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

COMPLETE COPY OF DATA PACKAGE TO:

Kathy Wendt H4-21 KW 8/28/13
INITIAL/DATE

COMMENTS:

SDG XP0005 SAF-RC-233

Rad only ☑ Chem only Rad & Chem

☑ Complete Partial

Sample Location: 600-356

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 26, 2013

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

Re: RC-233 Soil
Work Order: 331250
SDG: XP0005

Dear Joan Kessner:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on August 09, 2013. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,

Orlette Johnson
Project Manager

Purchase Order: 1510
Chain of Custody: RC-233-036
Enclosures

Table of Contents

Case Narrative.....1

Chain of Custody and Supporting Documentation.....3

Laboratory Certifications.....7

HPLC Polynuclear Aromatic Hydrocarbon Analysis.....9

Sample Data Summary.....17

QC Summary.....21

Miscellaneous Data.....26

FID Diesel Range Organics Analysis.....28

Case Narrative.....29

Sample Data Summary.....35

Quality Control Summary.....39

Miscellaneous.....42

Metals Analysis.....44

Case Narrative.....45

Sample Data Summary.....53

Quality Control Summary.....61

Case Narrative

Receipt Narrative
for
WC-HANFORD, INC.
SDG: XP0005
Work Order: 331250

August 26, 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 August 09, 2013 for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. GEL is not currently certified for NWTPH-Dx. The laboratory has successfully completed a PT study and is in the certification process.

Sample Identification: The laboratory received the following samples:

Laboratory ID	Client ID
331250001	J1RW93
331250002	J1RW94
331250003	J1RW95

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, HPLC Polynuclear Aromatic Hydrocarbon and Metals.

Orlette Johnson
Project Manager

Chain of Custody and Supporting Documentation

Washington Closure Hanford

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-233-036

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: 600-356		SAF No.: RC-233
Ice Chest No.: WCH-11-056	Field Logbook No.: EL-10666-01	COA: 0603562600	Method of Shipment: Fed Ex
Shipped To: Eberline - GEL	Offsite Property No.: A120902		Bill of Lading/Air Bill No.: See OSPC

Price Code: 8B — Data Turnaround: 7 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

None

Special Handling and/or Storage

Cool 4C

Preservation	Cool 4C	Cool 4C	Cool 4C								
Type of Container	G/P	aG	aG								
No. of Container(s)	1	1	1								
Volume	125mL	125mL	125mL								
SAMPLE ANALYSIS	See item (1) in Special Instructions	TPH-Diesel Range - WTPH-D +	PAHs - 8310								

Sample No.	Matrix	Sample Date	Sample Time									
J1RW93	SOIL	8-7-13	0742	X	X	X						
J1RW94	SOIL	8-7-13	0805	X	X	X						
J1RW95	SOIL	8-7-13	0820	X	X	X						
J1RW96	SOIL	MAB	8-7-13									
J1RW97	SOIL											

CHAIN OF POSSESSION

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
WF(BB) JACKSON	8-7-13/0830	MA Bamberger	8-7-13 0830
MA Bamberger	8-7-13 1005	B. Fahlberg	8-7-13 1005
B. Fahlberg	8-7-13 1600	A. Freier	8-7-13 1600
A. Freier	8-7-13 1602	1060 Battelle Ref # 1A	8-7-13 1602
Ref 1A 1060 Battelle	8/8/13 0845	DWShea DWSH&A	8/8/13 0845 *
DWShea DWSH&A	8/8/13 0858	Fed EX	

Sign/Print Names

FINAL SAMPLE DISPOSITION

Disposal Method: | Disposed By: | Date/Time:

WCH-EE-011

SPECIAL INSTRUCTIONS

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

* Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to lab.

REVIEWED BY AT DATE 8-8-13

XP0005

Generated Date/Time: 08/05/2013 16:15, PDT

331250

Washington Closure Hanford

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-233-036

Page 1 of 1

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: 600-356		SAF No.: RC-233
Ice Chest No.: WCH-11-056	Field Logbook No.: EL-16666-01	COA: 0603562600	Method of Shipment: Fed Ex
Shipped To: Eberline - GEL	Offsite Property No.: A120902		Bill of Lading/Air Bill No.: See OSPC

Price Code: 8B

Data Turnaround: 7 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

None

Special Handling and/or Storage

Cool 4C

Preservation	Cool 4C	Cool 4C	Cool 4C								
Type of Container	G/P	aG	aG								
No. of Container(s)	1	1	1								
Volume	125mL	125mL	125mL								
SAMPLE ANALYSIS	See item (1) in Special Instructions	TPH-Diesel Range - WTPH-D +	PAHs - 8310								
Sample No.	**Matrix**	**Sample Date**	**Sample Time**								
J1RW93	SOIL	8-7-13	0742	X	X	X					
J1RW94	SOIL	8-7-13	0805	X	X	X					
J1RW95	SOIL	8-7-13	0820	X	X	X					
J1RW96	SOIL	MAB	8-7-13								
J1RW97	SOIL										

CHAIN OF POSSESSION

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
WF(BB) JACKSON	8-7-13/0830	MA Bamberger	8-7-13 0830
MA Bamberger	8-7-13 1005	B. Fahlberg	8-7-13 1005
B. Fahlberg	8-7-13 1600	A. Freier	8-7-13 1600
A. Freier	8-7-13 1602	1060 Battelle Ref # 1A	8-7-13 1602
Ref 1A 1060 Battelle	8/8/13 0845	DWShea DWSHEA	8/8/13 0845 *
DWShea DWSHEA	8/8/13 0858	Fed EX	
		Jennifer Pellegrini	8-9-13 0900

Sign/Print Names

FINAL SAMPLE DISPOSITION

Disposal Method:

Disposed By:

Date/Time:

SPECIAL INSTRUCTIONS

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

* Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to lab.

REVIEWED BY AF DATE 8-8-13

XP0005

WCH-EE-011

Generated Date/Time: 08/05/2013 16:15, PDT

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: WCHN			**SDG/AR/COC/Work Order:** 331250
Received By: JP			**Date Received:** 8-9-13
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?		✓	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0cpm
Classified Radioactive II or III by RSO?		✓	If yes, Were swipes taken of sample contatiners < action levels?
COC/Samples marked containing PCBs?		✓	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		✓	If yes, samples are to be segregeated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		✓	

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	✓			Preservation Method: Ice bags Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius 3
2a	Daily check performed and passed on IR temperature gun?	✓			Temperature Device Serial #: 415022804 Secondary Temperature Device Serial # (If Applicable):
3	Chain of custody documents included with shipment?	✓			
4	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?		✓		Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	VOA vials free of headspace (defined as < 6mm bubble)?		✓		Sample ID's and containers affected:
7	Are Encore containers present?			✓	(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	✓			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	✓			Sample ID's affected:
11	Number of containers received match number indicated on COC?	✓			Sample ID's affected:
12	Are sample containers identifiable as GEL provided?			✓	
13	COC form is properly signed in relinquished/received sections?	✓			
14	Carrier and tracking number.				Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other 7964 2181 2949

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials JP Date 8-3-13 Page 1 of 1

Laboratory Certifications

List of current GEL Certifications as of 26 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

HPLC Polynuclear Aromatic Hydrocarbon Analysis

HPLC-PAH
WC-HANFORD, INC. (WCHN)
SDG XP0005

Method/Analysis Information

Procedure:	**Polynuclear Aromatic Hydrocarbons**
Analytical Method:	SW846 8310
Prep Method:	SW846 3550B
Analytical Batch Number:	1321780
Prep Batch Number:	1321778

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 8310:

Sample ID	Client ID
331250001	J1RW93
331250002	J1RW94
331250003	J1RW95
1202925802	Method Blank (MB)
1202925803	Laboratory Control Sample (LCS)
1202925804	331250001(J1RW93) Matrix Spike (MS)
1202925805	331250001(J1RW93) Matrix Spike Duplicate (MSD)

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

Preparation/Analytical Method Verification

SOP Reference
Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP).

The data discussed in this narrative has been analyzed in accordance with GL-OA-E-030 REV# 15.

Raw data reports are processed and reviewed by the analyst using the Target software package. False positives have been removed from the Target quantitation reports per standard operating procedures (SOP) section 18.0.

Calibration Information

Due to software limitations, the files displayed at the beginning of the Form 6 are only the last files uploaded for each individual level. A complete listing of all files used in the current ICAL are shown on the Calibration History that is included with each Level 4 or higher package. The last file by date in each level is the one currently uploaded for that level.

The linear equation used in Target and indicated on the initial calibration summary form is not a conventional linear equation (slope intercept formula) and does not match the equation found in SW-846 method 8000B. The x and y axes are inversed in Target, so that the instrument response is treated as the independent variable (x) and the concentration ratio is treated as the dependent variable (y). The equation used in Target to calculate sample results is adjusted to account for the linear equation inversion and reciprocal slope. The adjusted calculation has been independently verified to produce valid results.

Initial Calibration
All initial calibration requirements have been met for this SDG.

CCV Requirements
All associated calibration verification standards (ICV or CCV) met the acceptance criteria.

Quality Control (QC) Information

Method Blank (MB) Statement
The MB analyzed with this SDG met the acceptance criteria.

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

Laboratory Control Sample (LCS) Recovery
A high recovery for Anthracene was observed in the LCS (1202925803). The recovery was 97% and the acceptance range is 63-94%. The biased high recovery may be attributed to vagaries in the extraction process. While Anthracene exhibited a high bias, it was not detected in the associated samples. Therefore, the data are reported with the appropriate DER.

QC Sample Designation
Sample 331250001 (J1RW93) was chosen for matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement
A high recovery for Anthracene was observed in the MS (1202925804). The recovery was 93% and the acceptance range is 49-91%. The biased high recoveries may be attributed to vagaries in the extraction process. While Anthracene exhibited a high bias, it was not detected in the associated samples. Therefore, the data are reported with the appropriate DER. The associated samples were flagged with a 'T' qualifier for Anthracene.

Matrix Spike Duplicate (MSD) Recovery Statement
The MSD recoveries were within the established acceptance limits.

MS/MSD Relative Percent Difference (RPD) Statement
The RPDs between the MS and MSD met the acceptance limits.

Technical Information:

Holding Time Specifications
All samples in this SDG in this analytical batch met the specified holding time. GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection or 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.

Preparation/Analytical Method Verification
All procedures were performed as stated in the SOP.

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

Sample Re-extraction/Re-analysis
Due to the nature of the sample extracts, samples 331250001 (J1RW93), 1202925804 (J1RW93MS), 1202925805 (J1RW93MSD), and 331250002 (J1RW94) were analyzed at a dilution. Upon review of the data, the samples were re-analyzed neat. The re-analysis data are reported.

Miscellaneous Information:

Data Exception (DER) Documentation
Data Exception Report 1212003 was generated for this SDG.

A high recovery for Anthracene was observed in the LCS (1202925803). The recovery was 97% and the acceptance range is 63-94%. The biased high recovery may be attributed to vagaries in the extraction process. While Anthracene exhibited a high bias, it was not detected in the associated samples.

A high recovery for Anthracene was observed in the MS (1202925804). The recovery was 93% and the acceptance range is 49-91%. The biased high recoveries may be attributed to vagaries in the extraction process. While Anthracene exhibited a high bias, it was not detected in the associated samples. The associated samples were flagged with a 'T' qualifier for Anthracene.

Manual Integrations
Some initial calibration standards, continuing calibration standards, and samples 331250001 (J1RW93), 1202925804 (J1RW93MS), 1202925805 (J1RW93MSD), 331250002 (J1RW94) and 331250003 (J1RW95) required manual integrations due to software limitations. Please see the raw data in the Miscellaneous Section of the data package.

Additional Comments
One or more analytes were detected on both columns or detectors that indicated an acceptable peak within the retention time window and acceptable concentration match in sample 331250003 (J1RW95). Although method criteria have been satisfied for reporting a positive result for these analytes, the result is considered a false positive due to matrix interference and/or comparison to the DAD generated spectrum and is indicated as such on the appropriate Form I/Certificate of Analysis (C of A) with an 'X' qualifier.

One or more analytes were detected whose concentration greatly differed between the primary and confirmation analysis (greater than 40% difference or RPD) in sample 331250003 (J1RW95). Because both columns or detectors indicated an acceptable peak in the appropriate retention time window for these analytes, the analytes are reported as positive results. Due to the high percent difference or RPD between the two columns, it is indicated as such on the appropriate Form I/Certificate of Analysis (C of A) with a 'P' qualifier. Those analytes reported with a percent difference or RPD greater than 40% but less than 70% are qualified as presumptive evidence of the presence of the material.

Electronic Package Comment

The following 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. An electronic signature page inserted after the case narrative of each electronic package will indicate the analyst, reviewer, and report specialist names associated with the generation of the data and package. The data validator will always sign and date the case narrative.

Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

System Configuration

The laboratory utilizes a high performance liquid chromatography (HPLC) instrument configuration for Polynuclear Aromatic Hydrocarbons analyses.

The chromatographic hardware system consists of a HP Model 1100 HPLC with programmable gradient pumping and a 100 uL loop injector.

The HPLC 1100 is coupled to a HP Model G1315A Diode Array UV detector which monitors absorbance at the following five wavelengths: 1) 224 nm; 2) 250 nm; 3) 270 nm; 4) 234 nm; 5) 300 nm.

The HPLC 1100 is also coupled to a HP Model G1321A Fluorescence Detector in series which monitors the following varying excitations and emissions 1) EX 230 nm EM 330 nm; 2) EX 210 nm EM 314 nm; 3) EX 250 nm EM 368 nm; 4) EX 237 nm EM 440 nm; 5) EX 277 nm EM 376 nm; 6) EX 255 nm EM 420 nm; 7) EX 230 nm EM 453 nm.

The Diode Array UV detector is used as the primary detector and the Fluorescence Detector is used as the confirmation detector.

All results are reported from the primary Diode Array UV detector.

The HPLC system is identified with a designation of HPLC E in the raw data printouts.

Chromatographic Columns

Chromatographic separation of Polynuclear Aromatic Hydrocarbons is accomplished through analysis on the following reversed phase columns:

Phenomenex: Luna C18 (2), 100 A, 250 mm x 4.6 mm containing 5 um size particle.

Certification Statement

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

DATA EXCEPTION REPORT

Mo.Day Yr.	**Division:**	**Quality Criteria:**	**Type:**
15-AUG-13	Industrial	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
HPLC	SW846 8310	Solid	WCHN
Batch ID:	**Sample Numbers:**		
1321780	See Below		

Potentially affected work order(s)(SDG): 331250(XP0005)

Application Issues:

Failed Recovery for MS/PS

Failed Recovery for LCS/LCSD

Specification and Requirements Exception Description:	**DER Disposition:**
1. A high recovery for Anthracene was observed in the LCS (1202925803). The recovery was 97% and the acceptance range is 63-94%. 2. A high recovery for Anthracene was observed in the MS (1202925804). The recovery was 93% and the acceptance range is 49-91%.	1. & 2. The biased high recoveries may be attributed to vagaries in the extraction process. While Anthracene exhibited a high bias, it was not detected in the associated samples. Therefore, the data are reported with the appropriate DER. The discrepancies are noted in the case narrative.

Originator's Name:

Charles Wilson 16-AUG-13

Data Validator/Group Leader:

Michael Penny 16-AUG-13

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: XP0005 GEL Work Order: 331250 Project: RC-233 Soil

The Qualifiers in this report are defined as follows:

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

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: Michael Penny**

Date: 17 AUG 2013 **Title: Group Leader**

Roadmap for WCHN XP0005 HPLC_PAH

This roadmap was analyzed by cww on 08-16-2013, 09:57.
This roadmap was reviewed by map on 08-16-2013, 10:20.
This roadmap was packaged by map on 08-17-2013, 09:32.

Sample

exclude	manual	datafile	smpid	injdate	injtime	sublist	clientid	dilution	batchid	comment
■	N	/chem/hplce.i/p081313.b/ph5h1318.d	331250001	14-AUG-2013	00:37	XP0005.sub	J1RW93	4	1321780	Duse, too dilute. RA neat. See ph5h1328
□	N	/chem/hplce.i/p081313.b/ph5h1328.d	331250001	14-AUG-2013	07:38	XP0005.sub	J1RW93	1	1321780	(RA)
■	N	/chem/hplce.i/p081313.b/ph5h1322.d	331250002	14-AUG-2013	03:25	XP0005.sub	J1RW94	10	1321780	Duse, too dilute. RA neat. See ph5h1332
□	N	/chem/hplce.i/p081313.b/ph5h1332.d	331250002	14-AUG-2013	10:27	XP0005.sub	J1RW94	1	1321780	(RA)
□	N	/chem/hplce.i/p081313.b/ph5h1324.d	331250003	14-AUG-2013	04:50	XP0005.sub	J1RW95	1	1321780	

QC Sample

exclude	manual	datafile	smpid	sampletype	injdate	injtime	sublist	clientid	dilution	batchid	comment
□	N	/chem/hplce.i/p081313.b/ph5h1316.d	1202925802	mb	13-AUG-2013	23:12	XP0005.sub	PAHBLK01	1	1321780	
□	N	/chem/hplce.i/p081313.b/ph5h1317.d	1202925803	lcs	13-AUG-2013	23:55	XP0005.sub	PAHBLK01LCS	1	1321780	Pass
■	N	/chem/hplce.i/p081313.b/ph5h1319.d	1202925804	ms	14-AUG-2013	01:19	XP0005.sub	J1RW93MS	4	1321780	Duse, too dilute. RA neat. See ph5h1329
□	N	/chem/hplce.i/p081313.b/ph5h1329.d	1202925804	ms	14-AUG-2013	08:20	XP0005.sub	J1RW93MS	1	1321780	(RA)
■	N	/chem/hplce.i/p081313.b/ph5h1320.d	1202925805	msd	14-AUG-2013	02:01	XP0005.sub	J1RW93MSD	4	1321780	Duse, too dilute. RA neat. See ph5h1330
□	N	/chem/hplce.i/p081313.b/ph5h1330.d	1202925805	msd	14-AUG-2013	09:03	XP0005.sub	J1RW93MSD	1	1321780	(RA)

Sample Data Summary

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

Certificate of Analysis

Report Date: August 16, 2013

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

Client SDG: XP0005

Client Sample ID: J1RW93
Sample ID: 331250001
Matrix: Soil
Collect Date: 07-AUG-13 07:42
Receive Date: 09-AUG-13
Collector: Client
Moisture: 1.99%

Project: WCHN00313
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
HPLC-PAH											
8310/3550 PAH Std list Soil "Dry Weight Corrected"											
Acenaphthene	U	5.10	5.10	17.0	ug/kg	1	CWW	08/14/13	0738	1321780	1
Acenaphthylene	U	5.10	5.10	17.0	ug/kg	1					
Anthracene	TU	1.70	1.70	17.0	ug/kg	1					
Benzo(a)anthracene	U	0.544	0.544	1.70	ug/kg	1					
Benzo(a)pyrene	U	0.544	0.544	1.70	ug/kg	1					
Benzo(b)fluoranthene	U	0.544	0.544	1.70	ug/kg	1					
Benzo(ghi)perylene		17.1	0.544	1.70	ug/kg	1					
Benzo(k)fluoranthene	U	0.272	0.272	0.850	ug/kg	1					
Chrysene		7.21	0.544	1.70	ug/kg	1					
Dibenzo(a,h)anthracene	U	0.544	0.544	1.70	ug/kg	1					
Fluoranthene		3.63	0.544	1.70	ug/kg	1					
Fluorene	U	5.10	5.10	17.0	ug/kg	1					
Indeno(1,2,3-cd)pyrene	U	0.544	0.544	1.70	ug/kg	1					
Naphthalene	U	5.10	5.10	17.0	ug/kg	1					
Phenanthrene	J	6.28	5.10	17.0	ug/kg	1					
Pyrene		14.0	0.544	1.70	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3550B	3550B PAH BY HPLC Prep in soil	MXS4	08/12/13	1655	1321778

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8310	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Decafluorobiphenyl	8310/3550 PAH Std list Soil "Dry Weight Corrected"	6510 ug/kg	8500	76.6	(23%-104%)

Notes:

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

Certificate of Analysis

Report Date: August 16, 2013

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

Client SDG: XP0005

Client Sample ID: J1RW94
Sample ID: 331250002
Matrix: Soil
Collect Date: 07-AUG-13 08:05
Receive Date: 09-AUG-13
Collector: Client
Moisture: 1.99%

Project: WCHN00313
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
HPLC-PAH											
8310/3550 PAH Std list Soil "Dry Weight Corrected"											
Acenaphthene	U	5.09	5.09	17.0	ug/kg	1	CWW	08/14/13	1027	1321780	1
Acenaphthylene	U	5.09	5.09	17.0	ug/kg	1					
Anthracene	TU	1.70	1.70	17.0	ug/kg	1					
Benzo(a)anthracene	U	0.543	0.543	1.70	ug/kg	1					
Benzo(a)pyrene	U	0.543	0.543	1.70	ug/kg	1					
Benzo(b)fluoranthene	U	0.543	0.543	1.70	ug/kg	1					
Benzo(ghi)perylene		75.5	0.543	1.70	ug/kg	1					
Benzo(k)fluoranthene	U	0.272	0.272	0.849	ug/kg	1					
Chrysene		6.69	0.543	1.70	ug/kg	1					
Dibenzo(a,h)anthracene	U	0.543	0.543	1.70	ug/kg	1					
Fluoranthene	U	0.543	0.543	1.70	ug/kg	1					
Fluorene	U	5.09	5.09	17.0	ug/kg	1					
Indeno(1,2,3-cd)pyrene	U	0.543	0.543	1.70	ug/kg	1					
Naphthalene	U	5.09	5.09	17.0	ug/kg	1					
Phenanthrene	U	5.09	5.09	17.0	ug/kg	1					
Pyrene	U	0.543	0.543	1.70	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3550B	3550B PAH BY HPLC Prep in soil	MXS4	08/12/13	1655	1321778

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8310	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Decafluorobiphenyl	8310/3550 PAH Std list Soil "Dry Weight Corrected"	6680 ug/kg	8490	78.7	(23%-104%)

Notes:

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

Certificate of Analysis

Report Date: August 16, 2013

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

Client SDG: XP0005

Client Sample ID: J1RW95
Sample ID: 331250003
Matrix: Soil
Collect Date: 07-AUG-13 08:20
Receive Date: 09-AUG-13
Collector: Client
Moisture: 2.21%

Project: WCHN00313
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
HPLC-PAH											
8310/3550 PAH Std list Soil "Dry Weight Corrected"											
Acenaphthene	U	5.10	5.10	17.0	ug/kg	1	CWW	08/14/13	0450	1321780	1
Acenaphthylene	U	5.10	5.10	17.0	ug/kg	1					
Anthracene	TU	1.70	1.70	17.0	ug/kg	1					
Benzo(a)anthracene	PX	1.81	0.544	1.70	ug/kg	1					
Benzo(a)pyrene	U	0.544	0.544	1.70	ug/kg	1					
Benzo(b)fluoranthene		7.85	0.544	1.70	ug/kg	1					
Benzo(ghi)perylene		3.06	0.544	1.70	ug/kg	1					
Benzo(k)fluoranthene	U	0.272	0.272	0.850	ug/kg	1					
Chrysene		4.24	0.544	1.70	ug/kg	1					
Dibenzo(a,h)anthracene		8.87	0.544	1.70	ug/kg	1					
Fluoranthene		3.68	0.544	1.70	ug/kg	1					
Fluorene	U	5.10	5.10	17.0	ug/kg	1					
Indeno(1,2,3-cd)pyrene	PX	1.72	0.544	1.70	ug/kg	1					
Naphthalene	U	5.10	5.10	17.0	ug/kg	1					
Phenanthrene	U	5.10	5.10	17.0	ug/kg	1					
Pyrene		7.41	0.544	1.70	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3550B	3550B PAH BY HPLC Prep in soil	MXS4	08/12/13	1655	1321778

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8310	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Decafluorobiphenyl	8310/3550 PAH Std list Soil "Dry Weight Corrected"	6140 ug/kg	8500	72.1	(23%-104%)

Notes:

QC Summary

QC Summary

Report Date: August 16, 2013

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

Contact: **Joan Kessner**

Workorder: **331250** **Client SDG:** XP0005 **Project Description:** RC-233 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
HPLC-PAH										
Batch 1321780										
QC1202925803 LCS										
Acenaphthene	1660			1470	ug/kg		88.7	(58%-99%)	CWW	08/13/13 23:55
Acenaphthylene	1660			1470	ug/kg		88.3	(58%-98%)		
Anthracene	1660			1610	ug/kg		96.7*	(63%-94%)		
Benzo(a)anthracene	166			154	ug/kg		92.6	(73%-98%)		
Benzo(a)pyrene	166			148	ug/kg		89.2	(63%-99%)		
Benzo(b)fluoranthene	166			149	ug/kg		89.6	(70%-130%)		
Benzo(ghi)perylene	166			147	ug/kg		88.6	(70%-130%)		
Benzo(k)fluoranthene	83.1			69.8	ug/kg		84.1	(70%-130%)		
Chrysene	166			170	ug/kg		103	(70%-130%)		
Dibenzo(a,h)anthracene	166			174	ug/kg		104	(70%-130%)		
Fluoranthene	166			146	ug/kg		87.8	(70%-130%)		
Fluorene	1660			1500	ug/kg		90.4	(65%-130%)		
Indeno(1,2,3-cd)pyrene	166			158	ug/kg		95.3	(70%-130%)		
Naphthalene	1660			1430	ug/kg		85.8	(57%-130%)		
Phenanthrene	1660			1480	ug/kg		89.2	(70%-130%)		
Pyrene	166			157	ug/kg		94.5	(70%-130%)		
**Decafluorobiphenyl	8310			7330	ug/kg		88.3	(23%-104%)		
QC1202925802 MB										
Acenaphthene			U	4.99	ug/kg					08/13/13 23:12
Acenaphthylene			U	4.99	ug/kg					

QC Summary

Workorder: 331250 **Client SDG:** XP0005 **Project Description:** RC-233 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
HPLC-PAH											
Batch 1321780											
Anthracene				U	1.66	ug/kg					
Benzo(a)anthracene				U	0.532	ug/kg				CWW	08/13/13 23:12
Benzo(a)pyrene				U	0.532	ug/kg					
Benzo(b)fluoranthene				U	0.532	ug/kg					
Benzo(ghi)perylene				U	0.532	ug/kg					
Benzo(k)fluoranthene				U	0.266	ug/kg					
Chrysene				U	0.532	ug/kg					
Dibenzo(a,h)anthracene				U	0.532	ug/kg					
Fluoranthene				U	0.532	ug/kg					
Fluorene				U	4.99	ug/kg					
Indeno(1,2,3-cd)pyrene				U	0.532	ug/kg					
Naphthalene				U	4.99	ug/kg					
Phenanthrene				U	4.99	ug/kg					
Pyrene				U	0.532	ug/kg					
**Decafluorobiphenyl	8310				7130	ug/kg		85.8	(23%-104%)		
QC1202925804 331250001 MS											
Acenaphthene	1700	U	5.10		1390	ug/kg		81.9	(49%-90%)		08/14/13 08:20
Acenaphthylene	1700	U	5.10		1380	ug/kg		81.3	(48%-97%)		
Anthracene	1700	TU	1.70	T	1570	ug/kg		92.5 *	(49%-91%)		
Benzo(a)anthracene	170	U	0.544		142	ug/kg		83.7	(29%-126%)		
Benzo(a)pyrene	170	U	0.544		143	ug/kg		84.3	(26%-130%)		
Benzo(b)fluoranthene	170	U	0.544		141	ug/kg		83	(32%-135%)		
Benzo(ghi)perylene	170		17.1		136	ug/kg		70.1	(34%-125%)		

QC Summary

Workorder: 331250 **Client SDG:** XP0005 **Project Description:** RC-233 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
HPLC-PAH											
Batch 1321780											
Benzo(k)fluoranthene	84.9	U	0.272		81.2	ug/kg		95.6	(48%-142%)	CWW	08/14/13 08:20
Chrysene	170		7.21		154	ug/kg		86.4	(39%-127%)		
Dibenzo(a,h)anthracene	170	U	0.544		158	ug/kg		92.7	(38%-130%)		
Fluoranthene	170		3.63		142	ug/kg		81.5	(20%-139%)		
Fluorene	1700	U	5.10		1450	ug/kg		85.1	(51%-90%)		
Indeno(1,2,3-cd)pyrene	170	U	0.544		120	ug/kg		70.4	(41%-145%)		
Naphthalene	1700	U	5.10		1270	ug/kg		74.8	(43%-87%)		
Phenanthrene	1700	J	6.28		1410	ug/kg		82.5	(50%-100%)		
Pyrene	170		14.0		170	ug/kg		92	(18%-149%)		
**Decafluorobiphenyl	8490		6510		6700	ug/kg		78.9	(23%-104%)		
QC1202925805 331250001 MSD											
Acenaphthene	1700	U	5.10		1340	ug/kg	3.82	79	(0%-30%)		08/14/13 09:03
Acenaphthylene	1700	U	5.10		1330	ug/kg	3.91	78.3	(0%-30%)		
Anthracene	1700	TU	1.70		1510	ug/kg	4.15	88.9	(0%-30%)		
Benzo(a)anthracene	170	U	0.544		133	ug/kg	7.02	78.2	(0%-30%)		
Benzo(a)pyrene	170	U	0.544		131	ug/kg	8.60	77.5	(0%-30%)		
Benzo(b)fluoranthene	170	U	0.544		132	ug/kg	6.34	78.1	(0%-30%)		
Benzo(ghi)perylene	170		17.1		136	ug/kg	0.382	69.9	(0%-30%)		
Benzo(k)fluoranthene	84.8	U	0.272		69.3	ug/kg	15.9	81.7	(0%-30%)		
Chrysene	170		7.21		145	ug/kg	5.90	81.4	(0%-30%)		
Dibenzo(a,h)anthracene	170	U	0.544		152	ug/kg	3.39	89.8	(0%-30%)		
Fluoranthene	170		3.63		134	ug/kg	5.98	76.8	(0%-30%)		

QC Summary

Workorder: 331250 **Client SDG:** XP0005 **Project Description:** RC-233 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH												
Batch 1321780												
Fluorene	1700	U	5.10		1380	ug/kg	4.90	81.2	(0%-30%)	CWW	08/14/13	09:03
Indeno(1,2,3-cd)pyrene	170	U	0.544		118	ug/kg	1.64	69.4	(0%-30%)			
Naphthalene	1700	U	5.10		1280	ug/kg	0.591	75.4	(0%-30%)			
Phenanthrene	1700	J	6.28		1350	ug/kg	4.20	79.2	(0%-30%)			
Pyrene	170		14.0		142	ug/kg	18.1	75.5	(0%-30%)			
**Decafluorobiphenyl	8480		6510		6720	ug/kg		79.2	(23%-104%)			

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics 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 Data

Prep Logbook

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

Batch ID: 1321778 **Verified by:** _____
Analyst: Matthew Selepack
Method: SW846 3550B

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)
1202925802 MB	12-AUG-2013 16:55:00	30.08	1	0.03324
1202925803 LCS	12-AUG-2013 16:55:00	30.1	1	0.03322
331250001	12-AUG-2013 16:55:00	30.01	1	0.03332
1202925804 MS (331250001)	12-AUG-2013 16:55:00	30.03	1	0.0333
1202925805 MSD (331250001)	12-AUG-2013 16:55:00	30.09	1	0.03323
331250002	12-AUG-2013 16:55:00	30.05	1	0.03328
331250003	12-AUG-2013 16:55:00	30.06	1	0.03327

Type	Sample Id	Description	Serial Number	Spike Amt	Units
LCS	1202925803	8310 PAH SPIKE	UE130325-15	1	mL
MS	1202925804	8310 PAH SPIKE	UE130325-15	1	mL
MSD	1202925805	8310 PAH SPIKE	UE130325-15	1	mL
SURR	All	Decafluorobiphenyl 250 mg/L	UE130808-07	1	mL
REGNT	All	Methylene Chloride	1940909-D	300	mL
REGNT	All	HPLC Grade Acetonitrile	1948785	5	mL
SOURC	All	SODIUM SULFATE	1948175	30	g

Comments:

Verified By: SJW
Final Solvent: Acetonitrile

FID Diesel Range Organics Analysis

Case Narrative

FID Diesel Range Organics
WC-HANFORD, INC. (WCHN)
SDG XP0005

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:	1321850
Prep Batch Number:	1321849

Sample Analysis

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

Sample ID	Client ID
331250001	J1RW93
331250002	J1RW94
331250003	J1RW95
1202926003	Method Blank (MB)
1202926004	Laboratory Control Sample (LCS)
1202926005	331250002(J1RW94) Matrix Spike (MS)
1202926006	331250002(J1RW94) Matrix Spike Duplicate (MSD)

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

Preparation/Analytical Method Verification

SOP Reference
Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-003 REV# 23.

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 standards (ICV or CCV) met the acceptance criteria for the target analytes. Analyte peaks eluted within the established retention time windows for this method.

Surrogate recovery did not meet the acceptance criteria in one of the standards analyzed for this SDG. This non-compliance had no adverse effects on the data as all undiluted samples in this SDG recovered well within the acceptance limits for the surrogate.

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 in motor oil range.

Surrogate Recoveries
Samples 1202926005 (J1RW94MS), 1202926006 (J1RW94MSD) and 331250002 (J1RW94) did not meet surrogate recovery acceptance criteria due to dilution.

Laboratory Control Sample (LCS) Recovery
The LCS spike recoveries met the acceptance limits.

QC Sample Designation
Sample 331250002 (J1RW94) was selected for the matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement
The MS recovery was not within the established acceptance limits due to dilution and sample matrix interference.

Matrix Spike Duplicate (MSD) Recovery Statement
The MSD recovery was not within the established acceptance limits due to dilution and sample matrix interference.

MS/MSD Relative Percent Difference (RPD) Statement
The RPD between the MS and MSD met the acceptance limits.

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
Samples 1202926005 (J1RW94MS), 1202926006 (J1RW94MSD) and 331250002 (J1RW94) were diluted at 1:5 due to the presence of over-range target analytes.

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. DER #1212144 was 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.

DATA EXCEPTION REPORT

Mo.Day Yr.	**Division:**	**Quality Criteria:**	**Type:**
16-AUG-13	Federal	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
GC/FID	NWTPH-Dx in Soil	Solid	WCHN
Batch ID:	**Sample Numbers:**		
1321850	See Below		

Potentially affected work order(s)(SDG): 331250(XP0005)

Application Issues:

Failed Recovery for MS/PS

Failed Yield for Surrogates

Failed Recovery for MSD/PSD

Specification and Requirements Exception Description:	**DER Disposition:**
1. Samples 331250002, 1202926005MS and 1202926006MSD recovered o-Terphenyl at 0%(SPC Limit: 50%-150%). 2. The MS(1202926005) and MSD(1202926006) did not meet spike recovery acceptance criteria.	1. Samples were diluted 1:5 due to overrange target analyte. As a result, the surrogates were diluted out of their acceptance limit. Data were reported. 2. As the MS and MSD displayed similar recoveries, the failures were attributed to sample matrix interference and the data have been reported.

Originator's Name:

Benjamin Taft 16-AUG-13

Data Validator/Group Leader:

Jimin Cao 16-AUG-13

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: XP0005 GEL Work Order: 331250 Project: RC-233 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.

D Results are reported from a diluted aliquot of 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

T Spike and/or spike duplicate sample recovery is outside control limits.

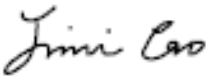
U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

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: 22 AUG 2013 **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: August 16, 2013

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

Client SDG: XP0005

Client Sample ID: J1RW93
Sample ID: 331250001
Matrix: Soil
Collect Date: 07-AUG-13 07:42
Receive Date: 09-AUG-13
Collector: Client
Moisture: 1.99%

Project: WCHN00313
Client ID: WCHN001

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)		15000	2210	6790	ug/kg	1	BYT1	08/14/13	1521	1321850	1
Motor Oil (C20-C36)	B	65900	2210	6790	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	3541 DRO IN SOIL PREP	AXV1	08/13/13	1720	1321849

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"	799 ug/kg	679	118	(50%-150%)

Notes:

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

Certificate of Analysis

Report Date: August 16, 2013

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

Client SDG: XP0005

Client Sample ID: J1RW94
Sample ID: 331250002
Matrix: Soil
Collect Date: 07-AUG-13 08:05
Receive Date: 09-AUG-13
Collector: Client
Moisture: 1.99%

Project: WCHN00313
Client ID: WCHN001

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)	DT	36800	11000	33700	ug/kg	5	BYT1	08/15/13	2356	1321850	1
Motor Oil (C20-C36)	BDT	386000	11000	33700	ug/kg	5					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	3541 DRO IN SOIL PREP	AXV1	08/13/13	1720	1321849

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"	0.00 ug/kg	674	0.00*	(50%-150%)

Notes:

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

Certificate of Analysis

Report Date: August 16, 2013

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

Client SDG: XP0005

Client Sample ID: J1RW95
Sample ID: 331250003
Matrix: Soil
Collect Date: 07-AUG-13 08:20
Receive Date: 09-AUG-13
Collector: Client
Moisture: 2.21%

Project: WCHN00313
Client ID: WCHN001

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)		14300	2200	6760	ug/kg	1	BYT1	08/16/13	0145	1321850	1
Motor Oil (C20-C36)	B	62300	2200	6760	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	3541 DRO IN SOIL PREP	AXV1	08/13/13	1720	1321849

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"	487 ug/kg	676	72.0	(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: August 16, 2013

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

Contact: **Joan Kessner**

Workorder: **331250** **Client SDG:** XP0005 **Project Description:** RC-233 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics											
Batch 1321850											
QC1202926004 LCS											
Diesel Range Organics (C10-C20)	66600				57900	ug/kg		87.1	(70%-130%)	BYT1	08/14/13 14:44
Motor Oil (C20-C36)	66600			B	61400	ug/kg		92.2	(70%-130%)		
**o-Terphenyl	666				767	ug/kg		115	(50%-150%)		
QC1202926003 MB											
Diesel Range Organics (C10-C20)				U	2170	ug/kg					08/14/13 14:08
Motor Oil (C20-C36)				J	2330	ug/kg					
**o-Terphenyl	666				443	ug/kg		66.5	(50%-150%)		
QC1202926005 331250002 MS											
Diesel Range Organics (C10-C20)	67900	DT	36800	DT	70600	ug/kg		49.8*	(70%-130%)		08/16/13 00:32
Motor Oil (C20-C36)	67900	BDT	386000	BDT	478000	ug/kg		N/A	(70%-130%)		
**o-Terphenyl	679		0.00		0.00	ug/kg		0*	(50%-150%)		
QC1202926006 331250002 MSD											
Diesel Range Organics (C10-C20)	68000	DT	36800	DT	73300	ug/kg	3.78	53.7*	(0%-20%)		08/16/13 01:09
Motor Oil (C20-C36)	68000	BDT	386000	BD	445000	ug/kg	7.21	N/A	(0%-20%)		
**o-Terphenyl	680		0.00		0.00	ug/kg		0*	(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

QC Summary

Workorder: 331250 **Client SDG:** XP0005 **Project Description:** RC-233 Soil

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

P Aroclor target analyte with greater than 25% difference between column analyses.

T Spike and/or spike duplicate sample recovery is outside control limits.

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

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

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

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

o Analyte failed to recover within LCS limits (0rganics 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: 1321849 **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)
1202926003 MB	13-AUG-2013 17:20:00	30.02	1	0.03331
1202926004 LCS	13-AUG-2013 17:20:00	30.05	1	0.03328
331250001	13-AUG-2013 17:20:00	30.06	1	0.03327
331250002	13-AUG-2013 17:20:00	30.28	1	0.03303
1202926005 MS (331250002)	13-AUG-2013 17:20:00	30.07	1	0.03326
1202926006 MSD (331250002)	13-AUG-2013 17:20:00	30.02	1	0.03331
331250003	13-AUG-2013 17:20:00	30.25	1	0.03306

Type	Sample Id	Description	Serial Number	Spike Amt	Units
LCS	1202926004	AZDRO SPIKE LCS STD,4000ug/ml	WFI130606-52	1	mL
MS	1202926005	AZDRO SPIKE LCS STD,4000ug/ml	WFI130606-52	1	mL
MSD	1202926006	AZDRO SPIKE LCS STD,4000ug/ml	WFI130606-52	1	mL
SURR	All	20 ppm surrogate	WE130730-04	1	mL
REGNT	All	Methylene Chloride	1940919-D	120	mL
SOURC	All	SODIUM SULFATE	1948175	30	g

Comments:

Final Solvent: CH2Cl2
Verified By: MJS

Metals Analysis

Case Narrative

Metals Fractional Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0005

Sample Analysis

Sample ID	Client ID
331250001	J1RW93
331250002	J1RW94
331250003	J1RW95
1202926117	Method Blank (MB) **ICP**
1202926118	Laboratory Control Sample (LCS)
1202926121	331250001(J1RW93L) Serial Dilution (SD)
1202926119	331250001(J1RW93D) Sample Duplicate (DUP)
1202926120	331250001(J1RW93S) Matrix Spike (MS)
1202929677	331250001(J1RW93PS) Post Spike (PS)
1202934170	Method Blank (MB) **ICP-MS**
1202934177	Laboratory Control Sample (LCS)
1202934173	331250001(J1RW93L) Serial Dilution (SD)
1202934171	331250001(J1RW93D) Sample Duplicate (DUP)
1202934175	331250001(J1RW93S) Matrix Spike (MS)
1202925764	Method Blank (MB) **CVAA**
1202925765	Laboratory Control Sample (LCS)
1202925771	331250001(J1RW93L) Serial Dilution (SD)
1202925769	331250001(J1RW93D) Sample Duplicate (DUP)
1202925770	331250001(J1RW93S) Matrix Spike (MS)

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

Method/Analysis Information

Analytical Batch:	1321907, 1325390 and 1321764
Prep Batch :	1321906, 1325389 and 1321762
Standard Operating Procedures:	GL-MA-E-013 REV# 22, GL-MA-E-009 REV# 22, GL-MA-E-014 REV# 25 and GL-MA-E-010 REV# 26

Analytical Method:	SW846 3050B/6010C, SW846 3050B/6020A and SW846 7471B
Prep Method :	SW846 3050B and SW846 7471B Prep

Preparation/Analytical Method Verification

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

System Configuration

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

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

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

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

Calibration Information

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

CRDL Requirements
All CRDL standards met the advisory control limits with the exception of potassium. PQL01 (analyzed at 11:00 on 08/19/13) and PQL03 (analyzed at 17:12 on 08/19/13) recovered low for potassium; however, the sample results were 2x greater than the PQL, therefore the data is reported.

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

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

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

Quality Control (QC) Information

Method Blank (MB) Statement
The MBs analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery
The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Sample Statement
The following sample was selected as the quality control (QC) sample for this SDG: 331250001 (J1RW93).

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 potassium.

Duplicate Relative Percent Difference (RPD) Statement
The relative percent difference (RPD) obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required reporting limit (RL). In cases where either the sample or duplicate value is less than 5X the contract required detection limit (RL), a control of +/-RL is used to evaluate the DUP results. All applicable analytes met these requirements with the exception of mercury and potassium.

Post Spike (PS) Recovery Statement
The percent recoveries (%R) obtained from the PS analyses are evaluated when the

sample concentration is less than four times (4X) the spike concentration added. The PS met the recommended quality control acceptance criteria for percent recoveries for all applicable analytes and verifies the absence of matrix interferences.

Serial Dilution % Difference Statement
The serial dilution is used to assess matrix suppression or enhancement. Raw element concentrations 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 criteria of less than 10% difference (%D) with the exception of aluminum, barium, calcium, iron, magnesium, manganese, and silicon.

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 antiony, cobalt, lead, vanadium, and zinc that titanium interferes with, in order to ensure that the inter-element correction factors were valid on the ICP. Sample 331250001 was reported at 5x dilution for potassium because there was not enough sample to do the re-analysis. Samples in this SDG were diluted the standard 2x for solids on the ICPMS.

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

Miscellaneous Information

Electronic Packaging Comment
This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has

developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

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

Data Exception (DER) Documentation
Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. The following DERs were generated for this SDG: 1211047 and 1212970. A copy of each DER 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:** 02/26/13

DATA EXCEPTION REPORT

Mo.Day Yr.	**Division:**	**Quality Criteria:**	**Type:**
13-AUG-13	Industrial	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
MERCURY	SW846 7471B	Solid	BETT, WCHN
Batch ID:	**Sample Numbers:**		
1321764	See Below		

Potentially affected work order(s)(SDG): 330642,331250(XP0005)

Application Issues:

Failed RPD for DUP

Failed Recovery for MSD/PSD

Failed Recovery for MS/PS

Failed RPD for MS/MSD, or PS/PSD

Specification and Requirements Exception Description:	**DER Disposition:**
1. Failed Recovery for MS/PS: QC 1202925773MS 2. Failed RPD for MS/MSD, or PS/PSD: QC 1202925774MSD 3. Failed Recovery for MSD/PSD: QC 1202925767MSD, 1202925774MSD 4. Failed RPD for sample and DUP QC 1202925769DUP	1/3. The matrix spike and the matrix spike duplicate recoveries failed outside of the control limits for mercury due to possible matrix interferences and/or non-homogeneity. Per GEL's accredited methods and SOPs, a corrective action is not required and the data is qualified and reported. 2. The matrix spike and matrix spike duplicate % RPD failed outside of the control limits for mercury due to possible matrix interferences and/or sample non-homogeneity. Per GEL's accredited methods and SOPs, a corrective action is not required and the data is qualified and reported. 4. The sample and sample duplicate % RPD failed outside the control limits for mercury 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.

Originator's Name:

Nik-Cole Elmore 26-AUG-13

Data Validator/Group Leader:

Aubrey Kingsbury 26-AUG-13

DATA EXCEPTION REPORT

Mo.Day Yr.	**Division:**	**Quality Criteria:**	**Type:**
19-AUG-13	Industrial	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
ICP	SW846 3050B/6010C	Solid	WCHN
Batch ID:	**Sample Numbers:**		
1321907	See Below		

Potentially affected work order(s)(SDG): 331250(XP0005)

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 1202926120MS 2. Failed RPD for DUP: QC 1202926119DUP	1. The matrix spike recovery failed outside of the control limits for silicon and potassium. The post spike passed the required control limits for all analytes. This verifies the absence of a matrix interference. Per GEL's accredited methods and SOPs, a corrective action is not required and the data is qualified and reported. 2. The sample and sample duplicate % RPD failed outside the control limits for potassium 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.

Originator's Name:

Helen Camello 20-AUG-13

Data Validator/Group Leader:

Jerry Wigfall 20-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: XP0005 GEL Work Order: 331250 Project: RC-233 Soil

The Qualifiers in this report are defined as follows:

* Duplicate analysis not within control limits

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

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

D Results are reported from a diluted aliquot of sample.

M Duplicate precision not met.

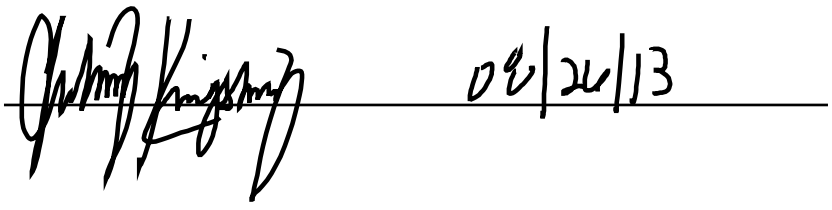
N Spike Sample recovery is outside control limits.

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

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

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

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

Reviewed by  08/26/13

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

Certificate of Analysis

Report Date: August 26, 2013

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

Client SDG: XP0005

Client Sample ID: J1RW93
Sample ID: 331250001
Matrix: Soil
Collect Date: 07-AUG-13 07:42
Receive Date: 09-AUG-13
Collector: Client
Moisture: 1.99%

Project: WCHN00313
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	*	0.0178	0.00391	0.0117	mg/kg	1	NOR1	08/13/13	1156	1321764	1
Metals Analysis-ICP											
ICP METALS 6010TR Client List "Dry Weight Corrected"											
Aluminum	M	7720	6.42	18.9	mg/kg	1	HSC	08/17/13	1503	1321907	2
Arsenic	B	2.34	0.472	2.83	mg/kg	1					
Barium	M	80.6	0.0945	0.472	mg/kg	1					
Beryllium		1.01	0.0945	0.472	mg/kg	1					
Boron	B	3.06	0.945	4.72	mg/kg	1					
Cadmium	B	0.223	0.0945	0.472	mg/kg	1					
Calcium	M	5580	7.56	23.6	mg/kg	1					
Chromium		9.35	0.142	0.472	mg/kg	1					
Copper		20.1	0.283	0.945	mg/kg	1					
Iron	M	27800	7.56	23.6	mg/kg	1					
Magnesium	M	5340	8.03	28.3	mg/kg	1					
Manganese	M	415	0.189	0.945	mg/kg	1					
Molybdenum	U	0.189	0.189	0.945	mg/kg	1					
Nickel		10.6	0.142	0.472	mg/kg	1					
Silicon	MN	1260	1.42	9.45	mg/kg	1					
Silver	U	0.0945	0.0945	0.472	mg/kg	1					
Sodium		229	6.61	23.6	mg/kg	1					
Antimony	DU	1.56	1.56	4.72	mg/kg	5	HSC	08/17/13	1603	1321907	3
Cobalt	D	9.60	0.709	2.36	mg/kg	5					
Lead	D	6.22	1.56	4.72	mg/kg	5					
Vanadium	D	69.7	0.472	2.36	mg/kg	5					
Zinc	D	53.0	1.89	4.72	mg/kg	5					
Potassium	*DN	1890	30.2	118	mg/kg	5	HSC	08/19/13	1654	1321907	4
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.316	0.316	1.00	mg/kg	2	PRB	08/23/13	1838	1325390	5

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	AXG2	08/23/13	0930	1325389
SW846 3050B	SW846 3050B Prep for 6010C	MTM1	08/14/13	1100	1321906
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	08/12/13	1654	1321762

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

Certificate of Analysis

Report Date: August 26, 2013

Company :	WC-Hanford, Inc.		
Address :	2620 Fermi Avenue MSIN H4-21 Richland, Washington 99354		
Contact:	Joan Kessner	Client SDG:	XP0005
Project:	RC-233 Soil		

Client Sample ID:	J1RW93	Project:	WCHN00313
Sample ID:	331250001	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:

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

Certificate of Analysis

Report Date: August 26, 2013

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

Client SDG: XP0005

Client Sample ID: J1RW94
Sample ID: 331250002
Matrix: Soil
Collect Date: 07-AUG-13 08:05
Receive Date: 09-AUG-13
Collector: Client
Moisture: 1.99%

Project: WCHN00313
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	0.0041	0.0041	0.0122	mg/kg	1	NOR1	08/13/13	1202	1321764	1
Metals Analysis-ICP											
ICP METALS 6010TR Client List "Dry Weight Corrected"											
Aluminum	M	6570	6.91	20.3	mg/kg	1	HSC	08/17/13	1458	1321907	2
Arsenic		3.87	0.508	3.05	mg/kg	1					
Barium	M	61.6	0.102	0.508	mg/kg	1					
Beryllium		0.900	0.102	0.508	mg/kg	1					
Boron	B	1.81	1.02	5.08	mg/kg	1					
Cadmium	B	0.205	0.102	0.508	mg/kg	1					
Calcium	M	6040	8.13	25.4	mg/kg	1					
Chromium		8.25	0.152	0.508	mg/kg	1					
Copper		18.0	0.305	1.02	mg/kg	1					
Iron	M	25000	8.13	25.4	mg/kg	1					
Magnesium	M	4760	8.64	30.5	mg/kg	1					
Manganese	M	365	0.203	1.02	mg/kg	1					
Molybdenum	U	0.203	0.203	1.02	mg/kg	1					
Nickel		9.75	0.152	0.508	mg/kg	1					
Silicon	MN	1230	1.52	10.2	mg/kg	1					
Silver	U	0.102	0.102	0.508	mg/kg	1					
Sodium		214	7.11	25.4	mg/kg	1					
Antimony	DU	1.68	1.68	5.08	mg/kg	5	HSC	08/17/13	1557	1321907	3
Cobalt	D	8.32	0.762	2.54	mg/kg	5					
Lead	BD	4.41	1.68	5.08	mg/kg	5					
Vanadium	D	67.9	0.508	2.54	mg/kg	5					
Zinc	D	46.6	2.03	5.08	mg/kg	5					
Potassium	*N	1320	6.50	25.4	mg/kg	1	HSC	08/19/13	1650	1321907	4
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.337	0.337	1.02	mg/kg	2	PRB	08/23/13	1902	1325390	5

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	AXG2	08/23/13	0930	1325389
SW846 3050B	SW846 3050B Prep for 6010C	MTM1	08/14/13	1100	1321906
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	08/12/13	1654	1321762

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

Certificate of Analysis

Report Date: August 26, 2013

Company :	WC-Hanford, Inc.		
Address :	2620 Fermi Avenue MSIN H4-21 Richland, Washington 99354		
Contact:	Joan Kessner	Client SDG:	XP0005
Project:	RC-233 Soil		

Client Sample ID:	J1RW94	Project:	WCHN00313
Sample ID:	331250002	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:

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

Certificate of Analysis

Report Date: August 26, 2013

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

Client SDG: XP0005

Client Sample ID: J1RW95
Sample ID: 331250003
Matrix: Soil
Collect Date: 07-AUG-13 08:20
Receive Date: 09-AUG-13
Collector: Client
Moisture: 2.21%

Project: WCHN00313
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	0.00381	0.00381	0.0114	mg/kg	1	NOR1	08/13/13	1204	1321764	1
Metals Analysis-ICP											
ICP METALS 6010TR Client List "Dry Weight Corrected"											
Aluminum	M	6850	6.62	19.5	mg/kg	1	HSC	08/17/13	1500	1321907	2
Arsenic	B	2.38	0.487	2.92	mg/kg	1					
Barium	M	78.8	0.0974	0.487	mg/kg	1					
Beryllium		0.874	0.0974	0.487	mg/kg	1					
Boron		4.92	0.974	4.87	mg/kg	1					
Cadmium	B	0.212	0.0974	0.487	mg/kg	1					
Calcium	M	4110	7.79	24.3	mg/kg	1					
Chromium		9.68	0.146	0.487	mg/kg	1					
Copper		16.4	0.292	0.974	mg/kg	1					
Iron	M	25100	7.79	24.3	mg/kg	1					
Magnesium	M	4490	8.28	29.2	mg/kg	1					
Manganese	M	372	0.195	0.974	mg/kg	1					
Molybdenum	U	0.195	0.195	0.974	mg/kg	1					
Nickel		9.62	0.146	0.487	mg/kg	1					
Silicon	MN	1180	1.46	9.74	mg/kg	1					
Silver	U	0.0974	0.0974	0.487	mg/kg	1					
Sodium		143	6.82	24.3	mg/kg	1					
Antimony	DU	1.61	1.61	4.87	mg/kg	5	HSC	08/17/13	1600	1321907	3
Cobalt	D	8.43	0.730	2.43	mg/kg	5					
Lead	BD	4.47	1.61	4.87	mg/kg	5					
Vanadium	D	66.8	0.487	2.43	mg/kg	5					
Zinc	D	46.4	1.95	4.87	mg/kg	5					
Potassium	*N	1640	6.23	24.3	mg/kg	1	HSC	08/19/13	1652	1321907	4
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.322	0.322	1.00	mg/kg	2	PRB	08/23/13	1906	1325390	5

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	AXG2	08/23/13	0930	1325389
SW846 3050B	SW846 3050B Prep for 6010C	MTM1	08/14/13	1100	1321906
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	08/12/13	1654	1321762

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

Certificate of Analysis

Report Date: August 26, 2013

Company :	WC-Hanford, Inc.		
Address :	2620 Fermi Avenue MSIN H4-21 Richland, Washington 99354		
Contact:	Joan Kessner	Client SDG:	XP0005
Project:	RC-233 Soil		

Client Sample ID:	J1RW95	Project:	WCHN00313
Sample ID:	331250003	Client ID:	WCHN001

The following Analytical Methods were performed:

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

Notes:

Quality Control Summary

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

QC Summary

Report Date: August 26, 2013

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

Contact: **Joan Kessner**

Workorder: **331250** **Client SDG:** XP0005 **Project Description:** RC-233 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS										
Batch 1325390										
QC1202934171 331250001 DUP										
Selenium	DU	0.316	DU	0.302	mg/kg	N/A ^			PRB	08/23/13 18:42
QC1202934177 LCS										
Selenium	4.68		D	4.66	mg/kg		99.5	(80%-120%)		08/23/13 18:28
QC1202934170 MB										
Selenium			DU	0.326	mg/kg					08/23/13 18:25
QC1202934175 331250001 MS										
Selenium	5.07 DU	0.316	D	4.34	mg/kg		85.6	(75%-125%)		08/23/13 18:45
QC1202934173 331250001 SDILT										
Selenium	DU	-0.338	DU	1.58	ug/L	N/A		(0%-10%)		08/23/13 18:52
Metals Analysis-ICP										
Batch 1321907										
QC1202926119 331250001 DUP										
Aluminum	M	7720		7010	mg/kg	9.62		(0%-20%)	HSC	08/17/13 15:05
Antimony	DU	1.56	DU	1.64	mg/kg	N/A ^				08/17/13 16:05
Arsenic	B	2.34	B	2.22	mg/kg	5.40 ^		(+/-2.98)		08/17/13 15:05
Barium	M	80.6		66.9	mg/kg	18.5		(0%-20%)		
Beryllium		1.01		0.940	mg/kg	7.49 ^		(+/-0.497)		
Boron	B	3.06	B	2.07	mg/kg	38.7 ^		(+/-4.97)		
Cadmium	B	0.223	B	0.190	mg/kg	16.3 ^		(+/-0.497)		
Calcium	M	5580		5210	mg/kg	6.74		(0%-20%)		
Chromium		9.35		8.82	mg/kg	5.92		(0%-20%)		
Cobalt	D	9.60	D	8.87	mg/kg	7.90 ^		(+/-2.49)		08/17/13 16:05
Copper		20.1		21.0	mg/kg	4.42		(0%-20%)		08/17/13 15:05
Iron	M	27800		26800	mg/kg	3.54		(0%-20%)		

QC Summary

Workorder: 331250 **Client SDG:** XP0005 **Project Description:** RC-233 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP										
Batch 1321907										
Lead	D	6.22	BD	4.81	mg/kg	25.5 ^		(+/-4.97)	HSC	08/17/13 16:05
Magnesium	M	5340		5200	mg/kg	2.75		(0%-20%)		08/17/13 15:05
Manganese	M	415		376	mg/kg	9.91		(0%-20%)		
Molybdenum	U	0.189	U	0.199	mg/kg	N/A ^				
Nickel		10.6		9.81	mg/kg	7.71		(0%-20%)		
Potassium	*DN	1890	*D	1460	mg/kg	25.2*		(0%-20%)		08/19/13 16:57
Silicon	MN	1260		1160	mg/kg	8.00		(0%-20%)		08/17/13 15:05
Silver	U	0.0945	U	0.0994	mg/kg	N/A ^				
Sodium		229		211	mg/kg	8.18		(0%-20%)		
Vanadium	D	69.7	D	65.2	mg/kg	6.69		(0%-20%)		08/17/13 16:05
Zinc	D	53.0	D	48.9	mg/kg	7.95		(0%-20%)		
QC1202926118 LCS										
Aluminum	474			490	mg/kg		103	(80%-120%)		08/17/13 14:54
Antimony	47.4			44.3	mg/kg		93.5	(80%-120%)		08/17/13 15:54
Arsenic	47.4			48.5	mg/kg		102	(80%-120%)		08/17/13 14:54
Barium	47.4			48.1	mg/kg		101	(80%-120%)		
Beryllium	47.4			49.7	mg/kg		105	(80%-120%)		
Boron	47.4			47.4	mg/kg		99.9	(80%-120%)		
Cadmium	47.4			49.9	mg/kg		105	(80%-120%)		
Calcium	474			508	mg/kg		107	(80%-120%)		
Chromium	47.4			47.4	mg/kg		100	(80%-120%)		
Cobalt	47.4			44.6	mg/kg		94	(80%-120%)		08/17/13 15:54

QC Summary

Workorder: 331250 **Client SDG:** XP0005 **Project Description:** RC-233 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP										
Batch 1321907										
Copper	47.4			48.7	mg/kg		103	(80%-120%)	HSC	08/17/13 14:54
Iron	474			498	mg/kg		105	(80%-120%)		
Lead	47.4			44.5	mg/kg		93.8	(80%-120%)		08/17/13 15:54
Magnesium	474			512	mg/kg		108	(80%-120%)		08/17/13 14:54
Manganese	47.4			47.3	mg/kg		99.7	(80%-120%)		
Molybdenum	47.4			47.0	mg/kg		99	(80%-120%)		
Nickel	47.4			48.1	mg/kg		101	(80%-120%)		
Potassium	474			504	mg/kg		106	(80%-120%)		08/19/13 16:46
Silicon	474			404	mg/kg		85.2	(80%-120%)		08/17/13 14:54
Silver	47.4			48.1	mg/kg		101	(80%-120%)		
Sodium	474			472	mg/kg		99.6	(80%-120%)		
Vanadium	47.4			45.0	mg/kg		94.8	(80%-120%)		08/17/13 15:54
Zinc	47.4			44.4	mg/kg		93.6	(80%-120%)		
QC1202926117 MB										
Aluminum			U	6.49	mg/kg					08/17/13 14:51
Antimony			U	0.315	mg/kg					08/17/13 15:51
Arsenic			U	0.477	mg/kg					08/17/13 14:51
Barium			U	0.0954	mg/kg					
Beryllium			U	0.0954	mg/kg					
Boron			U	0.954	mg/kg					
Cadmium			U	0.0954	mg/kg					
Calcium			U	7.63	mg/kg					

QC Summary

Workorder: 331250 **Client SDG:** XP0005 **Project Description:** RC-233 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1321907											
Chromium				U	0.143	mg/kg				HSC	08/17/13 14:51
Cobalt				U	0.143	mg/kg					08/17/13 15:51
Copper				U	0.286	mg/kg					08/17/13 14:51
Iron				U	7.63	mg/kg					
Lead				U	0.315	mg/kg					08/17/13 15:51
Magnesium				U	8.11	mg/kg					08/17/13 14:51
Manganese				U	0.191	mg/kg					
Molybdenum				B	0.198	mg/kg					
Nickel				B	0.168	mg/kg					
Potassium				U	6.11	mg/kg					08/19/13 16:43
Silicon				U	1.43	mg/kg					08/17/13 14:51
Silver				U	0.0954	mg/kg					
Sodium				U	6.68	mg/kg					
Vanadium				B	-0.13	mg/kg					08/17/13 15:51
Zinc				U	0.382	mg/kg					
QC1202926120 331250001 MS											
Aluminum	506	M	7720		10700	mg/kg		N/A	(75%-125%)		08/17/13 15:08
Antimony	50.6	DU	1.56	D	43.1	mg/kg		85.3	(75%-125%)		08/17/13 16:09
Arsenic	50.6	B	2.34		55.3	mg/kg		105	(75%-125%)		08/17/13 15:08
Barium	50.6	M	80.6		136	mg/kg		109	(75%-125%)		
Beryllium	50.6		1.01		54.4	mg/kg		105	(75%-125%)		
Boron	50.6	B	3.06		53.8	mg/kg		100	(75%-125%)		

QC Summary

Workorder: 331250 **Client SDG:** XP0005 **Project Description:** RC-233 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1321907											
Cadmium	50.6	B	0.223		53.1	mg/kg		105	(75%-125%)	HSC	08/17/13 15:08
Calcium	506	M	5580		6710	mg/kg		N/A	(75%-125%)		
Chromium	50.6		9.35		61.0	mg/kg		102	(75%-125%)		
Cobalt	50.6	D	9.60	D	60.7	mg/kg		101	(75%-125%)		08/17/13 16:09
Copper	50.6		20.1		78.6	mg/kg		116	(75%-125%)		08/17/13 15:08
Iron	506	M	27800		30300	mg/kg		N/A	(75%-125%)		
Lead	50.6	D	6.22	D	56.3	mg/kg		99	(75%-125%)		08/17/13 16:09
Magnesium	506	M	5340		6540	mg/kg		N/A	(75%-125%)		08/17/13 15:08
Manganese	50.6	M	415		496	mg/kg		N/A	(75%-125%)		
Molybdenum	50.6	U	0.189		50.2	mg/kg		99.1	(75%-125%)		
Nickel	50.6		10.6		62.4	mg/kg		102	(75%-125%)		
Potassium	506	*DN	1890	DN	2660	mg/kg		153*	(75%-125%)		08/19/13 17:01
Silicon	506	MN	1260	N	1350	mg/kg		16.8*	(75%-125%)		08/17/13 15:08
Silver	50.6	U	0.0945		52.9	mg/kg		105	(75%-125%)		
Sodium	506		229		827	mg/kg		118	(75%-125%)		
Vanadium	50.6	D	69.7	D	126	mg/kg		111	(75%-125%)		08/17/13 16:09
Zinc	50.6	D	53.0	D	107	mg/kg		107	(75%-125%)		
QC1202929677 331250001 PS											
Potassium	5000	*DN	3990	D	8200	ug/L		84.2	(80%-120%)		08/19/13 17:04
Silicon	5000	MN	13300		18700	ug/L		107	(80%-120%)		08/17/13 15:11
QC1202926121 331250001 SDILT											
Aluminum		M	81700	DM	18600	ug/L	13.6*		(0%-10%)		08/17/13 15:13
Antimony		DU	-1.11	DU	7.68	ug/L	N/A		(0%-10%)		08/17/13 16:13

QC Summary

Workorder: 331250 **Client SDG:** XP0005 **Project Description:** RC-233 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP										
Batch 1321907										
Arsenic	B	24.8	D	5.97	ug/L	20.2		(0%-10%)	HSC	08/17/13 15:13
Barium	M	853	DM	189	ug/L	11*		(0%-10%)		
Beryllium		10.7	D	2.50	ug/L	16.7		(0%-10%)		
Boron	B	32.4	DU	4.65	ug/L	N/A		(0%-10%)		
Cadmium	B	2.36	DU	0.465	ug/L	N/A		(0%-10%)		
Calcium	M	59000	DM	13200	ug/L	12.1*		(0%-10%)		
Chromium		99.0	D	21.5	ug/L	8.61		(0%-10%)		
Cobalt	D	20.3	D	3.78	ug/L	7.11		(0%-10%)		08/17/13 16:13
Copper		213	D	44.1	ug/L	3.5		(0%-10%)		08/17/13 15:13
Iron	M	294000	DM	67100	ug/L	14*		(0%-10%)		
Lead	D	13.2	DU	7.68	ug/L	N/A		(0%-10%)		08/17/13 16:13
Magnesium	M	56500	DM	12800	ug/L	12.8*		(0%-10%)		08/17/13 15:13
Manganese	M	4390	DM	980	ug/L	11.6*		(0%-10%)		
Molybdenum	U	-0.78	DU	0.931	ug/L	N/A		(0%-10%)		
Nickel		112	CD	24.3	ug/L	8.43		(0%-10%)		
Potassium	*DN	3990	D	740	ug/L	7.31		(0%-10%)		08/19/13 17:06
Silicon	MN	13300	DM	3300	ug/L	23.6*		(0%-10%)		08/17/13 15:13
Silver	U	-1.2	DU	0.465	ug/L	N/A		(0%-10%)		
Sodium		2430	D	586	ug/L	20.7		(0%-10%)		
Vanadium	D	148	D	28.8	ug/L	2.29		(0%-10%)		08/17/13 16:13
Zinc	D	112	D	20.9	ug/L	6.87		(0%-10%)		

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

QC Summary

Workorder: 331250 **Client SDG:** XP0005 **Project Description:** RC-233 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-Mercury										
Batch 1321764										
QC1202925769 331250001 DUP										
Mercury	*	0.0178	*U	0.00391	mg/kg	136*^		(+/-0.0117)	NOR1	08/13/13 11:57
QC1202925765 LCS										
Mercury	0.116			0.116	mg/kg		100	(80%-120%)		08/13/13 11:36
QC1202925764 MB										
Mercury			U	0.00392	mg/kg					08/13/13 11:34
QC1202925770 331250001 MS										
Mercury	0.117 *	0.0178		0.120	mg/kg		88.1	(80%-120%)		08/13/13 11:59
QC1202925771 331250001 SDILT										
Mercury	*	0.305	DU	0.0195	ug/L	N/A		(0%-10%)		08/13/13 12:01

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.