

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 6/30/14
INITIAL/DATE

COMMENTS:

SDG XP0101

SAF-RC-233

Rad only

Chem only

Rad & Chem

Complete

Partial

**Sample Location: 600-20, tank cleaning site,
Discovered oily soil**



June 25, 2014

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

Re: RC-233 Soil
Work Order: 350758
SDG: XP0101

Dear Joan Kessner:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 17, 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-233-045
Enclosures



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Case Narrative

**Receipt Narrative
for
WC-HANFORD, INC.
SDG: XP0101
Work Order: 350758**

June 25, 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 June 17, 2014 for analysis.

Sample Identification: The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
350758001	J1TW78
350758002	J1TW79
350758003	J1TW80
350758004	J1TW81

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, GC/MS Semivolatile, HPLC Polynuclear Aromatic Hydrocarbon and Metals.



Orlette Johnson
Project Manager

Chain of Custody and Supporting Documentation

350758

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			RC-233-045	Page 1 of 1
Collector STOWE QG	Company Contact Joan Kessner	Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code	Data Turnaround <i>7 days</i>	
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites	Sampling Location 600-20, Tank cleaning site, discovered oily soil	SAF No. RC-233				
Ice Chest No. <i>BMS 6-16-14</i> <i>RCC-07-02 002</i>	Field Logbook No. EL-1667-01	COA 0FR221Y000	Method of Shipment Commerical Carrier / <i>FED Ex</i>			
Shipped To GEL Laboratories Charlston	Offsite Property No. <i>A131184</i>	Bill of Lading/Air Bill No. <i>See OSPC</i>				

Other Labs Shipped To	Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C										
	Type of Container	G/P	aG	aG	aG										
	No. of Container(s)	1	1	1	1										
	Volume	125mL	125mL	125mL	125mL										
POSSIBLE SAMPLE HAZARDS/REMARKS <i>none</i>	Sample Analysis	See item (1) in Special Instructions	TPH-Diesel Range - WTPH-D +	Semi-VOA - 8270A (TCL)	PAHs - 8310										

Sample No.	Matrix	Sample Date	Sample Time												
J1TW78	SOIL	6/12/14	1220	X	X	X	X								
J1TW79	SOIL	6/12/14	1225	X	X	X	X								
J1TW80	SOIL	6/12/14	1230	X	X	X	X								
J1TW81	SOIL	6/12/14	1234	X	X	X	X								
J1TW82	SOIL	<i>BMS 6-16-14</i>													

CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS	
Relinquished By/Removed From <i>Quincy Stone</i>	Date/Time 6/12/14 1253	Received By/Stored In <i>DWShea</i>	Date/Time 6/12/14 1253	(1) ICP Metals - 6010TR (Client 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}	
Relinquished By/Removed From <i>DWShea</i>	Date/Time 6/12/14 1604	Received By/Stored In <i>SM SEXTON</i>	Date/Time 6/12/14 1604		
Relinquished By/Removed From <i>SM SEXTON</i>	Date/Time 6/12/14 1606	Received By/Stored In <i>1060 Battelle Fridge 3C</i>	Date/Time 6/12/14 1606		
Relinquished By/Removed From <i>1060 Battelle Fridge 3C</i>	Date/Time 6/12/14 1603	Received By/Stored In <i>SM SEXTON</i>	Date/Time 6/12/14 1603		
Relinquished By/Removed From <i>SM SEXTON</i>	Date/Time 6/12/14 1605	Received By/Stored In <i>FED Ex</i>	Date/Time		
Relinquished By/Removed From <i>Fed Ex</i>	Date/Time	Received By/Stored In <i>OP J. Pellegrini</i>	Date/Time 6-17-14 0900		
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time	<div style="text-align: center;">  <p>XP0101</p> </div>	

Client: <u>WCHN</u>		SDG/AR/COC/Work Order: <u>350753/350758</u>
Received By: <u>JP</u>		Date Received: <u>6-17-14</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 checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0cpm</u>
Classified Radioactive II or III by RSO?	<input checked="" type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?	<input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?	<input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?	<input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?	<input checked="" type="checkbox"/>	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>		<u>2</u>	Preservation Method: <u>Ice bags</u> 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"/>			Temperature Device Serial #: <u>130MU2961</u> Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
7 Are Encore containers present?	<input checked="" type="checkbox"/>			(If yes, immediately deliver to Volatiles laboratory)
8 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
12 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>			
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
14 Carrier and tracking number.	<input checked="" type="checkbox"/>			Circle Applicable: <u>FedEx Air</u> FedEx Ground UPS Field Services Courier Other <u>7703 1685 9614</u>

Comments (Use Continuation Form if needed):

Laboratory Certifications

List of current GEL Certifications as of 25 June 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	SC000122014-12
Vermont	VT87156
Virginia NELAP	460202
Washington	C780-12
Wisconsin	999887790

Semi-Volatile Analysis

Case Narrative

**Semi-Volatile Case Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0101**

Method/Analysis Information

Procedure: Analysis of Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry

Analytical Method: SW846 3541/8270D

Prep Method: SW846 3541

Analytical Batch Number: 1396742

Prep Batch Number: 1396739

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 3541/8270D:

Sample ID	Client ID
350758001	J1TW78
350758002	J1TW79
350758003	J1TW80
350758004	J1TW81
1203111273	Method Blank (MB)
1203111274	Laboratory Control Sample (LCS)
1203111277	350758001(J1TW78) Matrix Spike (MS)
1203111278	350758001(J1TW78) 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-009 REV# 32.

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

Calibration Information

A complete list of the initial calibration data files are shown in the Calibration History report located in the Standard Data section of the data package. The various calibration mixes may not be calibrated using all of the calibration levels. In addition, not all of the mixes are calibrated using the same levels.

Diphenylamine has now superseded N-Nitroso-diphenylamine on Quantitation Reports, Initial Calibration Reports, Calibration Check Standard Reports, etc. Previous versions of EPA Methodologies referenced N-Nitroso-diphenylamine. However, as stated in EPA Methodology, "N-Nitroso-diphenylamine decomposes in the gas chromatographic inlet and cannot be separated from Diphenylamine." Studies of these two compounds at GEL, both independent of each other and together, showed that they not only co-elute, but also have similar mass spectra. N-Nitroso-diphenylamine and Diphenylamine will be reported as Diphenylamine on all reports and forms.

Initial Calibration

All initial calibration requirements have been met for this sample delivery group (SDG) in this batch. A second source initial calibration verification (ICV) was included in the standard section directly behind the initial calibration.

CCV Requirements

All Calibration Verification Standards (CCV) did not meet the acceptance criteria as outlined in Method 8270D. However, the method allows for a designated number of outliers dependent on the requested analyte list. This SDG satisfied the 8270D outlier acceptance criteria. Detected concentrations of these analytes should be considered as estimated.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG in this batch met the acceptance criteria.

Surrogate Recoveries

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

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 350758001 (J1TW78) was selected for analysis as the matrix spike and matrix spike duplicate.

Matrix Spike (MS) Recovery Statement

The MS recoveries were within the established acceptance limits.

Matrix Spike Duplicate (MSD) Recovery Statement

The MSD recoveries were within the established acceptance limits.

MS/MSD Relative Percent Difference (RPD) Statement

The MS/MSD, 1203111277 (J1TW78) and 1203111278 (J1TW78) pair displayed RPD values outside of the acceptance limits. Please see the QC Summary report for the specific recovery values. Since all spike analytes were within the acceptance limits in the MS and MSD, the non-conformance had no adverse impact on the data and the results have been reported.

Internal Standard (ISTD) Acceptance

Samples 350758003 (J1TW80) and 350758004 (J1TW81) failed ISTD acceptance criteria. The samples were re-analyzed and confirmed the failure. The initial analysis data are reported. The re-analysis raw data have been placed in the Miscellaneous Section of the data package. Samples 1203111273 (MB), 1203111274 (LCS) and 350758002 (J1TW79) failed ISTD acceptance criteria. The samples were re-analyzed and passed ISTD acceptance criteria. The re-analysis data are reported. The internal standard response for Perylene-d12 was outside of the acceptance criteria for the MS and MSD, 1203111277 (J1TW78) and 1203111278 (J1TW78). Since the associated parent sample 350758001 displayed a similar response to the MS and MSD, the failures were attributed to matrix interference. The data were reported.

Technical Information:

Holding Time Specifications

All samples in this SDG met the specified holding time. GEL assigns holding times based on the associated methodology that 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. All reported compound mass spectra met the detection specifications in the method.

Sample Dilutions

Samples 350758003 (J1TW80) and 350758004 (J1TW81) were diluted because the extracts were very dark and viscous. The data from the dilutions are reported.

Sample Re-extraction/Re-analysis

Samples 1203111273 (MB), 1203111274 (LCS), 350758002 (J1TW79), 350758003 (J1TW80) and 350758004 (J1TW81) were re-analyzed due to internal standard responses outside of the acceptance criteria.

Miscellaneous Information:

Data Exception (DER) Documentation

The following DER was generated for this SDG: 1307060.

Manual Integrations

Some initial calibration standards, continuing calibration standards, and/or samples may require manual integrations due to software limitations. Manual integrations were required in this SDG and are included with the raw data.

TIC Comment

Tentatively identified compounds (TIC) may be requested for samples 1203111273 (MB), 350758001 (J1TW78), 350758002 (J1TW79), 350758003 (J1TW80) and 350758004 (J1TW81) in this delivery group/work order. Please note that non-requested calibrated analytes detected in a client sample may be reported on the Form 1/Certificate of Analysis as TICs. TIC data, if requested, are included on the Sample Data Summary (Form 1) and are also included with the sample raw data.

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 following additional comments were required:

Due to rounding differences in the calculation, the data reported in the Surrogate Recovery Report may differ slightly from the raw data. Due to software issue, the raw data may not correctly display the updated SPC limits. Please see Sample Data Summary Report and Surrogate Recovery Report for the correct surrogate acceptance limits.

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 reviewer

name 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 Semi-Volatile-GC/MS analysis was performed on the following instrument configuration:

Instrument ID	Instrument	System Configuration	Column ID	Column Description
MSD3.I	Agilent 7890A/5975C GC/MS w/ 7683 Autosampler	HP7890A/HP5975C	DB-5MS	25m x 0.2mm, 0.33um (5% Phenylmethylpolysiloxane)

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. 23-JUN-14	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: SEMIOVA GC/MS	Test / Method: SW846 3541/8270D	Matrix Type: Solid	Client Code: WCHN
Batch ID: 1396742	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 350753(X0056),350758(XP0101)			
Application Issues: Failed RPD for MS/MSD, or PS/PSD			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. The MS(1203111275)/MSD(1203111276) pair displayed RPD values outside of the acceptance limits. Please see the QC Summary report for the specific recovery values.</p> <p>2. The MS(1203111277)/MSD(1203111278) pair displayed RPD values outside of the acceptance limits. Please see the QC Summary for specific recovery values.</p>		<p>1. Since all spike analytes were within the acceptance limits in the MS and MSD, the non-conformance had no adverse impact on the data and the results have been reported.</p> <p>2. Since all spike analytes were within the acceptance limits in the MS and MSD, the non-conformance had no adverse impact on the data and the results have been reported.</p>	

Originator's Name:
Jennifer Dunagan Jones 23-JUN-14

Data Validator/Group Leader:
Barbara Bailey 23-JUN-14

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: XP0101 GEL Work Order: 350758 Project: RC-233 Soil

The Qualifiers in this report are defined as follows:

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

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: Barbara Bailey

Date: 23 JUN 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

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

Report Date: June 23, 2014

Client SDG: XP0101

Client Sample ID: J1TW78
 Sample ID: 350758001
 Matrix: SOIL
 Collect Date: 12-JUN-14 12:20
 Receive Date: 17-JUN-14
 Collector: Client
 Moisture: 1.94%

Project: WCHN00313
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Semi-Volatile-GC/MS										
<i>8270D/3541 BNA Soil Automated Soxhlet "Dry Weight Corrected"</i>										
1,2,4-Trichlorobenzene	U	102	102	340	ug/kg	1	JLD1 06/19/14	1627	1396742	1
1,2-Dichlorobenzene	U	102	102	340	ug/kg	1				
1,3-Dichlorobenzene	U	102	102	340	ug/kg	1				
1,4-Dichlorobenzene	U	102	102	340	ug/kg	1				
2,4,5-Trichlorophenol	U	102	102	340	ug/kg	1				
2,4,6-Trichlorophenol	U	102	102	340	ug/kg	1				
2,4-Dichlorophenol	U	102	102	340	ug/kg	1				
2,4-Dimethylphenol	U	102	102	340	ug/kg	1				
2,4-Dinitrophenol	U	102	102	680	ug/kg	1				
2,4-Dinitrotoluene	U	102	102	340	ug/kg	1				
2,6-Dinitrotoluene	U	102	102	340	ug/kg	1				
2-Chloronaphthalene	U	10.2	10.2	34.0	ug/kg	1				
2-Chlorophenol	U	102	102	340	ug/kg	1				
2-Methyl-4,6-dinitrophenol	U	102	102	340	ug/kg	1				
2-Methylnaphthalene	U	10.2	10.2	34.0	ug/kg	1				
2-Nitrophenol	U	102	102	340	ug/kg	1				
3,3'-Dichlorobenzidine	U	102	102	340	ug/kg	1				
4-Bromophenylphenylether	U	102	102	340	ug/kg	1				
4-Chloro-3-methylphenol	U	136	136	340	ug/kg	1				
4-Chloroaniline	U	102	102	340	ug/kg	1				
4-Chlorophenylphenylether	U	102	102	340	ug/kg	1				
4-Nitrophenol	U	102	102	340	ug/kg	1				
Acenaphthene	U	10.2	10.2	34.0	ug/kg	1				
Acenaphthylene	U	10.2	10.2	34.0	ug/kg	1				
Anthracene	U	10.2	10.2	34.0	ug/kg	1				
Benzo(a)anthracene	U	10.2	10.2	34.0	ug/kg	1				
Benzo(a)pyrene	U	10.2	10.2	34.0	ug/kg	1				
Benzo(b)fluoranthene	U	10.2	10.2	34.0	ug/kg	1				
Benzo(ghi)perylene	U	10.2	10.2	34.0	ug/kg	1				
Benzo(k)fluoranthene	U	10.2	10.2	34.0	ug/kg	1				
Butylbenzylphthalate	U	102	102	340	ug/kg	1				
Carbazole	U	10.2	10.2	34.0	ug/kg	1				
Chrysene	U	10.2	10.2	34.0	ug/kg	1				

GEL LABORATORIES LLC

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

Certificate of Analysis

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

Report Date: June 23, 2014

Client SDG: XP0101

Client Sample ID: J1TW78 Project: WCHN00313
 Sample ID: 350758001 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatile-GC/MS											
<i>8270D/3541 BNA Soil Automated Soxhlet "Dry Weight Corrected"</i>											
Di-n-butylphthalate	U	102	102	340	ug/kg	1					
Di-n-octylphthalate	U	102	102	340	ug/kg	1					
Dibenzo(a,h)anthracene	U	10.2	10.2	34.0	ug/kg	1					
Dibenzofuran	U	102	102	340	ug/kg	1					
Diethylphthalate	U	102	102	340	ug/kg	1					
Dimethylphthalate	U	102	102	340	ug/kg	1					
Diphenylamine	U	102	102	340	ug/kg	1					
Fluoranthene	U	10.2	10.2	34.0	ug/kg	1					
Fluorene	U	10.2	10.2	34.0	ug/kg	1					
Hexachlorobenzene	U	102	102	340	ug/kg	1					
Hexachlorobutadiene	U	102	102	340	ug/kg	1					
Hexachlorocyclopentadiene	U	102	102	340	ug/kg	1					
Hexachloroethane	U	102	102	340	ug/kg	1					
Indeno(1,2,3-cd)pyrene	U	10.2	10.2	34.0	ug/kg	1					
Isophorone	U	102	102	340	ug/kg	1					
N-Nitrosodipropylamine	U	102	102	340	ug/kg	1					
Naphthalene	U	10.2	10.2	34.0	ug/kg	1					
Nitrobenzene	U	102	102	340	ug/kg	1					
Pentachlorophenol	U	102	102	340	ug/kg	1					
Phenanthrene	U	10.2	10.2	34.0	ug/kg	1					
Phenol	U	102	102	340	ug/kg	1					
Pyrene	U	10.2	10.2	34.0	ug/kg	1					
bis(2-Chloro-1-methylethyl)ether	U	102	102	340	ug/kg	1					
bis(2-Chloroethoxy)methane	U	102	102	340	ug/kg	1					
bis(2-Chloroethyl) ether	U	102	102	340	ug/kg	1					
bis(2-Ethylhexyl)phthalate	U	102	102	340	ug/kg	1					
3- and/or 4-Methylphenol	U	102	102	340	ug/kg	1					
m-Nitroaniline	U	102	102	340	ug/kg	1					
o-Cresol	U	102	102	340	ug/kg	1					
o-Nitroaniline	U	112	112	340	ug/kg	1					
p-Nitroaniline	U	102	102	340	ug/kg	1					

<i>Surrogate/Tracer recovery</i>	<i>Result</i>	<i>Nominal</i>	<i>Recovery%</i>	<i>Acceptable Limits</i>	<i>Date Time:</i>
Nitrobenzene-d5	1260 ug/kg	1700	74.4	(21%-103%)	06/19/14 16 27
2-Fluorobiphenyl	1410 ug/kg	1700	83.1	(25%-100%)	
p-Terphenyl-d14	1830 ug/kg	1700	108	(31%-124%)	
2,4,6-Tribromophenol	3100 ug/kg	3400	91.1	(20%-122%)	
Phenol-d5	3110 ug/kg	3400	91.4	(25%-108%)	

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Certificate of Analysis

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

Report Date: June 23, 2014

Client SDG: XP0101

Client Sample ID: J1TW78
 Sample ID: 350758001

Project: WCHN00313
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
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Semi-Volatile-GC/MS

8270D/3541 BNA Soil Automated Soxhlet "Dry Weight Corrected"

2-Fluorophenol		3400 ug/kg	3400	99.9	(23%-107%)						
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<i>Tentatively Identified Compound (TIC)</i>	<i>CAS No.</i>	<i>RT</i>	<i>Est. Concentration</i>	<i>Fit</i>	<i>Qual</i>	<i>Date Time:</i>	<i>06/19/14 16 27</i>
unknown		1.824	20100 ug/kg	0	J		
unknown		1.921	154 ug/kg	0	J		
Trichloromethane	000067-66-3	2.132	228 ug/kg	96	NJ		
unknown		2.285	136 ug/kg	0	J		
Unknown Aldol Condensate		3.977	2210 ug/kg		AJ		

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 8270D BNA for Soil	AXV1	06/18/14	1647	1396739

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 3541/8270D	

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Address : 2620 Fermi Avenue
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Richland, Washington 99354
Contact: Joan Kessner
Project: **RC-233 Soil**

Report Date: June 23, 2014

Client SDG: XP0101

Client Sample ID: J1TW79
Sample ID: 350758002
Matrix: SOIL
Collect Date: 12-JUN-14 12:25
Receive Date: 17-JUN-14
Collector: Client
Moisture: 4.71%

Project: WCHN00313
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatile-GC/MS											
<i>8270D/3541 BNA Soil Automated Soxhlet "Dry Weight Corrected"</i>											
1,2,4-Trichlorobenzene	U	105	105	350	ug/kg	1	JLD1	06/20/14	1925	1396742	1
1,2-Dichlorobenzene	U	105	105	350	ug/kg	1					
1,3-Dichlorobenzene	U	105	105	350	ug/kg	1					
1,4-Dichlorobenzene	U	105	105	350	ug/kg	1					
2,4,5-Trichlorophenol	U	105	105	350	ug/kg	1					
2,4,6-Trichlorophenol	U	105	105	350	ug/kg	1					
2,4-Dichlorophenol	U	105	105	350	ug/kg	1					
2,4-Dimethylphenol	U	105	105	350	ug/kg	1					
2,4-Dinitrophenol	U	105	105	699	ug/kg	1					
2,4-Dinitrotoluene	U	105	105	350	ug/kg	1					
2,6-Dinitrotoluene	U	105	105	350	ug/kg	1					
2-Chloronaphthalene	U	10.5	10.5	35.0	ug/kg	1					
2-Chlorophenol	U	105	105	350	ug/kg	1					
2-Methyl-4,6-dinitrophenol	U	105	105	350	ug/kg	1					
2-Methylnaphthalene	U	10.5	10.5	35.0	ug/kg	1					
2-Nitrophenol	U	105	105	350	ug/kg	1					
3,3'-Dichlorobenzidine	U	105	105	350	ug/kg	1					
4-Bromophenylphenylether	U	105	105	350	ug/kg	1					
4-Chloro-3-methylphenol	U	140	140	350	ug/kg	1					
4-Chloroaniline	U	105	105	350	ug/kg	1					
4-Chlorophenylphenylether	U	105	105	350	ug/kg	1					
4-Nitrophenol	U	105	105	350	ug/kg	1					
Acenaphthene	U	10.5	10.5	35.0	ug/kg	1					
Acenaphthylene	U	10.5	10.5	35.0	ug/kg	1					
Anthracene	U	10.5	10.5	35.0	ug/kg	1					
Benzo(a)anthracene	U	10.5	10.5	35.0	ug/kg	1					
Benzo(a)pyrene	U	10.5	10.5	35.0	ug/kg	1					
Benzo(b)fluoranthene	U	10.5	10.5	35.0	ug/kg	1					
Benzo(ghi)perylene	U	10.5	10.5	35.0	ug/kg	1					
Benzo(k)fluoranthene	U	10.5	10.5	35.0	ug/kg	1					
Butylbenzylphthalate	U	105	105	350	ug/kg	1					
Carbazole	U	10.5	10.5	35.0	ug/kg	1					
Chrysene	U	10.5	10.5	35.0	ug/kg	1					

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Certificate of Analysis

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 Richland, Washington 99354
 Contact: Joan Kessner
 Project: **RC-233 Soil**

Report Date: June 23, 2014

Client SDG: XP0101

Client Sample ID: J1TW79
 Sample ID: 350758002

Project: WCHN00313
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatile-GC/MS											
<i>8270D/3541 BNA Soil Automated Soxhlet "Dry Weight Corrected"</i>											
Di-n-butylphthalate	U	105	105	350	ug/kg	1					
Di-n-octylphthalate	U	105	105	350	ug/kg	1					
Dibenzo(a,h)anthracene	U	10.5	10.5	35.0	ug/kg	1					
Dibenzofuran	U	105	105	350	ug/kg	1					
Diethylphthalate	U	105	105	350	ug/kg	1					
Dimethylphthalate	U	105	105	350	ug/kg	1					
Diphenylamine	U	105	105	350	ug/kg	1					
Fluoranthene	U	10.5	10.5	35.0	ug/kg	1					
Fluorene	U	10.5	10.5	35.0	ug/kg	1					
Hexachlorobenzene	U	105	105	350	ug/kg	1					
Hexachlorobutadiene	U	105	105	350	ug/kg	1					
Hexachlorocyclopentadiene	U	105	105	350	ug/kg	1					
Hexachloroethane	U	105	105	350	ug/kg	1					
Indeno(1,2,3-cd)pyrene	U	10.5	10.5	35.0	ug/kg	1					
Isophorone	U	105	105	350	ug/kg	1					
N-Nitrosodipropylamine	U	105	105	350	ug/kg	1					
Naphthalene	U	10.5	10.5	35.0	ug/kg	1					
Nitrobenzene	U	105	105	350	ug/kg	1					
Pentachlorophenol	U	105	105	350	ug/kg	1					
Phenanthrene	U	10.5	10.5	35.0	ug/kg	1					
Phenol	U	105	105	350	ug/kg	1					
Pyrene	U	10.5	10.5	35.0	ug/kg	1					
bis(2-Chloro-1-methylethyl)ether	U	105	105	350	ug/kg	1					
bis(2-Chloroethoxy)methane	U	105	105	350	ug/kg	1					
bis(2-Chloroethyl) ether	U	105	105	350	ug/kg	1					
bis(2-Ethylhexyl)phthalate	U	105	105	350	ug/kg	1					
3- and/or 4-Methylphenol	U	105	105	350	ug/kg	1					
m-Nitroaniline	U	105	105	350	ug/kg	1					
o-Cresol	U	105	105	350	ug/kg	1					
o-Nitroaniline	U	115	115	350	ug/kg	1					
p-Nitroaniline	U	105	105	350	ug/kg	1					

Surrogate/Tracer recovery

	Result	Nominal	Recovery%	Acceptable Limits	Date Time:	06/20/14 19 25
p-Terphenyl-d14	1390 ug/kg	1750	79.4	(31%-124%)		
Phenol-d5	1560 ug/kg	3500	44.7	(25%-108%)		
2-Fluorophenol	2110 ug/kg	3500	60.4	(23%-107%)		
2,4,6-Tribromophenol	2150 ug/kg	3500	61.6	(20%-122%)		
Nitrobenzene-d5	810 ug/kg	1750	46.3	(21%-103%)		

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Certificate of Analysis

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 Contact: Joan Kessner
 Project: **RC-233 Soil**

Report Date: June 23, 2014

Client SDG: XP0101

Client Sample ID: J1TW79
 Sample ID: 350758002

Project: WCHN00313
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
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Semi-Volatile-GC/MS

8270D/3541 BNA Soil Automated Soxhlet "Dry Weight Corrected"

2-Fluorobiphenyl 881 ug/kg 1750 50.4 (25%-100%)

<i>Tentatively Identified Compound (TIC)</i>	<i>CAS No.</i>	<i>RT</i>	<i>Est. Concentration</i>	<i>Fit</i>	<i>Qual</i>	<i>Date Time:</i>	<i>06/20/14 19 25</i>
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unknown		1.856	15900 ug/kg	0	J		
Trichloromethane	000067-66-3	2.153	265 ug/kg	96	NJ		
Unknown Aldol Condensate		3.95	1570 ug/kg		AJ		
Octadecanoic acid, butyl ester	000123-95-5	14.63	140 ug/kg	95	NJ		

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
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SW846 3541	Prep Method 3541 8270D BNA for Soil	AXV1	06/18/14	1647	1396739
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The following Analytical Methods were performed

Method	Description	Analyst Comments
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1	SW846 3541/8270D	
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Contact: Joan Kessner
Project: **RC-233 Soil**

Report Date: June 23, 2014

Client SDG: XP0101

Client Sample ID: J1TW80
Sample ID: 350758003
Matrix: SOIL
Collect Date: 12-JUN-14 12:30
Receive Date: 17-JUN-14
Collector: Client
Moisture: 3.55%

Project: WCHN00313
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatile-GC/MS											
<i>8270D/3541 BNA Soil Automated Soxhlet "Dry Weight Corrected"</i>											
1,2,4-Trichlorobenzene	DU	5160	5160	17200	ug/kg	50	JLD1	06/19/14	1949	1396742	1
1,2-Dichlorobenzene	DU	5160	5160	17200	ug/kg	50					
1,3-Dichlorobenzene	DU	5160	5160	17200	ug/kg	50					
1,4-Dichlorobenzene	DU	5160	5160	17200	ug/kg	50					
2,4,5-Trichlorophenol	DU	5160	5160	17200	ug/kg	50					
2,4,6-Trichlorophenol	DU	5160	5160	17200	ug/kg	50					
2,4-Dichlorophenol	DU	5160	5160	17200	ug/kg	50					
2,4-Dimethylphenol	DU	5160	5160	17200	ug/kg	50					
2,4-Dinitrophenol	DU	5160	5160	34400	ug/kg	50					
2,4-Dinitrotoluene	DU	5160	5160	17200	ug/kg	50					
2,6-Dinitrotoluene	DU	5160	5160	17200	ug/kg	50					
2-Chloronaphthalene	DU	516	516	1720	ug/kg	50					
2-Chlorophenol	DU	5160	5160	17200	ug/kg	50					
2-Methyl-4,6-dinitrophenol	DU	5160	5160	17200	ug/kg	50					
2-Methylnaphthalene	DU	516	516	1720	ug/kg	50					
2-Nitrophenol	DU	5160	5160	17200	ug/kg	50					
3,3'-Dichlorobenzidine	DU	5160	5160	17200	ug/kg	50					
4-Bromophenylphenylether	DU	5160	5160	17200	ug/kg	50					
4-Chloro-3-methylphenol	DU	6880	6880	17200	ug/kg	50					
4-Chloroaniline	DU	5160	5160	17200	ug/kg	50					
4-Chlorophenylphenylether	DU	5160	5160	17200	ug/kg	50					
4-Nitrophenol	DU	5160	5160	17200	ug/kg	50					
Acenaphthene	DU	516	516	1720	ug/kg	50					
Acenaphthylene	DU	516	516	1720	ug/kg	50					
Anthracene	DU	516	516	1720	ug/kg	50					
Benzo(a)anthracene	DJ	791	516	1720	ug/kg	50					
Benzo(a)pyrene	DU	516	516	1720	ug/kg	50					
Benzo(b)fluoranthene	DU	516	516	1720	ug/kg	50					
Benzo(ghi)perylene	DU	516	516	1720	ug/kg	50					
Benzo(k)fluoranthene	DU	516	516	1720	ug/kg	50					
Butylbenzylphthalate	DU	5160	5160	17200	ug/kg	50					
Carbazole	DU	516	516	1720	ug/kg	50					
Chrysene	DJ	722	516	1720	ug/kg	50					

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Certificate of Analysis

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 Richland, Washington 99354
 Contact: Joan Kessner
 Project: **RC-233 Soil**

Report Date: June 23, 2014

Client SDG: XP0101

Client Sample ID: J1TW80
 Sample ID: 350758003

Project: WCHN00313
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
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Semi-Volatile-GC/MS

8270D/3541 BNA Soil Automated Soxhlet "Dry Weight Corrected"

Di-n-butylphthalate	DU	5160	5160	17200	ug/kg	50					
Di-n-octylphthalate	DU	5160	5160	17200	ug/kg	50					
Dibenzo(a,h)anthracene	DU	516	516	1720	ug/kg	50					
Dibenzofuran	DU	5160	5160	17200	ug/kg	50					
Diethylphthalate	DU	5160	5160	17200	ug/kg	50					
Dimethylphthalate	DU	5160	5160	17200	ug/kg	50					
Diphenylamine	DU	5160	5160	17200	ug/kg	50					
Fluoranthene	DU	516	516	1720	ug/kg	50					
Fluorene	DU	516	516	1720	ug/kg	50					
Hexachlorobenzene	DU	5160	5160	17200	ug/kg	50					
Hexachlorobutadiene	DU	5160	5160	17200	ug/kg	50					
Hexachlorocyclopentadiene	DU	5160	5160	17200	ug/kg	50					
Hexachloroethane	DU	5160	5160	17200	ug/kg	50					
Indeno(1,2,3-cd)pyrene	DU	516	516	1720	ug/kg	50					
Isophorone	DU	5160	5160	17200	ug/kg	50					
N-Nitrosodipropylamine	DU	5160	5160	17200	ug/kg	50					
Naphthalene	DU	516	516	1720	ug/kg	50					
Nitrobenzene	DU	5160	5160	17200	ug/kg	50					
Pentachlorophenol	DU	5160	5160	17200	ug/kg	50					
Phenanthrene	DJ	533	516	1720	ug/kg	50					
Phenol	DU	5160	5160	17200	ug/kg	50					
Pyrene	DJ	1070	516	1720	ug/kg	50					
bis(2-Chloro-1-methylethyl)ether	DU	5160	5160	17200	ug/kg	50					
bis(2-Chloroethoxy)methane	DU	5160	5160	17200	ug/kg	50					
bis(2-Chloroethyl) ether	DU	5160	5160	17200	ug/kg	50					
bis(2-Ethylhexyl)phthalate	DU	5160	5160	17200	ug/kg	50					
3- and/or 4-Methylphenol	DU	5160	5160	17200	ug/kg	50					
m-Nitroaniline	DU	5160	5160	17200	ug/kg	50					
o-Cresol	DU	5160	5160	17200	ug/kg	50					
o-Nitroaniline	DU	5670	5670	17200	ug/kg	50					
p-Nitroaniline	DU	5160	5160	17200	ug/kg	50					

Surrogate/Tracer recovery

	Result	Nominal	Recovery%	Acceptable Limits
p-Terphenyl-d14	1220 ug/kg	1720	71.0	(31%-124%)
Phenol-d5	1290 ug/kg	3440	37.5	(25%-108%)
2,4,6-Tribromophenol	1380 ug/kg	3440	40.0	(20%-122%)
2-Fluorophenol	1440 ug/kg	3440	42.0	(23%-107%)
2-Fluorobiphenyl	859 ug/kg	1720	50.0	(25%-100%)

Date Time: 06/19/14 19 49

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Certificate of Analysis

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Richland, Washington 99354
Contact: Joan Kessner
Project: **RC-233 Soil**

Report Date: June 23, 2014

Client SDG: XP0101

Client Sample ID: J1TW80
Sample ID: 350758003
Project: WCHN00313
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
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Semi-Volatile-GC/MS

8270D/3541 BNA Soil Automated Soxhlet "Dry Weight Corrected"

Nitrobenzene-d5 980 ug/kg 1720 57.0 (21%-103%)

<i>Tentatively Identified Compound (TIC)</i>	<i>CAS No.</i>	<i>RT</i>	<i>Est. Concentration</i>	<i>Fit</i>	<i>Qual</i>	<i>Date Time:</i>	<i>06/19/14 19 49</i>
unknown		8.496	9180 ug/kg	0	J		
Dodecane, 2,6,10-trimethyl-	003891-98-3	9.126	9420 ug/kg	90	NJ		
Bacchotricuneatin c	066563-30-2	9.712	8200 ug/kg	96	NJ		
unknown		10.886	8920 ug/kg	0	J		
Heptadecane, 2,6-dimethyl-	054105-67-8	11.219	23100 ug/kg	93	NJ		

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 8270D BNA for Soil	AXV1	06/18/14	1647	1396739

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 3541/8270D	

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Certificate of Analysis

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 Richland, Washington 99354
 Contact: Joan Kessner
 Project: **RC-233 Soil**

Report Date: June 23, 2014

Client SDG: XP0101

Client Sample ID: J1TW81
 Sample ID: 350758004
 Matrix: SOIL
 Collect Date: 12-JUN-14 12:34
 Receive Date: 17-JUN-14
 Collector: Client
 Moisture: 3.9%

Project: WCHN00313
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
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Semi-Volatile-GC/MS

8270D/3541 BNA Soil Automated Soxhlet "Dry Weight Corrected"

1,2,4-Trichlorobenzene	DU	5190	5190	17300	ug/kg	50	JLD1	06/19/14	2018	1396742	1
1,2-Dichlorobenzene	DU	5190	5190	17300	ug/kg	50					
1,3-Dichlorobenzene	DU	5190	5190	17300	ug/kg	50					
1,4-Dichlorobenzene	DU	5190	5190	17300	ug/kg	50					
2,4,5-Trichlorophenol	DU	5190	5190	17300	ug/kg	50					
2,4,6-Trichlorophenol	DU	5190	5190	17300	ug/kg	50					
2,4-Dichlorophenol	DU	5190	5190	17300	ug/kg	50					
2,4-Dimethylphenol	DU	5190	5190	17300	ug/kg	50					
2,4-Dinitrophenol	DU	5190	5190	34600	ug/kg	50					
2,4-Dinitrotoluene	DU	5190	5190	17300	ug/kg	50					
2,6-Dinitrotoluene	DU	5190	5190	17300	ug/kg	50					
2-Chloronaphthalene	DU	519	519	1730	ug/kg	50					
2-Chlorophenol	DU	5190	5190	17300	ug/kg	50					
2-Methyl-4,6-dinitrophenol	DU	5190	5190	17300	ug/kg	50					
2-Methylnaphthalene	D	2040	519	1730	ug/kg	50					
2-Nitrophenol	DU	5190	5190	17300	ug/kg	50					
3,3'-Dichlorobenzidine	DU	5190	5190	17300	ug/kg	50					
4-Bromophenylphenylether	DU	5190	5190	17300	ug/kg	50					
4-Chloro-3-methylphenol	DU	6920	6920	17300	ug/kg	50					
4-Chloroaniline	DU	5190	5190	17300	ug/kg	50					
4-Chlorophenylphenylether	DU	5190	5190	17300	ug/kg	50					
4-Nitrophenol	DU	5190	5190	17300	ug/kg	50					
Acenaphthene	DU	519	519	1730	ug/kg	50					
Acenaphthylene	DU	519	519	1730	ug/kg	50					
Anthracene	DU	519	519	1730	ug/kg	50					
Benzo(a)anthracene	DU	519	519	1730	ug/kg	50					
Benzo(a)pyrene	DU	519	519	1730	ug/kg	50					
Benzo(b)fluoranthene	DU	519	519	1730	ug/kg	50					
Benzo(ghi)perylene	DU	519	519	1730	ug/kg	50					
Benzo(k)fluoranthene	DU	519	519	1730	ug/kg	50					
Butylbenzylphthalate	DU	5190	5190	17300	ug/kg	50					
Carbazole	DU	519	519	1730	ug/kg	50					
Chrysene	DU	519	519	1730	ug/kg	50					

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Certificate of Analysis

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

Report Date: June 23, 2014

Client SDG: XP0101

Client Sample ID: J1TW81
 Sample ID: 350758004
 Project: WCHN00313
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
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Semi-Volatile-GC/MS

8270D/3541 BNA Soil Automated Soxhlet "Dry Weight Corrected"

Di-n-butylphthalate	DU	5190	5190	17300	ug/kg	50					
Di-n-octylphthalate	DU	5190	5190	17300	ug/kg	50					
Dibenzo(a,h)anthracene	DU	519	519	1730	ug/kg	50					
Dibenzofuran	DU	5190	5190	17300	ug/kg	50					
Diethylphthalate	DU	5190	5190	17300	ug/kg	50					
Dimethylphthalate	DU	5190	5190	17300	ug/kg	50					
Diphenylamine	DU	5190	5190	17300	ug/kg	50					
Fluoranthene	DU	519	519	1730	ug/kg	50					
Fluorene	DU	519	519	1730	ug/kg	50					
Hexachlorobenzene	DU	5190	5190	17300	ug/kg	50					
Hexachlorobutadiene	DU	5190	5190	17300	ug/kg	50					
Hexachlorocyclopentadiene	DU	5190	5190	17300	ug/kg	50					
Hexachloroethane	DU	5190	5190	17300	ug/kg	50					
Indeno(1,2,3-cd)pyrene	DU	519	519	1730	ug/kg	50					
Isophorone	DU	5190	5190	17300	ug/kg	50					
N-Nitrosodipropylamine	DU	5190	5190	17300	ug/kg	50					
Naphthalene	DU	519	519	1730	ug/kg	50					
Nitrobenzene	DU	5190	5190	17300	ug/kg	50					
Pentachlorophenol	DU	5190	5190	17300	ug/kg	50					
Phenanthrene	DU	519	519	1730	ug/kg	50					
Phenol	DU	5190	5190	17300	ug/kg	50					
Pyrene	DU	519	519	1730	ug/kg	50					
bis(2-Chloro-1-methylethyl)ether	DU	5190	5190	17300	ug/kg	50					
bis(2-Chloroethoxy)methane	DU	5190	5190	17300	ug/kg	50					
bis(2-Chloroethyl) ether	DU	5190	5190	17300	ug/kg	50					
bis(2-Ethylhexyl)phthalate	DU	5190	5190	17300	ug/kg	50					
3- and/or 4-Methylphenol	DU	5190	5190	17300	ug/kg	50					
m-Nitroaniline	DU	5190	5190	17300	ug/kg	50					
o-Cresol	DU	5190	5190	17300	ug/kg	50					
o-Nitroaniline	DU	5710	5710	17300	ug/kg	50					
p-Nitroaniline	DU	5190	5190	17300	ug/kg	50					

Surrogate/Tracer recovery

	Result	Nominal	Recovery%	Acceptable Limits
Nitrobenzene-d5	1110 ug/kg	1730	64.0	(21%-103%)
2,4,6-Tribromophenol	1140 ug/kg	3460	33.0	(20%-122%)
p-Terphenyl-d14	1900 ug/kg	1730	110	(31%-124%)
Phenol-d5	1950 ug/kg	3460	56.5	(25%-108%)
2-Fluorophenol	2010 ug/kg	3460	58.0	(23%-107%)

Date Time: 06/19/14 20 18

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Project: WCHN00313
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
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Semi-Volatile-GC/MS

8270D/3541 BNA Soil Automated Soxhlet "Dry Weight Corrected"

2-Fluorobiphenyl 968 ug/kg 1730 56.0 (25%-100%)

<i>Tentatively Identified Compound (TIC)</i>	<i>CAS No.</i>	<i>RT</i>	<i>Est. Concentration</i>	<i>Fit</i>	<i>Qual</i>	<i>Date Time:</i>	<i>06/19/14 20 18</i>
unknown		9.125	11500 ug/kg	0	J		
Bacchotricuneatin c	066563-30-2	9.712	7680 ug/kg	98	NJ		
Pentadecane, 2,6,10,14-tetramethyl	001921-70-6	11.219	7280 ug/kg	94	NJ		

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 8270D BNA for Soil	AXV1	06/18/14	1647	1396739

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 3541/8270D	

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: June 23, 2014

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

Workorder: 350758

Client SDG: XP0101

Project Description: RC-233 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1396742										
QC1203111274	LCS										
1,2,4-Trichlorobenzene	1670			1030	ug/kg		61.6	(37%-98%)	JLD1	06/19/14	14:02
1,2-Dichlorobenzene	1670			1050	ug/kg		62.9	(39%-93%)			
1,3-Dichlorobenzene	1670			1020	ug/kg		61.3	(39%-110%)			
1,4-Dichlorobenzene	1670			1080	ug/kg		64.7	(40%-110%)			
2,4,5-Trichlorophenol	1670			1020	ug/kg		61	(41%-103%)			
2,4,6-Trichlorophenol	1670			1040	ug/kg		62.4	(36%-98%)			
2,4-Dichlorophenol	1670			1030	ug/kg		61.5	(35%-110%)			
2,4-Dimethylphenol	1670			971	ug/kg		58.3	(35%-102%)			
2,4-Dinitrophenol	1670			810	ug/kg		48.6	(22%-83%)			
2,4-Dinitrotoluene	1670			1170	ug/kg		70.1	(43%-109%)			
2,6-Dinitrotoluene	1670			1050	ug/kg		63	(41%-103%)			
2-Chloronaphthalene	1670			1040	ug/kg		62.2	(39%-101%)			
2-Chlorophenol	1670			1130	ug/kg		67.6	(38%-100%)			
2-Methyl-4,6-dinitrophenol	1670			969	ug/kg		58.2	(33%-103%)			
2-Methylnaphthalene	1670			963	ug/kg		57.8	(36%-107%)			
2-Nitrophenol	1670			1020	ug/kg		61.3	(35%-106%)			
3,3'-Dichlorobenzidine	1670			1180	ug/kg		71	(32%-111%)			
3- and/or 4-Methylphenol	1670			1300	ug/kg		77.9	(39%-115%)			
4-Bromophenylphenylether	1670			998	ug/kg		59.9	(42%-110%)			
4-Chloro-3-methylphenol	1670			1040	ug/kg		62.6	(35%-104%)			

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QC Summary

Workorder: 350758

Client SDG: XP0101

Project Description: RC-233 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1396742										
4-Chloroaniline	1670			959	ug/kg		57.6	(32%-106%)	JLD1	06/19/14	14:02
4-Chlorophenylphenylether	1670			1070	ug/kg		64.1	(41%-104%)			
4-Nitrophenol	1670			1170	ug/kg		69.9	(23%-114%)			
Acenaphthene	1670			1030	ug/kg		61.9	(36%-105%)			
Acenaphthylene	1670			1020	ug/kg		61.1	(38%-103%)			
Anthracene	1670			1030	ug/kg		61.9	(43%-104%)			
Benzo(a)anthracene	1670			1070	ug/kg		64.4	(46%-108%)			
Benzo(a)pyrene	1670			1040	ug/kg		62.5	(45%-109%)			
Benzo(b)fluoranthene	1670			1050	ug/kg		63.3	(42%-111%)			
Benzo(ghi)perylene	1670			1030	ug/kg		61.7	(43%-115%)			
Benzo(k)fluoranthene	1670			1060	ug/kg		63.7	(43%-103%)			
Butylbenzylphthalate	1670			1080	ug/kg		65	(37%-107%)			
Carbazole	1670			1240	ug/kg		74.6	(53%-118%)			
Chrysene	1670			1090	ug/kg		65.7	(47%-107%)			
Di-n-butylphthalate	1670			1080	ug/kg		64.6	(46%-112%)			
Di-n-octylphthalate	1670			1090	ug/kg		65.6	(41%-110%)			
Dibenzo(a,h)anthracene	1670			1070	ug/kg		64.1	(39%-128%)			
Dibenzofuran	1670			1050	ug/kg		63.2	(38%-104%)			
Diethylphthalate	1670			1040	ug/kg		62.2	(42%-109%)			
Dimethylphthalate	1670			1070	ug/kg		64.3	(41%-105%)			
Diphenylamine	1670			987	ug/kg		59.2	(40%-101%)			

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QC Summary

Workorder: 350758

Client SDG: XP0101

Project Description: RC-233 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1396742										
Fluoranthene	1670			1130	ug/kg		67.6	(44%-106%)			
Fluorene	1670			1010	ug/kg		60.7	(39%-102%)	JLD1	06/19/14	14:02
Hexachlorobenzene	1670			1020	ug/kg		61.1	(41%-108%)			
Hexachlorobutadiene	1670			987	ug/kg		59.3	(32%-104%)			
Hexachlorocyclopentadiene	1670			806	ug/kg		48.4	(24%-84%)			
Hexachloroethane	1670			980	ug/kg		58.8	(34%-98%)			
Indeno(1,2,3-cd)pyrene	1670			1200	ug/kg		72.3	(45%-115%)			
Isophorone	1670			975	ug/kg		58.5	(36%-98%)			
N-Nitrosodipropylamine	1670			1040	ug/kg		62.2	(34%-106%)			
Naphthalene	1670			996	ug/kg		59.8	(38%-106%)			
Nitrobenzene	1670			1050	ug/kg		62.8	(35%-99%)			
Pentachlorophenol	1670			1010	ug/kg		60.7	(31%-93%)			
Phenanthrene	1670			1010	ug/kg		60.5	(43%-105%)			
Phenol	1670			1170	ug/kg		70.1	(38%-98%)			
Pyrene	1670			963	ug/kg		57.8	(33%-99%)			
bis(2-Chloro-1-methylethyl)ether	1670			803	ug/kg		48.2	(27%-109%)			
bis(2-Chloroethoxy)methane	1670			1020	ug/kg		61.2	(37%-98%)			
bis(2-Chloroethyl) ether	1670			1120	ug/kg		67	(35%-96%)			
bis(2-Ethylhexyl)phthalate	1670			1080	ug/kg		64.7	(41%-104%)			
m-Nitroaniline	1670			1110	ug/kg		66.4	(32%-113%)			
o-Cresol	1670			1160	ug/kg		69.8	(37%-97%)			
o-Nitroaniline	1670			1020	ug/kg		61	(34%-116%)			

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QC Summary

Workorder: 350758

Client SDG: XP0101

Project Description: RC-233 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1396742										
p-Nitroaniline	1670			1370	ug/kg		82.2	(35%-150%)			
**2,4,6-Tribromophenol	3330			2660	ug/kg		79.7	(20%-122%)	JLD1	06/19/14	14:02
**2-Fluorobiphenyl	1670			1030	ug/kg		61.9	(25%-100%)			
**2-Fluorophenol	3330			2640	ug/kg		79.2	(23%-107%)			
**Nitrobenzene-d5	1670			1090	ug/kg		65.5	(21%-103%)			
**Phenol-d5	3330			2470	ug/kg		74.2	(25%-108%)			
**p-Terphenyl-d14	1670			1160	ug/kg		69.9	(31%-124%)			
QC1203111273 MB											
1,2,4-Trichlorobenzene			U	99.9	ug/kg					06/20/14	12:45
1,2-Dichlorobenzene			U	99.9	ug/kg						
1,3-Dichlorobenzene			U	99.9	ug/kg						
1,4-Dichlorobenzene			U	99.9	ug/kg						
2,4,5-Trichlorophenol			U	99.9	ug/kg						
2,4,6-Trichlorophenol			U	99.9	ug/kg						
2,4-Dichlorophenol			U	99.9	ug/kg						
2,4-Dimethylphenol			U	99.9	ug/kg						
2,4-Dinitrophenol			U	99.9	ug/kg						
2,4-Dinitrotoluene			U	99.9	ug/kg						
2,6-Dinitrotoluene			U	99.9	ug/kg						
2-Chloronaphthalene			U	9.99	ug/kg						
2-Chlorophenol			U	99.9	ug/kg						
2-Methyl-4,6-dinitrophenol			U	99.9	ug/kg						
2-Methylnaphthalene			U	9.99	ug/kg						

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QC Summary

Workorder: 350758

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Project Description: RC-233 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1396742										
2-Nitrophenol			U	99.9	ug/kg				JLD1	06/20/14	12:45
3,3'-Dichlorobenzidine			U	99.9	ug/kg						
3- and/or 4-Methylphenol			U	99.9	ug/kg						
4-Bromophenylphenylether			U	99.9	ug/kg						
4-Chloro-3-methylphenol			U	133	ug/kg						
4-Chloroaniline			U	99.9	ug/kg						
4-Chlorophenylphenylether			U	99.9	ug/kg						
4-Nitrophenol			U	99.9	ug/kg						
Acenaphthene			U	9.99	ug/kg						
Acenaphthylene			U	9.99	ug/kg						
Anthracene			U	9.99	ug/kg						
Benzo(a)anthracene			U	9.99	ug/kg						
Benzo(a)pyrene			U	9.99	ug/kg						
Benzo(b)fluoranthene			U	9.99	ug/kg						
Benzo(ghi)perylene			U	9.99	ug/kg						
Benzo(k)fluoranthene			U	9.99	ug/kg						
Butylbenzylphthalate			U	99.9	ug/kg						
Carbazole			U	9.99	ug/kg						
Chrysene			U	9.99	ug/kg						
Di-n-butylphthalate			U	99.9	ug/kg						
Di-n-octylphthalate			U	99.9	ug/kg						

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QC Summary

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Project Description: RC-233 Soil

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Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1396742										
Dibenzo(a,h)anthracene			U	9.99	ug/kg						
Dibenzofuran			U	99.9	ug/kg				JLD1	06/20/14	12:45
Diethylphthalate			U	99.9	ug/kg						
Dimethylphthalate			U	99.9	ug/kg						
Diphenylamine			U	99.9	ug/kg						
Fluoranthene			U	9.99	ug/kg						
Fluorene			U	9.99	ug/kg						
Hexachlorobenzene			U	99.9	ug/kg						
Hexachlorobutadiene			U	99.9	ug/kg						
Hexachlorocyclopentadiene			U	99.9	ug/kg						
Hexachloroethane			U	99.9	ug/kg						
Indeno(1,2,3-cd)pyrene			U	9.99	ug/kg						
Isophorone			U	99.9	ug/kg						
N-Nitrosodipropylamine			U	99.9	ug/kg						
Naphthalene			U	9.99	ug/kg						
Nitrobenzene			U	99.9	ug/kg						
Pentachlorophenol			U	99.9	ug/kg						
Phenanthrene			U	9.99	ug/kg						
Phenol			U	99.9	ug/kg						
Pyrene			U	9.99	ug/kg						
bis(2-Chloro-1-methylethyl)ether			U	99.9	ug/kg						
bis(2-Chloroethoxy)methane			U	99.9	ug/kg						

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QC Summary

Workorder: 350758

Client SDG: XP0101

Project Description: RC-233 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1396742										
bis(2-Chloroethyl) ether			U	99.9	ug/kg						
bis(2-Ethylhexyl)phthalate			U	99.9	ug/kg				JLD1	06/20/14	12:45
m-Nitroaniline			U	99.9	ug/kg						
o-Cresol			U	99.9	ug/kg						
o-Nitroaniline			U	110	ug/kg						
p-Nitroaniline			U	99.9	ug/kg						
**2,4,6-Tribromophenol	3330			2660	ug/kg		80	(20%-122%)			
**2-Fluorobiphenyl	1660			1450	ug/kg		86.9	(25%-100%)			
**2-Fluorophenol	3330			2270	ug/kg		68.2	(23%-107%)			
**Nitrobenzene-d5	1660			1340	ug/kg		80.4	(21%-103%)			
**Phenol-d5	3330			2770	ug/kg		83.2	(25%-108%)			
**p-Terphenyl-d14	1660			1540	ug/kg		92.7	(31%-124%)			
QC1203111277 350758001 MS											
1,2,4-Trichlorobenzene	1700	U	102	973	ug/kg		57.3	(25%-102%)		06/19/14	16:55
1,2-Dichlorobenzene	1700	U	102	918	ug/kg		54	(25%-99%)			
1,3-Dichlorobenzene	1700	U	102	893	ug/kg		52.6	(24%-96%)			
1,4-Dichlorobenzene	1700	U	102	937	ug/kg		55.2	(24%-97%)			
2,4,5-Trichlorophenol	1700	U	102	1070	ug/kg		62.8	(38%-109%)			
2,4,6-Trichlorophenol	1700	U	102	1030	ug/kg		60.7	(32%-103%)			
2,4-Dichlorophenol	1700	U	102	1010	ug/kg		59.7	(31%-103%)			
2,4-Dimethylphenol	1700	U	102	1000	ug/kg		58.9	(30%-109%)			
2,4-Dinitrophenol	1700	U	102	482	ug/kg	J	28.4	(19%-101%)			
2,4-Dinitrotoluene	1700	U	102	1100	ug/kg		64.6	(36%-115%)			

GEL LABORATORIES LLC

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QC Summary

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Project Description: RC-233 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1396742										
2,6-Dinitrotoluene	1700	U	102	1030	ug/kg		60.6	(36%-107%)	JLD1	06/19/14	16:55
2-Chloronaphthalene	1700	U	10.2	1110	ug/kg		65.6	(27%-109%)			
2-Chlorophenol	1700	U	102	976	ug/kg		57.5	(28%-108%)			
2-Methyl-4,6-dinitrophenol	1700	U	102	667	ug/kg		39.3	(14%-116%)			
2-Methylnaphthalene	1700	U	10.2	967	ug/kg		56.9	(23%-107%)			
2-Nitrophenol	1700	U	102	1010	ug/kg		59.3	(24%-106%)			
3,3'-Dichlorobenzidine	1700	U	102	886	ug/kg		52.2	(28%-105%)			
3- and/or 4-Methylphenol	1700	U	102	1270	ug/kg		74.9	(32%-123%)			
4-Bromophenylphenylether	1700	U	102	1150	ug/kg		67.6	(37%-112%)			
4-Chloro-3-methylphenol	1700	U	136	1030	ug/kg		60.5	(32%-112%)			
4-Chloroaniline	1700	U	102	868	ug/kg		51.1	(27%-100%)			
4-Chlorophenylphenylether	1700	U	102	1140	ug/kg		67.2	(37%-110%)			
4-Nitrophenol	1700	U	102	1020	ug/kg		59.9	(12%-128%)			
Acenaphthene	1700	U	10.2	993	ug/kg		58.4	(28%-102%)			
Acenaphthylene	1700	U	10.2	1050	ug/kg		61.8	(32%-103%)			
Anthracene	1700	U	10.2	1060	ug/kg		62.7	(36%-104%)			
Benzo(a)anthracene	1700	U	10.2	1060	ug/kg		62.7	(27%-120%)			
Benzo(a)pyrene	1700	U	10.2	1040	ug/kg		61.4	(31%-116%)			
Benzo(b)fluoranthene	1700	U	10.2	1220	ug/kg		71.7	(30%-119%)			
Benzo(ghi)perylene	1700	U	10.2	749	ug/kg		44.1	(30%-109%)			
Benzo(k)fluoranthene	1700	U	10.2	1220	ug/kg		71.9	(31%-125%)			

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1396742										
Butylbenzylphthalate	1700	U	102	1470	ug/kg		86.5	(33%-121%)			
Carbazole	1700	U	10.2	1230	ug/kg		72.3	(40%-133%)	JLD1	06/19/14	16:55
Chrysene	1700	U	10.2	1070	ug/kg		62.7	(33%-114%)			
Di-n-butylphthalate	1700	U	102	1040	ug/kg		61.2	(42%-119%)			
Di-n-octylphthalate	1700	U	102	980	ug/kg		57.7	(36%-115%)			
Dibenzo(a,h)anthracene	1700	U	10.2	839	ug/kg		49.4	(26%-128%)			
Dibenzofuran	1700	U	102	1080	ug/kg		63.7	(28%-117%)			
Diethylphthalate	1700	U	102	1070	ug/kg		63.3	(40%-113%)			
Dimethylphthalate	1700	U	102	1070	ug/kg		62.8	(38%-110%)			
Diphenylamine	1700	U	102	1120	ug/kg		66.2	(34%-111%)			
Fluoranthene	1700	U	10.2	994	ug/kg		58.5	(32%-115%)			
Fluorene	1700	U	10.2	1050	ug/kg		61.6	(30%-115%)			
Hexachlorobenzene	1700	U	102	1020	ug/kg		60	(34%-111%)			
Hexachlorobutadiene	1700	U	102	941	ug/kg		55.4	(24%-105%)			
Hexachlorocyclopentadiene	1700	U	102	583	ug/kg		34.3	(12%-106%)			
Hexachloroethane	1700	U	102	866	ug/kg		51	(24%-102%)			
Indeno(1,2,3-cd)pyrene	1700	U	10.2	746	ug/kg		43.9	(29%-117%)			
Isophorone	1700	U	102	895	ug/kg		52.7	(24%-108%)			
N-Nitrosodipropylamine	1700	U	102	940	ug/kg		55.3	(23%-117%)			
Naphthalene	1700	U	10.2	910	ug/kg		53.6	(21%-107%)			
Nitrobenzene	1700	U	102	970	ug/kg		57.1	(25%-104%)			
Pentachlorophenol	1700	U	102	911	ug/kg		53.6	(22%-108%)			

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QC Summary

Workorder: 350758

Client SDG: XP0101

Project Description: RC-233 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1396742										
Phenanthrene	1700	U	10.2	1010	ug/kg		59.7	(28%-119%)			
Phenol	1700	U	102	903	ug/kg		53.1	(28%-108%)	JLD1	06/19/14	16:55
Pyrene	1700	U	10.2	1400	ug/kg		82.5	(25%-119%)			
bis(2-Chloro-1-methylethyl)ether	1700	U	102	676	ug/kg		39.8	(25%-105%)			
bis(2-Chloroethoxy)methane	1700	U	102	900	ug/kg		53	(27%-104%)			
bis(2-Chloroethyl) ether	1700	U	102	848	ug/kg		49.9	(25%-102%)			
bis(2-Ethylhexyl)phthalate	1700	U	102	1340	ug/kg		78.9	(33%-124%)			
m-Nitroaniline	1700	U	102	1080	ug/kg		63.6	(31%-110%)			
o-Cresol	1700	U	102	1050	ug/kg		61.9	(27%-105%)			
o-Nitroaniline	1700	U	112	1080	ug/kg		63.9	(37%-114%)			
p-Nitroaniline	1700	U	102	1360	ug/kg		80	(36%-141%)			
**2,4,6-Tribromophenol	3400		3100	2390	ug/kg		70.4	(20%-122%)			
**2-Fluorobiphenyl	1700		1410	1060	ug/kg		62.5	(25%-100%)			
**2-Fluorophenol	3400		3400	2130	ug/kg		62.7	(23%-107%)			
**Nitrobenzene-d5	1700		1260	962	ug/kg		56.6	(21%-103%)			
**Phenol-d5	3400		3110	1880	ug/kg		55.4	(25%-108%)			
**p-Terphenyl-d14	1700		1830	1630	ug/kg		96.1	(31%-124%)			
QC1203111278 350758001 MSD											
1,2,4-Trichlorobenzene	1700	U	102	1070	ug/kg	9.54	63	(0%-30%)		06/19/14	17:24
1,2-Dichlorobenzene	1700	U	102	1030	ug/kg	12.0	60.9	(0%-30%)			
1,3-Dichlorobenzene	1700	U	102	992	ug/kg	10.5	58.4	(0%-30%)			
1,4-Dichlorobenzene	1700	U	102	1060	ug/kg	12.5	62.5	(0%-30%)			
2,4,5-Trichlorophenol	1700	U	102	1230	ug/kg	14.3	72.4	(0%-30%)			

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1396742										
2,4,6-Trichlorophenol	1700	U	102	1280	ug/kg	21.3	75.1	(0%-30%)	JLD1	06/19/14	17:24
2,4-Dichlorophenol	1700	U	102	1190	ug/kg	16.4	70.3	(0%-30%)			
2,4-Dimethylphenol	1700	U	102	1090	ug/kg	8.99	64.4	(0%-30%)			
2,4-Dinitrophenol	1700	U	102	J 617	ug/kg	24.6	36.3	(0%-30%)			
2,4-Dinitrotoluene	1700	U	102	1240	ug/kg	12.5	73.2	(0%-30%)			
2,6-Dinitrotoluene	1700	U	102	1180	ug/kg	13.7	69.4	(0%-30%)			
2-Chloronaphthalene	1700	U	10.2	1260	ug/kg	12.1	74	(0%-30%)			
2-Chlorophenol	1700	U	102	1260	ug/kg	25.2	74	(0%-30%)			
2-Methyl-4,6-dinitrophenol	1700	U	102	791	ug/kg	16.9	46.6	(0%-30%)			
2-Methylnaphthalene	1700	U	10.2	940	ug/kg	2.78	55.3	(0%-30%)			
2-Nitrophenol	1700	U	102	1160	ug/kg	14.1	68.3	(0%-30%)			
3,3'-Dichlorobenzidine	1700	U	102	1140	ug/kg	24.9	66.9	(0%-30%)			
3- and/or 4-Methylphenol	1700	U	102	1580	ug/kg	21.2	92.7	(0%-30%)			
4-Bromophenylphenylether	1700	U	102	1240	ug/kg	7.88	73.1	(0%-30%)			
4-Chloro-3-methylphenol	1700	U	136	1050	ug/kg	1.84	61.6	(0%-30%)			
4-Chloroaniline	1700	U	102	1030	ug/kg	16.9	60.5	(0%-30%)			
4-Chlorophenylphenylether	1700	U	102	1260	ug/kg	10.0	74.2	(0%-30%)			
4-Nitrophenol	1700	U	102	1170	ug/kg	14.2	69	(0%-30%)			
Acenaphthene	1700	U	10.2	1100	ug/kg	10.5	64.9	(0%-30%)			
Acenaphthylene	1700	U	10.2	1170	ug/kg	10.6	68.6	(0%-30%)			
Anthracene	1700	U	10.2	1170	ug/kg	9.46	68.9	(0%-30%)			

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QC Summary

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Project Description: RC-233 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1396742										
Benzo(a)anthracene	1700	U	10.2	1200	ug/kg	11.9	70.6	(0%-30%)			
Benzo(a)pyrene	1700	U	10.2	1190	ug/kg	13.5	70.3	(0%-30%)	JLD1	06/19/14	17:24
Benzo(b)fluoranthene	1700	U	10.2	1260	ug/kg	3.49	74.2	(0%-30%)			
Benzo(ghi)perylene	1700	U	10.2	1160	ug/kg	42.7*	68	(0%-30%)			
Benzo(k)fluoranthene	1700	U	10.2	1310	ug/kg	6.98	77.1	(0%-30%)			
Butylbenzylphthalate	1700	U	102	1690	ug/kg	14.1	99.5	(0%-30%)			
Carbazole	1700	U	10.2	1380	ug/kg	11.4	81.1	(0%-30%)			
Chrysene	1700	U	10.2	1180	ug/kg	10.6	69.7	(0%-30%)			
Di-n-butylphthalate	1700	U	102	1150	ug/kg	10.4	67.9	(0%-30%)			
Di-n-octylphthalate	1700	U	102	1130	ug/kg	14.5	66.7	(0%-30%)			
Dibenzo(a,h)anthracene	1700	U	10.2	1230	ug/kg	37.7*	72.3	(0%-30%)			
Dibenzofuran	1700	U	102	1190	ug/kg	9.91	70.3	(0%-30%)			
Diethylphthalate	1700	U	102	1210	ug/kg	11.6	71	(0%-30%)			
Dimethylphthalate	1700	U	102	1250	ug/kg	15.8	73.6	(0%-30%)			
Diphenylamine	1700	U	102	1240	ug/kg	9.48	72.7	(0%-30%)			
Fluoranthene	1700	U	10.2	1090	ug/kg	9.35	64.3	(0%-30%)			
Fluorene	1700	U	10.2	1160	ug/kg	10.3	68.2	(0%-30%)			
Hexachlorobenzene	1700	U	102	1140	ug/kg	11.0	67	(0%-30%)			
Hexachlorobutadiene	1700	U	102	1010	ug/kg	7.17	59.5	(0%-30%)			
Hexachlorocyclopentadiene	1700	U	102	546	ug/kg	6.47	32.1	(0%-30%)			
Hexachloroethane	1700	U	102	953	ug/kg	9.56	56.1	(0%-30%)			
Indeno(1,2,3-cd)pyrene	1700	U	10.2	1110	ug/kg	38.8*	65	(0%-30%)			

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1396742										
Isophorone	1700	U	102	1120	ug/kg	22.0	65.7	(0%-30%)			
N-Nitrosodipropylamine	1700	U	102	1150	ug/kg	19.7	67.4	(0%-30%)	JLD1	06/19/14	17:24
Naphthalene	1700	U	10.2	1060	ug/kg	14.9	62.2	(0%-30%)			
Nitrobenzene	1700	U	102	1040	ug/kg	6.54	61	(0%-30%)			
Pentachlorophenol	1700	U	102	1060	ug/kg	15.4	62.5	(0%-30%)			
Phenanthrene	1700	U	10.2	1140	ug/kg	11.9	67.2	(0%-30%)			
Phenol	1700	U	102	1310	ug/kg	37.2*	77.4	(0%-30%)			
Pyrene	1700	U	10.2	1620	ug/kg	14.5	95.5	(0%-30%)			
bis(2-Chloro-1-methylethyl)ether	1700	U	102	824	ug/kg	19.7	48.5	(0%-30%)			
bis(2-Chloroethoxy)methane	1700	U	102	1140	ug/kg	23.7	67.2	(0%-30%)			
bis(2-Chloroethyl) ether	1700	U	102	1110	ug/kg	27.1	65.6	(0%-30%)			
bis(2-Ethylhexyl)phthalate	1700	U	102	1560	ug/kg	14.9	91.6	(0%-30%)			
m-Nitroaniline	1700	U	102	1260	ug/kg	15.5	74.2	(0%-30%)			
o-Cresol	1700	U	102	1330	ug/kg	23.8	78.5	(0%-30%)			
o-Nitroaniline	1700	U	112	1230	ug/kg	12.9	72.6	(0%-30%)			
p-Nitroaniline	1700	U	102	1550	ug/kg	13.0	91.2	(0%-30%)			
**2,4,6-Tribromophenol	3400		3100	2750	ug/kg		81	(20%-122%)			
**2-Fluorobiphenyl	1700		1410	1190	ug/kg		70.3	(25%-100%)			
**2-Fluorophenol	3400		3400	2630	ug/kg		77.5	(23%-107%)			
**Nitrobenzene-d5	1700		1260	978	ug/kg		57.5	(21%-103%)			
**Phenol-d5	3400		3110	2580	ug/kg		75.8	(25%-108%)			
**p-Terphenyl-d14	1700		1830	1910	ug/kg		112	(31%-124%)			

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QC Summary

Workorder: 350758

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Project Description: RC-233 Soil

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

The Qualifiers in this report are defined as follows:

- 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 (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 or %RPD not applicable.

^ 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

Automated Soxhlet Extraction

Batch ID: 1396739 Verified by: _____
 Analyst: Alberto Velasco
 Method: SW846 3541

Lab SOP: GL-OA-E-066 REV# 5
 Instrument: Semi-Volatiles Manual

Sample ID	Run Date	Aliquot (g)	Prepped Aliquot (mL)	Prepped Factor (mL/g)
1203111273 MB	18-JUN-2014 16:47:00	30.04	1	0.03329
1203111274 LCS	18-JUN-2014 16:47:00	30.01	1	0.03332
350753001	18-JUN-2014 16:47:00	30.01	1	0.03332
1203111275 MS (350753001)	18-JUN-2014 16:47:00	30.1	1	0.03322
1203111276 MSD (350753001)	18-JUN-2014 16:47:00	30.06	1	0.03327
350758001	18-JUN-2014 16:47:00	30	1	0.03333
1203111277 MS (350758001)	18-JUN-2014 16:47:00	30.02	1	0.03331
1203111278 MSD (350758001)	18-JUN-2014 16:47:00	30.01	1	0.03332
350758002	18-JUN-2014 16:47:00	30.02	1	0.03331
350758003	18-JUN-2014 16:47:00	30.16	1	0.03316
350758004	18-JUN-2014 16:47:00	30.09	1	0.03323

Type	Sample Id	Description	Serial Number	Spike Amt	Units	Comments:
LCS	1203111274	BENZIDINE LCS	UE140523-30	1	mL	Final Solvent: CH2Cl2 Verified By: SLW
LCS	1203111274	BNA LCS w/o Benzdine 50ppm	UE140610-35	1	mL	
MS	1203111275	BENZIDINE LCS	UE140523-30	1	mL	
MS	1203111275	BNA LCS w/o Benzdine 50ppm	UE140610-35	1	mL	
MS	1203111277	BENZIDINE LCS	UE140523-30	1	mL	
MS	1203111277	BNA LCS w/o Benzdine 50ppm	UE140610-35	1	mL	
MSD	1203111276	BENZIDINE LCS	UE140523-30	1	mL	
MSD	1203111276	BNA LCS w/o Benzdine 50ppm	UE140610-35	1	mL	
MSD	1203111278	BENZIDINE LCS	UE140523-30	1	mL	
MSD	1203111278	BNA LCS w/o Benzdine 50ppm	UE140610-35	1	mL	
SURR	All	BNA for all Surrogate	UE140408-06	1	mL	
REGNT	All	Acetone	2114306-B1	60	mL	
REGNT	All	Methylene Chloride	2115544-D	60	mL	
SOURC	All	SODIUM SULFATE	2101676	30	g	

HPLC Polynuclear Aromatic Hydrocarbon Analysis

**HPLC-PAH
WC-HANFORD, INC. (WCHN)
SDG XP0101**

Method/Analysis Information

Procedure: Polynuclear Aromatic Hydrocarbons
Analytical Method: SW846 8310
Prep Method: SW846 3550B
Analytical Batch Number: 1396929
Prep Batch Number: 1396928

Sample Analysis

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

Sample ID	Client ID
350758001	J1TW78
350758002	J1TW79
350758003	J1TW80
350758004	J1TW81
1203111655	Method Blank (MB)
1203111656	Laboratory Control Sample (LCS)
1203111659	350758003(J1TW80) Matrix Spike (MS)
1203111660	350758003(J1TW80) 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 standard(s) (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

Surrogate recoveries outside the acceptance range of 23-104% were observed for samples 350758003 (J1TW80), 350758004 (J1TW81), 1203111659 (MS), and 1203111660 (MSD). Please see the Form 2 in the package for complete list of recoveries. The outliers observed in the affected samples were the result of the need to analyze the samples at a dilution and the co-elution of unknown matrix interference.

Laboratory Control Sample (LCS) Recovery

High recovery for anthracene was observed in the LCS 1203111656. The recovery was 97% and the acceptance range is 63-94%. The slightly high recovery was attributed to anomalies of the extraction process. Since this target analyte was not detected in client samples, the data were reported.

QC Sample Designation

Client sample 350758003 (J1TW80) was chosen for matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

Several target analytes were not detected in 1203111659 (MS) and other spike analytes were observed with low recoveries. Please see the Form 3 in the package for complete list of recoveries and their acceptance ranges. Due to the nature of the sample extracts it was necessary to analyze the parent sample and matrix spikes as dilutions. Each sample was analyzed at a 1:5 dilution and upon review of the data, the samples were not amenable to more concentrated analyses. Due to the nature of the matrix interference many spiked analytes were not chromatographically distinguishable. The affected analyte results were qualified with 'T' qualifiers.

Matrix Spike Duplicate (MSD) Recovery Statement

Several target analytes had high recoveries in 1203111660 (MSD). Please see the Form 3 in the package for complete list of recoveries and their acceptance ranges. Due to the nature of the sample extracts it was necessary to analyze the parent sample and matrix spikes as dilutions. Each sample was analyzed at a 1:5 dilution and upon review of the data, the samples were not amenable to more concentrated analyses. Due to the nature of the matrix interference many spiked analytes were not chromatographically distinguishable. The affected analyte results were qualified with 'T' qualifiers.

MS/MSD Relative Percent Difference (RPD) Statement

The RPD values between the applicable MS and MSD results were within the acceptance limits except for benzo(ghi)perylene. The recovery was 200% with an acceptance range of 0-30%. This was the result of the spiked analyte not being detected in the 1203111659 (MS). The parent sample and matrix spikes were analyzed at 1:5 dilutions to minimize matrix interferences.

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

Sample 350758003 (J1TW80) and the associated matrix spikes were analyzed and reported at 1:5 dilutions. Samples were diluted due to the nature of the sample extracts. Upon review of the data, it was not feasible to re-analyze the samples more concentrated. The data were qualified with 'D' qualifiers. Sample 350758004 (J1TW81) was analyzed and reported at a 1:2 dilution. This was due to the nature of the sample extract and sample matrix. Upon review of the data, it

was not feasible to re-analyze the samples more concentrated. The data was qualified with 'D' qualifiers.

Sample Re-extraction/Re-analysis

Sample 350758001 (J1TW78) was initially analyzed at a 1:2 dilution and sample 350758004 (J1TW81) at a 1:5 dilution. Upon review of the data both were re-analyzed more concentrated. Sample 350758001 (J1TW78) was re-analyzed neat and 350758004 (J1TW81) at 1:2 and qualified with 'D' qualifiers.

Miscellaneous Information:

Data Exception (DER) Documentation

The following DER was generated for this SDG: 1307691.

Manual Integrations

Some initial calibration standards, continuing calibration standards, and/or samples may have required manual integrations due to software limitations. Please see the raw data in the Miscellaneous Section.

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 samples 350758001 (J1TW78) and 350758003 (J1TW80). 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 350758003 (J1TW80). 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 100uL 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 C, or 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. 24-JUN-14	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: HPLC	Test / Method: SW846 8310	Matrix Type: Solid	Client Code: QCQA, WCHN
Batch ID: 1396929	Sample Numbers: See Below		

Potentially affected work order(s)(SDG): 345954(2014LOD_LOQ_HPLPAHX_S-S_HPLCE_I_1),350753(X0056),350758(XP0101)

Application Issues:

- Failed Recovery for MS/PS
- Failed RPD for MS/MSD, or PS/PSD
- Failed Recovery for LCS/LCSD
- Failed Yield for Surrogates
- Failed Recovery for MSD/PSD
- Sample Prepped out of Holding

Specification and Requirements Exception Description:

DER Disposition:

This DER is only for the two WCHN SDGs: X0056 (350753) and XP0101 (350758).

1. Surrogate recoveries outside the acceptance range of 23-104% were observed for 350758003 (J1TW80), 350758004 (J1TW81), 1203111659 (MS), and 1203111660 (MSD). Please see the Form 2 in the package for complete list of recoveries.
2. High recovery for Anthracene was observed in 1203111656 (LCS). The recovery was 97% and the acceptance range is 63-94%.
3. Several target analytes had high recoveries in the MS/MSD set analyzed for sample 350753001 (J1TRJ8). Please see the Form 3 in the package for complete list of recoveries and their acceptance ranges.
4. Several target analytes were not detected in the MS/MSD set analyzed for sample 350758003 (J1TW80). Other spike analytes were observed to have low recoveries. Please see the Form 3 in the package for complete list of recoveries and their acceptance ranges.
5. High RPD value was observed for Benzo(ghi)perylene in the MS/MSD set for sample 350758003 (J1TW80). The recovery was 200% and the acceptance range is 0-30%.

1. The outliers observed in the affected samples were the result of the need to analyze the samples at a dilution and the co-elution of unknown matrix interference.
2. The high recovery observed in the LCS may be the result of anomalies of the extraction process. Since no detections were observed in the samples, the data are reported.
3. The high recovery observed in the matrix spikes may be the result of anomalies of the extraction process. Analyzing the samples at a dilution was not necessary to minimize matrix effect. Affected data are qualified with 'T' qualifiers.
4. Due to the nature of the sample extracts it was necessary to analyze the parent sample and matrix spikes at a dilution. Each were analyzed at a 1:5 dilution and upon review of the data it was not possible to re-analyze more concentrated. Due to the nature of the matrix interference many spiked analytes were not distinguishable. Affected data are qualified with 'T' qualifiers.
5. The high RPD value was the result of the spiked analyte not being detected in the 1203111659 (MS). The parent sample and matrix spikes were analyzed at a 1:5 dilution, to minimize matrix interference..

Originator's Name:

Charles Wilson 24-JUN-14

Data Validator/Group Leader:

Patricia Steele 25-JUN-14

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Qualifier Definition Report for

WCHN001 WC-HANFORD, INC.

Client SDG: XP0101 GEL Work Order: 350758 Project: RC-233 Soil

The Qualifiers in this report are defined as follows:

- 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
- 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: Patricia Steele

Date: 25 JUN 2014

Title: Data Validator

Roadmap for WCHN XP0101 HPLC_PAH

This roadmap was analyzed by cww on 06-24-2014, 16:57.

This roadmap was reviewed by ps on 06-25-2014, 09:33.

Sample

exclude	manual	datafile	smpid	injdate	injtime	sublist	clientid	dilution	batchid	comment
<input checked="" type="checkbox"/>	N	/chem/hplce.i/p062014.b/ph5f2019.d	350758001	20-JUN-2014	22:29	XP0101.sub	JITW78	2	1396929	Duse, too dilute. See ph5f2034
<input type="checkbox"/>	N	/chem/hplce.i/p062014.b/ph5f2034.d	350758001	21-JUN-2014	09:01	XP0101.sub	JITW78	1	1396929	(RA)
<input type="checkbox"/>	N	/chem/hplce.i/p062014.b/ph5f2021.d	350758002	20-JUN-2014	23:54	XP0101.sub	JITW79	1	1396929	
<input type="checkbox"/>	N	/chem/hplce.i/p062014.b/ph5f2023.d	350758003	21-JUN-2014	01:18	XP0101.sub	JITW80	5	1396929	DL at 5x due to extract. Not feasible to analyze more conc.
<input checked="" type="checkbox"/>	N	/chem/hplce.i/p062014.b/ph5f2031.d	350758004	21-JUN-2014	06:55	XP0101.sub	JITW81	5	1396929	Duse, will re-analyze at 2x. See ph5f23
<input type="checkbox"/>	N	/chem/hplce.i/p062314.b/ph5f2304.d	350758004	23-JUN-2014	19:30	XP0101.sub	JITW81	2	1396929	(RA) Surrogate ND due to co-elution w/ matrix & DL. Same in 4x

QC Sample

exclude	manual	datafile	smpid	sampletype	injdate	injtime	sublist	clientid	dilution	batchid	comment
<input type="checkbox"/>	N	/chem/hplce.i/p062014.b/ph5f2009B.d	1203111655	mb	20-JUN-2014	15:28	XP0101.sub	PAHBLK01	1	1396929	
<input type="checkbox"/>	N	/chem/hplce.i/p062014.b/ph5f2010B.d	1203111656	lcs	20-JUN-2014	16:10	XP0101.sub	PAHBLK01LCS	1	1396929	Anthracene high, no detections in samples.
<input type="checkbox"/>	N	/chem/hplce.i/p062014.b/ph5f2027.d	1203111659	ms	21-JUN-2014	04:06	XP0101.sub	JITW80MS	5	1396929	DL at 5x due to extract. Several analytes not detected.
<input type="checkbox"/>	N	/chem/hplce.i/p062014.b/ph5f2029.d	1203111660	msd	21-JUN-2014	05:31	XP0101.sub	JITW80MSD	5	1396929	DL at 5x due to extract. Several analytes not detected.

Sample Data Summary

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: June 25, 2014

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

Client SDG: XP0101

Client Sample ID: J1TW78	Project: WCHN00313
Sample ID: 350758001	Client ID: WCHN001
Matrix: SOIL	
Collect Date: 12-JUN-14 12:20	
Receive Date: 17-JUN-14	
Collector: Client	
Moisture: 1.94%	

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	5.08	5.08	16.9	ug/kg	1	CWW	06/21/14	0901	1396929	1
Acenaphthylene	U	5.08	5.08	16.9	ug/kg	1					
Anthracene	U	1.69	1.69	16.9	ug/kg	1					
Benzo(a)anthracene	U	0.542	0.542	1.69	ug/kg	1					
Benzo(a)pyrene	TU	0.542	0.542	1.69	ug/kg	1					
Benzo(b)fluoranthene	TU	0.542	0.542	1.69	ug/kg	1					
Benzo(ghi)perylene	TX	4.87	0.542	1.69	ug/kg	1					
Benzo(k)fluoranthene	TU	0.271	0.271	0.847	ug/kg	1					
Chrysene	JT	1.50	0.542	1.69	ug/kg	1					
Dibenzo(a,h)anthracene	TX	5.08	0.542	1.69	ug/kg	1					
Fluoranthene	TU	0.542	0.542	1.69	ug/kg	1					
Fluorene	U	5.08	5.08	16.9	ug/kg	1					
Indeno(1,2,3-cd)pyrene	TU	0.542	0.542	1.69	ug/kg	1					
Naphthalene	U	5.08	5.08	16.9	ug/kg	1					
Phenanthrene	U	5.08	5.08	16.9	ug/kg	1					
Pyrene	TU	0.542	0.542	1.69	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	AXV1	06/19/14	1740	1396928

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"	6270 ug/kg	8470	74.0	(23%-104%)

Notes:

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: June 25, 2014

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

Client SDG: XP0101

Client Sample ID: J1TW79	Project: WCHN00313
Sample ID: 350758002	Client ID: WCHN001
Matrix: SOIL	
Collect Date: 12-JUN-14 12:25	
Receive Date: 17-JUN-14	
Collector: Client	
Moisture: 4.71%	

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	5.24	5.24	17.5	ug/kg	1	CWW	06/20/14	2354	1396929	1
Acenaphthylene	U	5.24	5.24	17.5	ug/kg	1					
Anthracene	U	1.75	1.75	17.5	ug/kg	1					
Benzo(a)anthracene	U	0.559	0.559	1.75	ug/kg	1					
Benzo(a)pyrene	TU	0.559	0.559	1.75	ug/kg	1					
Benzo(b)fluoranthene	TU	0.559	0.559	1.75	ug/kg	1					
Benzo(ghi)perylene	TU	0.559	0.559	1.75	ug/kg	1					
Benzo(k)fluoranthene	TU	0.280	0.280	0.874	ug/kg	1					
Chrysene	TU	0.559	0.559	1.75	ug/kg	1					
Dibenzo(a,h)anthracene	TU	0.559	0.559	1.75	ug/kg	1					
Fluoranthene	TU	0.559	0.559	1.75	ug/kg	1					
Fluorene	U	5.24	5.24	17.5	ug/kg	1					
Indeno(1,2,3-cd)pyrene	TU	0.559	0.559	1.75	ug/kg	1					
Naphthalene	U	5.24	5.24	17.5	ug/kg	1					
Phenanthrene	U	5.24	5.24	17.5	ug/kg	1					
Pyrene	TU	0.559	0.559	1.75	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	AXV1	06/19/14	1740	1396928

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"	5860 ug/kg	8740	67.0	(23%-104%)

Notes:

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Certificate of Analysis

Report Date: June 25, 2014

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

Client SDG: XP0101

Client Sample ID: J1TW80	Project: WCHN00313
Sample ID: 350758003	Client ID: WCHN001
Matrix: SOIL	
Collect Date: 12-JUN-14 12:30	
Receive Date: 17-JUN-14	
Collector: Client	
Moisture: 3.55%	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
HPLC-PAH											
8310/3550 PAH Std list Soil "Dry Weight Corrected"											
Acenaphthene	DU	25.8	25.8	85.9	ug/kg	5	CWW	06/21/14	0118	1396929	1
Acenaphthylene	DU	25.8	25.8	85.9	ug/kg	5					
Anthracene	DU	8.59	8.59	85.9	ug/kg	5					
Benzo(a)anthracene	DU	2.75	2.75	8.59	ug/kg	5					
Benzo(a)pyrene	DTU	2.75	2.75	8.59	ug/kg	5					
Benzo(b)fluoranthene	DTU	2.75	2.75	8.59	ug/kg	5					
Benzo(ghi)perylene	DTX	47.3	2.75	8.59	ug/kg	5					
Benzo(k)fluoranthene	DTU	1.38	1.38	4.30	ug/kg	5					
Chrysene	DTU	2.75	2.75	8.59	ug/kg	5					
Dibenzo(a,h)anthracene	DPTX	46.7	2.75	8.59	ug/kg	5					
Fluoranthene	DTU	2.75	2.75	8.59	ug/kg	5					
Fluorene	DP	231	25.8	85.9	ug/kg	5					
Indeno(1,2,3-cd)pyrene	DTU	2.75	2.75	8.59	ug/kg	5					
Naphthalene	DU	25.8	25.8	85.9	ug/kg	5					
Phenanthrene	D	537	25.8	85.9	ug/kg	5					
Pyrene	DTU	2.75	2.75	8.59	ug/kg	5					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3550B	3550B PAH BY HPLC Prep in soil	AXV1	06/19/14	1740	1396928

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"	22300 ug/kg	8590	259*	(23%-104%)

Notes:

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Certificate of Analysis

Report Date: June 25, 2014

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

Client SDG: XP0101

Client Sample ID: J1TW81	Project: WCHN00313
Sample ID: 350758004	Client ID: WCHN001
Matrix: SOIL	
Collect Date: 12-JUN-14 12:34	
Receive Date: 17-JUN-14	
Collector: Client	
Moisture: 3.9%	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
HPLC-PAH											
8310/3550 PAH Std list Soil "Dry Weight Corrected"											
Acenaphthene	DU	10.4	10.4	34.7	ug/kg	2	CWW	06/23/14	1930	1396929	1
Acenaphthylene	DU	10.4	10.4	34.7	ug/kg	2					
Anthracene	DU	3.47	3.47	34.7	ug/kg	2					
Benzo(a)anthracene	DU	1.11	1.11	3.47	ug/kg	2					
Benzo(a)pyrene	DTU	1.11	1.11	3.47	ug/kg	2					
Benzo(b)fluoranthene	DTU	1.11	1.11	3.47	ug/kg	2					
Benzo(ghi)perylene	DTU	1.11	1.11	3.47	ug/kg	2					
Benzo(k)fluoranthene	DTU	0.555	0.555	1.73	ug/kg	2					
Chrysene	DTU	1.11	1.11	3.47	ug/kg	2					
Dibenzo(a,h)anthracene	DTU	1.11	1.11	3.47	ug/kg	2					
Fluoranthene	DTU	1.11	1.11	3.47	ug/kg	2					
Fluorene	D	365	10.4	34.7	ug/kg	2					
Indeno(1,2,3-cd)pyrene	DTU	1.11	1.11	3.47	ug/kg	2					
Naphthalene	DU	10.4	10.4	34.7	ug/kg	2					
Phenanthrene	D	504	10.4	34.7	ug/kg	2					
Pyrene	DTU	1.11	1.11	3.47	ug/kg	2					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3550B	3550B PAH BY HPLC Prep in soil	AXV1	06/19/14	1740	1396928

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"	0.00 ug/kg	8670	0.00*	(23%-104%)

Notes:

QC Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: June 25, 2014

Page 1 of 4

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

Workorder: 350758

Client SDG: XP0101

Project Description: RC-233 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH											
Batch	1396929										
QC1203111656	LCS										
Acenaphthene	1660			1550	ug/kg		92.9	(58%-99%)	CWW	06/20/14	16:10
Acenaphthylene	1660			1430	ug/kg		86.1	(58%-98%)			
Anthracene	1660			1610	ug/kg		96.8*	(63%-94%)			
Benzo(a)anthracene	166			154	ug/kg		92.6	(73%-98%)			
Benzo(a)pyrene	166			152	ug/kg		91.4	(63%-99%)			
Benzo(b)fluoranthene	166			148	ug/kg		88.9	(70%-130%)			
Benzo(ghi)perylene	166			142	ug/kg		85.3	(70%-130%)			
Benzo(k)fluoranthene	83.2			82.0	ug/kg		98.6	(70%-130%)			
Chrysene	166			157	ug/kg		94.5	(70%-130%)			
Dibenzo(a,h)anthracene	166			174	ug/kg		105	(70%-130%)			
Fluoranthene	166			145	ug/kg		87.3	(70%-130%)			
Fluorene	1660			1490	ug/kg		89.6	(65%-130%)			
Indeno(1,2,3-cd)pyrene	166			157	ug/kg		94.6	(70%-130%)			
Naphthalene	1660			1360	ug/kg		81.8	(57%-130%)			
Phenanthrene	1660			1480	ug/kg		89	(70%-130%)			
Pyrene	166			151	ug/kg		90.8	(70%-130%)			
**Decafluorobiphenyl	8320			7090	ug/kg		85.3	(23%-104%)			
QC1203111655	MB										
Acenaphthene			U	5.00	ug/kg					06/20/14	15:28
Acenaphthylene			U	5.00	ug/kg						

GEL LABORATORIES LLC

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QC Summary

Workorder: 350758

Client SDG: XP0101

Project Description: RC-233 Soil

Page 2 of 4

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH											
Batch	1396929										
Anthracene			U	1.67	ug/kg						
Benzo(a)anthracene			U	0.533	ug/kg				CWW	06/20/14	15:28
Benzo(a)pyrene			U	0.533	ug/kg						
Benzo(b)fluoranthene			U	0.533	ug/kg						
Benzo(ghi)perylene			U	0.533	ug/kg						
Benzo(k)fluoranthene			U	0.266	ug/kg						
Chrysene			U	0.533	ug/kg						
Dibenzo(a,h)anthracene			U	0.533	ug/kg						
Fluoranthene			U	0.533	ug/kg						
Fluorene			U	5.00	ug/kg						
Indeno(1,2,3-cd)pyrene			U	0.533	ug/kg						
Naphthalene			U	5.00	ug/kg						
Phenanthrene			U	5.00	ug/kg						
Pyrene			U	0.533	ug/kg						
**Decafluorobiphenyl	8330			7400	ug/kg		88.9	(23%-104%)			
QC1203111659 350758003 MS											
Acenaphthene	1730	DU	25.8	D	998	ug/kg	57.8	(49%-90%)		06/21/14	04:06
Acenaphthylene	1730	DU	25.8	D	990	ug/kg	57.4	(48%-97%)			
Anthracene	1730	DU	8.59	D	1280	ug/kg	74.2	(49%-91%)			
Benzo(a)anthracene	173	DU	2.75	DP	152	ug/kg	87.9	(29%-126%)			
Benzo(a)pyrene	173	DTU	2.75	DTU	2.76	ug/kg	0*	(26%-130%)			
Benzo(b)fluoranthene	173	DTU	2.75	DTU	2.76	ug/kg	0*	(32%-135%)			
Benzo(ghi)perylene	173	DTX	47.3	DTU	2.76	ug/kg	0*	(34%-125%)			

GEL LABORATORIES LLC

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QC Summary

Workorder: **350758**

Client SDG: XP0101

Project Description: RC-233 Soil

Page 3 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH											
Batch	1396929										
Benzo(k)fluoranthene	86.3	DTU	1.38	DTU	1.38	ug/kg	0*	(48%-142%)	CWW	06/21/14	04:06
Chrysene	173	DTU	2.75	DTU	2.76	ug/kg	0*	(39%-127%)			
Dibenzo(a,h)anthracene	173	DPTX	46.7	DT	91.0	ug/kg	25.6*	(38%-130%)			
Fluoranthene	173	DTU	2.75	DPT	924	ug/kg	536*	(20%-139%)			
Fluorene	1730	DP	231	D	1250	ug/kg	59	(51%-90%)			
Indeno(1,2,3-cd)pyrene	173	DTU	2.75	DTU	2.76	ug/kg	0*	(41%-145%)			
Naphthalene	1730	DU	25.8	D	1250	ug/kg	72.6	(43%-87%)			
Phenanthrene	1730	D	537	D	1640	ug/kg	63.8	(50%-100%)			
Pyrene	173	DTU	2.75	DTU	2.76	ug/kg	0*	(18%-149%)			
**Decafluorobiphenyl	8630		22300		26000	ug/kg	301*	(23%-104%)			
QC1203111660 350758003 MSD											
Acenaphthene	1730	DU	25.8	D	1090	ug/kg	9.28	63.4	(0%-30%)		06/21/14 05:31
Acenaphthylene	1730	DU	25.8	D	1080	ug/kg	8.93	62.7	(0%-30%)		
Anthracene	1730	DU	8.59	D	1410	ug/kg	9.75	81.7	(0%-30%)		
Benzo(a)anthracene	173	DU	2.75	DP	151	ug/kg	0.633	87.3	(0%-30%)		
Benzo(a)pyrene	173	DTU	2.75	DTU	2.76	ug/kg	N/A	0*	(0%-30%)		
Benzo(b)fluoranthene	173	DTU	2.75	DTU	2.76	ug/kg	N/A	0*	(0%-30%)		
Benzo(ghi)perylene	173	DTX	47.3	DT	35.2	ug/kg	200*	0*	(0%-30%)		
Benzo(k)fluoranthene	86.4	DTU	1.38	DTU	1.38	ug/kg	N/A	0*	(0%-30%)		
Chrysene	173	DTU	2.75	DTU	2.76	ug/kg	N/A	0*	(0%-30%)		
Dibenzo(a,h)anthracene	173	DPTX	46.7	DT	94.3	ug/kg	3.59	27.5*	(0%-30%)		
Fluoranthene	173	DTU	2.75	DPT	904	ug/kg	2.21	523*	(0%-30%)		

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QC Summary

Workorder: **350758**

Client SDG: XP0101

Project Description: RC-233 Soil

Page 4 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH											
Batch	1396929										
Fluorene	1730 DP	231	D	1330	ug/kg	6.45	63.7	(0%-30%)	CWW	06/21/14	05:31
Indeno(1,2,3-cd)pyrene	173 DTU	2.75	DTU	2.76	ug/kg	N/A	0*	(0%-30%)			
Naphthalene	1730 DU	25.8	D	1310	ug/kg	4.77	76	(0%-30%)			
Phenanthrene	1730 D	537	D	1710	ug/kg	4.25	67.8	(0%-30%)			
Pyrene	173 DTU	2.75	DTU	2.76	ug/kg	N/A	0*	(0%-30%)			
Decafluorobiphenyl	8640	22300		25600	ug/kg		297	(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 (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 or %RPD not applicable.

^ 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: 1396928 Verified by: _____
 Analyst: Alberto Velasco
 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)
1203111655 MB	19-JUN-2014 17:40:00	30.02	1	0.03331
1203111656 LCS	19-JUN-2014 17:40:00	30.05	1	0.03328
345954001	19-JUN-2014 17:40:00	30.01	1	0.03332
345954002	19-JUN-2014 17:40:00	30.03	1	0.0333
350753001	19-JUN-2014 17:40:00	30.05	1	0.03328
1203111657 MS (350753001)	19-JUN-2014 17:40:00	30.14	1	0.03318
1203111658 MSD (350753001)	19-JUN-2014 17:40:00	30.09	1	0.03323
350758001	19-JUN-2014 17:40:00	30.1	1	0.03322
350758002	19-JUN-2014 17:40:00	30.02	1	0.03331
350758003	19-JUN-2014 17:40:00	30.16	1	0.03316
1203111659 MS (350758003)	19-JUN-2014 17:40:00	30.05	1	0.03328
1203111660 MSD (350758003)	19-JUN-2014 17:40:00	30.01	1	0.03332
350758004	19-JUN-2014 17:40:00	30.02	1	0.03331

Type	Sample Id	Description	Serial Number	Spike Amt	Units	Comments:
LCS	1203111656	8310 PAH SPIKE	UE140613-10	1	mL	Verified By: SLW Final Solvent: ACN
MS	1203111657	8310 PAH SPIKE	UE140613-10	1	mL	
MS	1203111659	8310 PAH SPIKE	UE140613-10	1	mL	
MSD	1203111658	8310 PAH SPIKE	UE140613-10	1	mL	
MSD	1203111660	8310 PAH SPIKE	UE140613-10	1	mL	
SAMPL	345954001	8310 PAH MDL Solution, 50/500/25 ug/L	UPA130125-01.2	.66	mL	
SAMPL	345954002	8310 PAH MDL Solution, 50/500/25 ug/L	UPA130125-01.2	1	mL	
SURR	All	Decafluorobiphenyl 250 mg/L	UE140604-30	.0066	mL	
SURR	All	Decafluorobiphenyl 250 mg/L	UE140604-30	.01	mL	
SURR	All	Decafluorobiphenyl 250 mg/L	UE140604-30	1	mL	
REGNT	All	HiPerSolv (HPLC Grade)	2103153	5	mL	
REGNT	All	Methylene Chloride	2119290-D	300	mL	
SOURC	All	SODIUM SULFATE	2101676	30	g	

FID Diesel Range Organics Analysis

Case Narrative

**FID Diesel Range Organics
WC-HANFORD, INC. (WCHN)
SDG XP0101**

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: 1396926
Prep Batch Number: 1396924

Sample Analysis

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

Sample ID	Client ID
350758001	J1TW78
350758002	J1TW79
350758003	J1TW80
350758004	J1TW81
1203111643	Method Blank (MB)
1203111644	Laboratory Control Sample (LCS)
1203111647	350758002(J1TW79) Matrix Spike (MS)
1203111648	350758002(J1TW79) 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# 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.

Surrogate Recoveries

Samples 350758003 (J1TW80) and 350758004 (J1TW81) failed surrogate recovery limits for o-Terphenyl at 0.0% due to dilution.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 350758002 (J1TW79) was selected for the matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The MS recovery was within the established acceptance limits.

Matrix Spike Duplicate (MSD) Recovery Statement

The MSD recovery was within the established acceptance limits.

MS/MSD Relative Percent Difference (RPD) Statement

The relative percent difference between MS and MSD did not meet 0.0%-20.0% limits for Motor Oil at 25.7% due to relatively higher spike recovery in the MSD.

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 350758003 (J1TW80) and 350758004 (J1TW81) were diluted due to thick and oily matrix of the extracts and 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 #1306864 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. 21-JUN-14	Division: Federal	Quality Criteria: Specifications	Type: Process
Instrument Type: GC/FID	Test / Method: NWTPH-Dx in Soil	Matrix Type: Solid	Client Code: WCHN
Batch ID: 1396926	Sample Numbers: See Below		
<p>Potentially affected work order(s)(SDG): 350758(XP0101)</p> <p>Application Issues: Failed RPD for MS/MSD, or PS/PSD Failed Yield for Surrogates</p>			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. The relative percent difference between MS (1203111647) and MSD (1203111648) did not meet 0.0%-20.0% limits for Motor Oil at 25.7%.</p> <p>2. WCHN (350758003) and WCHN (350758004) failed surrogate recovery limits for o-Terphenyl at 0.0%.</p>		<p>1. The individual spike recoveries were within the acceptance limits in the MS/MSD, the data were reported.</p> <p>2. The samples were analyzed at a dilution of 1:100, therefore the surrogate was diluted out of the analysis. The data have been reported.</p>	

Originator's Name:

Josh Brooks 21-JUN-14

Data Validator/Group Leader:

Jimin Cao 23-JUN-14

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Qualifier Definition Report for

WCHN001 WC-HANFORD, INC.

Client SDG: XP0101 GEL Work Order: 350758 Project: RC-233 Soil

The Qualifiers in this report are defined as follows:

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

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.

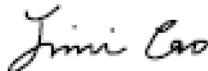
RE Indicates that sample is re-extracted.

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: 23 JUN 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: June 23, 2014

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

Client SDG: XP0101

Client Sample ID: J1TW78	Project: WCHN00313
Sample ID: 350758001	Client ID: WCHN001
Matrix: SOIL	
Collect Date: 12-JUN-14 12:20	
Receive Date: 17-JUN-14	
Collector: Client	
Moisture: 1.94%	

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)	J	3610	2210	6800	ug/kg	1	BYT1	06/20/14	1421	1396926	1
Motor Oil (C20-C36)		111000	2210	6800	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	3541 DRO IN SOIL PREP	SXW3	06/19/14	1705	1396924

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"	439 ug/kg	680	64.6	(50%-150%)

Notes:

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: June 23, 2014

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

Client SDG: XP0101

Client Sample ID: J1TW79	Project: WCHN00313
Sample ID: 350758002	Client ID: WCHN001
Matrix: SOIL	
Collect Date: 12-JUN-14 12:25	
Receive Date: 17-JUN-14	
Collector: Client	
Moisture: 4.71%	

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)	J	4020	2270	6990	ug/kg	1	BYT1	06/20/14	1500	1396926	1
Motor Oil (C20-C36)		36200	2270	6990	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	3541 DRO IN SOIL PREP	SXW3	06/19/14	1705	1396924

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"	497 ug/kg	699	71.0	(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: June 23, 2014

Page 1 of 2

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

Workorder: 350758

Client SDG: XP0101

Project Description: RC-233 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Diesel Range Organics											
Batch	1396926										
QC1203111644	LCS										
Diesel Range Organics (C10-C20)	66600			47000	ug/kg		70.6	(70%-130%)	BYT1	06/20/14	10:28
Motor Oil (C20-C36)	66600			50900	ug/kg		76.4	(70%-130%)			
**o-Terphenyl	666			496	ug/kg		74.5	(50%-150%)			
QC1203111643	MB										
Diesel Range Organics (C10-C20)			U	2160	ug/kg					06/20/14	09:50
Motor Oil (C20-C36)			U	2160	ug/kg						
**o-Terphenyl	666			461	ug/kg		69.2	(50%-150%)			
QC1203111647	350758002 MS										
Diesel Range Organics (C10-C20)	69900	J	4020	56700	ug/kg		75.4	(70%-130%)		06/20/14	15:39
Motor Oil (C20-C36)	69900		36200	93700	ug/kg		82.4	(70%-130%)			
**o-Terphenyl	699		497	537	ug/kg		76.8	(50%-150%)			
QC1203111648	350758002 MSD										
Diesel Range Organics (C10-C20)	69800	J	4020	66100	ug/kg	15.3	88.9	(0%-20%)		06/20/14	16:18
Motor Oil (C20-C36)	69800		36200	121000	ug/kg	25.7*	122	(0%-20%)			
**o-Terphenyl	698		497	607	ug/kg		86.9	(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

GEL LABORATORIES LLC

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QC Summary

Workorder: 350758

Client SDG: XP0101

Project Description: RC-233 Soil

Page 2 of 2

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 (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 or %RPD not applicable.

^ 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: 1396924 Verified by: _____
 Analyst: Shannon Whitehead
 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)
1203111643 MB	19-JUN-2014 17:05:00	30.03	1	0.0333
1203111644 LCS	19-JUN-2014 17:05:00	30.03	1	0.0333
350753001	19-JUN-2014 17:05:00	30.04	1	0.03329
1203111645 MS (350753001)	19-JUN-2014 17:05:00	30.01	1	0.03332
1203111646 MSD (350753001)	19-JUN-2014 17:05:00	30.04	1	0.03329
350758001	19-JUN-2014 17:05:00	30	1	0.03333
350758002	19-JUN-2014 17:05:00	30.03	1	0.0333
1203111647 MS (350758002)	19-JUN-2014 17:05:00	30.03	1	0.0333
1203111648 MSD (350758002)	19-JUN-2014 17:05:00	30.05	1	0.03328
350758003	19-JUN-2014 17:05:00	30.04	1	0.03329
350758004	19-JUN-2014 17:05:00	30.02	1	0.03331

Type	Sample Id	Description	Serial Number	Spike Amt	Units	Comments:
LCS	1203111644	AZDRO SPIKE LCS STD,4000ug/ml	WFI140611-62	1	mL	Final Solvent: CH2Cl2 Verified by: AV
MS	1203111645	AZDRO SPIKE LCS STD,4000ug/ml	WFI140611-62	1	mL	
MS	1203111647	AZDRO SPIKE LCS STD,4000ug/ml	WFI140611-62	1	mL	sample 35058003 is a tar consisting of rocks. Sample 350758004 is tar.
MSD	1203111646	AZDRO SPIKE LCS STD,4000ug/ml	WFI140611-62	1	mL	
MSD	1203111648	AZDRO SPIKE LCS STD,4000ug/ml	WFI140611-62	1	mL	
SURR	All	20 ppm surrogate	WE140520-04	1	mL	
REGNT	All	Methylene Chloride	2119290-D	120	mL	
SOURC	All	SODIUM SULFATE	2101676	30	g	

Metals Analysis

Case Narrative

**Metals Fractional Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0101**

Sample Analysis

Sample ID	Client ID
350758001	J1TW78
350758002	J1TW79
350758003	J1TW80
350758004	J1TW81
1203110516	Method Blank (MB) ICP
1203114467	Method Blank (MB) ICP
1203110517	Laboratory Control Sample (LCS)
1203114468	Laboratory Control Sample (LCS)
1203110520	350758001(J1TW78L) Serial Dilution (SD)
1203110518	350758001(J1TW78D) Sample Duplicate (DUP)
1203110519	350758001(J1TW78S) Matrix Spike (MS)
1203114421	350758001(J1TW78PS) Post Spike (PS)
1203114944	350758001(J1TW78PS) Post Spike (PS)
1203110509	Method Blank (MB) ICP-MS
1203110510	Laboratory Control Sample (LCS)
1203110513	350758001(J1TW78L) Serial Dilution (SD)
1203110511	350758001(J1TW78D) Sample Duplicate (DUP)
1203110512	350758001(J1TW78S) Matrix Spike (MS)
1203111168	Method Blank (MB) CVAA
1203111169	Laboratory Control Sample (LCS)
1203111175	350758001(J1TW78L) Serial Dilution (SD)
1203111173	350758001(J1TW78D) Sample Duplicate (DUP)
1203111174	350758001(J1TW78S) Matrix Spike (MS)

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

Method/Analysis Information

Analytical Batch:	1396424, 1398034, 1396420 and 1396706
Prep Batch :	1396421, 1398033, 1396419 and 1396705
Standard Operating Procedures:	GL-MA-E-013 REV# 22, GL-MA-E-009 REV# 23, 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 an ESI SC-FAST introduction, 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 0.4L/min, argon gas flows of 13 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/PQL Requirements

All PQL standards for 6010C met the control limits with the exception of sodium listed below. The sample concentrations were less than the MDL or greater than 2x the PQL, so the data is not adversely affected. 350758001 (J1TW78), 350758002 (J1TW79), 350758003 (J1TW80) and 350758004 (J1TW81)-ICP.

ICSA/ICSAB Statement

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

Continuing Calibration Blanks (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: 350758001 (J1TW78)-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 the recommended quality control acceptance criteria for percent recoveries for vanadium. 1203110519 (J1TW78)-ICP. The MS did not meet the recommended quality control acceptance criteria for percent recoveries for silicon. 1203110519 (J1TW78)-ICP.

Duplicate Relative Percent Difference (RPD) Statement

The RPD obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required reporting limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control of +/-RL is used to evaluate the DUP results. Aluminum, calcium, chromium, magnesium and sodium did not meet these requirements. 1203110518 (J1TW78)-ICP. All applicable analytes did not meet these requirements. 1203111173 (J1TW78)-CVAA.

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. Aluminum, calcium, copper and sodium did not meet the established percent difference criteria. 1203110520 (J1TW78)-ICP.

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 were diluted for titanium was over the linear range and in order to bring raw values within the linear range of the instrument, and for the analytes interfered with, in order to ensure that the inter-element correction factors were valid antimony, cobalt, lead, vanadium and zinc. 350758001 (J1TW78), 350758002 (J1TW79), 350758003 (J1TW80) and 350758004 (J1TW81)-ICP. The ICPMS solid samples in this SDG were diluted the standard two times. ICP-MS.

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 reports were included behind the Case Narrative or in the Miscellaneous Data section of this data package. The following DER was generated for this SDG: 1307261. 1203110518 (J1TW78), 1203110519 (J1TW78) and 1203114421 (J1TW78)-ICP. The following DER was generated for this SDG: 1307618. 1203110519 (J1TW78)-ICP. The following DER was generated for this SDG: 1306528. 1203111173 (J1TW78)-CVAA.

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: Nick Cole A. Elmore Date: 6-24-14

DATA EXCEPTION REPORT

Mo.Day Yr. 20-JUN-14	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: MERCURY	Test / Method: SW846 7471B	Matrix Type: Solid	Client Code: BCCM, WCHN
Batch ID: 1396706	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 350758(XP0101)			
Application Issues: Failed RPD for DUP			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Failed RPD for DUP: QC 1203111173DUP</p>		<p>1. 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.</p>	

Originator's Name:

Monifa Basdeo 23-JUN-14

Data Validator/Group Leader:

Nik-Cole Elmore 23-JUN-14

DATA EXCEPTION REPORT

Mo.Day Yr. 23-JUN-14	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: ICP	Test / Method: SW846 3050B/6010C	Matrix Type: Solid	Client Code: WCHN
Batch ID: 1396424	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 350758(XP0101)			
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 1203110519MS</p> <p>2. Failed RPD for DUP: QC 1203110518DUP</p>		<p>1. The matrix spike recovery failed outside of the control limits for vanadium. The post spike passed the required control limits for all analytes. This verifies the absence of a matrix interference.</p> <p>2. The sample and sample duplicate % RPD failed outside the control limits for aluminum, calcium, chromium, magnesium and sodium due to possible sample non-homogeneity and/or matrix interference.</p>	

Originator's Name:

Helen Camello 24-JUN-14

Data Validator/Group Leader:

Jerry Wigfall 24-JUN-14

DATA EXCEPTION REPORT

Mo.Day Yr. 24-JUN-14	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: ICP	Test / Method: SW846 3050B/6010C	Matrix Type: Solid	Client Code: WCHN
Batch ID: 1398034	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 350758(XP0101)			
Application Issues: Failed Recovery for MS/PS			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Failed Recovery for MS/PS:</p> <p>QC 1203110519MS</p>		<p>1. The matrix spike recovery failed outside of the control limits for silicon. The post spike passed the required control limits for all analytes. This verifies the absence of a matrix interference.</p>	

Originator's Name:

Helen Camello 24-JUN-14

Data Validator/Group Leader:

Jerry Wigfall 24-JUN-14

Sample Data Summary

GEL LABORATORIES LLC

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Qualifier Definition Report for

WCHN001 WC-HANFORD, INC.

Client SDG: XP0101 GEL Work Order: 350758 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).
- 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.
- 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

Nick Cole A. Elmore 6-24-14

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: June 24, 2014

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

Client SDG: XP0101

Client Sample ID: J1TW78	Project: WCHN00313
Sample ID: 350758001	Client ID: WCHN001
Matrix: SOIL	
Collect Date: 12-JUN-14 12:20	
Receive Date: 17-JUN-14	
Collector: Client	
Moisture: 1.94%	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	*U	0.00402	0.00402	0.012	mg/kg	1	NOR1	06/19/14	1122	1396706	1
Metals Analysis-ICP											
ICP METALS 6010TR Client List "Dry Weight Corrected"											
Aluminum	*M	8390	6.47	19.0	mg/kg	1	HSC	06/23/14	1035	1396424	2
Arsenic	B	2.17	0.476	2.85	mg/kg	1					
Barium		74.4	0.0951	0.476	mg/kg	1					
Beryllium		0.900	0.0951	0.476	mg/kg	1					
Boron	U	0.951	0.951	4.76	mg/kg	1					
Cadmium	U	0.0951	0.0951	0.476	mg/kg	1					
Calcium	*M	6480	7.61	23.8	mg/kg	1					
Chromium	*	10.3	0.143	0.476	mg/kg	1					
Copper	M	23.2	0.285	0.951	mg/kg	1					
Iron		22800	7.61	23.8	mg/kg	1					
Magnesium	*	6420	8.09	28.5	mg/kg	1					
Manganese		312	0.190	0.951	mg/kg	1					
Molybdenum	B	0.651	0.190	0.951	mg/kg	1					
Nickel		14.4	0.143	0.476	mg/kg	1					
Potassium		921	6.09	23.8	mg/kg	1					
Silver	B	0.334	0.0951	0.476	mg/kg	1					
Sodium	*M	539	6.66	23.8	mg/kg	1					
Antimony	DU	1.57	1.57	4.76	mg/kg	5	HSC	06/23/14	0929	1396424	3
Cobalt	D	8.58	0.713	2.38	mg/kg	5					
Lead	DU	1.57	1.57	4.76	mg/kg	5					
Vanadium	DN	44.7	0.476	2.38	mg/kg	5					
Zinc	D	36.5	1.90	4.76	mg/kg	5					
Silicon	N	346	1.43	9.55	mg/kg	1	HSC	06/24/14	0843	1398034	4
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.335	0.335	1.02	mg/kg	2	PRB	06/19/14	0600	1396420	5

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	JXM5	06/18/14	0730	1396419
SW846 3050B	SW846 3050B Prep for 6010C	JXM5	06/23/14	1430	1398033
SW846 3050B	SW846 3050B Prep for 6010C	JXO1	06/17/14	1330	1396421

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Certificate of Analysis

Report Date: June 24, 2014

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

Client SDG: XP0101

Client Sample ID: J1TW78
Sample ID: 350758001

Project: WCHN00313
Client ID: WCHN001

SW846 7471B Prep SW846 7471B Mercury Prep Soil AXS5 06/18/14 1543 1396705

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:

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Certificate of Analysis

Report Date: June 24, 2014

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

Client SDG: XP0101

Client Sample ID: J1TW79	Project: WCHN00313
Sample ID: 350758002	Client ID: WCHN001
Matrix: SOIL	
Collect Date: 12-JUN-14 12:25	
Receive Date: 17-JUN-14	
Collector: Client	
Moisture: 4.71%	

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	0.00415	0.00415	0.0124	mg/kg	1	NOR1	06/19/14	1134	1396706	1
Metals Analysis-ICP											
ICP METALS 6010TR Client List "Dry Weight Corrected"											
Aluminum	*M	3970	6.13	18.0	mg/kg	1	HSC	06/23/14	1025	1396424	2
Arsenic	B	1.97	0.451	2.70	mg/kg	1					
Barium		58.6	0.0902	0.451	mg/kg	1					
Beryllium		0.975	0.0902	0.451	mg/kg	1					
Boron	U	0.902	0.902	4.51	mg/kg	1					
Cadmium	B	0.0971	0.0902	0.451	mg/kg	1					
Calcium	*M	5110	7.21	22.5	mg/kg	1					
Chromium	*	5.14	0.135	0.451	mg/kg	1					
Copper	M	12.7	0.270	0.902	mg/kg	1					
Iron		21900	7.21	22.5	mg/kg	1					
Magnesium	*	3710	7.66	27.0	mg/kg	1					
Manganese		314	0.180	0.902	mg/kg	1					
Molybdenum	B	0.370	0.180	0.902	mg/kg	1					
Nickel		9.48	0.135	0.451	mg/kg	1					
Potassium		496	5.77	22.5	mg/kg	1					
Silver	B	0.287	0.0902	0.451	mg/kg	1					
Sodium	*M	220	6.31	22.5	mg/kg	1					
Antimony	DU	1.49	1.49	4.51	mg/kg	5	HSC	06/23/14	0917	1396424	3
Cobalt	D	8.48	0.676	2.25	mg/kg	5					
Lead	DU	1.49	1.49	4.51	mg/kg	5					
Vanadium	DN	64.1	0.451	2.25	mg/kg	5					
Zinc	D	41.2	1.80	4.51	mg/kg	5					
Silicon	N	352	1.42	9.44	mg/kg	1	HSC	06/24/14	0833	1398034	4
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.333	0.333	1.01	mg/kg	2	PRB	06/19/14	0633	1396420	5

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	JXM5	06/18/14	0730	1396419
SW846 3050B	SW846 3050B Prep for 6010C	JXM5	06/23/14	1430	1398033
SW846 3050B	SW846 3050B Prep for 6010C	JXO1	06/17/14	1330	1396421

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Certificate of Analysis

Report Date: June 24, 2014

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

Client SDG: XP0101

Client Sample ID: J1TW79
Sample ID: 350758002

Project: WCHN00313
Client ID: WCHN001

SW846 7471B Prep SW846 7471B Mercury Prep Soil AXS5 06/18/14 1543 1396705

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:

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Certificate of Analysis

Report Date: June 24, 2014

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

Client SDG: XP0101

Client Sample ID: J1TW80
Sample ID: 350758003

Project: WCHN00313
Client ID: WCHN001

SW846 7471B Prep SW846 7471B Mercury Prep Soil AXS5 06/18/14 1543 1396705

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:

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Certificate of Analysis

Report Date: June 24, 2014

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

Client SDG: XP0101

Client Sample ID: J1TW81	Project: WCHN00313
Sample ID: 350758004	Client ID: WCHN001
Matrix: SOIL	
Collect Date: 12-JUN-14 12:34	
Receive Date: 17-JUN-14	
Collector: Client	
Moisture: 3.9%	

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	0.00404	0.00404	0.0121	mg/kg	1	NOR1	06/19/14	1137	1396706	1
Metals Analysis-ICP											
ICP METALS 6010TR Client List "Dry Weight Corrected"											
Aluminum	*M	4000	7.02	20.6	mg/kg	1	HSC	06/23/14	1032	1396424	2
Arsenic	B	1.03	0.516	3.10	mg/kg	1					
Barium		70.4	0.103	0.516	mg/kg	1					
Beryllium		1.14	0.103	0.516	mg/kg	1					
Boron	U	1.03	1.03	5.16	mg/kg	1					
Cadmium	U	0.103	0.103	0.516	mg/kg	1					
Calcium	*M	4860	8.26	25.8	mg/kg	1					
Chromium	*	4.49	0.155	0.516	mg/kg	1					
Copper	M	15.2	0.310	1.03	mg/kg	1					
Iron		26400	8.26	25.8	mg/kg	1					
Magnesium	*	4270	8.77	31.0	mg/kg	1					
Manganese		328	0.206	1.03	mg/kg	1					
Molybdenum	B	0.610	0.206	1.03	mg/kg	1					
Nickel		9.09	0.155	0.516	mg/kg	1					
Potassium		504	6.61	25.8	mg/kg	1					
Silver	B	0.277	0.103	0.516	mg/kg	1					
Sodium	*M	250	7.23	25.8	mg/kg	1					
Antimony	DU	1.70	1.70	5.16	mg/kg	5	HSC	06/23/14	0925	1396424	3
Cobalt	D	9.88	0.774	2.58	mg/kg	5					
Lead	DU	1.70	1.70	5.16	mg/kg	5					
Vanadium	DN	86.2	0.516	2.58	mg/kg	5					
Zinc	D	47.8	2.06	5.16	mg/kg	5					
Silicon	N	219	1.42	9.46	mg/kg	1	HSC	06/24/14	0840	1398034	4
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.333	0.333	1.01	mg/kg	2	PRB	06/19/14	0646	1396420	5

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	JXM5	06/18/14	0730	1396419
SW846 3050B	SW846 3050B Prep for 6010C	JXM5	06/23/14	1430	1398033
SW846 3050B	SW846 3050B Prep for 6010C	JXO1	06/17/14	1330	1396421

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: June 24, 2014

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

Client SDG: XP0101

Client Sample ID: J1TW81
Sample ID: 350758004

Project: WCHN00313
Client ID: WCHN001

SW846 7471B Prep SW846 7471B Mercury Prep Soil AXS5 06/18/14 1543 1396705

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: June 24, 2014

Page 1 of 8

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

Workorder: 350758

Client SDG: XP0101

Project Description: RC-233 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1396420										
QC1203110511	350758001	DUP									
Selenium		DU	0.335	DU	0.329	mg/kg	N/A		PRB	06/19/14	06:07
QC1203110510	LCS										
Selenium	4.90		D	4.82	mg/kg		98.4	(80%-120%)		06/19/14	05:40
QC1203110509	MB										
Selenium			DU	0.329	mg/kg					06/19/14	05:33
QC1203110512	350758001	MS									
Selenium	5.08	DU	0.335	D	4.71	mg/kg		92.8	(75%-125%)	06/19/14	06:13
QC1203110513	350758001	SDILT									
Selenium		DU	-0.178	DU	1.68	ug/L	N/A	(0%-10%)		06/19/14	06:27
Metals Analysis-ICP											
Batch	1396424										
QC1203110518	350758001	DUP									
Aluminum		*M	8390	*	6360	mg/kg	27.6*	(0%-20%)	HSC	06/23/14	10:38
Antimony		DU	1.57	DU	1.66	mg/kg	N/A			06/23/14	09:33
Arsenic		B	2.17	B	2.09	mg/kg	3.72 ^	(+/-3.02)		06/23/14	10:38
Barium			74.4		67.8	mg/kg	9.37	(0%-20%)			
Beryllium			0.900		0.832	mg/kg	7.81 ^	(+/-0.504)			
Boron		U	0.951	U	1.01	mg/kg	N/A				
Cadmium		U	0.0951	U	0.101	mg/kg	N/A				
Calcium		*M	6480	*	4990	mg/kg	25.9*	(0%-20%)			
Chromium		*	10.3	*	7.11	mg/kg	36.7*	(0%-20%)			
Cobalt		D	8.58	D	9.27	mg/kg	7.74 ^	(+/-2.52)		06/23/14	09:33
Copper		M	23.2		21.1	mg/kg	9.71	(0%-20%)		06/23/14	10:38
Iron			22800		20600	mg/kg	10.2	(0%-20%)			

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QC Summary

Workorder: 350758

Client SDG: XP0101

Project Description: RC-233 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1396424										
Lead	DU	1.57	BD	4.14	mg/kg	128	^	(+/-5.04)	HSC	06/23/14	09:33
Magnesium	*	6420	*	5160	mg/kg	21.8*		(0%-20%)		06/23/14	10:38
Manganese		312		274	mg/kg	12.9		(0%-20%)			
Molybdenum	B	0.651	B	0.386	mg/kg	51.1	^	(+/-1.01)			
Nickel		14.4		13.0	mg/kg	10.6		(0%-20%)			
Potassium		921		817	mg/kg	11.9		(0%-20%)			
Silver	B	0.334	B	0.272	mg/kg	20.7	^	(+/-0.504)			
Sodium	*M	539	*	352	mg/kg	41.9*		(0%-20%)			
Vanadium	DN	44.7	D	46.8	mg/kg	4.55		(0%-20%)		06/23/14	09:33
Zinc	D	36.5	D	35.4	mg/kg	2.94		(0%-20%)			
QC1203110517	LCS										
Aluminum		489		495	mg/kg			101 (80%-120%)		06/23/14	10:18
Antimony		48.9		50.7	mg/kg			104 (80%-120%)			
Arsenic		48.9		50.8	mg/kg			104 (80%-120%)			
Barium		48.9		50.5	mg/kg			103 (80%-120%)			
Beryllium		48.9		52.4	mg/kg			107 (80%-120%)			
Boron		48.9		49.0	mg/kg			100 (80%-120%)			
Cadmium		48.9		50.9	mg/kg			104 (80%-120%)			
Calcium		489		514	mg/kg			105 (80%-120%)			
Chromium		48.9		50.1	mg/kg			102 (80%-120%)			
Cobalt		48.9		49.8	mg/kg			102 (80%-120%)			
Copper		48.9		50.1	mg/kg			103 (80%-120%)			

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1396424										
Iron	489			519	mg/kg		106	(80%-120%)	HSC	06/23/14	10:18
Lead	48.9			50.3	mg/kg		103	(80%-120%)			
Magnesium	489			527	mg/kg		108	(80%-120%)			
Manganese	48.9			50.7	mg/kg		104	(80%-120%)			
Molybdenum	48.9			49.9	mg/kg		102	(80%-120%)			
Nickel	48.9			49.4	mg/kg		101	(80%-120%)			
Potassium	489			509	mg/kg		104	(80%-120%)			
Silver	48.9			51.5	mg/kg		105	(80%-120%)			
Sodium	489			476	mg/kg		97.3	(80%-120%)			
Vanadium	48.9			51.9	mg/kg		106	(80%-120%)			
Zinc	48.9			51.4	mg/kg		105	(80%-120%)			
QC1203110516	MB										
Aluminum			U	6.60	mg/kg					06/23/14	09:09
Antimony			U	0.320	mg/kg						
Arsenic			U	0.485	mg/kg						
Barium			U	0.0971	mg/kg						
Beryllium			U	0.0971	mg/kg						
Boron			U	0.971	mg/kg						
Cadmium			U	0.0971	mg/kg						
Calcium			U	7.77	mg/kg						
Chromium			U	0.146	mg/kg						
Cobalt			U	0.146	mg/kg						

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1396424										
Copper			U	0.291	mg/kg				HSC	06/23/14	09:09
Iron			U	7.77	mg/kg						
Lead			U	0.320	mg/kg						
Magnesium			U	8.25	mg/kg						
Manganese			U	0.194	mg/kg						
Molybdenum			U	0.194	mg/kg						
Nickel			U	0.146	mg/kg						
Potassium			U	6.21	mg/kg						
Silver			U	0.0971	mg/kg						
Sodium			U	6.80	mg/kg						
Vanadium			U	0.0971	mg/kg						
Zinc			U	0.388	mg/kg						
QC1203110519 350758001 MS											
Aluminum	481	*M	8390	8970	mg/kg		N/A	(75%-125%)		06/23/14	10:41
Antimony	48.1	DU	1.57	D 46.1	mg/kg		95.9	(75%-125%)		06/23/14	09:37
Arsenic	48.1	B	2.17	51.1	mg/kg		102	(75%-125%)		06/23/14	10:41
Barium	48.1		74.4	123	mg/kg		100	(75%-125%)			
Beryllium	48.1		0.900	50.0	mg/kg		102	(75%-125%)			
Boron	48.1	U	0.951	48.4	mg/kg		99.4	(75%-125%)			
Cadmium	48.1	U	0.0951	46.7	mg/kg		97.2	(75%-125%)			
Calcium	481	*M	6480	7080	mg/kg		N/A	(75%-125%)			
Chromium	48.1	*	10.3	60.1	mg/kg		103	(75%-125%)			

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Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1396424										
Cobalt	48.1	D	8.58	D	59.0	mg/kg	105	(75%-125%)	HSC	06/23/14	09:37
Copper	48.1	M	23.2		74.3	mg/kg	106	(75%-125%)		06/23/14	10:41
Iron	481		22800		23800	mg/kg	N/A	(75%-125%)			
Lead	48.1	DU	1.57	D	50.2	mg/kg	102	(75%-125%)		06/23/14	09:37
Magnesium	481	*	6420		6650	mg/kg	N/A	(75%-125%)		06/23/14	10:41
Manganese	48.1		312		379	mg/kg	N/A	(75%-125%)			
Molybdenum	48.1	B	0.651		47.1	mg/kg	96.6	(75%-125%)			
Nickel	48.1		14.4		62.6	mg/kg	100	(75%-125%)			
Potassium	481		921		1510	mg/kg	123	(75%-125%)			
Silver	48.1	B	0.334		51.0	mg/kg	105	(75%-125%)			
Sodium	481	*M	539		1030	mg/kg	103	(75%-125%)			
Vanadium	48.1	DN	44.7	DN	105	mg/kg	126*	(75%-125%)		06/23/14	09:37
Zinc	48.1	D	36.5	D	90.1	mg/kg	111	(75%-125%)			
QC1203114421 350758001 PS											
Vanadium	500	DN	94.0	D	628	ug/L	107	(80%-120%)		06/23/14	10:21
QC1203110520 350758001 SDILT											
Aluminum		*M	88200	DM	13800	ug/L	21.8*	(0%-10%)		06/23/14	10:46
Antimony		DU	-3.84	DU	7.85	ug/L	N/A	(0%-10%)		06/23/14	09:40
Arsenic		B	22.8	D	5.68	ug/L	24.4	(0%-10%)		06/23/14	10:46
Barium			783	D	141	ug/L	10	(0%-10%)			
Beryllium			9.46	D	2.08	ug/L	9.73	(0%-10%)			
Boron		U	6.26	DU	4.76	ug/L	N/A	(0%-10%)			
Cadmium		U	-0.971	DU	0.476	ug/L	N/A	(0%-10%)			

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Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1396424										
Calcium	*M	68100	DM	11500	ug/L	15.6*		(0%-10%)	HSC	06/23/14	10:46
Chromium	*	108	D	21.5	ug/L	.951		(0%-10%)			
Cobalt	D	18.0	D	4.58	ug/L	27		(0%-10%)		06/23/14	09:40
Copper	M	244	DM	42.9	ug/L	12.2*		(0%-10%)		06/23/14	10:46
Iron		239000	D	47400	ug/L	.915		(0%-10%)			
Lead	DU	1.93	DU	7.85	ug/L	N/A		(0%-10%)		06/23/14	09:40
Magnesium	*	67400	D	12600	ug/L	6.47		(0%-10%)		06/23/14	10:46
Manganese		3280	D	654	ug/L	.21		(0%-10%)			
Molybdenum	B	6.84	DU	0.951	ug/L	N/A		(0%-10%)			
Nickel		152	D	28.1	ug/L	7.27		(0%-10%)			
Potassium		9680	D	1890	ug/L	2.24		(0%-10%)			
Silver	B	3.52	DU	0.476	ug/L	N/A		(0%-10%)			
Sodium	*M	5660	DM	384	ug/L	66.1*		(0%-10%)			
Vanadium	DN	94.0	D	18.5	ug/L	1.5		(0%-10%)		06/23/14	09:40
Zinc	D	76.7	D	15.8	ug/L	2.93		(0%-10%)			
Batch	1398034										
QC1203110518	350758001	DUP									
Silicon	N	346		393	mg/kg	12.6		(0%-20%)	HSC	06/24/14	08:45
QC1203114468	LCS										
Silicon		476		432	mg/kg		90.6	(80%-120%)		06/24/14	08:29
QC1203114467	MB										
Silicon			U	1.48	mg/kg					06/24/14	08:25
QC1203110519	350758001	MS									
Silicon	497	N	346	N	628	mg/kg	56.8*	(75%-125%)		06/24/14	08:49

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Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch 1398034											
QC1203114944	350758001	PS									
Silicon	5000	N	3620	7800	ug/L		83.5	(80%-120%)	HSC	06/24/14	08:52
QC1203110520 350758001 SDILT											
Silicon		N	3620	D	696	ug/L	3.98	(0%-10%)		06/24/14	08:55
Metals Analysis-Mercury											
Batch 1396706											
QC1203111173	350758001	DUP									
Mercury		*U	0.00402	*	0.0604	mg/kg	187*^	(+/-0.0121)	NOR1	06/19/14	11:24
QC1203111169	LCS										
Mercury	0.115				0.109	mg/kg	94.9	(80%-120%)		06/19/14	11:12
QC1203111168	MB										
Mercury			U		0.00387	mg/kg				06/19/14	11:11
QC1203111174	350758001	MS									
Mercury	0.122	*U	0.00402		0.124	mg/kg	100	(80%-120%)		06/19/14	11:26
QC1203111175	350758001	SDILT									
Mercury		*U	0.033	DU	0.0201	ug/L	N/A	(0%-10%)		06/19/14	11:31

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

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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 or %RPD not applicable.

^ 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: 1396421	Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
Analyst: John Orgel	LCS	1203110517	Metals Spike Mix I	UI2087802-01	.25	mL
Method: SW846 3050B	LCS	1203110517	Metals Spike Mix II	UI2087804-06	.25	mL
Lab SOP: GL-MA-E-009 REV# 23	MS	1203110519	Metals Spike Mix I	UI2087802-01	.25	mL
Instrument: BAL-892	MS	1203110519	Metals Spike Mix II	UI2087804-06	.25	mL

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)
1203110516 MB	17-JUN-2014 13:30:29	Soil	0.515	50	97.08738
1203110517 LCS	17-JUN-2014 13:30:29	Soil	0.511	50	97.84736
350758001	17-JUN-2014 13:30:29	Soil	0.536	50	93.28358
1203110518 DUP (350758001)	17-JUN-2014 13:30:29	Soil	0.506	50	98.81423
1203110519 MS (350758001)	17-JUN-2014 13:30:29	Soil	0.53	50	94.33962
1203110520 SDILT (350758001)	17-JUN-2014 13:30:29	Soil	0.536	50	93.28358
350758002	17-JUN-2014 13:30:29	Soil	0.582	50	85.91065
350758003	17-JUN-2014 13:30:29	Soil	0.55	50	90.90909
350758004	17-JUN-2014 13:30:29	Soil	0.504	50	99.20635

Reagent/Solvent Lot ID	Description	Amount	Comments:
2098278	Concentrated Nitric Acid	1.25 mL	Block Temperature: 91 C
2108818	HYDROCHLORIC ACID	10 mL	Thermometer ID: 89095-622 Hot Block ID: 011

Prep Logbook

Acid Digestion of Sediments, Sludges, and Soils

Batch ID: 1398033	Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
Analyst: Jack Mabry	LCS	1203114468	Metals Spike Mix I	UI2087802-01	.25	mL
Method: SW846 3050B	LCS	1203114468	Metals Spike Mix II	UI2087804-06	.25	mL
Lab SOP: GL-MA-E-009 REV# 23	MS	1203110519	Metals Spike Mix I	UI2087802-01	.25	mL
Instrument: BAL-892	MS	1203110519	Metals Spike Mix II	UI2087804-06	.25	mL

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)
1203114467 MB	23-JUN-2014 14:30:33	Soil	0.506	50	98.81423
1203114468 LCS	23-JUN-2014 14:30:33	Soil	0.525	50	95.2381
350758001 - 2	23-JUN-2014 14:30:33	Soil	0.534	50	93.63296
1203110518 - 2 DUP (350758001)	23-JUN-2014 14:30:33	Soil	0.52	50	96.15385
1203110519 - 2 MS (350758001)	23-JUN-2014 14:30:33	Soil	0.513	50	97.46589
1203110520 - 2 SDILT (350758001)	23-JUN-2014 14:30:33	Soil	0.534	50	93.63296
350758002 - 2	23-JUN-2014 14:30:33	Soil	0.556	50	89.92806
350758003 - 2	23-JUN-2014 14:30:33	Soil	0.529	50	94.51796
350758004 - 2	23-JUN-2014 14:30:33	Soil	0.55	50	90.90909

Reagent/Solvent Lot ID	Description	Amount	Comments:
140610	HYDROCHLORIC ACID	10 mL	Block Temperature: 92 C
2110352	Concentrated Nitric Acid	1.25 mL	Thermometer ID: 118631 Hot Block ID: 2

Prep Logbook

Acid Digestion of Sediments, Sludges, and Soils

Batch ID: 1396419	Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
Analyst: Jack Mabry	LCS	1203110510	ICP-MS spiking solution A	UI2091842-A	.25	mL
Method: SW846 3050B	LCS	1203110510	ICP-MS spiking solution B	UI2091844-B	.25	mL
Lab SOP: GL-MA-E-009 REV# 23	MS	1203110512	ICP-MS spiking solution A	UI2091842-A	.25	mL
Instrument: BAL-892	MS	1203110512	ICP-MS spiking solution B	UI2091844-B	.25	mL

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)
1203110509 MB	18-JUN-2014 07:30:50	Soil	0.501	50	99.8004
1203110510 LCS	18-JUN-2014 07:30:50	Soil	0.51	50	98.03922
350758001	18-JUN-2014 07:30:50	Soil	0.502	50	99.60159
1203110511 DUP (350758001)	18-JUN-2014 07:30:50	Soil	0.512	50	97.65625
1203110512 MS (350758001)	18-JUN-2014 07:30:50	Soil	0.502	50	99.60159
1203110513 SDILT (350758001)	18-JUN-2014 07:30:50	Soil	0.502	50	99.60159
350758002	18-JUN-2014 07:30:50	Soil	0.52	50	96.15385
350758003	18-JUN-2014 07:30:50	Soil	0.507	50	98.61933
350758004	18-JUN-2014 07:30:50	Soil	0.516	50	96.89922

Reagent/Solvent Lot ID	Description	Amount	Comments:
2098278	Concentrated Nitric Acid	5 mL	Block Temperature: 94 C
2115989-02	Hydrogen Peroxide 30%	1.5 mL	Thermometer ID: 61066-a1 Hot Block ID: 8

Prep Logbook

Mercury Analysis Using the Perkin Elmer Automated Mercury Analyzer

Batch ID:	1396705	Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
Analyst:	Alan Stanley	LCS	1203111169	MHGSOILMSSPIKE	WHG140618-14	.3	mL
Method:	SW846 7471B Prep	MS	1203111171	MHGSOILMSSPIKE	WHG140618-14	.3	mL
Lab SOP:	GL-MA-E-010 REV# 27	MS	1203111174	MHGSOILMSSPIKE	WHG140618-14	.3	mL
Instrument:	Satorius						

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)
1203111168 MB	18-JUN-2014 15:43:52	Soil	0.519	30	57.80347
1203111169 LCS	18-JUN-2014 15:43:52	Soil	0.522	30	57.47126
350753001	18-JUN-2014 15:43:52	Soil	0.5	30	60
1203111170 DUP (350753001)	18-JUN-2014 15:43:52	Soil	0.523	30	57.36138
1203111171 MS (350753001)	18-JUN-2014 15:43:52	Soil	0.505	30	59.40594
1203111172 SDILT (350753001)	18-JUN-2014 15:43:52	Soil	0.5	30	60
350758001	18-JUN-2014 15:43:52	Soil	0.51	30	58.82353
1203111173 DUP (350758001)	18-JUN-2014 15:43:52	Soil	0.507	30	59.1716
1203111174 MS (350758001)	18-JUN-2014 15:43:52	Soil	0.5	30	60
1203111175 SDILT (350758001)	18-JUN-2014 15:43:52	Soil	0.51	30	58.82353
350758002	18-JUN-2014 15:43:52	Soil	0.508	30	59.05512
350758003	18-JUN-2014 15:43:52	Soil	0.516	30	58.13953
350758004	18-JUN-2014 15:43:52	Soil	0.518	30	57.91506
350791001	18-JUN-2014 15:43:52	Misc Solid	0.525	30	57.14286
350791002	18-JUN-2014 15:43:52	Misc Solid	0.526	30	57.03422
350791003	18-JUN-2014 15:43:52	Misc Solid	0.542	30	55.35055
350791004	18-JUN-2014 15:43:52	Misc Solid	0.504	30	59.52381
350791005	18-JUN-2014 15:43:52	Misc Solid	0.524	30	57.25191
350791006	18-JUN-2014 15:43:52	Misc Solid	0.517	30	58.02708
350791007	18-JUN-2014 15:43:52	Misc Solid	0.569	30	52.72408
350791008	18-JUN-2014 15:43:52	Misc Solid	0.514	30	58.36576
350791009	18-JUN-2014 15:43:52	Misc Solid	0.515	30	58.25243
350791010	18-JUN-2014 15:43:52	Misc Solid	0.529	30	56.71078
350793001	18-JUN-2014 15:43:52	Solid	0.51	30	58.82353

Reagent/Solvent Lot ID	Description	Amount	Comments:
140522-1	NITRIC ACID	.375 mL	Digestion Start Date: 18-JUN-2014 15:43 Digestion End Date: 18-JUN-2014 16:13

Prep Logbook

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)
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Reagent/Solvent Lot ID	Description	Amount	Comments:
2072331-C	Hg reducing agent	2 mL	Block Temperature: 95 C
2108387-A	Hydrochloric Acid Conc.	1.125 mL	Thermometer ID: 119131
2117950-C	5% KMnO4 solution	7.5 mL	Hot Block ID: 6
WHG140618-07	Mercury Working Standard 1st Source CAL S 0.2/CRA	30 uL	
WHG140618-08	Mercury Working Standard 1st Source CAL S 0.5	75 uL	
WHG140618-09	Mercury Working 1st Source CAL S 2.0	300 uL	
WHG140618-10	Mercury Working 1st Source CAL S 5.0/CCV	750 uL	
WHG140618-11	Mercury Working 1st Source CAL S 10.0	1500 uL	
WHG140618-12	Mercury Working 2nd Source S 5.0/ICV	750 uL	