

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

COMPLETE COPY OF DATA PACKAGE TO:

Kathy Wendt

H4-21

KW 9/3/13
INITIAL/DATE

COMMENTS:

SDG X0019

SAF-RC-232

Rad only

Chem only

Rad & Chem

Complete

Partial

Sample Location: 100-D-105



August 27, 2013

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

Re: RC-232 Soil
Work Order: 331422
SDG: X0019

Dear Joan Kessner:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on August 13, 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-232-039
Enclosures



Table of Contents

Case Narrative.....	1
Chain of Custody and Supporting Documentation.....	3
Laboratory Certifications.....	6
Metals Analysis.....	8
Case Narrative.....	9
Sample Data Summary.....	17
Quality Control Summary.....	21
General Chem Analysis.....	29
Case Narrative.....	30
Sample Data Summary.....	45
Quality Control Summary.....	48
Miscellaneous.....	52

Case Narrative

**Receipt Narrative
for
WC-HANFORD, INC.
SDG: X0019
Work Order: 331422**

August 27, 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 August 13, 2013 for analysis.

Sample Identification: The laboratory received the following sample:

<u>Laboratory ID</u>	<u>Client ID</u>
331422001	J1RV35

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: General Chemistry and Metals.



Orlette Johnson
Project Manager

Chain of Custody and Supporting Documentation

Washington Closure Hanford
 Collector: A. DUNSTON
 Project Designation: 100-IU-2 & 100-IU-6 Remaining Waste Sites
 Ice Chest No.: WCH-11-018
 Shipped To: Eberline - GEL

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST
 Company Contact: Joan Kessner
 Telephone No.: 375-4688
 Project Coordinator: KESSNER, JH
 Price Code: 8C
 Data Turnaround: 15 Days

Field Logbook No.: EL-1667-01
 Offsite Property No.: A120903
 Method of Shipment: Fed Ex
 Bill of Lading/Air Bill No.: See OSAC

Sample No.	Matrix	Sample Date	Sample Time	Preservation	Cool 4C	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Freeze
J1RX8	J1RV35	8-8-13	1315	None	125mL	125mL	125mL	125mL	125mL	125mL	125mL	Freeze
J1RX9	SOIL	8-8-13	1315	None	125mL	125mL	125mL	125mL	125mL	125mL	125mL	Freeze
J1RW00	SOIL	8-8-13	1315	None	125mL	125mL	125mL	125mL	125mL	125mL	125mL	Freeze
J1RW01	SOIL	8-8-13	1315	None	125mL	125mL	125mL	125mL	125mL	125mL	125mL	Freeze
J1RW02	SOIL	8-8-13	1315	None	125mL	125mL	125mL	125mL	125mL	125mL	125mL	Freeze

SPECIAL INSTRUCTIONS

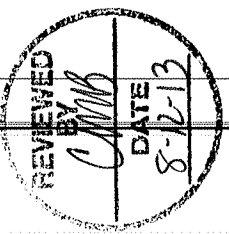
(1) ICP Metals - 6010TR (Close-out List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7471 - (CV) (Mercury)
 (2) IC Anions - 9056 (Bromide, Chloride, Fluoride, Nitrate, Nitrite, Nitrogen in Nitrate, Phosphate, Sulfate); NO2/NO3 - 353.1 (Nitrogen in Nitrite and Nitrate); pH (Soil) - 9045 (pH Measurement)

TPH-Diesel Chromium Hex Range - 7196
 PAHs - 8310 PCBs - 8082
 VOA - 5035/8260 (TCL)

CHAIN OF POSSESSION

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	Sign/Print Names
A. Dunston	8-8-13 1330	MA Bambrey	8-8-13 1330	MA Bambrey
MA Bambrey	8-8-13 1502	DUSHEA	8/8/13 1502	DUSHEA
MA Bambrey	8-8-13 1503	Fridge	8/8/13 1503	Fridge
MA Bambrey	8-8-13 0730	DUSHEA	8/12/13 0730	DUSHEA
MA Bambrey	8-12-13 0735	DUSHEA	8/12-13 0735	DUSHEA
MA Bambrey	8-12-13 0740	Fridge	8-12-13 0740	Fridge

FINAL SAMPLE DISPOSITION
 Disposal Method: Fed Ex
 Disposed By: Jiri Fomic Rukgini
 Date/Time: 8-13-13 0845





SAMPLE RECEIPT & REVIEW FORM

Client: WCHW SDG/AR/COC/Work Order: 331422/331425

Received By: JP Date Received: 8-13-13

Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0cpm</u>
Classified Radioactive II or III by RSO?		<input checked="" type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?		<input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		<input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:
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)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: <u>Ice bags</u> <u>Blue ice</u> <u>Dry ice</u> <u>None</u> 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 #: <u>41502209</u> Secondary Temperature Device Serial # (If Applicable):
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"/>			
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
14 Carrier and tracking number.				Circle Applicable: <u>FedEx Air</u> FedEx Ground UPS Field Services Courier Other <u>7964 4226 7330</u>

Comments (Use Continuation Form if needed):

Laboratory Certifications

List of current GEL Certifications as of 27 August 2013

State	Certification
Alaska	UST-110
Arkansas	88-0651
CLIA	42D0904046
California NELAP	01151CA
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
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	SC00012
Idaho	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
Nevada	SC000122011-1
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 Radiochemi	10120002
Tennessee	TN 02934
Texas NELAP	T104704235-13-8
Utah NELAP	SC000122013-8
Vermont	VT87156
Virginia NELAP	460202
Washington	C780-12
Wisconsin	999887790

Metals Analysis

Case Narrative

**Metals Fractional Narrative
WC-HANFORD, INC. (WCHN)
SDG X0019**

Sample Analysis

Sample ID	Client ID
331422001	J1RV35
1202927456	Method Blank (MB) ICP
1202927457	Laboratory Control Sample (LCS)
1202927466	331422001(J1RV35L) Serial Dilution (SD)
1202927464	331422001(J1RV35D) Sample Duplicate (DUP)
1202927465	331422001(J1RV35S) Matrix Spike (MS)
1202932309	331422001(J1RV35PS) Post Spike (PS)
1202929129	Method Blank (MB) ICP-MS
1202929157	Laboratory Control Sample (LCS)
1202929145	331422001(J1RV35L) Serial Dilution (SD)
1202929136	331422001(J1RV35D) Sample Duplicate (DUP)
1202929154	331422001(J1RV35S) Matrix Spike (MS)
1202929699	331422001(J1RV35PS) Post Spike (PS)
1202930169	Method Blank (MB) CVAA
1202930170	Laboratory Control Sample (LCS)
1202930173	331422001(J1RV35L) Serial Dilution (SD)
1202930174	331422001(J1RV35D) Sample Duplicate (DUP)
1202930171	331422001(J1RV35S) Matrix Spike (MS)

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

Method/Analysis Information

Analytical Batch:	1322447, 1323141 and 1323588
Prep Batch :	1322445, 1323139 and 1323585
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 9000 inductively coupled plasma mass spectrometer (ICP-MS). The instrument is equipped with a cross-flow nebulizer, quadruple 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

All CRDL standards met the advisory control limits with the exception of aluminum, calcium, and potassium. PQL08 (analyzed at 17:28 on 08/17/13) recovered high for aluminum and calcium; however, the sample results were 2x greater than the PQL, therefore the data is reported. PQL01 (analyzed at 12:46 on 08/20/13) recovered high for potassium and PQL04 (analyzed at 16:57 on 08/20/13) recovered low for potassium; however, the sample results were 2x greater than the PQL, therefore the data is reported.

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 sample was selected as the quality control (QC) sample for this SDG: 331422001 (J1RV35).

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 selenium and silicon.

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 calcium, cobalt, zinc, chromium, copper, molybdenum, and nickel.

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 met the recommended quality control acceptance criteria for percent recoveries for all applicable analytes and verifies the absence 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. Sample 331422001 required dilutions in order to bring raw values of titanium and/or iron within the linear range of the instrument, and for the analytes antimony, cobalt, lead, vanadium, potassium, arsenic, barium, boron, cadmium, chromium, copper, manganese, molybdenum, nickel, silicon, silver, and/or zinc that those elements interfere 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.

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

DATA EXCEPTION REPORT

Mo.Day Yr. 19-AUG-13	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: ICP/MS	Test / Method: SW846 3050B/6020A	Matrix Type: Solid	Client Code: WCHN
Batch ID: 1323141	Sample Numbers: See Below		
<p>Potentially affected work order(s)(SDG): 330624(X0013),330705(X0014),330707(X0015),330790(X0016),331001(X0017),331136(X0018),331422(X0019),331425(XP0006)</p> <p>Application Issues:</p> <p>Failed Recovery for MS/PS Container scanning event for custody missed</p>			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Failed Recovery for MS/PS:</p> <p>QC 1202929150MS,1202929154MS, 1202929694PS</p> <p>2. Container scanning event for custody missed:</p> <p>331250 001</p>		<p>The matrix spike (1202929150MS and 1202929154MS) recovery failed outside of the control limits for Se. The post spike failed outside the required control limits for Se in 1202929694PS but passed in all other PS's. This verifies the presence of a matrix interference for Se in sample 330707001 and verifies the absence of a matrix interference for all the other samples. Per GEL's accredited methods and SOPs, a corrective action is not required and the data is qualified and reported.</p> <p>The samples were in the custody of the ICPMS lab during analysis. The data is reported as is.</p>	

Originator's Name:

Paul Boyd 19-AUG-13

Data Validator/Group Leader:

Aubrey Kingsbury 20-AUG-13

DATA EXCEPTION REPORT

Mo.Day Yr. 22-AUG-13	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: ICP	Test / Method: SW846 3050B/6010C	Matrix Type: Solid	Client Code: WCHN
Batch ID: 1322447	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 331001(X0017),331136(X0018),331422(X0019),331425(XP0006)			
Application Issues: Failed Recovery for MS/PS Failed RPD for DUP			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Failed Recovery for MS/PS:</p> <p>QC 1202927459MS,1202927462MS, 1202927465MS, 1202927468MS, 1202932407PS, 1202932408PS, 1202932409PS</p> <p>2. Failed RPD for DUP:</p> <p>QC 1202927458DUP, 1202927461DUP, 1202927464DUP, 1202927467DUP</p>		<p>1. The matrix spike recovery failed outside of the control limits for 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 barium,silicon,lead,calcium,cobalt,zinc,chromium,copper,molybdenum and nickel due to possible sample non-homogeneity and/or matrix interference. Per GEL's accredited methods and SOPs, a corrective action is not required and the data is qualified and reported.</p>	

Originator's Name:

Helen Camello 22-AUG-13

Data Validator/Group Leader:

Jamie Johnson 22-AUG-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: X0019 GEL Work Order: 331422 Project: RC-232 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).

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



08/27/13

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: August 26, 2013

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

Client SDG: X0019

Client Sample ID: J1RV35
Sample ID: 331422001

Project: WCHN00213
Client ID: WCHN001

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: August 26, 2013

Page 1 of 7

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

Workorder: 331422

Client SDG: X0019

Project Description: RC-232 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1323141										
QC1202929136	331422001	DUP									
Selenium	DNU	0.384	DU	0.375	mg/kg	N/A ^			PRB	08/19/13	06:04
QC1202929157	LCS										
Selenium	4.65		D	4.42	mg/kg		95.2	(80%-120%)		08/19/13	00:19
QC1202929129	MB										
Selenium			DU	0.289	mg/kg					08/19/13	00:14
QC1202929154	331422001	MS									
Selenium	5.63 DNU	0.384	DN	1.26	mg/kg		22.3*	(75%-125%)		08/19/13	06:10
QC1202929699	331422001	PS									
Selenium	25.0 DNU	-0.374	D	21.3	ug/L		85.1	(80%-120%)		08/19/13	06:15
QC1202929145	331422001	SDILT									
Selenium	DNU	-0.374	DU	1.92	ug/L	N/A		(0%-10%)		08/19/13	06:21
Metals Analysis-ICP											
Batch	1322447										
QC1202927464	331422001	DUP									
Aluminum		4260		4090	mg/kg	3.90		(0%-20%)	HSC	08/17/13	17:22
Antimony	DU	1.86	DU	1.85	mg/kg	N/A ^				08/20/13	17:23
Arsenic	DU	2.81	DU	2.81	mg/kg	N/A ^				08/21/13	15:49
Barium	D	58.6	D	61.1	mg/kg	4.09		(0%-20%)			
Beryllium	B	0.537	B	0.505	mg/kg	6.04 ^		(+/-0.561)		08/17/13	17:22
Boron	DU	5.62	BD	6.20	mg/kg	23.6 ^		(+/-28.1)		08/21/13	15:49
Cadmium	BD	1.91	BD	1.67	mg/kg	13.7 ^		(+/-2.81)			
Calcium	*	3350	*	2450	mg/kg	30.9*		(0%-20%)		08/17/13	17:22
Chromium	*D	31.0	*D	21.9	mg/kg	34.6*		(0%-20%)		08/21/13	15:49
Cobalt	*D	10.2	*D	7.09	mg/kg	35.5*^		(+/-2.81)		08/20/13	17:23

GEL LABORATORIES LLC

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

QC Summary

Workorder: 331422

Client SDG: X0019

Project Description: RC-232 Soil

Page 2 of 7

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1322447										
Copper	*D	68.0	*D	38.9	mg/kg	54.5*		(0%-20%)		08/21/13	15:49
Iron	D	206000	D	210000	mg/kg	2.02		(0%-20%)	HSC		
Lead	BD	3.37	BD	3.33	mg/kg	1.09 ^		(+/-5.61)		08/20/13	17:23
Magnesium		3060		2980	mg/kg	2.54		(0%-20%)		08/17/13	17:22
Manganese	D	939	D	1060	mg/kg	11.8		(0%-20%)		08/21/13	15:49
Molybdenum	*D	14.3	*D	8.31	mg/kg	52.9*^		(+/-5.61)			
Nickel	*D	67.7	*D	45.4	mg/kg	39.5*		(0%-20%)			
Potassium	D	862	D	890	mg/kg	3.27		(0%-20%)		08/20/13	17:23
Silicon	DN	1720	D	1940	mg/kg	12.0		(0%-20%)		08/21/13	15:49
Silver	BD	2.07	BD	1.96	mg/kg	5.50 ^		(+/-2.81)			
Sodium		225		225	mg/kg	0.117		(0%-20%)		08/17/13	17:22
Vanadium	D	27.9	D	25.9	mg/kg	7.50		(0%-20%)		08/20/13	17:23
Zinc	*D	70.5	*D	52.9	mg/kg	28.4*		(0%-20%)			
QC1202927457	LCS										
Aluminum		478		491	mg/kg		103	(80%-120%)		08/17/13	16:39
Antimony		47.8		46.4	mg/kg		97.1	(80%-120%)		08/20/13	16:35
Arsenic		47.8		48.3	mg/kg		101	(80%-120%)		08/17/13	16:39
Barium		47.8		48.5	mg/kg		102	(80%-120%)			
Beryllium		47.8		49.6	mg/kg		104	(80%-120%)			
Boron		47.8		47.2	mg/kg		98.6	(80%-120%)			
Cadmium		47.8		50.0	mg/kg		105	(80%-120%)			
Calcium		478		511	mg/kg		107	(80%-120%)			
Chromium		47.8		46.2	mg/kg		96.6	(80%-120%)			

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QC Summary

Workorder: 331422

Client SDG: X0019

Project Description: RC-232 Soil

Page 3 of 7

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1322447										
Cobalt	47.8			48.8	mg/kg		102	(80%-120%)	HSC	08/20/13	16:35
Copper	47.8			47.6	mg/kg		99.6	(80%-120%)		08/17/13	16:39
Iron	478			498	mg/kg		104	(80%-120%)			
Lead	47.8			50.1	mg/kg		105	(80%-120%)		08/20/13	16:35
Magnesium	478			516	mg/kg		108	(80%-120%)		08/17/13	16:39
Manganese	47.8			45.9	mg/kg		96.1	(80%-120%)			
Molybdenum	47.8			45.7	mg/kg		95.6	(80%-120%)			
Nickel	47.8			46.5	mg/kg		97.3	(80%-120%)			
Potassium	478			493	mg/kg		103	(80%-120%)		08/20/13	16:35
Silicon	478			415	mg/kg		86.9	(80%-120%)		08/17/13	16:39
Silver	47.8			49.1	mg/kg		103	(80%-120%)			
Sodium	478			493	mg/kg		103	(80%-120%)			
Vanadium	47.8			47.6	mg/kg		99.7	(80%-120%)		08/20/13	16:35
Zinc	47.8			47.3	mg/kg		99	(80%-120%)			
QC1202927456	MB										
Aluminum			U	6.34	mg/kg					08/17/13	16:36
Antimony			U	0.308	mg/kg					08/20/13	16:32
Arsenic			U	0.466	mg/kg					08/17/13	16:36
Barium			U	0.0933	mg/kg						
Beryllium			U	0.0933	mg/kg						
Boron			U	0.933	mg/kg						
Cadmium			U	0.0933	mg/kg						

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QC Summary

Workorder: 331422

Client SDG: X0019

Project Description: RC-232 Soil

Page 4 of 7

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1322447										
Calcium			U	7.46	mg/kg				HSC	08/17/13	16:36
Chromium			U	0.140	mg/kg						
Cobalt			U	0.140	mg/kg					08/20/13	16:32
Copper			U	0.280	mg/kg					08/17/13	16:36
Iron			U	7.46	mg/kg						
Lead			U	0.308	mg/kg					08/20/13	16:32
Magnesium			U	7.93	mg/kg					08/17/13	16:36
Manganese			U	0.187	mg/kg						
Molybdenum			U	0.187	mg/kg						
Nickel			U	0.140	mg/kg						
Potassium			U	5.97	mg/kg					08/20/13	16:32
Silicon			U	1.40	mg/kg					08/17/13	16:36
Silver			U	0.0933	mg/kg						
Sodium			U	6.53	mg/kg						
Vanadium			U	0.0933	mg/kg					08/20/13	16:32
Zinc			U	0.373	mg/kg						
QC1202927465 331422001 MS											
Aluminum	563			4260	5450	mg/kg		N/A (75%-125%)		08/17/13	17:35
Antimony	56.3	DU		1.86	D 50.4	mg/kg		89.4 (75%-125%)		08/20/13	17:35
Arsenic	56.3	DU		2.81	D 53.5	mg/kg		95 (75%-125%)		08/21/13	15:52
Barium	56.3	D		58.6	D 121	mg/kg		110 (75%-125%)			
Beryllium	56.3	B		0.537	58.0	mg/kg		102 (75%-125%)		08/17/13	17:35

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

QC Summary

Workorder: 331422

Client SDG: X0019

Project Description: RC-232 Soil

Page 5 of 7

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1322447										
Boron	56.3	DU	5.62	D	60.8	mg/kg	99.2	(75%-125%)	HSC	08/21/13	15:52
Cadmium	56.3	BD	1.91	D	61.8	mg/kg	106	(75%-125%)			
Calcium	563	*	3350		3320	mg/kg	N/A	(75%-125%)		08/17/13	17:35
Chromium	56.3	*D	31.0	D	85.3	mg/kg	96.3	(75%-125%)		08/21/13	15:52
Cobalt	56.3	*D	10.2	D	68.1	mg/kg	103	(75%-125%)		08/20/13	17:35
Copper	56.3	*D	68.0	D	116	mg/kg	85.1	(75%-125%)		08/21/13	15:52
Iron	563	D	206000	D	196000	mg/kg	N/A	(75%-125%)			
Lead	56.3	BD	3.37	D	62.7	mg/kg	105	(75%-125%)		08/20/13	17:35
Magnesium	563		3060		4130	mg/kg	N/A	(75%-125%)		08/17/13	17:35
Manganese	56.3	D	939	D	1020	mg/kg	N/A	(75%-125%)		08/21/13	15:52
Molybdenum	56.3	*D	14.3	D	67.0	mg/kg	93.6	(75%-125%)			
Nickel	56.3	*D	67.7	D	119	mg/kg	90.4	(75%-125%)			
Potassium	563	D	862	D	1560	mg/kg	124	(75%-125%)		08/20/13	17:35
Silicon	563	DN	1720	DN	1700	mg/kg	0*	(75%-125%)		08/21/13	15:52
Silver	56.3	BD	2.07	D	61.3	mg/kg	105	(75%-125%)			
Sodium	563		225		820	mg/kg	106	(75%-125%)		08/17/13	17:35
Vanadium	56.3	D	27.9	D	87.2	mg/kg	105	(75%-125%)		08/20/13	17:35
Zinc	56.3	*D	70.5	D	122	mg/kg	91.7	(75%-125%)			
QC1202932309 331422001 PS											
Silicon	5000	DN	3050	D	7970	ug/L	98.3	(80%-120%)		08/21/13	15:55
QC1202927466 331422001 SDILT											
Aluminum			37900	D	8080	ug/L	6.71	(0%-10%)		08/17/13	17:37
Antimony		DU	-3.72	DU	9.28	ug/L	N/A	(0%-10%)		08/20/13	17:38

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QC Summary

Workorder: 331422

Client SDG: X0019

Project Description: RC-232 Soil

Page 6 of 7

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1322447										
Arsenic	DU	-10.5	DU	14.1	ug/L	N/A		(0%-10%)	HSC	08/21/13	15:59
Barium	D	104	D	20.5	ug/L	1.81		(0%-10%)			
Beryllium	B	4.78	D	1.08	ug/L	13		(0%-10%)		08/17/13	17:37
Boron	DU	8.70	DU	28.1	ug/L	N/A		(0%-10%)		08/21/13	15:59
Cadmium	BD	3.40	DU	2.81	ug/L	N/A		(0%-10%)			
Calcium	*	29800	D	6140	ug/L	2.96		(0%-10%)		08/17/13	17:37
Chromium	*D	55.2	D	10.6	ug/L	3.97		(0%-10%)		08/21/13	15:59
Cobalt	*D	18.1	D	3.68	ug/L	1.73		(0%-10%)		08/20/13	17:38
Copper	*D	121	D	19.6	ug/L	19		(0%-10%)		08/21/13	15:59
Iron	D	367000	D	76900	ug/L	4.77		(0%-10%)			
Lead	BD	5.99	DU	9.28	ug/L	N/A		(0%-10%)		08/20/13	17:38
Magnesium		27200	D	5670	ug/L	4.11		(0%-10%)		08/17/13	17:37
Manganese	D	1670	D	351	ug/L	5.08		(0%-10%)		08/21/13	15:59
Molybdenum	*D	25.4	D	5.21	ug/L	2.43		(0%-10%)			
Nickel	*D	121	D	24.9	ug/L	3.27		(0%-10%)			
Potassium	D	1530	D	244	ug/L	20.4		(0%-10%)		08/20/13	17:38
Silicon	DN	3050	D	632	ug/L	3.54		(0%-10%)		08/21/13	15:59
Silver	BD	3.68	DU	2.81	ug/L	N/A		(0%-10%)			
Sodium		2000	D	364	ug/L	9.23		(0%-10%)		08/17/13	17:37
Vanadium	D	49.6	D	9.78	ug/L	1.43		(0%-10%)		08/20/13	17:38
Zinc	*D	125	D	24.8	ug/L	.902		(0%-10%)			

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QC Summary

Workorder: 331422

Client SDG: X0019

Project Description: RC-232 Soil

Page 7 of 7

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-Mercury											
Batch 1323588											
QC1202930174	331422001	DUP									
Mercury		U	0.00466	U	0.00465	mg/kg	N/A ^		NOR1	08/20/13	15:13
QC1202930170	LCS										
Mercury	0.115			B	0.122	mg/kg		106 (80%-120%)		08/20/13	15:53
QC1202930169	MB										
Mercury				U	0.00396	mg/kg				08/20/13	14:33
QC1202930171	331422001	MS									
Mercury	0.135	U	0.00466		0.138	mg/kg		99 (80%-120%)		08/20/13	15:08
QC1202930173	331422001	SDILT									
Mercury		U	0.061	DU	0.0233	ug/L	N/A	(0%-10%)		08/20/13	15:15

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.

General Chem Analysis

Case Narrative

**General Chemistry Narrative
WC-HANFORD, INC. (WCHN)
SDG X0019**

Method/Analysis Information

Product: pH
Analytical Batch: 1322316 **Method:** SW9045D pH

Sample Analysis

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

Sample ID	Client ID
331422001	J1RV35
1202927129	331422001(J1RV35) Sample Duplicate (DUP)
1202927130	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: 331422001 (J1RV35).

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: 331422001 (J1RV35).

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: 1211797 331422001 (J1RV35).

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: 1322191 **Method:** SW846 9056A Anions
Prep Batch : 1322190 **Method:** SW846 9056A

Sample Analysis

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

Sample ID	Client ID
331422001	J1RV35
1202926818	Method Blank (MB)
1202926819	331422001(J1RV35) Sample Duplicate (DUP)
1202926820	331422001(J1RV35) Matrix Spike (MS)
1202926821	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-3000 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: 331422001 (J1RV35).

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

The spike recovery for Ortho-phosphate falls outside of the established acceptance limits due to matrix interference: 1202926820 (J1RV35).

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**

The following DER was generated for this SDG: 1212680 1202926820 (J1RV35).

Manual Integrations

The following samples from this sample group had to be manually integrated due to errors in the instrument software peak integration: 1202926819 (J1RV35) and 331422001 (J1RV35).

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: 1322859 **Method:** EPA 353.2 Nitrogen and Nitrate/Nitrite
Prep Batch : 1322858 **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
331422001	J1RV35
1202928410	Method Blank (MB)
1202928411	Laboratory Control Sample (LCS)
1202928412	331422001(J1RV35) Sample Duplicate (DUP)
1202928413	331422001(J1RV35) Matrix Spike (MS)

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: 331422001 (J1RV35).

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.

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: Hexavalent Chromium
Analytical Batch: 1322827 **Method:** SW846_7196A Hexavalent Chromium
Prep Batch : 1322820 **Method:** SW846 3060A

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 7196A:

Sample ID	Client ID
331422001	J1RV35
1202928302	Method Blank (MB)
1202928304	331422001(J1RV35) Sample Duplicate (DUP)
1202928307	331422001(J1RV35) Matrix Spike (MS)
1202928311	331422001(J1RV35) Matrix Spike Duplicate (MSD)
1202928313	Laboratory Control Sample (LCS)
1202928314	Insoluble Lab Control Sample (ILCS)

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-044 REV# 18.

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 Spectrometric analysis was performed on a Spectronic 20D+ Digital Spectrophotometer.

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: 331422001 (J1RV35).

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

The spike recovery falls outside of the established acceptance limits due to matrix interference: 1202928307 (J1RV35).

Matrix Spike Duplicate (MSD) Recovery Statement

The spike duplicate recovery falls outside of the established acceptance limits due to matrix interference: 1202928311 (J1RV35).

MS/MSD Relative Percent Difference (RPD) Statement

The RPD between the spike and spike duplicate met the 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

The following DER was generated for this SDG: 1212946 1202928307 (J1RV35) and 1202928311 (J1RV35).

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.

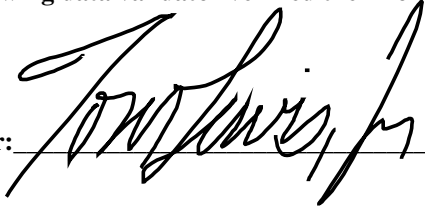
Certification Statement

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: 27Aug13

DATA EXCEPTION REPORT

Mo.Day Yr. 15-AUG-13	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: ELECTRODE	Test / Method: SW846 9045D	Matrix Type: Solid	Client Code: WCHN, SOOP, OLAB
Batch ID: 1322316	Sample Numbers: See below.		
Potentially affected work order(s)(SDG): 331001(X0017),331136(X0018),331249(X308038),331287,331422(X0019)			
Application Issues: Sample received out of holding			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Sample received out of holding: 331001001, 331001002, 331136001, 331136002, 331249001, 331287001, and 331422001</p>		<p>1. Samples were received out of holding.</p>	

Originator's Name:

Lisa Gregory 15-AUG-13

Data Validator/Group Leader:

Julia Hamilton 15-AUG-13

DATA EXCEPTION REPORT

Mo.Day Yr. 19-AUG-13	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: IC	Test / Method: SW846 9056A	Matrix Type: Solid	Client Code: WCHN
Batch ID: 1322191	Sample Numbers: See below.		
Potentially affected work order(s)(SDG): 331422(X0019)			
Application Issues: Failed Recovery for MS/PS			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Failed Recovery for MS: QC 1202926820MS</p>		<p>1. The MS recovery for Ortho-phosphate falls outside of the established acceptance limits. The failure is attributed to matrix interference because the successful recoveries for Fluoride, Chloride, Nitrite, Bromide, Nitrate, and Sulfate indicate that the laboratory process was in control at the time of analysis.</p>	

Originator's Name:
Mary Sherwood 19-AUG-13

Data Validator/Group Leader:
Julia Hamilton 27-AUG-13

DATA EXCEPTION REPORT

Mo.Day Yr. 19-AUG-13	Division:	Quality Criteria: Specifications	Type: Process
Instrument Type: VIS SPECTROMETER	Test / Method: SW846 7196A	Matrix Type: Solid	Client Code: WCHN
Batch ID: 1322827	Sample Numbers: See below.		
Potentially affected work order(s)(SDG): 330709,330715,331422(X0019),331621(X308057)			
Application Issues: Failed Recovery for MS/PS			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Failed Recovery for MS/MSD:</p> <p>QC 1202928307MS and QC 1202928311MSD</p>		<p>1. The MS recovery falls outside of the established acceptance limits. The MSD verifies the recovery failure with a passing RPD; therefore, the failure is attributed to matrix interference. The failures were further verified by a second MS and MSD performed for parent sample 331422001 with QC IDs:</p> <p>QC 1202928308MS and QC 1202928312MSD.</p> <p>The recoveries for sample 331422001 are 63.3%, 50.6%, 42.1%, and 42.1.</p>	

Originator's Name:
Travis Tola 19-AUG-13

Data Validator/Group Leader:
Julia Hamilton 20-AUG-13

Sample Data Summary

GEL LABORATORIES LLC

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Certificate of Analysis Report for

WCHN001 WC-HANFORD, INC.

Client SDG: X0019 GEL Work Order: 331422 Project: RC-232 Soil

The Qualifiers in this report are defined as follows:

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).

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

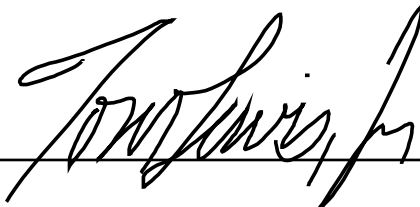
X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

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



Quality Control Summary

GEL LABORATORIES LLC

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QC Summary

Report Date: August 27, 2013

Page 1 of 3

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

Workorder: 331422

Client SDG: X0019

Project Description: RC-232 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Electrode Analysis											
Batch	1322316										
QC1202927129	331422001	DUP									
pH	X	8.05	X	8.48	pH	5.20		(0%-10%)	LYG1	08/15/13	09:35
QC1202927130	LCS										
pH	7.00			7.01	pH		100	(99%-101%)		08/15/13	09:21
Ion Chromatography											
Batch	1322191										
QC1202926819	331422001	DUP									
Bromide	U	0.770	U	0.770	mg/kg	N/A	^		MAR1	08/17/13	03:14
Chloride	B	2.26		2.33	mg/kg	3.05	^	(+/-2.30)			
Fluoride	U	0.379	U	0.379	mg/kg	N/A	^				
Nitrate-N	B	0.730	B	0.734	mg/kg	0.471	^	(+/-1.15)			
Nitrite-N	U	0.379	U	0.379	mg/kg	N/A	^				
O-Phosphate as P	U	0.770	U	0.770	mg/kg	N/A	^				
Sulfate		23.7		23.8	mg/kg	0.150		(0%-20%)			
QC1202926821	LCS										
Bromide		12.5		12.2	mg/kg		97.4	(90%-110%)		08/17/13	02:08
Chloride		50.0		48.6	mg/kg		97.2	(90%-110%)			
Fluoride		25.0		25.1	mg/kg		100	(90%-110%)			
Nitrate-N		25.0		24.8	mg/kg		99.2	(90%-110%)			
Nitrite-N		25.0		25.1	mg/kg		100	(90%-110%)			
O-Phosphate as P		12.5		12.4	mg/kg		99.2	(90%-110%)			
Sulfate		100		100	mg/kg		100	(90%-110%)			
QC1202926818	MB										
Bromide			U	0.670	mg/kg					08/17/13	01:35

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QC Summary

Workorder: 331422

Client SDG: X0019

Project Description: RC-232 Soil

Page 2 of 3

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1322191										
Chloride			U	0.670	mg/kg				MAR1	08/17/13	01:35
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						
QC1202926820 331422001 MS											
Bromide	14.5	U	0.770	14.2	mg/kg		98.1	(70%-134%)		08/17/13	03:47
Chloride	58.1	B	2.26	55.3	mg/kg		91.3	(46%-150%)			
Fluoride	29.0	U	0.379	25.7	mg/kg		87.5	(34%-134%)			
Nitrate-N	29.0	B	0.730	27.8	mg/kg		93.4	(68%-129%)			
Nitrite-N	29.0	U	0.379	27.7	mg/kg		95.5	(68%-130%)			
O-Phosphate as P	14.5	U	0.770	2.39	mg/kg		16.5*	(26%-124%)			
Sulfate	116		23.7	136	mg/kg		96.5	(50%-151%)			
Nutrient Analysis											
Batch	1322859										
QC1202928412 331422001 DUP											
Nitrogen, Nitrate/Nitrite		B	0.207	B	0.232	mg/kg	11.1 ^	(+/-0.562)	KLP1	08/26/13	12:29
QC1202928411 LCS											
Nitrogen, Nitrate/Nitrite	10.0			10.3	mg/kg		103	(90%-110%)		08/26/13	12:26
QC1202928410 MB											
Nitrogen, Nitrate/Nitrite			U	0.170	mg/kg					08/26/13	12:25
QC1202928413 331422001 MS											
Nitrogen, Nitrate/Nitrite	11.1	B	0.207	10.6	mg/kg		93	(75%-125%)		08/26/13	12:30

Spectrometric Analysis

Batch 1322827

GEL LABORATORIES LLC

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QC Summary

Workorder: 331422

Client SDG: X0019

Project Description: RC-232 Soil

Page 3 of 3

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Spectrometric Analysis											
Batch	1322827										
QC1202928304	331422001	DUP									
Hexavalent Chromium		U	0.186	U	0.183	mg/kg	N/A ^		TXT1	08/19/13	14:46
QC1202928314	ILCS										
Hexavalent Chromium	7.70				7.19	mg/kg	93.3	(80%-120%)		08/19/13	12:16
QC1202928313	LCS										
Hexavalent Chromium	3.99				3.99	mg/kg	100	(80%-120%)		08/19/13	12:12
QC1202928302	MB										
Hexavalent Chromium			U		0.156	mg/kg				08/19/13	12:10
QC1202928307	331422001	MS									
Hexavalent Chromium	4.66	U	0.186		2.95	mg/kg	63.3*	(75%-125%)		08/19/13	14:48
QC1202928311	331422001	MSD									
Hexavalent Chromium	4.62	U	0.186		2.34	mg/kg	23.3	50.6*	(0%-30%)	08/19/13	14:52

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 <= 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.

Miscellaneous

Moisture LogBook

Batch: 1322151

Analyst: DRS1

Date/Time: 13-AUG-2013

Procedure Code DRY WEIGHT

Procedure Description Dry Weight-Percent Moisture

Lab Sop: GL-OA-E-020

Sample St	Sample Id	Rpd(%)
DUP	1202926731	4.203

Sample Id	Sample Type	Original Hsn	Instrument	Run Time	Container Wt	Initial Wt	Final Wt (g)	Net Initial Wt (g)	Net Final Wt (g)	Moisture (%)
331387002	SAMPLE		BALHD2000D	15:20	7.309	21.377	20.017	14.068	12.708	9.67
331387003	SAMPLE		BALHD2000D	15:20	7.095	30.075	28.288	22.98	21.193	7.78
331422001	SAMPLE		BALHD2000D	15:20	7.257	36.03	31.911	28.773	24.654	14.3
1202926731	DUP	331387002	BALHD2000D	15:20	7.259	22.794	21.354	15.535	14.095	9.27

Comments:

A) Result = (Net Initial - Net Final) /Net Initial * 100

Note: Aliquot is used for the determination of the effective MDL and PQL in LIMS