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 10/9/14
INITIAL/DATE

COMMENTS:

SDG XP0134 SAF-RC-233

Rad only ☑ Chem only Rad & Chem

☑ Complete Partial

Sample Location: 600-358, Burn Pit, waste stockpile

GEL Laboratories LLC
a member of The GEL Group INC

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

www.gel.com

September 29, 2014

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

Re: RC-233 Soil
Work Order: 357115
SDG: XP0134

Dear Joan Kessner:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on September 19, 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-233-062
Enclosures

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Case Narrative

Receipt Narrative
for
WC-HANFORD, INC.
SDG: XP0134
Work Order: 357115

September 29, 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 September 19, 2014 for analysis.

Sample Identification: The laboratory received the following samples:

Laboratory ID	Client ID
357115001	J1V0D1
357115002	J1V0D1
357115003	J1V0D2
357115004	J1V0D2

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 Semivolatile Herbicide, GC Semivolatile PCB, GC Semivolatile Pesticide, GC Volatiles (GRO), GC/MS Semivolatile, HPLC Polynuclear Aromatic Hydrocarbon and Metals.

Orlette Johnson
Project Manager

Chain of Custody and Supporting Documentation

Washington Closure Hanford

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-233-062

Collector: WEBER, HC	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Price Code: 8J	Data Turnaround: 7 days		
Project Designation: 100-IU-2 & 100-IU-6 Remaining Waste Sites	Sampling Location: 600-358, Burn pit, waste stockpile		SAF No.: RC-233
Ice Chest No.: WCH-12-029	Field Logbook No.: EL-1667-02	COA: 0603582600	Method of Shipment: Commerical Carrier / Fed Ex
Shipped To: GEL Laboratories Charlston	Offsite Property No.: A131230		Bill of Lading/Air Bill No.: See OSR

Other Labs Shipped To: n/A 357115

POSSIBLE SAMPLE HAZARDS/REMARKS: None

Special Handling and/or Storage: Cool 4C

Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None		
Type of Container	G/P	aG	aG/s	aG	aG	aG	aG	aG		
No. of Container(s)	1	1	3	1	1	1	1	1		
Volume	60mL	125mL	40mL	125mL	125mL	125mL	125mL	125mL		
Sample Analysis	See item (1) in Special Instructions	TPH-Diesel Range - WTPH-D +	TPH-Gasoline Range - WTPH-G	Semi-VOA - 8270 (TCL)	PAHs - 8310	PCBs - 8082	Pesticides - 8081; Chloro-Herbicides - EPA8151	See item (2) in Special Instructions		

Sample No.	Matrix	Sample Date	Sample Time										
J1V0D1	SOIL	09/17/14	1035	X	X	X	X	X	X	X	X		
J1V0D2	SOIL	09/17/14	1025	X	X	X	X	X	X	X	X		
~~J1V0D3 09/17/14~~	~~SOIL~~	~~Dup~~											

CHAIN OF POSSESSION / Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Heather Ebert	09/17/14 1040	C. Martinez / C. Martinez	09/17/14 1040
C. Martinez / C. Martinez	09/17/14 1545	SM Sexton	9/17/14 1545
SM Sexton	9/17/14 1550	1060 Battelle 1A Fridge	9/17/14 1550
1060 Battelle Fridge 1A	9/18 9/18/14 BMS 9-18-14 0735	SM Sexton	9/18/14 0735
SM Sexton	9/18/14 WCH 0740	FED EX	
FED X		P. Dent Patricia Dent	9/19/14 0900

FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010TR (Client List) {Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc}; Mercury - 7471 - (CV) {Mercury}
(2) ICP Metals (TCLP) - 1311/6010 {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; Mercury (TCLP) - 1311/7470 {Mercury}

REVIEWED BY K. Wood via email DATE 9/18/14

XP0134

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: WCHN	SDG/AR/COC/Work Order: 357115
Received By: P. Ulent	Date Received: 9/19/14

Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?		X	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 cpm
Classified Radioactive II or III by RSO?		X	If yes, Were swipes taken of sample contatiners < action levels?
COC/Samples marked containing PCBs?		X	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		X	If yes, samples are to be segregeated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?		X	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		X	

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	X			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	X			Preservation Method: Ice bags Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius 2C
2a	Daily check performed and passed on IR temperature gun?	X			Temperature Device Serial #: Secondary Temperature Device Serial # (If Applicable): 130462966
3	Chain of custody documents included with shipment?	X			
4	Sample containers intact and sealed?	X			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?		X		Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	VOA vials free of headspace (defined as < 6mm bubble)?		X		Sample ID's and containers affected:
7	Are Encore containers present?			X	(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	X			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	X			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	X			Sample ID's affected:
11	Number of containers received match number indicated on COC?	X			Sample ID's affected:
12	Are sample containers identifiable as GEL provided?			X	
13	COC form is properly signed in relinquished/received sections?	X			
14	Carrier and tracking number.				Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other 7712 0186 4110 7712 0186 4680

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials HH Date 09/19/14 Page 1 of 1

GL-CHL-SR-001

Laboratory Certifications

List of current GEL Certifications as of 29 September 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	SC000122014−14
Vermont	VT87156
Virginia NELAP	460202
Washington	C780−12
Wisconsin	999887790

Semi-Volatile Analysis

Case Narrative

Semi-Volatile Case Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0134

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:	1420745
Prep Batch Number:	1420744

Sample Analysis

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

Sample ID	Client ID
357115001	J1V0D1
357115003	J1V0D2
1203171379	MB for batch 1420744
1203171380	Laboratory Control Sample (LCS)
1203171383	357115001(J1V0D1) Matrix Spike (MS)
1203171384	357115001(J1V0D1) 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 1203171380 (LCS) failed recovery for 2,4-Dinitrophenol at 17.3%(limits are 22-83%). This failure is less than 5% of the total requested analytes. The data are reported.

QC Sample Designation
Sample 357115001 (J1V0D1) was selected for analysis as the matrix spike and matrix spike duplicate.

Matrix Spike (MS) Recovery Statement
The MS, 1203171383 (J1V0D1), failed recovery for multiple analytes. Please see the QC Summary/Spike Recovery Report for the specific recoveries. The sample was analyzed at a dilution and the spiking compounds were diluted out of the acceptance limits. The data are reported.

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

MS/MSD Relative Percent Difference (RPD) Statement
The relative percent differences (RPD) for the MS and MSD, 1203171383 (J1V0D1) and 1203171384 (J1V0D1), were not within the acceptance limits. The failures were attributed to matrix interference. The data are reported.

Internal Standard (ISTD) Acceptance
The MS, 1203171383 (J1V0D1), failed ISTD acceptance criteria. The MS was re-analyzed and confirmed the failure. The re-analysis data are reported. The initial analysis raw data have been placed in the Miscellaneous Section of the data package.

Technical Information:

Holding Time Specifications
All samples in this SDG in this batch met the specified holding time.

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
The samples in this SDG in this batch did not require dilutions.

Sample Re-extraction/Re-analysis
The MS, 1203171383 (J1V0D1), was re-analyzed due to internal standard response failure.

The initial analysis for samples 1203171383 (J1V0D1), 1203171384 (J1V0D1) and 357115003 (J1V0D2) was outside of the DFTPP TUNE window. The samples were re-analyzed within a new DFTPP TUNE window. The data results are reported from the re-analysis.

Miscellaneous Information:

Data Exception (DER) Documentation
Data exception report 1336806 was generated for the samples in this batch for this SDG.

Manual Integrations
Some initial calibration standards, continuing calibration standards, and/or samples may require manual integrations due to software limitations. Manual integrations, if any, are included with the raw data.

TIC Comment
Tentatively identified compounds (TIC) may be requested for samples 1203171379(MB) and 357115001 (J1V0D1) and 357115003 (J1V0D2) 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
MSD5.I	Agilent 6890/5973 GC/MS w/ 7683 Autosampler	HP6890/HP5973	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.	Division:	Quality Criteria:	Type:
24-SEP-14	Industrial	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
SEMIVOA GC/MS	SW846 3541/8270D	Solid	ARSL(LANL), OLAB, WCHN
Batch ID:	**Sample Numbers:**		
1420745	See Below		

Potentially affected work order(s)(SDG): 356977(2014-4561),357033(X409165),357086(2014-4580),357115(XP0134)

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

Specification and Requirements Exception Description:	DER Disposition:
1. Sample 356977001(ARSL) failed recovery for surrogates 2-Fluorophenol at 22.2%(limits are 23-107%) and Phenol-d5 at 23.1%(limits are 25-108%).	1. The sample was analyzed at a dilution and the surrogates were diluted out of the acceptance limits. The data are reported.
2. 1203171380LCS failed recovery for 2,4-Dinitrophenol at 17.3%(limits are 22-83%).	2. This failure is less than 5% of the total requested analytes. The data are reported.
3. 1203171381MS and 1203171382MSD failed recovery for multiple analytes. Please see the QC Summary/Spike Recovery Report for the specific recoveries.	3. These samples were analyzed at a dilution and the spiking compounds were diluted out of the acceptance limits. The data are reported.
4. 1203171383MS failed recovery for multiple analytes. Please see the QC Summary/Spike Recovery Report for the specific recoveries.	4. These failures are attributed to possible matrix interference. The data are reported.
5. The RPD values between the 1203171381MS and 1203171382MSD were not within the 0-30% limits for multiple analytes. Please see the QC Summary/Spike Recovery Report for the specific RPD values.	5. These failures are attributed to matrix interference. The data are reported.
6. The RPD values between the 1203171383MS and 1203171384MSD were not within the 0-30% limits for multiple analytes. Please see the QC Summary/Spike Recovery Report for the specific RPD values.	6. These failures are attributed to matrix interference. The data are reported.

Originator's Name:

Richard Bomar 24-SEP-14

Data Validator/Group Leader:

Herbert Maier 24-SEP-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: XP0134 GEL Work Order: 357115 Project: RC-233 Soil

The Qualifiers in this report are defined as follows:

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

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

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

DL Indicates that sample is diluted.

RA Indicates that sample is re-analyzed without re-extraction.

RE Indicates that sample is re-extracted.

Review/Validation

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

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

Signature: Barbara Bailey **Name: Barbara Bailey**

Date: 06 OCT 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: October 2, 2014

Client SDG: XP0134

Client Sample ID: J1V0D1
Sample ID: 357115001
Matrix: SOIL
Collect Date: 17-SEP-14 10:35
Receive Date: 19-SEP-14
Collector: Client
Moisture: .93%

Project: WCHN00313
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Semi-Volatile-GC/MS										
8270D/3541 BNA Soil Automated Soxhlet "Dry Weight Corrected"										
1,2,4-Trichlorobenzene	U	101	101	336	ug/kg	1	RMB 09/20/14	2249	1420745	1
1,2-Dichlorobenzene	U	101	101	336	ug/kg	1				
1,3-Dichlorobenzene	U	101	101	336	ug/kg	1				
1,4-Dichlorobenzene	U	101	101	336	ug/kg	1				
2,4,5-Trichlorophenol	U	101	101	336	ug/kg	1				
2,4,6-Trichlorophenol	U	101	101	336	ug/kg	1				
2,4-Dichlorophenol	U	101	101	336	ug/kg	1				
2,4-Dimethylphenol	U	101	101	336	ug/kg	1				
2,4-Dinitrophenol	TU	101	101	673	ug/kg	1				
2,4-Dinitrotoluene	U	101	101	336	ug/kg	1				
2,6-Dinitrotoluene	U	101	101	336	ug/kg	1				
2-Chloronaphthalene	U	10.1	10.1	33.6	ug/kg	1				
2-Chlorophenol	TU	101	101	336	ug/kg	1				
2-Methyl-4,6-dinitrophenol	TU	101	101	336	ug/kg	1				
2-Methylnaphthalene	U	10.1	10.1	33.6	ug/kg	1				
2-Nitrophenol	U	101	101	336	ug/kg	1				
3,3'-Dichlorobenzidine	TU	101	101	336	ug/kg	1				
4-Bromophenylphenylether	U	101	101	336	ug/kg	1				
4-Chloro-3-methylphenol	U	135	135	336	ug/kg	1				
4-Chloroaniline	U	101	101	336	ug/kg	1				
4-Chlorophenylphenylether	U	101	101	336	ug/kg	1				
4-Nitrophenol	U	101	101	336	ug/kg	1				
Acenaphthene	U	10.1	10.1	33.6	ug/kg	1				
Acenaphthylene	U	10.1	10.1	33.6	ug/kg	1				
Anthracene	U	10.1	10.1	33.6	ug/kg	1				
Benzo(a)anthracene	U	10.1	10.1	33.6	ug/kg	1				
Benzo(a)pyrene	U	10.1	10.1	33.6	ug/kg	1				
Benzo(b)fluoranthene	U	10.1	10.1	33.6	ug/kg	1				
Benzo(ghi)perylene	U	10.1	10.1	33.6	ug/kg	1				
Benzo(k)fluoranthene	U	10.1	10.1	33.6	ug/kg	1				
Butylbenzylphthalate	U	101	101	336	ug/kg	1				
Carbazole	U	10.1	10.1	33.6	ug/kg	1				
Chrysene	U	10.1	10.1	33.6	ug/kg	1				

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: October 2, 2014

Client SDG: XP0134

Client Sample ID: J1V0D1
Sample ID: 357115001

Project: WCHN00313
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Semi-Volatile-GC/MS										
8270D/3541 BNA Soil Automated Soxhlet "Dry Weight Corrected"										
Di-n-butylphthalate	U	101	101	336	ug/kg	1				
Di-n-octylphthalate	U	101	101	336	ug/kg	1				
Dibenzo(a,h)anthracene	U	10.1	10.1	33.6	ug/kg	1				
Dibenzofuran	U	101	101	336	ug/kg	1				
Diethylphthalate	TU	101	101	336	ug/kg	1				
Dimethylphthalate	TU	101	101	336	ug/kg	1				
Diphenylamine	U	101	101	336	ug/kg	1				
Fluoranthene	U	10.1	10.1	33.6	ug/kg	1				
Fluorene	U	10.1	10.1	33.6	ug/kg	1				
Hexachlorobenzene	TU	101	101	336	ug/kg	1				
Hexachlorobutadiene	TU	101	101	336	ug/kg	1				
Hexachlorocyclopentadiene	TU	101	101	336	ug/kg	1				
Hexachloroethane	U	101	101	336	ug/kg	1				
Indeno(1,2,3-cd)pyrene	U	10.1	10.1	33.6	ug/kg	1				
Isophorone	TU	101	101	336	ug/kg	1				
N-Nitrosodipropylamine	TU	101	101	336	ug/kg	1				
Naphthalene	U	10.1	10.1	33.6	ug/kg	1				
Nitrobenzene	U	101	101	336	ug/kg	1				
Pentachlorophenol	TU	101	101	336	ug/kg	1				
Phenanthrene	U	10.1	10.1	33.6	ug/kg	1				
Phenol	U	101	101	336	ug/kg	1				
Pyrene	U	10.1	10.1	33.6	ug/kg	1				
bis(2-Chloro-1-methylethyl)ether	U	101	101	336	ug/kg	1				
bis(2-Chloroethoxy)methane	U	101	101	336	ug/kg	1				
bis(2-Chloroethyl) ether	U	101	101	336	ug/kg	1				
bis(2-Ethylhexyl)phthalate	U	101	101	336	ug/kg	1				
3- and/or 4-Methylphenol	TU	101	101	336	ug/kg	1				
m-Nitroaniline	TU	101	101	336	ug/kg	1				
o-Cresol	TU	101	101	336	ug/kg	1				
o-Nitroaniline	U	111	111	336	ug/kg	1				
p-Nitroaniline	TU	101	101	336	ug/kg	1				

Surrogate/Tracer recovery	*Result*	*Nominal*	*Recovery%*	*Acceptable Limits*	*Date Time:*	*09/20/14 22 49*
2-Fluorobiphenyl	1140 ug/kg	1680	67.8	(25%-100%)		
p-Terphenyl-d14	1680 ug/kg	1680	99.9	(31%-124%)		
2,4,6-Tribromophenol	1890 ug/kg	3360	56.1	(20%-122%)		
Phenol-d5	1960 ug/kg	3360	58.2	(25%-108%)		
2-Fluorophenol	2160 ug/kg	3360	64.2	(23%-107%)		

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: October 2, 2014
Client SDG: XP0134

Client Sample ID: J1V0D1
Sample ID: 357115001

Project: WCHN00313
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method

Semi-Volatile-GC/MS
8270D/3541 BNA Soil Automated Soxhlet "Dry Weight Corrected"

Nitrobenzene-d5	975 ug/kg	1680	58.0	(21%-103%)	

Tentatively Identified Compound (TIC)	*CAS No.*	*RT*	*Est. Concentration*	*Fit*	*Qual*	*Date Time:*	*09/20/14 22 49*
unknown		2.001	231 ug/kg	0	J		
Unknown Aldol Condensate		3.625	3710 ug/kg		AJ		
unknown		16.773	301 ug/kg	0	J		
9-Octadecenamide, (Z)-	000301-02-0	16.882	256 ug/kg	87	NJ		
unknown		17.944	145 ug/kg	0	J		
unknown		19.025	177 ug/kg	0	J		

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 8270D BNA for Soil	SXW3	09/19/14	1808	1420744

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 3541/8270D	

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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: October 2, 2014

Client SDG: XP0134

Client Sample ID: J1V0D2
Sample ID: 357115003
Matrix: SOIL
Collect Date: 17-SEP-14 10:25
Receive Date: 19-SEP-14
Collector: Client
Moisture: .625%

Project: WCHN00313
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Semi-Volatile-GC/MS										
8270D/3541 BNA Soil Automated Soxhlet "Dry Weight Corrected"										
1,2,4-Trichlorobenzene	U	101	101	335	ug/kg	1	RMB 09/23/14	1249	1420745	1
1,2-Dichlorobenzene	U	101	101	335	ug/kg	1				
1,3-Dichlorobenzene	U	101	101	335	ug/kg	1				
1,4-Dichlorobenzene	U	101	101	335	ug/kg	1				
2,4,5-Trichlorophenol	U	101	101	335	ug/kg	1				
2,4,6-Trichlorophenol	U	101	101	335	ug/kg	1				
2,4-Dichlorophenol	U	101	101	335	ug/kg	1				
2,4-Dimethylphenol	U	101	101	335	ug/kg	1				
2,4-Dinitrophenol	TU	101	101	670	ug/kg	1				
2,4-Dinitrotoluene	U	101	101	335	ug/kg	1				
2,6-Dinitrotoluene	U	101	101	335	ug/kg	1				
2-Chloronaphthalene	U	10.1	10.1	33.5	ug/kg	1				
2-Chlorophenol	TU	101	101	335	ug/kg	1				
2-Methyl-4,6-dinitrophenol	TU	101	101	335	ug/kg	1				
2-Methylnaphthalene	U	10.1	10.1	33.5	ug/kg	1				
2-Nitrophenol	U	101	101	335	ug/kg	1				
3,3'-Dichlorobenzidine	TU	101	101	335	ug/kg	1				
4-Bromophenylphenylether	U	101	101	335	ug/kg	1				
4-Chloro-3-methylphenol	U	134	134	335	ug/kg	1				
4-Chloroaniline	U	101	101	335	ug/kg	1				
4-Chlorophenylphenylether	U	101	101	335	ug/kg	1				
4-Nitrophenol	U	101	101	335	ug/kg	1				
Acenaphthene	U	10.1	10.1	33.5	ug/kg	1				
Acenaphthylene	U	10.1	10.1	33.5	ug/kg	1				
Anthracene	U	10.1	10.1	33.5	ug/kg	1				
Benzo(a)anthracene	U	10.1	10.1	33.5	ug/kg	1				
Benzo(a)pyrene	U	10.1	10.1	33.5	ug/kg	1				
Benzo(b)fluoranthene	U	10.1	10.1	33.5	ug/kg	1				
Benzo(ghi)perylene	U	10.1	10.1	33.5	ug/kg	1				
Benzo(k)fluoranthene	U	10.1	10.1	33.5	ug/kg	1				
Butylbenzylphthalate	U	101	101	335	ug/kg	1				
Carbazole	U	10.1	10.1	33.5	ug/kg	1				
Chrysene	U	10.1	10.1	33.5	ug/kg	1				

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: October 2, 2014
Client SDG: XP0134

Client Sample ID: J1V0D2
Sample ID: 357115003

Project: WCHN00313
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Semi-Volatile-GC/MS										
8270D/3541 BNA Soil Automated Soxhlet "Dry Weight Corrected"										
Di-n-butylphthalate	U	101	101	335	ug/kg	1				
Di-n-octylphthalate	U	101	101	335	ug/kg	1				
Dibenzo(a,h)anthracene	U	10.1	10.1	33.5	ug/kg	1				
Dibenzofuran	U	101	101	335	ug/kg	1				
Diethylphthalate	TU	101	101	335	ug/kg	1				
Dimethylphthalate	TU	101	101	335	ug/kg	1				
Diphenylamine	U	101	101	335	ug/kg	1				
Fluoranthene	U	10.1	10.1	33.5	ug/kg	1				
Fluorene	U	10.1	10.1	33.5	ug/kg	1				
Hexachlorobenzene	TU	101	101	335	ug/kg	1				
Hexachlorobutadiene	TU	101	101	335	ug/kg	1				
Hexachlorocyclopentadiene	TU	101	101	335	ug/kg	1				
Hexachloroethane	U	101	101	335	ug/kg	1				
Indeno(1,2,3-cd)pyrene	U	10.1	10.1	33.5	ug/kg	1				
Isophorone	TU	101	101	335	ug/kg	1				
N-Nitrosodipropylamine	TU	101	101	335	ug/kg	1				
Naphthalene	U	10.1	10.1	33.5	ug/kg	1				
Nitrobenzene	U	101	101	335	ug/kg	1				
Pentachlorophenol	TU	101	101	335	ug/kg	1				
Phenanthrene	U	10.1	10.1	33.5	ug/kg	1				
Phenol	U	101	101	335	ug/kg	1				
Pyrene	U	10.1	10.1	33.5	ug/kg	1				
bis(2-Chloro-1-methylethyl)ether	U	101	101	335	ug/kg	1				
bis(2-Chloroethoxy)methane	U	101	101	335	ug/kg	1				
bis(2-Chloroethyl) ether	U	101	101	335	ug/kg	1				
bis(2-Ethylhexyl)phthalate	U	101	101	335	ug/kg	1				
3- and/or 4-Methylphenol	TU	101	101	335	ug/kg	1				
m-Nitroaniline	TU	101	101	335	ug/kg	1				
o-Cresol	TU	101	101	335	ug/kg	1				
o-Nitroaniline	U	111	111	335	ug/kg	1				
p-Nitroaniline	TU	101	101	335	ug/kg	1				

Surrogate/Tracer recovery	*Result*	*Nominal*	*Recovery%*	*Acceptable Limits*	*Date Time:*	*09/23/14 12 49*
p-Terphenyl-d14	1070 ug/kg	1680	63.9	(31%-124%)		
Nitrobenzene-d5	1110 ug/kg	1680	66.4	(21%-103%)		
2-Fluorobiphenyl	1330 ug/kg	1680	79.5	(25%-100%)		
Phenol-d5	2140 ug/kg	3350	64.0	(25%-108%)		
2-Fluorophenol	2360 ug/kg	3350	70.4	(23%-107%)		

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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: October 2, 2014

Client SDG: XP0134

Client Sample ID: J1V0D2
Sample ID: 357115003

Project: WCHN00313
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method

Semi-Volatile-GC/MS

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

2,4,6-Tribromophenol	2470 ug/kg	3350	73.8	(20%-122%)	

Tentatively Identified Compound (TIC)	*CAS No.*	*RT*	*Est. Concentration*	*Fit*	*Qual*	*Date Time:*	*09/23/14 12 49*
unknown		1.958	239 ug/kg	0	J		
Unknown Aldol Condensate		3.592	4540 ug/kg		AJ		
9-Octadecenamide, (Z)-	000301-02-0	16.83	438 ug/kg	90	NJ		
unknown		18.959	163 ug/kg	0	J		
unknown		20.187	191 ug/kg	0	J		
unknown		22.497	1460 ug/kg	0	J		

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 8270D BNA for Soil	SXW3	09/19/14	1808	1420744

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: October 2, 2014

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

Contact: **Joan Kessner**

Workorder: **357115** **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch 1420745											
QC1203171380 LCS											
1,2,4-Trichlorobenzene	1670			1130	ug/kg		67.8	(37%-98%)	RMB	09/20/14	16:34
1,2-Dichlorobenzene	1670			1110	ug/kg		66.9	(39%-93%)			
1,3-Dichlorobenzene	1670			1060	ug/kg		63.7	(39%-110%)			
1,4-Dichlorobenzene	1670			1100	ug/kg		66.2	(40%-110%)			
2,4,5-Trichlorophenol	1670			1220	ug/kg		73.4	(41%-103%)			
2,4,6-Trichlorophenol	1670			1180	ug/kg		70.8	(36%-98%)			
2,4-Dichlorophenol	1670			1110	ug/kg		66.5	(35%-110%)			
2,4-Dimethylphenol	1670			1020	ug/kg		61	(35%-102%)			
2,4-Dinitrophenol	1670		J	288	ug/kg		17.3*	(22%-83%)			
2,4-Dinitrotoluene	1670			1200	ug/kg		71.9	(43%-109%)			
2,6-Dinitrotoluene	1670			1150	ug/kg		68.9	(41%-103%)			
2-Chloronaphthalene	1670			1230	ug/kg		73.8	(39%-101%)			
2-Chlorophenol	1670			1150	ug/kg		68.8	(38%-100%)			
2-Methyl-4,6-dinitrophenol	1670			579	ug/kg		34.8	(33%-103%)			
2-Methylnaphthalene	1670			1060	ug/kg		63.5	(36%-107%)			
2-Nitrophenol	1670			1070	ug/kg		64.4	(35%-106%)			
3,3'-Dichlorobenzidine	1670			943	ug/kg		56.6	(32%-111%)			
3- and/or 4-Methylphenol	1670			1310	ug/kg		78.4	(39%-115%)			
4-Bromophenylphenylether	1670			1180	ug/kg		70.7	(42%-110%)			
4-Chloro-3-methylphenol	1670			1090	ug/kg		65.6	(35%-104%)			

QC Summary

Workorder: 357115 **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1420745										
4-Chloroaniline	1670			1000	ug/kg		60	(32%-106%)	RMB	09/20/14 16:34
4-Chlorophenylphenylether	1670			1320	ug/kg		79.2	(41%-104%)		
4-Nitrophenol	1670			531	ug/kg		31.9	(23%-114%)		
Acenaphthene	1670			1170	ug/kg		70.5	(36%-105%)		
Acenaphthylene	1670			1300	ug/kg		78.1	(38%-103%)		
Anthracene	1670			1110	ug/kg		66.5	(43%-104%)		
Benzo(a)anthracene	1670			1150	ug/kg		68.9	(46%-108%)		
Benzo(a)pyrene	1670			1070	ug/kg		64.4	(45%-109%)		
Benzo(b)fluoranthene	1670			1200	ug/kg		71.8	(42%-111%)		
Benzo(ghi)perylene	1670			791	ug/kg		47.5	(43%-115%)		
Benzo(k)fluoranthene	1670			1170	ug/kg		70.4	(43%-103%)		
Butylbenzylphthalate	1670			1410	ug/kg		84.9	(37%-107%)		
Carbazole	1670			1170	ug/kg		70.3	(53%-118%)		
Chrysene	1670			1140	ug/kg		68.6	(47%-107%)		
Di-n-butylphthalate	1670			1360	ug/kg		81.8	(46%-112%)		
Di-n-octylphthalate	1670			1480	ug/kg		88.7	(41%-110%)		
Dibenzo(a,h)anthracene	1670			928	ug/kg		55.7	(39%-128%)		
Dibenzofuran	1670			1290	ug/kg		77.2	(38%-104%)		
Diethylphthalate	1670			1370	ug/kg		82.3	(42%-109%)		
Dimethylphthalate	1670			1340	ug/kg		80.3	(41%-105%)		
Diphenylamine	1670			1160	ug/kg		69.7	(40%-101%)		

QC Summary

Workorder: 357115 **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1420745										
Fluoranthene	1670			1240	ug/kg		74.4	(44%-106%)		
Fluorene	1670			1250	ug/kg		75.1	(39%-102%)	RMB	09/20/14 16:34
Hexachlorobenzene	1670			1160	ug/kg		69.5	(41%-108%)		
Hexachlorobutadiene	1670			1030	ug/kg		61.9	(32%-104%)		
Hexachlorocyclopentadiene	1670			907	ug/kg		54.5	(24%-84%)		
Hexachloroethane	1670			1080	ug/kg		65	(34%-98%)		
Indeno(1,2,3-cd)pyrene	1670			786	ug/kg		47.2	(45%-115%)		
Isophorone	1670			1070	ug/kg		64	(36%-98%)		
N-Nitrosodipropylamine	1670			1180	ug/kg		70.9	(34%-106%)		
Naphthalene	1670			1120	ug/kg		67	(38%-106%)		
Nitrobenzene	1670			1040	ug/kg		62.7	(35%-99%)		
Pentachlorophenol	1670			813	ug/kg		48.8	(31%-93%)		
Phenanthrene	1670			1120	ug/kg		67.5	(43%-105%)		
Phenol	1670			1070	ug/kg		64.5	(38%-98%)		
Pyrene	1670			1200	ug/kg		71.9	(33%-99%)		
bis(2-Chloro-1-methylethyl)ether	1670			607	ug/kg		36.4	(27%-109%)		
bis(2-Chloroethoxy)methane	1670			1000	ug/kg		60.1	(37%-98%)		
bis(2-Chloroethyl) ether	1670			1020	ug/kg		61.2	(35%-96%)		
bis(2-Ethylhexyl)phthalate	1670			1510	ug/kg		90.6	(41%-104%)		
m-Nitroaniline	1670			1080	ug/kg		64.8	(32%-113%)		
o-Cresol	1670			1150	ug/kg		68.8	(37%-97%)		
o-Nitroaniline	1670			1040	ug/kg		62.3	(34%-116%)		

QC Summary

Workorder: 357115 **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch 1420745											
p-Nitroaniline	1670			1000	ug/kg		60.2	(35%-150%)			
**2,4,6-Tribromophenol	3330			2220	ug/kg		66.8	(20%-122%)	RMB	09/20/14	16:34
**2-Fluorobiphenyl	1670			1230	ug/kg		74.1	(25%-100%)			
**2-Fluorophenol	3330			2390	ug/kg		71.7	(23%-107%)			
**Nitrobenzene-d5	1670			1050	ug/kg		63	(21%-103%)			
**Phenol-d5	3330			2200	ug/kg		65.9	(25%-108%)			
**p-Terphenyl-d14	1670			1340	ug/kg		80.3	(31%-124%)			
QC1203171379 MB											
1,2,4-Trichlorobenzene			U	100	ug/kg					09/23/14	11:15
1,2-Dichlorobenzene			U	100	ug/kg						
1,3-Dichlorobenzene			U	100	ug/kg						
1,4-Dichlorobenzene			U	100	ug/kg						
2,4,5-Trichlorophenol			U	100	ug/kg						
2,4,6-Trichlorophenol			U	100	ug/kg						
2,4-Dichlorophenol			U	100	ug/kg						
2,4-Dimethylphenol			U	100	ug/kg						
2,4-Dinitrophenol			U	100	ug/kg						
2,4-Dinitrotoluene			U	100	ug/kg						
2,6-Dinitrotoluene			U	100	ug/kg						
2-Chloronaphthalene			U	10.0	ug/kg						
2-Chlorophenol			U	100	ug/kg						
2-Methyl-4,6-dinitrophenol			U	100	ug/kg						
2-Methylnaphthalene			U	10.0	ug/kg						

QC Summary

Workorder: **357115** **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch 1420745											
2-Nitrophenol			U	100	ug/kg				RMB	09/23/14	11:15
3,3'-Dichlorobenzidine			U	100	ug/kg						
3- and/or 4-Methylphenol			U	100	ug/kg						
4-Bromophenylphenylether			U	100	ug/kg						
4-Chloro-3-methylphenol			U	133	ug/kg						
4-Chloroaniline			U	100	ug/kg						
4-Chlorophenylphenylether			U	100	ug/kg						
4-Nitrophenol			U	100	ug/kg						
Acenaphthene			U	10.0	ug/kg						
Acenaphthylene			U	10.0	ug/kg						
Anthracene			U	10.0	ug/kg						
Benzo(a)anthracene			U	10.0	ug/kg						
Benzo(a)pyrene			U	10.0	ug/kg						
Benzo(b)fluoranthene			U	10.0	ug/kg						
Benzo(ghi)perylene			U	10.0	ug/kg						
Benzo(k)fluoranthene			U	10.0	ug/kg						
Butylbenzylphthalate			U	100	ug/kg						
Carbazole			U	10.0	ug/kg						
Chrysene			U	10.0	ug/kg						
Di-n-butylphthalate			U	100	ug/kg						
Di-n-octylphthalate			U	100	ug/kg						

QC Summary

Workorder: 357115 **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch 1420745											
Dibenzo(a,h)anthracene			U	10.0	ug/kg						
Dibenzofuran			U	100	ug/kg				RMB	09/23/14	11:15
Diethylphthalate			U	100	ug/kg						
Dimethylphthalate			U	100	ug/kg						
Diphenylamine			U	100	ug/kg						
Fluoranthene			U	10.0	ug/kg						
Fluorene			U	10.0	ug/kg						
Hexachlorobenzene			U	100	ug/kg						
Hexachlorobutadiene			U	100	ug/kg						
Hexachlorocyclopentadiene			U	100	ug/kg						
Hexachloroethane			U	100	ug/kg						
Indeno(1,2,3-cd)pyrene			U	10.0	ug/kg						
Isophorone			U	100	ug/kg						
N-Nitrosodipropylamine			U	100	ug/kg						
Naphthalene			U	10.0	ug/kg						
Nitrobenzene			U	100	ug/kg						
Pentachlorophenol			U	100	ug/kg						
Phenanthrene			U	10.0	ug/kg						
Phenol			U	100	ug/kg						
Pyrene			U	10.0	ug/kg						
bis(2-Chloro-1-methylethyl)ether			U	100	ug/kg						
bis(2-Chloroethoxy)methane			U	100	ug/kg						

QC Summary

Workorder: 357115 **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS												
Batch 1420745												
bis(2-Chloroethyl) ether				U	100	ug/kg						
bis(2-Ethylhexyl)phthalate				U	100	ug/kg				RMB	09/23/14	11:15
m-Nitroaniline				U	100	ug/kg						
o-Cresol				U	100	ug/kg						
o-Nitroaniline				U	110	ug/kg						
p-Nitroaniline				U	100	ug/kg						
**2,4,6-Tribromophenol	3330				2030	ug/kg		60.8	(20%-122%)			
**2-Fluorobiphenyl	1670				1140	ug/kg		68.5	(25%-100%)			
**2-Fluorophenol	3330				2110	ug/kg		63.2	(23%-107%)			
**Nitrobenzene-d5	1670				964	ug/kg		57.9	(21%-103%)			
**Phenol-d5	3330				1930	ug/kg		57.8	(25%-108%)			
**p-Terphenyl-d14	1670				879	ug/kg		52.8	(31%-124%)			
QC1203171383 357115001 MS												
1,2,4-Trichlorobenzene	1680	U	101		563	ug/kg		33.5	(25%-102%)		09/23/14	13:21
1,2-Dichlorobenzene	1680	U	101		1020	ug/kg		60.9	(25%-99%)			
1,3-Dichlorobenzene	1680	U	101		860	ug/kg		51.1	(24%-96%)			
1,4-Dichlorobenzene	1680	U	101		920	ug/kg		54.7	(24%-97%)			
2,4,5-Trichlorophenol	1680	U	101		1140	ug/kg		67.8	(38%-109%)			
2,4,6-Trichlorophenol	1680	U	101		1510	ug/kg		89.7	(32%-103%)			
2,4-Dichlorophenol	1680	U	101		1400	ug/kg		83	(31%-103%)			
2,4-Dimethylphenol	1680	U	101		1520	ug/kg		90.2	(30%-109%)			
2,4-Dinitrophenol	1680	TU	101	ET	6530	ug/kg		388*	(19%-101%)			
2,4-Dinitrotoluene	1680	U	101		1750	ug/kg		104	(36%-115%)			

QC Summary

Workorder: 357115 **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Semi-Volatile-GC/MS
Batch 1420745

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
2,6-Dinitrotoluene	1680	U	101		1550	ug/kg		92.3	(36%-107%)	RMB	09/23/14 13:21
2-Chloronaphthalene	1680	U	10.1		805	ug/kg		47.8	(27%-109%)		
2-Chlorophenol	1680	TU	101	T	2290	ug/kg		136*	(28%-108%)		
2-Methyl-4,6-dinitrophenol	1680	TU	101	ET	9000	ug/kg		535*	(14%-116%)		
2-Methylnaphthalene	1680	U	10.1		638	ug/kg		37.9	(23%-107%)		
2-Nitrophenol	1680	U	101		1380	ug/kg		81.8	(24%-106%)		
3,3'-Dichlorobenzidine	1680	TU	101	T	2250	ug/kg		134*	(28%-105%)		
3- and/or 4-Methylphenol	1680	TU	101	T	2190	ug/kg		130*	(32%-123%)		
4-Bromophenylphenylether	1680	U	101		637	ug/kg		37.9	(37%-112%)		
4-Chloro-3-methylphenol	1680	U	135		1750	ug/kg		104	(32%-112%)		
4-Chloroaniline	1680	U	101		1620	ug/kg		96.5	(27%-100%)		
4-Chlorophenylphenylether	1680	U	101		757	ug/kg		45	(37%-110%)		
4-Nitrophenol	1680	U	101		1680	ug/kg		99.9	(12%-128%)		
Acenaphthene	1680	U	10.1		953	ug/kg		56.7	(28%-102%)		
Acenaphthylene	1680	U	10.1		1120	ug/kg		66.7	(32%-103%)		
Anthracene	1680	U	10.1		845	ug/kg		50.2	(36%-104%)		
Benzo(a)anthracene	1680	U	10.1		895	ug/kg		53.2	(27%-120%)		
Benzo(a)pyrene	1680	U	10.1		889	ug/kg		52.9	(31%-116%)		
Benzo(b)fluoranthene	1680	U	10.1		880	ug/kg		52.3	(30%-119%)		
Benzo(ghi)perylene	1680	U	10.1		1200	ug/kg		71.6	(30%-109%)		
Benzo(k)fluoranthene	1680	U	10.1		851	ug/kg		50.6	(31%-125%)		

QC Summary

Workorder: 357115 **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1420745											
Butylbenzylphthalate	1680	U	101		847	ug/kg		50.4	(33%-121%)		
Carbazole	1680	U	10.1		2010	ug/kg		120	(40%-133%)	RMB	09/23/14 13:21
Chrysene	1680	U	10.1		1100	ug/kg		65.5	(33%-114%)		
Di-n-butylphthalate	1680	U	101		954	ug/kg		56.7	(42%-119%)		
Di-n-octylphthalate	1680	U	101		620	ug/kg		36.9	(36%-115%)		
Dibenzo(a,h)anthracene	1680	U	10.1		1120	ug/kg		66.8	(26%-128%)		
Dibenzofuran	1680	U	101		1040	ug/kg		61.8	(28%-117%)		
Diethylphthalate	1680	TU	101	T	2180	ug/kg		130*	(40%-113%)		
Dimethylphthalate	1680	TU	101	T	2930	ug/kg		174*	(38%-110%)		
Diphenylamine	1680	U	101		1090	ug/kg		65	(34%-111%)		
Fluoranthene	1680	U	10.1		1060	ug/kg		62.8	(32%-115%)		
Fluorene	1680	U	10.1		928	ug/kg		55.2	(30%-115%)		
Hexachlorobenzene	1680	TU	101	T	505	ug/kg		30*	(34%-111%)		
Hexachlorobutadiene	1680	TU	101	T	401	ug/kg		23.9*	(24%-105%)		
Hexachlorocyclopentadiene	1680	TU	101	TU	101	ug/kg		0*	(12%-106%)		
Hexachloroethane	1680	U	101		739	ug/kg		43.9	(24%-102%)		
Indeno(1,2,3-cd)pyrene	1680	U	10.1		1110	ug/kg		66	(29%-117%)		
Isophorone	1680	TU	101	T	2260	ug/kg		134*	(24%-108%)		
N-Nitrosodipropylamine	1680	TU	101	T	2450	ug/kg		146*	(23%-117%)		
Naphthalene	1680	U	10.1		816	ug/kg		48.5	(21%-107%)		
Nitrobenzene	1680	U	101		1220	ug/kg		72.6	(25%-104%)		
Pentachlorophenol	1680	TU	101	ET	4610	ug/kg		274*	(22%-108%)		

QC Summary

Workorder: 357115 **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1420745											
Phenanthrene	1680	U	10.1		922	ug/kg		54.8	(28%-119%)		
Phenol	1680	U	101		1400	ug/kg		83.5	(28%-108%)	RMB	09/23/14 13:21
Pyrene	1680	U	10.1		847	ug/kg		50.4	(25%-119%)		
bis(2-Chloro-1-methylethyl)ether	1680	U	101		669	ug/kg		39.8	(25%-105%)		
bis(2-Chloroethoxy)methane	1680	U	101		1170	ug/kg		69.5	(27%-104%)		
bis(2-Chloroethyl) ether	1680	U	101		1620	ug/kg		96.4	(25%-102%)		
bis(2-Ethylhexyl)phthalate	1680	U	101		706	ug/kg		42	(33%-124%)		
m-Nitroaniline	1680	TU	101	T	2030	ug/kg		121*	(31%-110%)		
o-Cresol	1680	TU	101	T	2340	ug/kg		139*	(27%-105%)		
o-Nitroaniline	1680	U	111		1800	ug/kg		107	(37%-114%)		
p-Nitroaniline	1680	TU	101	T	2890	ug/kg		172*	(36%-141%)		
**2,4,6-Tribromophenol	3360		1890		3330	ug/kg		99.1	(20%-122%)		
**2-Fluorobiphenyl	1680		1140		851	ug/kg		50.6	(25%-100%)		
**2-Fluorophenol	3360		2160		3420	ug/kg		102	(23%-107%)		
**Nitrobenzene-d5	1680		975		1130	ug/kg		67.1	(21%-103%)		
**Phenol-d5	3360		1960		2840	ug/kg		84.3	(25%-108%)		
**p-Terphenyl-d14	1680		1680		559	ug/kg		33.2	(31%-124%)		
QC1203171384 357115001 MSD											
1,2,4-Trichlorobenzene	1680	U	101		1060	ug/kg	61.5*	63.3	(0%-30%)		09/23/14 12:18
1,2-Dichlorobenzene	1680	U	101		1020	ug/kg	0.00201	61	(0%-30%)		
1,3-Dichlorobenzene	1680	U	101		990	ug/kg	14.0	58.9	(0%-30%)		
1,4-Dichlorobenzene	1680	U	101		1000	ug/kg	8.58	59.7	(0%-30%)		
2,4,5-Trichlorophenol	1680	U	101		1330	ug/kg	15.1	78.9	(0%-30%)		

QC Summary

Workorder: 357115 **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Semi-Volatile-GC/MS
Batch 1420745

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
2,4,6-Trichlorophenol	1680	U	101		1280	ug/kg	16.2	76.4	(0%-30%)	RMB	09/23/14 12:18
2,4-Dichlorophenol	1680	U	101		1130	ug/kg	21.0	67.3	(0%-30%)		
2,4-Dimethylphenol	1680	U	101		1020	ug/kg	38.9*	60.9	(0%-30%)		
2,4-Dinitrophenol	1680	TU	101	J	442	ug/kg	175*	26.3	(0%-30%)		
2,4-Dinitrotoluene	1680	U	101		1320	ug/kg	28.2	78.5	(0%-30%)		
2,6-Dinitrotoluene	1680	U	101		1210	ug/kg	24.6	72.2	(0%-30%)		
2-Chloronaphthalene	1680	U	10.1		1250	ug/kg	43.0*	74.2	(0%-30%)		
2-Chlorophenol	1680	TU	101		1080	ug/kg	72.1*	64.2	(0%-30%)		
2-Methyl-4,6-dinitrophenol	1680	TU	101		786	ug/kg	168*	46.8	(0%-30%)		
2-Methylnaphthalene	1680	U	10.1		1000	ug/kg	44.5*	59.7	(0%-30%)		
2-Nitrophenol	1680	U	101		1020	ug/kg	29.3	61	(0%-30%)		
3,3'-Dichlorobenzidine	1680	TU	101		1160	ug/kg	63.8*	69.3	(0%-30%)		
3- and/or 4-Methylphenol	1680	TU	101		1260	ug/kg	53.8*	75.2	(0%-30%)		
4-Bromophenylphenylether	1680	U	101		1180	ug/kg	59.7*	70.1	(0%-30%)		
4-Chloro-3-methylphenol	1680	U	135		1120	ug/kg	44.5*	66.4	(0%-30%)		
4-Chloroaniline	1680	U	101		934	ug/kg	53.9*	55.6	(0%-30%)		
4-Chlorophenylphenylether	1680	U	101		1350	ug/kg	56.6*	80.7	(0%-30%)		
4-Nitrophenol	1680	U	101		849	ug/kg	65.7*	50.6	(0%-30%)		
Acenaphthene	1680	U	10.1		1150	ug/kg	18.5	68.3	(0%-30%)		
Acenaphthylene	1680	U	10.1		1290	ug/kg	13.9	76.7	(0%-30%)		
Anthracene	1680	U	10.1		1200	ug/kg	34.7*	71.5	(0%-30%)		

QC Summary

Workorder: 357115 **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS												
Batch 1420745												
Benzo(a)anthracene	1680	U	10.1		1260	ug/kg	34.3*	75.3	(0%-30%)			
Benzo(a)pyrene	1680	U	10.1		1220	ug/kg	31.0*	72.4	(0%-30%)	RMB	09/23/14	12:18
Benzo(b)fluoranthene	1680	U	10.1		1270	ug/kg	36.1*	75.4	(0%-30%)			
Benzo(ghi)perylene	1680	U	10.1		1180	ug/kg	1.74	70.5	(0%-30%)			
Benzo(k)fluoranthene	1680	U	10.1		1240	ug/kg	37.3*	73.9	(0%-30%)			
Butylbenzylphthalate	1680	U	101		1330	ug/kg	44.4*	79.2	(0%-30%)			
Carbazole	1680	U	10.1		1360	ug/kg	38.9*	80.7	(0%-30%)			
Chrysene	1680	U	10.1		1250	ug/kg	12.6	74.4	(0%-30%)			
Di-n-butylphthalate	1680	U	101		1460	ug/kg	41.8*	86.8	(0%-30%)			
Di-n-octylphthalate	1680	U	101		1400	ug/kg	77.2*	83.4	(0%-30%)			
Dibenzo(a,h)anthracene	1680	U	10.1		1240	ug/kg	9.71	73.7	(0%-30%)			
Dibenzofuran	1680	U	101		1290	ug/kg	21.8	77	(0%-30%)			
Diethylphthalate	1680	TU	101		1470	ug/kg	39.3*	87.4	(0%-30%)			
Dimethylphthalate	1680	TU	101		1390	ug/kg	71.3*	82.9	(0%-30%)			
Diphenylamine	1680	U	101		1220	ug/kg	11.2	72.9	(0%-30%)			
Fluoranthene	1680	U	10.1		1440	ug/kg	31.0*	85.9	(0%-30%)			
Fluorene	1680	U	10.1		1290	ug/kg	33.0*	77.1	(0%-30%)			
Hexachlorobenzene	1680	TU	101		1160	ug/kg	78.9*	69.3	(0%-30%)			
Hexachlorobutadiene	1680	TU	101		1000	ug/kg	85.6*	59.6	(0%-30%)			
Hexachlorocyclopentadiene	1680	TU	101		983	ug/kg	200*	58.5	(0%-30%)			
Hexachloroethane	1680	U	101		1010	ug/kg	31.2*	60.2	(0%-30%)			
Indeno(1,2,3-cd)pyrene	1680	U	10.1		1160	ug/kg	4.45	69.1	(0%-30%)			

QC Summary

Workorder: 357115 **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS												
Batch 1420745												
Isophorone	1680	TU	101		1020	ug/kg	75.4*	60.8	(0%-30%)			
N-Nitrosodipropylamine	1680	TU	101		1100	ug/kg	76.1*	65.4	(0%-30%)	RMB	09/23/14	12:18
Naphthalene	1680	U	10.1		1050	ug/kg	24.9	62.4	(0%-30%)			
Nitrobenzene	1680	U	101		997	ug/kg	20.2	59.4	(0%-30%)			
Pentachlorophenol	1680	TU	101		1170	ug/kg	119*	69.6	(0%-30%)			
Phenanthrene	1680	U	10.1		1180	ug/kg	24.7	70.4	(0%-30%)			
Phenol	1680	U	101		1120	ug/kg	22.2	66.9	(0%-30%)			
Pyrene	1680	U	10.1		1130	ug/kg	28.5	67.2	(0%-30%)			
bis(2-Chloro-1-methylethyl)ether	1680	U	101		548	ug/kg	20.0	32.6	(0%-30%)			
bis(2-Chloroethoxy)methane	1680	U	101		949	ug/kg	20.7	56.5	(0%-30%)			
bis(2-Chloroethyl) ether	1680	U	101		923	ug/kg	54.8*	55	(0%-30%)			
bis(2-Ethylhexyl)phthalate	1680	U	101		1430	ug/kg	68.0*	85.3	(0%-30%)			
m-Nitroaniline	1680	TU	101		1160	ug/kg	54.5*	69.3	(0%-30%)			
o-Cresol	1680	TU	101		1120	ug/kg	70.9*	66.5	(0%-30%)			
o-Nitroaniline	1680	U	111		1130	ug/kg	45.7*	67.4	(0%-30%)			
p-Nitroaniline	1680	TU	101		1320	ug/kg	74.4*	78.8	(0%-30%)			
**2,4,6-Tribromophenol	3360		1890		2490	ug/kg		74	(20%-122%)			
**2-Fluorobiphenyl	1680		1140		1210	ug/kg		71.8	(25%-100%)			
**2-Fluorophenol	3360		2160		2130	ug/kg		63.4	(23%-107%)			
**Nitrobenzene-d5	1680		975		973	ug/kg		57.9	(21%-103%)			
**Phenol-d5	3360		1960		1970	ug/kg		58.7	(25%-108%)			
**p-Terphenyl-d14	1680		1680		1210	ug/kg		72.2	(31%-124%)			

QC Summary

Workorder: **357115** **Client SDG:** XP0134 **Project Description:** RC-233 Soil

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

Notes:

The Qualifiers in this report are defined as follows:

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

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more 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: **1420744** **Verified by:** _____

Analyst: **Shannon Whitehead**

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)
1203171379 MB	19-SEP-2014 18:08:00	30	1	0.03333
1203171380 LCS	19-SEP-2014 18:08:00	30.02	1	0.03331
356977001	19-SEP-2014 18:08:00	30.01	1	0.03332
357033001	19-SEP-2014 18:08:00	30.01	1	0.03332
357086001	19-SEP-2014 18:08:00	30.04	1	0.03329
1203171381 MS (357086001)	19-SEP-2014 18:08:00	30.02	1	0.03331
1203171382 MSD (357086001)	19-SEP-2014 18:08:00	30.02	1	0.03331
357115001	19-SEP-2014 18:08:00	30.01	1	0.03332
1203171383 MS (357115001)	19-SEP-2014 18:08:00	30.01	1	0.03332
1203171384 MSD (357115001)	19-SEP-2014 18:08:00	30.05	1	0.03328
357115003	19-SEP-2014 18:08:00	30.02	1	0.03331

Type	Sample Id	Description	Serial Number	Spike Amt	Units
LCS	1203171380	BNA LCS w/o Benzidine 50ppm	UE140904-36	1	mL
LCS	1203171380	BENZIDINE LCS	UE140904-40	1	mL
MS	1203171381	BNA LCS w/o Benzidine 50ppm	UE140904-36	1	mL
MS	1203171381	BENZIDINE LCS	UE140904-40	1	mL
MS	1203171383	BNA LCS w/o Benzidine 50ppm	UE140904-36	1	mL
MS	1203171383	BENZIDINE LCS	UE140904-40	1	mL
MSD	1203171382	BNA LCS w/o Benzidine 50ppm	UE140904-36	1	mL
MSD	1203171382	BENZIDINE LCS	UE140904-40	1	mL
MSD	1203171384	BNA LCS w/o Benzidine 50ppm	UE140904-36	1	mL
MSD	1203171384	BENZIDINE LCS	UE140904-40	1	mL
SURR	All	BNA for all Surrogate	UE140717-06	1	mL
REGNT	All	Acetone	2148834-B1	60	mL
REGNT	All	Methylene Chloride	2156262-D	60	mL
SOURC	All	SODIUM SULFATE	2148821	30	g

Comments:

Final Solvent: CH2Cl2
Verified By: AV

* Samples 356977001, 357086001, MS-6001, and MSD-6001 became oily while concentrating to 1 mL.

HPLC Polynuclear Aromatic Hydrocarbon Analysis

HPLC-PAH
WC-HANFORD, INC. (WCHN)
SDG XP0134

Method/Analysis Information

Procedure:	**Polynuclear Aromatic Hydrocarbons**
Analytical Method:	SW846 8310
Prep Method:	SW846 3550B
Analytical Batch Number:	1421097
Prep Batch Number:	1421096

Sample Analysis

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

Sample ID	Client ID
357115001	J1V0D1
357115003	J1V0D2
1203172210	MB for batch 1421096
1203172211	Laboratory Control Sample (LCS)
1203172212	357115003(J1V0D2) Matrix Spike (MS)
1203172213	357115003(J1V0D2) Matrix Spike Duplicate (MSD)

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

Preparation/Analytical Method Verification

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

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

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

Calibration Information

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

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

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

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

Quality Control (QC) Information

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

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

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

QC Sample Designation
Client sample 357115003 (J1V0D2) was chosen for matrix spike and matrix spike duplicate analysis.

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 RPDs between the MS and MSD met the acceptance limits.

Technical Information:

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

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

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

Sample Re-extraction/Re-analysis
Re-extractions or re-analyses were not required in this SDG.

Miscellaneous Information:

Data Exception (DER) Documentation
Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents.

A data exception report (DER) was not generated for this SDG.

Manual Integrations
Some initial calibration standards, and samples 357115001 (J1V0D1) and 357115003 (J1V0D2) required manual integrations due to software limitations.

Please see the raw data in the Miscellaneous Section.

Additional Comments
The Form 8 is used only as a sequence of the analysis.

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 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.

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Qualifier Definition Report
for

WCHN001 WC−HANFORD, INC.

Client SDG: XP0134 GEL Work Order: 357115 Project: RC−233 Soil

The Qualifiers in this report are defined as follows:

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: Michael A. Penny Jr. **Name: Michael Penny**

Date: 25 SEP 2014 **Title: Group Leader**

Roadmap for WCHN XP0134 HPLC_PAH

This roadmap was analyzed by cww on 09-24-2014, 13:24.
This roadmap was reviewed by map on 09-25-2014, 09:40.
This roadmap was packaged by map on 09-25-2014, 10:25.

Sample

exclude	manual	datafile	smpid	injdate	injtime	sublist	clientid	dilution	batchid	comment
☐	N	/chem/hplce.i/p092314.b/ph5i2306.d	357115001	23-SEP-2014	12:31	XP0134.sub	J1V0D1	1	1421097	
☐	N	/chem/hplce.i/p092314.b/ph5i2307.d	357115003	23-SEP-2014	13:13	XP0134.sub	J1V0D2	1	1421097	

QC Sample

exclude	manual	datafile	smpid	sampletype	injdate	injtime	sublist	clientid	dilution	batchid	comment
☐	N	/chem/hplce.i/p092314.b/ph5i2304.d	1203172210	mb	23-SEP-2014	11:06	XP0134.sub	PAHBLK01	1	1421097	
☐	N	/chem/hplce.i/p092314.b/ph5i2305.d	1203172211	lcs	23-SEP-2014	11:48	XP0134.sub	PAHBLK01LCS	1	1421097	Pass
☐	N	/chem/hplce.i/p092314.b/ph5i2308.d	1203172212	ms	23-SEP-2014	13:55	XP0134.sub	J1V0D2MS	1	1421097	Pass
☐	N	/chem/hplce.i/p092314.b/ph5i2309.d	1203172213	msd	23-SEP-2014	14:37	XP0134.sub	J1V0D2MSD	1	1421097	Pass

Sample Data Summary

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: September 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: XP0134

Client Sample ID:	J1V0D1	Project:	WCHN00313
Sample ID:	357115001	Client ID:	WCHN001
Matrix:	SOIL		
Collect Date:	17-SEP-14 10:35		
Receive Date:	19-SEP-14		
Collector:	Client		
Moisture:	.93%		

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	5.04	5.04	16.8	ug/kg	1	CWW	09/23/14	1231	1421097	1
Acenaphthylene	U	5.04	5.04	16.8	ug/kg	1					
Anthracene	U	1.68	1.68	16.8	ug/kg	1					
Benzo(a)anthracene		6.05	0.538	1.68	ug/kg	1					
Benzo(a)pyrene		3.73	0.538	1.68	ug/kg	1					
Benzo(b)fluoranthene		3.63	0.538	1.68	ug/kg	1					
Benzo(ghi)perylene		2.89	0.538	1.68	ug/kg	1					
Benzo(k)fluoranthene	U	0.269	0.269	0.840	ug/kg	1					
Chrysene		4.16	0.538	1.68	ug/kg	1					
Dibenzo(a,h)anthracene	U	0.538	0.538	1.68	ug/kg	1					
Fluoranthene		4.49	0.538	1.68	ug/kg	1					
Fluorene	U	5.04	5.04	16.8	ug/kg	1					
Indeno(1,2,3-cd)pyrene	U	0.538	0.538	1.68	ug/kg	1					
Naphthalene	U	5.04	5.04	16.8	ug/kg	1					
Phenanthrene	U	5.04	5.04	16.8	ug/kg	1					
Pyrene		7.73	0.538	1.68	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	09/22/14	1728	1421096

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"	5990 ug/kg	8400	71.3	(46%-101%)

Notes:

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Certificate of Analysis

Report Date: September 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: XP0134

Client Sample ID:	J1V0D2	Project:	WCHN00313
Sample ID:	357115003	Client ID:	WCHN001
Matrix:	SOIL		
Collect Date:	17-SEP-14 10:25		
Receive Date:	19-SEP-14		
Collector:	Client		
Moisture:	.625%		

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	5.03	5.03	16.8	ug/kg	1	CWW	09/23/14	1313	1421097	1
Acenaphthylene	U	5.03	5.03	16.8	ug/kg	1					
Anthracene	U	1.68	1.68	16.8	ug/kg	1					
Benzo(a)anthracene		5.14	0.536	1.68	ug/kg	1					
Benzo(a)pyrene		3.71	0.536	1.68	ug/kg	1					
Benzo(b)fluoranthene		3.93	0.536	1.68	ug/kg	1					
Benzo(ghi)perylene		2.74	0.536	1.68	ug/kg	1					
Benzo(k)fluoranthene	U	0.268	0.268	0.838	ug/kg	1					
Chrysene		3.95	0.536	1.68	ug/kg	1					
Dibenzo(a,h)anthracene	U	0.536	0.536	1.68	ug/kg	1					
Fluoranthene		4.06	0.536	1.68	ug/kg	1					
Fluorene	U	5.03	5.03	16.8	ug/kg	1					
Indeno(1,2,3-cd)pyrene	U	0.536	0.536	1.68	ug/kg	1					
Naphthalene	U	5.03	5.03	16.8	ug/kg	1					
Phenanthrene	U	5.03	5.03	16.8	ug/kg	1					
Pyrene		9.60	0.536	1.68	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	09/22/14	1728	1421096

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"	6080 ug/kg	8380	72.5	(46%-101%)

Notes:

QC Summary

GEL LABORATORIES LLC

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QC Summary

Report Date: September 25, 2014

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

Contact: **Joan Kessner**

Workorder: **357115** **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
HPLC-PAH										
Batch 1421097										
QC1203172211 LCS										
Acenaphthene	1670			1380	ug/kg		82.7	(66%-98%)	CWW	09/23/14 11:48
Acenaphthylene	1670			1290	ug/kg		77.4	(65%-95%)		
Anthracene	1670			1430	ug/kg		85.5	(71%-107%)		
Benzo(a)anthracene	167			139	ug/kg		83.3	(72%-103%)		
Benzo(a)pyrene	167			136	ug/kg		81.7	(68%-98%)		
Benzo(b)fluoranthene	167			136	ug/kg		81.6	(72%-99%)		
Benzo(ghi)perylene	167			127	ug/kg		76.3	(69%-98%)		
Benzo(k)fluoranthene	83.3			73.2	ug/kg		87.9	(62%-103%)		
Chrysene	167			146	ug/kg		87.4	(80%-113%)		
Dibenzo(a,h)anthracene	167			158	ug/kg		95	(83%-115%)		
Fluoranthene	167			136	ug/kg		81.5	(68%-98%)		
Fluorene	1670			1340	ug/kg		80.4	(68%-99%)		
Indeno(1,2,3-cd)pyrene	167			143	ug/kg		85.8	(76%-105%)		
Naphthalene	1670			1250	ug/kg		75.2	(62%-93%)		
Phenanthrene	1670			1360	ug/kg		81.8	(70%-98%)		
Pyrene	167			137	ug/kg		82.2	(73%-104%)		
**Decafluorobiphenyl	8330			6450	ug/kg		77.5	(46%-101%)		
QC1203172210 MB										
Acenaphthene			U	5.00	ug/kg					09/23/14 11:06
Acenaphthylene			U	5.00	ug/kg					

QC Summary

Workorder: 357115 **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH												
Batch 1421097												
Anthracene				U	1.67	ug/kg						
Benzo(a)anthracene				U	0.533	ug/kg				CWW	09/23/14	11:06
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				6500	ug/kg		78	(46%-101%)			
QC1203172212 357115003 MS												
Acenaphthene	1680	U	5.03		1240	ug/kg		73.7	(57%-97%)		09/23/14	13:55
Acenaphthylene	1680	U	5.03		1150	ug/kg		68.7	(55%-94%)			
Anthracene	1680	U	1.68		1290	ug/kg		76.7	(65%-103%)			
Benzo(a)anthracene	168		5.14		124	ug/kg		71.1	(53%-110%)			
Benzo(a)pyrene	168		3.71		125	ug/kg		72.6	(53%-105%)			
Benzo(b)fluoranthene	168		3.93		123	ug/kg		70.9	(52%-110%)			
Benzo(ghi)perylene	168		2.74		115	ug/kg		66.8	(44%-107%)			

QC Summary

Workorder: 357115 **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
HPLC-PAH											
Batch 1421097											
Benzo(k)fluoranthene	83.8	U	0.268		68.1	ug/kg		81.3	(48%-116%)	CWW	09/23/14 13:55
Chrysene	168		3.95		130	ug/kg		75.4	(61%-118%)		
Dibenzo(a,h)anthracene	168	U	0.536		140	ug/kg		83.4	(63%-119%)		
Fluoranthene	168		4.06		123	ug/kg		70.7	(56%-100%)		
Fluorene	1680	U	5.03		1190	ug/kg		71.1	(59%-97%)		
Indeno(1,2,3-cd)pyrene	168	U	0.536		129	ug/kg		76.9	(53%-115%)		
Naphthalene	1680	U	5.03		1120	ug/kg		66.6	(54%-88%)		
Phenanthrene	1680	U	5.03		1220	ug/kg		72.9	(60%-99%)		
Pyrene	168		9.60		126	ug/kg		69.7	(54%-112%)		
**Decafluorobiphenyl	8380		6080		5640	ug/kg		67.2	(46%-101%)		
QC1203172213 357115003 MSD											
Acenaphthene	1680	U	5.03		1230	ug/kg	0.446	73.4	(0%-30%)		09/23/14 14:37
Acenaphthylene	1680	U	5.03		1150	ug/kg	0.594	68.4	(0%-30%)		
Anthracene	1680	U	1.68		1330	ug/kg	3.67	79.6	(0%-30%)		
Benzo(a)anthracene	168		5.14		130	ug/kg	4.44	74.5	(0%-30%)		
Benzo(a)pyrene	168		3.71		131	ug/kg	4.62	76.2	(0%-30%)		
Benzo(b)fluoranthene	168		3.93		128	ug/kg	3.98	73.9	(0%-30%)		
Benzo(ghi)perylene	168		2.74		119	ug/kg	3.44	69.3	(0%-30%)		
Benzo(k)fluoranthene	83.8	U	0.268		70.9	ug/kg	3.98	84.6	(0%-30%)		
Chrysene	168		3.95		136	ug/kg	3.98	78.6	(0%-30%)		
Dibenzo(a,h)anthracene	168	U	0.536		145	ug/kg	3.75	86.7	(0%-30%)		
Fluoranthene	168		4.06		128	ug/kg	4.55	74.1	(0%-30%)		

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QC Summary

Workorder: **357115** **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH												
Batch 1421097												
Fluorene	1680	U	5.03		1220	ug/kg	2.00	72.5	(0%-30%)	CWW	09/23/14	14:37
Indeno(1,2,3-cd)pyrene	168	U	0.536		134	ug/kg	4.07	80.2	(0%-30%)			
Naphthalene	1680	U	5.03		1100	ug/kg	1.73	65.5	(0%-30%)			
Phenanthrene	1680	U	5.03		1260	ug/kg	3.37	75.5	(0%-30%)			
Pyrene	168		9.60		133	ug/kg	5.00	73.6	(0%-30%)			
**Decafluorobiphenyl	8380		6080		5520	ug/kg		65.9	(46%-101%)			

Notes:

The Qualifiers in this report are defined as follows:

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

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more 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: **1421096** **Verified by:** _____

Analyst: **Alberto Velasco**

Method: **SW846 3550B**

Lab SOP: **GL-OA-E-010 REV# 22**

Instrument: **Semi-Volatiles Manual**

Sample ID	Run Date	Aliquot (g)	Prepped Aliquot (mL)	Prepped Factor (mL/g)
1203172210 MB	22-SEP-2014 17:28:00	30.03	1	0.0333
1203172211 LCS	22-SEP-2014 17:28:00	30.01	1	0.03332
357115001	22-SEP-2014 17:28:00	30.04	1	0.03329
357115003	22-SEP-2014 17:28:00	30.02	1	0.03331
1203172212 MS (357115003)	22-SEP-2014 17:28:00	30.01	1	0.03332
1203172213 MSD (357115003)	22-SEP-2014 17:28:00	30.03	1	0.0333

Type	Sample Id	Description	Serial Number	Spike Amt	Units
LCS	1203172211	8310 PAH SPIKE	UE140804-10	1	mL
MS	1203172212	8310 PAH SPIKE	UE140804-10	1	mL
MSD	1203172213	8310 PAH SPIKE	UE140804-10	1	mL
SURR	All	Decafluorobiphenyl 250 mg/L	UE140918-30	1	mL
REGNT	All	HPLC Grade Acetonitrile	2140056	5	mL
REGNT	All	Methylene Chloride	2156262-D	300	mL
SOURC	All	SODIUM SULFATE	2148821	30	g

Comments:

Verified By: SLW

Final Solvent: ACN

FID Diesel Range Organics Analysis

Case Narrative

FID Diesel Range Organics
WC-HANFORD, INC. (WCHN)
SDG XP0134

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:	1420696
Prep Batch Number:	1420695

Sample Analysis

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

Sample ID	Client ID
357115001	J1V0D1
357115003	J1V0D2
1203171253	MB for batch 1420695
1203171254	Laboratory Control Sample (LCS)
1203171255	357115001(J1V0D1) Matrix Spike (MS)
1203171256	357115001(J1V0D1) 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
All surrogate recoveries were within the established acceptance criteria for this SDG.

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

QC Sample Designation
Sample 357115001 (J1V0D1) 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 RPD between the MS and MSD met the acceptance limits.

Technical Information

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

Preparation/Analytical Method Verification
All procedures were performed as stated in the SOP. Analyte peaks eluted within the established retention time windows for this method.

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

Sample Re-extraction/Re-analysis
Re-extractions or re-analyses were not required in this SDG.

Miscellaneous Information

Electronic Package Comment

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

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

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

(DER) was not generated for this SDG.

Manual Integrations
Certain standards and samples may have required manual integration to correctly position the baseline as set in the calibration standard injections. If manual integration was performed, copies of all manual integration peak profiles are included in the raw data section of this fraction.

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

System Configuration

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

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

Certification Statement

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

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Qualifier Definition Report
for

WCHN001 WC-HANFORD, INC.

Client SDG: XP0134 GEL Work Order: 357115 Project: RC-233 Soil

The Qualifiers in this report are defined as follows:

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

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: Jimin Cao **Name: Jimin Cao**

Date: 03 OCT 2014 **Title: Data Validator**

Sample Data Summary

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: September 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: XP0134

Client Sample ID:	J1V0D1	Project:	WCHN00313
Sample ID:	357115001	Client ID:	WCHN001
Matrix:	SOIL		
Collect Date:	17-SEP-14 10:35		
Receive Date:	19-SEP-14		
Collector:	Client		
Moisture:	.93%		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Diesel Range Organics											
SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"											
Diesel Range Organics (C10-C20)	U	2180	2180	6710	ug/kg	1	BYT1	09/24/14	0907	1420696	1
Motor Oil (C20-C36)	J	4470	2180	6710	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	3541 DRO IN SOIL PREP	SXW3	09/22/14	1748	1420695

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"	494 ug/kg	671	73.6	(50%-150%)

Notes:

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: September 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: XP0134

Client Sample ID:	J1V0D2	Project:	WCHN00313
Sample ID:	357115003	Client ID:	WCHN001
Matrix:	SOIL		
Collect Date:	17-SEP-14 10:25		
Receive Date:	19-SEP-14		
Collector:	Client		
Moisture:	.625%		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Diesel Range Organics											
SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"											
Diesel Range Organics (C10-C20)	U	2180	2180	6700	ug/kg	1	BYT1	09/24/14	1103	1420696	1
Motor Oil (C20-C36)	J	5790	2180	6700	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	3541 DRO IN SOIL PREP	SXW3	09/22/14	1748	1420695

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"	481 ug/kg	670	71.7	(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: September 24, 2014

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

Contact: **Joan Kessner**

Workorder: **357115** **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics											
Batch 1420696											
QC1203171254 LCS											
Diesel Range Organics (C10-C20)	66600				52100	ug/kg		78.2	(70%-130%)	BYT1	09/23/14 23:29
Motor Oil (C20-C36)	66600				55500	ug/kg		83.3	(70%-130%)		
**o-Terphenyl	666				548	ug/kg		82.3	(50%-150%)		
QC1203171253 MB											
Diesel Range Organics (C10-C20)				U	2160	ug/kg					09/23/14 22:50
Motor Oil (C20-C36)				U	2160	ug/kg					
**o-Terphenyl	666				466	ug/kg		70	(50%-150%)		
QC1203171255 357115001 MS											
Diesel Range Organics (C10-C20)	67200	U	2180		59000	ug/kg		87.8	(70%-130%)		09/24/14 09:45
Motor Oil (C20-C36)	67200	J	4470		68100	ug/kg		92.7	(70%-130%)		
**o-Terphenyl	672		494		614	ug/kg		91.4	(50%-150%)		
QC1203171256 357115001 MSD											
Diesel Range Organics (C10-C20)	67300	U	2180		57200	ug/kg	3.12	85	(0%-20%)		09/24/14 10:24
Motor Oil (C20-C36)	67300	J	4470		66900	ug/kg	1.80	90.7	(0%-20%)		
**o-Terphenyl	673		494		613	ug/kg		91	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated

QC Summary

Workorder: **357115** **Client SDG:** XP0134 **Project Description:** RC-233 Soil

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

P	Aroclor target analyte with greater than 25% difference between column analyses.
T	Spike and/or spike duplicate sample recovery is outside control limits.
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
o	Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more 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: **1420695** **Verified by:** _____

Analyst: **Shannon Whitehead**

Method: **SW846 3541**

Lab SOP: **GL-OA-E-010 REV# 22**

Instrument: **Semi-Volatiles Manual**

Sample ID	Run Date	Aliquot (g)	Prepped Aliquot (mL)	Prepped Factor (mL/g)
1203171253 MB	22-SEP-2014 17:48:00	30.03	1	0.0333
1203171254 LCS	22-SEP-2014 17:48:00	30.03	1	0.0333
357108001	22-SEP-2014 17:48:00	30.06	1	0.03327
1203171257 MS (357108001)	22-SEP-2014 17:48:00	30.04	1	0.03329
1203171258 MSD (357108001)	22-SEP-2014 17:48:00	30.02	1	0.03331
357108002	22-SEP-2014 17:48:00	30.08	1	0.03324
357108003	22-SEP-2014 17:48:00	30.04	1	0.03329
357108004	22-SEP-2014 17:48:00	30.01	1	0.03332
357108005	22-SEP-2014 17:48:00	30.07	1	0.03326
357108006	22-SEP-2014 17:48:00	30.03	1	0.0333
357108007	22-SEP-2014 17:48:00	30.08	1	0.03324
357108008	22-SEP-2014 17:48:00	30.02	1	0.03331
357108009	22-SEP-2014 17:48:00	30.05	1	0.03328
357108010	22-SEP-2014 17:48:00	30.03	1	0.0333
357115001	22-SEP-2014 17:48:00	30.08	1	0.03324
1203171255 MS (357115001)	22-SEP-2014 17:48:00	30.05	1	0.03328
1203171256 MSD (357115001)	22-SEP-2014 17:48:00	30	1	0.03333
357115003	22-SEP-2014 17:48:00	30.02	1	0.03331

Type	Sample Id	Description	Serial Number	Spike Amt	Units
LCS	1203171254	AZDRO SPIKE LCS STD,4000ug/ml	WFI140918-63	1	mL
MS	1203171255	AZDRO SPIKE LCS STD,4000ug/ml	WFI140918-63	1	mL
MS	1203171257	AZDRO SPIKE LCS STD,4000ug/ml	WFI140918-63	1	mL
MSD	1203171256	AZDRO SPIKE LCS STD,4000ug/ml	WFI140918-63	1	mL
MSD	1203171258	AZDRO SPIKE LCS STD,4000ug/ml	WFI140918-63	1	mL
SURR	All	20 ppm surrogate	WE140819-04	1	mL
REGNT	All	Methylene Chloride	2156262-D	120	mL
SOURC	All	SODIUM SULFATE	2148821	30	g

Comments:

Verified By: AV
Final Solvent: CH2Cl2

GC Volatiles (GRO) Analysis

Case Narrative

Method/Analysis Information

Procedure:	**Volatile Total Petroleum Hydrocarbons by Flame Ionization Detector**
Analytical Method:	NWTPH-Gx in Soil
Prep Method:	NWTPH-Gx in Soil
Analytical Batch Number:	1421379
Prep Batch Number:	1421377

Sample Analysis

The following client and quality control samples were analyzed to complete this sample delivery group/work order using the methods referenced in the Analysis Information section:

Sample ID	Client ID
357115001	J1V0D1
357115003	J1V0D2
1203173087	MB for batch 1421377
1203173089	Laboratory Control Sample (LCS)
1203173090	357115001(J1V0D1) Post Spike (PS)
1203173091	357115001(J1V0D1) Post Spike Duplicate (PSD)
1203173088	High Blank (HB)

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

NOTE: For volatile organic analyses the matrix spike designations may be indicated as "PS" or "PSD". The "PS" designation (post spike) indicates that the matrix was fortified prior to analysis but after applying any prep factors, such as a dilution. The laboratory considers the MS/MSD and PS/PSD designations interchangeable.

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-004 REV# 25.

Calibration Information

Initial Calibration
All initial calibration requirements have been met for this sample delivery group (SDG). See the calibration history report for a list of data files that were used to generate the initial calibration curve in the Standard Data Section of this data package.

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(s) analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries
Surrogate recoveries, in all samples and quality control samples, were within the acceptance limits.

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

QC Sample Designation
Sample 357115001 (J1V0D1) was selected for analysis as the matrix spike.

Matrix Spike (PS) Recovery Statement
The GRO recovery was within the acceptance limits.

Matrix Spike Duplicate (PSD) Recovery Statement
The GRO recovery was within the acceptance limits.

Relative Percent Difference (RPD) Statement
The RPD between the matrix spike pair met the acceptance limits.

Technical Information

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

Sample Dilutions
Samples were analyzed using a methanol extraction procedure at 1:50 dilutions. The samples were analyzed at the lowest dilution possible when using a methanol extraction procedure.

Sample Re-extraction/Re-analysis
Re-extractions or re-analyses were not required in this SDG.

Miscellaneous Information

Electronic Packaging Comment

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

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

Data Exception (DER) Documentation

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

Manual Integrations
Data files associated with the initial calibration, continuing calibration check(s), and samples may have been manually integrated to correct misidentification of peaks by the integration software.

Additional Comments
Additional comments were not required for this SDG.

System Configuration

The GRO Organics analysis was performed on the following instrument configuration:

Instrument ID	Instrument	System Configuration	Column ID	Column Description	P & T Trap
VOC4A.I	Agilent 6890N GC/FID w/ OI 4560/Archon Autosampler	HP6890N GC/FID	DB-624	0.53mm x 3.0u x 15m	OI #10

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Qualifier Definition Report
for

WCHN001 WC-HANFORD, INC.

Client SDG: XP0134 GEL Work Order: 357115 Project: RC-233 Soil

The Qualifiers in this report are defined as follows:

D Results are reported from a diluted aliquot of sample.

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

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: Erin Haubert **Name:** **Erin Haubert**

Date: **06 OCT 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: September 26, 2014

Company :	WC-Hanford, Inc.		
Address :	2620 Fermi Avenue MSIN H4-21 Richland, Washington 99354		
Contact:	Joan Kessner	Client SDG:	XP0134
Project:	RC-233 Soil		

Client Sample ID:	J1V0D1	Project:	WCHN00313
Sample ID:	357115001	Client ID:	WCHN001
Matrix:	SOIL		
Collect Date:	17-SEP-14 10:35		
Receive Date:	19-SEP-14		
Collector:	Client		
Moisture:	.93%		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Volatiles GRO Organics											
NWTPH-Gx GRO in Soil "Dry Weight Corrected"											
Gasoline Range Organics (C6 - C10)	DU	1680	1680	5050	UG/KG	50	ACJ	09/24/14	1525	1421379	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
NWTPH-Gx in Soil	NWTPH-Gx Prep in Soil	ACJ	09/24/14	1431	1421377

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	NWTPH-Gx in Soil	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Bromofluorobenzene	NWTPH-Gx GRO in Soil "Dry Weight Corrected"	5240 UG/KG	50.0	104	(50%-150%)

Notes:

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: September 26, 2014

Company :	WC-Hanford, Inc.		
Address :	2620 Fermi Avenue MSIN H4-21 Richland, Washington 99354		
Contact:	Joan Kessner	Client SDG:	XP0134
Project:	RC-233 Soil		

Client Sample ID:	J1V0D2	Project:	WCHN00313
Sample ID:	357115003	Client ID:	WCHN001
Matrix:	SOIL		
Collect Date:	17-SEP-14 10:25		
Receive Date:	19-SEP-14		
Collector:	Client		
Moisture:	.625%		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Volatiles GRO Organics											
NWTPH-Gx GRO in Soil "Dry Weight Corrected"											
Gasoline Range Organics (C6 - C10)	DU	1680	1680	5030	UG/KG	50	ACJ	09/24/14	1553	1421379	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
NWTPH-Gx in Soil	NWTPH-Gx Prep in Soil	ACJ	09/24/14	1432	1421377

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	NWTPH-Gx in Soil	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Bromofluorobenzene	NWTPH-Gx GRO in Soil "Dry Weight Corrected"	4650 UG/KG	50.0	92.3	(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: September 26, 2014

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

Contact: **Joan Kessner**

Workorder: **357115** **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatiles GRO Organics											
Batch 1421379											
QC1203173088 HB											
Gasoline Range Organics (C6 - C10)				DU	1670	UG/KG				ACJ	09/24/14 14:57
**Bromofluorobenzene					5160	UG/KG		103	(50%-150%)		
QC1203173089 LCS											
Gasoline Range Organics (C6 - C10)	500				457	UG/KG		91.4	(70%-130%)		09/24/14 09:43
**Bromofluorobenzene					51.8	UG/KG		104	(50%-150%)		
QC1203173087 MB											
Gasoline Range Organics (C6 - C10)				U	16.7	UG/KG					09/24/14 10:11
**Bromofluorobenzene					52.1	UG/KG		104	(50%-150%)		
QC1203173090 357115001 PS											
Gasoline Range Organics (C6 - C10)	500	DU	0.00	D	448	ug/L		89.5	(70%-130%)		09/24/14 16:21
**Bromofluorobenzene	50.0		51.9		51.5	ug/L		103	(50%-150%)		
QC1203173091 357115001 PSD											
Gasoline Range Organics (C6 - C10)	500	DU	0.00	D	459	ug/L	2.44	91.8	(0%-20%)		09/24/14 16:50
**Bromofluorobenzene	50.0		51.9		51.2	ug/L		102	(50%-150%)		

Notes:

The Qualifiers in this report are defined as follows:

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

QC Summary

Workorder: **357115** **Client SDG:** XP0134 **Project Description:** RC-233 Soil

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

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

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

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

o Analyte failed to recover within LCS limits (0rganics only)

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

Volatile Total Petroleum Hydrocarbons by Flame Ionization Detector

Batch ID: **1421377**
Analyst: Amy Jamison
Method: NWTPH-Gx in Soil
Lab SOP: GL-OA-E-004 REV# 25
Instrument: Sartorius Balance B-001

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)	pH Check
1203173089 LCS	24-SEP-2014 08:00:00	Soil	5	5	1	
1203173087 MB	24-SEP-2014 08:30:00	Soil	5	5	1	
1203173088 HB	24-SEP-2014 14:30:00	Soil	5	10	2	
357115001	24-SEP-2014 14:31:00	Soil	5	10	2	
1203173090 PS (357115001)	24-SEP-2014 14:31:00	Soil	5	10	2	
1203173091 PSD (357115001)	24-SEP-2014 14:31:00	Soil	5	10	2	
357115003	24-SEP-2014 14:32:00	Soil	5	10	2	

Reagent/Solvent Lot ID	Description	Amount

Comments:

Pesticide Analysis

Case Narrative

Pesticide Case Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0134

Method/Analysis Information

Procedure:	**Organochlorine Pesticides and Chlorinated Hydrocarbons**
Analytical Method:	SW846 3541/8081B
Prep Method:	SW846 3541
Analytical Batch Number:	1420968
Prep Batch Number:	1420967

Sample Analysis

Sample ID	Client ID
357115001	J1V0D1
357115003	J1V0D2
1203171894	MB for batch 1420967
1203171895	Laboratory Control Sample (LCS)
1203171963	357115003(J1V0D2) Matrix Spike (MS)
1203171964	357115003(J1V0D2) 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-041 REV# 13.

Raw data reports are processed and reviewed by the analyst using ChemStation software. False positives have been removed from the ChemStation 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.

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

Continuing Calibration Verification (CCV) Requirements
The associated calibration verification standards (ICV or CCV) did not meet the acceptance criteria.

The CCV standard for Toxaphene recovered above the acceptance limits; however, this had no adverse effects on the data as Toxaphene was not detected in the associated WCHN samples.

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

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

QC Sample Designation
Sample 357115003 (J1V0D2) was selected for the matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement
The MS recoveries for this SDG were within the established acceptance limits.

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

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

Technical Information:

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

Preparation/Analytical Method Verification
All procedures were performed as stated in the SOP. All reported analyte detections in client and quality control samples were within the established retention time windows.

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

Sample Re-extraction/Re-analysis
Re-extractions or re-analyses were not required in this SDG in this analytical batch unless confirmations or dilutions were required.

Florisil
Florisil clean-up was not performed on client and quality control samples in this batch.

Miscellaneous Information:

Electronic Package Comment

This package was generated using an electronic data processing program referred to as "virtual packaging". In an effort to increase quality and efficiency, the laboratory is developing systems to eventually generate all data packages electronically. The following change from "traditional" packages should be noted:
Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative.

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

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 pesticide 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 following additional comments were required:

Detected target analytes were reported from the analytical column with the higher concentration. Results below the method detection limit (non-detects) were reported from column one.

Due to software issue, the surrogate recovery range was not indicated or possibly indicated incorrectly in Quantitation Report. Please see Surrogate Recovery Report for correct surrogate recovery acceptance limits.

Due to rounding differences in the calculation between the forms, the data reported in Sample Summary (form 1) and Spike Recovery Report (form 3) may differ slightly from the data reported in Identification Summary (form 10).

System Configuration

The Semi-Volatiles-Pesticide analysis was performed on the following instrument configuration:

Instrument ID	Instrument	System Configuration	Column ID	Column Description
ECD7A.I_1	Agilent 6890 Gas Chromatograph/Dual ECD w/ 7673 Autosampler	HP6890 Series ECD	Rtx-CLP I	30m x 0.25mm, 0.25um (Rtx-CLPesticide I)
ECD7A.I_2	Agilent 6890 Gas Chromatograph/Dual ECD w/ 7673 Autosampler	HP6890 Series ECD	Rtx-CLP II	30m x 0.25mm, 0.20um (Rtx-CLPesticide II)

Certification Statement

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

GEL LABORATORIES LLC

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Qualifier Definition Report
for

WCHN001 WC-HANFORD, INC.

Client SDG: XP0134 GEL Work Order: 357115 Project: RC-233 Soil

The Qualifiers in this report are defined as follows:

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: Jimin Cao **Name: Jimin Cao**

Date: 01 OCT 2014 **Title: Data Validator**

Sample Data Summary

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: September 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: XP0134

Client Sample ID:	J1V0D1	Project:	WCHN00313
Sample ID:	357115001	Client ID:	WCHN001
Matrix:	SOIL		
Collect Date:	17-SEP-14 10:35		
Receive Date:	19-SEP-14		
Collector:	Client		
Moisture:	.93%		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-Pesticide											
8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"											
4,4'-DDD	U	0.336	0.336	1.34	ug/kg	1	LOF	09/24/14	2331	1420968	1
4,4'-DDE	U	0.336	0.336	1.34	ug/kg	1					
4,4'-DDT	U	0.336	0.336	1.34	ug/kg	1					
Aldrin	U	0.168	0.168	0.672	ug/kg	1					
Dieldrin	U	0.336	0.336	1.34	ug/kg	1					
Endosulfan I	U	0.168	0.168	0.672	ug/kg	1					
Endosulfan II	U	0.336	0.336	1.34	ug/kg	1					
Endosulfan sulfate	U	0.336	0.336	1.34	ug/kg	1					
Endrin	U	0.336	0.336	1.34	ug/kg	1					
Endrin aldehyde	U	0.336	0.336	1.34	ug/kg	1					
Endrin ketone	U	0.336	0.336	1.34	ug/kg	1					
Heptachlor	U	0.168	0.168	0.672	ug/kg	1					
Heptachlor epoxide	U	0.168	0.168	0.672	ug/kg	1					
Methoxychlor	U	1.68	1.68	6.72	ug/kg	1					
Toxaphene	U	5.59	5.59	16.8	ug/kg	1					
alpha-BHC	U	0.168	0.168	0.672	ug/kg	1					
alpha-Chlordane	U	0.168	0.168	0.672	ug/kg	1					
beta-BHC	U	0.168	0.168	0.672	ug/kg	1					
delta-BHC	U	0.168	0.168	0.672	ug/kg	1					
gamma-BHC (Lindane)	U	0.168	0.168	0.672	ug/kg	1					
gamma-Chlordane	U	0.168	0.168	0.672	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 8081B Prep Soil	MXD2	09/23/14	1150	1420967

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3541/8081B	
2	SW846 3541/8081B	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
4cmx	8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"	30.5 ug/kg	33.6	90.6	(27%-124%)
Decachlorobiphenyl	8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"	30.2 ug/kg	33.6	89.9	(31%-131%)

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Certificate of Analysis

Report Date: September 25, 2014

Company :	WC-Hanford, Inc.		
Address :	2620 Fermi Avenue MSIN H4-21 Richland, Washington 99354		
Contact:	Joan Kessner	Client SDG:	XP0134
Project:	RC-233 Soil		

Client Sample ID:	J1V0D1	Project:	WCHN00313
Sample ID:	357115001	Client ID:	WCHN001

Notes:

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: September 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: XP0134

Client Sample ID:	J1V0D2	Project:	WCHN00313
Sample ID:	357115003	Client ID:	WCHN001
Matrix:	SOIL		
Collect Date:	17-SEP-14 10:25		
Receive Date:	19-SEP-14		
Collector:	Client		
Moisture:	.625%		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-Pesticide											
8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"											
4,4'-DDD	U	0.335	0.335	1.34	ug/kg	1	LOF	09/25/14	0020	1420968	1
4,4'-DDE	U	0.335	0.335	1.34	ug/kg	1					
4,4'-DDT	U	0.335	0.335	1.34	ug/kg	1					
Aldrin	U	0.167	0.167	0.670	ug/kg	1					
Dieldrin	U	0.335	0.335	1.34	ug/kg	1					
Endosulfan I	U	0.167	0.167	0.670	ug/kg	1					
Endosulfan II	U	0.335	0.335	1.34	ug/kg	1					
Endosulfan sulfate	U	0.335	0.335	1.34	ug/kg	1					
Endrin	U	0.335	0.335	1.34	ug/kg	1					
Endrin aldehyde	U	0.335	0.335	1.34	ug/kg	1					
Endrin ketone	U	0.335	0.335	1.34	ug/kg	1					
Heptachlor	U	0.167	0.167	0.670	ug/kg	1					
Heptachlor epoxide	U	0.167	0.167	0.670	ug/kg	1					
Methoxychlor	U	1.67	1.67	6.70	ug/kg	1					
Toxaphene	U	5.57	5.57	16.7	ug/kg	1					
alpha-BHC	U	0.167	0.167	0.670	ug/kg	1					
alpha-Chlordane	U	0.167	0.167	0.670	ug/kg	1					
beta-BHC	U	0.167	0.167	0.670	ug/kg	1					
delta-BHC	U	0.167	0.167	0.670	ug/kg	1					
gamma-BHC (Lindane)	U	0.167	0.167	0.670	ug/kg	1					
gamma-Chlordane	U	0.167	0.167	0.670	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 8081B Prep Soil	MXD2	09/23/14	1150	1420967

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3541/8081B	
2	SW846 3541/8081B	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
4cmx	8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"	29.5 ug/kg	33.5	88.1	(27%-124%)
Decachlorobiphenyl	8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"	28.4 ug/kg	33.5	84.9	(31%-131%)

GEL LABORATORIES LLC
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Certificate of Analysis

Report Date: September 25, 2014

Company :	WC-Hanford, Inc.		
Address :	2620 Fermi Avenue MSIN H4-21 Richland, Washington 99354		
Contact:	Joan Kessner	Client SDG:	XP0134
Project:	RC-233 Soil		

Client Sample ID:	J1V0D2	Project:	WCHN00313
Sample ID:	357115003	Client ID:	WCHN001

Notes:

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: September 25, 2014

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

Contact: **Joan Kessner**

Workorder: **357115** **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-Pesticide											
Batch 1420968											
QC1203171895 LCS											
4,4'-DDD	41.6			42.9	ug/kg		103	(49%-123%)	LOF	09/24/14	15:23
4,4'-DDE	41.6			41.0	ug/kg		98.5	(46%-118%)			
4,4'-DDT	41.6			44.9	ug/kg		108	(48%-126%)			
Aldrin	16.7			15.4	ug/kg		92.6	(42%-114%)			
Dieldrin	41.6			39.0	ug/kg		93.7	(45%-110%)			
Endosulfan I	16.7			15.4	ug/kg		92.6	(38%-107%)			
Endosulfan II	41.6			42.2	ug/kg		102	(43%-110%)			
Endosulfan sulfate	41.6			42.8	ug/kg		103	(46%-121%)			
Endrin	41.6			54.6	ug/kg		131	(53%-135%)			
Endrin aldehyde	41.6			39.0	ug/kg		93.8	(42%-116%)			
Endrin ketone	41.6			36.5	ug/kg		87.7	(45%-111%)			
Heptachlor	16.7			16.2	ug/kg		97.2	(43%-120%)			
Heptachlor epoxide	16.7			15.5	ug/kg		93.2	(44%-116%)			
Methoxychlor	167			178	ug/kg		107	(45%-127%)			
alpha-BHC	16.7			14.7	ug/kg		88.4	(42%-124%)			
alpha-Chlordane	16.7			15.5	ug/kg		92.8	(43%-116%)			
beta-BHC	16.7			15.4	ug/kg		92.3	(44%-118%)			
delta-BHC	16.7			15.3	ug/kg		92	(43%-124%)			
gamma-BHC (Lindane)	16.7			15.1	ug/kg		90.9	(42%-123%)			
gamma-Chlordane	16.7			16.4	ug/kg		98.4	(45%-117%)			

QC Summary

Workorder: 357115 **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-Pesticide											
Batch 1420968											
**4cmx	33.3			33.0	ug/kg		99.2	(27%-124%)	LOF	09/24/14	15:23
**Decachlorobiphenyl	33.3			33.0	ug/kg		99	(31%-131%)			
QC1203171894 MB											
4,4'-DDD			U	0.333	ug/kg					09/24/14	15:07
4,4'-DDE			U	0.333	ug/kg						
4,4'-DDT			U	0.333	ug/kg						
Aldrin			U	0.166	ug/kg						
Dieldrin			U	0.333	ug/kg						
Endosulfan I			U	0.166	ug/kg						
Endosulfan II			U	0.333	ug/kg						
Endosulfan sulfate			U	0.333	ug/kg						
Endrin			U	0.333	ug/kg						
Endrin aldehyde			U	0.333	ug/kg						
Endrin ketone			U	0.333	ug/kg						
Heptachlor			U	0.166	ug/kg						
Heptachlor epoxide			U	0.166	ug/kg						
Methoxychlor			U	1.66	ug/kg						
Toxaphene			U	5.54	ug/kg						
alpha-BHC			U	0.166	ug/kg						
alpha-Chlordane			U	0.166	ug/kg						
beta-BHC			U	0.166	ug/kg						
delta-BHC			U	0.166	ug/kg						

QC Summary

Workorder: 357115 **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-Pesticide											
Batch 1420968											
gamma-BHC (Lindane)				U	0.166	ug/kg				LOF	09/24/14 15:07
gamma-Chlordane				U	0.166	ug/kg					
**4cmx	33.3				30.4	ug/kg		91.5	(27%-124%)		
**Decachlorobiphenyl	33.3				31.1	ug/kg		93.3	(31%-131%)		
QC1203171963 357115003 MS											
4,4'-DDD	41.8	U	0.335		38.9	ug/kg		93	(23%-142%)		09/24/14 23:48
4,4'-DDE	41.8	U	0.335		38.8	ug/kg		92.8	(23%-133%)		
4,4'-DDT	41.8	U	0.335		43.0	ug/kg		103	(25%-141%)		
Aldrin	16.7	U	0.167		14.1	ug/kg		84.3	(21%-129%)		
Dieldrin	41.8	U	0.335		35.6	ug/kg		85.2	(19%-131%)		
Endosulfan I	16.7	U	0.167		13.4	ug/kg		80	(15%-121%)		
Endosulfan II	41.8	U	0.335		35.3	ug/kg		84.5	(17%-126%)		
Endosulfan sulfate	41.8	U	0.335		37.2	ug/kg		89	(20%-134%)		
Endrin	41.8	U	0.335		48.5	ug/kg		116	(24%-154%)		
Endrin aldehyde	41.8	U	0.335		31.7	ug/kg		75.7	(18%-124%)		
Endrin ketone	41.8	U	0.335		32.4	ug/kg		77.4	(18%-127%)		
Heptachlor	16.7	U	0.167		15.9	ug/kg		95.3	(19%-137%)		
Heptachlor epoxide	16.7	U	0.167		14.5	ug/kg		86.7	(20%-131%)		
Methoxychlor	167	U	1.67		162	ug/kg		96.7	(18%-147%)		
alpha-BHC	16.7	U	0.167		14.3	ug/kg		85.2	(21%-133%)		
alpha-Chlordane	16.7	U	0.167		14.3	ug/kg		85.7	(17%-133%)		
beta-BHC	16.7	U	0.167		15.7	ug/kg		93.7	(22%-135%)		

QC Summary

Workorder: 357115 **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-Pesticide											
Batch 1420968											
delta-BHC	16.7	U	0.167		14.7	ug/kg		88.2	(20%-139%)	LOF	09/24/14 23:48
gamma-BHC (Lindane)	16.7	U	0.167		14.7	ug/kg		87.9	(20%-134%)		
gamma-Chlordane	16.7	U	0.167		14.0	ug/kg		83.5	(20%-131%)		
**4cmx	33.4		29.5		31.5	ug/kg		94.3	(27%-124%)		
**Decachlorobiphenyl	33.4		28.4		29.7	ug/kg		88.7	(31%-131%)		
QC1203171964 357115003 MSD											
4,4'-DDD	41.8	U	0.335		36.9	ug/kg	5.19	88.2	(0%-30%)		09/25/14 00:04
4,4'-DDE	41.8	U	0.335		35.5	ug/kg	8.88	84.9	(0%-30%)		
4,4'-DDT	41.8	U	0.335		38.9	ug/kg	9.94	93	(0%-30%)		
Aldrin	16.7	U	0.167		13.4	ug/kg	4.76	80.3	(0%-30%)		
Dieldrin	41.8	U	0.335		33.8	ug/kg	5.21	80.8	(0%-30%)		
Endosulfan I	16.7	U	0.167		12.6	ug/kg	5.87	75.4	(0%-30%)		
Endosulfan II	41.8	U	0.335		33.5	ug/kg	5.25	80.1	(0%-30%)		
Endosulfan sulfate	41.8	U	0.335		35.0	ug/kg	6.08	83.7	(0%-30%)		
Endrin	41.8	U	0.335		46.2	ug/kg	4.80	110	(0%-30%)		
Endrin aldehyde	41.8	U	0.335		30.6	ug/kg	3.55	73	(0%-30%)		
Endrin ketone	41.8	U	0.335		30.4	ug/kg	6.17	72.7	(0%-30%)		
Heptachlor	16.7	U	0.167		14.6	ug/kg	8.64	87.3	(0%-30%)		
Heptachlor epoxide	16.7	U	0.167		13.8	ug/kg	5.13	82.3	(0%-30%)		
Methoxychlor	167	U	1.67		153	ug/kg	5.28	91.7	(0%-30%)		
alpha-BHC	16.7	U	0.167		13.5	ug/kg	5.62	80.5	(0%-30%)		
alpha-Chlordane	16.7	U	0.167		13.5	ug/kg	5.81	80.8	(0%-30%)		

QC Summary

Workorder: **357115** **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-Pesticide											
Batch 1420968											
beta-BHC	16.7	U	0.167		13.4	ug/kg	15.6	80.1	(0%-30%)	LOF	09/25/14 00:04
delta-BHC	16.7	U	0.167		13.6	ug/kg	8.22	81.1	(0%-30%)		
gamma-BHC (Lindane)	16.7	U	0.167		13.8	ug/kg	6.38	82.4	(0%-30%)		
gamma-Chlordane	16.7	U	0.167		13.3	ug/kg	4.52	79.7	(0%-30%)		
**4cmx	33.5		29.5		29.4	ug/kg		87.9	(27%-124%)		
**Decachlorobiphenyl	33.5		28.4		27.4	ug/kg		81.8	(31%-131%)		

Notes:

The Qualifiers in this report are defined as follows:

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

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more 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: **1420967** **Verified by:** _____

Analyst: **Mia DeLee**

Method: **SW846 3541**

Lab SOP: **GL-OA-E-066 REV# 5**

Instrument: **Semi-Volatiles Manual**

Sample ID	Run Date	Aliquot (g)	Final Volume (mL)	Prepped Factor (mL/g)
1203171894 MB	23-SEP-2014 11:50:00	30.05	5	0.16639
1203171895 LCS	23-SEP-2014 11:50:00	30.03	5	0.1665
356379001 - 2	23-SEP-2014 11:50:00	30.05	5	0.16639
356379002 - 2	23-SEP-2014 11:50:00	30.06	5	0.16633
1203171896 - 2 MS (356379002)	23-SEP-2014 11:50:00	30.01	5	0.16661
1203171897 - 2 MSD (356379002)	23-SEP-2014 11:50:00	30.14	5	0.16589
356379003 - 2	23-SEP-2014 11:50:00	30.13	5	0.16595
356379004 - 2	23-SEP-2014 11:50:00	30.09	5	0.16617
356379005 - 2	23-SEP-2014 11:50:00	30.16	5	0.16578
356379006 - 2	23-SEP-2014 11:50:00	30.03	5	0.1665
356379007 - 2	23-SEP-2014 11:50:00	30.16	5	0.16578
356379008 - 2	23-SEP-2014 11:50:00	30.14	5	0.16589
356379009 - 2	23-SEP-2014 11:50:00	30.12	5	0.166
356379010 - 2	23-SEP-2014 11:50:00	30.07	5	0.16628
356379011 - 2	23-SEP-2014 11:50:00	30.16	5	0.16578
356379012 - 2	23-SEP-2014 11:50:00	30.01	5	0.16661
356379013 - 2	23-SEP-2014 11:50:00	30.06	5	0.16633
356379014 - 2	23-SEP-2014 11:50:00	30.09	5	0.16617
356379015 - 2	23-SEP-2014 11:50:00	30.1	5	0.16611
356379016 - 2	23-SEP-2014 11:50:00	30.09	5	0.16617
357115001	23-SEP-2014 11:50:00	30.04	5	0.16644
357115003	23-SEP-2014 11:50:00	30.06	5	0.16633
1203171963 MS (357115003)	23-SEP-2014 11:50:00	30.09	5	0.16617
1203171964 MSD (357115003)	23-SEP-2014 11:50:00	30.06	5	0.16633

Type	Sample Id	Description	Serial Number	Spike Amt	Units
LCS	1203171895	PESTSPIKE	WE140826-10	1	mL
MS	1203171896	PESTSPIKE	WE140826-10	1	mL
MS	1203171963	PESTSPIKE	WE140826-10	1	mL
MSD	1203171897	PESTSPIKE	WE140826-10	1	mL
MSD	1203171964	PESTSPIKE	WE140826-10	1	mL
SURR	All	PEST SURROGATE 1000 UG/L	WE140829-08	1	mL

Comments:

Final Solvent: Hexane
Verified by: SJW

Samples 356379002 (including the MS/MSD), 356379004, and 356379014 resembled hard clay.

Prep Logbook

Batch ID: **1420967** **Verified by:** _____

Analyst: **Mia DeLee**

Method: **SW846 3541**

Lab SOP: **GL-OA-E-066 REV# 5**

Instrument: **Semi-Volatiles Manual**

Sample ID		Run Date	Aliquot (g)	Final Volume (mL)	Prepped Factor (mL/g)		
REGNT	All	Acetone			2148834-B1	60	mL
REGNT	All	Hexane			2151969-B10	60	mL
SOURC	All	SODIUM SULFATE			2148821	30	g

PCB Analysis

Case Narrative

PCB Case Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0134

Method/Analysis Information

Procedure:	**Analysis of Polychlorinated Biphenyls by ECD**
Analytical Method:	SW846 3541/8082A
Prep Method:	SW846 3541
Analytical Batch Number:	1420834
Prep Batch Number:	1420833

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 3541/8082A:

Sample ID	Client ID
357115001	J1V0D1
357115003	J1V0D2
1203171637	MB for batch 1420833
1203171638	Laboratory Control Sample (LCS)
1203171639	357115001(J1V0D1) Matrix Spike (MS)
1203171640	357115001(J1V0D1) 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-040 REV# 20.

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

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.

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

Continuing Calibration Verification (CCV) Requirements
All associated calibration verification standards (ICV or CCV) met the acceptance criteria. All analytes were 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
All surrogate recoveries were within the established acceptance criteria for the samples in this SDG in this batch.

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

QC Sample Designation
Sample 357115001 (J1V0D1) was selected for the matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement
The MS recoveries for this SDG were within the established acceptance limits.

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

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

Technical Information

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

Preparation/Analytical Method Verification
All procedures were performed as stated in the SOP. All reported analyte detections in client and quality control samples were within the established retention time windows. Reported analyte concentrations were confirmed on dissimilar columns. All sample extracts were cleaned using alumina.

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

Sample Re-extraction/Re-analysis
Re-extractions or re-analyses were not required in this SDG in this batch.

Miscellaneous Information

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. 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.

Data Exception (DER) Documentation
Data exception report (DER) is generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A DER was not required for the samples in this SDG in this batch.

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 PCB 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 following additional comments were required:

The higher results from either column have been chosen and reported in the data package for the client samples, MB and LCS. The data reported for the MS and MSD are from the same analytical column as the parent sample.

Due to software issue, the surrogate recovery range was not indicated or possibly indicated incorrectly in Quantitation Report. Please see Surrogate Recovery Report for correct surrogate acceptance limits.

Due to rounding differences in the calculation between the forms, the data reported in Sample Summary (form 1) and Spike Recovery Report (form 3) may differ slightly from the data reported in Identification Summary (form 10).

Aroclors quantitated on the raw data report by ChemStation data system do not necessarily represent positive Aroclor identification. In order for positive identification to be made, the Aroclor must match in pattern and retention time; as well as quantitate relatively close between the primary and confirmation columns, as specified in SW846 method 8000. When these conditions are not met, the Aroclor is reported as a non-detect on the data report.

System Configuration

The Semi-Volatiles-PCB analysis was performed on the following instrument configuration:

Instrument ID	Instrument	System Configuration	Column ID	Column Description
ECD9A.I_1	Agilent 7890A Gas Chromatograph/Dual ECD w/ 7693 Autosampler	7890A GC/ECD	Restek Rtx-CLPest 1	30m x 0.25mm, 0.25um
ECD9A.I_2	Agilent 7890A Gas Chromatograph/Dual ECD w/ 7693 Autosampler	7890A GC/ECD	Restek Rtx-CLPest 2	30m x 0.25mm, 0.20um

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report
for

WCHN001 WC-HANFORD, INC.

Client SDG: XP0134 GEL Work Order: 357115 Project: RC-233 Soil

The Qualifiers in this report are defined as follows:

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: Jimin Cao **Name: Jimin Cao**

Date: 24 SEP 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: September 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: XP0134

Client Sample ID:	J1V0D1	Project:	WCHN00313
Sample ID:	357115001	Client ID:	WCHN001
Matrix:	SOIL		
Collect Date:	17-SEP-14 10:35		
Receive Date:	19-SEP-14		
Collector:	Client		
Moisture:	.93%		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-PCB											
SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"											
Aroclor-1016	U	1.12	1.12	3.36	ug/kg	1	YS1	09/23/14	1402	1420834	1
Aroclor-1221	U	1.12	1.12	3.36	ug/kg	1					
Aroclor-1232	U	1.12	1.12	3.36	ug/kg	1					
Aroclor-1242	U	1.12	1.12	3.36	ug/kg	1					
Aroclor-1248	U	1.12	1.12	3.36	ug/kg	1					
Aroclor-1254	U	1.12	1.12	3.36	ug/kg	1					
Aroclor-1260	U	1.12	1.12	3.36	ug/kg	1					
Aroclor-1262	U	1.12	1.12	3.36	ug/kg	1					
Aroclor-1268	U	1.12	1.12	3.36	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 PCB Prep Soil	MXD2	09/22/14	1025	1420833

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3541/8082A	
2	SW846 3541/8082A	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
4cmx	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	5.47 ug/kg	6.72	81.5	(29%-106%)
Decachlorobiphenyl	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	6.97 ug/kg	6.72	104	(25%-131%)

Notes:

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: September 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: XP0134

Client Sample ID:	J1V0D2	Project:	WCHN00313
Sample ID:	357115003	Client ID:	WCHN001
Matrix:	SOIL		
Collect Date:	17-SEP-14 10:25		
Receive Date:	19-SEP-14		
Collector:	Client		
Moisture:	.625%		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-PCB											
SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"											
Aroclor-1016	U	1.12	1.12	3.35	ug/kg	1	YS1	09/23/14	1445	1420834	1
Aroclor-1221	U	1.12	1.12	3.35	ug/kg	1					
Aroclor-1232	U	1.12	1.12	3.35	ug/kg	1					
Aroclor-1242	U	1.12	1.12	3.35	ug/kg	1					
Aroclor-1248	U	1.12	1.12	3.35	ug/kg	1					
Aroclor-1254	U	1.12	1.12	3.35	ug/kg	1					
Aroclor-1260	U	1.12	1.12	3.35	ug/kg	1					
Aroclor-1262	U	1.12	1.12	3.35	ug/kg	1					
Aroclor-1268	U	1.12	1.12	3.35	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 PCB Prep Soil	MXD2	09/22/14	1025	1420833

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3541/8082A	
2	SW846 3541/8082A	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
4cmx	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	5.15 ug/kg	6.70	76.9	(29%-106%)
Decachlorobiphenyl	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	6.73 ug/kg	6.70	100	(25%-131%)

Notes:

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: September 23, 2014

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

Contact: **Joan Kessner**

Workorder: **357115** **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-PCB										
Batch 1420834										
QC1203171638 LCS										
Aroclor-1016	33.3			26.9	ug/kg		80.9	(44%-97%)	YS1	09/23/14 10:35
Aroclor-1260	33.3			26.7	ug/kg		80.3	(49%-109%)		
**4cmx	6.66			5.42	ug/kg		81.4	(29%-106%)		
**Decachlorobiphenyl	6.66			6.43	ug/kg		96.6	(25%-131%)		
QC1203171637 MB										
Aroclor-1016			U	1.11	ug/kg					09/23/14 10:24
Aroclor-1221			U	1.11	ug/kg					
Aroclor-1232			U	1.11	ug/kg					
Aroclor-1242			U	1.11	ug/kg					
Aroclor-1248			U	1.11	ug/kg					
Aroclor-1254			U	1.11	ug/kg					
Aroclor-1260			U	1.11	ug/kg					
Aroclor-1262			U	1.11	ug/kg					
Aroclor-1268			U	1.11	ug/kg					
**4cmx	6.66			5.30	ug/kg		79.6	(29%-106%)		
**Decachlorobiphenyl	6.66			6.17	ug/kg		92.7	(25%-131%)		
QC1203171639 357115001 MS										
Aroclor-1016	33.5	U	1.12	22.5	ug/kg		67.2	(22%-127%)		09/23/14 14:15
Aroclor-1260	33.5	U	1.12	22.3	ug/kg		66.6	(18%-130%)		
**4cmx	6.70		5.47	5.27	ug/kg		78.6	(29%-106%)		
**Decachlorobiphenyl	6.70		6.97	6.36	ug/kg		95	(25%-131%)		

GEL LABORATORIES LLC

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QC Summary

Workorder: **357115** **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-PCB											
Batch 1420834											
QC1203171640 357115001 MSD											
Aroclor-1016	33.6	U	1.12		21.6	ug/kg	4.09	64.4	(0%-30%)	YS1	09/23/14 14:29
Aroclor-1260	33.6	U	1.12		22.3	ug/kg	0.120	66.3	(0%-30%)		
**4cmx	6.71		5.47		4.99	ug/kg		74.3	(29%-106%)		
**Decachlorobiphenyl	6.71		6.97		6.35	ug/kg		94.7	(25%-131%)		

Notes:

The Qualifiers in this report are defined as follows:

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

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more 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: **1420833** **Verified by:** _____

Analyst: **Mia DeLee**

Method: **SW846 3541**

Lab SOP: **GL-OA-E-066 REV# 5**

Instrument: **Semi-Volatiles Manual**

Sample ID	Run Date	Aliquot (g)	Clean Up 1	Clean Up Amount 1 (mL)	Post Clean Up Amount 1 (mL)	Final Volume (mL)	Prepped Factor (mL/g)
1203171637 MB	22-SEP-2014 10:25:00	30.03	H2SO4/KMnO4	2	9	1	0.0333
1203171638 LCS	22-SEP-2014 10:25:00	30.04	H2SO4/KMnO4	2	9	1	0.03329
357108001	22-SEP-2014 10:25:00	30.04	H2SO4/KMnO4	2	9	1	0.03329
357108002	22-SEP-2014 10:25:00	30.04	H2SO4/KMnO4	2	9	1	0.03329
357108003	22-SEP-2014 10:25:00	30.05	H2SO4/KMnO4	2	9	1	0.03328
1203171641 MS (357108003)	22-SEP-2014 10:25:00	30.1	H2SO4/KMnO4	2	9	1	0.03322
1203171642 MSD (357108003)	22-SEP-2014 10:25:00	30.06	H2SO4/KMnO4	2	9	1	0.03327
357108004	22-SEP-2014 10:25:00	30.02	H2SO4/KMnO4	2	9	1	0.03331
357108005	22-SEP-2014 10:25:00	30.04	H2SO4/KMnO4	2	9	1	0.03329
357108006	22-SEP-2014 10:25:00	30.03	H2SO4/KMnO4	2	9	1	0.0333
357108007	22-SEP-2014 10:25:00	30.09	H2SO4/KMnO4	2	9	1	0.03323
357108008	22-SEP-2014 10:25:00	30.11	H2SO4/KMnO4	2	9	1	0.03321
357108009	22-SEP-2014 10:25:00	30.07	H2SO4/KMnO4	2	9	1	0.03326
357108010	22-SEP-2014 10:25:00	30.04	H2SO4/KMnO4	2	9	1	0.03329
357115001	22-SEP-2014 10:25:00	30.05	H2SO4/KMnO4	2	9	1	0.03328
1203171639 MS (357115001)	22-SEP-2014 10:25:00	30.13	H2SO4/KMnO4	2	9	1	0.03319
1203171640 MSD (357115001)	22-SEP-2014 10:25:00	30.07	H2SO4/KMnO4	2	9	1	0.03326
357115003	22-SEP-2014 10:25:00	30.04	H2SO4/KMnO4	2	9	1	0.03329

Type	Sample Id	Description	Serial Number	Spike Amt	Units
LCS	1203171638	PCB Laboratory Control	WE140908-06	1	mL
MS	1203171639	PCB Laboratory Control	WE140908-06	1	mL
MS	1203171641	PCB Laboratory Control	WE140908-06	1	mL
MSD	1203171640	PCB Laboratory Control	WE140908-06	1	mL
MSD	1203171642	PCB Laboratory Control	WE140908-06	1	mL
SURR	All	PEST LOW LEVEL SURROGATE 200 UG/L	WE140812-01	1	mL

Comments:

Final Solvent: Hexane
Verified by: SJW
Clean-up Initials: MD
Clean-up SOP: GL-OA-E-037 REV.1
Clean-up date: 09/22/2014

Prior to Clean-up: 2mL

Prep Logbook

Batch ID: **1420833** **Verified by:** _____

Analyst: **Mia DeLee**

Method: **SW846 3541**

Lab SOP: **GL-OA-E-066 REV# 5**

Instrument: **Semi-Volatiles Manual**

Sample ID	Run Date	Aliquot (g)	Clean Up 1	Clean Up Amount 1 (mL)	Post Clean Up Amount 1 (mL)	Final Volume (mL)	Prepped Factor (mL/g)
REGNT All	5% Potassium Permanganate		2134734	5	mL		
REGNT All	1:1 sulfuric acid		2144769	5	mL		
REGNT All	Hexane		2151969-B10	120	mL		
SOURC All	SODIUM SULFATE		2148821	30	g		

Herbicide Analysis

Case Narrative

Herbicide Case Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0134

Method/Analysis Information

Procedure:	**Analysis of Chlorophenoxy Acid Herbicides by ECD**
Analytical Method:	SW846 8151A
Prep Method:	SW846 8151A
Analytical Batch Number:	1421190
Prep Batch Number:	1421189

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 8151A:

Sample ID	Client ID
357115001	J1V0D1
357115003	J1V0D2
1203172483	MB for batch 1421189
1203172484	Laboratory Control Sample (LCS)
1203172487	357115001(J1V0D1) Matrix Spike (MS)
1203172488	357115001(J1V0D1) 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-011 REV# 21.

Raw data reports are processed and reviewed by the analyst using 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 Initial Calibration Verification (ICV) requirements have been met for this SDG. However, not all Calibration Verification Standards (CCV) requirements were met. Several target analytes failed acceptance criteria with a negative bias on one analytical column in the standards bracketing the samples in this SDG. The negative bias for the analytical data is a result of instrument response decreasing after the initial calibration. The instrument response never decreased to a point where the target analytes would not be detected. Several target analytes

failed acceptance criteria with a positive bias on one analytical column in the standards bracketing the samples in this SDG. The positive bias for the analytical data is a result of instrument response increasing after the initial calibration. Since the target analytes were not detected in the samples, the non-compliance had no adverse impact on the data. All analytes were 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
All surrogate recoveries were within the established acceptance criteria for this SDG.

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

QC Sample Designation
Sample 357115001 (J1V0D1) was selected for analysis as the matrix spike and matrix spike duplicate.

Matrix Spike (MS) Recovery Statement
The MS, 1203172487 (J1V0D1), did not meet spike recovery acceptance limits for Dinoseb. The LCS and MSD were both within the acceptance criteria for Dinoseb. Since the failure was limited to the MS only, the data results have been reported.

Matrix Spike Duplicate (MSD) Recovery Statement
The MSD, 1203172488 (J1V0D1), did not meet spike recovery acceptance limits for MCPP. Since MCPP was not detected in the associated parent sample, the biased high recovery had no adverse impact on the data and the results have been reported.

MS/MSD Relative Percent Difference (RPD) Statement
The MS and MSD, 1203172487 (J1V0D1) and 1203172488 (J1V0D1) did not meet RPD acceptance criteria for Dinoseb and MCPA. The RPD failure for Dinoseb was attributed to the spike recovery failure in the MS, when compared to the MSD. Since MCPA was individually within the acceptance criteria for the MS and MSD, the non-conformance had no adverse impact on the data. The results have been reported.

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. All reported analyte detections in client and quality control samples were within the established retention time windows. Reported target analyte concentrations were confirmed on a dissimilar column.

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

Sample Re-extraction/Re-analysis
Re-extractions or re-analyses were not required in this SDG in this analytical batch unless confirmations or dilutions were required.

Miscellaneous Information

Electronic Package 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 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.

Data Exception (DER) Documentation

The following DER was generated for this SDG: 1337856.

Manual Integrations

Some initial calibration standards, continuing calibration standards, and/or 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 Herbicide 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 following additional comments were required:

The higher results from either column have been chosen and reported in the data package for the client samples, MB and LCS. The data reported for the MS and MSD are from the same analytical column as the parent sample.

Due to rounding differences in the calculation between the forms, the data reported in the Sample Summary (form 1) and Spike Recovery Report (form 3) may differ slightly from the data reported in Identification Summary (form 10).

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.

System Configuration

The Semi-Volatiles-HERB analysis was performed on the following instrument configuration:

Instrument ID	Instrument	System Configuration	Column ID	Column Description
ECD6A.I_1	Agilent 6890 Gas Chromatograph/Dual ECD w/ 7683 Autosampler	HP6890 Series GC/ECD	Rtx-CLP I	30m x 0.32mm, 0.50um (Rtx-CLPesticide)
ECD6A.I_2	Agilent 6890 Gas Chromatograph/Dual ECD w/ 7683 Autosampler	HP6890 Series GC/ECD	Rtx-CLP II	30m x 0.32mm, 0.50um (Rtx-CLPesticide II)

Certification Statement

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

DATA EXCEPTION REPORT

Mo.Day Yr.	Division:	Quality Criteria:	Type:
26-SEP-14	Industrial	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
GC/ECD	SW846 8151A	Solid	AREV, CARE, WCHN
Batch ID:	**Sample Numbers:**		
1421190	See Below		

Potentially affected work order(s)(SDG): 356694(EUI-9703),356957,357115(XP0134)

Application Issues:

Failed Recovery for MS/PS

Failed RPD for MS/MSD, or PS/PSD

Failed Recovery for MSD/PSD

Specification and Requirements Exception Description:	DER Disposition:
1. The MS(1203172487) did not meet spike recovery acceptance limits for Dinoseb.	1. The LCS and MSD were both within the acceptance criteria for Dinoseb. Since the failure was limited to the MS only, the data results have been reported.
2. The MSD(1203172488) did not meet spike recovery acceptance limits for MCPP.	2. Since MCPP was not detected in the associated parent sample, the biased high recovery had no adverse impact on the data and the results have been reported.
2. The MS(1203172487) and MSD(1203172488) did not meet RPD acceptance criteria for Dinoseb and MCPA.	3. The RPD failure for Dinoseb was attributed to the spike recovery failure in the MS, when compared to the MSD. Since MCPA was individually within the acceptance criteria for the MS and MSD, the non-conformance had no adverse impact on the data. The results have been reported.

Originator's Name:

Lloyd O Fox 26-SEP-14

Data Validator/Group Leader:

Barbara Bailey 06-OCT-14

GEL LABORATORIES LLC

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Qualifier Definition Report
for

WCHN001 WC-HANFORD, INC.

Client SDG: XP0134 GEL Work Order: 357115 Project: RC-233 Soil

The Qualifiers in this report are defined as follows:

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

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

DL Indicates that sample is diluted.
RA Indicates that sample is re-analyzed without re-extraction.
RE Indicates that sample is re-extracted.

Review/Validation

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

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

Signature: Barbara Bailey **Name: Barbara Bailey**

Date: 06 OCT 2014 **Title: Data Validator**

Sample Data Summary

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: October 6, 2014

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

Client SDG: XP0134

Client Sample ID:	J1V0D1	Project:	WCHN00313
Sample ID:	357115001	Client ID:	WCHN001
Matrix:	SOIL		
Collect Date:	17-SEP-14 10:35		
Receive Date:	19-SEP-14		
Collector:	Client		
Moisture:	.93%		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-HERB											
8151A Herbicides Soil "Dry Weight Corrected"											
2,4,5-T	U	1.68	1.68	5.05	ug/kg	1	LXA1	09/25/14	1749	1421190	1
2,4,5-TP	U	1.68	1.68	5.05	ug/kg	1					
2,4-D	U	1.68	1.68	5.05	ug/kg	1					
2,4-DB	U	1.68	1.68	5.05	ug/kg	1					
Dalapon	U	35.3	35.3	101	ug/kg	1					
Dicamba	U	2.02	2.02	5.05	ug/kg	1					
Dichlorprop	U	2.28	2.28	5.05	ug/kg	1					
Dinoseb	TU	1.68	1.68	5.05	ug/kg	1					
MCPA	U	232	232	1010	ug/kg	1					
MCPP	TU	202	202	1010	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8151A	8151A Herbicides Prep in Soil	SJW1	09/23/14	1220	1421189

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8151A	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
2,4-Dichlorophenylacetic acid	8151A Herbicides Soil "Dry Weight Corrected"	124 ug/kg	101	123	(33%-143%)

Notes:

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: October 6, 2014

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

Client SDG: XP0134

Client Sample ID:	J1V0D2	Project:	WCHN00313
Sample ID:	357115003	Client ID:	WCHN001
Matrix:	SOIL		
Collect Date:	17-SEP-14 10:25		
Receive Date:	19-SEP-14		
Collector:	Client		
Moisture:	.625%		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-HERB											
8151A Herbicides Soil "Dry Weight Corrected"											
2,4,5-T	U	1.67	1.67	5.02	ug/kg	1	LXA1	09/25/14	1912	1421190	1
2,4,5-TP	U	1.67	1.67	5.02	ug/kg	1					
2,4-D	U	1.67	1.67	5.02	ug/kg	1					
2,4-DB	U	1.67	1.67	5.02	ug/kg	1					
Dalapon	U	35.1	35.1	100	ug/kg	1					
Dicamba	U	2.01	2.01	5.02	ug/kg	1					
Dichlorprop	U	2.27	2.27	5.02	ug/kg	1					
Dinoseb	TU	1.67	1.67	5.02	ug/kg	1					
MCPA	U	231	231	1000	ug/kg	1					
MCPP	TU	201	201	1000	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8151A	8151A Herbicides Prep in Soil	SJW1	09/23/14	1220	1421189

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8151A	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
2,4-Dichlorophenylacetic acid	8151A Herbicides Soil "Dry Weight Corrected"	134 ug/kg	100	134	(33%-143%)

Notes:

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: October 6, 2014

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

Contact: **Joan Kessner**

Workorder: **357115** **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch 1421190											
QC1203172484 LCS											
2,4,5-T	40.0			44.2	ug/kg		111	(60%-130%)	LXA1	09/25/14	16:54
2,4,5-TP	40.0			44.3	ug/kg		111	(64%-126%)			
2,4-D	40.0			43.9	ug/kg		110	(57%-133%)			
2,4-DB	40.0			47.9	ug/kg		120	(57%-141%)			
Dalapon	400			296	ug/kg		74	(25%-105%)			
Dicamba	40.0			42.4	ug/kg		106	(55%-116%)			
Dichlorprop	40.0			42.8	ug/kg		107	(57%-125%)			
Dinoseb	40.0			28.7	ug/kg		71.7	(24%-104%)			
MCPA	4000			3740	ug/kg		93.6	(45%-123%)			
MCPP	4000			4160	ug/kg		104	(40%-119%)			
**2,4-Dichlorophenylacetic acid	100			113	ug/kg		113	(33%-143%)			
QC1203172483 MB											
2,4,5-T			U	1.66	ug/kg					09/25/14	16:27
2,4,5-TP			U	1.66	ug/kg						
2,4-D			U	1.66	ug/kg						
2,4-DB			U	1.66	ug/kg						
Dalapon			U	35.0	ug/kg						
Dicamba			U	2.00	ug/kg						
Dichlorprop			U	2.26	ug/kg						
Dinoseb			U	1.66	ug/kg						

QC Summary

Workorder: 357115 **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB											
Batch 1421190											
MCPA				U	230	ug/kg					
MCPP				U	200	ug/kg				LXA1	09/25/14 16:27
**2,4-Dichlorophenylacetic acid	99.9				118	ug/kg		118	(33%-143%)		
QC1203172487 357115001 MS											
2,4,5-T	40.4	U	1.68		39.4	ug/kg		97.6	(39%-137%)		09/25/14 18:16
2,4,5-TP	40.4	U	1.68		39.8	ug/kg		98.5	(38%-139%)		
2,4-D	40.4	U	1.68		47.0	ug/kg		116	(40%-142%)		
2,4-DB	40.4	U	1.68		48.0	ug/kg		119	(39%-147%)		
Dalapon	404	U	35.3		296	ug/kg		73.3	(23%-111%)		
Dicamba	40.4	U	2.02		43.3	ug/kg		107	(37%-128%)		
Dichlorprop	40.4	U	2.28		45.2	ug/kg		112	(35%-140%)		
Dinoseb	40.4	TU	1.68	TU	1.67	ug/kg		0*	(23%-128%)		
MCPA	4040	U	232		3830	ug/kg		95	(34%-135%)		
MCPP	4040	TU	202		5210	ug/kg		129	(32%-129%)		
**2,4-Dichlorophenylacetic acid	101		124		120	ug/kg		119	(33%-143%)		
QC1203172488 357115001 MSD											
2,4,5-T	40.3	U	1.68		38.7	ug/kg	1.68	96	(0%-30%)		09/25/14 18:44
2,4,5-TP	40.3	U	1.68		37.0	ug/kg	7.13	91.8	(0%-30%)		
2,4-D	40.3	U	1.68		42.6	ug/kg	9.86	105	(0%-30%)		
2,4-DB	40.3	U	1.68		44.3	ug/kg	7.99	110	(0%-30%)		
Dalapon	403	U	35.3		334	ug/kg	12.0	82.8	(0%-30%)		
Dicamba	40.3	U	2.02		44.6	ug/kg	2.81	110	(0%-30%)		
Dichlorprop	40.3	U	2.28		41.5	ug/kg	8.56	103	(0%-30%)		
Dinoseb	40.3	TU	1.68		21.1	ug/kg	200*	52.2	(0%-30%)		

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QC Summary

Workorder: **357115** **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-HERB											
Batch 1421190											
MCPA	4030	U	232		2790	ug/kg	31.5*	69.1	(0%-30%)	LXA1	09/25/14 18:44
MCPP	4030	TU	202	T	5330	ug/kg	2.22	132*	(0%-30%)		
**2,4-Dichlorophenylacetic acid	101		124		126	ug/kg		125	(33%-143%)		

Notes:

The Qualifiers in this report are defined as follows:

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

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

The Extraction of Herbicides from Soil and Sludge Samples

Batch ID: 1421189 **Verified by:** _____

Analyst: Sirena White

Method: SW846 8151A

Lab SOP: GL-OA-E-027 REV# 14

Instrument: Semi-Volatiles Manual

Sample ID	Run Date	Aliquot (g)	Initial pH	Int Ext pH	Sec Ext pH	Prepped Aliquot (mL)	Prepped Factor (mL/g)
1203172483 MB	23-SEP-2014 12:20:00	50.04	7	2	0	10	0.19984
1203172484 LCS	23-SEP-2014 12:20:00	50.02	7	2	0	10	0.19992
356694001	23-SEP-2014 12:20:00	10.189	7	2	0	10	0.98145
356957001	23-SEP-2014 12:20:00	50	7	2	0	10	0.2
356957002	23-SEP-2014 12:20:00	50.04	7	2	0	10	0.19984
356957003	23-SEP-2014 12:20:00	50.04	7	2	0	10	0.19984
356957004	23-SEP-2014 12:20:00	50.04	7	2	0	10	0.19984
356957005	23-SEP-2014 12:20:00	50.08	7	2	0	10	0.19968
356957006	23-SEP-2014 12:20:00	50.08	7	2	0	10	0.19968
356957007	23-SEP-2014 12:20:00	50.1	7	2	0	10	0.1996
356957008	23-SEP-2014 12:20:00	50	7	2	0	10	0.2
356957009	23-SEP-2014 12:20:00	50.03	7	2	0	10	0.19988
356957010	23-SEP-2014 12:20:00	50	7	2	0	10	0.2
356957011	23-SEP-2014 12:20:00	50	7	2	0	10	0.2
356957012	23-SEP-2014 12:20:00	50.13	7	2	0	10	0.19948
356957013	23-SEP-2014 12:20:00	50.13	7	2	0	10	0.19948
356957014	23-SEP-2014 12:20:00	50.14	7	2	0	10	0.19944
356957015	23-SEP-2014 12:20:00	50.14	7	2	0	10	0.19944
357115001	23-SEP-2014 12:20:00	50	7	2	0	10	0.2
1203172487 MS (357115001)	23-SEP-2014 12:20:00	50.02	7	2	0	10	0.19992
1203172488 MSD (357115001)	23-SEP-2014 12:20:00	50.04	7	2	0	10	0.19984
357115003	23-SEP-2014 12:20:00	50.14	7	2	0	10	0.19944

Type	Sample Id	Description	Serial Number	Spike Amt	Units
LCS	1203172484	HERBICIDE LCS	WE140905-10	1	mL
MS	1203172487	HERBICIDE LCS	WE140905-10	1	mL
MSD	1203172488	HERBICIDE LCS	WE140905-10	1	mL
SURR	All	HERBICIDE SURROGATE	WE140818-03	.05	mL
REGNT	All	Iso-octane	2105147-A	1	mL
REGNT	All	Acetone	2148834-B1	20	mL
REGNT	All	Hexane	2151967-B10	54	mL
REGNT	All	Methanol	2152454-C	.5	mL
REGNT	All	Methylene Chloride	2156262-D	290	mL

Comments:

Samples 356957014 and 356957015 became very foamy during the sonication process. Samples also remained very dark after the sonication process. During the hydrolysis phase samples 356957014 and 356957015 remained very dark and became slightly viscous.

Diazomethane - 2160626B was used. Number is not available in AlphaLims for this batch because Diazomethane was created after start time of batch.
O-37% KOH-X - 140924A

1-HCL 2069408
Silicic Acid - 1980396-A

Hydrolysis Analyst: Sirena White/Sharlene Robinson

Prep Logbook

Batch ID: **1421189** **Verified by:** _____

Analyst: **Sirena White**

Method: **SW846 8151A**

Lab SOP: **GL-OA-E-027 REV# 14**

Instrument: **Semi-Volatiles Manual**

Sample ID	Run Date	Aliquot (g)	Initial pH	Int Ext pH	Sec Ext pH	Prepped Aliquot (mL)	Prepped Factor (mL/g)
REGNT All	Sulfuric Acid Sol., 12N For Herbicides			2158370	17	mL	
REGNT All	N-METHYL-N-NITROSO-P-TOLUENESULFON-AMIDE			2158855B	2	mL	
REGNT All	Ethyl ether			UN2152998a	80	mL	
SOURC All	ACIDIFIED SODIUM SULFATE			2159899	10	g	

Hydrolysis Date: 24-SEP-2014 08:05:13

Verified By: MD

Final Solvent: Hexane

Metals Analysis

Case Narrative

Metals Fractional Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0134

Sample Analysis

Sample ID	Client ID
357115001	J1V0D1
357115002	J1V0D1
357115003	J1V0D2
357115004	J1V0D2
1203171198	Tumbling Blank (TB)
1203171160	Method Blank (MB) **ICP**
1203172865	Method Blank (MB) **ICP**
1203171161	Laboratory Control Sample (LCS)
1203172866	Laboratory Control Sample (LCS)
1203171164	357115001(J1V0D1L) Serial Dilution (SD)
1203172869	357115002(J1V0D1L) Serial Dilution (SD)
1203171162	357115001(J1V0D1D) Sample Duplicate (DUP)
1203172867	357115002(J1V0D1D) Sample Duplicate (DUP)
1203171163	357115001(J1V0D1S) Matrix Spike (MS)
1203171197	357115002(J1V0D1S) Matrix Spike (MS)
1203172631	357115001(J1V0D1PS) Post Spike (PS)
1203171124	Method Blank (MB) **ICP-MS**
1203171125	Laboratory Control Sample (LCS)
1203171128	357115001(J1V0D1L) Serial Dilution (SD)
1203171126	357115001(J1V0D1D) Sample Duplicate (DUP)
1203171127	357115001(J1V0D1S) Matrix Spike (MS)
1203171198	Tumbling Blank (TB)
1203171935	Method Blank (MB) **CVAA**
1203172821	Method Blank (MB) **CVAA**

1203171936	Laboratory Control Sample (LCS)
1203172822	Laboratory Control Sample (LCS)
1203171939	357115001(J1V0D1L) Serial Dilution (SD)
1203172825	357115002(J1V0D1L) Serial Dilution (SD)
1203171937	357115001(J1V0D1D) Sample Duplicate (DUP)
1203172823	357115002(J1V0D1D) Sample Duplicate (DUP)
1203171938	357115001(J1V0D1S) Matrix Spike (MS)
1203171197	357115002(J1V0D1S) Matrix Spike (MS)

Samples 357115 001 and 003 in this SDG were analyzed on a "dry weight" basis. Samples 357115 002 and 004 in this SDG were analyzed on an "as received" basis.

Method/Analysis Information

Analytical Batch:	1421302, 1420646, 1420632, 1420986 and 1421286
Prep Batch :	1421301, 1420645, 1420631, 1420983 and 1421285
TCLP Prep Batch :	1420671
Standard Operating Procedures:	GL-MA-E-013 REV# 22, GL-MA-E-008 REV# 16, GL-LB-E-006 REV# 19, GL-MA-E-009 REV# 24, GL-MA-E-014 REV# 25 and GL-MA-E-010 REV# 28
Analytical Method:	SW846 3010A/6010C, SW846 3050B/6010C, SW846 3050B/6020A, SW846 7471B and SW846 7470A
Prep Method :	SW846 3010A, SW846 3050B, SW846 7471B Prep and SW846 7470A Prep
TCLP Prep Method :	SW846 1311

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-ICP was performed on a PE 7300 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 DRC-e 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, and dynamic reaction cell. The DRC-e uses a dynamic reaction cell to eliminate polyatomic interferences. 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 potassium and zinc listed below. The sample concentrations were less than the MDL or greater than 2x the PQL, so the data is not adversely affected. 357115001 (J1V0D1) and 357115003 (J1V0D2)-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: 357115002 (J1V0D1)-ICP and CVAA and 357115001 (J1V0D1)-ICP, CVAA and ICP-MS.

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 silicon. 1203171163 (J1V0D1)-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. Barium, copper and nickel did not meet these requirements. 1203171162 (J1V0D1)-ICP.

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

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 did not meet the recommended quality control acceptance criteria for percent recoveries for silicon and verifies the presence of matrix interferences. 1203172631 (J1V0D1)-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. The ICPMS solid samples in this SDG were diluted the standard two times. ICP-MS.

Preparation Information
The samples and associated matrix QC were prepared at a ten times or greater dilution factor to minimize potential interferences arising from the high sodium content in the TCLP leaching solution. ICP and CVAA.

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: 1336639. 1203171162 (J1V0D1), 1203171163 (J1V0D1) and 1203172631 (J1V0D1)-ICP.

Additional Comments

Additional comments were not required for this SDG.

Certification Statement

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

Review Validation:

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

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

Reviewer:_____ **Date:** 10·6·14

DATA EXCEPTION REPORT

Mo.Day Yr.	Division:	Quality Criteria:	Type:
23-SEP-14	Industrial	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
ICP	SW846 3050B/6010C	Solid	WCHN
Batch ID:	**Sample Numbers:**		
1420646	See Below		

Potentially affected work order(s)(SDG): 357115(XP0134)

Application Issues:

Failed Recovery for MS/PS

Failed RPD for DUP

Specification and Requirements Exception Description:	DER Disposition:
1. Failed Recovery for MS/PS: QC 1203171163MS,1203172631PS 2. Failed RPD for DUP: QC 1203171162DUP	1. The matrix spike recovery failed outside of the control limits for silicon. The post spike failed outside the required control limits for silicon but passed for all other analytes. This verifies the presence of a matrix interference for silicon and verifies the absence of a matrix interference for all the other analytes. 2. The sample and sample duplicate % RPD failed outside the control limits for barium, copper and nickel due to possible sample non-homogeneity and/or matrix interference.

Originator's Name:

Helen Camello 23-SEP-14

Data Validator/Group Leader:

Louise Smith 26-SEP-14

Sample Data Summary

GEL LABORATORIES LLC

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Qualifier Definition Report
for

WCHN001 WC-HANFORD, INC.

Client SDG: XP0134 GEL Work Order: 357115 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.

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 10.6.14

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: October 3, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-233 Soil
Client SDG: XP0134

Client Sample ID: J1V0D1
Sample ID: 357115001
Matrix: SOIL
Collect Date: 17-SEP-14 10:35
Receive Date: 19-SEP-14
Collector: Client
Moisture: .93%
Project: WCHN00313
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury		0.0165	0.00399	0.0119	mg/kg	1	MTM1	09/23/14	1101	1420986	1
Metals Analysis-ICP											
ICP METALS 6010TR Client List "Dry Weight Corrected"											
Aluminum		4230	6.77	19.9	mg/kg	1	HSC	09/23/14	0727	1420646	2
Arsenic	U	0.498	0.498	2.99	mg/kg	1					
Barium	*	70.6	0.0995	0.498	mg/kg	1					
Beryllium		1.97	0.0995	0.498	mg/kg	1					
Boron	U	0.995	0.995	4.98	mg/kg	1					
Cadmium		0.690	0.0995	0.498	mg/kg	1					
Chromium		4.68	0.149	0.498	mg/kg	1					
Cobalt		15.0	0.149	0.498	mg/kg	1					
Copper	*	13.5	0.299	0.995	mg/kg	1					
Iron		25600	7.96	24.9	mg/kg	1					
Magnesium		4400	8.46	29.9	mg/kg	1					
Manganese		328	0.199	0.995	mg/kg	1					
Nickel	*	8.93	0.149	0.498	mg/kg	1					
Silicon	N	437	1.49	9.95	mg/kg	1					
Silver	B	0.437	0.0995	0.498	mg/kg	1					
Sodium		143	6.97	24.9	mg/kg	1					
Vanadium		84.9	0.0995	0.498	mg/kg	1					
Calcium		5470	7.96	24.9	mg/kg	1	HSC	09/23/14	0838	1420646	3
Potassium		752	6.37	24.9	mg/kg	1					
Antimony	DU	3.28	3.28	9.95	mg/kg	10	HSC	09/23/14	0759	1420646	4
Lead	DU	3.28	3.28	9.95	mg/kg	10					
Molybdenum	DU	1.99	1.99	9.95	mg/kg	10					
Zinc	D	39.8	3.98	9.95	mg/kg	10					
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.322	0.322	1.00	mg/kg	2	BCD1	09/23/14	1653	1420632	5

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	JXM5	09/22/14	0800	1420631
SW846 3050B	SW846 3050B Prep for 6010C	JXM5	09/22/14	0800	1420645
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	09/22/14	1529	1420983

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: October 3, 2014

Company :	WC-Hanford, Inc.		
Address :	2620 Fermi Avenue MSIN H4-21 Richland, Washington 99354		
Contact:	Joan Kessner	Client SDG:	XP0134
Project:	RC-233 Soil		

Client Sample ID:	J1V0D1	Project:	WCHN00313
Sample ID:	357115001	Client ID:	WCHN001

The following Analytical Methods were performed:

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

Notes:

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Certificate of Analysis

Report Date: October 3, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-233 Soil
Client SDG: XP0134

Client Sample ID: J1V0D1
Sample ID: 357115002
Matrix: OTHERLIQ
Collect Date: 17-SEP-14 10:35
Receive Date: 19-SEP-14
Collector: Client
Project: WCHN00313
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
TCLP Hg in Solid "As Received"											
Mercury	U	0.000067	0.000067	0.0002	mg/L	1	MTM1	09/24/14	1411	1421286	1
Metals Analysis-ICP											
TCLP ICP Metals - 1311/3010A/6010C "As Received"											
Barium		0.519	0.010	0.050	mg/L	1	HSC	09/24/14	0913	1421302	2
Cadmium	U	0.010	0.010	0.050	mg/L	1					
Chromium	B	0.0103	0.010	0.050	mg/L	1					
Lead	U	0.033	0.033	0.100	mg/L	1					
Selenium	U	0.060	0.060	0.300	mg/L	1					
Silver	U	0.010	0.010	0.050	mg/L	1					
Arsenic	U	0.050	0.050	0.300	mg/L	1	HSC	09/24/14	0708	1421302	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 1311	SW846 1311 TCLP Leaching	JXO1	09/22/14	1600	1420671
SW846 3010A	ICP-TRACE TCLP by SW846 3010A	KXP3	09/23/14	1330	1421301
SW846 7470A Prep	EPA 7470A Mercury Prep TCLP Liquid	AXS5	09/23/14	1436	1421285

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 7470A	
2	SW846 3010A/6010C	
3	SW846 3010A/6010C	

Notes:

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: October 3, 2014

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

Client SDG: XP0134

Client Sample ID: J1V0D2
Sample ID: 357115003
Matrix: SOIL
Collect Date: 17-SEP-14 10:25
Receive Date: 19-SEP-14
Collector: Client
Moisture: .625%

Project: WCHN00313
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	B	0.00793	0.00382	0.0114	mg/kg	1	MTM1	09/23/14	1113	1420986	1
Metals Analysis-ICP											
ICP METALS 6010TR Client List "Dry Weight Corrected"											
Aluminum		4180	6.72	19.8	mg/kg	1	HSC	09/23/14	0724	1420646	2
Arsenic	U	0.494	0.494	2.97	mg/kg	1					
Barium	*	68.7	0.0988	0.494	mg/kg	1					
Beryllium		2.06	0.0988	0.494	mg/kg	1					
Boron	U	0.988	0.988	4.94	mg/kg	1					
Cadmium		0.790	0.0988	0.494	mg/kg	1					
Chromium		4.83	0.148	0.494	mg/kg	1					
Cobalt		15.5	0.148	0.494	mg/kg	1					
Copper	*	13.8	0.297	0.988	mg/kg	1					
Iron		26800	7.91	24.7	mg/kg	1					
Magnesium		4370	8.40	29.7	mg/kg	1					
Manganese		334	0.198	0.988	mg/kg	1					
Nickel	*	8.66	0.148	0.494	mg/kg	1					
Silicon	N	350	1.48	9.88	mg/kg	1					
Silver	B	0.382	0.0988	0.494	mg/kg	1					
Sodium		140	6.92	24.7	mg/kg	1					
Vanadium		90.5	0.0988	0.494	mg/kg	1					
Zinc		39.8	0.395	0.988	mg/kg	1					
Calcium		4620	7.91	24.7	mg/kg	1	HSC	09/23/14	0834	1420646	3
Potassium		726	6.33	24.7	mg/kg	1					
Antimony	DU	3.26	3.26	9.88	mg/kg	10	HSC	09/23/14	0757	1420646	4
Lead	DU	3.26	3.26	9.88	mg/kg	10					
Molybdenum	DU	1.98	1.98	9.88	mg/kg	10					
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.324	0.324	1.00	mg/kg	2	BCD1	09/23/14	1714	1420632	5

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	JXM5	09/22/14	0800	1420631
SW846 3050B	SW846 3050B Prep for 6010C	JXM5	09/22/14	0800	1420645
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	09/22/14	1529	1420983

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Certificate of Analysis

Report Date: October 3, 2014

Company :	WC-Hanford, Inc.		
Address :	2620 Fermi Avenue MSIN H4-21 Richland, Washington 99354		
Contact:	Joan Kessner	Client SDG:	XP0134
Project:	RC-233 Soil		

Client Sample ID:	J1V0D2	Project:	WCHN00313
Sample ID:	357115003	Client ID:	WCHN001

The following Analytical Methods were performed:

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

Notes:

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Certificate of Analysis

Report Date: October 3, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-233 Soil
Client SDG: XP0134

Client Sample ID: J1V0D2
Sample ID: 357115004
Matrix: OTHERLIQ
Collect Date: 17-SEP-14 10:25
Receive Date: 19-SEP-14
Collector: Client

Project: WCHN00313
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
TCLP Hg in Solid "As Received"											
Mercury	U	0.000067	0.000067	0.0002	mg/L	1	MTM1	09/24/14	1419	1421286	1
Metals Analysis-ICP											
TCLP ICP Metals - 1311/3010A/6010C "As Received"											
Barium		0.368	0.010	0.050	mg/L	1	HSC	09/24/14	0910	1421302	2
Cadmium	U	0.010	0.010	0.050	mg/L	1					
Chromium	U	0.010	0.010	0.050	mg/L	1					
Lead	U	0.033	0.033	0.100	mg/L	1					
Selenium	U	0.060	0.060	0.300	mg/L	1					
Silver	U	0.010	0.010	0.050	mg/L	1					
Arsenic	U	0.050	0.050	0.300	mg/L	1	HSC	09/24/14	0705	1421302	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 1311	SW846 1311 TCLP Leaching	JXO1	09/22/14	1600	1420671
SW846 3010A	ICP-TRACE TCLP by SW846 3010A	KXP3	09/23/14	1330	1421301
SW846 7470A Prep	EPA 7470A Mercury Prep TCLP Liquid	AXS5	09/23/14	1436	1421285

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 7470A	
2	SW846 3010A/6010C	
3	SW846 3010A/6010C	

Notes:

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: October 3, 2014

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

Contact: **Joan Kessner**

Workorder: **357115** **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS											
Batch 1420632											
QC1203171126 357115001 DUP											
Selenium		DU	0.322	DU	0.326	mg/kg	N/A			BCD1	09/23/14 16:57
QC1203171125 LCS											
Selenium	4.89			D	4.80	mg/kg		98	(80%-120%)		09/23/14 16:49
QC1203171124 MB											
Selenium				DU	0.320	mg/kg					09/23/14 16:45
QC1203171127 357115001 MS											
Selenium	4.93	DU	0.322	D	4.03	mg/kg		81.7	(75%-125%)		09/23/14 17:01
QC1203171128 357115001 SDILT											
Selenium		DU	-0.006	DU	1.61	ug/L	N/A		(0%-10%)		09/23/14 17:10
Metals Analysis-ICP											
Batch 1420646											
QC1203171162 357115001 DUP											
Aluminum			4230		4660	mg/kg	9.53		(0%-20%)	HSC	09/23/14 07:29
Antimony		DU	3.28	DU	3.27	mg/kg	N/A				09/23/14 08:01
Arsenic		U	0.498	U	0.495	mg/kg	N/A				09/23/14 07:29
Barium		*	70.6	*	98.2	mg/kg	32.7*		(0%-20%)		
Beryllium			1.97		2.12	mg/kg	7.80 ^		(+/-0.495)		
Boron		U	0.995	U	0.990	mg/kg	N/A				
Cadmium			0.690		0.737	mg/kg	6.56 ^		(+/-0.495)		
Calcium			5470		5810	mg/kg	6.03		(0%-20%)		09/23/14 08:41
Chromium			4.68		5.65	mg/kg	18.7		(0%-20%)		09/23/14 07:29
Cobalt			15.0		15.7	mg/kg	4.38		(0%-20%)		
Copper		*	13.5	*	16.7	mg/kg	21.0*		(0%-20%)		
Iron			25600		27300	mg/kg	6.44		(0%-20%)		

QC Summary

Workorder: 357115 **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP										
Batch 1420646										
Lead	DU	3.28	DU	3.27	mg/kg	N/A			HSC	09/23/14 08:01
Magnesium		4400		4900	mg/kg	10.8		(0%-20%)		09/23/14 07:29
Manganese		328		341	mg/kg	3.94		(0%-20%)		
Molybdenum	DU	1.99	DU	1.98	mg/kg	N/A				09/23/14 08:01
Nickel	*	8.93	*	12.4	mg/kg	32.5*		(0%-20%)		09/23/14 07:29
Potassium		752		772	mg/kg	2.61		(0%-20%)		09/23/14 08:41
Silicon	N	437		396	mg/kg	9.89		(0%-20%)		09/23/14 07:29
Silver	B	0.437	B	0.327	mg/kg	28.8 ^		(+/-0.495)		
Sodium		143		154	mg/kg	7.47		(0%-20%)		
Vanadium		84.9		91.1	mg/kg	7.08		(0%-20%)		
Zinc	D	39.8	D	42.5	mg/kg	6.55 ^		(+/-9.90)		09/23/14 08:01
QC1203171161 LCS										
Aluminum	492			488	mg/kg		99.2	(80%-120%)		09/23/14 07:22
Antimony	49.2			49.1	mg/kg		99.8	(80%-120%)		
Arsenic	49.2			50.4	mg/kg		102	(80%-120%)		
Barium	49.2			49.2	mg/kg		100	(80%-120%)		
Beryllium	49.2			50.5	mg/kg		103	(80%-120%)		
Boron	49.2			49.6	mg/kg		101	(80%-120%)		
Cadmium	49.2			49.3	mg/kg		100	(80%-120%)		
Calcium	492			508	mg/kg		103	(80%-120%)		09/23/14 08:31
Chromium	49.2			48.5	mg/kg		98.6	(80%-120%)		09/23/14 07:22
Cobalt	49.2			49.2	mg/kg		100	(80%-120%)		

QC Summary

Workorder: 357115 **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP										
Batch 1420646										
Copper	49.2			49.4	mg/kg		100	(80%-120%)	HSC	09/23/14 07:22
Iron	492			487	mg/kg		98.9	(80%-120%)		
Lead	49.2			49.1	mg/kg		99.8	(80%-120%)		
Magnesium	492			499	mg/kg		101	(80%-120%)		
Manganese	49.2			49.2	mg/kg		100	(80%-120%)		
Molybdenum	49.2			47.7	mg/kg		96.9	(80%-120%)		
Nickel	49.2			49.5	mg/kg		101	(80%-120%)		
Potassium	492			514	mg/kg		104	(80%-120%)		09/23/14 08:31
Silicon	492			436	mg/kg		88.7	(80%-120%)		09/23/14 07:22
Silver	49.2			48.3	mg/kg		98.1	(80%-120%)		
Sodium	492			483	mg/kg		98.1	(80%-120%)		
Vanadium	49.2			49.9	mg/kg		101	(80%-120%)		
Zinc	49.2			51.5	mg/kg		105	(80%-120%)		
QC1203171160 MB										
Aluminum			U	6.71	mg/kg					09/23/14 07:20
Antimony			U	0.325	mg/kg					
Arsenic			U	0.493	mg/kg					
Barium			U	0.0986	mg/kg					
Beryllium			U	0.0986	mg/kg					
Boron			U	0.986	mg/kg					
Cadmium			U	0.0986	mg/kg					
Calcium			B	8.30	mg/kg					09/23/14 08:28

QC Summary

Workorder: 357115 **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1420646											
Chromium				U	0.148	mg/kg				HSC	09/23/14 07:20
Cobalt				U	0.148	mg/kg					
Copper				U	0.296	mg/kg					
Iron				U	7.89	mg/kg					
Lead				U	0.325	mg/kg					
Magnesium				U	8.38	mg/kg					
Manganese				U	0.197	mg/kg					
Molybdenum				U	0.197	mg/kg					
Nickel				U	0.148	mg/kg					
Potassium				U	6.31	mg/kg					09/23/14 08:28
Silicon				U	1.48	mg/kg					09/23/14 07:20
Silver				U	0.0986	mg/kg					
Sodium				U	6.90	mg/kg					
Vanadium				U	0.0986	mg/kg					
Zinc				U	0.394	mg/kg					
QC1203171163 357115001 MS											
Aluminum	497		4230		5520	mg/kg		N/A	(75%-125%)		09/23/14 07:31
Antimony	49.7	DU	3.28	D	37.7	mg/kg		75.8	(75%-125%)		09/23/14 08:03
Arsenic	49.7	U	0.498		46.3	mg/kg		93.2	(75%-125%)		09/23/14 07:31
Barium	49.7	*	70.6		117	mg/kg		92.8	(75%-125%)		
Beryllium	49.7		1.97		50.2	mg/kg		97	(75%-125%)		
Boron	49.7	U	0.995		47.6	mg/kg		95.8	(75%-125%)		

QC Summary

Workorder: 357115 **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1420646											
Cadmium	49.7		0.690		47.0	mg/kg		93.2	(75%-125%)	HSC	09/23/14 07:31
Calcium	497		5470		6160	mg/kg		N/A	(75%-125%)		09/23/14 08:44
Chromium	49.7		4.68		52.3	mg/kg		95.8	(75%-125%)		09/23/14 07:31
Cobalt	49.7		15.0		61.7	mg/kg		94	(75%-125%)		
Copper	49.7	*	13.5		63.6	mg/kg		101	(75%-125%)		
Iron	497		25600		27700	mg/kg		N/A	(75%-125%)		
Lead	49.7	DU	3.28	D	38.4	mg/kg		77.4	(75%-125%)		09/23/14 08:03
Magnesium	497		4400		4980	mg/kg		N/A	(75%-125%)		09/23/14 07:31
Manganese	49.7		328		386	mg/kg		N/A	(75%-125%)		
Molybdenum	49.7	DU	1.99	D	44.1	mg/kg		88.8	(75%-125%)		09/23/14 08:03
Nickel	49.7	*	8.93		56.9	mg/kg		96.6	(75%-125%)		09/23/14 07:31
Potassium	497		752		1250	mg/kg		101	(75%-125%)		09/23/14 08:44
Silicon	497	N	437	N	623	mg/kg		37.6*	(75%-125%)		09/23/14 07:31
Silver	49.7	B	0.437		47.9	mg/kg		95.5	(75%-125%)		
Sodium	497		143		686	mg/kg		109	(75%-125%)		
Vanadium	49.7		84.9		141	mg/kg		113	(75%-125%)		
Zinc	49.7	D	39.8	D	90.9	mg/kg		103	(75%-125%)		09/23/14 08:03
QC1203172631 357115001 PS											
Silicon	5000	N	4390		7300	ug/L		58.2*	(80%-120%)		09/23/14 07:54
QC1203171164 357115001 SDILT											
Aluminum			42500	D	8820	ug/L	3.68		(0%-10%)		09/23/14 07:33
Antimony		DU	-5.27	DU	16.4	ug/L	N/A		(0%-10%)		09/23/14 08:07
Arsenic		U	-18.6	DU	2.49	ug/L	N/A		(0%-10%)		09/23/14 07:33

QC Summary

Workorder: 357115 **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP										
Batch 1420646										
Barium	*	709	D	144	ug/L	1.21		(0%-10%)	HSC	09/23/14 07:33
Beryllium		19.7	D	4.22	ug/L	7		(0%-10%)		
Boron	U	-0.815	DU	4.98	ug/L	N/A		(0%-10%)		
Cadmium		6.93	D	1.57	ug/L	12.9		(0%-10%)		
Calcium		54900	D	11000	ug/L	.0309		(0%-10%)		09/23/14 08:46
Chromium		47.1	D	9.48	ug/L	.75		(0%-10%)		09/23/14 07:33
Cobalt		151	D	31.5	ug/L	4.5		(0%-10%)		
Copper	*	136	D	26.6	ug/L	2.27		(0%-10%)		
Iron		257000	D	53300	ug/L	3.44		(0%-10%)		
Lead	DU	-8.06	DU	16.4	ug/L	N/A		(0%-10%)		09/23/14 08:07
Magnesium		44200	D	9190	ug/L	3.97		(0%-10%)		09/23/14 07:33
Manganese		3290	D	687	ug/L	4.29		(0%-10%)		
Molybdenum	DU	-1.54	DU	9.95	ug/L	N/A		(0%-10%)		09/23/14 08:07
Nickel	*	89.7	D	19.3	ug/L	7.42		(0%-10%)		09/23/14 07:33
Potassium		7550	D	1540	ug/L	2.11		(0%-10%)		09/23/14 08:46
Silicon	N	4390	D	915	ug/L	4.22		(0%-10%)		09/23/14 07:33
Silver	B	4.39	D	1.31	ug/L	48.9		(0%-10%)		
Sodium		1430	D	280	ug/L	2.17		(0%-10%)		
Vanadium		852	D	170	ug/L	.0551		(0%-10%)		
Zinc	D	40.0	D	9.07	ug/L	13.4		(0%-10%)		09/23/14 08:07
Batch 1421302										
QC1203172867 357115002 DUP										

QC Summary

Workorder: 357115 **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP										
Batch 1421302										
Arsenic	U	0.050	U	0.050	mg/L	N/A			HSC	09/24/14 07:10
Barium		0.519		0.525	mg/L	1.19		(0%-20%)		09/24/14 09:15
Cadmium	U	0.010	U	0.010	mg/L	N/A				
Chromium	B	0.0103	B	0.0141	mg/L	31.5 ^		(+/-0.050)		
Lead	U	0.033	U	0.033	mg/L	N/A				
Selenium	U	0.060	U	0.060	mg/L	N/A				
Silver	U	0.010	U	0.010	mg/L	N/A				
QC1203172866 LCS										
Arsenic	5.00			4.87	mg/L		97.4	(80%-120%)		09/24/14 07:03
Barium	5.00			5.13	mg/L		103	(80%-120%)		09/24/14 09:08
Cadmium	5.00			5.08	mg/L		102	(80%-120%)		
Chromium	5.00			5.04	mg/L		101	(80%-120%)		
Lead	5.00			5.22	mg/L		104	(80%-120%)		
Selenium	5.00			4.90	mg/L		98	(80%-120%)		
Silver	5.00			4.85	mg/L		97	(80%-120%)		
QC1203172865 MB										
Arsenic			U	0.050	mg/L					09/24/14 06:57
Barium			U	0.010	mg/L					09/24/14 09:02
Cadmium			U	0.010	mg/L					
Chromium			B	0.0109	mg/L					
Lead			U	0.033	mg/L					
Selenium			U	0.060	mg/L					
Silver			U	0.010	mg/L					
QC1203171197 357115002 MS										

QC Summary

Workorder: **357115** **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1421302											
Arsenic	5.00	U	0.050		5.99	mg/L		120	(75%-125%)		09/24/14 07:12
Barium	10.0		0.519		10.5	mg/L		100	(75%-125%)	HSC	09/24/14 09:17
Cadmium	1.00	U	0.010		1.02	mg/L		101	(75%-125%)		
Chromium	5.00	B	0.0103		5.02	mg/L		100	(75%-125%)		
Lead	5.00	U	0.033		5.04	mg/L		101	(75%-125%)		
Selenium	1.00	U	0.060		1.00	mg/L		100	(75%-125%)		
Silver	0.503	U	0.010		0.489	mg/L		97.2	(75%-125%)		
QC1203172869 357115002 SDILT											
Arsenic		U	-2.34	DU	0.250	ug/L	N/A		(0%-10%)		09/24/14 07:14
Barium			51.9	D	10.4	ug/L	.316		(0%-10%)		09/24/14 09:19
Cadmium		U	0.777	DU	0.050	ug/L	N/A		(0%-10%)		
Chromium		B	1.03	DU	0.050	ug/L	N/A		(0%-10%)		
Lead		U	0.249	DU	0.165	ug/L	N/A		(0%-10%)		
Selenium		U	-2.77	DU	0.300	ug/L	N/A		(0%-10%)		
Silver		U	-0.689	DU	0.050	ug/L	N/A		(0%-10%)		
QC1203171198 TB											
Arsenic				U	0.050	mg/L					09/24/14 07:00
Barium				U	0.010	mg/L					09/24/14 09:05
Cadmium				U	0.010	mg/L					
Chromium				U	0.010	mg/L					
Lead				U	0.033	mg/L					
Selenium				U	0.060	mg/L					
Silver				U	0.010	mg/L					
Metals Analysis-Mercury											

QC Summary

Workorder: 357115 **Client SDG:** XP0134 **Project Description:** RC-233 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-Mercury											
Batch 1420986											
QC1203171937 357115001 DUP											
Mercury		0.0165	B	0.0108	mg/kg	41.8 ^		(+/-0.0118)	MTM1	09/23/14	11:03
QC1203171936 LCS											
Mercury	0.118			0.102	mg/kg		86.7	(80%-120%)		09/23/14	10:50
QC1203171935 MB											
Mercury			U	0.00394	mg/kg					09/23/14	10:48
QC1203171938 357115001 MS											
Mercury	0.120	0.0165		0.143	mg/kg		105	(80%-120%)		09/23/14	11:08
QC1203171939 357115001 SDILT											
Mercury		0.276	DU	0.020	ug/L	N/A		(0%-10%)		09/23/14	11:10
Batch 1421286											
QC1203172823 357115002 DUP											
Mercury	U	0.000067	U	0.000067	mg/L	N/A			MTM1	09/24/14	14:14
QC1203172822 LCS											
Mercury	0.002			0.00213	mg/L		107	(80%-120%)		09/24/14	14:06
QC1203172821 MB											
Mercury			U	0.000067	mg/L					09/24/14	14:02
QC1203171197 357115002 MS											
Mercury	0.002 U	0.000067		0.00192	mg/L		96.2	(75%-125%)		09/24/14	14:13
QC1203172825 357115002 SDILT											
Mercury	U	-0.071	DU	0.000335	ug/L	N/A		(0%-10%)		09/24/14	14:16
QC1203171198 TB											
Mercury			U	0.000067	mg/L					09/24/14	14:04

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. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples.
- 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.

QC Summary

Workorder: **357115** **Client SDG:** XP0134 **Project Description:** RC-233 Soil

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

N	Spike Sample recovery is outside control limits.
S	Reported value determined by the Method of Standard Additions (MSA)
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
W	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more 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: **1420645**
Analyst: Jack Mabry
Method: SW846 3050B
Lab SOP: GL-MA-E-009 REV# 24
Instrument: BAL-893

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1203171161	Metals Spike Mix I	UI140806-01	.25	mL
LCS	1203171161	Metals Spike Mix II	UI2140648-06	.25	mL
MS	1203171163	Metals Spike Mix I	UI140806-01	.25	mL
MS	1203171163	Metals Spike Mix II	UI2140648-06	.25	mL

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)
1203171160 MB	22-SEP-2014 08:00:46	Soil	0.507	50	98.61933
1203171161 LCS	22-SEP-2014 08:00:46	Soil	0.508	50	98.4252
357115001	22-SEP-2014 08:00:46	Soil	0.507	50	98.61933
1203171162 DUP (357115001)	22-SEP-2014 08:00:46	Soil	0.51	50	98.03922
1203171163 MS (357115001)	22-SEP-2014 08:00:46	Soil	0.508	50	98.4252
1203171164 SDILT (357115001)	22-SEP-2014 08:00:46	Soil	0.507	50	98.61933
357115003	22-SEP-2014 08:00:46	Soil	0.509	50	98.23183

Reagent/Solvent Lot ID	Description	Amount
140731	Concentrated Nitric Acid	1.25 mL
140818	HYDROCHLORIC ACID	10 mL

Comments:

Block Temperature: 90 C

Thermometer ID: 61066-a1

Hot Block ID: 8

Prep Logbook

Acid Digestion of Total Metals in Aqueous Samples and Extracts for Analysis by ICP and ICP-MS

Batch ID: **1421301**
Analyst: Karen Paolucci
Method: SW846 3010A
Lab SOP: GL-MA-E-008 REV# 16
Instrument: Metals Manual Instrument

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1203172866	Metals Spike Mix I	UI140806-01	.25	mL
LCS	1203172866	Metals Spike Mix II	UI2140648-06	.25	mL

Sample ID	Run Date	Matrix	Initial Volume (mL)	Final Volume (mL)	Prep Factor (mL/mL)	pH Check
1203172865 MB	23-SEP-2014 13:30:37	Soil	5	50	10	<2
1203171198 TB	23-SEP-2014 13:30:37	Soil	5	50	10	<2
1203172866 LCS	23-SEP-2014 13:30:37	Soil	5	50	10	<2
357115002	23-SEP-2014 13:30:37	Soil	5	50	10	<2
1203171197 MS (357115002)	23-SEP-2014 13:30:37	Soil	5	50	10	<2
1203172867 DUP (357115002)	23-SEP-2014 13:30:37	Soil	5	50	10	<2
1203172869 SDILT (357115002)	23-SEP-2014 13:30:37	Soil	5	50	10	<2
357115004	23-SEP-2014 13:30:37	Soil	5	50	10	<2

Reagent/Solvent Lot ID	Description	Amount
140731	Concentrated Nitric Acid	3 mL
140818	HYDROCHLORIC ACID	2.5 mL

Comments:

Block Temperature: 90 C

Thermometer ID: 118840

Hot Block ID: 09

Prep Logbook

Acid Digestion of Sediments, Sludges, and Soils

Batch ID: **1420631**
Analyst: Jack Mabry
Method: SW846 3050B
Lab SOP: GL-MA-E-009 REV# 24
Instrument: BAL-893

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1203171125	ICP-MS spiking solution B	UI2145879-B	.25	mL
LCS	1203171125	ICP-MS spiking soluiton A	UI2145882-A	.25	mL
MS	1203171127	ICP-MS spiking solution B	UI2145879-B	.25	mL
MS	1203171127	ICP-MS spiking soluiton A	UI2145882-A	.25	mL

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)
1203171124 MB	22-SEP-2014 08:00:44	Soil	0.515	50	97.08738
1203171125 LCS	22-SEP-2014 08:00:44	Soil	0.511	50	97.84736
357115001	22-SEP-2014 08:00:44	Soil	0.518	50	96.5251
1203171126 DUP (357115001)	22-SEP-2014 08:00:44	Soil	0.511	50	97.84736
1203171127 MS (357115001)	22-SEP-2014 08:00:44	Soil	0.512	50	97.65625
1203171128 SDILT (357115001)	22-SEP-2014 08:00:44	Soil	0.518	50	96.5251
357115003	22-SEP-2014 08:00:44	Soil	0.512	50	97.65625

Reagent/Solvent Lot ID	Description	Amount
140731	Concentrated Nitric Acid	5 mL
2115989-02	Hydrogen Peroxide 30%	1.5 mL

Comments:

Block Temperature: 95 C

Thermometer ID: 89095-622

Hot Block ID: 11

Prep Logbook

Mercury Analysis Using the Perkin Elmer Automated Mercury Analyzer

Batch ID: **1420983**
Analyst: Alan Stanley
Method: SW846 7471B Prep
Lab SOP: GL-MA-E-010 REV# 28
Instrument: Metals Manual Instrument

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1203171936	MHGSOILMSSPIKE	WHG140922-14	.3	mL
MS	1203171938	MHGSOILMSSPIKE	WHG140922-14	.3	mL
MS	1203172003	MHGSOILMSSPIKE	WHG140922-14	.3	mL
MSD	1203172004	MHGSOILMSSPIKE	WHG140922-14	.3	mL

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)
1203171935 MB	22-SEP-2014 15:29:36	Soil	0.51	30	58.82353
1203171936 LCS	22-SEP-2014 15:29:36	Soil	0.509	30	58.9391
356023001	22-SEP-2014 15:29:36	Oil	0.501	30	59.88024
1203172003 MS (356023001)	22-SEP-2014 15:29:36	Oil	0.505	30	59.40594
1203172004 MSD (356023001)	22-SEP-2014 15:29:36	Oil	0.5	30	60
1203172005 SDILT (356023001)	22-SEP-2014 15:29:36	Oil	0.501	30	59.88024
356023003	22-SEP-2014 15:29:36	Oil	0.506	30	59.28854
357115001	22-SEP-2014 15:29:36	Soil	0.508	30	59.05512
1203171937 DUP (357115001)	22-SEP-2014 15:29:36	Soil	0.512	30	58.59375
1203171938 MS (357115001)	22-SEP-2014 15:29:36	Soil	0.506	30	59.28854
1203171939 SDILT (357115001)	22-SEP-2014 15:29:36	Soil	0.508	30	59.05512
357115003	22-SEP-2014 15:29:36	Soil	0.529	30	56.71078

Reagent/Solvent Lot ID	Description	Amount
2108387-A	Hydrochloric Acid Conc.	1.125 mL
2145891-C	Hg reducing agent	3 mL
2146339-1	NITRIC ACID	.375 mL
2157475-C	5% KMnO4 solution	7.5 mL
WHG140922-07	Mercury Working Standard 1st Source CAL S 0.2/CRA	30 uL
WHG140922-08	Mercury Working Standard 1st Source CAL S 0.5	75 uL
WHG140922-09	Mercury Working 1st Source CAL S 2.0	300 uL
WHG140922-10	Mercury Working 1st Source CAL S 5.0/CCV	750 uL
WHG140922-11	Mercury Working 1st Source CAL S 10.0	1500 uL
WHG140922-12	Mercury Working 2nd Source S 5.0/ICV	750 uL

Comments:

Digestion Start Date: 22-SEP-2014 15:30
Digestion End Date: 22-SEP-2014 16:00
Block Temperature: 95 C
Thermometer ID: 119131
Hot Block ID: 6

Prep Logbook

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)

Reagent/Solvent Lot ID	Description	Amount

Comments:

Prep Logbook

Mercury Analysis Using the Perkin Elmer Automated Mercury Analyzer

Batch ID: **1421285**
Analyst: Alan Stanley
Method: SW846 7470A Prep
Lab SOP: GL-MA-E-010 REV# 28
Instrument: Metals Manual Instrument

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1203172822	MHGLIQLCSMSSPIKE	WHG140923-13	.2	mL

Sample ID	Run Date	Matrix	Initial Volume (mL)	Final Volume (mL)	Prep Factor (mL/mL)	pH Check
1203172821 MB	23-SEP-2014 14:36:29	Soil	2	20	10	<2
1203171198 TB	23-SEP-2014 14:36:29	Soil	2	20	10	<2
1203172822 LCS	23-SEP-2014 14:36:29	Soil	2	20	10	<2
357115002	23-SEP-2014 14:36:29	Soil	2	20	10	<2
1203171197 MS (357115002)	23-SEP-2014 14:36:29	Soil	2	20	10	<2
1203172823 DUP (357115002)	23-SEP-2014 14:36:29	Soil	2	20	10	<2
1203172825 SDILT (357115002)	23-SEP-2014 14:36:29	Soil	2	20	10	<2
357115004	23-SEP-2014 14:36:29	Soil	2	20	10	<2

Reagent/Solvent Lot ID	Description	Amount
2092609	Sulfuric Acid, Concentrated	1 mL
2145891-C	Hg reducing agent	1 mL
2146339-1	NITRIC ACID	.5 mL
2157473-C	5% Potassium Persulfate	1.5 mL
2157475-C	5% KMnO4 solution	3 mL
WHG140923-01A	Mercury Working 1st Source CAL 0.2/CRA	20 uL
WHG140923-02	Mercury Working 1st Source CAL 0.5	50 uL
WHG140923-03	Mercury Working 1st Source CAL 2.0	200 uL
WHG140923-04	Mercury Working 1st Source CAL 5.0/CCV	500 uL
WHG140923-05	Mercury Working 1st Source CAL 10.0	1 mL
WHG140923-06	Mercury Working 2nd Source 5.0/ICV	500 uL

Comments:

Digestion Start Date: 23-SEP-2014 14:36
Digestion End Date: 23-SEP-2014 16:36
Block Temperature: 95 C
Thermometer ID: 118629
Hot Block ID: 7

Prep Logbook

Toxicity Characteristic Leaching Procedure Preparation

Batch ID: 1420671 **Verified by:** _____
Analyst: John Orgel
Method: SW846 1311

Lab SOP: GL-LB-E-006 REV# 19
Instrument: TCLP Tumbler #104

Sample ID Analysis Start Date	1203171198 TB 22-SEP-2014 16:00:00	357115002 22-SEP-2014 16:00:00	1203171197 MS (357115002) 22-SEP-2014 16:00:00	357115004 22-SEP-2014 16:00:00
100% Solid Y/N		Y	Y	Y
(I) Sub Sample Aliquot I=G-H (g)		100	100	100
Initial pH (su)	4.88	9.28	9.28	9.21
pH Temperature (celsius)	50	50	50	50
Final pH (su)		1.64	1.64	1.55
Filtrate pH (su)		5	5	5
Tumbler Speed	28	28	28	28
Sample Properties <>/= Water	TCLP 1	Solid	Solid	Solid
(J) 10X Wet Solid Weight 20XI (g)	2000	2000	2000	2000
Filtrate Volume (mL)	500	100	100	100

Type	Sample Id	Description	Serial Number	Spike Amt	Units
MS	1203171197	TCLP Spiking Solution Hg	UI2114528	.25	mL
MS	1203171197	TCLP Spiking Solution A/B	UI2126876	.25	mL
RGNT	All	1N HCl for pH testing	2146887	3.5	mL
RGNT	All	TCLP EXTRACTION FLUID 1	T140917-1-2	2000	mL
REGNT	All	Concentrated Nitric Acid	140912-tclp	2	mL

Comments:

Extration End Date: 23-SEP-2014 08:00:00
Filtration End Date: 23-SEP-2014 10:00:00
Bottle Lot Number: 41051400
Filter Lot Number: 409441914193-4204
Extration Start Temperature: 23 C
Extration End Temperature: 23 C
Filtration End Temperature: 23 C