

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 10/28/13
INITIAL/DATE

COMMENTS:

SDG XP0016

SAF-RC-232

Sample Location: 600-374

Date: 24 October 2013
To: Washington Closure Hanford Inc. (technical representative)
From: ELR Consulting
Project: 100-IU-2 & 100-IU-6 Remaining Waste Sites – Soil Full Protocol - Waste Site 600-374
Subject: Inorganic - Data Package No. XP0016-GEL

INTRODUCTION

This memo presents the results of data validation on Data Package No. XP0016 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
J1T1V0	9/23/13	Soil	C	See note 1
J1T1V1	9/23/13	Soil	C	See note 1
J1T1V2	9/23/13	Soil	C	See note 1

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

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, September 2009). Appendices 1 through 6 provide the following information as indicated below:

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

DATA QUALITY PARAMETERS

Holding Times

Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 6 months for ICP metals and 28 days for mercury.

All holding times were acceptable.

Preparation (Method) Blanks

Preparation Blanks

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

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

All preparation blank results were acceptable.

Field (Equipment) Blank

One field blank (J1T1V2) was submitted for analysis. Nineteen analytes were detected in the field blank. Under the WCH statement of work, no qualification is required.

Accuracy

Matrix Spike and Laboratory Control Sample

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

Due to a matrix spike recovery outside QC limits, all potassium (168%) and silicon (1.3%) 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 an RPD outside QC limits (84.5%), all silicon results were qualified as estimates and flagged "J".

All other laboratory duplicate results were acceptable.

Field Duplicate

One set of field duplicates (J1RWR0/J1RWT4) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

Analytical Detection Levels

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

Completeness

Data package No. XP0016 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 a matrix spike recovery outside QC limits, all potassium (168%) and silicon (1.3%) results were qualified as estimates and flagged "J".
- Due to an RPD outside QC limits (84.5%), all silicon 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: XP0016	REVIEWER: ELR	Project: 600-374	PAGE <u>1</u> OF <u>1</u>
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Silicon Potassium	J	All	MS recovery
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: October 9, 2013

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

Client SDG: XP0016

Client Sample ID: J1T1V1
 Sample ID: 334067002
 Matrix: SOIL
 Collect Date: 23-SEP-13 07:40
 Receive Date: 25-SEP-13
 Collector: Client
 Moisture: 11%

Project: WCHN00213
 Client ID: WCHN001

✓
10/23/13

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	U	0.0044	0.0044	0.0131	mg/kg	1	NOR1	09/27/13	1206	1334136	1
Metals Analysis-ICP											
ICP METALS 6010TR Close-out List "Dry Weight Corrected"											
Aluminum		6980	7.46	21.9	mg/kg	1	HSC	09/27/13	2231	1333881	2
Arsenic		4.61	0.549	3.29	mg/kg	1					
Barium		82.9	0.110	0.549	mg/kg	1					
Beryllium		0.634	0.110	0.549	mg/kg	1					
Boron	B	1.74	1.10	5.49	mg/kg	1					
Cadmium	B	0.334	0.110	0.549	mg/kg	1					
Calcium		3460	8.78	27.4	mg/kg	1					
Chromium		12.4	0.165	0.549	mg/kg	1					
Copper		12.8	0.329	1.10	mg/kg	1					
Iron		20600	8.78	27.4	mg/kg	1					
Magnesium		4430	9.33	32.9	mg/kg	1					
Manganese		357	0.219	1.10	mg/kg	1					
Molybdenum	B	0.606	0.219	1.10	mg/kg	1					
Nickel		11.3	0.165	0.549	mg/kg	1					
Potassium	N S	2070	7.02	27.4	mg/kg	1					
Silicon	*N S	508	1.65	11.0	mg/kg	1					
Silver	U	0.110	0.110	0.549	mg/kg	1					
Sodium		85.6	7.68	27.4	mg/kg	1					
Lead		6.49	0.362	1.10	mg/kg	1	JWJ	10/02/13	1131	1333881	3
Antimony	DU	1.81	1.81	5.49	mg/kg	5	HSC	10/02/13	1204	1333881	4
Cobalt	D	7.84	0.823	2.74	mg/kg	5					
Vanadium	D	53.1	0.549	2.74	mg/kg	5					
Zinc	D	44.6	2.19	5.49	mg/kg	5					
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.364	0.364	1.10	mg/kg	2	SKJ	09/30/13	2229	1333879	5

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	AXG2	09/27/13	0800	1333876
SW846 3050B	SW846 3050B Prep for 6010C	AXG2	09/27/13	0800	1333880
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	09/26/13	1649	1334135

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

**Metals Fractional Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0016**

Sample Analysis

Sample ID	Client ID
334067001	J1T1V0
334067002	J1T1V1
334067003	J1T1V2
1202954622	Method Blank (MB) ICP
1202954623	Laboratory Control Sample (LCS)
1202954629	334067001(J1T1V0L) Serial Dilution (SD)
1202954627	334067001(J1T1V0D) Sample Duplicate (DUP)
1202954628	334067001(J1T1V0S) Matrix Spike (MS)
1202958835	334067001(J1T1V0PS) Post Spike (PS)
1202954605	Method Blank (MB) ICP-MS
1202954606	Laboratory Control Sample (LCS)
1202954612	334067001(J1T1V0L) Serial Dilution (SD)
1202954610	334067001(J1T1V0D) Sample Duplicate (DUP)
1202954611	334067001(J1T1V0S) Matrix Spike (MS)
1202955261	Method Blank (MB) CVAA
1202955262	Laboratory Control Sample (LCS)
1202955268	334067001(J1T1V0L) Serial Dilution (SD)
1202955266	334067001(J1T1V0D) Sample Duplicate (DUP)
1202955267	334067001(J1T1V0S) Matrix Spike (MS)

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

Method/Analysis Information

Analytical Batch: 1333881, 1333879 and 1334136
Prep Batch : 1333880, 1333876 and 1334135
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# 26

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 P E 5300 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-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 6100E 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 3607 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

All CRDL standards met the advisory control limits with the exception of potassium, sodium, and antimony. The PQL recovered high for potassium and antimony and low for sodium. The samples were 2x greater than the PQL for potassium and sodium but less than the MDL for antimony.

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: 334067001 (J1T1V0)-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 met the recommended quality control acceptance criteria for percent recoveries for all applicable analytes, with the exception of potassium and silicon, as indicated by the "N" qualifiers.

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. All applicable analytes met these requirements, with the exception of silicon, as indicated by the "*" qualifiers.

Post Spike (PS) Recovery Statement

The percent recoveries (%R) obtained from the PS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The PS did not meet the recommended quality control acceptance criteria for percent recoveries for silicon and verifies the presence of matrix interferences.

Serial Dilution % Difference Statement

The serial dilution is used to assess matrix suppression or enhancement. Raw element concentrations that are 25X the IDL/MDL for CVAA, 50X the IDL/MDL for ICP, and 100X the IDL/MDL for ICP-MS analyses are applicable for serial dilution assessment. All applicable analytes met the acceptance criteria of less than 10% difference (%D).

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 334067001 (J1T1V0) and 334067002 (J1T1V1) were diluted 5x in order to bring titanium raw values within the linear range of the instrument, and antimony, cobalt, vanadium, and zinc the titanium interferes with, in order to ensure that the inter-element correction factors were valid. Samples in this SDG were diluted the standard 2x for solids on the ICPMS. ICP-MS.

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

DATA EXCEPTION REPORT			
Mo.Day Yr. 02-OCT-13	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: ICP	Test / Method: SW846 3050B/6010C	Matrix Type: Solid	Client Code: WCHN
Batch ID: 1333881	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 334065(XP0015),334067(XP0016),334070(XP0017),334072(XP0018),334074(XP0019)			
Application Issues: Failed Recovery for MS/PS Failed RPD for DUP Other			
Specification and Requirements		DER Disposition:	
Exception Description:			
<p>1. Failed Recovery for MS/PS:</p> <p>QC 1202954625MS,1202954628MS, 1202954631MS, 1202954634MS, 1202954637MS, 1202958834PS, 1202958835PS, 1202958836PS, 1202958837PS, 1202958838PS</p> <p>2. Failed RPD for DUP:</p> <p>QC 1202954624DUP, 1202954627DUP, 1202954630DUP, 1202954633DUP, 1202954636DUP</p> <p>3. Low level PQL recovered high for antimony.</p>		<p>1. The matrix spike recovery failed outside of the control limits for potassium,silicon,barium and copper. The post spike failed outside the required control limits for silicon and barium but passed for all other analytes. This verifies the presence of a matrix interference for silicon and barium 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 potassium,silicon,manganese,zinc,cadmium and calcium 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>3. The samples were analyzed on 3 separate passing calibrations. The closing PQL recovered high for antimony in all 3 analyses due to possible matrix interactions. Sample #334074002 was the only one not less than the MDL or 2x greater than the PQL. The data is being reported.</p>	

Originator's Name:
Helen Camello 02-OCT-13

Data Validator/Group Leader:
Jerry Wigfall 02-OCT-13

224461

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST					RC-232-055		Page 1 of 1	
Collector DUNNUM, AJ		Company Contact Joan Kessner		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8C B 145 Days		
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites		Sampling Location 600-374		SAF No. RC-232		Method of Shipment Commerical Carrier fed ex		Bill of Lading/Air Bill No. See OSPC		
Ice Chest No. WCH-11-014		Field Logbook No. EL-1666-01		COA 0603742000		Method of Shipment Commerical Carrier fed ex		Bill of Lading/Air Bill No. See OSPC		
Shipped To GEL Laboratories, LLC		Offsite Property No. A120953		COA 0603742000		Method of Shipment Commerical Carrier fed ex		Bill of Lading/Air Bill No. See OSPC		
Other Labs Shipped To		Preservation		Cool 4C	Cool 4C	None	Cool 4C	Cool 4C		
None		Type of Container		G/P	gG	G/P	gG	gG		
POSSIBLE SAMPLE HAZARDS/REMARKS		No. of Container(s)		1	1	1	1	1		
None		Volume		125mL	250mL	125mL	125mL	125mL		
Special Handling and/or Storage Cool 4C		Sample Analysis		See item (1) in Special Instructions	Pesticides - 8081	See item (2) in Special Instructions	Semi-VOA - 8270A (TCL)	PCBs - 8082		
Sample No.	Matrix	Sample Date	Sample Time							
J1T1V0	SOIL	9-23-13	0740	X	X	X	X	X		
J1T1V1	SOIL	9-23-13	0740	X	X	X	X	X		
J1T1V2	SOIL	9-23-13	0735	X					9-23-13 umb	
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS		
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		<p>(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)</p> <p>(2) IC Anions - 9056 (Bromide, Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphorus in Phosphate, Sulfate); NO2/NO3 - 353.1 (Nitrogen in Nitrite and Nitrate); pH (Soil) - 9045 (pH Measurement)</p>		
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time				
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time				
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time				
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time				
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time				
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time				
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time				
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		<p>REVIEWED BY K. Val Vetterline DATE 9-24-13</p>		
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time				
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time		<p>XP0016</p>		

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WCH-EE-011

Appendix 5
Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	600-374		DATA PACKAGE: XP0016		
VALIDATOR:	ELR	LAB:	Ge	DATE: 10/22/13	
			SDG: VP0016		
ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide		
SAMPLES/MATRIX					
JIT1U0 JIT1U1 JIT1U2					
Soil					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? Yes No N/A

Comments: _____

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

Initial calibrations performed on all instruments? Yes No N/A

Initial calibrations acceptable? Yes No N/A

ICP interference checks acceptable? Yes No N/A

ICV and CCV checks performed on all instruments? Yes No N/A

ICV and CCV checks acceptable? Yes No N/A

Standards traceable? Yes No N/A

Standards expired? Yes No N/A

Calculation check acceptable? Yes No N/A

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

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

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

Comments: analyzing at VO & V1
10/20/17

FS - 19 detects

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 - K (16890) silica (1.3%)

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: Silicon 84.5% - J cell

6. ICP QUALITY CONTROL (Levels D and E)

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

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

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

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

Comments: _____

8. HOLDING TIMES (all levels)

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

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

9. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

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

Comments: _____

Appendix 6
Additional Documentation Requested by Client

GEL LABORATORIES LLC

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

QC Summary

Report Date: October 9, 2013

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

Contact:

Workorder: 334067

Client SDG: XP0016

Project Description: RC-232 Soil

Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch 1333879											
QC1202954610	334067001	DUP									
Selenium		DU	0.364	DU	0.371	mg/kg	N/A	^	SKJ	09/30/13	21:47
QC1202954606	LCS										
Selenium	4.94		D	4.57	mg/kg		92.5	(80%-120%)		09/30/13	20:30
QC1202954605	MB										
Selenium			DU	0.325	mg/kg					09/30/13	20:24
QC1202954611	334067001	MS									
Selenium	5.64	DU	0.364	D	4.73	mg/kg		83.9	(75%-125%)	09/30/13	21:53
QC1202954612	334067001	SDILT									
Selenium		DU	-0.594	DU	1.82	ug/L	N/A		(0%-10%)	09/30/13	22:05
Metals Analysis-ICP											
Batch 1333881											
QC1202954627	334067001	DUP									
Aluminum			6800		6880	mg/kg	1.13		(0%-20%)	HSC	09/27/13 22:16
Antimony		DU	1.86	DU	1.86	mg/kg	N/A	^			10/02/13 11:49
Arsenic			4.89		4.83	mg/kg	1.19	^	(+/-3.38)		09/27/13 22:16
Barium			85.1		79.9	mg/kg	6.26		(0%-20%)		
Beryllium			0.645		0.633	mg/kg	1.90	^	(+/-0.563)		
Boron		B	1.74	B	1.27	mg/kg	30.9	^	(+/-5.63)		
Cadmium		B	0.349	B	0.259	mg/kg	29.7	^	(+/-0.563)		
Calcium			3410		3270	mg/kg	4.10		(0%-20%)		
Chromium			11.7		11.8	mg/kg	1.40		(0%-20%)		
Cobalt		D	7.68	D	8.00	mg/kg	4.06	^	(+/-2.82)		10/02/13 11:49
Copper			12.5		12.6	mg/kg	0.726		(0%-20%)		09/27/13 22:16
Iron			20300		20500	mg/kg	0.768		(0%-20%)		

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QC Summary

Workorder: 334067

Client SDG: XP0016

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	1333881										
Lead		6.24		6.66	mg/kg	6.45		(0%-20%)	JWJ	10/02/13	11:18
Magnesium		4400		4360	mg/kg	0.910		(0%-20%)	HSC	09/27/13	22:16
Manganese		357		333	mg/kg	7.00		(0%-20%)			
Molybdenum	B	0.612	B	0.602	mg/kg	1.59	^	(+/-1.13)			
Nickel		10.7		10.4	mg/kg	2.97		(0%-20%)			
Potassium	N	1990		2090	mg/kg	5.16		(0%-20%)			
Silicon	*N	532	*	216	mg/kg	84.5*		(0%-20%)			
Silver	B	0.137	B	0.221	mg/kg	46.7	^	(+/-0.563)			
Sodium		84.2		76.4	mg/kg	9.75	^	(+/-28.2)			
Vanadium	D	52.5	D	51.4	mg/kg	1.98		(0%-20%)		10/02/13	11:49
Zinc	D	44.0	D	43.7	mg/kg	0.759		(0%-20%)			
QC1202954623	LCS										
Aluminum	469			482	mg/kg		103	(80%-120%)		09/27/13	21:56
Antimony	46.9			47.5	mg/kg		101	(80%-120%)		10/02/13	11:27
Arsenic	46.9			46.8	mg/kg		99.8	(80%-120%)		09/27/13	21:56
Barium	46.9			46.6	mg/kg		99.4	(80%-120%)			
Beryllium	46.9			47.6	mg/kg		101	(80%-120%)			
Boron	46.9			46.1	mg/kg		98.3	(80%-120%)			
Cadmium	46.9			48.3	mg/kg		103	(80%-120%)			
Calcium	469			498	mg/kg		106	(80%-120%)			
Chromium	46.9			45.7	mg/kg		97.4	(80%-120%)			
Cobalt	46.9			47.9	mg/kg		102	(80%-120%)		10/02/13	11:27

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QC Summary

Workorder: 334067

Client SDG: XP0016

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	1333881								
Copper	46.9		47.0	mg/kg		100	(80%-120%)	HSC	09/27/13 21:56
Iron	469		474	mg/kg		101	(80%-120%)		
Lead	46.9		48.8	mg/kg		104	(80%-120%)	JWJ	10/02/13 10:55
Magnesium	469		513	mg/kg		109	(80%-120%)	HSC	09/27/13 21:56
Manganese	46.9		45.8	mg/kg		97.7	(80%-120%)		
Molybdenum	46.9		45.4	mg/kg		96.9	(80%-120%)		
Nickel	46.9		48.1	mg/kg		103	(80%-120%)		
Potassium	469		479	mg/kg		102	(80%-120%)		
Silicon	469		403	mg/kg		86	(80%-120%)		
Silver	46.9		47.8	mg/kg		102	(80%-120%)		
Sodium	469		450	mg/kg		95.9	(80%-120%)		
Vanadium	46.9		47.6	mg/kg		102	(80%-120%)		10/02/13 11:27
Zinc	46.9		47.9	mg/kg		102	(80%-120%)		
QC1202954622	MB								
Aluminum		U	6.59	mg/kg					09/27/13 21:53
Antimony		B	0.534	mg/kg					10/02/13 11:24
Arsenic		U	0.484	mg/kg					09/27/13 21:53
Barium		U	0.0969	mg/kg					
Beryllium		U	0.0969	mg/kg					
Boron		U	0.969	mg/kg					
Cadmium		U	0.0969	mg/kg					
Calcium		U	7.75	mg/kg					

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QC Summary

Workorder: 334067

Client SDG: XP0016

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	1333881										
Chromium			U	0.145	mg/kg				HSC	09/27/13	21:53
Cobalt			U	0.145	mg/kg					10/02/13	11:24
Copper			U	0.291	mg/kg					09/27/13	21:53
Iron			U	7.75	mg/kg						
Lead			U	0.320	mg/kg				JWJ	10/02/13	10:53
Magnesium			U	8.24	mg/kg				HSC	09/27/13	21:53
Manganese			U	0.194	mg/kg						
Molybdenum			U	0.194	mg/kg						
Nickel			B	0.146	mg/kg						
Potassium			B	6.36	mg/kg						
Silicon			U	1.45	mg/kg						
Silver			U	0.0969	mg/kg						
Sodium			U	6.78	mg/kg						
Vanadium			U	0.0969	mg/kg					10/02/13	11:24
Zinc			U	0.388	mg/kg						
QC1202954628 334067001 MS											
Aluminum	56.4	6800		9980	mg/kg		N/A	(75%-125%)		09/27/13	22:25
Antimony	56.4	DU	1.86	D	53.4	mg/kg	94	(75%-125%)		10/02/13	11:58
Arsenic	56.4		4.89		59.9	mg/kg	97.5	(75%-125%)		09/27/13	22:25
Barium	56.4		85.1		144	mg/kg	105	(75%-125%)			
Beryllium	56.4		0.645		56.3	mg/kg	98.6	(75%-125%)			
Boron	56.4	B	1.74		56.1	mg/kg	96.3	(75%-125%)			

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QC Summary

Workorder: 334067

Client SDG: XP0016

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	1333881										
Cadmium	56.4	B	0.349	56.0	mg/kg		98.7	(75%-125%)	HSC	09/27/13	22:25
Calcium	564		3410	4290	mg/kg		N/A	(75%-125%)			
Chromium	56.4		11.7	67.4	mg/kg		98.7	(75%-125%)			
Cobalt	56.4	D	7.68	D	66.6	mg/kg	104	(75%-125%)		10/02/13	11:58
Copper	56.4		12.5	73.9	mg/kg		109	(75%-125%)		09/27/13	22:25
Iron	564		20300	22500	mg/kg		N/A	(75%-125%)			
Lead	56.4		6.24	62.2	mg/kg		99.1	(75%-125%)	JWJ	10/02/13	11:20
Magnesium	564		4400	5350	mg/kg		N/A	(75%-125%)	HSC	09/27/13	22:25
Manganese	56.4		357	423	mg/kg		N/A	(75%-125%)			
Molybdenum	56.4	B	0.612	54.0	mg/kg		94.6	(75%-125%)			
Nickel	56.4		10.7	65.7	mg/kg		97.4	(75%-125%)			
Potassium	564	N	1990	N	2930	mg/kg	168 *	(75%-125%)			
Silicon	564	*N	532	N	539	mg/kg	1.3 *	(75%-125%)			
Silver	56.4	B	0.137	57.6	mg/kg		102	(75%-125%)			
Sodium	564		84.2	613	mg/kg		93.7	(75%-125%)			
Vanadium	56.4	D	52.5	D	113	mg/kg	107	(75%-125%)		10/02/13	11:58
Zinc	56.4	D	44.0	D	107	mg/kg	112	(75%-125%)			
QC1202958835 334067001 PS											
Potassium	5000	N	17600	C	23400	ug/L	116	(80%-120%)		10/02/13	13:45
Silicon	5000	*N	4710		21700	ug/L	339 *	(80%-120%)			
QC1202954629 334067001 SDILT											
Aluminum			60300	D	12600	ug/L	4.26	(0%-10%)		09/27/13	22:28
Antimony		DU	0.684	DU	9.31	ug/L	N/A	(0%-10%)		10/02/13	12:01

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QC Summary

Workorder: 334067

Client SDG: XP0016

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	1333881										
Arsenic		43.3	D	10.2	ug/L	17.5		(0%-10%)	HSC	09/27/13	22:28
Barium		754	D	154	ug/L	2.25		(0%-10%)			
Beryllium		5.71	D	1.19	ug/L	4.34		(0%-10%)			
Boron	B	15.4	DU	5.64	ug/L	N/A		(0%-10%)			
Cadmium	B	3.09	DU	0.564	ug/L	N/A		(0%-10%)			
Calcium		30200	D	6280	ug/L	3.83		(0%-10%)			
Chromium		103	D	20.8	ug/L	.633		(0%-10%)			
Cobalt	D	13.6	D	2.93	ug/L	7.55		(0%-10%)		10/02/13	12:01
Copper		111	D	21.2	ug/L	4.24		(0%-10%)		09/27/13	22:28
Iron		180000	D	38400	ug/L	6.66		(0%-10%)			
Lead		55.3	D	12.3	ug/L	10.9		(0%-10%)	JWJ	10/02/13	11:22
Magnesium		39000	D	8180	ug/L	4.87		(0%-10%)	HSC	09/27/13	22:28
Manganese		3160	D	661	ug/L	4.55		(0%-10%)			
Molybdenum	B	5.42	DU	1.13	ug/L	N/A		(0%-10%)			
Nickel		95.0	CD	19.4	ug/L	2.22		(0%-10%)			
Potassium	N	17600	CD	3690	ug/L	4.68		(0%-10%)			
Silicon	*N	4710	D	987	ug/L	4.76		(0%-10%)			
Silver	B	1.22	D	1.48	ug/L	509		(0%-10%)			
Sodium		747	D	123	ug/L	17.9		(0%-10%)			
Vanadium	D	93.0	D	19.5	ug/L	4.84		(0%-10%)		10/02/13	12:01
Zinc	D	78.0	D	15.9	ug/L	1.57		(0%-10%)			

GEL LABORATORIES LLC

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QC Summary

Workorder: 334067 Client SDG: XP0016 Project Description: RC-232 Soil Page 7 of 7

Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-Mercury											
Batch 1334136											
QC1202955266	334067001	DUP									
Mercury		B	0.00512	U	0.00438	mg/kg	40.4 ^	(+/-0.0131)	NOR1	09/27/13	12:01
QC1202955262	LCS										
Mercury			0.119		0.121	mg/kg		(80%-120%)		09/27/13	11:46
QC1202955261	MB										
Mercury				B	-0.00457	mg/kg				09/27/13	11:44
QC1202955267	334067001	MS									
Mercury			0.129	B	0.00512	mg/kg		(80%-120%)		09/27/13	12:03
QC1202955268	334067001	SDILT									
Mercury				B	0.078	DU	0.022	ug/L	N/A	(0%-10%)	09/27/13 12:04

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: 24 October 2013
 To: Washington Closure Hanford Inc. (technical representative)
 From: ELR Consulting
 Project: 100-IU-2 & 100-IU-6 Remaining Waste Sites – Soil Full Protocol - Waste Site 600-374
 Subject: Pesticide/PCB - Data Package No. XP0016-GEL

INTRODUCTION

This memo presents the results of data validation on Data Package No. XP0016 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
J1T1V0	9/23/13	Soil	C	See note 1
J1T1V1	9/23/13	Soil	C	See note 1

1 – Pesticides by 8081B & 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

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. Holding times are not applicable for PCB analysis.

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.

Due to the lack of a matrix spike, matrix spike duplicate and LCS analysis, all toxaphene results were qualified as estimates 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.

Due to the lack of a matrix spike and matrix spike duplicate analysis, all toxaphene results were qualified as estimates and flagged "J".

All other duplicate results were acceptable.

Field Duplicate Samples

One set field duplicates (J1T1V0/J1T1V1) were submitted for analysis. Laboratory duplicates are compared using the same criteria as for laboratory results. All field duplicate results are acceptable.

Analytical Detection Levels

Reported analytical detection levels are compared against the required quantitation limits (RQL's) to ensure that laboratory detection levels meet the required criteria. Two pesticide analytes exceeded the RQL. Under the WCH statement of work, no qualification is required. All other analytes met the RQL.

Completeness

Data package No. XP0016 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 the lack of a matrix spike, matrix spike duplicate and LCS analysis, all toxaphene 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 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

PESTICIDE & PCB DATA QUALIFICATION SUMMARY*

SDG: XP0016	REVIEWER: ELR	Project: 600-374	PAGE <u>1</u> OF <u>1</u>
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Toxaphene	J	All	No MS, MSD or LCS analysis

* - 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: September 30, 2013

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

Client SDG: XP0016

Client Sample ID: J1T1V0
 Sample ID: 334067001
 Matrix: SOIL
 Collect Date: 23-SEP-13 07:40
 Receive Date: 25-SEP-13
 Collector: Client
 Moisture: 11.4%

Project: WCHN00213
 Client ID: WCHN001

✓ 10/23/13

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-PCB											
SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"											
Aroclor-1016	U	1.25	1.25	3.75	ug/kg	1	YS1	09/27/13	1603	1334323	1
Aroclor-1221	U	1.25	1.25	3.75	ug/kg	1					
Aroclor-1232	U	1.25	1.25	3.75	ug/kg	1					
Aroclor-1242	U	1.25	1.25	3.75	ug/kg	1					
Aroclor-1248	U	1.25	1.25	3.75	ug/kg	1					
Aroclor-1254	U	1.25	1.25	3.75	ug/kg	1					
Aroclor-1260	U	1.25	1.25	3.75	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 PCB Prep Soil	MXS4	09/26/13	1730	1334322

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"	5.43 ug/kg	7.50	72.4	(44%-106%)
Decachlorobiphenyl	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	5.22 ug/kg	7.50	69.6	(35%-119%)

Notes:

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: October 2, 2013

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

Client SDG: XP0016

Client Sample ID: J1T1V1
 Sample ID: 334067002
 Matrix: SOIL
 Collect Date: 23-SEP-13 07:40
 Receive Date: 25-SEP-13
 Collector: Client
 Moisture: 11%

Project: WCHN00213
 Client ID: WCHN001

✓
10/23/13

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-Pesticide											
8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"											
4,4'-DDD	DU	3.74	3.74	15.0	ug/kg	10	RXE1	09/30/13	2057	1334300	1
4,4'-DDE	DU	3.74	3.74	15.0	ug/kg	10					
4,4'-DDT	DU	3.74	3.74	15.0	ug/kg	10					
Aldrin	DU	1.87	1.87	7.48	ug/kg	10					
Dieldrin	DU	3.74	3.74	15.0	ug/kg	10					
Endosulfan I	DU	1.87	1.87	7.48	ug/kg	10					
Endosulfan II	DU	3.74	3.74	15.0	ug/kg	10					
Endosulfan sulfate	DU	3.74	3.74	15.0	ug/kg	10					
Endrin	DU	3.74	3.74	15.0	ug/kg	10					
Endrin aldehyde	DU	3.74	3.74	15.0	ug/kg	10					
Endrin ketone	DU	3.74	3.74	15.0	ug/kg	10					
Heptachlor	DU	1.87	1.87	7.48	ug/kg	10					
Heptachlor epoxide	DTU	1.87	1.87	7.48	ug/kg	10					
Methoxychlor	DU	18.7	18.7	74.8	ug/kg	10					
Toxaphene	DU	62.3	62.3	187	ug/kg	10					
alpha-BHC	DTU	1.87	1.87	7.48	ug/kg	10					
alpha-Chlordane	DU	1.87	1.87	7.48	ug/kg	10					
beta-BHC	DU	1.87	1.87	7.48	ug/kg	10					
delta-BHC	DU	1.87	1.87	7.48	ug/kg	10					
gamma-BHC (Lindane)	DU	1.87	1.87	7.48	ug/kg	10					
gamma-Chlordane	DU	1.87	1.87	7.48	ug/kg	10					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 8081B Prep Soil	VSG1	09/27/13	0835	1334297

The following Analytical Methods were performed:

Method	Description	Analyst Comments			
I	SW846 3541/8081B				
Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
4cmx	8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"	21.5 ug/kg	37.4	57.5	(32%-120%)
Decachlorobiphenyl	8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"	27.7 ug/kg	37.4	73.9	(37%-129%)

Notes:

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

**Pesticide Case Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0016**

Method/Analysis Information

Procedure: Organochlorine Pesticides and Chlorinated Hydrocarbons
Analytical Method: SW846 3541/8081B
Prep Method: SW846 3541
Analytical Batch Number: 1334300
Prep Batch Number: 1334297

Sample Analysis

Sample ID	Client ID
334067001	J1T1V0
334067002	J1T1V1
1202955666	Method Blank (MB)
1202955667	Laboratory Control Sample (LCS)
1202955668	334067001(J1T1V0) Matrix Spike (MS)
1202955669	334067001(J1T1V0) 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-041 REV# 13.

Raw data reports are processed and reviewed by the analyst using ChemStation software. False positives have been removed from the ChemStation 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 calibration verification standards (CVS, ICV, or CCV) requirements have not been met for this SDG. Several target analytes failed acceptance criteria with a negative bias on one analytical column in the standards bracketing the samples in this SDG. The negative bias for the analytical data is a result of instrument response decreasing after the initial calibration. The instrument response never decreased to a point where the target

analytes would not be detected. These target analytes were not detected above the PQL in the samples; therefore, the non-compliance has no adverse effects on the data.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

Sample 334067001 (J1T1V0) recovered surrogate DCB at 130% on one column. The limits are 37-129%. DCB recovered with a positive bias on one column only in the sample. The other column passed recovery and target analytes were not detected in the sample. The data are reported.

The MS 1202955668 (J1T1V0), recovered surrogates DCB at 130% on one column (limits are 37-129%) and 4cmx at 126% on one column (limits are 32-120%). DCB and 4CMX recovered with a positive bias on one column only in the MS. The other column passed recoveries. The data are reported.

Laboratory Control Sample (LCS) Recovery

The laboratory control sample (LCS) spike recoveries met the acceptance limits.

QC Sample Designation

Sample 334067001 (J1T1V0) was selected for the matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The MS, 1202955668 (J1T1V0), recovered Heptachlor epoxide at 147% on one column and at 150% on the other column (limits are 36-130%) and alpha-BHC at 133% on one column (limits are 37-129%). Heptachlor epoxide and alpha-BHC recovered with a positive bias on at least one column in the MS. The MSD recovered within the acceptance limits on both columns for all analytes and target analytes were not detected in the sample. The data are reported.

Matrix Spike Duplicate (MSD) Recovery Statement

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

MS/MSD Relative Percent Difference (RPD) Statement

The RPD value between the MS and MSD, 1202955668 (J1T1V0) and 1202955669 (J1T1V0), for Heptachlor epoxide was 33.8%. The limits are 0-30%. The RPD recovered outside of the acceptance limits for Heptachlor epoxide due to the positive recovery in the MS. The data are reported.

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 in this analytical batch 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.

Sample Dilutions

Samples 334067001 (J1T1V0) and 334067002 (J1T1V1) were diluted 1:10 due to a very high baseline rise observed when screened.

Sample Re-extraction/Re-analysis

Re-extractions or re-analyses were not required in this SDG in this analytical batch unless confirmations or

dilutions were required.

Florisil

Florisil clean-up was not performed on client and quality control samples in this batch.

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 1227041 was generated for the samples in this batch for this SDG.

Manual Integrations

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

Detected target analytes were reported from the analytical column with the higher concentration. Results below the method detection limit (non-detects) were reported from column one.

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

System Configuration

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

Instrument ID	Instrument	System Configuration	Column ID	Column Description
ECD5A.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)
ECD5A.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. 01-OCT-13	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: GC/ECD	Test / Method: SW846 3541/8081B	Matrix Type: Solid	Client Code: WCHN
Batch ID: 1334300	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 334067(XP0016) Application Issues: Failed Recovery for MS/PS Failed RPD for MS/MSD, or PS/PSD Failed Yield for Surrogates			
Specification and Requirements Exception Description:		DER Disposition:	
1. Sample 334067001 recovered surrogate DCB at 130% on one column. The limits are 37-129%. The 1202955668MS recovered surrogates DCB at 130% on one column (limits are 37-129%) and 4cmx at 126% on one column (limits are 32-120%). 2. QC sample 1202955668MS recovered Heptachlor epoxide at 147% on one column and at 150% on the other column (limits are 36-130%) and alpha-BHC at 133% on one column (limits are 37-129%). 3. The RPD value between the 1202955668MS and 1202955669MSD for Heptachlor epoxide was 33.8%. The limits are 0-30%.		1. DCB recovered with a positive bias on one column only in the sample. The other column passed recovery and target analytes were not detected in the sample. The data are reported. DCB and 4CMX recovered with a positive bias on one column only in the MS. The other column passed recoveries. The data are reported. 2. Heptachlor epoxide and alpha-BHC recovered with a positive bias on at least one column in the MS. The MSD recovered within the acceptance limits on both columns for all analytes and target analytes were not detected in the sample. The data are reported. 3. The RPD recovered outside of the acceptance limits for Heptachlor epoxide due to the positive recovery in the MS. The data are reported.	

Originator's Name:
Rebecca Enzor 01-OCT-13

Data Validator/Group Leader:
Herbert Maier 02-OCT-13

**PCB Case Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0016**

Method/Analysis Information

Procedure: Analysis of Polychlorinated Biphenyls by ECD
Analytical Method: SW846 3541/8082A
Prep Method: SW846 3541
Analytical Batch Number: 1334323
Prep Batch Number: 1334322

Sample Analysis

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

Sample ID	Client ID
334067001	J1T1V0
334067002	J1T1V1
1202955738	Method Blank (MB)
1202955739	Laboratory Control Sample (LCS)
1202955742	334067002(J1T1V1) Matrix Spike (MS)
1202955743	334067002(J1T1V1) 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 this SDG.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 334067002 (J1T1V1) was selected for the matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

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

Matrix Spike Duplicate (MSD) Recovery Statement

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

MS/MSD Relative Percent Difference (RPD) Statement

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

Technical Information

Holding Time Specifications

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

Preparation/Analytical Method Verification

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

Re-extractions or re-analyses were not required 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. A DER was not required for the samples in this SDG in this batch.

Manual Integrations

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

Additional Comments

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

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

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

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

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

System Configuration

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

Instrument ID	Instrument	System Configuration	Column ID	Column Description
ECD9A.I_1	Agilent 7890A Gas Chromatograph/Dual ECD w/ 7693 Autosampler	7890A GC/ECD	Restek Rtx-CLPest 1	30m x 0.25mm, 0.25um
ECD9A.I_2	Agilent 7890A Gas Chromatograph/Dual ECD w/ 7693 Autosampler	7890A GC/ECD	Restek Rtx-CLPest 2	30m x 0.25mm, 0.20um

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.

25461

Washington Closure Hanford				CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST					RC-232-055		Page 1 of 1			
Collector DUNNUM, AJ				Company Contact Joan Kessner			Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8C B		Data Turnaround 15 Days 7	
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites				Sampling Location 600-374			SAF No. RC-232							
Ice Chest No. WCH-11-014				Field Logbook No. EL-1666-01		COA 0603742000		Method of Shipment Commerical Carrier fed EX						
Shipped To GEL Laboratories, LLC				Offsite Property No. A120953			Bill of Lading/Air Bill No. See OSPC							
Other Labs Shipped To NA				Preservation		Cool 4C	Cool 4C	None	Cool 4C	Cool 4C				
				Type of Container		G/P	gG	G/P	gG	gG				
POSSIBLE SAMPLE HAZARDS/REMARKS None				No. of Container(s)		1	1	1	1	1				
				Volume		125mL	250mL	125mL	125mL	125mL				
Special Handling and/or Storage Cool 4C				Sample Analysis		See item (1) in Special Instructions	Pesticides - 8081	See item (2) in Special Instructions	Semi-VOA - 8270A (TCL)	PCBs - 8082				
				Sample No.		Matrix	Sample Date	Sample Time						
J1T1V0		SOIL	9-23-13	0740	X	X	X	X	X					
J1T1V1		SOIL	9-23-13	0740	X	X	X	X	X					
J1T1V2		SOIL	9-23-13	0735	X					9-23-13 CMB				
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS						
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		(1) ICP Metals - 6010TR (Close-out List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7471 - (CV) (Mercury) (2) IC Anions - 9056 (Bromide, Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphorus in Phosphate, Sulfate); NO2/NO3 - 353.1 (Nitrogen in Nitrite and Nitrate); pH (Soil) - 9045 (pH Measurement)						
Joan Dunnum		9-23-13 0750		M. Bingham		9-23-13 0750								
M. Bingham		9-23-13 1625		M. Bingham		9-23-13 1625								
M. Bingham		9-23-13 1630		CHARHALL CATHALL		9-23-2013								
CHARHALL CATHALL		9-23-2013 1630		M. Bingham		9-23-13 1630								
C. Bingham		9-23-13 1638		C. Bingham		9-23-13 1638								
1060 Battelle, fridge		9-24-13 1020		1060 Battelle, fridge		9-23-13 1638								
C. Bingham		9-24-13 1025		Fed EX				REVIEWED BY K. B. Valeriani DATE 9-24-13						
C. Bingham		9-24-13 1025		Fed EX										
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time		XP0016						

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WCH-EE-011

Appendix 5
Data Validation Supporting Documentation

PCB DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	600-374		DATA PACKAGE: XPool6		
VALIDATOR:	EKR	LAB: GC	DATE: 10/22/13		
			SDG: XPool6		
ANALYSES PERFORMED					
SW-846 8081	SW-846 8081 (TCLP)	SW-846 8082	SW-846 8081 (TCLP)		
SAMPLES/MATRIX					
JIT100 JIT101					
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: no PAS

top - no MS/MSD/LCS - Jall

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: no box ms/msd - J al

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: N/A for PCB

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: <u>pest - 2am</u>			

9. SAMPLE CLEANUP (Levels D and E)

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

Appendix 6

Additional Documentation Requested by Client

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

QC Summary

Report Date: September 30, 2013

Page 1 of 2

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

Workorder: 334067 Client SDG: XP0016 Project Description: RC-232 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-PCB											
Batch	1334323										
QC1202955739	LCS										
Aroclor-1016	33.2			27.5	ug/kg		82.7	(39%-120%)	YS1	09/27/13	11:42
Aroclor-1260	33.2			30.5	ug/kg		91.9	(50%-116%)			
**4cmx	6.64			5.99	ug/kg		90.2	(44%-106%)			
**Decachlorobiphenyl	6.64			6.41	ug/kg		96.5	(35%-119%)			
QC1202955738	MB										
Aroclor-1016			U	1.11	ug/kg					09/27/13	11:31
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	6.64			4.88	ug/kg		73.5	(44%-106%)			
**Decachlorobiphenyl	6.64			5.53	ug/kg		83.2	(35%-119%)			
QC1202955742	334067002	MS									
Aroclor-1016	37.4	U	1.25	27.5	ug/kg		73.7	(25%-125%)		09/27/13	14:32
Aroclor-1260	37.4	U	1.25	28.3	ug/kg		75.6	(28%-127%)			
**4cmx	7.48		5.39	5.93	ug/kg		79.4	(44%-106%)			
**Decachlorobiphenyl	7.48		5.61	5.70	ug/kg		76.2	(35%-119%)			
QC1202955743	334067002	MSD									
Aroclor-1016	37.3	U	1.25	28.0	ug/kg	1.59	75	(0%-30%)		09/27/13	14:43

GEL LABORATORIES LLC

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

QC Summary

Workorder: 334067 Client SDG: XP0016 Project Description: RC-232 Soil Page 2 of 2

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-PCB											
Batch	1334323										
Aroclor-1260	37.3	U	1.25	29.1	ug/kg	2.79	77.9	(0%-30%)			
**4cmx	7.47		5.39	5.80	ug/kg		77.7	(44%-106%)	YS1	09/27/13	14:43
**Decachlorobiphenyl	7.47		5.61	5.55	ug/kg		74.3	(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.

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

QC Summary

Report Date: October 2, 2013

Page 1 of 5

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

Contact:

Workorder: 334067

Client SDG: XP0016

Project Description: RC-232 Soil

Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-Pesticide										
Batch	1334300									
QC1202955667	LCS									
4,4'-DDD	41.7		33.9	ug/kg		81.4	(51%-124%)	RXE1	09/30/13	19:41
4,4'-DDE	41.7		28.0	ug/kg		67.2	(51%-119%)			
4,4'-DDT	41.7		29.1	ug/kg		69.8	(50%-128%)			
Aldrin	16.7		13.2	ug/kg		79.4	(48%-113%)			
Dieldrin	41.7		30.2	ug/kg		72.6	(51%-112%)			
Endosulfan I	16.7		11.1	ug/kg		66.6	(43%-110%)			
Endosulfan II	41.7		30.5	ug/kg		73.1	(49%-111%)			
Endosulfan sulfate	41.7		33.2	ug/kg		79.7	(54%-121%)			
Endrin	41.7		37.2	ug/kg		89.4	(54%-134%)			
Endrin aldehyde	41.7		29.6	ug/kg		71	(49%-117%)			
Endrin ketone	41.7		29.8	ug/kg		71.6	(48%-110%)			
Heptachlor	16.7		13.9	ug/kg		83.2	(52%-117%)			
Heptachlor epoxide	16.7		13.5	ug/kg		80.7	(53%-115%)			
Methoxychlor	16.7		136	ug/kg		81.7	(48%-117%)			
alpha-BHC	16.7		13.9	ug/kg		83.2	(50%-122%)			
alpha-Chlordane	16.7		13.5	ug/kg		81.1	(52%-113%)			
beta-BHC	16.7		13.8	ug/kg		82.5	(54%-110%)			
delta-BHC	16.7		14.5	ug/kg		86.9	(53%-117%)			
gamma-BHC (Lindane)	16.7		13.7	ug/kg		81.9	(53%-120%)			
gamma-Chlordane	16.7		13.3	ug/kg		80.1	(52%-117%)			

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QC Summary

Workorder: 334067

Client SDG: XP0016

Project Description: RC-232 Soil

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Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-Pesticide											
Batch 1334300											
**4cmx	33.3			24.2	ug/kg		72.5	(32%-120%)	RXE1	09/30/13	19:41
**Decachlorobiphenyl	33.3			25.4	ug/kg		76.2	(37%-129%)			
QC1202955666 MB											
4,4'-DDD			U	0.333	ug/kg					09/30/13	19:23
4,4'-DDE			U	0.333	ug/kg						
4,4'-DDT			U	0.333	ug/kg						
Aldrin			U	0.167	ug/kg						
Dieldrin			U	0.333	ug/kg						
Endosulfan I			U	0.167	ug/kg						
Endosulfan II			U	0.333	ug/kg						
Endosulfan sulfate			U	0.333	ug/kg						
Endrin			U	0.333	ug/kg						
Endrin aldehyde			U	0.333	ug/kg						
Endrin ketone			U	0.333	ug/kg						
Heptachlor			U	0.167	ug/kg						
Heptachlor epoxide			U	0.167	ug/kg						
Methoxychlor			U	1.67	ug/kg						
Toxaphene			U	5.55	ug/kg						
alpha-BHC			U	0.167	ug/kg						
alpha-Chlordane			U	0.167	ug/kg						
beta-BHC			U	0.167	ug/kg						
delta-BHC			U	0.167	ug/kg						

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QC Summary

Workorder: 334067

Client SDG: XP0016

Project Description: RC-232 Soil

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Parmaame	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-Pesticide											
Batch 1334300											
gamma-BHC (Lindane)			U	0.167	ug/kg				RXE1	09/30/13	19:23
gamma-Chlordane			U	0.167	ug/kg						
**4cmx	33.3			25.7	ug/kg		77	(32%-120%)			
**Decachlorobiphenyl	33.3			27.6	ug/kg		82.8	(37%-129%)			
QC1202955668 334067001 MS											
4,4'-DDD	47.0	DU	3.76 D	52.4	ug/kg		112	(37%-134%)		09/30/13	20:19
4,4'-DDE	47.0	DU	3.76 D	50.9	ug/kg		108	(33%-133%)			
4,4'-DDT	47.0	DU	3.76 D	45.3	ug/kg		96.4	(21%-149%)			
Aldrin	18.8	DU	1.88 D	20.8	ug/kg		111	(34%-134%)			
Dieldrin	47.0	DU	3.76 D	49.9	ug/kg		106	(36%-132%)			
Endosulfan I	18.8	DU	1.88 D	18.0	ug/kg		95.8	(36%-125%)			
Endosulfan II	47.0	DU	3.76 D	49.1	ug/kg		105	(37%-129%)			
Endosulfan sulfate	47.0	DU	3.76 D	55.7	ug/kg		118	(31%-140%)			
Endrin	47.0	DU	3.76 D	61.0	ug/kg		130	(45%-142%)			
Endrin aldehyde	47.0	DU	3.76 D	39.2	ug/kg		83.4	(31%-133%)			
Endrin ketone	47.0	DU	3.76 D	52.8	ug/kg		112	(30%-139%)			
Heptachlor	18.8	DU	1.88 D	22.8	ug/kg		122	(32%-137%)			
Heptachlor epoxide	18.8	DTU	1.88 DT	27.5	ug/kg		147*	(36%-130%)			
Methoxychlor	188	DU	18.8 D	222	ug/kg		118	(28%-143%)			
alpha-BHC	18.8	DTU	1.88 DT	24.9	ug/kg		133*	(37%-129%)			
alpha-Chlordane	18.8	DU	1.88 D	20.6	ug/kg		110	(29%-141%)			
beta-BHC	18.8	DU	1.88 D	23.3	ug/kg		124	(33%-136%)			

GEL LABORATORIES LLC

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QC Summary

Workorder: 334067

Client SDG: XP0016

Project Description: RC-232 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-Pesticide											
Batch 1334300											
delta-BHC	18.8	DU	1.88	D	21.9	ug/kg	117	(37%-136%)	RXE1	09/30/13	20:19
gamma-BHC (Lindane)	18.8	DU	1.88	D	22.9	ug/kg	122	(35%-130%)			
gamma-Chlordane	18.8	DU	1.88	D	23.1	ug/kg	123	(30%-139%)			
**4cmx	37.6		44.6		47.5	ug/kg	126*	(32%-120%)			
**Decachlorobiphenyl	37.6		48.9		49.0	ug/kg	130*	(37%-129%)			
QC1202955669 334067001 MSD											
4,4'-DDD	46.6	DU	3.76	D	44.3	ug/kg	16.9	95	(0%-30%)	09/30/13	20:38
4,4'-DDE	46.6	DU	3.76	D	44.5	ug/kg	13.3	95.5	(0%-30%)		
4,4'-DDT	46.6	DU	3.76	D	43.5	ug/kg	4.13	93.2	(0%-30%)		
Aldrin	18.7	DU	1.88	D	18.2	ug/kg	13.4	97.5	(0%-30%)		
Dieldrin	46.6	DU	3.76	D	42.7	ug/kg	15.6	91.6	(0%-30%)		
Endosulfan I	18.7	DU	1.88	D	15.5	ug/kg	15.2	82.9	(0%-30%)		
Endosulfan II	46.6	DU	3.76	D	42.2	ug/kg	15.2	90.5	(0%-30%)		
Endosulfan sulfate	46.6	DU	3.76	D	47.7	ug/kg	15.4	102	(0%-30%)		
Endrin	46.6	DU	3.76	D	53.2	ug/kg	13.6	114	(0%-30%)		
Endrin aldehyde	46.6	DU	3.76	D	35.6	ug/kg	9.51	76.4	(0%-30%)		
Endrin ketone	46.6	DU	3.76	D	45.4	ug/kg	15.0	97.4	(0%-30%)		
Heptachlor	18.7	DU	1.88	D	19.5	ug/kg	15.6	105	(0%-30%)		
Heptachlor epoxide	18.7	DTU	1.88	D	20.9	ug/kg	27.6	112	(0%-30%)		
Methoxychlor	187	DU	18.8	D	202	ug/kg	9.51	108	(0%-30%)		
alpha-BHC	18.7	DTU	1.88	D	21.0	ug/kg	17.0	113	(0%-30%)		
alpha-Chlordane	18.7	DU	1.88	D	17.8	ug/kg	14.7	95.3	(0%-30%)		

QC Summary

Workorder: 334067 Client SDG: XP0016 Project Description: RC-232 Soil Page 5 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-Pesticide											
Batch 1334300											
beta-BHC	18.7	DU	1.88	D	19.8	ug/kg	16.1	106	(0%-30%)	RXE1	09/30/13 20:38
delta-BHC	18.7	DU	1.88	D	18.0	ug/kg	19.7	96.5	(0%-30%)		
gamma-BHC (Lindane)	18.7	DU	1.88	D	19.6	ug/kg	15.7	105	(0%-30%)		
gamma-Chlordane	18.7	DU	1.88	D	17.8	ug/kg	25.6	95.7	(0%-30%)		
**4cmx	37.3		44.6		39.1	ug/kg		105	(32%-120%)		
**Decachlorobiphenyl	37.3		48.9		42.2	ug/kg		113	(37%-129%)		

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: 24 October 2013
 To: Washington Closure Hanford Inc. (technical representative)
 From: ELR Consulting
 Project: 100-IU-2 & 100-IU-6 Remaining Waste Sites – Soil Full Protocol - Waste Site 600-374
 Subject: Semivolatile Organic - Data Package No. XP0016-GEL

INTRODUCTION

This memo presents the results of data validation on Data Package No. XP0016 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
J1T1V0	9/23/13	Soil	C	See note 1
J1T1V1	9/23/13	Soil	C	See note 1

1 – Semivolatile organics by 8270C.

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.

Due to an LCS recovery outside QC limits, all 2,4-dinitrophenol (31.7%) and hexachlorocyclopentadiene (49.5%), results were qualified as estimates and flagged "J".

Due to a matrix spike recovery outside QC limits, all 2,4-dinitrophenol (34.9%), 2-methyl-4,6-dinitrophenol (48.7%) and hexachlorocyclopentadiene (43.7%), results were qualified as estimates and flagged "J".

Due to a matrix spike duplicate recovery outside QC limits, all 2,4-dinitrophenol (30.3%), 2-methyl-4,6-dinitrophenol (43.1%), 3,3-dichlorobenzidine (48.1%) and hexachlorocyclopentadiene (42%) results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

Surrogate Recovery

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

All surrogate results were acceptable.

Precision

Matrix Spike/Matrix Spike Duplicate Samples

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

All duplicate results were acceptable.

Field Duplicate Samples

One set field duplicates (J1T1V0/J1T1V1) were submitted for analysis. Laboratory duplicates are compared using the same criteria as for laboratory results. All field duplicate results are acceptable.

Analytical Detection Levels

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

Completeness

Data package No. XP0016 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 an LCS recovery outside QC limits, all 2,4-dinitrophenol (31.7%) and hexachlorocyclopentadiene (49.5%), results were qualified as estimates and flagged "J".
- Due to a matrix spike recovery outside QC limits, all 2,4-dinitrophenol (34.9%), 2-methyl-4,6-dinitrophenol (48.7%) and hexachlorocyclopentadiene (43.7%), results were qualified as estimates and flagged "J".
- Due to a matrix spike duplicate recovery outside QC limits, all 2,4-dinitrophenol (30.3%), 2-methyl-4,6-dinitrophenol (43.1%), 3,3-dichlorobenzidine (48.1%) and hexachlorocyclopentadiene (42%), 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 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

SEMIVOLATILE ORGANIC DATA QUALIFICATION SUMMARY*

SDG: XP0016	REVIEWER: ELR	Project: 600-374	PAGE <u>1</u> OF <u>1</u>
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
2,4-dinitrophenol 2-methyl-4,6-dinitrophenol hexachlorocyclopentadiene	J	All	MS recovery
2,4-dinitrophenol 2-methyl-4,6-dinitrophenol 3,3-dichlorobenzidine hexachlorocyclopentadiene	J	All	MSD recovery
2,4-dinitrophenol hexachlorocyclopentadiene	J	All	LCS 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

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

Report Date: October 8, 2013

Client SDG: XP0016

Client Sample ID:	JIT1V0	Project:	WCHN00213
Sample ID:	334067001	Client ID:	WCHN001
Matrix:	SOIL		
Collect Date:	23-SEP-13 07:40		
Receive Date:	25-SEP-13		
Collector:	Client		
Moisture:	11.4%		

✓ 10/23/17

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Semi-Volatile-GC/MS										
<i>8270D/3541 BNA Soil Automated Soxhlet "Dry Weight Corrected"</i>										
1,2,4-Trichlorobenzene	U	112	112	375	ug/kg	1	JMB3 09/28/13	0003	1334486	1
1,2-Dichlorobenzene	U	112	112	375	ug/kg	1				
1,3-Dichlorobenzene	U	112	112	375	ug/kg	1				
1,4-Dichlorobenzene	U	112	112	375	ug/kg	1				
2,4,5-Trichlorophenol	U	112	112	375	ug/kg	1				
2,4,6-Trichlorophenol	U	112	112	375	ug/kg	1				
2,4-Dichlorophenol	U	112	112	375	ug/kg	1				
2,4-Dimethylphenol	U	112	112	375	ug/kg	1				
2,4-Dinitrophenol	U J	112	112	750	ug/kg	1				
2,4-Dinitrotoluene	U	112	112	375	ug/kg	1				
2,6-Dinitrotoluene	U	112	112	375	ug/kg	1				
2-Chloronaphthalene	U	11.2	11.2	37.5	ug/kg	1				
2-Chlorophenol	U	112	112	375	ug/kg	1				
2-Methyl-4,6-dinitrophenol	U J	112	112	375	ug/kg	1				
2-Methylnaphthalene	U	11.2	11.2	37.5	ug/kg	1				
2-Nitrophenol	U	112	112	375	ug/kg	1				
3,3'-Dichlorobenzidine	U J	112	112	375	ug/kg	1				
4-Bromophenylphenylether	U	112	112	375	ug/kg	1				
4-Chloro-3-methylphenol	U	150	150	375	ug/kg	1				
4-Chloroaniline	U	112	112	375	ug/kg	1				
4-Chlorophenylphenylether	U	112	112	375	ug/kg	1				
4-Nitrophenol	U	112	112	375	ug/kg	1				
Acenaphthene	U	11.2	11.2	37.5	ug/kg	1				
Acenaphthylene	U	11.2	11.2	37.5	ug/kg	1				
Anthracene	U	11.2	11.2	37.5	ug/kg	1				
Benzo(a)anthracene	U	11.2	11.2	37.5	ug/kg	1				
Benzo(a)pyrene	U	11.2	11.2	37.5	ug/kg	1				
Benzo(b)fluoranthene	U	11.2	11.2	37.5	ug/kg	1				
Benzo(ghi)perylene	U	11.2	11.2	37.5	ug/kg	1				
Benzo(k)fluoranthene	U	11.2	11.2	37.5	ug/kg	1				
Butylbenzylphthalate	U	112	112	375	ug/kg	1				
Carbazole	U	11.2	11.2	37.5	ug/kg	1				
Chrysene	U	11.2	11.2	37.5	ug/kg	1				

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Certificate of Analysis

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

✓
10/23/13

Report Date: October 8, 2013

Client SDG: XP0016

Client Sample ID: J1T1V0
 Sample ID: 334067001

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
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Semi-Volatile-GC/MS

8270D/3541 BNA Soil Automated Soxhlet "Dry Weight Corrected"

Di-n-butylphthalate	U	112	112	375	ug/kg	1					
Di-n-octylphthalate	U	112	112	375	ug/kg	1					
Dibenzo(a,h)anthracene	U	11.2	11.2	37.5	ug/kg	1					
Dibenzofuran	U	112	112	375	ug/kg	1					
Diethylphthalate	U	112	112	375	ug/kg	1					
Dimethylphthalate	U	112	112	375	ug/kg	1					
Diphenylamine	U	112	112	375	ug/kg	1					
Fluoranthene	U	11.2	11.2	37.5	ug/kg	1					
Fluorene	U	11.2	11.2	37.5	ug/kg	1					
Hexachlorobenzene	U	112	112	375	ug/kg	1					
Hexachlorobutadiene	U	112	112	375	ug/kg	1					
Hexachlorocyclopentadiene	U J	112	112	375	ug/kg	1					
Hexachloroethane	U	112	112	375	ug/kg	1					
Indeno(1,2,3-cd)pyrene	U	11.2	11.2	37.5	ug/kg	1					
Isophorone	U	112	112	375	ug/kg	1					
N-Nitrosodipropylamine	U	112	112	375	ug/kg	1					
Naphthalene	U	11.2	11.2	37.5	ug/kg	1					
Nitrobenzene	U	112	112	375	ug/kg	1					
Pentachlorophenol	U	112	112	375	ug/kg	1					
Phenanthrene	U	11.2	11.2	37.5	ug/kg	1					
Phenol	U	112	112	375	ug/kg	1					
Pyrene	U	11.2	11.2	37.5	ug/kg	1					
bis(2-Chloroethoxy)methane	U	112	112	375	ug/kg	1					
bis(2-Chloroethyl) ether	U	112	112	375	ug/kg	1					
bis(2-Chloroisopropyl)ether	U	112	112	375	ug/kg	1					
bis(2-Ethylhexyl)phthalate	U	112	112	375	ug/kg	1					
3- and/or 4-Methylphenol	U	112	112	375	ug/kg	1					
m-Nitroaniline	U	112	112	375	ug/kg	1					
o-Cresol	U	112	112	375	ug/kg	1					
o-Nitroaniline	U	124	124	375	ug/kg	1					
p-Nitroaniline	U	112	112	375	ug/kg	1					

Surrogate/Tracer recovery

	Result	Nominal	Recovery%	Acceptable Limits	Date Time:	09/28/13 00 03
2-Fluorobiphenyl	1260 ug/kg	1870	67.3	(25%-100%)		
Nitrobenzene-d5	1340 ug/kg	1870	71.3	(21%-103%)		
p-Terphenyl-d14	1530 ug/kg	1870	81.8	(31%-124%)		
2,4,6-Tribromophenol	2720 ug/kg	3750	72.6	(20%-122%)		
2-Fluorophenol	2760 ug/kg	3750	73.6	(23%-107%)		
Phenol-d5	2840 ug/kg	3750	75.7	(25%-108%)		

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Certificate of Analysis

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

Report Date: October 8, 2013

Client SDG: XP0016

Client Sample ID: J1T1V0
 Sample ID: 334067001

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
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Semi-Volatile-GC/MS

8270D/3541 BNA Soil Automated Soxhlet "Dry Weight Corrected"

<i>Tentatively Identified Compound (TIC)</i>	<i>CAS No.</i>	<i>RT</i>	<i>Est. Concentration</i>	<i>Fit</i>	<i>Qual</i>	<i>Date Time:</i>
Unknown Aldol Condensate		3.67	12900 ug/kg		AJ	09/28/13 00 03
1,2-Benzenedicarboxylic acid, bis(000084-69-5	11.928	178 ug/kg	91	NJ	
unknown		13.271	630 ug/kg	0	J	
unknown		13.367	441 ug/kg	0	J	
unknown		13.559	253 ug/kg	0	J	
unknown		13.859	284 ug/kg	0	J	
unknown		14.014	1300 ug/kg	0	J	
1-Octadecanol	000112-92-5	15.185	216 ug/kg	91	NJ	
Heptadecane	000629-78-7	17.362	158 ug/kg	91	NJ	
Octacosane	000630-02-4	18.362	297 ug/kg	91	NJ	
Heptacosane	000593-49-7	19.512	411 ug/kg	94	NJ	
Pentadecane	000629-62-9	20.812	392 ug/kg	93	NJ	
9-Tricosene, (Z)-	027519-02-4	21.122	518 ug/kg	93	NJ	
Tetratriacontane	014167-59-0	22.048	424 ug/kg	94	NJ	
Campesterol	000474-62-4	22.588	343 ug/kg	95	NJ	
Hexadecane, 2,6,10,14-tetramethyl-	000638-36-8	22.946	465 ug/kg	93	NJ	
.gamma.-Sitosterol	000083-47-6	23.422	427 ug/kg	99	NJ	
Heneicosane	000629-94-7	23.925	399 ug/kg	91	NJ	

✓
10/23/13

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 8270D BNA for Soil	MXS4	09/27/13	1750	1334482

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 3541/8270D	

GEL LABORATORIES LLC

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Certificate of Analysis

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

Report Date: October 8, 2013

Client SDG: XP0016

Client Sample ID: JIT1V1
 Sample ID: 334067002
 Matrix: SOIL
 Collect Date: 23-SEP-13 07:40
 Receive Date: 25-SEP-13
 Collector: Client
 Moisture: 11%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatile-GC/MS											
<i>8270D/3541 BNA Soil Automated Soxhlet "Dry Weight Corrected"</i>											
1,2,4-Trichlorobenzene	U	112	112	374	ug/kg	1	JMB3	09/28/13	0132	1334486	1
1,2-Dichlorobenzene	U	112	112	374	ug/kg	1					
1,3-Dichlorobenzene	U	112	112	374	ug/kg	1					
1,4-Dichlorobenzene	U	112	112	374	ug/kg	1					
2,4,5-Trichlorophenol	U	112	112	374	ug/kg	1					
2,4,6-Trichlorophenol	U	112	112	374	ug/kg	1					
2,4-Dichlorophenol	U	112	112	374	ug/kg	1					
2,4-Dimethylphenol	U	112	112	374	ug/kg	1					
2,4-Dinitrophenol	U J	112	112	748	ug/kg	1					
2,4-Dinitrotoluene	U	112	112	374	ug/kg	1					
2,6-Dinitrotoluene	U	112	112	374	ug/kg	1					
2-Chloronaphthalene	U	11.2	11.2	37.4	ug/kg	1					
2-Chlorophenol	U	112	112	374	ug/kg	1					
2-Methyl-4,6-dinitrophenol	U J	112	112	374	ug/kg	1					
2-Methylnaphthalene	U	11.2	11.2	37.4	ug/kg	1					
2-Nitrophenol	U	112	112	374	ug/kg	1					
3,3'-Dichlorobenzidine	U J	112	112	374	ug/kg	1					
4-Bromophenylphenylether	U	112	112	374	ug/kg	1					
4-Chloro-3-methylphenol	U	150	150	374	ug/kg	1					
4-Chloroaniline	U	112	112	374	ug/kg	1					
4-Chlorophenylphenylether	U	112	112	374	ug/kg	1					
4-Nitrophenol	U	112	112	374	ug/kg	1					
Acenaphthene	U	11.2	11.2	37.4	ug/kg	1					
Acenaphthylene	U	11.2	11.2	37.4	ug/kg	1					
Anthracene	U	11.2	11.2	37.4	ug/kg	1					
Benzo(a)anthracene	U	11.2	11.2	37.4	ug/kg	1					
Benzo(a)pyrene	U	11.2	11.2	37.4	ug/kg	1					
Benzo(b)fluoranthene	U	11.2	11.2	37.4	ug/kg	1					
Benzo(ghi)perylene	U	11.2	11.2	37.4	ug/kg	1					
Benzo(k)fluoranthene	U	11.2	11.2	37.4	ug/kg	1					
Butylbenzylphthalate	U	112	112	374	ug/kg	1					
Carbazole	U	11.2	11.2	37.4	ug/kg	1					
Chrysene	U	11.2	11.2	37.4	ug/kg	1					

✓
10/23/13

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

Certificate of Analysis

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

Report Date: October 8, 2013

Client SDG: XP0016

Client Sample ID: J1T1V1
 Sample ID: 334067002

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
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Semi-Volatile-GC/MS

8270D/3541 BNA Soil Automated Soxhlet "Dry Weight Corrected"

Di-n-butylphthalate	U	112	112	374	ug/kg	1				
Di-n-octylphthalate	U	112	112	374	ug/kg	1				
Dibenzo(a,h)anthracene	U	11.2	11.2	37.4	ug/kg	1				
Dibenzofuran	U	112	112	374	ug/kg	1				
Diethylphthalate	U	112	112	374	ug/kg	1				
Dimethylphthalate	U	112	112	374	ug/kg	1				
Diphenylamine	U	112	112	374	ug/kg	1				
Fluoranthene	U	11.2	11.2	37.4	ug/kg	1				
Fluorene	U	11.2	11.2	37.4	ug/kg	1				
Hexachlorobenzene	U	112	112	374	ug/kg	1				
Hexachlorobutadiene	U	112	112	374	ug/kg	1				
Hexachlorocyclopentadiene	U	112	112	374	ug/kg	1				
Hexachloroethane	U	112	112	374	ug/kg	1				
Indeno(1,2,3-cd)pyrene	U	11.2	11.2	37.4	ug/kg	1				
Isophorone	U	112	112	374	ug/kg	1				
N-Nitrosodipropylamine	U	112	112	374	ug/kg	1				
Naphthalene	U	11.2	11.2	37.4	ug/kg	1				
Nitrobenzene	U	112	112	374	ug/kg	1				
Pentachlorophenol	U	112	112	374	ug/kg	1				
Phenanthrene	U	11.2	11.2	37.4	ug/kg	1				
Phenol	U	112	112	374	ug/kg	1				
Pyrene	U	11.2	11.2	37.4	ug/kg	1				
bis(2-Chloroethoxy)methane	U	112	112	374	ug/kg	1				
bis(2-Chloroethyl) ether	U	112	112	374	ug/kg	1				
bis(2-Chloroisopropyl)ether	U	112	112	374	ug/kg	1				
bis(2-Ethylhexyl)phthalate	U	112	112	374	ug/kg	1				
3- and/or 4-Methylphenol	U	112	112	374	ug/kg	1				
m-Nitroaniline	U	112	112	374	ug/kg	1				
o-Cresol	U	112	112	374	ug/kg	1				
o-Nitroaniline	U	123	123	374	ug/kg	1				
p-Nitroaniline	U	112	112	374	ug/kg	1				

✓
10/23/13

Surrogate/Tracer recovery

	Result	Nominal	Recovery%	Acceptable Limits	Date Time: 09/28/13 01 32
2-Fluorobiphenyl	1280 ug/kg	1870	68.7	(25%-100%)	
Nitrobenzene-d5	1410 ug/kg	1870	75.3	(21%-103%)	
p-Terphenyl-d14	1600 ug/kg	1870	85.4	(31%-124%)	
2,4,6-Tribromophenol	2550 ug/kg	3740	68.1	(20%-122%)	
2-Fluorophenol	3330 ug/kg	3740	89.1	(23%-107%)	
Phenol-d5	3440 ug/kg	3740	92.0	(25%-108%)	

GEL LABORATORIES LLC

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Certificate of Analysis

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

Report Date: October 8, 2013

Client SDG: XP0016

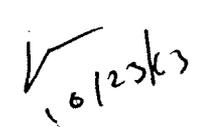
Client Sample ID: J1T1V1
 Sample ID: 334067002

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
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Semi-Volatile-GC/MS

8270D/3541 BNA Soil Automated Soxhlet "Dry Weight Corrected"

Tentatively Identified Compound (TIC)	CAS No.	RT	Est. Concentration	Fit	Qual	Date Time:
Furan, 2,5-dimethyl-	000625-86-5	2.333	178 ug/kg	95	NJ	
2-Pentanone, 4-hydroxy-	004161-60-8	3.397	197 ug/kg	87	NJ	
Unknown Aldol Condensate		3.68	15800 ug/kg		AJ	
1,2-Benzenedicarboxylic acid, bis(000084-69-5	11.928	181 ug/kg	91	NJ	
1-Nonadecene	018435-45-5	13.105	646 ug/kg	99	NJ	
unknown		13.367	388 ug/kg	0	J	
unknown		13.559	280 ug/kg	0	J	
unknown		13.859	274 ug/kg	0	J	
unknown		14.014	991 ug/kg	0	J	
9-Nonadecene	031035-07-1	15.164	173 ug/kg	93	NJ	
13-Docosenamide, (Z)-	000112-84-5	17.25	228 ug/kg	87	NJ	
Nonadecane	000629-92-5	18.368	314 ug/kg	93	NJ	
unknown		19.512	296 ug/kg	0	J	
Octacosane	000630-02-4	20.812	248 ug/kg	90	NJ	
9-Tricosene, (Z)-	027519-02-4	21.112	671 ug/kg	93	NJ	
Heneicosane	000629-94-7	22.042	168 ug/kg	87	NJ	
unknown		22.593	240 ug/kg	0	J	
Eicosane	000112-95-8	22.946	237 ug/kg	87	NJ	
Stigmasterol, 22,23-dihydro-	1000214-20-7	23.401	409 ug/kg	94	NJ	
unknown		23.893	157 ug/kg	0	J	

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 8270D BNA for Soil	MXS4	09/27/13	1750	1334482

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 3541/8270D	

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

**Semi-Volatile Case Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0016**

Method/Analysis Information

Procedure: Analysis of Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry

Analytical Method: SW846 3541/8270D

Prep Method: SW846 3541

Analytical Batch Number: 1334486

Prep Batch Number: 1334482

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 3541/8270D:

Sample ID	Client ID
334067001	J1T1V0
334067002	J1T1V1
1202956108	Method Blank (MB)
1202956109	Laboratory Control Sample (LCS)
1202956110	334067001(J1T1V0) Matrix Spike (MS)
1202956111	334067001(J1T1V0) 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-009 REV# 30.

Raw data reports are processed and reviewed by the analyst using the data analysis 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. The various calibration mixes may not be calibrated using all of the calibration levels. In addition, not all of the mixes are calibrated using the same levels.

Diphenylamine has now superseded N-Nitroso-diphenylamine on Quantitation Reports, Initial Calibration Reports, Calibration Check Standard Reports, etc. Previous versions of EPA Methodologies referenced N-Nitroso-diphenylamine. However, as stated in EPA Methodology, "N-Nitroso-diphenylamine decomposes in

the gas chromatographic inlet and cannot be separated from Diphenylamine." Studies of these two compounds at GEL, both independent of each other and together, showed that they not only co-elute, but also have similar mass spectra. N-Nitroso-diphenylamine and Diphenylamine will be reported as Diphenylamine on all reports and forms.

Initial Calibration

All initial calibration requirements have been met for this sample delivery group (SDG) in this batch. A second source initial calibration verification (ICV) was included in the standard section directly behind the initial calibration.

CCV Requirements

All Calibration Verification Standards (CCV) did not meet the acceptance criteria as outlined in Method 8270D. However, the method allows for a designated number of outliers dependent on the requested analyte list. This SDG satisfied the 8270D outlier acceptance criteria. Detected concentrations of these analytes should be considered as estimated.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG in this batch met the acceptance criteria.

Surrogate Recoveries

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

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 334067001 (J1T1V0) was selected for analysis as the matrix spike and matrix spike duplicate.

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

Internal Standard (ISTD) Acceptance

The internal standard responses used to quantitate the requested target analytes were within the required acceptance criteria for the SDG associated samples in this batch.

Technical Information:

Holding Time Specifications

All samples in this SDG met the specified holding time. GEL assigns holding times based on the associated methodology that 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. All reported compound mass spectra met the detection specifications in the method.

Sample Dilutions

The samples in this SDG in this batch did not require dilutions.

Sample Re-extraction/Re-analysis

Re-extractions or re-analyses were not required in this SDG in this analytical batch unless confirmations or dilutions were required.

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 require manual integrations due to software limitations. Manual integrations, if any, are included with the raw data.

TIC Comment

Tentatively identified compounds (TIC) may be requested for samples 1202956108 (MB), 334067001 (J1T1V0) and 334067002 (J1T1V1) in this delivery group/work order. Please note that non-requested calibrated analytes detected in a client sample may be reported on the Form 1/Certificate of Analysis as TICs. TIC data, if requested, are included on the Sample Data Summary (Form 1) and are also included with the sample raw data.

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:

Due to rounding differences in the calculation, the data reported in the Surrogate Recovery Report may differ slightly from the raw data. Due to software issue, the raw data may not correctly display the updated SPC limits. Please see Sample Data Summary Report and Surrogate Recovery Report for the correct surrogate acceptance limits.

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 reviewer name 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 Semi-Volatile-GC/MS analysis was performed on the following instrument configuration:

Instrument ID	Instrument	System Configuration	Column ID	Column Description
----------------------	-------------------	-----------------------------	------------------	---------------------------

MSD4.1	Agilent 7890A/5975C GC/MS w/ 7683 Autosampler	HP6890/HP5973	DB-5MS	25m x 0.2mm, 0.33um (5% Phenylmethylpolysiloxane)
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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.

224461

Washington Closure Hanford			CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST					RC-232-055		Page 1 of 1		
Collector DUNNUM, AJ			Company Contact Joan Kessner		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8C		Data Turnaround 15 Days	
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites			Sampling Location 600-374		SAF No. RC-232							
Ice Chest No. WCH-11-014			Field Logbook No. EL-1666-01		COA 0603742000		Method of Shipment Commerical Carrier		fed ex			
Shipped To GEL Laboratories, LLC			Offsite Property No. A120953				Bill of Lading/Air Bill No. See OSPC					
Other Labs Shipped To			Preservation		Cool 4C	Cool 4C	None	Cool 4C	Cool 4C			
NA			Type of Container		G/P	aG	G/P	aG	aG			
POSSIBLE SAMPLE HAZARDS/REMARKS None			No. of Container(s)		1	1	1	1	1			
			Volume		125mL	250mL	125mL	125mL	125mL			
Special Handling and/or Storage Cool 4C			Sample Analysis		See item (1) in Special Instructions	Pesticides - 8081	See item (2) in Special Instructions	Semi-VOA - 8270A (TCL)	PCBs - 8082			
Sample No.	Matrix	Sample Date	Sample Time									
J1T1V0	SOIL	9-23-13	0740	X	X	X	X	X				
J1T1V1	SOIL	9-23-13	0740	X	X	X	X	X				
J1T1V2	SOIL	9-23-13	0735	X					9-23-13 dmb			
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS				
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		(1) ICP Metals - 6010TR (Close-out List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7471 - (CV) (Mercury) (2) IC Anions - 9056 (Bromide, Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphorus in Phosphate, Sulfate); NO2/NO3 - 353.1 (Nitrogen in Nitrite and Nitrate); pH (Soil) - 9045 (pH Measurement)				
Joan Dunnum		9-23-13 0750		M. Bamberger		9-23-13 0750						
M. Bamberger		9-23-13 1625		CHARITALL CATHALL		9-23-13 1625						
CHARITALL CATHALL		9-23-2013 1630		C. Bingham		9-23-13 1630						
C. Bingham		9-23-13 1638		1060 Battelle, fridge		9-23-13 1638						
1060 Battelle, fridge		9-24-13 1020		C. Bingham		9-24-13 1020						
C. Bingham		9-24-13 1025		Fed EX								
Fed EX		9-23-13 0900										
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time		XP0016 REVIEWED BY K. J. Valverde DATE 9-24-13				
WCH-EE-011												

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Appendix 5
Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	600-374		DATA PACKAGE: XP0016		
VALIDATOR:	ELR	LAB: Cc	DATE: 10/22/13		
			SDG: XP0016		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)
SAMPLES/MATRIX					
JITIVO JITIVO					
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)

GC/MS tuning/performance check acceptable? Yes No **N/A**
 Initial calibrations acceptable? Yes No **N/A**
 Continuing calibrations acceptable? Yes No **N/A**
 Standards traceable? Yes No **N/A**
 Standards expired? Yes No **N/A**
 Calculation check acceptable? Yes No **N/A**

Comments: _____

GC/MS 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 FG

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

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

Comments: LCS - 11 - Fall
MS - 111 - Fall MSD - 1111 - Fall

_____ no PG

GC/MS ORGANIC DATA VALIDATION CHECKLIST

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

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

Comments: _____

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed? Yes No N/A
Internal standard areas acceptable? Yes No N/A
Internal standard retention times acceptable? Yes No N/A
Standards traceable? Yes No N/A
Standards expired? Yes No N/A
Transcription/calculation errors? Yes No N/A

Comments: _____

7. HOLDING TIMES (all levels)

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

Comments: _____

GC/MS ORGANIC 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
Laboratory properly identified and coded all TIC? (Levels D, E)	Yes	No	N/A
Detection limits meet RDL?	Yes	No	N/A
Transcription/calculation errors? (Levels D, E)	Yes	No	N/A

Comments: _____

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed?	Yes	No	N/A
GPC check performed?	Yes	No	N/A
GPC check recoveries acceptable?	Yes	No	N/A
GPC calibration performed?	Yes	No	N/A
GPC calibration check performed?	Yes	No	N/A
GPC calibration check retention times acceptable?	Yes	No	N/A
Check/calibration materials traceable?	Yes	No	N/A
Check/calibration materials Expired?	Yes	No	N/A
Analytical batch QC given similar cleanup?	Yes	No	N/A
Transcription/Calculation Errors?	Yes	No	N/A

Comments: _____

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: October 8, 2013

Page 1 of 14

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

Contact:

Workorder: 334067

Client SDG: XP0016

Project Description: RC-232 Soil

Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS										
Batch 1334486										
QC1202956109 LCS										
1,2,4-Trichlorobenzene	1660		1290	ug/kg		77.7	(37%-98%)	JMB3	09/27/13	22:34
1,2-Dichlorobenzene	1660		1280	ug/kg		77.3	(39%-93%)			
1,3-Dichlorobenzene	1660		1240	ug/kg		74.9	(39%-110%)			
1,4-Dichlorobenzene	1660		1260	ug/kg		75.9	(40%-110%)			
2,4,5-Trichlorophenol	1660		1400	ug/kg		84.4	(41%-103%)			
2,4,6-Trichlorophenol	1660		1360	ug/kg		82.1	(36%-98%)			
2,4-Dichlorophenol	1660		1300	ug/kg		78.3	(35%-110%)			
2,4-Dimethylphenol	1660		1300	ug/kg		78.4	(35%-102%)			
2,4-Dinitrophenol	1660	J	526	ug/kg		31.7	(22%-83%)			
2,4-Dinitrotoluene	1660		1640	ug/kg		99	(43%-109%)			
2,6-Dinitrotoluene	1660		1510	ug/kg		91.2	(41%-103%)			
2-Chloronaphthalene	1660		1320	ug/kg		79.4	(39%-101%)			
2-Chlorophenol	1660		1330	ug/kg		80.4	(38%-100%)			
2-Methyl-4,6-dinitrophenol	1660		1060	ug/kg		63.9	(33%-103%)			
2-Methylnaphthalene	1660		1300	ug/kg		78.5	(36%-107%)			
2-Nitrophenol	1660		1440	ug/kg		86.9	(35%-106%)			
3,3'-Dichlorobenzidine	1660		1390	ug/kg		84	(32%-111%)			
3- and/or 4-Methylphenol	1660		1510	ug/kg		91.3	(39%-115%)			
4-Bromophenylphenylether	1660		1320	ug/kg		79.5	(42%-110%)			
4-Chloro-3-methylphenol	1660		1370	ug/kg		82.6	(35%-104%)			

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QC Summary

Workorder: 334067

Client SDG: XP0016

Project Description: RC-232 Soil

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Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS										
Batch 1334486										
4-Chloroaniline	1660		1170	ug/kg		70.6	(32%-106%)	JMB3	09/27/13	22:34
4-Chlorophenylphenylether	1660		1330	ug/kg		80.1	(41%-104%)			
4-Nitrophenol	1660		1350	ug/kg		81.4	(23%-114%)			
Acenaphthene	1660		1290	ug/kg		78	(36%-105%)			
Acenaphthylene	1660		1320	ug/kg		79.4	(38%-103%)			
Anthracene	1660		1340	ug/kg		80.9	(43%-104%)			
Benzo(a)anthracene	1660		1450	ug/kg		87.3	(46%-108%)			
Benzo(a)pyrene	1660		1460	ug/kg		87.8	(45%-109%)			
Benzo(b)fluoranthene	1660		1510	ug/kg		91.1	(42%-111%)			
Benzo(ghi)perylene	1660		1270	ug/kg		76.3	(43%-115%)			
Benzo(k)fluoranthene	1660		1540	ug/kg		92.9	(43%-103%)			
Butylbenzylphthalate	1660		1550	ug/kg		93.7	(37%-107%)			
Carbazole	1660		1470	ug/kg		88.5	(53%-118%)			
Chrysene	1660		1420	ug/kg		85.8	(47%-107%)			
Di-n-butylphthalate	1660		1580	ug/kg		95.3	(46%-112%)			
Di-n-octylphthalate	1660		1510	ug/kg		90.9	(41%-110%)			
Dibenzo(a,h)anthracene	1660		1330	ug/kg		80.3	(39%-128%)			
Dibenzofuran	1660		1530	ug/kg		92.3	(38%-104%)			
Diethylphthalate	1660		1440	ug/kg		86.5	(42%-109%)			
Dimethylphthalate	1660		1370	ug/kg		82.8	(41%-105%)			
Diphenylamine	1660		1380	ug/kg		83.1	(40%-101%)			

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QC Summary

Workorder: 334067

Client SDG: XP0016

Project Description: RC-232 Soil

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Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS										
Batch 1334486										
Fluoranthene	1660		1480	ug/kg		89.1	(44%-106%)			
Fluorene	1660		1360	ug/kg		82.2	(39%-102%)	JMB3	09/27/13	22:34
Hexachlorobenzene	1660		1360	ug/kg		82.2	(41%-108%)			
Hexachlorobutadiene	1660		1290	ug/kg		77.5	(32%-104%)			
Hexachlorocyclopentadiene	1660		821	ug/kg		49.5	(24%-84%)			
Hexachloroethane	1660		1330	ug/kg		80.3	(34%-98%)			
Indeno(1,2,3-cd)pyrene	1660		1340	ug/kg		80.6	(45%-115%)			
Isophorone	1660		1600	ug/kg		96.6	(36%-98%)			
N-Nitrosodipropylamine	1660		1480	ug/kg		89.4	(34%-106%)			
Naphthalene	1660		1310	ug/kg		79.1	(38%-106%)			
Nitrobenzene	1660		1530	ug/kg		92.5	(35%-99%)			
Pentachlorophenol	1660		1120	ug/kg		67.7	(31%-93%)			
Phenanthrene	1660		1330	ug/kg		80.3	(43%-105%)			
Phenol	1660		1320	ug/kg		79.3	(38%-98%)			
Pyrene	1660		1400	ug/kg		84.2	(33%-99%)			
bis(2-Chloroethoxy)methane	1660		1300	ug/kg		78.3	(37%-98%)			
bis(2-Chloroethyl) ether	1660		1330	ug/kg		79.9	(35%-96%)			
bis(2-Chloroisopropyl)ether	1660		1220	ug/kg		73.2	(27%-109%)			
bis(2-Ethylhexyl)phthalate	1660		1500	ug/kg		90.5	(41%-104%)			
m-Nitroaniline	1660		1280	ug/kg		77	(32%-113%)			
o-Cresol	1660		1320	ug/kg		79.3	(37%-97%)			
o-Nitroaniline	1660		1430	ug/kg		86.4	(34%-116%)			

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QC Summary

Workorder: 334067 Client SDG: XP0016 Project Description: RC-232 Soil Page 4 of 14

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch 1334486											
p-Nitroaniline	1660			1620	ug/kg		97.8	(35%-150%)			
**2,4,6-Tribromophenol	3320			2780	ug/kg		83.6	(20%-122%)	JMB3	09/27/13	22:34
**2-Fluorobiphenyl	1660			1230	ug/kg		74	(25%-100%)			
**2-Fluorophenol	3320			2680	ug/kg		80.8	(23%-107%)			
**Nitrobenzene-d5	1660			1320	ug/kg		79.6	(21%-103%)			
**Phenol-d5	3320			2750	ug/kg		82.9	(25%-108%)			
**p-Terphenyl-d14	1660			1440	ug/kg		86.5	(31%-124%)			
QC1202956108 MB											
1,2,4-Trichlorobenzene			U	99.6	ug/kg					09/27/13	22:04
1,2-Dichlorobenzene			U	99.6	ug/kg						
1,3-Dichlorobenzene			U	99.6	ug/kg						
1,4-Dichlorobenzene			U	99.6	ug/kg						
2,4,5-Trichlorophenol			U	99.6	ug/kg						
2,4,6-Trichlorophenol			U	99.6	ug/kg						
2,4-Dichlorophenol			U	99.6	ug/kg						
2,4-Dimethylphenol			U	99.6	ug/kg						
2,4-Dinitrophenol			U	99.6	ug/kg						
2,4-Dinitrotoluene			U	99.6	ug/kg						
2,6-Dinitrotoluene			U	99.6	ug/kg						
2-Chloronaphthalene			U	9.96	ug/kg						
2-Chlorophenol			U	99.6	ug/kg						
2-Methyl-4,6-dinitrophenol			U	99.6	ug/kg						
2-Methylnaphthalene			U	9.96	ug/kg						

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QC Summary

Workorder: 334067

Client SDG: XP0016

Project Description: RC-232 Soil

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Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS										
Batch 1334486										
2-Nitrophenol		U	99.6	ug/kg				JMB3	09/27/13	22:04
3,3'-Dichlorobenzidine		U	99.6	ug/kg						
3- and/or 4-Methylphenol		U	99.6	ug/kg						
4-Bromophenylphenylether		U	99.6	ug/kg						
4-Chloro-3-methylphenol		U	133	ug/kg						
4-Chloroaniline		U	99.6	ug/kg						
4-Chlorophenylphenylether		U	99.6	ug/kg						
4-Nitrophenol		U	99.6	ug/kg						
Acenaphthene		U	9.96	ug/kg						
Acenaphthylene		U	9.96	ug/kg						
Anthracene		U	9.96	ug/kg						
Benzo(a)anthracene		U	9.96	ug/kg						
Benzo(a)pyrene		U	9.96	ug/kg						
Benzo(b)fluoranthene		U	9.96	ug/kg						
Benzo(ghi)perylene		U	9.96	ug/kg						
Benzo(k)fluoranthene		U	9.96	ug/kg						
Butylbenzylphthalate		U	99.6	ug/kg						
Carbazole		U	9.96	ug/kg						
Chrysene		U	9.96	ug/kg						
Di-n-butylphthalate		U	99.6	ug/kg						
Di-n-octylphthalate		U	99.6	ug/kg						

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QC Summary

Workorder: 334067

Client SDG: XP0016

Project Description: RC-232 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch 1334486											
Dibenzo(a,h)anthracene			U	9.96	ug/kg						
Dibenzofuran			U	99.6	ug/kg				JMB3	09/27/13	22:04
Diethylphthalate			U	99.6	ug/kg						
Dimethylphthalate			U	99.6	ug/kg						
Diphenylamine			U	99.6	ug/kg						
Fluoranthene			U	9.96	ug/kg						
Fluorene			U	9.96	ug/kg						
Hexachlorobenzene			U	99.6	ug/kg						
Hexachlorobutadiene			U	99.6	ug/kg						
Hexachlorocyclopentadiene			U	99.6	ug/kg						
Hexachloroethane			U	99.6	ug/kg						
Indeno(1,2,3-cd)pyrene			U	9.96	ug/kg						
Isophorone			U	99.6	ug/kg						
N-Nitrosodipropylamine			U	99.6	ug/kg						
Naphthalene			U	9.96	ug/kg						
Nitrobenzene			U	99.6	ug/kg						
Pentachlorophenol			U	99.6	ug/kg						
Phenanthrene			U	9.96	ug/kg						
Phenol			U	99.6	ug/kg						
Pyrene			U	9.96	ug/kg						
bis(2-Chloroethoxy)methane			U	99.6	ug/kg						
bis(2-Chloroethyl) ether			U	99.6	ug/kg						

GEL LABORATORIES LLC

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QC Summary

Workorder: 334067 Client SDG: XP0016 Project Description: RC-232 Soil Page 7 of 14

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch 1334486											
bis(2-Chloroisopropyl)ether			U	99.6	ug/kg						
bis(2-Ethylhexyl)phthalate			U	99.6	ug/kg				JMB3	09/27/13	22:04
m-Nitroaniline			U	99.6	ug/kg						
o-Cresol			U	99.6	ug/kg						
o-Nitroaniline			U	110	ug/kg						
p-Nitroaniline			U	99.6	ug/kg						
**2,4,6-Tribromophenol	3320			2580	ug/kg		77.6	(20%-122%)			
**2-Fluorobiphenyl	1660			1350	ug/kg		81.4	(25%-100%)			
**2-Fluorophenol	3320			2880	ug/kg		86.8	(23%-107%)			
**Nitrobenzene-d5	1660			1430	ug/kg		85.9	(21%-103%)			
**Phenol-d5	3320			2910	ug/kg		87.6	(25%-108%)			
**p-Terphenyl-d14	1660			1670	ug/kg		100	(31%-124%)			
QC1202956110 334067001 MS											
1,2,4-Trichlorobenzene	1870	U	112	1350	ug/kg		71.9	(25%-102%)		09/28/13	00:33
1,2-Dichlorobenzene	1870	U	112	1370	ug/kg		73.1	(25%-99%)			
1,3-Dichlorobenzene	1870	U	112	1300	ug/kg		69.6	(24%-96%)			
1,4-Dichlorobenzene	1870	U	112	1320	ug/kg		70.5	(24%-97%)			
2,4,5-Trichlorophenol	1870	U	112	1430	ug/kg		76.4	(38%-109%)			
2,4,6-Trichlorophenol	1870	U	112	1470	ug/kg		78.4	(32%-103%)			
2,4-Dichlorophenol	1870	U	112	1420	ug/kg		75.5	(31%-103%)			
2,4-Dimethylphenol	1870	U	112	1390	ug/kg		74.2	(30%-109%)			
2,4-Dinitrophenol	1870	U	112 J	654	ug/kg		34.9	(19%-101%)			
2,4-Dinitrotoluene	1870	U	112	1630	ug/kg		86.8	(36%-115%)			

QC Summary

Workorder: 334067 Client SDG: XP0016 Project Description: RC-232 Soil Page 8 of 14

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch 1334486											
2,6-Dinitrotoluene	1870	U	112	1540	ug/kg	82.1	(36%-107%)	JMB3	09/28/13	00:33	
2-Chloronaphthalene	1870	U	11.2	1390	ug/kg	74.3	(27%-109%)				
2-Chlorophenol	1870	U	112	1500	ug/kg	80.3	(28%-108%)				
2-Methyl-4,6-dinitrophenol	1870	U	112	913	ug/kg	48.7	(14%-116%)				
2-Methylnaphthalene	1870	U	11.2	1410	ug/kg	75.1	(23%-107%)				
2-Nitrophenol	1870	U	112	1530	ug/kg	81.8	(24%-106%)				
3,3'-Dichlorobenzidine	1870	U	112	978	ug/kg	52.2	(28%-105%)				
3- and/or 4-Methylphenol	1870	U	112	1740	ug/kg	92.7	(32%-123%)				
4-Bromophenylphenylether	1870	U	112	1330	ug/kg	70.8	(37%-112%)				
4-Chloro-3-methylphenol	1870	U	150	1490	ug/kg	79.2	(32%-112%)				
4-Chloroaniline	1870	U	112	1260	ug/kg	67.3	(27%-100%)				
4-Chlorophenylphenylether	1870	U	112	1400	ug/kg	74.4	(37%-110%)				
4-Nitrophenol	1870	U	112	1310	ug/kg	69.9	(12%-128%)				
Acenaphthene	1870	U	11.2	1380	ug/kg	73.5	(28%-102%)				
Acenaphthylene	1870	U	11.2	1410	ug/kg	75	(32%-103%)				
Anthracene	1870	U	11.2	1330	ug/kg	71.1	(36%-104%)				
Benzo(a)anthracene	1870	U	11.2	1330	ug/kg	70.7	(27%-120%)				
Benzo(a)pyrene	1870	U	11.2	1350	ug/kg	72	(31%-116%)				
Benzo(b)fluoranthene	1870	U	11.2	1430	ug/kg	76.1	(30%-119%)				
Benzo(ghi)perylene	1870	U	11.2	1120	ug/kg	59.6	(30%-109%)				
Benzo(k)fluoranthene	1870	U	11.2	1420	ug/kg	75.6	(31%-125%)				

QC Summary

Workorder: 334067 Client SDG: XP0016 Project Description: RC-232 Soil Page 9 of 14

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1334486										
Butylbenzylphthalate	1870	U	112	1480	ug/kg		78.8	(33%-121%)			
Carbazole	1870	U	11.2	1390	ug/kg		74.1	(40%-133%)	JMB3	09/28/13	00:33
Chrysene	1870	U	11.2	1300	ug/kg		69.3	(33%-114%)			
Di-n-butylphthalate	1870	U	112	1500	ug/kg		79.9	(42%-119%)			
Di-n-octylphthalate	1870	U	112	1440	ug/kg		76.7	(36%-115%)			
Dibenzo(a,h)anthracene	1870	U	11.2	1200	ug/kg		64	(26%-128%)			
Dibenzofuran	1870	U	112	1620	ug/kg		86.2	(28%-117%)			
Diethylphthalate	1870	U	112	1450	ug/kg		77.6	(40%-113%)			
Dimethylphthalate	1870	U	112	1410	ug/kg		75.3	(38%-110%)			
Diphenylamine	1870	U	112	1370	ug/kg		73	(34%-111%)			
Fluoranthene	1870	U	11.2	1390	ug/kg		74.3	(32%-115%)			
Fluorene	1870	U	11.2	1420	ug/kg		75.9	(30%-115%)			
Hexachlorobenzene	1870	U	112	1350	ug/kg		72.1	(34%-111%)			
Hexachlorobutadiene	1870	U	112	1310	ug/kg		70.1	(24%-105%)			
Hexachlorocyclopentadiene	1870	U	112	820	ug/kg		43.7	(12%-106%)			
Hexachloroethane	1870	U	112	1370	ug/kg		73.3	(24%-102%)			
Indeno(1,2,3-cd)pyrene	1870	U	11.2	1200	ug/kg		63.8	(29%-117%)			
Isophorone	1870	U	112	1710	ug/kg		91.2	(24%-108%)			
N-Nitrosodipropylamine	1870	U	112	1660	ug/kg		88.8	(23%-117%)			
Naphthalene	1870	U	11.2	1400	ug/kg		74.5	(21%-107%)			
Nitrobenzene	1870	U	112	1610	ug/kg		85.7	(25%-104%)			
Pentachlorophenol	1870	U	112	1300	ug/kg		69.4	(22%-108%)			

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QC Summary

Workorder:	334067	Client SDG:	XP0016	Project Description:	RC-232 Soil	Page 10 of 14					
Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1334486										
Phenanthrene	1870	U	11.2	1340	ug/kg	71.5	(28%-119%)				
Phenol	1870	U	112	1430	ug/kg	76.4	(28%-108%)	JMB3	09/28/13	00:33	
Pyrene	1870	U	11.2	1380	ug/kg	73.8	(25%-119%)				
bis(2-Chloroethoxy)methane	1870	U	112	1380	ug/kg	73.7	(27%-104%)				
bis(2-Chloroethyl) ether	1870	U	112	1440	ug/kg	76.7	(25%-102%)				
bis(2-Chloroisopropyl)ether	1870	U	112	1350	ug/kg	72.2	(25%-105%)				
bis(2-Ethylhexyl)phthalate	1870	U	112	1430	ug/kg	76.3	(33%-124%)				
m-Nitroaniline	1870	U	112	1270	ug/kg	67.5	(31%-110%)				
o-Cresol	1870	U	112	1490	ug/kg	79.5	(27%-105%)				
o-Nitroaniline	1870	U	124	1520	ug/kg	81.2	(37%-114%)				
p-Nitroaniline	1870	U	112	1510	ug/kg	80.3	(36%-141%)				
**2,4,6-Tribromophenol	3750		2720	2850	ug/kg	76.1	(20%-122%)				
**2-Fluorobiphenyl	1870		1260	1290	ug/kg	68.7	(25%-100%)				
**2-Fluorophenol	3750		2760	2920	ug/kg	77.9	(23%-107%)				
**Nitrobenzene-d5	1870		1340	1360	ug/kg	72.4	(21%-103%)				
**Phenol-d5	3750		2840	3100	ug/kg	82.8	(25%-108%)				
**p-Terphenyl-d14	1870		1530	1380	ug/kg	73.3	(31%-124%)				
QC1202956111	334067001	MSD									
1,2,4-Trichlorobenzene	1880	U	112	1310	ug/kg	3.06	69.7	(0%-30%)		09/28/13	01:02
1,2-Dichlorobenzene	1880	U	112	1330	ug/kg	3.04	70.8	(0%-30%)			
1,3-Dichlorobenzene	1880	U	112	1260	ug/kg	3.17	67.3	(0%-30%)			
1,4-Dichlorobenzene	1880	U	112	1280	ug/kg	2.86	68.4	(0%-30%)			
2,4,5-Trichlorophenol	1880	U	112	1490	ug/kg	4.18	79.6	(0%-30%)			

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QC Summary

Workorder: 334067 Client SDG: XP0016 Project Description: RC-232 Soil Page 11 of 14

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch 1334486											
2,4,6-Trichlorophenol	1880	U	112	1490	ug/kg	1.55	79.5	(0%-30%)	JMB3	09/28/13	01:02
2,4-Dichlorophenol	1880	U	112	1390	ug/kg	1.87	74	(0%-30%)			
2,4-Dimethylphenol	1880	U	112	1380	ug/kg	0.598	73.6	(0%-30%)			
2,4-Dinitrophenol	1880	U	112 J	570	ug/kg	13.8	30.3	(0%-30%)			
2,4-Dinitrotoluene	1880	U	112	1630	ug/kg	0.179	86.9	(0%-30%)			
2,6-Dinitrotoluene	1880	U	112	1590	ug/kg	3.46	84.9	(0%-30%)			
2-Chloronaphthalene	1880	U	11.2	1400	ug/kg	0.455	74.6	(0%-30%)			
2-Chlorophenol	1880	U	112	1460	ug/kg	3.26	77.6	(0%-30%)			
2-Methyl-4,6-dinitrophenol	1880	U	112	810	ug/kg	12.0	43.1	(0%-30%)			
2-Methylnaphthalene	1880	U	11.2	1360	ug/kg	3.61	72.4	(0%-30%)			
2-Nitrophenol	1880	U	112	1500	ug/kg	2.44	79.8	(0%-30%)			
3,3'-Dichlorobenzidine	1880	U	112	902	ug/kg	8.05	48.1	(0%-30%)			
3- and/or 4-Methylphenol	1880	U	112	1690	ug/kg	2.58	90.2	(0%-30%)			
4-Bromophenylphenylether	1880	U	112	1430	ug/kg	7.40	76.1	(0%-30%)			
4-Chloro-3-methylphenol	1880	U	150	1480	ug/kg	0.0439	79.1	(0%-30%)			
4-Chloroaniline	1880	U	112	1180	ug/kg	6.85	62.8	(0%-30%)			
4-Chlorophenylphenylether	1880	U	112	1420	ug/kg	1.49	75.4	(0%-30%)			
4-Nitrophenol	1880	U	112	1250	ug/kg	4.88	66.5	(0%-30%)			
Acenaphthene	1880	U	11.2	1400	ug/kg	1.91	74.8	(0%-30%)			
Acenaphthylene	1880	U	11.2	1410	ug/kg	0.266	75.1	(0%-30%)			
Anthracene	1880	U	11.2	1410	ug/kg	5.39	74.9	(0%-30%)			

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QC Summary

Workorder: 334067 Client SDG: XP0016 Project Description: RC-232 Soil Page 12 of 14

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch 1334486											
Benzo(a)anthracene	1880	U	11.2	1400	ug/kg	5.29	74.5	(0%-30%)			
Benzo(a)pyrene	1880	U	11.2	1460	ug/kg	7.60	77.6	(0%-30%)	JMB3	09/28/13	01:02
Benzo(b)fluoranthene	1880	U	11.2	1500	ug/kg	5.33	80.1	(0%-30%)			
Benzo(ghi)perylene	1880	U	11.2	1250	ug/kg	11.6	66.8	(0%-30%)			
Benzo(k)fluoranthene	1880	U	11.2	1500	ug/kg	5.89	80.1	(0%-30%)			
Butylbenzylphthalate	1880	U	112	1540	ug/kg	4.09	82	(0%-30%)			
Carbazole	1880	U	11.2	1430	ug/kg	2.67	76	(0%-30%)			
Chrysene	1880	U	11.2	1380	ug/kg	6.17	73.7	(0%-30%)			
Di-n-butylphthalate	1880	U	112	1550	ug/kg	3.17	82.4	(0%-30%)			
Di-n-octylphthalate	1880	U	112	1480	ug/kg	2.73	78.7	(0%-30%)			
Dibenzo(a,h)anthracene	1880	U	11.2	1380	ug/kg	14.1	73.7	(0%-30%)			
Dibenzofuran	1880	U	112	1640	ug/kg	1.26	87.1	(0%-30%)			
Diethylphthalate	1880	U	112	1480	ug/kg	1.59	78.7	(0%-30%)			
Dimethylphthalate	1880	U	112	1440	ug/kg	2.31	76.9	(0%-30%)			
Diphenylamine	1880	U	112	1510	ug/kg	9.95	80.5	(0%-30%)			
Fluoranthene	1880	U	11.2	1350	ug/kg	2.98	72	(0%-30%)			
Fluorene	1880	U	11.2	1440	ug/kg	1.05	76.6	(0%-30%)			
Hexachlorobenzene	1880	U	112	1480	ug/kg	9.04	78.8	(0%-30%)			
Hexachlorobutadiene	1880	U	112	1270	ug/kg	3.53	67.6	(0%-30%)			
Hexachlorocyclopentadiene	1880	U	112	788	ug/kg	3.98	42	(0%-30%)			
Hexachloroethane	1880	U	112	1340	ug/kg	2.63	71.3	(0%-30%)			
Indeno(1,2,3-cd)pyrene	1880	U	11.2	1360	ug/kg	12.6	72.2	(0%-30%)			

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QC Summary

Workorder: 334067

Client SDG: XP0016

Project Description: RC-232 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch 1334486											
Isophorone	1880	U	112	1680	ug/kg	1.82	89.4	(0%-30%)			
N-Nitrosodipropylamine	1880	U	112	1640	ug/kg	1.66	87.2	(0%-30%)	JMB3	09/28/13	01:02
Naphthalene	1880	U	11.2	1350	ug/kg	3.64	71.7	(0%-30%)			
Nitrobenzene	1880	U	112	1560	ug/kg	2.80	83.2	(0%-30%)			
Pentachlorophenol	1880	U	112	1350	ug/kg	3.87	72	(0%-30%)			
Phenanthrene	1880	U	11.2	1410	ug/kg	4.88	75	(0%-30%)			
Phenol	1880	U	112	1320	ug/kg	8.16	70.3	(0%-30%)			
Pyrene	1880	U	11.2	1520	ug/kg	9.09	80.7	(0%-30%)			
bis(2-Chloroethoxy)methane	1880	U	112	1360	ug/kg	1.45	72.6	(0%-30%)			
bis(2-Chloroethyl) ether	1880	U	112	1430	ug/kg	0.600	76.1	(0%-30%)			
bis(2-Chloroisopropyl)ether	1880	U	112	1320	ug/kg	2.17	70.5	(0%-30%)			
bis(2-Ethylhexyl)phthalate	1880	U	112	1460	ug/kg	1.90	77.7	(0%-30%)			
m-Nitroaniline	1880	U	112	1210	ug/kg	4.57	64.4	(0%-30%)			
o-Cresol	1880	U	112	1460	ug/kg	1.77	78	(0%-30%)			
o-Nitroaniline	1880	U	124	1550	ug/kg	2.04	82.8	(0%-30%)			
p-Nitroaniline	1880	U	112	1430	ug/kg	5.16	76.1	(0%-30%)			
**2,4,6-Tribromophenol	3750		2720	2850	ug/kg		75.9	(20%-122%)			
**2-Fluorobiphenyl	1880		1260	1300	ug/kg		69	(25%-100%)			
**2-Fluorophenol	3750		2760	2880	ug/kg		76.8	(23%-107%)			
**Nitrobenzene-d5	1880		1340	1340	ug/kg		71.6	(21%-103%)			
**Phenol-d5	3750		2840	3010	ug/kg		80.1	(25%-108%)			
**p-Terphenyl-d14	1880		1530	1510	ug/kg		80.4	(31%-124%)			

Date: 24 October 2013
 To: Washington Closure Hanford Inc. (technical representative)
 From: ELR Consulting
 Project: 100-IU-2 & 100-IU-6 Remaining Waste Sites – Soil Full Protocol - Waste Site 600-374
 Subject: Wet Chemistry - Data Package No. XP0016-GEL

INTRODUCTION

This memo presents the results of data validation on Data Package No. XP0016 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
J1T1V0	9/23/13	Soil	C	See note 1
J1T1V1	9/23/13	Soil	C	See note 1

1 – IC anions by 300.0, nitrate/nitrite by 353.2 & pH by 9045D.

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: 28 days for nitrate/nitrite, chloride, fluoride, bromide, sulfate; 48 hours for nitrate, nitrite and orthophosphate; and immediate (24 hours) for pH.

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".

Due to the holding time being exceeded by greater than twice the limit, all undetected nitrate, nitrite and orthophosphate results were qualified as rejected and flagged "UR".

Due to the holding time being exceeded by greater than twice the limit, all detected pH, nitrate, nitrite and orthophosphate results were qualified as estimates and flagged "J".

All other holding times were acceptable.

Method Blanks

Method Blanks

Method blank analyses are performed 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. All blank results must fall below the contract required detection limit (CRQL) to be acceptable.

All method blank results were acceptable.

Field Blanks

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 70% to 130%. 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 69% and a sample result less than the IDL are qualified "UJ". Samples with a recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 130% and a sample result less than the IDL, no qualification is required.

All accuracy results were acceptable.

Precision

Laboratory Duplicate Samples

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike duplicate (MSD) analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate

analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the CRDL and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All laboratory duplicate results were acceptable.

Field Duplicate

One set of field duplicates (J1T1V0/J1T1V1) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

Analytical Detection Levels

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

Completeness

Data package XP0016 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 89%.

MAJOR DEFICIENCIES

The following major deficiency was noted:

- Due to the holding time being exceeded by greater than twice the limit, all undetected nitrate, nitrite and orthophosphate results were qualified as rejected and flagged "UR".

Rejected data is unusable and should not be reported.

MINOR DEFICIENCIES

The following minor deficiencies were noted:

- Due to the holding time being exceeded by greater than twice the limit, all detected pH, nitrate, nitrite and orthophosphate 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*.

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

WET CHEMISTRY DATA QUALIFICATION SUMMARY*

SDG: XP0016	REVIEWER: ELR	Project: 600-374	PAGE <u>1</u> OF <u>1</u>
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Nitrate Orthophosphate pH	J	All	Hold time
Nitrite	UR	All	Hold time

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

Appendix 3
Annotated Laboratory Reports

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Certificate of Analysis

Report Date: October 4, 2013

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

Client SDG: XP0016

Client Sample ID: J1T1V0
 Sample ID: 334067001
 Matrix: SOIL
 Collect Date: 23-SEP-13 07:40
 Receive Date: 25-SEP-13
 Collector: Client
 Moisture: 11.4%

Project: WCHN00213
 Client ID: WCHN001

✓ 10/25/13

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Electrode Analysis											
SW9045D pH "As Received"											
pH at Temp 20.8C	X J	6.99	0.010	0.100	pH	1	LYG1	09/30/13	1042	1334133	1
Ion Chromatography											
SW846 9056A Anions "Dry Weight Corrected"											
Bromide	U	0.743	0.743	2.22	mg/kg	1	DM	09/25/13	1936	1333965	2
Chloride		2.81	0.743	2.22	mg/kg	1					
Fluoride	B	0.874	0.366	1.11	mg/kg	1					
Nitrate-N	J	5.89	0.366	1.11	mg/kg	1					
Nitrite-N	U R	0.366	0.366	1.11	mg/kg	1					
O-Phosphate as P	J	2.71	0.743	2.22	mg/kg	1					
Sulfate		11.0	1.47	4.44	mg/kg	1					
Nutrient Analysis											
EPA 353.2 Nitrogen, Nitrate/Nitrite "Dry Weight Corrected"											
Nitrogen, Nitrate/Nitrite		5.95	0.189	0.556	mg/kg	1	KLP1	10/01/13	1215	1334340	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 353.2 Modified	EPA 353.2 Modified Nitrate/Nitrite	KLP1	10/01/13	1100	1334339
SW846 9056A	SW846 9056A Total Anions in Soil	DM	09/25/13	1652	1333964

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9045D	
2	SW846 9056A	
3	EPA 353.2 Modified	

Notes:

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: October 4, 2013

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

Client SDG: XP0016

Client Sample ID: J1T1V1
 Sample ID: 334067002
 Matrix: SOIL
 Collect Date: 23-SEP-13 07:40
 Receive Date: 25-SEP-13
 Collector: Client
 Moisture: 11%

Project: WCHN00213
 Client ID: WCHN001

✓ 10/23/13

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Electrode Analysis											
SW9045D pH "As Received"											
pH at Temp 20.7C	X J	7.09	0.010	0.100	pH	1	LYG1	09/30/13	1043	1334133	1
Ion Chromatography											
SW846 9056A Anions "Dry Weight Corrected"											
Bromide	U	0.753	0.753	2.25	mg/kg	1	DM	09/25/13	2007	1333965	2
Chloride		3.31	0.753	2.25	mg/kg	1					
Fluoride	B	0.959	0.371	1.12	mg/kg	1					
Nitrate-N	J	5.83	0.371	1.12	mg/kg	1					
Nitrite-N	U J	0.371	0.371	1.12	mg/kg	1					
O-Phosphate as P	J	2.43	0.753	2.25	mg/kg	1					
Sulfate		11.3	1.49	4.49	mg/kg	1					
Nutrient Analysis											
EPA 353.2 Nitrogen, Nitrate/Nitrite "Dry Weight Corrected"											
Nitrogen, Nitrate/Nitrite		6.60	0.189	0.556	mg/kg	1	KLP1	10/01/13	1224	1334340	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 353.2 Modified	EPA 353.2 Modified Nitrate/Nitrite	KLP1	10/01/13	1100	1334339
SW846 9056A	SW846 9056A Total Anions in Soil	DM	09/25/13	1652	1333964

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9045D	
2	SW846 9056A	
3	EPA 353.2 Modified	

Notes:

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

**General Chemistry Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0016**

Method/Analysis Information

Product: pH
Analytical Batch: 1334133 **Method:** SW9045D pH

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 9045D:

Sample ID	Client ID
334067001	J1T1V0
334067002	J1T1V1
1202955259	334067002(J1T1V1) Sample Duplicate (DUP)
1202955260	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

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-GC-E-008 REV# 21.

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.

Calibration Information

The Electrode analysis was performed on a PerpHect pH Meter Orion 370.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information (CCV)

All continuing calibration verification standards (CCVs) associated with reported data from this batch were within acceptance limits.

Quality Control (QC) Information

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 334067002 (J1T1V1).

Duplicate Relative Percent Difference (RPD) Statement

The RPD between the sample and its duplicate met the acceptance limits.

Technical Information

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

Holding Times

The following samples from this sample group were received by the lab outside of the method specified holding time: 334067001 (J1T1V0) and 334067002 (J1T1V1).

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

The samples in this SDG did not require re-analysis.

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

The following DER was generated for this SDG: 1226795 334067001 (J1T1V0) and 334067002 (J1T1V1).

Additional Comments

Additional comments were not required for this SDG.

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. 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.

Method/Analysis Information

Product: Ion Chromatography
Analytical Batch: 1333965 **Method:** SW846 9056A Anions
Prep Batch : 1333964 **Method:** SW846 9056A

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 9056A:

Sample ID	Client ID
334067001	J1T1V0
334067002	J1T1V1
1202954847	Method Blank (MB)
1202954848	334067002(J1T1V1) Sample Duplicate (DUP)
1202954849	334067002(J1T1V1) Matrix Spike (MS)
1202954850	Laboratory Control Sample (LCS)

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

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-GC-E-086 REV# 22.

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.

Calibration Information

The Ion Chromatography analysis was performed on a Dionex ICS-5000 Ion Chromatograph.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

All continuing calibration blanks (CCBs) associated with reported data from this batch were within acceptance limits.

Calibration Verification Information (CCV)

All continuing calibration verification standards (CCVs) associated with reported data from this batch were within

acceptance limits.

Y Intercept Rule

The absolute value of the intercept is less than 3 times the MDL.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 334067002 (J1T1V1).

Matrix Spike (MS)/Post Spike (PS) Recovery Statement

The MS/PS recovery for this sample set was within the required acceptance limits.

Duplicate Relative Percent Difference (RPD) Statement

The RPD between the sample and its duplicate met the acceptance limits.

Technical Information

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

The samples in this SDG did not require re-analysis.

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

The following samples from this sample group had to be manually integrated due to errors in the instrument software peak integration: 1202954848 (J1T1V1), 334067001 (J1T1V0) and 334067002 (J1T1V1).

Additional Comments

Additional comments were not required for this SDG.

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. 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.

Method/Analysis Information

Product: Nitrate + Nitrite
Analytical Batch: 1334340 **Method:** EPA 353.2 Nitrogen and Nitrate/Nitrite
Prep Batch : 1334339 **Method:** EEPA 353.2 Modified

Sample Analysis

The following samples were analyzed using the analytical protocol as established in EPA 353.2 Modified:

Sample ID	Client ID
334067001	J1T1V0
334067002	J1T1V1
1202955792	Method Blank (MB)
1202955794	334067001(J1T1V0) Sample Duplicate (DUP)
1202955797	334067001(J1T1V0) Matrix Spike (MS)
1202955799	Laboratory Control Sample (LCS)

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

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-GC-E-128 REV# 8.

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.

Calibration Information

The Nutrient analysis was performed on a Lachat QuickChem FIA+ 8500 Series.

Calibration Verification Information

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

Continuing Calibration Blanks

All continuing calibration blanks (CCBs) associated with reported data from this batch were within acceptance limits.

Y Intercept Rule

The absolute value of the intercept is less than 3 times the MDL.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 334067001 (J1T1V0).

Matrix Spike (MS)/Post Spike (PS) Recovery Statement

The MS/PS recoveries for this sample set were within the required acceptance limits.

Duplicate Relative Percent Difference (RPD) Statement

The RPD between the sample and its duplicate met the acceptance limits.

Technical Information

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

The samples in this SDG did not require re-analysis.

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.

Additional Comments

Additional comments were not required for this SDG.

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. 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.

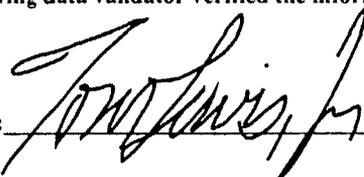
Certification Statement

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: 09Oct13

DATA EXCEPTION REPORT			
Mo. Day Yr. 01-OCT-13	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: ELECTRODE	Test / Method: SW846 9045C/9045D, SW846 9045D	Matrix Type: Solid	Client Code: ERMC, POEN, WCHN
Batch ID: 1334133	Sample Numbers: See below.		
Potentially affected work order(s)(SDG): 334029,334052,334067(XP0016)			
Application Issues: Sample received out of holding			
Specification and Requirements Exception Description:		DER Disposition:	
1. Sample received out of holding: 334029 001,002,003,004,005,006,007,008,009, 010 334052 001 334067 001,002		1. Samples were received out of holding.	

Originator's Name:
Lisa Gregory 01-OCT-13

Data Validator/Group Leader:
Julia Hamilton 02-OCT-13

22441

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST					RC-232-055		Page 1 of 1		
Collector DUNNUM, AJ		Company Contact Joan Kessner		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8C		Data Turnaround 15 Days	
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites		Sampling Location 600-374		SAF No. RC-232							
Ice Chest No. WCH-11-014		Field Logbook No. EL-1666-01		COA 0603742000		Method of Shipment Commerical Carrier		Fed Ex			
Shipped To GEL Laboratories, LLC		Offsite Property No. A120953				Bill of Lading/Air Bill No. See OSPC					
Other Labs Shipped To		Preservation		Cool 4C	Cool 4C	None	Cool 4C	Cool 4C			
NA		Type of Container		G/P	aG	G/P	aG	aG			
POSSIBLE SAMPLE HAZARDS/REMARKS None		No. of Container(s)		1	1	1	1	1			
		Volume		125mL	250mL	125mL	125mL	125mL			
Special Handling and/or Storage Cool 4C		Sample Analysis		See item (1) in Special Instructions	Pesticides - 8081	See item (2) in Special Instructions	Semi-VOA - 8270A (TCL)	PCBs - 8082			
Sample No.	Matrix	Sample Date	Sample Time								
J1T1V0	SOIL	9-23-13	0740	X	X	X	X	Y			
J1T1V1	SOIL	9-23-13	0740	X	X	X	X	Y			
J1T1V2	SOIL	9-23-13	0735	X					9-23-13 CMB		
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		(1) ICP Metals - 6010TR (Close-out List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7471 - (CV) (Mercury) (2) IC Anions - 9056 (Bromide, Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphorus in Phosphate, Sulfate); NO2/NO3 - 353.1 (Nitrogen in Nitrite and Nitrate); pH (Soil) - 9045 (pH Measurement)			
Joan Dunnum		9-23-13 0750		MABamburgh		9-23-13 16:25					
MABamburgh		9-23-13 16:30		CHARITALL CATHALL		9-23-13 16:30					
CHARITALL CATHALL		9-23-13 16:38		C. Bingham		9-23-13 16:38					
C. Bingham		9-23-13 10:20		1060 Battelle, Inc		9-23-13 10:20					
1060 Battelle, Inc		9-24-13 10:25		C. Bingham		9-24-13 10:20					
C. Bingham		9-24-13 10:25		Fed Ex							
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time					
1060 Battelle, Inc		9-23-13 0900		1060 Battelle, Inc		9-23-13 0900					
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time		XP0016			
WCH-EE-011											



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Appendix 5
Data Validation Supporting Documentation

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	600-374		DATA PACKAGE: XP0016		
VALIDATOR:	ELR	LAB: Gre	DATE: 10/22/13		
		SDG: XP0016			
ANALYSES PERFORMED					
Anions/IC	TOC	TOX	TPH-418.1	Oil and Grease	Alkalinity
Ammonia	BOD/COD	Chloride	Chromium-VI	pH	NO₃/NO₂
Sulfate	TDS	TKN	Phosphate		
SAMPLES/MATRIX					
JIT1U0 JIT1U1					
Soil					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? Yes No N/A

Comments: _____

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

Initial calibrations performed on all instruments? Yes No N/A

Initial calibrations acceptable? Yes No N/A

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: _____

GENERAL CHEMISTRY 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: NO PAs

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

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

Comments: NO PAs

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

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

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

Comments: _____

6. HOLDING TIMES (all levels)

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

Comments: pH nitrate nitrite & ortho >2A - J/UR cell

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

7. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

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

Comments: _____

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: October 4, 2013

Page 1 of 3

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

Contact:

Workorder: 334067

Client SDG: XP0016

Project Description: RC-232 Soil

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Electrode Analysis											
Batch	1334133										
QC1202955259	334067002	DUP									
pH		X	7.09	X	6.89	pH	2.86	(0%-10%)	LYG1	09/30/13	10:48
QC1202955260	LCS										
pH	7.00				7.00	pH	100	(99%-101%)		09/30/13	09:42
Ion Chromatography											
Batch	1333965										
QC1202954848	334067002	DUP									
Bromide		U	0.753	U	0.753	mg/kg	N/A ^		DM	09/25/13	20:38
Chloride			3.31		3.64	mg/kg	9.50 ^	(+/-2.25)			
Fluoride		B	0.959	B	1.06	mg/kg	9.60 ^	(+/-1.12)			
Nitrate-N			5.83		5.88	mg/kg	0.844	(0%-20%)			
Nitrite-N		U	0.371	U	0.371	mg/kg	N/A ^				
O-Phosphate as P			2.43		2.26	mg/kg	7.14 ^	(+/-2.25)			
Sulfate			11.3		13.5	mg/kg	17.5 ^	(+/-4.49)			
QC1202954850	LCS										
Bromide	12.5				12.4	mg/kg	99.1	(90%-110%)		09/25/13	19:04
Chloride	50.0				45.9	mg/kg	91.9	(90%-110%)			
Fluoride	25.0				23.6	mg/kg	94.3	(90%-110%)			
Nitrate-N	25.0				23.4	mg/kg	93.8	(90%-110%)			
Nitrite-N	25.0				23.9	mg/kg	95.6	(90%-110%)			
O-Phosphate as P	12.5				12.4	mg/kg	98.9	(90%-110%)			
Sulfate	100				95.6	mg/kg	95.6	(90%-110%)			
QC1202954847	MB										
Bromide		U		U	0.670	mg/kg				09/25/13	18:33

GEL LABORATORIES LLC

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

QC Summary

Workorder: 334067 Client SDG: XP0016 Project Description: RC-232 Soil Page 2 of 3

Paramname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anist	Date	Time
Ion Chromatography											
Batch	1333965										
Chloride			U	0.670	mg/kg					DM	09/25/13 18:33
Fluoride			U	0.330	mg/kg						
Nitrate-N			U	0.330	mg/kg						
Nitrite-N			U	0.330	mg/kg						
O-Phosphate as P			U	0.670	mg/kg						
Sulfate			U	1.33	mg/kg						
QC1202954849 334067002 MS											
Bromide	13.7	U	0.753	17.0	mg/kg		123	(70%-134%)		09/25/13	21:10
Chloride	55.0		3.31	55.1	mg/kg		94.2	(46%-150%)			
Fluoride	27.5	B	0.959	23.8	mg/kg		83.1	(34%-134%)			
Nitrate-N	27.5		5.83	36.1	mg/kg		110	(68%-129%)			
Nitrite-N	27.5	U	0.371	26.7	mg/kg		95.9	(68%-130%)			
O-Phosphate as P	13.7		2.43	16.0	mg/kg		98.6	(26%-124%)			
Sulfate	110		11.3	123	mg/kg		102	(50%-151%)			
Nutrient Analysis											
Batch	1334340										
QC1202955794 334067001 DUP											
Nitrogen, Nitrate/Nitrite			5.95	6.69	mg/kg	1.41		(0%-20%)	KLP1	10/01/13	12:16
QC1202955799 LCS											
Nitrogen, Nitrate/Nitrite	10.0			10.5	mg/kg		105	(90%-110%)		10/01/13	11:51
QC1202955792 MB											
Nitrogen, Nitrate/Nitrite			U	0.170	mg/kg					10/01/13	11:50
QC1202955797 334067001 MS											
Nitrogen, Nitrate/Nitrite	11.2		5.95	17.7	mg/kg		105	(75%-125%)		10/01/13	12:17

Notes: