

**SAF-RC-233**  
**100-IU-2 & 100-IU-6 Remaining**  
**Waste Sites – Soil In-Process**  
**FINAL DATA PACKAGE**

**COMPLETE COPY OF DATA PACKAGE TO:**

Kathy Wendt

H4-21

KW 10/29/13  
INITIAL/DATE

**COMMENTS:**

**SDG XP0022**

**SAF-RC-233**

Rad only

Chem only

Rad & Chem

Complete

Partial

**Sample Location: 600-279**



October 23, 2013

Joan Kessner  
WC-Hanford, Inc.  
2620 Fermi Avenue  
MSIN H4-21  
Richland, Washington 99354

Re: RC-233 Soil  
Work Order: 335330  
SDG: XP0022

Dear Joan Kessner:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on October 10, 2013. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 1616.

Sincerely,

Orlette Johnson  
Project Manager

Purchase Order: 1510  
Chain of Custody: RC-233-040  
Enclosures



## Table of Contents

Case Narrative.....	1
Chain of Custody and Supporting Documentation.....	3
Laboratory Certifications.....	6
Herbicide Analysis.....	8
Case Narrative.....	9
Sample Data Summary.....	15
Quality Control Summary.....	17
Miscellaneous.....	21
Metals Analysis.....	23
Case Narrative.....	24
Sample Data Summary.....	31
Quality Control Summary.....	35
Miscellaneous.....	44
General Chem Analysis.....	50
Case Narrative.....	51
Sample Data Summary.....	56
Quality Control Summary.....	59

# Case Narrative

**Receipt Narrative  
for  
WC-HANFORD, INC.  
SDG: XP0022  
Work Order: 335330**

**October 23, 2013**

**Laboratory Identification:**

GEL Laboratories LLC  
2040 Savage Road  
Charleston, South Carolina 29407  
(843) 556-8171

**Summary:**

**Sample receipt:** The sample arrived at GEL Laboratories LLC, Charleston, South Carolina on October 10, 2013 for analysis.

**Sample Identification:** The laboratory received the following sample:

<b><u>Laboratory ID</u></b>	<b><u>Client ID</u></b>
335330001	J1T3J3

**Case Narrative:**

Sample analyses were conducted using methodology as outlined in GEL's Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

The enclosed data package contains the following sections: Case Narrative, Chain of Custody, Cooler Receipt Checklist, Data Package Qualifier Definitions and data from the following fractions: GC Semivolatile Herbicide, General Chemistry and Metals.



Orlette Johnson  
Project Manager

# **Chain of Custody and Supporting Documentation**





SAMPLE RECEIPT & REVIEW FORM

Client: <u>WCHN</u>		SDG/AR/COC/Work Order: <u>335330</u>
Received By: <u>P. Nantz</u>		Date Received: <u>Oct 10, 2013</u>
Suspected Hazard Information	Yes	No
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>
Classified Radioactive II or III by RSO?		<input checked="" type="checkbox"/>
COC/Samples marked containing PCBs?		<input checked="" type="checkbox"/>
Package, COC, and/or Samples marked as beryllium or asbestos containing?		<input checked="" type="checkbox"/>
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>
Samples identified as Foreign Soil?		<input checked="" type="checkbox"/>

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe) <u>dc</u>
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: <u>Ice bags</u> Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: Secondary Temperature Device Serial # (If Applicable): <u>130462966</u>
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?		<input checked="" type="checkbox"/>		Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 VOA vials free of headspace (defined as < 6mm bubble)?		<input checked="" type="checkbox"/>		Sample ID's and containers affected:
7 Are Encore containers present?			<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
8 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
12 Are sample containers identifiable as GEL provided?		<input checked="" type="checkbox"/>		<u>clients</u>
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
14 Carrier and tracking number.	<input checked="" type="checkbox"/>			Circle Applicable: <u>FedEx Air</u> FedEx Ground UPS Field Services Courier Other <u>7968 7542 6750-2c</u>

Comments (Use Continuation Form if needed):

# **Laboratory Certifications**

**List of current GEL Certifications as of 23 October 2013**

<b>State</b>	<b>Certification</b>
Alaska	UST-110
Arkansas	88-0651
CLIA	42D0904046
California NELAP	01151CA
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC000122013-10
DoD ELAP A2LA ISO 17025	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-12-00283, P330-12-00284
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC000122013-10
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA130005
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC000122013-10
Nebraska	NE-OS-26-13
Nevada	SC000122013-2
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
Oklahoma	9904
Pennsylvania NELAP	68-00485
Plant Material Permit	PDEP-12-00260
South Carolina Chemistry	10120001
South Carolina Greenville	23611001
South Carolina Radiochemi	10120002
Tennessee	TN 02934
Texas NELAP	T104704235-13-8
Utah NELAP	SC000122013-10
Vermont	VT87156
Virginia NELAP	460202
Washington	C780-12
Wisconsin	999887790

# **Herbicide Analysis**

# Case Narrative

**Herbicide Case Narrative  
WC-HANFORD, INC. (WCHN)  
SDG XP0022**

**Method/Analysis Information**

**Procedure:** Analysis of Chlorophenoxy Acid Herbicides by ECD  
Analytical Method: SW846 8151A  
Prep Method: SW846 8151A  
Analytical Batch Number: 1339163  
Prep Batch Number: 1339162

**Sample Analysis**

The following samples were analyzed using the analytical protocol as established in SW846 8151A:

<b>Sample ID</b>	<b>Client ID</b>
335330001	J1T3J3
1202967854	Method Blank (MB)
1202967855	Laboratory Control Sample (LCS)
1202967856	335330001(J1T3J3) Matrix Spike (MS)
1202967857	335330001(J1T3J3) 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-011 REV# 20.

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

**Calibration Information**

**Initial Calibration**

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

**Continuing Calibration Verification (CCV) Requirements**

All Initial Calibration Verification (ICV) requirements have been met for this SDG. However, not all Calibration Verification Standards (CCV) requirements were met. MCPP failed acceptance criteria with a positive bias on one analytical column in the standards bracketing the samples in this SDG. The positive bias for the analytical data is a result of instrument response increasing after the initial calibration. Since the target analyte was not detected in the samples, the non-compliance had no adverse impact on the data. 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**

Samples 1202967856 (J1T3J3), 1202967857 (J1T3J3) and 335330001 (J1T3J3) did not meet surrogate recovery acceptance criteria. The samples were analyzed at a dilution due to high level of non-target analytes within the retention time window of the interests. As a result, the surrogate was diluted out of the acceptance criteria and the data were reported.

### **Laboratory Control Sample (LCS) Recovery**

The LCS(1202967855) did not meet spike recovery acceptance criteria for 2,4-DB and Dinoseb. Since 2,4-DB was not detected in the associated client sample, the biased high recovery in the LCS had no adverse impact on the data. The LCS recovered very low for Dinoseb due to extraction issue. The WCHN sample in this batch could not be re-extracted due to limited sample volume. The data were reported at the PM's instruction.

### **QC Sample Designation**

Sample 335330001 (J1T3J3) was selected for analysis as the matrix spike and matrix spike duplicate.

### **Matrix Spike (MS) Recovery Statement**

The MS(1202967856(J1T3J3)) did not meet spike recovery acceptance criteria for several spiked analytes. The MS and MSD were analyzed at a dilution due to high level of non-target analytes within the retention time window of the interests. As a result, some spike analytes were diluted out of the acceptance criteria and the data were reported.

### **Matrix Spike Duplicate (MSD) Recovery Statement**

The MSD(1202967857(J1T3J3)) did not meet spike recovery acceptance criteria for several spiked analytes. The MS and MSD were analyzed at a dilution due to high level of non-target analytes within the retention time window of the interests. As a result, some spike analytes were diluted out of the acceptance criteria and the data were reported.

### **MS/MSD Relative Percent Difference (RPD) Statement**

The RPD(s) between the MS and MSD met the acceptance limits.

## **Technical Information**

### **Holding Time Specifications**

All samples in this SDG met the specified holding time. 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 target analyte concentrations were confirmed on a dissimilar column.

### **Sample Dilutions**

Samples 1202967856 (J1T3J3), 1202967857 (J1T3J3) and 335330001 (J1T3J3) were diluted due to high concentrations of non-target analytes within the retention time window of interest.

### **Sample Re-extraction/Re-analysis**

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

## Miscellaneous Information

### **Electronic Package Comment**

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

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative 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.

### **Data Exception (DER) Documentation**

The following DER was generated for this SDG: 1232875.

### **Manual Integrations**

Some initial calibration standards, continuing calibration standards, and/or 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 Herbicide fraction.

### **Additional Comments**

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

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

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

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.

### **System Configuration**

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

<b>Instrument ID</b>	<b>Instrument</b>	<b>System Configuration</b>	<b>Column ID</b>	<b>Column Description</b>
ECD6A.I_1	Agilent 6890 Gas Chromatograph/Dual ECD w/ 7683 Autosampler	HP6890 Series GC/ECD	Rtx-CLP I	30m x 0.32mm, 0.50um (Rtx-CLPesticide)
ECD6A.I_2	Agilent 6890 Gas Chromatograph/Dual ECD w/ 7683 Autosampler	HP6890 Series GC/ECD	Rtx-CLP II	30m x 0.32mm, 0.50um (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**

<b>Mo.Day Yr.</b> 16-OCT-13	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> GC/ECD	<b>Test / Method:</b> SW846 8151A	<b>Matrix Type:</b> Solid	<b>Client Code:</b> WCHN
<b>Batch ID:</b> 1339163	<b>Sample Numbers:</b> See Below		

**Potentially affected work order(s)(SDG): 335330(XP0022)**

**Application Issues:**

- Failed Recovery for MS/PS
- Failed Recovery for LCS/LCSD
- Failed Yield for Surrogates
- Failed Recovery for MSD/PSD

**Specification and Requirements Exception Description:**

1. QC sample 1202967855(LCS) did not meet spike recovery acceptance criteria for 2,4-DB and Dinoseb.
2. Sample 335330001 and its matrix QC samples 1202967856(MS) and 1202967857(MSD) did not meet surrogate recovery acceptance criteria.
3. QC samples 1202967856(MS) and 1202967857(MSD) did not meet spike recovery acceptance criteria for several spiked analytes.

**DER Disposition:**

1. Since 2,4-DB was not detected in the associated client sample, the biased high recovery in the LCS had no adverse impact on the data. The LCS recovered very low for Dinoseb due to extraction issue. The WCHN sample in this batch could not be re-extracted due to limited sample volume. The data were reported at the PM's instruction.
2. The samples were analyzed at a dilution due to high level of non-target analytes within the retention time window of the interests. As a result, the surrogate was diluted out of the acceptance criteria and the data were reported.
3. The MS and MSD were analyzed at a dilution due to high level of non-target analytes within the retention time window of the interests. As a result, some spike analytes were diluted out of the acceptance criteria and the data were reported.

**Originator's Name:**

Lloyd O Fox                      16-OCT-13

**Data Validator/Group Leader:**

Barbara Bailey                      24-OCT-13

# **Sample Data Summary**

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: October 24, 2013

Company : WC-Hanford, Inc.  
 Address : 2620 Fermi Avenue  
 MSIN H4-21  
 Richland, Washington 99354  
 Contact: Joan Kessner  
 Project: RC-233 Soil

Client SDG: XP0022

Client Sample ID: J1T3J3  
 Sample ID: 335330001  
 Matrix: SOIL  
 Collect Date: 08-OCT-13 08:16  
 Receive Date: 10-OCT-13  
 Collector: Client  
 Moisture: 7.55%

Project: WCHN00313  
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-HERB											
8151A Herbicides Soil "Dry Weight Corrected"											
2,4,5-T	DU	17.9	17.9	54.1	ug/kg	10	RXE1	10/16/13	1851	1339163	1
2,4,5-TP	DU	17.9	17.9	54.1	ug/kg	10					
2,4-D	DTU	17.9	17.9	54.1	ug/kg	10					
2,4-DB	DTU	17.9	17.9	54.1	ug/kg	10					
Dalapon	DTU	378	378	1080	ug/kg	10					
Dicamba	DU	21.6	21.6	54.1	ug/kg	10					
Dichlorprop	DTU	24.4	24.4	54.1	ug/kg	10					
Dinoseb	DTU	17.9	17.9	54.1	ug/kg	10					
MCPA	DTU	2490	2490	10800	ug/kg	10					
MCP	DTU	2160	2160	10800	ug/kg	10					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8151A	8151A Herbicides Prep in Soil	MXS4	10/15/13	1730	1339162

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8151A	
2	SW846 8151A	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
2,4-Dichlorophenylacetic acid	8151A Herbicides Soil "Dry Weight Corrected"	237 ug/kg	108	219*	(38%-142%)

**Notes:**

# **Quality Control Summary**

# GEL LABORATORIES LLC

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

## QC Summary

Report Date: October 24, 2013

Page 1 of 3

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

**Workorder: 335330**

**Client SDG: XP0022**

**Project Description: RC-233 Soil**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Semi-Volatiles-HERB</b>											
Batch	1339163										
QC1202967855	LCS										
2,4,5-T	40.0			44.3	ug/kg		111	(52%-137%)	RXE1	10/16/13	18:24
2,4,5-TP	40.0			40.8	ug/kg		102	(58%-133%)			
2,4-D	40.0			42.8	ug/kg		107	(53%-139%)			
2,4-DB	40.0		P	65.5	ug/kg		164 *	(61%-139%)			
Dalapon	400			330	ug/kg		82.6	(39%-113%)			
Dicamba	40.0			39.7	ug/kg		99.5	(54%-118%)			
Dichlorprop	40.0			42.6	ug/kg		107	(59%-126%)			
Dinoseb	40.0		J	1.77	ug/kg		4.43 *	(39%-94%)			
MCPA	4000			3620	ug/kg		90.7	(60%-120%)			
MCPP	4000			4430	ug/kg		111	(50%-123%)			
**2,4-Dichlorophenylacetic acid	99.9			108	ug/kg		108	(38%-142%)			
 QC1202967854 MB											
2,4,5-T			U	1.66	ug/kg					10/16/13	17:56
2,4,5-TP			U	1.66	ug/kg						
2,4-D			U	1.66	ug/kg						
2,4-DB			U	1.66	ug/kg						
Dalapon			U	35.0	ug/kg						
Dicamba			U	2.00	ug/kg						
Dichlorprop			U	2.26	ug/kg						
Dinoseb			U	1.66	ug/kg						

# GEL LABORATORIES LLC

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

## QC Summary

Workorder: 335330

Client SDG: XP0022

Project Description: RC-233 Soil

Page 2 of 3

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Semi-Volatiles-HERB</b>											
Batch	1339163										
MCPA			U	230	ug/kg						
MCPP			U	200	ug/kg				RXE1	10/16/13	17:56
**2,4-Dichlorophenylacetic acid	99.9			91.6	ug/kg		91.7	(38%-142%)			
QC1202967856 335330001 MS											
2,4,5-T	43.2	DU	17.9 DJ	49.2	ug/kg		114	(45%-131%)		10/16/13	19:18
2,4,5-TP	43.2	DU	17.9 DJ	38.2	ug/kg		88.3	(49%-135%)			
2,4-D	43.2	DTU	17.9 DTU	17.9	ug/kg		0*	(53%-135%)			
2,4-DB	43.2	DTU	17.9 DTU	17.9	ug/kg		0*	(61%-139%)			
Dalapon	432	DTU	378 DTU	378	ug/kg		0*	(30%-113%)			
Dicamba	43.2	DU	21.6 DJ	47.9	ug/kg		111	(48%-124%)			
Dichlorprop	43.2	DTU	24.4 DTU	24.4	ug/kg		0*	(46%-138%)			
Dinoseb	43.2	DTU	17.9 DJ	53.4	ug/kg		124	(25%-130%)			
MCPA	4320	DTU	2490 DTU	2480	ug/kg		0*	(50%-133%)			
MCPP	4320	DTU	2160 DTU	2160	ug/kg		0*	(47%-123%)			
**2,4-Dichlorophenylacetic acid	108		237	2720	ug/kg		2510*	(38%-142%)			
QC1202967857 335330001 MSD											
2,4,5-T	43.3	DU	17.9 D	55.0	ug/kg	11.1	127	(0%-32%)		10/16/13	19:45
2,4,5-TP	43.3	DU	17.9 DJ	51.2	ug/kg	29.2	118	(0%-31%)			
2,4-D	43.3	DTU	17.9 DTU	18.0	ug/kg	N/A	0*	(0%-70%)			
2,4-DB	43.3	DTU	17.9 DTU	18.0	ug/kg	N/A	0*	(0%-27%)			
Dalapon	433	DTU	378 DTU	379	ug/kg	N/A	0*	(0%-18%)			
Dicamba	43.3	DU	21.6 DJ	44.3	ug/kg	7.92	102	(0%-41%)			
Dichlorprop	43.3	DTU	24.4 DTU	24.4	ug/kg	N/A	0*	(0%-40%)			
Dinoseb	43.3	DTU	17.9 DJ	46.5	ug/kg	13.8	108	(0%-169%)			

# GEL LABORATORIES LLC

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

## QC Summary

Workorder: 335330

Client SDG: XP0022

Project Description: RC-233 Soil

Page 3 of 3

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Semi-Volatiles-HERB</b>											
Batch	1339163										
MCPA	4330	DTU	2490 DTU	2490	ug/kg	N/A	0*	(0%-38%)	RXE1	10/16/13	19:45
MCPP	4330	DTU	2160 DTU	2160	ug/kg	N/A	0*	(0%-30%)			
**2,4-Dichlorophenylacetic acid	108		237	445	ug/kg		412*	(38%-142%)			

**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.

# Miscellaneous

# Prep Logbook

## The Extraction of Herbicides from Soil and Sludge Samples

**Batch ID:** 1339162      **Verified by:** \_\_\_\_\_  
**Analyst:** Matthew Selepack  
**Method:** SW846 8151A

**Lab SOP:** GL-OA-E-027 REV# 14  
**Instrument:** Semi-Volatiles Manual

Sample ID	Run Date	Aliquot (g)	Initial pH	Int Ext pH	Sec Ext pH	Prepped Aliquot (mL)	Prepped Factor (mL/g)
1202967854 MB	15-OCT-2013 17:30:00	50.03	3	2	0	10	0.19988
1202967855 LCS	15-OCT-2013 17:30:00	50.05	3	2	0	10	0.1998
335330001	15-OCT-2013 17:30:00	50.03	5	2	0	10	0.19988
1202967856 MS (335330001)	15-OCT-2013 17:30:00	50.06	5	2	0	10	0.19976
1202967857 MSD (335330001)	15-OCT-2013 17:30:00	50.01	5	2	0	10	0.19996

Type	Sample Id	Description	Serial Number	Spike Amt	Units	Comments:
LCS	1202967855	HERBICIDE LCS	WE130925-04	1	mL	The sample and its QC has a very strong sulfur odor. Clean up Date: 16-OCT-2013 13:56:25 Hydrolysis Analyst: Sharlene Robinson Hydrolysis Date: 16-OCT-2013 13:56:25 Verified By: AV Final Solvent: Hexane
MS	1202967856	HERBICIDE LCS	WE130925-04	1	mL	
MSD	1202967857	HERBICIDE LCS	WE130925-04	1	mL	
SURR	All	HERBICIDE SURROGATE	WE130925-03	.05	mL	
REGNT	All	Acetone	130918-B1	20	mL	
REGNT	All	Hexane	130918-B4	54	mL	
REGNT	All	37g KOH to 100mL DI H2O	130923A	5	mL	
REGNT	All	Iso-octane	1950022-A	1	mL	
REGNT	All	acidified sodium sulfate	1952499	50	g	
REGNT	All	Methylene Chloride	1966518-D	280	mL	
REGNT	All	Sulfuric Acid Sol., 12N For Herbicides	1971186	17	mL	
REGNT	All	Methanol	1971394-C	.5	mL	
REGNT	All	N-METHYL-N-NITROSO-P-TOLUENESULFON-AMIDE	1971623C	2	mL	
REGNT	All	Ethyl ether	UN1969652a	80	mL	
WORK	All	HERBICIDE SURROGATE	WE130925-03	.05	mL	

# **Metals Analysis**

# Case Narrative

**Metals Fractional Narrative  
WC-HANFORD, INC. (WCHN)  
SDG XP0022**

**Sample Analysis**

<b>Sample ID</b>	<b>Client ID</b>
335330001	J1T3J3
1202965586	Method Blank (MB) <b>ICP</b>
1202968172	Method Blank (MB) <b>ICP</b>
1202965587	Laboratory Control Sample (LCS)
1202968173	Laboratory Control Sample (LCS)
1202965590	335330001(J1T3J3L) Serial Dilution (SD)
1202965588	335330001(J1T3J3D) Sample Duplicate (DUP)
1202965589	335330001(J1T3J3S) Matrix Spike (MS)
1202966862	335330001(J1T3J3PS) Post Spike (PS)
1202965581	Method Blank (MB) <b>ICP-MS</b>
1202965582	Laboratory Control Sample (LCS)
1202965585	335330001(J1T3J3L) Serial Dilution (SD)
1202965583	335330001(J1T3J3D) Sample Duplicate (DUP)
1202965584	335330001(J1T3J3S) Matrix Spike (MS)
1202966497	Method Blank (MB) <b>CVAA</b>
1202966498	Laboratory Control Sample (LCS)
1202966501	335330001(J1T3J3L) Serial Dilution (SD)
1202966499	335330001(J1T3J3D) Sample Duplicate (DUP)
1202966500	335330001(J1T3J3S) Matrix Spike (MS)

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

**Method/Analysis Information**

<b>Analytical Batch:</b>	1338228, 1339278, 1338226 and 1338656
<b>Prep Batch :</b>	1338227, 1339277, 1338225 and 1338650
<b>Standard Operating Procedures:</b>	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
<b>Analytical Method:</b>	SW846 3050B/6010C, SW846 3050B/6020A and SW846 7471B
<b>Prep Method :</b>	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 4300 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 360+/-7 kPa for the plasma and auxiliary gases, and 0.85 L/min carrier gas flow, and an initial lens voltage of 5.2.

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

### **Calibration Information**

#### **Instrument Calibration**

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

#### **CRDL Requirements**

The PQL standard recoveries met the advisory control limits except for antimony and iron in file 101413-1. The PQL standard recovered high for antimony and iron; however the client sample concentration for antimony was less than the MDL and greater than two times the PQL for iron.

#### **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. Nickel and silicon were detected in the method blank (1202965586) below the RL; however sample concentrations for these analytes were greater than five times the results in the method blank.

#### **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: 335330001 (J1T3J3)-ICP, ICP-MS and CVAA.

#### **Matrix Spike (MS) Recovery Statement**

The percent recoveries (%R) obtained from the MS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The MS did not meet all the recommended quality control acceptance criteria for percent recoveries for applicable analytes. Manganese and silicon recoveries were not within the acceptance limits in sample 1202965589 (J1T3J3)-ICP. See data exception report (DER ID 1232301) behind the case narrative in this data package.

#### **Duplicate Relative Percent Difference (RPD) Statement**

The relative percent difference (RPD) obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required reporting limit (RL). In cases where either the sample or duplicate value is less than 5X the contract required detection limit (RL), a control of +/-RL is used to evaluate the DUP results. Not all the applicable analytes met these requirements. The RPD value for silicon was not within the acceptance criteria in sample 1202965588 (J1T3J3)-ICP. See data exception report (DER ID 1232301) behind the case narrative in this data package.

#### **Post Spike (PS) Recovery Statement**

The percent recoveries (%R) obtained from the PS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The PS did not meet the recommended quality control acceptance criteria for percent recoveries for silicon and verifies the presence of matrix interferences. See data exception report (DER ID 1232301) behind the case narrative in this data package.

#### **Serial Dilution % Difference Statement**

The serial dilution is used to assess matrix suppression or enhancement. Raw element concentrations 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 instruments. Dilutions were required for this SDG in order to minimize suppression due to matrix interferences. Sample 335330001 (J1T3J3)-ICP was diluted because silver was suppressed. Samples in this SDG were diluted the standard 2x for solids on the ICPMS.

### **Preparation Information**

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

## **Miscellaneous Information**

### **Electronic Packaging Comment**

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

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

### **Data Exception (DER) Documentation**

Data exception reports are generated to document any procedural anomalies that may deviate

from referenced SOP or contractual documents. Data exception report (DER ID 1232301) was generated for this SDG.

**Additional Comments**

Additional comments were not required for this SDG.

**Certification Statement**

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

**Review Validation:**

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

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

Reviewer: Pat Steele Date: 10/23/2013

**DATA EXCEPTION REPORT**

<b>Mo.Day Yr.</b> 16-OCT-13	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> ICP	<b>Test / Method:</b> SW846 3050B/6010C	<b>Matrix Type:</b> Solid	<b>Client Code:</b> WCHN
<b>Batch ID:</b> 1338228	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 335330(XP0022)</b>			
<b>Application Issues:</b> Failed Recovery for MS/PS Failed RPD for DUP			
<b>Specification and Requirements Exception Description:</b>		<b>DER Disposition:</b>	
<p>1. Failed Recovery for MS/PS: QC 1202965589MS,1202966862PS</p> <p>2. Failed RPD for DUP: QC 1202965588DUP</p>		<p>1. The matrix spike recovery failed outside of the control limits for manganese and silicon. The post spike failed outside the required control limits for silicon but passed for all other analytes. This verifies the presence of a matrix interference for silicon and verifies the absence of a matrix interference for all the other analytes. Per GEL's accredited methods and SOPs, a corrective action is not required and the data is qualified and reported.</p> <p>2. The sample and sample duplicate % RPD failed outside the control limits for silicon due to possible sample non-homogeneity and/or matrix interference. Per GEL's accredited methods and SOPs, a corrective action is not required and the data is qualified and reported.</p> <p>Sample #335330001 consist of yellow/black sand.</p>	

**Originator's Name:**

Helen Camello 16-OCT-13

**Data Validator/Group Leader:**

Theresa McKelvey 16-OCT-13

# **Sample Data Summary**

# GEL LABORATORIES LLC

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

## Qualifier Definition Report for

WCHN001 WC-HANFORD, INC.

Client SDG: XP0022 GEL Work Order: 335330 Project: RC-233 Soil

### The Qualifiers in this report are defined as follows:

\* Duplicate analysis not within control limits

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  $\leq 5$  times the blank concentration.

D Results are reported from a diluted aliquot of sample.

N Spike 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.

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 Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Orlette Johnson.

Reviewed by

Pat Steel 10/23/2013

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: October 22, 2013

Company : WC-Hanford, Inc.  
 Address : 2620 Fermi Avenue  
 MSIN H4-21  
 Richland, Washington 99354  
 Contact: Joan Kessner  
 Project: RC-233 Soil

Client SDG: XP0022

Client Sample ID: J1T3J3	Project: WCHN00313
Sample ID: 335330001	Client ID: WCHN001
Matrix: SOIL	
Collect Date: 08-OCT-13 08:16	
Receive Date: 10-OCT-13	
Collector: Client	
Moisture: 7.55%	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Mercury Analysis-CVAA</b>											
<b>SW846 7471B Mercury in Solid "Dry Weight Corrected"</b>											
Mercury	B	0.00911	0.00424	0.0127	mg/kg	1	NOR1	10/15/13	1102	1338656	1
<b>Metals Analysis-ICP</b>											
<b>ICP METALS 6010TR Client List "Dry Weight Corrected"</b>											
Aluminum		5670	6.43	18.9	mg/kg	1	HSC	10/14/13	1224	1338228	2
Antimony	U	0.312	0.312	0.946	mg/kg	1					
Arsenic		3.26	0.473	2.84	mg/kg	1					
Barium		33.2	0.0946	0.473	mg/kg	1					
Beryllium	B	0.332	0.0946	0.473	mg/kg	1					
Boron	B	3.82	0.946	4.73	mg/kg	1					
Cadmium	U	0.0946	0.0946	0.473	mg/kg	1					
Calcium		17300	7.56	23.6	mg/kg	1					
Chromium		8.57	0.142	0.473	mg/kg	1					
Cobalt		6.57	0.142	0.473	mg/kg	1					
Iron		17600	7.56	23.6	mg/kg	1					
Lead		3.72	0.312	0.946	mg/kg	1					
Magnesium		3230	8.04	28.4	mg/kg	1					
Manganese	N	175	0.189	0.946	mg/kg	1					
Molybdenum	B	0.903	0.189	0.946	mg/kg	1					
Nickel		7.47	0.142	0.473	mg/kg	1					
Potassium		993	6.05	23.6	mg/kg	1					
Silicon	*N	346	1.42	9.46	mg/kg	1					
Sodium		438	6.62	23.6	mg/kg	1					
Vanadium		41.5	0.0946	0.473	mg/kg	1					
Zinc		31.3	0.378	0.946	mg/kg	1					
Silver	DU	0.473	0.473	2.36	mg/kg	5	HSC	10/14/13	1256	1338228	3
Copper		15.5	0.281	0.937	mg/kg	1	HSC	10/16/13	1627	1339278	4
<b>Metals Analysis-ICP-MS</b>											
<b>SW846 3050B/6020A Selenium "Dry Weight Corrected"</b>											
Selenium	DU	0.335	0.335	1.02	mg/kg	2	SKJ	10/14/13	1924	1338226	5

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	AXG2	10/14/13	0830	1338225
SW846 3050B	SW846 3050B Prep for 6010C	AXG2	10/14/13	0900	1338227
SW846 3050B	SW846 3050B Prep for 6010C	AXG2	10/16/13	1030	1339277

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: October 22, 2013

Company : WC-Hanford, Inc.  
Address : 2620 Fermi Avenue  
MSIN H4-21  
Richland, Washington 99354  
Contact: Joan Kessner  
Project: RC-233 Soil

Client SDG: XP0022

Client Sample ID: J1T3J3  
Sample ID: 335330001

Project: WCHN00313  
Client ID: WCHN001

---

SW846 7471B Prep      SW846 7471B Mercury Prep Soil      AXS5      10/14/13      1704      1338650

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 7471B	
2	SW846 3050B/6010C	
3	SW846 3050B/6010C	
4	SW846 3050B/6010C	
5	SW846 3050B/6020A	

**Notes:**

# **Quality Control Summary**

# GEL LABORATORIES LLC

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

## QC Summary

Report Date: October 23, 2013

Page 1 of 8

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

**Workorder: 335330**

**Client SDG: XP0022**

**Project Description: RC-233 Soil**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1338226										
QC1202965583	335330001	DUP									
Selenium		DU	0.335	DU	0.315	mg/kg	N/A ^		SKJ	10/14/13	19:30
QC1202965582	LCS										
Selenium	4.59		D	4.27	mg/kg		93	(80%-120%)		10/14/13	19:06
QC1202965581	MB										
Selenium			DU	0.319	mg/kg					10/14/13	19:00
QC1202965584	335330001	MS									
Selenium	4.66	DU	0.335	D	4.53	mg/kg	97.2	(75%-125%)		10/14/13	19:36
QC1202965585	335330001	SDILT									
Selenium		DU	-0.174	DU	1.68	ug/L	N/A	(0%-10%)		10/14/13	19:48
<b>Metals Analysis-ICP</b>											
Batch	1338228										
QC1202965588	335330001	DUP									
Aluminum			5670		4990	mg/kg	12.7	(0%-20%)	HSC	10/14/13	12:27
Antimony		U	0.312	U	0.349	mg/kg	N/A ^				
Arsenic			3.26	B	2.21	mg/kg	38.3 ^	(+/-3.18)			
Barium			33.2		36.3	mg/kg	8.95	(0%-20%)			
Beryllium		B	0.332	B	0.285	mg/kg	15.2 ^	(+/-0.529)			
Boron		B	3.82	B	3.50	mg/kg	8.91 ^	(+/-5.29)			
Cadmium		U	0.0946	U	0.106	mg/kg	N/A ^				
Calcium			17300		15100	mg/kg	13.5	(0%-20%)			
Chromium			8.57		8.84	mg/kg	3.16	(0%-20%)			
Cobalt			6.57		5.97	mg/kg	9.54	(0%-20%)			
Iron			17600		15200	mg/kg	14.3	(0%-20%)			
Lead			3.72		3.38	mg/kg	9.43 ^	(+/-1.06)			

# GEL LABORATORIES LLC

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

## QC Summary

Workorder: 335330

Client SDG: XP0022

Project Description: RC-233 Soil

Page 2 of 8

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1338228										
Magnesium		3230		3080	mg/kg	4.66		(0%-20%)	HSC	10/14/13	12:27
Manganese	N	175		161	mg/kg	8.23		(0%-20%)			
Molybdenum	B	0.903	B	0.934	mg/kg	3.42	^	(+/-1.06)			
Nickel		7.47		6.90	mg/kg	7.93		(0%-20%)			
Potassium		993		904	mg/kg	9.36		(0%-20%)			
Silicon	*N	346	*	426	mg/kg	20.6*		(0%-20%)			
Silver	DU	0.473	DU	0.529	mg/kg	N/A	^			10/14/13	12:59
Sodium		438		389	mg/kg	11.9		(0%-20%)		10/14/13	12:27
Vanadium		41.5		40.3	mg/kg	3.16		(0%-20%)			
Zinc		31.3		25.9	mg/kg	18.8		(0%-20%)			
QC1202965587	LCS										
Aluminum	481			504	mg/kg		105	(80%-120%)		10/14/13	12:22
Antimony	48.1			47.9	mg/kg		99.5	(80%-120%)			
Arsenic	48.1			50.6	mg/kg		105	(80%-120%)			
Barium	48.1			50.3	mg/kg		105	(80%-120%)			
Beryllium	48.1			51.3	mg/kg		107	(80%-120%)			
Boron	48.1			49.7	mg/kg		103	(80%-120%)			
Cadmium	48.1			51.2	mg/kg		106	(80%-120%)			
Calcium	481			503	mg/kg		105	(80%-120%)			
Chromium	48.1			49.7	mg/kg		103	(80%-120%)			
Cobalt	48.1			50.6	mg/kg		105	(80%-120%)			
Iron	481			507	mg/kg		105	(80%-120%)			

# GEL LABORATORIES LLC

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

## QC Summary

Workorder: 335330

Client SDG: XP0022

Project Description: RC-233 Soil

Page 3 of 8

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1338228										
Lead	48.1			51.3	mg/kg		107	(80%-120%)	HSC	10/14/13	12:22
Magnesium	481			515	mg/kg		107	(80%-120%)			
Manganese	48.1			50.0	mg/kg		104	(80%-120%)			
Molybdenum	48.1			48.9	mg/kg		102	(80%-120%)			
Nickel	48.1			51.1	mg/kg		106	(80%-120%)			
Potassium	481			496	mg/kg		103	(80%-120%)			
Silicon	481			458	mg/kg		95.3	(80%-120%)			
Silver	48.1			50.1	mg/kg		104	(80%-120%)			
Sodium	481			501	mg/kg		104	(80%-120%)			
Vanadium	48.1			49.5	mg/kg		103	(80%-120%)			
Zinc	48.1			51.3	mg/kg		107	(80%-120%)			
QC1202965586	MB										
Aluminum			U	6.43	mg/kg					10/14/13	12:19
Antimony			U	0.312	mg/kg						
Arsenic			U	0.473	mg/kg						
Barium			U	0.0945	mg/kg						
Beryllium			U	0.0945	mg/kg						
Boron			U	0.945	mg/kg						
Cadmium			U	0.0945	mg/kg						
Calcium			U	7.56	mg/kg						
Chromium			U	0.142	mg/kg						
Cobalt			U	0.142	mg/kg						

# GEL LABORATORIES LLC

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

## QC Summary

Workorder: 335330

Client SDG: XP0022

Project Description: RC-233 Soil

Page 4 of 8

Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1338228										
Iron			U	7.56	mg/kg				HSC	10/14/13	12:19
Lead			U	0.312	mg/kg						
Magnesium			U	8.03	mg/kg						
Manganese			U	0.189	mg/kg						
Molybdenum			U	0.189	mg/kg						
Nickel			B	0.161	mg/kg						
Potassium			U	6.05	mg/kg						
Silicon			B	1.50	mg/kg						
Silver			U	0.0945	mg/kg						
Sodium			U	6.62	mg/kg						
Vanadium			U	0.0945	mg/kg						
Zinc			U	0.378	mg/kg						
QC1202965589 335330001 MS											
Aluminum	531	5670		5810	mg/kg		N/A	(75%-125%)		10/14/13	12:29
Antimony	53.1	U	0.312	47.7	mg/kg		89.9	(75%-125%)			
Arsenic	53.1		3.26	56.2	mg/kg		99.6	(75%-125%)			
Barium	53.1		33.2	91.0	mg/kg		109	(75%-125%)			
Beryllium	53.1	B	0.332	53.4	mg/kg		99.9	(75%-125%)			
Boron	53.1	B	3.82	55.3	mg/kg		97	(75%-125%)			
Cadmium	53.1	U	0.0946	52.3	mg/kg		98.4	(75%-125%)			
Calcium	531	17300		15800	mg/kg		N/A	(75%-125%)			
Chromium	53.1	8.57		60.2	mg/kg		97.2	(75%-125%)			

# GEL LABORATORIES LLC

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

## QC Summary

Workorder: 335330

Client SDG: XP0022

Project Description: RC-233 Soil

Page 5 of 8

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1338228										
Cobalt	53.1	6.57		59.0	mg/kg		98.7	(75%-125%)	HSC	10/14/13	12:29
Iron	531	17600		17700	mg/kg		N/A	(75%-125%)			
Lead	53.1	3.72		55.5	mg/kg		97.5	(75%-125%)			
Magnesium	531	3230		3820	mg/kg		N/A	(75%-125%)			
Manganese	53.1	N	175	N	252	mg/kg	144*	(75%-125%)			
Molybdenum	53.1	B	0.903		52.3	mg/kg	96.7	(75%-125%)			
Nickel	53.1		7.47		60.7	mg/kg	100	(75%-125%)			
Potassium	531		993		1540	mg/kg	103	(75%-125%)			
Silicon	531	*N	346	N	695	mg/kg	65.6*	(75%-125%)			
Silver	53.1	DU	0.473	D	53.6	mg/kg	101	(75%-125%)		10/14/13	13:01
Sodium	531		438		976	mg/kg	101	(75%-125%)		10/14/13	12:29
Vanadium	53.1		41.5		93.5	mg/kg	97.8	(75%-125%)			
Zinc	53.1		31.3		80.5	mg/kg	92.6	(75%-125%)			
QC1202966862 335330001 PS											
Manganese	500	N	1850		2360	ug/L	103	(80%-120%)		10/14/13	12:54
Silicon	5000	*N	3660		7100	ug/L	68.7*	(80%-120%)			
QC1202965590 335330001 SDILT											
Aluminum			59900	D	12400	ug/L	3.17	(0%-10%)		10/14/13	12:32
Antimony		U	-4.78	D	9.67	ug/L	N/A	(0%-10%)			
Arsenic			34.5	D	11.5	ug/L	66.3	(0%-10%)			
Barium			351	D	73.5	ug/L	4.49	(0%-10%)			
Beryllium		B	3.51	D	1.02	ug/L	45.5	(0%-10%)			
Boron		B	40.4	D	10.1	ug/L	25.5	(0%-10%)			

# GEL LABORATORIES LLC

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

## QC Summary

Workorder: 335330

Client SDG: XP0022

Project Description: RC-233 Soil

Page 6 of 8

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1338228										
Cadmium		U	-4.71	DU	0.473	ug/L	N/A	(0%-10%)	HSC	10/14/13	12:32
Calcium			183000	D	38400	ug/L	5.04	(0%-10%)			
Chromium			90.6	D	18.2	ug/L	.639	(0%-10%)			
Cobalt			69.5	D	14.8	ug/L	6.44	(0%-10%)			
Iron			186000	D	39000	ug/L	4.89	(0%-10%)			
Lead			39.3	D	9.10	ug/L	15.6	(0%-10%)			
Magnesium			34100	D	7230	ug/L	5.84	(0%-10%)			
Manganese		N	1850	D	393	ug/L	6.2	(0%-10%)			
Molybdenum		B	9.55	D	4.54	ug/L	138	(0%-10%)			
Nickel			79.0	D	16.0	ug/L	1.53	(0%-10%)			
Potassium			10500	D	2190	ug/L	4.05	(0%-10%)			
Silicon		*N	3660	D	795	ug/L	8.61	(0%-10%)			
Silver		DU	-2.39	DU	2.36	ug/L	N/A	(0%-10%)		10/14/13	13:05
Sodium			4630	D	991	ug/L	6.92	(0%-10%)		10/14/13	12:32
Vanadium			439	D	90.8	ug/L	3.29	(0%-10%)			
Zinc			331	D	68.6	ug/L	3.71	(0%-10%)			
Batch	1339278										
QC1202965588	335330001	DUP									
Copper			15.5		15.8	mg/kg	2.13	(0%-20%)	HSC	10/16/13	16:29
QC1202968173	LCS										
Copper			48.4		51.8	mg/kg	107	(80%-120%)		10/16/13	16:24
QC1202968172	MB										
Copper				U	0.260	mg/kg				10/16/13	16:21
QC1202965589	335330001	MS									

# GEL LABORATORIES LLC

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

## QC Summary

**Workorder:** 335330

**Client SDG:** XP0022

**Project Description:** RC-233 Soil

**Page 7 of 8**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1339278										
Copper	46.1	15.5		63.7	mg/kg		105	(75%-125%)		10/16/13	16:31
QC1202965590	335330001 SDILT										
Copper		165	D	30.8	ug/L	6.98		(0%-10%)	HSC	10/16/13	16:34
<b>Metals Analysis-Mercury</b>											
Batch	1338656										
QC1202966499	335330001 DUP										
Mercury		B	0.00911	B	0.00818	mg/kg	10.8 ^	(+/-0.0126)	NOR1	10/15/13	11:03
QC1202966498	LCS										
Mercury	0.115				0.118	mg/kg	103	(80%-120%)		10/15/13	10:50
QC1202966497	MB										
Mercury			U		0.0039	mg/kg				10/15/13	10:48
QC1202966500	335330001 MS										
Mercury	0.129	B	0.00911		0.144	mg/kg	105	(80%-120%)		10/15/13	11:08
QC1202966501	335330001 SDILT										
Mercury		B	0.144	DU	0.0212	ug/L	N/A	(0%-10%)		10/15/13	11:12

**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

# GEL LABORATORIES LLC

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

## QC Summary

Workorder: 335330

Client SDG: XP0022

Project Description: RC-233 Soil

Page 8 of 8

<u>Parmname</u>	<u>NOM</u>	<u>Sample Qual</u>	<u>QC</u>	<u>Units</u>	<u>RPD/D%</u>	<u>REC%</u>	<u>Range</u>	<u>Anlst</u>	<u>Date</u>	<u>Time</u>
-----------------	------------	--------------------	-----------	--------------	---------------	-------------	--------------	--------------	-------------	-------------

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.

# Miscellaneous

# Prep Logbook

## Acid Digestion of Sediments, Sludges, and Soils

<b>Batch ID:</b> 1338227.0	Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
Analyst: Anthony Green	LCS	1202965587	Metals Spike Mix I	UI1943364-01	.25	mL
Method: SW846 3050B	LCS	1202965587	Metals Spike Mix II	UI1943367-06	.25	mL
Lab SOP: GL-MA-E-009 REV# 22	MS	1202965589	Metals Spike Mix I	UI1943364-01	.25	mL
Instrument: BAL-001	MS	1202965589	Metals Spike Mix II	UI1943367-06	.25	mL

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)
1202965586 MB	14-OCT-2013 09:00:21	Soil	0.529	50	94.51796
1202965587 LCS	14-OCT-2013 09:00:21	Soil	0.52	50	96.15385
335330001	14-OCT-2013 09:00:21	Soil	0.572	50	87.41259
1202965588 DUP (335330001)	14-OCT-2013 09:00:21	Soil	0.511	50	97.84736
1202965589 MS (335330001)	14-OCT-2013 09:00:21	Soil	0.509	50	98.23183
1202965590 SDILT (335330001)	14-OCT-2013 09:00:21	Soil	0.572	50	87.41259

Reagent/Solvent Lot ID	Description	Amount	Comments:
1961850	Concentrated Nitric Acid	1.25 mL	Block Temperature: 94 C
1961852	HYDROCHLORIC ACID	10 mL	Thermometer ID: 118680
			Hot Block ID: 14
			Sample 335330001 consist of yellow/black sand.

# Prep Logbook

## Acid Digestion of Sediments, Sludges, and Soils

<b>Batch ID:</b> 1339277.0	Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
Analyst: Anthony Green	LCS	1202968173	Metals Spike Mix I	UI1943364-01	.25	mL
Method: SW846 3050B	LCS	1202968173	Metals Spike Mix II	UI1943367-06	.25	mL
Lab SOP: GL-MA-E-009 REV# 22	MS	1202965589	Metals Spike Mix I	UI1943364-01	.25	mL
Instrument: BAL-001	MS	1202965589	Metals Spike Mix II	UI1943367-06	.25	mL

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)
1202968172 MB	16-OCT-2013 10:30:00	Soil	0.578	50	86.50519
1202968173 LCS	16-OCT-2013 10:30:00	Soil	0.517	50	96.7118
335330001 - 2	16-OCT-2013 10:30:00	Soil	0.577	50	86.65511
1202965588 - 2 DUP (335330001)	16-OCT-2013 10:30:00	Soil	0.556	50	89.92806
1202965589 - 2 MS (335330001)	16-OCT-2013 10:30:00	Soil	0.587	50	85.17888
1202965590 - 2 SDILT (335330001)	16-OCT-2013 10:30:00	Soil	0.577	50	86.65511

Reagent/Solvent Lot ID	Description	Amount	Comments:
1961850	Concentrated Nitric Acid	1.25 mL	Block Temperature: 92 C
1961852	HYDROCHLORIC ACID	10 mL	Thermometer ID: 119015 Hot Block ID: 13 Sample 335330001 consist of brown, gritty solid.

# Prep Logbook

## Acid Digestion of Sediments, Sludges, and Soils

Batch ID:	1338225.0	Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
Analyst:	Anthony Green	LCS	1202965582	ICP-MS spiking soluiton A	UI1960544-A	.25	mL
Method:	SW846 3050B	LCS	1202965582	ICP-MS spiking solution B	UI1960549-B	.25	mL
Lab SOP:	GL-MA-E-009 REV# 22	MS	1202965584	ICP-MS spiking soluiton A	UI1960544-A	.25	mL
Instrument:	BAL-001	MS	1202965584	ICP-MS spiking solution B	UI1960549-B	.25	mL

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)
1202965581 MB	14-OCT-2013 08:30:32	Soil	0.518	50	96.5251
1202965582 LCS	14-OCT-2013 08:30:32	Soil	0.545	50	91.74312
335330001	14-OCT-2013 08:30:32	Soil	0.532	50	93.98496
1202965583 DUP (335330001)	14-OCT-2013 08:30:32	Soil	0.567	50	88.18342
1202965584 MS (335330001)	14-OCT-2013 08:30:32	Soil	0.58	50	86.2069
1202965585 SDILT (335330001)	14-OCT-2013 08:30:32	Soil	0.532	50	93.98496

Reagent/Solvent Lot ID	Description	Amount	Comments:
1904936-02	Hydrogen Peroxide 30%	1.5 mL	Block Temperature: 91 C
1961850	Concentrated Nitric Acid	5 mL	Thermometer ID: 119015
			Hot Block ID: 13
			Sample 335330001 consist of black/yellow sand.

# Prep Logbook

## Mercury Analysis Using the Perkin Elmer Automated Mercury Analyzer

<b>Batch ID:</b> 1338650.0	Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
Analyst: Alan Stanley	LCS	1202966498	MHGSOILMSSPIKE	WHG131014-14	.3	mL
Method: SW846 7471B Prep	MS	1202966500	MHGSOILMSSPIKE	WHG131014-14	.3	mL
Lab SOP: GL-MA-E-010 REV# 26	MSD	1202966502	MHGSOILMSSPIKE	WHG131014-14	.3	mL
Instrument: Metals Manual Instrument						

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)
1202966497 MB	14-OCT-2013 17:04:53	Soil	0.516	30	58.13953
1202966498 LCS	14-OCT-2013 17:04:53	Soil	0.523	30	57.36138
334646001	14-OCT-2013 17:04:53	Solid	0.504	30	59.52381
334681001	14-OCT-2013 17:04:53	Soil	0.504	30	59.52381
334681002	14-OCT-2013 17:04:53	Soil	0.526	30	57.03422
334681003	14-OCT-2013 17:04:53	Soil	0.508	30	59.05512
334681004	14-OCT-2013 17:04:53	Soil	0.525	30	57.14286
334681005	14-OCT-2013 17:04:53	Soil	0.555	30	54.05405
335330001	14-OCT-2013 17:04:53	Soil	0.513	30	58.47953
1202966499 DUP (335330001)	14-OCT-2013 17:04:53	Soil	0.516	30	58.13953
1202966500 MS (335330001)	14-OCT-2013 17:04:53	Soil	0.505	30	59.40594
1202966502 MSD (335330001)	14-OCT-2013 17:04:53	Soil	0.502	30	59.76096
1202966501 SDILT (335330001)	14-OCT-2013 17:04:53	Soil	0.513	30	58.47953
335467001	14-OCT-2013 17:04:53	Oil	0.15	30	200

Reagent/Solvent Lot ID	Description	Amount	Comments:
130712-A	Hydrochloric Acid Conc.	1.125 mL	Digestion Start Date: 14-OCT-2013 17:05
130717-1	NITRIC ACID	.375 mL	Digestion End Date: 14-OCT-2013 17:35
1966862-C	Hg reducing agent	2 mL	Block Temperature: 95 C
1968546-C	5% KMnO4 solution	7.5 mL	Thermometer ID: 118629
WHG131014-07	Mercury Working Standard 1st Source CAL S 0.2/CRA	30 uL	Hot Block ID: 7
WHG131014-08	Mercury Working Standard 1st Source CAL S 0.5	75 uL	The QC was a sand like soil.
WHG131014-09	Mercury Working 1st Source CAL S 2.0	300 uL	
WHG131014-10	Mercury Working 1st Source CAL S 5.0/CCV	750 uL	
WHG131014-11	Mercury Working 1st Source CAL S 10.0	1500 uL	

## Prep Logbook

**Batch ID:** 1338650.0  
**Analyst:** Alan Stanley  
**Method:** SW846 7471B Prep  
**Lab SOP:** GL-MA-E-010 REV# 26  
**Instrument:** Metals Manual Instrument

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1202966498	MHGSOILMSSPIKE	WHG131014-14	.3	mL
MS	1202966500	MHGSOILMSSPIKE	WHG131014-14	.3	mL
MSD	1202966502	MHGSOILMSSPIKE	WHG131014-14	.3	mL

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)
-----------	----------	--------	--------------------	-------------------	--------------------

Reagent/Solvent Lot ID	Description	Amount	Comments:
WHG131014-12	Mercury Working 2nd Source S 5.0/ICV	750 uL	

# **General Chem Analysis**

# Case Narrative

**General Chemistry Narrative  
WC-HANFORD, INC. (WCHN)  
SDG XP0022**

**Method/Analysis Information**

**Product:** pH  
**Analytical Batch:** 1338730    **Method:** SW9045D pH

**Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
335330001	J1T3J3
1202966711	Laboratory Control Sample (LCS)
1202966712	335330001(J1T3J3) Sample Duplicate (DUP)

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: 335330001 (J1T3J3).

**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 sample from this sample group was received by the lab outside of the method specified holding time: 335330001 (J1T3J3).

**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: 1231917 1202966712 (J1T3J3) and 335330001 (J1T3J3).

**Additional Comments**

Samples were centrifuged for 5 minutes prior to analysis.

**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.

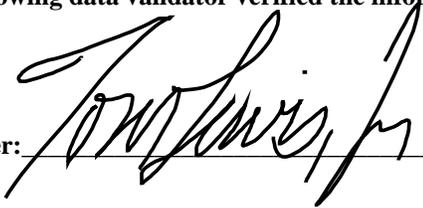
**Certification Statement**

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: 23Oct13

**DATA EXCEPTION REPORT**

<b>Mo.Day Yr.</b> 15-OCT-13	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> ELECTRODE	<b>Test / Method:</b> SW846 9045C/9045D, SW846 9045D	<b>Matrix Type:</b> Solid	<b>Client Code:</b> ERMC, PAES, WCHN
<b>Batch ID:</b> 1338730	<b>Sample Numbers:</b> See below.		
<b>Potentially affected work order(s)(SDG): 335198,335202,335203,335206,335330(XP0022)</b>			
<b>Application Issues:</b> Sample received out of holding			
<b>Specification and Requirements Exception Description:</b>		<b>DER Disposition:</b>	
<p>1. Sample received out of holding:</p> <p>335198 001</p> <p>335202 001</p> <p>335203 001</p> <p>335206 001,002</p> <p>335330 001</p>		<p>1. Samples were received out of holding.</p>	

**Originator's Name:**  
Lindsey Jensen      15-OCT-13

**Data Validator/Group Leader:**  
Julia Hamilton      16-OCT-13

# **Sample Data Summary**

**GEL LABORATORIES LLC**

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

**Certificate of Analysis Report  
for**

WCHN001 WC-HANFORD, INC.

Client SDG: XP0022 GEL Work Order: 335330 Project: RC-233 Soil

**The Qualifiers in this report are defined as follows:**

X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

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 Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Orlette Johnson.

Reviewed by



---

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: October 21, 2013

Company : WC-Hanford, Inc.  
Address : 2620 Fermi Avenue  
MSIN H4-21  
Richland, Washington 99354  
Contact: Joan Kessner  
Project: RC-233 Soil

Client SDG: XP0022

Client Sample ID: J1T3J3  
Sample ID: 335330001  
Matrix: SOIL  
Collect Date: 08-OCT-13 08:16  
Receive Date: 10-OCT-13  
Collector: Client  
Moisture: 7.55%

Project: WCHN00313  
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Electrode Analysis											
SW9045D pH "As Received"											
pH at Temp 18.8C	X	3.99		0.100	pH	1	LXA1	10/14/13	1827	1338730	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9045D	

Notes:

# **Quality Control Summary**

# GEL LABORATORIES LLC

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

## QC Summary

Report Date: October 21, 2013

Page 1 of 1

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

Workorder: 335330

Client SDG: XP0022

Project Description: RC-233 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Electrode Analysis</b>											
Batch	1338730										
QC1202966712	335330001	DUP									
pH	X	3.99	X	4.05	pH	1.49		(0%-10%)	LXA1	10/14/13	18:30
QC1202966711	LCS										
pH	7.00			7.02	pH		100	(99%-101%)		10/14/13	18:08

### Notes:

The Qualifiers in this report are defined as follows:

- > Result greater than quantifiable range or greater than upper limit of the analysis range
- 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  $\leq 5$  times the blank concentration.
- D Results are reported from a diluted aliquot of sample.
- 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

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.