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 9/24/13
INITIAL/DATE

COMMENTS:

SDG X0012 SAF-RC-232

Rad only ☑ Chem only Rad & Chem

☑ Complete Partial

REVISED TO ADD ICP-MS METALS

Sample Location: 100-D-105 – Confirmatory Test Pits Underlying Soils

GEL Laboratories LLC

a member of The GEL Group INC

PO Box 30712 Charleston, SC 29417
2040 Savage Road Charleston, SC 29407

P 843.556.8171 F 843.766.1178

www.gel.com

August 13, 2013

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

Re: RC-232 Soil
Work Order: 330494
SDG: X0012

Dear Joan Kessner:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on July 30, 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

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Case Narrative

Receipt Narrative
for
WC-HANFORD, INC.
SDG: X0012
Work Order: 330494

August 13, 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 30, 2013 for analysis.

Sample Identification: The laboratory received the following samples:

Laboratory ID	Client ID
330494001	J1RV22
330494002	J1RV23
330494003	J1RV25

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

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-232-039

Page ~~2 of 4~~ MAB 7-25-13

Collector: WF JACKSON	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Project Designation: 100-IU-2 & 100-IU-6 Remaining Waste Sites	Sampling Location: 100-D-105 - Confirmatory Test Pits Underlying Soils		SAF No.: RC-232
Ice Chest No.: WCH-11-072	Field Logbook No.: EL-1667	COA: C1D105A000	Method of Shipment: Fed Ex
Shipped To: Eberline - GEL	Offsite Property No.: A120896		Bill of Lading/Air Bill No.: See OSPC

Price Code: 8C

Data Turnaround: 15 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

None

Special Handling and/or Storage

Cool 4 C

Preservation	Cool 4C	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	Freeze			
Type of Container	G/P	G/P	G/P	aG	aG	aG	aGs*			
No. of Container(s)	1	1	1	1	1	1	5			
Volume	125mL	125mL	125mL	125mL	125mL	125mL	40mL			

SAMPLE ANALYSIS 330494

Sample No.	Matrix	Sample Date	Sample Time	See item (1) in Special Instructions	Chromium Hex - 7196	See item (2) in Special Instructions	TPH-Diesel Range - WTPH-D +	PAHs - 8310	PCBs - 8082	VOA - 5035/8260 (TCL)			
~~J1RV21~~	~~SOIL~~								MAB	7-25-13			
J1RV22	SOIL	7/25/13 MAB 7-25-13	0906	X	X	X		MAB 7-25-13					
J1RV23	SOIL	7/25/13 MAB 7-25-13	1040 1046 MAB 7-25-13	X	X	X							
~~J1RV24~~	~~SOIL~~	~~7/25/13~~	~~1300~~ MAB 7-25-13	~~X~~	~~X~~	~~X~~		MAB 7-25-13					
J1RV25	SOIL	7/25/13	1500 1300 MAB 7-25-13	X	X	Y							

CHAIN OF POSSESSION

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
WF W. (PB) JACKSON	7-25-13 1506	MA Bamberger	7-25 1506
MA Bamberger	7-25-13 1525	R. Fahlberg	7-25-13 1525
R. Fahlberg	7-25-13 1615	Joan Harrison	7-25-13 1615
~~Joan Harrison~~ Fridge #3C 1060 Battelle	7-25-13 1620	Fridge #3C 1060 Battelle	7-25-13 1620
Fridge #3 1060 Battelle	7-29-13 1030	Joan Harrison	7-29-13 1030
Joan Harrison	7-29-13 1040	fed EX	
		P. Kent Patrick Dent	7-30-13 08:50

FINAL SAMPLE DISPOSITION — Disposal Method: — Disposed By: — Date/Time:

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, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphate, Sulfate}; NO2/NO3 - 353.1 {Nitrogen in Nitrite and Nitrate}; pH (Soil) - 9045 {pH Measurement}

REVIEWED BY CWMB DATE 7-29-13

Generated Date/Time: 07/16/2013 08:47, PDT

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: WCHN	**SDG/AR/COC/Work Order:** 330494 XOO12
Received By: P. Kent	**Date Received:** 7-30-13

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?		X	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 CPM
Classified Radioactive II or III by RSO?		X	If yes, Were swipes taken of sample contatiners < action levels?
COC/Samples marked containing PCBs?		X	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		X	If yes, samples are to be segregeated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?		X	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		X	

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	X			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	X			Preservation Method: Ice bags Blue ice Dry ice None Other (describe) 3C *all temperatures are recorded in Celsius
2a	Daily check performed and passed on IR temperature gun?	X			Temperature Device Serial #: Secondary Temperature Device Serial # (If Applicable): 61524649
3	Chain of custody documents included with shipment?	X			
4	Sample containers intact and sealed?	X			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?		X		Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	VOA vials free of headspace (defined as < 6mm bubble)?		X		Sample ID's and containers affected:
7	Are Encore containers present?			X	(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	X			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	X			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	X			Sample ID's affected:
11	Number of containers received match number indicated on COC?	X			Sample ID's affected:
12	Are sample containers identifiable as GEL provided?			X	Clients
13	COC form is properly signed in relinquished/received sections?	X			
14	Carrier and tracking number.	X			Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other 7963 3616 8405-3c

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials NS Date 7/31/13 Page 1 of 1

Laboratory Certifications

List of current GEL Certifications as of 13 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 X0012

Sample Analysis

Sample ID	Client ID
330494001	J1RV22
330494002	J1RV23
330494003	J1RV25
1202919255	Method Blank (MB) **ICP**
1202919256	Laboratory Control Sample (LCS)
1202919259	330494001(J1RV22L) Serial Dilution (SD)
1202919257	330494001(J1RV22D) Sample Duplicate (DUP)
1202919258	330494001(J1RV22S) Matrix Spike (MS)
1202926267	330494001(J1RV22PS) Post Spike (PS)
1202919681	Method Blank (MB) **CVAA**
1202919682	Laboratory Control Sample (LCS)
1202919691	330494001(J1RV22L) Serial Dilution (SD)
1202919689	330494001(J1RV22D) Sample Duplicate (DUP)
1202919690	330494001(J1RV22S) Matrix Spike (MS)

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

Method/Analysis Information

Analytical Batch:	1319118 and 1319303
Prep Batch :	1319087 and 1319295
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-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 selenium and zinc. PQL01 (analyzed at 13:08 on 08/09/13) recovered high for selenium and PQL03 (analyzed at 19:06 on 08/12/13) recovered high for zinc; 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: 330494001 (J1RV22).

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 silicon and sodium.

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 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 presence of matrix interferences with the exception of silicon and sodium.

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

Technical Information

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

holding time.

Preparation/Analytical Method Verification
All procedures were performed as stated in the SOP. Method SW-846 3050B is not a total digestion technique for most samples. It is a very strong acid digestion that will dissolve almost all elements that could become environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Sample Dilutions
Dilutions are performed to minimize matrix interferences resulting from elevated mineral element concentrations present in solid samples and/or to bring over range target analyte concentrations into the linear calibration range of the instrument. Samples in this SDG 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: 1210875. 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:** 02/13/13

DATA EXCEPTION REPORT

Mo.Day Yr.	**Division:**	**Quality Criteria:**	**Type:**
13-AUG-13	Industrial	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
ICP	SW846 3050B/6010C	Solid	WCHN
Batch ID:	**Sample Numbers:**		
1319118	See Below		

Potentially affected work order(s)(SDG): 330494(X0012)

Application Issues:

Failed Recovery for MS/PS

Failed RPD for DUP

Specification and Requirements Exception Description:	**DER Disposition:**
1. Failed Recovery for MS/PS: QC 1202919258MS,1202926267PS 2. Failed RPD for DUP: QC 1202919257DUP	1. The matrix spike recovery failed outside of the control limits for silicon and sodium. The post spike failed outside the required control limits for silicon and sodium but passed for all other analytes. This verifies the presence of a matrix interference for silicon and sodium and verifies the absence of a matrix interference for all the other analytes. Per GEL's accredited methods and SOPs, a corrective action is not required and the data is qualified and reported. 2. The sample and sample duplicate % RPD failed outside the control limits for silicon due to possible sample non-homogeneity and/or matrix interference. Per GEL's accredited methods and SOPs, a corrective action is not required and the data is qualified and reported. Sample #330494001 is a multi-colored, granular material with small and large rocks.

Originator's Name:

Helen Camello 13-AUG-13

Data Validator/Group Leader:

Jerry Wigfall 13-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: X0012 GEL Work Order: 330494 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.

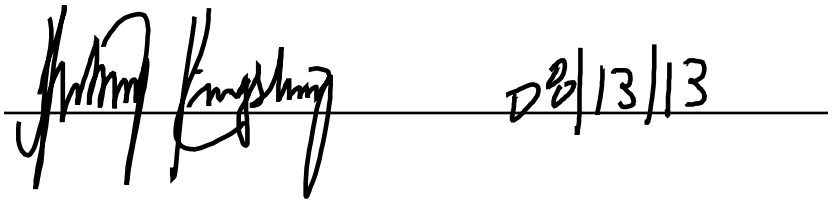
N Spike Sample recovery is outside control limits.

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  12/13/13

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

Certificate of Analysis

Report Date: August 13, 2013

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

Client SDG: X0012

Client Sample ID: J1RV22
Sample ID: 330494001
Matrix: SOIL
Collect Date: 25-JUL-13 09:06
Receive Date: 30-JUL-13
Collector: Client
Moisture: 4.47%

Project: WCHN00213
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	U	0.00402	0.00402	0.012	mg/kg	1	NOR1	08/02/13	1327	1319303	1
Metals Analysis-ICP											
ICP METALS 6010TR Close-out List "Dry Weight Corrected"											
Aluminum		5830	6.37	18.7	mg/kg	1	HSC	08/08/13	1926	1319118	2
Arsenic	U	0.468	0.468	2.81	mg/kg	1					
Barium		66.4	0.0936	0.468	mg/kg	1					
Beryllium		1.26	0.0936	0.468	mg/kg	1					
Boron	B	1.25	0.936	4.68	mg/kg	1					
Cadmium		0.884	0.0936	0.468	mg/kg	1					
Calcium		7060	7.49	23.4	mg/kg	1					
Chromium		7.87	0.140	0.468	mg/kg	1					
Copper		17.9	0.281	0.936	mg/kg	1					
Iron		31500	7.49	23.4	mg/kg	1					
Magnesium		5550	7.96	28.1	mg/kg	1					
Manganese		399	0.187	0.936	mg/kg	1					
Molybdenum	U	0.187	0.187	0.936	mg/kg	1					
Nickel		9.91	0.140	0.468	mg/kg	1					
Silver	U	0.0936	0.0936	0.468	mg/kg	1					
Potassium		773	5.99	23.4	mg/kg	1	HSC	08/09/13	2155	1319118	3
Selenium		9.95	0.468	2.81	mg/kg	1					
Silicon	*N	577	1.40	9.36	mg/kg	1					
Sodium	N	476	6.55	23.4	mg/kg	1					
Antimony	BD	4.33	1.54	4.68	mg/kg	5	HSC	08/12/13	1847	1319118	4
Cobalt	D	12.2	0.702	2.34	mg/kg	5					
Lead	BD	2.28	1.54	4.68	mg/kg	5					
Vanadium	D	111	0.468	2.34	mg/kg	5					
Zinc	D	59.0	1.87	4.68	mg/kg	5					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	SW846 3050B Prep for 6010C	AXG2	08/07/13	1100	1319087
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	08/01/13	1632	1319295

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

Certificate of Analysis

Report Date: August 13, 2013

Company :	WC-Hanford, Inc.		
Address :	2620 Fermi Avenue MSIN H4-21 Richland, Washington 99354		
Contact:	Joan Kessner	Client SDG:	X0012
Project:	RC-232 Soil		

Client Sample ID:	J1RV22	Project:	WCHN00213
Sample ID:	330494001	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: August 13, 2013

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil
Client SDG: X0012

Client Sample ID: J1RV23
Sample ID: 330494002
Matrix: SOIL
Collect Date: 25-JUL-13 10:40
Receive Date: 30-JUL-13
Collector: Client
Moisture: 3.01%
Project: WCHN00213
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	U	0.00386	0.00386	0.0115	mg/kg	1	NOR1	08/02/13	1333	1319303	1
Metals Analysis-ICP											
ICP METALS 6010TR Close-out List "Dry Weight Corrected"											
Aluminum		5390	6.72	19.8	mg/kg	1	HSC	08/08/13	1920	1319118	2
Arsenic	U	0.494	0.494	2.96	mg/kg	1					
Barium		66.4	0.0988	0.494	mg/kg	1					
Beryllium		1.28	0.0988	0.494	mg/kg	1					
Boron	B	1.14	0.988	4.94	mg/kg	1					
Cadmium		0.874	0.0988	0.494	mg/kg	1					
Calcium		7360	7.90	24.7	mg/kg	1					
Chromium		6.94	0.148	0.494	mg/kg	1					
Copper		17.8	0.296	0.988	mg/kg	1					
Iron		33600	7.90	24.7	mg/kg	1					
Magnesium		5540	8.39	29.6	mg/kg	1					
Manganese		389	0.198	0.988	mg/kg	1					
Molybdenum	U	0.198	0.198	0.988	mg/kg	1					
Nickel		9.41	0.148	0.494	mg/kg	1					
Silver	B	0.153	0.0988	0.494	mg/kg	1					
Potassium		846	6.32	24.7	mg/kg	1	HSC	08/09/13	2150	1319118	3
Selenium		9.93	0.494	2.96	mg/kg	1					
Silicon	*N	494	1.48	9.88	mg/kg	1					
Sodium	N	625	6.91	24.7	mg/kg	1					
Antimony	BD	4.08	1.63	4.94	mg/kg	5	HSC	08/12/13	1840	1319118	4
Cobalt	D	12.4	0.741	2.47	mg/kg	5					
Lead	BD	2.05	1.63	4.94	mg/kg	5					
Vanadium	D	121	0.494	2.47	mg/kg	5					
Zinc	D	62.1	1.98	4.94	mg/kg	5					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	SW846 3050B Prep for 6010C	AXG2	08/07/13	1100	1319087
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	08/01/13	1632	1319295

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

Certificate of Analysis

Report Date: August 13, 2013

Company :	WC-Hanford, Inc.		
Address :	2620 Fermi Avenue MSIN H4-21 Richland, Washington 99354		
Contact:	Joan Kessner	Client SDG:	X0012
Project:	RC-232 Soil		

Client Sample ID:	J1RV23	Project:	WCHN00213
Sample ID:	330494002	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: August 13, 2013

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

Client SDG: X0012

Client Sample ID: J1RV25
Sample ID: 330494003
Matrix: SOIL
Collect Date: 25-JUL-13 15:00
Receive Date: 30-JUL-13
Collector: Client
Moisture: 17%

Project: WCHN00213
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	B	0.0093	0.00445	0.0133	mg/kg	1	NOR1	08/02/13	1335	1319303	1
Metals Analysis-ICP											
ICP METALS 6010TR Close-out List "Dry Weight Corrected"											
Aluminum		8720	7.94	23.3	mg/kg	1	HSC	08/08/13	1923	1319118	2
Arsenic	U	0.584	0.584	3.50	mg/kg	1					
Barium		91.2	0.117	0.584	mg/kg	1					
Beryllium		0.962	0.117	0.584	mg/kg	1					
Boron	B	2.06	1.17	5.84	mg/kg	1					
Cadmium		0.600	0.117	0.584	mg/kg	1					
Calcium		7840	9.34	29.2	mg/kg	1					
Chromium		16.3	0.175	0.584	mg/kg	1					
Copper		23.0	0.350	1.17	mg/kg	1					
Iron		40800	9.34	29.2	mg/kg	1					
Magnesium		5420	9.92	35.0	mg/kg	1					
Manganese		435	0.233	1.17	mg/kg	1					
Molybdenum	U	0.233	0.233	1.17	mg/kg	1					
Nickel		13.9	0.175	0.584	mg/kg	1					
Silver	B	0.186	0.117	0.584	mg/kg	1					
Potassium		1430	7.47	29.2	mg/kg	1	HSC	08/09/13	2153	1319118	3
Selenium		11.6	0.584	3.50	mg/kg	1					
Silicon	*N	773	1.75	11.7	mg/kg	1					
Sodium	N	412	8.17	29.2	mg/kg	1					
Antimony	DU	1.93	1.93	5.84	mg/kg	5	HSC	08/12/13	1844	1319118	4
Cobalt	D	10.5	0.875	2.92	mg/kg	5					
Lead	BD	3.32	1.93	5.84	mg/kg	5					
Vanadium	D	69.8	0.584	2.92	mg/kg	5					
Zinc	D	50.8	2.33	5.84	mg/kg	5					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	SW846 3050B Prep for 6010C	AXG2	08/07/13	1100	1319087
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	08/01/13	1632	1319295

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

Certificate of Analysis

Report Date: August 13, 2013

Company :	WC-Hanford, Inc.		
Address :	2620 Fermi Avenue MSIN H4-21 Richland, Washington 99354		
Contact:	Joan Kessner	Client SDG:	X0012
Project:	RC-232 Soil		

Client Sample ID:	J1RV25	Project:	WCHN00213
Sample ID:	330494003	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

QC Summary

Report Date: August 13, 2013

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

Contact: **Joan Kessner**

Workorder: **330494** **Client SDG:** X0012 **Project Description:** RC-232 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP										
Batch 1319118										
QC1202919257 330494001 DUP										
Aluminum		5830		6360	mg/kg	8.80		(0%-20%)	HSC	08/08/13 19:28
Antimony	BD	4.33	BD	4.04	mg/kg	6.99 ^		(+/-4.62)		08/12/13 18:50
Arsenic	U	0.468	U	0.462	mg/kg	N/A ^				08/08/13 19:28
Barium		66.4		58.9	mg/kg	12.1		(0%-20%)		
Beryllium		1.26		1.30	mg/kg	3.68 ^		(+/-0.462)		
Boron	B	1.25	B	1.27	mg/kg	2.12 ^		(+/-4.62)		
Cadmium		0.884		0.898	mg/kg	1.58 ^		(+/-0.462)		
Calcium		7060		7450	mg/kg	5.46		(0%-20%)		
Chromium		7.87		7.33	mg/kg	7.11		(0%-20%)		
Cobalt	D	12.2	D	12.5	mg/kg	2.50		(0%-20%)		08/12/13 18:50
Copper		17.9		17.2	mg/kg	4.43		(0%-20%)		08/08/13 19:28
Iron		31500		32700	mg/kg	3.75		(0%-20%)		
Lead	BD	2.28	BD	2.37	mg/kg	4.05 ^		(+/-4.62)		08/12/13 18:50
Magnesium		5550		5310	mg/kg	4.30		(0%-20%)		08/08/13 19:28
Manganese		399		415	mg/kg	3.95		(0%-20%)		
Molybdenum	U	0.187	U	0.185	mg/kg	N/A ^				
Nickel		9.91		8.98	mg/kg	9.85		(0%-20%)		
Potassium		773		871	mg/kg	11.9		(0%-20%)		08/09/13 21:58
Selenium		9.95		9.57	mg/kg	3.92 ^		(+/-2.77)		
Silicon	*N	577	*	447	mg/kg	25.4*		(0%-20%)		

QC Summary

Workorder: 330494 **Client SDG:** X0012 **Project Description:** RC-232 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP										
Batch 1319118										
Silver		U	U	0.0925	mg/kg	N/A ^			HSC	08/08/13 19:28
Sodium		N		545	mg/kg	13.5		(0%-20%)		08/09/13 21:58
Vanadium		D	D	120	mg/kg	7.31		(0%-20%)		08/12/13 18:50
Zinc		D	D	61.8	mg/kg	4.73		(0%-20%)		
QC1202919256 LCS										
Aluminum	473			477	mg/kg		101	(80%-120%)		08/08/13 19:17
Antimony	47.3			48.8	mg/kg		103	(80%-120%)		08/12/13 18:34
Arsenic	47.3			52.1	mg/kg		110	(80%-120%)		08/08/13 19:17
Barium	47.3			49.6	mg/kg		105	(80%-120%)		
Beryllium	47.3			50.5	mg/kg		107	(80%-120%)		
Boron	47.3			49.6	mg/kg		105	(80%-120%)		
Cadmium	47.3			53.1	mg/kg		112	(80%-120%)		
Calcium	473			508	mg/kg		107	(80%-120%)		
Chromium	47.3			49.8	mg/kg		105	(80%-120%)		
Cobalt	47.3			48.4	mg/kg		102	(80%-120%)		08/12/13 18:34
Copper	47.3			49.7	mg/kg		105	(80%-120%)		08/08/13 19:17
Iron	473			494	mg/kg		104	(80%-120%)		
Lead	47.3			48.8	mg/kg		103	(80%-120%)		08/12/13 18:34
Magnesium	473			509	mg/kg		108	(80%-120%)		08/08/13 19:17
Manganese	47.3			50.4	mg/kg		106	(80%-120%)		
Molybdenum	47.3			50.3	mg/kg		106	(80%-120%)		
Nickel	47.3			50.3	mg/kg		106	(80%-120%)		

QC Summary

Workorder: 330494 **Client SDG:** X0012 **Project Description:** RC-232 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP										
Batch 1319118										
Potassium	473			520	mg/kg		110	(80%-120%)	HSC	08/09/13 21:47
Selenium	47.3			50.3	mg/kg		106	(80%-120%)		
Silicon	473			436	mg/kg		92	(80%-120%)		
Silver	47.3			49.2	mg/kg		104	(80%-120%)		08/08/13 19:17
Sodium	473			509	mg/kg		108	(80%-120%)		08/09/13 21:47
Vanadium	47.3			49.3	mg/kg		104	(80%-120%)		08/12/13 18:34
Zinc	47.3			49.6	mg/kg		105	(80%-120%)		
QC1202919255 MB										
Aluminum			U	6.48	mg/kg					08/08/13 19:14
Antimony			U	0.314	mg/kg					08/12/13 18:31
Arsenic			U	0.476	mg/kg					08/08/13 19:14
Barium			U	0.0952	mg/kg					
Beryllium			U	0.0952	mg/kg					
Boron			U	0.952	mg/kg					
Cadmium			U	0.0952	mg/kg					
Calcium			U	7.62	mg/kg					
Chromium			B	0.174	mg/kg					
Cobalt			U	0.143	mg/kg					08/12/13 18:31
Copper			U	0.286	mg/kg					08/08/13 19:14
Iron			U	7.62	mg/kg					
Lead			U	0.314	mg/kg					08/12/13 18:31
Magnesium			U	8.10	mg/kg					08/08/13 19:14

QC Summary

Workorder: 330494 **Client SDG:** X0012 **Project Description:** RC-232 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1319118											
Manganese				U	0.190	mg/kg				HSC	08/08/13 19:14
Molybdenum				U	0.190	mg/kg					
Nickel				U	0.143	mg/kg					
Potassium				U	6.10	mg/kg					08/09/13 21:44
Selenium				B	-1.06	mg/kg					
Silicon				U	1.43	mg/kg					
Silver				U	0.0952	mg/kg					08/08/13 19:14
Sodium				B	10.7	mg/kg					08/09/13 21:44
Vanadium				U	0.0952	mg/kg					08/12/13 18:31
Zinc				B	0.405	mg/kg					
QC1202919258 330494001 MS											
Aluminum	466		5830		7280	mg/kg		N/A	(75%-125%)		08/08/13 19:31
Antimony	46.6	BD	4.33	D	49.2	mg/kg		96.4	(75%-125%)		08/12/13 18:54
Arsenic	46.6	U	0.468		45.8	mg/kg		98.4	(75%-125%)		08/08/13 19:31
Barium	46.6		66.4		105	mg/kg		83.2	(75%-125%)		
Beryllium	46.6		1.26		46.2	mg/kg		96.5	(75%-125%)		
Boron	46.6	B	1.25		45.8	mg/kg		95.8	(75%-125%)		
Cadmium	46.6		0.884		45.9	mg/kg		96.7	(75%-125%)		
Calcium	466		7060		9220	mg/kg		N/A	(75%-125%)		
Chromium	46.6		7.87		50.5	mg/kg		91.5	(75%-125%)		
Cobalt	46.6	D	12.2	D	57.4	mg/kg		97.1	(75%-125%)		08/12/13 18:54
Copper	46.6		17.9		67.7	mg/kg		107	(75%-125%)		08/08/13 19:31

QC Summary

Workorder: 330494 **Client SDG:** X0012 **Project Description:** RC-232 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1319118											
Iron	466		31500		32700	mg/kg		N/A	(75%-125%)	HSC	08/08/13 19:31
Lead	46.6	BD	2.28	D	48.3	mg/kg		98.9	(75%-125%)		08/12/13 18:54
Magnesium	466		5550		6310	mg/kg		N/A	(75%-125%)		08/08/13 19:31
Manganese	46.6		399		468	mg/kg		N/A	(75%-125%)		
Molybdenum	46.6	U	0.187		45.1	mg/kg		96.9	(75%-125%)		
Nickel	46.6		9.91		54.0	mg/kg		94.6	(75%-125%)		
Potassium	466		773		1330	mg/kg		120	(75%-125%)		08/09/13 22:01
Selenium	46.6		9.95		54.5	mg/kg		95.7	(75%-125%)		
Silicon	466	*N	577	N	577	mg/kg		0*	(75%-125%)		
Silver	46.6	U	0.0936		45.0	mg/kg		96.5	(75%-125%)		08/08/13 19:31
Sodium	466	N	476	N	1100	mg/kg		133*	(75%-125%)		08/09/13 22:01
Vanadium	46.6	D	111	D	157	mg/kg		98.4	(75%-125%)		08/12/13 18:54
Zinc	46.6	D	59.0	D	105	mg/kg		99.9	(75%-125%)		
QC1202926267 330494001 PS											
Silicon	5000	*N	6160		13700	ug/L		150*	(80%-120%)		08/12/13 18:38
Sodium	5000	N	5090	C	13600	ug/L		170*	(80%-120%)		
QC1202919259 330494001 SDILT											
Aluminum			62200	D	13500	ug/L	8.75		(0%-10%)		08/08/13 19:34
Antimony		BD	9.26	D	7.41	ug/L	300		(0%-10%)		08/12/13 19:00
Arsenic		U	-1.03	DU	2.34	ug/L	N/A		(0%-10%)		08/08/13 19:34
Barium			710	D	144	ug/L	1.34		(0%-10%)		
Beryllium			13.4	D	3.03	ug/L	13		(0%-10%)		
Boron		B	13.3	DU	4.68	ug/L	N/A		(0%-10%)		

QC Summary

Workorder: 330494 **Client SDG:** X0012 **Project Description:** RC-232 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP										
Batch 1319118										
Cadmium		9.44	D	1.99	ug/L	5.6		(0%-10%)	HSC	08/08/13 19:34
Calcium		75400	D	16000	ug/L	6.19		(0%-10%)		
Chromium		84.1	CD	17.6	ug/L	4.65		(0%-10%)		
Cobalt	D	26.0	D	4.92	ug/L	5.32		(0%-10%)		08/12/13 19:00
Copper		192	D	36.4	ug/L	5.07		(0%-10%)		08/08/13 19:34
Iron		337000	D	71900	ug/L	6.68		(0%-10%)		
Lead	BD	4.87	DU	7.72	ug/L	N/A		(0%-10%)		08/12/13 19:00
Magnesium		59300	D	12500	ug/L	5.74		(0%-10%)		08/08/13 19:34
Manganese		4270	D	915	ug/L	7.23		(0%-10%)		
Molybdenum	U	-2.87	DU	0.936	ug/L	N/A		(0%-10%)		
Nickel		106	D	22.3	ug/L	5.38		(0%-10%)		
Potassium		8250	D	1760	ug/L	6.61		(0%-10%)		08/09/13 22:04
Selenium		106	D	21.5	ug/L	1.25		(0%-10%)		
Silicon	*N	6160	D	1300	ug/L	5.51		(0%-10%)		
Silver	U	0.679	DU	0.468	ug/L	N/A		(0%-10%)		08/08/13 19:34
Sodium	N	5090	CD	1110	ug/L	8.78		(0%-10%)		08/09/13 22:04
Vanadium	D	238	D	47.2	ug/L	.674		(0%-10%)		08/12/13 19:00
Zinc	D	126	CD	26.0	ug/L	3.18		(0%-10%)		
Metals Analysis-Mercury										
Batch 1319303										
QC1202919689 330494001 DUP										
Mercury	U	0.00402	U	0.00421	mg/kg	N/A ^			NOR1	08/02/13 13:28
QC1202919682 LCS										

QC Summary

Workorder: 330494 **Client SDG:** X0012 **Project Description:** RC-232 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-Mercury										
Batch 1319303										
Mercury	0.119			0.119	mg/kg		100	(80%-120%)		08/02/13 13:00
QC1202919681 MB										
Mercury			U	0.00392	mg/kg				NOR1	08/02/13 12:58
QC1202919690 330494001 MS										
Mercury	0.125	U	0.00402	0.132	mg/kg		106	(80%-120%)		08/02/13 13:30
QC1202919691 330494001 SDILT										
Mercury		U	0.010	DU 0.0201	ug/L	N/A		(0%-10%)		08/02/13 13:32

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 X0012

Method/Analysis Information

Product: **pH**

Analytical Batch: 1320493 **Method:** SW9045D pH

Sample Analysis

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

Sample ID	Client ID
330494001	J1RV22
330494002	J1RV23
330494003	J1RV25
1202922460	330494001(J1RV22) Sample Duplicate (DUP)
1202922462	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: 330494001 (J1RV22).

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: 1202922460 (J1RV22), 330494001 (J1RV22), 330494002 (J1RV23) and 330494003 (J1RV25).

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: 1209143 1202922460 (J1RV22), 330494001 (J1RV22), 330494002 (J1RV23) and 330494003 (J1RV25).

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:	1319594	**Method:**	SW846 9056A Anions
Prep Batch :	1319593	**Method:**	SW846 9056A

Sample Analysis

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

Sample ID	Client ID
330494001	J1RV22
330494002	J1RV23
330494003	J1RV25
1202920499	Method Blank (MB)
1202920500	330494001(J1RV22) Sample Duplicate (DUP)
1202920501	330494001(J1RV22) Matrix Spike (MS)
1202920502	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: 330494001 (J1RV22).

Matrix Spike (MS)/Post Spike (PS) Recovery Statement
The MS/PS recovery for this sample set was within the required acceptance limits.

Duplicate Relative Percent Difference (RPD) Statement
The RPD between the sample and its duplicate met the acceptance limits.

Technical Information

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

Holding Times
All samples in this SDG met the specified holding time.

Sample Dilutions
The samples in this SDG did not require dilutions.

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

Miscellaneous Information

Data Exception (DER) Documentation
Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Manual Integrations
The following samples from this sample group had to be manually integrated due to errors in the instrument software peak integration: 1202920500 (J1RV22), 330494001 (J1RV22), 330494002 (J1RV23) and 330494003 (J1RV25).

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:	1318211	**Method:**	EPA 353.2 Nitrogen and Nitrate/Nitrite
Prep Batch :	1318208	**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
330494001	J1RV22
330494002	J1RV23
330494003	J1RV25
1202917040	Method Blank (MB)
1202917045	Laboratory Control Sample (LCS)
1202919403	330494001(J1RV22) Sample Duplicate (DUP)
1202919405	330494001(J1RV22) 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+ 8000 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: 330494001 (J1RV22).

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:	1319557	**Method:**	SW846_7196A Hexavalent Chromium
Prep Batch :	1319556	**Method:**	SW846 3060A

Sample Analysis

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

Sample ID	Client ID
330494001	J1RV22
330494002	J1RV23
330494003	J1RV25
1202920390	Method Blank (MB)
1202920391	Laboratory Control Sample (LCS)
1202920401	330494001(J1RV22) Sample Duplicate (DUP)
1202920402	330494001(J1RV22) Matrix Spike (MS)
1202920403	330494001(J1RV22) Matrix Spike Duplicate (MSD)
1202920404	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: 330494001 (J1RV22).

Matrix Spike (MS)/Post Spike (PS) Recovery Statement
The MS/PS recovery for this sample set was within the required acceptance limits.

Matrix Spike Duplicate (MSD) Recovery Statement
The MSD recovery for this sample set was within the required acceptance limits.

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
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.

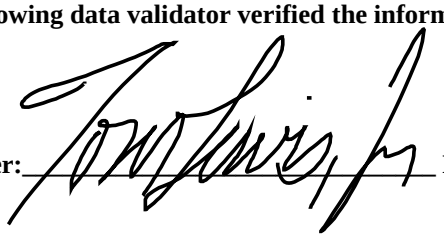
Certification Statement

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:** 12Aug13

DATA EXCEPTION REPORT

Mo.Day Yr.	**Division:**	**Quality Criteria:**	**Type:**
07-AUG-13	Industrial	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
ELECTRODE	SW846 9045D	Solid	THCG, WCHN
Batch ID:	**Sample Numbers:**		
1320493	See Below		

Potentially affected work order(s)(SDG): 330494(X0012),330624(X0013),330705(X0014),330707(X0015),330790(X0016),330819,330841,330842

Application Issues:

Sample received out of holding

Specification and Requirements Exception Description:	**DER Disposition:**
1. Sample received out of holding: 330494 001,002,003 330624 001,002,003 330705 001,002 330707 001 330790 001 330819 001 330841 001 330842 001 QC 1202922460DUP,1202922461DUP, 1202922590DUP, 1202922591DUP, 1202922592DUP	1. Sample received out of holding

Originator's Name:

Lisa Gregory 07-AUG-13

Data Validator/Group Leader:

Thomas Lewis 10-AUG-13

Sample Data Summary

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

Certificate of Analysis Report
for

WCHN001 WC-HANFORD, INC.

Client SDG: X0012 GEL Work Order: 330494 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).

C Target analyte was detected in the sample and the associated blank, and the sample concentration was <= 5 times the blank concentration.

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: August 10, 2013

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil
Client SDG: X0012

Client Sample ID: J1RV22
Sample ID: 330494001
Matrix: SOIL
Collect Date: 25-JUL-13 09:06
Receive Date: 30-JUL-13
Collector: Client
Moisture: 4.47%
Project: WCHN00213
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Electrode Analysis											
SW9045D pH "As Received"											
pH at Temp 20.8C		9.07	0.010	0.100	pH	1	LYG1	08/07/13	0926	1320493	1
Ion Chromatography											
SW846 9056A Anions "Dry Weight Corrected"											
Bromide	U	0.701	0.701	2.09	mg/kg	1	MAR1	08/07/13	0351	1319594	2
Chloride	B	1.01	0.701	2.09	mg/kg	1					
Fluoride	B	0.727	0.345	1.05	mg/kg	1					
Nitrate-N	U	0.345	0.345	1.05	mg/kg	1					
Nitrite-N	U	0.345	0.345	1.05	mg/kg	1					
O-Phosphate as P	U	0.701	0.701	2.09	mg/kg	1					
Sulfate	B	3.05	1.39	4.19	mg/kg	1					
Nutrient Analysis											
EPA 353.2 Nitrogen, Nitrate/Nitrite "Dry Weight Corrected"											
Nitrogen, Nitrate/Nitrite	U	0.180	0.180	0.530	mg/kg	1	KLP1	08/01/13	1151	1318211	3
Spectrometric Analysis											
SW846_7196A Hexavalent Chromium "Dry Weight Corrected"											
Hexavalent Chromium	U	0.164	0.164	0.411	mg/kg	1	LXA1	08/06/13	1434	1319557	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	08/01/13	1000	1318208
SW846 3060A	SW846_7196A Hexavalent Chromium in Soil	LXA1	08/02/13	1125	1319556
SW846 9056A	SW846 9056A Total Anions in Soil	MAR1	08/06/13	1400	1319593

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: August 10, 2013

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

Client SDG: X0012

Client Sample ID: J1RV23
Sample ID: 330494002
Matrix: SOIL
Collect Date: 25-JUL-13 10:40
Receive Date: 30-JUL-13
Collector: Client
Moisture: 3.01%

Project: WCHN00213
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Electrode Analysis											
SW9045D pH "As Received"											
pH at Temp 21.0C		9.41	0.010	0.100	pH	1	LYG1	08/07/13	0928	1320493	1
Ion Chromatography											
SW846 9056A Anions "Dry Weight Corrected"											
Bromide	U	0.691	0.691	2.06	mg/kg	1	MAR1	08/07/13	0530	1319594	2
Chloride	B	0.922	0.691	2.06	mg/kg	1					
Fluoride	B	0.650	0.340	1.03	mg/kg	1					
Nitrate-N	B	0.430	0.340	1.03	mg/kg	1					
Nitrite-N	U	0.340	0.340	1.03	mg/kg	1					
O-Phosphate as P	U	0.691	0.691	2.06	mg/kg	1					
Sulfate	B	2.29	1.37	4.12	mg/kg	1					
Nutrient Analysis											
EPA 353.2 Nitrogen, Nitrate/Nitrite "Dry Weight Corrected"											
Nitrogen, Nitrate/Nitrite	B	0.279	0.174	0.510	mg/kg	1	KLP1	08/01/13	1159	1318211	3
Spectrometric Analysis											
SW846_7196A Hexavalent Chromium "Dry Weight Corrected"											
Hexavalent Chromium	U	0.162	0.162	0.404	mg/kg	1	LXA1	08/06/13	1443	1319557	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	08/01/13	1000	1318208
SW846 3060A	SW846_7196A Hexavalent Chromium in Soil	LXA1	08/02/13	1125	1319556
SW846 9056A	SW846 9056A Total Anions in Soil	MAR1	08/06/13	1400	1319593

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
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Certificate of Analysis

Report Date: August 10, 2013

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

Client SDG: X0012

Client Sample ID: J1RV25
Sample ID: 330494003
Matrix: SOIL
Collect Date: 25-JUL-13 15:00
Receive Date: 30-JUL-13
Collector: Client
Moisture: 17%

Project: WCHN00213
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Electrode Analysis											
SW9045D pH "As Received"											
pH at Temp 21.0C		7.31	0.010	0.100	pH	1	LYG1	08/07/13	0930	1320493	1
Ion Chromatography											
SW846 9056A Anions "Dry Weight Corrected"											
Bromide	U	0.803	0.803	2.40	mg/kg	1	MAR1	08/07/13	0602	1319594	2
Chloride		8.66	0.803	2.40	mg/kg	1					
Fluoride	B	0.822	0.396	1.20	mg/kg	1					
Nitrate-N	U	0.396	0.396	1.20	mg/kg	1					
Nitrite-N	U	0.396	0.396	1.20	mg/kg	1					
O-Phosphate as P	U	0.803	0.803	2.40	mg/kg	1					
Sulfate		13.8	1.59	4.79	mg/kg	1					
Nutrient Analysis											
EPA 353.2 Nitrogen, Nitrate/Nitrite "Dry Weight Corrected"											
Nitrogen, Nitrate/Nitrite	B	0.459	0.218	0.641	mg/kg	1	KLP1	08/01/13	1200	1318211	3
Spectrometric Analysis											
SW846_7196A Hexavalent Chromium "Dry Weight Corrected"											
Hexavalent Chromium	BC	0.203	0.188	0.470	mg/kg	1	LXA1	08/06/13	1443	1319557	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	08/01/13	1000	1318208
SW846 3060A	SW846_7196A Hexavalent Chromium in Soil	LXA1	08/02/13	1125	1319556
SW846 9056A	SW846 9056A Total Anions in Soil	MAR1	08/06/13	1400	1319593

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: August 10, 2013

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

Contact: **Joan Kessner**

Workorder: **330494** **Client SDG:** X0012 **Project Description:** RC-232 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Electrode Analysis										
Batch 1320493										
QC1202922460 330494001 DUP										
pH		9.07		9.02	pH	0.553		(0%-10%)	LYG1	08/07/13 09:27
QC1202922462 LCS										
pH	7.00			7.02	pH		100	(99%-101%)		08/07/13 09:23
Ion Chromatography										
Batch 1319594										
QC1202920500 330494001 DUP										
Bromide	U	0.701	U	0.701	mg/kg	N/A ^			MAR1	08/07/13 04:24
Chloride	B	1.01	B	1.01	mg/kg	0.311 ^		(+/-2.09)		
Fluoride	B	0.727	B	0.735	mg/kg	1.00 ^		(+/-1.05)		
Nitrate-N	U	0.345	U	0.345	mg/kg	N/A ^				
Nitrite-N	U	0.345	U	0.345	mg/kg	N/A ^				
O-Phosphate as P	U	0.701	U	0.701	mg/kg	N/A ^				
Sulfate	B	3.05	B	2.98	mg/kg	2.29 ^		(+/-4.19)		
QC1202920502 LCS										
Bromide	12.5			12.8	mg/kg		103	(90%-110%)		08/07/13 03:18
Chloride	50.0			48.9	mg/kg		97.8	(90%-110%)		
Fluoride	25.0			25.3	mg/kg		101	(90%-110%)		
Nitrate-N	25.0			25.2	mg/kg		101	(90%-110%)		
Nitrite-N	25.0			25.0	mg/kg		99.9	(90%-110%)		
O-Phosphate as P	12.5			12.8	mg/kg		103	(90%-110%)		
Sulfate	100			100	mg/kg		100	(90%-110%)		
QC1202920499 MB										
Bromide			U	0.670	mg/kg					08/07/13 02:45

QC Summary

Workorder: 330494 **Client SDG:** X0012 **Project Description:** RC-232 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Ion Chromatography											
Batch 1319594											
Chloride				U	0.670	mg/kg				MAR1	08/07/13 02:45
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					
QC1202920501 330494001 MS											
Bromide	13.1	U	0.701		13.2	mg/kg		101	(70%-134%)		08/07/13 04:57
Chloride	52.3	B	1.01		50.1	mg/kg		93.8	(46%-150%)		
Fluoride	26.2	B	0.727		26.1	mg/kg		97	(34%-134%)		
Nitrate-N	26.2	U	0.345		25.6	mg/kg		96.5	(68%-129%)		
Nitrite-N	26.2	U	0.345		25.8	mg/kg		98.7	(68%-130%)		
O-Phosphate as P	13.1	U	0.701		13.2	mg/kg		97.3	(26%-124%)		
Sulfate	105	B	3.05		105	mg/kg		97.5	(50%-151%)		
Nutrient Analysis											
Batch 1318211											
QC1202919403 330494001 DUP											
Nitrogen, Nitrate/Nitrite		U	0.180	U	0.179	mg/kg	N/A ^			KLP1	08/01/13 11:52
QC1202917045 LCS											
Nitrogen, Nitrate/Nitrite	10.0				9.78	mg/kg		97.8	(90%-110%)		08/01/13 11:26
QC1202917040 MB											
Nitrogen, Nitrate/Nitrite				U	0.170	mg/kg					08/01/13 11:25
QC1202919405 330494001 MS											
Nitrogen, Nitrate/Nitrite	9.88	U	0.180		9.62	mg/kg		95.8	(75%-125%)		08/01/13 11:58
Spectrometric Analysis											
Batch 1319557											

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QC Summary

Workorder: 330494 **Client SDG:** X0012 **Project Description:** RC-232 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Spectrometric Analysis											
Batch 1319557											
QC1202920401 330494001 DUP											
Hexavalent Chromium		U	0.164	U	0.162	mg/kg	N/A ^			LXA1	08/06/13 14:34
QC1202920404 ILCS											
Hexavalent Chromium	7.98				8.23	mg/kg		103	(80%-120%)		08/06/13 11:44
QC1202920391 LCS											
Hexavalent Chromium	3.99				4.18	mg/kg		105	(80%-120%)		08/06/13 11:44
QC1202920390 MB											
Hexavalent Chromium				B	0.172	mg/kg					08/06/13 11:44
QC1202920402 330494001 MS											
Hexavalent Chromium	4.12	U	0.164		3.40	mg/kg		82.5	(75%-125%)		08/06/13 14:34
QC1202920403 330494001 MSD											
Hexavalent Chromium	4.00	U	0.164		3.36	mg/kg	1.21	84	(0%-30%)		08/06/13 14:34

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: 1318678
Analyst: CXC1
Date/Time: 30-JUL-2013
Procedure Code DRY WEIGHT
Procedure Description Dry Weight-Percent Moisture
Lab Sop: GL-OA-E-020

Sample St	Sample Id	Rpd(%)
DUP	1202918202	**4.718**

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 (%)
330494001	SAMPLE		BALHD2000D	14:58	7.288	35.293	34.042	28.005	26.754	4.47
330494002	SAMPLE		BALHD2000D	14:58	7.278	36.402	35.525	29.124	28.247	3.01
330494003	SAMPLE		BALHD2000D	14:58	7.27	43.219	37.113	35.949	29.843	17
1202918202	DUP	330494001	BALHD2000D	14:58	7.227	34.872	33.694	27.645	26.467	4.26

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

GEL Laboratories LLC
a member of The GEL Group INC

PO Box 30712 Charleston, SC 29417
2040 Savage Road Charleston, SC 29407
P 843.556.8171 F 843.766.1178

www.gel.com

September 18, 2013

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

Re: RC-232 Soil
Work Order: 333339
SDG: X0012A

Dear Joan Kessner:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on July 30, 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

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Case Narrative

Receipt Narrative
for
WC-HANFORD, INC.
SDG: X0012A
Work Order: 333339

September 18, 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 30, 2013 for analysis.

Sample Identification: The laboratory received the following samples:

Laboratory ID	Client ID
333339001	J1RV22
333339002	J1RV23
333339003	J1RV25

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: Metals.

Orlette Johnson
Project Manager

Chain of Custody and Supporting Documentation

Washington Closure Hanford

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-232-039

Page ~~2 of 4~~ MAB 7-25-13

Collector: WF JACKSON	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Project Designation: 100-IU-2 & 100-IU-6 Remaining Waste Sites	Sampling Location: 100-D-105 - Confirmatory Test Pits Underyling Soils		SAF No.: RC-232
Ice Chest No.: WCH-11-072	Field Logbook No.: EL-1667	COA: C1D105A000	Method of Shipment: Fed Ex
Shipped To: Eberline - GEL	Offsite Property No.: A120896		Bill of Lading/Air Bill No.: See OSPC

Price Code: 8C

Data Turnaround: 15 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

None

Special Handling and/or Storage

Cool 4 C

Preservation	Cool 4C	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	Freeze			
Type of Container	G/P	G/P	G/P	aG	aG	aG	aGs*			
No. of Container(s)	1	1	1	1	1	1	5			
Volume	125mL	125mL	125mL	125mL	125mL	125mL	40mL			

SAMPLE ANALYSIS 330494

Sample No.	Matrix	Sample Date	Sample Time	See item (1) in Special Instructions	Chromium Hex - 7196	See item (2) in Special Instructions	TPH-Diesel Range - WTPH-D +	PAHs - 8310	PCBs - 8082	VOA - 5035/8260 (TCL)			
~~J1RV21~~	~~SOIL~~								MAB	7-25-13			
J1RV22	SOIL	7/25/13 MAB 7-25-13	0906	X	X	X		MAB 7-25-13					
J1RV23	SOIL	7/25/13 MAB 7-25-13	1040 1046 MAB 7-25-13	X	X	X							
~~J1RV24~~	~~SOIL~~	~~7/25/13~~	~~1300~~ MAB 7-25-13	~~X~~	~~X~~	~~X~~		MAB 7-25-13					
J1RV25	SOIL	7/25/13	1500 1300 MAB 7-25-13	X	X	Y							

CHAIN OF POSSESSION

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
WF W. (PB) JACKSON	7-25-13 1506	MA Bamberger	7-25 1506
MA Bamberger	7-25-13 1525	R. Fahlberg	7-25-13 1525
R. Fahlberg	7-25-13 1615	Joan Harrison	7-25-13 1615
~~Joan Harrison~~ Fridge #3C 1060 Battelle	7-25-13 1620	Fridge #3C 1060 Battelle	7-25-13 1620
Fridge #3 1060 Battelle	7-29-13 1030	Joan Harrison	7-29-13 1030
Joan Harrison	7-29-13 1040	Fed EX	
		P. Kent Patrick Dent	7-30-13 08:50

FINAL SAMPLE DISPOSITION — Disposal Method: — Disposed By: — Date/Time:

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, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphate, Sulfate}; NO2/NO3 - 353.1 {Nitrogen in Nitrite and Nitrate}; pH (Soil) - 9045 {pH Measurement}

REVIEWED BY CWMB DATE 7-29-13

Generated Date/Time: 07/16/2013 08:47, PDT

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: WCHN	**SDG/AR/COC/Work Order:** 330494 XOO12
Received By: P. Kent	**Date Received:** 7-30-13

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?		X	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 CPM
Classified Radioactive II or III by RSO?		X	If yes, Were swipes taken of sample contatiners < action levels?
COC/Samples marked containing PCBs?		X	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		X	If yes, samples are to be segregeated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?		X	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		X	

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	X			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	X			Preservation Method: Ice bags Blue ice Dry ice None Other (describe) 3C *all temperatures are recorded in Celsius
2a	Daily check performed and passed on IR temperature gun?	X			Temperature Device Serial #: Secondary Temperature Device Serial # (If Applicable): 61524649
3	Chain of custody documents included with shipment?	X			
4	Sample containers intact and sealed?	X			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?		X		Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	VOA vials free of headspace (defined as < 6mm bubble)?		X		Sample ID's and containers affected:
7	Are Encore containers present?			X	(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	X			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	X			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	X			Sample ID's affected:
11	Number of containers received match number indicated on COC?	X			Sample ID's affected:
12	Are sample containers identifiable as GEL provided?			X	Clients
13	COC form is properly signed in relinquished/received sections?	X			
14	Carrier and tracking number.	X			Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other 7963 3616 8405-3C

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials NS Date 7/31/13 Page 1 of 1

Laboratory Certifications

List of current GEL Certifications as of 18 September 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 X0012A

Sample Analysis

Sample ID	Client ID
333339001	J1RV22
333339002	J1RV23
333339003	J1RV25
1202947419	Method Blank (MB) **ICP-MS**
1202947420	Laboratory Control Sample (LCS)
1202947423	333339001(J1RV22L) Serial Dilution (SD)
1202947421	333339001(J1RV22D) Sample Duplicate (DUP)
1202947422	333339001(J1RV22S) Matrix Spike (MS)

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

Method/Analysis Information

Analytical Batch:	1330999
Prep Batch :	1330998
Standard Operating Procedures:	GL-MA-E-014 REV# 25 and GL-MA-E-009 REV# 22
Analytical Method:	SW846 3050B/6020A
Prep Method :	SW846 3050B

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 - ICPMS was performed on a Perkin Elmer ELAN 6100E inductively coupled plasma mass spectrometer (ICP-MS). The instrument is equipped with a cross-flow nebulizer, 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.

Calibration Information

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

CRDL Requirements
All CRDL standard(s) met the referenced advisory control limits.

ICSA/ICSAB Statement
All interference check samples (ICSA and ICSAB) associated with this SDG met the established acceptance criteria.

Continuing Calibration Blank (CCB) Requirements
All continuing calibration blanks (CCB) bracketing this batch met the established acceptance criteria.

Continuing Calibration Verification (CCV) Requirements
All continuing calibration verifications (CCV) bracketing this SDG met the acceptance criteria.

Quality Control (QC) Information

Method Blank (MB) Statement
The MB 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: 333339001 (J1RV22).

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. All applicable elements met the acceptance criteria.

Duplicate Relative Percent Difference (RPD) Statement
The 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 RL, a control

of +/-RL is used to evaluate the DUP results. All applicable analytes met these requirements.

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

Technical Information

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

Preparation/Analytical Method Verification
All procedures were performed as stated in the SOP. Method SW-846 3050B is not a total digestion technique for most samples. It is a very strong acid digestion that will dissolve almost all elements that could become environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Sample Dilutions
Dilutions are performed to minimize matrix interferences resulting from elevated mineral element concentrations present in solid samples and/or to bring over range target analyte concentrations into the linear calibration range of the instrument. Samples in this SDG were diluted the standard 2x for solids on the ICPMS.

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

Miscellaneous Information

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

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

includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Data Exception (DER) Documentation
Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report was not required for this SDG.

Additional Comments
Additional comments were not required for this SDG.

Certification Statement

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

Review Validation:

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

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

Reviewer: _____ **Date:** 09/18/13

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: X0012A GEL Work Order: 333339 Project: RC-232 Soil

The Qualifiers in this report are defined as follows:

* Duplicate analysis not within control limits

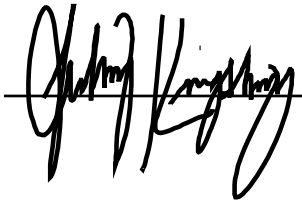
D Results are reported from a diluted aliquot of sample.

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

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  09/18/13

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

Certificate of Analysis

Report Date: September 18, 2013

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

Client SDG: X0012A

Client Sample ID:	J1RV22	Project:	WCHN00213
Sample ID:	333339001	Client ID:	WCHN001
Matrix:	SOIL		
Collect Date:	25-JUL-13 09:06		
Receive Date:	30-JUL-13		
Collector:	Client		
Moisture:	4.47%		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.316	0.316	1.00	mg/kg	2	SKJ	09/17/13	2058	1330999	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	AXG2	09/17/13	0820	1330998

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3050B/6020A	

Notes:

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

Certificate of Analysis

Report Date: September 18, 2013

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

Client SDG: X0012A

Client Sample ID:	J1RV23	Project:	WCHN00213
Sample ID:	333339002	Client ID:	WCHN001
Matrix:	SOIL		
Collect Date:	25-JUL-13 10:40		
Receive Date:	30-JUL-13		
Collector:	Client		
Moisture:	3.01%		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.312	0.312	1.00	mg/kg	2	SKJ	09/17/13	2127	1330999	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	AXG2	09/17/13	0820	1330998

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3050B/6020A	

Notes:

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

Certificate of Analysis

Report Date: September 18, 2013

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

Client SDG: X0012A

Client Sample ID:	J1RV25	Project:	WCHN00213
Sample ID:	333339003	Client ID:	WCHN001
Matrix:	SOIL		
Collect Date:	25-JUL-13 15:00		
Receive Date:	30-JUL-13		
Collector:	Client		
Moisture:	17%		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.394	0.394	1.20	mg/kg	2	SKJ	09/17/13	2133	1330999	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	AXG2	09/17/13	0820	1330998

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	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: September 18, 2013

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

Contact: **Joan Kessner**

Workorder: **333339** **Client SDG:** X0012A **Project Description:** RC-232 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS												
Batch 1330999												
QC1202947421 333339001 DUP												
Selenium		DU	0.316	DU	0.328	mg/kg	N/A ^			SKJ	09/17/13	21:04
QC1202947420 LCS												
Selenium	4.77			D	4.90	mg/kg		103	(80%-120%)		09/17/13	20:40
QC1202947419 MB												
Selenium				DU	0.299	mg/kg					09/17/13	20:34
QC1202947422 333339001 MS												
Selenium	4.77	DU	0.316	D	4.21	mg/kg		88.3	(75%-125%)		09/17/13	21:10
QC1202947423 333339001 SDILT												
Selenium		DU	-1.69	DU	1.58	ug/L	N/A		(0%-10%)		09/17/13	21:22

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

QC Summary

Workorder: 333339 **Client SDG:** X0012A **Project Description:** RC-232 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Miscellaneous

Prep Logbook

Acid Digestion of Sediments, Sludges, and Soils

Batch ID: **1330998.0**
Analyst: Anthony Green
Method: SW846 3050B
Lab SOP: GL-MA-E-009 REV# 22
Instrument: BAL-001

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1202947420	ICP-MS spiking soluiton A	UI1960544-A	.25	mL
LCS	1202947420	ICP-MS spiking solution B	UI1960549-B	.25	mL
MS	1202947422	ICP-MS spiking soluiton A	UI1960544-A	.25	mL
MS	1202947422	ICP-MS spiking solution B	UI1960549-B	.25	mL

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)
1202947419 MB	17-SEP-2013 08:20:17	Soil	0.551	50	90.7441
1202947420 LCS	17-SEP-2013 08:20:17	Soil	0.524	50	95.41985
333339001	17-SEP-2013 08:20:17	Soil	0.546	50	91.57509
1202947421 DUP (333339001)	17-SEP-2013 08:20:17	Soil	0.526	50	95.05703
1202947422 MS (333339001)	17-SEP-2013 08:20:17	Soil	0.549	50	91.07468
1202947423 SDILT (333339001)	17-SEP-2013 08:20:17	Soil	0.546	50	91.57509
333339002	17-SEP-2013 08:20:17	Soil	0.545	50	91.74312
333339003	17-SEP-2013 08:20:17	Soil	0.504	50	99.20635

Reagent/Solvent Lot ID	Description	Amount
1904936-02	Hydrogen Peroxide 30%	1.5 mL
1924940	Concentrated Nitric Acid	5 mL

Comments:

Block Temperature: 92 C

Thermometer ID: 118840

Hot Block ID: 9