

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 3/26/14
INITIAL/DATE

COMMENTS:

SDG XP0058

SAF-RC-232

Rad only

Chem only

Rad & Chem

Complete

Partial

Sample Location: 600-382:1



March 20, 2014

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

Re: RC-232 Soil
Work Order: 344484
SDG: XP0058

Dear Joan Kessner:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on March 13, 2014. 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-232-083
Enclosures



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Case Narrative

**Receipt Narrative
for
WC-HANFORD, INC.
SDG: XP0058
Work Order: 344484**

March 20, 2014

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 March 13, 2014 for analysis.

Sample Identification: The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
344484001	J1TFK5
344484002	J1TFK6
344484003	J1TFK8

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: Diesel Range Organics and Metals.



Orlette Johnson
Project Manager

Chain of Custody and Supporting Documentation

344484

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-232-083	Page 1 of 1
Collector WHITE, E.	Company Contact Joan Kessner	Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 8B	Data Turnaround
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites	Sampling Location 600-382:1		SAF No. RC-232	7 Days	
Ice Chest No. WCH-11-018	Field Logbook No. EL-1666-01	COA 0603822000	Method of Shipment Commercial Carrier - Fed Ex		
Shipped To GEL Laboratories Charleston	Offsite Property No. A131058		Bill of Lading/Air Bill No. See O5PC		
Other Labs Shipped To NA					

Sample No.	Matrix	Sample Date	Sample Time	Preservation	Cool 4C	Type of Container	No. of Container(s)	Volume	Sample Analysis	Sign/Print Names							
																Received By/Stored In	Date/Time
J1TFK5	SOIL	3-12-14	0920													R. Fallberg	3-12-14 0930
J1TFK6	SOIL	3-12-14	0920													R. Fallberg	3-12-14 0930
J1TFK7	SOIL	3-12-14	0915													R. Fallberg	3-12-14 0930
J1TFK8	SOIL	3-12-14	0915													R. Fallberg	3-12-14 0930

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)



XP0058

FINAL SAMPLE DISPOSITION	Disposal Method
WCH-EE-011	

SAMPLE RECEIPT & REVIEW FORM

Client: <u>WCHN</u>		SDG/AR/COC/Work Order: <u>344484</u>
Received By: <u>JP</u>		Date Received: <u>3-13-14</u>
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?	<input type="checkbox"/> <input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0cpm</u>
Classified Radioactive II or III by RSO?	<input type="checkbox"/> <input checked="" type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?	<input type="checkbox"/> <input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?	<input type="checkbox"/> <input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?	<input type="checkbox"/> <input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?	<input type="checkbox"/> <input checked="" type="checkbox"/>	

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Preservation Method: Ice bags Blue ice Dry ice None Other (describe) all temperatures are recorded in Celsius
2a	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>1304629101</u> Secondary Temperature Device Serial # (If Applicable):
3	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4	Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
7	Are Encore containers present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
11	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
12	Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
13	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
14	Carrier and tracking number.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other <u>7981 9043 2151</u>

Comments (Use Continuation Form if needed):

Laboratory Certifications

List of current GEL Certifications as of 20 March 2014

State	Certification
Alaska	UST-110
Arkansas	88-0651
CLIA	42D0904046
California NELAP	01151CA
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC000122013-10
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-12-00283, P330-12-00284
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC000122013-10
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA130005
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC000122013-10
Nebraska	NE-OS-26-13
Nevada	SC000122014-1
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 GVL	23611001
South Carolina Radiochemi	10120002
Tennessee	TN 02934
Texas NELAP	T104704235-14-9
Utah NELAP	SC000122013-11
Vermont	VT87156
Virginia NELAP	460202
Washington	C780-12
Wisconsin	999887790

FID Diesel Range Organics Analysis

Case Narrative

**FID Diesel Range Organics
WC-HANFORD, INC. (WCHN)
SDG XP0058**

Method/Analysis Information

Procedure: Analysis of Diesel Range Organics by Flame Ionization Detector
Analytical Method: NWTPH-Dx in Soil
Prep Method: SW846 3541
Analytical Batch Number: 1373304
Prep Batch Number: 1373303

Sample Analysis

The following samples were analyzed using the analytical protocol as established in NWTPH-Dx in Soil:

Sample ID	Client ID
344484001	J1TFK5
344484002	J1TFK6
1203051907	Method Blank (MB)
1203051908	Laboratory Control Sample (LCS)
1203052808	Laboratory Control Sample Duplicate (LCSD)

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

Preparation/Analytical Method Verification

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-003 REV# 24.

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

Calibration Information

Initial Calibration

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

Continuing Calibration Verification (CCV) Requirements

All associated calibration verification standard(s) (ICV or CCV) met the acceptance criteria. Analyte peaks eluted within the established retention time windows for this method.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria; however, the MB contained low level (below the PQL) of hydrocarbons.

Surrogate Recoveries

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

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Laboratory Control Sample Duplicate (LCSD) Recovery

The LCSD spike recoveries met the acceptance limits.

LCS/LCSD Relative Percent Difference (RPD) Statement

The RPD between the LCS and LCSD met the acceptance limits.

QC Sample Designation

The matrix spike and matrix spike duplicate analysis was not performed for this SDG due to limited sample amount. The LCS and LCSD analysis was performed to measure the precision and accuracy for the batch.

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. Analyte peaks eluted within the established retention time windows for this method.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

Re-extractions or re-analyses were not required in this SDG.

Miscellaneous Information

Electronic Package Comment

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

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative.

Data Exception (DER) Documentation

Data exception report (DER) is 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

Certain standards and samples may have required manual integration to correctly position the baseline as set in the calibration standard injections. If manual integration was performed, copies of all manual integration peak

profiles are included in the raw data section of this fraction.

Additional Comments

The additional comments field is used to address special issues associated with each analysis, clarify method/contractual issues pertaining to the analysis, and to list any report documents generated as a result of sample analysis or review. The additional comments were not required.

System Configuration

The Diesel Range Organics analysis was performed on the following instrument configuration:

Instrument ID	Instrument	System Configuration	Column ID	Column Description
FID7.I	Agilent Gas Chromatograph	Agilent 6890N GC/FID	DB-5MS	30m x 0.25mm, 0.25um(J&W)

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.

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: XP0058 GEL Work Order: 344484 Project: RC-232 Soil

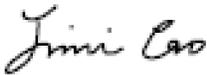
The Qualifiers in this report are defined as follows:

- B The analyte was detected in both the associated QC blank and in the sample.
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: 

Name: Jimin Cao

Date: 20 MAR 2014

Title: Data Validator

Sample Data Summary

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: March 20, 2014

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

Client SDG: XP0058

Client Sample ID: J1TFK5	Project: WCHN00213
Sample ID: 344484001	Client ID: WCHN001
Matrix: SOIL	
Collect Date: 12-MAR-14 09:20	
Receive Date: 13-MAR-14	
Collector: Client	
Moisture: 11.3%	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Diesel Range Organics											
SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"											
Diesel Range Organics (C10-C20)	U	2430	2430	7490	ug/kg	1	BYT1	03/19/14	1405	1373304	1
Motor Oil (C20-C36)	BJ	7400	2430	7490	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	3541 DRO IN SOIL PREP	AXV1	03/18/14	1704	1373303

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	NWTPH-Dx in Soil	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
o-Terphenyl	SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"	538 ug/kg	749	71.8	(50%-150%)

Notes:

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: March 20, 2014

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

Client SDG: XP0058

Client Sample ID: J1TFK6	Project: WCHN00213
Sample ID: 344484002	Client ID: WCHN001
Matrix: SOIL	
Collect Date: 12-MAR-14 09:20	
Receive Date: 13-MAR-14	
Collector: Client	
Moisture: 11.7%	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Diesel Range Organics											
SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"											
Diesel Range Organics (C10-C20)	U	2450	2450	7530	ug/kg	1	BYT1	03/19/14	1444	1373304	1
Motor Oil (C20-C36)	B	7550	2450	7530	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	3541 DRO IN SOIL PREP	AXV1	03/18/14	1704	1373303

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	NWTPH-Dx in Soil	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
o-Terphenyl	SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"	517 ug/kg	753	68.6	(50%-150%)

Notes:

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: March 20, 2014

Page 1 of 2

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

Workorder: 344484

Client SDG: XP0058

Project Description: RC-232 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Diesel Range Organics											
Batch	1373304										
QC1203051908	LCS										
Diesel Range Organics (C10-C20)	66500			53600	ug/kg		80.5	(70%-130%)	BYT1	03/19/14	12:47
Motor Oil (C20-C36)	66500		B	58100	ug/kg		87.3	(70%-130%)			
**o-Terphenyl	665			566	ug/kg		85.1	(50%-150%)			
QC1203052808	LCSD										
Diesel Range Organics (C10-C20)	66600			50100	ug/kg	6.68	75.2	(0%-20%)		03/19/14	13:26
Motor Oil (C20-C36)	66600		B	54500	ug/kg	6.34	81.8	(0%-20%)			
**o-Terphenyl	666			524	ug/kg		78.7	(50%-150%)			
QC1203051907	MB										
Diesel Range Organics (C10-C20)			U	2170	ug/kg					03/19/14	12:08
Motor Oil (C20-C36)			J	3390	ug/kg						
**o-Terphenyl	666			539	ug/kg		80.8	(50%-150%)			

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

GEL LABORATORIES LLC

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QC Summary

Workorder: 344484

Client SDG: XP0058

Project Description: RC-232 Soil

Page 2 of 2

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

- o Analyte failed to recover within LCS limits (Organics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

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

Miscellaneous

Prep Logbook

Extraction of Semivolatile and Nonvolatile Organic Compounds from Soil, Sludge, and Other Miscellaneous Solid Samples

Batch ID: 1373303 **Verified by:** _____
Analyst: Alberto Velasco
Method: SW846 3541

Lab SOP: GL-OA-E-010 REV# 21
Instrument: Semi-Volatiles Manual

Sample ID	Run Date	Aliquot (g)	Prepped Aliquot (mL)	Prepped Factor (mL/g)
1203051907 MB	18-MAR-2014 17:04:00	30.02	1	0.03331
1203051908 LCS	18-MAR-2014 17:04:00	30.07	1	0.03326
1203052808 LCSD	18-MAR-2014 17:04:00	30.03	1	0.0333
344484001	18-MAR-2014 17:04:00	30.11	1	0.03321
344484002	18-MAR-2014 17:04:00	30.07	1	0.03326

Type	Sample Id	Description	Serial Number	Spike Amt	Units	Comments:
LCS	1203051908	AZDRO SPIKE LCS STD,4000ug/ml	WFI140315-52	1	mL	Final Solvent: CH2Cl2 Verified By; CR
LCSD	1203052808	AZDRO SPIKE LCS STD,4000ug/ml	WFI140315-52	1	mL	
SURR	All	20 ppm surrogate	WE140227-04	1	mL	
REGNT	All	Methylene Chloride	2079698-D	120	mL	
SOURC	All	SODIUM SULFATE	2051933	30	g	

Metals Analysis

Case Narrative

**Metals Fractional Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0058**

Sample Analysis

Sample ID	Client ID
344484003	J1TFK8
1203050510	Method Blank (MB) ICP
1203050511	Laboratory Control Sample (LCS)
1203050514	344484003(J1TFK8L) Serial Dilution (SD)
1203050512	344484003(J1TFK8D) Sample Duplicate (DUP)
1203050513	344484003(J1TFK8S) Matrix Spike (MS)
1203053105	344484003(J1TFK8PS) Post Spike (PS)
1203050515	Method Blank (MB) ICP-MS
1203050516	Laboratory Control Sample (LCS)
1203050519	344484003(J1TFK8L) Serial Dilution (SD)
1203050517	344484003(J1TFK8D) Sample Duplicate (DUP)
1203050518	344484003(J1TFK8S) Matrix Spike (MS)
1203050952	Method Blank (MB) CVAA
1203050953	Laboratory Control Sample (LCS)
1203050956	344484003(J1TFK8L) Serial Dilution (SD)
1203050957	344484003(J1TFK8D) Sample Duplicate (DUP)
1203050954	344484003(J1TFK8S) Matrix Spike (MS)

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

Method/Analysis Information

Analytical Batch:	1372618, 1372622 and 1372804
Prep Batch :	1372617, 1372621 and 1372803
Standard Operating Procedures:	GL-MA-E-013 REV# 22, GL-MA-E-009 REV# 22, GL-MA-E-014 REV# 25 and GL-MA-E-010 REV# 27
Analytical Method:	SW846 3050B/6010C, SW846 3050B/6020A and SW846 7471B
Prep Method :	SW846 3050B and SW846 7471B Prep

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

System Configuration

The Metals analysis-ICP was performed on a P E 5300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with a Burgener nebulizer, cyclonic spray chamber, and yttrium or scandium internal standard. Operating conditions for the ICP are set at a power level of 1500 watts. The instrument has a peristaltic pump flow rate of 1.4L/min, argon gas flows of 15 L/min and 0.2 L/min for the torch and auxiliary gases, and a flow setting of 0.65L/min for the nebulizer.

The Metals analysis-ICP was performed on a PE 7300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with a Burgener nebulizer, cyclonic spray chamber, and yttrium or scandium internal standard. Operating conditions for the ICP are set at a power level of 1500 watts. The instrument has a peristaltic pump flow rate of 1.4L/min, argon gas flows of 15 L/min and 0.2 L/min for the torch and auxiliary gases, and a flow setting of 0.65L/min for the nebulizer.

The Metals analysis - ICPMS was performed on a Perkin Elmer ELAN 9000 inductively coupled plasma mass spectrometer (ICP-MS). The instrument is equipped with a cross-flow nebulizer, quadrupole mass spectrometer, and dual mode electron multiplier detector. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum. Operating conditions are set at 1400W power and combined argon pressures of 360+/- 7 kPa for the plasma and auxiliary gases, and 0.85 L/min carrier gas flow, and an initial lens voltage of 5.2.

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

Calibration Information

Instrument Calibration

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

CRDL Requirements

The CRDL standard recoveries 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 MBs analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Sample Statement

The following samples were selected as the quality control (QC) samples for this SDG: 344484003 (J1TFK8)-ICP, ICP-MS and CVAA.

Matrix Spike (MS) Recovery Statement

The percent recoveries (%R) obtained from the MS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The MS did not meet all the recommended quality control acceptance criteria for percent recoveries for the applicable analytes. The recoveries for aluminum, iron, manganese, and silicon were not within the acceptance limits in sample 1203050513 (J1TFK8)-ICP. See data exception report (DER ID 1276111) behind the case narrative in this data package.

Duplicate Relative Percent Difference (RPD) Statement

The relative percent difference (RPD) obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required reporting limit (RL). In cases where either the sample or duplicate value is less than 5X the contract required detection limit (RL), a control of +/-RL is used to evaluate the DUP results. Not all applicable analytes met these requirements. The RPD values for barium, iron, manganese, vanadium, and zinc were not within the acceptance limits. See data exception report (DER ID 1276111) behind the case narrative in this data package.

Post Spike (PS) Recovery Statement

The percent recoveries (%R) obtained from the PS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The PS met the recommended quality control acceptance criteria for percent recoveries for all applicable analytes and verifies the absence of matrix interferences in the post-digested sample.

Serial Dilution % Difference Statement

The serial dilution is used to assess matrix suppression or enhancement. Raw element concentrations 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 established acceptance criteria.

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. The samples in this SDG were diluted the standard two times for solids analyzed on the ICPMS.

Preparation Information

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

Miscellaneous Information

Electronic Packaging Comment

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

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

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. Data exception report (DER ID 1276111) was generated for this SDG.

Additional Comments

Additional comments were not required for this SDG.

Certification Statement

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

Review Validation:

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

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

Reviewer: Pat Steel Date: 03/20/2014

DATA EXCEPTION REPORT

Mo.Day Yr. 20-MAR-14	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: ICP	Test / Method: SW846 3050B/6010C	Matrix Type: Solid	Client Code: WCHN
Batch ID: 1372618	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 344484(XP0058)			
Application Issues: Failed Recovery for MS/PS Failed RPD for DUP			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Failed Recovery for MS/PS: QC 1203050513MS</p> <p>2. Failed RPD for DUP: QC 1203050512DUP</p>		<p>1. The matrix spike recovery failed outside of the control limits for aluminum,iron,manganese and silicon. The post spike passed the required control limits for all analytes. This verifies the absence of a matrix interference. Per GEL's accredited methods and SOPs, a corrective action is not required and the data is qualified and reported.</p> <p>2. The sample and sample duplicate % RPD failed outside the control limits for barium,manganese,vanadium,iron and zinc due to possible sample non-homogeneity and/or matrix interference. Per GEL's accredited methods and SOPs, a corrective action is not required and the data is qualified and reported.</p>	

Originator's Name:

Helen Camello 20-MAR-14

Data Validator/Group Leader:

Louise Smith 20-MAR-14

Sample Data Summary

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Qualifier Definition Report for

WCHN001 WC-HANFORD, INC.

Client SDG: XP0058 GEL Work Order: 344484 Project: RC-232 Soil

The Qualifiers in this report are defined as follows:

* Duplicate analysis not within control limits

B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).

D Results are reported from a diluted aliquot of sample.

N Spike Sample recovery is outside control limits.

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

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

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

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

Reviewed by

Pat Steel 03/20/2014

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Certificate of Analysis

Report Date: March 20, 2014

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

Client SDG: XP0058

Client Sample ID: J1TFK8
Sample ID: 344484003

Project: WCHN00213
Client ID: WCHN001

The following Analytical Methods were performed:

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

Notes:

Quality Control Summary

GEL LABORATORIES LLC

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QC Summary

Report Date: March 20, 2014

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

Workorder: 344484

Client SDG: XP0058

Project Description: RC-232 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1372622										
QC1203050517	344484003	DUP									
Selenium		DU	0.319	DU	0.322	mg/kg	N/A ^		BAJ	03/18/14	02:32
QC1203050516	LCS										
Selenium	4.97		D	4.80	mg/kg		96.6	(80%-120%)		03/18/14	02:06
QC1203050515	MB										
Selenium			DU	0.330	mg/kg					03/18/14	01:59
QC1203050518	344484003	MS									
Selenium	4.84	DU	0.319	D	4.40	mg/kg		91	(75%-125%)	03/18/14	02:39
QC1203050519	344484003	SDILT									
Selenium		DU	0.00	DU	1.60	ug/L	N/A	(0%-10%)		03/18/14	02:52
Metals Analysis-ICP											
Batch	1372618										
QC1203050512	344484003	DUP									
Aluminum		N	131		109	mg/kg		18.7	(0%-20%)	HSC	03/19/14 09:09
Antimony		U	0.320	U	0.326	mg/kg	N/A ^				
Arsenic		B	1.24	B	0.862	mg/kg	35.9 ^	(+/-2.97)		03/17/14	15:26
Barium		*	2.96	*	1.81	mg/kg	48.0*^	(+/-0.495)			
Beryllium		U	0.097	U	0.0989	mg/kg	N/A ^				
Boron		U	0.970	U	0.989	mg/kg	N/A ^				
Cadmium		U	0.097	U	0.0989	mg/kg	N/A ^				
Calcium			42.4		37.9	mg/kg	11.1 ^	(+/-24.7)			
Chromium		U	0.145	U	0.148	mg/kg	N/A ^				
Cobalt		B	0.429	U	0.148	mg/kg	98.9 ^	(+/-0.495)			
Copper		U	0.291	U	0.297	mg/kg	N/A ^				
Iron		*N	1060	*	236	mg/kg	127*	(0%-20%)		03/19/14	09:09

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QC Summary

Workorder: 344484

Client SDG: XP0058

Project Description: RC-232 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1372618										
Lead		1.20	B	0.491	mg/kg	83.9	^	(+/-0.989)	HSC	03/19/14	09:09
Magnesium	B	17.5	B	22.1	mg/kg	23.2	^	(+/-29.7)		03/17/14	15:26
Manganese	*N	20.6		6.62	mg/kg	103*		(0%-20%)		03/19/14	09:09
Molybdenum	U	0.194	U	0.198	mg/kg	N/A	^			03/17/14	15:26
Nickel	B	0.228	U	0.148	mg/kg	91.8	^	(+/-0.495)			
Potassium		39.0		38.0	mg/kg	2.64	^	(+/-24.7)		03/19/14	09:09
Silicon	N	189		164	mg/kg	14.5		(0%-20%)			
Silver	U	0.097	U	0.0989	mg/kg	N/A	^				
Sodium	B	9.07	U	6.92	mg/kg	32.4	^	(+/-24.7)		03/20/14	09:26
Vanadium	*	0.579	*U	0.0989	mg/kg	160*^		(+/-0.495)		03/17/14	15:26
Zinc	*	2.04	*	1.00	mg/kg	67.9*^		(+/-0.989)			
QC1203050511	LCS										
Aluminum		490		519	mg/kg			106 (80%-120%)		03/19/14	09:02
Antimony		49.0		49.3	mg/kg			101 (80%-120%)			
Arsenic		49.0		50.1	mg/kg			102 (80%-120%)		03/17/14	15:19
Barium		49.0		48.9	mg/kg			99.8 (80%-120%)			
Beryllium		49.0		50.3	mg/kg			103 (80%-120%)			
Boron		49.0		48.5	mg/kg			98.9 (80%-120%)			
Cadmium		49.0		49.4	mg/kg			101 (80%-120%)			
Calcium		490		511	mg/kg			104 (80%-120%)			
Chromium		49.0		48.8	mg/kg			99.5 (80%-120%)			
Cobalt		49.0		50.3	mg/kg			103 (80%-120%)			

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QC Summary

Workorder: 344484

Client SDG: XP0058

Project Description: RC-232 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1372618										
Copper	49.0			50.8	mg/kg		104	(80%-120%)	HSC	03/17/14	15:19
Iron	490			522	mg/kg		106	(80%-120%)		03/19/14	09:02
Lead	49.0			51.6	mg/kg		105	(80%-120%)			
Magnesium	490			509	mg/kg		104	(80%-120%)		03/17/14	15:19
Manganese	49.0			50.7	mg/kg		103	(80%-120%)		03/19/14	09:02
Molybdenum	49.0			48.8	mg/kg		99.5	(80%-120%)		03/17/14	15:19
Nickel	49.0			50.5	mg/kg		103	(80%-120%)			
Potassium	490			505	mg/kg		103	(80%-120%)		03/19/14	09:02
Silicon	490			453	mg/kg		92.4	(80%-120%)			
Silver	49.0			50.9	mg/kg		104	(80%-120%)			
Sodium	490			498	mg/kg		102	(80%-120%)		03/20/14	09:19
Vanadium	49.0			49.7	mg/kg		101	(80%-120%)		03/17/14	15:19
Zinc	49.0			48.9	mg/kg		99.8	(80%-120%)			
QC1203050510	MB										
Aluminum			U	6.68	mg/kg					03/19/14	08:58
Antimony			U	0.324	mg/kg						
Arsenic			U	0.491	mg/kg					03/17/14	15:16
Barium			U	0.0982	mg/kg						
Beryllium			U	0.0982	mg/kg						
Boron			U	0.982	mg/kg						
Cadmium			U	0.0982	mg/kg						
Calcium			U	7.86	mg/kg						

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QC Summary

Workorder: 344484

Client SDG: XP0058

Project Description: RC-232 Soil

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Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1372618										
Chromium			U	0.147	mg/kg				HSC	03/17/14	15:16
Cobalt			U	0.147	mg/kg						
Copper			U	0.295	mg/kg						
Iron			U	7.86	mg/kg					03/19/14	08:58
Lead			U	0.324	mg/kg						
Magnesium			U	8.35	mg/kg					03/17/14	15:16
Manganese			U	0.196	mg/kg					03/19/14	08:58
Molybdenum			U	0.196	mg/kg					03/17/14	15:16
Nickel			U	0.147	mg/kg						
Potassium			U	6.29	mg/kg					03/19/14	08:58
Silicon			U	1.47	mg/kg						
Silver			U	0.0982	mg/kg						
Sodium			U	6.88	mg/kg					03/20/14	09:15
Vanadium			U	0.0982	mg/kg					03/17/14	15:16
Zinc			U	0.393	mg/kg						
QC1203050513 344484003 MS											
Aluminum	482	N	131	N	834	mg/kg		146* (75%-125%)		03/19/14	09:13
Antimony	48.2	U	0.320		48.6	mg/kg		101 (75%-125%)			
Arsenic	48.2	B	1.24		48.7	mg/kg		98.5 (75%-125%)		03/17/14	15:29
Barium	48.2	*	2.96		49.9	mg/kg		97.4 (75%-125%)			
Beryllium	48.2	U	0.097		49.6	mg/kg		103 (75%-125%)			
Boron	48.2	U	0.970		47.8	mg/kg		98.2 (75%-125%)			

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QC Summary

Workorder: 344484

Client SDG: XP0058

Project Description: RC-232 Soil

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Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP												
Batch	1372618											
Cadmium	48.2	U	0.097		48.6	mg/kg		101	(75%-125%)	HSC	03/17/14	15:29
Calcium	482		42.4		551	mg/kg		106	(75%-125%)			
Chromium	48.2	U	0.145		48.1	mg/kg		99.4	(75%-125%)			
Cobalt	48.2	B	0.429		49.7	mg/kg		102	(75%-125%)			
Copper	48.2	U	0.291		50.3	mg/kg		104	(75%-125%)			
Iron	482	*N	1060	N	808	mg/kg		0*	(75%-125%)		03/19/14	09:13
Lead	48.2		1.20		51.2	mg/kg		104	(75%-125%)			
Magnesium	482	B	17.5		521	mg/kg		104	(75%-125%)		03/17/14	15:29
Manganese	48.2	*N	20.6	N	54.2	mg/kg		69.7*	(75%-125%)		03/19/14	09:13
Molybdenum	48.2	U	0.194		47.8	mg/kg		98.9	(75%-125%)		03/17/14	15:29
Nickel	48.2	B	0.228		50.0	mg/kg		103	(75%-125%)			
Potassium	482		39.0		562	mg/kg		109	(75%-125%)		03/19/14	09:13
Silicon	482	N	189	N	872	mg/kg		142*	(75%-125%)			
Silver	48.2	U	0.097		50.3	mg/kg		104	(75%-125%)			
Sodium	482	B	9.07		500	mg/kg		102	(75%-125%)		03/20/14	09:30
Vanadium	48.2	*	0.579		48.8	mg/kg		100	(75%-125%)		03/17/14	15:29
Zinc	48.2	*	2.04		49.1	mg/kg		97.7	(75%-125%)			
QC1203053105 344484003 PS												
Aluminum	5000	N	1350		6440	ug/L		102	(80%-120%)		03/19/14	09:16
Iron	5000	*N	10900		15900	ug/L		98.5	(80%-120%)			
Manganese	500	*N	213		711	ug/L		99.7	(80%-120%)			
Silicon	5000	N	1950		6830	ug/L		97.7	(80%-120%)			

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QC Summary

Workorder: 344484

Client SDG: XP0058

Project Description: RC-232 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1372618										
QC1203050514 344484003 SDILT											
Aluminum	N	1350	D	269	ug/L	.594		(0%-10%)	HSC	03/19/14	09:18
Antimony	U	-1.73	DU	1.60	ug/L	N/A		(0%-10%)			
Arsenic	B	12.8	DU	2.42	ug/L	N/A		(0%-10%)		03/17/14	15:32
Barium	*	30.5	D	5.80	ug/L	4.76		(0%-10%)			
Beryllium	U	0.952	DU	0.485	ug/L	N/A		(0%-10%)			
Boron	U	4.92	DU	4.85	ug/L	N/A		(0%-10%)			
Cadmium	U	0.345	DU	0.485	ug/L	N/A		(0%-10%)			
Calcium		437	D	107	ug/L	22		(0%-10%)			
Chromium	U	1.44	DU	0.727	ug/L	N/A		(0%-10%)			
Cobalt	B	4.43	DU	0.727	ug/L	N/A		(0%-10%)			
Copper	U	1.90	DU	1.45	ug/L	N/A		(0%-10%)			
Iron	*N	10900	D	2120	ug/L	3.05		(0%-10%)		03/19/14	09:18
Lead		12.4	DU	1.60	ug/L	N/A		(0%-10%)			
Magnesium	B	180	DU	41.2	ug/L	N/A		(0%-10%)		03/17/14	15:32
Manganese	*N	213	D	41.3	ug/L	2.99		(0%-10%)		03/19/14	09:18
Molybdenum	U	1.53	DU	0.970	ug/L	N/A		(0%-10%)		03/17/14	15:32
Nickel	B	2.35	DU	0.727	ug/L	N/A		(0%-10%)			
Potassium		402	D	70.2	ug/L	12.8		(0%-10%)		03/19/14	09:18
Silicon	N	1950	D	376	ug/L	3.5		(0%-10%)			
Silver	U	0.298	DU	0.485	ug/L	N/A		(0%-10%)			
Sodium	B	93.5	DU	33.9	ug/L	N/A		(0%-10%)		03/20/14	09:33

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QC Summary

Workorder: 344484

Client SDG: XP0058

Project Description: RC-232 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1372618										
Vanadium		*	5.97 D	1.25	ug/L	4.59		(0%-10%)	HSC	03/17/14	15:32
Zinc		*	21.0 D	4.18	ug/L	.557		(0%-10%)			
Metals Analysis-Mercury											
Batch	1372804										
QC1203050957	344484003	DUP									
Mercury		U	0.00397 U	0.00398	mg/kg	N/A ^			NOR1	03/17/14	15:52
QC1203050953	LCS										
Mercury	0.115			0.117	mg/kg		101	(80%-120%)		03/17/14	15:43
QC1203050952	MB										
Mercury			U	0.00402	mg/kg					03/17/14	15:41
QC1203050954	344484003	MS									
Mercury	0.118	U	0.00397	0.121	mg/kg		103	(80%-120%)		03/17/14	15:47
QC1203050956	344484003	SDILT									
Mercury		U	-0.02 DU	0.0198	ug/L	N/A		(0%-10%)		03/17/14	15:50

Notes:

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank, and the sample concentration was <= 5 times the blank concentration.
- D Results are reported from a diluted aliquot of sample.
- E Reported value is estimated due to interferences. See comment in narrative.
- M Duplicate precision not met.
- N Spike Sample recovery is outside control limits.
- S Reported value determined by the Method of Standard Additions (MSA)
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- W Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

GEL LABORATORIES LLC

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QC Summary

Workorder: 344484

Client SDG: XP0058

Project Description: RC-232 Soil

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<u>Parmname</u>	<u>NOM</u>	<u>Sample Qual</u>	<u>QC</u>	<u>Units</u>	<u>RPD/D%</u>	<u>REC%</u>	<u>Range</u>	<u>Anlst</u>	<u>Date</u>	<u>Time</u>
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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: 1372617	Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
Analyst: Monifa Basdeo	LCS	1203050511	Metals Spike Mix I	UI1977019-01	.25	mL
Method: SW846 3050B	LCS	1203050511	Metals Spike Mix II	UI1977022-06	.25	mL
Lab SOP: GL-MA-E-009 REV# 22	MS	1203050513	Metals Spike Mix I	UI1977019-01	.25	mL
Instrument: BAL-892	MS	1203050513	Metals Spike Mix II	UI1977022-06	.25	mL

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)
1203050510 MB	14-MAR-2014 15:00:51	Soil	0.509	50	98.23183
1203050511 LCS	14-MAR-2014 15:00:51	Soil	0.51	50	98.03922
344484003	14-MAR-2014 15:00:51	Soil	0.516	50	96.89922
1203050512 DUP (344484003)	14-MAR-2014 15:00:51	Soil	0.506	50	98.81423
1203050513 MS (344484003)	14-MAR-2014 15:00:51	Soil	0.519	50	96.33911
1203050514 SDILT (344484003)	14-MAR-2014 15:00:51	Soil	0.516	50	96.89922

Reagent/Solvent Lot ID	Description	Amount	Comments:
1961850	Concentrated Nitric Acid	1.25 mL	Block Temperature: 94 C
2056579	HYDROCHLORIC ACID	10 mL	Thermometer ID: 119015 Hot Block ID: 13 qc is tan/brown granular substance with small rocks present.

Prep Logbook

Acid Digestion of Sediments, Sludges, and Soils

Batch ID: 1372621	Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
Analyst: Anthony Green	LCS	1203050516	ICP-MS spiking solution A	UI2065986-A	.25	mL
Method: SW846 3050B	LCS	1203050516	ICP-MS spiking solution B	UI2065988-B	.25	mL
Lab SOP: GL-MA-E-009 REV# 22	MS	1203050518	ICP-MS spiking solution A	UI2065986-A	.25	mL
Instrument: BAL-001	MS	1203050518	ICP-MS spiking solution B	UI2065988-B	.25	mL

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)
1203050515 MB	17-MAR-2014 08:00:02	Soil	0.5	50	100
1203050516 LCS	17-MAR-2014 08:00:02	Soil	0.503	50	99.40358
344484003	17-MAR-2014 08:00:02	Soil	0.517	50	96.7118
1203050517 DUP (344484003)	17-MAR-2014 08:00:02	Soil	0.513	50	97.46589
1203050518 MS (344484003)	17-MAR-2014 08:00:02	Soil	0.517	50	96.7118
1203050519 SDILT (344484003)	17-MAR-2014 08:00:02	Soil	0.517	50	96.7118

Reagent/Solvent Lot ID	Description	Amount	Comments:
1976094-02	Hydrogen Peroxide 30%	1.5 mL	Block Temperature: 93 C
2059610	Concentrated Nitric Acid	5 mL	Thermometer ID: 118840 Hot Block ID: 9
			Sample 344484003 consist of tan, granular rock-like substance.

Prep Logbook

Mercury Analysis Using the Perkin Elmer Automated Mercury Analyzer

Batch ID: 1372803	Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
Analyst: Alan Stanley	LCS	1203050953	MHGSOILMSSPIKE	WHG140314-14	.3	mL
Method: SW846 7471B Prep	MS	1203050954	MHGSOILMSSPIKE	WHG140314-14	.3	mL
Lab SOP: GL-MA-E-010 REV# 27	MSD	1203050955	MHGSOILMSSPIKE	WHG140314-14	.3	mL
Instrument: Metals Manual Instrument						

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)
1203050952 MB	14-MAR-2014 16:00:29	Soil	0.5	30	60
1203050953 LCS	14-MAR-2014 16:00:29	Soil	0.52	30	57.69231
344484003	14-MAR-2014 16:00:29	Soil	0.507	30	59.1716
1203050954 MS (344484003)	14-MAR-2014 16:00:29	Soil	0.508	30	59.05512
1203050955 MSD (344484003)	14-MAR-2014 16:00:29	Soil	0.503	30	59.64215
1203050956 SDILT (344484003)	14-MAR-2014 16:00:29	Soil	0.507	30	59.1716
1203050957 DUP (344484003)	14-MAR-2014 16:00:29	Soil	0.506	30	59.28854
344550001	14-MAR-2014 16:00:29	Sludge	0.534	30	56.17978
344550002	14-MAR-2014 16:00:29	Soil	0.562	30	53.38078
344550003	14-MAR-2014 16:00:29	Sludge	0.533	30	56.28518
344550004	14-MAR-2014 16:00:29	Sludge	0.52	30	57.69231
344550005	14-MAR-2014 16:00:29	Soil	0.518	30	57.91506
344550006	14-MAR-2014 16:00:29	Sludge	0.521	30	57.58157
344550007	14-MAR-2014 16:00:29	Sludge	0.54	30	55.55556
344550008	14-MAR-2014 16:00:29	Sludge	0.545	30	55.04587
344550009	14-MAR-2014 16:00:29	Soil	0.556	30	53.95683
344550010	14-MAR-2014 16:00:29	Soil	0.523	30	57.36138
344550011	14-MAR-2014 16:00:29	Sludge	0.55	30	54.54545
344550012	14-MAR-2014 16:00:29	Soil	0.535	30	56.07477
344550013	14-MAR-2014 16:00:29	Sludge	0.573	30	52.35602
344550014	14-MAR-2014 16:00:29	Sludge	0.509	30	58.9391
344550015	14-MAR-2014 16:00:29	Sludge	0.549	30	54.64481
344550016	14-MAR-2014 16:00:29	Soil	0.512	30	58.59375
344550017	14-MAR-2014 16:00:29	Sludge	0.537	30	55.86592
344550018	14-MAR-2014 16:00:29	Soil	0.528	30	56.81818
344550019	14-MAR-2014 16:00:29	Sludge	0.537	30	55.86592

Reagent/Solvent Lot ID	Description	Amount	Comments:
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Prep Logbook

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)
Reagent/Solvent Lot ID	Description	Amount	Comments:		
2071784-C	5% KMnO4 solution	7.5 mL	Digestion Start Date: 14-MAR-2014 16:00		
2072331-C	Hg reducing agent	2 mL	Digestion End Date: 14-MAR-2014 16:30		
2077152-1	NITRIC ACID	.375 mL	Block Temperature: 95 C		
2079494-A	Hydrochloric Acid Conc.	1.125 mL	Thermometer ID: 118533		
WHG140314-07	Mercury Working Standard 1st Source CAL S 0.2/CRA	30 uL	Hot Block ID: 12		
WHG140314-08	Mercury Working Standard 1st Source CAL S 0.5	75 uL	The QC was a large sand like material.		
WHG140314-09	Mercury Working 1st Source CAL S 2.0	300 uL			
WHG140314-10	Mercury Working 1st Source CAL S 5.0/CCV	750 uL			
WHG140314-11	Mercury Working 1st Source CAL S 10.0	1500 uL			
WHG140314-12	Mercury Working 2nd Source S 5.0/ICV	750 uL			