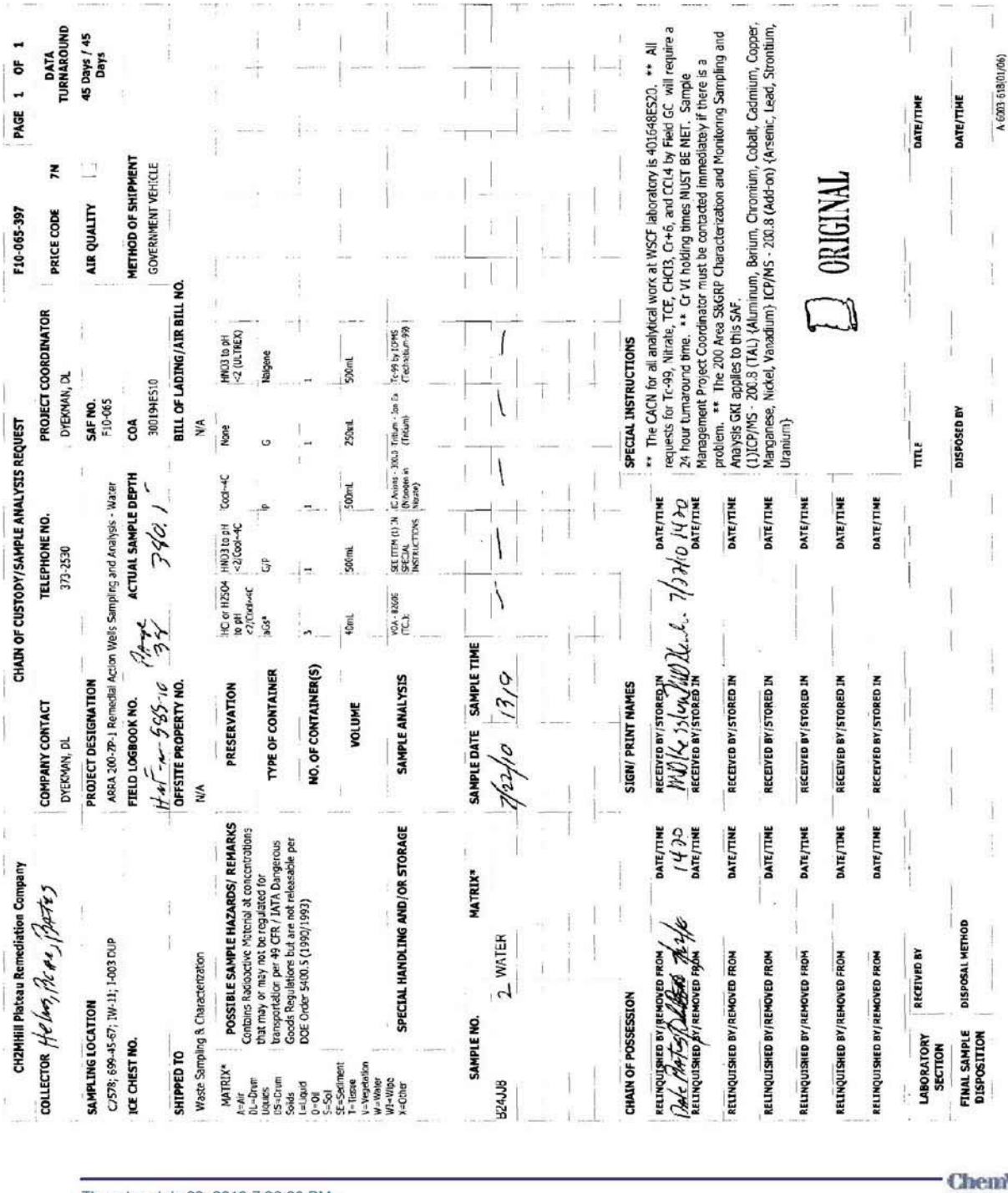
LABORATORY SECTION | RECEIVED BY | TITLE | DATE/TIME

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

A-6003-618(01/06)

## Sample Receipt

### Chain of Custody



CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F10-065-397

PAGE 1 OF 1

COLLECTOR: Heather Peters

COMPANY CONTACT: DYEKMAN, DL

TELEPHONE NO.: 373-2530

PROJECT COORDINATOR: DYEKMAN, DL

PRICE CODE: 7N

AIR QUALITY:

DATA TURNAROUND: 45 Days / 45 Days

SAMPLING LOCATION: C/578; 699-45-67; TW-11; 1-003 DUP

PROJECT DESIGNATION: ARRA 200-ZP-1 Remedial Action Wells Sampling and Analysis - Water

SAF NO.: F10-065

ICE CHEST NO.

FIELD LOGBOOK NO.: HAF-m-595-10

ACTUAL SAMPLE DEPTH: 340.1

COA: 300194ES10

METHOD OF SHIPMENT: GOVERNMENT VEHICLE

SHIPPED TO: Waste Sampling & Characterization

OFFSITE PROPERTY NO.: N/A

BILL OF LADING/AIR BILL NO.: N/A

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

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

PRESERVATION: HCl or H2SO4 to pH <2/Cool<4C | HNO3 to pH <2/Cool<4C | Cool<4C | None | HNO3 to pH <2 (ULTREX)

TYPE OF CONTAINER: VOA* | G/P | P | G | Nalgene

NO. OF CONTAINER(S): 3 | 1 | 1 | 1 | 1

VOLUME: 40mL | 500mL | 500mL | 250mL | 500mL

SAMPLE ANALYSIS: VOA - 8260 (TCL) | SEE ITEM (1) IN SPECIAL INSTRUCTIONS | IC Anions - 300.0 Tritium - Ion Ex (Nitrate in Water) | Tritium (Tritium) | Tc-99 by LSMS (Technetium-99)

SPECIAL HANDLING AND/OR STORAGE

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME |
|---|---|---|---|
| B24VJ8 | 2. WATER | 7/22/10 | 1310 |

SPECIAL INSTRUCTIONS

** The CACN for all analytical work at WSCF laboratory is 401648ES20. ** All requests for Tc-99, Nitrate, TCE, CHCl3, Cr+6, and CCl4 by Field GC will require a 24 hour turnaround time. ** Cr VI holding times MUST BE MET. Sample Management Project Coordinator must be contacted immediately if there is a problem. ** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF. (1)ICP/MS - 200.8 (TAL) {Aluminum, Barium, Chromium, Cobalt, Cadmium, Copper, Manganese, Nickel, Vanadium} ICP/MS - 200.8 (Add-on) {Arsenic, Lead, Strontium, Uranium}

CHAIN OF POSSESSION

SIGN/ PRINT NAMES

RELINQUISHED BY/REMOVED FROM — DATE/TIME — RECEIVED BY/STORED IN — DATE/TIME

Dirk Dyekman — 1430 — Mike Johnson — 7/23/10 1430

RELINQUISHED BY/REMOVED FROM — DATE/TIME — RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME — RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME — RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME — RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME — RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME — RECEIVED BY/STORED IN — DATE/TIME

LABORATORY SECTION: RECEIVED BY — TITLE — DATE/TIME

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

ORIGINAL

A 6093 618(01/06)

Thursday, July 22, 2010 7:23:20 PM

Page 3 of 3

ChemWare

## Narrative

Attachment 2
**Narrative**
WSCF101903

**Introduction**

One (1) S&GRP sample was received at the WSCF Laboratory on July 28, 2010. The sample was analyzed for the analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *Statement of Work (SOW), Modification No. 2 to Agreement 36587, Release 3, "FH WSCF ANALYTICAL SERVICES FOR GROUNDWATER."*

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

It should be noted that the attached chain of custody was not stamped "ICED" by the WSCF Laboratory Sample Custodian during sample receiving. However, based on procedure LO-090-403 form "NOTICE OF IMPROPER SAMPLE SUBMITTAL" was not submitted and was not stamped "NOT ICED". No anomaly was noted during sample receipt.

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

- **B** – Sample results with a concentration greater than the MDL but less than the PQL are B flagged (applies to inorganic and wet chemical analyses), as appropriate.
- **D** – Sample results are D flagged if dilution(s) were required, as appropriate.
- **J** – Sample results with a concentration greater than the MDL but less than the PQL are J flagged (applies to organic analyses), as appropriate.
- **U** – Analyzed for but not detected above limiting criteria. Relative Percent Difference (RPD) values associated with an analyte qualified with a "U" are not applicable.

**Analytical Methodology for Requested Analyses**

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

**Inorganic Comments**

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

- Batch QC 147580 analyzed on sample# B25RL7 (101901007)
    - Relative Percent Difference (RPD) values associated with an analyte qualified with a "U" are not applicable.

1

## Narrative

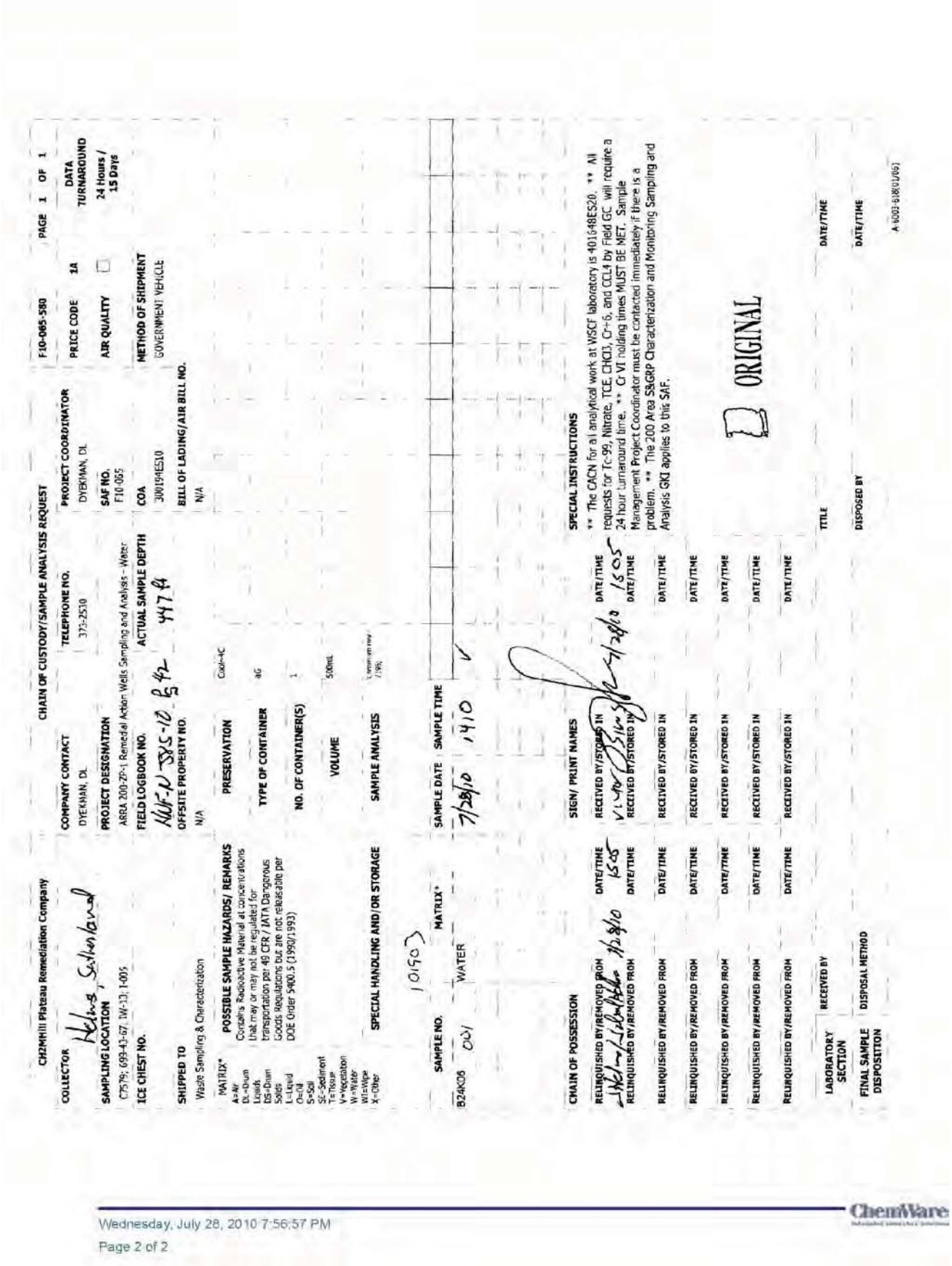
Attachment 2
**Narrative**
WSCF101903

All QC controls are within the established limits.

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

2

## Sample Receipt



CH2MHill Plateau Remediation Company — CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST — F10-065-580 — PAGE 1 OF 1

COLLECTOR: Helen Sahlstrand
COMPANY CONTACT: DYEKMAN, DL
TELEPHONE NO.: 373-2530
PROJECT COORDINATOR: DYEKMAN, DL
PRICE CODE: 1A
DATA TURNAROUND: 24 Hours / 15 Days
SAMPLING LOCATION: C7579; 699-43-67; IW-33; I-005
PROJECT DESIGNATION: ARRA 200-ZP-1 Remedial Action Wells Sampling and Analysis - Water
SAF NO.: F10-065
AIR QUALITY: ☐
ICE CHEST NO.:
FIELD LOGBOOK NO.: HNF-U 393-10 pg 42
ACTUAL SAMPLE DEPTH: 447 ft
COA: 300194ES10
METHOD OF SHIPMENT: GOVERNMENT VEHICLE
SHIPPED TO: Waste Sampling & Characterization
OFFSITE PROPERTY NO.: N/A
BILL OF LADING/AIR BILL NO.: N/A

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

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

PRESERVATION: Cool-4C
TYPE OF CONTAINER: aG
NO. OF CONTAINER(S): 1
VOLUME: 500mL
SAMPLE ANALYSIS: Tc-99 (HASL-300)
SPECIAL HANDLING AND/OR STORAGE

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME | |
|---|---|---|---|---|
| B24K06 001 | WATER | 7/28/10 | 1410 | ✓ |

10190

CHAIN OF POSSESSION — SIGN/ PRINT NAMES

RELINQUISHED BY/REMOVED FROM: [signature] DATE/TIME 7/28/10 1505
RECEIVED BY/STORED IN: [signature] DATE/TIME 7/28/10 1505
RELINQUISHED BY/REMOVED FROM: DATE/TIME
RECEIVED BY/STORED IN: DATE/TIME
RELINQUISHED BY/REMOVED FROM: DATE/TIME
RECEIVED BY/STORED IN: DATE/TIME
RELINQUISHED BY/REMOVED FROM: DATE/TIME
RECEIVED BY/STORED IN: DATE/TIME
RELINQUISHED BY/REMOVED FROM: DATE/TIME
RECEIVED BY/STORED IN: DATE/TIME
RELINQUISHED BY/REMOVED FROM: DATE/TIME
RECEIVED BY/STORED IN: DATE/TIME
RELINQUISHED BY/REMOVED FROM: DATE/TIME
RECEIVED BY/STORED IN: DATE/TIME
LABORATORY SECTION — RECEIVED BY — TITLE — DATE/TIME
FINAL SAMPLE DISPOSITION — DISPOSAL METHOD — DISPOSED BY — DATE/TIME

SPECIAL INSTRUCTIONS

** The CACN for all analytical work at WSCF laboratory is 401648ES20. ** All requests for Tc-99, Nitrate, TCE, CHCl3, Cr+6, and CCL4 by Field GC will require a 24 hour turnaround time. ** Cr VI holding times MUST BE MET. Sample Management Project Coordinator must be contacted immediately if there is a problem. ** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.

ORIGINAL

A-6003-618(01/06)

Wednesday, July 28, 2010 7:56:57 PM
Page 2 of 2
ChemWare

# Appendix 5

Data Validation Supporting Documentation

| VALIDATION LEVEL: | A | B | (C) | D | E |
|---|---|---|---|---|---|
| PROJECT: 200 Area SGRP | | | DATA PACKAGE: VSR11-043 | | |
| VALIDATOR: Eyda Hergenreder | | LAB: WSCF | | DATE: 04-18-2011 | |
| | | | SDG: WSCF100568, WSCF100628, WSCF100685, WSCF101545, WSCF101611, WSCF101801, WSCF101903 | | |
| ANALYSES PERFORMED | | | | | |
| Anions/IC X | TOC | TOX | TPH-418.1 | Oil and Grease | Alkalinity |
| Ammonia | BOD/COD | Chloride | Chromium-VI X | pH | $NO_3/NO_2$ |
| Sulfate | TDS | TKN | Phosphate | Cyanide | |
| | | | | | |

SAMPLES/MATRIX Water samples

SDG WSCF100568: B23CD6, B23F96
SDG WSCF100628: B23CF0
SDG WSCF100685: B24134
SDG WSCF101545: B24JX7
SDG WSCF101611: B24JJ9
SDG WSCF101801: B24JJ8
SDG WSCF101903: B24K06

## 1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments: None

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

| | | | |
|---|---|---|---|
| Initial calibrations performed on all instruments? | Yes | No | N/A |
| Initial calibrations acceptable? | Yes | No | N/A |
| ICV and CCV checks performed on all instruments? | Yes | No | N/A |
| ICV and CCV checks acceptable? | Yes | No | N/A |
| Standards traceable? | Yes | No | N/A |
| Standards expired? | Yes | No | N/A |
| Calculation check acceptable? | Yes | No | N/A |

Comments:

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

| | | | |
|---|---|---|---|
| ICB and CCB checks performed for all applicable analyses? (Levels D, E) | Yes | No | N/A |
| ICB and CCB results acceptable? (Levels D, E) | Yes | No | N/A |
| Laboratory blanks analyzed? | Yes | No | N/A |
| Laboratory blank results acceptable? | Yes | No | N/A |
| Field blanks analyzed? (Levels C, D, E) | Yes | No | N/A |
| Field blank results acceptable? (Levels C, D, E) | Yes | No | N/A |
| Transcription/calculation errors? (Levels D, E) | Yes | No | N/A |

Comments: None

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

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

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

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

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

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

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

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

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

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

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

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

Comments: None

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

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

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

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

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

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

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

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

Comments: None

**6. HOLDING TIMES (all levels)**

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

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

Comments: None

**7. RESULT QUANTITATION AND DETECTION LIMITS (all levels)**

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

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

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

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

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

Comments: None

# Appendix 6

Additional Documentation Requested By Client

## Quality Control Report

**Attention** Michael Neely
**Department** Inorganic

**Group #** WSCF100568

**QC Batch** 105276
**Associated Samples** 100568001, 100568002

**Test** Hexavalent chromium Discrete Analyzer

| Analyte | CAS # | Original Found | QC Found | Units | % Recov | Limits | RPD | RPD Limit | RQ | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| **BLANK** | | | **QC Sample #25498** | | | | | | | |
| Hexavalent chromium | 18540-29-9 | | <0.0020 | mg/L | | | | | U | 03/23/10 |
| **LCS** | | | **QC Sample #25500** | | | | | | | |
| Hexavalent chromium | 18540-29-9 | | 0.0520 | mg/L | 104 | 90 - 110 | | | | 03/23/10 |
| **DUP** | | | **QC Sample #25501** | | | | | | | |
| | | | **Original 100568001** | | | | | | | |
| Hexavalent chromium | 18540-29-9 | <0.0020 | <0.0020 | mg/L | | | 0.00 | 20 | U | 03/23/10 |
| **MS** | | | **QC Sample #25502** | | | | | | | |
| | | | **Original 100568001** | | | | | | | |
| Hexavalent chromium | 18540-29-9 | <0.0020 | 0.0429 | mg/L | 107.2 | 85 - 115 | | | | 03/23/10 |

## Quality Control Report

**Attention** Michael Neely
**Department** Inorganic

**Group #** WSCF100628

**QC Batch** 107482
**Associated Samples** 100628001

**Test** Hexavalent chromium Discrete Analyzer

| Analyte | CAS # | Original Found | QC Found | Units | % Recov | Limits | RPD | RPD Limit | RQ | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| **BLANK** | | | **QC Sample #25969** | | | | | | | |
| Hexavalent chromium | 18540-29-9 | | <0.0020 | mg/L | | | | | U | 03/31/10 |
| **LCS** | | | **QC Sample #25971** | | | | | | | |
| Hexavalent chromium | 18540-29-9 | | 0.0499 | mg/L | 99.8 | 90 - 110 | | | | 03/31/10 |
| **DUP** | | | **QC Sample #25972** | | | | | | | |
| | | | **Original 100628001** | | | | | | | |
| Hexavalent chromium | 18540-29-9 | <0.0020 | <0.0020 | mg/L | | | 0.00 | 20 | U | 03/31/10 |
| **MS** | | | **QC Sample #25973** | | | | | | | |
| | | | **Original 100628001** | | | | | | | |
| Hexavalent chromium | 18540-29-9 | <0.0020 | 0.0387 | mg/L | 96.8 | 85 - 115 | | | | 03/31/10 |

## Quality Control Report

**Attention** Michael Neely
**Department** Inorganic

**Group #** WSCF100685

**QC Batch** 108975
**Associated Samples** 100685001

**Test** Anions by Ion Chromatography (Water)

| Analyte | CAS # | Original Found | QC Found | Units | % Recov | Limits | RPD | RPD Limit | RQ | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| **BLANK** | | | **QC Sample #26371** | | | | | | | |
| Fluoride | 16984-48-8 | | <0.030 | ug/mL | | | | | U | 04/06/10 |
| Chloride | 16887-00-6 | | <0.043 | ug/mL | | | | | U | 04/06/10 |
| Nitrite-N | NO2-N | | <0.018 | ug/mL | | | | | U | 04/06/10 |
| Bromide | 24959-67-9 | | <0.045 | ug/mL | | | | | U | 04/06/10 |
| Nitrate-N | NO3-N | | <0.031 | ug/mL | | | | | U | 04/06/10 |
| Phosphate-P | PO4-P | | <0.070 | ug/mL | | | | | U | 04/06/10 |
| **LCS** | | | **QC Sample #26372** | | | | | | | |
| Fluoride | 16984-48-8 | | 0.930 | ug/mL | 93.9 | 90 - 110 | | | | 04/06/10 |
| Chloride | 16887-00-6 | | 1.99 | ug/mL | 100.3 | 90 - 110 | | | | 04/06/10 |
| Nitrite-N | NO2-N | | 1.03 | ug/mL | 105.7 | 90 - 110 | | | | 04/06/10 |
| Bromide | 24959-67-9 | | 4.06 | ug/mL | 103.5 | 90 - 110 | | | | 04/06/10 |
| Nitrate-N | NO3-N | | 0.919 | ug/mL | 103.8 | 90 - 110 | | | | 04/06/10 |
| Phosphate-P | PO4-P | | 1.92 | ug/mL | 100.4 | 90 - 110 | | | | 04/06/10 |
| **DUP** | | | **QC Sample #26373** | | | | | | | |
| | | | **Original 100690009** | | | | | | | |
| Fluoride | 16984-48-8 | | 0.233 | ug/mL | | | 2.10 | 20 | BD | 04/06/10 |
| Chloride | 16887-00-6 | | 7.46 | ug/mL | | | 0.00 | 20 | D | 04/06/10 |
| Nitrite-N | NO2-N | | <0.036 | ug/mL | | | 0.00 | 20 | UD | 04/06/10 |

## Quality Control Report

**Attention** Michael Neely
**Department** Inorganic

**Group #** WSCF100685

| Analyte | CAS # | Original Found | QC Found | Units | % Recov | Limits | RPD | RPD Limit | RQ | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| Bromide | 24959-67-9 | | <0.090 | ug/mL | | | 0.00 | 20 | UD | 04/06/10 |
| Nitrate-N | NO3-N | | 4.24 | ug/mL | | | 1.20 | 20 | D | 04/06/10 |
| Phosphate-P | PO4-P | | <0.14 | ug/mL | | | 0.00 | 20 | UD | 04/06/10 |
| **MS** | | | **QC Sample #26374** | | | | | | | |
| | | | **Original 100690009** | | | | | | | |
| Fluoride | 16984-48-8 | | 0.969 | ug/mL | 96.9 | 80 - 120 | | | D | 04/06/10 |
| Chloride | 16887-00-6 | | 1.94 | ug/mL | 97 | 80 - 120 | | | D | 04/06/10 |
| Nitrite-N | NO2-N | | 1.07 | ug/mL | 108.7 | 80 - 120 | | | D | 04/06/10 |
| Bromide | 24959-67-9 | | 3.98 | ug/mL | 100.6 | 80 - 120 | | | D | 04/06/10 |
| Nitrate-N | NO3-N | | 0.817 | ug/mL | 91.4 | 80 - 120 | | | D | 04/06/10 |
| Phosphate-P | PO4-P | | 1.95 | ug/mL | 101 | 80 - 120 | | | D | 04/06/10 |
| **MSD** | | | **QC Sample #26375** | | | | | | | |
| | | | **Original 100690009** | | | | | **Paired 26374** | | |
| Fluoride | 16984-48-8 | | 1.00 | ug/mL | 100.4 | 80 - 120 | 3.50 | 20 | D | 04/06/10 |
| Chloride | 16887-00-6 | | 1.89 | ug/mL | 94.4 | 80 - 120 | 2.70 | 20 | D | 04/06/10 |
| Nitrite-N | NO2-N | | 1.05 | ug/mL | 106.5 | 80 - 120 | 2.00 | 20 | D | 04/06/10 |
| Bromide | 24959-67-9 | | 3.95 | ug/mL | 99.6 | 80 - 120 | 1.00 | 20 | D | 04/06/10 |
| Nitrate-N | NO3-N | | 0.827 | ug/mL | 92.5 | 80 - 120 | 1.20 | 20 | D | 04/06/10 |
| Phosphate-P | PO4-P | | 1.96 | ug/mL | 101.4 | 80 - 120 | 0.40 | 20 | D | 04/06/10 |

## Quality Control Report

**Attention** Michael Neely
**Department** Inorganic

**Group #** WSCF101545

**QC Batch** 141777
**Associated Samples** 101545001

**Test** Hexavalent chromium Discrete Analyzer

| Analyte | CAS # | Original Found | QC Found | Units | % Recov | Limits | RPD | RPD Limit | | RQ | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **BLANK** | | | **QC Sample #32620** | | | | | | | | |
| Hexavalent chromium | 18540-29-9 | | <0.0020 | mg/L | | | | | | U | 07/01/10 |
| **LCS** | | | **QC Sample #32622** | | | | | | | | |
| Hexavalent chromium | 18540-29-9 | | 0.0502 | mg/L | 100.4 | 90 - 110 | | | | | 07/01/10 |
| **DUP** | | | **QC Sample #32623** | | | | | | | | |
| | | | **Original 101545001** | | | | | | | | |
| Hexavalent chromium | 18540-29-9 | <0.0020 | <0.0020 | mg/L | | | 104.00 | 20 | * | U | 07/01/10 |
| **MS** | | | **QC Sample #32624** | | | | | | | | |
| | | | **Original 101545001** | | | | | | | | |
| Hexavalent chromium | 18540-29-9 | <0.0020 | 0.0596 | mg/L | 112.1 | 85 - 115 | | | | | 07/01/10 |

## Quality Control Report

**Attention** Michael Neely
**Department** Inorganic

**Group #** WSCF101611

**QC Batch** 142878
**Associated Samples** 101611001

**Test** Anions by Ion Chromatography (Water)

| Analyte | CAS # | Original Found | QC Found | Units | % Recov | Limits | RPD | RPD Limit | | RQ | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **BLANK** | | | **QC Sample #32989** | | | | | | | | |
| Nitrate-N | NO3-N | | <0.031 | ug/mL | | | | | | U | 07/08/10 |
| **LCS** | | | **QC Sample #32990** | | | | | | | | |
| Nitrate-N | NO3-N | | 0.892 | ug/mL | 100.7 | 90 - 110 | | | | | 07/08/10 |
| **DUP** | | | **QC Sample #32991** | | | | | | | | |
| | | | **Original 101611001** | | | | | | | | |
| Nitrate-N | NO3-N | 11.8 | 11.9 | ug/mL | | | 0.80 | 20 | | D | 07/08/10 |
| **MS** | | | **QC Sample #32992** | | | | | | | | |
| | | | **Original 101611001** | | | | | | | | |
| Nitrate-N | NO3-N | 11.8 | 4.38 | ug/mL | 98.1 | 80 - 120 | | | | D | 07/08/10 |
| **MSD** | | | **QC Sample #32993** | | | | | | | | |
| | | | **Original 101611001** | | | | | | **Paired** | **32992** | |
| Nitrate-N | NO3-N | 11.8 | 4.46 | ug/mL | 99.7 | 80 - 120 | 1.60 | 20 | | D | 07/08/10 |

## Quality Control Report

**Attention** Michael Neely
**Department** Inorganic

**Group #** WSCF101801

**QC Batch** 145695
**Associated Samples** 101801002

**Test** Anions by Ion Chromatography (Water)

| Analyte | CAS # | Original Found | QC Found | Units | % Recov | Limits | RPD | RPD Limit | RQ | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| **BLANK** | | | **QC Sample #34036** | | | | | | | |
| Nitrate-N | NO3-N | | <0.031 | ug/mL | | | | | U | 07/22/10 |
| **LCS** | | | **QC Sample #34037** | | | | | | | |
| Nitrate-N | NO3-N | | 0.893 | ug/mL | 100.9 | 90 - 110 | | | | 07/22/10 |
| **DUP** | | | **QC Sample #34038** | | | | | | | |
| | | | **Original 101797001** | | | | | | | |
| Nitrate-N | NO3-N | | <0.062 | ug/mL | | | 0.00 | 20 | UD | 07/22/10 |
| **MS** | | | **QC Sample #34039** | | | | | | | |
| | | | **Original 101797001** | | | | | | | |
| Nitrate-N | NO3-N | | 0.912 | ug/mL | 102 | 80 - 120 | | | D | 07/22/10 |
| **MSD** | | | **QC Sample #34040** | | | | | | | |
| | | | **Original 101797001** | | | | | **Paired** | **34039** | |
| Nitrate-N | NO3-N | | 0.899 | ug/mL | 100.5 | 80 - 120 | 1.50 | 20 | D | 07/22/10 |

## Quality Control Report

**Attention** Michael Neely
**Department** Inorganic

**Group #** WSCF101903

**QC Batch** 147580
**Associated Samples** 101903001

**Test** Hexavalent chromium Discrete Analyzer

| Analyte | CAS # | Original Found | QC Found | Units | % Recov | Limits | RPD | RPD Limit | | RQ | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **LCS** | | | **QC Sample #34405** | | | | | | | | |
| Hexavalent chromium | 18540-29-9 | | 0.0492 | mg/L | 98.4 | 90 - 110 | | | | | 07/28/10 |
| **BLANK** | | | **QC Sample #34406** | | | | | | | | |
| Hexavalent chromium | 18540-29-9 | | <0.0020 | mg/L | | | | | | U | 07/28/10 |
| **DUP** | | | **QC Sample #34407** | | | | | | | | |
| | | | **Original 101901007** | | | | | | | | |
| Hexavalent chromium | 18540-29-9 | | <0.0020 | mg/L | | | 22.20 | 20 | * | U | 07/28/10 |
| **MS** | | | **QC Sample #34408** | | | | | | | | |
| | | | **Original 101901007** | | | | | | | | |
| Hexavalent chromium | 18540-29-9 | | 0.0431 | mg/L | 107.8 | 85 - 115 | | | | | 07/28/10 |

Date: 18 April 2011
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: 200 Area SGRP
Subject: Radiochemical - Sample Data Group (SDG) WSCF101801

## INTRODUCTION

This memorandum presents the results of data validation for SDG WSCF101801 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 |
|---|---|---|---|---|
| B24JH2 | 07/22/10 | Water | C | Tritium |
| B24JJ8 | 07/22/10 | Water | C | Tritium & Tc-99 |

Data validation was conducted in accordance with the CHPRC validation statement of work and the Sampling and Analysis Plan for Eleven ARRA Wells to Support the 200 West Groundwater Treatment System in FY 2010, DOE/RL-2009-95, Rev. 0 (SAP). Appendices 1 through 6 provide the following information as indicated below:

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

## DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 180 days. Sample preservation for water samples for all analyses except tritium requires acid preservation with nitric acid to pH <2.

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

- **Blanks**

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

**Laboratory Blanks**

All laboratory blank results were acceptable.

**Trip Blanks**

No trip blanks were submitted for validation.

**Field Blanks**

No field blanks were submitted for validation.

**Equipment Blanks**

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results, laboratory control sample results, and chemical recovery factors. Chemical recovery factors are determined through use of a carrier or tracer and provide assessment of the chemical separation process that is affected by the laboratory procedure, sample matrix, and/or interference. Chemical recovery factors are used to correct sample concentration, uncertainty, and MDC results. According to the SAP, the laboratory control sample accuracy limits are 80% to 120%. The matrix spike sample accuracy limits are ones specified by the DV procedure.

**Matrix Spike (MS) Samples**

All MS recoveries were acceptable.

**Laboratory Control Samples (LCSs)**

All LCS recoveries were acceptable.

**Carrier/Tracer Recovery Factors**

Carrier/tracer analyses are not required for the requested methods.

- **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 ±20%. When duplicate RPDs exceed the limits and have associated results <5X the MDCs the precision limits are ones specified by the DV procedure.

**Laboratory Duplicate Samples**

All laboratory duplicate results were acceptable.

**Field Duplicate Samples**

No field duplicates were submitted for validation.

**Field Split Samples**

No field splits were submitted for validation.

- **Detection Limits**

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

All reported sample MDCs were below the CRDLs.

- **Completeness**

SDG WSCF101801 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-2009-95, Rev. 0, *Sampling and Analysis Plan for Eleven ARRA Wells to Support the 200 West Groundwater Treatment System in FY 2010*, October 2009.

# 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: WSCF101801 | Reviewer: AQA | Project:<br>200 Area SGRP | Page 1 of 1 |
| **Analyte(s)** | **Qualifier** | **Samples Affected** | **Reason** |
| Radiochemical | None | N/A | N/A |

Comments: None

# Appendix 3

Annotated Laboratory Reports

## WSCF Analytical Results Report

**Attention** Michael Neely
**Department** Radiochemistry

**Group #** WSCF101801

**Sample #** 101801001
**SAF#** F10-065
**Sample ID** B24JH2

**Matrix** WATER
**Sampled** 07/22/10
**Received** 07/22/10

| Test Performed | CAS # | Method | RQ | Result | TP Err | Units | DF | MDL | PQL | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| **H3 EICHROM** | | | | | | | | | | **08/02/10** |
| **TRI-CARB LSC** | | | | | | | | | | |
| Tritium | 10028-17-8 | LA-508-421 | U | -11 | 66 | pCi/L | 1 | 180 | | 08/08/10 |



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

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

## WSCF Analytical Results Report

**Attention** Michael Neely
**Department** Radiochemistry

**Group #** WSCF101801

**Sample #** 101801002
**SAF#** F10-065
**Sample ID** B24JJ8

**Matrix** WATER
**Sampled** 07/22/10
**Received** 07/22/10

| Test Performed | CAS # | Method | RQ | Result | TP Err | Units | DF | MDL | PQL | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| **H3 EICHROM** | | | | | | | | | | **08/02/10** |
| **TRI-CARB LSC** | | | | | | | | | | |
| Tritium | 10028-17-8 | LA-508-421 | U | 33 | 100 | pCi/L | 1 | 180 | | 08/08/10 |
| **Tc-99** | | | | | | | | | | **08/09/10** |
| **TRI-CARB LSC** | | | | | | | | | | |
| Technetium-99 | 14133-76-7 | LA-508-421 | U | 5.8 | 4.1 | pCi/L | 1 | 6.3 | | 08/12/10 |

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

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

# Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Attachment 2
**Narrative**
WSCF101801

**Introduction**

Two (2) S&GRP samples were received at the WSCF Laboratory on July 22, 2010. The samples were analyzed for the analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *Statement of Work (SOW), Modification No. 2 to Agreement 36587, Release 3, "FH WSCF ANALYTICAL SERVICES FOR GROUNDWATER."*

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

It should be noted that the attached chain of custody was not stamped "ICED" by the WSCF Laboratory Sample Custodian during sample receiving. However, based on procedure LO-090-403 form "NOTICE OF IMPROPER SAMPLE SUBMITTAL" was not submitted and was not stamped "NOT ICED". No anomaly was noted during sample receipt.

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

- **B** – Sample results with a concentration greater than the MDL but less than the PQL are B flagged (applies to inorganic and wet chemical analyses), as appropriate.
- **D** – Sample results are D flagged if dilution(s) were required, as appropriate.
- **J** – Sample results with a concentration greater than the MDL but less than the PQL are J flagged (applies to organic analyses), as appropriate.
- **U** – Analyzed for but not detected above limiting criteria. Relative Percent Difference (RPD) values associated with an analyte qualified with a "U" are not applicable.

**Analytical Methodology for Requested Analyses**

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

**Inorganic Comments**

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

- Batch QC 145695 analyzed on sample# B25FT7 (101797001)

All QC controls are within the established limits.

1

## Narrative

Attachment 2
**Narrative**
WSCF101801

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

- Batch QC 148380 analyzed on sample# B26767 (101799008)
    - Chromium - was detected in the Blank and was evaluated. Affected sample results in this batch were "C" Flagged.

All other QC controls are within the established limits.

**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):

- Batch QC 146279 analyzed on sample# B24JH2 (101801001)

All QC controls are within the established limits.

**Radiochemistry Comments**

**Rad Chem** – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike (Matrix Spikes apply only to Technetium & Tritium), Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- Rad Chem requested to be performed included: Tritium and Technetium-99 by LSC.
- Technetium-99:
    - Batch QC 150092 analyzed on sample# B26901 (101787009)

All QC controls are within the established limits.

- Tritium:
    - Batch QC 148375 analyzed on sample# B26F29 (101793001)

All QC controls are within the established limits.

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

**CH2MHill Plateau Remediation Company**

**CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**

F10-065-381 PAGE 1 OF 1

COLLECTOR Heiny, Bean, Bates

COMPANY CONTACT: DYEKMAN, DL | TELEPHONE NO.: 373-2530 | PROJECT COORDINATOR: DYEKMAN, DL | PRICE CODE: 7N | DATA TURNAROUND: 45 Days / 45 Days

SAMPLING LOCATION: C7578; 699-45-67; IW-11; I-003

PROJECT DESIGNATION: ARRA 200-ZP-1 Remedial Action Wells Sampling and Analysis - Water | SAF NO.: F10-065 | AIR QUALITY: ☐

ICE CHEST NO.

FIELD LOGBOOK NO.: HNF-N-585-10 Page 38 | ACTUAL SAMPLE DEPTH: 348.1 | COA: 300194ES10 | METHOD OF SHIPMENT: GOVERNMENT VEHICLE

SHIPPED TO: Waste Sampling & Characterization

OFFSITE PROPERTY NO.: N/A | BILL OF LADING/AIR BILL NO.: N/A

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

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

101801

**SPECIAL HANDLING AND/OR STORAGE**

| PRESERVATION | HCl or H2SO4 to pH <2/Cool~4C | HNO3 to pH <2/Cool~4C | None |
|---|---|---|---|
| TYPE OF CONTAINER | aG6* | G/P | G |
| NO. OF CONTAINER(S) | 3 | 1 | 1 |
| VOLUME | 40mL | 500mL | 250mL |
| SAMPLE ANALYSIS | VOA - 8260B (TCL); | See ITEM (1) IN SPECIAL INSTRUCTIONS | Tritium - 906.0 (Tritium) |

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME |
|---|---|---|---|
| B24JH2 | WATER | 7/22/10 | 1314 |

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

| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
|---|---|---|---|
| [illegible] 7/22/10 | 1420 | [illegible] 7-22-10 | 1420 |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME |

**SPECIAL INSTRUCTIONS**

** The CACN for all analytical work at WSCF laboratory is 401648ES20. ** All requests for Tc-99, Nitrate, TCE, CHCl3, Cr+6, and CCL4 by Field GC will require a 24 hour turnaround time. ** Cr VI holding times MUST BE MET. Sample Management Project Coordinator must be contacted immediately if there is a problem. ** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
(1)ICP/MS - 200.8 (TAL) {Aluminum, Barium, Chromium, Cobalt, Cadmium, Copper, Manganese, Nickel, Vanadium} ICP/MS - 200.8 (Add-on) {Arsenic, Lead, Strontium, Uranium}

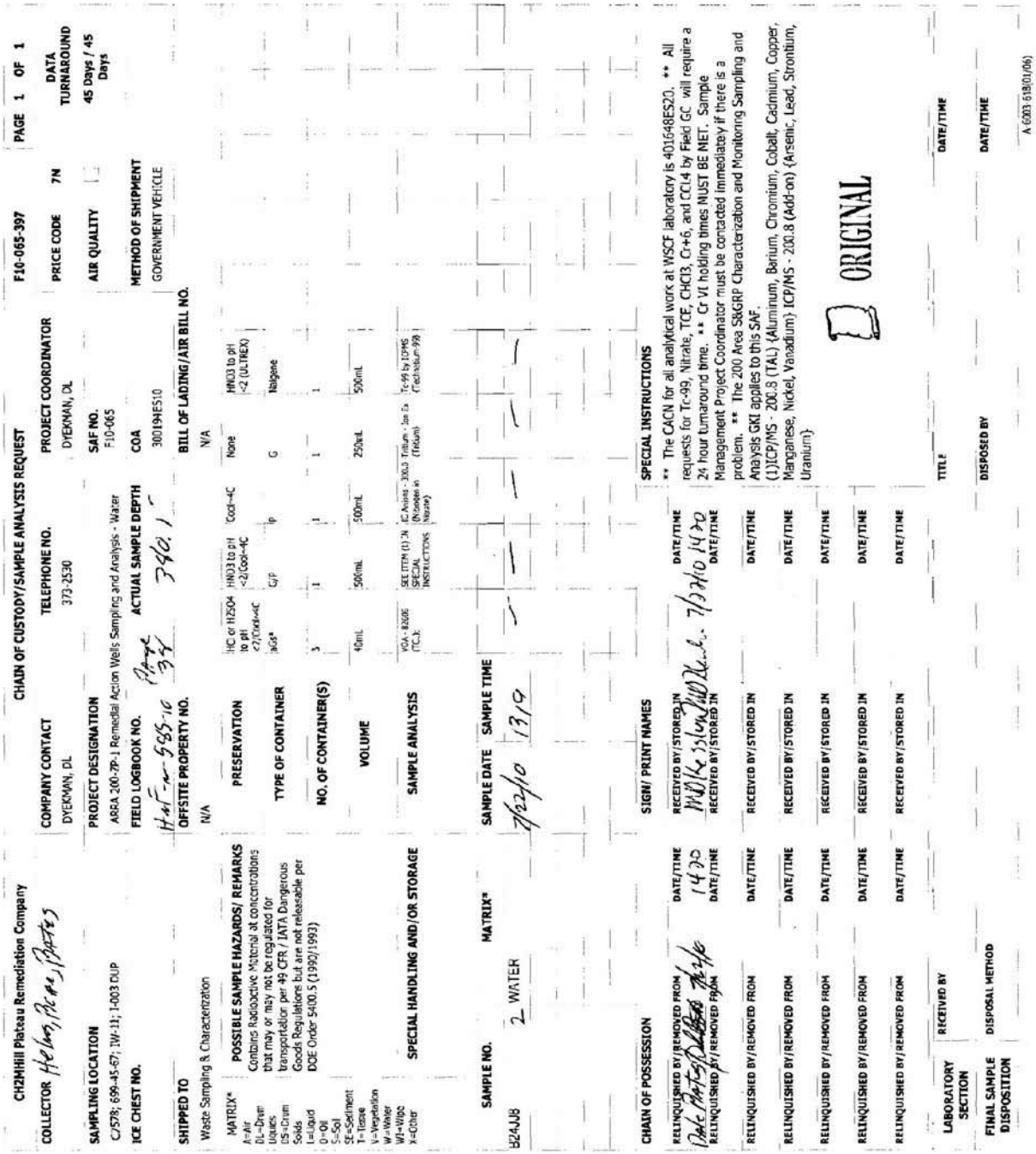
☐ ORIGINAL

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

A-6003-618(01/06)

## Sample Receipt

### Chain of Custody



CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F10-065-397

PAGE 1 OF 1

COLLECTOR: Heather Peters

COMPANY CONTACT: DYEKMAN, DL

TELEPHONE NO.: 373-2530

PROJECT COORDINATOR: DYEKMAN, DL

PRICE CODE: 7N

DATA TURNAROUND: 45 Days / 45 Days

SAMPLING LOCATION: C/578; 699-45-67; TW-11; 1-003 DUP

PROJECT DESIGNATION: ARRA 200-ZP-1 Remedial Action Wells Sampling and Analysis - Water

SAF NO.: F10-065

AIR QUALITY

ICE CHEST NO.

FIELD LOGBOOK NO.: HAF-09-595-10

ACTUAL SAMPLE DEPTH: 340.1

COA: 300194ES10

METHOD OF SHIPMENT: GOVERNMENT VEHICLE

SHIPPED TO: Waste Sampling & Characterization

OFFSITE PROPERTY NO.: N/A

BILL OF LADING/AIR BILL NO.: N/A

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

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

PRESERVATION: HCl or H2SO4 to pH <2/Cool<4C; HNO3 to pH <2/Cool<4C; Cool<4C; HNO3 to pH <2 (ULTREX)

TYPE OF CONTAINER: VOA*; G/P; P; G; Nalgene

NO. OF CONTAINER(S): 3; 1; 1; 1; 1

VOLUME: 40mL; 500mL; 500mL; 250mL; 500mL

SAMPLE ANALYSIS: VOA - 8260 (TCL); SEE ITEM (1) IN SPECIAL INSTRUCTIONS; IC Anions - 300.0 Tritium - Ion Ex (Nitrate in Water); Tc-99 by ICPMS (Technetium-99)

SPECIAL HANDLING AND/OR STORAGE

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME |
|---|---|---|---|
| B24VJ8 | 2 WATER | 7/22/10 | 1310 |

CHAIN OF POSSESSION

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS

** The CACN for all analytical work at WSCF laboratory is 401648ES20. ** All requests for Tc-99, Nitrate, TCE, CHCl3, Cr+6, and CCl4 by Field GC will require a 24 hour turnaround time. ** Cr VI holding times MUST BE MET. Sample Management Project Coordinator must be contacted immediately if there is a problem. ** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF. (1)ICP/MS - 200.8 (TAL) {Aluminum, Barium, Chromium, Cobalt, Cadmium, Copper, Manganese, Nickel, Vanadium} ICP/MS - 200.8 (Add-on) {Arsenic, Lead, Strontium, Uranium}

RELINQUISHED BY/REMOVED FROM: Heather Peters — DATE/TIME: 7/23/10 1430

RECEIVED BY/STORED IN: Mike Skwarek — DATE/TIME: 7/23/10 1430

RELINQUISHED BY/REMOVED FROM — DATE/TIME

RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME

RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME

RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME

RECEIVED BY/STORED IN — DATE/TIME

RELINQUISHED BY/REMOVED FROM — DATE/TIME

RECEIVED BY/STORED IN — DATE/TIME

ORIGINAL

LABORATORY SECTION: RECEIVED BY — TITLE — DATE/TIME

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

A 6093 618(01/06)

Thursday, July 22, 2010 7:23:20 PM

Page 3 of 3

ChemWare

# Appendix 5

Data Validation Supporting Documentation

## Appendix B - Radiochemical Data Validation Checklist

RADIOCHEMICAL DATA VALIDATION CHECKLIST

| VALIDATION LEVEL: | A | B | (C) | D | E |
|---|---|---|---|---|---|
| PROJECT: 200 Area SGRP | | | DATA PACKAGE: VSR11-043 | | |
| VALIDATOR: Eyda Hergenreder | | LAB: WSCF | | DATE: 04-18-2011 | |
| | | | SDG: WSCF101801 | | |
| ANALYSES PERFORMED | | | | | |
| Gross Alpha/Beta | Strontium-90 | Technetium-99 X | Alpha Spectroscopy | Gamma Spectroscopy | |
| Total Uranium | Radium-22 | Tritium X | C-14 | I-129 | |
| SAMPLES/MATRIX Water samples | | | | | |
| SDG WSCF101801: B24JH2, B24JJ8 | | | | | |

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)..... X 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) ..... X N/A

Background Counts checked within required frequency? ..... Yes No N/A
Background Counts acceptable? ..... Yes No N/A
Calculation check acceptable?..... Yes No N/A
Comments:

5. Blanks (Levels B, C, D, E) ☐ N/A

Method blank analyzed within required frequency? (Yes) No N/A
Method blank results acceptable? (Yes) No N/A
Analytes detected in method blank? Yes (No) N/A
Field blank(s) analyzed? Yes No (N/A)
Field blank results acceptable? Yes No (N/A)
Analytes detected in field blank(s)? Yes No (N/A)
Transcription/Calculation Errors? (Levels D, E) Yes No (N/A)
Comments: None

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

LCS /BSS analyzed within required frequency? (Yes) No N/A
LCS/BSS recoveries acceptable? (Yes) No N/A
LCS/BSS traceable? (Levels D,E) Yes No (N/A)
LCS/BSS expired? (Levels D,E) Yes No (N/A)
LCS/BSS levels correct? (Levels D,E) Yes No (N/A)
Transcription/Calculation Errors? (Levels D, E) Yes No (N/A)
Comments: None

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

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

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

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

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

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

Comments: None

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

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

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

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

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

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

Comments: None

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

Matrix spike analyzed? (Yes) No N/A

Spike recoveries acceptable? (Yes) No N/A

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

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

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

Comments: None

10. Duplicates (Levels C, D, E) ☐ N/A

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

RPD Values Acceptable? (Yes) No N/A

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

Comments: None

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

Field duplicate sample(s) analyzed? ..... Yes No (N/A)
Field duplicate RPD values acceptable? ..... Yes No (N/A)
Field split sample(s) analyzed? ..... Yes No (N/A)
Field split RPD values acceptable? ..... Yes No (N/A)
Performance audit sample(s) analyzed? ..... Yes No (N/A)
Performance audit sample results acceptable? ..... Yes No (N/A)
Comments: None

12. Holding Times (All levels)

Are sample holding times acceptable? ..... (Yes) No N/A
Comments: None

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

Results reported for all required sample analyses? ..... (Yes) No N/A
Results supported in raw data?(Levels D, E) ..... Yes No (N/A)
Results Acceptable? (Levels D, E) ..... Yes No (N/A)
Transcription/Calculation errors? (Levels D, E) ..... Yes No (N/A)
MDA's meet required detection limits? ..... (Yes) No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)
Comments: None

# Appendix 6

Additional Documentation Requested By Client

## Quality Control Report

**Attention** Michael Neely
**Department** Radiochemistry

**Group #** WSCF101801

**QC Batch** 148375
**Associated Samples** 101801001, 101801002

**Test** Tritium by LSC

| Analyte | CAS # | Original Found | QC Found | Units | % Recov | Limits | RPD | RPD Limit | RQ | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| **BLANK** | | | **QC Sample #34699** | | | | | | | |
| Tritium | 10028-17-8 | | 61 | pCi/L | | | | | U | 08/08/10 |
| **LCS** | | | **QC Sample #34700** | | | | | | | |
| Tritium | 10028-17-8 | | 2900 | pCi/L | 96.2 | 80 - 120 | | | | 08/08/10 |
| **DUP** | | | **QC Sample #34701** | | | | | | | |
| | | | **Original 101793001** | | | | | | | |
| Tritium | 10028-17-8 | | 1.7E4 | pCi/L | | | 0.00 | -20 - 20 | | 08/08/10 |
| **MS** | | | **QC Sample #34702** | | | | | | | |
| | | | **Original 101793001** | | | | | | | |
| Tritium | 10028-17-8 | | 17000 | pCi/L | 85.2 | 75 - 125 | | | | 08/08/10 |

## Quality Control Report

**Attention** Michael Neely
**Department** Radiochemistry

**Group #** WSCF101801

**QC Batch** 150092
**Associated Samples** 101801002

**Test** TC99 by Liquid Scintillation

| Analyte | CAS # | Original Found | QC Found | Units | % Recov | Limits | RPD | RPD Limit | RQ | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| **BLANK** | | | **QC Sample #35167** | | | | | | | |
| Technetium-99 | 14133-76-7 | | -3.6 | pCi/L | | | | | U | 08/12/10 |
| **LCS** | | | **QC Sample #35168** | | | | | | | |
| Technetium-99 | 14133-76-7 | | 230 | pCi/L | 101.4 | 80 - 120 | | | | 08/12/10 |
| **DUP** | | | **QC Sample #35169** | | | | | | | |
| | | | **Original 101787009** | | | | | | | |
| Technetium-99 | 14133-76-7 | | -4.6 | pCi/L | | | -19.00 | -20 - 20 | U | 08/12/10 |
| **MS** | | | **QC Sample #35170** | | | | | | | |
| | | | **Original 101787009** | | | | | | | |
| Technetium-99 | 14133-76-7 | | 940 | pCi/L | 103.6 | 75 - 125 | | | | 08/12/10 |