

SAF-RC-232
100-IU-2 & 100-IU-6 Remaining
Waste Sites – Soil Full Protocol
FINAL VALIDATION PACKAGE

COMPLETE COPY OF VALIDATION PACKAGE TO:

Kathy Wendt

H4-21

KW 3/5/14
INITIAL/DATE

COMMENTS:

SDG XP0050

SAF-RC-232

Sample Location: 600-356

Date: 3 March 2014
 To: Washington Closure Hanford Inc. (technical representative)
 From: ELR Consulting
 Project: 100-IU-2 & 100-IU-6 Remaining Waste Sites – Soil Full Protocol - Waste Site
 600-356
 Subject: Inorganics - Data Package No. XP0050-GEL

INTRODUCTION

This memo presents the results of data validation on Data Package No. XP0050 prepared by GEL Laboratories (GEL). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analyte
J1T932	2/18/14	Soil	C	See note 1
J1T933	2/18/14	Soil	C	See note 1
J1T934	2/18/14	Soil	C	See note 1
J1T935	2/18/14	Soil	C	See note 1
J1T936	2/18/14	Soil	C	See note 1
J1T937	2/18/14	Soil	C	See note 1
J1T938	2/18/14	Soil	C	See note 1
J1T939	2/18/14	Soil	C	See note 1
J1T940	2/18/14	Soil	C	See note 1
J1T941	2/18/14	Soil	C	See note 1
J1T942	2/18/14	Soil	C	See note 1
J1T943	2/18/14	Soil	C	See note 1
J1T944	2/18/14	Soil	C	See note 1
J1T945	2/18/14	Soil	C	See note 1

1 – Metals by 6010C & mercury by 7471B.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, September 2009). 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 PARAMETERS

Holding Times

Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements

are as follows: Soil samples must be analyzed within 6 months for ICP metals and 28 days for mercury.

All holding times were acceptable.

· **Preparation (Method) Blanks**

Preparation Blanks

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "UJ". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

In the case of negative blank results, if the absolute value exceeds the contract required detection limit (CRDL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the instrument detection limit (IDL) and less than or equal to the CRDL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

All preparation blank results were acceptable.

Field (Equipment) Blank

One field blank (J1T945) was submitted for analysis. Ten analytes were detected in the field blank. Under the WCH statement of work, no qualification is required.

· **Accuracy**

Matrix Spike and Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 75% to 125%. Samples with a recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a recovery of 30% to 74% and a sample result less than the IDL are qualified "UJ". Samples with a recovery of greater than 125% or less than 74% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 125% and a sample result less than the IDL, no qualification is

required.

Due to matrix spike recoveries outside QC limits, all silicon (41.6%) and potassium (138%) results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

- **Precision**

- Laboratory Duplicate Samples

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike duplicate (MSD) analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the CRDL and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All laboratory duplicate results were acceptable.

- Field Duplicate

One set of field duplicates (J1T932/J1T944) were submitted for analysis. Field duplicate results are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the 100 Area RQLs to ensure that laboratory detection levels meet the required criteria. All results met the RQL.

- **Completeness**

Data package No. XP0050 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

The following minor deficiencies were noted:

- Due to matrix spike recoveries outside QC limits, all silicon (41.6%) and potassium (138%) results were qualified as estimates and flagged "J".

Data flagged "J" indicates that the associated concentration is an estimate, but under the WCH statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

Washington Closure Hanford Contract #S00W307A00 (March 2008), *Data Validation Services*, March 2008.

DOE/RL-96-22, Rev. 5, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, September 2009.

Appendix 1
Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with WCH validation SOW are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

INORGANICS DATA QUALIFICATION SUMMARY*

SDG: XP0050	REVIEWER: ELR	Project: 600-356	PAGE <u>1</u> OF <u>1</u>
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Silicon Potassium	J	All	MS recovery

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3
Annotated Laboratory Reports

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: February 26, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354
 Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0050

Client Sample ID: J1T932
 Sample ID: 343290001
 Matrix: SOIL
 Collect Date: 18-FEB-14 08:20
 Receive Date: 20-FEB-14
 Collector: Client
 Moisture: 11.5%

3/2/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	U	0.00444	0.00444	0.0132	mg/kg	1	BCD1	02/24/14	1212	1368072	1
Metals Analysis-ICP											
ICP METALS 6010TR Close-out List "Dry Weight Corrected"											
Aluminum		6950	7.46	22.0	mg/kg	1	HSC	02/24/14	1657	1368248	2
Arsenic	B	2.34	0.549	3.29	mg/kg	1					
Barium		86.1	0.110	0.549	mg/kg	1					
Beryllium	B	0.529	0.110	0.549	mg/kg	1					
Boron	B	2.72	1.10	5.49	mg/kg	1					
Cadmium	B	0.312	0.110	0.549	mg/kg	1					
Calcium		2990	8.78	27.4	mg/kg	1					
Chromium		11.0	0.165	0.549	mg/kg	1					
Copper		13.1	0.329	1.10	mg/kg	1					
Iron		22700	8.78	27.4	mg/kg	1					
Magnesium		3830	9.33	32.9	mg/kg	1					
Manganese		406	0.220	1.10	mg/kg	1					
Molybdenum	U	0.220	0.220	1.10	mg/kg	1					
Nickel		10.4	0.165	0.549	mg/kg	1					
Potassium	NF	1860	7.02	27.4	mg/kg	1					
Silicon	*NF	1210	1.65	11.0	mg/kg	1					
Silver		0.566	0.110	0.549	mg/kg	1					
Sodium		105	7.68	27.4	mg/kg	1					
Antimony	DU	1.81	1.81	5.49	mg/kg	5	HSC	02/25/14	1000	1368248	3
Cobalt	D	9.65	0.823	2.74	mg/kg	5					
Lead	D	5.96	1.81	5.49	mg/kg	5					
Vanadium	D	60.8	0.549	2.74	mg/kg	5					
Zinc	D	45.7	2.20	5.51	mg/kg	5	HSC	02/26/14	0747	1368854	4
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.365	0.365	1.11	mg/kg	2	BAJ	02/25/14	0313	1368081	5

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	KXP3	02/21/14	1100	1368079
SW846 3050B	SW846 3050B Prep for 6010C	KXP3	02/21/14	1500	1368247
SW846 3050B	SW846 3050B Prep for 6010C	KXP3	02/25/14	1400	1368853

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: February 26, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354
 Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0050

Client Sample ID: J1 T939
 Sample ID: 343290008
 Matrix: SOIL
 Collect Date: 18-FEB-14 09:10
 Receive Date: 20-FEB-14
 Collector: Client
 Moisture: 4.53%

W
3/2/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	U	0.00404	0.00404	0.0121	mg/kg	1	BCD1	02/24/14	1233	1368072	1
Metals Analysis-ICP											
ICP METALS 6010TR Close-out List "Dry Weight Corrected"											
Aluminum		5900	6.42	18.9	mg/kg	1	HSC	02/24/14	1727	1368248	2
Arsenic		2.98	0.472	2.83	mg/kg	1					
Barium		55.3	0.0944	0.472	mg/kg	1					
Beryllium		0.483	0.0944	0.472	mg/kg	1					
Boron	B	2.94	0.944	4.72	mg/kg	1					
Cadmium	B	0.471	0.0944	0.472	mg/kg	1					
Calcium		3580	7.55	23.6	mg/kg	1					
Chromium		7.51	0.142	0.472	mg/kg	1					
Copper		17.5	0.283	0.944	mg/kg	1					
Iron		23100	7.55	23.6	mg/kg	1					
Magnesium		4440	8.02	28.3	mg/kg	1					
Manganese		342	0.189	0.944	mg/kg	1					
Molybdenum	U	0.189	0.189	0.944	mg/kg	1					
Nickel		8.70	0.142	0.472	mg/kg	1					
Potassium	N J J	1050	6.04	23.6	mg/kg	1					
Silicon	*N J J	717	1.42	9.44	mg/kg	1					
Silver		0.513	0.0944	0.472	mg/kg	1					
Sodium		131	6.61	23.6	mg/kg	1					
Antimony	DU	1.56	1.56	4.72	mg/kg	5	HSC	02/25/14	1046	1368248	3
Cobalt	D	9.05	0.708	2.36	mg/kg	5					
Lead	D	6.09	1.56	4.72	mg/kg	5					
Vanadium	D	59.7	0.472	2.36	mg/kg	5					
Zinc	D	37.7	1.89	4.72	mg/kg	5	HSC	02/26/14	0831	1368854	4
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.318	0.318	1.00	mg/kg	2	BAJ	02/25/14	0447	1368081	5

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	KXP3	02/21/14	1100	1368079
SW846 3050B	SW846 3050B Prep for 6010C	KXP3	02/21/14	1500	1368247
SW846 3050B	SW846 3050B Prep for 6010C	KXP3	02/25/14	1400	1368853

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Certificate of Analysis

Report Date: February 26, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0050

Client Sample ID: J1T942	Project: WCHN00213
Sample ID: 343290011	Client ID: WCHN001
Matrix: SOIL	
Collect Date: 18-FEB-14 09:25	
Receive Date: 20-FEB-14	✓ 3/2/14
Collector: Client	
Moisture: 9.65%	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	U	0.0038	0.0038	0.0113	mg/kg	1	BCD1	02/24/14	1238	1368072	1
Metals Analysis-ICP											
ICP METALS 6010TR Close-out List "Dry Weight Corrected"											
Aluminum		6200	7.51	22.1	mg/kg	1	HSC	02/24/14	1733	1368248	2
Arsenic	B	1.66	0.552	3.31	mg/kg	1					
Barium		86.5	0.110	0.552	mg/kg	1					
Beryllium	B	0.486	0.110	0.552	mg/kg	1					
Boron	B	3.12	1.10	5.52	mg/kg	1					
Cadmium	B	0.353	0.110	0.552	mg/kg	1					
Calcium		3420	8.84	27.6	mg/kg	1					
Chromium		9.76	0.166	0.552	mg/kg	1					
Copper		13.2	0.331	1.10	mg/kg	1					
Iron		22700	8.84	27.6	mg/kg	1					
Magnesium		3650	9.39	33.1	mg/kg	1					
Manganese		401	0.221	1.10	mg/kg	1					
Molybdenum	U	0.221	0.221	1.10	mg/kg	1					
Nickel		9.24	0.166	0.552	mg/kg	1					
Potassium	NJ	1770	7.07	27.6	mg/kg	1					
Silicon	*N JS	1030	1.66	11.0	mg/kg	1					
Silver	B	0.498	0.110	0.552	mg/kg	1					
Sodium		122	7.73	27.6	mg/kg	1					
Antimony	DU	1.82	1.82	5.52	mg/kg	5	HSC	02/25/14	1057	1368248	3
Cobalt	D	9.31	0.828	2.76	mg/kg	5					
Lead	D	6.68	1.82	5.52	mg/kg	5					
Vanadium	D	59.0	0.552	2.76	mg/kg	5					
Zinc	D	45.4	2.20	5.49	mg/kg	5	HSC	02/26/14	0842	1368854	4
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.338	0.338	1.02	mg/kg	2	BAJ	02/25/14	0527	1368081	5

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	KXP3	02/21/14	1100	1368079
SW846 3050B	SW846 3050B Prep for 6010C	KXP3	02/21/14	1500	1368247
SW846 3050B	SW846 3050B Prep for 6010C	KXP3	02/25/14	1400	1368853

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: February 26, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354
 Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0050

Client Sample ID: J1T945
 Sample ID: 343290014
 Matrix: SOIL
 Collect Date: 18-FEB-14 08:15
 Receive Date: 20-FEB-14
 Collector: Client
 Moisture: <0.1%

Project: WCHN00213
 Client ID: WCHN001

✓ 2/21/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	U	0.00342	0.00342	0.0102	mg/kg	1	BCD1	02/24/14	1243	1368072	1
Metals Analysis-ICP											
ICP METALS 6010TR Close-out List "Dry Weight Corrected"											
Aluminum		88.6	6.55	19.3	mg/kg	1	HSC	02/24/14	1739	1368248	2
Antimony	U	0.318	0.318	0.963	mg/kg	1					
Arsenic	U	0.482	0.482	2.89	mg/kg	1					
Barium		1.61	0.0963	0.482	mg/kg	1					
Beryllium	U	0.0963	0.0963	0.482	mg/kg	1					
Boron	U	0.963	0.963	4.82	mg/kg	1					
Cadmium	U	0.0963	0.0963	0.482	mg/kg	1					
Calcium		30.7	7.71	24.1	mg/kg	1					
Chromium	U	0.145	0.145	0.482	mg/kg	1					
Cobalt	U	0.145	0.145	0.482	mg/kg	1					
Copper	U	0.289	0.289	0.963	mg/kg	1					
Iron		184	7.71	24.1	mg/kg	1					
Lead	U	0.318	0.318	0.963	mg/kg	1					
Magnesium	B	11.2	8.19	28.9	mg/kg	1					
Manganese		4.11	0.193	0.963	mg/kg	1					
Molybdenum	U	0.193	0.193	0.963	mg/kg	1					
Nickel	U	0.145	0.145	0.482	mg/kg	1					
Potassium	N J	30.0	6.17	24.1	mg/kg	1					
Silicon	*N	128	1.45	9.63	mg/kg	1					
Silver	U	0.0963	0.0963	0.482	mg/kg	1					
Sodium	U	6.74	6.74	24.1	mg/kg	1					
Vanadium	B	0.201	0.0963	0.482	mg/kg	1					
Zinc		2.87	0.361	0.903	mg/kg	1	HSC	02/26/14	0854	1368854	3
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.317	0.317	1.00	mg/kg	2	BAJ	02/25/14	0547	1368081	4

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	KXP3	02/21/14	1100	1368079
SW846 3050B	SW846 3050B Prep for 6010C	KXP3	02/21/14	1500	1368247
SW846 3050B	SW846 3050B Prep for 6010C	KXP3	02/25/14	1400	1368853

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

**Metals Fractional Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0050**

Sample Analysis

Sample ID	Client ID
343290001	J1T932
343290002	J1T933
343290003	J1T934
343290004	J1T935
343290005	J1T936
343290006	J1T937
343290007	J1T938
343290008	J1T939
343290009	J1T940
343290010	J1T941
343290011	J1T942
343290012	J1T943
343290013	J1T944
343290014	J1T945
1203039657	Method Blank (MB) ICP
1203041116	Method Blank (MB) ICP
1203039658	Laboratory Control Sample (LCS)
1203041117	Laboratory Control Sample (LCS)
1203039661	343290001(J1T932L) Serial Dilution (SD)
1203039659	343290001(J1T932D) Sample Duplicate (DUP)
1203039660	343290001(J1T932S) Matrix Spike (MS)
1203040879	343290001(J1T932PS) Post Spike (PS)
1203039307	Method Blank (MB) ICP-MS
1203039308	Laboratory Control Sample (LCS)
1203039311	343290001(J1T932L) Serial Dilution (SD)
1203039309	343290001(J1T932D) Sample Duplicate (DUP)
1203039310	343290001(J1T932S) Matrix Spike (MS)
1203039291	Method Blank (MB) CVAA
1203039292	Laboratory Control Sample (LCS)
1203039295	343290001(J1T932L) Serial Dilution (SD)

1203039293 343290001(J1T932D) Sample Duplicate (DUP)
1203039294 343290001(J1T932S) Matrix Spike (MS)

The samples in this SDG were analyzed on a "dry weight" basis.

Method/Analysis Information

Analytical Batch: 1368248, 1368854, 1368081 and 1368072
Prep Batch : 1368247, 1368853, 1368079 and 1368071
Standard Operating Procedures: GL-MA-E-013 REV# 22, GL-MA-E-009 REV# 22, GL-MA-E-014 REV# 25 and GL-MA-E-010 REV# 27
Analytical Method: SW846 3050B/6010C, SW846 3050B/6020A and SW846 7471B
Prep Method : SW846 3050B and SW846 7471B Prep

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

System Configuration

The Metals analysis-ICP was performed on a PE 7300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with a Burgener nebulizer, cyclonic spray chamber, and yttrium or scandium internal standard. Operating conditions for the ICP are set at a power level of 1500 watts. The instrument has a peristaltic pump flow rate of 1.4L/min, argon gas flows of 15 L/min and 0.2 L/min for the torch and auxiliary gases, and a flow setting of 0.65L/min for the nebulizer.

The Metals analysis - ICPMS was performed on a Perkin Elmer ELAN 9000 inductively coupled plasma mass spectrometer (ICP-MS). The instrument is equipped with a cross-flow nebulizer, quadrupole mass spectrometer, and dual mode electron multiplier detector. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum. Operating conditions are set at 1400W power and combined argon pressures of 360+/- 7 kPa for the plasma and auxiliary gases, and 0.85 L/min carrier gas flow, and an initial lens voltage of 5.2.

The Metals analysis-Mercury was performed on a Perkin-Elmer Flow Injection Mercury System (FIMS-100) automated mercury analyzer. The instrument consists of a cold vapor atomic absorption spectrometer set to detect mercury at a wavelength of 253.7 nm. Sample introduction through the flow injection system is performed via a peristaltic pump at 9 mL/min and nitrogen carrier gas rate of 80 mL/min.

Calibration Information

Instrument Calibration

All initial calibration requirements have been met for this sample delivery group (SDG).

CRDL Requirements

The CRDL standard recoveries met the referenced advisory control limits.

ICSA/ICSAB Statement

All interference check samples (ICSA and ICSAB) associated with this SDG met the established acceptance criteria.

Continuing Calibration Blank (CCB) Requirements

All continuing calibration blanks (CCB) bracketing this batch met the established acceptance criteria.

Continuing Calibration Verification (CCV) Requirements

All continuing calibration verifications (CCV) bracketing this SDG met the acceptance criteria.

Quality Control (QC) Information

Method Blank (MB) Statement

The MBs analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Sample Statement

The following samples were selected as the quality control (QC) samples for this SDG: 343290001 (J1T932)-ICP, ICP-MS and CVAA.

Matrix Spike (MS) Recovery Statement

The percent recoveries (%R) obtained from the MS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The MS did not meet all the recommended quality control acceptance criteria for percent recoveries for the applicable analytes. The recoveries for potassium and silicon were not within the acceptance limits in sample 1203039660 (J1T932)-ICP. See data exception report (DER ID 1270242) in the miscellaneous data section in this data package.

Duplicate Relative Percent Difference (RPD) Statement

The relative percent difference (RPD) obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required reporting limit (RL). In cases where either the sample or duplicate value is less than 5X the contract required detection limit (RL), a control of +/-RL is used to evaluate the DUP results. Not all applicable analytes met these requirements. The RPD value for silicon was not within the acceptance limits in sample 1203039659 (J1T932). See data exception report (DER ID 1270242)

in the miscellaneous data section in this data package.

Post Spike (PS) Recovery Statement

The percent recoveries (%R) obtained from the PS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The PS did not meet the recommended quality control acceptance criteria for silicon and verifies the presence of matrix interferences. See data exception report (DER ID 1270242) in the miscellaneous data section in this data package.

Serial Dilution % Difference Statement

The serial dilution is used to assess matrix suppression or enhancement. Raw element concentrations that are 25X the IDL/MDL for CVAA, 50X the IDL/MDL for ICP, and 100X the IDL/MDL for ICP-MS analyses are applicable for serial dilution assessment. All applicable analytes met the established acceptance criteria.

Technical Information

Holding Time Specifications

GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection of sample receipt. Those holding times expressed in hours are *calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration.* All samples in this SDG met the specified holding time.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP. Method SW-846 3050B is not a total digestion technique for most samples. It is a very strong acid digestion that will dissolve almost all elements that could become environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Sample Dilutions

Dilutions are performed to minimize matrix interferences resulting from elevated mineral element concentrations present in solid samples and/or to bring over range target analyte concentrations into the linear calibration range of the instrument. Samples 343290001 (J1T932), 343290002 (J1T933), 343290003 (J1T934), 343290004 (J1T935), 343290005 (J1T936), 343290006 (J1T937), 343290007 (J1T938), 343290008 (J1T939), 343290009 (J1T940), 343290010 (J1T941), 343290011 (J1T942), 343290012 (J1T943) and 343290013 (J1T944)-ICP were diluted because the titanium concentration exceeded the linear range of the instrument which affected antimony, cobalt, lead, vanadium, and zinc. Samples in this SDG were diluted the standard two times for soil samples analyzed on the ICPMS.

Preparation Information

The samples in this SDG were prepared exactly according to the cited SOP.

Miscellaneous Information

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. Data exception report (DER ID 1270242) was generated for this SDG.

Additional Comments

Additional comments were not required for this SDG.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Review Validation:

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

The following data validator verified the information presented in this case narrative:

Reviewer: _____ **Date:** _____

DATA EXCEPTION REPORT			
Mo. Day Yr. 25-FEB-14	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: ICP	Test / Method: SW846 3050B/6010C	Matrix Type: Solid	Client Code: WCHN
Batch ID: 1368248	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 343290(XP0050)			
Application Issues: Failed Recovery for MS/PS Failed RPD for DUP			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Failed Recovery for MS/PS: QC 1203039660MS, 1203040879PS</p> <p>2. Failed RPD for DUP: QC 1203039859DUP</p>		<p>1. The matrix spike recovery failed outside of the control limits for potassium and silicon. The post spike failed outside the required control limits for silicon but passed for all other analytes. This verifies the presence of a matrix interference for silicon and verifies the absence of a matrix interference for all the other analytes. Per GEL's accredited methods and SOPs, a corrective action is not required and the data is qualified and reported.</p> <p>2. The sample and sample duplicate % RPD failed outside the control limits for silicon due to possible sample non-homogeneity and/or matrix interference. Per GEL's accredited methods and SOPs, a corrective action is not required and the data is qualified and reported.</p>	

Originator's Name:
Helen Camello 25-FEB-14

Data Validator/Group Leader:
Louise Smith 26-FEB-14

343290

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-232-074	Page 1 of 3
Collector WHITE, EC	Company Contact Joan Kessner	Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 8B	Data Turnaround 7day		
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites	Sampling Location 600-356	SAF No. RC-232					
Ice Chest No. WCH-11-014	Field Logbook No. EL-1666-01	COA 0603562000	Method of Shipment Commerical Carrier -- fed EX				
Shipped To GEL Laboratories Charlston	Offsite Property No. A131050	Bill of Lading/Air Bill No. See OSPC					

Other Labs Shipped To NA	Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C								
	Type of Container	GP	#G	#G	#G								
	No. of Container(s)	1	1	1	1								
	Volume	125mL	125mL	125mL	125mL								
POSSIBLE SAMPLE HAZARDS/REMARKS None	No. of Containers	1	1	1	1								
Special Handling and/or Storage Cool 4c	Sample Analysis	See item (1) in Special Instructions	TPH-Diesel Range - WTPH-D +	PAHs - 8310	PCBs - 8062								

Sample No.	Matrix	Sample Date	Sample Time										
J1T932	SOIL	2-18-14	0820	X	X	X	X						
J1T933	SOIL	2-18-14	0830	X	X	X	X						
J1T934	SOIL	2-18-14	0840	X	X	X	X						
J1T935	SOIL	2-18-14	0850	X	X	X	X						
-J1T936	SOIL	2-18-14	0855	X	X	X	X						

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
E. White / G. W. W	2-18-14 0940	R. Fahlers	2-18-14 0940
R. Fahlers	2-18-14 1520	E. Bingham	2-18-14 1520
G. Bingham	2-18-14 1525	1000 Battelle	2-18-14 1525
1000 Battelle	2-19-14 0920	E. Bingham	2-19-14 0920
E. Bingham	2-19-14 0925	Fed EX	
Fed EX		J. J. Fellegini	2-20-14 0905

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010TR (Close-out List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7471 - (CV) (Mercury)

REVIEWED BY
K. WOOD VIATMAN
DATE
2-19-14

XP0050

FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time
WCH-EE-011			

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Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-232-074	Page 2 of 3
Collector WHITE, EC	Company Contact Joan Kessner	Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 8B	Data Turnaround		
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites	Sampling Location 600-356	SAF No. RC-232	7 Day				
Ice Chest No. WCH-11-014	Field Logbook No. EL-166-01	COA. 0603562000	Method of Shipment Commerical Carrier fed EX				
Shipped To GEL Laboratories Charlston	Offsite Property No. A131050	Bill of Lading/Air Bill No. SPR OSPC					

Other Labs Shipped To NA	Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C								
	Type of Container	G/P	gG	gG	gG								
	No. of Container(s)	1	1	1	1								
	Volume	125mL	125mL	125mL	125mL								
POSSIBLE SAMPLE HAZARDS/REMARKS None	Sample Analysis	See item (1) in Special Instructions	TPH-Diesel Range - WTPH-D +	PAHs - 8310	PCBs - 8082								
Special Handling and/or Storage Cool 4c													

Sample No.	Matrix	Sample Date	Sample Time										
J1T937	SOIL	2-18-14	0900	X	X	X	X						
J1T938	SOIL	2-18-14	0905	X	X	X	X						
J1T939	SOIL	2-18-14	0910	X	X	X	X						
J1T940	SOIL	2-18-14	0915	X	X	X	X						
J1T941	SOIL	2-18-14	0920	X	X	X	X						

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
E. White/EC	2-18-14 0940	R. Fabian	2-18-14 0940
R. Fabian	2-18-14 1520	E. Bingham	2-18-14 1520
E. Bingham	2-18-14 1525	1060 Battelle, fridge	2-18-14 1525
1060 Battelle, fridge	2-19-14 0920	E. Bingham	2-19-14 0920
E. Bingham	2-19-14 0925	fed EX	
fed EX		J. Jennifer Pellegrini	2-20-14 0905

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010TR (Close-out List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7471 - (CV) (Mercury)



XP0050

FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time
WCH-EE-011			

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Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-232-074		Page 3 of 3	
Collector WHITE, EC		Company Contact Joan Kessner		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8B Data Turnaround 7 Days	
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites		Sampling Location 600-356		SAF No. RC-232					
Ice Chest No. WCH-11-014		Field Logbook No. EL-1666-01		COA 0603562000		Method of Shipment Commercial Carrier fed ex			
Shipped To GEL Laboratories Charleston		Offsite Property No. A131050		Bill of Lading/Air Bill No. See OSPC					
Other Labs Shipped To NA		Preservation		Cool 4C	Cool 4C	Cool 4C	Cool 4C		
		Type of Container		GP	gG	gG	gG		
POSSIBLE SAMPLE HAZARDS/REMARKS None		No. of Container(s)		1	1	1	1		
		Volume		125mL	125mL	125mL	125mL		
Special Handling and/or Storage Cool 4c		Sample Analysis		See item (1) in Special Instructions	TPH-Diesel Range - WTPH-D +	PAHs - 8310	PCBs - 8062		
Sample No.	Matrix	Sample Date	Sample Time						
J1T942	SOIL	2-18-14	0925	X	X	X	X		
J1T943	SOIL	2-18-14	0930	X	X	X	X		
J1T944	SOIL	2-18-14	0820	X	X	X	X		
J1T945	SOIL	2-18-14	0815	X	X	X	X		
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS	
Relinquished By/Removed From E. White/Joan White 2-18-14 0940		Date/Time		Received By/Stored In R. Fabian R. Fabian 2-18-14		Date/Time		(1) ICP Metals - 6010TR (Close-out List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7471 - (CV) (Mercury)	
Relinquished By/Removed From R. Fabian R. Fabian 2-18-14 1520		Date/Time		Received By/Stored In G. Bingham 2-18-14 1520		Date/Time			
Relinquished By/Removed From G. Bingham 2-18-14 1525		Date/Time		Received By/Stored In 1060 Battelle, fridge 2-18-14		Date/Time			
Relinquished By/Removed From 1060 Battelle, fridge 2-19-14 0920		Date/Time		Received By/Stored In G. Bingham 2-19-14 0920		Date/Time			
Relinquished By/Removed From G. Bingham 2-19-14 0925		Date/Time		Received By/Stored In fed ex		Date/Time			
Relinquished By/Removed From Fed Ex		Date/Time		Received By/Stored In G. Bingham 2-20-14 0925		Date/Time			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time			
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time		XP0050	



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WCH-EE-011

Appendix 5
Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 600-356			DATA PACKAGE: XP0050		
VALIDATOR: ELR	LAB: Gre		DATE: 3/2/14		
		SDG: XP0050			
ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide		
SAMPLES/MATRIX					
J1T932	J1T933	J1T934	J1T935	J1T936	
J1T937	J1T938	J1T939	J1T940	J1T941	
J1T942	J1T943	J1T944	J1T945		
					Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? Yes No N/A

Comments: _____

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: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

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: _____

FB - 10 detectors

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: MS - Silicon (41.6%) - potassium (135%) - July

NO PAS

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

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: _____

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: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

7. FURNACE AA QUALITY CONTROL (Levels D and E)

- Duplicate injections performed as required? Yes No **N/A**
- Duplicate injection %RSD values acceptable? Yes No **N/A**
- Analytical spikes performed as required? Yes No **N/A**
- Analytical spike recoveries acceptable? Yes No **N/A**
- Standards traceable? Yes No **N/A**
- Standards expired? Yes No **N/A**
- MSA performed as required? Yes No **N/A**
- MSA results acceptable? Yes No **N/A**
- Transcription/calculation errors? Yes No **N/A**

Comments: _____

8. HOLDING TIMES (all levels)

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

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

9. 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: _____

Appendix 6
Additional Documentation Requested by Client

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: February 26, 2014

Page 1 of 8

WC-Hanford, Inc.
2620 Fermi Avenue
MSIN H4-21
Richland, Washington
Joan Kessner

Contact:

Workorder: 343290

Client SDG: XP0050

Project Description: RC-232 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1368081										
QC1203039309	343290001	DUP									
Selenium		DU	0.365	DU	0.371	mg/kg	N/A ^		BAJ	02/25/14	03:20
QC1203039308	LCS										
Selenium	4.90			D	4.45	mg/kg	90.7	(80%-120%)		02/25/14	02:53
QC1203039307	MB										
Selenium				DU	0.329	mg/kg				02/25/14	02:47
QC1203039310	343290001	MS									
Selenium	5.49	DU	0.365	D	4.40	mg/kg	80.1	(75%-125%)		02/25/14	03:27
QC1203039311	343290001	SDILT									
Selenium		DU	-0.598	DU	1.74	ug/L	N/A	(0%-10%)		02/25/14	03:40
Metals Analysis-ICP											
Batch	1368248										
QC1203039659	343290001	DUP									
Aluminum			6950		6750	mg/kg	2.95	(0%-20%)	HSC	02/24/14	16:59
Antimony		DU	1.81	DU	1.81	mg/kg	N/A ^			02/25/14	10:04
Arsenic		B	2.34	B	2.52	mg/kg	7.58 ^	(+/-3.29)		02/24/14	16:59
Barium			86.1		100	mg/kg	14.9	(0%-20%)			
Beryllium		B	0.529	B	0.534	mg/kg	0.779 ^	(+/-0.549)			
Boron		B	2.72	B	3.27	mg/kg	18.4 ^	(+/-5.49)			
Cadmium		B	0.312	B	0.354	mg/kg	12.7 ^	(+/-0.549)			
Calcium			2990		3030	mg/kg	1.53	(0%-20%)			
Chromium			11.0		11.1	mg/kg	0.318	(0%-20%)			
Cobalt		D	9.65	D	9.73	mg/kg	0.906 ^	(+/-2.74)		02/25/14	10:04
Copper			13.1		15.0	mg/kg	13.2	(0%-20%)		02/24/14	16:59
Iron			22700		22500	mg/kg	0.558	(0%-20%)			

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 343290

Client SDG: XP0050

Project Description: RC-232 Soil

Page 2 of 8

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch 1368248											
Lead		D	5.96 D	5.77	mg/kg	3.16 ^		(+/-5.49)	HSC	02/25/14	10:04
Magnesium			3830	3670	mg/kg	4.14		(0%-20%)		02/24/14	16:59
Manganese			406	407	mg/kg	0.235		(0%-20%)			
Molybdenum		U	0.220 U	0.220	mg/kg	N/A ^					
Nickel			10.4	11.1	mg/kg	6.37		(0%-20%)			
Potassium		N	1860	2000	mg/kg	7.51		(0%-20%)			
Silicon		*N	1210 *	964	mg/kg	22.3*		(0%-20%)			
Silver			0.566 B	0.544	mg/kg	4.04 ^		(+/-0.549)			
Sodium			105	102	mg/kg	2.54 ^		(+/-27.4)			
Vanadium		D	60.8 D	64.3	mg/kg	5.58		(0%-20%)		02/25/14	10:04
QC1203039658	LCS										
Aluminum			491	495	mg/kg		101	(80%-120%)		02/24/14	16:54
Antimony			49.1	51.0	mg/kg		104	(80%-120%)			
Arsenic			49.1	49.7	mg/kg		101	(80%-120%)			
Barium			49.1	50.4	mg/kg		103	(80%-120%)			
Beryllium			49.1	54.5	mg/kg		111	(80%-120%)			
Boron			49.1	49.2	mg/kg		100	(80%-120%)			
Cadmium			49.1	51.5	mg/kg		105	(80%-120%)			
Calcium			491	495	mg/kg		101	(80%-120%)			
Chromium			49.1	50.4	mg/kg		103	(80%-120%)			
Cobalt			49.1	50.0	mg/kg		102	(80%-120%)			
Copper			49.1	51.9	mg/kg		106	(80%-120%)			

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 343290

Client SDG: XP0050

Project Description: RC-232 Soil

Page 3 of 8

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1368248										
Iron	491			503	mg/kg		102	(80%-120%)	HSC	02/24/14	16:54
Lead	49.1			51.4	mg/kg		105	(80%-120%)			
Magnesium	491			500	mg/kg		102	(80%-120%)			
Manganese	49.1			50.4	mg/kg		103	(80%-120%)			
Molybdenum	49.1			49.4	mg/kg		100	(80%-120%)			
Nickel	49.1			51.4	mg/kg		105	(80%-120%)			
Potassium	491			499	mg/kg		102	(80%-120%)			
Silicon	491			454	mg/kg		92.5	(80%-120%)			
Silver	49.1			50.1	mg/kg		102	(80%-120%)			
Sodium	491			492	mg/kg		100	(80%-120%)			
Vanadium	49.1			50.8	mg/kg		104	(80%-120%)			
QC1203039657	MB										
Aluminum			U	6.77	mg/kg					02/24/14	16:50
Antimony			U	0.329	mg/kg						
Arsenic			U	0.498	mg/kg						
Barium			U	0.0996	mg/kg						
Beryllium			U	0.0996	mg/kg						
Boron			U	0.996	mg/kg						
Cadmium			U	0.0996	mg/kg						
Calcium			U	7.97	mg/kg						
Chromium			U	0.149	mg/kg						
Cobalt			U	0.149	mg/kg						

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QC Summary

Workorder: 343290

Client SDG: XP0050

Project Description: RC-232 Soil

Page 4 of 8

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch 1368248											
Copper			U	0.299	mg/kg				HSC	02/24/14	16:50
Iron			U	7.97	mg/kg						
Lead			U	0.329	mg/kg						
Magnesium			U	8.47	mg/kg						
Manganese			U	0.199	mg/kg						
Molybdenum			U	0.199	mg/kg						
Nickel			U	0.149	mg/kg						
Potassium			U	6.37	mg/kg						
Silicon			U	1.49	mg/kg						
Silver			U	0.0996	mg/kg						
Sodium			U	6.97	mg/kg						
Vanadium			U	0.0996	mg/kg						
QC1203039660	343290001	MS									
Aluminum	556			6950	9910	mg/kg	N/A	(75%-125%)		02/24/14	17:01
Antimony	55.6	DU	1.81	D	53.5	mg/kg	94.5	(75%-125%)		02/25/14	10:08
Arsenic	55.6	B	2.34		55.4	mg/kg	95.4	(75%-125%)		02/24/14	17:01
Barium	55.6		86.1		139	mg/kg	95.6	(75%-125%)			
Beryllium	55.6	B	0.529		56.9	mg/kg	101	(75%-125%)			
Boron	55.6	B	2.72		55.8	mg/kg	95.4	(75%-125%)			
Cadmium	55.6	B	0.312		53.5	mg/kg	95.6	(75%-125%)			
Calcium	556		2990		3690	mg/kg	N/A	(75%-125%)			
Chromium	55.6		11.0		66.0	mg/kg	98.8	(75%-125%)			

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QC Summary

Workorder: 343290

Client SDG: XP0050

Project Description: RC-232 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1368248										
Cobalt	55.6	D	9.65 D	66.1	mg/kg		102	(75%-125%)	HSC	02/25/14	10:08
Copper	55.6		13.1	74.6	mg/kg		110	(75%-125%)		02/24/14	17:01
Iron	556		22700	24400	mg/kg		N/A	(75%-125%)			
Lead	55.6	D	5.96 D	63.3	mg/kg		103	(75%-125%)		02/25/14	10:08
Magnesium	556		3830	4620	mg/kg		N/A	(75%-125%)		02/24/14	17:01
Manganese	55.6		406	447	mg/kg		N/A	(75%-125%)			
Molybdenum	55.6	U	0.220	51.6	mg/kg		92.8	(75%-125%)			
Nickel	55.6		10.4	66.2	mg/kg		100	(75%-125%)			
Potassium	556	N	1860 N	2630	mg/kg		138 *	(75%-125%)			
Silicon	556	*N	1210 N	1440	mg/kg		41.6 *	(75%-125%)			
Silver	55.6		0.566	55.1	mg/kg		98	(75%-125%)			
Sodium	556		105	682	mg/kg		104	(75%-125%)			
Vanadium	55.6	D	60.8 D	118	mg/kg		103	(75%-125%)		02/25/14	10:08
QC1203040879	343290001	PS									
Potassium	5000	N	16900	21500	ug/L		90.5	(80%-120%)		02/25/14	10:15
Silicon	5000	*N	11000	18700	ug/L		154 *	(80%-120%)			
QC1203039661	343290001	SDILT									
Aluminum			63300 D	12900	ug/L	1.62		(0%-10%)		02/24/14	17:03
Antimony		DU	1.65 DU	9.06	ug/L	N/A		(0%-10%)		02/25/14	10:11
Arsenic		B	21.3 D	5.78	ug/L	35.6		(0%-10%)		02/24/14	17:03
Barium			784 D	163	ug/L	3.58		(0%-10%)			
Beryllium		B	4.82 D	1.15	ug/L	18.9		(0%-10%)			
Boron		B	24.8 DU	5.49	ug/L	N/A		(0%-10%)			

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QC Summary

Workorder: 343290

Client SDG: XP0050

Project Description: RC-232 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1368248										
Cadmium		B	2.84	DU	0.549	ug/L	N/A	(0%-10%)	HSC	02/24/14	17:03
Calcium			27200	D	5540	ug/L	1.68	(0%-10%)			
Chromium			100	D	20.6	ug/L	2.4	(0%-10%)			
Cobalt		D	17.6	D	3.45	ug/L	1.81	(0%-10%)		02/25/14	10:11
Copper			119	D	23.1	ug/L	3.24	(0%-10%)		02/24/14	17:03
Iron			206000	D	43200	ug/L	4.69	(0%-10%)			
Lead		D	10.9	DU	9.06	ug/L	N/A	(0%-10%)		02/25/14	10:11
Magnesium			34900	D	7130	ug/L	2.23	(0%-10%)		02/24/14	17:03
Manganese			3700	D	767	ug/L	3.68	(0%-10%)			
Molybdenum		U	-5.03	DU	1.10	ug/L	N/A	(0%-10%)			
Nickel			95.1	D	19.8	ug/L	4.03	(0%-10%)			
Potassium		N	16900	D	3410	ug/L	.599	(0%-10%)			
Silicon		*N	11000	D	2260	ug/L	2.94	(0%-10%)			
Silver			5.16	DU	0.549	ug/L	N/A	(0%-10%)			
Sodium			953	D	200	ug/L	4.89	(0%-10%)			
Vanadium		D	111	D	22.2	ug/L	.325	(0%-10%)		02/25/14	10:11
Batch	1368854										
QC1203039659	343290001	DUP									
Zinc		D	45.7	D	46.7	mg/kg	2.18	(0%-20%)	HSC	02/26/14	07:50
QC1203041117	LCS										
Zinc			49.8		53.1	mg/kg	107	(80%-120%)		02/26/14	07:44
QC1203041116	MB										
Zinc				B	0.564	mg/kg				02/26/14	07:40
QC1203039660	343290001	MS									

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QC Summary

Workorder: 343290 Client SDG: XP0050 Project Description: RC-232 Soil Page 7 of 8

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1368854										
Zinc	54.0	D	45.7	D	107	mg/kg	113	(75%-125%)		02/26/14	07:54
QC1203039661	343290001	SDILT									
Zinc		D	82.9	D	15.8	ug/L	4.63	(0%-10%)	HSC	02/26/14	07:57
Metals Analysis-Mercury											
Batch	1368072										
QC1203039293	343290001	DUP									
Mercury		U	0.00444	U	0.00434	mg/kg	N/A ^		BCD1	02/24/14	12:13
QC1203039292	LCS				0.116	mg/kg	96.1	(80%-120%)		02/24/14	12:10
Mercury					0.112	mg/kg					
QC1203039291	MB			B	-0.0041	mg/kg				02/24/14	12:08
Mercury											
QC1203039294	343290001	MS									
Mercury	0.135	U	0.00444		0.132	mg/kg	96.2	(80%-120%)		02/24/14	12:15
QC1203039295	343290001	SDILT									
Mercury		U	0.023	DU	0.0222	ug/L	N/A	(0%-10%)		02/24/14	12:17

Notes:

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank, and the sample concentration was <= 5 times the blank concentration.
- D Results are reported from a diluted aliquot of sample.
- E Reported value is estimated due to interferences. See comment in narrative.
- M Duplicate precision not met.
- N Spike Sample recovery is outside control limits.
- S Reported value determined by the Method of Standard Additions (MSA)
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- W Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

Date: 3 March 2014
 To: Washington Closure Hanford Inc. (technical representative)
 From: ELR Consulting
 Project: 100-IU-2 & 100-IU-6 Remaining Waste Sites – Soil Full Protocol - Waste Site 600-356
 Subject: Diesel Range Organics - Data Package No. XP0050-GEL

INTRODUCTION

This memo presents the results of data validation on Data Package No. XP0050 prepared by GEL Laboratories (GEL). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analyte
J1T932	2/18/14	Soil	C	See note 1
J1T933	2/18/14	Soil	C	See note 1
J1T934	2/18/14	Soil	C	See note 1
J1T935	2/18/14	Soil	C	See note 1
J1T936	2/18/14	Soil	C	See note 1
J1T937	2/18/14	Soil	C	See note 1
J1T938	2/18/14	Soil	C	See note 1
J1T939	2/18/14	Soil	C	See note 1
J1T940	2/18/14	Soil	C	See note 1
J1T941	2/18/14	Soil	C	See note 1
J1T942	2/18/14	Soil	C	See note 1
J1T943	2/18/14	Soil	C	See note 1
J1T944	2/18/14	Soil	C	See note 1

1 – Diesel range organics by NWTPH-d.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, September 2009). 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 Data Requested by Client

DATA QUALITY OBJECTIVES

Holding Times

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Analytes must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all *associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR"*.

All holding times were acceptable.

Method Blanks

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

All method blank results were acceptable.

Field (equipment) Blanks

No field blanks were submitted for analysis.

Accuracy

Matrix Spike/Matrix Spike Duplicate & Blank Spike Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in

duplicate using five compounds for which percent recoveries must be within a range of 50-150% or within laboratory control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries below control limits are qualified as estimates and flagged "UJ". Undetected sample results are not qualified if the spike recovery is above control limits. Sample results greater than five times the spike concentration require no qualification.

All accuracy results were acceptable.

Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the contract required quantitation limit (CRQL) are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the CRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

All surrogate results were acceptable.

Precision

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All duplicate results were acceptable.

Field Duplicate Samples

One set of field duplicates (J1T932/J1T944) were submitted for analysis. Field duplicate results are compared using the same criteria as for laboratory duplicates. All

field duplicate results were acceptable.

· **Analytical Detection Levels**

Reported analytical detection levels are compared against the required quantitation limits (RQL's) to ensure that laboratory detection levels meet the required criteria. All analytes met the RQL.

· **Completeness**

Data package No. XP0050 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

Washington Closure Hanford Contract #S00W307A00 (March 2008), *Data Validation Services*, March 2008.

DOE/RL-96-22, Rev. 5, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, September 2009.

Appendix 1
Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the WCH validation SOW are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the same quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

DIESEL RANGE ORGANICS DATA QUALIFICATION SUMMARY*

SDG: XP0050	REVIEWER: ELR	Project: 600-356	PAGE <u>1</u> OF <u>1</u>
COMMENTS: No qualifiers assigned			

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3
Annotated Laboratory Reports

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Certificate of Analysis

Report Date: February 25, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354
 Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0050

Client Sample ID: J1T933
 Sample ID: 343290002
 Matrix: SOIL
 Collect Date: 18-FEB-14 08:30
 Receive Date: 20-FEB-14
 Collector: Client
 Moisture: 5.68%

Project: WCHN00213
 Client ID: WCHN001

✓ 3/2/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Diesel Range Organics											
SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"											
Diesel Range Organics (C10-C20)	J	3610	2290	7040	ug/kg	1	BYT1	02/25/14	0617	1367952	1
Motor Oil (C20-C36)		64400	2290	7040	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	3541 DRO IN SOIL PREP	SJW1	02/21/14	1035	1367951

The following Analytical Methods were performed:

Method	Description	Analyst Comments
I	NWTPH-Dx in Soil	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
o-Terphenyl	SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"	493 ug/kg	704	70.0	(50%-150%)

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: February 25, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354
 Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0050

Client Sample ID: J1T936
 Sample ID: 343290005
 Matrix: SOIL
 Collect Date: 18-FEB-14 08:55
 Receive Date: 20-FEB-14
 Collector: Client
 Moisture: 6.75%

Project: WCHN00213
 Client ID: WCHN001

3/2/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Diesel Range Organics											
SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"											
Diesel Range Organics (C10-C20)	U	2310	2310	7120	ug/kg	1	BYT1	02/24/14	2155	1367952	1
Motor Oil (C20-C36)		8840	2310	7120	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	3541 DRO IN SOIL PREP	SJW1	02/21/14	1035	1367951

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	NWTPH-Dx in Soil	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
o-Terphenyl	SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"	553 ug/kg	712	77.6	(50%-150%)

Notes:

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

**FID Diesel Range Organics
WC-HANFORD, INC. (WCHN)
SDG XP0050**

Method/Analysis Information

Procedure: Analysis of Diesel Range Organics by Flame Ionization Detector
Analytical Method: NWTPH-Dx in Soil
Prep Method: SW846 3541
Analytical Batch Number: 1367952
Prep Batch Number: 1367951

Sample Analysis

The following samples were analyzed using the analytical protocol as established in NWTPH-Dx in Soil:

Sample ID	Client ID
343290001	J1T932
343290002	J1T933
343290003	J1T934
343290004	J1T935
343290005	J1T936
343290006	J1T937
343290007	J1T938
343290008	J1T939
343290009	J1T940
343290010	J1T941
343290011	J1T942
343290012	J1T943
343290013	J1T944
1203038989	Method Blank (MB)
1203038990	Laboratory Control Sample (LCS)
1203038991	343290003(J1T934) Matrix Spike (MS)
1203038992	343290003(J1T934) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on a "dry weight" basis.

Preparation/Analytical Method Verification

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-003 REV# 24.

Raw data reports are processed and reviewed by the analyst using the Chemstation software package. False positives have been removed from the quantitation reports per standard operating procedures (SOP).

Calibration Information

Initial Calibration

All initial calibration requirements have been met for this sample delivery group (SDG).

Continuing Calibration Verification (CCV) Requirements

All associated calibration verification standard(s) (ICV or CCV) met the acceptance criteria. Analyte peaks eluted within the established retention time windows for this method.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

All surrogate recoveries were within the established acceptance criteria for this SDG.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 343290003 (J1T934) was selected for the matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The MS recovery was within the established acceptance limits.

Matrix Spike Duplicate (MSD) Recovery Statement

The MSD recovery was within the established acceptance limits.

MS/MSD Relative Percent Difference (RPD) Statement

The RPD between the MS and MSD met the acceptance limits.

Technical Information

Holding Time Specifications

GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection of sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP. Analyte peaks eluted within the established retention time windows for this method.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

Re-extractions were not required in this SDG.

Miscellaneous Information

Electronic Package Comment

This package was generated using an electronic data processing program referred to as "virtual packaging". In an effort to increase quality and efficiency, the laboratory is developing systems to eventually generate all data packages electronically. The following change from "traditional" packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative.

Data Exception (DER) Documentation

Data exception report (DER) is generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A DER is not required for this SDG.

Manual Integrations

Certain standards and samples may have required manual integration to correctly position the baseline as set in the calibration standard injections. If manual integration was performed, copies of all manual integration peak profiles are included in the raw data section of this fraction.

Additional Comments

The additional comments field is used to address special issues associated with each analysis, clarify method/contractual issues pertaining to the analysis, and to list any report documents generated as a result of sample analysis or review. The additional comments were not required.

System Configuration

The Diesel Range Organics analysis was performed on the following instrument configuration:

Instrument ID	Instrument	System Configuration	Column ID	Column Description
FID7.1	Agilent Gas Chromatograph	Agilent 6890N GC/FID	DB-5MS	30m x 0.25mm, 0.25um(J&W)

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

343290

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-232-074		Page 1 of 3	
Collector WHITE, EC		Company Contact Joan Kessner		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8B 7day	
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites		Sampling Location 600-356		SAF No. RC-232		Data Turnaround			
Ice Chest No. WCH-11-014		Field Logbook No. EL-1666-01		COA 0603562000		Method of Shipment Commerical Carrier - Fed Ex		Bill of Lading/Air Bill No. SEP 05PC	
Shipped To GEL Laboratories Charleston		Offsite Property No. A131050							
Other Labs Shipped To NA		Preservation		Cool 4C	Cool 4C	Cool 4C	Cool 4C		
		Type of Container		GF	AG	AG	AG		
POSSIBLE SAMPLE HAZARDS/REMARKS None		No. of Container(s)		1	1	1	1		
		Volume		125mL	125mL	125mL	125mL		
Special Handling and/or Storage Cool 4c		Sample Analysis		See item (1) in Special Instructions	TPH-Diesel Range - WTPH-D -	PAHs - 8310	PCBs - 8082		
Sample No.	Matrix	Sample Date	Sample Time						
J1T932	SOIL	2-18-14	0820	X	X	X	X		
J1T933	SOIL	2-18-14	0830	X	X	X	X		
J1T934	SOIL	2-18-14	0840	X	X	X	X		
J1T935	SOIL	2-18-14	0850	X	X	X	X		
-J1T936	SOIL	2-18-14	0855	X	X	X	X		
CHAIN OF POSSESSION				Sign/Print Names		SPECIAL INSTRUCTIONS			
Relinquished By/Removed From E. White / G. W. W. 2-18-14 0940		Date/Time		Received By/Stored In R. Fabberg R. Fedro 2-18-14 0940		(1) ICP Metals - 6010TR (Close-out List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7471 - (CV) (Mercury)			
Relinquished By/Removed From R. Fabberg R. Fedro 2-18-14 1520		Date/Time		Received By/Stored In G. Bingham 2-18-14 1520					
Relinquished By/Removed From G. Bingham 2-18-14 1525		Date/Time		Received By/Stored In 1000 Battelle Fridge 1A 2-18-14 1525					
Relinquished By/Removed From 1000 Battelle Fridge 1A 2-19-14 0920		Date/Time		Received By/Stored In G. Bingham 2-19-14 0920					
Relinquished By/Removed From G. Bingham WCH 2-19-14 0925		Date/Time		Received By/Stored In Fed Ex					
Relinquished By/Removed From Fed Ex		Date/Time		Received By/Stored In Dr. Jennifer Pellegrini 2-20-14 0905					
Relinquished By/Removed From		Date/Time		Received By/Stored In					
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time			
WCH-EE-011									

REVIEWED BY
K. WOOD V. [Signature]
DATE
2-19-14

XP0050

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Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-232-074		Page 2 of 3	
Collector WHITE, EC		Company Contact Joan Kessner		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8 B Data Turnaround 7 Day	
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites		Sampling Location 600-356		SAF No. RC-232					
Ice Chest No. WCH-11-014		Field Logbook No. EL-166-01		COA 0603562000		Method of Shipment Commercial Carrier fed ex			
Shipped To GEL Laboratories Charleston		Offsite Property No. A 131050		Bill of Lading/Air Bill No. See OSPC					
Other Labs Shipped To NA		Preservation		Cool 4C	Cool 4C	Cool 4C	Cool 4C		
		Type of Container		GP	aG	aG	aG		
POSSIBLE SAMPLE HAZARDS/REMARKS None		No. of Container(s)		1	1	1	1		
		Volume		125mL	125mL	125mL	125mL		
Special Handling and/or Storage Cool 4c		Sample Analysis		See item (1) in Special Instructions	TPH-Diesel Range - WTPH-D +	PAHs - 8310	PCBs - 8082		
Sample No.	Matrix	Sample Date	Sample Time						
-J1T937	SOIL	2-18-14	0900	X	X	X	X		
-J1T938	SOIL	2-18-14	0905	X	X	X	X		
-J1T939	SOIL	2-18-14	0910	X	X	X	X		
-J1T940	SOIL	2-18-14	0915	X	X	X	X		
J1T941	SOIL	2-18-14	0920	X	X	X	X		
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		(1) ICP Metals - 6010TR (Close-out List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7471 - (CV) (Mercury)	
E. White/g. mo		2-18-14 0940		R. F. Allen, R. F. Allen		2-18-14 0940			
R. F. Allen, R. F. Allen		2-18-14 1520		C. Birmingham		2-18-14 1520			
C. Birmingham		2-18-14 1525		1060 Battelle, fridge 1A		2-18-14 1525			
1060 Battelle, fridge 1A		2-19-14 0920		C. Birmingham		2-19-14 0920			
C. Birmingham		2-19-14 0925		Fed EX					
Fed EX		2-19-14		J. Jennifer Pellegrini		2-20-14 0905			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time			
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time			
WCH-EE-011								XP0050	

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Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-232-074		Page 3 of 3	
Collector WHITE, EC		Company Contact Joan Kessner		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8 B	
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites		Sampling Location 600-356		SAF No. RC-232		7 Days		Data Turnaround	
Ice Chest No. WCH-11-014		Field Logbook No. EL-166-01		COA 0603562000		Method of Shipment Commercial Carrier Fed Ex			
Shipped To GEL Laboratories Charleston		Offsite Property No. A131050		Bill of Lading/Air Bill No. See OSPC					
Other Labs Shipped To NA		Preservation		Cool 4C	Cool 4C	Cool 4C	Cool 4C		
		Type of Container		G/P	a/G	a/G	a/G		
POSSIBLE SAMPLE HAZARDS/REMARKS None		No. of Container(s)		1	1	1	1		
		Volume		125mL	125mL	125mL	125mL		
Special Handling and/or Storage Cool 4c		Sample Analysis		See item (1) in Special Instructions	TPH-Diesel Range - WTPH-D +	PAHs - 8310	PCBs - 8062		
Sample No.	Matrix	Sample Date	Sample Time						
J1T942	SOIL	2-18-14	0925	X	X	X	X		
J1T943	SOIL	2-18-14	0930	X	X	X	X		
J1T944	SOIL	2-18-14	0820	X	X	X	X		
J1T945	SOIL	2-18-14	0815	X	X	X	X		
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS	
Relinquished By/Removed From E. White/EC		Date/Time 2-18-14 0940		Received By/Stored In R. Fellner		Date/Time 2-18-14		(1) ICP Metals - 6010TR (Close-out List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7471 - (CV) (Mercury)	
Relinquished By/Removed From R. Fellner		Date/Time 2-18-14 1520		Received By/Stored In G. Bingham		Date/Time 2-18-14 1920			
Relinquished By/Removed From 1060 Battelle, Fridge		Date/Time 2-18-14 1525		Received By/Stored In G. Bingham		Date/Time 2-19-14 0920			
Relinquished By/Removed From 1060 Battelle, Fridge		Date/Time 2-19-14 0930		Received By/Stored In Fed Ex		Date/Time 2-20-14 0905			
Relinquished By/Removed From G. Bingham		Date/Time 2-19-14 0925		Received By/Stored In G. Bingham		Date/Time 2-19-14 0920			
Relinquished By/Removed From Fed Ex		Date/Time 2-19-14		Received By/Stored In G. Bingham		Date/Time 2-19-14			
Relinquished By/Removed From Fed Ex		Date/Time 2-19-14		Received By/Stored In G. Bingham		Date/Time 2-19-14			
Relinquished By/Removed From Fed Ex		Date/Time 2-19-14		Received By/Stored In G. Bingham		Date/Time 2-19-14			
FINAL SAMPLE DISPOSITION WCH-EE-011		Disposal Method		Disposed By		Date/Time		 XP0050	

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Appendix 5
Data Validation Supporting Documentation

GENERAL ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	600-356		DATA PACKAGE: XP0050		
VALIDATOR:	ELR	LAB:	Gre	DATE: 3/2/14	
			SDG: XP0050		
ANALYSES PERFORMED					
8015	8021	8141	8151	8315	
		WTPH-HCID	WTPH-G	WTPH-D	
SAMPLES/MATRIX:					
J1T932	J1T933	J1T934	J1T935	J1T936	
J1T937	J1T938	J1T939	J1T940	J1T941	
J1T942	J1T943	J1T944			
					Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments: _____

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: _____

GENERAL ORGANIC DATA VALIDATION CHECKLIST

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: no Pq

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: no Pq

GENERAL ORGANIC DATA VALIDATION CHECKLIST

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: _____

6. HOLDING TIMES (all levels)

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

Comments: _____

GENERAL ORGANIC DATA VALIDATION CHECKLIST

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

Results reported for all requested analyses?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
Results supported in the raw data? (Levels D, E).....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Samples properly prepared? (Levels D, E).....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Detection limits meet RDL?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
Transcription/calculation errors? (Levels D, E).....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A

Comments: _____

9. SAMPLE CLEANUP (Levels D and E)

Fluoricil ® (or other aborbant) cleanup performed?.....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Lot check performed?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Check recoveries acceptable?.....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Check materials traceable?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Check materials Expired?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Analytical batch QC given similar cleanup?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Transcription/Calculation Errors?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A

Comments: _____

Appendix 6

Additional Documentation Requested by Client

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: February 25, 2014

Page 1 of 2

WC-Hanford, Inc.
2620 Fermi Avenue
MSIN H4-21
Richland, Washington
Joan Kessner

Contact:

Workorder: 343290

Client SDG: XP0050

Project Description: RC-232 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Diesel Range Organics											
Batch	1367952										
QC1203038990	LCS										
Diesel Range Organics (C10-C20)	66600			54800	ug/kg		82.3	(70%-130%)	BYT1	02/24/14	17:24
Motor Oil (C20-C36)	66600			56100	ug/kg		84.2	(70%-130%)			
**o-Terphenyl	666			553	ug/kg		83.1	(50%-150%)			
QC1203038989	MB										
Diesel Range Organics (C10-C20)			U	2170	ug/kg					02/24/14	16:46
Motor Oil (C20-C36)			U	2170	ug/kg						
**o-Terphenyl	666			501	ug/kg		75.2	(50%-150%)			
QC1203038991	343290003 MS										
Diesel Range Organics (C10-C20)	69800	U	2270	54100	ug/kg		77.6	(70%-130%)		02/24/14	19:59
Motor Oil (C20-C36)	69800		9780	67300	ug/kg		82.4	(70%-130%)			
**o-Terphenyl	698		509	531	ug/kg		76.1	(50%-150%)			
QC1203038992	343290003 MSD										
Diesel Range Organics (C10-C20)	69800	U	2270	56200	ug/kg	3.66	80.5	(0%-20%)		02/24/14	20:37
Motor Oil (C20-C36)	69800		9780	64900	ug/kg	3.63	79	(0%-20%)			
**o-Terphenyl	698		509	560	ug/kg		80.3	(50%-150%)			

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated

Date: 3 March 2014
 To: Washington Closure Hanford Inc. (technical representative)
 From: ELR Consulting
 Project: 100-IU-2 & 100-IU-6 Remaining Waste Sites – Soil Full Protocol - Waste Site 600-356
 Subject: Polyaromatic Hydrocarbon - Data Package No. XP0050-GEL

INTRODUCTION

This memo presents the results of data validation on Data Package No. XP0050 prepared by GEL Laboratories (GEL). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analyte
J1T932	2/18/14	Soil	C	See note 1
J1T933	2/18/14	Soil	C	See note 1
J1T934	2/18/14	Soil	C	See note 1
J1T935	2/18/14	Soil	C	See note 1
J1T936	2/18/14	Soil	C	See note 1
J1T937	2/18/14	Soil	C	See note 1
J1T938	2/18/14	Soil	C	See note 1
J1T939	2/18/14	Soil	C	See note 1
J1T940	2/18/14	Soil	C	See note 1
J1T941	2/18/14	Soil	C	See note 1
J1T942	2/18/14	Soil	C	See note 1
J1T943	2/18/14	Soil	C	See note 1
J1T944	2/18/14	Soil	C	See note 1
J1T945	2/18/14	Soil	C	See note 1

1 – Polyaromatic Hydrocarbons by 3550B.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, September 2009). 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 Data Requested by Client

DATA QUALITY OBJECTIVES

· **Holding Times**

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Analytes must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were acceptable.

· **Method Blanks**

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

All method blank results were acceptable.

Field (equipment) Blanks

One field blank (J1T945) was submitted for analysis. No analytes were detected in the field blank.

· **Accuracy**

Matrix Spike/Matrix Spike Duplicate & Blank Spike Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify

sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent recoveries must be within a range of 50-150% or within laboratory control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries below control limits are qualified as estimates and flagged "UJ". Undetected sample results are not qualified if the spike recovery is above control limits. Sample results greater than five times the spike concentration require no qualification.

All accuracy results were acceptable.

Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the contract required quantitation limit (CRQL) are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the CRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

All surrogate results were acceptable.

Precision

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All duplicate results were acceptable.

Field Duplicate Samples

One set of field duplicates (J1T932/J1T944) were submitted for analysis. Field duplicate results are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

Analytical Detection Levels

Reported analytical detection levels are compared against the required quantitation limits (RQL's) to ensure that laboratory detection levels meet the required criteria. All analytes met the RQL.

Completeness

Data package No. XP0050 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

Washington Closure Hanford Contract #S00W307A00 (March 2008), *Data Validation Services*, March 2008.

DOE/RL-96-22, Rev. 5, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, September 2009.

Appendix 1
Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the WCH validation SOW are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the same quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

POLYAROMATIC HYDROCARBON DATA QUALIFICATION SUMMARY*

SDG: XP0050	REVIEWER: ELR	Project: 600-356	PAGE <u>1</u> OF <u>1</u>
COMMENTS: No qualifiers assigned			

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3
Annotated Laboratory Reports

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: February 25, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354
 Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0050

Client Sample ID: J1T933
 Sample ID: 343290002
 Matrix: SOIL
 Collect Date: 18-FEB-14 08:30
 Receive Date: 20-FEB-14
 Collector: Client
 Moisture: 5.68%

Project: WCHN00213
 Client ID: WCHN001

✓
3/2/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
HPLC-PAH											
8310/3550 PAH Std list Soil "Dry Weight Corrected"											
Acenaphthene	U	5.29	5.29	17.6	ug/kg	1	CWW	02/21/14	1416	1367912	1
Acenaphthylene	U	5.29	5.29	17.6	ug/kg	1					
Anthracene	U	1.76	1.76	17.6	ug/kg	1					
Benzo(a)anthracene	U	0.564	0.564	1.76	ug/kg	1					
Benzo(a)pyrene	U	0.564	0.564	1.76	ug/kg	1					
Benzo(b)fluoranthene	U	0.564	0.564	1.76	ug/kg	1					
Benzo(ghi)perylene	U	11.3	0.564	1.76	ug/kg	1					
Benzo(k)fluoranthene	U	0.282	0.282	0.881	ug/kg	1					
Chrysene	U	0.564	0.564	1.76	ug/kg	1					
Dibenzo(a,h)anthracene	U	0.564	0.564	1.76	ug/kg	1					
Fluoranthene	U	0.564	0.564	1.76	ug/kg	1					
Fluorene	U	5.29	5.29	17.6	ug/kg	1					
Indeno(1,2,3-cd)pyrene	U	0.564	0.564	1.76	ug/kg	1					
Naphthalene	U	5.29	5.29	17.6	ug/kg	1					
Phenanthrene	U	5.29	5.29	17.6	ug/kg	1					
Pyrene	U	0.564	0.564	1.76	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3550B	3550B PAH BY HPLC Prep in soil	AXVI	02/20/14	1750	1367910

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8310	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Decafluorobiphenyl	8310/3550 PAH Std list Soil "Dry Weight Corrected"	5000 ug/kg	8810	56.7	(23%-104%)

Notes:

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Certificate of Analysis

Report Date: February 25, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354
 Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0050

Client Sample ID: J1T935
 Sample ID: 343290004
 Matrix: SOIL
 Collect Date: 18-FEB-14 08:50
 Receive Date: 20-FEB-14
 Collector: Client
 Moisture: 13.2%

Project: WCHN00213
 Client ID: WCHN001

3/2/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
HPLC-PAH											
8310/3550 PAH Std list Soil "Dry Weight Corrected"											
Acenaphthene	U	5.73	5.73	19.1	ug/kg	1	CWW	02/21/14	1622	1367912	1
Acenaphthylene	U	5.73	5.73	19.1	ug/kg	1					
Anthracene	U	1.91	1.91	19.1	ug/kg	1					
Benzo(a)anthracene	U	0.611	0.611	1.91	ug/kg	1					
Benzo(a)pyrene	U	0.611	0.611	1.91	ug/kg	1					
Benzo(b)fluoranthene	U	0.611	0.611	1.91	ug/kg	1					
Benzo(ghi)perylene	U	8.75	0.611	1.91	ug/kg	1					
Benzo(k)fluoranthene	U	0.306	0.306	0.955	ug/kg	1					
Chrysene	U	0.611	0.611	1.91	ug/kg	1					
Dibenzo(a,h)anthracene	U	0.611	0.611	1.91	ug/kg	1					
Fluoranthene	U	0.611	0.611	1.91	ug/kg	1					
Fluorene	U	5.73	5.73	19.1	ug/kg	1					
Indeno(1,2,3-cd)pyrene	U	0.611	0.611	1.91	ug/kg	1					
Naphthalene	U	5.73	5.73	19.1	ug/kg	1					
Phenanthrene	U	5.73	5.73	19.1	ug/kg	1					
Pyrene	U	0.611	0.611	1.91	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3550B	3550B PAH BY HPLC Prep in soil	AXVI	02/20/14	1750	1367910

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8310	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Decafluorobiphenyl	8310/3550 PAH Std list Soil "Dry Weight Corrected"	5180 ug/kg	9550	54.3	(23%-104%)

Notes:

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Report Date: February 25, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0050

Client Sample ID: J1T936
 Sample ID: 343290005
 Matrix: SOIL
 Collect Date: 18-FEB-14 08:55
 Receive Date: 20-FEB-14
 Collector: Client
 Moisture: 6.75%

Project: WCHN00213
 Client ID: WCHN001

✓ 3/2/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
HPLC-PAH											
8310/3550 PAH Std list Soil "Dry Weight Corrected"											
Acenaphthene	U	5.34	5.34	17.8	ug/kg	1	CWW	02/21/14	1911	1367912	1
Acenaphthylene	U	5.34	5.34	17.8	ug/kg	1					
Anthracene	U	1.78	1.78	17.8	ug/kg	1					
Benzo(a)anthracene	U	0.570	0.570	1.78	ug/kg	1					
Benzo(a)pyrene	U	0.570	0.570	1.78	ug/kg	1					
Benzo(b)fluoranthene	U	0.570	0.570	1.78	ug/kg	1					
Benzo(ghi)perylene	U	0.570	0.570	1.78	ug/kg	1					
Benzo(k)fluoranthene	U	0.285	0.285	0.890	ug/kg	1					
Chrysene	U	0.570	0.570	1.78	ug/kg	1					
Dibenzo(a,h)anthracene	U	0.570	0.570	1.78	ug/kg	1					
Fluoranthene	U	0.570	0.570	1.78	ug/kg	1					
Fluorene	U	5.34	5.34	17.8	ug/kg	1					
Indeno(1,2,3-cd)pyrene	U	0.570	0.570	1.78	ug/kg	1					
Naphthalene	U	5.34	5.34	17.8	ug/kg	1					
Phenanthrene	U	5.34	5.34	17.8	ug/kg	1					
Pyrene	U	0.570	0.570	1.78	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3550B	3550B PAH BY HPLC Prep in soil	AXVI	02/20/14	1750	1367910

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8310	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Decafluorobiphenyl	8310/3550 PAH Std list Soil "Dry Weight Corrected"	5900 ug/kg	8900	66.3	(23%-104%)

Notes:

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Report Date: February 25, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354
 Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0050

Client Sample ID: J1T937
 Sample ID: 343290006
 Matrix: SOIL
 Collect Date: 18-FEB-14 09:00
 Receive Date: 20-FEB-14
 Collector: Client
 Moisture: 6.06%

Project: WCHN00213
 Client ID: WCHN001

✓
3/2/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
HPLC-PAH											
8310/3550 PAH Std list Soil "Dry Weight Corrected"											
Acenaphthene	U	5.31	5.31	17.7	ug/kg	1	CWW	02/21/14	1953	1367912	1
Acenaphthylene	U	5.31	5.31	17.7	ug/kg	1					
Anthracene	U	1.77	1.77	17.7	ug/kg	1					
Benzo(a)anthracene	U	0.566	0.566	1.77	ug/kg	1					
Benzo(a)pyrene	U	0.566	0.566	1.77	ug/kg	1					
Benzo(b)fluoranthene	U	0.566	0.566	1.77	ug/kg	1					
Benzo(ghi)perylene	U	0.566	0.566	1.77	ug/kg	1					
Benzo(k)fluoranthene	U	0.283	0.283	0.884	ug/kg	1					
Chrysene	U	0.566	0.566	1.77	ug/kg	1					
Dibenzo(a,h)anthracene	U	0.566	0.566	1.77	ug/kg	1					
Fluoranthene	U	0.566	0.566	1.77	ug/kg	1					
Fluorene	U	5.31	5.31	17.7	ug/kg	1					
Indeno(1,2,3-cd)pyrene	U	0.566	0.566	1.77	ug/kg	1					
Naphthalene	U	5.31	5.31	17.7	ug/kg	1					
Phenanthrene	U	5.31	5.31	17.7	ug/kg	1					
Pyrene	U	0.566	0.566	1.77	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3550B	3550B PAH BY HPLC Prep in soil	AXVI	02/20/14	1750	1367910

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8310	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Decafluorobiphenyl	8310/3550 PAH Std list Soil "Dry Weight Corrected"	5430 ug/kg	8840	61.3	(23%-104%)

Notes:

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Certificate of Analysis

Report Date: February 25, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Client SDG: XP0050

Client Sample ID: J1T938
 Sample ID: 343290007
 Matrix: SOIL
 Collect Date: 18-FEB-14 09:05
 Receive Date: 20-FEB-14
 Collector: Client
 Moisture: 8.4%

Project: WCHN00213
 Client ID: WCHN001

✓
3/2/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
HPLC-PAH											
8310/3550 PAH Std list Soil "Dry Weight Corrected"											
Accnaphthene	U	5.43	5.43	18.1	ug/kg	1	CWW	02/21/14	2035	1367912	1
Acenaphthylene	U	5.43	5.43	18.1	ug/kg	1					
Anthracene	U	1.81	1.81	18.1	ug/kg	1					
Benzo(a)anthracene	U	0.579	0.579	1.81	ug/kg	1					
Benzo(a)pyrene	U	0.579	0.579	1.81	ug/kg	1					
Benzo(b)fluoranthene	U	0.579	0.579	1.81	ug/kg	1					
Benzo(ghi)perylene	U	0.579	0.579	1.81	ug/kg	1					
Benzo(k)fluoranthene	U	0.289	0.289	0.904	ug/kg	1					
Chrysene	U	0.579	0.579	1.81	ug/kg	1					
Dibenzo(a,h)anthracene	U	0.579	0.579	1.81	ug/kg	1					
Fluoranthene	U	0.579	0.579	1.81	ug/kg	1					
Fluorene	U	5.43	5.43	18.1	ug/kg	1					
Indeno(1,2,3-cd)pyrene	U	0.579	0.579	1.81	ug/kg	1					
Naphthalene	U	5.43	5.43	18.1	ug/kg	1					
Phenanthrene	U	5.43	5.43	18.1	ug/kg	1					
Pyrene	U	0.579	0.579	1.81	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3550B	3550B PAH BY HPLC Prep in soil	AXVI	02/20/14	1750	1367910

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8310	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Decafluorobiphenyl	8310/3550 PAH Std list Soil "Dry Weight Corrected"	5960 ug/kg	9040	65.9	(23%-104%)

Notes:

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Certificate of Analysis

Report Date: February 25, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354
 Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0050

Client Sample ID: J1T939
 Sample ID: 343290008
 Matrix: SOIL
 Collect Date: 18-FEB-14 09:10
 Receive Date: 20-FEB-14
 Collector: Client
 Moisture: 4.53%

Project: WCHN00213
 Client ID: WCHN001

✓ 3/2/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
HPLC-PAH											
8310/3550 PAH Std list Soil "Dry Weight Corrected"											
Acenaphthene	U	5.23	5.23	17.4	ug/kg	1	CWW	02/21/14	2117	1367912	1
Acenaphthylene	U	5.23	5.23	17.4	ug/kg	1					
Anthracene	U	1.74	1.74	17.4	ug/kg	1					
Benzo(a)anthracene	U	0.557	0.557	1.74	ug/kg	1					
Benzo(a)pyrene	U	0.557	0.557	1.74	ug/kg	1					
Benzo(b)fluoranthene	U	0.557	0.557	1.74	ug/kg	1					
Benzo(ghi)perylene		2.22	0.557	1.74	ug/kg	1					
Benzo(k)fluoranthene	U	0.279	0.279	0.871	ug/kg	1					
Chrysene	J	0.733	0.557	1.74	ug/kg	1					
Dibenzo(a,h)anthracene	U	0.557	0.557	1.74	ug/kg	1					
Fluoranthene	U	0.557	0.557	1.74	ug/kg	1					
Fluorene	U	5.23	5.23	17.4	ug/kg	1					
Indeno(1,2,3-cd)pyrene	U	0.557	0.557	1.74	ug/kg	1					
Naphthalene	U	5.23	5.23	17.4	ug/kg	1					
Phenanthrene	U	5.23	5.23	17.4	ug/kg	1					
Pyrene	U	0.557	0.557	1.74	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3550B	3550B PAH BY HPLC Prep in soil	AXVI	02/20/14	1750	1367910

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8310	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Decafluorobiphenyl	8310/3550 PAH Std list Soil "Dry Weight Corrected"	4210 ug/kg	8710	48.4	(23%-104%)

Notes:

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Certificate of Analysis

Report Date: February 25, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354
 Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0050

Client Sample ID: J1T941
 Sample ID: 343290010
 Matrix: SOIL
 Collect Date: 18-FEB-14 09:20
 Receive Date: 20-FEB-14
 Collector: Client
 Moisture: 6.04%

Project: WCHN00213
 Client ID: WCHN001

3/2/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
HPLC-PAH											
8310/3550 PAH Std list Soil "Dry Weight Corrected"											
Acenaphthene	U	5.31	5.31	17.7	ug/kg	1	CWW	02/21/14	2324	1367912	1
Acenaphthylene	U	5.31	5.31	17.7	ug/kg	1					
Anthracene	U	1.77	1.77	17.7	ug/kg	1					
Benzo(a)anthracene	U	0.566	0.566	1.77	ug/kg	1					
Benzo(a)pyrene	U	0.566	0.566	1.77	ug/kg	1					
Benzo(b)fluoranthene	U	0.566	0.566	1.77	ug/kg	1					
Benzo(ghi)perylene	J	1.23	0.566	1.77	ug/kg	1					
Benzo(k)fluoranthene	U	0.283	0.283	0.885	ug/kg	1					
Chrysene	U	0.566	0.566	1.77	ug/kg	1					
Dibenzo(a,h)anthracene	U	0.566	0.566	1.77	ug/kg	1					
Fluoranthene	U	0.566	0.566	1.77	ug/kg	1					
Fluorene	U	5.31	5.31	17.7	ug/kg	1					
Indeno(1,2,3-cd)pyrene	U	0.566	0.566	1.77	ug/kg	1					
Naphthalene	U	5.31	5.31	17.7	ug/kg	1					
Phenanthrene	U	5.31	5.31	17.7	ug/kg	1					
Pyrene	U	0.566	0.566	1.77	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3550B	3550B PAH BY HPLC Prep in soil	AXV1	02/20/14	1750	1367910

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8310	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Decafluorobiphenyl	8310/3550 PAH Std list Soil "Dry Weight Corrected"	4860 ug/kg	8850	55.0	(23%-104%)

Notes:

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Certificate of Analysis

Report Date: February 25, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354
 Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0050

Client Sample ID: J1T942 Project: WCHN00213
 Sample ID: 343290011 Client ID: WCHN001
 Matrix: SOIL
 Collect Date: 18-FEB-14 09:25
 Receive Date: 20-FEB-14
 Collector: Client
 Moisture: 9.65%

✓
3/2/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
HPLC-PAH											
8310/3550 PAH Std list Soil "Dry Weight Corrected"											
Acenaphthene	U	5.53	5.53	18.4	ug/kg	1	CWW	02/22/14	0048	1367912	1
Acenaphthylene	U	5.53	5.53	18.4	ug/kg	1					
Anthracene	U	1.84	1.84	18.4	ug/kg	1					
Benzo(a)anthracene	U	0.590	0.590	1.84	ug/kg	1					
Benzo(a)pyrene	J	1.28	0.590	1.84	ug/kg	1					
Benzo(b)fluoranthene		11.8	0.590	1.84	ug/kg	1					
Benzo(ghi)perylene		7.40	0.590	1.84	ug/kg	1					
Benzo(k)fluoranthene	U	0.295	0.295	0.922	ug/kg	1					
Chrysene		3.91	0.590	1.84	ug/kg	1					
Dibenzo(a,h)anthracene	U	0.590	0.590	1.84	ug/kg	1					
Fluoranthene		4.63	0.590	1.84	ug/kg	1					
Fluorene	U	5.53	5.53	18.4	ug/kg	1					
Indeno(1,2,3-cd)pyrene	U	0.590	0.590	1.84	ug/kg	1					
Naphthalene	U	5.53	5.53	18.4	ug/kg	1					
Phenanthrene	U	5.53	5.53	18.4	ug/kg	1					
Pyrene		5.49	0.590	1.84	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3550B	3550B PAH BY HPLC Prep in soil	AXVI	02/20/14	1750	1367910

The following Analytical Methods were performed:

Method	Description	Analyst Comments
I	SW846 8310	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Decafluorobiphenyl	8310/3550 PAH Std list Soil "Dry Weight Corrected"	4900 ug/kg	9220	53.1	(23%-104%)

Notes:

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Certificate of Analysis

Report Date: February 25, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354
 Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0050

Client Sample ID: J1T944 Project: WCHN00213
 Sample ID: 343290013 Client ID: WCHN001
 Matrix: SOIL
 Collect Date: 18-FEB-14 08:20
 Receive Date: 20-FEB-14
 Collector: Client
 Moisture: 12.3%

✓
3/2/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
HPLC-PAH											
8310/3550 PAH Std list Soil "Dry Weight Corrected"											
Acenaphthene	U	5.68	5.68	18.9	ug/kg	1	CWW	02/22/14	0418	1367912	1
Acenaphthylene	U	5.68	5.68	18.9	ug/kg	1					
Anthracene	U	1.89	1.89	18.9	ug/kg	1					
Benzo(a)anthracene	U	0.606	0.606	1.89	ug/kg	1					
Benzo(a)pyrene	U	0.606	0.606	1.89	ug/kg	1					
Benzo(b)fluoranthene		11.7	0.606	1.89	ug/kg	1					
Benzo(ghi)perylene		3.31	0.606	1.89	ug/kg	1					
Benzo(k)fluoranthene	U	0.303	0.303	0.947	ug/kg	1					
Chrysene		3.88	0.606	1.89	ug/kg	1					
Dibenzo(a,h)anthracene	U	0.606	0.606	1.89	ug/kg	1					
Fluoranthene	U	0.606	0.606	1.89	ug/kg	1					
Fluorene	U	5.68	5.68	18.9	ug/kg	1					
Indeno(1,2,3-cd)pyrene	U	0.606	0.606	1.89	ug/kg	1					
Naphthalene	U	5.68	5.68	18.9	ug/kg	1					
Phenanthrene	U	5.68	5.68	18.9	ug/kg	1					
Pyrene	J	0.750	0.606	1.89	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3550B	3550B PAH BY HPLC Prep in soil	AXV1	02/20/14	1750	1367910

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8310	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Decafluorobiphenyl	8310/3550 PAH Std list Soil "Dry Weight Corrected"	3360 ug/kg	9470	35.5	(23%-104%)

Notes:

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

**HPLC-PAH
WC-HANFORD, INC. (WCHN)
SDG XP0050**

Method/Analysis Information

Procedure: Polynuclear Aromatic Hydrocarbons
Analytical Method: SW846 8310
Prep Method: SW846 3550B
Analytical Batch Number: 1367912
Prep Batch Number: 1367910

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 8310:

Sample ID	Client ID
343290001	J1T932
343290002	J1T933
343290003	J1T934
343290004	J1T935
343290005	J1T936
343290006	J1T937
343290007	J1T938
343290008	J1T939
343290009	J1T940
343290010	J1T941
343290011	J1T942
343290012	J1T943
343290013	J1T944
343290014	J1T945
1203038896	Method Blank (MB)
1203038897	Laboratory Control Sample (LCS)
1203038898	343290001(J1T932) Matrix Spike (MS)
1203038899	343290001(J1T932) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on a "dry weight" basis.

Preparation/Analytical Method Verification

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP).

The data discussed in this narrative has been analyzed in accordance with GL-OA-E-030 REV# 15.

Raw data reports are processed and reviewed by the analyst using the Target software package. False positives have been removed from the Target quantitation reports per standard operating procedures (SOP) section 18.0.

Calibration Information

Due to software limitations, the files displayed at the beginning of the Form 6 are only the last files uploaded for each individual level. A complete listing of all files used in the current ICAL are shown on the Calibration History that is included with each Level 4 or higher package. The last file by date in each level is the one currently uploaded for that level.

The linear equation used in Target and indicated on the initial calibration summary form is not a conventional linear equation (slope intercept formula) and does not match the equation found in SW-846 method 8000B. The x and y axes are inversed in Target, so that the instrument response is treated as the independent variable (x) and the concentration ratio is treated as the dependent variable (y). The equation used in Target to calculate sample results is adjusted to account for the linear equation inversion and reciprocal slope. The adjusted calculation has been independently verified to produce valid results.

Initial Calibration

All initial calibration requirements have been met for this SDG.

CCV Requirements

All associated calibration verification standards (ICV or CCV) met the acceptance criteria.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

All the surrogate recoveries were within the established acceptance criteria for this SDG.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Client sample 343290001 (J1T932) was chosen for matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The MS recoveries were within the established acceptance limits.

Matrix Spike Duplicate (MSD) Recovery Statement

The MSD recoveries were within the established acceptance limits.

MS/MSD Relative Percent Difference (RPD) Statement

The RPDs between the MS and MSD met the acceptance limits.

Technical Information:

Holding Time Specifications

All samples in this SDG in this analytical batch met the specified holding time. GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection or sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

Re-extractions or re-analyses were not required in this SDG.

Miscellaneous Information:**Data Exception (DER) Documentation**

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents.

A data exception report (DER) was not generated for this SDG.

Manual Integrations

Some initial calibration standards, and samples 343290002 (J1T933), 343290004 (J1T935), 343290008 (J1T939), 343290010 (J1T941), 343290011 (J1T942) and 343290013 (J1T944) required manual integrations due to software limitations.

Please see the raw data in the Miscellaneous Section.

Additional Comments

The Form 8 is used only as a sequence of the analysis.

Due to the nature of the sample extract, instrument blanks were analyzed after samples 343290002 (J1T933), 343290004 (J1T935), 343290008 (J1T939), 343290010 (J1T941) and 343290011 (J1T942) to prevent possible matrix carryover.

Electronic Package Comment

The following package was generated using an electronic data processing program referred to as "virtual packaging". In an effort to increase quality and efficiency, the laboratory is developing systems to eventually generate all data packages electronically. The following change from "traditional" packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative of each electronic package will indicate the analyst, reviewer, and report specialist names associated with the generation of the data and package. The data validator will always sign and date the case narrative.

Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

System Configuration

The laboratory utilizes a high performance liquid chromatography (HPLC) instrument configuration for Polynuclear Aromatic Hydrocarbons analyses.

The chromatographic hardware system consists of a HP Model 1100 HPLC with programmable gradient pumping and a 100 uL loop injector.

The HPLC 1100 is coupled to a HP Model G1315A Diode Array UV detector which monitors absorbance at the following five wavelengths: 1) 224 nm; 2) 250 nm; 3) 270 nm; 4) 234 nm; 5) 300 nm.

The HPLC 1100 is also coupled to a HP Model G1321A Fluorescence Detector in series which monitors the following varying excitations and emissions 1) EX 230 nm EM 330 nm; 2) EX 210 nm EM 314 nm; 3) EX 250 nm EM 368 nm; 4) EX 237 nm EM 440 nm; 5) EX 277 nm EM 376 nm; 6) EX 255 nm EM 420 nm; 7) EX 230 nm EM 453 nm.

The Diode Array UV detector is used as the primary detector and the Fluorescence Detector is used as the confirmation detector. All results are reported from the primary Diode Array UV detector.

The HPLC system is identified with a designation of HPLC E in the raw data printouts.

Chromatographic Columns

Chromatographic separation of Polynuclear Aromatic Hydrocarbons is accomplished through analysis on the following reversed phase columns:

Phenomenex: Luna C18 (2), 100 A, 250 mm x 4.6 mm containing 5 um size particle.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

343290

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-232-074	Page 1 of 3
Collector WHITE, EC	Company Contact Joan Kessner	Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 8B	Data Turnaround 7day		
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites	Sampling Location 600-356	SAF No. RC-232					
Ice Chest No. WCH-11-014	Field Logbook No. EL-1666-01	COA 0603562000	Method of Shipment Commerical Carrier - fed EX				
Shipped To GEL Laboratories Charleston	Offsite Property No. A131050	Bill of Lading/Air Bill No. See OSPC					

Other Labs Shipped To NA	Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C								
	Type of Container	GP	aG	aG	aG								
	No. of Container(s)	1	1	1	1								
	Volume	125mL	125mL	125mL	125mL								
POSSIBLE SAMPLE HAZARDS/REMARKS None	Sample Analysis	See item (1) in Special Instructions	TPH-Diesel Range - WTPH-D +	PAHs - 8310	PCBs - 8082								
Special Handling and/or Storage Cool 4c													

Sample No.	Matrix	Sample Date	Sample Time										
J1T932	SOIL	2-18-14	0820	X	X	X	X						
J1T933	SOIL	2-18-14	0830	X	X	X	X						
J1T934	SOIL	2-18-14	0840	X	X	X	X						
J1T935	SOIL	2-18-14	0850	X	X	X	X						
J1T936	SOIL	2-18-14	0855	X	X	X	X						

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From E. White / G. W. W. 2-18-14 0940	Date/Time	Received By/Stored In R. Fabbers R. Fabbers 2-18-14	Date/Time
Relinquished By/Removed From R. Fabbers R. Fabbers 2-18-14	Date/Time	Received By/Stored In G. Bingham 2-18-14 1520	Date/Time
Relinquished By/Removed From C. Bingham 2-18-14 1525	Date/Time	Received By/Stored In 1060 Battelle G. W. W. 2-18-14	Date/Time
Relinquished By/Removed From 1060 Battelle G. W. W. 2-19-14 0920	Date/Time	Received By/Stored In C. Bingham 2-19-14 0920	Date/Time
Relinquished By/Removed From G. Bingham 2-19-14 0925	Date/Time	Received By/Stored In Fed EX	Date/Time
Relinquished By/Removed From Fed EX	Date/Time	Received By/Stored In J. Jennifer Pellegrini 2-20-14	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010TR (Close-out List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7471 - (CV) (Mercury)

REVIEWED BY
K. WOOD V. A. [Signature]
DATE
2-19-14

XP0050

FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time
WCH-EE-011			

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Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-232-074		Page 2 of 3	
Collector WHITE, EC		Company Contact Joan Kessner		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8B Data Turnaround 7 Day	
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites		Sampling Location 600-356		SAF No. RC-232					
Ice Chest No. WCH-11-014		Field Logbook No. EL-1666-0		COA 0603562000		Method of Shipment Commercial Carrier fed EX			
Shipped To GEL Laboratories Charleston		Offsite Property No. A131050		Bill of Lading/Air Bill No. See OSPC					
Other Labs Shipped To NA		Preservation		Cool 4C	Cool 4C	Cool 4C	Cool 4C		
		Type of Container		GP	aG	aG	aG		
POSSIBLE SAMPLE HAZARDS/REMARKS None		No. of Container(s)		1	1	1	1		
		Volume		125mL	125mL	125mL	125mL		
Special Handling and/or Storage Cool 4c		Sample Analysis		See item (1) in Special Instructions	TPH-Diesel Range - WTPH-D +	PAHs - 8310	PCBs - 8082		
Sample No.	Matrix	Sample Date	Sample Time						
-J1T937	SOIL	2-18-14	0900	X	X	X	X		
-J1T938	SOIL	2-18-14	0905	X	X	X	X		
-J1T939	SOIL	2-18-14	0910	X	X	X	X		
-J1T940	SOIL	2-18-14	0915	X	X	X	X		
J1T941	SOIL	2-18-14	0920	X	X	X	X		
CHAIN OF POSSESSION				Sign/Print Names		SPECIAL INSTRUCTIONS			
Relinquished By/Removed From E. White/g-400		Date/Time 2-18-14 0940		Received By/Stored In R. Fabian R. Fabian		Date/Time 2-18-14 0940			
Relinquished By/Removed From R. Fabian R. Fabian		Date/Time 2-18-14 1520		Received By/Stored In C. Bingham		Date/Time 2-18-14 1520			
Relinquished By/Removed From C. Bingham		Date/Time 2-18-14 1525		Received By/Stored In 1060 Battelle, fridge		Date/Time 2-18-14 1525			
Relinquished By/Removed From 1060 Battelle, fridge		Date/Time 2-19-14 0920		Received By/Stored In C. Bingham		Date/Time 2-19-14 0920			
Relinquished By/Removed From C. Bingham		Date/Time 2-19-14 0925		Received By/Stored In fed EX		Date/Time 2-19-14 0925			
Relinquished By/Removed From Fed EX		Date/Time 2-19-14		Received By/Stored In Jennifer Pellegrini		Date/Time 2-20-14 0905			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time			
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time			
WCH-EE-011									



XP0050

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Washington Closure Hanford			CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST					RC-232-074		Page 3 of 3	
Collector WHITE, EC			Company Contact Joan Kessner		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8 B		Data Turnaround
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites			Sampling Location 600-356		SAF No. RC-232		7 Dec				
Ice Chest No. WCH-11-014			Field Logbook No. EL-1666-01		COA 0603562000		Method of Shipment Commerical Carrier fed Ex				
Shipped To GEL Laboratories Charlston			Offsite Property No. A131050		Bill of Lading/Air Bill No. See OSPC						
Other Labs Shipped To NA			Preservation		Cool 4C	Cool 4C	Cool 4C	Cool 4C			
			Type of Container		G/P	aG	aG	aG			
POSSIBLE SAMPLE HAZARDS/REMARKS None			No. of Container(s)		1	1	1	1			
			Volume		125mL	125mL	125mL	125mL			
Special Handling and/or Storage Cool 4c			Sample Analysis		See item (1) in Special Instructions	TPH-Diesel Range - WTPH-D +	PAHs - 8310	PCBs - 8062			
Sample No.	Matrix	Sample Date	Sample Time								
J1T942	SOIL	2-18-14	0925	X	X	X	X				
J1T943	SOIL	2-18-14	0930	X	X	X	X				
J1T944	SOIL	2-18-14	0820	X	X	X	X				
J1T945	SOIL	2-18-14	0815	X	X	X	X				
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		(1) ICP Metals - 6010TR (Close-out List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7471 - (CV) (Mercury)			
E. White/g		2-18-14 0940		R. Fahlberg		2-18-14 0940					
R. Fahlberg		2-18-14 1520		G. Bingham		2-18-14 1520					
G. Bingham		2-18-14 1525		1060 Battelle, fridge		2-18-14 1525					
1060 Battelle, fridge		2-19-14 0930		G. Bingham		2-19-14 0930					
G. Bingham		2-19-14 0925		fed Ex							
Fed EX				Op. James Palomieri		2-20-14 0905					
Fed EX											
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time		XP0050 			
WCH-EE-011											

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Appendix 5
Data Validation Supporting Documentation

GENERAL ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	600-356		DATA PACKAGE: XP0050		
VALIDATOR:	ELR	LAB: Gel	DATE: 3/2/14		
		SDG: XP0050			
ANALYSES PERFORMED					
8015	8021	8141	8151	8315	8310
		WTPH-HCID	WTPH-G	WTPH-D	
SAMPLES/MATRIX:					
J1T932	J1T933	J1T934	J1T935	J1T936	
J1T937	J1T938	J1T939	J1T940	J1T941	
J1T942	J1T943	J1T944	J1T945		
					soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? Yes No N/A

Comments: _____

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: _____

GENERAL ORGANIC DATA VALIDATION CHECKLIST

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: no FB

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: _____

_____ no PAS

GENERAL ORGANIC DATA VALIDATION CHECKLIST

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: _____

6. HOLDING TIMES (all levels)

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

Comments: _____

GENERAL ORGANIC DATA VALIDATION CHECKLIST

8. 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: _____

9. SAMPLE CLEANUP (Levels D and E)

Fluoridil ® (or other aborbant) 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

QC Summary

Report Date: February 25, 2014

Page 1 of 4

WC-Hanford, Inc.
 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington
 Joan Kessner

Contact:

Workorder: 343290

Client SDG: XP0050

Project Description: RC-232 Soil

Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH										
Batch	1367912									
QC1203038897	LCS									
Acenaphthene	1660		1330	ug/kg	79.7	(58%-99%)	CWW	02/21/14	11:27	
Acenaphthylene	1660		1320	ug/kg	79.4	(58%-98%)				
Anthracene	1660		1510	ug/kg	90.9	(63%-94%)				
Benzo(a)anthracene	166		145	ug/kg	87.3	(73%-98%)				
Benzo(a)pyrene	166		138	ug/kg	83.1	(63%-99%)				
Benzo(b)fluoranthene	166		138	ug/kg	83.1	(70%-130%)				
Benzo(ghi)perylene	166		139	ug/kg	83.3	(70%-130%)				
Benzo(k)fluoranthene	83.2		65.1	ug/kg	78.2	(70%-130%)				
Chrysene	166		155	ug/kg	93.2	(70%-130%)				
Dibenzo(a,h)anthracene	166		162	ug/kg	97.4	(70%-130%)				
Fluoranthene	166		136	ug/kg	81.4	(70%-130%)				
Fluorene	1660		1370	ug/kg	82.1	(65%-130%)				
Indeno(1,2,3-cd)pyrene	166		148	ug/kg	88.8	(70%-130%)				
Naphthalene	1660		1270	ug/kg	76.5	(57%-130%)				
Phenanthrene	1660		1370	ug/kg	82.5	(70%-130%)				
Pyrene	166		147	ug/kg	88.2	(70%-130%)				
**Decafluorobiphenyl	8320		6100	ug/kg	73.3	(23%-104%)				
QC1203038896	MB									
Acenaphthene		U	4.99	ug/kg				02/21/14	10:45	
Acenaphthylene		U	4.99	ug/kg						

QC Summary

Workorder: 343290 Client SDG: XP0050 Project Description: RC-232 Soil Page 2 of 4

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH											
Batch	1367912										
Anthracene			U	1.66	ug/kg						
Benzo(a)anthracene			U	0.532	ug/kg				CWW	02/21/14	10:45
Benzo(a)pyrene			U	0.532	ug/kg						
Benzo(b)fluoranthene			U	0.532	ug/kg						
Benzo(ghi)perylene			U	0.532	ug/kg						
Benzo(k)fluoranthene			U	0.266	ug/kg						
Chrysene			U	0.532	ug/kg						
Dibenzo(a,h)anthracene			U	0.532	ug/kg						
Fluoranthene			U	0.532	ug/kg						
Fluorene			U	4.99	ug/kg						
Indeno(1,2,3-cd)pyrene			U	0.532	ug/kg						
Naphthalene			U	4.99	ug/kg						
Phenanthrene			U	4.99	ug/kg						
Pyrene			U	0.532	ug/kg						
**Decafluorobiphenyl	8310			6150	ug/kg		74	(23%-104%)			
QC1203038898 343290001 MS											
Acenaphthene	1880	U	5.64	1430	ug/kg		76.2	(49%-90%)		02/21/14	12:51
Acenaphthylene	1880	U	5.64	1430	ug/kg		76.2	(48%-97%)			
Anthracene	1880	U	1.88	1630	ug/kg		86.7	(49%-91%)			
Benzo(a)anthracene	188	U	0.602	154	ug/kg		81.6	(29%-126%)			
Benzo(a)pyrene	188	U	0.602	149	ug/kg		79.1	(26%-130%)			
Benzo(b)fluoranthene	188	U	0.602	145	ug/kg		77.2	(32%-135%)			
Benzo(ghi)perylene	188	U	0.602	145	ug/kg		76.9	(34%-125%)			

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 343290

Client SDG: XP0050

Project Description: RC-232 Soil

Page 3 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH											
Batch	1367912										
Benzo(k)fluoranthene	94.1	U	0.301	68.8	ug/kg		73.1	(48%-142%)	CWW	02/21/14	12:51
Chrysene	188	U	0.602	164	ug/kg		86.9	(39%-127%)			
Dibenzo(a,h)anthracene	188	U	0.602	170	ug/kg		90.6	(38%-130%)			
Fluoranthene	188	U	0.602	144	ug/kg		76.6	(20%-139%)			
Fluorene	1880	U	5.64	1470	ug/kg		78.3	(51%-90%)			
Indeno(1,2,3-cd)pyrene	188	U	0.602	155	ug/kg		82.2	(41%-145%)			
Naphthalene	1880	U	5.64	1360	ug/kg		72.1	(43%-87%)			
Phenanthrene	1880	U	5.64	1480	ug/kg		78.8	(50%-100%)			
Pyrene	188	U	0.602	156	ug/kg		83.1	(18%-149%)			
**Decafluorobiphenyl	9410		5650	6430	ug/kg		68.3	(23%-104%)			
QC1203038899	343290001	MSD									
Acenaphthene	1880	U	5.64	1340	ug/kg	6.67	71.5	(0%-30%)		02/21/14	13:34
Acenaphthylene	1880	U	5.64	1340	ug/kg	6.55	71.5	(0%-30%)			
Anthracene	1880	U	1.88	1520	ug/kg	7.18	80.9	(0%-30%)			
Benzo(a)anthracene	188	U	0.602	141	ug/kg	8.78	74.9	(0%-30%)			
Benzo(a)pyrene	188	U	0.602	137	ug/kg	8.36	72.9	(0%-30%)			
Benzo(b)fluoranthene	188	U	0.602	133	ug/kg	8.91	70.8	(0%-30%)			
Benzo(ghi)perylene	188	U	0.602	133	ug/kg	8.43	70.8	(0%-30%)			
Benzo(k)fluoranthene	93.9	U	0.301	62.7	ug/kg	9.26	66.8	(0%-30%)			
Chrysene	188	U	0.602	150	ug/kg	8.45	80	(0%-30%)			
Dibenzo(a,h)anthracene	188	U	0.602	157	ug/kg	8.52	83.4	(0%-30%)			
Fluoranthene	188	U	0.602	132	ug/kg	8.75	70.3	(0%-30%)			

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 343290

Client SDG: XP0050

Project Description: RC-232 Soil

Page 4 of 4

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH											
Batch	1367912										
Fluorene	1880	U	5.64	1370	ug/kg	7.54	72.8	(0%-30%)	CWW	02/21/14	13:34
Indeno(1,2,3-cd)pyrene	188	U	0.602	142	ug/kg	8.93	75.4	(0%-30%)			
Naphthalene	1880	U	5.64	1290	ug/kg	4.96	68.8	(0%-30%)			
Phenanthrene	1880	U	5.64	1370	ug/kg	7.86	73	(0%-30%)			
Pyrene	188	U	0.602	143	ug/kg	8.71	76.4	(0%-30%)			
**Decafluorobiphenyl	9390		5650	6000	ug/kg		63.9	(23%-104%)			

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (Organics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Date: 3 March 2014
 To: Washington Closure Hanford Inc. (technical representative)
 From: ELR Consulting
 Project: 100-IU-2 & 100-IU-6 Remaining Waste Sites – Soil Full Protocol - Waste Site 600-356
 Subject: PCB - Data Package No. XP0050-GEL

INTRODUCTION

This memo presents the results of data validation on Data Package No. XP0050 prepared by GEL Laboratories (GEL). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analyte
J1T932	2/18/14	Soil	C	See note 1
J1T933	2/18/14	Soil	C	See note 1
J1T934	2/18/14	Soil	C	See note 1
J1T935	2/18/14	Soil	C	See note 1
J1T936	2/18/14	Soil	C	See note 1
J1T937	2/18/14	Soil	C	See note 1
J1T938	2/18/14	Soil	C	See note 1
J1T939	2/18/14	Soil	C	See note 1
J1T940	2/18/14	Soil	C	See note 1
J1T941	2/18/14	Soil	C	See note 1
J1T942	2/18/14	Soil	C	See note 1
J1T943	2/18/14	Soil	C	See note 1
J1T944	2/18/14	Soil	C	See note 1

1 – PCBs by 8082A.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, September 2009). 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 Data Requested by Client

DATA QUALITY OBJECTIVES

· Holding Times

Holding times are not applicable for PCB analysis.

· Method Blanks

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. *No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".*

All method blank results were acceptable.

Field (equipment) Blanks

No field blanks were submitted for analysis.

· Accuracy

Matrix Spike/Matrix Spike Duplicate & Blank Spike Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent recoveries must be within a range of 50-150% or within laboratory control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries below control limits are qualified as estimates and flagged "UJ". Undetected sample results are not qualified if the spike recovery is above control limits. Sample results greater than five times the spike concentration require no qualification.

Due to matrix spike (0%) and matrix spike duplicate (0%) results outside Q limits, the aroclor-1016 results in sample J1T939 were qualified as estimated and flagged "J".

All other accuracy results were acceptable.

Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the contract required quantitation limit (CRQL) are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the CRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

All surrogate results were acceptable.

Precision

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All duplicate results were acceptable.

Field Duplicate Samples

One set of field duplicates (J1T932/J1T944) were submitted for analysis. Field duplicate results are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

Analytical Detection Levels

Reported analytical detection levels are compared against the required quantitation limits (RQL's) to ensure that laboratory detection levels meet the required criteria. All analytes met the RQL.

Completeness

Data package No. XP0050 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

The following minor deficiencies were noted:

- Due to matrix spike (0%) and matrix spike duplicate (0%) results outside Q limits, the aroclor-1016 results in sample J1T939 were qualified as estimated and flagged "J".

Data flagged "J" indicates that the associated concentration is an estimate, but under the WCH statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

Washington Closure Hanford Contract #S00W307A00 (March 2008), *Data Validation Services*, March 2008.

DOE/RL-96-22, Rev. 5, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, September 2009.

Appendix 1
Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the WCH validation SOW are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the same quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

PCB DATA QUALIFICATION SUMMARY*

SDG: XP0050	REVIEWER: ELR	Project: 600-356	PAGE <u>1</u> OF <u>1</u>
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Arocclor-1016	J	J1T939	MS & MSD recovery

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3
Annotated Laboratory Reports

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: February 25, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354
 Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0050

Client Sample ID: J1T932
 Sample ID: 343290001
 Matrix: SOIL
 Collect Date: 18-FEB-14 08:20
 Receive Date: 20-FEB-14
 Collector: Client
 Moisture: 11.5%

Project: WCHN00213
 Client ID: WCHN001

✓ 3/2/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-PCB											
SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"											
Aroclor-1016	U	1.24	1.24	3.73	ug/kg	1	JXM	02/22/14	1002	1367920	I
Aroclor-1221	U	1.24	1.24	3.73	ug/kg	1					
Aroclor-1232	U	1.24	1.24	3.73	ug/kg	1					
Aroclor-1242	U	1.24	1.24	3.73	ug/kg	1					
Aroclor-1248	U	1.24	1.24	3.73	ug/kg	1					
Aroclor-1254	U	1.24	1.24	3.73	ug/kg	1					
Aroclor-1260	U	1.24	1.24	3.73	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 PCB Prep Soil	CXR2	02/21/14	1000	1367917

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	SW846 3541/8082A		
2	SW846 3541/8082A		

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Decachlorobiphenyl	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	6.81 ug/kg	7.46	91.2	(35%-119%)
4cmx	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	5.09 ug/kg	7.46	68.2	(44%-106%)

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: February 25, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Client SDG: XP0050

Contact: Joan Kessner
 Project: RC-232 Soil

Client Sample ID: J1T935
 Sample ID: 343290004
 Matrix: SOIL
 Collect Date: 18-FEB-14 08:50
 Receive Date: 20-FEB-14
 Collector: Client
 Moisture: 13.2%

Project: WCHN00213
 Client ID: WCHN001

✓ 3/2/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-PCB											
SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"											
Aroclor-1016	U	1.27	1.27	3.82	ug/kg	1	JXM	02/22/14	1114	1367920	1
Aroclor-1221	U	1.27	1.27	3.82	ug/kg	1					
Aroclor-1232	U	1.27	1.27	3.82	ug/kg	1					
Aroclor-1242	U	1.27	1.27	3.82	ug/kg	1					
Aroclor-1248	U	1.27	1.27	3.82	ug/kg	1					
Aroclor-1254	U	1.27	1.27	3.82	ug/kg	1					
Aroclor-1260	U	1.27	1.27	3.82	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 PCB Prep Soil	CXR2	02/21/14	1000	1367917

The following Analytical Methods were performed:

Method	Description	Analyst Comments			
1	SW846 3541/8082A				
Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
4cmx	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	4.43 ug/kg	7.64	58.0	(44%-106%)
Decachlorobiphenyl	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	4.51 ug/kg	7.64	59.0	(35%-119%)

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: February 25, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354
 Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0050

Client Sample ID: J1T937 Project: WCHN00213
 Sample ID: 343290006 Client ID: WCHN001
 Matrix: SOIL
 Collect Date: 18-FEB-14 09:00
 Receive Date: 20-FEB-14
 Collector: Client
 Moisture: 6.06%

✓ 3/2/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-PCB											
SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"											
Aroclor-1016	U	1.18	1.18	3.54	ug/kg	1	JXM	02/22/14	1142	1367920	1
Aroclor-1221	U	1.18	1.18	3.54	ug/kg	1					
Aroclor-1232	U	1.18	1.18	3.54	ug/kg	1					
Aroclor-1242	U	1.18	1.18	3.54	ug/kg	1					
Aroclor-1248	U	1.18	1.18	3.54	ug/kg	1					
Aroclor-1254	U	1.18	1.18	3.54	ug/kg	1					
Aroclor-1260	U	1.18	1.18	3.54	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 PCB Prep Soil	CXR2	02/21/14	1000	1367917

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3541/8082A	
2	SW846 3541/8082A	

Surrogate/Tracer	Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Decachlorobiphenyl		SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	6.17 ug/kg	7.08	87.1	(35%-119%)
4cmx		SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	4.73 ug/kg	7.08	66.8	(44%-106%)

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: February 25, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354
 Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0050

Client Sample ID: J1T941
 Sample ID: 343290010
 Matrix: SOIL
 Collect Date: 18-FEB-14 09:20
 Receive Date: 20-FEB-14
 Collector: Client
 Moisture: 6.04%

Project: WCHN00213
 Client ID: WCHN001

✓
3/2/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-PCB											
SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"											
Aroclor-1016	U	1.18	1.18	3.54	ug/kg	1	JXM	02/22/14	1304	1367920	1
Aroclor-1221	U	1.18	1.18	3.54	ug/kg	1					
Aroclor-1232	U	1.18	1.18	3.54	ug/kg	1					
Aroclor-1242	U	1.18	1.18	3.54	ug/kg	1					
Aroclor-1248	U	1.18	1.18	3.54	ug/kg	1					
Aroclor-1254	U	1.18	1.18	3.54	ug/kg	1					
Aroclor-1260	U	1.18	1.18	3.54	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 PCB Prep Soil	CXR2	02/21/14	1000	1367917

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3541/8082A	
2	SW846 3541/8082A	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Decachlorobiphenyl	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	5.45 ug/kg	7.09	76.9	(35%-119%)
4cmx	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	4.70 ug/kg	7.09	66.3	(44%-106%)

Notes:

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

**PCB Case Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0050**

Method/Analysis Information

Procedure: Analysis of Polychlorinated Biphenyls by ECD
Analytical Method: SW846 3541/8082A
Prep Method: SW846 3541
Analytical Batch Number: 1367920
Prep Batch Number: 1367917

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 3541/8082A:

Sample ID	Client ID
343290001	J1T932
343290002	J1T933
343290003	J1T934
343290004	J1T935
343290005	J1T936
343290006	J1T937
343290007	J1T938
343290009	J1T940
343290010	J1T941
343290011	J1T942
343290012	J1T943
343290013	J1T944
1203038904	Method Blank (MB)
1203038905	Laboratory Control Sample (LCS)
1203038906	343290002(J1T933) Matrix Spike (MS)
1203038907	343290002(J1T933) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on a "dry weight" basis.

Preparation/Analytical Method Verification

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-040 REV# 20.

Raw data reports are processed and reviewed by the analyst using the Chemstation software package. False positives have been removed from the quantitation reports per standard operating procedures (SOP).

Calibration Information

A complete list of the initial calibration data files are shown in the Calibration History report located in the Standard Data section of the data package.

Initial Calibration

All initial calibration requirements have been met for this sample delivery group (SDG).

Continuing Calibration Verification (CCV) Requirements

All associated calibration verification standards (ICV or CCV) met the acceptance criteria. All analytes were within the established retention time windows for this method.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

All surrogate recoveries were within the established acceptance criteria for the samples reported in this batch.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 343290002 (J1T933) was selected for the matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The MS recoveries for this SDG were within the established acceptance limits.

Matrix Spike Duplicate (MSD) Recovery Statement

The MSD recoveries for this SDG were within the established acceptance limits.

MS/MSD Relative Percent Difference (RPD) Statement

The RPD between the MS and MSD met the acceptance limits.

Technical Information

Holding Time Specifications

GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection of sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP. All reported analyte detections in client and quality control samples were within the established retention time windows. Reported analyte concentrations were confirmed on dissimilar columns. All sample extracts were cleaned using alumina. Additionally, copper was added to all sample extracts to remove sulfur.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

Re-extractions or re-analyses were not required for the samples reported in this batch.

Miscellaneous Information

Electronic Package Comment

The following package was generated using an electronic data processing program referred to as "virtual packaging". In an effort to increase quality and efficiency, the laboratory is developing systems to eventually generate all data packages electronically. The following change from "traditional" packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Data Exception (DER) Documentation

Data exception report (DER) is generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A DER was not required for the samples in this SDG in this batch.

Manual Integrations

Certain standards and samples may have required manual integration to correctly position the baseline as set in the calibration standard injections. If manual integration was performed, copies of all manual integration peak profiles are included in the raw data section of this PCB fraction.

Additional Comments

The additional comments field is used to address special issues associated with each analysis, clarify method/contractual issues pertaining to the analysis, and to list any report documents generated as a result of sample analysis or review. The following additional comments were required:

The higher results from either column have been chosen and reported in the data package for the client samples, MB and LCS. The data reported for the MS and MSD are from the same analytical column as the parent sample.

Due to software issue, the surrogate recovery range was not indicated or possibly indicated incorrectly in Quantitation Report. Please see Surrogate Recovery Report for correct surrogate acceptance limits.

Due to rounding differences in the calculation between the forms, the data reported in Sample Summary (form 1) and Spike Recovery Report (form 3) may differ slightly from the data reported in Identification Summary (form 10).

Aroclors quantitated on the raw data report by ChemStation data system do not necessarily represent positive Aroclor identification. In order for positive identification to be made, the Aroclor must match in pattern and retention time; as well as quantitate relatively close between the primary and confirmation columns, as specified in SW846 method 8000. When these conditions are not met, the Aroclor is reported as a non-detect on the data report.

System Configuration

The Semi-Volatiles-PCB analysis was performed on the following instrument configuration:

Instrument ID	Instrument	System Configuration	Column ID	Column Description
ECD8A.I_1	Agilent 6890 Gas Chromatograph/Dual ECD w/ 7683 Autosampler	HP6890 Series ECD	Rtx-CLP I	30m x 0.25mm, 0.25um (Rtx-CLPesticide I)

ECD8A.I_2 Agilent 6890 Gas Chromatograph/Dual ECD w/ 7683 Autosampler HP6890 Series ECD Rtx-CLP II 30m x 0.25mm, 0.20um (Rtx-CLPesticide II)

Method/Analysis Information

Procedure: **Analysis of Polychlorinated Biphenyls by ECD**
Analytical Method: SW846 3541/8082A
Prep Method: SW846 3541
Analytical Batch Number: 1368417
Prep Batch Number: 1368416

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 3541/8082A:

Sample ID	Client ID
343290008	J1T939
1203040111	Method Blank (MB)
1203040112	Laboratory Control Sample (LCS)
1203040115	343419001(J1T9J6) Matrix Spike (MS)
1203040116	343419001(J1T9J6) Matrix Spike Duplicate (MSD)
1203040117	343428001(J1T9K5) Matrix Spike (MS)
1203040118	343428001(J1T9K5) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on a "dry weight" basis.

Preparation/Analytical Method Verification

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-040 REV# 20.

Raw data reports are processed and reviewed by the analyst using the Chemstation software package. False positives have been removed from the quantitation reports per standard operating procedures (SOP).

Calibration Information

A complete list of the initial calibration data files are shown in the Calibration History report located in the Standard Data section of the data package.

Initial Calibration

All initial calibration requirements have been met for this sample delivery group (SDG).

Continuing Calibration Verification (CCV) Requirements

All associated calibration verification standards (ICV or CCV) met the acceptance criteria. All analytes were

within the established retention time windows for this method.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

All surrogate recoveries were within the established acceptance criteria for the samples in this SDG in this batch.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

WCHN samples 343419001 (J1T9J6) and 343428001 (J1T9K5) of similar matrix were selected for the matrix spike and matrix spike duplicate analysis for this batch of the samples.

Matrix Spike (MS) Recovery Statement

The MS, performed on sample 343419001 (J1T9J6), did not meet spike recovery acceptance criteria due to dilution and sample matrix interference.

The MS, performed on sample and 343428001 (J1T9K5), met spike recovery acceptance criteria.

Matrix Spike Duplicate (MSD) Recovery Statement

The MSD, performed on sample 343419001 (J1T9J6), did not meet spike recovery acceptance criteria due to dilution and sample matrix interference.

The MSD, performed on sample and 343428001 (J1T9K5), met spike recovery acceptance criteria.

MS/MSD Relative Percent Difference (RPD) Statement

The RPD between the MS and MSD met the acceptance limits.

Technical Information

Holding Time Specifications

GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection of sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP. All reported analyte detections in client and quality control samples were within the established retention time windows. Reported analyte concentrations were confirmed on dissimilar columns. All sample extracts were cleaned using alumina. Additionally, copper was added to all sample extracts to remove sulfur.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

Sample 343290008 (J1T939) was extracted and analyzed twice due to low surrogate recovery in the first analysis. The second analysis was reported.

Miscellaneous Information

Electronic Package Comment

The following package was generated using an electronic data processing program referred to as "virtual packaging". In an effort to increase quality and efficiency, the laboratory is developing systems to eventually generate all data packages electronically. The following change from "traditional" packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Data Exception (DER) Documentation

Data exception report (DER) is generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A DER was not required for the samples in this SDG in this batch.

Manual Integrations

Certain standards and samples may have required manual integration to correctly position the baseline as set in the calibration standard injections. If manual integration was performed, copies of all manual integration peak profiles are included in the raw data section of this PCB fraction.

Additional Comments

The additional comments field is used to address special issues associated with each analysis, clarify method/contractual issues pertaining to the analysis, and to list any report documents generated as a result of sample analysis or review. The following additional comments were required:

The front column has been chosen as the primary column. The data are reported from the front column for all samples in this batch.

Due to software issue, the surrogate recovery range was not indicated in Quantitation Report. Please see Surrogate Recovery Report for correct surrogate acceptance limits.

Due to rounding differences in the calculation between the forms, the data reported in Sample Summary (form 1) and Spike Recovery Report (form 3) may differ slightly from the data reported in Identification Summary (form 10).

Aroclors quantitated on the raw data report by ChemStation data system do not necessarily represent positive Aroclor identification. In order for positive identification to be made, the Aroclor must match in pattern and retention time; as well as quantitate relatively close between the primary and confirmation columns, as specified in SW846 method 8000. When these conditions are not met, the Aroclor is reported as a non-detect on the data report.

System Configuration

The Semi-Volatiles-PCB analysis was performed on the following instrument configuration:

Instrument ID	Instrument	System Configuration	Column ID	Column Description
ECD8A.I_1	Agilent 6890 Gas Chromatograph/Dual ECD w/ 7683 Autosampler	HP6890 Series ECD	Rtx-CLP I	30m x 0.25mm, 0.25um (Rtx-CLPesticide I)

ECD8A.1_2	Agilent 6890 Gas Chromatograph/Dual ECD w/ 7683 Autosampler	HP6890 Series ECD	Rtx-CLP II	30m x 0.25mm, 0.20um (Rtx-CLPesticide II)
-----------	---	----------------------	---------------	---

Certification Statement

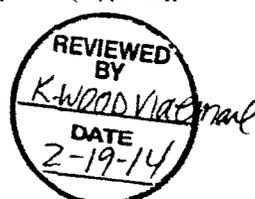
Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

DATA EXCEPTION REPORT			
Mo.Day Yr. 25-FEB-14	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: GC/ECD	Test / Method: SW846 3541/8082A	Matrix Type: Solid	Client Code: OLAB, WCHN
Batch ID: 1368417	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 343290(XP0050),343419(XP0051),343495(X402192)			
Application Issues: Failed Recovery for MS/PS Failed Recovery for MSD/PSD			
Specification and Requirements Exception Description:		DER Disposition:	
QC sample1203040115(MS) and 1203040116(MSD), performed on sample 343419001, did not meet spike recovery acceptance criteria.		The failure was attributed to sample matrix interference and dilution as the MS and MSD failed in the same manner. The data were reported.	

Originator's Name:
Yiping Shi 25-FEB-14

Data Validator/Group Leader:
Jimin Cao 25-FEB-14

343290

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-232-074		Page 1 of 3	
Collector WHITE, EC		Company Contact Joan Kessner		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8B	
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites		Sampling Location 600-356		SAF No. RC-232		Data Turnaround 7day			
Ice Chest No. WCH-11-014		Field Logbook No. EL-1666-01		COA 0603562000		Method of Shipment Commerical Carrier - Fed Ex			
Shipped To GEL Laboratories Charlston		Offsite Property No. A131050		Bill of Lading/Air Bill No. See OSPC					
Other Labs Shipped To NA		Preservation		Cool 4C	Cool 4C	Cool 4C	Cool 4C		
POSSIBLE SAMPLE HAZARDS/REMARKS None		Type of Container		G/P	aG	aG	aG		
Special Handling and/or Storage Cool 4c		No. of Container(s)		1	1	1	1		
		Volume		125mL	125mL	125mL	125mL		
		Sample Analysis		See item (1) in Special Instructions	TPH-Diesel Range - WTPH-D -	PAHs - 8310	PCBs - 8082		
Sample No.	Matrix	Sample Date	Sample Time						
J1T932	SOIL	2-18-14	0820	X	X	X	X		
J1T933	SOIL	2-18-14	0830	X	X	X	X		
J1T934	SOIL	2-18-14	0840	X	X	X	X		
J1T935	SOIL	2-18-14	0850	X	X	X	X		
-J1T936	SOIL	2-18-14	0855	X	X	X	X		
CHAIN OF POSSESSION			Sign/Print Names		SPECIAL INSTRUCTIONS				
Relinquished By/Removed From E. White / G WAD	Date/Time 2-18-14 0940	Received By/Stored In R. Fahlers R. Farro	Date/Time 2-18-14 0940	(1) ICP Metals - 6010TR (Close-out List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7471 - (CV) (Mercury) 					
Relinquished By/Removed From R. Fahlers R. Farro	Date/Time 2-18-14 1520	Received By/Stored In G. Birmingham	Date/Time 2-18-14 1520						
Relinquished By/Removed From G. Birmingham	Date/Time 2-18-14 1525	Received By/Stored In 1060 Battelle Fridge 1A	Date/Time 2-18-14 1535						
Relinquished By/Removed From 1060 Battelle Fridge	Date/Time 2-19-14 0920	Received By/Stored In G. Birmingham	Date/Time 2-19-14 0920						
Relinquished By/Removed From G. Birmingham	Date/Time 2-19-14 0925	Received By/Stored In Fed EX	Date/Time 2-19-14 0925						
Relinquished By/Removed From Fed EX	Date/Time 2-19-14	Received By/Stored In Off Jennifer Pellegrini	Date/Time 2-20-14 0905						
Relinquished By/Removed From Off Jennifer Pellegrini	Date/Time 2-20-14	Received By/Stored In	Date/Time						
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time	XP0050					

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Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-232-074		Page 2 of 3	
Collector WHITE, EC		Company Contact Joan Kessner		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8B Data Turnaround	
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites		Sampling Location 600-356		SAF No. RC-232		7 Day			
Ice Chest No. WCH-11-014		Field Logbook No. EL-166-01		COA. 0603562000		Method of Shipment Commerical Carrier fed ex			
Shipped To GEL Laboratories Charlston		Offsite Property No. A131050		Bill of Lading/Air Bill No. See OSPC					
Other Labs Shipped To NA		Preservation		Cool 4C	Cool 4C	Cool 4C	Cool 4C		
		Type of Container		GP	aG	aG	aG		
POSSIBLE SAMPLE HAZARDS/REMARKS None		No. of Container(s)		1	1	1	1		
		Volume		125mL	125mL	125mL	125mL		
Special Handling and/or Storage Cool 4c		Sample Analysis		See item (1) in Special Instructions	TPH-Diesel Range - WTPH-D +	PAHs - 8310	PCBs - 8082		
Sample No.	Matrix	Sample Date	Sample Time						
-J1T937	SOIL	2-18-14	0900	X	X	X	X		
J1T938	SOIL	2-18-14	0905	X	X	X	X		
J1T939	SOIL	2-18-14	0910	X	X	X	X		
J1T940	SOIL	2-18-14	0915	X	X	X	X		
J1T941	SOIL	2-18-14	0920	X	X	X	X		
CHAIN OF POSSESSION				Sign/Print Names		SPECIAL INSTRUCTIONS			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time			
E. White/Joan		2-18-14 0940		R. F. Hillen		2-18-14 0940			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time			
R. F. Hillen		2-18-14 1520		C. Bingham		2-18-14 1520			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time			
C. Bingham		2-18-14 1525		1060 Battelle, fridge		2-18-14 1525			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time			
1060 Battelle, fridge		2-19-14 0920		C. Bingham		2-19-14 0920			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time			
C. Bingham		2-19-14 0925		Fed Ex		2-20-14 0905			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time			
Fed Ex		2-19-14		J. Jennifer Pelligrini		2-20-14 0905			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time			
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time			
WCH-EE-011									



XP0050

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Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-232-074		Page 3 of 3	
Collector WHITE, EC		Company Contact Joan Kessner		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8 B Data Turnaround	
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites		Sampling Location 600-356		SAF No. RC-232		7 Days			
Ice Chest No. WCH-11-014		Field Logbook No. EL-166-01		COA 0603562000		Method of Shipment Commercial Carrier Fed Ex			
Shipped To GEL Laboratories Charlston		Offsite Property No. A131050		Bill of Lading/Air Bill No. See OSPC					
Other Labs Shipped To NA		Preservation		Cool 4C	Cool 4C	Cool 4C	Cool 4C		
		Type of Container		G/P	aG	aG	aG		
POSSIBLE SAMPLE HAZARDS/REMARKS None		No. of Container(s)		1	1	1	1		
		Volume		125mL	125mL	125mL	125mL		
Special Handling and/or Storage Cool 4c		Sample Analysis		See item (1) in Special Instructions	TPH-Diesel Range - WTPH-D +	PAHs - 8310	PCBs - 8062		
Sample No.	Matrix	Sample Date	Sample Time						
J1T942	SOIL	2-18-14	0925	X	X	X	X		
J1T943	SOIL	2-18-14	0930	X	X	X	X		
J1T944	SOIL	2-18-14	0820	X	X	X	X		
J1T945	SOIL	2-18-14	0815	X	X	X	X		
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS	
Relinquished By/Removed From E. White/EC		Date/Time 2-18-14 0940		Received By/Stored In R. Fellner		Date/Time 2-18-14 0940		(1) ICP Metals - 6010TR (Close-out List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7471 - (CV) (Mercury)	
Relinquished By/Removed From R. Fellner		Date/Time 2-18-14 1520		Received By/Stored In G. Bingham		Date/Time 2-18-14 1520			
Relinquished By/Removed From G. Bingham		Date/Time 2-18-14 1525		Received By/Stored In 1060 Battelle, Fredrick		Date/Time 2-18-14 1525			
Relinquished By/Removed From 1060 Battelle, Fredrick		Date/Time 2-19-14 0920		Received By/Stored In G. Bingham		Date/Time 2-19-14 0920			
Relinquished By/Removed From G. Bingham		Date/Time 2-19-14 0925		Received By/Stored In Fed Ex		Date/Time 2-19-14 0925			
Relinquished By/Removed From Fed Ex		Date/Time		Received By/Stored In G. J. Pomeroy		Date/Time 2-20-14 0905			
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time			
						XP0050			



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WCH-EE-011

Appendix 5
Data Validation Supporting Documentation

PCB DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	600-356		DATA PACKAGE: XP0050		
VALIDATOR:	ELR	LAB:	Cel	DATE: 3/2/14	
			SDG: XP0050		
ANALYSES PERFORMED					
SW-846 8081	SW-846 8081 (TCLP)	SW-846 8082	SW-846 8081 (TCLP)		
SAMPLES/MATRIX					
J1T932	J1T933	J1T934	J1T935	J1T936	
J1T937	J1T938	J1T939	J1T940	J1T941	
J1T942	J1T943	J1T944			
					soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments: _____

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: _____

PCB DATA VALIDATION CHECKLIST

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: No FB

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: 39 - 09. MS + MSD - J 1014

NO PAF

PCB DATA VALIDATION CHECKLIST

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: _____

6. SYSTEM PERFORMANCE (Levels D and E)

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

Comments: _____

7. HOLDING TIMES (all levels)

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

Comments: _____

PCB DATA VALIDATION CHECKLIST

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: _____

9. SAMPLE CLEANUP (Levels D and E)

Fluorocil ® (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

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: February 25, 2014

Page 1 of 4

WC-Hanford, Inc.
2620 Fermi Avenue
MSIN H4-21
Richland, Washington
Joan Kessner

Contact:

Workorder: 343290

Client SDG: XP0050

Project Description: RC-232 Soil

Paramname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-PCB											
Batch	1367920										
QC1203038905	LCS										
Aroclor-1016	33.2			20.5	ug/kg		61.7	(39%-120%)	JXM	02/22/14	09:49
Aroclor-1260	33.2			25.4	ug/kg		76.3	(50%-116%)			
**4cmx	6.65			4.47	ug/kg		67.2	(44%-106%)			
**Decachlorobiphenyl	6.65			5.71	ug/kg		85.9	(35%-119%)			
QC1203038904	MB										
Aroclor-1016			U	1.11	ug/kg					02/22/14	09:37
Aroclor-1221			U	1.11	ug/kg						
Aroclor-1232			U	1.11	ug/kg						
Aroclor-1242			U	1.11	ug/kg						
Aroclor-1248			U	1.11	ug/kg						
Aroclor-1254			U	1.11	ug/kg						
Aroclor-1260			U	1.11	ug/kg						
**4cmx	6.66			4.84	ug/kg		72.5	(44%-106%)			
**Decachlorobiphenyl	6.66			6.23	ug/kg		93.5	(35%-119%)			
QC1203038906	343290002 MS										
Aroclor-1016	35.3	U	1.18	20.7	ug/kg		58.5	(25%-125%)		02/22/14	10:30
Aroclor-1260	35.3	U	1.18	20.2	ug/kg		57.3	(28%-127%)			
**4cmx	7.07		4.09	4.55	ug/kg		64.4	(44%-106%)			
**Decachlorobiphenyl	7.07		3.79	4.13	ug/kg		58.5	(35%-119%)			
QC1203038907	343290002 MSD										
Aroclor-1016	35.2	U	1.18	22.5	ug/kg	8.36	63.9	(0%-30%)		02/22/14	10:45

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 343290

Client SDG: XP0050

Project Description: RC-232 Soil

Page 2 of 4

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-PCB											
Batch	1367920										
Aroclor-1260	35.2	U	1.18	19.1	ug/kg	5.73	54.3	(0%-30%)			
**4cmx	7.04		4.09	4.22	ug/kg		60	(44%-106%)	JXM	02/22/14	10:45
**Decachlorobiphenyl	7.04		3.79	4.04	ug/kg		57.3	(35%-119%)			
Batch	1368417										
QC1203040112	LCS										
Aroclor-1016	33.3			23.5	ug/kg		70.5	(39%-120%)	JXM	02/25/14	07:59
Aroclor-1260	33.3			28.0	ug/kg		84.2	(50%-116%)			
**4cmx	6.66			4.84	ug/kg		72.6	(44%-106%)			
**Decachlorobiphenyl	6.66			5.95	ug/kg		89.2	(35%-119%)			
QC1203040111	MB										
Aroclor-1016			U	1.11	ug/kg					02/25/14	07:46
Aroclor-1221			U	1.11	ug/kg						
Aroclor-1232			U	1.11	ug/kg						
Aroclor-1242			U	1.11	ug/kg						
Aroclor-1248			U	1.11	ug/kg						
Aroclor-1254			U	1.11	ug/kg						
Aroclor-1260			U	1.11	ug/kg						
**4cmx	6.67			5.06	ug/kg		75.9	(44%-106%)			
**Decachlorobiphenyl	6.67			6.34	ug/kg		95.2	(35%-119%)			
QC1203040115	343419001 MS										
Aroclor-1016	35.5	DTU	11.9 DTU	11.8	ug/kg		0*	(25%-125%)		02/25/14	10:51
Aroclor-1260	35.5	DP	42.4 D	77.6	ug/kg		99.3	(28%-127%)			
**4cmx	7.09		5.15	4.90	ug/kg		69.1	(44%-106%)			
**Decachlorobiphenyl	7.09		5.48	5.12	ug/kg		72.2	(35%-119%)			
QC1203040117	343428001 MS										

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 343290

Client SDG: XP0050

Project Description: RC-232 Soil

Page 3 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-PCB											
Batch	1368417										
Aroclor-1016	33.3	U	1.11	P	23.3	ug/kg	70.1	(25%-125%)		02/25/14	09:31
Aroclor-1260	33.3		4.24		25.5	ug/kg	63.9	(28%-127%)	JXM		
**4cmx	6.66		3.87		3.75	ug/kg	56.4	(44%-106%)			
**Decachlorobiphenyl	6.66		5.08		4.92	ug/kg	73.9	(35%-119%)			
QC1203040116	343419001	MSD									
Aroclor-1016	35.5	DTU	11.9	DTU	11.8	ug/kg	N/A	0*	(0%-30%)	02/25/14	11:05
Aroclor-1260	35.5	DP	42.4	D	65.0	ug/kg	17.6	63.8	(0%-30%)		
**4cmx	7.10		5.15		4.52	ug/kg	63.6	(44%-106%)			
**Decachlorobiphenyl	7.10		5.48		4.79	ug/kg	67.5	(35%-119%)			
QC1203040118	343428001	MSD									
Aroclor-1016	33.1	U	1.11	P	22.5	ug/kg	3.69	68	(0%-30%)	02/25/14	09:45
Aroclor-1260	33.1		4.24		27.5	ug/kg	7.59	70.3	(0%-30%)		
**4cmx	6.62		3.87		4.19	ug/kg	63.3	(44%-106%)			
**Decachlorobiphenyl	6.62		5.08		5.22	ug/kg	78.9	(35%-119%)			

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
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