

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 7/29/13
INITIAL/DATE

COMMENTS:

SDG X0005

SAF-RC-232

Rad only

Chem only

Rad & Chem

Complete

Partial

Sample Location: 100-H-56 – Test pit underlying soil



July 25, 2013

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

Re: RC-232 Soil
Work Order: 329170
SDG: X0005

Dear Joan Kessner:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on July 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-232-033
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.....	16
Quality Control Summary.....	22
General Chem Analysis.....	30
Case Narrative.....	31
Sample Data Summary.....	48
Quality Control Summary.....	52
Miscellaneous.....	57

Case Narrative

**Receipt Narrative
for
WC-HANFORD, INC.
SDG: X0005
Work Order: 329170**

July 24, 2013

Laboratory Identification:

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

Summary:

Sample receipt: The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on July 10, 2013 for analysis.

Sample Identification: The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
329170001	J1RR71
329170002	J1RR72

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 RC-232-033 Price Code 8C
 Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites
 Company Contact: Joan Kessner, Telephone No. 375-4688
 Project Coordinator: KESSNER, JH
 Sampling Location: 100-H-56 - Test Pit underlying soil
 SAF No. 329170
 Method of Shipment: fed EX
 Field Logbook No. EL-1667
 COA C10H56A000
 Offsite Property No. A120888
 Bill of Lading/Air Bill No. See OSPC
 Data Turnaround: 15 Days

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Sample No.	Matrix	Sample Date	Sample Time	Preservation	Cool 4C	Cool 4C	Cool 4C	None	Cool 4C	Freeze
J1RR68	SOIL				G/P	G/P				
J1RR69	SOIL				G/P	G/P				
J1RR70	SOIL				G/P	G/P				
J1RR71	SOIL	7-8-13	1000		G/P	G/P				
J1RR72	SOIL	7-8-13	1415		G/P	G/P				

Special Handling and/or Storage

Cool 4 C

See item (1) in Chromium Hex Special Instructions - 7196

See item (2) in TPH-Diesel Range - WTPH-D + Special Instructions

See item (1) in Chromium Hex Special Instructions - 7196

See item (2) in TPH-Diesel Range - WTPH-D + Special Instructions

7-8-13
 VOA
 5035/6260
 (TCL)

SAMPLE ANALYSIS

329170

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Cool 4 C

See item (1) in Chromium Hex Special Instructions - 7196

See item (2) in TPH-Diesel Range - WTPH-D + Special Instructions

See item (1) in Chromium Hex Special Instructions - 7196

See item (2) in TPH-Diesel Range - WTPH-D + Special Instructions

CHAIN OF POSSESSION

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
MA Budyne MA Bamberger	7-8-13 1425	MA Budyne MA Bamberger	7-8-13 1425
MA Budyne MA Bamberger	7-8-13 1000 #1	MA Budyne MA Bamberger	7-8-13 1000 #1
MA Budyne MA Bamberger	7-8-13 1035	MA Budyne MA Bamberger	7-8-13 1035
Fed EX		Fed EX	
P. N. O. R. D.	7-16-13 09:16	P. N. O. R. D.	7-16-13 09:16

SPECIAL INSTRUCTIONS

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

(2) IC Anions - 9056 (Bromide, Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphate, Sulfate); NO2/NO3 - 353.1 (Nitrogen in Nitrite and Nitrate); pH (Soil) - 9045 (pH Measurement)



SAMPLE RECEIPT & REVIEW FORM

Client: WCHN		SDG/AR/COC/Work Order: 329170
Received By: P. Went		Date Received: 7-10-13
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)
2 Samples requiring cold preservation within (0 ≤ deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: <u>Ice bags</u> Blue ice Dry ice None Other (describe) 4 *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):
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"/>		<input checked="" type="checkbox"/>	Sample ID's affected: RD 7-10-13 k-96 Prod 3 Com
12 Are sample containers identifiable as GEL provided?		<input checked="" type="checkbox"/>		clients
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
	<input checked="" type="checkbox"/>			7961 8624 0507.

Comments (Use Continuation Form if needed):

Laboratory Certifications

List of current GEL Certifications as of 24 July 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 X0005**

Sample Analysis

Sample ID	Client ID
329170001	J1RR71
329170002	J1RR72
1202906071	Method Blank (MB) ICP
1202906072	Laboratory Control Sample (LCS)
1202906075	329170001(J1RR71L) Serial Dilution (SD)
1202906073	329170001(J1RR71D) Sample Duplicate (DUP)
1202906074	329170001(J1RR71S) Matrix Spike (MS)
1202914478	329170001(J1RR71PS) Post Spike (PS)
1202906681	Method Blank (MB) CVAA
1202906682	Laboratory Control Sample (LCS)
1202906685	329170001(J1RR71L) Serial Dilution (SD)
1202906686	329170001(J1RR71D) Sample Duplicate (DUP)
1202906683	329170001(J1RR71S) Matrix Spike (MS)

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

Method/Analysis Information

Analytical Batch:	1313647 and 1313922
Prep Batch :	1313646 and 1313921
Standard Operating Procedures:	GL-MA-E-013 REV# 22, GL-MA-E-009 REV# 22 and GL-MA-E-010 REV# 26
Analytical Method:	SW846 3050B/6010C 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-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 barium, calcium, potassium, antimony, lead, and zinc. PQL01 (analyzed at 07:14 on 07/15/13) recovered high for calcium and PQL10 (analyzed at 17:47 on 07/15/13) recovered high for barium and calcium; however, the sample results were 2x greater than the PQL, therefore the data is reported. PQL01 (analyzed at 10:56 on 07/24/13) recovered high for potassium, PQL02 (analyzed at 11:53 on 07/24/13) recovered high for antimony and low for lead, PQL03 (analyzed at 12:23 on 07/24/13) recovered high for antimony and lead and low for potassium, and PQL06 (analyzed at 14:43 on 07/24/13) recovered high for antimony, potassium, and zinc, and low for lead; however, the sample results were either less than the MDL or 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: 329170001 (J1RR71).

Matrix Spike (MS) Recovery Statement

The percent recoveries (%R) obtained from the MS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The MS met the recommended quality control acceptance criteria for percent recoveries for all applicable analytes with the exception of potassium.

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 detection 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 barium, nickel, and silicon.

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 329170001 required dilutions in order to bring raw values of titanium within the linear range of the instrument, and for the analytes antimony, cobalt, lead, vanadium, and zinc that titanium interferes with, in order to ensure that the inter-element correction factors were valid on the ICP.

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. The following DER was generated for this SDG: 1205034. A copy is included in the Miscellaneous Data section of this package.

Additional Comments

Additional comments were not required for this SDG.

Certification Statement

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

Review Validation:

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

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

Reviewer:  Date: 07/24/13

DATA EXCEPTION REPORT

Mo.Day Yr. 24-JUL-13	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: ICP	Test / Method: SW846 3050B/6010C	Matrix Type: Solid	Client Code: WCHN
Batch ID: 1313647	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 329170(X0005)			
Application Issues: Failed Recovery for MS/PS Failed RPD for DUP			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Failed Recovery for MS/PS: QC 1202906074MS</p> <p>2. Failed RPD for DUP: QC 1202906073DUP</p>		<p>1. The matrix spike recovery failed outside of the control limits for potassium. The post spike passed the required control limits for all analytes. This verifies the absence of a matrix interference. 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,nickel and silicon due to possible sample non-homogeneity and/or matrix interference. Per GEL's accredited methods and SOPs, a corrective action is not required and the data is qualified and reported.</p>	

Originator's Name:

Helen Camello 24-JUL-13

Data Validator/Group Leader:

Jerry Wigfall 24-JUL-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: X0005 GEL Work Order: 329170 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).

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.

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



07/24/13

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: July 24, 2013

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

Client SDG: X0005

Client Sample ID: J1RR71
Sample ID: 329170001

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	

Notes:

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: July 24, 2013

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

Client SDG: X0005

Client Sample ID: J1RR72
Sample ID: 329170002

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	

Notes:

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 24, 2013

Page 1 of 7

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

Contact: Joan Kessner

Workorder: 329170

Client SDG: X0005

Project Description: RC-232 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1313647										
QC1202906073	329170001 DUP										
Aluminum		7170000		6350000	ug/kg	12.1		(0%-20%)	HSC	07/15/13	17:35
Antimony	DU	1830	DU	1670	ug/kg	N/A	^			07/24/13	12:04
Arsenic		7650		6370	ug/kg	18.3	^	(+/-3030)		07/15/13	17:35
Barium	*	72000	*	93300	ug/kg	25.7*		(0%-20%)			
Beryllium		578		539	ug/kg	7.12	^	(+/-506)			
Boron	B	1230	B	1040	ug/kg	17.1	^	(+/-5060)			
Cadmium	B	405	B	383	ug/kg	5.68	^	(+/-506)			
Calcium		4300000		4330000	ug/kg	0.656		(0%-20%)			
Chromium		11900		10300	ug/kg	14.3		(0%-20%)			
Cobalt	D	7610	D	7910	ug/kg	3.80	^	(+/-2530)		07/24/13	12:04
Copper		17800		17100	ug/kg	4.25		(0%-20%)		07/15/13	17:35
Iron		21300000		20100000	ug/kg	5.83		(0%-20%)			
Lead	D	15600	D	11700	ug/kg	28.5	^	(+/-5060)		07/24/13	12:04
Magnesium		4880000		4350000	ug/kg	11.5		(0%-20%)		07/15/13	17:35
Manganese		326000		296000	ug/kg	9.60		(0%-20%)			
Molybdenum	U	222	U	202	ug/kg	N/A	^				
Nickel	*	13200	*	10700	ug/kg	21.4*		(0%-20%)			
Potassium	N	1290000		1220000	ug/kg	5.44		(0%-20%)		07/24/13	11:40
Selenium	U	556	U	506	ug/kg	N/A	^			07/15/13	17:35
Silicon	*	2940000	*	2330000	ug/kg	23.2*		(0%-20%)		07/24/13	11:40

GEL LABORATORIES LLC

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QC Summary

Workorder: 329170

Client SDG: X0005

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	1313647										
Silver	B	462	B	272	ug/kg	51.9	^	(+/-506)	HSC	07/15/13	17:35
Sodium		140000		128000	ug/kg	8.55		(0%-20%)			
Vanadium	D	57300	D	59100	ug/kg	3.10		(0%-20%)		07/24/13	12:04
Zinc	D	45500	D	47200	ug/kg	3.67		(0%-20%)			
QC1202906072	LCS										
Aluminum		497000		512000	ug/kg			103 (80%-120%)		07/15/13	17:27
Antimony		49700		48400	ug/kg			97.5 (80%-120%)		07/24/13	11:34
Arsenic		49700		54200	ug/kg			109 (80%-120%)		07/15/13	17:27
Barium		49700		53400	ug/kg			107 (80%-120%)			
Beryllium		49700		54900	ug/kg			110 (80%-120%)			
Boron		49700		53000	ug/kg			107 (80%-120%)			
Cadmium		49700		56700	ug/kg			114 (80%-120%)			
Calcium		497000		551000	ug/kg			111 (80%-120%)			
Chromium		49700		52400	ug/kg			106 (80%-120%)			
Cobalt		49700		48800	ug/kg			98.1 (80%-120%)		07/24/13	11:34
Copper		49700		53100	ug/kg			107 (80%-120%)		07/15/13	17:27
Iron		497000		544000	ug/kg			109 (80%-120%)			
Lead		49700		49200	ug/kg			99 (80%-120%)		07/24/13	11:34
Magnesium		497000		564000	ug/kg			114 (80%-120%)		07/15/13	17:27
Manganese		49700		52000	ug/kg			105 (80%-120%)			
Molybdenum		49700		51200	ug/kg			103 (80%-120%)			
Nickel		49700		52200	ug/kg			105 (80%-120%)			

GEL LABORATORIES LLC

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QC Summary

Workorder: 329170

Client SDG: X0005

Project Description: RC-232 Soil

Page 3 of 7

Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1313647										
Potassium	497000			492000	ug/kg		98.9	(80%-120%)	HSC	07/24/13	11:34
Selenium	49700			55600	ug/kg		112	(80%-120%)		07/15/13	17:27
Silicon	497000			453000	ug/kg		91.1	(80%-120%)		07/24/13	11:34
Silver	49700			52900	ug/kg		106	(80%-120%)		07/15/13	17:27
Sodium	497000			509000	ug/kg		103	(80%-120%)			
Vanadium	49700			49100	ug/kg		98.8	(80%-120%)		07/24/13	11:34
Zinc	49700			49100	ug/kg		98.8	(80%-120%)			
QC1202906071	MB										
Aluminum			U	6640	ug/kg					07/15/13	17:24
Antimony			U	322	ug/kg					07/24/13	11:31
Arsenic			B	682	ug/kg					07/15/13	17:24
Barium			U	97.7	ug/kg						
Beryllium			U	97.7	ug/kg						
Boron			U	977	ug/kg						
Cadmium			U	97.7	ug/kg						
Calcium			U	7810	ug/kg						
Chromium			U	146	ug/kg						
Cobalt			U	146	ug/kg					07/24/13	11:31
Copper			U	293	ug/kg					07/15/13	17:24
Iron			U	7810	ug/kg						
Lead			U	322	ug/kg					07/24/13	11:31
Magnesium			U	8300	ug/kg					07/15/13	17:24

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QC Summary

Workorder: 329170

Client SDG: X0005

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	1313647										
Manganese			U	195	ug/kg				HSC	07/15/13	17:24
Molybdenum			B	-366	ug/kg						
Nickel			U	146	ug/kg						
Potassium			U	6250	ug/kg					07/24/13	11:31
Selenium			U	488	ug/kg					07/15/13	17:24
Silicon			U	1460	ug/kg					07/24/13	11:31
Silver			U	97.7	ug/kg					07/15/13	17:24
Sodium			U	6840	ug/kg						
Vanadium			U	97.7	ug/kg					07/24/13	11:31
Zinc			B	631	ug/kg						
QC1202906074 329170001 MS											
Aluminum	548000	7170000		7640000	ug/kg		N/A	(75%-125%)		07/15/13	17:38
Antimony	54800	DU	1830	D	45000	ug/kg	81.7	(75%-125%)		07/24/13	12:07
Arsenic	54800		7650		61900	ug/kg	98.9	(75%-125%)		07/15/13	17:38
Barium	54800	*	72000		117000	ug/kg	82.2	(75%-125%)			
Beryllium	54800		578		56400	ug/kg	102	(75%-125%)			
Boron	54800	B	1230		54800	ug/kg	97.7	(75%-125%)			
Cadmium	54800	B	405		56700	ug/kg	103	(75%-125%)			
Calcium	548000		4300000		4840000	ug/kg	N/A	(75%-125%)			
Chromium	54800		11900		62500	ug/kg	92.3	(75%-125%)			
Cobalt	54800	D	7610	D	64300	ug/kg	103	(75%-125%)		07/24/13	12:07
Copper	54800		17800		73700	ug/kg	102	(75%-125%)		07/15/13	17:38

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QC Summary

Workorder: 329170

Client SDG: X0005

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	1313647										
Iron	548000	21300000		21800000	ug/kg		N/A	(75%-125%)	HSC	07/15/13	17:38
Lead	54800	D 15600	D	64800	ug/kg		89.8	(75%-125%)		07/24/13	12:07
Magnesium	548000	4880000		4760000	ug/kg		N/A	(75%-125%)		07/15/13	17:38
Manganese	54800	326000		336000	ug/kg		N/A	(75%-125%)			
Molybdenum	54800	U 222		53400	ug/kg		97.5	(75%-125%)			
Nickel	54800	* 13200		64800	ug/kg		94.2	(75%-125%)			
Potassium	548000	N 1290000	N	1570000	ug/kg		52.3*	(75%-125%)		07/24/13	11:42
Selenium	54800	U 556		58100	ug/kg		105	(75%-125%)		07/15/13	17:38
Silicon	548000	* 2940000		2590000	ug/kg		N/A	(75%-125%)		07/24/13	11:42
Silver	54800	B 462		56500	ug/kg		102	(75%-125%)		07/15/13	17:38
Sodium	548000	140000		646000	ug/kg		92.4	(75%-125%)			
Vanadium	54800	D 57300	D	125000	ug/kg		124	(75%-125%)		07/24/13	12:07
Zinc	54800	D 45500	D	104000	ug/kg		106	(75%-125%)			
QC1202914478 329170001 PS											
Potassium	5000	N 11600		16100	ug/L		89.6	(80%-120%)		07/24/13	11:44
QC1202906075 329170001 SDILT											
Aluminum		64500	D	13700	ug/L	5.94		(0%-10%)		07/15/13	17:41
Antimony		DU 0.276	D	9.25	ug/L	N/A		(0%-10%)		07/24/13	12:14
Arsenic		68.9	CD	18.0	ug/L	31		(0%-10%)		07/15/13	17:41
Barium		* 648	D	137	ug/L	5.98		(0%-10%)			
Beryllium		5.20	DU	556	ug/L	N/A		(0%-10%)			
Boron		B 11.1	DU	5560	ug/L	N/A		(0%-10%)			
Cadmium		B 3.65	DU	556	ug/L	N/A		(0%-10%)			

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QC Summary

Workorder: 329170

Client SDG: X0005

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	1313647										
Calcium		38700	D	8020	ug/L	3.63		(0%-10%)	HSC	07/15/13	17:41
Chromium		107	D	23.6	ug/L	10		(0%-10%)			
Cobalt	D	13.7	D	3.01	ug/L	9.95		(0%-10%)		07/24/13	12:14
Copper		160	D	34.5	ug/L	7.62		(0%-10%)		07/15/13	17:41
Iron		192000	D	40500	ug/L	5.5		(0%-10%)			
Lead	D	28.1	DU	9170	ug/L	N/A		(0%-10%)		07/24/13	12:14
Magnesium		43900	D	9160	ug/L	4.38		(0%-10%)		07/15/13	17:41
Manganese		2930	D	628	ug/L	7.04		(0%-10%)			
Molybdenum	U	-2.96	DU	1110	ug/L	N/A		(0%-10%)			
Nickel	*	119	D	24.5	ug/L	2.62		(0%-10%)			
Potassium	N	11600	D	2420	ug/L	4.31		(0%-10%)		07/24/13	11:46
Selenium	U	4.94	DU	2780	ug/L	N/A		(0%-10%)		07/15/13	17:41
Silicon	*	26500	D	5240	ug/L	.967		(0%-10%)		07/24/13	11:46
Silver	B	4.15	D	1.33	ug/L	60.4		(0%-10%)		07/15/13	17:41
Sodium		1260	D	281	ug/L	11.8		(0%-10%)			
Vanadium	D	103	D	21.3	ug/L	3.07		(0%-10%)		07/24/13	12:14
Zinc	D	81.9	CD	17.5	ug/L	6.64		(0%-10%)			
Metals Analysis-Mercury											
Batch	1313922										
QC1202906686	329170001	DUP									
Mercury	U	4.52	U	4.40	ug/kg	N/A ^			NOR1	07/12/13	10:42
QC1202906682	LCS										
Mercury	116		B	118	ug/kg		102	(80%-120%)		07/12/13	10:35
QC1202906681	MB										

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QC Summary

Workorder: 329170

Client SDG: X0005

Project Description: RC-232 Soil

Page 7 of 7

Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-Mercury											
Batch	1313922										
Mercury			U	4.02	ug/kg					07/12/13	10:34
QC1202906683	329170001	MS									
Mercury	131	U	4.52	B	140	ug/kg	106	(80%-120%)	NOR1	07/12/13	10:39
QC1202906685	329170001	SDILT									
Mercury		U	0.018	DU	22.6	ug/L	N/A	(0%-10%)		07/12/13	10:44

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 X0005**

Method/Analysis Information

Product: pH
Analytical Batch: 1313837 **Method:** SW9045D pH

Sample Analysis

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

Sample ID	Client ID
329170001	J1RR71
329170002	J1RR72
1202906472	Laboratory Control Sample (LCS)
1202906473	329027001(J1RR68) Sample Duplicate (DUP)
1202906475	329170001(J1RR71) 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 samples were selected for QC analysis: 329027001 (J1RR68) and 329170001 (J1RR71).

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

The following samples from this sample group were received by the lab outside of the method specified holding time: 329170001 (J1RR71) and 329170002 (J1RR72).

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: 1201510 329170001 (J1RR71) and 329170002 (J1RR72).

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: 1313450 **Method:** SW846 9056A Anions
Prep Batch : 1313449 **Method:** SW846 9056A

Sample Analysis

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

Sample ID	Client ID
329170001	J1RR71
329170002	J1RR72

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# 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 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)

The ICV standard was above the required limits. The results for the following samples bracketed by the failing ICV are less than the MDL or are QC samples associated with these samples. Therefore, the data is deemed acceptable for Bromide and Orthophosphate. 329170001 (J1RR71) and 329170002 (J1RR72).

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

No samples were selected for QC analysis. Please see the additional comments section of the Narrative for details.

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

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

Duplicate Relative Percent Difference (RPD) Statement

The values for the sample and duplicate are less than the Practical Quantitation Limit (PQL); therefore, the RPD is not applicable for Chloride. 329170001 (J1RR71) and 329170002 (J1RR72).

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.

Manual Integrations

Manual integrations were not required for the samples in this SDG.

Additional Comments

Matrix QC was inadvertently not performed for SDG X0005. Batch QC was performed on client sample J1RR68 from SDG X0004, these data are reported. 329170001 (J1RR71) and 329170002 (J1RR72).

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: 1313804 **Method:** EPA 353.2 Nitrogen and Nitrate/Nitrite
Prep Batch : 1313803 **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
329170001	J1RR71
329170002	J1RR72
1202906412	Method Blank (MB)
1202906413	Laboratory Control Sample (LCS)
1202906414	329027001(J1RR68) Sample Duplicate (DUP)
1202906415	329027001(J1RR68) Matrix Spike (MS)
1202906419	329170001(J1RR71) Sample Duplicate (DUP)
1202906420	329170001(J1RR71) 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 samples were selected for QC analysis: 329027001 (J1RR68) and 329170001 (J1RR71).

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

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

Duplicate Relative Percent Difference (RPD) Statement

The Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample: 1202906414 (J1RR68).

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: 1202576 1202906414 (J1RR68).

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: 1315407 **Method:** SW846_7196A Hexavalent Chromium
Prep Batch : 1315406 **Method:** SW846 3060A

Sample Analysis

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

Sample ID	Client ID
329170001	J1RR71
329170002	J1RR72
1202910159	Method Blank (MB)
1202910160	Laboratory Control Sample (LCS)
1202910161	329027001(J1RR68) Sample Duplicate (DUP)
1202910162	329027001(J1RR68) Matrix Spike (MS)
1202910163	329027001(J1RR68) Matrix Spike Duplicate (MSD)
1202910164	329170001(J1RR71) Sample Duplicate (DUP)
1202910165	329170001(J1RR71) Matrix Spike (MS)
1202910166	329170001(J1RR71) Matrix Spike Duplicate (MSD)
1202910167	329170001(J1RR71) Matrix Spike (MS)
1202910168	329027001(J1RR68) Matrix Spike (MS)
1202910169	329027001(J1RR68) Matrix Spike Duplicate (MSD)
1202910170	329170001(J1RR71) Matrix Spike Duplicate (MSD)
1202910533	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 samples were selected for QC analysis: 329027001 (J1RR68) and 329170001 (J1RR71).

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

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

Matrix Spike Duplicate (MSD) Recovery Statement

The spike duplicate recovery falls outside of the established acceptance limits. Since both the spike recovery and the RPD between the spike and spike duplicate fall within acceptance limits, the data is reported. 1202910162 (J1RR68) and 1202910163 (J1RR68).

MS/MSD Relative Percent Difference (RPD) Statement

The RPDs between the spike and spike duplicate met the acceptance limits.

Duplicate Relative Percent Difference (RPD) Statement

The values for the sample and duplicate are less than the Practical Quantitation Limit (PQL); therefore, the RPD is not applicable. 1202910161 (J1RR68), 1202910164 (J1RR71) and 329170001 (J1RR71).

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: 1203307 1202910163 (J1RR68), 1202910168 (J1RR68) and 1202910170 (J1RR71).

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: 24 July 13

DATA EXCEPTION REPORT

Mo.Day Yr. 11-JUL-13	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: ELECTRODE	Test / Method: SW846 9045C/9045D, SW846 9045D	Matrix Type: Solid	Client Code: PAES, WCHN
Batch ID: 1313837	Sample Numbers: See below.		
Potentially affected work order(s)(SDG): 328601,328605,329027(X0004),329170(X0005)			
Application Issues: Container scanning event for custody missed Sample received out of holding			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Sample received out of holding:</p> <p>328601 001</p> <p>328605 001</p> <p>329027 001,002,003</p> <p>329170 001,002</p> <p>2. Container scanning event for custody missed:</p> <p>328601 001</p> <p>328605 001</p>		<p>1. Samples were received out of holding.</p> <p>2. Samples were not scanned to the analytical batch prior to analysis; however, they were in the analyst's custody at the time of analysis.</p>	

Originator's Name:
Lindsey Jensen 11-JUL-13

Data Validator/Group Leader:
Julia Hamilton 12-JUL-13

DATA EXCEPTION REPORT

Mo.Day Yr. 16-JUL-13	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: LACHAT Flow Injection Analyzer	Test / Method: EPA 353.2 Modified	Matrix Type: Solid	Client Code: GSWS, JEMZ, WCHN, WSRB
Batch ID: 1313804	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 328737,328742,329027(X0004),329122,329170(X0005),329241			
Application Issues: Failed Recovery for MS/PS Failed RPD for DUP			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Failed Recovery for MS/PS: QC 1202908602MS</p> <p>2. Failed RPD for DUP: QC 1202906414DUP</p>		<p>1. The spike recovery falls outside of the established acceptance limits due to matrix interference.</p> <p>2. The Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample.</p>	

Originator's Name:

Kristen Parson 16-JUL-13

Data Validator/Group Leader:

Thomas Lewis 16-JUL-13

DATA EXCEPTION REPORT

Mo.Day Yr. 17-JUL-13	Division: Other	Quality Criteria: SOP	Type: Process
Instrument Type: IC	Test / Method: ICX9056A_S	Matrix Type: Solid	Client Code: WCHN001
Batch ID: 1313450	Sample Numbers: All		
<p>Potentially affected work order(s)(SDG): 329027(X0004),329170(X0005)</p> <p>Application Issues: Failed Recovery for MS/PS</p>			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Failed Recovery for MS: 1202905603</p>		<p>1. The MS/PS failed required acceptance limits for Sulfate due to matrix interference. Of the remaining anions in the MS/PS, all meet required acceptance limits. The deviation is noted in the Case Narrative and DER, and the data has been reported.</p>	

Originator's Name:
Virginia Winger 17-JUL-13

Data Validator/Group Leader:
Mary Sherwood 17-JUL-13

DATA EXCEPTION REPORT

Mo.Day Yr. 17-JUL-13	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: VIS SPECTROMETER	Test / Method: SW846 7196A	Matrix Type: Solid	Client Code: ENRG, WCHN
Batch ID: 1315407	Sample Numbers: See Below		
<p>Potentially affected work order(s)(SDG): 329027(X0004),329170(X0005),329476</p> <p>Application Issues: Failed Recovery for MS/PS Failed Recovery for MSD/PSD</p>			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Failed Recovery for MSD/PSD: QC 1202910163MSD,</p>		<p>1. The spike duplicate recovery falls outside of the established acceptance limits. Since both the spike recovery and the RPD between the spike and spike duplicate fall within acceptance limits, the data is reported.</p>	

Originator's Name:

Travis Tola 17-JUL-13

Data Validator/Group Leader:

Thomas Lewis 19-JUL-13

Sample Data Summary

GEL LABORATORIES LLC

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**Certificate of Analysis Report
for**

WCHN001 WC-HANFORD, INC.

Client SDG: X0005 GEL Work Order: 329170 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.

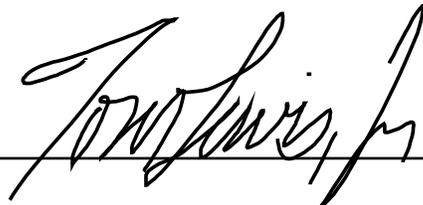
X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

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



GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: July 25, 2013

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

Client SDG: X0005

Client Sample ID: J1RR71	Project: WCHN00213
Sample ID: 329170001	Client ID: WCHN001
Matrix: SOIL	
Collect Date: 08-JUL-13 10:00	
Receive Date: 10-JUL-13	
Collector: Client	
Moisture: 11.1%	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Electrode Analysis											
SW9045D pH "As Received"											
pH at Temp 21.5C	X	8.63	0.010	0.100	pH	1	LXA1	07/11/13	1431	1313837	1
Ion Chromatography											
SW846 9056A Anions "Dry Weight Corrected"											
Bromide	U	0.754	0.754	2.25	mg/kg	1	VH1	07/17/13	0318	1313450	2
Chloride	B	1.24	0.754	2.25	mg/kg	1					
Fluoride	B	0.900	0.371	1.12	mg/kg	1					
Nitrate-N		1.39	0.371	1.12	mg/kg	1					
Nitrite-N	U	0.371	0.371	1.12	mg/kg	1					
O-Phosphate as P	U	0.754	0.754	2.25	mg/kg	1					
Sulfate		138	1.50	4.50	mg/kg	1					
Nutrient Analysis											
EPA 353.2 Nitrogen, Nitrate/Nitrite "Dry Weight Corrected"											
Nitrogen, Nitrate/Nitrite		1.29	0.189	0.555	mg/kg	1	KLP1	07/15/13	1609	1313804	3
Spectrometric Analysis											
SW846_7196A Hexavalent Chromium "Dry Weight Corrected"											
Hexavalent Chromium	U	0.176	0.176	0.441	mg/kg	1	TXT1	07/17/13	1518	1315407	4

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 353.2 Modified	EPA 353.2 Modified Nitrate/Nitrite	KLP1	07/15/13	1440	1313803
SW846 3060A	SW846_7196A Hexavalent Chromium in Soil	LXA1	07/17/13	1024	1315406
SW846 9056A	SW846 9056A Total Anions in Soil	VH1	07/16/13	1635	1313449

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9045D	
2	SW846 9056A	
3	EPA 353.2 Modified	
4	SW846 7196A	

Notes:

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: July 25, 2013

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

Client SDG: X0005

Client Sample ID: J1RR72	Project: WCHN00213
Sample ID: 329170002	Client ID: WCHN001
Matrix: SOIL	
Collect Date: 08-JUL-13 14:15	
Receive Date: 10-JUL-13	
Collector: Client	
Moisture: 5.73%	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Electrode Analysis											
SW9045D pH "As Received"											
pH at Temp 21.5C	X	9.00	0.010	0.100	pH	1	LXA1	07/11/13	1433	1313837	1
Ion Chromatography											
SW846 9056A Anions "Dry Weight Corrected"											
Bromide	U	0.711	0.711	2.12	mg/kg	1	VH1	07/17/13	0348	1313450	2
Chloride	B	1.10	0.711	2.12	mg/kg	1					
Fluoride		1.11	0.350	1.06	mg/kg	1					
Nitrate-N		1.34	0.350	1.06	mg/kg	1					
Nitrite-N	U	0.350	0.350	1.06	mg/kg	1					
O-Phosphate as P	U	0.711	0.711	2.12	mg/kg	1					
Sulfate		5.27	1.41	4.24	mg/kg	1					
Nutrient Analysis											
EPA 353.2 Nitrogen, Nitrate/Nitrite "Dry Weight Corrected"											
Nitrogen, Nitrate/Nitrite		1.10	0.175	0.514	mg/kg	1	KLP1	07/15/13	1613	1313804	3
Spectrometric Analysis											
SW846_7196A Hexavalent Chromium "Dry Weight Corrected"											
Hexavalent Chromium	U	0.169	0.169	0.423	mg/kg	1	TXT1	07/17/13	1526	1315407	4

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 353.2 Modified	EPA 353.2 Modified Nitrate/Nitrite	KLP1	07/15/13	1440	1313803
SW846 3060A	SW846_7196A Hexavalent Chromium in Soil	LXA1	07/17/13	1024	1315406
SW846 9056A	SW846 9056A Total Anions in Soil	VH1	07/16/13	1635	1313449

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9045D	
2	SW846 9056A	
3	EPA 353.2 Modified	
4	SW846 7196A	

Notes:

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 25, 2013

Page 1 of 3

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

Workorder: 329170

Client SDG: X0005

Project Description: RC-232 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Electrode Analysis											
Batch	1313837										
QC1202906475	329170001	DUP									
pH	X	8.63	X	8.67	pH	0.462		(0%-10%)	LXA1	07/11/13	14:32
QC1202906472	LCS										
pH	7.00			6.98	pH		99.7	(99%-101%)		07/11/13	14:02
Ion Chromatography											
Batch	1313450										
QC1202905602	329027001	DUP									
Bromide	U	0.715	U	0.715	mg/kg	N/A	^		VH1	07/17/13	01:19
Chloride	B	0.890	U	0.715	mg/kg	N/A	^	(+/-2.13)			
Fluoride	U	0.352	U	0.352	mg/kg	N/A	^				
Nitrate-N		2.48		2.51	mg/kg	1.28	^	(+/-1.07)			
Nitrite-N	U	0.352	U	0.352	mg/kg	N/A	^				
O-Phosphate as P	U	0.715	U	0.715	mg/kg	N/A	^				
Sulfate		32.5		32.2	mg/kg	0.756		(0%-20%)			
QC1202905604	LCS										
Bromide		12.5		13.1	mg/kg		105	(90%-110%)		07/17/13	00:19
Chloride		50.0		49.1	mg/kg		98.1	(90%-110%)			
Fluoride		25.0		26.2	mg/kg		105	(90%-110%)			
Nitrate-N		25.0		25.4	mg/kg		101	(90%-110%)			
Nitrite-N		25.0		26.5	mg/kg		106	(90%-110%)			
O-Phosphate as P		12.5		11.4	mg/kg		91	(90%-110%)			
Sulfate		100		103	mg/kg		103	(90%-110%)			
QC1202905601	MB										
Bromide			U	0.670	mg/kg					07/16/13	23:49

GEL LABORATORIES LLC

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QC Summary

Workorder: 329170

Client SDG: X0005

Project Description: RC-232 Soil

Page 2 of 3

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1313450										
Chloride			U	0.670	mg/kg				VH1	07/16/13	23:49
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						
QC1202905603 329027001 MS											
Bromide	13.3	U	0.715	12.8	mg/kg		96	(61%-133%)		07/17/13	01:49
Chloride	53.4	B	0.890	49.7	mg/kg		91.5	(60%-131%)			
Fluoride	26.7	U	0.352	20.1	mg/kg		75.2	(31%-122%)			
Nitrate-N	26.7		2.48	31.0	mg/kg		107	(63%-129%)			
Nitrite-N	26.7	U	0.352	26.1	mg/kg		97.9	(64%-132%)			
O-Phosphate as P	13.3	U	0.715	10.4	mg/kg		78	(23%-118%)			
Sulfate	107		32.5	203	mg/kg		160*	(55%-137%)			
Nutrient Analysis											
Batch	1313804										
QC1202906419 329170001 DUP											
Nitrogen, Nitrate/Nitrite			1.29	1.17	mg/kg	9.75	^	(+/-0.551)	KLP1	07/15/13	16:10
QC1202906413 LCS											
Nitrogen, Nitrate/Nitrite	10.0			9.95	mg/kg		99.5	(90%-110%)		07/15/13	15:50
QC1202906412 MB											
Nitrogen, Nitrate/Nitrite			U	0.170	mg/kg					07/15/13	15:49
QC1202906420 329170001 MS											
Nitrogen, Nitrate/Nitrite	11.1		1.29	11.6	mg/kg		93.4	(75%-125%)		07/15/13	16:11

Spectrometric Analysis

Batch 1315407

GEL LABORATORIES LLC

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QC Summary

Workorder: 329170

Client SDG: X0005

Project Description: RC-232 Soil

Page 3 of 3

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Spectrometric Analysis											
Batch	1315407										
QC1202910164	329170001	DUP									
Hexavalent Chromium		U	0.176	U	0.178	mg/kg	N/A ^		TXT1	07/17/13	15:19
QC1202910533	ILCS										
Hexavalent Chromium	8.00				8.02	mg/kg		100 (80%-120%)		07/17/13	14:42
QC1202910160	LCS										
Hexavalent Chromium	3.99				4.56	mg/kg		114 (80%-120%)		07/17/13	14:39
QC1202910159	MB										
Hexavalent Chromium			U		0.159	mg/kg				07/17/13	14:37
QC1202910165	329170001	MS									
Hexavalent Chromium	4.49	U	0.176		4.37	mg/kg		97.3 (75%-125%)		07/17/13	15:21
QC1202910166	329170001	MSD									
Hexavalent Chromium	4.46	U	0.176		4.22	mg/kg	3.58	94.5 (0%-30%)		07/17/13	15:22

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.

GEL LABORATORIES LLC

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QC Summary

Workorder: 329170

Client SDG: X0005

Project Description: RC-232 Soil

Page 4 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
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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: 1313742

Analyst: CXC1

Date/Time: 10-JUL-2013

Procedure Code DRY WEIGHT

Procedure Description Dry Weight-Percent Moisture

Lab Sop: GL-OA-E-020

Sample St	Sample Id	Rpd(%)
DUP	1202906309	.00244

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 (%)
329122001	SAMPLE		BALHD2000D	15:29	7.294	42.561	7.768	35.267	0.474	98.7
329170001	SAMPLE		BALHD2000D	15:29	7.292	32.568	29.766	25.276	22.474	11.1
329170002	SAMPLE		BALHD2000D	15:29	7.245	37.39	35.663	30.145	28.418	5.73
1202906309	DUP	329122001	BALHD2000D	15:29	7.09	39.886	7.53	32.796	0.44	98.7

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