

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 4/7/14
INITIAL/DATE

COMMENTS:

SDG XP0051

SAF-RC-232

Sample Location: 100-B-35

Date: 1 April 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 100-B-35
 Subject: PCB - Data Package No. XP0051-GEL

INTRODUCTION

This memo presents the results of data validation on Data Package No. XP0051 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
J1T9J5	2/20/14	Soil	C	See note 1
J1T9J6	2/20/14	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, all aroclor-1016 results 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

No field duplicates were submitted for analysis.

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. XP0051 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, all aroclor-1016 results 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: XP0051	REVIEWER: ELR	Project: 100-B-35	PAGE <u>1</u> OF <u>1</u>
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Aroclor-1016	J	All	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: XP0051

Client Sample ID: J1T9J5
 Sample ID: 343419002
 Matrix: SOIL
 Collect Date: 20-FEB-14 08:38
 Receive Date: 21-FEB-14
 Collector: Client
 Moisture: 7.01%

Project: WCHN00213
 Client ID: WCHN001

4/1/14

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	TU	1.19	1.19	3.58	ug/kg	1	JXM	02/25/14	0904	1368417	1
Aroclor-1221	U	1.19	1.19	3.58	ug/kg	1					
Aroclor-1232	U	1.19	1.19	3.58	ug/kg	1					
Aroclor-1242	U	1.19	1.19	3.58	ug/kg	1					
Aroclor-1248	U	1.19	1.19	3.58	ug/kg	1					
Aroclor-1254	U	1.19	1.19	3.58	ug/kg	1					
Aroclor-1260		10.7	1.19	3.58	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 PCB Prep Soil	SJW1	02/24/14	1027	1368416

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"	5.27 ug/kg	7.16	73.6	(44%-106%)
Decachlorobiphenyl	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	5.53 ug/kg	7.16	77.2	(35%-119%)

Notes:

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

**PCB Case Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0051**

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
343419001	J1T9J6
343419002	J1T9J5
1203040111	Method Blank (MB)
1203040112	Laboratory Control Sample (LCS)
1203040115	343419001(J1T9J6) Matrix Spike (MS)
1203040116	343419001(J1T9J6) 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

Sample 343419001 (J1T9J6) was selected for the matrix spike and matrix spike duplicate analysis for this SDG.

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.

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.

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

Samples 1203040115 (J1T9J6MS), 1203040116 (J1T9J6MSD) and 343419001 (J1T9J6) were diluted due to high concentrations of non-target analytes within the retention time window of interest.

Sample Re-extraction/Re-analysis

Re-extractions or re-analyses were not required in this SDG 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. DER #1270205 was generated for the MS and MSD of sample 343419001 (J1T9J6).

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.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)

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 sample 1203040115(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

040719 / 343424

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST					RC-232-076		Page 1 of 1		
Collector <i>B. Johnson</i>		Company Contact Joan Kessner		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code <i>-80</i>		Data Turnaround <i>DWS 2/19/14 7/15 Days</i>	
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites		Sampling Location 100-B-35, (152-B1)		SAF No. RC-232		Method of Shipment Commercial Carrier <i>fed ex</i>		Bill of Lading/Air Bill No. <i>See OSPC</i>			
Ice Chest No. <i>RCC-08-027</i>		Field Logbook No. EL-1667-01		COA C10B35A000		Method of Shipment Commercial Carrier <i>fed ex</i>		Bill of Lading/Air Bill No. <i>See OSPC</i>			
Shipped To GEL Laboratories Charlston		Offsite Property No. <i>A131051</i>									
Other Labs Shipped To Eberline Services Oak Ridge Radiological Counting Facility <i>NA 2-20-14 CWB</i>		Preservation		Cool 4C	Cool 4C	Cool 4C	Freeze	Cool 4C	none		
POSSIBLE SAMPLE HAZARDS/REMARKS <i>none</i>		Type of Container		GP	gG	gG	gG*	gG	gG		
Special Handling and/or Storage <i>COO14C</i>		No. of Container(s)		1	1	1	5	1	1		
		Volume		125mL	125mL	125mL	4mL	125mL	125mL		
		Sample Analysis		See item (1) in Special Instructions	PCBs - 8062	TPH-Diesel Range - WTPH-D+	VOC - 5035A250 (TCU)	PAHs - 8310	ICP metals (TCLP) 1311/6010 broken 2/12/14		
Sample No.	Matrix	Sample Date	Sample Time								
J1T9J5	SOIL	2/20/14	0824	✓	✓	✓	✓	✓	✓	✓	
J1T9J6	SOIL	2/20/14	0838	✓	✓	✓	✓	✓	✓	✓	
J1T9J7	SOIL										
J1T9J8	SOIL										
J1T9J9	SOIL										
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS			
Relinquished By/Removed From <i>Joan Kessner</i>		Date/Time <i>2-20-14 0944</i>		Received By/Stored In <i>Joan Kessner</i>		Date/Time <i>2/20/14 0944</i>		(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 <i>Joan Kessner</i>		Date/Time <i>2/20/14 1135</i>		Received By/Stored In <i>fed ex</i>		Date/Time					
Relinquished By/Removed From <i>fed ex</i>		Date/Time		Received By/Stored In <i>Jennifer Belkani</i>		Date/Time <i>2-21-14 0855</i>					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time					
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time					

REVIEWED BY
K. Wood via email
DATE
2-20-14

XP0051

WCH-EE-011

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Appendix 5
Data Validation Supporting Documentation

PCB DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	100-B-35		DATA PACKAGE: XPOOSI		
VALIDATOR:	ELR	LAB:	Cel	DATE: 3/30/14	
			SDG:	XPOOSI	
ANALYSES PERFORMED					
SW-846 8081	SW-846 8081 (TCLP)	SW-846 8082	SW-846 8081 (TCLP)		
SAMPLES/MATRIX					
JIT9U6 J1T9JS					
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 PB

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: LOIG - MS + MSD - J all

_____ no PAJ

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)

Fluorilic ® (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) 558-8171 - 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: 343419

Client SDG: XP0051

Project Description: RC-232 Soil

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-PCB											
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%)			
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

GEL LABORATORIES LLC

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

QC Summary

Workorder: 343419

Client SDG: XP0051

Project Description: RC-232 Soil

Page 2 of 2

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-PCB											
Batch	1368417										
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%)	JXM	02/25/14 11:05
**Decachlorobiphenyl	7.10		5.48		4.79	ug/kg		67.5	(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
- 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: 1 April 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 100-B-35
Subject: Inorganic - Data Package No. XP0051-GEL

INTRODUCTION

This memo presents the results of data validation on Data Package No. XP0051 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
J1T9J5	2/20/14	Soil	C	See note 1
J1T9J6	2/20/14	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.

Due to method blank contamination, the cadmium result in sample J1T9J6 was qualified as undetected and flagged "UJ".

All other preparation blank results were acceptable.

Field (Equipment) Blank

No field blanks were submitted for analysis.

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 arsenic (62.1%), beryllium (66.4%), boron (59.8%), cadmium (63.7%), chromium (60.8%), copper (61.1%), molybdenum

(61.7%), nickel (60.7%), potassium (43.2%), silicon (0%), silver (64.7%) and sodium (66%) 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.

Due to RPDs outside QC limits all copper (31%) and silicon (52.7%) results were qualified as estimates and flagged "J".

All other laboratory duplicate results were acceptable.

Field Duplicate

No field duplicates were submitted for analysis.

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. XP0051 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 method blank contamination, the cadmium result in sample J1T9J6 was qualified as undetected and flagged "UJ".
- Due to matrix spike recoveries outside QC limits, all antimony arsenic (62.1%), beryllium (66.4%), boron (59.8%), cadmium (63.7%), chromium (60.8%), copper (61.1%), molybdenum (61.7%), nickel (60.7%), potassium (43.2%), silicon (0%), silver (64.7%) and sodium (66%) results were qualified as estimates and flagged "J".
- Due to RPDs outside QC limits all copper (31%) and silicon (52.7%) 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: XP0051	REVIEWER: ELR	Project: 100-B-35	PAGE <u>1</u> OF <u>1</u>
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Cadmium	UJ	J1T9J6	Method blank contamination
Arsenic Beryllium Boron Cadmium Chromium Copper Molybdenum Nickel Potassium Silicon Silver Sodium	J	All	MS recovery
Copper Silicon	J	All	RPD

* - 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 28, 2014

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

Client SDG: XP0051

Client Sample ID: J1T9J6
 Sample ID: 343419001
 Matrix: SOIL
 Collect Date: 20-FEB-14 08:24
 Receive Date: 21-FEB-14
 Collector: Client
 Moisture: 6.71%

Project: WCHN00213
 Client ID: WCHN001

✓ 4/1/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
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Mercury Analysis-CVAA

SW846 7471B Mercury in Solid "Dry Weight Corrected"

Mercury	B	0.00926	0.00431	0.0129	mg/kg	1	BCD1	02/25/14	1427	1367115	1
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Metals Analysis-ICP

ICP METALS 6010TR Close-out List "Dry Weight Corrected"

Aluminum	*M	5350	7.29	21.4	mg/kg	1	HSC	02/26/14	1326	1368332	2
Arsenic	BN	1.62	0.536	3.22	mg/kg	1					
Barium	*MN	51.6	0.107	0.536	mg/kg	1					
Beryllium	BN	0.318	0.107	0.536	mg/kg	1					
Boron	NU	1.07	1.07	5.36	mg/kg	1					
Cadmium	BN	0.529	0.107	0.536	mg/kg	1					
Calcium	M	4090	8.58	26.8	mg/kg	1					
Chromium	MN	11.5	0.161	0.536	mg/kg	1					
Copper	*MN	21.8	0.322	1.07	mg/kg	1					
Iron	M	15800	8.58	26.8	mg/kg	1					
Magnesium	*M	3460	9.11	32.2	mg/kg	1					
Manganese	*M	234	0.214	1.07	mg/kg	1					
Molybdenum	NU	0.214	0.214	1.07	mg/kg	1					
Nickel	*MN	9.66	0.161	0.536	mg/kg	1					
Potassium	MN	1240	6.86	26.8	mg/kg	1					
Silicon	*MN	941	1.61	10.7	mg/kg	1					
Silver	N	0.569	0.107	0.536	mg/kg	1					
Sodium	*N	127	7.50	26.8	mg/kg	1					
Antimony	BD	3.57	1.77	5.36	mg/kg	5	HSC	02/26/14	1137	1368332	3
Cobalt	D	7.46	0.804	2.68	mg/kg	5					
Lead	D	12.7	1.77	5.36	mg/kg	5					
Vanadium	D	46.8	0.536	2.68	mg/kg	5					
Zinc	D	158	2.14	5.36	mg/kg	5					

Metals Analysis-ICP-MS

SW846 3050B/6020A Selenium "Dry Weight Corrected"

Selenium	DU	0.350	0.350	1.06	mg/kg	2	PRB	02/25/14	1934	1368329	4
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The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	KXP3	02/24/14	1306	1368328
SW846 3050B	SW846 3050B Prep for 6010C	KXP3	02/24/14	0100	1368331
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	02/24/14	1630	1367113

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: February 28, 2014

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

Client SDG: XP0051

Client Sample ID: J1T9J5
 Sample ID: 343419002
 Matrix: SOIL
 Collect Date: 20-FEB-14 08:38
 Receive Date: 21-FEB-14
 Collector: Client
 Moisture: 7.01%

Project: WCHN00213
 Client ID: WCHN001

✓ 4/1/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	B	0.00586	0.00381	0.0114	mg/kg	1	BCDI	02/25/14	1436	1367115	1
Metals Analysis-ICP											
ICP METALS 6010TR Close-out List "Dry Weight Corrected"											
Aluminum	*M	3230	6.64	19.5	mg/kg	1	HSC	02/26/14	1345	1368332	2
Arsenic	BN J	0.531	0.488	2.93	mg/kg	1					
Barium	*MN	37.3	0.0976	0.488	mg/kg	1					
Beryllium	BN	0.224	0.0976	0.488	mg/kg	1					
Boron	NU	0.976	0.976	4.88	mg/kg	1					
Cadmium	NU	0.0976	0.0976	0.488	mg/kg	1					
Calcium	M	2250	7.81	24.4	mg/kg	1					
Chromium	MN	7.17	0.146	0.488	mg/kg	1					
Copper	*MN	11.6	0.293	0.976	mg/kg	1					
Iron	M	11600	7.81	24.4	mg/kg	1					
Magnesium	*M	2240	8.29	29.3	mg/kg	1					
Manganese	*M	156	0.195	0.976	mg/kg	1					
Molybdenum	NU	0.195	0.195	0.976	mg/kg	1					
Nickel	*MN	6.71	0.146	0.488	mg/kg	1					
Potassium	MN	761	6.25	24.4	mg/kg	1					
Silicon	*MN	527	1.46	9.76	mg/kg	1					
Silver	BN	0.246	0.0976	0.488	mg/kg	1					
Sodium	*N	105	6.83	24.4	mg/kg	1					
Antimony	DU	1.61	1.61	4.88	mg/kg	5	HSC	02/26/14	1151	1368332	3
Cobalt	D	6.14	0.732	2.44	mg/kg	5					
Lead	D	6.83	1.61	4.88	mg/kg	5					
Vanadium	D	48.4	0.488	2.44	mg/kg	5					
Zinc	D	111	1.95	4.88	mg/kg	5					
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.340	0.340	1.03	mg/kg	2	PRB	02/26/14	1556	1368329	4

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	KXP3	02/24/14	1306	1368328
SW846 3050B	SW846 3050B Prep for 6010C	KXP3	02/24/14	0100	1368331
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	02/24/14	1630	1367113

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

**Metals Fractional Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0051**

Sample Analysis

Sample ID	Client ID
343419001	J1T9J6
343419002	J1T9J5
1203039862	Method Blank (MB) ICP
1203039863	Laboratory Control Sample (LCS)
1203039866	343419001(J1T9J6L) Serial Dilution (SD)
1203039864	343419001(J1T9J6D) Sample Duplicate (DUP)
1203039865	343419001(J1T9J6S) Matrix Spike (MS)
1203041736	343419001(J1T9J6PS) Post Spike (PS)
1203039854	Method Blank (MB) ICP-MS
1203039855	Laboratory Control Sample (LCS)
1203039858	343419001(J1T9J6L) Serial Dilution (SD)
1203039856	343419001(J1T9J6D) Sample Duplicate (DUP)
1203039857	343419001(J1T9J6S) Matrix Spike (MS)
1203037031	Method Blank (MB) CVAA
1203037032	Laboratory Control Sample (LCS)
1203040170	343419001(J1T9J6L) Serial Dilution (SD)
1203040168	343419001(J1T9J6D) Sample Duplicate (DUP)
1203040169	343419001(J1T9J6S) Matrix Spike (MS)

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

Method/Analysis Information

Analytical Batch: 1368332, 1368329 and 1367115
Prep Batch : 1368331, 1368328 and 1367113
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: 343419001 (J1T9J6)-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 arsenic, barium, beryllium, boron, cadmium, chromium, copper, molybdenum, nickel, potassium, silicon, silver, and sodium were not within the acceptance limits in sample 1203039865 (J1T9J6)-ICP. See data exception report (DER ID 1270913) behind the case narrative 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 values for aluminum, barium, copper, magnesium, manganese, nickel, silicon, and sodium were not within the acceptance limits in sample 1203039864 (J1T9J6)-ICP. See data exception report (DER ID 1270913) behind the case narrative 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 all recommended quality control acceptance criteria for percent recoveries for the applicable analytes and verifies the presence of matrix interferences. The potassium recovery was not within the acceptance limits in sample 1203041736 (J1T9J6)-ICP. See data exception report (DER ID 1270913) behind the case narrative in this data package.

Serial Dilution % Difference Statement

The serial dilution is used to assess matrix suppression or enhancement. Raw element concentrations 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. Not all applicable analytes met the established percent difference criteria. The %D value for aluminum, barium, calcium, chromium, copper, iron, magnesium, manganese, nickel, potassium, and silicon were not within the acceptance limits in sample 1203039866 (J1T9J6)-ICP.

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 343419001 (J1T9J6) and 343419002 (J1T9J5)-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 solids 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 1270913) 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. 27-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: 1368332	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 343419(XP0051),343428(XP0052)			
Application Issues: Failed Recovery for MS/PS Failed RPD for DUP			
Specification and Requirements		DER Disposition:	
Exception Description:			
<p>1. Failed Recovery for MS/PS:</p> <p>QC 1203039865MS,1203039868MS, 1203041736PS, 1203041737PS</p> <p>2. Failed RPD for DUP:</p> <p>QC 1203039864DUP, 1203039867DUP</p>		<p>1. The matrix spike recovery failed outside of the control limits for arsenic, barium, beryllium, boron, cadmium, chromium, copper, molybdenum, nickel, potassium, selenium, silicon, silver and sodium. The post spike failed outside the required control limits for silicon, barium, copper, potassium and sodium but passed for all other analytes. This verifies the presence of a matrix interference for silicon, barium, copper, potassium and sodium 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 aluminum, barium, copper, magnesium, manganese, nickel, silicon, sodium, chromium, potassium and silver 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> <p>Sample #343419001 is light brown, dry soil-like material.</p> <p>Sample #343428001 is fine, gray powder with small rocks.</p>	

Originator's Name:
Helen Camello 27-FEB-14

Data Validator/Group Leader:
Louise Smith 27-FEB-14

040717/343424

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST					RC-232-076	Page 1 of 1
Collector <i>B. Johnson</i>	Company Contact Joan Kassner	Telephone No. 375-4688	Project Coordinator KESSNER, JH		Price Code <i>-80</i>	Data Turnaround <i>2/19/14 7/15 Days</i>		
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites	Sampling Location 100-B-35, (152-B1)	Field Logbook No. EL-1667-01	COA C10B35A000	SAF No. RC-232	Method of Shipment Commerical Carrier <i>fed EX</i>			
Ice Chest No. <i>RCC-08-027</i>	Offsite Property No. <i>A131051</i>	Bill of Lading/Air Bill No. <i>See O5PC</i>		Other Labs Shipped To Ebertine Services Oak Ridge Radiological Counting Facility <i>NA 2-20-14 CWB</i>				
POSSIBLE SAMPLE HAZARDS/REMARKS <i>none</i>	Preservation	Cool 4C	Cool 4C	Cool 4C	Freeze	Cool 4C	<i>none</i>	
	Type of Container	GP	gG	gG	gG*	gG	<i>gG</i>	
	No. of Container(s)	1	1	1	5	1	<i>1</i>	
	Volume	125mL	125mL	125mL	40mL	125mL	<i>125mL</i>	
Special Handling and/or Storage <i>COO14C</i>	Sample Analysis	See item (1) in Special Instructions	PCBs - 8082	TPH-Diesel Range - WTPH-D +	VOC - 5035/6260 (TC)	PAHs - 8310	<i>ICP Metals (TCLP) 1311/6010 pushen 2/18/14</i>	
Sample No.	Matrix	Sample Date	Sample Time					
J1T9J5	SOIL	2/20/14	0824	✓	✓	✓	✓	
J1T9J6	SOIL	2/20/14	0838	✓	✓	✓	✓	
J1T9J7	SOIL							
J1T9J8	SOIL							
J1T9J9	SOIL							
CHAIN OF POSSESSION				SPECIAL INSTRUCTIONS				
Relinquished By/Removed From <i>Bruce Johnson</i>		Date/Time <i>2-20-14 0944</i>	Received By/Stored In <i>DUSTEN DUSHEA</i>		Date/Time <i>2/20/14 0944</i>			
Relinquished By/Removed From <i>DUSTEN DUSHEA</i>		Date/Time <i>2/20/14 1135</i>	Received By/Stored In <i>fed EX</i>		Date/Time			
Relinquished By/Removed From <i>Fed Ex</i>		Date/Time	Received By/Stored In <i>Off Jennifer Pelkani</i>		Date/Time <i>2-21-14 0855</i>			
Relinquished By/Removed From		Date/Time	Received By/Stored In		Date/Time			
Relinquished By/Removed From		Date/Time	Received By/Stored In		Date/Time			
Relinquished By/Removed From		Date/Time	Received By/Stored In		Date/Time			
Relinquished By/Removed From		Date/Time	Received By/Stored In		Date/Time			
FINAL SAMPLE DISPOSITION	Disposed Method	Disposed By	Date/Time					

REVIEWED BY
K. Wood Via email
DATE
2-20-14

XP0051

19

WCH-EE-011

Appendix 5
Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	100-B-35		DATA PACKAGE: XP0051		
VALIDATOR:	ELR	LAB:	Ciel	DATE: 3/30/14	
			SDG:	XP0051	
ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide		
SAMPLES/MATRIX					
JIT9JG		JIT9JS			
S.O.I 3/30/14					

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

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: _____

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: Codman - DJ 3/12 - J6

No FB

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 - ~~NI~~ NI 11 - J all

No PAT

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: Copper (31%) Silicon (52.7%) - Jall

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: Copper 317^K 3/20/14

8. HOLDING TIMES (all levels)

Samples properly preserved?	Yes	No	N/A
Sample holding times acceptable?	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 28, 2014

Page 1 of 8

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

Contact:

Workorder: 343419

Client SDG: XP0051

Project Description: RC-232 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch 1368329											
QC1203039856	343419001	DUP									
Selenium		DU	0.350	DU	0.342	mg/kg	N/A ^		PRB	02/25/14	19:41
QC1203039855	LCS										
Selenium	4.90		D		4.32	mg/kg	88.2	(80%-120%)		02/25/14	19:12
QC1203039854	MB										
Selenium			DU		0.315	mg/kg				02/25/14	19:04
QC1203039857	343419001	MS									
Selenium	5.16	DU	0.350	D	4.40	mg/kg	84.3	(75%-125%)		02/25/14	19:48
QC1203039858	343419001	SDILT									
Selenium		DU	0.218	DU	1.75	ug/L	N/A	(0%-10%)		02/25/14	20:03
Metals Analysis-ICP											
Batch 1368332											
QC1203039864	343419001	DUP									
Aluminum		*M	5350	*	4100	mg/kg	26.5*	(0%-20%)	HSC	02/26/14	13:29
Antimony		BD	3.57	BD	1.73	mg/kg	69.3 ^	(+/-5.16)		02/26/14	11:41
Arsenic		BN	1.62	U	0.516	mg/kg	145 ^	(+/-3.10)		02/26/14	13:29
Barium		*MN	51.6	*	41.5	mg/kg	21.7*	(0%-20%)			
Beryllium		BN	0.318	B	0.279	mg/kg	12.8 ^	(+/-0.516)			
Boron		NU	1.07	U	1.03	mg/kg	N/A ^				
Cadmium		BN	0.529	B	0.433	mg/kg	20.1 ^	(+/-0.516)			
Calcium		M	4090		3630	mg/kg	11.8	(0%-20%)			
Chromium		MN	11.5		11.5	mg/kg	0.358	(0%-20%)			
Cobalt		D	7.46	D	7.97	mg/kg	6.63 ^	(+/-2.58)		02/26/14	11:41
Copper		*MN	21.8	*	29.9	mg/kg	31.0*	(0%-20%)		02/26/14	13:29
Iron		M	15800		13200	mg/kg	17.9	(0%-20%)			

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QC Summary

Workorder: 343419

Client SDG: XP0051

Project Description: RC-232 Soil

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Paramname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1368332										
Lead	D	12.7	D	13.2	mg/kg	4.13	^	(+/-5.16)	HSC	02/26/14	11:41
Magnesium	*M	3460	*	2750	mg/kg	22.8*		(0%-20%)		02/26/14	13:29
Manganese	*M	234	*	189	mg/kg	21.4*		(0%-20%)			
Molybdenum	NU	0.214	U	0.207	mg/kg	N/A	^				
Nickel	*MN	9.66	*	7.86	mg/kg	20.6*		(0%-20%)			
Potassium	MN	1240		1040	mg/kg	17.8		(0%-20%)			
Silicon	*MN	941	*	548	mg/kg	52.7*		(0%-20%)			
Silver	N	0.569	B	0.483	mg/kg	16.4	^	(+/-0.516)			
Sodium	*N	127	*	93.1	mg/kg	30.5*	^	(+/-25.8)			
Vanadium	D	46.8	D	54.9	mg/kg	16.0		(0%-20%)		02/26/14	11:41
Zinc	D	158	D	166	mg/kg	5.18		(0%-20%)			
QC1203039863	LCS										
Aluminum		484		498	mg/kg			103 (80%-120%)		02/26/14	13:23
Antimony		48.4		48.5	mg/kg			100 (80%-120%)			
Arsenic		48.4		49.3	mg/kg			102 (80%-120%)			
Barium		48.4		49.2	mg/kg			101 (80%-120%)			
Beryllium		48.4		52.3	mg/kg			108 (80%-120%)			
Boron		48.4		47.8	mg/kg			98.6 (80%-120%)			
Cadmium		48.4		50.2	mg/kg			104 (80%-120%)			
Calcium		484		501	mg/kg			103 (80%-120%)			
Chromium		48.4		48.2	mg/kg			99.5 (80%-120%)			
Cobalt		48.4		48.6	mg/kg			100 (80%-120%)			

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QC Summary

Workorder: 343419 Client SDG: XP0051 Project Description: RC-232 Soil Page 3 of 8

Parname	NOM	Sample Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP									
Batch 1368332									
Copper	48.4		49.7	mg/kg		103	(80%-120%)	HSC	02/26/14 13:23
Iron	484		508	mg/kg		105	(80%-120%)		
Lead	48.4		49.5	mg/kg		102	(80%-120%)		
Magnesium	484		505	mg/kg		104	(80%-120%)		
Manganese	48.4		48.7	mg/kg		100	(80%-120%)		
Molybdenum	48.4		47.4	mg/kg		97.9	(80%-120%)		
Nickel	48.4		49.1	mg/kg		101	(80%-120%)		
Potassium	484		479	mg/kg		98.9	(80%-120%)		
Silicon	484		440	mg/kg		90.8	(80%-120%)		
Silver	48.4		48.8	mg/kg		101	(80%-120%)		
Sodium	484		492	mg/kg		102	(80%-120%)		
Vanadium	48.4		48.9	mg/kg		101	(80%-120%)		
Zinc	48.4		49.2	mg/kg		101	(80%-120%)		
QC1203039862	MB								02/26/14 13:19
Aluminum		U	6.75	mg/kg					
Antimony		U	0.327	mg/kg					
Arsenic		U	0.496	mg/kg					
Barium		U	0.0992	mg/kg					
Beryllium		U	0.0992	mg/kg					
Boron		U	0.992	mg/kg					
Cadmium		B	-0.125	mg/kg					
Calcium		U	7.94	mg/kg					

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QC Summary

Workorder: 343419

Client SDG: XP0051

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	1368332										
Chromium			U	0.149	mg/kg				HSC	02/26/14	13:19
Cobalt			U	0.149	mg/kg						
Copper			U	0.298	mg/kg						
Iron			U	7.94	mg/kg						
Lead			U	0.327	mg/kg						
Magnesium			U	8.43	mg/kg						
Manganese			U	0.198	mg/kg						
Molybdenum			U	0.198	mg/kg						
Nickel			U	0.149	mg/kg						
Potassium			U	6.35	mg/kg						
Silicon			U	1.49	mg/kg						
Silver			U	0.0992	mg/kg						
Sodium			U	6.94	mg/kg						
Vanadium			U	0.0992	mg/kg						
Zinc			B	0.400	mg/kg						
QC1203039865	343419001	MS									
Aluminum	530	*M	5350	5470	mg/kg		N/A	(75%-125%)		02/26/14	13:31
Antimony	53.0	BD	3.57	D	49.0	mg/kg	85.7	(75%-125%)		02/26/14	11:45
Arsenic	53.0	BN	1.62	N	34.5	mg/kg	62.1 *	(75%-125%)		02/26/14	13:31
Barium	53.0	*MN	51.6	N	89.6	mg/kg	71.7 *	(75%-125%)			
Beryllium	53.0	BN	0.318	N	35.5	mg/kg	66.4 *	(75%-125%)			
Boron	53.0	NU	1.07	N	31.7	mg/kg	59.8 *	(75%-125%)			

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QC Summary

Workorder: 343419

Client SDG: XP0051

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 1368332											
Cadmium	53.0	BN	0.529	N	34.3	mg/kg	63.7*	(75%-125%)	HSC	02/26/14	13:31
Calcium	530	M	4090		3860	mg/kg	N/A	(75%-125%)			
Chromium	53.0	MN	11.5	N	43.7	mg/kg	60.8*	(75%-125%)			
Cobalt	53.0	D	7.46	D	60.4	mg/kg	99.9	(75%-125%)		02/26/14	11:45
Copper	53.0	*MN	21.8	N	54.2	mg/kg	61.1*	(75%-125%)		02/26/14	13:31
Iron	530	M	15800		14200	mg/kg	N/A	(75%-125%)			
Lead	53.0	D	12.7	D	68.1	mg/kg	105	(75%-125%)		02/26/14	11:45
Magnesium	530	*M	3460		3250	mg/kg	N/A	(75%-125%)		02/26/14	13:31
Manganese	53.0	*M	234		229	mg/kg	N/A	(75%-125%)			
Molybdenum	53.0	NU	0.214	N	32.7	mg/kg	61.7*	(75%-125%)			
Nickel	53.0	*MN	9.66	N	41.8	mg/kg	60.7*	(75%-125%)			
Potassium	530	MN	1240	N	1470	mg/kg	43.2*	(75%-125%)			
Silicon	530	*MN	941	N	649	mg/kg	0*	(75%-125%)			
Silver	53.0	N	0.569	N	34.9	mg/kg	64.7*	(75%-125%)			
Sodium	530	*N	127	N	476	mg/kg	66*	(75%-125%)			
Vanadium	53.0	D	46.8	D	105	mg/kg	110	(75%-125%)		02/26/14	11:45
Zinc	53.0	D	158	D	206	mg/kg	91.9	(75%-125%)			
QC1203041736	343419001	PS									
Aluminum	5000	*M	49900		64400	ug/L	N/A	(80%-120%)		02/26/14	12:48
Arsenic	500	BN	15.1		490	ug/L	95.1	(80%-120%)			
Barium	500	*MN	482		1060	ug/L	116	(80%-120%)			
Beryllium	500	BN	2.96		508	ug/L	101	(80%-120%)			

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QC Summary

Workorder: 343419

Client SDG: XP0051

Project Description: RC-232 Soil

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Paramname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch 1368332											
Boron	500	NU	-10.7	471	ug/L		94.2	(80%-120%)	HSC	02/26/14	12:48
Cadmium	500	BN	4.94	488	ug/L		96.7	(80%-120%)			
Calcium	5000	M	38100	51100	ug/L		N/A	(80%-120%)			
Chromium	500	MN	107	601	ug/L		98.9	(80%-120%)			
Copper	500	*MN	204	784	ug/L		116	(80%-120%)			
Iron	5000	M	148000	183000	ug/L		N/A	(80%-120%)			
Magnesium	5000	*M	32300	43900	ug/L		N/A	(80%-120%)			
Manganese	500	*M	2190	3110	ug/L		N/A	(80%-120%)			
Molybdenum	500	NU	-4.06	469	ug/L		93.9	(80%-120%)			
Nickel	500	*MN	90.1	583	ug/L		98.5	(80%-120%)			
Potassium	5000	MN	11600	19100	ug/L		149*	(80%-120%)			
Silicon	5000	*MN	8780	13700	ug/L		98.5	(80%-120%)			
Silver	500	N	5.31	484	ug/L		95.8	(80%-120%)			
Sodium	5000	*N	1180	6250	ug/L		101	(80%-120%)			
QC1203039866 343419001 SDILT											
Aluminum		*M	49900 DM	12000	ug/L	20*		(0%-10%)		02/26/14	13:34
Antimony		BD	6.66 DU	8.84	ug/L	N/A		(0%-10%)		02/26/14	11:47
Arsenic		BN	15.1 DU	2.68	ug/L	N/A		(0%-10%)		02/26/14	13:34
Barium		*MN	482 DM	118	ug/L	22.3*		(0%-10%)			
Beryllium		BN	2.96 DU	0.536	ug/L	N/A		(0%-10%)			
Boron		NU	-10.7 DU	5.36	ug/L	N/A		(0%-10%)			
Cadmium		BN	4.94 DU	0.536	ug/L	N/A		(0%-10%)			

GEL LABORATORIES LLC
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QC Summary

Workorder: 343419

Client SDG: XP0051

Project Description: RC-232 Soil

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Paramname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch 1368332											
Calcium	M	38100	DM	9320	ug/L	22.3*		(0%-10%)	HSC	02/26/14	13:34
Chromium	MN	107	DM	26.6	ug/L	24.2*		(0%-10%)			
Cobalt	D	13.9	D	2.70	ug/L	2.98		(0%-10%)		02/26/14	11:47
Copper	*MN	204	DM	48.2	ug/L	18.3*		(0%-10%)		02/26/14	13:34
Iron	M	148000	DM	37100	ug/L	25.7*		(0%-10%)			
Lead	D	23.6	D	4.34	ug/L	8.13		(0%-10%)		02/26/14	11:47
Magnesium	*M	32300	DM	7950	ug/L	23.2*		(0%-10%)		02/26/14	13:34
Manganese	*M	2190	DM	557	ug/L	27.3*		(0%-10%)			
Molybdenum	NU	-4.06	DU	1.07	ug/L	N/A		(0%-10%)			
Nickel	*MN	90.1	DM	23.3	ug/L	29.5*		(0%-10%)			
Potassium	MN	11600	DM	2840	ug/L	22.4*		(0%-10%)			
Silicon	*MN	8780	DM	1290	ug/L	26.6*		(0%-10%)			
Silver	N	5.31	D	1.08	ug/L	1.59		(0%-10%)			
Sodium	*N	1180	D	262	ug/L	10.9		(0%-10%)			
Vanadium	D	87.2	D	16.9	ug/L	2.99		(0%-10%)		02/26/14	11:47
Zinc	D	294	D	57.1	ug/L	3.07		(0%-10%)			

Metals Analysis-Mercury

Batch 1367115

QC1203040168	343419001	DUP									
Mercury			B	0.00926	B	0.00823	mg/kg	11.8 ^	(+/-0.0127)	BCD1	02/25/14 14:29
QC1203037032	LCS										
Mercury				0.116		0.117	mg/kg	101	(80%-120%)		02/25/14 14:09
QC1203037031	MB										
Mercury					U	0.00386	mg/kg				02/25/14 14:07

QC Summary

Workorder: 343419 Client SDG: XP0051 Project Description: RC-232 Soil Page 8 of 8

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anst	Date	Time
Metals Analysis-Mercury											
Batch 1367115											
QC1203040169 343419001 MS	0.128	B	0.00926	0.141	mg/kg		103	(80%-120%)	BCD1	02/25/14	14:31
Mercury											
QC1203040170 343419001 SDILT		B	0.144 DU	0.0215	ug/L	N/A		(0%-10%)		02/25/14	14:33
Mercury											

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

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: 1 April 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 100-B-35
Subject: Diesel Range Organics - Data Package No. XP0051-GEL

INTRODUCTION

This memo presents the results of data validation on Data Package No. XP0051 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
J1T9J5	2/20/14	Soil	C	See note 1
J1T9J6	2/20/14	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

No field duplicates were submitted for analysis.

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. XP0051 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 ORGANIC DATA QUALIFICATION SUMMARY*

SDG: XP0051	REVIEWER: ELR	Project: 100-B-35	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 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: XP0051

Client Sample ID: J1T9J5
 Sample ID: 343419002
 Matrix: SOIL
 Collect Date: 20-FEB-14 08:38
 Receive Date: 21-FEB-14
 Collector: Client
 Moisture: 7.01%

Project: WCHN00213
 Client ID: WCHN001

W
2/11/14

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)	JT	2650	2330	7160	ug/kg	1	BYT1	02/25/14	2113	1368613	1
Motor Oil (C20-C36)		18300	2330	7160	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	3541 DRO IN SOIL PREP	SXW3	02/24/14	1839	1368612

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"	518 ug/kg	716	72.3	(50%-150%)

Notes:

GEL LABORATORIES LLC

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

Certificate of Analysis

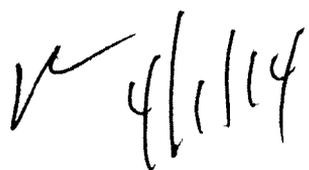
Report Date: February 26, 2014

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

Client SDG: XP0051

Client Sample ID: J1T9J6
 Sample ID: 343419001
 Matrix: SOIL
 Collect Date: 20-FEB-14 08:24
 Receive Date: 21-FEB-14
 Collector: Client
 Moisture: 6.71%

Project: WCHN00213
 Client ID: WCHN001



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)	JT	3580	2320	7140	ug/kg	1	BYT1	02/25/14	1916	1368613	1
Motor Oil (C20-C36)		19300	2320	7140	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	3541 DRO IN SOIL PREP	SXW3	02/24/14	1839	1368612

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"	482 ug/kg	714	67.5	(50%-150%)

Notes:

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

**FID Diesel Range Organics
WC-HANFORD, INC. (WCHN)
SDG XP0051**

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: 1368613
Prep Batch Number: 1368612

Sample Analysis

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

Sample ID	Client ID
343419001	J1T9J6
343419002	J1T9J5
1203040578	Method Blank (MB)
1203040579	Laboratory Control Sample (LCS)
1203040580	343419001(J1T9J6) Matrix Spike (MS)
1203040581	343419001(J1T9J6) 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 343419001 (J1T9J6) was selected for the matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The MS, performed on sample 343419001 (J1T9J6), recovered outside the established acceptance limits due to sample matrix interference as the MSD failed spike recovery in the same manner.

Matrix Spike Duplicate (MSD) Recovery Statement

The MSD, performed on sample 343419001 (J1T9J6), recovered outside the established acceptance limits due to sample matrix interference as the MS failed spike recovery in the same manner.

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 or re-analyses 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. DER #1270453 was generated for the MS and MSD of sample 343419001 (J1T9J6).

Manual Integrations

Manual integrations were required for surrogates.

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.I	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.

DATA EXCEPTION REPORT			
Mo. Day Yr. 26-FEB-14	Division: Federal	Quality Criteria: Specifications	Type: Process
Instrument Type: GC/FID	Test / Method: NWTPH-Dx in Soil	Matrix Type: Solid	Client Code: WCHN
Batch ID: 1368613	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 343419(XP0051)			
Application Issues: Failed Recovery for MS/PS Failed Recovery for MSD/PSD			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. The MS(1203040580) and MSD(1203040581) recovered diesel range organics at 65% and 66% respectively(SPC Limit: 70%-130%).</p>		<p>1. As the MS and MSD displayed similar recoveries, the failures were attributed to sample matrix interference and the data have been reported.</p>	

Originator's Name:
Benjamin Taft 26-FEB-14

Data Validator/Group Leader:
Jimin Cao 26-FEB-14

040719/343424

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST					RC-232-076	Page 1 of 1
Collector B. Johnson	Company Contact Joan Kessner	Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code -86	Data Turnaround 2/19/14 7/15 Days			
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites	Sampling Location 100-B-35, (152-B1)	Field Logbook No. EL-1667-01	SAF No. RC-232	Method of Shipment Commerical Carrier fed EX				
Ice Chest No. RCC-08-027	COA C10B35A000	Method of Shipment Commerical Carrier fed EX		Bill of Lading/Air Bill No. See O5PC				
Shipped To GEL Laboratories Charleston	Offsite Property No. A131051							
Other Labs Shipped To Eberline Services Oak Ridge Radiological Counting Facility	NA 2-20-14 CWS	Preservation	Cool 4C	Cool 4C	Cool 4C	Freeze	Cool 4C	none
		Type of Container	GP	gG	gG	gG*	gG	gG
POSSIBLE SAMPLE HAZARDS/REMARKS <i>none</i>		No. of Container(s)	1	1	1	5	1	1
		Volume	125mL	125mL	125mL	4mL	125mL	125mL
	Special Handling and/or Storage COO14C	Sample Analysis	See item (1) in Special Instructions	PCBs - 8082	TPH-Diesel Range - WTPH-D +	VOC - 5035/8250 (TC)	PAHs - 8310	ICP metals (TCLP) 1311/6010 2/18/14
Sample No.	Matrix	Sample Date	Sample Time					
J1T9J5 J1T9J6	SOIL	2/20/14	0824	✓	✓	✓	✓	✓
J1T9J6 J1T9J5	SOIL	2/20/14	0838	✓	✓	✓	✓	✓
J1T9J7	SOIL							
J1T9J8	SOIL							
J1T9J9	SOIL							
CHAIN OF POSSESSION				SPECIAL INSTRUCTIONS				
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		
Brady Johnson		2-20-14 0944		DUSTEN DUSTEN		2/20/14 0944		
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		
MOSHEN DUSTEN		2/20/14 1135		fed EX				
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		
Fed Ex				Jennifer Pelgrini		2-21-14 0855		
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time					



XP0051

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WCH-EE-011

Appendix 5
Data Validation Supporting Documentation

GENERAL ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	100-B-35		DATA PACKAGE: XP0051		
VALIDATOR:	ELR	LAB:	Cel	DATE: 3/30/14	
			SDG:	XP0051	
ANALYSES PERFORMED					
8015	8021	8141	8151	8315	
		WTPH-HCID	WTPH-G	WTPH-D	
SAMPLES/MATRIX:					
JIT9J4		JIT9J5			
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 FR _____

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 FR _____

GENERAL ORGANIC DATA VALIDATION CHECKLIST

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

Duplicate RPD values acceptable?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
Duplicate results acceptable?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
MS/MSD standards NIST traceable? (Levels D, E)	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
MS/MSD standards expired? (Levels D, E)	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Field duplicate RPD values acceptable?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Field split RPD values acceptable?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" 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: _____

6. HOLDING TIMES (all levels)

Samples properly preserved?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
Sample holding times acceptable?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> 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 absorbant) 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

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 2

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

Contact:

Workorder: 343419

Client SDG: XP0051

Project Description: RC-232 Soil

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Diesel Range Organics											
Batch	1368613										
QC1203040579	LCS			46600	ug/kg		70.1	(70%-130%)	BYT1	02/25/14	18:37
Diesel Range Organics (C10-C20)	66600			48000	ug/kg		72.2	(70%-130%)			
Motor Oil (C20-C36)	66600			479	ug/kg		72	(50%-150%)			
**o-Terphenyl	666										
QC1203040578	MB			2170	ug/kg					02/25/14	17:58
Diesel Range Organics (C10-C20)			U	2170	ug/kg						
Motor Oil (C20-C36)			U	437	ug/kg		65.5	(50%-150%)			
**o-Terphenyl	666										
QC1203040580	343419001 MS			50600	ug/kg		65.7 *	(70%-130%)		02/25/14	19:55
Diesel Range Organics (C10-C20)	71500	JT	3580 T	71500	ug/kg		73.1	(70%-130%)			
Motor Oil (C20-C36)	71500		19300	504	ug/kg		70.5	(50%-150%)			
**o-Terphenyl	715		482								
QC1203040581	343419001 MSD			50800	ug/kg	0.552	66.1 *	(0%-20%)		02/25/14	20:34
Diesel Range Organics (C10-C20)	71500	JT	3580 T	76800	ug/kg	7.15	80.5	(0%-20%)			
Motor Oil (C20-C36)	71500		19300				68	(50%-150%)			
**o-Terphenyl	715		482	486	ug/kg						

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: 1 April 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
 100-B-35
 Subject: Polyaromatic Hydrocarbon - Data Package No. XP0051-GEL

INTRODUCTION

This memo presents the results of data validation on Data Package No. XP0051 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
J1T9J5	2/20/14	Soil	C	See note 1
J1T9J6	2/20/14	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

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

No field duplicates were submitted for analysis.

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. XP0051 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: XP0051	REVIEWER: ELR	Project: 100-B-35	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

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

**HPLC-PAH
WC-HANFORD, INC. (WCHN)
SDG XP0051**

Method/Analysis Information

Procedure: Polynuclear Aromatic Hydrocarbons
Analytical Method: SW846 8310
Prep Method: SW846 3550B
Analytical Batch Number: 1368519
Prep Batch Number: 1368518

Sample Analysis

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

Sample ID	Client ID
343419001	J1T9J6
343419002	J1T9J5
1203040354	Method Blank (MB)
1203040355	Laboratory Control Sample (LCS)
1203040356	343419001(J1T9J6) Matrix Spike (MS)
1203040357	343419001(J1T9J6) 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 inverted 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 343419001 (J1T9J6) 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, continuing calibration standards, and/or samples may have required manual integrations due to software limitations.

Please see the raw data in the Miscellaneous Section.

Due to an unknown eluting between Benzo(b)fluoranthene and Benzo(k)fluoranthene, it was necessary to manually integrate the Benzo(k)fluoranthene peak for the DAD detector for samples 343419001 (J1T9J6) and 343419002 (J1T9J5). Analyst judgement was used to make the best integration.

Additional Comments

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

One or more analytes were detected whose concentration greatly differed between the primary and confirmation analysis (greater than 40% difference or RPD) in sample 343419001 (J1T9J6). Because both detectors indicated an acceptable peak in the appropriate retention time window for these analytes, the analytes are reported as positive results. Due to the high percent difference or RPD between the two detectors, it is indicated as such on the appropriate Form I/Certificate of Analysis (C of A) with a 'P' qualifier. Those analytes reported with a percent difference or RPD greater than 40% but less than 70% are qualified as presumptive evidence of the presence of the material.

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 100uL 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.

040717/343424

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST					RC-232-076	Page 1 of 1
Collector <i>B. Johnson</i>	Company Contact Joan Kessner	Telephone No. 375-4688	Project Coordinator KESSNER, JH		Price Code -8C	Data Turnaround <i>2/19/14 7/15 Days</i>		
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites	Sampling Location 100-B-35, (152-B1)	SAF No. RC-232	Method of Shipment Commercial Carrier <i>FedEx</i>					
Ice Chest No. <i>RCC-08-027</i>	Field Logbook No. EL-1667-01	COA C10B35A000	Bill of Lading/Air Bill No. <i>See O5PC</i>					
Shipped To GEL Laboratories Chariston	Offsite Property No. <i>A13105</i>	Other Labs Shipped To Eberline Services Oak Ridge Radiological Counting Facility <i>NA 2-20-14 CMB</i>						
POSSIBLE SAMPLE HAZARDS/REMARKS <i>none</i>	Preservation	Cool 4C	Cool 4C	Cool 4C	Freeze	Cool 4C	none	
	Type of Container	GP	aG	aG	aG*	aG	aG	
	No. of Container(s)	1	1	1	5	1	1	
	Volume	125mL	125mL	125mL	4mL	125mL	125mL	
Special Handling and/or Storage <i>COO14C</i>	Sample Analysis	See Item (1) in Special Instructions	PCBs - 8082	TPH-Diesel Range - WTPH-D+	VOC - 5035A260 (TCU)	PAHs - 8310	ICP metals (TCLP) 1311/6010 <i>pushen 2/18/14</i>	
Sample No.	Matrix	Sample Date	Sample Time					
J1T9J5 J1T9J6	SOIL	2/20/14	0824	✓	✓	✓	✓	
J1T9J6 J1T9J5	SOIL	2/20/14	0838	✓	✓	✓	✓	
J1T9J7	SOIL							
J1T9J8	SOIL							
J1T9J9	SOIL							
CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS				
Relinquished By/Removed From <i>Bryde Johnson</i>	Date/Time <i>2-20-14 0944</i>	Received By/Stored In <i>DUSTEN DUSHEA</i>	Date/Time <i>2/20/14 0944</i>	(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 <i>Moshen DUSHEA</i>	Date/Time <i>2/20/14 1135</i>	Received By/Stored In <i>FedEx</i>	Date/Time					
Relinquished By/Removed From <i>FedEx</i>	Date/Time	Received By/Stored In <i>Off. Jennifer Pelgrini</i>	Date/Time <i>2-21-14 0855</i>					
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time					
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time					
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time					
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time	<div style="text-align: center;">  <p>XP0051</p> </div>				
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:	100-B-35		DATA PACKAGE: XP0051		
VALIDATOR:	ELR	LAB: Ciel	DATE:		
		SDG: XP0051			
ANALYSES PERFORMED					
8015	8021	8141	8151	8315	8310
		WTPH-HCID	WTPH-G	WTPH-D	
SAMPLES/MATRIX:					
JIT9JL JIT9JS					
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 PAT _____

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)

Fluoricil ® (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

GEL LABORATORIES LLC

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

QC Summary

Report Date: February 27, 2014

Page 1 of 4

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

Contact:

Workorder: 343419

Client SDG: XP0051

Project Description: RC-232 Soil

Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
HPLC-PAH									
Batch	1368519								
QC1203040355	LCS								
Acenaphthene	1670		1330	ug/kg	79.6	(58%-99%)	CWW	02/25/14	11:45
Acenaphthylene	1670		1320	ug/kg	79.2	(58%-98%)			
Anthracene	1670		1540	ug/kg	92.2	(63%-94%)			
Benzo(a)anthracene	167		150	ug/kg	90	(73%-98%)			
Benzo(a)pyrene	167		138	ug/kg	83	(63%-99%)			
Benzo(b)fluoranthene	167		143	ug/kg	86	(70%-130%)			
Benzo(ghi)perylene	167		142	ug/kg	85.2	(70%-130%)			
Benzo(k)fluoranthene	83.3		67.4	ug/kg	80.9	(70%-130%)			
Chrysene	167		161	ug/kg	96.9	(70%-130%)			
Dibenzo(a,h)anthracene	167		168	ug/kg	101	(70%-130%)			
Fluoranthene	167		140	ug/kg	84.3	(70%-130%)			
Fluorene	1670		1380	ug/kg	83.1	(65%-130%)			
Indeno(1,2,3-cd)pyrene	167		153	ug/kg	91.6	(70%-130%)			
Naphthalene	1670		1280	ug/kg	76.6	(57%-130%)			
Phenanthrene	1670		1400	ug/kg	84.1	(70%-130%)			
Pyrene	167		151	ug/kg	90.5	(70%-130%)			
**Decafluorobiphenyl	8330		6380	ug/kg	76.6	(23%-104%)			
QC1203040354	MB								
Acenaphthene		U	4.99	ug/kg				02/25/14	11:03
Acenaphthylene		U	4.99	ug/kg					

GEL LABORATORIES LLC

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

QC Summary

Workorder: 343419

Client SDG: XP0051

Project Description: RC-232 Soil

Page 2 of 4

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH											
Batch	1368519										
Anthracene			U	1.66	ug/kg						
Benzo(a)anthracene			U	0.532	ug/kg				CWW	02/25/14	11:03
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	8320			6410	ug/kg		77	(23%-104%)			
QC1203040356 343419001 MS											
Acenaphthene	1790	U	5.36	1300	ug/kg		73	(49%-90%)		02/25/14	13:10
Acenaphthylene	1790	U	5.36	1280	ug/kg		71.8	(48%-97%)			
Anthracene	1790	U	1.79	1530	ug/kg		85.4	(49%-91%)			
Benzo(a)anthracene	179		67.0	202	ug/kg		75.6	(29%-126%)			
Benzo(a)pyrene	179		76.8	220	ug/kg		80.3	(26%-130%)			
Benzo(b)fluoranthene	179		74.1	229	ug/kg		86.9	(32%-135%)			
Benzo(ghi)perylene	179		67.8	201	ug/kg		74.7	(34%-125%)			

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QC Summary

Workorder: 343419 Client SDG: XP0051 Project Description: RC-232 Soil Page 3 of 4

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH											
Batch	1368519										
Benzo(k)fluoranthene	89.3	41.1		135	ug/kg		106	(48%-142%)	CWW	02/25/14	13:10
Chrysene	179	53.5		217	ug/kg		91.8	(39%-127%)			
Dibenzo(a,h)anthracene	179	P	7.72	174	ug/kg		93.3	(38%-130%)			
Fluoranthene	179		62.9	202	ug/kg		77.6	(20%-139%)			
Fluorene	1790	U	5.36	1380	ug/kg		77.2	(51%-90%)			
Indeno(1,2,3-cd)pyrene	179	P	63.1	208	ug/kg		81.3	(41%-145%)			
Naphthalene	1790	U	5.36	1160	ug/kg		64.9	(43%-87%)			
Phenanthrene	1790	J	11.8	1390	ug/kg		77	(50%-100%)			
Pyrene	179		61.5	214	ug/kg		85.3	(18%-149%)			
**Decafluorobiphenyl	8930		5870	5650	ug/kg		63.2	(23%-104%)			
QC1203040357	343419001	MSD									
Acenaphthene	1780	U	5.36	1300	ug/kg	0.560	72.6	(0%-30%)		02/25/14	13:52
Acenaphthylene	1780	U	5.36	1280	ug/kg	0.450	71.5	(0%-30%)			
Anthracene	1780	U	1.79	1520	ug/kg	0.168	85.3	(0%-30%)			
Benzo(a)anthracene	178		67.0	191	ug/kg	5.56	69.6	(0%-30%)			
Benzo(a)pyrene	178		76.8	201	ug/kg	9.28	69.4	(0%-30%)			
Benzo(b)fluoranthene	178		74.1	202	ug/kg	12.7	71.6	(0%-30%)			
Benzo(ghi)perylene	178		67.8	188	ug/kg	7.06	67.1	(0%-30%)			
Benzo(k)fluoranthene	89.2		41.1	117	ug/kg	14.1	85.6	(0%-30%)			
Chrysene	178		53.5	202	ug/kg	7.35	83.2	(0%-30%)			
Dibenzo(a,h)anthracene	178	P	7.72	169	ug/kg	3.40	90.1	(0%-30%)			
Fluoranthene	178		62.9	196	ug/kg	2.68	74.7	(0%-30%)			

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QC Summary

Workorder: 343419 Client SDG: XP0051 Project Description: RC-232 Soil Page 4 of 4

Parname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
HPLC-PAH									
Batch	1368519								
Fluorene	1780	U	5.36	1370	ug/kg	0.441	76.9	(0%-30%)	CWW 02/25/14 13:52
Indeno(1,2,3-cd)pyrene	178	P	63.1	193	ug/kg	7.70	72.7	(0%-30%)	
Naphthalene	1780	U	5.36	1130	ug/kg	2.32	63.5	(0%-30%)	
Phenanthrene	1780	J	11.8	1390	ug/kg	0.218	77.3	(0%-30%)	
Pyrene	178		61.5	208	ug/kg	2.99	81.9	(0%-30%)	
**Decafluorobiphenyl	8920		5870	5540	ug/kg		62.1	(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.