

**Data Validation Report for CH2M Hill
Plateau Remediation Company**

**VSR11-002
Project 200 AREA GRP**

Chemical & Radiochemical Validation - Level C

Validation Performed By: Carl Schroeder Date: 11-23-2010

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Date: 18 November 2010
 To: CH2M Hill (technical representative)
 From: Analytical Quality Associates, Inc.
 Project: 200 AREA GRP
 Subject: Volatile Organics - Sample Data Group (SDG) WSCF20100415

INTRODUCTION

This memorandum presents the results of data validation for SDG WSCF20100415 prepared by WSCF. A list of samples validated along with the analytical method is provided in the following table.

| Sample ID | Sample Date | Media | Validation Level | Analytical Methods |
|------------------|--------------------|--------------|-------------------------|---------------------------|
| B247W5 | 3-19-2010 | Soil | C | 8260 |
| B247W6 | 3-19-2010 | Soil | C | 8260 |

Data validation was conducted in accordance with the CHPRC validation statement of work and the Tanks/Lines/Pits/Boxes/Septic Tank and Drain Fields Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan; Includes: 200-IS-1 and 200-ST-1 Operable Units, DOE/RL-2002-14, Rev. 1, and the Sampling and Analysis Plan for Supplemental Remedial Investigation Activities at Model Group 5, Large-Area Ponds, Waste Sites Located Within the 200-CW-1 Operable Unit, DOE/RL-2006-57, Rev. 0, REISSUE (SAPs). Appendices 1 through 6 provide the following information as indicated below:

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

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

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

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

- **Blanks**

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

Laboratory Blanks

All laboratory blank results were acceptable with the following exception. Acetonitrile was not reported in the laboratory blank. The associated acetonitrile sample results were non-detects and should be qualified as estimates and flagged "UJ."

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 SAPs, the laboratory control sample accuracy limits are 70% to 130% at a minimum, and the statistical ones established by the analytical laboratory if more stringent. The matrix spike sample accuracy limits are the ones specified by the DV procedure. The limits for reported analytes not listed in the SAP are specified by the DV procedure.

Surrogates

All surrogate recoveries were acceptable.

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

All MS/MSD recoveries were acceptable with the following exceptions. The only 8260 MS/MSD analytes reported were 1,1-dichloroethene, benzene, chlorobenzene, toluene and trichloroethene. Reported analytes not represented in the MS/MSD were cis-1,3-dichloropropene, trans-1,3-dichloropropene, 4-methyl-2-pentanone, 2-hexanone, acetone, carbon disulfide, bromodichloromethane, 2-butanone, hexane, tetrahydrofuran, acetonitrile and 1-butanol. These 12 analytes were non-detects in sample B247W5 and should be qualified as estimates and flagged "UJ." Carbon disulfide was a detect in sample B247W6 and should be qualified as an estimate and flagged "J." The other 11 non-represented analytes were non-detects in sample B247W6 and should be qualified as estimates and flagged "UJ."

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exceptions. The only 8260 LCS analytes reported were 1,1-dichloroethene, benzene, chlorobenzene, toluene and trichloroethene. Reported analytes not represented in the LCS were cis-1,3-dichloropropene, trans-1,3-dichloropropene, 4-methyl-2-pentanone, 2-hexanone, acetone, carbon disulfide, bromodichloromethane, 2-butanone, hexane, tetrahydrofuran, acetonitrile and 1-butanol. These 12 analytes were non-detects in sample B247W5 and should be qualified as estimates and flagged "UJ." Carbon disulfide was a detect in sample B247W6 and should be qualified as an estimate and flagged "J." The other 11 non-represented analytes were non-detects in sample B247W6 and should be qualified as estimates and flagged "UJ."

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAPs, the relative percent difference (RPD) limits are $\pm 30\%$. The RPD limits for reported analytes not listed in the SAP are specified by the DV procedure. When duplicate RPDs exceed the limits and have associated results $< 5X$ the required detection limits with differences $< 2X$ the required detection limits no precision infraction occurred.

MS/MSD Samples

All MS/MSD relative percent difference values were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Internal Standards**

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

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

- **Detection Limits**

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

All reported sample MDLs were below the CRDLs.

- **Completeness**

SDG WSCF20100415 was submitted for validation and verified for completeness.

Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to non-represented QC data for multiple analytes and lack of acetonitrile laboratory blank data. 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-2002-14, Rev. 1, *Tanks/Lines/Pits/Boxes/Septic Tank and Drain Fields Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan; Includes: 200-IS-1 and 200-ST-1 Operable Units*, July 2008.

DOE/RL-2006-57, Rev. 0, REISSUE, *Sampling and Analysis Plan for Supplemental Remedial Investigation Activities at Model Group 5, Large-Area Ponds, Waste Sites Located Within the 200-CW-1 Operable Unit*, February 2008.

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: WSCF20100415 | Reviewer: AQA | Project: 200 AREA GRP | Page 1 of 1 |
| Analyte(s) | Qualifier | Samples Affected | Reason |
| cis-1,3-Dichloropropene trans-1,3-Dichloropropene 4-Methyl-2-pentanone 2-Hexanone Acetone Bromodichloromethane 2-Butanone Hexane Tetrahydrofuran 1-Butanol | UJ | B247W5 & B247W6 | Non-represented MS/MSD and LCS data |
| Acetonitrile | UJ | B247W5 & B247W6 | Lack of laboratory blank data, and non-represented MS/MSD and LCS data |
| Carbon disulfide | UJ | B247W5 | Non-represented MS/MSD and LCS data |
| Carbon disulfide | J | B247W6 | Non-represented MS/MSD and LCS data |

Comments: None

Appendix 3

Annotated Laboratory Reports

WSCF ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-102
Sample # W10GR00869
Client ID: B247W5

Group #: WSCF20100415
Department: Organic
Sampled: 03/19/10
Received: 03/19/10

GPP TRENT
WSCF

Matrix: SOIL

| Test Performed | CAS # | Method | RQ | Result | Unit | TP Err | Unit | DF | MDL | PQL | Analysis Date |
|------------------------------------|------------|------------|----|---------|-------|--------|------|------|---------|-----|---------------|
| Naphthalene | 91-20-3 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| 2-Methylnaphthalene | 91-57-6 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| 2-Chloronaphthalene | 91-58-7 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| 3,3'-Dichlorobenzidine | 91-94-1 | LA-523-456 | U | < 270 | ug/kg | | | 1.00 | 2.7e+02 | | 03/25/10 |
| 2-Methylphenol (cresol, o-) | 95-48-7 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| 1,2-Dichlorobenzene | 95-50-1 | LA-523-456 | U | < 250 | ug/kg | | | 1.00 | 2.5e+02 | | 03/25/10 |
| 2,4,5-Trichlorophenol | 95-95-4 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| Nitrobenzene | 98-95-3 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| 3-Nitroaniline | 99-09-2 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| 3 & 4 Methylphenol Total | 65794-96-9 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| Hexachloroethane | 67-72-1 | LA-523-456 | U | < 240 | ug/kg | | | 1.00 | 2.4e+02 | | 03/25/10 |
| 2,4,6-Trichlorophenol | 88-06-2 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| Decane | 124-18-5 | LA-523-456 | U | < 210 | ug/kg | | | 1.00 | 2.1e+02 | | 03/25/10 |
| Dodecane | 112-40-3 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| Benzyl alcohol | 100-51-6 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| 2-Butoxyethanol | 111-78-2 | LA-523-456 | U | < 210 | ug/kg | | | 1.00 | 2.1e+02 | | 03/25/10 |
| Tributyl phosphate | 126-73-8 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| 2-Naphthylamine | 91-59-8 | LA-523-456 | U | < 400 | ug/kg | | | 1.00 | 4.0e+02 | | 03/25/10 |
| Cyclohexanone | 108-94-1 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| 1,2,4-Trimethylbenzene | 95-63-6 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| VOA Ground Water Protection | | | | | | | | | | | |
| 1,1-Dichloroethene | 75-35-4 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |
| Trichloroethene | 79-01-6 | LA-523-455 | U | < 0.200 | ug/kg | | | 1.00 | 0.20 | | 03/25/10 |
| Benzene | 71-43-2 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |
| Toluene | 108-88-3 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |

LS
11-18-2010

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

B - The analyte < the RDL but > = the IDL/MDL (inorg)

D - Analyte was identified at a secondary dilution factor(inorg)

J - Analyte < lowest calibration but > = MDL.(org)

U - Analyzed for but not detected above limiting criteria(inorg)

D - Analyte was identified at a secondary dilution factor

E - Analyte is an estimate, has potentially larger errors(inorg)

N - Spike sample recovery is outside control limits.(inorg)

U - Analyzed for but not detected above limiting criteria.

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

Report WGPP/ver. 5.2
 Groundwater Remediation Program

WSCF ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-102
Sample # W10GR00869
Client ID: B247W5

GPP TRENT
WSCF

Matrix: SOIL

Group #: WSCF20100415
Department: Organic
Sampled: 03/19/10
Received: 03/19/10

| Test Performed | CAS # | Method | RQ | Result | Unit | TP Err | Unit | DF | MDL | PQL | Analysis Date |
|---------------------------|------------|------------|----|---------|-------|--------|------|------|------|-----|---------------|
| Chlorobenzene | 108-90-7 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |
| 1,1-Dichloroethane | 75-34-3 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |
| Ethylbenzene | 100-41-4 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |
| Styrene | 100-42-5 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |
| cis-1,3-Dichloropropene | 10061-01-5 | LA-523-455 | U | < 0.990 | ug/kg | UJ | | 1.00 | 0.99 | | 03/25/10 |
| trans-1,3-Dichloropropene | 10061-02-6 | LA-523-455 | U | < 0.990 | ug/kg | UJ | | 1.00 | 0.99 | | 03/25/10 |
| 1,2-Dichloroethane | 107-06-2 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |
| 4-Methyl-2-Pentanone | 108-10-1 | LA-523-455 | U | < 0.990 | ug/kg | UJ | | 1.00 | 0.99 | | 03/25/10 |
| Dibromochloromethane | 124-48-1 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |
| Tetrachloroethene | 127-18-4 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |
| Xylenes (total) | 1330-20-7 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |
| 1,2-Dichloroethene(Total) | 540-59-0 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |
| Carbon tetrachloride | 56-23-5 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |
| 2-Hexanone | 591-78-6 | LA-523-455 | U | < 0.990 | ug/kg | UJ | | 1.00 | 0.99 | | 03/25/10 |
| Acetone | 67-64-1 | LA-523-455 | U | < 0.990 | ug/kg | UJ | | 1.00 | 0.99 | | 03/25/10 |
| Chloroform | 67-66-3 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |
| 1,1,1-Trichloroethane | 71-55-6 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |
| Bromomethane | 74-83-9 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |
| Chloromethane | 74-87-3 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |
| Chloroethane | 75-00-3 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |
| Vinyl chloride | 75-01-4 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |
| Methylenechloride | 75-09-2 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |
| Carbon disulfide | 75-15-0 | LA-523-455 | U | < 0.990 | ug/kg | UJ | | 1.00 | 0.99 | | 03/25/10 |
| Bromoform | 75-25-2 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |
| Bromodichloromethane | 75-27-4 | LA-523-455 | U | < 0.990 | ug/kg | UJ | | 1.00 | 0.99 | | 03/25/10 |

MDL=Minimum Detection Limit

RQ=Result Qualifier

TP Err=Total Propagated Error

DF=Dilution Factor

B - The analyte < the RDL but > = the IDL/MDL (inorg)

D - Analyte was identified at a secondary dilution factor(inorg)

J - Analyte < lowest calibration but > = MDL.(org)

U - Analyzed for but not detected above limiting criteria(inorg)

D - Analyte was identified at a secondary dilution factor

E - Analyte is an estimate, has potentially larger errors(inorg)

N - Spike sample recovery is outside control limits.(inorg)

U - Analyzed for but not detected above limiting criteria.

* - Indicates results that have NOT been validated;

+ - Indicates more than six qualifier symbols

Report WGPP/ver. 5.2

Groundwater Remediation Program


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WSCF

ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-102
Sample # W10GR00869
Client ID: B247W5

GPP TRENT
WSCF

Matrix: SOIL

Group #: WSCF20100415
Department: Organic
Sampled: 03/19/10
Received: 03/19/10

| Test Performed | CAS # | Method | RQ | Result | Unit | TP Err | Unit | DF | MDL | PQL | Analysis Date |
|----------------------------|----------|------------|----|---------|-------|--------|------|------|------|-----|---------------|
| 1,2-Dichloropropane | 78-87-5 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |
| 2-Butanone | 78-93-3 | LA-523-455 | U | < 0.990 | ug/kg | UJ | | 1.00 | 0.99 | | 03/25/10 |
| 1,1,2-Trichloroethane | 79-00-5 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |
| 1,1,2,2-Tetrachloroethane | 79-34-5 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |
| 1-Butanol | 71-36-3 | LA-523-455 | U | < 99.0 | ug/kg | UJ | | 1.00 | 99 | | 03/25/10 |
| Hexane | 110-54-3 | LA-523-455 | U | < 0.990 | ug/kg | UJ | | 1.00 | 0.99 | | 03/25/10 |
| Tetrahydrofuran | 109-99-9 | LA-523-455 | U | < 2.00 | ug/kg | UJ | | 1.00 | 2.0 | | 03/25/10 |
| Trichloromonofluoromethane | 75-69-4 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |
| n-Butylbenzene | 104-51-8 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |
| trans-1,2-Dichloroethylene | 156-60-5 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |
| Acetonitrile | 75-05-8 | LA-523-455 | U | < 2.00 | ug/kg | UJ | | 1.00 | 2.0 | | 03/25/10 |
| cis-1,2-Dichloroethylene | 156-59-2 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |


 11-18-2010

MDL=Minimum Detection Limit
RQ=Result Qualifier
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DF=Dilution Factor

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 D - Analyte was identified at a secondary dilution factor (inorg)
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D - Analyte was identified at a secondary dilution factor
 E - Analyte is an estimate, has potentially larger errors (inorg)
 N - Spike sample recovery is outside control limits. (inorg)
 U - Analyzed for but not detected above limiting criteria.

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

Report WGPP/ver. 5.2
 Groundwater Remediation Program

WSCF ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-102
Sample # W10GR00870
Client ID: B247W6

GPP TRENT
WSCF

Matrix: SOIL

Group #: WSCF20100415
Department: Organic
Sampled: 03/19/10
Received: 03/19/10

| Test Performed | CAS # | Method | RQ | Result | Unit | TP Err | Unit | DF | MDL | PQL | Analysis Date |
|---|-----------------------|-----------------------|--------------|---------------------|------------------|--------|------|-----------------|--------------------|-----|---------------------|
| Naphthalene | 91-20-3 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| 2-Methylnaphthalene | 91-57-6 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| 2-Chloronaphthalene | 91-58-7 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| 3,3'-Dichlorobenzidine | 91-94-1 | LA-523-456 | U | < 260 | ug/kg | | | 1.00 | 2.6e+02 | | 03/25/10 |
| 2-Methylphenol (cresol, o-) | 95-48-7 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| 1,2-Dichlorobenzene | 95-50-1 | LA-523-456 | U | < 240 | ug/kg | | | 1.00 | 2.4e+02 | | 03/25/10 |
| 2,4,5-Trichlorophenol | 95-95-4 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| Nitrobenzene | 98-95-3 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| 3-Nitroaniline | 99-09-2 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| 3 & 4 Methylphenol Total | 65794-96-9 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| Hexachloroethane | 67-72-1 | LA-523-456 | U | < 230 | ug/kg | | | 1.00 | 2.3e+02 | | 03/25/10 |
| 2,4,6-Trichlorophenol | 88-06-2 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| Decane | 124-18-5 | LA-523-456 | U | < 200 | ug/kg | | | 1.00 | 2.0e+02 | | 03/25/10 |
| Dodecane | 112-40-3 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| Benzyl alcohol | 100-51-6 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| 2-Butoxyethanol | 111-76-2 | LA-523-456 | U | < 200 | ug/kg | | | 1.00 | 2.0e+02 | | 03/25/10 |
| Tributyl phosphate | 126-73-8 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| 2-Naphthylamine | 91-59-8 | LA-523-456 | U | < 390 | ug/kg | | | 1.00 | 3.9e+02 | | 03/25/10 |
| Cyclohexanone | 108-94-1 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| 1,2,4-Trimethylbenzene | 95-83-6 | LA-523-456 | U | < 180 | ug/kg | | | 1.00 | 1.8e+02 | | 03/25/10 |
| VOA Ground Water Protection | | | | | | | | | | | |
| 1,1-Dichloroethene | 75-35-4 | LA-523-455 | U | < 1.60 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |
| Trichloroethene | 79-01-6 | LA-523-455 | U | < 0.320 | ug/kg | | | 1.00 | 0.32 | | 03/25/10 |
| Benzene | 71-43-2 | LA-523-455 | U | < 1.60 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |
| Toluene | 108-88-3 | LA-523-455 | U | < 1.60 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |

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

B - The analyte < the RDL but >= the IDL/MDL (inorg)
 D - Analyte was identified at a secondary dilution factor(inorg)
 J - Analyte < lowest calibration but >= MDL.(org)
 U - Analyzed for but not detected above limiting criteria(inorg)

D - Analyte was identified at a secondary dilution factor
 E - Analyte is an estimate, has potentially larger errors(inorg)
 N - Spike sample recovery is outside control limits.(inorg)
 U - Analyzed for but not detected above limiting criteria.

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

Report WGPP/ver. 5.2
 Groundwater Remediation Program

WSCF

ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-102
Sample # W10GR00870
Client ID: B247W6

GPP TRENT
WSCF

Matrix: SOIL

Group #: WSCF20100415
Department: Organic
Sampled: 03/19/10
Received: 03/19/10

| Test Performed | CAS # | Method | RQ | Result | Unit | TP Err | Unit | DF | MDL | PQL | Analysis Date |
|---------------------------|------------|------------|----|--------|-------|--------|------|------|-----|-----|---------------|
| Chlorobenzene | 108-90-7 | LA-523-455 | U | < 1.60 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |
| 1,1-Dichloroethane | 75-34-3 | LA-523-455 | U | < 1.60 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |
| Ethylbenzene | 100-41-4 | LA-523-455 | U | < 1.60 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |
| Styrene | 100-42-5 | LA-523-455 | U | < 1.60 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |
| cis-1,3-Dichloropropene | 10061-01-5 | LA-523-455 | U | < 1.60 | ug/kg | UJ | | 1.00 | 1.6 | | 03/25/10 |
| trans-1,3-Dichloropropene | 10061-02-6 | LA-523-455 | U | < 1.60 | ug/kg | UJ | | 1.00 | 1.6 | | 03/25/10 |
| 1,2-Dichloroethane | 107-06-2 | LA-523-455 | U | < 1.60 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |
| 4-Methyl-2-Pentanone | 108-10-1 | LA-523-455 | U | < 1.60 | ug/kg | UJ | | 1.00 | 1.6 | | 03/25/10 |
| Dibromochloromethane | 124-48-1 | LA-523-455 | U | < 1.60 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |
| Tetrachloroethene | 127-18-4 | LA-523-455 | U | < 1.60 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |
| Xylenes (total) | 1330-20-7 | LA-523-455 | U | < 1.60 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |
| 1,2-Dichloroethene(Total) | 540-59-0 | LA-523-455 | U | < 1.60 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |
| Carbon tetrachloride | 56-23-5 | LA-523-455 | U | < 1.60 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |
| 2-Hexanone | 591-78-6 | LA-523-455 | U | < 1.60 | ug/kg | UJ | | 1.00 | 1.6 | | 03/25/10 |
| Acetone | 67-64-1 | LA-523-455 | U | < 1.60 | ug/kg | UJ | | 1.00 | 1.6 | | 03/25/10 |
| Chloroform | 67-66-3 | LA-523-455 | U | < 1.60 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |
| 1,1,1-Trichloroethane | 71-55-6 | LA-523-455 | U | < 1.60 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |
| Bromomethane | 74-83-9 | LA-523-455 | U | < 1.60 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |
| Chloromethane | 74-87-3 | LA-523-455 | U | < 1.60 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |
| Chloroethane | 75-00-3 | LA-523-455 | U | < 1.60 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |
| Vinyl chloride | 75-01-4 | LA-523-455 | U | < 1.60 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |
| Methylenechloride | 75-09-2 | LA-523-455 | U | < 1.60 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |
| Carbon disulfide | 75-15-0 | LA-523-455 | | 32.0 | ug/kg | J | | 1.00 | 1.6 | | 03/25/10 |
| Bromoform | 75-25-2 | LA-523-455 | U | < 1.60 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |
| Bromodichloromethane | 75-27-4 | LA-523-455 | U | < 1.60 | ug/kg | UJ | | 1.00 | 1.6 | | 03/25/10 |

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

B - The analyte < the RDL but > = the IDL/MDL (inorg)
 D - Analyte was identified at a secondary dilution factor(inorg)
 J - Analyte < lowest calibration but > = MDL.(org)
 U - Analyzed for but not detected above limiting criteria(inorg)

D - Analyte was identified at a secondary dilution factor
 E - Analyte is an estimate, has potentially larger errors(inorg)
 N - Spike sample recovery is outside control limits.(inorg)
 U - Analyzed for but not detected above limiting criteria.

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Report WGPP/ver. 5.2
 Groundwater Remediation Program

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WSCF ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-102
Sample # W10GR00870
Client ID: B247W6

Group #: WSCF20100415
Department: Organic
Sampled: 03/19/10
Received: 03/19/10

GPP TRENT
WSCF

Matrix: SOIL

| Test Performed | CAS # | Method | RQ | Result | Unit | TP Err | Unit | DF | MDL | PQL | Analysis Date |
|----------------------------|----------|------------|----|--------|-------|--------|------|------|---------|-----|---------------|
| 1,2-Dichloropropane | 78-87-5 | LA-523-455 | U | < 1.60 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |
| 2-Butanone | 78-93-3 | LA-523-455 | U | < 1.60 | ug/kg | UJ | | 1.00 | 1.6 | | 03/25/10 |
| 1,1,2-Trichloroethane | 79-00-5 | LA-523-455 | U | < 1.60 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |
| 1,1,2,2-Tetrachloroethane | 79-34-5 | LA-523-455 | U | < 1.60 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |
| 1-Butanol | 71-36-3 | LA-523-455 | U | < 160 | ug/kg | UJ | | 1.00 | 1.6e+02 | | 03/25/10 |
| Hexane | 110-54-3 | LA-523-455 | U | < 1.60 | ug/kg | UJ | | 1.00 | 1.6 | | 03/25/10 |
| Tetrahydrofuran | 109-99-9 | LA-523-455 | U | < 3.20 | ug/kg | UJ | | 1.00 | 3.2 | | 03/25/10 |
| Trichloromonofluoromethane | 75-69-4 | LA-523-455 | | 11.0 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |
| n-Butylbenzene | 104-51-8 | LA-523-455 | U | < 1.60 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |
| trans-1,2-Dichloroethylene | 156-60-5 | LA-523-455 | U | < 1.60 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |
| Acetonitrile | 75-05-8 | LA-523-455 | U | < 3.20 | ug/kg | UJ | | 1.00 | 3.2 | | 03/25/10 |
| cis-1,2-Dichloroethylene | 156-59-2 | LA-523-455 | U | < 1.60 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |


 11-18-2010

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

B - The analyte < the RDL but > = the IDL/MDL (inorg)
 D - Analyte was identified at a secondary dilution factor(inorg)
 J - Analyte < lowest calibration but > = MDL.(org)
 U - Analyzed for but not detected above limiting criteria(inorg)

D - Analyte was identified at a secondary dilution factor
 E - Analyte is an estimate, has potentially larger errors(inorg)
 N - Spike sample recovery is outside control limits.(inorg)
 U - Analyzed for but not detected above limiting criteria.

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Report WGPP/ver. 5.2
 Groundwater Remediation Program

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Introduction

Two (2) S&GRP samples were received at the WSCF Laboratory on March 19, 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 16 through 18, 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. See pages 23 through 24 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00869 (B247W5 in work order 20100415)
 - Fluoride, Nitrate and Nitrite – Matrix Spike and Matrix Spike Duplicate recoveries exceeded established laboratory limits. Affected sample results in this batch were “N” flagged. Percent recovery failures most likely due to matrix effects from the sample.

All other QC controls are within the established limits.

Cyanide – The hold time requirement for this analysis was met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 25 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00736 (B240J5 in work order 20100371)

All QC controls are within the established limits.

Hexavalent Chromium – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 26 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00703 (B23PH9 in work order 20100369)

All QC controls are within the established limits.

ICP-AES Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 27 through 28 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Estimated Boron results due to iron interference. Sample results are “E” flagged.
- Batch QC analyzed on sample# W10GR00736 and Batch QC analyzed on sample# W10GR00758 are not associated with this analytical group but cannot be removed from this printout. Please ignore these results.

All other QC controls are within the established limits.

ICP-MS Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 29 through 32 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00870 (B247W6 in work order 20100415)
 - Barium –Matrix Spike Duplicate recoveries exceeded laboratory spike levels. Affected sample results in this batch were “N” flagged.

All other QC controls are within the established limits.

Organic Comments

Sample concentrations are corrected for moisture content and reported on a dry weight basis.

Alcohol/Glycols - The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 46 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)

All QC controls are within the established limits.

PCB – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 49 through 50 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)

All QC controls are within the established limits.

Semi-VOA – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 51 through 56 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00863 (B247X2 in work order 20100409)

All QC controls are within the established limits.

TPHD-WA – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 47 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Surrogate recoveries exceeded acceptance limits for sample B247W5 (W10GR00869) and B247W6 (W10GR00870). Due to analysis problems, samples were re-analyzed on 03/29/10. Surrogate failure is contributed to the possible evaporation of solvent between analysis runs; thus increasing the surrogate concentration. All additional batch QC was within limits.
- Due to the co-elution of analytes for TPHD-WA (DRO) and kerosene analysis, samples are spiked and evaluated for TPHD only.

All other QC controls are within the established limits.

TPHG-WA – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 48 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00865 (B247X4 in work order 20100409)

All QC controls are within the established limits.

VOA – The hold time requirement for this analysis was met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 57 through 60 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)

All QC controls are within the established limits.

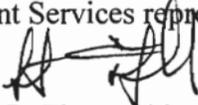
Radiochemistry Comments

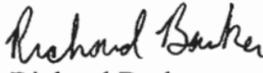
Rad Chem – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike (Matrix Spikes apply only to Technetium), Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 66 through 71 for QC details. Analytical Note(s):

- Tracers are used to determine chemical yield. RPD is monitored in sample duplicate and is not required for tracer recovery per SOW.
- Rad Chem requested to be performed included: Americium-241 by AEA, Gamma Energy Analysis, Plutonium Isotopic and Uranium Isotopic by AEA, Strontium-89/90, and Technetium-99 by LSC.
- Americium-241: Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Duplicate Relative Percent Difference(s) (RPD) did not meet the established laboratory limits. The RPD criterion does not apply to results near or below the minimum detectable activity. No flags issued.
 - All other QC controls are within the established limits.
- Gamma Energy Analysis: Batch QC analyzed on sample# W10GR000869 (B247W5 in work order 20100415)
 - Naturally occurring radioisotopes: Radium-226 was detected in the blank at less than 2 times the MDL. No flags applied.
 - All other QC controls are within the established limits.

- Isotopic Plutonium analysis: Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Plutonium-239 – detected in blank. Activity is less than 2 times the MDL and is acceptable.
 - All other QC controls are within the established limits.
- Isotopic Uranium analysis: Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - U-234 – detected in blank. Activity is less than 2 times the MDL and is acceptable.
 - All other QC controls are within the established limits.
- Strontium-89/90: Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Duplicate is flagged for poor RPD due to heterogeneous nature of the sample.
 - All other QC controls are within the established limits.
- Technetium-99: Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Matrix Spike flagged due to low recovery, however, it is still within the range of the statement of work that allows 60-140%.
 - All other QC controls are within the established limits.

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


Scot L. Fitzgerald
WSCF Analytical Laboratory Manager

 4-7-10
Richard Barker
WSCF Client Services

COLLECTOR FM Hall
CHPRC

SAMPLING LOCATION
C6724 (200E-127-PL) I-003

ICE CHEST NO.
N/A

SHIPPED TO
Waste Sampling & Characterization

COMPANY CONTACT
BAMBERGER, MACHELLE

PROJECT DESIGNATION
200-E-127 Pipeline - Soil

FIELD LOGBOOK NO.
HNF-N-507-5

OFFSITE PROPERTY NO.
N/A

TELEPHONE NO.
373-0880

ACTUAL SAMPLE DEPTH
15.0' - 20.0'

PROJECT COORDINATOR
WIDRIG, DL

SAF NO.
F10-102

COA
302427ES10

BILL OF LADING/AIR BILL NO.
N/A

PRICE CODE 8C

AIR QUALITY

METHOD OF SHIPMENT
GOVERNMENT VEHICLE

DATA TURNAROUND
15 Days / 15 Days

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

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B247W1
20100415

| PRESERVATION | Cool <-7C and >-20C | Cool~4C | Cool~4C | Cool~4C | None | None |
|----------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| TYPE OF CONTAINER | aGs* | aGs* | aG | G/P | P | G/P |
| NO. OF CONTAINER(S) | 5 | 3 | 1 | 1 | 1 | 1 |
| VOLUME | 40mL | 40mL | 125mL | 60mL | 125mL | 60mL |
| SAMPLE ANALYSIS | SEE ITEM (1) IN SPECIAL INSTRUCTIONS | SEE ITEM (2) IN SPECIAL INSTRUCTIONS | SEE ITEM (3) IN SPECIAL INSTRUCTIONS | SEE ITEM (4) IN SPECIAL INSTRUCTIONS | SEE ITEM (5) IN SPECIAL INSTRUCTIONS | SEE ITEM (6) IN SPECIAL INSTRUCTIONS |

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME | | | | | | |
|------------|-----------------|-------------|-------------|---|---|---|---|---|---|
| B247W5 | W106200869 SOIL | 3-19-10 | 0846 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

[Handwritten signature and date 3-19-10]

| CHAIN OF POSSESSION | SIGN/ PRINT NAMES | SPECIAL INSTRUCTIONS |
|--|----------------------|--------------------------------------|
| RELINQUISHED BY/REMOVED FROM FM Hall CHPRC | DATE/TIME 3-19-10 | RECEIVED BY/STORED IN [Signature] |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN |

SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

ORIGINAL

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

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COLLECTOR
 FM Hall
 CHPRC

SAMPLING LOCATION
 C6724 (200E-127-PL) I-003

ICE CHEST NO.
 N/A

SHIPPED TO
 Waste Sampling & Characterization

COMPANY CONTACT
 BAMBERGER, MACHELLE

PROJECT DESIGNATION
 200-E-127 Pipeline - Soil

FIELD LOGBOOK NO.

OFFSITE PROPERTY NO.
 N/A

TELEPHONE NO.
 373-0880

ACTUAL SAMPLE DEPTH

PROJECT COORDINATOR
 WIDRIG, DL

SAF NO.
 F10-102

COA
 302427ES10

BILL OF LADING/AIR BILL NO.
 N/A

PRICE CODE 8C

AIR QUALITY

METHOD OF SHIPMENT
 GOVERNMENT VEHICLE

DATA TURNAROUND
 15 Days / 15 Days

SPECIAL INSTRUCTIONS

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

(1)VOA - 5035/8260 (LOW LEVEL); VOA - 5035/8260 (LOW LEVEL) - (Add-On) {n-Butylbenzene, Acetonitrile, Trichloromonofluoromethane, Hexane, 1-Butanol, cis-1,2-Dichloroethylene, Tetrahydrofuran, trans-1,2-Dichloroethylene}

(2)Alcohols, Glycols, & Ketones - 8015 {Diethyl ether}

(3)Semi-VOA - 8270B (TCL); Semi-VOA - 8270B (Add-On) {Benzyl alcohol, Tributyl phosphate, 1,2,4-Trimethylbenzene, 1-Naphthylamine, 2-Butoxyethanol, 2-Naphthylamine, Cyclohexanone, Dodecane, Decane} TPH-Diesel/Kerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range} TPH-Gasoline Range - WTPH-G {Total petroleum hydrocarbons - gasoline range} PCBs - 8082;

(4)ICP Metals - 6010B (Add-On) {Boron, Bismuth} ICP/MS - 200.8 (TAL) {Antimony, Barium, Chromium, Cadmium, Copper, Zinc, Nickel, Vanadium, Silver} ICP/MS - 200.8 (Add-on) {Arsenic, Lead, Thorium-232, Molybdenum, Thallium, Beryllium, Uranium, Selenium} 200.8_HG - ICPMS {Mercury} Total Cyanide - 9014; Chromium Hex - 7196; IC Anions - 300.0 {Nitrogen in Nitrate, Fluoride, Nitrogen in Nitrate, Sulfate}

(5)Gamma Spectroscopy {Europium-155, Cesium-137, Europium-154, Europium-152, Cobalt-60} Gamma Spec - Add-on {Radium-226, Radium-228, Antimony-125, Cesium-134, Niobium-94}

(6)Americium-241; Isotopic Plutonium {Plutonium-239/240, Plutonium-238} Isotopic Uranium {Uranium-233/234, Uranium-235, Uranium-238} Strontium-89,90 -- Total Sr; Technetium-99;

 ORIGINAL

COLLECTOR
 FM Hall
 CHPRC

SAMPLING LOCATION
 C6724 (200E-127-PL) I-004

ICE CHEST NO.
 N/A

SHIPPED TO
 Waste Sampling & Characterization

COMPANY CONTACT
 BAMBERGER, MACHELLE

PROJECT DESIGNATION
 200-E-127 Pipeline - Soil

FIELD LOGBOOK NO.
 HNF-N-507-5

OFFSITE PROPERTY NO.
 N/A

TELEPHONE NO.
 373-0880

ACTUAL SAMPLE DEPTH
 20.0' - 25.0'

PROJECT COORDINATOR
 WIDRIG, DL

SAF NO.
 F10-102

COA
 302427ES10

BILL OF LADING/AIR BILL NO.
 N/A

PRICE CODE 8C

AIR QUALITY

METHOD OF SHIPMENT
 GOVERNMENT VEHICLE

DATA TURNAROUND
 15 Days / 15 Days

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

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

SPECIAL HANDLING AND/OR STORAGE
 RADIOACTIVE TIE TO: B247W2

| PRESERVATION | Cool <-7C and >-20C | Cool~4C | Cool~4C | Cool~4C | None | None |
|----------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| TYPE OF CONTAINER | aGs* | aGs* | aG | G/P | P | G/P |
| NO. OF CONTAINER(S) | 5 | 3 | 1 | 1 | 1 | 1 |
| VOLUME | 40mL | 40mL | 125mL | 60mL | 125mL | 60mL |
| SAMPLE ANALYSIS | SEE ITEM (1) IN SPECIAL INSTRUCTIONS | SEE ITEM (2) IN SPECIAL INSTRUCTIONS | SEE ITEM (3) IN SPECIAL INSTRUCTIONS | SEE ITEM (4) IN SPECIAL INSTRUCTIONS | SEE ITEM (5) IN SPECIAL INSTRUCTIONS | SEE ITEM (6) IN SPECIAL INSTRUCTIONS |

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME | SEE ITEM (1) IN SPECIAL INSTRUCTIONS | SEE ITEM (2) IN SPECIAL INSTRUCTIONS | SEE ITEM (3) IN SPECIAL INSTRUCTIONS | SEE ITEM (4) IN SPECIAL INSTRUCTIONS | SEE ITEM (5) IN SPECIAL INSTRUCTIONS | SEE ITEM (6) IN SPECIAL INSTRUCTIONS |
|------------------------|---------|-------------|-------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| B247W6 W106200870 SOIL | | 3-19-10 | 1012 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

CHAIN OF POSSESSION

| RELINQUISHED BY/REMOVED FROM | DATE/TIME | SIGN/ PRINT NAMES | RECEIVED BY/STORED IN | DATE/TIME |
|------------------------------|-----------|-----------------------|-----------------------|-----------|
| FM Hall CHPRC | 3-19-10 | [Signature] | [Signature] | 3-19-10 |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME | DATE/TIME |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME | DATE/TIME |

SPECIAL INSTRUCTIONS
 SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

ORIGINAL

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

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COLLECTOR
FM Hall
CHPRC

COMPANY CONTACT
BAMBERGER, MACHELLE

TELEPHONE NO.
373-0880

PROJECT COORDINATOR
WIDRIG, DL

PRICE CODE 8C

DATA TURNAROUND
15 Days / 15 Days

SAMPLING LOCATION
C6724 (200E-127-PL) I-004

PROJECT DESIGNATION
200-E-127 Pipeline - Soil

SAF NO.
F10-102

AIR QUALITY

ICE CHEST NO.
N/A

FIELD LOGBOOK NO.
HWF-N-507-S

ACTUAL SAMPLE DEPTH
20.0' - 25.0'

COA
302427ES10

METHOD OF SHIPMENT
GOVERNMENT VEHICLE

SHIPPED TO
Waste Sampling & Characterization

OFFSITE PROPERTY NO.
N/A

BILL OF LADING/AIR BILL NO.
N/A

SPECIAL INSTRUCTIONS

- ** The CACN for all analytical work at WSCF laboratory is to be determined. ** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
- (1)VOA - 5035/8260 (LOW LEVEL); VOA - 5035/8260 (LOW LEVEL) - (Add-On) (n-Butylbenzene, Acetonitrile, Trichloromonoofluoromethane, Hexane, 1-Butanol, cis-1,2-Dichloroethylene, Tetrahydrofuran, trans-1,2-Dichloroethylene)
 - (2)Alcohols, Glycols, & Ketones - 8015 (Diethyl ether)
 - (3)Semi-VOA - 8270B (TCL); Semi-VOA - 8270B (Add-On) (Tributyl phosphate, 1,2,4-Trimethylbenzene, Benzyl alcohol, 1-Naphthylamine, 2-Naphthylamine, 2-Butoxyethanol, Cyclohexanone, Dodecane, Decane) TPH-Diesel/Kerosene Range - WTPH-D (Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range) TPH-Gasoline Range - WTPH-G (Total petroleum hydrocarbons - gasoline range) PCBs - 8082;
 - (4)ICP Metals - 6010B (Add-On) (Boron, Bismuth) ICP/MS - 200.8 (TAL) (Antimony, Barium, Chromium, Cadmium, Copper, Zinc, Nickel, Vanadium, Silver) ICP/MS - 200.8 (Add-on) (Arsenic, Lead, Thorium-232, Molybdenum, Thallium, Beryllium, Uranium, Selenium) 200.8_HG - ICPMS (Mercury) Total Cyanide - 9014; Chromium Hex - 7196; IC Anions - 300.0 (Nitrogen in Nitrite, Fluoride, Nitrogen in Nitrate, Sulfate)
 - (5)Gamma Spectroscopy (Europium-155, Cesium-137, Europium-154, Europium-152, Cobalt-60) Gamma Spec - Add-on (Radium-226, Radium-228, Antimony-125, Cesium-134, Niobium-94)
 - (6)Americium-241; Isotopic Plutonium (Plutonium-239/240, Plutonium-238) Isotopic Uranium (Uranium-233/234, Uranium-235, Uranium-238) Strontium-89,90 -- Total Sr; Technetium-99;

 ORIGINAL

Appendix 5

Data Validation Supporting Documentation

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

Appendix A - Chemical Data Validation Checklist

| | | | | | |
|--|---|-----------------------|------------------------------------|------------------|-----------------------|
| VALIDATION LEVEL: | A | B | <input checked="" type="radio"/> C | D | E |
| PROJECT: 200 AREA GRP | | | DATA PACKAGE: VSR11-002 | | |
| VALIDATOR: Carl Schloesslin | | LAB: WSCF | | DATE: 11-18-2010 | |
| | | | SDG: WSCF20100415 | | |
| ANALYSES PERFORMED | | | | | |
| SW-846 8260 X | | SW-846 8260 (TCLP) | SW-846 8270 | | SW-846 8270 (TCLP) |
| | | | | | |
| SAMPLES/MATRIX Soil samples B247W5 & B247W6 | | | | | |

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments: None

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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:

Target analyte acetonitrile not reported in laboratory blank.

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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

Surrogates/system monitoring compounds analyzed? Yes No N/A
 Surrogate/system monitoring compound recoveries acceptable? Yes No N/A
 Surrogates traceable? (Levels D, E) Yes No N/A
 Surrogates expired? (Levels D, E) Yes No N/A
 MS/MSD samples analyzed? Yes No N/A
 MS/MSD results acceptable? Yes No N/A
 MS/MSD standards NIST traceable? (Levels D, E) Yes No N/A
 MS/MSD standards? (Levels D, E) Yes No N/A
 LCS/BSS samples analyzed? Yes No N/A
 LCS/BSS results acceptable? Yes No N/A
 Standards traceable? (Levels D, E) Yes No N/A
 Standards expired? (Levels D, E) Yes No N/A
 Transcription/calculation errors? (Levels D, E) Yes No N/A
 Performance audit sample(s) analyzed? Yes No N/A
 Performance audit sample results acceptable? Yes No N/A

Comments:

Five primary analytes spiked into LCS and MS/MSD only. Twelve target analytes not represented by five spiked analytes.

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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:

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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

WSCF ANALYTICAL LABORATORY QC REPORT

Department: **Organic**

SDG Number: WSCF20100415
 Matrix: SOLID
 Test: VOA Ground Water Protection

Sample Date: 03/17/10
 Receive Date: 03/17/10

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|---------------------------------|-----------------------------|------------|----------|----------|---------|-------------|-------------|--------|-----------|----|---------------|
| Lab ID: W10GR00862 | | | | | | | | | | | |
| BATCH QC ASSOCIATED WITH SAMPLE | | | | | | | | | | | |
| MS | 1,1-Dichloroethene | 75-35-4 | 28.150 | 91.600 | % Recov | 63.000 | 117.000 | | | | 03/24/10 |
| MS | Benzene | 71-43-2 | 33.460 | 109.000 | % Recov | 75.000 | 129.000 | | | | 03/24/10 |
| MS | 4-Bromofluorobenzene(Surr) | 460-00-4 | 52.640 | 85.600 | % Recov | 75.000 | 125.000 | | | | 03/24/10 |
| MS | Chlorobenzene | 108-90-7 | 31.320 | 102.000 | % Recov | 79.000 | 119.000 | | | | 03/24/10 |
| MS | 1,2-Dichloroethane-d4(Surr) | 17060-07-0 | 66.170 | 108.000 | % Recov | 75.000 | 125.000 | | | | 03/24/10 |
| MS | Toluene-d8(Surr) | 2037-26-5 | 60.980 | 99.200 | % Recov | 75.000 | 125.000 | | | | 03/24/10 |
| MS | Toluene | 108-88-3 | 30.830 | 100.000 | % Recov | 76.000 | 120.000 | | | | 03/24/10 |
| MS | Trichloroethene | 79-01-6 | 26.220 | 85.300 | % Recov | 73.000 | 123.000 | | | | 03/24/10 |
| MSD | 1,1-Dichloroethene | 75-35-4 | 28.020 | 95.300 | % Recov | 63.000 | 117.000 | | | | 03/25/10 |
| MSD | Benzene | 71-43-2 | 32.770 | 111.000 | % Recov | 75.000 | 129.000 | | | | 03/25/10 |
| MSD | 4-Bromofluorobenzene(Surr) | 460-00-4 | 53.040 | 90.200 | % Recov | 75.000 | 125.000 | | | | 03/25/10 |
| MSD | Chlorobenzene | 108-90-7 | 30.500 | 104.000 | % Recov | 79.000 | 119.000 | | | | 03/25/10 |
| MSD | 1,2-Dichloroethane-d4(Surr) | 17060-07-0 | 63.000 | 107.000 | % Recov | 75.000 | 125.000 | | | | 03/25/10 |
| MSD | Toluene-d8(Surr) | 2037-26-5 | 58.480 | 99.400 | % Recov | 75.000 | 125.000 | | | | 03/25/10 |
| MSD | Toluene | 108-88-3 | 30.480 | 104.000 | % Recov | 76.000 | 120.000 | | | | 03/25/10 |
| MSD | Trichloroethene | 79-01-6 | 25.260 | 85.900 | % Recov | 73.000 | 123.000 | | | | 03/25/10 |
| SPK-RPD | 1,1-Dichloroethene | 75-35-4 | 95.300 | | RPD | | | 3.959 | 20.000 | | 03/24/10 |
| SPK-RPD | Benzene | 71-43-2 | 111.000 | | RPD | | | 1.818 | 20.000 | | 03/24/10 |
| SPK-RPD | 4-Bromofluorobenzene(Surr) | 460-00-4 | 90.200 | | RPD | | | 5.233 | 20.000 | | 03/24/10 |
| SPK-RPD | Chlorobenzene | 108-90-7 | 104.000 | | RPD | | | 1.942 | 20.000 | | 03/24/10 |
| SPK-RPD | 1,2-Dichloroethane-d4(Surr) | 17060-07-0 | 107.000 | | RPD | | | 0.930 | 20.000 | | 03/24/10 |
| SPK-RPD | Toluene-d8(Surr) | 2037-26-5 | 99.400 | | RPD | | | 0.201 | 20.000 | | 03/24/10 |
| SPK-RPD | Toluene | 108-88-3 | 104.000 | | RPD | | | 3.922 | 20.000 | | 03/24/10 |
| SPK-RPD | Trichloroethene | 79-01-6 | 85.900 | | RPD | | | 0.701 | 20.000 | | 03/24/10 |

WSCF ANALYTICAL LABORATORY QC REPORT

Department: **Organic**

SDG Number: WSCF20100415
 Matrix: SOLID
 Test: VOA Ground Water Protection

Sample Date: 03/19/10
 Receive Date: 03/19/10

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|--|-----------------------------|------------|----------|----------|---------|-------------|-------------|--------|-----------|----|---------------|
| Lab ID: W10GR00869 | | | | | | | | | | | |
| BATCH QC ASSOCIATED WITH SAMPLE | | | | | | | | | | | |
| SURR | 4-Bromofluorobenzene(Surr) | 460-00-4 | 44.400 | 89.800 | % Recov | 75.000 | 125.000 | | | | 03/25/10 |
| SURR | 1,2-Dichloroethane-d4(Surr) | 17060-07-0 | 53.120 | 107.000 | % Recov | 75.000 | 125.000 | | | | 03/25/10 |
| SURR | Toluene-d8(Surr) | 2037-26-5 | 51.010 | 103.000 | % Recov | 80.000 | 126.000 | | | | 03/25/10 |
| Lab ID: W10GR00870 | | | | | | | | | | | |
| BATCH QC ASSOCIATED WITH SAMPLE | | | | | | | | | | | |
| SURR | 4-Bromofluorobenzene(Surr) | 460-00-4 | 61.500 | 77.100 | % Recov | 75.000 | 125.000 | | | | 03/25/10 |
| SURR | 1,2-Dichloroethane-d4(Surr) | 17060-07-0 | 83.820 | 105.000 | % Recov | 75.000 | 125.000 | | | | 03/25/10 |
| SURR | Toluene-d8(Surr) | 2037-26-5 | 77.280 | 96.900 | % Recov | 80.000 | 126.000 | | | | 03/25/10 |
| BATCH QC | | | | | | | | | | | |
| BLANK | 1,1-Dichloroethane | 75-34-3 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | 1,1,1-Trichloroethane | 71-55-6 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | 1,1,2-Trichloroethane | 79-00-5 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | 1,1,2,2-Tetrachloroethane | 79-34-5 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | 1,1-Dichloroethene | 75-35-4 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | 1,2-Dichloroethane | 107-06-2 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | 1,2-Dichloroethene(Total) | 540-59-0 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | 1-Butanol | 71-36-3 | < 100 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | 2-Hexanone | 591-78-6 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | 4-Methyl-2-Pentanone | 108-10-1 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | Acetone | 67-64-1 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | Bromodichloromethane | 75-27-4 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | Benzene | 71-43-2 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | 4-Bromofluorobenzene(Surr) | 460-00-4 | 47.800 | 95.600 | % Recov | 75.000 | 125.000 | | | | 03/24/10 |
| BLANK | Bromoform | 75-25-2 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | n-Butylbenzene | 104-51-8 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |

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WSCF ANALYTICAL LABORATORY QC REPORT

Department: **Organic**

SDG Number: WSCF20100415
 Matrix: SOLID
 Test: VOA Ground Water Protection

Sample Date:
 Receive Date:

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|---------|-----------------------------|------------|----------|----------|---------|-------------|-------------|--------|-----------|----|---------------|
| BLANK | Carbon disulfide | 75-15-0 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | Carbon tetrachloride | 56-23-5 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | Dibromochloromethane | 124-48-1 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | Chloroform | 67-66-3 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | Chlorobenzene | 108-90-7 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | cis-1,2-Dichloroethylene | 156-59-2 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | cis-1,3-Dichloropropene | 10061-01-5 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | Chloroethane | 75-00-3 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | 1,2-Dichloroethane-d4(Surr) | 17060-07-0 | 52.490 | 105.000 | % Recov | 75.000 | 125.000 | | | | 03/24/10 |
| BLANK | trans-1,2-Dichloroethylene | 156-60-5 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | 1,2-Dichloropropane | 78-87-5 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | Ethylbenzene | 100-41-4 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | Hexane | 110-54-3 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | Bromomethane | 74-83-9 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | Chloromethane | 74-87-3 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | 2-Butanone | 78-93-3 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | Methylenechloride | 75-09-2 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | Tetrachloroethene | 127-18-4 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | Styrene | 100-42-5 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | Xylenes (total) | 1330-20-7 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | Tetrahydrofuran | 109-99-9 | < 2.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | Toluene-d8(Surr) | 2037-26-5 | 51.070 | 102.000 | % Recov | 80.000 | 126.000 | | | | 03/24/10 |
| BLANK | Toluene | 108-88-3 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | trans-1,3-Dichloropropene | 10061-02-6 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | Trichloromonofluoromethane | 75-69-4 | < 1.0 | n/a | ug/Kg | 0.000 | 5.000 | | | U | 03/24/10 |
| BLANK | Trichloroethene | 79-01-6 | < 0.20 | n/a | ug/Kg | | | | | U | 03/24/10 |
| BLANK | Vinyl chloride | 75-01-4 | < 1.0 | n/a | ug/Kg | | | | | U | 03/24/10 |
| LCS | 1,1-Dichloroethene | 75-35-4 | 23.700 | 94.800 | % Recov | 75.000 | 125.000 | | | | 03/24/10 |
| LCS | Benzene | 71-43-2 | 25.770 | 103.000 | % Recov | 75.000 | 125.000 | | | | 03/24/10 |
| LCS | 4-Bromofluorobenzene(Surr) | 460-00-4 | 47.530 | 95.100 | % Recov | 75.000 | 125.000 | | | | 03/24/10 |

WSCF ANALYTICAL LABORATORY QC REPORT

Department: **Organic**

SDG Number: WSCF20100415
 Matrix: SOLID
 Test: VOA Ground Water Protection

Sample Date:
 Receive Date:

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|---------|-----------------------------|------------|----------|----------|---------|-------------|-------------|--------|-----------|----|---------------|
| LCS | Chlorobenzene | 108-90-7 | 24.550 | 98.200 | % Recov | 75.000 | 125.000 | | | | 03/24/10 |
| LCS | 1,2-Dichloroethane-d4(Surr) | 17060-07-0 | 52.320 | 105.000 | % Recov | 75.000 | 125.000 | | | | 03/24/10 |
| LCS | Toluene-d8(Surr) | 2037-26-5 | 50.230 | 100.000 | % Recov | 80.000 | 126.000 | | | | 03/24/10 |
| LCS | Toluene | 108-88-3 | 24.380 | 97.500 | % Recov | 75.000 | 125.000 | | | | 03/24/10 |
| LCS | Trichloroethene | 79-01-6 | 21.280 | 85.100 | % Recov | 75.000 | 125.000 | | | | 03/24/10 |

Date: 23 November 2010
 To: CH2M Hill (technical representative)
 From: Analytical Quality Associates, Inc.
 Project: 200 AREA GRP
 Subject: Semivolatile Organics - Sample Data Group (SDG) WSCF20100415

INTRODUCTION

This memorandum presents the results of data validation for SDG WSCF20100415 prepared by WSCF. 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 |
|------------------|--------------------|--------------|-------------------------|--|
| B247W5 | 3-19-2010 | Soil | C | 8270, WTPH-G, WTPH-D, 8015B Alcohols/Glycols |
| B247W6 | 3-19-2010 | Soil | C | 8270, WTPH-G, WTPH-D, 8015B Alcohols/Glycols |

Data validation was conducted in accordance with the CHPRC validation statement of work and the Tanks/Lines/Pits/Boxes/Septic Tank and Drain Fields Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan; Includes: 200-IS-1 and 200-ST-1 Operable Units, DOE/RL-2002-14, Rev. 1, and the Sampling and Analysis Plan for Supplemental Remedial Investigation Activities at Model Group 5, Large-Area Ponds, Waste Sites Located Within the 200-CW-1 Operable Unit, DOE/RL-2006-57, Rev. 0, REISSUE (SAPs). 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 methods 8270 and WTPH-D are extraction within 14 days of sample collection and analysis within 40 days of sample extraction. The holding time requirements for methods WTPH-G and 8015B Alcohols/Glycols are analysis within 14 days from sample collection. Sample preservation requires chilling to 4 degrees Celsius.

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

- **Blanks**

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

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

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 SAPs, the laboratory control sample accuracy limits are 70% to 130% at a minimum, and the statistical ones established by the analytical laboratory if more stringent. The matrix spike sample accuracy limits are the ones specified by the DV procedure. The limits for reported analytes not listed in the SAP are specified by the DV procedure.

Surrogates

All surrogate recoveries were acceptable with the following exception. For method WTPH-D the ortho-terphenyl surrogate recovery for sample B247W6 was >150%. The TPH-D and kerosene results for sample B247W6 were non-detects and should not be qualified.

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

All MS/MSD recoveries were acceptable with the following exception. Only eleven 8270 MS/MSD analytes were reported, and cyclohexanone and tributyl phosphate were not represented in the MS/MSD. The cyclohexanone and tributyl phosphate results for samples B247W5 and B247W6 were non-detects and should be qualified as estimates and flagged "UJ."

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exception. Only eleven 8270 LCS analytes were reported, and cyclohexanone and tributyl phosphate were not represented in the LCS. The cyclohexanone and tributyl phosphate results for samples B247W5 and B247W6 were non-detects and should be qualified as estimates and flagged "UJ."

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAPs, the relative percent difference (RPD) limits are $\pm 30\%$. The RPD limits for reported analytes not listed in the SAP are specified by the DV procedure. When duplicate RPDs exceed the limits and have associated results $< 5X$ the required detection limits with differences $< 2X$ the required detection limits no precision infraction occurred.

MS/MSD Samples

All MS/MSD relative percent difference values were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Internal Standards**

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

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

- **Detection Limits**

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

All reported sample MDLs were below the CRDLs.

- **Completeness**

SDG WSCF20100415 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to non-represented 8270 QC data. See the table in Appendix 2 for a listing of all affected sample results.

It should be noted that results were not reported for COC requested analyte 1-naphthylamine.

REFERENCES

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

DOE/RL-2002-14, Rev. 1, *Tanks/Lines/Pits/Boxes/Septic Tank and Drain Fields Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan; Includes: 200-IS-1 and 200-ST-1 Operable Units*, July 2008.

DOE/RL-2006-57, Rev. 0, REISSUE, *Sampling and Analysis Plan for Supplemental Remedial Investigation Activities at Model Group 5, Large-Area Ponds, Waste Sites Located Within the 200-CW-1 Operable Unit*, February 2008.

Appendix 1

Glossary of Data Reporting Qualifiers

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

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.
- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.
- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.
- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.
- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.
- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.
- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.
- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.
- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.
- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.
- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2
Summary of Data Qualification

| Semivolatile Organics Data Qualification Summary | | | |
|---|------------------|--------------------------|--|
| SDG: WSCF20100415 | Reviewer: AQA | Project: 200 AREA GRP | Page 1 of 1 |
| Analyte(s) | Qualifier | Samples Affected | Reason |
| Cyclohexanone Tributyl phosphate | UJ | B247W5 & B247W6 | Non-represented MS/MSD and LCS data |

Comments: None

Appendix 3

Annotated Laboratory Reports

WSCF

ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-102
Sample # W10GR00869
Client ID: B247W5

GPP TRENT
WSCF

Matrix: SOIL

Group #: WSCF20100415
Department: Organic
Sampled: 03/19/10
Received: 03/19/10

| Test Performed | CAS # | Method | RQ | Result | Unit | TP Err | Unit | DF | MDL | PQL | Analysis Date |
|---|-------------|------------|----|------------|-------|--------|------|------|---------|-----|---------------|
| Alcohols, Glycols - 8015 Prep | | | | | | | | | | | |
| Alcohols, Glycols - 8015 | | | | | | | | | | | |
| Diethyl ether | 60-29-7 | Organics | U | < 5.00e+03 | ug/kg | | | 1.00 | 5.0e+03 | | 03/25/10 |
| NWTPH-D TPH Diesel Range (Wa) Prep | | | | | | | | | | | |
| NWTPH-D TPH Diesel Range (Wa) | | | | | | | | | | | |
| Total Pet. Hydrocarbons Diesel | TPHDIESEL | LA-523-493 | U | < 5.20 | mg/kg | | | 1.00 | 5.2 | | 03/29/10 |
| Kerosene | TPHKEROSENE | LA-523-493 | U | < 5.20 | mg/kg | | | 1.00 | 5.2 | | 03/29/10 |
| NWTPH-GX TPH Gasoline Range Prep | | | | | | | | | | | |
| NWTPH-GX TPH Gasoline Range | | | | | | | | | | | |
| Total Pet. Hydrocarbons Gas | TPHGASOLINE | LA-523-443 | U | < 100 | ug/kg | | | 1.00 | 1.0e+02 | | 03/31/10 |
| PCBs complete list Prep | | | | | | | | | | | |
| PCBs complete list | | | | | | | | | | | |
| Aroclor-1016 | 12674-11-2 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| Aroclor-1221 | 11104-28-2 | LA-523-427 | U | < 21.0 | ug/kg | | | 1.00 | 21 | | 03/25/10 |
| Aroclor-1232 | 11141-16-5 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| Aroclor-1242 | 53469-21-9 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| Aroclor-1248 | 12672-29-6 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| Aroclor-1254 | 11097-69-1 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| Aroclor-1260 | 11096-82-5 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| Aroclor-1262 | 37324-23-5 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| Aroclor-1268 | 11100-11-4 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| SW-846 8270C Semi-Vols Prep | | | | | | | | | | | |
| SW-846 8270C Semi-Vols | | | | | | | | | | | |
| 4-Nitrophenol | 100-02-7 | LA-523-456 | U | < 210 | ug/kg | | | 1.00 | 2.1e+02 | | 03/25/10 |
| 1,4-Dichlorobenzene | 106-46-7 | LA-523-456 | U | < 250 | ug/kg | | | 1.00 | 2.5e+02 | | 03/25/10 |

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

B - The analyte < the RDL but > = the IDL/MDL (inorg)
 D - Analyte was identified at a secondary dilution factor(inorg)
 J - Analyte < lowest calibration but > = MDL.(org)
 U - Analyzed for but not detected above limiting criteria(inorg)

D - Analyte was identified at a secondary dilution factor
 E - Analyte is an estimate, has potentially larger errors(inorg)
 N - Spike sample recovery is outside control limits.(inorg)
 U - Analyzed for but not detected above limiting criteria.

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

Report WGPP/ver. 5.2
 Groundwater Remediation Program

11-18-2010

WSCF ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-102
Sample # W10GR00869
Client ID: B247W5

GPP TRENT
WSCF

Matrix: SOIL

Group #: WSCF20100415
Department: Organic
Sampled: 03/19/10
Received: 03/19/10

| Test Performed | CAS # | Method | RQ | Result | Unit | TP Err | Unit | DF | MDL | PQL | Analysis Date |
|--------------------------------|----------|------------|----|--------|-------|--------|------|------|---------|-----|---------------|
| Phenol | 108-95-2 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| 1,2,4-Trichlorobenzene | 120-82-1 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| 2,4-Dinitrotoluene | 121-14-2 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| Pyrene | 129-00-0 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| 4-Chloro-3-methylphenol | 59-50-7 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| N-Nitrosodi-n-dipropylamine | 621-64-7 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| Acenaphthene | 83-32-9 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| Pentachlorophenol | 87-86-5 | LA-523-456 | U | < 210 | ug/kg | | | 1.00 | 2.1e+02 | | 03/25/10 |
| 2-Chlorophenol | 95-57-8 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| 4-Nitroaniline | 100-01-6 | LA-523-456 | U | < 210 | ug/kg | | | 1.00 | 2.1e+02 | | 03/25/10 |
| 4-Bromophenylphenyl ether | 101-55-3 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| 2,4-Dimethylphenol | 105-67-9 | LA-523-456 | U | < 230 | ug/kg | | | 1.00 | 2.3e+02 | | 03/25/10 |
| 4-Chloroaniline | 106-47-8 | LA-523-456 | U | < 310 | ug/kg | | | 1.00 | 3.1e+02 | | 03/25/10 |
| Bis(2-chloro-1-methylethyl)eth | 108-60-1 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| Bis(2-chloroethyl) ether | 111-44-4 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| Bis(2-Chloroethoxy)methane | 111-91-1 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| Bis(2-ethylhexyl) phthalate | 117-81-7 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| Di-n-octylphthalate | 117-84-0 | LA-523-456 | J | 790 | ug/kg | | | 1.00 | 2.1e+02 | | 03/25/10 |
| Hexachlorobenzene | 118-74-1 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| Anthracene | 120-12-7 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| 2,4-Dichlorophenol | 120-83-2 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| Dimethyl phthalate | 131-11-3 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| Dibenzofuran | 132-64-9 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| Benzo(ghi)perylene | 191-24-2 | LA-523-456 | U | < 230 | ug/kg | | | 1.00 | 2.3e+02 | | 03/25/10 |
| Indeno(1,2,3-cd)pyrene | 193-39-5 | LA-523-456 | U | < 250 | ug/kg | | | 1.00 | 2.5e+02 | | 03/25/10 |

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

B - The analyte < the RDL but > = the IDL/MDL (inorg)
 D - Analyte was identified at a secondary dilution factor(inorg)
 J - Analyte < lowest calibration but > = MDL.(org)
 U - Analyzed for but not detected above limiting criteria(inorg)

D - Analyte was identified at a secondary dilution factor
 E - Analyte is an estimate, has potentially larger errors(inorg)
 N - Spike sample recovery is outside control limits.(inorg)
 U - Analyzed for but not detected above limiting criteria.

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

Report WGPP/ver. 5.2
 Groundwater Remediation Program

WSCF ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-102
Sample # W10GR00869
Client ID: B247W5

GPP TRENT
WSCF

Matrix: SOIL

Group #: WSCF20100415
Department: Organic
Sampled: 03/19/10
Received: 03/19/10

| Test Performed | CAS # | Method | RQ | Result | Unit | TP Err | Unit | DF | MDL | PQL | Analysis Date |
|----------------------------|-----------|------------|----|--------|-------|--------|------|------|---------|-----|---------------|
| Benzo(b)fluoranthene | 205-99-2 | LA-523-456 | U | < 180 | ug/kg | | | 1.00 | 1.8e+02 | | 03/25/10 |
| Fluoranthene | 206-44-0 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| Benzo(k)fluoranthene | 207-08-9 | LA-523-456 | U | < 180 | ug/kg | | | 1.00 | 1.8e+02 | | 03/25/10 |
| Acenaphthylene | 208-96-8 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| Chrysene | 218-01-9 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| Benzo(a)pyrene | 50-32-8 | LA-523-456 | U | < 210 | ug/kg | | | 1.00 | 2.1e+02 | | 03/25/10 |
| 2,4-Dinitrophenol | 51-28-5 | LA-523-456 | U | < 630 | ug/kg | | | 1.00 | 6.3e+02 | | 03/25/10 |
| Dibenz[a,h]anthracene | 53-70-3 | LA-523-456 | U | < 270 | ug/kg | | | 1.00 | 2.7e+02 | | 03/25/10 |
| 4,6-Dinitro-2-methylphenol | 534-52-1 | LA-523-456 | U | < 230 | ug/kg | | | 1.00 | 2.3e+02 | | 03/25/10 |
| 1,3-Dichlorobenzene | 541-73-1 | LA-523-456 | U | < 270 | ug/kg | | | 1.00 | 2.7e+02 | | 03/25/10 |
| Benzo(a)anthracene | 56-55-3 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| 2,6-Dinitrotoluene | 606-20-2 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| 4-Chlorophenylphenyl ether | 7005-72-3 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| Hexachlorocyclopentadiene | 77-47-4 | LA-523-456 | U | < 170 | ug/kg | | | 1.00 | 1.7e+02 | | 03/25/10 |
| Isophorone | 78-59-1 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| Diethylphthalate | 84-66-2 | LA-523-456 | U | < 220 | ug/kg | | | 1.00 | 2.2e+02 | | 03/25/10 |
| Di-n-butylphthalate | 84-74-2 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| Phenanthrene | 85-01-8 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| Butylbenzylphthalate | 85-68-7 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| N-Nitrosodiphenylamine | 86-30-6 | LA-523-456 | U | < 170 | ug/kg | | | 1.00 | 1.7e+02 | | 03/25/10 |
| Fluorene | 86-73-7 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| Carbazole | 86-74-8 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| Hexachlorobutadiene | 87-68-3 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| 2-Nitroaniline | 88-74-4 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| 2-Nitrophenol | 88-75-5 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |

MDL = Minimum Detection Limit

RQ = Result Qualifier

TP Err = Total Propagated Error

DF = Dilution Factor

B - The analyte < the RDL but > = the IDL/MDL (inorg)

D - Analyte was identified at a secondary dilution factor(inorg)

J - Analyte < lowest calibration but > = MDL.(org)

U - Analyzed for but not detected above limiting criteria(inorg)

D - Analyte was identified at a secondary dilution factor

E - Analyte is an estimate, has potentially larger errors(inorg)

N - Spike sample recovery is outside control limits.(inorg)

U - Analyzed for but not detected above limiting criteria.

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Report WGPP/ver. 5.2

Groundwater Remediation Program

WSCF ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-102
Sample # W10GR00869
Client ID: B247W5

GPP TRENT
WSCF

Matrix: SOIL

Group #: WSCF20100415
Department: Organic
Sampled: 03/19/10
Received: 03/19/10

| Test Performed | CAS # | Method | RQ | Result | Unit | TP Err | Unit | DF | MDL | PQL | Analysis Date |
|-----------------------------|------------|------------|----|--------|-------|--------|------|------|---------|-----|---------------|
| Naphthalene | 91-20-3 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| 2-Methylnaphthalene | 91-57-6 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| 2-Chloronaphthalene | 91-58-7 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| 3,3'-Dichlorobenzidine | 91-94-1 | LA-523-456 | U | < 270 | ug/kg | | | 1.00 | 2.7e+02 | | 03/25/10 |
| 2-Methylphenol (cresol, o-) | 95-48-7 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| 1,2-Dichlorobenzene | 95-50-1 | LA-523-456 | U | < 250 | ug/kg | | | 1.00 | 2.5e+02 | | 03/25/10 |
| 2,4,5-Trichlorophenol | 95-95-4 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| Nitrobenzene | 98-95-3 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| 3-Nitroaniline | 99-09-2 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| 3 & 4 Methylphenol Total | 65794-96-9 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| Hexachloroethane | 67-72-1 | LA-523-456 | U | < 240 | ug/kg | | | 1.00 | 2.4e+02 | | 03/25/10 |
| 2,4,6-Trichlorophenol | 88-06-2 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| Decane | 124-18-5 | LA-523-456 | U | < 210 | ug/kg | | | 1.00 | 2.1e+02 | | 03/25/10 |
| Dodecane | 112-40-3 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| Benzyl alcohol | 100-51-6 | LA-523-456 | U | < 150 | ug/kg | | | 1.00 | 1.5e+02 | | 03/25/10 |
| 2-Butoxyethanol | 111-76-2 | LA-523-456 | U | < 210 | ug/kg | | | 1.00 | 2.1e+02 | | 03/25/10 |
| Tributyl phosphate | 126-73-8 | LA-523-456 | U | < 150 | ug/kg | UJ | | 1.00 | 1.5e+02 | | 03/25/10 |
| 2-Naphthylamine | 91-59-8 | LA-523-456 | U | < 400 | ug/kg | | | 1.00 | 4.0e+02 | | 03/25/10 |
| Cyclohexanone | 108-94-1 | LA-523-456 | U | < 150 | ug/kg | UJ | | 1.00 | 1.5e+02 | | 03/25/10 |
| 1,2,4-Trimethylbenzene | 95-63-6 | LA-523-456 | U | < 190 | ug/kg | | | 1.00 | 1.9e+02 | | 03/25/10 |

VOA Ground Water Protection

| | | | | | | | | | | | |
|--------------------|----------|------------|---|---------|-------|--|--|------|------|--|----------|
| 1,1-Dichloroethene | 75-35-4 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |
| Trichloroethene | 79-01-6 | LA-523-455 | U | < 0.200 | ug/kg | | | 1.00 | 0.20 | | 03/25/10 |
| Benzene | 71-43-2 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |
| Toluene | 108-88-3 | LA-523-455 | U | < 0.990 | ug/kg | | | 1.00 | 0.99 | | 03/25/10 |

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

B - The analyte < the RDL but > = the IDL/MDL (inorg)

D - Analyte was identified at a secondary dilution factor(inorg)

J - Analyte < lowest calibration but > = MDL.(org)

U - Analyzed for but not detected above limiting criteria(inorg)

D - Analyte was identified at a secondary dilution factor

E - Analyte is an estimate, has potentially larger errors(inorg)

N - Spike sample recovery is outside control limits.(inorg)

U - Analyzed for but not detected above limiting criteria.

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

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Groundwater Remediation Program


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WSCF

ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-102
Sample # W10GR00870
Client ID: B247W6

GPP TRENT
WSCF

Matrix: SOIL

Group #: WSCF20100415
Department: Organic
Sampled: 03/19/10
Received: 03/19/10

| Test Performed | CAS # | Method | RQ | Result | Unit | TP Err | Unit | DF | MDL | PQL | Analysis Date |
|---|-------------|------------|----|------------|-------|--------|------|------|---------|-----|---------------|
| Alcohols, Glycols - 8015 Prep | | | | | | | | | | | |
| Alcohols, Glycols - 8015 | | | | | | | | | | | |
| Diethyl ether | 60-29-7 | Organics | U | < 5.00e+03 | ug/kg | | | 1.00 | 5.0e+03 | | 03/25/10 |
| NWTPH-D TPH Diesel Range (Wa) Prep | | | | | | | | | | | |
| NWTPH-D TPH Diesel Range (Wa) | | | | | | | | | | | |
| Total Pet. Hydrocarbons Diesel | TPHDIESEL | LA-523-493 | U | < 5.10 | mg/kg | | | 1.00 | 5.1 | | 03/29/10 |
| Kerosene | TPHKEROSENE | LA-523-493 | U | < 5.10 | mg/kg | | | 1.00 | 5.1 | | 03/29/10 |
| NWTPH-GX TPH Gasoline Range Prep | | | | | | | | | | | |
| NWTPH-GX TPH Gasoline Range | | | | | | | | | | | |
| Total Pet. Hydrocarbons Gas | TPHGASOLINE | LA-523-443 | U | < 100 | ug/kg | | | 1.00 | 1.0e+02 | | 03/31/10 |
| PCBs complete list Prep | | | | | | | | | | | |
| PCBs complete list | | | | | | | | | | | |
| Aroclor-1016 | 12674-11-2 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| Aroclor-1221 | 11104-28-2 | LA-523-427 | U | < 20.0 | ug/kg | | | 1.00 | 20 | | 03/25/10 |
| Aroclor-1232 | 11141-16-5 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| Aroclor-1242 | 53469-21-9 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| Aroclor-1248 | 12672-29-6 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| Aroclor-1254 | 11097-69-1 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| Aroclor-1260 | 11096-82-5 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| Aroclor-1262 | 37324-23-5 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| Aroclor-1268 | 11100-14-4 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| SW-846 8270C Semi-Vols Prep | | | | | | | | | | | |
| SW-846 8270C Semi-Vols | | | | | | | | | | | |
| 4-Nitrophenol | 100-02-7 | LA-523-456 | U | < 200 | ug/kg | | | 1.00 | 2.0e+02 | | 03/25/10 |
| 1,4-Dichlorobenzene | 106-46-7 | LA-523-456 | U | < 240 | ug/kg | | | 1.00 | 2.4e+02 | | 03/25/10 |

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 J - Analyte < lowest calibration but > = MDL.(org)
 U - Analyzed for but not detected above limiting criteria(inorg)

D - Analyte was identified at a secondary dilution factor
 E - Analyte is an estimate, has potentially larger errors(inorg)
 N - Spike sample recovery is outside control limits.(inorg)
 U - Analyzed for but not detected above limiting criteria.

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Report WGPP/ver. 5.2
 Groundwater Remediation Program


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WSCF ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-102
Sample # W10GR00870
Client ID: B247W6

GPP TRENT
WSCF

Matrix: SOIL

Group #: WSCF20100415
Department: Organic
Sampled: 03/19/10
Received: 03/19/10

| Test Performed | CAS # | Method | RQ | Result | Unit | TP Err | Unit | DF | MDL | PQL | Analysis Date |
|----------------------------|-----------|------------|----|--------|-------|--------|------|------|---------|-----|---------------|
| Benzo(b)fluoranthene | 205-99-2 | LA-523-456 | U | < 170 | ug/kg | | | 1.00 | 1.7e+02 | | 03/25/10 |
| Fluoranthene | 206-44-0 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| Benzo(k)fluoranthene | 207-08-9 | LA-523-456 | U | < 170 | ug/kg | | | 1.00 | 1.7e+02 | | 03/25/10 |
| Acenaphthylene | 208-96-8 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| Chrysene | 218-01-9 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| Benzo(a)pyrene | 50-32-8 | LA-523-456 | U | < 200 | ug/kg | | | 1.00 | 2.0e+02 | | 03/25/10 |
| 2,4-Dinitrophenol | 51-28-5 | LA-523-456 | U | < 610 | ug/kg | | | 1.00 | 6.1e+02 | | 03/25/10 |
| Dibenz[a,h]anthracene | 53-70-3 | LA-523-456 | U | < 260 | ug/kg | | | 1.00 | 2.6e+02 | | 03/25/10 |
| 4,6-Dinitro-2-methylphenol | 534-52-1 | LA-523-456 | U | < 220 | ug/kg | | | 1.00 | 2.2e+02 | | 03/25/10 |
| 1,3-Dichlorobenzene | 541-73-1 | LA-523-456 | U | < 260 | ug/kg | | | 1.00 | 2.6e+02 | | 03/25/10 |
| Benzo(a)anthracene | 56-55-3 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| 2,6-Dinitrotoluene | 606-20-2 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| 4-Chlorophenylphenyl ether | 7005-72-3 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| Hexachlorocyclopentadiene | 77-47-4 | LA-523-456 | U | < 160 | ug/kg | | | 1.00 | 1.6e+02 | | 03/25/10 |
| Isophorone | 78-59-1 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| Diethylphthalate | 84-66-2 | LA-523-456 | J | 490 | ug/kg | | | 1.00 | 2.1e+02 | | 03/25/10 |
| Di-n-butylphthalate | 84-74-2 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| Phenanthrene | 85-01-8 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| Butylbenzylphthalate | 85-68-7 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| N-Nitrosodiphenylamine | 86-30-6 | LA-523-456 | U | < 160 | ug/kg | | | 1.00 | 1.6e+02 | | 03/25/10 |
| Fluorene | 86-73-7 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| Carbazole | 86-74-8 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| Hexachlorobutadiene | 87-68-3 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| 2-Nitroaniline | 88-74-4 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| 2-Nitrophenol | 88-75-5 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |

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U - Analyzed for but not detected above limiting criteria(inorg)

D - Analyte was identified at a secondary dilution factor
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Report WGPP/ver. 5.2
Groundwater Remediation Program

WSCF ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-102
Sample # W10GR00870
Client ID: B247W6

GPP TRENT
WSCF

Matrix: SOIL

Group #: WSCF20100415
Department: Organic
Sampled: 03/19/10
Received: 03/19/10

| Test Performed | CAS # | Method | RQ | Result | Unit | TP Err | Unit | DF | MDL | PQL | Analysis Date |
|------------------------------------|------------|------------|----|---------|-------|--------|------|------|---------|-----|---------------|
| Naphthalene | 91-20-3 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| 2-Methylnaphthalene | 91-57-6 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| 2-Chloronaphthalene | 91-58-7 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| 3,3'-Dichlorobenzidine | 91-94-1 | LA-523-456 | U | < 260 | ug/kg | | | 1.00 | 2.6e+02 | | 03/25/10 |
| 2-Methylphenol (cresol, o-) | 95-48-7 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| 1,2-Dichlorobenzene | 95-50-1 | LA-523-456 | U | < 240 | ug/kg | | | 1.00 | 2.4e+02 | | 03/25/10 |
| 2,4,5-Trichlorophenol | 95-95-4 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| Nitrobenzene | 98-95-3 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| 3-Nitroaniline | 99-09-2 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| 3 & 4 Methylphenol Total | 65794-96-9 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| Hexachloroethane | 67-72-1 | LA-523-456 | U | < 230 | ug/kg | | | 1.00 | 2.3e+02 | | 03/25/10 |
| 2,4,6-Trichlorophenol | 88-06-2 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| Decane | 124-18-5 | LA-523-456 | U | < 200 | ug/kg | | | 1.00 | 2.0e+02 | | 03/25/10 |
| Dodecane | 112-40-3 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| Benzyl alcohol | 100-51-6 | LA-523-456 | U | < 140 | ug/kg | | | 1.00 | 1.4e+02 | | 03/25/10 |
| 2-Butoxyethanol | 111-76-2 | LA-523-456 | U | < 200 | ug/kg | | | 1.00 | 2.0e+02 | | 03/25/10 |
| Tributyl phosphate | 126-73-8 | LA-523-456 | U | < 140 | ug/kg | UJ | | 1.00 | 1.4e+02 | | 03/25/10 |
| 2-Naphthylamine | 91-59-8 | LA-523-456 | U | < 390 | ug/kg | | | 1.00 | 3.9e+02 | | 03/25/10 |
| Cyclohexanone | 108-94-1 | LA-523-456 | U | < 140 | ug/kg | UJ | | 1.00 | 1.4e+02 | | 03/25/10 |
| 1,2,4-Trimethylbenzene | 95-63-6 | LA-523-456 | U | < 180 | ug/kg | | | 1.00 | 1.8e+02 | | 03/25/10 |
| VOA Ground Water Protection | | | | | | | | | | | |
| 1,1-Dichloroethene | 75-35-4 | LA-523-455 | U | < 1.60 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |
| Trichloroethene | 79-01-6 | LA-523-455 | U | < 0.320 | ug/kg | | | 1.00 | 0.32 | | 03/25/10 |
| Benzene | 71-43-2 | LA-523-455 | U | < 1.60 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |
| Toluene | 108-88-3 | LA-523-455 | U | < 1.60 | ug/kg | | | 1.00 | 1.6 | | 03/25/10 |

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

B - The analyte < the RDL but >= the IDL/MDL (inorg)
 D - Analyte was identified at a secondary dilution factor(inorg)
 J - Analyte < lowest calibration but >= MDL.(org)
 U - Analyzed for but not detected above limiting criteria(inorg)

D - Analyte was identified at a secondary dilution factor
 E - Analyte is an estimate, has potentially larger errors(inorg)
 N - Spike sample recovery is outside control limits.(inorg)
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Report WGPP/ver. 5.2
 Groundwater Remediation Program


 11-18-2010

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Introduction

Two (2) S&GRP samples were received at the WSCF Laboratory on March 19, 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 16 through 18, 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. See pages 23 through 24 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00869 (B247W5 in work order 20100415)
 - Fluoride, Nitrate and Nitrite – Matrix Spike and Matrix Spike Duplicate recoveries exceeded established laboratory limits. Affected sample results in this batch were “N” flagged. Percent recovery failures most likely due to matrix effects from the sample.

All other QC controls are within the established limits.

Cyanide – The hold time requirement for this analysis was met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 25 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00736 (B240J5 in work order 20100371)

All QC controls are within the established limits.

Hexavalent Chromium – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 26 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00703 (B23PH9 in work order 20100369)

All QC controls are within the established limits.

ICP-AES Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 27 through 28 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Estimated Boron results due to iron interference. Sample results are “E” flagged.
- Batch QC analyzed on sample# W10GR00736 and Batch QC analyzed on sample# W10GR00758 are not associated with this analytical group but cannot be removed from this printout. Please ignore these results.

All other QC controls are within the established limits.

ICP-MS Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 29 through 32 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00870 (B247W6 in work order 20100415)
 - Barium –Matrix Spike Duplicate recoveries exceeded laboratory spike levels. Affected sample results in this batch were “N” flagged.

All other QC controls are within the established limits.

Organic Comments

Sample concentrations are corrected for moisture content and reported on a dry weight basis.

Alcohol/Glycols - The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 46 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)

All QC controls are within the established limits.

PCB – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 49 through 50 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)

All QC controls are within the established limits.

Semi-VOA – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 51 through 56 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00863 (B247X2 in work order 20100409)

All QC controls are within the established limits.

TPHD-WA – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 47 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Surrogate recoveries exceeded acceptance limits for sample B247W5 (W10GR00869) and B247W6 (W10GR00870). Due to analysis problems, samples were re-analyzed on 03/29/10. Surrogate failure is contributed to the possible evaporation of solvent between analysis runs; thus increasing the surrogate concentration. All additional batch QC was within limits.
- Due to the co-elution of analytes for TPHD-WA (DRO) and kerosene analysis, samples are spiked and evaluated for TPHD only.

All other QC controls are within the established limits.

TPHG-WA – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 48 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00865 (B247X4 in work order 20100409)

All QC controls are within the established limits.

VOA – The hold time requirement for this analysis was met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 57 through 60 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)

All QC controls are within the established limits.

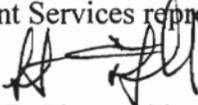
Radiochemistry Comments

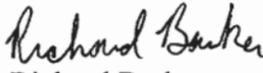
Rad Chem – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike (Matrix Spikes apply only to Technetium), Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 66 through 71 for QC details. Analytical Note(s):

- Tracers are used to determine chemical yield. RPD is monitored in sample duplicate and is not required for tracer recovery per SOW.
- Rad Chem requested to be performed included: Americium-241 by AEA, Gamma Energy Analysis, Plutonium Isotopic and Uranium Isotopic by AEA, Strontium-89/90, and Technetium-99 by LSC.
- Americium-241: Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Duplicate Relative Percent Difference(s) (RPD) did not meet the established laboratory limits. The RPD criterion does not apply to results near or below the minimum detectable activity. No flags issued.
 - All other QC controls are within the established limits.
- Gamma Energy Analysis: Batch QC analyzed on sample# W10GR000869 (B247W5 in work order 20100415)
 - Naturally occurring radioisotopes: Radium-226 was detected in the blank at less than 2 times the MDL. No flags applied.
 - All other QC controls are within the established limits.

- Isotopic Plutonium analysis: Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Plutonium-239 – detected in blank. Activity is less than 2 times the MDL and is acceptable.
 - All other QC controls are within the established limits.
- Isotopic Uranium analysis: Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - U-234 – detected in blank. Activity is less than 2 times the MDL and is acceptable.
 - All other QC controls are within the established limits.
- Strontium-89/90: Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Duplicate is flagged for poor RPD due to heterogeneous nature of the sample.
 - All other QC controls are within the established limits.
- Technetium-99: Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Matrix Spike flagged due to low recovery, however, it is still within the range of the statement of work that allows 60-140%.
 - All other QC controls are within the established limits.

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


Scot L. Fitzgerald
WSCF Analytical Laboratory Manager

 4-7-10
Richard Barker
WSCF Client Services

COLLECTOR FM Hall
CHPRC

SAMPLING LOCATION
C6724 (200E-127-PL) I-003

ICE CHEST NO.
N/A

SHIPPED TO
Waste Sampling & Characterization

COMPANY CONTACT
BAMBERGER, MACHELLE

PROJECT DESIGNATION
200-E-127 Pipeline - Soil

FIELD LOGBOOK NO.
HNF-N-507-5

OFFSITE PROPERTY NO.
N/A

TELEPHONE NO.
373-0880

ACTUAL SAMPLE DEPTH
15.0'-20.0'

PROJECT COORDINATOR
WIDRIG, DL

SAF NO.
F10-102

COA
302427ES10

BILL OF LADING/AIR BILL NO.
N/A

PRICE CODE 8C

AIR QUALITY

METHOD OF SHIPMENT
GOVERNMENT VEHICLE

DATA TURNAROUND
15 Days / 15 Days

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

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B247W1
20100415

| PRESERVATION | Cool <-7C and >-20C | Cool~4C | Cool~4C | Cool~4C | None | None |
|----------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| TYPE OF CONTAINER | aGs* | aGs* | aG | G/P | P | G/P |
| NO. OF CONTAINER(S) | 5 | 3 | 1 | 1 | 1 | 1 |
| VOLUME | 40mL | 40mL | 125mL | 60mL | 125mL | 60mL |
| SAMPLE ANALYSIS | SEE ITEM (1) IN SPECIAL INSTRUCTIONS | SEE ITEM (2) IN SPECIAL INSTRUCTIONS | SEE ITEM (3) IN SPECIAL INSTRUCTIONS | SEE ITEM (4) IN SPECIAL INSTRUCTIONS | SEE ITEM (5) IN SPECIAL INSTRUCTIONS | SEE ITEM (6) IN SPECIAL INSTRUCTIONS |

Handwritten signature and date: 3-19-10

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME | | | | | | |
|------------|-----------------|-------------|-------------|---|---|---|---|---|---|
| B247W5 | W106200869 SOIL | 3-19-10 | 0846 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

| CHAIN OF POSSESSION | SIGN/ PRINT NAMES | SPECIAL INSTRUCTIONS |
|--|----------------------|--|
| RELINQUISHED BY/REMOVED FROM FM Hall CHPRC | DATE/TIME 3-19-10 | RECEIVED BY/STORED IN [Signature] DATE/TIME 3-19-10 |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN |

SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

ORIGINAL

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LABORATORY SECTION
FINAL SAMPLE DISPOSITION

RECEIVED BY
DISPOSAL METHOD

TITLE
DATE/TIME
DISPOSED BY
DATE/TIME

COLLECTOR
 FM Hall
 CHPRC

SAMPLING LOCATION
 C6724 (200E-127-PL) I-003

ICE CHEST NO.
 N/A

SHIPPED TO
 Waste Sampling & Characterization

COMPANY CONTACT
 BAMBERGER, MACHELLE

PROJECT DESIGNATION
 200-E-127 Pipeline - Soil

FIELD LOGBOOK NO.

OFFSITE PROPERTY NO.
 N/A

TELEPHONE NO.
 373-0880

ACTUAL SAMPLE DEPTH

PROJECT COORDINATOR
 WIDRIG, DL

SAF NO.
 F10-102

COA
 302427ES10

BILL OF LADING/AIR BILL NO.
 N/A

PRICE CODE 8C

AIR QUALITY

METHOD OF SHIPMENT
 GOVERNMENT VEHICLE

DATA TURNAROUND
 15 Days / 15 Days

SPECIAL INSTRUCTIONS

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

(1)VOA - 5035/8260 (LOW LEVEL); VOA - 5035/8260 (LOW LEVEL) - (Add-On) {n-Butylbenzene, Acetonitrile, Trichloromonofluoromethane, Hexane, 1-Butanol, cis-1,2-Dichloroethylene, Tetrahydrofuran, trans-1,2-Dichloroethylene}

(2)Alcohols, Glycols, & Ketones - 8015 {Diethyl ether}

(3)Semi-VOA - 8270B (TCL); Semi-VOA - 8270B (Add-On) {Benzyl alcohol, Tributyl phosphate, 1,2,4-Trimethylbenzene, 1-Naphthylamine, 2-Butoxyethanol, 2-Naphthylamine, Cyclohexanone, Dodecane, Decane} TPH-Diesel/Kerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range} TPH-Gasoline Range - WTPH-G {Total petroleum hydrocarbons - gasoline range} PCBs - 8082;

(4)ICP Metals - 6010B (Add-On) {Boron, Bismuth} ICP/MS - 200.8 (TAL) {Antimony, Barium, Chromium, Cadmium, Copper, Zinc, Nickel, Vanadium, Silver} ICP/MS - 200.8 (Add-on) {Arsenic, Lead, Thorium-232, Molybdenum, Thallium, Beryllium, Uranium, Selenium} 200.8_HG - ICPMS {Mercury} Total Cyanide - 9014; Chromium Hex - 7196; IC Anions - 300.0 {Nitrogen in Nitrate, Fluoride, Nitrogen in Nitrate, Sulfate}

(5)Gamma Spectroscopy {Europium-155, Cesium-137, Europium-154, Europium-152, Cobalt-60} Gamma Spec - Add-on {Radium-226, Radium-228, Antimony-125, Cesium-134, Niobium-94}

(6)Americium-241; Isotopic Plutonium {Plutonium-239/240, Plutonium-238} Isotopic Uranium {Uranium-233/234, Uranium-235, Uranium-238} Strontium-89,90 -- Total Sr; Technetium-99;

 ORIGINAL

COLLECTOR
FM Hall
CHPRC

SAMPLING LOCATION
C6724 (200E-127-PL) I-004

ICE CHEST NO.
N/A

SHIPPED TO
Waste Sampling & Characterization

COMPANY CONTACT
BAMBERGER, MACHELLE

PROJECT DESIGNATION
200-E-127 Pipeline - Soil

FIELD LOGBOOK NO.
HMF-N-507-5

OFFSITE PROPERTY NO.
N/A

TELEPHONE NO.
373-0880

ACTUAL SAMPLE DEPTH
20.0' - 25.0'

PROJECT COORDINATOR
WIDRIG, DL

SAF NO.
F10-102

COA
302427ES10

BILL OF LADING/AIR BILL NO.
N/A

PRICE CODE 8C

AIR QUALITY

METHOD OF SHIPMENT
GOVERNMENT VEHICLE

DATA TURNAROUND
15 Days / 15 Days

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

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B247W2

| PRESERVATION | Cool <-7C and >-20C | Cool~4C | Cool~4C | Cool~4C | None | None |
|----------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| TYPE OF CONTAINER | aGs* | aGs* | aG | G/P | P | G/P |
| NO. OF CONTAINER(S) | 5 | 3 | 1 | 1 | 1 | 1 |
| VOLUME | 40mL | 40mL | 125mL | 60mL | 125mL | 60mL |
| SAMPLE ANALYSIS | SEE ITEM (1) IN SPECIAL INSTRUCTIONS | SEE ITEM (2) IN SPECIAL INSTRUCTIONS | SEE ITEM (3) IN SPECIAL INSTRUCTIONS | SEE ITEM (4) IN SPECIAL INSTRUCTIONS | SEE ITEM (5) IN SPECIAL INSTRUCTIONS | SEE ITEM (6) IN SPECIAL INSTRUCTIONS |

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME | SEE ITEM (1) IN SPECIAL INSTRUCTIONS | SEE ITEM (2) IN SPECIAL INSTRUCTIONS | SEE ITEM (3) IN SPECIAL INSTRUCTIONS | SEE ITEM (4) IN SPECIAL INSTRUCTIONS | SEE ITEM (5) IN SPECIAL INSTRUCTIONS | SEE ITEM (6) IN SPECIAL INSTRUCTIONS |
|------------------------|---------|-------------|-------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| B247W6 W106200870 SOIL | | 3-19-10 | 1012 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

CHAIN OF POSSESSION

| RELINQUISHED BY/REMOVED FROM | DATE/TIME | SIGN/ PRINT NAMES | RECEIVED BY/STORED IN | DATE/TIME |
|------------------------------|-----------|-----------------------|-----------------------|-----------|
| FM Hall CHPRC | 3-19-10 | [Signature] | Victoria J. Sims | 3-19-10 |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME | |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME | |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME | |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME | |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN | DATE/TIME | |

SPECIAL INSTRUCTIONS
SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

ORIGINAL

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

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Page 63 of 295

COLLECTOR
FM Hall
CHPRC

COMPANY CONTACT
BAMBERGER, MACHELLE

TELEPHONE NO.
373-0880

PROJECT COORDINATOR
WIDRIG, DL

PRICE CODE 8C

DATA
TURNAROUND
15 Days / 15
Days

SAMPLING LOCATION
C6724 (200E-127-PL) I-004

PROJECT DESIGNATION
200-E-127 Pipeline - Soil

SAF NO.
F10-102

AIR QUALITY

ICE CHEST NO.
N/A

FIELD LOGBOOK NO.
HWF-N-507-S

ACTUAL SAMPLE DEPTH
20.0' - 25.0'

COA
302427ES10

METHOD OF SHIPMENT
GOVERNMENT VEHICLE

SHIPPED TO
Waste Sampling & Characterization

OFFSITE PROPERTY NO.
N/A

BILL OF LADING/AIR BILL NO.
N/A

SPECIAL INSTRUCTIONS

- ** The CACN for all analytical work at WSCF laboratory is to be determined. ** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
- (1)VOA - 5035/8260 (LOW LEVEL); VOA - 5035/8260 (LOW LEVEL) - (Add-On) (n-Butylbenzene, Acetonitrile, Trichloromonoofluoromethane, Hexane, 1-Butanol, cis-1,2-Dichloroethylene, Tetrahydrofuran, trans-1,2-Dichloroethylene)
 - (2)Alcohols, Glycols, & Ketones - 8015 (Diethyl ether)
 - (3)Semi-VOA - 8270B (TCL); Semi-VOA - 8270B (Add-On) (Tributyl phosphate, 1,2,4-Trimethylbenzene, Benzyl alcohol, 1-Naphthylamine, 2-Naphthylamine, 2-Butoxyethanol, Cyclohexanone, Dodecane, Decane) TPH-Diesel/Kerosene Range - WTPH-D (Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range) TPH-Gasoline Range - WTPH-G (Total petroleum hydrocarbons - gasoline range) PCBs - 8082;
 - (4)ICP Metals - 6010B (Add-On) (Boron, Bisphuth) ICP/MS - 200.8 (TAL) (Antimony, Barium, Chromium, Cadmium, Copper, Zinc, Nickel, Vanadium, Silver) ICP/MS - 200.8 (Add-on) (Arsenic, Lead, Thorium-232, Molybdenum, Thallium, Beryllium, Uranium, Selenium) 200.8_HG - ICPMS (Mercury) Total Cyanide - 9014; Chromium Hex - 7196; IC Anions - 300.0 (Nitrogen in Nitrite, Fluoride, Nitrogen in Nitrate, Sulfate)
 - (5)Gamma Spectroscopy (Europium-155, Cesium-137, Europium-154, Europium-152, Cobalt-60) Gamma Spec - Add-on (Radium-226, Radium-228, Antimony-125, Cesium-134, Niobium-94)
 - (6)Americium-241; Isotopic Plutonium (Plutonium-239/240, Plutonium-238) Isotopic Uranium (Uranium-233/234, Uranium-235, Uranium-238) Strontium-89,90 -- Total Sr; Technetium-99;

 ORIGINAL

Appendix 5

Data Validation Supporting Documentation

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

Appendix A - Chemical Data Validation Checklist

| | | | | | |
|--|---|-----------------------|------------------------------------|------------------|-----------------------|
| VALIDATION LEVEL: | A | B | <input checked="" type="radio"/> C | D | E |
| PROJECT: 200 AREA GRP | | | DATA PACKAGE: VSR11-002 | | |
| VALIDATOR: Carl Schloesslin | | LAB: WSCF | | DATE: 11-18-2010 | |
| | | | SDG: WSCF20100415 | | |
| ANALYSES PERFORMED | | | | | |
| SW-846 8260 | | SW-846 8260 (TCLP) | SW-846 8270 X | | SW-846 8270 (TCLP) |
| | | | | | |
| SAMPLES/MATRIX Soil samples B247W5 & B247W6 | | | | | |

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments:

COC requested analyte 1-naphthylamine not reported.

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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:

Eleven primary analytes spiked into LCS and MS/MSD only. Two target analytes not represented by eleven spiked analytes.

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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:

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

| | | | | | |
|---|-------------------------------------|-----------|------------------------------------|--|--|
| VALIDATION LEVEL: | A | B | <input checked="" type="radio"/> C | D | E |
| PROJECT: 200 AREA GRP | | | DATA PACKAGE: VSR11-002 | | |
| VALIDATOR: Carl Schloesslin | | LAB: WSCF | | DATE: 11-23-2010 | |
| | | | SDG: WSCF20100415 | | |
| ANALYSES PERFORMED | | | | | |
| 8015 | <input checked="" type="checkbox"/> | 8021 | 8141 | 8151 | 8315 |
| | | | WTPH-HCID | WTPH-G <input checked="" type="checkbox"/> | WTPH-D <input checked="" type="checkbox"/> |
| | | | | | |
| SAMPLES/MATRIX: Soil samples B247W5 & B247W6 | | | | | |

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments: None

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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

| | | | |
|---|-----|----|-----|
| Initial calibrations acceptable? | Yes | No | N/A |
| Continuing calibrations acceptable? | Yes | No | N/A |
| Standards traceable? | Yes | No | N/A |
| Standards expired? | Yes | No | N/A |
| Calculation check acceptable? | Yes | No | N/A |

Comments:

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

| | | | |
|---|-----|----|-----|
| Calibration blanks analyzed? (Levels D, E) | Yes | No | N/A |
| Calibration blank results acceptable? (Levels D, E) | Yes | No | N/A |
| Laboratory blanks analyzed? | Yes | No | N/A |
| Laboratory blank results acceptable? | Yes | No | N/A |
| Field/trip blanks analyzed? (Levels C, D, E) | Yes | No | N/A |
| Field/trip blank results acceptable? (Levels C, D, E) | Yes | No | N/A |
| Transcription/calculation errors? (Levels D, E) | Yes | No | N/A |

Comments: None

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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

Surrogates/system monitoring compounds analyzed? Yes No N/A
 Surrogate/system monitoring compound recoveries acceptable? Yes No N/A
 Surrogates traceable? (Levels D, E) Yes No N/A
 Surrogates expired? (Levels D, E) Yes No N/A
 MS/MSD samples analyzed? Yes No N/A
 MS/MSD results acceptable? Yes No N/A
 MS/MSD standards NIST traceable? (Levels D, E) Yes No N/A
 MS/MSD standards expired? (Levels D, E) Yes No N/A
 LCS/BSS samples analyzed? Yes No N/A
 LCS/BSS results acceptable? Yes No N/A
 Standards traceable? (Levels D, E) Yes No N/A
 Standards expired? (Levels D, E) Yes No N/A
 Transcription/calculation errors? (Levels D, E) Yes No N/A
 Performance audit sample(s) analyzed? Yes No N/A
 Performance audit sample results acceptable? Yes No N/A

Comments:

WTPH-D ortho-terphenyl surrogate recovery for sample B247W6 = 152%

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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

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

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

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

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

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

Comments: None

8. SAMPLE CLEANUP (Levels D and E)

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

Lot check performed? Yes No N/A

Check recoveries acceptable? Yes No N/A

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

Check materials Expired? Yes No N/A

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

Transcription/Calculation Errors? Yes No N/A

Comments:

Appendix 6

Additional Documentation Requested By Client

WSCF ANALYTICAL LABORATORY QC REPORT

Department: **Organic**

SDG Number: WSCF20100415
 Matrix: SOLID
 Test: Alcohols, Glycols - 8015

Sample Date: 03/17/10
 Receive Date: 03/17/10

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|--|----------------|----------|----------|----------|---------|-------------|-------------|--------|-----------|----|---------------|
| Lab ID: W10GR00862 | | | | | | | | | | | |
| BATCH QC ASSOCIATED WITH SAMPLE | | | | | | | | | | | |
| DUP | 2-Bromoethanol | 540-51-2 | 18000 | | RPD | | | 5.405 | 25.000 | | 03/25/10 |
| DUP | Diethyl ether | 60-29-7 | < 5000 | | RPD | | | n/a | 25.000 | U | 03/25/10 |
| MS | 2-Bromoethanol | 540-51-2 | 18400 | 112.883 | % Recov | 70.000 | 125.000 | | | | 03/25/10 |
| MS | Diethyl ether | 60-29-7 | 7400 | 112.805 | % Recov | 75.000 | 125.000 | | | | 03/25/10 |
| MSD | 2-Bromoethanol | 540-51-2 | 17800 | 109.202 | % Recov | 70.000 | 125.000 | | | | 03/25/10 |
| MSD | Diethyl ether | 60-29-7 | 7800 | 118.902 | % Recov | 75.000 | 125.000 | | | | 03/25/10 |
| SPK-RPD | 2-Bromoethanol | 540-51-2 | 109.202 | | RPD | | | 3.315 | 20.000 | | 03/25/10 |
| SPK-RPD | Diethyl ether | 60-29-7 | 118.902 | | RPD | | | 5.263 | 20.000 | | 03/25/10 |
| BATCH QC | | | | | | | | | | | |
| BLANK | 2-Bromoethanol | 540-51-2 | 19500 | 110.795 | % Recov | 75.000 | 125.000 | | | | 03/25/10 |
| BLANK | Diethyl ether | 60-29-7 | < 5000 | n/a | ug/Kg | 0.000 | 10.000 | | | U | 03/25/10 |
| LCS | 2-Bromoethanol | 540-51-2 | 16600 | 94.318 | % Recov | 70.000 | 130.000 | | | | 03/25/10 |
| LCS | Diethyl ether | 60-29-7 | 7600 | 107.042 | % Recov | 70.000 | 130.000 | | | | 03/25/10 |

From: "Lynch, Sherry A" <Sherry_A_Lynch@RL.gov>
To: "Carl Schloesslin" <cschloesslin@aqainc.net>
Sent: Thursday, November 18, 2010 5:59 PM
Attach: 20100415 TPHG Surrogate recoveries.docx
Subject: FW: 20100415 TPHG Surrogate recoveries

From: Radloff, Anna W
Sent: Thursday, November 18, 2010 4:21 PM
To: Avila, Marisol
Cc: Lynch, Sherry A
Subject: FW: 20100415 TPHG Surrogate recoveries

Marisol,

Thank you very much. The screen shot works well.

Thank you,

Anna

From: Avila, Marisol
Sent: Thursday, November 18, 2010 2:43 PM
To: Radloff, Anna W
Subject: 20100415 TPHG Surrogate recoveries

Anna, attached I have a screen shot of the surrogate results for TPHG for both the samples.

-
20100415
W10GR00869 (B247W5)
W10GR00870 (B247W6)

The sample ID is on the top of each page. Please let me know if this will be satisfactory. I am still working on getting the 8015 surrogate data. The chemist is able to provide me the recoveries in an email but he can't quite figure out how to get the information put into a screen shot or a text file. These were those results:

The sample surrogate recoveries for 8015 (2-Bromoethanol) were as follows:
85% Recovery for sample W10GR00869 (B247W5), and 81.5% Recovery for sample W10GR00870 (B247W6). (75-125% limits)

Marisol Avila
WSCF Client Services
Office: (509) 373-1613
Mobile: (509)366-8823
Marisol_Avila@rl.gov

Alcohols/Glycols
surrogate recoveries
for samples B247W5
and B24746 provided
to AQA in this email
dated 11-18-2010.

WSCF ANALYTICAL LABORATORY QC REPORT

Department: **Organic**

SDG Number: WSCF20100415
 Matrix: SOLID
 Test: NWTPH-D TPH Diesel Range (Wa)

Sample Date: 03/17/10
 Receive Date: 03/17/10

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|--|--------------------------------|-------|-------------|----------|---------|-------------|-------------|---------|-----------|--------|---------------|
| Lab ID: W10GR00862 | | | | | | | | | | | |
| BATCH QC ASSOCIATED WITH SAMPLE | | | | | | | | | | | |
| MS | ortho-Terphenyl | Surr | 84-15-1 | 34.496 | 122.000 | % Recov | 70.000 | 130.000 | | | 03/29/10 |
| MS | Total Pet. Hydrocarbons Diesel | | TPHDIESEL | 154.98 | 110.000 | % Recov | 75.000 | 125.000 | | | 03/29/10 |
| MSD | ortho-Terphenyl | Surr | 84-15-1 | 32.079 | 113.000 | % Recov | 70.000 | 130.000 | | | 03/29/10 |
| MSD | Total Pet. Hydrocarbons Diesel | | TPHDIESEL | 138.75 | 97.700 | % Recov | 75.000 | 125.000 | | | 03/29/10 |
| SPK-RPD | ortho-Terphenyl | Surr | 84-15-1 | 113.000 | | RPD | | | 7.660 | 20.000 | 03/29/10 |
| SPK-RPD | Total Pet. Hydrocarbons Diesel | | TPHDIESEL | 97.700 | | RPD | | | 11.844 | 20.000 | 03/29/10 |
| Lab ID: W10GR00869 | | | | | | | | | | | |
| BATCH QC ASSOCIATED WITH SAMPLE | | | | | | | | | | | |
| SURR | ortho-Terphenyl | Surr | 84-15-1 | 29.350 | 140.000 | % Recov | 70.000 | 130.000 | | • | 03/29/10 |
| Lab ID: W10GR00870 | | | | | | | | | | | |
| BATCH QC ASSOCIATED WITH SAMPLE | | | | | | | | | | | |
| SURR | ortho-Terphenyl | Surr | 84-15-1 | 30.995 | 152.000 | % Recov | 70.000 | 130.000 | | • | 03/29/10 |
| BATCH QC | | | | | | | | | | | |
| BLANK | Kerosene | | TPHKEROSENE | < 5.0 | n/a | ug/Kg | | | | U | 03/29/10 |
| BLANK | ortho-Terphenyl | Surr | 84-15-1 | 19.226 | 96.100 | % Recov | 70.000 | 130.000 | | | 03/29/10 |
| BLANK | Total Pet. Hydrocarbons Diesel | | TPHDIESEL | < 5.0 | n/a | ug/Kg | | | | U | 03/29/10 |
| LCS | ortho-Terphenyl | Surr | 84-15-1 | 20.961 | 105.000 | % Recov | 70.000 | 130.000 | | | 03/29/10 |
| LCS | Total Pet. Hydrocarbons Diesel | | TPHDIESEL | 92.850 | 92.800 | % Recov | 80.000 | 120.000 | | | 03/29/10 |

WSCF ANALYTICAL LABORATORY QC REPORT

Department: **Organic**

SDG Number: WSCF20100415
 Matrix: SOLID
 Test: NWTPH-GX TPH Gasoline Range

Sample Date: 03/17/10
 Receive Date: 03/17/10

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|--|-----------------------------|-------------|----------|----------|---------|-------------|-------------|--------|-----------|----|---------------|
| Lab ID: W10GR00865 | | | | | | | | | | | |
| BATCH QC ASSOCIATED WITH SAMPLE | | | | | | | | | | | |
| DUP | Total Pet. Hydrocarbons Gas | TPHGASOLINE | < 100 | | RPD | | | n/a | 20.000 | U | 03/31/10 |
| MS | Total Pet. Hydrocarbons Gas | TPHGASOLINE | 3400 | 80.952 | % Recov | 50.000 | 150.000 | | | | 03/31/10 |
| MSD | Total Pet. Hydrocarbons Gas | TPHGASOLINE | 3700 | 90.244 | % Recov | 50.000 | 150.000 | | | | 03/31/10 |
| SPK-RPD | Total Pet. Hydrocarbons Gas | TPHGASOLINE | 90.244 | | RPD | | | 10.855 | 20.000 | | 03/31/10 |
| BATCH QC | | | | | | | | | | | |
| BLANK | Total Pet. Hydrocarbons Gas | TPHGASOLINE | < 100 | n/a | mg/L | 0.000 | 300.000 | | | U | 03/31/10 |
| LCS | Total Pet. Hydrocarbons Gas | TPHGASOLINE | 5100 | 102.000 | % Recov | 75.000 | 125.000 | | | | 03/31/10 |

Target Viewer - \\apwscf02\wscf\chem\fid401.i\100331.b\W10GR00869.D\spike.rp
File Edit View Help

Data File: \\Apwscf02\WSCF\chem\fid401.i\100331.b\W10GR00869.D Page 1
Report Date: 01-Apr-2010 08:33

WSCF/222-S

RECOVERY REPORT

Client Name: Client SDG: SDGa00271
Sample Matrix: SOLID Fraction: OTHER
Lab Smp Id: W10GR00869
Level: LOW Operator: eal
Data Type: GC DATA SampleType: SAMPLE
SpikeList File: gasms.spk Quant Type: ESTD
Sublist File: all.sub
Method File: \\Apwscf02\WSCF\chem\fid401.i\100331.b\WTPHg.m
Misc Info:

| SURROGATE COMPOUND | CONC ADDED ug/Kg | CONC RECOVERED ug/Kg | % RECOVERED | LIMITS |
|--------------------|------------------------|----------------------------|----------------|--------|
| § 2 bfb | 171.839 | 134.987 | 78.55 | 75-125 |

WTPH-G surrogate recoveries for samples B247W5 and B247W6 provided to AQA in an email dated 11-18-2010.

Target Viewer - \\apwscf02\wscf\chem\fid401.i\100331.b\W10GR00870.D\spike.rp
File Edit View Help

Data File: \\Apwscf02\WSCF\chem\fid401.i\100331.b\W10GR00870.D Page 1
Report Date: 01-Apr-2010 08:33

WSCF/222-S

RECOVERY REPORT

Client Name: Client SDG: SDGa00271
Sample Matrix: SOLID Fraction: OTHER
Lab Smp Id:
Level: LOW Operator: eal
Data Type: GC DATA SampleType: SAMPLE
SpikeList File: gasms.spk Quant Type: ESTD
Sublist File: all.sub
Method File: \\Apwscf02\WSCF\chem\fid401.i\100331.b\WTPHg.m
Misc Info:

| SURROGATE COMPOUND | CONC ADDED ug/Kg | CONC RECOVERED ug/Kg | % RECOVERED | LIMITS |
|--------------------|------------------------|----------------------------|----------------|--------|
| § 2 bfb | 160.441 | 132.608 | 82.65 | 75-125 |

WSCF ANALYTICAL LABORATORY QC REPORT

Department: **Organic**

SDG Number: WSCF20100415
 Matrix: SOLID
 Test: SW-846 8270C Semi-Vols

Sample Date: 03/17/10
 Receive Date: 03/17/10

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|--|-----------------------------|------------|----------|----------|---------|-------------|-------------|--------|-----------|----|---------------|
| Lab ID: W10GR00863 BATCH QC ASSOCIATED WITH SAMPLE | | | | | | | | | | | |
| MS | 1,2,4-Trichlorobenzene | 120-82-1 | 6719.3 | 110.000 | % Recov | 75.000 | 121.000 | | | | 03/25/10 |
| MS | 1,4-Dichlorobenzene | 106-46-7 | 5807.0 | 95.300 | % Recov | 68.000 | 121.000 | | | | 03/25/10 |
| MS | 2,4-Dinitrotoluene | 121-14-2 | 6239.7 | 102.000 | % Recov | 66.000 | 113.000 | | | | 03/25/10 |
| MS | 2-Fluorophenol(Surr) | 367-12-4 | 4332.6 | 107.000 | % Recov | 72.000 | 120.000 | | | | 03/25/10 |
| MS | Acenaphthene | 83-32-9 | 6038.5 | 99.100 | % Recov | 69.000 | 125.000 | | | | 03/25/10 |
| MS | 4-Chloro-3-methylphenol | 59-50-7 | 6322.2 | 104.000 | % Recov | 68.000 | 116.000 | | | | 03/25/10 |
| MS | 2-Chlorophenol | 95-57-8 | 5956.9 | 97.700 | % Recov | 65.000 | 124.000 | | | | 03/25/10 |
| MS | N-Nitrosodi-n-dipropylamine | 621-64-7 | 6131.6 | 101.000 | % Recov | 69.000 | 127.000 | | | | 03/25/10 |
| MS | 2-Fluorobiphenyl(Surr) | 321-60-8 | 4019.9 | 98.900 | % Recov | 66.000 | 122.000 | | | | 03/25/10 |
| MS | Phenol | 108-95-2 | 6126.2 | 101.000 | % Recov | 71.000 | 122.000 | | | | 03/25/10 |
| MS | Nitrobenzene-d5(Surr) | 4165-60-0 | 3642.5 | 89.600 | % Recov | 63.000 | 125.000 | | | | 03/25/10 |
| MS | 4-Nitrophenol | 100-02-7 | 5285.8 | 86.700 | % Recov | 55.000 | 113.000 | | | | 03/25/10 |
| MS | Pentachlorophenol | 87-86-5 | 6793.8 | 111.000 | % Recov | 50.000 | 113.000 | | | | 03/25/10 |
| MS | Phenol-d5(Surr) | 4165-62-2 | 4150.6 | 102.000 | % Recov | 66.000 | 124.000 | | | | 03/25/10 |
| MS | Pyrene | 129-00-0 | 6199.0 | 102.000 | % Recov | 67.000 | 125.000 | | | | 03/25/10 |
| MS | 2,4,6-Tribromophenol(Surr) | 118-79-6 | 3845.0 | 94.600 | % Recov | 49.000 | 120.000 | | | | 03/25/10 |
| MS | Terphenyl-d14(Surr) | 98904-43-9 | 3138.3 | 77.200 | % Recov | 58.000 | 128.000 | | | | 03/25/10 |
| MSD | 1,2,4-Trichlorobenzene | 120-82-1 | 6530.0 | 107.000 | % Recov | 75.000 | 121.000 | | | | 03/25/10 |
| MSD | 1,4-Dichlorobenzene | 106-46-7 | 5753.1 | 94.400 | % Recov | 68.000 | 121.000 | | | | 03/25/10 |
| MSD | 2,4-Dinitrotoluene | 121-14-2 | 6252.2 | 103.000 | % Recov | 66.000 | 113.000 | | | | 03/25/10 |
| MSD | 2-Fluorophenol(Surr) | 367-12-4 | 4321.3 | 106.000 | % Recov | 72.000 | 120.000 | | | | 03/25/10 |
| MSD | Acenaphthene | 83-32-9 | 6058.6 | 99.400 | % Recov | 69.000 | 125.000 | | | | 03/25/10 |
| MSD | 4-Chloro-3-methylphenol | 59-50-7 | 6393.6 | 105.000 | % Recov | 68.000 | 116.000 | | | | 03/25/10 |
| MSD | 2-Chlorophenol | 95-57-8 | 5997.9 | 98.500 | % Recov | 65.000 | 124.000 | | | | 03/25/10 |
| MSD | N-Nitrosodi-n-dipropylamine | 621-64-7 | 6235.4 | 102.000 | % Recov | 69.000 | 127.000 | | | | 03/25/10 |
| MSD | 2-Fluorobiphenyl(Surr) | 321-60-8 | 4112.1 | 101.000 | % Recov | 66.000 | 122.000 | | | | 03/25/10 |

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WSCF ANALYTICAL LABORATORY QC REPORT

Department: **Organic**

SDG Number: WSCF20100415
 Matrix: SOLID
 Test: SW-846 8270C Semi-Vols

Sample Date: 03/17/10
 Receive Date: 03/17/10

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|---------|-----------------------------|------------|----------|----------|---------|-------------|-------------|--------|-----------|----|---------------|
| MSD | Phenol | 108-95-2 | 6119.3 | 100.000 | % Recov | 71.000 | 122.000 | | | | 03/25/10 |
| MSD | Nitrobenzene-d5(Surr) | 4165-60-0 | 3714.7 | 91.500 | % Recov | 63.000 | 125.000 | | | | 03/25/10 |
| MSD | 4-Nitrophenol | 100-02-7 | 5261.2 | 86.400 | % Recov | 55.000 | 113.000 | | | | 03/25/10 |
| MSD | Pentachlorophenol | 87-86-5 | 6850.3 | 112.000 | % Recov | 50.000 | 113.000 | | | | 03/25/10 |
| MSD | Phenol-d5(Surr) | 4165-62-2 | 4232.0 | 104.000 | % Recov | 66.000 | 124.000 | | | | 03/25/10 |
| MSD | Pyrene | 129-00-0 | 6089.8 | 100.000 | % Recov | 67.000 | 125.000 | | | | 03/25/10 |
| MSD | 2,4,6-Tribromophenol(Surr) | 118-79-6 | 4153.5 | 102.000 | % Recov | 49.000 | 120.000 | | | | 03/25/10 |
| MSD | Terphenyl-d14(Surr) | 98904-43-9 | 3161.5 | 77.800 | % Recov | 58.000 | 128.000 | | | | 03/25/10 |
| SPK-RPD | 1,2,4-Trichlorobenzene | 120-82-1 | 107.000 | | RPD | | | 2.765 | 20.000 | | 03/25/10 |
| SPK-RPD | 1,4-Dichlorobenzene | 106-46-7 | 94.400 | | RPD | | | 0.949 | 20.000 | | 03/25/10 |
| SPK-RPD | 2,4-Dinitrotoluene | 121-14-2 | 103.000 | | RPD | | | 0.976 | 20.000 | | 03/25/10 |
| SPK-RPD | 2-Fluorophenol(Surr) | 367-12-4 | 106.000 | | RPD | | | 0.939 | 20.000 | | 03/25/10 |
| SPK-RPD | Acenaphthene | 83-32-9 | 99.400 | | RPD | | | 0.302 | 20.000 | | 03/25/10 |
| SPK-RPD | 4-Chloro-3-methylphenol | 59-50-7 | 105.000 | | RPD | | | 0.957 | 20.000 | | 03/25/10 |
| SPK-RPD | 2-Chlorophenol | 95-57-8 | 98.500 | | RPD | | | 0.815 | 20.000 | | 03/25/10 |
| SPK-RPD | N-Nitrosodi-n-dipropylamine | 621-64-7 | 102.000 | | RPD | | | 0.985 | 20.000 | | 03/25/10 |
| SPK-RPD | 2-Fluorobiphenyl(Surr) | 321-60-8 | 101.000 | | RPD | | | 2.101 | 20.000 | | 03/25/10 |
| SPK-RPD | Phenol | 108-95-2 | 100.000 | | RPD | | | 0.995 | 20.000 | | 03/25/10 |
| SPK-RPD | Nitrobenzene-d5(Surr) | 4165-60-0 | 91.500 | | RPD | | | 2.098 | 20.000 | | 03/25/10 |
| SPK-RPD | 4-Nitrophenol | 100-02-7 | 86.400 | | RPD | | | 0.347 | 20.000 | | 03/25/10 |
| SPK-RPD | Pentachlorophenol | 87-86-5 | 112.000 | | RPD | | | 0.897 | 20.000 | | 03/25/10 |
| SPK-RPD | Phenol-d5(Surr) | 4165-62-2 | 104.000 | | RPD | | | 1.942 | 20.000 | | 03/25/10 |
| SPK-RPD | Pyrene | 129-00-0 | 100.000 | | RPD | | | 1.980 | 20.000 | | 03/25/10 |
| SPK-RPD | 2,4,6-Tribromophenol(Surr) | 118-79-6 | 102.000 | | RPD | | | 7.528 | 20.000 | | 03/25/10 |
| SPK-RPD | Terphenyl-d14(Surr) | 98904-43-9 | 77.800 | | RPD | | | 0.774 | 20.000 | | 03/25/10 |

Lab ID: **W10GR00869**
 BATCH QC ASSOCIATED WITH SAMPLE

| | | | | | | | | | | | |
|------|------------------------|----------|--------|---------|---------|--------|---------|--|--|--|----------|
| SURR | 2-Fluorophenol(Surr) | 367-12-4 | 4832.2 | 115.000 | % Recov | 72.000 | 120.000 | | | | 03/25/10 |
| SURR | 2-Fluorobiphenyl(Surr) | 321-60-8 | 4286.8 | 102.000 | % Recov | 66.000 | 122.000 | | | | 03/25/10 |

WSCF ANALYTICAL LABORATORY QC REPORT

Department: **Organic**

SDG Number: WSCF20100415
 Matrix: SOLID
 Test: SW-846 8270C Semi-Vols

Sample Date: 03/19/10
 Receive Date: 03/19/10

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|---------|----------------------------|------------|----------|----------|---------|-------------|-------------|--------|-----------|----|---------------|
| SURR | Nitrobenzene-d5(Surr) | 4165-60-0 | 3866.6 | 92.300 | % Recov | 63.000 | 125.000 | | | | 03/25/10 |
| SURR | Phenol-d5(Surr) | 4165-62-2 | 4526.7 | 108.000 | % Recov | 66.000 | 124.000 | | | | 03/25/10 |
| SURR | 2,4,6-Tribromophenol(Surr) | 118-79-6 | 3937.0 | 94.000 | % Recov | 49.000 | 120.000 | | | | 03/25/10 |
| SURR | Terphenyl-d14(Surr) | 98904-43-9 | 3831.6 | 91.500 | % Recov | 58.000 | 128.000 | | | | 03/25/10 |

Lab ID: W10GR00870
BATCH QC ASSOCIATED WITH SAMPLE

| | | | | | | | | | | | |
|------|----------------------------|------------|--------|---------|---------|--------|---------|--|--|--|----------|
| SURR | 2-Fluorophenol(Surr) | 367-12-4 | 4572.2 | 112.000 | % Recov | 72.000 | 120.000 | | | | 03/25/10 |
| SURR | 2-Fluorobiphenyl(Surr) | 321-60-8 | 4219.2 | 104.000 | % Recov | 66.000 | 122.000 | | | | 03/25/10 |
| SURR | Nitrobenzene-d5(Surr) | 4165-60-0 | 2844.7 | 69.900 | % Recov | 63.000 | 125.000 | | | | 03/25/10 |
| SURR | Phenol-d5(Surr) | 4165-62-2 | 4355.5 | 107.000 | % Recov | 66.000 | 124.000 | | | | 03/25/10 |
| SURR | 2,4,6-Tribromophenol(Surr) | 118-79-6 | 3816.2 | 93.700 | % Recov | 49.000 | 120.000 | | | | 03/25/10 |
| SURR | Terphenyl-d14(Surr) | 98904-43-9 | 3768.6 | 92.500 | % Recov | 58.000 | 128.000 | | | | 03/25/10 |

BATCH QC

| | | | | | | | | | | | |
|-------|------------------------|----------|--------|--------|---------|--------|---------|--|--|---|----------|
| BLANK | 1,2-Dichlorobenzene | 95-50-1 | < 240 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | 1,2,4-Trimethylbenzene | 95-63-6 | < 180 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | 1,2,4-Trichlorobenzene | 120-82-1 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | 1,3-Dichlorobenzene | 541-73-1 | < 260 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | 1,4-Dichlorobenzene | 106-46-7 | < 240 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | 2-Naphthylamine | 91-59-8 | < 380 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | 2,4-Dichlorophenol | 120-83-2 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | 2,4-Dinitrotoluene | 121-14-2 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | 2,4,5-Trichlorophenol | 95-95-4 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | 2,4,6-Trichlorophenol | 88-06-2 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | 2,4-Dimethylphenol | 105-67-9 | < 220 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | 2,6-Dinitrotoluene | 606-20-2 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | 2-Butoxyethanol | 111-76-2 | < 200 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | 2-Chloronaphthalene | 91-58-7 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | 2-Fluorophenol(Surr) | 367-12-4 | 3758.2 | 94.000 | % Recov | 72.000 | 120.000 | | | | 03/25/10 |

WSCF ANALYTICAL LABORATORY QC REPORT

Department: **Organic**

SDG Number: WSCF20100415
 Matrix: SOLID
 Test: SW-846 8270C Semi-Vols

Sample Date:
 Receive Date:

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|---------|--------------------------------|------------|----------|----------|-------|-------------|-------------|--------|-----------|----|---------------|
| BLANK | 2-Methylnaphthalene | 91-57-6 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | 2-Methylphenol (cresol, o-) | 95-48-7 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | 2-Nitroaniline | 88-74-4 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | 2-Nitrophenol | 88-75-5 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | 3 & 4 Methylphenol Total | 65794-96-9 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | 3-Nitroaniline | 99-09-2 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | 4,6-Dinitro-2-methylphenol | 534-52-1 | < 220 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | 4-Bromophenylphenyl ether | 101-55-3 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | 4-Chlorophenylphenyl ether | 7005-72-3 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Acenaphthene | 83-32-9 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Acenaphthylene | 208-96-8 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Anthracene | 120-12-7 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Bis(2-chloroethyl) ether | 111-44-4 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Benzo(a)anthracene | 56-55-3 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Benzo(b)fluoranthene | 205-99-2 | < 170 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Benzo(ghi)perylene | 191-24-2 | < 220 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Benzo(a)pyrene | 50-32-8 | < 200 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Bis(2-Chloroethoxy)methane | 111-91-1 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Bis(2-ethylhexyl) phthalate | 117-81-7 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Bis(2-chloro-1-methylethyl)eth | 108-60-1 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Benzyl alcohol | 100-51-6 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Benzo(k)fluoranthene | 207-08-9 | < 170 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Butylbenzylphthalate | 85-68-7 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Carbazole | 86-74-8 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | 4-Chloroaniline | 106-47-8 | < 300 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | 4-Chloro-3-methylphenol | 59-50-7 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | 2-Chlorophenol | 95-57-8 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Chrysene | 218-01-9 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Cyclohexanone | 108-94-1 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | 3,3'-Dichlorobenzidine | 91-94-1 | < 260 | n/a | ug/Kg | | | | | U | 03/25/10 |

WSCF ANALYTICAL LABORATORY QC REPORT

Department: **Organic**

SDG Number: WSCF20100415
 Matrix: SOLID
 Test: SW-846 8270C Semi-Vols

Sample Date:
 Receive Date:

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|---------|-----------------------------|-----------|----------|----------|---------|-------------|-------------|--------|-----------|----|---------------|
| BLANK | Decane | 124-18-5 | < 200 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Dibenz[a,h]anthracene | 53-70-3 | < 260 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Dibenzofuran | 132-64-9 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Di-n-butylphthalate | 84-74-2 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Diethylphthalate | 84-66-2 | < 210 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Dimethyl phthalate | 131-11-3 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | 2,4-Dinitrophenol | 51-28-5 | < 600 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Di-n-octylphthalate | 117-84-0 | < 200 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | N-Nitrosodi-n-dipropylamine | 621-64-7 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Dodecane | 112-40-3 | < 140 | n/a | ug/Kg | -999.000 | 999.000 | | | U | 03/25/10 |
| BLANK | 2-Fluorobiphenyl(Surr) | 321-60-8 | 3406.4 | 85.200 | % Recov | 66.000 | 122.000 | | | | 03/25/10 |
| BLANK | Fluorene | 86-73-7 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Fluoranthene | 206-44-0 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Hexachlorobenzene | 118-74-1 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Hexachlorobutadiene | 87-68-3 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Hexachlorocyclopentadiene | 77-47-4 | < 160 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Hexachloroethane | 67-72-1 | < 230 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Indeno(1,2,3-cd)pyrene | 193-39-5 | < 240 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Isophorone | 78-59-1 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Phenol | 108-95-2 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Naphthalene | 91-20-3 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Nitrobenzene-d5(Surr) | 4165-60-0 | 3222.4 | 80.600 | % Recov | 63.000 | 125.000 | | | | 03/25/10 |
| BLANK | Nitrobenzene | 98-95-3 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | 4-Nitrophenol | 100-02-7 | < 200 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | 4-Nitroaniline | 100-01-6 | < 200 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | N-Nitrosodiphenylamine | 86-30-6 | < 160 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Pentachlorophenol | 87-86-5 | < 200 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Phenanthrene | 85-01-8 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Phenol-d5(Surr) | 4165-62-2 | 3530.5 | 88.300 | % Recov | 66.000 | 124.000 | | | | 03/25/10 |
| BLANK | Pyrene | 129-00-0 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |

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WSCF ANALYTICAL LABORATORY QC REPORT

Department: **Organic**

SDG Number: WSCF20100415
 Matrix: SOLID
 Test: SW-846 8270C Semi-Vols

Sample Date:
 Receive Date:

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|---------|-----------------------------|------------|----------|----------|---------|-------------|-------------|--------|-----------|----|---------------|
| BLANK | Tributyl phosphate | 126-73-8 | < 140 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | 2,4,6-Tribromophenol(Surr) | 118-79-6 | 2804.6 | 70.100 | % Recov | 49.000 | 120.000 | | | | 03/25/10 |
| BLANK | Terphenyl-d14(Surr) | 98904-43-9 | 3091.2 | 77.300 | % Recov | 58.000 | 128.000 | | | | 03/25/10 |
| LCS | 1,2,4-Trichlorobenzene | 120-82-1 | 6354.4 | 106.000 | % Recov | 76.000 | 118.000 | | | | 03/25/10 |
| LCS | 1,4-Dichlorobenzene | 106-46-7 | 5591.2 | 93.200 | % Recov | 68.000 | 121.000 | | | | 03/25/10 |
| LCS | 2,4-Dinitrotoluene | 121-14-2 | 5956.8 | 99.300 | % Recov | 68.000 | 112.000 | | | | 03/25/10 |
| LCS | 2-Fluorophenol(Surr) | 367-12-4 | 3843.4 | 96.100 | % Recov | 50.000 | 110.000 | | | | 03/25/10 |
| LCS | Acenaphthene | 83-32-9 | 5612.6 | 93.500 | % Recov | 75.000 | 121.000 | | | | 03/25/10 |
| LCS | 4-Chloro-3-methylphenol | 59-50-7 | 5847.3 | 97.500 | % Recov | 68.000 | 117.000 | | | | 03/25/10 |
| LCS | 2-Chlorophenol | 95-57-8 | 5788.8 | 96.500 | % Recov | 84.000 | 114.000 | | | | 03/25/10 |
| LCS | N-Nitrosodi-n-dipropylamine | 621-64-7 | 6001.5 | 100.000 | % Recov | 76.000 | 119.000 | | | | 03/25/10 |
| LCS | 2-Fluorobiphenyl(Surr) | 321-60-8 | 3782.7 | 94.600 | % Recov | 58.000 | 109.000 | | | | 03/25/10 |
| LCS | Phenol | 108-95-2 | 5816.5 | 96.900 | % Recov | 80.000 | 113.000 | | | | 03/25/10 |
| LCS | Nitrobenzene-d5(Surr) | 4165-60-0 | 3340.1 | 83.500 | % Recov | 60.000 | 118.000 | | | | 03/25/10 |
| LCS | 4-Nitrophenol | 100-02-7 | 4893.6 | 81.600 | % Recov | 42.000 | 123.000 | | | | 03/25/10 |
| LCS | Pentachlorophenol | 87-86-5 | 5764.1 | 96.100 | % Recov | 55.000 | 120.000 | | | | 03/25/10 |
| LCS | Phenol-d5(Surr) | 4165-62-2 | 3953.2 | 98.800 | % Recov | 59.000 | 116.000 | | | | 03/25/10 |
| LCS | Pyrene | 129-00-0 | 6452.2 | 108.000 | % Recov | 67.000 | 122.000 | | | | 03/25/10 |
| LCS | 2,4,6-Tribromophenol(Surr) | 118-79-6 | 3809.1 | 95.200 | % Recov | 60.000 | 120.000 | | | | 03/25/10 |
| LCS | Terphenyl-d14(Surr) | 98904-43-9 | 3305.2 | 82.600 | % Recov | 60.000 | 120.000 | | | | 03/25/10 |

Date: 18 November 2010
 To: CH2M Hill (technical representative)
 From: Analytical Quality Associates, Inc.
 Project: 200 AREA GRP
 Subject: PCB Congeners - Sample Data Group (SDG) W05860

INTRODUCTION

This memorandum presents the results of data validation for SDG W05860 prepared by TestAmerica. The sample validated along with the analytical method is provided in the following table.

| Sample ID | Sample Date | Media | Validation Level | Analytical Method |
|------------------|--------------------|--------------|-------------------------|--------------------------|
| B247X5 | 3-17-2010 | Soil | C | 1668A |

Data validation was conducted in accordance with the CHPRC validation statement of work and the Tanks/Lines/Pits/Boxes/Septic Tank and Drain Fields Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan; Includes: 200-IS-1 and 200-ST-1 Operable Units, DOE/RL-2002-14, Rev. 1, and the Sampling and Analysis Plan for Supplemental Remedial Investigation Activities at Model Group 5, Large-Area Ponds, Waste Sites Located Within the 200-CW-1 Operable Unit, DOE/RL-2006-57, Rev. 0, REISSUE (SAPs), and the DOE NNSA Model Data Validation Procedure (MDVP). The MDVP provided guidance on PCB congener data validation that is not provided in the CHPRC chemical data validation procedure, GRP-GD-003, Rev. 0. Appendices 1 through 7 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
- Appendix 7. Excerpt from the DOE NNSA Model Data Validation Procedure

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 PCB congeners in soil are extraction within 14 days of sample collection and analysis within 40 days of sample extraction. There are no sample preservation requirements.

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

- **Blanks**

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

Laboratory Blanks

All laboratory blank results were acceptable.

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 labeled compound results and laboratory control sample (ongoing performance and recovery – OPR) results. According to the SAPs, the laboratory control sample accuracy limits are 70% to 130% at a minimum, and the statistical ones established by the analytical laboratory if more stringent.

Labeled Compounds

All labeled compound recoveries were acceptable.

Laboratory Control Sample (LCS)

All LCS recoveries were acceptable with the following exception. The LCS recovery for PCB 123 was above the upper acceptance limit. The PCB 123 result for sample B247X5 was a non-detect and should not be qualified.

- **Precision**

Precision is evaluated by reviewing LCS/LCSD 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 SAPs, the relative percent difference (RPD) limits are $\pm 30\%$.

LCS/LCSD Samples

An LCSD was not performed. No sample data should be qualified as a result.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

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

All reported sample estimated detection limits were below the CRDLs.

- **Completeness**

SDG W05860 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

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

DOE/RL-2002-14, Rev. 1, *Tanks/Lines/Pits/Boxes/Septic Tank and Drain Fields Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan; Includes: 200-IS-1 and 200-ST-1 Operable Units*, July 2008.

DOE/RL-2006-57, Rev. 0, REISSUE, *Sampling and Analysis Plan for Supplemental Remedial Investigation Activities at Model Group 5, Large-Area Ponds, Waste Sites Located Within the 200-CW-1 Operable Unit*, February 2008.

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

| PCB Congener Data Qualification Summary | | | |
|--|------------------|-------------------------|---------------|
| SDG: W05860 | Reviewer: AQA | Project: 200 AREA GRP | Page 1 of 1 |
| Analyte(s) | Qualifier | Samples Affected | Reason |
| PCB Congeners | None | N/A | N/A |

Comments: None

Appendix 3

Annotated Laboratory Reports

CH2M Hill Plateau Remediation DOE RL

Sample ID: B247X5

Trace Level Organic Compounds

| | | | | | |
|---------------------|------------------------|--------------------|----------|-------------------|--------------|
| Lot - Sample #....: | H0C250511 - 001 | Work Order #....: | LW40M1AA | Matrix....: | SOLID |
| Date Sampled....: | 03/17/10 | Date Received....: | 03/25/10 | Dilution Factor: | 1 |
| Prep Date....: | 03/26/10 | Analysis Date....: | 04/09/10 | Percent Moisture: | 7.8 |
| Prep Batch #: | 0085234 | | | | |
| Initial Wgt/Vol : | 10 g | Instrument ID....: | M1D | Method: | EPA-22 1668A |
| Analyst ID....: | Daniel (Dan) C. Gobich | | | | |

| PARAMETER | RESULT | | MINIMUM LEVEL | ESTIMATED DETECTION LIMIT | UNITS |
|--------------|--------|----------|---------------|---------------------------|-------|
| PCB 77 (BZ) | ND | | 0.011 | 0.00076 | ng/g |
| PCB 81 (BZ) | ND | | 0.011 | 0.00083 | ng/g |
| PCB 126 (BZ) | ND | | 0.011 | 0.00049 | ng/g |
| PCB 105 (BZ) | 0.0024 | Q J | 0.011 | 0.00048 | ng/g |
| PCB 118 (BZ) | 0.0030 | Q J | 0.011 | 0.00049 | ng/g |
| PCB 123 (BZ) | ND | | 0.011 | 0.00049 | ng/g |
| PCB 114 (BZ) | ND | | 0.011 | 0.00047 | ng/g |
| PCB 169 (BZ) | ND | | 0.011 | 0.00059 | ng/g |
| PCB 156 (BZ) | 0.0012 | Q C J | 0.011 | 0.0011 | ng/g |
| PCB 157 (BZ) | 0.0012 | Q C156 J | 0.011 | 0.0011 | ng/g |
| PCB 167 (BZ) | ND | | 0.011 | 0.00066 | ng/g |
| PCB 189 (BZ) | ND | | 0.011 | 0.00050 | ng/g |

CH2M Hill Plateau Remediation DOE RL

Sample ID: B247X5

Trace Level Organic Compounds

| | | | | | |
|---------------------|------------------------|--------------------|----------|-------------------|--------------|
| Lot - Sample #....: | H0C250511 - 001 | Work Order #....: | LW40M1AA | Matrix....: | SOLID |
| Date Sampled....: | 03/17/10 | Date Received....: | 03/25/10 | Dilution Factor: | 1 |
| Prep Date....: | 03/26/10 | Analysis Date....: | 04/09/10 | Percent Moisture: | 7.8 |
| Prep Batch #: | 0085234 | | | | |
| Initial Wgt/Vol : | 10 g | Instrument ID....: | M1D | Method: | EPA-22 1668A |
| Analyst ID....: | Daniel (Dan) C. Gobich | | | | |

| <u>INTERNAL STANDARDS</u> | <u>PERCENT RECOVERY</u> | <u>RECOVERY LIMITS</u> |
|---------------------------|-------------------------|------------------------|
| 13C12-PCB 1 | 77 | 30 - 140 |
| 13C12-PCB 3 | 82 | 30 - 140 |
| 13C12-PCB 4 | 81 | 30 - 140 |
| 13C12-PCB 15 | 75 | 30 - 140 |
| 13C12-PCB 19 | 74 | 30 - 140 |
| 13C12-PCB 37 | 82 | 30 - 140 |
| 13C12-PCB 54 | 103 | 30 - 140 |
| 13C12-PCB 77 | 82 | 30 - 140 |
| 13C12-PCB 81 | 75 | 30 - 140 |
| 13C12-PCB 104 | 78 | 30 - 140 |
| 13C12-PCB 105 | 81 | 30 - 140 |
| 13C12-PCB 114 | 80 | 30 - 140 |
| 13C12-PCB 118 | 79 | 30 - 140 |
| 13C12-PCB 123 | 82 | 30 - 140 |
| 13C12-PCB 126 | 83 | 30 - 140 |
| 13C12-PCB 155 | 99 | 30 - 140 |
| 13C12-PCB 156 | 84 | C |
| 13C12-PCB 157 | 84 | C |
| 13C12-PCB 167 | 78 | 30 - 140 |
| 13C12-PCB 169 | 83 | 30 - 140 |
| 13C12-PCB 170 | 89 | 30 - 140 |
| 13C12-PCB 188 | 83 | 30 - 140 |
| 13C12-PCB 189 | 106 | 30 - 140 |
| 13C12-PCB 202 | 94 | 30 - 140 |
| 13C12-PCB 205 | 88 | 30 - 140 |
| 13C12-PCB 206 | 80 | 30 - 140 |
| 13C12-PCB 208 | 88 | 30 - 140 |
| 13C12-PCB 209 | 52 | 30 - 140 |

| <u>SURROGATE</u> | <u>PERCENT RECOVERY</u> | <u>RECOVERY LIMITS</u> |
|------------------|-------------------------|------------------------|
| 13C12-PCB 28 | 82 | 40 - 125 |
| 13C12-PCB 111 | 87 | 40 - 125 |
| 13C12-PCB 178 | 76 | 40 - 125 |

CH2M Hill Plateau Remediation DOE RL

Sample ID: B247X5

Trace Level Organic Compounds

| | | | | | |
|---------------------|------------------------|--------------------|----------|-------------------|--------------|
| Lot - Sample #....: | H0C250511 - 001 | Work Order #....: | LW40M1AA | Matrix....: | SOLID |
| Date Sampled....: | 03/17/10 | Date Received....: | 03/25/10 | Dilution Factor: | 1 |
| Prep Date....: | 03/26/10 | Analysis Date....: | 04/09/10 | Percent Moisture: | 7.8 |
| Prep Batch #: | 0085234 | Instrument ID....: | M1D | Method: | EPA-22 1668A |
| Initial Wgt/Vol : | 10 g | | | | |
| Analyst ID....: | Daniel (Dan) C. Gobich | | | | |

QUALIFIERS

Results and reporting limits have been adjusted for dry weight.

- C Co-eluting isomer.
- J Estimated Result.
- Q Estimated maximum possible concentration (EMPC).

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

PROJECT NARRATIVE W05680

The results reported herein are applicable to the samples submitted for analysis only.

This report shall not be reproduced except in full, without the written approval of the laboratory.

The original chain of custody documentation is included with this report.

Sample Receipt

There were no problems with the condition of the samples received.

Quality Control and Data Interpretation

Unless otherwise noted, all holding times and QC criteria were met and the test results shown in this report meet all applicable NELAC requirements.

The method referenced for the analysis was EPA 1668 Revision A.

Nomenclature

The standardization strategy described in this report uses the naming convention of SW-846 Method 8290. This convention differs from Method 1668A in the following manner:

| Standard Addition Occurs Prior To: | Method 1668 A | SW-846 Conventions Used in This Report |
|---------------------------------------|--|---|
| Sampling | None | Sampling Surrogate |
| Extraction | Labeled Toxics/LOC/Window Defining | Internal Standard |
| Cleanups | Labeled Cleanup Standard | Cleanup Standard* |
| Injection | Labeled Injection Internal Standard | Recovery Standard |

TestAmerica Knoxville maintains the following certifications, approvals and accreditations: Arkansas DEQ Lab #88-0688, California DHS ELAP Cert. #2423, Colorado DPHE, Connecticut DPH Lab #PH-0223, Florida DOH Lab #E87177, Georgia DNR Lab #906, Hawaii DOH, Illinois EPA Lab #200012, Indiana DOH Lab #C-TN-02, Iowa DNR Lab #375, Kansas DHE Cert. #E-10349, Kentucky DEP Lab #90101, Louisiana DEQ Cert. #03079, Louisiana DOHH, Maryland DOE Cert. #277, Michigan DEQ Lab #9933, Nevada DEP, New Jersey DEP Lab #TN001, New York DOH Lab #10781, North Carolina DPH Lab #21705, North Carolina DEHNR Cert. #64, Ohio EPA VAP Lab #CL0059, Oklahoma DEQ Lab #9415, Pennsylvania DEP Lab #68-00576, South Carolina DHEC Cert #84001001, Tennessee DOH Lab #02014, Texas CEQ, Utah DOH Lab # QUAN3, Virginia DGS Lab #00165, Washington DOE Lab #C1314, West Virginia DEP Cert. #345, West Virginia DHHR Cert #9955C, Wisconsin DNR Lab #998044300, Naval Facilities Engineering Service Center and USDA Soil Permit #S-46424. This list of approvals is subject to change and does not imply that laboratory certification is available for all parameters reported in this environmental sample data report.

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* Cleanup Standard is also referred to as Surrogate Standard on report.

The shorthand notation used for congeners in this report is summarized in Table 2.

Qualifiers:

The following flags are used to qualify results for HRMS PCB results:

J – The reported result is an estimate. The amount reported is below the Estimated Minimum Level (EML). EML is defined by the method as the lowest concentration at which an analyte can be measured reliably with common laboratory interferences present. This value has been determined for each congener by MDL and laboratory method blank studies. The value is adjusted to reflect sample specific initial and final volumes.

E – The reported result is an estimate. The amount reported is above the UCL described below.

The E qualifier is applied on the basis of the **Upper Calibration Level (UCL)**. The quantitative definition of the UCL is listed below:

Upper Calibration Level: The concentration or mass of analyte in the sample that corresponds to the highest calibration level in the initial calibration. It is equivalent to the concentration of the highest calibration standard, assuming that all method-specified sample weights, volumes, and cleanup procedures have been employed.

B – The analyte is present in the associated method blank at a reportable level. For this analysis, there is no method specified reporting level, other than the qualitative criterion that peaks must exhibit a signal-to-noise ratio of 2.5-to-1. Therefore, the presence of any amount of the analyte present in the blank will result a B qualifier on all associated samples.

Note: Some laboratories do not report contamination in the blank unless it is above their lower calibration limit, or an established percentage of the level in the samples, or an established percentage of the regulatory limit. Likewise, some laboratories set a reporting limit at one half the lower calibration limit.

Q – Estimated maximum possible concentration. This qualifier is used when the result is generated from chromatographic data that does not meet all the qualitative criteria for a positive identification given in the method. The criteria include the following areas:

- Ion abundance ratios must be within specified limits (+/-15% of theoretical ion abundance ratio.)
- Retention time criteria (relative to the method-specified isotope labeled retention time standard).

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• Co-maximization criterion. The two quantitation ion peaks must reach their maxima within 2 seconds of each other.

S – Ion suppression evident. The trace indicating the signal from the lock mass of the calibration compound shows a deflection at the retention time of the analyte. This may indicate a temporary suppression of the instrument sensitivity, due to a matrix-borne interference.

C – Coeluting Isomer. The isomer is known to coelute with another member of its homologue group, or the peak shape is shouldered, indicating the likelihood of a coeluting isomer. When the C flag is followed by a number, the number indicates the lowest numbered congener among the coelution set. For example, if 100 pg/L is detected at the retention time of PCB 156, and PCB 157 is known to coelute with PCB 156, the results will be flagged as follows:

PCB 156 100 pg/L C
PCB 157 100 pg/L C156

In certain electronic deliverables the result field for PCB 157 will be null, with "C156" appearing in the qualifier field in accordance with the CARP EDD specification.

X – Other. See explanation in narrative.

Results

The results for the analyses are summarized in the following pages. Please see comments regarding qualifiers, above. Additional information regarding qualifiers is explained in the legends at the end of each result summary. All PCB shorthand identifications are done in accordance with the IUPAC convention. A summary of the IUPAC convention is provided in Table 2.

Detection Limits

For all analyte results a sample specific detection limit is calculated for that analyte. This is done by first determining the GC/MS peak height of the noise or interferent in the expected region of the analyte signal. This value is multiplied by the number 2.5, which serves as a safety factor. The 2.5 safety factor is disregarded if the noise present in the analyte region is a result of chemical interferences. The resulting signal response value is then used to estimate the minimum detectable analyte amount. The result is the estimated sample detection limit.

When an analyte is not detected, an ND appears in place of the result. The value in the detection limit column is the estimated detection limit for the analyte in that particular sample.

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EXAMPLE CALCULATIONS

The following formulas were used for sample calculations. Examples are given for calculating the percent recovery for internal standard $^{13}\text{C}_{12}$ -PCB 1, the concentration of native PCB 1 and the EDL for PCB 1. All values used in the calculations below are typical (i.e. not extracted from a particular sample). Actual values are found on the IsoCalc Preliminary Sample Report (IPSR) at the position indicated (in parentheses, below):

INTERNAL STANDARD RECOVERY ($^{13}\text{C}_{12}$ -PCB 1)

$$\text{Percent Recovery} = \frac{\Sigma A_{\text{IS}} \cdot W_{\text{RS}} \cdot 100\%}{\Sigma A_{\text{RS}} \cdot W_{\text{IS}} \cdot \text{RRF}}$$

ΣA_{IS} = Sum of areas for the Internal Standard quantitation ions. (IPSR – Column “Area”, Row “ $^{13}\text{C}_{12}$ -PCB 1”)

W_{RS} = Mass in ng of the Recovery Standard. (IPSR – Column “Std Amt”, Row “ $^{13}\text{C}_{12}$ -PCB 9”)

ΣA_{RS} = Sum of areas for the Recovery Standard quantitation ions. (IPSR – Column “Area”, Row “ $^{13}\text{C}_{12}$ -PCB 9”)

W_{IS} = Mass in ng of the Internal Standard. (IPSR – Column “Std Amt”, Row “ $^{13}\text{C}_{12}$ -PCB 1”)

RRF = Internal Standard mean relative response factor from the initial multipoint calibration. (IPSR - Column “RF”, Row “ $^{13}\text{C}_{12}$ -PCB 1”.)

$$\text{Substituting typical values, } \frac{1106275 \cdot 2.000 \text{ (ng)} \cdot 100\%}{1205581 \cdot 2.000 \text{ (ng)} \cdot 1.412} = 65\% \text{ Recovery}$$

NATIVE ANALYTE QUANTITATION (PCB 1)

$$\text{Conc} = \frac{\Sigma A_{\text{X}} \cdot W_{\text{IS}}}{\Sigma A_{\text{IS}} \cdot V \cdot 0.001 \text{ (mL/L)} \cdot \text{RRF}}$$

ΣA_{X} = Sum of areas for analyte quantitation ions. (IPSR – Area Column “Area”,

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Row "PCB 1")

W_{IS} = Mass in ng of Internal Standard. (IPSR – Column "Std Amt", Row "13C12-PCB 1")

ΣA_{IS} = Sum areas for the Internal Standard. (IPSR – Column "Area", Row 13C12-PCB 1)

V = Volume of sample extracted in mL. (IPSR – Header Column 2, Row "Initial Wt/Vol")

RRF = Native analyte mean relative response factor from the initial calibration, or daily response factor as appropriate. (IPSR – Column "RF", Row "PCB 1")

Substituting typical values, $\frac{8951 \cdot 2.000 \text{ (ng)}}{1106275 \cdot 2200 \text{ (mL)} \cdot 0.001 \text{ (mL/L)} \cdot 1.136} = 0.00647 \text{ ng/L} = 6.47 \text{ pg/L}$

$$1106275 \cdot 2200 \text{ (mL)} \cdot 0.001 \text{ (mL/L)} \cdot 1.136$$

CALCULATION OF SAMPLE SPECIFIC ESTIMATED DETECTION LIMIT

This calculation uses the noise values found on the IsoCalc Preliminary Peak Report (IPPR), which follows the IPSR. All the other values used in the equation are found on the IPSR.)

$$\frac{\Sigma I_X \cdot W_{IS} \cdot T_{SN}}{\Sigma I_{IS} \cdot V \cdot 0.001 \text{ (mL/L)} \cdot \text{RRF}}$$

ΣI_X = Sum of the intensities of the noise levels of the characteristic ions in the region of analyte elution. (IPPR – Columns "Height1" and "Height2", Row {mass} 188, Sub-Row "Noise").

W_{IS} = Mass in ng of the Internal Standard. (IPSR – Column "Std Amt", Row "13C12-PCB 1").

T_{SN} = Minimum Signal-to-Noise threshold. = 2.5. A constant, specified by the method.

ΣI_{IS} = Intensity of the corresponding ^{13}C ions. (IPSR – Column "Height", Row

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“13C12-PCB 9”)

V = Volume of sample extracted in mL. (IPSR – Header Column 2, Row “Initial Wt/Vol”)

RRF = Native analyte mean relative response factor from the initial calibration or daily standard as appropriate. (IPSR – Column “RF”, Row “PCB 1”)

$$\text{Substituting typical values } \frac{79 \bullet 2000 \text{ (pg)} \bullet 2.5}{334600 \bullet 2200 \text{ (mL)} \bullet 0.001 \text{ (mL/L)} \bullet 1.136} = 0.466 \text{ pg/L}$$

In sample data, peaks must have an intensity of 2.5 times the height of the background noise in order to be considered. Careful examination of the two equations above, and a bit of algebra reveals that for the concentration of the smallest peak detectable (per the EDL equation) to exactly equal the smallest peaks that are calculated, requires that the average height to area ratio obtained during the calibration must equal the area to height ratio for every peak obtained near 2.5 times the noise. When the area to height ratio on a peak in a sample is less than the average obtained during calibration, the calculated result will correspond to a peak that would have been less than 2.5 X the noise on the calibration. This is the result of normal variability. Because the source method for the EDL (EPA 1668 Revision A) does not provide for censoring of results by any other magnitude standard than being 2.5 times the noise, the laboratory does not censor at the calculated EDL. Hence, detections may be reported below the estimated detection limits.

| Analyte Type | BZ/IUPAC ¹ | CS 0.5 ng/mL | CS 1 ng/mL | CS 2 ng/mL | CS 3 ² ng/mL | CS 4 ng/mL | CS 5 ng/mL |
|------------------------|-----------------------|-----------------|---------------|---------------|----------------------------|---------------|---------------|
| Congeners | | | | | | | |
| 2-MoCB | 1 | 0.5 | 1.0 | 5.0 | 50 | 400 | 2000 |
| 4-MoCB | 3 | 0.5 | 1.0 | 5.0 | 50 | 400 | 2000 |
| 2,2'-DiCB | 4 | 0.5 | 1.0 | 5.0 | 50 | 400 | 2000 |
| 4,4'-DiCB | 15 | 0.5 | 1.0 | 5.0 | 50 | 400 | 2000 |
| 2,2',6'-TrCB | 19 | 0.5 | 1.0 | 5.0 | 50 | 400 | 2000 |
| 3,4,4'-TrCB | 37 | 0.5 | 1.0 | 5.0 | 50 | 400 | 2000 |
| 2,2',6,6'-TeCB | 54 | 0.5 | 1.0 | 5.0 | 50 | 400 | 2000 |
| 3,3',4,4'-TeCB | 77 | 0.5 | 1.0 | 5.0 | 50 | 400 | 2000 |
| 3,4,4',5'-TeCB | 81 | 0.5 | 1.0 | 5.0 | 50 | 400 | 2000 |
| 2,2',4,6,6'-PeCB | 104 | 0.5 | 1.0 | 5.0 | 50 | 400 | 2000 |
| 2,3,3',4,4'-PeCB | 105 | 0.5 | 1.0 | 5.0 | 50 | 400 | 2000 |
| 2,3,4,4',5'-PeCB | 114 | 0.5 | 1.0 | 5.0 | 50 | 400 | 2000 |
| 2,3',4,4',5'-PeCB | 118 | 0.5 | 1.0 | 5.0 | 50 | 400 | 2000 |
| 2',3,4,4',5'-PeCB | 123 | 0.5 | 1.0 | 5.0 | 50 | 400 | 2000 |
| 3,3',4,4',5'-PeCB | 126 | 0.5 | 1.0 | 5.0 | 50 | 400 | 2000 |
| 2,2',4,4',6,6'-HxCB | 155 | 0.5 | 1.0 | 5.0 | 50 | 400 | 2000 |
| 2,3,3',4,4',5'-HxCB | 156 | 0.5 | 1.0 | 5.0 | 50 | 400 | 2000 |
| 2,3,3',4,4',5',5'-HxCB | 157 | 0.5 | 1.0 | 5.0 | 50 | 400 | 2000 |
| 2,3',4,4',5',5'-HxCB | 167 | 0.5 | 1.0 | 5.0 | 50 | 400 | 2000 |
| 3,3',4,4',5',5'-HxCB | 169 | 0.5 | 1.0 | 5.0 | 50 | 400 | 2000 |

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| Analyte Type | BZ/IUPAC ¹ | CS 0.5 ng/mL | CS 1 ng/mL | CS 2 ng/mL | CS 3 ² ng/mL | CS 4 ng/mL | CS 5 ng/mL |
|--|-----------------------|-----------------|---------------|---------------|----------------------------|---------------|---------------|
| Congeners | | | | | | | |
| 2,2',3,4',5,6,6'-HpCB | 188 | 0.5 | 1.0 | 5.0 | 50 | 400 | 2000 |
| 2,5,3',4,4',5,5'-HpCB | 189 | 0.5 | 1.0 | 5.0 | 50 | 400 | 2000 |
| 2,2',3,3',5,5',6,6'-OeCB | 202 | 0.5 | 1.0 | 5.0 | 50 | 400 | 2000 |
| 2,3,3',4,4',5,5',6-OeCB | 205 | 0.5 | 1.0 | 5.0 | 50 | 400 | 2000 |
| 2,2',3,3',4,4',5,5',6-NoCB | 206 | 0.5 | 1.0 | 5.0 | 50 | 400 | 2000 |
| 2,2',3,3',4',5,5',6,6'-NoCB | 208 | 0.5 | 1.0 | 5.0 | 50 | 400 | 2000 |
| DeCB | 209 | 0.5 | 1.0 | 5.0 | 50 | 400 | 2000 |
| All other CB congeners | | 0.5 | 1.0 | 5.0 | 50 | 400 | 2000 |
| Labeled Congeners | | | | | | | |
| ¹³ C ₁₂ -2-MoCB | 1L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -4-MoCB | 3L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -2,2'-DiCB | 4L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -4,4'-DiCB | 15L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -2,2',6-TrCB | 19L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -3,4,4'-TrCB | 37L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -2,2',6,6'-TeCB | 54L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -3,3',4,4'-TeCB | 77L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -3,4,4',5-TeCB | 81L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -2,2',4,6,6'-PeCB | 104L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -2,3,3',4,4'-PeCB | 105L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -2,3,4,4',5-PeCB | 114L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -2,3',4,4',5-PeCB | 118L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -2',3,4,4',5-PeCB | 123L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -3,3',4,4',5-PeCB | 126L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -2,2',4,4',6,6'-HxCB | 155L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -2,3,3',4,4',5-HxCB | 156L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -2,3,3',4,4',5'-HxCB | 157L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -2,3',4,4',5,5'-HxCB | 167L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -3,3',4,4',5,5'-HxCB | 169L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -2,2',3,3',4,4',5-HpCB | 170L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -2,2',3,4',5,6,6'-HpCB | 188L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -2,3,3',4,4',5,5'-HpCB | 189L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -2,2',3,3',5,5',6,6'-OeCB | 202L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -2,3,3',4,4',5,5',6-OeCB | 205L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -2,2',3,3',4,4',5,5',6-NoCB | 206L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -2,2',3,3',4',5,5',6,6'-NoCB | 208L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -DeCB | 209L | 100 | 100 | 100 | 100 | 100 | 100 |
| Cleanup Standards | | | | | | | |
| ¹³ C ₁₂ -2,4,4'-TriCB | 28L | 0.5 | 1.0 | 5.0 | 50 | 400 | -- |
| ¹³ C ₁₂ -2,3,3',5,5'-PeCB | 111L | 0.5 | 1.0 | 5.0 | 50 | 400 | -- |
| ¹³ C ₁₂ -2,2',3,3',5,5',6-HpCB | 178L | 0.5 | 1.0 | 5.0 | 50 | 400 | -- |
| Recovery Standards | | | | | | | |
| ¹³ C ₁₂ -2,5-DiCB | 9L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -2,4',5-TriCB | 31L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -2,4',6-TriCB | 32L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -2,2',5,5'-TeCB | 52L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -2,2',4',5,5'-PeCB | 101L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -3,3',4,5,5'-PeCB | 127L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -2,2',3',4,4',5'-HxCB | 138L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -2,2',3,4,4',5,5'-HpCB | 180L | 100 | 100 | 100 | 100 | 100 | 100 |
| ¹³ C ₁₂ -2,2',3,3',4,4',5,5'-OeCB | 194L | 100 | 100 | 100 | 100 | 100 | 100 |
| Labeled Sampling Surrogates | | | | | | | |
| ¹³ C ₁₂ -2,4'-DiCB | 8L | 0.5 | 1.0 | 5.0 | 50 | 400 | -- |
| ¹³ C ₁₂ -3,3',4,5'-TeCB | 79L | 0.5 | 1.0 | 5.0 | 50 | 400 | -- |
| ¹³ C ₁₂ -2,2',3,5',6-PeCB | 95L | 0.5 | 1.0 | 5.0 | 50 | 400 | -- |
| ¹³ C ₁₂ -2,2',4,4',5,5'-HxCB | 153L | 0.5 | 1.0 | 5.0 | 50 | 400 | -- |

Notes:

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1. Suffix "L" indicates labeled compound
2. Section 15.3, calibration verification solution

| Table 2 | | | | | |
|--|---|----------------------------------|------------------------------|--|----------------------------------|
| PCB Shorthand Nomenclature Used in this Report | | | | | |
| BZ/IUPAC Number ¹ | PCB Chemical Structure Name ² | CAS Registry Number ³ | BZ/IUPAC Number ¹ | PCB Chemical Structure Name ² | CAS Registry Number ³ |
| 1 | 2-monochlorobiphenyl | 2051-60-7 | 106 | 2,3,3',4,5-pentachlorobiphenyl | 70424-69-0 |
| 2 | 3-monochlorobiphenyl | 2051-61-8 | 107/109 | 2,3,3',4,6-pentachlorobiphenyl | 74472-35-8 |
| 3 | 4-monochlorobiphenyl | 2051-62-9 | 108/107 | 2,3,3',4',5-pentachlorobiphenyl | 70424-68-9 |
| 4 | 2,2'-dichlorobiphenyl | 13029-08-8 | 109/108 | 2,3,3',4,5'-pentachlorobiphenyl | 70362-41-3 |
| 5 | 2,3-dichlorobiphenyl | 16605-91-7 | 110 | 2,3,3',4',6-pentachlorobiphenyl | 38380-03-9 |
| 6 | 2,3'-dichlorobiphenyl | 25569-80-6 | 111 | 2,3,3',5,5'-pentachlorobiphenyl | 39635-32-0 |
| 7 | 2,4-dichlorobiphenyl | 33284-50-3 | 112 | 2,3,3',5,6-pentachlorobiphenyl | 74472-36-9 |
| 8 | 2,4'-dichlorobiphenyl | 34883-43-7 | 113 | 2,3,3',5',6-pentachlorobiphenyl | 68194-10-5 |
| 9 | 2,5-dichlorobiphenyl | 34883-39-1 | 114 | 2,3,4,4',5-pentachlorobiphenyl | 74472-37-0 |
| 10 | 2,6-dichlorobiphenyl | 33146-45-1 | 115 | 2,3,4,4',6-pentachlorobiphenyl | 74472-38-1 |
| 11 | 3,3'-dichlorobiphenyl | 2050-67-1 | 116 | 2,3,4,5,6-pentachlorobiphenyl | 18259-05-7 |
| 12 | 3,4-dichlorobiphenyl | 2974-92-7 | 117 | 2,3,4',5,6-pentachlorobiphenyl | 68194-11-6 |
| 13 | 3,4'-dichlorobiphenyl | 2974-90-5 | 118 | 2,3',4,4',5-pentachlorobiphenyl | 31508-00-6 |
| 14 | 3,5-dichlorobiphenyl | 34883-41-5 | 119 | 2,3',4,4',6-pentachlorobiphenyl | 56558-17-9 |
| 15 | 4,4'-dichlorobiphenyl | 2050-68-2 | 120 | 2,3',4,5,5'-pentachlorobiphenyl | 68194-12-7 |
| 16 | 2,2',3-trichlorobiphenyl | 38444-78-9 | 121 | 2,3',4,5',6-pentachlorobiphenyl | 56558-18-0 |
| 17 | 2,2',4-trichlorobiphenyl | 37680-66-3 | 122 | 2',3,3',4,5-pentachlorobiphenyl (2,3,3',4',5'-pentachlorobiphenyl) | 76842-07-4 |
| 18 | 2,2',5-trichlorobiphenyl | 37680-65-2 | 123 | 2',3,4,4',5-pentachlorobiphenyl (2,3',4,4',5'-pentachlorobiphenyl) | 65510-44-3 |
| 19 | 2,2',6-trichlorobiphenyl | 38444-73-4 | 124 | 2',3,4,5,5'-pentachlorobiphenyl (2,3',4',5',5'-pentachlorobiphenyl) | 70424-70-3 |
| 20 | 2,3,3'-trichlorobiphenyl | 38444-84-7 | 125 | 2',3,4,5,6'-pentachlorobiphenyl (2,3',4',5',6'-pentachlorobiphenyl) | 74472-39-2 |
| 21 | 2,3,4-trichlorobiphenyl | 55702-46-0 | 126 | 3,3',4,4',5-pentachlorobiphenyl | 57465-28-8 |
| 22 | 2,3,4'-trichlorobiphenyl | 38444-85-8 | 127 | 3,3',4,5,5'-pentachlorobiphenyl | 39635-33-1 |
| 23 | 2,3,5-trichlorobiphenyl | 55720-44-0 | 128 | 2,2',3,3',4,4'-hexachlorobiphenyl | 38380-07-3 |
| 24 | 2,3,6-trichlorobiphenyl | 55702-45-9 | 129 | 2,2',3,3',4,5-hexachlorobiphenyl | 55215-18-4 |
| 25 | 2,3',4-trichlorobiphenyl | 55712-37-3 | 130 | 2,2',3,3',4,5'-hexachlorobiphenyl | 52663-66-8 |
| 26 | 2,3',5-trichlorobiphenyl | 38444-81-4 | 131 | 2,2',3,3',4,6-hexachlorobiphenyl | 61798-70-7 |
| 27 | 2,3',6-trichlorobiphenyl | 38444-76-7 | 132 | 2,2',3,3',4,6'-hexachlorobiphenyl | 38380-05-1 |
| 28 | 2,4,4'-trichlorobiphenyl | 7012-37-5 | 133 | 2,2',3,3',5,5'-hexachlorobiphenyl | 35694-04-3 |
| 29 | 2,4,5-trichlorobiphenyl | 15862-07-4 | 134 | 2,2',3,3',5,6-hexachlorobiphenyl | 52704-70-8 |
| 30 | 2,4,6-trichlorobiphenyl | 35693-92-6 | 135 | 2,2',3,3',5,6'-hexachlorobiphenyl | 52744-13-5 |
| 31 | 2,4',5-trichlorobiphenyl | 16606-02-3 | 136 | 2,2',3,3',6,6'-hexachlorobiphenyl | 38411-22-2 |
| 32 | 2,4',6-trichlorobiphenyl | 38444-77-8 | 137 | 2,2',3,4,4',5-hexachlorobiphenyl | 35694-06-5 |
| 33 | 2',3,4-trichlorobiphenyl (2,3',4'-trichlorobiphenyl) | 38444-86-9 | 138 | 2,2',3,4,4',5'-hexachlorobiphenyl | 35065-28-2 |
| 34 | 2',3,5-trichlorobiphenyl (2,3',5'-trichlorobiphenyl) | 37680-68-5 | 139 | 2,2',3,4,4',6-hexachlorobiphenyl | 56030-56-9 |
| 35 | 3,3',4-trichlorobiphenyl | 37680-69-6 | 140 | 2,2',3,4,4',6'-hexachlorobiphenyl | 59291-64-4 |
| 36 | 3,3',5-trichlorobiphenyl | 38444-87-0 | 141 | 2,2',3,4,5,5'-hexachlorobiphenyl | 52712-04-6 |
| 37 | 3,4,4'-trichlorobiphenyl | 38444-90-5 | 142 | 2,2',3,4,5,6-hexachlorobiphenyl | 41411-61-4 |
| 38 | 3,4,5-trichlorobiphenyl | 53555-66-1 | 143 | 2,2',3,4,5,6'-hexachlorobiphenyl | 68194-15-0 |
| 39 | 3,4',5-trichlorobiphenyl | 38444-88-1 | 144 | 2,2',3,4,5',6-hexachlorobiphenyl | 68194-14-9 |
| 40 | 2,2',3,3'-tetrachlorobiphenyl | 38444-93-8 | 145 | 2,2',3,4,6,6'-hexachlorobiphenyl | 74472-40-5 |
| 41 | 2,2',3,4-tetrachlorobiphenyl | 52663-59-9 | 146 | 2,2',3,4',5,5'-hexachlorobiphenyl | 51908-16-8 |
| 42 | 2,2',3,4'-tetrachlorobiphenyl | 36559-22-5 | 147 | 2,2',3,4',5,6-hexachlorobiphenyl | 68194-13-8 |
| 43 | 2,2',3,5-tetrachlorobiphenyl | 70362-46-8 | 148 | 2,2',3,4',5,6'-hexachlorobiphenyl | 74472-41-6 |
| 44 | 2,2',3,5'-tetrachlorobiphenyl | 41464-39-5 | 149 | 2,2',3,4',5',6-hexachlorobiphenyl | 38380-04-0 |
| 45 | 2,2',3,6-tetrachlorobiphenyl | 70362-45-7 | 150 | 2,2',3,4',6,6'-hexachlorobiphenyl | 68194-08-1 |

PROJECT NARRATIVE W05680

| Table 2 | | | | | |
|--|--|----------------------------------|------------------------------|---|----------------------------------|
| PCB Shorthand Nomenclature Used in this Report | | | | | |
| BZ/IUPAC Number ¹ | PCB Chemical Structure Name ² | CAS Registry ³ Number | BZ/IUPAC Number ¹ | PCB Chemical Structure Name ² | CAS Registry ³ Number |
| 46 | 2,2',3,6'-tetrachlorobiphenyl | 41464-47-5 | 151 | 2,2',3,5,5',6-hexachlorobiphenyl | 52663-63-5 |
| 47 | 2,2',4,4'-tetrachlorobiphenyl | 2437-79-8 | 152 | 2,2',3,5,6,6'-hexachlorobiphenyl | 68194-09-2 |
| 48 | 2,2',4,5-tetrachlorobiphenyl | 70362-47-9 | 153 | 2,2',4,4',5,5'-hexachlorobiphenyl | 35065-27-1 |
| 49 | 2,2',4,5'-tetrachlorobiphenyl | 41464-40-8 | 154 | 2,2',4,4',5,6'-hexachlorobiphenyl | 60145-22-4 |
| 50 | 2,2',4,6-tetrachlorobiphenyl | 62796-65-0 | 155 | 2,2',4,4',6,6'-hexachlorobiphenyl | 33979-03-2 |
| 51 | 2,2',4,6'-tetrachlorobiphenyl | 68194-04-7 | 156 | 2,3,3',4,4',5-hexachlorobiphenyl | 38380-08-4 |
| 52 | 2,2',5,5'-tetrachlorobiphenyl | 35693-99-3 | 157 | 2,3,3',4,4',5'-hexachlorobiphenyl | 69782-90-7 |
| 53 | 2,2',5,6'-tetrachlorobiphenyl | 41464-41-9 | 158 | 2,3,3',4,4',6-hexachlorobiphenyl | 74472-42-7 |
| 54 | 2,2',6,6'-tetrachlorobiphenyl | 15968-05-5 | 159 | 2,3,3',4,5,5'-hexachlorobiphenyl | 39635-35-3 |
| 55 | 2,3,3',4-tetrachlorobiphenyl | 74338-24-2 | 160 | 2,3,3',4,5,6-hexachlorobiphenyl | 41411-62-5 |
| 56 | 2,3,3',4'-tetrachlorobiphenyl | 41464-43-1 | 161 | 2,3,3',4,5',6-hexachlorobiphenyl | 74472-43-8 |
| 57 | 2,3,3',5-tetrachlorobiphenyl | 70424-67-8 | 162 | 2,3,3',4',5,5'-hexachlorobiphenyl | 39635-34-2 |
| 58 | 2,3,3',5'-tetrachlorobiphenyl | 41464-49-7 | 163 | 2,3,3',4',5,6-hexachlorobiphenyl | 74472-44-9 |
| 59 | 2,3,3',6-tetrachlorobiphenyl | 74472-33-6 | 164 | 2,3,3',4',5',6-hexachlorobiphenyl | 74472-45-0 |
| 60 | 2,3,4,4'-tetrachlorobiphenyl | 33025-41-1 | 165 | 2,3,3',5,5',6-hexachlorobiphenyl | 74472-46-1 |
| 61 | 2,3,4,5-tetrachlorobiphenyl | 33284-53-6 | 166 | 2,3,4,4',5,6-hexachlorobiphenyl | 41411-63-6 |
| 62 | 2,3,4,6-tetrachlorobiphenyl | 54230-22-7 | 167 | 2,3',4,4',5,5'-hexachlorobiphenyl | 52663-72-6 |
| 63 | 2,3,4',5-tetrachlorobiphenyl | 74472-34-7 | 168 | 2,3',4,4',5',6-hexachlorobiphenyl | 59291-65-5 |
| 64 | 2,3,4',6-tetrachlorobiphenyl | 52663-58-8 | 169 | 3,3',4,4',5,5'-hexachlorobiphenyl | 32774-16-6 |
| 65 | 2,3,5,6-tetrachlorobiphenyl | 33284-54-7 | 170 | 2,2',3,3',4,4',5-heptachlorobiphenyl | 35065-30-6 |
| 66 | 2,3',4,4'-tetrachlorobiphenyl | 32598-10-0 | 171 | 2,2',3,3',4,4',6-heptachlorobiphenyl | 52663-71-5 |
| 67 | 2,3',4,5-tetrachlorobiphenyl | 73575-53-8 | 172 | 2,2',3,3',4,5,5'-heptachlorobiphenyl | 52663-74-8 |
| 68 | 2,3',4,5'-tetrachlorobiphenyl | 73575-52-7 | 173 | 2,2',3,3',4,5,6-heptachlorobiphenyl | 68194-16-1 |
| 69 | 2,3',4,6-tetrachlorobiphenyl | 60233-24-1 | 174 | 2,2',3,3',4,5,6'-heptachlorobiphenyl | 38411-25-5 |
| 70 | 2,3',4',5-tetrachlorobiphenyl | 32598-11-1 | 175 | 2,2',3,3',4,5',6-heptachlorobiphenyl | 40186-70-7 |
| 71 | 2,3',4',6-tetrachlorobiphenyl | 41464-46-4 | 176 | 2,2',3,3',4,6,6'-heptachlorobiphenyl | 52663-65-7 |
| 72 | 2,3',5,5'-tetrachlorobiphenyl | 41464-42-0 | 177 | 2,2',3,3',4',5,6-heptachlorobiphenyl (2,2',3,3',4,5',6'-heptachlorobiphenyl) | 52663-70-4 |
| 73 | 2,3',5',6-tetrachlorobiphenyl | 74338-23-1 | 178 | 2,2',3,3',5,5',6-heptachlorobiphenyl | 52663-67-9 |
| 74 | 2,4,4',5-tetrachlorobiphenyl | 32690-93-0 | 179 | 2,2',3,3',5,6,6'-heptachlorobiphenyl | 52663-64-6 |
| 75 | 2,4,4',6-tetrachlorobiphenyl | 32598-12-2 | 180 | 2,2',3,4,4',5,5'-heptachlorobiphenyl | 35065-29-3 |
| 76 | 2',3,4,5-tetrachlorobiphenyl (2,3',4',5'-tetrachlorobiphenyl) | 70362-48-0 | 181 | 2,2',3,4,4',5,6-heptachlorobiphenyl | 74472-47-2 |
| 77 | 3,3',4,4'-tetrachlorobiphenyl | 32598-13-3 | 182 | 2,2',3,4,4',5,6'-heptachlorobiphenyl | 60145-23-5 |
| 78 | 3,3',4,5-tetrachlorobiphenyl | 70362-49-1 | 183 | 2,2',3,4,4',5',6-heptachlorobiphenyl | 52663-69-1 |
| 79 | 3,3',4,5'-tetrachlorobiphenyl | 41464-48-6 | 184 | 2,2',3,4,4',6,6'-heptachlorobiphenyl | 74472-48-3 |
| 80 | 3,3',5,5'-tetrachlorobiphenyl | 33284-52-5 | 185 | 2,2',3,4,5,5',6-heptachlorobiphenyl | 52712-05-7 |
| 81 | 3,4,4',5-tetrachlorobiphenyl | 70362-50-4 | 186 | 2,2',3,4,5,6,6'-heptachlorobiphenyl | 74472-49-4 |
| 82 | 2,2',3,3',4-pentachlorobiphenyl | 52663-62-4 | 187 | 2,2',3,4',5,5',6-heptachlorobiphenyl | 52663-68-0 |
| 83 | 2,2',3,3',5-pentachlorobiphenyl | 60145-20-2 | 188 | 2,2',3,4',5,6,6'-heptachlorobiphenyl | 74487-85-7 |
| 84 | 2,2',3,3',6-pentachlorobiphenyl | 52663-60-2 | 189 | 2,3,3',4,4',5,5'-heptachlorobiphenyl | 39635-31-9 |
| 85 | 2,2',3,4,4'-pentachlorobiphenyl | 65510-45-4 | 190 | 2,3,3',4,4',5,6-heptachlorobiphenyl | 41411-64-7 |
| 86 | 2,2',3,4,5-pentachlorobiphenyl | 55312-69-1 | 191 | 2,3,3',4,4',5',6-heptachlorobiphenyl | 74472-50-7 |
| 87 | 2,2',3,4,5'-pentachlorobiphenyl | 38380-02-8 | 192 | 2,3,3',4,5,5',6-heptachlorobiphenyl | 74472-51-8 |
| 88 | 2,2',3,4,6-pentachlorobiphenyl | 55215-17-3 | 193 | 2,3,3',4',5,5',6-heptachlorobiphenyl | 69782-91-8 |
| 89 | 2,2',3,4,6'-pentachlorobiphenyl | 73575-57-2 | 194 | 2,2',3,3',4,4',5,5'-octachlorobiphenyl | 35694-08-7 |
| 90 | 2,2',3,4',5-pentachlorobiphenyl | 68194-07-0 | 195 | 2,2',3,3',4,4',5,6-octachlorobiphenyl | 52663-78-2 |
| 91 | 2,2',3,4',6-pentachlorobiphenyl | 68194-05-8 | 196 | 2,2',3,3',4,4',5,6'-octachlorobiphenyl | 42740-50-1 |
| 92 | 2,2',3,5,5'-pentachlorobiphenyl | 52663-61-3 | 197 | 2,2',3,3',4,4',6,6'-octachlorobiphenyl | 33091-17-7 |
| 93 | 2,2',3,5,6-pentachlorobiphenyl | 73575-56-1 | 198 | 2,2',3,3',4,5,5',6-octachlorobiphenyl | 68194-17-2 |
| 94 | 2,2',3,5,6'-pentachlorobiphenyl | 73575-55-0 | 199/200 | 2,2',3,3',4,5,6,6'-octachlorobiphenyl | 52663-73-7 |
| 95 | 2,2',3,5',6-pentachlorobiphenyl | 38379-99-6 | 200/201 | 2,2',3,3',4,5',6,6'-octachlorobiphenyl | 40186-71-8 |
| 96 | 2,2',3,6,6'-pentachlorobiphenyl | 73575-54-9 | 201/199 | 2,2',3,3',4,5,5',6'-octachlorobiphenyl | 52663-75-9 |
| 97 | 2,2',3',4,5-pentachlorobiphenyl | 41464-51-1 | 202 | 2,2',3,3',5,5',6,6'-octachlorobiphenyl | 2136-99-4 |

PROJECT NARRATIVE W05680

| Table 2 | | | | | |
|--|---|----------------------------------|------------------------------|---|----------------------------------|
| PCB Shorthand Nomenclature Used in this Report | | | | | |
| BZ/IUPAC Number ¹ | PCB Chemical Structure Name ² | CAS Registry ³ Number | BZ/IUPAC Number ¹ | PCB Chemical Structure Name ² | CAS Registry ³ Number |
| | (2,2',3,4',5'-pentachlorobiphenyl) | | | | |
| 98 | 2,2',3',4,6-pentachlorobiphenyl (2,2',3,4',6'-pentachlorobiphenyl) | 60233-25-2 | 203 | 2,2',3,4,4',5,5',6-octachlorobiphenyl | 52663-76-0 |
| 99 | 2,2',4,4',5-pentachlorobiphenyl | 38380-01-7 | 204 | 2,2',3,4,4',5,6,6'-octachlorobiphenyl | 74472-52-9 |
| 100 | 2,2',4,4',6-pentachlorobiphenyl | 39485-83-1 | 205 | 2,3,3',4,4',5,5',6-octachlorobiphenyl | 74472-53-0 |
| 101 | 2,2',4,5,5'-pentachlorobiphenyl | 37680-73-2 | 206 | 2,2',3,3',4,4',5,5',6-nonachlorobiphenyl | 40186-72-9 |
| 102 | 2,2',4,5,6-pentachlorobiphenyl | 68194-06-9 | 207 | 2,2',3,3',4,4',5,6,6'-nonachlorobiphenyl | 52663-79-3 |
| 103 | 2,2',4,5',6-pentachlorobiphenyl | 60145-21-3 | 208 | 2,2',3,3',4,5,5',6,6'-nonachlorobiphenyl | 52663-77-1 |
| 104 | 2,2',4,6,6'-pentachlorobiphenyl | 56558-16-8 | 209 | 2,2',3,3',4,4',5,5',6,6'-decachlorobiphenyl | 2051-24-3 |
| 105 | 2,3,3',4,4'-pentachlorobiphenyl | 32598-14-4 | | | |

1. The BZ number is from Ballschmiter and Zell (1980). The IUPAC number, when different from the BZ, follows the recommended changes to the BZ number per Schulte and Malisch (1983) and Guitart et al. (1993).
2. The chemical structure names are from Ballschmiter and Zell (1980). IUPAC nomenclature structure names are listed in parenthesis when different from the BZ name (source CAS Registry).
3. Chemical Abstract Service Registry number (source CAS Registry and 1668A Table 1).

| CH2M Hill Plateau Remediation Company | | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST <i>1406250511</i> | | | F10-102-033 | PAGE 1 OF 1 | |
|--|---|--|--|--------------------------------------|---|---|--|
| COLLECTOR <i>Scales, Chamberlain</i> | | COMPANY CONTACT BAMBERGER, MACHELLE | TELEPHONE NO. 373-0880 | PROJECT COORDINATOR WIDRIG, DL | PRICE CODE 8C | DATA TURNAROUND 15 Days / 15 Days | |
| SAMPLING LOCATION C6725 (Near Diverston Box) I-001 | | PROJECT DESIGNATION 200-E-127 Pipeline - Soil | | SAF NO. F10-102 | AIR QUALITY <input type="checkbox"/> | | |
| ICE CHEST NO. <i>GW5-118</i> | | FIELD LOGBOOK NO. <i>ANF-N-507-5</i> | ACTUAL SAMPLE DEPTH <i>5.0-11.0'</i> | COA 302427E510 | METHOD OF SHIPMENT GOVERNMENT VEHICLE | | |
| SHIPPED TO TestAmerica Knoxville | | 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 None | TYPE OF CONTAINER aG | NO. OF CONTAINER(S) 1 | VOLUME 120ml | SPECIAL HANDLING AND/OR STORAGE RADIOACTIVE TIE TO: B247W7 | |
| SAMPLE NO. | | MATRIX* | SAMPLE DATE | SAMPLE TIME | SPECIAL INSTRUCTIONS | | |
| B247X5 | | SOIL | <i>3-17-10</i> | <i>1045</i> | <i>1 COOLER REFD @ 3'C</i> <i>FIELD EX # 7985 0642 0140</i> <i>CUSTODY TAPE INTACT</i> <i>TS 3/25/10</i> | | |
| CHAIN OF POSSESSION | | SIGN/ PRINT NAMES | | | SPECIAL INSTRUCTIONS | | |
| RELINQUISHED BY/REMOVED FROM <i>Copied Chamberlain/ by John</i> | | DATE/TIME <i>3-17-10</i> | RECEIVED BY/STORED IN SSU- 1 | DATE/TIME <i>3/17/10 1405</i> | ** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF. | | |
| RELINQUISHED BY/REMOVED FROM SSU- 1 | | DATE/TIME <i>0700 MAR 23 2010</i> | RECEIVED BY/STORED IN <i>SE Hamaker</i> | DATE/TIME <i>0700 MAR 23 2010</i> | (1)1668 PCB WHO CONGENER (TCL) {2,3,3',4,4',5-Hexachlorobiphenyl, 2,3,3',4,4',5,5'-Heptachlorobiphenyl, 2,3',4,4',5,5'-Hexachlorobiphenyl, 2,3,4,4',5-Pentachlorobiphenyl, 3,3',4,4',5,5'-Hexachlorobiphenyl, 2,3,3',4,4'-Pentachlorobiphenyl, 3,3',4,4',5-Pentachlorobiphenyl, 2',3,4,4',5-Pentachlorobiphenyl, 3,4,4',5-Tetrachlorobiphenyl, 2,3',4,4',5-Pentachlorobiphenyl, 3,3',4,4'-Tetrachlorobiphenyl, 2,3,3',4,4',5'-Hexachlorobiphenyl} | | |
| RELINQUISHED BY/REMOVED FROM <i>CHPRC</i> | | DATE/TIME <i>1155</i> | RECEIVED BY/STORED IN <i>CHPRC</i> | DATE/TIME <i>1155</i> | wcf 5860 | | |
| RELINQUISHED BY/REMOVED FROM <i>CHPRC</i> | | DATE/TIME <i>MAR 23 2010</i> | RECEIVED BY/STORED IN <i>CHPRC</i> | DATE/TIME <i>32310</i> | ORIGINAL | | |
| RELINQUISHED BY/REMOVED FROM <i>CHPRC</i> | | DATE/TIME <i>32410 250</i> | RECEIVED BY/STORED IN <i>CHPRC</i> | DATE/TIME <i>3/25/10 9:40</i> | | | |
| 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 | | |

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Appendix 5

Data Validation Supporting Documentation

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

Appendix A - Chemical Data Validation Checklist

| VALIDATION LEVEL: | A | B | C | D | E |
|--------------------------------------|---|-----------------------|-------------------------|-------------------|-----------------------|
| PROJECT: 200 AREA GRP | | | DATA PACKAGE: VSR11-002 | | |
| VALIDATOR: Carl Schloesslin | | LAB: TestAmerica | | DATE: 11-18-2010 | |
| | | | SDG: W05860 | | |
| ANALYSES PERFORMED | | | | | |
| SW-846 8260 | | SW-846 8260 (TCLP) | SW-846 8270 | SW-846 1668A X | SW-846 8270 (TCLP) |
| | | | | | |
| SAMPLES/MATRIX Soil sample B247X5 | | | | | |

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments: None

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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:

PCB 123 OCR (LCS) %R = 132%

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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:

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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

Method Blank Report
Trace Level Organic Compounds

| | | |
|--|-----------------------------|-----------------------|
| Lot - Sample #....: H0C260000 - 234B | Work Order #....: LW6M41AA | Matrix....: SOLID |
| Dilution Factor: 1 | Analysis Date....: 04/09/10 | Percent Moisture: 0.0 |
| Prep Date....: 03/26/10 | Instrument ID....: M1D | Method: EPA-22 1668A |
| Prep Batch #: 0085234 | | |
| Initial Wgt/Vol : 10 g | | |
| Analyst ID....: Daniel (Dan) C. Gobich | | |

| PARAMETER | RESULT | MINIMUM LEVEL | ESTIMATED DETECTION LIMIT | UNITS |
|--------------|--------|---------------|---------------------------|-------|
| PCB 77 (BZ) | ND | 0.010 | 0.00048 | ng/g |
| PCB 81 (BZ) | ND | 0.010 | 0.00050 | ng/g |
| PCB 126 (BZ) | ND | 0.010 | 0.00032 | ng/g |
| PCB 105 (BZ) | ND | 0.010 | 0.00033 | ng/g |
| PCB 118 (BZ) | ND | 0.010 | 0.00032 | ng/g |
| PCB 123 (BZ) | ND | 0.010 | 0.00034 | ng/g |
| PCB 114 (BZ) | ND | 0.010 | 0.00031 | ng/g |
| PCB 169 (BZ) | ND | 0.010 | 0.00037 | ng/g |
| PCB 156 (BZ) | ND | 0.010 | 0.00070 | ng/g |
| PCB 157 (BZ) | ND | 0.010 | 0.00070 | ng/g |
| PCB 167 (BZ) | ND | 0.010 | 0.00041 | ng/g |
| PCB 189 (BZ) | ND | 0.010 | 0.00038 | ng/g |

Method Blank Report
Trace Level Organic Compounds

| | | |
|--|-----------------------------|-----------------------|
| Lot - Sample #....: H0C260000 - 234B | Work Order #....: LW6M41AA | Matrix....: SOLID |
| Dilution Factor: 1 | Analysis Date....: 04/09/10 | Percent Moisture: 0.0 |
| Prep Date....: 03/26/10 | Instrument ID....: MID | Method: EPA-22 1668A |
| Prep Batch #: 0085234 | | |
| Initial Wgt/Vol : 10 g | | |
| Analyst ID....: Daniel (Dan) C. Gobich | | |

| <u>INTERNAL STANDARDS</u> | <u>PERCENT RECOVERY</u> | <u>RECOVERY LIMITS</u> |
|---------------------------|-----------------------------|----------------------------|
| 13C12-PCB 1 | 81 | 30 - 140 |
| 13C12-PCB 3 | 73 | 30 - 140 |
| 13C12-PCB 4 | 78 | 30 - 140 |
| 13C12-PCB 15 | 73 | 30 - 140 |
| 13C12-PCB 19 | 75 | 30 - 140 |
| 13C12-PCB 37 | 82 | 30 - 140 |
| 13C12-PCB 54 | 93 | 30 - 140 |
| 13C12-PCB 77 | 83 | 30 - 140 |
| 13C12-PCB 81 | 80 | 30 - 140 |
| 13C12-PCB 104 | 81 | 30 - 140 |
| 13C12-PCB 105 | 81 | 30 - 140 |
| 13C12-PCB 114 | 81 | 30 - 140 |
| 13C12-PCB 118 | 80 | 30 - 140 |
| 13C12-PCB 123 | 80 | 30 - 140 |
| 13C12-PCB 126 | 85 | 30 - 140 |
| 13C12-PCB 155 | 99 | 30 - 140 |
| 13C12-PCB 156 | 87 | 30 - 140 |
| 13C12-PCB 157 | 87 | 30 - 140 |
| 13C12-PCB 167 | 79 | 30 - 140 |
| 13C12-PCB 169 | 85 | 30 - 140 |
| 13C12-PCB 170 | 90 | 30 - 140 |
| 13C12-PCB 188 | 96 | 30 - 140 |
| 13C12-PCB 189 | 102 | 30 - 140 |
| 13C12-PCB 202 | 103 | 30 - 140 |
| 13C12-PCB 205 | 95 | 30 - 140 |
| 13C12-PCB 206 | 88 | 30 - 140 |
| 13C12-PCB 208 | 89 | 30 - 140 |
| 13C12-PCB 209 | 81 | 30 - 140 |
| | C | |
| | C | |
| <u>SURROGATE</u> | <u>PERCENT RECOVERY</u> | <u>RECOVERY LIMITS</u> |
| 13C12-PCB 28 | 79 | 40 - 125 |
| 13C12-PCB 111 | 87 | 40 - 125 |
| 13C12-PCB 178 | 85 | 40 - 125 |

Method Blank Report
Trace Level Organic Compounds

| | | | | | |
|---------------------|------------------------|--------------------|----------|-------------------|--------------|
| Lot - Sample #....: | H0C260000 - 234B | Work Order #....: | LW6M41AA | Matrix....: | SOLID |
| Dilution Factor: | 1 | Analysis Date....: | 04/09/10 | Percent Moisture: | 0.0 |
| Prep Date....: | 03/26/10 | Instrument ID....: | M1D | Method: | EPA-22 1668A |
| Prep Batch #: | 0085234 | | | | |
| Initial Wgt/Vol : | 10 g | | | | |
| Analyst ID....: | Daniel (Dan) C. Gobich | | | | |

QUALIFIERS

C Co-eluting isomer.

LABORATORY CONTROL SAMPLE DATA REPORT

Trace Level Organic Compounds

Client Lot # ...: WO5860 Work Order # ...: LW6M41AC-LCS Matrix: SOLID
 LCS Lot-Sample#: H0C260000 - 234
 Prep Date: 03/26/10 Analysis Date ..: 04/09/10
 Prep Batch # ...: 0085234
 Dilution Factor : 1
 Analyst ID.....: Daniel (Dan) C. Gobich Instrument ID..: MID Method.....: EPA-22 1668A
 Initial Wgt/Vol: 10 g

| PARAMETER | SPIKE AMOUNT | MEASURED AMOUNT | UNITS | PERCENT RECOVERY | RECOVERY LIMITS |
|--------------|-----------------|--------------------|-------|---------------------|--------------------|
| PCB 77 (BZ) | 0.500 | 0.502 | ng/g | 100 | (50 - 150) |
| PCB 1 (BZ) | 0.500 | 0.498 | ng/g | 100 | (50 - 150) |
| PCB 81 (BZ) | 0.500 | 0.501 | ng/g | 100 | (50 - 150) |
| PCB 126 (BZ) | 0.500 | 0.591 | ng/g | 118 | (50 - 150) |
| PCB 105 (BZ) | 0.500 | 0.627 | ng/g | 125 | (50 - 150) |
| PCB 3 (BZ) | 0.500 | 0.536 | ng/g | 107 | (50 - 150) |
| PCB 118 (BZ) | 0.500 | 0.619 | ng/g | 124 | (50 - 150) |
| PCB 4 (BZ) | 0.500 | 0.471 | ng/g | 94 | (50 - 150) |
| PCB 123 (BZ) | 0.500 | 0.658 | ng/g | 132 | (50 - 150) |
| PCB 114 (BZ) | 0.500 | 0.635 | ng/g | 127 | (50 - 150) |
| PCB 169 (BZ) | 0.500 | 0.568 | ng/g | 114 | (50 - 150) |
| PCB 156 (BZ) | 1.00 | 1.09 | ng/g | 109 C | (50 - 150) |
| PCB 157 (BZ) | 1.00 | 1.09 | ng/g | 109 C C156 | (50 - 150) |
| PCB 167 (BZ) | 0.500 | 0.562 | ng/g | 112 | (50 - 150) |
| PCB 189 (BZ) | 0.500 | 0.599 | ng/g | 120 | (50 - 150) |
| PCB 15 (BZ) | 0.500 | 0.488 | ng/g | 98 | (50 - 150) |
| PCB 19 (BZ) | 0.500 | 0.474 | ng/g | 95 | (50 - 150) |
| PCB 37 (BZ) | 0.500 | 0.583 | ng/g | 117 | (50 - 150) |
| PCB 54 (BZ) | 0.500 | 0.454 | ng/g | 91 | (50 - 150) |
| PCB 104 (BZ) | 0.500 | 0.494 | ng/g | 99 | (50 - 150) |
| PCB 155 (BZ) | 0.500 | 0.486 | ng/g | 97 | (50 - 150) |
| PCB 188 (BZ) | 0.500 | 0.492 | ng/g | 98 | (50 - 150) |
| PCB 202 (BZ) | 0.500 | 0.460 | ng/g | 92 | (50 - 150) |
| PCB 205 (BZ) | 0.500 | 0.525 | ng/g | 105 | (50 - 150) |
| PCB 206 (BZ) | 0.500 | 0.480 | ng/g | 96 | (50 - 150) |
| PCB 208 (BZ) | 0.500 | 0.534 | ng/g | 107 | (50 - 150) |
| PCB 209 (BZ) | 0.500 | 0.562 | ng/g | 112 | (50 - 150) |

| INTERNAL STANDARD | PERCENT RECOVERY | RECOVERY LIMITS |
|-------------------|---------------------|--------------------|
| 13C12-PCB 1 | 78 | (30 - 140) |
| 13C12-PCB 3 | 74 | (30 - 140) |
| 13C12-PCB 4 | 76 | (30 - 140) |
| 13C12-PCB 15 | 71 | (30 - 140) |
| 13C12-PCB 19 | 76 | (30 - 140) |
| 13C12-PCB 37 | 80 | (30 - 140) |
| 13C12-PCB 54 | 85 | (30 - 140) |
| 13C12-PCB 77 | 77 | (30 - 140) |
| 13C12-PCB 81 | 78 | (30 - 140) |
| 13C12-PCB 104 | 80 | (30 - 140) |
| 13C12-PCB 105 | 81 | (30 - 140) |

LABORATORY CONTROL SAMPLE DATA REPORT

Trace Level Organic Compounds

Client Lot # ...: WO5860
 LCS Lot-Sample#: H0C260000 - 234

Work Order # ...: LW6M41AC-LCS

Matrix: SOLID

| <u>INTERNAL STANDARD</u> | <u>PERCENT RECOVERY</u> | <u>RECOVERY LIMITS</u> |
|--------------------------|-----------------------------|----------------------------|
| 13C12-PCB 114 | 84 | (30 - 140) |
| 13C12-PCB 118 | 78 | (30 - 140) |
| 13C12-PCB 123 | 80 | (30 - 140) |
| 13C12-PCB 126 | 83 | (30 - 140) |
| 13C12-PCB 155 | 94 | (30 - 140) |
| 13C12-PCB 156 | 80 C | (30 - 140) |
| 13C12-PCB 157 | 80 C | (30 - 140) |
| 13C12-PCB 167 | 78 | (30 - 140) |
| 13C12-PCB 169 | 80 | (30 - 140) |
| 13C12-PCB 170 | 91 | (30 - 140) |
| 13C12-PCB 188 | 101 | (30 - 140) |
| 13C12-PCB 189 | 102 | (30 - 140) |
| 13C12-PCB 202 | 104 | (30 - 140) |
| 13C12-PCB 205 | 93 | (30 - 140) |
| 13C12-PCB 206 | 85 | (30 - 140) |
| 13C12-PCB 208 | 85 | (30 - 140) |
| 13C12-PCB 209 | 74 | (30 - 140) |
| <u>SURROGATE</u> | <u>PERCENT RECOVERY</u> | <u>RECOVERY LIMITS</u> |
| 13C12-PCB 28 | 79 | (40 - 125) |
| 13C12-PCB 111 | 86 | (40 - 125) |
| 13C12-PCB 178 | 89 | (40 - 125) |

Notes:

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

Bold print denotes control parameters

C Co-eluting isomer.

Appendix 7

Excerpt from the DOE NNSA Model Data Validation Procedure

Model Data Validation Procedure

**Prepared for the U.S. Department of Energy
NNSA Service Center**

By
Analytical Quality Associates, Inc.
616 Maxine, NE
Albuquerque, New Mexico 87123

Revision 4.2
February 2010

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Criteria: A daily humid zero air instrument blank shall be analyzed immediately prior to and after instrument calibration. The instrument blank results must be <0.2 parts per billion by volume (ppbv) for all target analytes before analysis may proceed.

| Evaluation | Action |
|--|--|
| If a humid zero air instrument blank was not analyzed at the required frequency, | qualify all associated detects <5X the PQL as "J." |
| If any target compound was detected in the instrument blank at a level \geq the MDL but <0.2 ppbv, | qualify all results as discussed in Section 3.2.4. |

3.2.14.6 Method 1668A, Chlorinated Biphenyl Congeners

Initial Calibration

Criteria: Isotope dilution shall be used for calibration of the toxics and beginning and ending level of chlorination (LOC) chlorinated biphenyls (CBs). A 5- or 6-point calibration is prepared for each native congener. The RRF %RSD for all native toxics/LOC CBs must be <20%. If a linear curve is used for initial calibration, the r^2 of the curve must be >0.99.

| Evaluation | Action |
|--|---|
| If the %RSD for any target compound is... >20% but \leq 40%, >40% but \leq 60%, >60%, | qualify all associated detects as "J" and, if any other calibration criteria have been exceeded for that compound, qualify all associated non-detects as "UJ." qualify all associated detects as "J" and all associated non-detects as "UJ." qualify all associated detects as "J" and all associated non-detects as "R." |
| If the r^2 for any target compound is... <0.99 but \geq 0.90, <0.90 but \geq 0.80, <0.80, | qualify all associated detects as "J" and, if any other calibration criteria have been exceeded for that compound, qualify all associated non-detects as "UJ." qualify all associated detects as "J" and all associated non-detects as "UJ." qualify all associated detects as "J" and all associated non-detects as "R." |

Criteria: Calibration using internal standards is used for determination of native CBs for which a labeled compound is not available. For these CBs, calibration is performed at a single point. Compounds should be quantitated using the appropriate reference internal standard listed in Table 2 of the method. Ion abundance ratios must meet the criteria in Appendix I or must be within 15% of the theoretical ratio of the ion monitored.

| Evaluation | Action |
|--|---|
| If the ion abundance criteria were not met for any calibration compound, | qualify all associated detects as “J” and all associated non-detects as “UJ.” |

Continuing Calibration

Criteria: At the beginning of each 12-hour period during which analysis is performed, calibration is verified for all native CBs and labeled compounds. The ion abundance ratios for all CBs must be within the limits in Appendix I, and all compounds must meet the calibration verification recovery limits listed in Appendix J.

RRTs of native CBs and labeled compounds in the calibration verification must be within $\pm 0.5\%$ of the mean RRT determined from the initial calibration or most recent calibration verification standard. The diluted combined 209 congener solution must be analyzed as a final step in the calibration verification and must meet the minimum analysis and resolution specifications of the method.

| Evaluation | Action |
|---|--|
| If the ion abundance ratio for any calibration verification compound is outside of the method limits, | qualify all associated detects as “J” and all associated non-detects as “UJ.” |
| If the verification limits are not met for any calibration verification compound and... the recovery is above the verification limits, the recovery is below the verification limits, | qualify all associated detects as “J+.” qualify all associated detects as “J-” and all associated non-detects as “UJ” if the recovery is $\geq 10\%$ and as “R” if the recovery is $< 10\%$. |
| If the RRT of any compound is outside of the RRT window, | qualify all associated results as “R.” |

RT Calibration

Criteria: The absolute RT of CB 209 must be ≥ 55 minutes if the SPB-octyl column is used. If a GC column or column system alternate to the SPB-octyl column is used, the absolute RT of CB 209 must be \geq the laboratory-established minimum RT for CB 209. If the laboratory has not established a minimum RT value for CB 209, the RT for CB 209 must be ≥ 55 minutes.

| Evaluation | Action |
|---|--|
| If an SPB-octyl column was used and the absolute RT of CB 209 is < 55 minutes, | qualify all associated results as "R." |
| If a GC column or column system alternate to the SPB-octyl column was used and the absolute RT is $<$ the laboratory established minimum RT for CB 209, or < 55 minutes if the laboratory has not established a minimum RT, | qualify all associated results as "R." |

OPR

Criteria: OPR must be established for every batch of samples extracted and analyzed and must meet the recovery and %RSD limits listed in Appendix J. If the OPR criteria are not met and reanalysis was not performed, then the lab performance and method accuracy are in question.

| Evaluation | Action |
|--|--|
| If the frequency of the OPR did not meet the specified criteria, | note the deficiency in the data validation report. |
| If the OPR recovery is $>$ the upper acceptance limit, | qualify all associated detects as "J+." |
| If the OPR recovery is $<$ the lower acceptance limit, | qualify all associated detects as "J-" and all associated non-detects as "UJ" if the recovery is $\geq 10\%$ and as "R" if the recovery is $< 10\%$. |
| If recoveries of more than half of the compounds in the OPR analysis are above the acceptance range, | qualify all associated detects as "J+." |
| If recoveries of more than half of the compounds in the OPR analysis are below the acceptance range, | qualify all associated detects as "J-" and all associated non-detects as "UJ" if the failures are marginally low and as "R" if recoveries are significantly below acceptance limits. |

| | |
|---|--|
| | NOTE: If recoveries for more than half of the compounds in the OPR analysis are below the acceptance range, the laboratory has not shown that it can actually meet program required detection limits. |
| If recoveries of more than half of the compounds in the OPR analysis exceed the acceptance range, both above and below, | qualify all associated detects as “J” and all associated non-detects as “UJ.” |

Sample Preparation

Criteria: CBs may be bound to suspended particles in aqueous samples; therefore, the preparation of aqueous samples is dependent upon the solids content of the sample. A direct extraction is used for aqueous samples containing <1% solids. For aqueous samples containing >1% solids, the sample is agitated and allowed to settle, and the liquid is decanted and discarded prior to extraction of the solids. The particle size for all solid samples should be determined prior to preparation. Particle size must be 1 millimeter or less prior to sample preparation.

| Evaluation | Action |
|--|---|
| If % solids and particle size were not determined prior to sample preparation or if the proper preparation method was not performed, | qualify all associated detects as “J” and all associated non-detects as “UJ.” |

Criteria: Extract cleanup shall be used as necessary to eliminate interferences. The laboratory may employ GPC; acid, base, or neutral silica gel; florisil; carbopak/celite; or HPLC cleanup methods or anthropogenic isolation column for lipids (tissue extracts only).

| Evaluation | Action |
|--|---|
| If the runlog notations, spectral data, and/or internal standard or labeled compound recoveries indicate potential interferences and applicable cleanup was not performed, | qualify all associated detects as “J” and all associated non-detects as “UJ.” |

Sample Analysis

Criteria: For identification of any CB or labeled compound, the ion abundance ratios must be within the limits specified in Appendix I or $\pm 15\%$ of the calibration verification standard. The RRT of each CB must be within $\pm 0.5\%$ of the mean RRT determined from the initial calibration or $\pm 0.5\%$ of the RRT from the most recent calibration verification standard.

| Evaluation | Action |
|--|--|
| If ion abundance ratio criteria were not met for any compound, | qualify all associated results as “R.” |
| If the RRT of any CB is outside of the RRT window, | qualify all associated results as “R.” |

Mass Spectrometer Performance Criteria

Criteria: Performance criteria are established to ensure mass resolution; identification; and, to some degree, sensitivity. These criteria are not sample specific. Conformance is determined using standard materials. These criteria should be met in all circumstances.

| Evaluation | Action |
|--|---|
| If mass spectrometer performance was not evaluated at the required frequency or if method criteria were not met, | qualify all associated detects as “R” and all associated non-detects as “UJ.” |

Labeled Compounds

Criteria: To assess method performance on the sample matrix, the laboratory must spike all samples with the labeled toxics/LOC/window defining standard spiking solution and all sample extracts with the labeled cleanup standard spiking solution. The recovery of each labeled compound must be within the limits listed in Table 6 of the method.

| Evaluation | Action |
|---|--|
| If the recovery of any labeled toxics/LOC/window defining standard compound is above acceptance limits, | qualify all detects for that sample fraction as “J-” and all non-detects for that sample fraction as “UJ.” |
| If the recovery of any labeled toxics/LOC/window defining standard compound is below acceptance limits, | qualify all detects for that sample fraction as “J+” and all non-detects for that sample fraction as “UJ” if the recovery is $\geq 10\%$ and as “R if the recovery is $< 10\%$. |
| If the recovery of any labeled cleanup standard compound is above acceptance limits, | qualify all associated detects as “J+.” |
| If the recovery of any labeled cleanup standard compound is below acceptance limits, | qualify all associated detects as “J-” and all associated non-detects as “UJ” if the recovery is $\geq 10\%$ and as “R” if the recovery is $< 10\%$. |

Date: 18 November 2010
 To: CH2M Hill (technical representative)
 From: Analytical Quality Associates, Inc.
 Project: 200 AREA GRP
 Subject: PCBs - Sample Data Group (SDG) WSCF20100415

INTRODUCTION

This memorandum presents the results of data validation for SDG WSCF20100415 prepared by WSCF. A list of samples validated along with the analytical method is provided in the following table.

| Sample ID | Sample Date | Media | Validation Level | Analytical Method |
|------------------|--------------------|--------------|-------------------------|--------------------------|
| B247W5 | 3-19-2010 | Soil | C | 8082A |
| B247W6 | 3-19-2010 | Soil | C | 8082A |

Data validation was conducted in accordance with the CHPRC validation statement of work and the Tanks/Lines/Pits/Boxes/Septic Tank and Drain Fields Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan; Includes: 200-IS-1 and 200-ST-1 Operable Units, DOE/RL-2002-14, Rev. 1, and the Sampling and Analysis Plan for Supplemental Remedial Investigation Activities at Model Group 5, Large-Area Ponds, Waste Sites Located Within the 200-CW-1 Operable Unit, DOE/RL-2006-57, Rev. 0, REISSUE (SAPs). Appendices 1 through 6 provide the following information as indicated below:

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

DATA QUALITY OBJECTIVES

• Holding Times and Sample Preservation

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for PCBs are extraction within one year of sample collection and analysis within one year sample extraction. Sample preservation requires chilling to 4 degrees Celsius.

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

- **Blanks**

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

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

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 SAPs, the laboratory control sample accuracy limits are 70% to 130% at a minimum, and the statistical ones established by the analytical laboratory if more stringent. The matrix spike sample accuracy limits are the ones specified by the DV procedure. The limits for reported analytes not listed in the SAP are specified by the DV procedure.

Surrogates

All surrogate recoveries were acceptable.

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

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

Laboratory Control Samples (LCSs)

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

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAPs, the relative percent difference (RPD) limits are $\pm 30\%$. The RPD limits for reported analytes not listed in the SAP are specified by the DV procedure. When duplicate RPDs exceed the limits and have associated results $< 5X$ the required detection limits with differences $< 2X$ the required detection limits no precision infraction occurred.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Field Duplicate Samples

No field duplicates were submitted for 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 WSCF20100415 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

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

DOE/RL-2002-14, Rev. 1, *Tanks/Lines/Pits/Boxes/Septic Tank and Drain Fields Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan; Includes: 200-IS-1 and 200-ST-1 Operable Units*, July 2008.

DOE/RL-2006-57, Rev. 0, REISSUE, *Sampling and Analysis Plan for Supplemental Remedial Investigation Activities at Model Group 5, Large-Area Ponds, Waste Sites Located Within the 200-CW-1 Operable Unit*, February 2008.

Appendix 1

Glossary of Data Reporting Qualifiers

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

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.
- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.
- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.
- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.
- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.
- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.
- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.
- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.
- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.
- **C** — This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).
- **X** — This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful. The data should be considered unusable for decision-making purposes.
- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

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

Appendix 2
Summary of Data Qualification

| PCB Data Qualification Summary | | | |
|---------------------------------------|------------------|--------------------------|---------------|
| SDG: WSCF20100415 | Reviewer: AQA | Project: 200 AREA GRP | Page 1 of 1 |
| Analyte(s) | Qualifier | Samples Affected | Reason |
| PCBs | None | N/A | N/A |

Comments: None

Appendix 3

Annotated Laboratory Reports

WSCF ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-102
Sample # W10GR00869
Client ID: B247W5

GPP TRENT
WSCF

Matrix: SOIL

Group #: WSCF20100415
Department: Organic
Sampled: 03/19/10
Received: 03/19/10

| Test Performed | CAS # | Method | RQ | Result | Unit | TP Err | Unit | DF | MDL | PQL | Analysis Date |
|---|-------------|------------|----|------------|-------|--------|------|------|---------|-----|---------------|
| Alcohols, Glycols - 8015 Prep | | | | | | | | | | | |
| Alcohols, Glycols - 8015 | | | | | | | | | | | |
| Diethyl ether | 60-29-7 | Organics | U | < 5.00e+03 | ug/kg | | | 1.00 | 5.0e+03 | | 03/25/10 |
| NWTPH-D TPH Diesel Range (Wa) Prep | | | | | | | | | | | |
| NWTPH-D TPH Diesel Range (Wa) | | | | | | | | | | | |
| Total Pet. Hydrocarbons Diesel | TPHDIESEL | LA-523-493 | U | < 5.20 | mg/kg | | | 1.00 | 5.2 | | 03/29/10 |
| Kerosene | TPHKEROSENE | LA-523-493 | U | < 5.20 | mg/kg | | LS | 1.00 | 5.2 | | 03/29/10 |
| NWTPH-GX TPH Gasoline Range Prep | | | | | | | | | | | |
| NWTPH-GX TPH Gasoline Range | | | | | | | | | | | |
| Total Pet. Hydrocarbons Gas | TPHGAOLINE | LA-523-443 | U | < 100 | ug/kg | | | 1.00 | 1.0e+02 | | 03/31/10 |
| PCBs complete list Prep | | | | | | | | | | | |
| PCBs complete list | | | | | | | | | | | |
| Aroclor-1016 | 12674-11-2 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| Aroclor-1221 | 11104-28-2 | LA-523-427 | U | < 21.0 | ug/kg | | | 1.00 | 21 | | 03/25/10 |
| Aroclor-1232 | 11141-16-5 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| Aroclor-1242 | 53469-21-9 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| Aroclor-1248 | 12672-29-6 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| Aroclor-1254 | 11097-69-1 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| Aroclor-1260 | 11096-82-5 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| Aroclor-1262 | 37324-23-5 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| Aroclor-1268 | 11100-14-4 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| SW-846 8270C Semi-Vols Prep | | | | | | | | | | | |
| SW-846 8270C Semi-Vols | | | | | | | | | | | |
| 4-Nitrophenol | 100-02-7 | LA-523-456 | U | < 210 | ug/kg | | | 1.00 | 2.1e+02 | | 03/25/10 |
| 1,4-Dichlorobenzene | 106-46-7 | LA-523-456 | U | < 250 | ug/kg | | | 1.00 | 2.5e+02 | | 03/25/10 |

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

B - The analyte < the RDL but > = the IDL/MDL (inorg)
D - Analyte was identified at a secondary dilution factor (inorg)
J - Analyte < lowest calibration but > = MDL. (org)
U - Analyzed for but not detected above limiting criteria (inorg)

D - Analyte was identified at a secondary dilution factor
E - Analyte is an estimate, has potentially larger errors (inorg)
N - Spike sample recovery is outside control limits. (inorg)
U - Analyzed for but not detected above limiting criteria.

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

Report WGPP/ver. 5.2
Groundwater Remediation Program

WSCF ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-102
Sample # W10GR00870
Client ID: B247W6

GPP TRENT
WSCF

Matrix: SOIL

Group #: WSCF20100415
Department: Organic
Sampled: 03/19/10
Received: 03/19/10

| Test Performed | CAS # | Method | RQ | Result | Unit | TP Err | Unit | DF | MDL | PQL | Analysis Date |
|---|-------------|------------|----|------------|-------|--------|------|------|---------|-----|---------------|
| Alcohols, Glycols - 8015 Prep | | | | | | | | | | | |
| Alcohols, Glycols - 8015 | | | | | | | | | | | |
| Diethyl ether | 60-29-7 | Organics | U | < 5.00e+03 | ug/kg | | | 1.00 | 5.0e+03 | | 03/25/10 |
| NWTPH-D TPH Diesel Range (Wa) Prep | | | | | | | | | | | |
| NWTPH-D TPH Diesel Range (Wa) | | | | | | | | | | | |
| Total Pet. Hydrocarbons Diesel | TPHDIESEL | LA-523-493 | U | < 5.10 | mg/kg | | | 1.00 | 5.1 | | 03/29/10 |
| Kerosene | TPHKEROSENE | LA-523-493 | U | < 5.10 | mg/kg | | LS | 1.00 | 5.1 | | 03/29/10 |
| NWTPH-GX TPH Gasoline Range Prep | | | | | | | | | | | |
| NWTPH-GX TPH Gasoline Range | | | | | | | | | | | |
| Total Pet. Hydrocarbons Gas | TPHGASOLINE | LA-523-443 | U | < 100 | ug/kg | | | 1.00 | 1.0e+02 | | 03/31/10 |
| PCBs complete list Prep | | | | | | | | | | | |
| PCBs complete list | | | | | | | | | | | |
| Aroclor-1016 | 12674-11-2 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| Aroclor-1221 | 11104-28-2 | LA-523-427 | U | < 20.0 | ug/kg | | | 1.00 | 20 | | 03/25/10 |
| Aroclor-1232 | 11141-16-5 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| Aroclor-1242 | 53469-21-9 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| Aroclor-1248 | 12672-29-6 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| Aroclor-1254 | 11097-69-1 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| Aroclor-1260 | 11096-82-5 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| Aroclor-1262 | 37324-23-5 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| Aroclor-1268 | 11100-14-4 | LA-523-427 | U | < 10.0 | ug/kg | | | 1.00 | 10 | | 03/25/10 |
| SW-846 8270C Semi-Vols Prep | | | | | | | | | | | |
| SW-846 8270C Semi-Vols | | | | | | | | | | | |
| 4-Nitrophenol | 100-02-7 | LA-523-456 | U | < 200 | ug/kg | | | 1.00 | 2.0e+02 | | 03/25/10 |
| 1,1-Dichlorobenzene | 106-46-7 | LA-523-456 | U | < 240 | ug/kg | | | 1.00 | 2.4e+02 | | 03/25/10 |

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

B - The analyte < the RDL but > = the IDL/MDL (inorg)
D - Analyte was identified at a secondary dilution factor(inorg)
J - Analyte < lowest calibration but > = MDL.(org)
U - Analyzed for but not detected above limiting criteria(inorg)

D - Analyte was identified at a secondary dilution factor
E - Analyte is an estimate, has potentially larger errors(inorg)
N - Spike sample recovery is outside control limits.(inorg)
U - Analyzed for but not detected above limiting criteria.

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

Report WGPP/ver. 5.2
Groundwater Remediation Program

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Introduction

Two (2) S&GRP samples were received at the WSCF Laboratory on March 19, 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 16 through 18, 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. See pages 23 through 24 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00869 (B247W5 in work order 20100415)
 - Fluoride, Nitrate and Nitrite – Matrix Spike and Matrix Spike Duplicate recoveries exceeded established laboratory limits. Affected sample results in this batch were “N” flagged. Percent recovery failures most likely due to matrix effects from the sample.

All other QC controls are within the established limits.

Cyanide – The hold time requirement for this analysis was met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 25 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00736 (B240J5 in work order 20100371)

All QC controls are within the established limits.

Hexavalent Chromium – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 26 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00703 (B23PH9 in work order 20100369)

All QC controls are within the established limits.

ICP-AES Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 27 through 28 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Estimated Boron results due to iron interference. Sample results are “E” flagged.
- Batch QC analyzed on sample# W10GR00736 and Batch QC analyzed on sample# W10GR00758 are not associated with this analytical group but cannot be removed from this printout. Please ignore these results.

All other QC controls are within the established limits.

ICP-MS Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 29 through 32 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00870 (B247W6 in work order 20100415)
 - Barium –Matrix Spike Duplicate recoveries exceeded laboratory spike levels. Affected sample results in this batch were “N” flagged.

All other QC controls are within the established limits.

Organic Comments

Sample concentrations are corrected for moisture content and reported on a dry weight basis.

Alcohol/Glycols - The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 46 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)

All QC controls are within the established limits.

PCB – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 49 through 50 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)

All QC controls are within the established limits.

Semi-VOA – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 51 through 56 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00863 (B247X2 in work order 20100409)

All QC controls are within the established limits.

TPHD-WA – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 47 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Surrogate recoveries exceeded acceptance limits for sample B247W5 (W10GR00869) and B247W6 (W10GR00870). Due to analysis problems, samples were re-analyzed on 03/29/10. Surrogate failure is contributed to the possible evaporation of solvent between analysis runs; thus increasing the surrogate concentration. All additional batch QC was within limits.
- Due to the co-elution of analytes for TPHD-WA (DRO) and kerosene analysis, samples are spiked and evaluated for TPHD only.

All other QC controls are within the established limits.

TPHG-WA – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 48 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00865 (B247X4 in work order 20100409)

All QC controls are within the established limits.

VOA – The hold time requirement for this analysis was met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 57 through 60 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)

All QC controls are within the established limits.

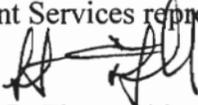
Radiochemistry Comments

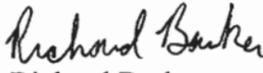
Rad Chem – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike (Matrix Spikes apply only to Technetium), Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 66 through 71 for QC details. Analytical Note(s):

- Tracers are used to determine chemical yield. RPD is monitored in sample duplicate and is not required for tracer recovery per SOW.
- Rad Chem requested to be performed included: Americium-241 by AEA, Gamma Energy Analysis, Plutonium Isotopic and Uranium Isotopic by AEA, Strontium-89/90, and Technetium-99 by LSC.
- Americium-241: Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Duplicate Relative Percent Difference(s) (RPD) did not meet the established laboratory limits. The RPD criterion does not apply to results near or below the minimum detectable activity. No flags issued.
 - All other QC controls are within the established limits.
- Gamma Energy Analysis: Batch QC analyzed on sample# W10GR000869 (B247W5 in work order 20100415)
 - Naturally occurring radioisotopes: Radium-226 was detected in the blank at less than 2 times the MDL. No flags applied.
 - All other QC controls are within the established limits.

- Isotopic Plutonium analysis: Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Plutonium-239 – detected in blank. Activity is less than 2 times the MDL and is acceptable.
 - All other QC controls are within the established limits.
- Isotopic Uranium analysis: Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - U-234 – detected in blank. Activity is less than 2 times the MDL and is acceptable.
 - All other QC controls are within the established limits.
- Strontium-89/90: Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Duplicate is flagged for poor RPD due to heterogeneous nature of the sample.
 - All other QC controls are within the established limits.
- Technetium-99: Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Matrix Spike flagged due to low recovery, however, it is still within the range of the statement of work that allows 60-140%.
 - All other QC controls are within the established limits.

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


Scot L. Fitzgerald
WSCF Analytical Laboratory Manager

 4-7-10
Richard Barker
WSCF Client Services

COLLECTOR FM Hall
CHPRC

SAMPLING LOCATION
C6724 (200E-127-PL) I-003

ICE CHEST NO.
N/A

SHIPPED TO
Waste Sampling & Characterization

COMPANY CONTACT
BAMBERGER, MACHELLE

PROJECT DESIGNATION
200-E-127 Pipeline - Soil

FIELD LOGBOOK NO.
HNF-N-507-5

OFFSITE PROPERTY NO.
N/A

TELEPHONE NO.
373-0880

ACTUAL SAMPLE DEPTH
15.0'-20.0'

PROJECT COORDINATOR
WIDRIG, DL

SAF NO.
F10-102

COA
302427ES10

BILL OF LADING/AIR BILL NO.
N/A

PRICE CODE 8C

AIR QUALITY

METHOD OF SHIPMENT
GOVERNMENT VEHICLE

DATA TURNAROUND
15 Days / 15 Days

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

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B247W1
20100415

| PRESERVATION | Cool <-7C and >-20C | Cool~4C | Cool~4C | Cool~4C | None | None |
|----------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| TYPE OF CONTAINER | aGs* | aGs* | aG | G/P | P | G/P |
| NO. OF CONTAINER(S) | 5 | 3 | 1 | 1 | 1 | 1 |
| VOLUME | 40mL | 40mL | 125mL | 60mL | 125mL | 60mL |
| SAMPLE ANALYSIS | SEE ITEM (1) IN SPECIAL INSTRUCTIONS | SEE ITEM (2) IN SPECIAL INSTRUCTIONS | SEE ITEM (3) IN SPECIAL INSTRUCTIONS | SEE ITEM (4) IN SPECIAL INSTRUCTIONS | SEE ITEM (5) IN SPECIAL INSTRUCTIONS | SEE ITEM (6) IN SPECIAL INSTRUCTIONS |

Handwritten signature and date: 3-19-10

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME | | | | | | |
|------------|-----------------|-------------|-------------|---|---|---|---|---|---|
| B247W5 | W106200869 SOIL | 3-19-10 | 0846 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

| CHAIN OF POSSESSION | SIGN/ PRINT NAMES | SPECIAL INSTRUCTIONS |
|--|----------------------|--|
| RELINQUISHED BY/REMOVED FROM FM Hall CHPRC | DATE/TIME 3-19-10 | RECEIVED BY/STORED IN [Signature] DATE/TIME 3-19-10 |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN |

SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

ORIGINAL

75 of 80
LABORATORY SECTION
FINAL SAMPLE DISPOSITION

| RECEIVED BY | TITLE | DATE/TIME |
|-----------------|-------------|-----------|
| DISPOSAL METHOD | DISPOSED BY | DATE/TIME |

COLLECTOR
 FM Hall
 CHPRC

SAMPLING LOCATION
 C6724 (200E-127-PL) I-003

ICE CHEST NO.
 N/A

SHIPPED TO
 Waste Sampling & Characterization

COMPANY CONTACT
 BAMBERGER, MACHELLE

PROJECT DESIGNATION
 200-E-127 Pipeline - Soil

FIELD LOGBOOK NO.

OFFSITE PROPERTY NO.
 N/A

TELEPHONE NO.
 373-0880

ACTUAL SAMPLE DEPTH

PROJECT COORDINATOR
 WIDRIG, DL

SAF NO.
 F10-102

COA
 302427ES10

BILL OF LADING/AIR BILL NO.
 N/A

PRICE CODE 8C

AIR QUALITY

METHOD OF SHIPMENT
 GOVERNMENT VEHICLE

DATA TURNAROUND
 15 Days / 15 Days

SPECIAL INSTRUCTIONS

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

(1)VOA - 5035/8260 (LOW LEVEL); VOA - 5035/8260 (LOW LEVEL) - (Add-On) {n-Butylbenzene, Acetonitrile, Trichloromonofluoromethane, Hexane, 1-Butanol, cis-1,2-Dichloroethylene, Tetrahydrofuran, trans-1,2-Dichloroethylene}

(2)Alcohols, Glycols, & Ketones - 8015 {Diethyl ether}

(3)Semi-VOA - 8270B (TCL); Semi-VOA - 8270B (Add-On) {Benzyl alcohol, Tributyl phosphate, 1,2,4-Trimethylbenzene, 1-Naphthylamine, 2-Butoxyethanol, 2-Naphthylamine, Cyclohexanone, Dodecane, Decane} TPH-Diesel/Kerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range} TPH-Gasoline Range - WTPH-G {Total petroleum hydrocarbons - gasoline range} PCBs - 8082;

(4)ICP Metals - 6010B (Add-On) {Boron, Bismuth} ICP/MS - 200.8 (TAL) {Antimony, Barium, Chromium, Cadmium, Copper, Zinc, Nickel, Vanadium, Silver} ICP/MS - 200.8 (Add-on) {Arsenic, Lead, Thorium-232, Molybdenum, Thallium, Beryllium, Uranium, Selenium} 200.8_HG - ICPMS {Mercury} Total Cyanide - 9014; Chromium Hex - 7196; IC Anions - 300.0 {Nitrogen in Nitrate, Fluoride, Nitrogen in Nitrate, Sulfate}

(5)Gamma Spectroscopy {Europium-155, Cesium-137, Europium-154, Europium-152, Cobalt-60} Gamma Spec - Add-on {Radium-226, Radium-228, Antimony-125, Cesium-134, Niobium-94}

(6)Americium-241; Isotopic Plutonium {Plutonium-239/240, Plutonium-238} Isotopic Uranium {Uranium-233/234, Uranium-235, Uranium-238} Strontium-89,90 -- Total Sr; Technetium-99;

 ORIGINAL

COLLECTOR
FM Hall
CHPRC

SAMPLING LOCATION
C6724 (200E-127-PL) I-004

ICE CHEST NO.
N/A

SHIPPED TO
Waste Sampling & Characterization

COMPANY CONTACT
BAMBERGER, MACHELLE

PROJECT DESIGNATION
200-E-127 Pipeline - Soil

FIELD LOGBOOK NO.
HNF-N-507-5

OFFSITE PROPERTY NO.
N/A

TELEPHONE NO.
373-0880

ACTUAL SAMPLE DEPTH
20.0' - 25.0'

PROJECT COORDINATOR
WIDRIG, DL

SAF NO.
F10-102

COA
302427ES10

BILL OF LADING/AIR BILL NO.
N/A

PRICE CODE 8C

AIR QUALITY

METHOD OF SHIPMENT
GOVERNMENT VEHICLE

DATA TURNAROUND
15 Days / 15 Days

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

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B247W2

| PRESERVATION | Cool <-7C and >-20C | Cool~4C | Cool~4C | Cool~4C | None | None |
|----------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| TYPE OF CONTAINER | aGs* | aGs* | aG | G/P | P | G/P |
| NO. OF CONTAINER(S) | 5 | 3 | 1 | 1 | 1 | 1 |
| VOLUME | 40mL | 40mL | 125mL | 60mL | 125mL | 60mL |
| SAMPLE ANALYSIS | SEE ITEM (1) IN SPECIAL INSTRUCTIONS | SEE ITEM (2) IN SPECIAL INSTRUCTIONS | SEE ITEM (3) IN SPECIAL INSTRUCTIONS | SEE ITEM (4) IN SPECIAL INSTRUCTIONS | SEE ITEM (5) IN SPECIAL INSTRUCTIONS | SEE ITEM (6) IN SPECIAL INSTRUCTIONS |

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME | SEE ITEM (1) IN SPECIAL INSTRUCTIONS | SEE ITEM (2) IN SPECIAL INSTRUCTIONS | SEE ITEM (3) IN SPECIAL INSTRUCTIONS | SEE ITEM (4) IN SPECIAL INSTRUCTIONS | SEE ITEM (5) IN SPECIAL INSTRUCTIONS | SEE ITEM (6) IN SPECIAL INSTRUCTIONS |
|------------------------|---------|-------------|-------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| B247W6 W106200870 SOIL | | 3-19-10 | 1012 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

| CHAIN OF POSSESSION | SIGN/ PRINT NAMES | SPECIAL INSTRUCTIONS |
|--|--------------------------------------|---|
| RELINQUISHED BY/REMOVED FROM FM Hall CHPRC | RECEIVED BY/STORED IN [Signature] | SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |

ORIGINAL

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

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Page 156 of 295

COLLECTOR
FM Hall
CHPRC

COMPANY CONTACT
BAMBERGER, MACHELLE

TELEPHONE NO.
373-0880

PROJECT COORDINATOR
WIDRIG, DL

PRICE CODE 8C

DATA
TURNAROUND
15 Days / 15
Days

SAMPLING LOCATION
C6724 (200E-127-PL) I-004

PROJECT DESIGNATION
200-E-127 Pipeline - Soil

SAF NO.
F10-102

AIR QUALITY

ICE CHEST NO.
N/A

FIELD LOGBOOK NO.
HWF-N-507-S

ACTUAL SAMPLE DEPTH
20.0' - 25.0'

COA
302427ES10

METHOD OF SHIPMENT
GOVERNMENT VEHICLE

SHIPPED TO
Waste Sampling & Characterization

OFFSITE PROPERTY NO.
N/A

BILL OF LADING/AIR BILL NO.
N/A

SPECIAL INSTRUCTIONS

- ** The CACN for all analytical work at WSCF laboratory is to be determined. ** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
- (1)VOA - 5035/8260 (LOW LEVEL); VOA - 5035/8260 (LOW LEVEL) - (Add-On) (n-Butylbenzene, Acetonitrile, Trichloromonoofluoromethane, Hexane, 1-Butanol, cis-1,2-Dichloroethylene, Tetrahydrofuran, trans-1,2-Dichloroethylene)
 - (2)Alcohols, Glycols, & Ketones - 8015 (Diethyl ether)
 - (3)Semi-VOA - 8270B (TCL); Semi-VOA - 8270B (Add-On) (Tributyl phosphate, 1,2,4-Trimethylbenzene, Benzyl alcohol, 1-Naphthylamine, 2-Naphthylamine, 2-Butoxyethanol, Cyclohexanone, Dodecane, Decane) TPH-Diesel/Kerosene Range - WTPH-D (Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range) TPH-Gasoline Range - WTPH-G (Total petroleum hydrocarbons - gasoline range) PCBs - 8082;
 - (4)ICP Metals - 6010B (Add-On) (Boron, Bisphuth) ICP/MS - 200.8 (TAL) (Antimony, Barium, Chromium, Cadmium, Copper, Zinc, Nickel, Vanadium, Silver) ICP/MS - 200.8 (Add-on) (Arsenic, Lead, Thorium-232, Molybdenum, Thallium, Beryllium, Uranium, Selenium) 200.8_HG - ICPMS (Mercury) Total Cyanide - 9014; Chromium Hex - 7196; IC Anions - 300.0 (Nitrogen in Nitrite, Fluoride, Nitrogen in Nitrate, Sulfate)
 - (5)Gamma Spectroscopy (Europium-155, Cesium-137, Europium-154, Europium-152, Cobalt-60) Gamma Spec - Add-on (Radium-226, Radium-228, Antimony-125, Cesium-134, Niobium-94)
 - (6)Americium-241; Isotopic Plutonium (Plutonium-239/240, Plutonium-238) Isotopic Uranium (Uranium-233/234, Uranium-235, Uranium-238) Strontium-89,90 -- Total Sr; Technetium-99;

 ORIGINAL

Appendix 5

Data Validation Supporting Documentation

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

| | | | | | |
|--|-----------------------|------------------|-------------------------|------------------|---|
| VALIDATION LEVEL: | A | B | (C) | D | E |
| PROJECT: 200 AREA GRP | | | DATA PACKAGE: VSR11-002 | | |
| VALIDATOR: Carl Schloesslin | | LAB: WSCF | | DATE: 11-18-2010 | |
| | | | SDG: WSCF20100415 | | |
| ANALYSES PERFORMED | | | | | |
| SW-846 8081 | SW-846 8081 (TCLP) | SW-846 8082 X | SW-846 8081 (TCLP) | | |
| SAMPLES/MATRIX Soil samples B247W5 & B247W6 | | | | | |

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments: None

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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

| | | | |
|---|-----|----|-----|
| Initial calibrations acceptable? | Yes | No | N/A |
| Continuing calibrations acceptable? | Yes | No | N/A |
| Standards traceable? | Yes | No | N/A |
| Standards expired? | Yes | No | N/A |
| Calculation check acceptable? | Yes | No | N/A |
| DDT and endrin breakdowns acceptable? | Yes | No | N/A |

Comments:

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

| | | | |
|---|-----|----|-----|
| Calibration blanks analyzed? (Levels D, E) | Yes | No | N/A |
| Calibration blank results acceptable? (Levels D, E) | Yes | No | N/A |
| Laboratory blanks analyzed? | Yes | No | N/A |
| Laboratory blank results acceptable? | Yes | No | N/A |
| Field/trip blanks analyzed? (Levels C, D, E) | Yes | No | N/A |
| Field/trip blank results acceptable? (Levels C, D, E) | Yes | No | N/A |
| Transcription/calculation errors? (Levels D, E) | Yes | No | N/A |

Comments: None

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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

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

Comments:

Aroclor-1260 only spiked into LCS and MS/MSD.

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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

- Duplicate RPD values acceptable?..... Yes No N/A
- Duplicate results acceptable?..... Yes No N/A
- MS/MSD standards NIST traceable? (Levels D, E)..... Yes No N/A
- MS/MSD standards expired? (Levels D, E)..... Yes No N/A
- Field duplicate RPD values acceptable?..... Yes No N/A
- Field split RPD values acceptable?..... Yes No N/A
- Transcription/calculation errors? (Levels D, E)..... Yes No N/A

Comments: None

6. SYSTEM PERFORMANCE (Levels D and E)

- Chromatographic performance acceptable?..... Yes No N/A
- Positive results resolved acceptably?..... Yes No N/A

Comments:

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

7. HOLDING TIMES (all levels)

Samples properly preserved? Yes No N/A
Sample holding times acceptable? Yes No N/A

Comments: None

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

Compound identification acceptable? (Levels D, E) Yes No N/A
Compound quantitation acceptable? (Levels D, E) Yes No N/A
Results reported for all requested analyses? Yes No N/A
Results supported in the raw data? (Levels D, E) Yes No N/A
Samples properly prepared? (Levels D, E) Yes No N/A
Detection limits meet RDL? Yes No N/A
Transcription/calculation errors? (Levels D, E) Yes No N/A

Comments: None

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

9. SAMPLE CLEANUP (Levels D and E)

| | | | |
|---|-----|----|-----|
| Fluorisil ® (or other absorbent) cleanup performed? | Yes | No | N/A |
| Lot check performed? | Yes | No | N/A |
| Check recoveries acceptable? | Yes | No | N/A |
| GPC cleanup performed? | Yes | No | N/A |
| GPC check performed?..... | Yes | No | N/A |
| GPC check recoveries acceptable?..... | Yes | No | N/A |
| GPC calibration performed?..... | Yes | No | N/A |
| GPC calibration check performed? | Yes | No | N/A |
| GPC calibration check retention times acceptable? | Yes | No | N/A |
| Check/calibration materials traceable? | Yes | No | N/A |
| Check/calibration materials Expired?..... | Yes | No | N/A |
| Analytical batch QC given similar cleanup?..... | Yes | No | N/A |
| Transcription/Calculation Errors?..... | Yes | No | N/A |

Comments:

Appendix 6

Additional Documentation Requested By Client

WSCF ANALYTICAL LABORATORY QC REPORT

Department: **Organic**

SDG Number: WSCF20100415
 Matrix: SOLID
 Test: PCBs complete list

Sample Date: 03/17/10
 Receive Date: 03/17/10

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|--|----------------------|------------|----------|----------|---------|-------------|-------------|--------|-----------|----|---------------|
| Lab ID: W10GR00862 | | | | | | | | | | | |
| BATCH QC ASSOCIATED WITH SAMPLE | | | | | | | | | | | |
| MS | Aroclor-1260 | 11096-82-5 | 259.67 | 121.000 | % Recov | 75.000 | 125.000 | | | | 03/25/10 |
| MS | Decachlorobiphenyl | 2051-24-3 | 226.18 | 106.000 | % Recov | 50.000 | 150.000 | | | | 03/25/10 |
| MS | Tetrachloro-m-xylene | 877-09-8 | 188.63 | 88.100 | % Recov | 50.000 | 150.000 | | | | 03/25/10 |
| MSD | Aroclor-1260 | 11096-82-5 | 256.48 | 119.000 | % Recov | 75.000 | 125.000 | | | | 03/25/10 |
| MSD | Decachlorobiphenyl | 2051-24-3 | 221.72 | 103.000 | % Recov | 50.000 | 150.000 | | | | 03/25/10 |
| MSD | Tetrachloro-m-xylene | 877-09-8 | 180.18 | 83.800 | % Recov | 50.000 | 150.000 | | | | 03/25/10 |
| SPK-RPD | Aroclor-1260 | 11096-82-5 | 119.000 | | RPD | | | 1.667 | 25.000 | | 03/25/10 |
| SPK-RPD | Decachlorobiphenyl | 2051-24-3 | 103.000 | | RPD | | | 2.871 | 20.000 | | 03/25/10 |
| SPK-RPD | Tetrachloro-m-xylene | 877-09-8 | 83.800 | | RPD | | | 5.003 | 20.000 | | 03/25/10 |
| Lab ID: W10GR00869 | | | | | | | | | | | |
| BATCH QC ASSOCIATED WITH SAMPLE | | | | | | | | | | | |
| SURR | Decachlorobiphenyl | 2051-24-3 | 214.92 | 104.000 | % Recov | 50.000 | 150.000 | | | | 03/25/10 |
| SURR | Tetrachloro-m-xylene | 877-09-8 | 188.31 | 90.700 | % Recov | 50.000 | 150.000 | | | | 03/25/10 |
| Lab ID: W10GR00870 | | | | | | | | | | | |
| BATCH QC ASSOCIATED WITH SAMPLE | | | | | | | | | | | |
| SURR | Decachlorobiphenyl | 2051-24-3 | 184.41 | 91.200 | % Recov | 50.000 | 150.000 | | | | 03/25/10 |
| SURR | Tetrachloro-m-xylene | 877-09-8 | 159.88 | 79.100 | % Recov | 50.000 | 150.000 | | | | 03/25/10 |
| BATCH QC | | | | | | | | | | | |
| BLANK | Aroclor-1016 | 12674-11-2 | < 10 | n/a | UGKG | | | | | U | 03/25/10 |
| BLANK | Aroclor-1221 | 11104-28-2 | < 20 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Aroclor-1232 | 11141-16-5 | < 10 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Aroclor-1242 | 53469-21-9 | < 10 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Aroclor-1248 | 12672-29-6 | < 10 | n/a | ug/Kg | | | | | U | 03/25/10 |

WSCF ANALYTICAL LABORATORY QC REPORT

Department: **Organic**

SDG Number: WSCF20100415
 Matrix: SOLID
 Test: PCBs complete list

Sample Date:
 Receive Date:

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|---------|----------------------|------------|----------|----------|---------|-------------|-------------|--------|-----------|----|---------------|
| BLANK | Aroclor-1254 | 11097-69-1 | < 10 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Aroclor-1260 | 11096-82-5 | < 10 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Aroclor-1262 | 37324-23-5 | < 10 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Aroclor-1268 | 11100-14-4 | < 10 | n/a | ug/Kg | | | | | U | 03/25/10 |
| BLANK | Decachlorobiphenyl | 2051-24-3 | 193.04 | 96.500 | % Recov | 50.000 | 150.000 | | | | 03/25/10 |
| BLANK | Tetrachloro-m-xylene | 877-09-8 | 169.53 | 84.800 | % Recov | 50.000 | 150.000 | | | | 03/25/10 |
| LCS | Aroclor-1260 | 11096-82-5 | 219.37 | 110.000 | % Recov | 70.000 | 130.000 | | | | 03/25/10 |
| LCS | Decachlorobiphenyl | 2051-24-3 | 201.52 | 101.000 | % Recov | 50.000 | 150.000 | | | | 03/25/10 |
| LCS | Tetrachloro-m-xylene | 877-09-8 | 166.19 | 83.100 | % Recov | 50.000 | 150.000 | | | | 03/25/10 |

Date: 18 November 2010
 To: CH2M Hill (technical representative)
 From: Analytical Quality Associates, Inc.
 Project: 200 AREA GRP
 Subject: Inorganics - Sample Data Group (SDG) WSCF20100415

INTRODUCTION

This memorandum presents the results of data validation for SDG WSCF20100415 prepared by WSCF. A list of samples validated along with the analytical method is provided in the following table.

| Sample ID | Sample Date | Media | Validation Level | Analytical Methods |
|------------------|--------------------|--------------|-------------------------|---------------------------|
| B247W5 | 3-19-2010 | Soil | C | 6010B & 200.8 |
| B247W6 | 3-19-2010 | Soil | C | 6010B & 200.8 |

Data validation was conducted in accordance with the CHPRC validation statement of work and the Tanks/Lines/Pits/Boxes/Septic Tank and Drain Fields Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan; Includes: 200-IS-1 and 200-ST-1 Operable Units, DOE/RL-2002-14, Rev. 1, and the Sampling and Analysis Plan for Supplemental Remedial Investigation Activities at Model Group 5, Large-Area Ponds, Waste Sites Located Within the 200-CW-1 Operable Unit, DOE/RL-2006-57, Rev. 0, REISSUE (SAPs). Appendices 1 through 6 provide the following information as indicated below:

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

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirement for ICP metals are analysis within 180 days of sample collection, and the holding time requirement for mercury is analysis within 28 days of sample collection. Sample preservation requires 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, laboratory control sample results, and ICP-AES interference check sample results. According to the SAPs, the laboratory control sample accuracy limits are 70% to 130%. The matrix spike accuracy limits are ones specified by the DV procedure. The limits for reported analytes not listed in the SAP are specified by the DV procedure. The interference check sample limits are ones specified by the DV procedure.

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

All MS/MSD recoveries were acceptable with the following exceptions. The MSD recovery for Ba was > the upper acceptance limit. The Ba results for samples B247W5 and B247W6 were detects and should be qualified as estimates and flagged "J+."

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

ICP-AES Interference Check Samples (ICSs)

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

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, field split sample results, and ICP serial dilution results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent

sample results. According to the SAPs, the relative percent difference (RPD) limits are $\pm 30\%$. The limits for reported analytes not listed in the SAP are specified by the DV procedure. When duplicate RPDs exceed the limits and have associated results $< 5X$ the SAP required detection limits (or $< 5X$ the laboratory reporting limits for analytes not listed in the SAP) with differences $< 2X$ the required detection limits no precision infraction occurred. The serial dilution limits are ones specified by the DV procedure.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

ICP Serial Dilution Samples

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

• ICP-MS Internal Standards

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

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

• Detection Limits

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

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

• Completeness

SDG WSCF20100415 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to a MSD recovery infraction for Ba. 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-2002-14, Rev. 1, *Tanks/Lines/Pits/Boxes/Septic Tank and Drain Fields Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan; Includes: 200-IS-1 and 200-ST-1 Operable Units*, July 2008.

DOE/RL-2006-57, Rev. 0, REISSUE, *Sampling and Analysis Plan for Supplemental Remedial Investigation Activities at Model Group 5, Large-Area Ponds, Waste Sites Located Within the 200-CW-1 Operable Unit*, February 2008.

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: WSCF20100415 | Reviewer: AQA | Project: 200 AREA GRP | Page 1 of 1 |
| Analyte(s) | Qualifier | Samples Affected | Reason |
| Ba | J+ | B247W5 & B247W6 | High MSD recovery |

Comments: None

Appendix 3

Annotated Laboratory Reports

WSCF ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-102
Sample # W10GR00869
Client ID: B247W5

GPP TRENT
WSCF

Matrix: SOIL

Group #: WSCF20100415
Department: Inorganic
Sampled: 03/19/10
Received: 03/19/10

| Test Performed | CAS # | Method | RQ | Result | Unit | TP Err | Unit | DF | MDL | PQL | Analysis Date |
|--|------------|------------|-----|---------|-------|--------|------|-----------|--------|-----|---------------|
| Anions by Ion Chromatography Prep | | | | | | | | | | | |
| Anions by Ion Chromatography | | | | | | | | | | | |
| Fluoride | 16984-48-8 | LA-533-410 | DNU | < 1.50 | mg/kg | | | 49.93 | 1.5 | | 03/22/10 |
| Nitrogen in Nitrite | NO2-N | LA-533-410 | DNU | < 0.899 | mg/kg | | | 49.93 | 0.90 | | 03/22/10 |
| Nitrogen in Nitrate | NO3-N | LA-533-410 | DNU | < 1.55 | mg/kg | | | 49.93 | 1.5 | | 03/22/10 |
| Sulfate | 14808-79-8 | LA-533-410 | BD | 8.26 | mg/kg | | | 49.93 | 3.3 | | 03/22/10 |
| Cyanide | | | | | | | | | | | |
| Cyanide | 57-12-5 | LA-695-402 | U | < 0.200 | mg/kg | | | 1.00 | 0.20 | | 03/24/10 |
| Hexavalent Chromium Prep | | | | | | | | | | | |
| Hexavalent Chromium | | | | | | | | | | | |
| Hexavalent Chromium | | | | | | | | | | | |
| ICP Metals Analysis, Grd H20 P Prep | | | | | | | | | | | |
| ICP Metals Analysis, Grd H20 P | | | | | | | | | | | |
| Boron | 7440-42-8 | LA-505-411 | BE | 8.76 | mg/kg | | | 1.01e+002 | 1.9 | | 03/22/10 |
| Bismuth | 7440-69-9 | LA-505-411 | U | < 2.32 | mg/kg | | | 1.01e+002 | 2.3 | | 03/22/10 |
| ICP-200.8 MS All possible meta Prep | | | | | | | | | | | |
| ICP-200.8 MS All possible meta | | | | | | | | | | | |
| Nickel | 7440-02-0 | LA-505-412 | | 10.8 | mg/kg | | | 1.00 | 0.201 | | 03/31/10 |
| Silver | 7440-22-4 | LA-505-412 | | 0.370 | mg/kg | | | 1.00 | 0.100 | | 03/31/10 |
| Antimony | 7440-36-0 | LA-505-412 | | 0.420 | mg/kg | | | 1.00 | 0.301 | | 03/31/10 |
| Barium | 7440-39-3 | LA-505-412 | N | 97.7 | mg/kg | J+ | | 1.00 | 0.201 | | 03/31/10 |
| Beryllium | 7440-41-7 | LA-505-412 | | 0.580 | mg/kg | | | 1.00 | 0.0502 | | 03/31/10 |
| Cadmium | 7440-43-9 | LA-505-412 | | 0.400 | mg/kg | | | 1.00 | 0.100 | | 03/31/10 |
| Chromium | 7440-47-3 | LA-505-412 | | 15.4 | mg/kg | | | 1.00 | 0.502 | | 03/31/10 |
| Copper | 7440-50-8 | LA-505-412 | | 16.1 | mg/kg | | | 1.00 | 0.100 | | 03/31/10 |

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

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

D - Analyte was identified at a secondary dilution factor
 E - Analyte is an estimate, has potentially larger errors(inorg)
 N - Spike sample recovery is outside control limits.(inorg)
 U - Analyzed for but not detected above limiting criteria.

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

Report WGPP/ver. 5.2
 Groundwater Remediation Program


 11-18-2010

WSCF ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-102
Sample # W10GR00869
Client ID: B247W5

Group #: WSCF20100415
Department: Inorganic
Sampled: 03/19/10
Received: 03/19/10

GPP TRENT
WSCF

Matrix: SOIL

| Test Performed | CAS # | Method | RQ | Result | Unit | TP Err | Unit | DF | MDL | PQL | Analysis Date |
|---------------------|-----------|------------|----|----------|---------|--------|------|------|--------|-----|---------------|
| Vanadium | 7440-62-2 | LA-505-412 | | 53.3 | mg/kg | | | 1.00 | 0.201 | | 03/31/10 |
| Zinc | 7440-66-6 | LA-505-412 | | 43.8 | mg/kg | | | 1.00 | 0.803 | | 03/31/10 |
| Lead | 7439-92-1 | LA-505-412 | | 4.38 | mg/kg | | | 1.00 | 0.100 | | 03/31/10 |
| Mercury | 7439-97-6 | LA-505-412 | U | < 0.0502 | mg/kg | | | 1.00 | 0.0502 | | 03/31/10 |
| Molybdenum | 7439-98-7 | LA-505-412 | | 2.54 | mg/kg | | | 1.00 | 0.0502 | | 03/31/10 |
| Thorium | 7440-29-1 | LA-505-412 | | 2.78 | mg/kg | | | 1.00 | 0.100 | | 03/31/10 |
| Uranium | 7440-61-1 | LA-505-412 | | 0.820 | mg/kg | | | 1.00 | 0.0502 | | 03/31/10 |
| Arsenic | 7440-38-2 | LA-505-412 | | 3.72 | mg/kg | | | 1.00 | 0.402 | | 03/31/10 |
| Selenium | 7782-49-2 | LA-505-412 | | 1.27 | mg/kg | | | 1.00 | 0.301 | | 03/31/10 |
| Thallium | 7440-28-0 | LA-505-412 | | 0.440 | mg/kg | | | 1.00 | 0.100 | | 03/31/10 |
| Total solids | | | | | | | | | | | |
| Total solids | 85 | LA-519-412 | | 95.4 | Percent | | | 1.00 | 0.0 | | 03/22/10 |


 11-18-2010

MDL = Minimum Detection Limit
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DF = Dilution Factor

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 D - Analyte was identified at a secondary dilution factor (inorg)
 J - Analyte < lowest calibration but > = MDL (org)
 U - Analyzed for but not detected above limiting criteria (inorg)

D - Analyte was identified at a secondary dilution factor
 E - Analyte is an estimate, has potentially larger errors (inorg)
 N - Spike sample recovery is outside control limits (inorg)
 U - Analyzed for but not detected above limiting criteria.

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

Report WGPP/ver. 5.2
 Groundwater Remediation Program

WSCF ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-102
Sample # W10GR00870
Client ID: B247W6

GPP TRENT
WSCF

Matrix: SOIL

Group #: WSCF20100415
Department: Inorganic
Sampled: 03/19/10
Received: 03/19/10

| Test Performed | CAS # | Method | RQ | Result | Unit | TP Err | Unit | DF | MDL | PQL | Analysis Date |
|--|------------|------------|-----|---------|-------|--------|------|-----------|--------|-----|---------------|
| Anions by Ion Chromatography Prep | | | | | | | | | | | |
| Anions by Ion Chromatography | | | | | | | | | | | |
| Fluoride | 16984-48-8 | LA-533-410 | DNU | < 1.49 | mg/kg | | | 49.76 | 1.5 | | 03/22/10 |
| Nitrogen in Nitrite | NO2-N | LA-533-410 | DNU | < 0.896 | mg/kg | | | 49.76 | 0.90 | | 03/22/10 |
| Nitrogen in Nitrate | NO3-N | LA-533-410 | DNU | < 1.54 | mg/kg | | | 49.76 | 1.5 | | 03/22/10 |
| Sulfate | 14808-79-8 | LA-533-410 | BD | 7.60 | mg/kg | | | 49.76 | 3.3 | | 03/22/10 |
| Cyanide | | | | | | | | | | | |
| Cyanide | 57-12-5 | LA-695-402 | U | < 0.200 | mg/kg | | | 1.00 | 0.20 | | 03/24/10 |
| Hexavalent Chromium Prep | | | | | | | | | | | |
| Hexavalent Chromium | | | | | | | | | | | |
| Hexavalent Chromium | 18540-29-9 | LA-265-403 | U | < 0.100 | mg/kg | | | 1.00 | 0.10 | | 03/23/10 |
| ICP Metals Analysis, Grd H2O P Prep | | | | | | | | | | | |
| ICP Metals Analysis, Grd H2O P | | | | | | | | | | | |
| Boron | 7440-42-8 | LA-505-411 | BE | 8.56 | mg/kg | | | 1.00e+002 | 1.9 | | 03/22/10 |
| Bismuth | 7440-69-9 | LA-505-411 | U | < 2.31 | mg/kg | | | 1.00e+002 | 2.3 | | 03/22/10 |
| ICP-200.8 MS All possible meta Prep | | | | | | | | | | | |
| ICP-200.8 MS All possible meta | | | | | | | | | | | |
| Nickel | 7440-02-0 | LA-505-412 | | 7.95 | mg/kg | | | 1.00 | 0.200 | | 03/31/10 |
| Silver | 7440-22-4 | LA-505-412 | U | < 0.100 | mg/kg | | | 1.00 | 0.100 | | 03/31/10 |
| Antimony | 7440-36-0 | LA-505-412 | U | < 0.300 | mg/kg | | | 1.00 | 0.300 | | 03/31/10 |
| Barium | 7440-39-3 | LA-505-412 | N | 63.6 | mg/kg | J+ | | 1.00 | 0.200 | | 03/31/10 |
| Beryllium | 7440-41-7 | LA-505-412 | | 0.220 | mg/kg | | | 1.00 | 0.0500 | | 03/31/10 |
| Cadmium | 7440-43-9 | LA-505-412 | U | < 0.100 | mg/kg | | | 1.00 | 0.100 | | 03/31/10 |
| Chromium | 7440-47-3 | LA-505-412 | | 17.6 | mg/kg | | | 1.00 | 0.500 | | 03/31/10 |
| Copper | 7440-50-8 | LA-505-412 | | 14.1 | mg/kg | | | 1.00 | 0.100 | | 03/31/10 |

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

B - The analyte < the RDL but > = the IDL/MDL (inorg)
 D - Analyte was identified at a secondary dilution factor(inorg)
 J - Analyte < lowest calibration but > = MDL.(org)
 U - Analyzed for but not detected above limiting criteria(inorg)

D - Analyte was identified at a secondary dilution factor
 E - Analyte is an estimate, has potentially larger errors(inorg)
 N - Spike sample recovery is outside control limits.(inorg)
 U - Analyzed for but not detected above limiting criteria.

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

Report WGPP/ver. 5.2
 Groundwater Remediation Program


 11-18-2010

WSCF ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-102
Sample # W10GR00870
Client ID: B247W6

GPP TRENT
 WSCF

Matrix: SOIL

Group #: WSCF20100415
Department: Inorganic
Sampled: 03/19/10
Received: 03/19/10

| Test Performed | CAS # | Method | RQ | Result | Unit | TP Err | Unit | DF | MDL | PQL | Analysis Date |
|-------------------------|---------------|-----------------------|----|-----------------|--------------------|--------|------|-----------------|----------------|-----|---------------------|
| Vanadium | 7440-62-2 | LA-505-412 | | 43.4 | mg/kg | | | 1.00 | 0.200 | | 03/31/10 |
| Zinc | 7440-66-6 | LA-505-412 | | 28.5 | mg/kg | | | 1.00 | 0.800 | | 03/31/10 |
| Lead | 7439-92-1 | LA-505-412 | | 2.43 | mg/kg | | | 1.00 | 0.100 | | 03/31/10 |
| Mercury | 7439-97-6 | LA-505-412 | U | < 0.0500 | mg/kg | | | 1.00 | 0.0500 | | 03/31/10 |
| Molybdenum | 7439-98-7 | LA-505-412 | | 2.88 | mg/kg | | | 1.00 | 0.0500 | | 03/31/10 |
| Thorium | 7440-29-1 | LA-505-412 | | 2.24 | mg/kg | | | 1.00 | 0.100 | | 03/31/10 |
| Uranium | 7440-61-1 | LA-505-412 | | 0.520 | mg/kg | | | 1.00 | 0.0500 | | 03/31/10 |
| Arsenic | 7440-38-2 | LA-505-412 | | 3.30 | mg/kg | | | 1.00 | 0.400 | | 03/31/10 |
| Selenium | 7782-49-2 | LA-505-412 | | 1.10 | mg/kg | | | 1.00 | 0.300 | | 03/31/10 |
| Thallium | 7440-28-0 | LA-505-412 | | 0.110 | mg/kg | | | 1.00 | 0.100 | | 03/31/10 |
| Total solids | 75 | LA-515-412 | | 36.0 | Percent | | | 1.00 | 0.0 | | 03/22/10 |


 11-18-2010

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

B - The analyte < the RDL but > = the IDL/MDL (inorg)
 D - Analyte was identified at a secondary dilution factor(inorg)
 J - Analyte < lowest calibration but > = MDL.(org)
 U - Analyzed for but not detected above limiting criteria(inorg)

D - Analyte was identified at a secondary dilution factor
 E - Analyte is an estimate, has potentially larger errors(inorg)
 N - Spike sample recovery is outside control limits.(inorg)
 U - Analyzed for but not detected above limiting criteria.

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

Report WGPP/ver. 5.2
 Groundwater Remediation Program

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Introduction

Two (2) S&GRP samples were received at the WSCF Laboratory on March 19, 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 16 through 18, 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. See pages 23 through 24 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00869 (B247W5 in work order 20100415)
 - Fluoride, Nitrate and Nitrite – Matrix Spike and Matrix Spike Duplicate recoveries exceeded established laboratory limits. Affected sample results in this batch were “N” flagged. Percent recovery failures most likely due to matrix effects from the sample.

All other QC controls are within the established limits.

Cyanide – The hold time requirement for this analysis was met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 25 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00736 (B240J5 in work order 20100371)

All QC controls are within the established limits.

Hexavalent Chromium – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 26 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00703 (B23PH9 in work order 20100369)

All QC controls are within the established limits.

ICP-AES Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 27 through 28 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Estimated Boron results due to iron interference. Sample results are “E” flagged.
- Batch QC analyzed on sample# W10GR00736 and Batch QC analyzed on sample# W10GR00758 are not associated with this analytical group but cannot be removed from this printout. Please ignore these results.

All other QC controls are within the established limits.

ICP-MS Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 29 through 32 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00870 (B247W6 in work order 20100415)
 - Barium –Matrix Spike Duplicate recoveries exceeded laboratory spike levels. Affected sample results in this batch were “N” flagged.

All other QC controls are within the established limits.

Organic Comments

Sample concentrations are corrected for moisture content and reported on a dry weight basis.

Alcohol/Glycols - The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 46 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)

All QC controls are within the established limits.

PCB – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 49 through 50 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)

All QC controls are within the established limits.

Semi-VOA – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 51 through 56 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00863 (B247X2 in work order 20100409)

All QC controls are within the established limits.

TPHD-WA – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 47 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Surrogate recoveries exceeded acceptance limits for sample B247W5 (W10GR00869) and B247W6 (W10GR00870). Due to analysis problems, samples were re-analyzed on 03/29/10. Surrogate failure is contributed to the possible evaporation of solvent between analysis runs; thus increasing the surrogate concentration. All additional batch QC was within limits.
- Due to the co-elution of analytes for TPHD-WA (DRO) and kerosene analysis, samples are spiked and evaluated for TPHD only.

All other QC controls are within the established limits.

TPHG-WA – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 48 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00865 (B247X4 in work order 20100409)

All QC controls are within the established limits.

VOA – The hold time requirement for this analysis was met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 57 through 60 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)

All QC controls are within the established limits.

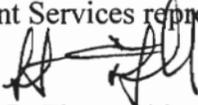
Radiochemistry Comments

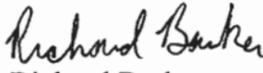
Rad Chem – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike (Matrix Spikes apply only to Technetium), Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 66 through 71 for QC details. Analytical Note(s):

- Tracers are used to determine chemical yield. RPD is monitored in sample duplicate and is not required for tracer recovery per SOW.
- Rad Chem requested to be performed included: Americium-241 by AEA, Gamma Energy Analysis, Plutonium Isotopic and Uranium Isotopic by AEA, Strontium-89/90, and Technetium-99 by LSC.
- Americium-241: Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Duplicate Relative Percent Difference(s) (RPD) did not meet the established laboratory limits. The RPD criterion does not apply to results near or below the minimum detectable activity. No flags issued.
 - All other QC controls are within the established limits.
- Gamma Energy Analysis: Batch QC analyzed on sample# W10GR000869 (B247W5 in work order 20100415)
 - Naturally occurring radioisotopes: Radium-226 was detected in the blank at less than 2 times the MDL. No flags applied.
 - All other QC controls are within the established limits.

- Isotopic Plutonium analysis: Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Plutonium-239 – detected in blank. Activity is less than 2 times the MDL and is acceptable.
 - All other QC controls are within the established limits.
- Isotopic Uranium analysis: Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - U-234 – detected in blank. Activity is less than 2 times the MDL and is acceptable.
 - All other QC controls are within the established limits.
- Strontium-89/90: Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Duplicate is flagged for poor RPD due to heterogeneous nature of the sample.
 - All other QC controls are within the established limits.
- Technetium-99: Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Matrix Spike flagged due to low recovery, however, it is still within the range of the statement of work that allows 60-140%.
 - All other QC controls are within the established limits.

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


Scot L. Fitzgerald
WSCF Analytical Laboratory Manager

 4-7-10
Richard Barker
WSCF Client Services

COLLECTOR FM Hall
CHPRC

SAMPLING LOCATION
C6724 (200E-127-PL) I-003

ICE CHEST NO.
N/A

SHIPPED TO
Waste Sampling & Characterization

COMPANY CONTACT
BAMBERGER, MACHELLE

PROJECT DESIGNATION
200-E-127 Pipeline - Soil

FIELD LOGBOOK NO.
HNF-N-507-5

OFFSITE PROPERTY NO.
N/A

TELEPHONE NO.
373-0880

ACTUAL SAMPLE DEPTH
15.0' - 20.0'

PROJECT COORDINATOR
WIDRIG, DL

SAF NO.
F10-102

COA
302427ES10

BILL OF LADING/AIR BILL NO.
N/A

PRICE CODE 8C

AIR QUALITY

METHOD OF SHIPMENT
GOVERNMENT VEHICLE

DATA TURNAROUND
15 Days / 15 Days

MATRIX*

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B247W1
20100415

| PRESERVATION | Cool <-7C and >-20C | | Cool~4C | Cool~4C | None | None |
|----------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| | aGs* | aGs* | aG | G/P | P | G/P |
| TYPE OF CONTAINER | | | | | | |
| NO. OF CONTAINER(S) | 5 | 3 | 1 | 1 | 1 | 1 |
| VOLUME | 40mL | 40mL | 125mL | 60mL | 125mL | 60mL |
| SAMPLE ANALYSIS | SEE ITEM (1) IN SPECIAL INSTRUCTIONS | SEE ITEM (2) IN SPECIAL INSTRUCTIONS | SEE ITEM (3) IN SPECIAL INSTRUCTIONS | SEE ITEM (4) IN SPECIAL INSTRUCTIONS | SEE ITEM (5) IN SPECIAL INSTRUCTIONS | SEE ITEM (6) IN SPECIAL INSTRUCTIONS |

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME | | | | | | |
|------------|---------|-------------|-------------|---|---|---|---|---|---|
| B247W5 | SOIL | 3-19-10 | 0846 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

[Handwritten signature and date 3-19-10]

| CHAIN OF POSSESSION | SIGN/ PRINT NAMES | SPECIAL INSTRUCTIONS |
|--|--------------------------------------|---|
| RELINQUISHED BY/REMOVED FROM FM Hall CHPRC | RECEIVED BY/STORED IN [Signature] | SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |

ORIGINAL

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

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COLLECTOR
 FM Hall
 CHPRC

SAMPLING LOCATION
 C6724 (200E-127-PL) I-003

ICE CHEST NO.
 N/A

SHIPPED TO
 Waste Sampling & Characterization

COMPANY CONTACT
 BAMBERGER, MACHELLE

PROJECT DESIGNATION
 200-E-127 Pipeline - Soil

FIELD LOGBOOK NO.

OFFSITE PROPERTY NO.
 N/A

TELEPHONE NO.
 373-0880

ACTUAL SAMPLE DEPTH

PROJECT COORDINATOR
 WIDRIG, DL

SAF NO.
 F10-102

COA
 302427ES10

BILL OF LADING/AIR BILL NO.
 N/A

PRICE CODE 8C

AIR QUALITY

METHOD OF SHIPMENT
 GOVERNMENT VEHICLE

DATA TURNAROUND
 15 Days / 15 Days

SPECIAL INSTRUCTIONS

- ** The CACN for all analytical work at WSCF laboratory is to be determined. ** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
- (1)VOA - 5035/8260 (LOW LEVEL); VOA - 5035/8260 (LOW LEVEL) - (Add-On) {n-Butylbenzene, Acetonitrile, Trichloromonofluoromethane, Hexane, 1-Butanol, cis-1,2-Dichloroethylene, Tetrahydrofuran, trans-1,2-Dichloroethylene}
 - (2)Alcohols, Glycols, & Ketones - 8015 {Diethyl ether}
 - (3)Semi-VOA - 8270B (TCL); Semi-VOA - 8270B (Add-On) {Benzyl alcohol, Tributyl phosphate, 1,2,4-Trimethylbenzene, 1-Naphthylamine, 2-Butoxyethanol, 2-Naphthylamine, Cyclohexanone, Dodecane, Decane} TPH-Diesel/Kerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range} TPH-Gasoline Range - WTPH-G {Total petroleum hydrocarbons - gasoline range} PCBs - 8082;
 - (4)ICP Metals - 6010B (Add-On) {Boron, Bismuth} ICP/MS - 200.8 (TAL) {Antimony, Barium, Chromium, Cadmium, Copper, Zinc, Nickel, Vanadium, Silver} ICP/MS - 200.8 (Add-on) {Arsenic, Lead, Thorium-232, Molybdenum, Thallium, Beryllium, Uranium, Selenium} 200.8_HG - ICPMS {Mercury} Total Cyanide - 9014; Chromium Hex - 7196; IC Anions - 300.0 {Nitrogen in Nitrate, Fluoride, Nitrogen in Nitrate, Sulfate}
 - (5)Gamma Spectroscopy {Europium-155, Cesium-137, Europium-154, Europium-152, Cobalt-60} Gamma Spec - Add-on {Radium-226, Radium-228, Antimony-125, Cesium-134, Niobium-94}
 - (6)Americium-241; Isotopic Plutonium {Plutonium-239/240, Plutonium-238} Isotopic Uranium {Uranium-233/234, Uranium-235, Uranium-238} Strontium-89,90 -- Total Sr; Technetium-99;

 ORIGINAL

COLLECTOR
FM Hall
CHPRC

SAMPLING LOCATION
C6724 (200E-127-PL) I-004

ICE CHEST NO.
N/A

SHIPPED TO
Waste Sampling & Characterization

COMPANY CONTACT
BAMBERGER, MACHELLE

PROJECT DESIGNATION
200-E-127 Pipeline - Soil

FIELD LOGBOOK NO.
HNF-N-507-5

OFFSITE PROPERTY NO.
N/A

TELEPHONE NO.
373-0880

ACTUAL SAMPLE DEPTH
20.0' - 25.0'

PROJECT COORDINATOR
WIDRIG, DL

SAF NO.
F10-102

COA
302427ES10

BILL OF LADING/AIR BILL NO.
N/A

PRICE CODE 8C

AIR QUALITY

METHOD OF SHIPMENT
GOVERNMENT VEHICLE

DATA TURNAROUND
15 Days / 15 Days

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

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B247W2

| PRESERVATION | Cool <-7C and >-20C | Cool~4C | Cool~4C | Cool~4C | None | None |
|----------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| TYPE OF CONTAINER | aGs* | aGs* | aG | G/P | P | G/P |
| NO. OF CONTAINER(S) | 5 | 3 | 1 | 1 | 1 | 1 |
| VOLUME | 40mL | 40mL | 125mL | 60mL | 125mL | 60mL |
| SAMPLE ANALYSIS | SEE ITEM (1) IN SPECIAL INSTRUCTIONS | SEE ITEM (2) IN SPECIAL INSTRUCTIONS | SEE ITEM (3) IN SPECIAL INSTRUCTIONS | SEE ITEM (4) IN SPECIAL INSTRUCTIONS | SEE ITEM (5) IN SPECIAL INSTRUCTIONS | SEE ITEM (6) IN SPECIAL INSTRUCTIONS |

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME | SEE ITEM (1) | SEE ITEM (2) | SEE ITEM (3) | SEE ITEM (4) | SEE ITEM (5) | SEE ITEM (6) |
|------------------------|---------|-------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|
| B247W6 W106200870 SOIL | | 3-19-10 | 1012 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

CTBC
 3-19-10

| CHAIN OF POSSESSION | SIGN/ PRINT NAMES | SPECIAL INSTRUCTIONS |
|--|--|---|
| RELINQUISHED BY/REMOVED FROM FM Hall CHPRC | RECEIVED BY/STORED IN [Signature] DATE/TIME 3-19-10 | SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |

ORIGINAL

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

COLLECTOR
FM Hall
CHPRC

COMPANY CONTACT
BAMBERGER, MACHELLE

TELEPHONE NO.
373-0880

PROJECT COORDINATOR
WIDRIG, DL

PRICE CODE 8C

DATA
TURNAROUND
15 Days / 15
Days

SAMPLING LOCATION
C6724 (200E-127-PL) I-004

PROJECT DESIGNATION
200-E-127 Pipeline - Soil

SAF NO.
F10-102

AIR QUALITY

ICE CHEST NO.
N/A

FIELD LOGBOOK NO.
HWF-N-507-S

ACTUAL SAMPLE DEPTH
20.0' - 25.0'

COA
302427ES10

METHOD OF SHIPMENT
GOVERNMENT VEHICLE

SHIPPED TO
Waste Sampling & Characterization

OFFSITE PROPERTY NO.
N/A

BILL OF LADING/AIR BILL NO.
N/A

SPECIAL INSTRUCTIONS

- ** The CACN for all analytical work at WSCF laboratory is to be determined. ** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
- (1)VOA - 5035/8260 (LOW LEVEL); VOA - 5035/8260 (LOW LEVEL) - (Add-On) (n-Butylbenzene, Acetonitrile, Trichloromonofluoromethane, Hexane, 1-Butanol, cis-1,2-Dichloroethylene, Tetrahydrofuran, trans-1,2-Dichloroethylene)
 - (2)Alcohols, Glycols, & Ketones - 8015 (Diethyl ether)
 - (3)Semi-VOA - 8270B (TCL); Semi-VOA - 8270B (Add-On) (Tributyl phosphate, 1,2,4-Trimethylbenzene, Benzyl alcohol, 1-Naphthylamine, 2-Naphthylamine, 2-Butoxyethanol, Cyclohexanone, Dodecane, Decane) TPH-Diesel/Kerosene Range - WTPH-D (Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range) TPH-Gasoline Range - WTPH-G (Total petroleum hydrocarbons - gasoline range) PCBs - 8082;
 - (4)ICP Metals - 6010B (Add-On) (Boron, Bisphuth) ICP/MS - 200.8 (TAL) (Antimony, Barium, Chromium, Cadmium, Copper, Zinc, Nickel, Vanadium, Silver) ICP/MS - 200.8 (Add-on) (Arsenic, Lead, Thorium-232, Molybdenum, Thallium, Beryllium, Uranium, Selenium) 200.8_HG - ICPMS (Mercury) Total Cyanide - 9014; Chromium Hex - 7196; IC Anions - 300.0 (Nitrogen in Nitrite, Fluoride, Nitrogen in Nitrate, Sulfate)
 - (5)Gamma Spectroscopy (Europium-155, Cesium-137, Europium-154, Europium-152, Cobalt-60) Gamma Spec - Add-on (Radium-226, Radium-228, Antimony-125, Cesium-134, Niobium-94)
 - (6)Americium-241; Isotopic Plutonium (Plutonium-239/240, Plutonium-238) Isotopic Uranium (Uranium-233/234, Uranium-235, Uranium-238) Strontium-89,90 -- Total Sr; Technetium-99;

 ORIGINAL

Appendix 5

Data Validation Supporting Documentation

Rev. 0, Chg. 0

GRP-GD-003

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Data Validation for Chemical Analyses**Published Date: 08/16/10****Effective Date: 08/16/10**

| | | | | | |
|---|-------------|-----------|------------------------------------|------------------|---|
| VALIDATION LEVEL: | A | B | <input checked="" type="radio"/> C | D | E |
| PROJECT: 200 AREA GRP | | | DATA PACKAGE: VSR11-002 | | |
| VALIDATOR: Carl Schloesslin | | LAB: WSCF | | DATE: 11-18-2010 | |
| | | | SDG: WSCF20100415 | | |
| ANALYSES PERFORMED | | | | | |
| SW-846/ICP X | SW-846/GFAA | SW-846/Hg | SW-846 Cyanide | EPA 200.8 X | |
| | | | | | |
| SAMPLES/MATRIX Soil samples B247W5 & B247W6 | | | | | |

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE
 Technical verification documentation present?..... Yes No N/A

Comments: None

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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

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

Comments:

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

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

Comments: None

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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:

Ba MSD %R = 137%

Data Validation for Chemical Analyses**Published Date: 08/16/10****Effective Date: 08/16/10****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

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20100415
 Matrix: SOLID
 Test: ICP Metals Analysis, Grd H2O P

Sample Date: 03/11/10
 Receive Date: 03/15/10

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|---------|---------|-------|----------|----------|-------|-------------|-------------|--------|-----------|----|---------------|
|---------|---------|-------|----------|----------|-------|-------------|-------------|--------|-----------|----|---------------|

Lab ID: W10GR00736
 BATCH QC ASSOCIATED WITH SAMPLE

| | | | | | | | | | | | |
|---------|---------|-----------|---------|---------|---------|--------|---------|-------|--------|--|----------|
| MS | Boron | 7440-42-8 | 201 | 100.500 | % Recov | 75.000 | 125.000 | | | | 03/22/10 |
| MS | Bismuth | 7440-69-9 | 196.8 | 98.400 | % Recov | 75.000 | 125.000 | | | | 03/22/10 |
| MSD | Boron | 7440-42-8 | 207.2 | 103.085 | % Recov | 75.000 | 125.000 | | | | 03/22/10 |
| MSD | Bismuth | 7440-69-9 | 202.6 | 100.796 | % Recov | 75.000 | 125.000 | | | | 03/22/10 |
| SPK-RPD | Boron | 7440-42-8 | 103.085 | | RPD | | | 2.539 | 20.000 | | 03/22/10 |
| SPK-RPD | Bismuth | 7440-69-9 | 100.796 | | RPD | | | 2.406 | 20.000 | | 03/22/10 |

Lab ID: W10GR00758
 BATCH QC ASSOCIATED WITH SAMPLE

| | | | | | | | | | | | |
|---------|-------|-----------|--------|--------|---------|--------|---------|-------|--------|--|----------|
| MS | Boron | 7440-42-8 | 199.32 | 99.164 | % Recov | 75.000 | 125.000 | | | | 03/22/10 |
| MSD | Boron | 7440-42-8 | 187.72 | 94.332 | % Recov | 75.000 | 125.000 | | | | 03/22/10 |
| SPK-RPD | Boron | 7440-42-8 | 94.332 | | RPD | | | 4.994 | 20.000 | | 03/22/10 |

Lab ID: W10GR00862
 BATCH QC ASSOCIATED WITH SAMPLE

| | | | | | | | | | | | |
|---------|---------|-----------|--------|--------|---------|--------|---------|-------|--------|--|----------|
| MS | Boron | 7440-42-8 | 200.33 | 99.173 | % Recov | 75.000 | 125.000 | | | | 03/22/10 |
| MS | Bismuth | 7440-69-9 | 196.3 | 97.178 | % Recov | 75.000 | 125.000 | | | | 03/22/10 |
| MSD | Boron | 7440-42-8 | 197.43 | 99.712 | % Recov | 75.000 | 125.000 | | | | 03/22/10 |
| MSD | Bismuth | 7440-69-9 | 192.5 | 97.222 | % Recov | 75.000 | 125.000 | | | | 03/22/10 |
| SPK-RPD | Boron | 7440-42-8 | 99.712 | | RPD | | | 0.542 | 20.000 | | 03/22/10 |
| SPK-RPD | Bismuth | 7440-69-9 | 97.222 | | RPD | | | 0.045 | 20.000 | | 03/22/10 |

BATCH QC

| | | | | | | | | | | | |
|-------|---------|-----------|----------|---------|---------|--------|---------|--|--|---|----------|
| BLANK | Boron | 7440-42-8 | < 1.9e-2 | n/a | ug/mL | | | | | U | 03/22/10 |
| BLANK | Bismuth | 7440-69-9 | < 2.3e-2 | n/a | ug/mL | | | | | U | 03/22/10 |
| LCS | Boron | 7440-42-8 | 133.8 | 116.348 | % Recov | 45.000 | 156.000 | | | | 03/22/10 |

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20100415
Matrix: SOLID
Test: ICP Metals Analysis, Grd H20 P

Sample Date:
Receive Date:

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|---------|---------|-----------|----------|----------|---------|-------------|-------------|--------|-----------|----|---------------|
| LCS | Bismuth | 7440-69-9 | 101.1 | 100.798 | % Recov | 80.000 | 120.000 | | | | 03/22/10 |

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20100415
 Matrix: SOLID
 Test: ICP-200.8 MS All possible meta

Sample Date: 03/19/10
 Receive Date: 03/19/10

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|---------------------------------|------------|-----------|----------|----------|---------|-------------|-------------|--------|-----------|----|---------------|
| Lab ID: W10GR00870 | | | | | | | | | | | |
| BATCH QC ASSOCIATED WITH SAMPLE | | | | | | | | | | | |
| MS | Silver | 7440-22-4 | 98.68 | 98.680 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MS | Arsenic | 7440-38-2 | 103.8 | 103.800 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MS | Barium | 7440-39-3 | 113.89 | 113.890 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MS | Beryllium | 7440-41-7 | 95 | 95.000 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MS | Cadmium | 7440-43-9 | 101.3 | 101.300 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MS | Chromium | 7440-47-3 | 96.4 | 96.400 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MS | Copper | 7440-50-8 | 92.19 | 92.190 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MS | Mercury | 7439-97-6 | 2.13 | 106.500 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MS | Molybdenum | 7439-98-7 | 100.72 | 100.720 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MS | Nickel | 7440-02-0 | 91.73 | 91.730 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MS | Lead | 7439-92-1 | 103.27 | 103.270 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MS | Antimony | 7440-36-0 | 96.64 | 96.640 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MS | Selenium | 7782-49-2 | 108.9 | 108.900 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MS | Thorium | 7440-29-1 | 103.56 | 103.560 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MS | Thallium | 7440-28-0 | 102.89 | 102.890 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MS | Uranium | 7440-61-1 | 103.58 | 103.580 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MS | Vanadium | 7440-62-2 | 86.19 | 86.190 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MS | Zinc | 7440-66-6 | 92.28 | 92.280 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MSD | Silver | 7440-22-4 | 98.64 | 98.640 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MSD | Arsenic | 7440-38-2 | 102.5 | 102.500 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MSD | Barium | 7440-39-3 | 136.89 | 136.890 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MSD | Beryllium | 7440-41-7 | 94.25 | 94.250 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MSD | Cadmium | 7440-43-9 | 99.6 | 99.600 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MSD | Chromium | 7440-47-3 | 93.2 | 93.200 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MSD | Copper | 7440-50-8 | 86.69 | 86.690 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MSD | Mercury | 7439-97-6 | 2.07 | 103.500 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20100415
 Matrix: SOLID
 Test: ICP-200.8 MS All possible meta

Sample Date: 03/19/10
 Receive Date: 03/19/10

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|---------|------------|-----------|----------|----------|---------|-------------|-------------|--------|-----------|----|---------------|
| MSD | Molybdenum | 7439-98-7 | 99.02 | 99.020 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MSD | Nickel | 7440-02-0 | 90.36 | 90.360 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MSD | Lead | 7439-92-1 | 101.37 | 101.370 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MSD | Antimony | 7440-36-0 | 96.63 | 96.630 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MSD | Selenium | 7782-49-2 | 104.4 | 104.400 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MSD | Thorium | 7440-29-1 | 101.46 | 101.460 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MSD | Thallium | 7440-28-0 | 101.49 | 101.490 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MSD | Uranium | 7440-61-1 | 100.88 | 100.880 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MSD | Vanadium | 7440-62-2 | 89.69 | 89.690 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| MSD | Zinc | 7440-66-6 | 90.28 | 90.280 | % Recov | 70.000 | 130.000 | | | | 03/31/10 |
| SPK-RPD | Silver | 7440-22-4 | 98.640 | | RPD | | | 0.041 | 20.000 | | 03/31/10 |
| SPK-RPD | Arsenic | 7440-38-2 | 102.500 | | RPD | | | 1.260 | 20.000 | | 03/31/10 |
| SPK-RPD | Barium | 7440-39-3 | 136.890 | | RPD | | | 18.343 | 20.000 | | 03/31/10 |
| SPK-RPD | Beryllium | 7440-41-7 | 94.250 | | RPD | | | 0.793 | 20.000 | | 03/31/10 |
| SPK-RPD | Cadmium | 7440-43-9 | 99.600 | | RPD | | | 1.692 | 20.000 | | 03/31/10 |
| SPK-RPD | Chromium | 7440-47-3 | 93.200 | | RPD | | | 3.376 | 20.000 | | 03/31/10 |
| SPK-RPD | Copper | 7440-50-8 | 86.690 | | RPD | | | 6.149 | 20.000 | | 03/31/10 |
| SPK-RPD | Mercury | 7439-97-6 | 103.500 | | RPD | | | 2.857 | 20.000 | | 03/31/10 |
| SPK-RPD | Molybdenum | 7439-98-7 | 99.020 | | RPD | | | 1.702 | 20.000 | | 03/31/10 |
| SPK-RPD | Nickel | 7440-02-0 | 90.360 | | RPD | | | 1.505 | 20.000 | | 03/31/10 |
| SPK-RPD | Lead | 7439-92-1 | 101.370 | | RPD | | | 1.857 | 20.000 | | 03/31/10 |
| SPK-RPD | Antimony | 7440-36-0 | 96.630 | | RPD | | | 0.010 | 20.000 | | 03/31/10 |
| SPK-RPD | Selenium | 7782-49-2 | 104.400 | | RPD | | | 4.219 | 20.000 | | 03/31/10 |
| SPK-RPD | Thorium | 7440-29-1 | 101.460 | | RPD | | | 2.049 | 20.000 | | 03/31/10 |
| SPK-RPD | Thallium | 7440-28-0 | 101.490 | | RPD | | | 1.370 | 20.000 | | 03/31/10 |
| SPK-RPD | Uranium | 7440-61-1 | 100.880 | | RPD | | | 2.641 | 20.000 | | 03/31/10 |
| SPK-RPD | Vanadium | 7440-62-2 | 89.690 | | RPD | | | 3.980 | 20.000 | | 03/31/10 |
| SPK-RPD | Zinc | 7440-66-6 | 90.280 | | RPD | | | 2.191 | 20.000 | | 03/31/10 |

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20100415
 Matrix: SOLID
 Test: ICP-200.8 MS All possible meta

Sample Date:
 Receive Date:

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|-----------------|------------|-----------|----------|----------|---------|-------------|-------------|--------|-----------|----|---------------|
| BATCH QC | | | | | | | | | | | |
| BLANK | Silver | 7440-22-4 | <0.1 | n/a | ug/L | | | | | U | 03/31/10 |
| BLANK | Arsenic | 7440-38-2 | <0.4 | n/a | ug/L | | | | | U | 03/31/10 |
| BLANK | Barium | 7440-39-3 | <0.2 | n/a | ug/L | | | | | U | 03/31/10 |
| BLANK | Beryllium | 7440-41-7 | <5e-2 | n/a | ug/L | | | | | U | 03/31/10 |
| BLANK | Cadmium | 7440-43-9 | <0.1 | n/a | ug/L | | | | | U | 03/31/10 |
| BLANK | Chromium | 7440-47-3 | <0.5 | n/a | ug/L | | | | | U | 03/31/10 |
| BLANK | Copper | 7440-50-8 | <0.1 | n/a | ug/L | | | | | U | 03/31/10 |
| BLANK | Mercury | 7439-97-6 | <5e-2 | n/a | ug/L | | | | | U | 03/31/10 |
| BLANK | Molybdenum | 7439-98-7 | <5e-2 | n/a | ug/L | | | | | U | 03/31/10 |
| BLANK | Nickel | 7440-02-0 | <0.2 | n/a | ug/L | | | | | U | 03/31/10 |
| BLANK | Lead | 7439-92-1 | <0.1 | n/a | ug/L | | | | | U | 03/31/10 |
| BLANK | Antimony | 7440-36-0 | <0.3 | n/a | ug/L | | | | | U | 03/31/10 |
| BLANK | Selenium | 7782-49-2 | <0.3 | n/a | ug/L | | | | | U | 03/31/10 |
| BLANK | Thorium | 7440-29-1 | <0.1 | n/a | ug/L | | | | | U | 03/31/10 |
| BLANK | Thallium | 7440-28-0 | <0.1 | n/a | ug/L | | | | | U | 03/31/10 |
| BLANK | Uranium | 7440-61-1 | <5e-2 | n/a | ug/L | | | | | U | 03/31/10 |
| BLANK | Vanadium | 7440-62-2 | <0.2 | n/a | ug/L | | | | | U | 03/31/10 |
| BLANK | Zinc | 7440-66-6 | <0.8 | n/a | ug/L | | | | | U | 03/31/10 |
| LCS | Silver | 7440-22-4 | 98.1 | 97.129 | % Recov | 81.000 | 128.000 | | | | 03/31/10 |
| LCS | Arsenic | 7440-38-2 | 132.8 | 100.606 | % Recov | 78.000 | 124.000 | | | | 03/31/10 |
| LCS | Barium | 7440-39-3 | 315.7 | 98.966 | % Recov | 77.000 | 119.000 | | | | 03/31/10 |
| LCS | Beryllium | 7440-41-7 | 80.1 | 89.497 | % Recov | 78.000 | 118.000 | | | | 03/31/10 |
| LCS | Cadmium | 7440-43-9 | 66.81 | 100.466 | % Recov | 75.000 | 127.000 | | | | 03/31/10 |
| LCS | Chromium | 7440-47-3 | 64.96 | 89.108 | % Recov | 67.000 | 119.000 | | | | 03/31/10 |
| LCS | Copper | 7440-50-8 | 60.84 | 88.818 | % Recov | 68.000 | 122.000 | | | | 03/31/10 |
| LCS | Mercury | 7439-97-6 | 7.62 | 92.029 | % Recov | 72.000 | 117.000 | | | | 03/31/10 |
| LCS | Molybdenum | 7439-98-7 | 47.64 | 97.823 | % Recov | 80.000 | 125.000 | | | | 03/31/10 |
| LCS | Nickel | 7440-02-0 | 51.3 | 92.266 | % Recov | 73.000 | 123.000 | | | | 03/31/10 |

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20100415
Matrix: SOLID
Test: ICP-200.8 MS All possible meta

Sample Date:
Receive Date:

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|---------|----------|-----------|----------|----------|---------|-------------|-------------|--------|-----------|----|---------------|
| LCS | Lead | 7439-92-1 | 125.2 | 96.308 | % Recov | 77.000 | 125.000 | | | | 03/31/10 |
| LCS | Antimony | 7440-36-0 | 110.9 | 122.949 | % Recov | 65.000 | 203.000 | | | | 03/31/10 |
| LCS | Selenium | 7782-49-2 | 164.1 | 101.925 | % Recov | 82.000 | 129.000 | | | | 03/31/10 |
| LCS | Thorium | 7440-29-1 | 390.7 | 97.675 | % Recov | 79.000 | 108.000 | | | | 03/31/10 |
| LCS | Thallium | 7440-28-0 | 126.7 | 95.263 | % Recov | 55.000 | 130.000 | | | | 03/31/10 |
| LCS | Uranium | 7440-61-1 | 408.3 | 102.075 | % Recov | 84.000 | 110.000 | | | | 03/31/10 |
| LCS | Vanadium | 7440-62-2 | 74.78 | 90.096 | % Recov | 65.000 | 122.000 | | | | 03/31/10 |
| LCS | Zinc | 7440-66-6 | 162.9 | 92.034 | % Recov | 75.000 | 130.000 | | | | 03/31/10 |

Date: 18 November 2010
 To: CH2M Hill (technical representative)
 From: Analytical Quality Associates, Inc.
 Project: 200 AREA GRP
 Subject: General Chemistry - Sample Data Group (SDG) WSCF20100415

INTRODUCTION

This memorandum presents the results of data validation for SDG WSCF20100415 prepared by WSCF. A list of samples validated along with the analytical method is provided in the following table.

| Sample ID | Sample Date | Media | Validation Level | Analytical Methods |
|------------------|--------------------|--------------|-------------------------|---------------------------|
| B247W5 | 3-19-2010 | Soil | C | 300.0, 7196A, 9014 |
| B247W6 | 3-19-2010 | Soil | C | 300.0, 7196A, 9014 |

Data validation was conducted in accordance with the CHPRC validation statement of work and the Tanks/Lines/Pits/Boxes/Septic Tank and Drain Fields Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan; Includes: 200-IS-1 and 200-ST-1 Operable Units, DOE/RL-2002-14, Rev. 1, and the Sampling and Analysis Plan for Supplemental Remedial Investigation Activities at Model Group 5, Large-Area Ponds, Waste Sites Located Within the 200-CW-1 Operable Unit, DOE/RL-2006-57, Rev. 0, REISSUE (SAPs). Appendices 1 through 6 provide the following information as indicated below:

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

DATA QUALITY OBJECTIVES

• Holding Times and Sample Preservation

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

- All anions except nitrate and nitrite – analysis within 28 days of sample collection
- Nitrate and nitrite – extraction within 28 days of sample collection and analysis within 48 hours of extraction
- Hexavalent chromium – analysis within 30 days of sample collection
- Total cyanide – analysis within 14 days of sample collection

Sample preservation requires chilling to 4 degrees Celsius.

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

- **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 SAPs, the laboratory control sample accuracy limits are 70% to 130%. The matrix spike accuracy limits are ones specified by the DV procedure. The limits for reported analytes not listed in the SAP are specified by the DV procedure.

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

All MS/MSD recoveries were acceptable with the following exceptions. The MS and MSD recoveries for fluoride, N in nitrate, and N in nitrite were < the lower acceptance limit but $\geq 20\%$. The associated sample results were all non-detects and should be qualified as estimates and flagged "UJ."

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, laboratory duplicate sample results, field duplicate sample results, and field split sample results. These QC results provide information on

the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAPs, the relative percent difference (RPD) limits are $\pm 30\%$. The limits for reported analytes not listed in the SAP are specified by the DV procedure. When duplicate RPDs exceed the limits and have associated results $< 5X$ the SAP required detection limits (or $< 5X$ the laboratory reporting limits for analytes not listed in the SAP) with differences $< 2X$ the required detection limits no precision infraction occurred.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Laboratory Duplicate Samples

All laboratory duplicate results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for 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 WSCF20100415 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of fluoride, N in nitrate, and N in nitrite sample results as estimates were due to MS/MSD recovery infractions. See the table in Appendix 2 for a listing of all affected sample results.

REFERENCES

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

DOE/RL-2002-14, Rev. 1, *Tanks/Lines/Pits/Boxes/Septic Tank and Drain Fields Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan; Includes: 200-IS-1 and 200-ST-1 Operable Units*, July 2008.

DOE/RL-2006-57, Rev. 0, REISSUE, *Sampling and Analysis Plan for Supplemental Remedial Investigation Activities at Model Group 5, Large-Area Ponds, Waste Sites Located Within the 200-CW-1 Operable Unit*, February 2008.

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 | | | |
|---|------------------|--------------------------|---------------------------|
| SDG: WSCF20100415 | Reviewer: AQA | Project: 200 AREA GRP | Page 1 of 1 |
| Analyte(s) | Qualifier | Samples Affected | Reason |
| Fluoride N in nitrate N in nitrite | UJ | B247W5 & B247W6 | Low MS and MSD recoveries |

Comments: None

Appendix 3

Annotated Laboratory Reports

WSCF ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-102
Sample # W10GR00869
Client ID: B247W5

Group #: WSCF20100415
Department: Inorganic
Sampled: 03/19/10
Received: 03/19/10

GPP TRENT
WSCF

Matrix: SOIL

| Test Performed | CAS # | Method | RQ | Result | Unit | TP Err | Unit | DF | MDL | PQL | Analysis Date |
|--|------------|------------|-----|---------|-------|--------|------|-----------|--------|-----|---------------|
| Anions by Ion Chromatography Prep | | | | | | | | | | | |
| Anions by Ion Chromatography | | | | | | | | | | | |
| Fluoride | 16984-48-8 | LA-533-410 | DNU | < 1.50 | mg/kg | UJ | | 49.93 | 1.5 | | 03/22/10 |
| Nitrogen in Nitrite | NO2-N | LA-533-410 | DNU | < 0.899 | mg/kg | UJ | | 49.93 | 0.90 | | 03/22/10 |
| Nitrogen in Nitrate | NO3-N | LA-533-410 | DNU | < 1.55 | mg/kg | UJ | | 49.93 | 1.5 | | 03/22/10 |
| Sulfate | 14808-79-8 | LA-533-410 | BD | 8.26 | mg/kg | | | 49.93 | 3.3 | | 03/22/10 |
| Cyanide | | | | | | | | | | | |
| Cyanide | 57-12-5 | LA-695-402 | U | < 0.200 | mg/kg | | | 1.00 | 0.20 | | 03/24/10 |
| Hexavalent Chromium Prep | | | | | | | | | | | |
| Hexavalent Chromium | | | | | | | | | | | |
| Hexavalent Chromium | 18540-29-9 | LA-265-403 | U | < 0.100 | mg/kg | | | 1.00 | 0.10 | | 03/23/10 |
| ICP Metals Analysis, Grd H2O P Prep | | | | | | | | | | | |
| ICP Metals Analysis, Grd H2O P | | | | | | | | | | | |
| Boron | 7440-42-8 | LA-505-411 | BE | 8.76 | mg/kg | | | 1.01e+002 | 1.9 | | 03/22/10 |
| Bismuth | 7440-69-9 | LA-505-411 | U | < 2.32 | mg/kg | | | 1.01e+002 | 2.3 | | 03/22/10 |
| ICP-200.8 MS All possible meta Prep | | | | | | | | | | | |
| ICP-200.8 MS All possible meta | | | | | | | | | | | |
| Nickel | 7440-02-0 | LA-505-412 | | 10.8 | mg/kg | | | 1.00 | 0.201 | | 03/31/10 |
| Silver | 7440-22-4 | LA-505-412 | | 0.370 | mg/kg | | | 1.00 | 0.100 | | 03/31/10 |
| Antimony | 7440-36-0 | LA-505-412 | | 0.420 | mg/kg | | | 1.00 | 0.301 | | 03/31/10 |
| Barium | 7440-39-3 | LA-505-412 | N | 97.7 | mg/kg | | | 1.00 | 0.201 | | 03/31/10 |
| Beryllium | 7440-41-7 | LA-505-412 | | 0.580 | mg/kg | | | 1.00 | 0.0502 | | 03/31/10 |
| Cadmium | 7440-43-9 | LA-505-412 | | 0.400 | mg/kg | | | 1.00 | 0.100 | | 03/31/10 |
| Chromium | 7440-47-3 | LA-505-412 | | 15.4 | mg/kg | | | 1.00 | 0.502 | | 03/31/10 |
| Copper | 7440-50-8 | LA-505-412 | | 16.1 | mg/kg | | | 1.00 | 0.100 | | 03/31/10 |

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

B - The analyte < the RDL but > = the IDL/MDL (inorg)
 D - Analyte was identified at a secondary dilution factor(inorg)
 J - Analyte < lowest calibration but > = MDL.(org)
 U - Analyzed for but not detected above limiting criteria(inorg)

D - Analyte was identified at a secondary dilution factor
 E - Analyte is an estimate, has potentially larger errors(inorg)
 N - Spike sample recovery is outside control limits.(inorg)
 U - Analyzed for but not detected above limiting criteria.

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

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 Groundwater Remediation Program


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WSCF ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-102
Sample # W10GR00870
Client ID: B247W6

GPP TRENT
WSCF

Matrix: SOIL

Group #: WSCF20100415
Department: Inorganic
Sampled: 03/19/10
Received: 03/19/10

| Test Performed | CAS # | Method | RQ | Result | Unit | TP Err | Unit | DF | MDL | PQL | Analysis Date |
|--|------------|------------|-----|---------|-------|--------|------|-----------|--------|-----|---------------|
| Anions by Ion Chromatography Prep | | | | | | | | | | | |
| Anions by Ion Chromatography | | | | | | | | | | | |
| Fluoride | 16984-48-8 | LA-533-410 | DNU | < 1.49 | mg/kg | UJ | | 49.76 | 1.5 | | 03/22/10 |
| Nitrogen in Nitrite | NO2-N | LA-533-410 | DNU | < 0.896 | mg/kg | UJ | | 49.76 | 0.90 | | 03/22/10 |
| Nitrogen in Nitrate | NO3-N | LA-533-410 | DNU | < 1.54 | mg/kg | UJ | | 49.76 | 1.5 | | 03/22/10 |
| Sulfate | 14808-79-8 | LA-533-410 | BD | 7.60 | mg/kg | | | 49.76 | 3.3 | | 03/22/10 |
| Cyanide | | | | | | | | | | | |
| Cyanide | 57-12-5 | LA-695-402 | U | < 0.200 | mg/kg | | | 1.00 | 0.20 | | 03/24/10 |
| Hexavalent Chromium Prep | | | | | | | | | | | |
| Hexavalent Chromium | | | | | | | | | | | |
| Hexavalent Chromium | 18540-29-9 | LA-265-403 | U | < 0.100 | mg/kg | | | 1.00 | 0.10 | | 03/23/10 |
| ICP Metals Analysis, Grd H20 P Prep | | | | | | | | | | | |
| ICP Metals Analysis, Grd H20 P | | | | | | | | | | | |
| Boron | 7440-42-8 | LA-505-411 | BE | 8.56 | mg/kg | | | 1.00e+002 | 1.9 | | 03/22/10 |
| Bismuth | 7440-69-9 | LA-505-411 | U | < 2.31 | mg/kg | | | 1.00e+002 | 2.3 | | 03/22/10 |
| ICP-200.8 MS All possible meta Prep | | | | | | | | | | | |
| ICP-200.8 MS All possible meta | | | | | | | | | | | |
| Nickel | 7440-02-0 | LA-505-412 | | 7.95 | mg/kg | | | 1.00 | 0.200 | | 03/31/10 |
| Silver | 7440-22-4 | LA-505-412 | U | < 0.100 | mg/kg | | | 1.00 | 0.100 | | 03/31/10 |
| Antimony | 7440-36-0 | LA-505-412 | U | < 0.300 | mg/kg | | | 1.00 | 0.300 | | 03/31/10 |
| Barium | 7440-39-3 | LA-505-412 | N | 63.6 | mg/kg | | | 1.00 | 0.200 | | 03/31/10 |
| Beryllium | 7440-41-7 | LA-505-412 | | 0.220 | mg/kg | | | 1.00 | 0.0500 | | 03/31/10 |
| Cadmium | 7440-43-9 | LA-505-412 | U | < 0.100 | mg/kg | | | 1.00 | 0.100 | | 03/31/10 |
| Chromium | 7440-47-3 | LA-505-412 | | 17.6 | mg/kg | | | 1.00 | 0.500 | | 03/31/10 |
| Copper | 7440-50-8 | LA-505-412 | | 14.1 | mg/kg | | | 1.00 | 0.100 | | 03/31/10 |

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

B - The analyte < the RDL but > = the IDL/MDL (inorg)
D - Analyte was identified at a secondary dilution factor(inorg)
J - Analyte < lowest calibration but > = MDL.(org)
U - Analyzed for but not detected above limiting criteria(inorg)

D - Analyte was identified at a secondary dilution factor
E - Analyte is an estimate, has potentially larger errors(inorg)
N - Spike sample recovery is outside control limits.(inorg)
U - Analyzed for but not detected above limiting criteria.

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

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Introduction

Two (2) S&GRP samples were received at the WSCF Laboratory on March 19, 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 16 through 18, 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. See pages 23 through 24 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00869 (B247W5 in work order 20100415)
 - Fluoride, Nitrate and Nitrite – Matrix Spike and Matrix Spike Duplicate recoveries exceeded established laboratory limits. Affected sample results in this batch were “N” flagged. Percent recovery failures most likely due to matrix effects from the sample.

All other QC controls are within the established limits.

Cyanide – The hold time requirement for this analysis was met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 25 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00736 (B240J5 in work order 20100371)

All QC controls are within the established limits.

Hexavalent Chromium – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 26 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00703 (B23PH9 in work order 20100369)

All QC controls are within the established limits.

ICP-AES Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 27 through 28 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Estimated Boron results due to iron interference. Sample results are “E” flagged.
- Batch QC analyzed on sample# W10GR00736 and Batch QC analyzed on sample# W10GR00758 are not associated with this analytical group but cannot be removed from this printout. Please ignore these results.

All other QC controls are within the established limits.

ICP-MS Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 29 through 32 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00870 (B247W6 in work order 20100415)
 - Barium –Matrix Spike Duplicate recoveries exceeded laboratory spike levels. Affected sample results in this batch were “N” flagged.

All other QC controls are within the established limits.

Organic Comments

Sample concentrations are corrected for moisture content and reported on a dry weight basis.

Alcohol/Glycols - The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 46 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)

All QC controls are within the established limits.

PCB – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 49 through 50 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)

All QC controls are within the established limits.

Semi-VOA – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 51 through 56 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00863 (B247X2 in work order 20100409)

All QC controls are within the established limits.

TPHD-WA – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 47 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Surrogate recoveries exceeded acceptance limits for sample B247W5 (W10GR00869) and B247W6 (W10GR00870). Due to analysis problems, samples were re-analyzed on 03/29/10. Surrogate failure is contributed to the possible evaporation of solvent between analysis runs; thus increasing the surrogate concentration. All additional batch QC was within limits.
- Due to the co-elution of analytes for TPHD-WA (DRO) and kerosene analysis, samples are spiked and evaluated for TPHD only.

All other QC controls are within the established limits.

TPHG-WA – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 48 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00865 (B247X4 in work order 20100409)

All QC controls are within the established limits.

VOA – The hold time requirement for this analysis was met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 57 through 60 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)

All QC controls are within the established limits.

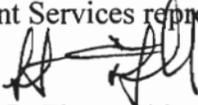
Radiochemistry Comments

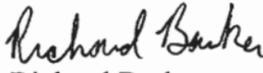
Rad Chem – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike (Matrix Spikes apply only to Technetium), Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 66 through 71 for QC details. Analytical Note(s):

- Tracers are used to determine chemical yield. RPD is monitored in sample duplicate and is not required for tracer recovery per SOW.
- Rad Chem requested to be performed included: Americium-241 by AEA, Gamma Energy Analysis, Plutonium Isotopic and Uranium Isotopic by AEA, Strontium-89/90, and Technetium-99 by LSC.
- Americium-241: Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Duplicate Relative Percent Difference(s) (RPD) did not meet the established laboratory limits. The RPD criterion does not apply to results near or below the minimum detectable activity. No flags issued.
 - All other QC controls are within the established limits.
- Gamma Energy Analysis: Batch QC analyzed on sample# W10GR000869 (B247W5 in work order 20100415)
 - Naturally occurring radioisotopes: Radium-226 was detected in the blank at less than 2 times the MDL. No flags applied.
 - All other QC controls are within the established limits.

- Isotopic Plutonium analysis: Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Plutonium-239 – detected in blank. Activity is less than 2 times the MDL and is acceptable.
 - All other QC controls are within the established limits.
- Isotopic Uranium analysis: Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - U-234 – detected in blank. Activity is less than 2 times the MDL and is acceptable.
 - All other QC controls are within the established limits.
- Strontium-89/90: Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Duplicate is flagged for poor RPD due to heterogeneous nature of the sample.
 - All other QC controls are within the established limits.
- Technetium-99: Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Matrix Spike flagged due to low recovery, however, it is still within the range of the statement of work that allows 60-140%.
 - All other QC controls are within the established limits.

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


Scot L. Fitzgerald
WSCF Analytical Laboratory Manager

 4-7-10
Richard Barker
WSCF Client Services

COLLECTOR FM Hall
CHPRC

SAMPLING LOCATION
C6724 (200E-127-PL) I-003

ICE CHEST NO.
N/A

SHIPPED TO
Waste Sampling & Characterization

COMPANY CONTACT
BAMBERGER, MACHELLE

PROJECT DESIGNATION
200-E-127 Pipeline - Soil

FIELD LOGBOOK NO.
HNF-N-507-5

OFFSITE PROPERTY NO.
N/A

TELEPHONE NO.
373-0880

ACTUAL SAMPLE DEPTH
15.0'-20.0'

PROJECT COORDINATOR
WIDRIG, DL

SAF NO.
F10-102

COA
302427ES10

BILL OF LADING/AIR BILL NO.
N/A

PRICE CODE 8C

AIR QUALITY

METHOD OF SHIPMENT
GOVERNMENT VEHICLE

DATA TURNAROUND
15 Days / 15 Days

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

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B247W1
20100415

| PRESERVATION | Cool <-7C and >-20C | Cool~4C | Cool~4C | Cool~4C | None | None |
|----------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| TYPE OF CONTAINER | aGs* | aGs* | aG | G/P | P | G/P |
| NO. OF CONTAINER(S) | 5 | 3 | 1 | 1 | 1 | 1 |
| VOLUME | 40mL | 40mL | 125mL | 60mL | 125mL | 60mL |
| SAMPLE ANALYSIS | SEE ITEM (1) IN SPECIAL INSTRUCTIONS | SEE ITEM (2) IN SPECIAL INSTRUCTIONS | SEE ITEM (3) IN SPECIAL INSTRUCTIONS | SEE ITEM (4) IN SPECIAL INSTRUCTIONS | SEE ITEM (5) IN SPECIAL INSTRUCTIONS | SEE ITEM (6) IN SPECIAL INSTRUCTIONS |

Handwritten signature and date: 3-19-10

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME | | | | | | |
|------------|-----------------|-------------|-------------|---|---|---|---|---|---|
| B247W5 | W106200869 SOIL | 3-19-10 | 0846 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

| CHAIN OF POSSESSION | SIGN/ PRINT NAMES | SPECIAL INSTRUCTIONS |
|--|--------------------------------------|---|
| RELINQUISHED BY/REMOVED FROM FM Hall CHPRC | RECEIVED BY/STORED IN [Signature] | SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |

ORIGINAL

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

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COLLECTOR
 FM Hall
 CHPRC

SAMPLING LOCATION
 C6724 (200E-127-PL) I-003

ICE CHEST NO.
 N/A

SHIPPED TO
 Waste Sampling & Characterization

COMPANY CONTACT
 BAMBERGER, MACHELLE

PROJECT DESIGNATION
 200-E-127 Pipeline - Soil

FIELD LOGBOOK NO.

OFFSITE PROPERTY NO.
 N/A

TELEPHONE NO.
 373-0880

ACTUAL SAMPLE DEPTH

PROJECT COORDINATOR
 WIDRIG, DL

SAF NO.
 F10-102

COA
 302427ES10

BILL OF LADING/AIR BILL NO.
 N/A

PRICE CODE 8C

AIR QUALITY

METHOD OF SHIPMENT
 GOVERNMENT VEHICLE

DATA TURNAROUND
 15 Days / 15 Days

SPECIAL INSTRUCTIONS

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

(1)VOA - 5035/8260 (LOW LEVEL); VOA - 5035/8260 (LOW LEVEL) - (Add-On) {n-Butylbenzene, Acetonitrile, Trichloromonofluoromethane, Hexane, 1-Butanol, cis-1,2-Dichloroethylene, Tetrahydrofuran, trans-1,2-Dichloroethylene}

(2)Alcohols, Glycols, & Ketones - 8015 {Diethyl ether}

(3)Semi-VOA - 8270B (TCL); Semi-VOA - 8270B (Add-On) {Benzyl alcohol, Tributyl phosphate, 1,2,4-Trimethylbenzene, 1-Naphthylamine, 2-Butoxyethanol, 2-Naphthylamine, Cyclohexanone, Dodecane, Decane} TPH-Diesel/Kerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range} TPH-Gasoline Range - WTPH-G {Total petroleum hydrocarbons - gasoline range} PCBs - 8082;

(4)ICP Metals - 6010B (Add-On) {Boron, Bismuth} ICP/MS - 200.8 (TAL) {Antimony, Barium, Chromium, Cadmium, Copper, Zinc, Nickel, Vanadium, Silver} ICP/MS - 200.8 (Add-on) {Arsenic, Lead, Thorium-232, Molybdenum, Thallium, Beryllium, Uranium, Selenium} 200.8_HG - ICPMS {Mercury} Total Cyanide - 9014; Chromium Hex - 7196; IC Anions - 300.0 {Nitrogen in Nitrate, Fluoride, Nitrogen in Nitrate, Sulfate}

(5)Gamma Spectroscopy {Europium-155, Cesium-137, Europium-154, Europium-152, Cobalt-60} Gamma Spec - Add-on {Radium-226, Radium-228, Antimony-125, Cesium-134, Niobium-94}

(6)Americium-241; Isotopic Plutonium {Plutonium-239/240, Plutonium-238} Isotopic Uranium {Uranium-233/234, Uranium-235, Uranium-238} Strontium-89,90 -- Total Sr; Technetium-99;

 ORIGINAL

COLLECTOR
FM Hall
CHPRC

SAMPLING LOCATION
C6724 (200E-127-PL) I-004

ICE CHEST NO.
N/A

SHIPPED TO
Waste Sampling & Characterization

COMPANY CONTACT
BAMBERGER, MACHELLE

PROJECT DESIGNATION
200-E-127 Pipeline - Soil

FIELD LOGBOOK NO.
HNF-N-507-5

OFFSITE PROPERTY NO.
N/A

TELEPHONE NO.
373-0880

ACTUAL SAMPLE DEPTH
20.0' - 25.0'

PROJECT COORDINATOR
WIDRIG, DL

SAF NO.
F10-102

COA
302427ES10

BILL OF LADING/AIR BILL NO.
N/A

PRICE CODE 8C

AIR QUALITY

METHOD OF SHIPMENT
GOVERNMENT VEHICLE

DATA TURNAROUND
15 Days / 15 Days

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

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B247W2

| PRESERVATION | Cool <-7C and >-20C | Cool~4C | Cool~4C | Cool~4C | None | None |
|----------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| TYPE OF CONTAINER | aGs* | aGs* | aG | G/P | P | G/P |
| NO. OF CONTAINER(S) | 5 | 3 | 1 | 1 | 1 | 1 |
| VOLUME | 40mL | 40mL | 125mL | 60mL | 125mL | 60mL |
| SAMPLE ANALYSIS | SEE ITEM (1) IN SPECIAL INSTRUCTIONS | SEE ITEM (2) IN SPECIAL INSTRUCTIONS | SEE ITEM (3) IN SPECIAL INSTRUCTIONS | SEE ITEM (4) IN SPECIAL INSTRUCTIONS | SEE ITEM (5) IN SPECIAL INSTRUCTIONS | SEE ITEM (6) IN SPECIAL INSTRUCTIONS |

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME | SEE ITEM (1) IN SPECIAL INSTRUCTIONS | SEE ITEM (2) IN SPECIAL INSTRUCTIONS | SEE ITEM (3) IN SPECIAL INSTRUCTIONS | SEE ITEM (4) IN SPECIAL INSTRUCTIONS | SEE ITEM (5) IN SPECIAL INSTRUCTIONS | SEE ITEM (6) IN SPECIAL INSTRUCTIONS |
|------------------------|---------|-------------|-------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| B247W6 W106200870 SOIL | | 3-19-10 | 1012 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

| CHAIN OF POSSESSION | SIGN/ PRINT NAMES | SPECIAL INSTRUCTIONS |
|--|--------------------------------------|---|
| RELINQUISHED BY/REMOVED FROM FM Hall CHPRC | RECEIVED BY/STORED IN [Signature] | SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |

ORIGINAL

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

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COLLECTOR
FM Hall
CHPRC

COMPANY CONTACT
BAMBERGER, MACHELLE

TELEPHONE NO.
373-0880

PROJECT COORDINATOR
WIDRIG, DL

PRICE CODE 8C

DATA
TURNAROUND
15 Days / 15
Days

SAMPLING LOCATION
C6724 (200E-127-PL) I-004

PROJECT DESIGNATION
200-E-127 Pipeline - Soil

SAF NO.
F10-102

AIR QUALITY

ICE CHEST NO.
N/A

FIELD LOGBOOK NO.
HWF-N-507-S

ACTUAL SAMPLE DEPTH
20.0' - 25.0'

COA
302427ES10

METHOD OF SHIPMENT
GOVERNMENT VEHICLE

SHIPPED TO
Waste Sampling & Characterization

OFFSITE PROPERTY NO.
N/A

BILL OF LADING/AIR BILL NO.
N/A

SPECIAL INSTRUCTIONS

- ** The CACN for all analytical work at WSCF laboratory is to be determined. ** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
- (1)VOA - 5035/8260 (LOW LEVEL); VOA - 5035/8260 (LOW LEVEL) - (Add-On) (n-Butylbenzene, Acetonitrile, Trichloromonoofluoromethane, Hexane, 1-Butanol, cis-1,2-Dichloroethylene, Tetrahydrofuran, trans-1,2-Dichloroethylene)
 - (2)Alcohols, Glycols, & Ketones - 8015 (Diethyl ether)
 - (3)Semi-VOA - 8270B (TCL); Semi-VOA - 8270B (Add-On) (Tributyl phosphate, 1,2,4-Trimethylbenzene, Benzyl alcohol, 1-Naphthylamine, 2-Naphthylamine, 2-Butoxyethanol, Cyclohexanone, Dodecane, Decane) TPH-Diesel/Kerosene Range - WTPH-D (Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range) TPH-Gasoline Range - WTPH-G (Total petroleum hydrocarbons - gasoline range) PCBs - 8082;
 - (4)ICP Metals - 6010B (Add-On) (Boron, Bisphuth) ICP/MS - 200.8 (TAL) (Antimony, Barium, Chromium, Cadmium, Copper, Zinc, Nickel, Vanadium, Silver) ICP/MS - 200.8 (Add-on) (Arsenic, Lead, Thorium-232, Molybdenum, Thallium, Beryllium, Uranium, Selenium) 200.8_HG - ICPMS (Mercury) Total Cyanide - 9014; Chromium Hex - 7196; IC Anions - 300.0 (Nitrogen in Nitrite, Fluoride, Nitrogen in Nitrate, Sulfate)
 - (5)Gamma Spectroscopy (Europium-155, Cesium-137, Europium-154, Europium-152, Cobalt-60) Gamma Spec - Add-on (Radium-226, Radium-228, Antimony-125, Cesium-134, Niobium-94)
 - (6)Americium-241; Isotopic Plutonium (Plutonium-239/240, Plutonium-238) Isotopic Uranium (Uranium-233/234, Uranium-235, Uranium-238) Strontium-89,90 -- Total Sr; Technetium-99;

 ORIGINAL

Appendix 5

Data Validation Supporting Documentation

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

| | | | | | |
|--|---------|-----------|---|---|----------------------------------|
| VALIDATION LEVEL: | A | B | <input checked="" type="radio"/> C | D | E |
| PROJECT: 200 AREA GRP | | | DATA PACKAGE: VSR11-002 | | |
| VALIDATOR: Carl Schloesslin | | LAB: WSCF | | DATE: 11-18-2010 | |
| | | | SDG: WSCF20100415 | | |
| ANALYSES PERFORMED | | | | | |
| Anions/IC <input checked="" type="checkbox"/> | TOC | TOX | TPH-418.1 | Oil and Grease | Alkalinity |
| Ammonia | BOD/COD | Chloride | Chromium-VI <input checked="" type="checkbox"/> | pH | NO ₃ /NO ₂ |
| Sulfate | TDS | TKN | Phosphate | Cyanide <input checked="" type="checkbox"/> | |
| | | | | | |
| SAMPLES/MATRIX Soil samples B247W5 & B247W6 | | | | | |

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments: None

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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:

Fluoride MS %R = 51%, MSD %R = 53%
 N in nitrite MS %R = 38%, MSD %R = 39%
 N in nitrate MS %R = 50%, MSD %R = 49%

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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

Data Validation for Chemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

7. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

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

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

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

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

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

Comments: None

Appendix 6

Additional Documentation Requested By Client

WSCF ANALYTICAL LABORATORY QC REPORT

Department: **Inorganic**

SDG Number: WSCF20100415
 Matrix: SOLID
 Test: Anions by Ion Chromatography

Sample Date: 03/19/10
 Receive Date: 03/19/10

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|--|---------------------|------------|-----------|----------|---------|-------------|-------------|--------|-----------|----|---------------|
| Lab ID: W10GR00869 | | | | | | | | | | | |
| BATCH QC ASSOCIATED WITH SAMPLE | | | | | | | | | | | |
| DUP | Fluoride | 16984-48-8 | <1.49652 | | RPD | | | n/a | 20.000 | U | 03/22/10 |
| DUP | Nitrogen in Nitrite | NO2-N | <0.897912 | | RPD | | | n/a | 20.000 | U | 03/22/10 |
| DUP | Nitrogen in Nitrate | NO3-N | <1.546404 | | RPD | | | n/a | 20.000 | U | 03/22/10 |
| DUP | Sulfate | 14808-79-8 | 8.3782 | | RPD | | | 1.477 | 20.000 | | 03/22/10 |
| MS | Fluoride | 16984-48-8 | 0.26234 | 51.439 | % Recov | 80.000 | 120.000 | | | * | 03/22/10 |
| MS | Nitrogen in Nitrite | NO2-N | 0.189923 | 38.214 | % Recov | 80.000 | 120.000 | | | * | 03/22/10 |
| MS | Nitrogen in Nitrate | NO3-N | 0.223316 | 49.626 | % Recov | 80.000 | 120.000 | | | * | 03/22/10 |
| MS | Sulfate | 14808-79-8 | 2.007238 | 100.362 | % Recov | 80.000 | 120.000 | | | * | 03/22/10 |
| MSD | Fluoride | 16984-48-8 | 0.269682 | 52.879 | % Recov | 80.000 | 120.000 | | | * | 03/22/10 |
| MSD | Nitrogen in Nitrite | NO2-N | 0.195861 | 39.409 | % Recov | 80.000 | 120.000 | | | * | 03/22/10 |
| MSD | Nitrogen in Nitrate | NO3-N | 0.221288 | 49.175 | % Recov | 80.000 | 120.000 | | | * | 03/22/10 |
| MSD | Sulfate | 14808-79-8 | 2.002552 | 100.128 | % Recov | 80.000 | 120.000 | | | * | 03/22/10 |
| SPK-RPD | Fluoride | 16984-48-8 | 52.879 | | RPD | | | 2.761 | 20.000 | | 03/23/10 |
| SPK-RPD | Nitrogen in Nitrite | NO2-N | 39.409 | | RPD | | | 3.079 | 20.000 | | 03/23/10 |
| SPK-RPD | Nitrogen in Nitrate | NO3-N | 49.175 | | RPD | | | 0.913 | 20.000 | | 03/23/10 |
| SPK-RPD | Sulfate | 14808-79-8 | 100.128 | | RPD | | | 0.233 | 20.000 | | 03/23/10 |
| BATCH QC | | | | | | | | | | | |
| BLANK | Fluoride | 16984-48-8 | <3e-2 | n/a | mg/L | 0.000 | 0.030 | | | U | 03/22/10 |
| BLANK | Fluoride | 16984-48-8 | <3e-2 | n/a | mg/L | 0.000 | 0.030 | | | U | 03/22/10 |
| BLANK | Nitrogen in Nitrite | NO2-N | <1.8e-2 | n/a | mg/L | 0.000 | 0.020 | | | U | 03/22/10 |
| BLANK | Nitrogen in Nitrite | NO2-N | <1.8e-2 | n/a | mg/L | 0.000 | 0.020 | | | U | 03/22/10 |
| BLANK | Nitrogen in Nitrate | NO3-N | <3.1e-2 | n/a | mg/L | 0.000 | 0.040 | | | U | 03/22/10 |
| BLANK | Nitrogen in Nitrate | NO3-N | <3.1e-2 | n/a | mg/L | 0.000 | 0.040 | | | U | 03/22/10 |
| BLANK | Sulfate | 14808-79-8 | <6.6e-2 | n/a | mg/L | 0.000 | 0.200 | | | U | 03/22/10 |
| BLANK | Sulfate | 14808-79-8 | <6.6e-2 | n/a | mg/L | 0.000 | 0.200 | | | U | 03/22/10 |

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20100415
 Matrix: SOLID
 Test: Anions by Ion Chromatography

Sample Date:
 Receive Date:

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|---------|---------------------|------------|----------|----------|---------|-------------|-------------|--------|-----------|----|---------------|
| LCS | Fluoride | 16984-48-8 | 102.1204 | 100.118 | % Recov | 80.000 | 120.000 | | | | 03/22/10 |
| LCS | Nitrogen in Nitrite | NO2-N | 94.7474 | 95.319 | % Recov | 80.000 | 120.000 | | | | 03/22/10 |
| LCS | Nitrogen in Nitrate | NO3-N | 90.9046 | 101.117 | % Recov | 80.000 | 120.000 | | | | 03/22/10 |
| LCS | Sulfate | 14808-79-8 | 372.3607 | 93.090 | % Recov | 80.000 | 120.000 | | | | 03/22/10 |

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20100415
 Matrix: SOLID
 Test: Cyanide by Midi/Spectrophotom

Sample Date: 03/11/10
 Receive Date: 03/15/10

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|---------|---------|-------|----------|----------|-------|-------------|-------------|--------|-----------|----|---------------|
|---------|---------|-------|----------|----------|-------|-------------|-------------|--------|-----------|----|---------------|

Lab ID: W10GR00736
BATCH QC ASSOCIATED WITH SAMPLE

| | | | | | | | | | | | |
|---------|-------------------------------|---------|--------|--------|---------|--------|---------|-------|--------|--|----------|
| MS | Cyanide by Midi/Spectrophotom | 57-12-5 | 1.89 | 94.500 | % Recov | 75.000 | 125.000 | | | | 03/24/10 |
| MSD | Cyanide by Midi/Spectrophotom | 57-12-5 | 1.85 | 92.500 | % Recov | 75.000 | 125.000 | | | | 03/24/10 |
| SPK-RPD | Cyanide by Midi/Spectrophotom | 57-12-5 | 92.500 | | RPD | | | 2.139 | 20.000 | | 03/24/10 |

BATCH QC

| | | | | | | | | | | | |
|-------|-------------------------------|---------|------|--------|---------|--------|---------|--|--|---|----------|
| BLANK | Cyanide by Midi/Spectrophotom | 57-12-5 | < 4 | n/a | ug/L | -4.000 | 4.000 | | | U | 03/24/10 |
| LCS | Cyanide by Midi/Spectrophotom | 57-12-5 | 60.7 | 95.591 | % Recov | 85.000 | 115.000 | | | | 03/24/10 |

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20100415
 Matrix: SOLID
 Test: Hexavalent chromium

Sample Date: 03/11/10
 Receive Date: 03/15/10

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|---------|---------|-------|----------|----------|-------|-------------|-------------|--------|-----------|----|---------------|
|---------|---------|-------|----------|----------|-------|-------------|-------------|--------|-----------|----|---------------|

Lab ID: W10GR00703

BATCH QC ASSOCIATED WITH SAMPLE

| | | | | | | | | | | | |
|----------|---------------------|------------|--------|--------|---------|--------|---------|-------|--------|---|----------|
| DUP | Hexavalent chromium | 18540-29-9 | < 0.10 | | RPD | | | n/a | 15.000 | U | 03/23/10 |
| MS | Hexavalent chromium | 18540-29-9 | 17.5 | 88.384 | % Recov | 75.000 | 125.000 | | | | 03/23/10 |
| MS | Hexavalent chromium | 18540-29-9 | 261 | 80.556 | % Recov | 75.000 | 125.000 | | | | 03/23/10 |
| MSD | Hexavalent chromium | 18540-29-9 | 18.0 | 90.452 | % Recov | 75.000 | 125.000 | | | | 03/23/10 |
| SPK-POST | Hexavalent chromium | 18540-29-9 | 0.0500 | 93.985 | % Recov | 75.000 | 125.000 | | | | 03/23/10 |
| SPK-RPD | Hexavalent chromium | 18540-29-9 | 90.452 | | RPD | | | 2.313 | 20.000 | | 03/23/10 |

BATCH QC

| | | | | | | | | | | | |
|-----------|---------------------|------------|--------|--------|---------|--------|---------|--|--|---|----------|
| BLNK-PREP | Hexavalent chromium | 18540-29-9 | < 0.10 | n/a | ug/g | 0.000 | 2.000 | | | U | 03/23/10 |
| LCS | Hexavalent chromium | 18540-29-9 | 17.9 | 89.950 | % Recov | 80.000 | 120.000 | | | | 03/23/10 |

Date: 23 November 2010
 To: CH2M Hill (technical representative)
 From: Analytical Quality Associates, Inc.
 Project: 200 AREA GRP
 Subject: Radiochemical - Sample Data Groups (SDGs) H4192, H4200 and WSCF20100415

INTRODUCTION

This memorandum presents the results of data validation for SDGs H4192 and H4200 prepared by Eberline Services, and SDG WSCF20100415 prepared by WSCF. 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 |
|------------------|--------------------|--------------|-------------------------|---------------------------|
| B247W5 | 3-19-2010 | Soil | C | See note 1 |
| B247W6 | 3-19-2010 | Soil | C | See note 1 |
| B247Y1 | 3-26-2010 | Soil | C | See note 2 |

1 – H-3, C-14, Np-237, Ni-63, Am-241, Iso-Pu, Iso-U, Gamma, Sr-89/90, Tc-99

2 – H-3, C-14, Np-237, Ni-63

Data validation was conducted in accordance with the CHPRC validation statement of work and the Tanks/Lines/Pits/Boxes/Septic Tank and Drain Fields Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan; Includes: 200-IS-1 and 200-ST-1 Operable Units, DOE/RL-2002-14, Rev. 1, and the Sampling and Analysis Plan for Supplemental Remedial Investigation Activities at Model Group 5, Large-Area Ponds, Waste Sites Located Within the 200-CW-1 Operable Unit, DOE/RL-2006-57, Rev. 0, REISSUE (SAPs). Appendices 1 through 6 provide the following information as indicated below:

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

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

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

The samples were analyzed within the prescribed holding time.

- **Blanks**

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

Laboratory Blanks

All laboratory blank results were acceptable with the following exceptions.

For SDG WSCF20100415, the Ra-226 and U-233/234 laboratory blank results were > the MDCs. The Ra-226 and U-233/234 results for samples B247W5 and B247W6 were detects <5X the blank results and should be qualified as estimates and flagged “J.”

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 SAPs, the matrix spike and laboratory control sample accuracy limits are 70% to 130%. The limits for reported analytes not listed in the SAP are specified by the DV procedure.

Matrix Spike (MS) Samples

All MS recoveries were acceptable.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

Carrier/Tracer Recovery Factors

All carrier/tracer recovery factors were acceptable.

- **Precision**

Precision is evaluated by reviewing laboratory duplicate, field duplicate, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAPs, the relative percent difference (RPD) limits are $\pm 30\%$. The RPD limits for reported analytes not listed in the SAP are specified by the DV procedure. When duplicate RPDs exceed the limits and have associated results $< 5X$ the MDCs the precision limits are ones specified by the DV procedure.

Laboratory Duplicate Samples

All laboratory duplicate results were acceptable with the following exception.

For SDG WSCF20100415, the Sr-89/90 RPD was $> 30\%$. The Sr-89/90 result for sample B247W5 was a detect and should be qualified as an estimate and flagged "J." The Sr-89/90 result for sample B247W6 was a non-detect and should be qualified as an estimate and flagged "UJ."

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

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

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

The C-14, Sb-125, Co-60, Eu-152, Eu-154 and Eu-155 MDCs for samples B247W5 and B247W6 were $>$ the CRDLs.

- **Completeness**

SDGs H4192, H4200 and WSCF20100415 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to laboratory blank infractions and a laboratory duplicate infraction. See the table in Appendix 2 for a listing of all affected sample results.

REFERENCES

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

DOE/RL-2002-14, Rev. 1, *Tanks/Lines/Pits/Boxes/Septic Tank and Drain Fields Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan; Includes: 200-IS-1 and 200-ST-1 Operable Units*, July 2008.

DOE/RL-2006-57, Rev. 0, REISSUE, *Sampling and Analysis Plan for Supplemental Remedial Investigation Activities at Model Group 5, Large-Area Ponds, Waste Sites Located Within the 200-CW-1 Operable Unit*, February 2008.

Appendix 1

Glossary of Data Reporting Qualifiers

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

- **U** — The constituent was analyzed for and was not detected. The data should be considered usable for decision-making purposes.
- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the MDC. The data should be considered usable for decision-making purposes.
- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.
- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.
- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.
- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.
- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2
Summary of Data Qualification

| Radiochemical Data Qualification Summary | | | |
|---|------------------|--------------------------|--|
| SDGs: H4192, H4200 and WSCF20100415 | Reviewer: AQA | Project: 200 AREA GRP | Page 1 of 1 |
| Analyte(s) | Qualifier | Samples Affected | Reason |
| Ra-226 U-233/234 | J | B247W5 & B247W6 | Laboratory blank contamination |
| Sr-89/90 | J | B247W5 | Poor laboratory duplicate precision |
| Sr-89/90 | UJ | B247W6 | Poor laboratory duplicate precision |

Comments: None

Appendix 3

Annotated Laboratory Reports

E B E R L I N E S E R V I C E S / R I C H M O N D
S A M P L E D E L I V E R Y G R O U P H 4 1 9 2

7809-001

B247W5

D A T A S H E E T

| | | |
|-----------------------------------|--|------------------|
| SDG <u>7809</u> | Client/Case no <u>CHPRC</u> | SDG <u>H4192</u> |
| Contact <u>N. Joseph Verville</u> | Contract <u>No. 33677</u> | |
| Lab sample id <u>S003142-01</u> | Client sample id <u>B247W5</u> | |
| Dept sample id <u>7809-001</u> | Location/Matrix <u>C6724(200E-127-PL)I-003</u> | <u>SOLID</u> |
| Received <u>03/25/10</u> | Collected/Weight <u>03/19/10 08:46</u> | <u>10.4 g</u> |
| % solids <u>96.0</u> | Custody/SAF No <u>F10-102-031</u> | <u>F10-102</u> |

| ANALYTE | CAS NO | RESULT pCi/g | 2 σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI- FIERS | TEST |
|---------------|------------|-----------------|---------------------------|--------------|--------------|-----------------|------|
| Tritium | 10028-17-8 | -0.977 | 4.4 | 7.62 | 400 | U | H |
| Carbon 14 | 14762-75-5 | 0.745 | 3.3 | 5.63 | 50.0 | U | C |
| Nickel 63 | 13981-37-8 | -0.351 | 1.8 | 3.10 | 30.0 | U | NI_L |
| Neptunium 237 | 13994-20-2 | 0.096 | <u>0.13</u> | 0.095 | 1.00 | | NP |

200-E-127 Pipeline - Soil

DATA SHEETS

Page 1

SUMMARY DATA SECTION

Page 10

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-DS
 Version 3.06
 Report date 04/09/10

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H4192

7809-002

B247W6

DATA SHEET

| | | |
|-----------------------------------|--|------------------|
| SDG <u>7809</u> | Client/Case no <u>CHPRC</u> | SDG <u>H4192</u> |
| Contact <u>N. Joseph Verville</u> | Contract <u>No. 33677</u> | |
| Lab sample id <u>S003142-02</u> | Client sample id <u>B247W6</u> | |
| Dept sample id <u>7809-002</u> | Location/Matrix <u>C6724(200E-127-PL)I-004</u> | <u>SOLID</u> |
| Received <u>03/25/10</u> | Collected/Weight <u>03/19/10 10:12</u> | <u>41.2 g</u> |
| % solids <u>97.5</u> | Custody/SAF No <u>F10-102-032</u> | <u>F10-102</u> |

| ANALYTE | CAS NO | RESULT pCi/g | 2 σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI- FIERS | TEST |
|---------------|------------|-----------------|---------------------------|--------------|--------------|-----------------|------|
| Tritium | 10028-17-8 | 3.68 | 4.6 | 7.65 | 400 | U | H |
| Carbon 14 | 14762-75-5 | 1.29 | 3.3 | 5.50 | 50.0 | U | C |
| Nickel 63 | 13981-37-8 | -0.724 | 1.8 | 3.20 | 30.0 | U | NI_L |
| Neptunium 237 | 13994-20-2 | 0.012 | 0.024 | 0.058 | 1.00 | U | NP |

200-E-127 Pipeline - Soil

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H4200

7817-001

B247Y1

DATA SHEET

| | | |
|-----------------------------------|--|------------------|
| SDG <u>7817</u> | Client/Case no <u>CHPRC</u> | SDG <u>H4200</u> |
| Contact <u>N. Joseph Verville</u> | Contract <u>No. 33677</u> | |
| Lab sample id <u>S004026-01</u> | Client sample id <u>B247Y1</u> | |
| Dept sample id <u>7817-001</u> | Location/Matrix <u>C6726 (NearDiversionBox)</u> <u>SOLID</u> | |
| Received <u>04/07/10</u> | Collected/Weight <u>03/26/10 12:45</u> <u>71.1 g</u> | |
| % solids <u>92.0</u> | Custody/SAF No <u>F10-102-055</u> <u>F10-102</u> | |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI- FIERS | TEST |
|---------------|------------|-----------------|-------------------|--------------|--------------|-----------------|------|
| Tritium | 10028-17-8 | -3.60 | 4.5 | 8.09 | 400 | U | H |
| Carbon 14 | 14762-75-5 | 106 | 4.4 | 4.09 | 50.0 | | C |
| Nickel 63 | 13981-37-8 | -1.16 | 1.8 | 3.14 | 30.0 | U | NI_L |
| Neptunium 237 | 13994-20-2 | -0.060 | <u>0.12</u> | 0 | 1.00 | U | NP |

200-E-127 Pipeline - Soil

WSCF ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-102
Sample # W10GR00869
Client ID: B247W5

GPP TRENT
WSCF

Matrix: SOIL

Group #: WSCF20100415
Department: Radiochemistry
Sampled: 03/19/10
Received: 03/19/10

| Test Performed | CAS # | Method | RQ | Result | Unit | TP Err | Unit | DF | MDL | PQL | Analysis Date |
|--------------------------------------|------------|------------|----|----------|---------|-------------|-------|------|-------|-----|---------------|
| Americium by AEA | | | | | | | | | | | |
| Americium-241 | 14596-10-2 | LA-508-471 | U | 0.0140 | pCi/g | + -0.0115 | pCi/g | 1.00 | 0.015 | | 03/29/10 |
| Am-243 tracer by AEA | AM243 | LA-508-471 | | 3.80 | pCi/g | | | 1.00 | 0.014 | | 03/29/10 |
| Gamma Energy Analysis-grd H2O | | | | | | | | | | | |
| Antimony-125 | 14234-35-6 | LA-508-481 | U | 3.72e-03 | pCi/g | + -0.0372 | pCi/g | 1.00 | 0.20 | | 03/24/10 |
| Cobalt-60 | 10198-40-0 | LA-508-481 | U | 0.0349 | pCi/g | + -0.0567 | pCi/g | 1.00 | 0.11 | | 03/24/10 |
| Cesium-134 | 13967-70-9 | LA-508-481 | U | 0.0240 | pCi/g | + -0.0524 | pCi/g | 1.00 | 0.098 | | 03/24/10 |
| Cesium-137 | 10045-97-3 | LA-508-481 | U | -0.0391 | pCi/g | + -0.0453 | pCi/g | 1.00 | 0.073 | | 03/24/10 |
| Europium-152 | 14683-23-9 | LA-508-481 | U | 0.110 | pCi/g | + -0.117 | pCi/g | 1.00 | 0.20 | | 03/24/10 |
| Europium-154 | 15585-10-1 | LA-508-481 | U | 0.0621 | pCi/g | + -0.159 | pCi/g | 1.00 | 0.30 | | 03/24/10 |
| Europium-155 | 14391-16-3 | LA-508-481 | U | 0.0868 | pCi/g | + -0.118 | pCi/g | 1.00 | 0.22 | | 03/24/10 |
| Niobium-94 | 14681-63-1 | LA-508-481 | U | 0.0463 | pCi/g | + -0.0581 | pCi/g | 1.00 | 0.084 | | 03/24/10 |
| Radium-226 | 13982-63-3 | LA-508-481 | | 0.455 | pCi/g | J + -0.205 | pCi/g | 1.00 | 0.15 | | 03/24/10 |
| Radium-228 | 15262-20-1 | LA-508-481 | | 0.606 | pCi/g | + -0.292 | pCi/g | 1.00 | 0.25 | | 03/24/10 |
| Plutonium Isotopics by AEA | | | | | | | | | | | |
| Plutonium-238 | 13981-16-3 | LA-508-471 | U | 1.40e-03 | pCi/g | + -2.80e-03 | pCi/g | 1.00 | 0.024 | | 03/29/10 |
| Pu-239/240 by AEA | PU-239/240 | LA-508-471 | U | 2.90e-03 | pCi/g | + -5.83e-03 | pCi/g | 1.00 | 0.011 | | 03/29/10 |
| Pu-242 | 13982-10-0 | LA-508-471 | | 5.60 | pCi/g | | | 1.00 | 0.013 | | 03/29/10 |
| Strontium 89/90 | | | | | | | | | | | |
| Strontium-89/90 | SR-RAD | LA-508-415 | | 0.920 | pCi/g | J + -0.690 | pCi/g | 1.00 | 0.36 | | 03/19/10 |
| Sr-85 Tracer by Beta Counting | SR85 | LA-508-415 | | 91.1 | Percent | | | 1.00 | 0.0 | | 03/19/10 |
| TC99 by Liquid Scin. | | | | | | | | | | | |
| Tc-99 by Liquid Scin. | 14133-76-7 | LA-508-421 | U | -0.200 | pCi/g | + -0.200 | pCi/g | 1.00 | 0.30 | | 03/24/10 |
| Uranium Isotopics by AEA | | | | | | | | | | | |
| Uranium-233/234 | U-233/234 | LA-508-471 | | 0.140 | pCi/g | J + -0.0560 | pCi/g | 1.00 | 0.036 | | 03/29/10 |

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

B - The analyte < the RDL but > = the IDL/MDL (inorg)
 D - Analyte was identified at a secondary dilution factor(inorg)
 J - Analyte < lowest calibration but > = MDL.(org)
 U - Analyzed for but not detected above limiting criteria(inorg)

D - Analyte was identified at a secondary dilution factor
 E - Analyte is an estimate, has potentially larger errors(inorg)
 N - Spike sample recovery is outside control limits.(inorg)
 U - Analyzed for but not detected above limiting criteria.

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

Report WGPP/ver. 5.2
 Groundwater Remediation Program


 11-18-2010

WSCF ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-102
Sample # W10GR00869
Client ID: B247W5

GPP TRENT
 WSCF

Matrix: SOIL

Group #: WSCF20100415
Department: Radiochemistry
Sampled: 03/19/10
Received: 03/19/10

| Test Performed | CAS # | Method | RQ | Result | Unit | TP Err | Unit | DF | MDL | PQL | Analysis Date |
|---------------------|------------|------------|----|----------|-------|-------------|-------|------|---------|-----|---------------|
| Uranium-235 | 15117-96-1 | LA-508-471 | U | 5.90e-03 | pCi/g | + -8.50e-03 | pCi/g | 1.00 | 8.0e-03 | | 03/29/10 |
| Uranium-238 | U-238 | LA-508-471 | | 0.150 | pCi/g | + -0.0570 | pCi/g | 1.00 | 0.020 | | 03/29/10 |
| U-232 tracer by AEA | U232 | LA-508-471 | | 3.60 | pCi/g | | | 1.00 | 0.060 | | 03/29/10 |

MDL=Minimum Detection Limit

RQ=Result Qualifier

TP Err=Total Propagated Error

DF=Dilution Factor

B - The analyte < the RDL but >= the IDL/MDL (inorg)

D - Analyte was identified at a secondary dilution factor(inorg)

J - Analyte < lowest calibration but >= MDL.(org)

U - Analyzed for but not detected above limiting criteria(inorg)

D - Analyte was identified at a secondary dilution factor

E - Analyte is an estimate, has potentially larger errors(inorg)

N - Spike sample recovery is outside control limits.(inorg)

U - Analyzed for but not detected above limiting criteria.

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

Report WGPP/ver. 5.2

Groundwater Remediation Program

WSCF ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-102
Sample # W10GR00870
Client ID: B247W6

GPP TRENT
WSCF

Matrix: SOIL

Group #: WSCF20100415
Department: Radiochemistry
Sampled: 03/19/10
Received: 03/19/10

| Test Performed | CAS # | Method | RQ | Result | Unit | TP Err | Unit | DF | MDL | PQL | Analysis Date |
|--------------------------------------|------------|------------|----|-----------|---------|-------------|-------|------|-------|-----|---------------|
| Americium by AEA | | | | | | | | | | | |
| Americium-241 | 14596-10-2 | LA-508-471 | | 0.0230 | pCi/g | + -0.0136 | pCi/g | 1.00 | 0.011 | | 03/29/10 |
| Am-243 tracer by AEA | AM243 | LA-508-471 | | 4.20 | pCi/g | | | 1.00 | 0.014 | | 03/29/10 |
| Gamma Energy Analysis-grd H2O | | | | | | | | | | | |
| Antimony-125 | 14234-35-6 | LA-508-481 | U | 0.0214 | pCi/g | + -0.0893 | pCi/g | 1.00 | 0.17 | | 03/24/10 |
| Cobalt-60 | 10198-40-0 | LA-508-481 | U | -5.58e-03 | pCi/g | + -0.0353 | pCi/g | 1.00 | 0.067 | | 03/24/10 |
| Cesium-134 | 13967-70-9 | LA-508-481 | U | 0.0573 | pCi/g | + -0.0443 | pCi/g | 1.00 | 0.090 | | 03/24/10 |
| Cesium-137 | 10045-97-3 | LA-508-481 | U | -0.0513 | pCi/g | + -0.0513 | pCi/g | 1.00 | 0.063 | | 03/24/10 |
| Europium-152 | 14683-23-9 | LA-508-481 | U | -0.0817 | pCi/g | + -0.112 | pCi/g | 1.00 | 0.17 | | 03/24/10 |
| Europium-154 | 15585-10-1 | LA-508-481 | U | -0.117 | pCi/g | + -0.125 | pCi/g | 1.00 | 0.20 | | 03/24/10 |
| Europium-155 | 14391-16-3 | LA-508-481 | U | -0.0495 | pCi/g | + -0.128 | pCi/g | 1.00 | 0.22 | | 03/24/10 |
| Niobium-94 | 14681-63-1 | LA-508-481 | U | -0.0231 | pCi/g | + -0.0390 | pCi/g | 1.00 | 0.064 | | 03/24/10 |
| Radium-226 | 13982-63-3 | LA-508-481 | | 0.549 | pCi/g | J + -0.172 | pCi/g | 1.00 | 0.14 | | 03/24/10 |
| Radium-228 | 15262-20-1 | LA-508-481 | | 0.682 | pCi/g | + -0.263 | pCi/g | 1.00 | 0.24 | | 03/24/10 |
| Plutonium Isotopes by AEA | | | | | | | | | | | |
| Plutonium-238 | 13981-16-3 | LA-508-471 | U | 6.10e-03 | pCi/g | + -0.0123 | pCi/g | 1.00 | 0.022 | | 03/29/10 |
| Pu-239/240 by AEA | PU-239/240 | LA-508-471 | U | 3.10e-03 | pCi/g | + -7.63e-03 | pCi/g | 1.00 | 0.014 | | 03/29/10 |
| Pu-242 | 13982-10-0 | LA-508-471 | | 6.10 | pCi/g | | | 1.00 | 0.014 | | 03/29/10 |
| Strontium 89/90 | | | | | | | | | | | |
| Strontium-89/90 | SR-RAD | LA-508-415 | U | 0.160 | pCi/g | UJ + -0.739 | pCi/g | 1.00 | 0.47 | | 03/19/10 |
| Sr-85 Tracer by Beta Counting | SR85 | LA-508-415 | | 75.1 | Percent | | | 1.00 | 0.0 | | 03/19/10 |
| TC99 by Liquid Scin. | | | | | | | | | | | |
| Tc-99 by Liquid Scin. | 14133-76-7 | LA-508-421 | U | -0.100 | pCi/g | + -0.103 | pCi/g | 1.00 | 0.20 | | 03/24/10 |
| Uranium Isotopes by AEA | | | | | | | | | | | |
| Uranium-233/234 | U-233/234 | LA-508-471 | | 0.140 | pCi/g | J + -0.0490 | pCi/g | 1.00 | 0.015 | | 03/29/10 |

MDL=Minimum Detection Limit

RQ=Result Qualifier

TP Err=Total Propagated Error

DF=Dilution Factor

B - The analyte < the RDL but > = the IDL/MDL (inorg)

D - Analyte was identified at a secondary dilution factor(inorg)

J - Analyte < lowest calibration but > = MDL.(org)

U - Analyzed for but not detected above limiting criteria(inorg)

D - Analyte was identified at a secondary dilution factor

E - Analyte is an estimate, has potentially larger errors(inorg)

N - Spike sample recovery is outside control limits.(inorg)

U - Analyzed for but not detected above limiting criteria.

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

Report WGPP/ver. 5.2

Groundwater Remediation Program


 11-18-2010

WSCF ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F10-102
Sample # W10GR00870
Client ID: B247W6

GPP TRENT
 WSCF

Matrix: SOIL

Group #: WSCF20100415
Department: Radiochemistry
Sampled: 03/19/10
Received: 03/19/10

| Test Performed | CAS # | Method | RQ | Result | Unit | TP Err | Unit | DF | MDL | PQL | Analysis Date |
|---------------------|------------|------------|----|--------|-------|---------|-------|------|---------|-----|---------------|
| Uranium-235 | 15117-96-1 | LA-508-471 | | 0.0160 | pCi/g | +0.0128 | pCi/g | 1.00 | 6.0e-03 | | 03/29/10 |
| Uranium-238 | U-238 | LA-508-471 | | 0.110 | pCi/g | +0.0418 | pCi/g | 1.00 | 0.015 | | 03/29/10 |
| U-232 tracer by AEA | U232 | LA-508-471 | | 4.00 | pCi/g | | | 1.00 | 0.038 | | 03/29/10 |

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

B - The analyte < the RDL but > = the IDL/MDL (inorg)
 D - Analyte was identified at a secondary dilution factor(inorg)
 J - Analyte < lowest calibration but > = MDL.(org)
 U - Analyzed for but not detected above limiting criteria(inorg)

D - Analyte was identified at a secondary dilution factor
 E - Analyte is an estimate, has potentially larger errors(inorg)
 N - Spike sample recovery is outside control limits.(inorg)
 U - Analyzed for but not detected above limiting criteria.

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

Report WGPP/ver. 5.2
 Groundwater Remediation Program

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Eberline Analytical
W.O. No. S0-03-142-7809

CH2M Hill Plateau Remediation Company
SDG H4192

Case Narrative

Page 1 of 2

1.0 GENERAL

CH2M Hill Plateau Remediation Company (CHPRC) Sample Delivery Group H4192 was composed of two solid (soil) samples designated under SAF No. F10-102 with a Project Designation of: 200-E-127 Pipeline – Soil.

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

2.0 ANALYSIS NOTES

2.1 Tritium Analysis

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

2.2 Carbon-14 Analysis

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

2.3 Nickel-63 Analysis

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

2.4 Neptunium-237 Analysis

The relative percent difference (RPD) in the original and duplicate results was 200%, greater than the control limit of 25%, however per DOE QSAS, Rev. 2.5, "When either the DER or the RPD pass, then the duplicate is acceptable." In this case, the DER was 1.4, less than the control limit of 3.0. No other problems were encountered during the course of the analyses.

3.0 Case Narrative Certification Statement

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



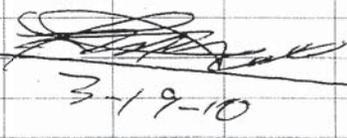
N. Joseph Verville
Client Services Manager

4-9-10
Date

| | | | | | |
|---|---|---|--|--|---|
| COLLECTOR Fm Hill CHPRC | COMPANY CONTACT BAMBERGER, MACHELLE | TELEPHONE NO. 373-0880 | PROJECT COORDINATOR WIDRIG, DL | PRICE CODE 8C | DATA TURNAROUND 15 Days / 15 Days |
| SAMPLING LOCATION C6724 (200E-127-PL) I-003 | PROJECT DESIGNATION 200-E-127 Pipeline - Soil | H4192 (7809) | | SAF NO. F10-102 | AIR QUALITY <input type="checkbox"/> |
| ICE CHEST NO. GWS-130 | FIELD LOGBOOK NO. HNF-N-507-S | ACTUAL SAMPLE DEPTH 15.0' - 20.0' | COA 302427ES10 | METHOD OF SHIPMENT FEDERAL EXPRESS | |

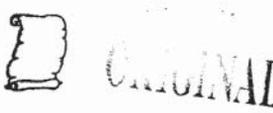
SHIPPED TO Eberline Services **OFFSITE PROPERTY NO.** SEE PTR **BILL OF LADING/AIR BILL NO.**
SEE PTR 20-324/10 798503925385

| | | | | | | |
|---|--|--|---------------------------------|---------------------------------|-----------------------|--|
| 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 None | TYPE OF CONTAINER G/P | NO. OF CONTAINER(S) 1 | VOLUME 60mL | SAMPLE ANALYSIS SEE ITEM (1) IN SPECIAL INSTRUCTIONS |
| SPECIAL HANDLING AND/OR STORAGE RADIOACTIVE TIE TO: B247W1 | |  | | | | |

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME | | | | | | |
|--|---------|-------------|-------------|---|--|--|--|--|--|
| B247W5 | SOIL | 3-19-10 | 0846 | V | | | | | |
|  | | | | | | | | | |

| CHAIN OF POSSESSION | SIGN/ PRINT NAMES | SPECIAL INSTRUCTIONS |
|--|-------------------------------|--|
| RELINQUISHED BY/REMOVED FROM Fm Hill CHPRC | DATE/TIME 3-19-10 | RECEIVED BY/STORED IN SSU # 1 |
| RELINQUISHED BY/REMOVED FROM SSU: 1 L.D. Wall CHPRC | DATE/TIME MAR 24 2010 0800 | RECEIVED BY/STORED IN L.D. Wall |
| RELINQUISHED BY/REMOVED FROM FED EX | DATE/TIME MAR 24 2010 1400 | RECEIVED BY/STORED IN PEDEX |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN Alex Kelvity KELENSON |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN |

SPECIAL INSTRUCTIONS: ** The CACN for all analytical work at WSCF laboratory is to be determined. **
 The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
 (1) Tritium - H3 {Tritium} C14 - LOW LEVEL; Neptunium-237; Nickel-63;



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

| | | | | | | |
|--|--|--|--|-----------------------------------|---------------------------------------|--|
| CH2MHill Plateau Remediation Company | | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | | | F10-102-032 | PAGE 1 OF 1 |
| COLLECTOR FM Hall CHPRC | | COMPANY CONTACT BAMBERGER, MACHELLE | TELEPHONE NO. 373-0880 | PROJECT COORDINATOR WIDRIG, DL | PRICE CODE 8C | DATA TURNAROUND 15 Days / 15 Days |
| SAMPLING LOCATION C6724 (200E-127-PL) I-004 | | PROJECT DESIGNATION 200-E-127 Pipeline - Soil | H4192 (7809) | | SAF NO. F10-102 | AIR QUALITY <input type="checkbox"/> |
| ICE CHEST NO. GWS-130 | | FIELD LOGBOOK NO. HNF-N-507-5 | ACTUAL SAMPLE DEPTH 20.0' - 25.0' | COA 302427E510 | METHOD OF SHIPMENT FEDERAL EXPRESS | |
| SHIPPED TO Eberline Services | | OFFSITE PROPERTY NO. SEE PTR | BILL OF LADING/AIR BILL NO. SEE PTR 20.3/24/10 79850392 5385 | | | |

| | | | |
|--|--|---------------------|--------------------------------------|
| 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 | None |
| | | TYPE OF CONTAINER | G/P |
| | | NO. OF CONTAINER(S) | 1 |
| | | VOLUME | 60mL |
| SPECIAL HANDLING AND/OR STORAGE RADIOACTIVE TIE TO: B247W2 | | SAMPLE ANALYSIS | SEE ITEM (1) IN SPECIAL INSTRUCTIONS |

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME | |
|------------|---------|-------------|-------------|---|
| B247W6 | SOIL | 3-19-10 | 1012 | V |

| CHAIN OF POSSESSION | | SIGN/ PRINT NAMES | | SPECIAL INSTRUCTIONS | |
|--|-------------------------------|---------------------------------------|-------------------------------|---|--|
| RELINQUISHED BY/REMOVED FROM FM Hall CHPRC | DATE/TIME 3-19-10 1300 | RECEIVED BY/STORED IN SSU # 1 | DATE/TIME 3-19-10 | * The CACN for all analytical work at WSCF laboratory is to be determined. ** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF. (1) Tritium - H3 {Tritium} C14 - LOW LEVEL; Neptunium-237; Nickel-63; | |
| RELINQUISHED BY/REMOVED FROM SSU: 1 | DATE/TIME MAR 24 2010 0800 | RECEIVED BY/STORED IN L.D. Wall | DATE/TIME MAR 24 2010 0800 | | |
| RELINQUISHED BY/REMOVED FROM L.D. Wall | DATE/TIME MAR 24 2010 1400 | RECEIVED BY/STORED IN CHPRC | DATE/TIME | | |
| RELINQUISHED BY/REMOVED FROM CHPRC | DATE/TIME | RECEIVED BY/STORED IN FEDEX | DATE/TIME | | |
| RELINQUISHED BY/REMOVED FROM FEDEX | DATE/TIME | RECEIVED BY/STORED IN Alex Keelson | DATE/TIME 3/25/10 10:00 | | |
| 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 |

Page 256 of 295

Eberline Analytical
W.O. No. S0-04-026-7817

CH2M Hill Plateau Remediation Company
SDG H4200

Case Narrative

Page 1 of 1

1.0 GENERAL

CH2M Hill Plateau Remediation Company (CHPRC) Sample Delivery Group H4200 was composed of one solid (soil) sample designated under SAF No. F10-102 with a Project Designation of: 200-E-127 Pipeline – Soil.

The sample was received as stated on the chain-of-custody document. Any discrepancies are noted on the Eberline Analytical Sample Receipt Checklist.

2.0 ANALYSIS NOTES

2.1 Tritium Analysis

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

2.2 Carbon-14 Analysis

The relative percent difference (RPD) in the original and duplicate results was 24%, greater than the control limit of 25%, however the DER was 3.1, greater than the control limit of 3.0. According to DOE QSAS, Rev. 2.5, "When either the DER or the RPD pass, then the duplicate is acceptable." In this case the RPD was acceptable, but the DER was greater than the control limit, therefore the duplicate results are reported. No other problems were encountered during the course of the analyses.

2.3 Nickel-63 Analysis

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

2.4 Neptunium-237 Analysis

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

3.0 Case Narrative Certification Statement

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



N. Joseph Verville
Client Services Manager

4/22/10

Date

| CH2MHill Plateau Remediation Company | | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | | | | F10-102-055 | PAGE 1 OF 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|--|------------------------------|--------------------------------------|--|---|---|--|--|--|-------------------|-----------------|--------------------|-----------------|--------------|---------------|--------------------|--|--|--------|------|---------|------|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| COLLECTOR <i>Scalos</i> | | COMPANY CONTACT BAMBERGER, MACHELLE | | TELEPHONE NO. 373-0880 | PROJECT COORDINATOR WIDRIG, DL | PRICE CODE 8C | DATA TURNAROUND 15 Days / 15 Days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SAMPLING LOCATION C6726 (Near Diversion Box) I-001 | | PROJECT DESIGNATION 200-E-127 Pipeline - Soil <i>H4200 (7817)</i> | | SAF NO. F10-102 | AIR QUALITY <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ICE CHEST NO. <i>6WS-170</i> | | FIELD LOGBOOK NO. <i>HNF-N-507-5</i> | | ACTUAL SAMPLE DEPTH <i>5-11ft</i> | COA 302427ES10 | METHOD OF SHIPMENT FEDERAL EXPRESS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SHIPPED TO Eberline Services | | OFFSITE PROPERTY NO. SEE PTR | | | BILL OF LADING/AIR BILL NO. <i>SEE PTR</i> <i>AW. 4/6/10</i> <i>793420249430</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 | None | <i>JS 3/26/10</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | TYPE OF CONTAINER | G/P | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | NO. OF CONTAINER(S) | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | VOLUME | 60mL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SPECIAL HANDLING AND/OR STORAGE RADIOACTIVE TIE TO: B247X7 | | SAMPLE ANALYSIS | | SEE ITEM (1) IN SPECIAL INSTRUCTIONS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>SAMPLE NO.</th> <th>MATRIX*</th> <th>SAMPLE DATE</th> <th>SAMPLE TIME</th> <th></th> <th></th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>B247Y1</td> <td>SOIL</td> <td>3/19/10</td> <td>0852</td> <td>X</td> <td>JS</td> <td>3/26/10</td> <td></td> <td></td> </tr> <tr> <td>B247Y1</td> <td>soil</td> <td>3/26/10</td> <td>1245</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> | | SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME | | | | | | B247Y1 | SOIL | 3/19/10 | 0852 | X | JS | 3/26/10 | | | B247Y1 | soil | 3/26/10 | 1245 | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B247Y1 | SOIL | 3/19/10 | 0852 | X | JS | 3/26/10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B247Y1 | soil | 3/26/10 | 1245 | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CHAIN OF POSSESSION | | | | SIGN/ PRINT NAMES | | SPECIAL INSTRUCTIONS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RELINQUISHED BY/REMOVED FROM | | DATE/TIME | RECEIVED BY/STORED IN | | DATE/TIME | ** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF. (1) Tritium - H3 {Tritium} C14 - LOW LEVEL; Neptunium-237; Nickel-63; | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <i>J Scalos</i> | | <i>3/26/10</i> | SSU- 1 | | <i>3/26/10 1500</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RELINQUISHED BY/REMOVED FROM | | DATE/TIME | RECEIVED BY/STORED IN | | DATE/TIME | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <i>SSU #1</i> | | <i>4/6/10</i> | <i>L. Wall & Wall</i> | | <i>4/6/10 1200</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RELINQUISHED BY/REMOVED FROM | | DATE/TIME | RECEIVED BY/STORED IN | | DATE/TIME | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <i>L. Wall & Wall</i> | | <i>4/6/10</i> | FEDEX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RELINQUISHED BY/REMOVED FROM | | DATE/TIME | RECEIVED BY/STORED IN | | DATE/TIME | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FEDEX | | | <i>flex kelusky KELENSON</i> | | <i>4/7/10 10:00</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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Introduction

Two (2) S&GRP samples were received at the WSCF Laboratory on March 19, 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 16 through 18, 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. See pages 23 through 24 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00869 (B247W5 in work order 20100415)
 - Fluoride, Nitrate and Nitrite – Matrix Spike and Matrix Spike Duplicate recoveries exceeded established laboratory limits. Affected sample results in this batch were “N” flagged. Percent recovery failures most likely due to matrix effects from the sample.

All other QC controls are within the established limits.

Cyanide – The hold time requirement for this analysis was met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 25 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00736 (B240J5 in work order 20100371)

All QC controls are within the established limits.

Hexavalent Chromium – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 26 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00703 (B23PH9 in work order 20100369)

All QC controls are within the established limits.

ICP-AES Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 27 through 28 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Estimated Boron results due to iron interference. Sample results are “E” flagged.
- Batch QC analyzed on sample# W10GR00736 and Batch QC analyzed on sample# W10GR00758 are not associated with this analytical group but cannot be removed from this printout. Please ignore these results.

All other QC controls are within the established limits.

ICP-MS Metals – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 29 through 32 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00870 (B247W6 in work order 20100415)
 - Barium –Matrix Spike Duplicate recoveries exceeded laboratory spike levels. Affected sample results in this batch were “N” flagged.

All other QC controls are within the established limits.

Organic Comments

Sample concentrations are corrected for moisture content and reported on a dry weight basis.

Alcohol/Glycols - The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 46 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)

All QC controls are within the established limits.

PCB – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 49 through 50 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)

All QC controls are within the established limits.

Semi-VOA – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 51 through 56 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00863 (B247X2 in work order 20100409)

All QC controls are within the established limits.

TPHD-WA – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 47 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Surrogate recoveries exceeded acceptance limits for sample B247W5 (W10GR00869) and B247W6 (W10GR00870). Due to analysis problems, samples were re-analyzed on 03/29/10. Surrogate failure is contributed to the possible evaporation of solvent between analysis runs; thus increasing the surrogate concentration. All additional batch QC was within limits.
- Due to the co-elution of analytes for TPHD-WA (DRO) and kerosene analysis, samples are spiked and evaluated for TPHD only.

All other QC controls are within the established limits.

TPHG-WA – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 48 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00865 (B247X4 in work order 20100409)

All QC controls are within the established limits.

VOA – The hold time requirement for this analysis was met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 57 through 60 for QC details. Analytical Note(s):

- Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)

All QC controls are within the established limits.

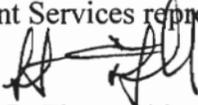
Radiochemistry Comments

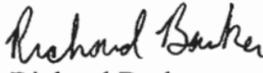
Rad Chem – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike (Matrix Spikes apply only to Technetium), Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 66 through 71 for QC details. Analytical Note(s):

- Tracers are used to determine chemical yield. RPD is monitored in sample duplicate and is not required for tracer recovery per SOW.
- Rad Chem requested to be performed included: Americium-241 by AEA, Gamma Energy Analysis, Plutonium Isotopic and Uranium Isotopic by AEA, Strontium-89/90, and Technetium-99 by LSC.
- Americium-241: Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Duplicate Relative Percent Difference(s) (RPD) did not meet the established laboratory limits. The RPD criterion does not apply to results near or below the minimum detectable activity. No flags issued.
 - All other QC controls are within the established limits.
- Gamma Energy Analysis: Batch QC analyzed on sample# W10GR000869 (B247W5 in work order 20100415)
 - Naturally occurring radioisotopes: Radium-226 was detected in the blank at less than 2 times the MDL. No flags applied.
 - All other QC controls are within the established limits.

- Isotopic Plutonium analysis: Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Plutonium-239 – detected in blank. Activity is less than 2 times the MDL and is acceptable.
 - All other QC controls are within the established limits.
- Isotopic Uranium analysis: Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - U-234 – detected in blank. Activity is less than 2 times the MDL and is acceptable.
 - All other QC controls are within the established limits.
- Strontium-89/90: Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Duplicate is flagged for poor RPD due to heterogeneous nature of the sample.
 - All other QC controls are within the established limits.
- Technetium-99: Batch QC analyzed on sample# W10GR00862 (B247X1 in work order 20100409)
 - Matrix Spike flagged due to low recovery, however, it is still within the range of the statement of work that allows 60-140%.
 - All other QC controls are within the established limits.

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


Scot L. Fitzgerald
WSCF Analytical Laboratory Manager

 4-7-10
Richard Barker
WSCF Client Services

COLLECTOR FM Hall
CHPRC

SAMPLING LOCATION
C6724 (200E-127-PL) I-003

ICE CHEST NO.
N/A

SHIPPED TO
Waste Sampling & Characterization

COMPANY CONTACT
BAMBERGER, MACHELLE

PROJECT DESIGNATION
200-E-127 Pipeline - Soil

FIELD LOGBOOK NO.
HNF-N-507-5

OFFSITE PROPERTY NO.
N/A

TELEPHONE NO.
373-0880

ACTUAL SAMPLE DEPTH
15.0'-20.0'

PROJECT COORDINATOR
WIDRIG, DL

SAF NO.
F10-102

COA
302427ES10

BILL OF LADING/AIR BILL NO.
N/A

PRICE CODE 8C

AIR QUALITY

METHOD OF SHIPMENT
GOVERNMENT VEHICLE

DATA TURNAROUND
15 Days / 15 Days

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

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B247W1
20100415

| PRESERVATION | Cool <-7C and >-20C | Cool~4C | Cool~4C | Cool~4C | None | None |
|----------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| TYPE OF CONTAINER | aGs* | aGs* | aG | G/P | P | G/P |
| NO. OF CONTAINER(S) | 5 | 3 | 1 | 1 | 1 | 1 |
| VOLUME | 40mL | 40mL | 125mL | 60mL | 125mL | 60mL |
| SAMPLE ANALYSIS | SEE ITEM (1) IN SPECIAL INSTRUCTIONS | SEE ITEM (2) IN SPECIAL INSTRUCTIONS | SEE ITEM (3) IN SPECIAL INSTRUCTIONS | SEE ITEM (4) IN SPECIAL INSTRUCTIONS | SEE ITEM (5) IN SPECIAL INSTRUCTIONS | SEE ITEM (6) IN SPECIAL INSTRUCTIONS |

Handwritten signature and date: 3-19-10

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME | | | | | | |
|------------|-----------------|-------------|-------------|---|---|---|---|---|---|
| B247W5 | W106200869 SOIL | 3-19-10 | 0846 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

| CHAIN OF POSSESSION | SIGN/ PRINT NAMES | SPECIAL INSTRUCTIONS |
|--|----------------------|--|
| RELINQUISHED BY/REMOVED FROM FM Hall CHPRC | DATE/TIME 3-19-10 | RECEIVED BY/STORED IN [Signature] DATE/TIME 3-19-10 |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME | RECEIVED BY/STORED IN |

SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

ORIGINAL

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

COLLECTOR
 FM Hall
 CHPRC

SAMPLING LOCATION
 C6724 (200E-127-PL) I-003

ICE CHEST NO.
 N/A

SHIPPED TO
 Waste Sampling & Characterization

COMPANY CONTACT
 BAMBERGER, MACHELLE

PROJECT DESIGNATION
 200-E-127 Pipeline - Soil

FIELD LOGBOOK NO.

OFFSITE PROPERTY NO.
 N/A

TELEPHONE NO.
 373-0880

ACTUAL SAMPLE DEPTH

PROJECT COORDINATOR
 WIDRIG, DL

SAF NO.
 F10-102

COA
 302427ES10

BILL OF LADING/AIR BILL NO.
 N/A

PRICE CODE 8C

AIR QUALITY

METHOD OF SHIPMENT
 GOVERNMENT VEHICLE

DATA TURNAROUND
 15 Days / 15 Days

SPECIAL INSTRUCTIONS

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

(1)VOA - 5035/8260 (LOW LEVEL); VOA - 5035/8260 (LOW LEVEL) - (Add-On) {n-Butylbenzene, Acetonitrile, Trichloromonofluoromethane, Hexane, 1-Butanol, cis-1,2-Dichloroethylene, Tetrahydrofuran, trans-1,2-Dichloroethylene}

(2)Alcohols, Glycols, & Ketones - 8015 {Diethyl ether}

(3)Semi-VOA - 8270B (TCL); Semi-VOA - 8270B (Add-On) {Benzyl alcohol, Tributyl phosphate, 1,2,4-Trimethylbenzene, 1-Naphthylamine, 2-Butoxyethanol, 2-Naphthylamine, Cyclohexanone, Dodecane, Decane} TPH-Diesel/Kerosene Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range} TPH-Gasoline Range - WTPH-G {Total petroleum hydrocarbons - gasoline range} PCBs - 8082;

(4)ICP Metals - 6010B (Add-On) {Boron, Bismuth} ICP/MS - 200.8 (TAL) {Antimony, Barium, Chromium, Cadmium, Copper, Zinc, Nickel, Vanadium, Silver} ICP/MS - 200.8 (Add-on) {Arsenic, Lead, Thorium-232, Molybdenum, Thallium, Beryllium, Uranium, Selenium} 200.8_HG - ICPMS {Mercury} Total Cyanide - 9014; Chromium Hex - 7196; IC Anions - 300.0 {Nitrogen in Nitrate, Fluoride, Nitrogen in Nitrate, Sulfate}

(5)Gamma Spectroscopy {Europium-155, Cesium-137, Europium-154, Europium-152, Cobalt-60} Gamma Spec - Add-on {Radium-226, Radium-228, Antimony-125, Cesium-134, Niobium-94}

(6)Americium-241; Isotopic Plutonium {Plutonium-239/240, Plutonium-238} Isotopic Uranium {Uranium-233/234, Uranium-235, Uranium-238} Strontium-89,90 -- Total Sr; Technetium-99;

 ORIGINAL

COLLECTOR
FM Hall
CHPRC

SAMPLING LOCATION
C6724 (200E-127-PL) I-004

ICE CHEST NO.
N/A

SHIPPED TO
Waste Sampling & Characterization

COMPANY CONTACT
BAMBERGER, MACHELLE

PROJECT DESIGNATION
200-E-127 Pipeline - Soil

FIELD LOGBOOK NO.
HNF-N-507-5

OFFSITE PROPERTY NO.
N/A

TELEPHONE NO.
373-0880

ACTUAL SAMPLE DEPTH
20.0' - 25.0'

PROJECT COORDINATOR
WIDRIG, DL

SAF NO.
F10-102

COA
302427ES10

BILL OF LADING/AIR BILL NO.
N/A

PRICE CODE 8C

AIR QUALITY

METHOD OF SHIPMENT
GOVERNMENT VEHICLE

DATA TURNAROUND
15 Days / 15 Days

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

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

SPECIAL HANDLING AND/OR STORAGE
RADIOACTIVE TIE TO: B247W2

| PRESERVATION | Cool <-7C and >-20C | Cool~4C | Cool~4C | Cool~4C | None | None |
|----------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| TYPE OF CONTAINER | aGs* | aGs* | aG | G/P | P | G/P |
| NO. OF CONTAINER(S) | 5 | 3 | 1 | 1 | 1 | 1 |
| VOLUME | 40mL | 40mL | 125mL | 60mL | 125mL | 60mL |
| SAMPLE ANALYSIS | SEE ITEM (1) IN SPECIAL INSTRUCTIONS | SEE ITEM (2) IN SPECIAL INSTRUCTIONS | SEE ITEM (3) IN SPECIAL INSTRUCTIONS | SEE ITEM (4) IN SPECIAL INSTRUCTIONS | SEE ITEM (5) IN SPECIAL INSTRUCTIONS | SEE ITEM (6) IN SPECIAL INSTRUCTIONS |

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME | SEE ITEM (1) IN SPECIAL INSTRUCTIONS | SEE ITEM (2) IN SPECIAL INSTRUCTIONS | SEE ITEM (3) IN SPECIAL INSTRUCTIONS | SEE ITEM (4) IN SPECIAL INSTRUCTIONS | SEE ITEM (5) IN SPECIAL INSTRUCTIONS | SEE ITEM (6) IN SPECIAL INSTRUCTIONS |
|------------------------|---------|-------------|-------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| B247W6 W106200870 SOIL | | 3-19-10 | 1012 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

| CHAIN OF POSSESSION | SIGN/ PRINT NAMES | SPECIAL INSTRUCTIONS |
|--|--|---|
| RELINQUISHED BY/REMOVED FROM FM Hall CHPRC | RECEIVED BY/STORED IN [Signature] DATE/TIME 3-19-10 | SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |
| RELINQUISHED BY/REMOVED FROM | RECEIVED BY/STORED IN | |

ORIGINAL

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

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COLLECTOR
FM Hall
CHPRC

COMPANY CONTACT
BAMBERGER, MACHELLE

TELEPHONE NO.
373-0880

PROJECT COORDINATOR
WIDRIG, DL

PRICE CODE 8C

DATA
TURNAROUND
15 Days / 15
Days

SAMPLING LOCATION
C6724 (200E-127-PL) I-004

PROJECT DESIGNATION
200-E-127 Pipeline - Soil

SAF NO.
F10-102

AIR QUALITY

ICE CHEST NO.
N/A

FIELD LOGBOOK NO.
HWF-N-507-S

ACTUAL SAMPLE DEPTH
20.0' - 25.0'

COA
302427ES10

METHOD OF SHIPMENT
GOVERNMENT VEHICLE

SHIPPED TO
Waste Sampling & Characterization

OFFSITE PROPERTY NO.
N/A

BILL OF LADING/AIR BILL NO.
N/A

SPECIAL INSTRUCTIONS

- ** The CACN for all analytical work at WSCF laboratory is to be determined. ** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.
- (1)VOA - 5035/8260 (LOW LEVEL); VOA - 5035/8260 (LOW LEVEL) - (Add-On) (n-Butylbenzene, Acetonitrile, Trichloromonoofluoromethane, Hexane, 1-Butanol, cis-1,2-Dichloroethylene, Tetrahydrofuran, trans-1,2-Dichloroethylene)
 - (2)Alcohols, Glycols, & Ketones - 8015 (Diethyl ether)
 - (3)Semi-VOA - 8270B (TCL); Semi-VOA - 8270B (Add-On) (Tributyl phosphate, 1,2,4-Trimethylbenzene, Benzyl alcohol, 1-Naphthylamine, 2-Naphthylamine, 2-Butoxyethanol, Cyclohexanone, Dodecane, Decane) TPH-Diesel/Kerosene Range - WTPH-D (Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range) TPH-Gasoline Range - WTPH-G (Total petroleum hydrocarbons - gasoline range) PCBs - 8082;
 - (4)ICP Metals - 6010B (Add-On) (Boron, Bisphuth) ICP/MS - 200.8 (TAL) (Antimony, Barium, Chromium, Cadmium, Copper, Zinc, Nickel, Vanadium, Silver) ICP/MS - 200.8 (Add-on) (Arsenic, Lead, Thorium-232, Molybdenum, Thallium, Beryllium, Uranium, Selenium) 200.8_HG - ICPMS (Mercury) Total Cyanide - 9014; Chromium Hex - 7196; IC Anions - 300.0 (Nitrogen in Nitrite, Fluoride, Nitrogen in Nitrate, Sulfate)
 - (5)Gamma Spectroscopy (Europium-155, Cesium-137, Europium-154, Europium-152, Cobalt-60) Gamma Spec - Add-on (Radium-226, Radium-228, Antimony-125, Cesium-134, Niobium-94)
 - (6)Americium-241; Isotopic Plutonium (Plutonium-239/240, Plutonium-238) Isotopic Uranium (Uranium-233/234, Uranium-235, Uranium-238) Strontium-89,90 -- Total Sr; Technetium-99;

 ORIGINAL

Appendix 5

Data Validation Supporting Documentation

Data Validation for Radiochemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

Appendix B - Radiochemical Data Validation Checklist

RADIOCHEMICAL DATA VALIDATION CHECKLIST

| | | | | | |
|---|-----------------------|------------------------|---------------------------------|-----------------------------|---|
| VALIDATION LEVEL: | A | B | C | D | E |
| PROJECT: 200 AREA GRP | | | DATA PACKAGE: VSR11-002 | | |
| VALIDATOR: Carl Schloesslin | | LAB: Eberline, WSCF | | DATE: 11-18-2010 | |
| | | | SDG: H4192, H4200, WSCF20100415 | | |
| ANALYSES PERFORMED | | | | | |
| Gross Alpha/Beta | Strontium-90 X | Technetium-99 X | Alpha Spectroscopy X | Gamma Spectroscopy X | |
| Total Uranium | Radium-22 | Tritium X | C-14 X | Ni-63 X | |
| SAMPLES/MATRIX Soil samples SDG H4192: B247W5, B247W6 SDG H4200: B247Y1 SDG WSCF20100415: B247W5, B247W6 | | | | | |

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

Data Validation for Radiochemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

Comments:

- 3. Continuing Calibration (Levels D, E)..... N/A
- Calibration checked within required frequency? Yes No N/A
- Calibration check acceptable? Yes No N/A
- Calibration check standards traceable? Yes No N/A
- Calibration check standards expired? Yes No N/A
- Calculation check acceptable? Yes No N/A

Comments:

- 4. Background Counts (Levels D, E) N/A
- Background Counts checked within required frequency? Yes No N/A
- Background Counts acceptable? Yes No N/A
- Calculation check acceptable? Yes No N/A

Comments:

Data Validation for Radiochemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

- 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:

WSCF20100415 MB detections (pCi/g): Ra-226 (0.29), U-233/234 (0.03)

- 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

Data Validation for Radiochemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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

Data Validation for Radiochemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

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:

WSCF20100415 Sr-89/90 RPD = 56%

Data Validation for Radiochemical Analyses

Published Date: 08/16/10

Effective Date: 08/16/10

- 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:

MDCs > CRDLs for associated non-detect sample results

- H4192: C-14 CRDL = 1 pCi/g, B247W5 MDC = 5.63 pCi/g, B247W6 MDC = 5.50 pCi/g
- WSCF20100415: Sb-125 CRDL = 0.1 pCi/g, B247W5 MDC = 0.20 pCi/g, B247W6 MDC = 0.17 pCi/g
- WSCF20100415: Co-60 CRDL = 0.05 pCi/g, B247W5 MDC = 0.11 pCi/g, B247W6 MDC = 0.067 pCi/g
- WSCF20100415: Eu-152 CRDL = 0.1 pCi/g, B247W5 MDC = 0.20 pCi/g, B247W6 MDC = 0.17 pCi/g
- WSCF20100415: Eu-154 CRDL = 0.1 pCi/g, B247W5 MDC = 0.30 pCi/g, B247W6 MDC = 0.20 pCi/g
- WSCF20100415: Eu-155 CRDL = 0.1 pCi/g, B247W5 MDC = 0.22 pCi/g, B247W6 MDC = 0.22 pCi/g

Appendix 6

Additional Documentation Requested By Client

E B E R L I N E S E R V I C E S / R I C H M O N D
S A M P L E D E L I V E R Y G R O U P H 4 1 9 2

7809-004

Method Blank

M E T H O D B L A N K

| | | |
|-----------------------------------|--------------------------------------|------------------|
| SDG <u>7809</u> | Client/Case no <u>CHPRC</u> | SDG <u>H4192</u> |
| Contact <u>N. Joseph Verville</u> | Contract No. <u>33677</u> | |
| Lab sample id <u>S003142-04</u> | Client sample id <u>Method Blank</u> | |
| Dept sample id <u>7809-004</u> | Material/Matrix <u>SOLID</u> | |
| | SAF No <u>F10-102</u> | |

| ANALYTE | CAS NO | RESULT pCi/g | 2 σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI- FIERS | TEST |
|---------------|------------|-----------------|---------------------------|--------------|--------------|-----------------|------|
| Tritium | 10028-17-8 | -0.763 | 4.5 | 7.93 | 400 | U | H |
| Carbon 14 | 14762-75-5 | 0.455 | 3.3 | 5.59 | 50.0 | U | C |
| Nickel 63 | 13981-37-8 | -0.405 | 1.7 | 2.93 | 30.0 | U | NI_L |
| Neptunium 237 | 13994-20-2 | 0.033 | 0.033 | 0.061 | 1.00 | U | NP |

QC-BLANK #72840

METHOD BLANKS

Page 1

SUMMARY DATA SECTION

Page 7

| |
|-----------------------------|
| Lab id <u>EBRLNE</u> |
| Protocol <u>CHPRC</u> |
| Version <u>Ver 1.0</u> |
| Form <u>DVD-DS</u> |
| Version <u>3.06</u> |
| Report date <u>04/09/10</u> |

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H4192

7809-003

Lab Control Sample

LAB CONTROL SAMPLE

| | | |
|-----------------------------------|--|------------------|
| SDG <u>7809</u> | Client/Case no <u>CHPRC</u> | <u>SDG H4192</u> |
| Contact <u>N. Joseph Verville</u> | Contract <u>No. 33677</u> | |
| Lab sample id <u>S003142-03</u> | Client sample id <u>Lab Control Sample</u> | |
| Dept sample id <u>7809-003</u> | Material/Matrix <u>SOLID</u> | |
| | SAF No <u>F10-102</u> | |

| ANALYTE | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI- FIERS | TEST | ADDED pCi/g | 2σ ERR pCi/g | REC % | 3σ LMTS (TOTAL) | PROTOCOL LIMITS |
|---------------|-----------------|-------------------|--------------|--------------|-----------------|------|----------------|-----------------|----------|--------------------|--------------------|
| Tritium | 954 | 22 | 8.24 | 400 | | H | 1010 | 40 | 94 | 84-116 | 80-120 |
| Carbon 14 | 2720 | 25 | 5.86 | 50.0 | | C | 2900 | 120 | 94 | 85-115 | 80-120 |
| Nickel 63 | 191 | 5.6 | 2.91 | 30.0 | | NI_L | 218 | 8.7 | 88 | 84-116 | 80-120 |
| Neptunium 237 | 11.1 | 0.53 | 0.047 | 1.00 | | NP | 11.9 | 0.48 | 93 | 77-123 | 80-120 |

QC-LCS #72839

| |
|-----------------------------|
| Lab id <u>EBRLNE</u> |
| Protocol <u>CHPRC</u> |
| Version <u>Ver 1.0</u> |
| Form <u>DVD-LCS</u> |
| Version <u>3.06</u> |
| Report date <u>04/09/10</u> |

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H4192

7809-005

B247W5

DUPLICATE

| | | |
|-----------------------------------|---------------------------------|---|
| SDG <u>7809</u> | Client/Case no <u>CHPRC</u> | <u>SDG H4192</u> |
| Contact <u>N. Joseph Verville</u> | Contract No. <u>33677</u> | |
| DUPLICATE | ORIGINAL | |
| Lab sample id <u>S003142-05</u> | Lab sample id <u>S003142-01</u> | Client sample id <u>B247W5</u> |
| Dept sample id <u>7809-005</u> | Dept sample id <u>7809-001</u> | Location/Matrix <u>C6724(200E-127-PL) I-003 SOLID</u> |
| | Received <u>03/25/10</u> | Collected/Weight <u>03/19/10 08:46 10.4 g</u> |
| % solids <u>96.0</u> | % solids <u>96.0</u> | Custody/SAP No <u>F10-102-031 F10-102</u> |

| ANALYTE | DUPLICATE pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI- FIERS | TEST | ORIGINAL pCi/g | 2σ ERR (COUNT) | MDA pCi/g | QUALI- FIERS | RPD % | 3σ TOT | DER σ |
|---------------|--------------------|-------------------|--------------|--------------|-----------------|------|-------------------|-------------------|--------------|-----------------|----------|-----------|----------|
| Tritium | 2.05 | 4.5 | 7.52 | 400 | U | H | -0.977 | 4.4 | 7.62 | U | - | | 1.0 |
| Carbon 14 | 0.603 | 3.2 | 5.38 | 50.0 | U | C | 0.745 | 3.3 | 5.63 | U | - | | 0.1 |
| Nickel 63 | -0.484 | 1.9 | 3.21 | 30.0 | U | NI_L | -0.351 | 1.8 | 3.10 | U | - | | 0.1 |
| Neptunium 237 | 0 | 0.054 | 0.207 | 1.00 | U | NP | 0.096 | <u>0.13</u> | 0.095 | | 200 | 442 | 1.4 |

QC-DUP#1 72841

200-E-127 Pipeline - Soil

DUPLICATES

Page 1

SUMMARY DATA SECTION

Page 9

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-DUP
 Version 3.06
 Report date 04/09/10

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H4192

LAB METHOD SUMMARY

NEPTUNIUM IN SOLIDS
ALPHA SPECTROSCOPY

Test NP Matrix SOLID
SDG 7809
Contact N. Joseph Verville

Client CHPRC
Contract No. 33677
Contract SDG H4192

RESULTS

| LAB | RAW | SUP- | Neptunium | |
|-----------|----------|----------|------------------|-----|
| SAMPLE ID | TEST FIX | PLANCHET | CLIENT SAMPLE ID | 237 |

Preparation batch 7237-093

| | | | | |
|------------|--|----------|------------------------|-------|
| S003142-01 | | 7809-001 | B247W5 | 0.096 |
| S003142-02 | | 7809-002 | B247W6 | U |
| S003142-03 | | 7809-003 | Lab Control Sample | ok |
| S003142-04 | | 7809-004 | Method Blank | U |
| S003142-05 | | 7809-005 | Duplicate (S003142-01) | ok U |

Nominal values and limits from method RDLs (pCi/g) 1.00

METHOD PERFORMANCE

| LAB | RAW | SUP- | MDA | ALIQ | PREP | DILU- | YIELD | EFF | COUNT | FWHM | DRIFT | DAYS | ANAL- | | |
|-----------|----------|------------------|-------|------|------|-------|-------|-----|-------|------|-------|------|----------|------|----------|
| SAMPLE ID | TEST FIX | CLIENT SAMPLE ID | pCi/g | g | FAC | TION | % | % | min | keV | KeV | HELD | PREPARED | YZED | DETECTOR |

Preparation batch 7237-093 2σ prep error 14.8 % Reference Lab Notebook No. 7237, pg 93

| | | | | | | | | | | | | | | |
|------------|--|------------------------|-------|-------|--|--|----|-----|--|--|----|----------|-------|--------|
| S003142-01 | | B247W5 | 0.095 | 0.500 | | | 52 | 136 | | | 19 | 04/06/10 | 04/07 | SS-055 |
| S003142-02 | | B247W6 | 0.058 | 0.500 | | | 47 | 825 | | | 18 | 04/06/10 | 04/06 | SS-062 |
| S003142-03 | | Lab Control Sample | 0.047 | 0.500 | | | 57 | 825 | | | | 04/06/10 | 04/06 | SS-063 |
| S003142-04 | | Method Blank | 0.061 | 0.500 | | | 54 | 825 | | | | 04/06/10 | 04/06 | SS-064 |
| S003142-05 | | Duplicate (S003142-01) | 0.207 | 0.500 | | | 60 | 136 | | | 19 | 04/06/10 | 04/07 | SS-056 |

Nominal values and limits from method 1.00 0.500 30-110 100 180

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

| | |
|-----------------|---------------------------------|
| AVERAGES ± 2 SD | MDA <u>0.094</u> ± <u>0.132</u> |
| FOR 5 SAMPLES | YIELD <u>54</u> ± <u>10</u> |

METHOD SUMMARIES

Page 1

SUMMARY DATA SECTION

Page 12

| | |
|-------------|-----------------|
| Lab id | <u>EBRLNE</u> |
| Protocol | <u>CHPRC</u> |
| Version | <u>Ver 1.0</u> |
| Form | <u>DVD-LMS</u> |
| Version | <u>3.06</u> |
| Report date | <u>04/09/10</u> |

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H4192

LAB METHOD SUMMARY

CARBON 14 IN SOLIDS

LIQUID SCINTILLATION COUNTING

Test C Matrix SOLID
SDG 7809
Contact N. Joseph Verville

Client CHPRC
Contract No. 33677
Contract SDG H4192

RESULTS

| LAB | RAW | SUF- | | |
|----------------------------|----------|----------|------------------------|-----------|
| SAMPLE ID | TEST FIX | PLANCHET | CLIENT SAMPLE ID | Carbon 14 |
| Preparation batch 7237-093 | | | | |
| S003142-01 | | 7809-001 | B247W5 | U |
| S003142-02 | | 7809-002 | B247W6 | U |
| S003142-03 | | 7809-003 | Lab Control Sample | ok |
| S003142-04 | | 7809-004 | Method Blank | U |
| S003142-05 | | 7809-005 | Duplicate (S003142-01) | - U |

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

METHOD PERFORMANCE

| LAB | RAW | SUF- | MDA | ALIQ | PREP | DILU- | YIELD | EFF | COUNT | FWHM | DRIFT | DAYS | ANAL- |
|--|----------|------------------------|-------|-------|------|-------|-------|-----|-------|------|-------|----------------|---------------|
| SAMPLE ID | TEST FIX | CLIENT SAMPLE ID | pCi/g | g | FAC | TION | % | % | min | keV | KeV | HELD PREPARED | YZED DETECTOR |
| Preparation batch 7237-093 2σ prep error 10.0 % Reference Lab Notebook No. 7237, pg 93 | | | | | | | | | | | | | |
| S003142-01 | | B247W5 | 5.63 | 0.224 | | | 100 | | 50 | | 9 | 03/26/10 03/28 | LSC-004 |
| S003142-02 | | B247W6 | 5.50 | 0.226 | | | 100 | | 50 | | 9 | 03/26/10 03/28 | LSC-004 |
| S003142-03 | | Lab Control Sample | 5.86 | 0.220 | | | 100 | | 50 | | | 03/26/10 03/28 | LSC-004 |
| S003142-04 | | Method Blank | 5.59 | 0.220 | | | 100 | | 50 | | | 03/26/10 03/28 | LSC-004 |
| S003142-05 | | Duplicate (S003142-01) | 5.38 | 0.230 | | | 100 | | 50 | | 9 | 03/26/10 03/28 | LSC-004 |

Nominal values and limits from method 50.0 0.220 10 180

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

AVERAGES ± 2 SD MDA 5.59 ± 0.356
FOR 5 SAMPLES YIELD 100 ± 0

Lab id EBRLINE
Protocol CHPRC
Version Ver 1.0
Form DVD-LMS
Version 3.06
Report date 04/09/10

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H4192

LAB METHOD SUMMARY

TRITIUM IN SOLIDS

LIQUID SCINTILLATION COUNTING

Test H Matrix SOLID
 SDG 7809
 Contact N. Joseph Verville

Client CHPRC
 Contract No. 33677
 Contract SDG H4192

RESULTS

| LAB | RAW | SUF- | | |
|----------------------------|----------|----------|------------------------|---------|
| SAMPLE ID | TEST FIX | PLANCHET | CLIENT SAMPLE ID | Tritium |
| Preparation batch 7237-093 | | | | |
| S003142-01 | | 7809-001 | B247W5 | U |
| S003142-02 | | 7809-002 | B247W6 | U |
| S003142-03 | | 7809-003 | Lab Control Sample | ok |
| S003142-04 | | 7809-004 | Method Blank | U |
| S003142-05 | | 7809-005 | Duplicate (S003142-01) | - U |

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

METHOD PERFORMANCE

| LAB | RAW | SUF- | MDA | ALIQ | PREP | DILU- | YIELD | EFF | COUNT | FWHM | DRIFT | DAYS | ANAL- | | |
|--|----------|------------------------|-------|-------|------|-------|-------|-----|-------|------|-------|----------|----------|---------|----------|
| SAMPLE ID | TEST FIX | CLIENT SAMPLE ID | pCi/g | g | FAC | TION | % | % | min | keV | KeV | HELD | PREPARED | YZED | DETECTOR |
| Preparation batch 7237-093 2σ prep error 10.0 % Reference Lab Notebook No. 7237, pg 93 | | | | | | | | | | | | | | | |
| S003142-01 | | B247W5 | 7.62 | 0.224 | | | 100 | | 50 | | 9 | 03/26/10 | 03/28 | LSC-004 | |
| S003142-02 | | B247W6 | 7.65 | 0.226 | | | 100 | | 50 | | 9 | 03/26/10 | 03/28 | LSC-004 | |
| S003142-03 | | Lab Control Sample | 8.24 | 0.220 | | | 100 | | 50 | | | 03/26/10 | 03/28 | LSC-004 | |
| S003142-04 | | Method Blank | 7.93 | 0.220 | | | 100 | | 50 | | | 03/26/10 | 03/28 | LSC-004 | |
| S003142-05 | | Duplicate (S003142-01) | 7.52 | 0.230 | | | 100 | | 50 | | 9 | 03/26/10 | 03/28 | LSC-004 | |

Nominal values and limits from method 400 0.220 25 180

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

AVERAGES ± 2 SD MDA 7.79 ± 0.586
 FOR 5 SAMPLES YIELD 100 ± 0

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-LMS
 Version 3.06
 Report date 04/09/10

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H4192

Test NI L Matrix SOLID
 SDG 7809
 Contact N. Joseph Verville

LAB METHOD SUMMARY

NICKEL 63 IN SOLIDS

LIQUID SCINTILLATION COUNTING

Client CHPRC
 Contract No. 33677
 Contract SDG H4192

RESULTS

LAB RAW SUF-
 SAMPLE ID TEST FIX PLANCHET CLIENT SAMPLE ID Nickel 63

Preparation batch 7237-093

| | | | | |
|------------|--|----------|------------------------|-----|
| S003142-01 | | 7809-001 | B247W5 | U |
| S003142-02 | | 7809-002 | B247W6 | U |
| S003142-03 | | 7809-003 | Lab Control Sample | ok |
| S003142-04 | | 7809-004 | Method Blank | U |
| S003142-05 | | 7809-005 | Duplicate (S003142-01) | - U |

Nominal values and limits from method RDLs (pCi/g) 30.0

METHOD PERFORMANCE

LAB RAW SUF- MDA ALIQ PREP DILU- YIELD EFF COUNT FWHM DRIFT DAYS ANAL-
 SAMPLE ID TEST FIX CLIENT SAMPLE ID pCi/g g FAC TION % % min keV KeV HELD PREPARED YZED DETECTOR

Preparation batch 7237-093 2σ prep error 11.2 % Reference Lab Notebook No. 7237, pg 93

| | | | | | | | | | | | | |
|------------|--|------------------------|------|-------|--|--|-----|----|----|----------|-------|---------|
| S003142-01 | | B247W5 | 3.10 | 0.500 | | | 95 | 50 | 17 | 04/01/10 | 04/05 | LSC-006 |
| S003142-02 | | B247W6 | 3.20 | 0.500 | | | 96 | 50 | 17 | 04/01/10 | 04/05 | LSC-006 |
| S003142-03 | | Lab Control Sample | 2.91 | 0.500 | | | 101 | 50 | | 04/01/10 | 04/05 | LSC-006 |
| S003142-04 | | Method Blank | 2.93 | 0.500 | | | 102 | 50 | | 04/01/10 | 04/05 | LSC-006 |
| S003142-05 | | Duplicate (S003142-01) | 3.21 | 0.500 | | | 93 | 50 | 17 | 04/01/10 | 04/05 | LSC-006 |

Nominal values and limits from method 30.0 0.500 40-110 25 180

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

AVERAGES ± 2 SD MDA 3.07 ± 0.287
 FOR 5 SAMPLES YIELD 97 ± 8

METHOD SUMMARIES

Page 4

SUMMARY DATA SECTION

Page 15

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-LMS
 Version 3.06
 Report date 04/09/10

E B E R L I N E S E R V I C E S / R I C H M O N D
S A M P L E D E L I V E R Y G R O U P H 4 2 0 0

7817-003

Method Blank

M E T H O D B L A N K

| | | |
|-----------------------------------|--------------------------------------|------------------|
| SDG <u>7817</u> | Client/Case no <u>CHPRC</u> | SDG <u>H4200</u> |
| Contact <u>N. Joseph Verville</u> | Contract <u>No. 33677</u> | |
| Lab sample id <u>S004026-03</u> | Client sample id <u>Method Blank</u> | |
| Dept sample id <u>7817-003</u> | Material/Matrix <u>SOLID</u> | |
| | SAF No <u>F10-102</u> | |

| ANALYTE | CAS NO | RESULT pCi/g | 2 σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI- FIERS | TEST |
|---------------|------------|-----------------|---------------------------|--------------|--------------|-----------------|------|
| Tritium | 10028-17-8 | 0.973 | 5.7 | 9.67 | 400 | U | H |
| Carbon 14 | 14762-75-5 | -1.06 | 3.1 | 4.70 | 50.0 | U | C |
| Nickel 63 | 13981-37-8 | -0.038 | 1.9 | 3.17 | 30.0 | U | NI_L |
| Neptunium 237 | 13994-20-2 | -0.058 | 0.12 | 0.447 | 1.00 | U | NP |

QC-BLANK #72905

| |
|-----------------------------|
| Lab id <u>EBRLNE</u> |
| Protocol <u>CHPRC</u> |
| Version <u>Ver 1.0</u> |
| Form <u>DVD-DS</u> |
| Version <u>3.06</u> |
| Report date <u>04/22/10</u> |

METHOD BLANKS

Page 1

SUMMARY DATA SECTION

Page 7

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H4200

7817-002

Lab Control Sample

LAB CONTROL SAMPLE

| | | |
|-----------------------------------|--|------------------|
| SDG <u>7817</u> | Client/Case no <u>CHPRC</u> | <u>SDG H4200</u> |
| Contact <u>N. Joseph Verville</u> | Contract No. <u>33677</u> | |
| Lab sample id <u>S004026-02</u> | Client sample id <u>Lab Control Sample</u> | |
| Dept sample id <u>7817-002</u> | Material/Matrix <u>SOLID</u> | |
| | SAF No <u>F10-102</u> | |

| ANALYTE | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI- FIERS TEST | ADDED pCi/g | 2σ ERR pCi/g | REC % | 3σ LMTS (TOTAL) | PROTOCOL LIMITS |
|---------------|-----------------|-------------------|--------------|--------------|----------------------|----------------|-----------------|----------|--------------------|--------------------|
| Tritium | 1060 | 25 | 9.62 | 400 | H | 1100 | 44 | 96 | 84-116 | 80-120 |
| Carbon 14 | 3090 | 20 | 4.59 | 50.0 | C | 3190 | 130 | 97 | 84-116 | 80-120 |
| Nickel 63 | 197 | 5.7 | 3.13 | 30.0 | NI_L | 218 | 8.7 | 90 | 83-117 | 80-120 |
| Neptunium 237 | 8.51 | 1.3 | 0.144 | 1.00 | NP | 9.92 | 0.40 | 86 | 72-128 | 80-120 |

QC-LCS #72904

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H4200

7817-004

B247Y1

DUPLICATE

| | | |
|-----------------------------------|---------------------------------|--|
| SDG <u>7817</u> | Client/Case no <u>CHPRC</u> | <u>SDG H4200</u> |
| Contact <u>N. Joseph Verville</u> | Contract No. <u>33677</u> | |
| DUPLICATE | ORIGINAL | |
| Lab sample id <u>S004026-04</u> | Lab sample id <u>S004026-01</u> | Client sample id <u>B247Y1</u> |
| Dept sample id <u>7817-004</u> | Dept sample id <u>7817-001</u> | Location/Matrix <u>C6726 (NearDiversionBox)</u> <u>SOLID</u> |
| | Received <u>04/07/10</u> | Collected/Weight <u>03/26/10 12:45</u> <u>71.1 g</u> |
| % solids <u>92.0</u> | % solids <u>92.0</u> | Custody/SAF No <u>F10-102-055</u> <u>F10-102</u> |

| ANALYTE | DUPLICATE pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI- FIERS | TEST | ORIGINAL pCi/g | 2σ ERR (COUNT) | MDA pCi/g | QUALI- FIERS | RPD % | 3σ TOT | DER σ |
|---------------|--------------------|-------------------|--------------|--------------|-----------------|------|-------------------|-------------------|--------------|-----------------|----------|-----------|----------|
| Tritium | 6.02 | 5.0 | 8.05 | 400 | U | H | -3.60 | 4.5 | 8.09 | U | - | | 2.8 |
| Carbon 14 | 135 | 5.4 | 3.96 | 50.0 | | C | 106 | 4.4 | 4.09 | | 24 | 23 | 3.1 |
| Nickel 63 | -2.04 | 1.8 | 3.24 | 30.0 | U | NI_L | -1.16 | 1.8 | 3.14 | U | - | | 0.7 |
| Neptunium 237 | 0.122 | 0.12 | 0.183 | 1.00 | U | NP | -0.060 | 0.12 | 0 | U | - | | 2.1 |

QC-DUP#1 72906

200-E-127 Pipeline - Soil

| |
|-----------------------------|
| Lab id <u>EBRLNE</u> |
| Protocol <u>CHPRC</u> |
| Version <u>Ver 1.0</u> |
| Form <u>DVD-DUP</u> |
| Version <u>3.06</u> |
| Report date <u>04/22/10</u> |

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H4200

Test NP Matrix SOLID
 SDG 7817
 Contact N. Joseph Verville

LAB METHOD SUMMARY

NEPTUNIUM IN SOLIDS
 ALPHA SPECTROSCOPY

Client CHPRC
 Contract No. 33677
 Contract SDG H4200

RESULTS

| LAB | RAW | SUF- | | Neptunium |
|-----------|----------|----------|------------------|-----------|
| SAMPLE ID | TEST FIX | PLANCHET | CLIENT SAMPLE ID | 237 |

Preparation batch 7237-113

| | | | | |
|------------|--|----------|------------------------|-----|
| S004026-01 | | 7817-001 | B247Y1 | U |
| S004026-02 | | 7817-002 | Lab Control Sample | ok |
| S004026-03 | | 7817-003 | Method Blank | U |
| S004026-04 | | 7817-004 | Duplicate (S004026-01) | - U |

Nominal values and limits from method RDLs (pCi/g) 1.00

METHOD PERFORMANCE

| LAB | RAW | SUF- | MDA | ALIQ | PREP | DILU- | YIELD | EFF | COUNT | FWHM | DRIFT | DAYS | ANAL- | | |
|-----------|----------|------------------|-------|------|------|-------|-------|-----|-------|------|-------|------|----------|------|----------|
| SAMPLE ID | TEST FIX | CLIENT SAMPLE ID | pCi/g | g | FAC | TION | % | % | min | keV | KeV | HELD | PREPARED | YZED | DETECTOR |

Preparation batch 7237-113 2σ prep error 14.8 % Reference Lab Notebook No. 7237, pg.113

| | | | | | | | | | | | | | | | |
|------------|--|------------------------|-------|-------|--|--|----|-----|--|--|--|----|----------|-------|--------|
| S004026-01 | | B247Y1 | 0 | 0.500 | | | 38 | 100 | | | | 25 | 04/19/10 | 04/20 | BETA |
| S004026-02 | | Lab Control Sample | 0.144 | 0.500 | | | 49 | 100 | | | | | 04/19/10 | 04/20 | SS-036 |
| S004026-03 | | Method Blank | 0.447 | 0.500 | | | 39 | 100 | | | | | 04/19/10 | 04/20 | SS-037 |
| S004026-04 | | Duplicate (S004026-01) | 0.183 | 0.500 | | | 46 | 101 | | | | 25 | 04/19/10 | 04/20 | SS-038 |

Nominal values and limits from method 1.00 0.500 30-110 100 180

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

| | | |
|-----------------|-------|-----------------------------|
| AVERAGES ± 2 SD | MDA | <u>0.194</u> ± <u>0.373</u> |
| FOR 4 SAMPLES | YIELD | <u>43</u> ± <u>11</u> |

METHOD SUMMARIES

Page 1

SUMMARY DATA SECTION

Page 11

| | |
|-------------|-----------------|
| Lab id | <u>EBRLNE</u> |
| Protocol | <u>CHPRC</u> |
| Version | <u>Ver 1.0</u> |
| Form | <u>DVD-LMS</u> |
| Version | <u>3.06</u> |
| Report date | <u>04/22/10</u> |

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H4200

Test C Matrix SOLID
 SDG 7817
 Contact N. Joseph Verville

LAB METHOD SUMMARY

CARBON 14 IN SOLIDS
 LIQUID SCINTILLATION COUNTING

Client CHPRC
 Contract No. 33677
 Contract SDG H4200

RESULTS

LAB RAW SUF-
 SAMPLE ID TEST FIX PLANCHET CLIENT SAMPLE ID Carbon 14

Preparation batch 7237-113

| | | | |
|------------|----------|------------------------|------------|
| S004026-01 | 7817-001 | B247Y1 | 106 |
| S004026-02 | 7817-002 | Lab Control Sample | ok |
| S004026-03 | 7817-003 | Method Blank | U |
| S004026-04 | 7817-004 | Duplicate (S004026-01) | <u>OUT</u> |

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

METHOD PERFORMANCE

LAB RAW SUF- MDA ALIQ PREP DILU- YIELD EFF COUNT FWHM DRIFT DAYS ANAL-
 SAMPLE ID TEST FIX CLIENT SAMPLE ID pCi/g g FAC TION % % min keV KeV HELD PREPARED YZED DETECTOR

Preparation batch 7237-113 2σ prep error 10.0 % Reference Lab Notebook No. 7237, pg.113

| | | | | | | | | | |
|------------|------------------------|------|-------|-----|-----|----|----------|-------|---------|
| S004026-01 | B247Y1 | 4.09 | 0.236 | 100 | 100 | 19 | 04/13/10 | 04/14 | LSC-004 |
| S004026-02 | Lab Control Sample | 4.59 | 0.200 | 100 | 100 | | 04/13/10 | 04/15 | LSC-004 |
| S004026-03 | Method Blank | 4.70 | 0.200 | 100 | 100 | | 04/13/10 | 04/14 | LSC-004 |
| S004026-04 | Duplicate (S004026-01) | 3.96 | 0.241 | 100 | 100 | 19 | 04/13/10 | 04/14 | LSC-004 |

Nominal values and limits from method 50.0 0.200 10 180

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

AVERAGES ± 2 SD MDA 4.34 ± 0.729
 FOR 4 SAMPLES YIELD 100 ± 0

METHOD SUMMARIES

Page 2

SUMMARY DATA SECTION

Page 12

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-LMS
 Version 3.06
 Report date 04/22/10

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H4200

Test NI L Matrix SOLID
 SDG 7817
 Contact N. Joseph Verville

LAB METHOD SUMMARY

NICKEL 63 IN SOLIDS
 LIQUID SCINTILLATION COUNTING

Client CHPRC
 Contract No. 33677
 Contract SDG H4200

RESULTS

LAB RAW SUP-
 SAMPLE ID TEST FIX PLANCHET CLIENT SAMPLE ID Nickel 63

Preparation batch 7237-113

| | | | |
|------------|----------|------------------------|-----|
| S004026-01 | 7817-001 | B247Y1 | U |
| S004026-02 | 7817-002 | Lab Control Sample | ok |
| S004026-03 | 7817-003 | Method Blank | U |
| S004026-04 | 7817-004 | Duplicate (S004026-01) | - U |

Nominal values and limits from method RDLs (pCi/g) 30.0

METHOD PERFORMANCE

LAB RAW SUP- MDA ALIQ PREP DILU- YIELD EFF COUNT FWHM DRIFT DAYS ANAL-
 SAMPLE ID TEST FIX CLIENT SAMPLE ID pCi/g g FAC TION % % min keV KeV HELD PREPARED YZED DETECTOR

Preparation batch 7237-113 2σ prep error 11.2 % Reference Lab Notebook No. 7237, pg.113

| | | | | | | | | | |
|------------|------------------------|------|-------|-----|----|----|----------|-------|---------|
| S004026-01 | B247Y1 | 3.14 | 0.500 | 98 | 50 | 19 | 04/14/10 | 04/14 | LSC-004 |
| S004026-02 | Lab Control Sample | 3.13 | 0.500 | 101 | 50 | | 04/14/10 | 04/14 | LSC-004 |
| S004026-03 | Method Blank | 3.17 | 0.500 | 99 | 50 | | 04/14/10 | 04/14 | LSC-004 |
| S004026-04 | Duplicate (S004026-01) | 3.24 | 0.500 | 97 | 50 | 19 | 04/14/10 | 04/14 | LSC-004 |

Nominal values and limits from method 30.0 0.500 40-110 25 180

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

AVERAGES ± 2 SD MDA 3.17 ± 0.099
 FOR 4 SAMPLES YIELD 99 ± 3

METHOD SUMMARIES

Page 4

SUMMARY DATA SECTION

Page 14

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-LMS
 Version 3.06
 Report date 04/22/10

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Radiochemistry

SDG Number: WSCF20100415
 Matrix: SOLID
 Test: Americium by AEA

Sample Date: 03/17/10
 Receive Date: 03/17/10

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|--|----------------------|------------|----------|----------|---------|-------------|-------------|--------|-----------|----|---------------|
| Lab ID: W10GR00862 | | | | | | | | | | | |
| BATCH QC ASSOCIATED WITH SAMPLE | | | | | | | | | | | |
| DUP | Americium-241 | 14596-10-2 | 3.1e-2 | | RPD | | | 48.000 | 20.000 * | | 03/29/10 |
| DUP | Am-243 tracer by AEA | AM243 | 4.069 | 87.700 | % Recov | 30.000 | 105.000 | | | | 03/29/10 |
| Lab ID: W10GR00869 | | | | | | | | | | | |
| BATCH QC ASSOCIATED WITH SAMPLE | | | | | | | | | | | |
| SURR | Am-243 tracer by AEA | AM243 | 3.785 | 92.310 | % Recov | 30.000 | 105.000 | | | | 03/29/10 |
| Lab ID: W10GR00870 | | | | | | | | | | | |
| BATCH QC ASSOCIATED WITH SAMPLE | | | | | | | | | | | |
| SURR | Am-243 tracer by AEA | AM243 | 4.15 | 86.990 | % Recov | 30.000 | 105.000 | | | | 03/29/10 |
| BATCH QC | | | | | | | | | | | |
| BLANK | Americium-241 | 14596-10-2 | U4.5e-3 | n/a | pCi/g | -10.000 | 1000.000 | | | | 03/29/10 |
| BLANK | Am-243 tracer by AEA | AM243 | 4.216 | 92.280 | % Recov | 30.000 | 105.000 | | | | 03/29/10 |
| LCS | Americium-241 | 14596-10-2 | 13.02 | 105.854 | % Recov | 80.000 | 120.000 | | | | 03/29/10 |
| LCS | Am-243 tracer by AEA | AM243 | 13.02 | 98.540 | % Recov | 30.000 | 105.000 | | | | 03/29/10 |

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WSCF ANALYTICAL LABORATORY QC REPORT

Department: Radiochemistry

SDG Number: WSCF20100415
 Matrix: SOLID
 Test: Gamma Energy Analysis-grd H2O

Sample Date: 03/19/10
 Receive Date: 03/19/10

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|---------|---------|-------|----------|----------|-------|-------------|-------------|--------|-----------|----|---------------|
|---------|---------|-------|----------|----------|-------|-------------|-------------|--------|-----------|----|---------------|

Lab ID: W10GR00869
BATCH QC ASSOCIATED WITH SAMPLE

| | | | | | | | | | | | |
|-----|--------------|------------|------------|--|-----|--|--|--------|--------|--|----------|
| DUP | Cobalt-60 | 10198-40-0 | U3.359e-2 | | RPD | | | n/a | 20.000 | | 03/24/10 |
| DUP | Cesium-134 | 13967-70-9 | U2.242e-2 | | RPD | | | n/a | 20.000 | | 03/24/10 |
| DUP | Cesium-137 | 10045-97-3 | U2.839e-2 | | RPD | | | n/a | 20.000 | | 03/24/10 |
| DUP | Europium-152 | 14683-23-9 | U4.314e-4 | | RPD | | | n/a | 20.000 | | 03/24/10 |
| DUP | Europium-154 | 15585-10-1 | U-9.818e-2 | | RPD | | | n/a | 20.000 | | 03/24/10 |
| DUP | Europium-155 | 14391-16-3 | U-4.66e-2 | | RPD | | | n/a | 20.000 | | 03/24/10 |
| DUP | Niobium-94 | 14681-63-1 | U3.812e-2 | | RPD | | | n/a | 20.000 | | 03/24/10 |
| DUP | Radium-226 | 13982-63-3 | 0.5043 | | RPD | | | 10.300 | 20.000 | | 03/24/10 |
| DUP | Radium-228 | 15262-20-1 | 0.5861 | | RPD | | | 3.339 | 20.000 | | 03/24/10 |
| DUP | Antimony-125 | 14234-35-6 | U-0.1323 | | RPD | | | n/a | 20.000 | | 03/24/10 |

BATCH QC

| | | | | | | | | | | | |
|-------|--------------|------------|-----------|---------|---------|---------|----------|--|--|--|----------|
| BLANK | Cobalt-60 | 10198-40-0 | U6.35e-3 | n/a | pCi/g | -10.000 | 1000.000 | | | | 03/24/10 |
| BLANK | Cesium-134 | 13967-70-9 | U-4.87e-3 | n/a | pCi/g | -10.000 | 1000.000 | | | | 03/24/10 |
| BLANK | Cesium-137 | 10045-97-3 | U2.052e-2 | n/a | pCi/g | -10.000 | 1000.000 | | | | 03/24/10 |
| BLANK | Europium-152 | 14683-23-9 | U-2.73e-2 | n/a | pCi/g | -10.000 | 1000.000 | | | | 03/24/10 |
| BLANK | Europium-154 | 15585-10-1 | U1.804e-2 | n/a | pCi/g | -10.000 | 1000.000 | | | | 03/24/10 |
| BLANK | Europium-155 | 14391-16-3 | U2.142e-2 | n/a | pCi/g | -10.000 | 1000.000 | | | | 03/24/10 |
| BLANK | Niobium-94 | 14681-63-1 | U3.149e-3 | n/a | pCi/g | -10.000 | 1000.000 | | | | 03/24/10 |
| BLANK | Radium-226 | 13982-63-3 | 0.2895 | 0.289 | pCi/g | -10.000 | 1000.000 | | | | 03/24/10 |
| BLANK | Radium-228 | 15262-20-1 | U-0.1232 | n/a | pCi/g | -10.000 | 1000.000 | | | | 03/24/10 |
| BLANK | Antimony-125 | 14234-35-6 | U1.732e-3 | n/a | pCi/g | -10.000 | 1000.000 | | | | 03/24/10 |
| LCS | Cobalt-60 | 10198-40-0 | 10320 | 103.823 | % Recov | 80.000 | 120.000 | | | | 03/24/10 |
| LCS | Cesium-137 | 10045-97-3 | 6460 | 106.954 | % Recov | 80.000 | 120.000 | | | | 03/24/10 |

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Radiochemistry

SDG Number: WSCF20100415
 Matrix: SOLID
 Test: Plutonium Isotopics by AEA

Sample Date: 03/17/10
 Receive Date: 03/17/10

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|---|-------------------|------------|----------|----------|---------|-------------|-------------|--------|-----------|----|---------------|
| Lab ID: W10GR00862 BATCH QC ASSOCIATED WITH SAMPLE | | | | | | | | | | | |
| DUP | Plutonium-238 | 13981-16-3 | U3.2e-2 | | RPD | | | n/a | 20.000 | | 03/29/10 |
| DUP | Pu-239/240 by AEA | PU-239/240 | 2.3e-2 | | RPD | | | 12.245 | 20.000 | | 03/29/10 |
| DUP | Pu-242 | 13982-10-0 | 5.98 | 79.077 | % Recov | 30.000 | 105.000 | | | | 03/29/10 |
| Lab ID: W10GR00869 BATCH QC ASSOCIATED WITH SAMPLE | | | | | | | | | | | |
| SURR | Pu-242 | 13982-10-0 | 5.565 | 89.770 | % Recov | 30.000 | 105.000 | | | | 03/29/10 |
| Lab ID: W10GR00870 BATCH QC ASSOCIATED WITH SAMPLE | | | | | | | | | | | |
| SURR | Pu-242 | 13982-10-0 | 6.102 | 87.750 | % Recov | 30.000 | 105.000 | | | | 03/29/10 |
| BATCH QC | | | | | | | | | | | |
| BLANK | Plutonium-238 | 13981-16-3 | U-9.3e-3 | n/a | pCi/g | -10.000 | 1000.000 | | | | 03/29/10 |
| BLANK | Pu-239/240 by AEA | PU-239/240 | U7.5e-03 | n/a | pCi/g | -10.000 | 1000.000 | | | | 03/29/10 |
| BLANK | Pu-242 | PU242 | 6.2 | 91.630 | % Recov | 30.000 | 105.000 | | | | 03/29/10 |
| LCS | Pu-239/240 by AEA | PU-239/240 | 12.74 | 99.531 | % Recov | 80.000 | 120.000 | | | | 03/29/10 |
| LCS | Pu-242 | PU242 | 17.2 | 92.940 | % Recov | 30.000 | 105.000 | | | | 03/29/10 |

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Radiochemistry

SDG Number: WSCF20100415
 Matrix: SOLID
 Test: Strontium 89/90

Sample Date: 03/17/10
 Receive Date: 03/17/10

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|--|-------------------------------|------------|-----------|----------|---------|-------------|-------------|--------|-----------|----|---------------|
| Lab ID: W10GR00862 | | | | | | | | | | | |
| BATCH QC ASSOCIATED WITH SAMPLE | | | | | | | | | | | |
| DUP | Sr-85 Tracer by Beta Counting | SR85 | 81.5 | 81.500 | % Recov | 30.000 | 105.000 | | | | 03/19/10 |
| DUP | Strontium-89/90 | SR-RAD | 9.0 | | RPD | | | 56.000 | 20.000 | | 03/19/10 |
| Lab ID: W10GR00869 | | | | | | | | | | | |
| BATCH QC ASSOCIATED WITH SAMPLE | | | | | | | | | | | |
| SURR | Sr-85 Tracer by Beta Counting | SR85 | 91.1 | 91.100 | % Recov | 30.000 | 105.000 | | | | 03/19/10 |
| Lab ID: W10GR00870 | | | | | | | | | | | |
| BATCH QC ASSOCIATED WITH SAMPLE | | | | | | | | | | | |
| SURR | Sr-85 Tracer by Beta Counting | SR85 | 75.1 | 75.100 | % Recov | 30.000 | 105.000 | | | | 03/19/10 |
| BATCH QC | | | | | | | | | | | |
| BLANK | Sr-85 Tracer by Beta Counting | SR85 | 90.9 | 90.900 | % Recov | 30.000 | 105.000 | | | | 03/19/10 |
| BLANK | Strontium-89/90 | 10098-97-2 | U-7.5E-01 | n/a | pCi/g | -10.000 | 300.000 | | | | 03/19/10 |
| LCS | Sr-85 Tracer by Beta Counting | SR85 | 92.5 | 92.500 | % Recov | 30.000 | 105.000 | | | | 03/19/10 |
| LCS | Strontium-89/90 | 10098-97-2 | 28.1 | 98.944 | % Recov | 80.000 | 120.000 | | | | 03/19/10 |

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Radiochemistry

SDG Number: WSCF20100415
 Matrix: SOLID
 Test: TC99 by Liquid Scin.

Sample Date: 03/17/10
 Receive Date: 03/17/10

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|--|-----------------------|------------|----------|----------|---------|-------------|-------------|--------|-----------|----|---------------|
| Lab ID: W10GR00862 | | | | | | | | | | | |
| BATCH QC ASSOCIATED WITH SAMPLE | | | | | | | | | | | |
| DUP | Tc-99 by Liquid Scin. | 14133-76-7 | U-0.0 | | RPD | | | n/a | 20.000 | | 03/24/10 |
| MS | Tc-99 by Liquid Scin. | 14133-76-7 | 28.9 | 72.250 | % Recov | 75.000 | 125.000 | | | | 03/24/10 |
| BATCH QC | | | | | | | | | | | |
| BLANK | Tc-99 by Liquid Scin. | 14133-76-7 | U0.1 | n/a | pCi/g | -10.000 | 1000.000 | | | | 03/24/10 |
| LCS | Tc-99 by Liquid Scin. | 14133-76-7 | 10.1 | 101.000 | % Recov | 80.000 | 120.000 | | | | 03/24/10 |

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Radiochemistry

SDG Number: WSCF20100415
 Matrix: SOLID
 Test: Uranium Isotopics by AEA

Sample Date: 03/17/10
 Receive Date: 03/17/10

| QC Type | Analyte | CAS # | QC Found | QC Yield | Units | Lower Limit | Upper Limit | RPD(%) | RPD Limit | RQ | Analysis Date |
|--|---------------------|------------|----------|----------|---------|-------------|-------------|--------|-----------|----|---------------|
| Lab ID: W10GR00862 | | | | | | | | | | | |
| BATCH QC ASSOCIATED WITH SAMPLE | | | | | | | | | | | |
| DUP | U-232 tracer by AEA | U232 | 3.908 | 70.720 | % Recov | 30.000 | 105.000 | | | | 03/29/10 |
| DUP | Uranium-233/234 | U-233/234 | 0.11 | | RPD | | | 16.667 | 20.000 | | 03/29/10 |
| DUP | Uranium-235 | 15117-96-1 | U4.9e-3 | | RPD | | | n/a | 20.000 | | 03/29/10 |
| DUP | Uranium-238 | U-238 | 0.13 | | RPD | | | 16.667 | 20.000 | | 03/29/10 |
| Lab ID: W10GR00869 | | | | | | | | | | | |
| BATCH QC ASSOCIATED WITH SAMPLE | | | | | | | | | | | |
| SURR | U-232 tracer by AEA | U232 | 3.635 | 54.410 | % Recov | 30.000 | 105.000 | | | | 03/29/10 |
| Lab ID: W10GR00870 | | | | | | | | | | | |
| BATCH QC ASSOCIATED WITH SAMPLE | | | | | | | | | | | |
| SURR | U-232 tracer by AEA | U232 | 3.985 | 78.620 | % Recov | 30.000 | 105.000 | | | | 03/29/10 |
| BATCH QC | | | | | | | | | | | |
| BLANK | U-232 tracer by AEA | U232 | 4.049 | 79.870 | % Recov | 30.000 | 105.000 | | | | 03/29/10 |
| BLANK | Uranium-233/234 | 13966-29-5 | 3.0e-2 | 0.030 | pCi/g | -10.000 | 1000.000 | | | | 03/29/10 |
| BLANK | Uranium-235 | 15117-96-1 | U6.7e-3 | n/a | pCi/g | -10.000 | 1000.000 | | | | 03/29/10 |
| BLANK | Uranium-238 | 24678-82-8 | U1e-2 | n/a | pCi/g | -10.000 | 1000.000 | | | | 03/29/10 |
| LCS | U-232 tracer by AEA | U232 | 11.24 | 74.920 | % Recov | 30.000 | 105.000 | | | | 03/29/10 |
| LCS | Uranium-238 | 24678-82-8 | 19.21 | 101.775 | % Recov | 80.000 | 120.000 | | | | 03/29/10 |