

SAF-RC-232
100-IU-2 & 100-IU-6 Remaining
Waste Sites – Soil Full Protocol
FINAL DATA PACKAGE

COMPLETE COPY OF DATA PACKAGE TO:

Kathy Wendt

H4-21

KW 2/21/14
INITIAL/DATE

COMMENTS:

SDG XP0044

SAF-RC-232

Rad only

Chem only

Rad & Chem

Complete

Partial

Sample Location: 600-384



February 12, 2014

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

Re: RC-232 Soil
Work Order: 342221
SDG: XP0044

Dear Joan Kessner:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on January 31, 2014. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,

Orlette Johnson
Project Manager

Purchase Order: 1510
Chain of Custody: RC-232-070
Enclosures

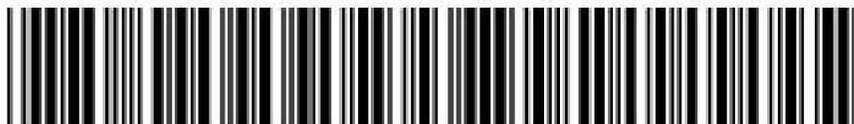


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Case Narrative

**Receipt Narrative
for
WC-HANFORD, INC.
SDG: XP0044
Work Order: 342221**

February 12, 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 January 31, 2014 for analysis.

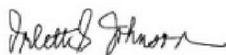
Sample Identification: The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
342221001	J1T5P8
342221002	J1T5P9
342221003	J1T5R0
342221004	J1T5R1
342221005	J1T5R2
342221006	J1T5R3
342221007	J1T5R4
342221008	J1T5R5
342221009	J1T5R6

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, General Chemistry, 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-232-070

Page 1 of 2

Collector <i>DWShea 1/29/14</i> <i>BUNNUM, AJ B. Johnson</i>	Company Contact Joan Kessner	Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code <i>7 days 8B</i>	Data Turnaround
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites	Sampling Location 600-384	SAF No. RC-232	Method of Shipment Commerical Carrier <i>fed ex</i>		
Case Chest No. <i>RCC-08-027</i>	Field Logbook No. EL-1662-01	COA 0603842000	Bill of Lading/Air Bill No. <i>see OSPC</i>		
Shipped To GEL Laboratories Charlston	Offsite Property No. <i>A131046</i>				
Other Labs Shipped To					

PRESERVATION	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	
	Type of Container	G/P	aG	aG	aG	aG	aG
POSSIBLE SAMPLE HAZARDS/REMARKS <i>None</i>	No. of Container(s)	1	1	1	1	1	1
	Volume	250mL	125mL	125mL	125mL	250mL	250mL
SPECIAL HANDLING and/or STORAGE <i>Cool 4C</i>	Sample Analysis	See item (1) in Special Instructions	TPH-Diesel Range - WTPH-D +	PAHs - 8310	PCBs - 8082	Pesticides - 8081; Chloro-Herbicides - EPA8151	See item (2) in Special Instructions

342221

Sample No.	Matrix	Sample Date	Sample Time									
J1T5P8	SOIL	<i>1/29/14</i>	<i>1509</i>	<i>✓</i>	<i>✓</i>	<i>✓</i>	<i>✓</i>	<i>✓</i>	<i>✓</i>			
J1T5P9	SOIL	<i>1/29/14</i>	<i>1448</i>	<i>✓</i>	<i>✓</i>	<i>✓</i>	<i>✓</i>	<i>✓</i>	<i>✓</i>			
J1T5R0	SOIL	<i>1/29/14</i>	<i>1436</i>	<i>✓</i>	<i>✓</i>	<i>✓</i>	<i>✓</i>	<i>✓</i>	<i>✓</i>			
J1T5R1	SOIL	<i>1/29/14</i>	<i>1351</i>	<i>✓</i>	<i>✓</i>	<i>✓</i>	<i>✓</i>	<i>✓</i>	<i>✓</i>			
J1T5R2	SOIL	<i>1/29/14</i>	<i>1403</i>	<i>✓</i>	<i>✓</i>	<i>✓</i>	<i>✓</i>	<i>✓</i>	<i>✓</i>			

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From <i>ANR</i>	Date/Time <i>1-29-14 1549</i>	Received By/Stored In <i>wc4</i>	Date/Time <i>1/29/14 1549</i>
Relinquished By/Removed From <i>Brandon Johnson</i>	Date/Time <i>1-29-14 1746</i>	Received By/Stored In <i>wc4</i>	Date/Time <i>1/29/14 1746</i>
Relinquished By/Removed From <i>DWShea</i>	Date/Time <i>1/30/14 0920</i>	Received By/Stored In <i>DWShea</i>	Date/Time <i>1/30/14 0920</i>
Relinquished By/Removed From <i>Fridge 3B</i>	Date/Time <i>1/30/14 1004</i>	Received By/Stored In <i>Fed Ex</i>	Date/Time <i>1-31-14 09:10</i>
Relinquished By/Removed From <i>DWShea</i>	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

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

(2) IC Anions - 9056 {Bromide, Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphorus in Phosphate, Sulfate}; NO2/NO3 - 353.1 {Nitrogen in Nitrite and Nitrate}; Total Cyanide - 9010



XP0044

Washington Closure Hanford

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-232-070

Page 2 of 2

Collector DUNNUM, AJ DWS loca 1/29/14 B. Johnson	Company Contact Joan Kessner	Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 7 days 8B	Data Turnaround
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites	Sampling Location 600-384	SAF No. RC-232	Method of Shipment Commerical Carrier - Fed Ex		
Ice Chest No. PCC-08-027	Field Logbook No. EL-1662-01	COA 0603842000	Bill of Lading/Air Bill No. See OSPC		
Shipped To GEL Laboratories Charlston	Offsite Property No. A131046				

Other Labs Shipped To	Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C				
	Type of Container	G/P	aG	aG	aG	aG	aG				
POSSIBLE SAMPLE HAZARDS/REMARKS None	No. of Container(s)	1	1	1	1	1	1				
	Volume	250mL	125mL	125mL	125mL	250mL	250mL				
	Sample Analysis	See item (1) in Special Instructions	TPH-Diesel Range - WTPH-D +	PAHs - 8310	PCBs - 8082	Pesticides - 8081; Chloro-Herbicides - EPA8151	See item (2) in Special Instructions				

Sample No.	Matrix	Sample Date	Sample Time								
J1T5R3	SOIL	1/29/14	1326	✓	✓	✓	✓	✓	✓		
J1T5R4	SOIL	1/29/14	1136	✓	✓	✓	✓	✓	✓		
J1T5R5	SOIL	1/29/14	1136	✓	✓	✓	✓	✓	✓		
J1T5R6	SOIL	1/29/14	1035	✓						DWS 1/30/14	

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Brendy Johnson	1-27-14/154	DWSHEA	1/29/14 1549
DWSHEA	1/29/14 1746	Fridse	1/29/14 1746
Fridse	1/30/14 0920	DWSHEA	1/30/14 0920
DWSHEA	1/30/14 1004	Fed Ex	
		P. Dent	1-31-14 09:10

SPECIAL INSTRUCTIONS

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

(2) IC Anions - 9056 {Bromide, Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphorus in Phosphate, Sulfate}; NO2/NO3 - 353.1 {Nitrogen in Nitrite and Nitrate}; Total Cyanide - 9010



XP0044

SAMPLE RECEIPT & REVIEW FORM

Client: <u>WCHN</u>		SDG/AR/COC/Work Order: <u>34222</u>	
Received By: <u>P. R. Dent</u>		Date Received: <u>1-31-14</u>	
Suspected Hazard Information		Yes	No
COC/Samples marked as radioactive?			<input checked="" type="checkbox"/>
Classified Radioactive II or III by RSO?			<input checked="" type="checkbox"/>
COC/Samples marked containing PCBs?			<input checked="" type="checkbox"/>
Package, COC, and/or Samples marked as beryllium or asbestos containing?			<input checked="" type="checkbox"/>
Shipped as a DOT Hazardous?			<input checked="" type="checkbox"/>
Samples identified as Foreign Soil?			<input checked="" type="checkbox"/>

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: <u>Ice bags</u> <u>Blue ice</u> Dry ice None Other (describe) *all temperatures are recorded in Celsius
2a	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: Secondary Temperature Device Serial # (If Applicable): <u>130462966</u>
3	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4	Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?		<input checked="" type="checkbox"/>		Sample ID's, containers affected and observed pH: If Preservation added Lot#:
6	VOA vials free of headspace (defined as < 6mm bubble)?		<input checked="" type="checkbox"/>		Sample ID's and containers affected:
7	Are Encore containers present?			<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
11	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
12	Are sample containers identifiable as GEL provided?		<input checked="" type="checkbox"/>		<u>CLIENTS</u>
13	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
14	Carrier and tracking number.	<input checked="" type="checkbox"/>			Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other <u>7977 7072 1656</u> <u>7977 7072 1406</u> <u>7977 7643 8261</u> } <u>ZC</u>

Comments (Use Continuation Form if needed):

Laboratory Certifications

List of current GEL Certifications as of 12 February 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	T104704235-13-8
Utah NELAP	SC000122013-11
Vermont	VT87156
Virginia NELAP	460202
Washington	C780-12
Wisconsin	999887790

HPLC Polynuclear Aromatic Hydrocarbon Analysis

**HPLC-PAH
WC-HANFORD, INC. (WCHN)
SDG XP0044**

Method/Analysis Information

Procedure: Polynuclear Aromatic Hydrocarbons
Analytical Method: SW846 8310
Prep Method: SW846 3550B
Analytical Batch Number: 1364016
Prep Batch Number: 1364015

Sample Analysis

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

Sample ID	Client ID
342221001	J1T5P8
342221002	J1T5P9
342221003	J1T5R0
342221004	J1T5R1
342221005	J1T5R2
342221006	J1T5R3
342221007	J1T5R4
342221008	J1T5R5
1203029272	Method Blank (MB)
1203029273	Laboratory Control Sample (LCS)
1203029276	342221001(J1T5P8) Matrix Spike (MS)
1203029277	342221001(J1T5P8) 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

A low level detection of Pyrene (@ 0.99 ug/Kg) was observed in MB (1203029272). This affected the reporting of several samples in this batch. Sample 342221003 (J1TR0) was sent back for re-extraction since a similar detection was observed in the sample. Samples 342221005 (J1T5R2) and 342221006 (J1T5R3) also had detections for Pyrene, however each concentration was greater than 10x of that observed in the MB. These detections were B qualified, along with the MS (1203029276) and MSD (1203029277).

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 342221001 (J1T5P8) 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

Sample 342221005 (J1T5R2) was initially analyzed at a 1:10 dilution due to the nature of the sample extract. After reviewing the data, it was determined the sample could be re-analyzed at a 1:2 dilution without causing significant contamination of the instrument.

Parmname **342221**
005
All **2X**

Sample Re-extraction/Re-analysis

Samples 342221006 (J1T5R3), 342221007 (J1T5R4), and 342221008 (J1T5R5) were initially analyzed at a 1:2 dilution based on the nature of the sample matrix. After reviewing the data, each were reanalyzed neat.

Miscellaneous Information:

Data Exception (DER) Documentation

Data Exception Report 1266821 was generated for this SDG.

A low level detection of Pyrene (@ 0.99 ug/Kg) was observed in MB (1203029272). This affected the reporting of several samples in this batch. Sample 342221003 (J1TR0) was sent back for re-extraction since a similar detection was observed in the sample. Samples 342221005 (J1T5R2) and 342221006 (J1T5R3) also had detections for Pyrene, however each concentration was greater than 10x of that observed in the MB. These detections were B qualified, along with the MS (1203029276) and MSD (1203029277).

Manual Integrations

Files for samples 342221001 (J1T5P8), 342221005 (J1T5R2), 342221006 (J1T5R3), 342221007 (J1T5R4) and 342221008 (J1T5R5) required manual integrations. The software could not correctly integrate all of the chromatographic and/or signal peaks on the primary analysis. Please see the raw data in the Miscellaneous Section.

Additional Comments

One or more analytes were detected on both columns or detectors that indicated an acceptable peak within the retention time window and acceptable concentration match in samples 342221007 (J1T5R4) and 342221008 (J1T5R5). Although method criteria have been satisfied for reporting a positive result for these analytes, the result is considered a false positive due to matrix interference and/or comparison to the DAD generated spectrum and is indicated as such on the appropriate Form I/Certificate of Analysis (C of A) with an 'X' qualifier.

One or more analytes were detected whose concentration greatly differed between the primary and confirmation analysis (greater than 40% difference or RPD) in samples 342221007 (J1T5R4) and 342221008 (J1T5R5). Because both columns or detectors indicated an acceptable peak in the appropriate retention time window for these analytes, the analytes are reported as positive results. Due to the high percent difference or RPD between the two columns, it is indicated as such on the appropriate Form I/Certificate of Analysis (C of A) with a 'P' qualifier. Those analytes reported with a percent difference or RPD greater than 40% but less than 70% are qualified as presumptive evidence of the presence of the material.

Sample 342221003 (J1T5R0) was sent back for re-extraction due to a low level detection of Pyrene, similar to that observed in the MB (1203029272). Since the re-extraction was completed in hold, data will be reported from batch# 1365317.

Electronic Package Comment

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

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative of each electronic package will indicate the analyst, reviewer, and report specialist names associated with the generation of the data and package. The data validator will always sign and date the case narrative.

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

System Configuration

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

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

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

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

The Diode Array UV detector is used as the primary detector and the Fluorescence Detector is used as the confirmation detector. All results are reported from the primary Diode Array UV detector.

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

Chromatographic Columns

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

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

Certification Statement

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

Method/Analysis Information

Procedure: Polynuclear Aromatic Hydrocarbons

Analytical Method: SW846 8310

Prep Method: SW846 3550B

Analytical Batch Number: 1365317

Prep Batch Number: 1365316

Sample Analysis

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

Sample ID	Client ID
342221003	J1T5R0
1203032443	Method Blank (MB)
1203032444	Laboratory Control Sample (LCS)
1203032445	342221003(J1T5R0) Matrix Spike (MS)
1203032446	342221003(J1T5R0) 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 inverted 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 342221003 (J1T5R0) 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 except for dilutions.

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

Additional Comments

Sample 342221003 (J1T5R0) was initially extracted and analyzed in batch# 1364016, however due to method blank contamination it was sent back for re-extraction. Since the second extraction was completed in hold and all QC criteria were met, data are reported from batch# 1365317.

Electronic Package Comment

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

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative of each electronic package will indicate the analyst, reviewer, and report specialist names associated with the generation of the data and package. The data validator will always sign and date the case narrative.

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

System Configuration

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

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

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

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

The Diode Array UV detector is used as the primary detector and the Fluorescence Detector is used as the confirmation detector. All results are reported from the primary Diode Array UV detector.

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

Chromatographic Columns

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

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

Certification Statement

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

DATA EXCEPTION REPORT

Mo.Day Yr. 12-FEB-14	Division: Federal	Quality Criteria: Others	Type: Process
Instrument Type: HPLC	Test / Method: SW846 8310	Matrix Type: Solid	Client Code: WCHN001
Batch ID: 1364016	Sample Numbers: See below		
Potentially affected work order(s)(SDG): 342221(XP0044)			
Application Issues: Method Blank contamination			
Specification and Requirements		DER Disposition:	
Exception Description:			
<p>1. A low level detection of Pyrene was observed in MB (1203029272).</p>		<p>1. The detection of Pyrene in the MB affected the reporting of several samples in this batch. Sample 342221003 (J1TR0) was sent back for re-extraction since a similar detection was observed in the sample. Since the re-extraction was done in hold, data will be reported from batch# 1365317. Samples 342221005 (J1T5R2) and 342221006 (J1T5R3) also had detections for Pyrene, however each concentration was greater than 10x of that observed in the MB. These detections will be B qualified, along with the MS (1203029276) and MSD (1203029277).</p>	

Originator's Name:

Charles Wilson 12-FEB-14

Data Validator/Group Leader:

Patricia Steele 12-FEB-14

GEL LABORATORIES LLC

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Qualifier Definition Report for

WCHN001 WC-HANFORD, INC.

Client SDG: XP0044 GEL Work Order: 342221 Project: RC-232 Soil

The Qualifiers in this report are defined as follows:

- B The analyte was detected in both the associated QC blank and in the sample.
- D Results are reported from a diluted aliquot of sample.
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated
- P Aroclor target analyte with greater than 25% difference between column analyses.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

Review/Validation

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

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

Signature: 

Name: Michael Penny

Date: 13 FEB 2014

Title: Group Leader

Roadmap for WCHN XP0044 HPLC_PAH

This roadmap was analyzed by cww on 02-12-2014, 11:56.

This roadmap was reviewed by ps on 02-12-2014, 12:29.

This roadmap was packaged by map on 02-13-2014, 11:05.

Sample

exclcode	manual	datafile	smplid	injdate	injtime	sublist	clientid	dilution	batchid	comment
<input type="checkbox"/>	N	/chem/hplce.i/p020514.b/ph5b0506.d	342221001	05-FEB-2014	16:03	XP0044.sub	J1T5P8	1	1364016	
<input type="checkbox"/>	N	/chem/hplce.i/p020514.b/ph5b0509.d	342221002	05-FEB-2014	18:10	XP0044.sub	J1T5P9	1	1364016	
<input checked="" type="checkbox"/>	N	/chem/hplce.i/p020514.b/ph5b0510.d	342221003	05-FEB-2014	18:52	XP0044.sub	J1T5R0	1	1364016	Duse, needs re-extraction due to blank. See ph5b1106
<input type="checkbox"/>	N	/chem/hplce.i/p021114.b/ph5b1106.d	342221003	11-FEB-2014	12:54	XP0044.sub	J1T5R0	1	1365317	(RE) Report from here, in hold.
<input type="checkbox"/>	N	/chem/hplce.i/p020514.b/ph5b0511.d	342221004	05-FEB-2014	19:34	XP0044.sub	J1T5R1	1	1364016	
<input checked="" type="checkbox"/>	N	/chem/hplce.i/p020514.b/ph5b0512.d	342221005	05-FEB-2014	20:16	XP0044.sub	J1T5R2	10	1364016	Duse, will re-analyze @ 1:2. See ph5b0604
<input type="checkbox"/>	N	/chem/hplce.i/p020614.b/ph5b0604.d	342221005	06-FEB-2014	14:12	XP0044.sub	J1T5R2	2	1364016	(RA) lowest dilution due to extract
<input checked="" type="checkbox"/>	N	/chem/hplce.i/p020514.b/ph5b0516.d	342221006	05-FEB-2014	23:05	XP0044.sub	J1T5R3	2	1364016	Duse, will re-analyze neat. See ph5b0607
<input type="checkbox"/>	N	/chem/hplce.i/p020614.b/ph5b0607.d	342221006	06-FEB-2014	16:18	XP0044.sub	J1T5R3	1	1364016	(RA)
<input checked="" type="checkbox"/>	N	/chem/hplce.i/p020514.b/ph5b0518.d	342221007	06-FEB-2014	09:29	XP0044.sub	J1T5R4	2	1364016	Duse, will re-analyze neat. See ph5b0609
<input type="checkbox"/>	N	/chem/hplce.i/p020614.b/ph5b0609.d	342221007	06-FEB-2014	17:42	XP0044.sub	J1T5R4	1	1364016	(RA)
<input checked="" type="checkbox"/>	N	/chem/hplce.i/p020514.b/ph5b0520.d	342221008	06-FEB-2014	01:53	XP0044.sub	J1T5R5	2	1364016	Duse, will re-analyze neat. See ph5b0611
<input type="checkbox"/>	N	/chem/hplce.i/p020614.b/ph5b0611.d	342221008	06-FEB-2014	19:06	XP0044.sub	J1T5R5	1	1364016	(RA)

QC Sample

exclcode	manual	datafile	smplid	sampletype	injdate	injtime	sublist	clientid	dilution	batchid	comment
<input type="checkbox"/>	N	/chem/hplce.i/p020514.b/ph5b0504.d	1203029272	mb	05-FEB-2014	14:39	XP0044.sub	PAHBLK01	1	1364016	Blank contamination, Pyrene
<input checked="" type="checkbox"/>	N	/chem/hplce.i/p020514.b/ph5b0522.d	1203029272	mb	06-FEB-2014	03:18	XP0044.sub	PAHBLK01RA	1	1364016	Duse (RA) Confirms Pyrene detection
<input type="checkbox"/>	N	/chem/hplce.i/p020514.b/ph5b0505.d	1203029273	lcs	05-FEB-2014	15:21	XP0044.sub	PAHBLK01LCS	1	1364016	Pass
<input type="checkbox"/>	N	/chem/hplce.i/p020514.b/ph5b0507.d	1203029276	ms	05-FEB-2014	16:45	XP0044.sub	J1T5P8MS	1	1364016	Pass
<input type="checkbox"/>	N	/chem/hplce.i/p020514.b/ph5b0508.d	1203029277	msd	05-FEB-2014	17:27	XP0044.sub	J1T5P8MSD	1	1364016	Pass
<input type="checkbox"/>	N	/chem/hplce.i/p021114.b/ph5b1104.d	1203032443	mb	11-FEB-2014	11:30	XP0044.sub	PAHBLK02	1	1365317	(RE)
<input type="checkbox"/>	N	/chem/hplce.i/p021114.b/ph5b1105.d	1203032444	lcs	11-FEB-2014	12:12	XP0044.sub	PAHBLK02LCS	1	1365317	(RE) Pass
<input type="checkbox"/>	N	/chem/hplce.i/p021114.b/ph5b1107.d	1203032445	ms	11-FEB-2014	13:37	XP0044.sub	J1T5R0MS	1	1365317	(RE) Pass
<input type="checkbox"/>	N	/chem/hplce.i/p021114.b/ph5b1108.d	1203032446	msd	11-FEB-2014	14:19	XP0044.sub	J1T5R0MSD	1	1365317	(RE) Pass

Sample Data Summary

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: February 12, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5P8
 Sample ID: 342221001
 Matrix: SOIL
 Collect Date: 29-JAN-14 15:09
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 7.37%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
HPLC-PAH											
8310/3550 PAH Std list Soil "Dry Weight Corrected"											
Acenaphthene	U	5.38	5.38	17.9	ug/kg	1	CWW	02/05/14	1603	1364016	1
Acenaphthylene	U	5.38	5.38	17.9	ug/kg	1					
Anthracene	U	1.79	1.79	17.9	ug/kg	1					
Benzo(a)anthracene	U	0.574	0.574	1.79	ug/kg	1					
Benzo(a)pyrene	J	0.821	0.574	1.79	ug/kg	1					
Benzo(b)fluoranthene	U	0.574	0.574	1.79	ug/kg	1					
Benzo(ghi)perylene	J	0.904	0.574	1.79	ug/kg	1					
Benzo(k)fluoranthene	U	0.287	0.287	0.897	ug/kg	1					
Chrysene	U	0.574	0.574	1.79	ug/kg	1					
Dibenzo(a,h)anthracene	U	0.574	0.574	1.79	ug/kg	1					
Fluoranthene	U	0.574	0.574	1.79	ug/kg	1					
Fluorene	U	5.38	5.38	17.9	ug/kg	1					
Indeno(1,2,3-cd)pyrene	U	0.574	0.574	1.79	ug/kg	1					
Naphthalene	U	5.38	5.38	17.9	ug/kg	1					
Phenanthrene	U	5.38	5.38	17.9	ug/kg	1					
Pyrene	U	0.574	0.574	1.79	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	02/03/14	1835	1364015

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"	5910 ug/kg	8970	65.9	(23%-104%)

Notes:

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Certificate of Analysis

Report Date: February 12, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5P9
 Sample ID: 342221002
 Matrix: SOIL
 Collect Date: 29-JAN-14 14:48
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 5.77%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
HPLC-PAH											
8310/3550 PAH Std list Soil "Dry Weight Corrected"											
Acenaphthene	U	5.30	5.30	17.7	ug/kg	1	CWW	02/05/14	1810	1364016	1
Acenaphthylene	U	5.30	5.30	17.7	ug/kg	1					
Anthracene	U	1.77	1.77	17.7	ug/kg	1					
Benzo(a)anthracene	U	0.566	0.566	1.77	ug/kg	1					
Benzo(a)pyrene	U	0.566	0.566	1.77	ug/kg	1					
Benzo(b)fluoranthene	U	0.566	0.566	1.77	ug/kg	1					
Benzo(ghi)perylene	U	0.566	0.566	1.77	ug/kg	1					
Benzo(k)fluoranthene	U	0.283	0.283	0.884	ug/kg	1					
Chrysene	U	0.566	0.566	1.77	ug/kg	1					
Dibenzo(a,h)anthracene	U	0.566	0.566	1.77	ug/kg	1					
Fluoranthene	U	0.566	0.566	1.77	ug/kg	1					
Fluorene	U	5.30	5.30	17.7	ug/kg	1					
Indeno(1,2,3-cd)pyrene	U	0.566	0.566	1.77	ug/kg	1					
Naphthalene	U	5.30	5.30	17.7	ug/kg	1					
Phenanthrene	U	5.30	5.30	17.7	ug/kg	1					
Pyrene	U	0.566	0.566	1.77	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	02/03/14	1835	1364015

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"	6480 ug/kg	8840	73.3	(23%-104%)

Notes:

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Certificate of Analysis

Report Date: February 12, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5R0
 Sample ID: 342221003
 Matrix: SOIL
 Collect Date: 29-JAN-14 14:36
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 6.08%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
HPLC-PAH											
8310/3550 PAH Std list Soil "Dry Weight Corrected"											
Acenaphthene	U	5.32	5.32	17.7	ug/kg	1	CWW	02/11/14	1254	1365317	1
Acenaphthylene	U	5.32	5.32	17.7	ug/kg	1					
Anthracene	U	1.77	1.77	17.7	ug/kg	1					
Benzo(a)anthracene	U	0.568	0.568	1.77	ug/kg	1					
Benzo(a)pyrene	U	0.568	0.568	1.77	ug/kg	1					
Benzo(b)fluoranthene	U	0.568	0.568	1.77	ug/kg	1					
Benzo(ghi)perylene	U	0.568	0.568	1.77	ug/kg	1					
Benzo(k)fluoranthene	U	0.284	0.284	0.887	ug/kg	1					
Chrysene	U	0.568	0.568	1.77	ug/kg	1					
Dibenzo(a,h)anthracene	U	0.568	0.568	1.77	ug/kg	1					
Fluoranthene	U	0.568	0.568	1.77	ug/kg	1					
Fluorene	U	5.32	5.32	17.7	ug/kg	1					
Indeno(1,2,3-cd)pyrene	U	0.568	0.568	1.77	ug/kg	1					
Naphthalene	U	5.32	5.32	17.7	ug/kg	1					
Phenanthrene	U	5.32	5.32	17.7	ug/kg	1					
Pyrene	U	0.568	0.568	1.77	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	02/03/14	1835	1364015
SW846 3550B	3550B PAH BY HPLC Prep in soil	AXV1	02/07/14	1835	1365316

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"	6600 ug/kg	8870	74.4	(23%-104%)

Notes:

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Certificate of Analysis

Report Date: February 12, 2014

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

Client SDG: XP0044

Client Sample ID: J1T5R1	Project: WCHN00213
Sample ID: 342221004	Client ID: WCHN001
Matrix: SOIL	
Collect Date: 29-JAN-14 13:51	
Receive Date: 31-JAN-14	
Collector: Client	
Moisture: 12.7%	

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	5.73	5.73	19.1	ug/kg	1	CWW	02/05/14	1934	1364016	1
Acenaphthylene	U	5.73	5.73	19.1	ug/kg	1					
Anthracene	U	1.91	1.91	19.1	ug/kg	1					
Benzo(a)anthracene	U	0.611	0.611	1.91	ug/kg	1					
Benzo(a)pyrene	U	0.611	0.611	1.91	ug/kg	1					
Benzo(b)fluoranthene	U	0.611	0.611	1.91	ug/kg	1					
Benzo(ghi)perylene	U	0.611	0.611	1.91	ug/kg	1					
Benzo(k)fluoranthene	U	0.305	0.305	0.955	ug/kg	1					
Chrysene	U	0.611	0.611	1.91	ug/kg	1					
Dibenzo(a,h)anthracene	U	0.611	0.611	1.91	ug/kg	1					
Fluoranthene	U	0.611	0.611	1.91	ug/kg	1					
Fluorene	U	5.73	5.73	19.1	ug/kg	1					
Indeno(1,2,3-cd)pyrene	U	0.611	0.611	1.91	ug/kg	1					
Naphthalene	U	5.73	5.73	19.1	ug/kg	1					
Phenanthrene	U	5.73	5.73	19.1	ug/kg	1					
Pyrene	U	0.611	0.611	1.91	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	02/03/14	1835	1364015

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"	7350 ug/kg	9550	77.0	(23%-104%)

Notes:

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Certificate of Analysis

Report Date: February 12, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5R2
 Sample ID: 342221005
 Matrix: SOIL
 Collect Date: 29-JAN-14 14:03
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 8.58%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
HPLC-PAH											
8310/3550 PAH Std list Soil "Dry Weight Corrected"											
Acenaphthene	DU	10.9	10.9	36.3	ug/kg	2	CWW	02/06/14	1412	1364016	1
Acenaphthylene	DU	10.9	10.9	36.3	ug/kg	2					
Anthracene	D	61.7	3.63	36.3	ug/kg	2					
Benzo(a)anthracene	DU	1.16	1.16	3.63	ug/kg	2					
Benzo(a)pyrene	D	71.3	1.16	3.63	ug/kg	2					
Benzo(b)fluoranthene	DU	1.16	1.16	3.63	ug/kg	2					
Benzo(ghi)perylene	DU	1.16	1.16	3.63	ug/kg	2					
Benzo(k)fluoranthene	DU	0.581	0.581	1.81	ug/kg	2					
Chrysene	DU	1.16	1.16	3.63	ug/kg	2					
Dibenzo(a,h)anthracene	DU	1.16	1.16	3.63	ug/kg	2					
Fluoranthene	DU	1.16	1.16	3.63	ug/kg	2					
Fluorene	DU	10.9	10.9	36.3	ug/kg	2					
Indeno(1,2,3-cd)pyrene	D	32.5	1.16	3.63	ug/kg	2					
Naphthalene	DU	10.9	10.9	36.3	ug/kg	2					
Phenanthrene	DU	10.9	10.9	36.3	ug/kg	2					
Pyrene	BD	236	1.16	3.63	ug/kg	2					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3550B	3550B PAH BY HPLC Prep in soil	AXV1	02/03/14	1835	1364015

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"	6110 ug/kg	9070	67.3	(23%-104%)

Notes:

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

Certificate of Analysis

Report Date: February 12, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5R3
 Sample ID: 342221006
 Matrix: SOIL
 Collect Date: 29-JAN-14 13:26
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 16.1%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
HPLC-PAH											
8310/3550 PAH Std list Soil "Dry Weight Corrected"											
Acenaphthene	U	5.93	5.93	19.8	ug/kg	1	CWW	02/06/14	1618	1364016	1
Acenaphthylene	U	5.93	5.93	19.8	ug/kg	1					
Anthracene	J	7.44	1.98	19.8	ug/kg	1					
Benzo(a)anthracene		72.0	0.632	1.98	ug/kg	1					
Benzo(a)pyrene		76.0	0.632	1.98	ug/kg	1					
Benzo(b)fluoranthene		57.2	0.632	1.98	ug/kg	1					
Benzo(ghi)perylene		49.9	0.632	1.98	ug/kg	1					
Benzo(k)fluoranthene	U	0.316	0.316	0.988	ug/kg	1					
Chrysene		72.5	0.632	1.98	ug/kg	1					
Dibenzo(a,h)anthracene		38.8	0.632	1.98	ug/kg	1					
Fluoranthene		122	0.632	1.98	ug/kg	1					
Fluorene	U	5.93	5.93	19.8	ug/kg	1					
Indeno(1,2,3-cd)pyrene	U	0.632	0.632	1.98	ug/kg	1					
Naphthalene	U	5.93	5.93	19.8	ug/kg	1					
Phenanthrene		102	5.93	19.8	ug/kg	1					
Pyrene	B	162	0.632	1.98	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	02/03/14	1835	1364015

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"	5680 ug/kg	9880	57.5	(23%-104%)

Notes:

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Certificate of Analysis

Report Date: February 12, 2014

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

Client SDG: XP0044

Client Sample ID: J1T5R4	Project: WCHN00213
Sample ID: 342221007	Client ID: WCHN001
Matrix: SOIL	
Collect Date: 29-JAN-14 11:36	
Receive Date: 31-JAN-14	
Collector: Client	
Moisture: 10.6%	

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	5.59	5.59	18.6	ug/kg	1	CWW	02/06/14	1742	1364016	1
Acenaphthylene	U	5.59	5.59	18.6	ug/kg	1					
Anthracene	U	1.86	1.86	18.6	ug/kg	1					
Benzo(a)anthracene	U	0.597	0.597	1.86	ug/kg	1					
Benzo(a)pyrene	U	0.597	0.597	1.86	ug/kg	1					
Benzo(b)fluoranthene	U	0.597	0.597	1.86	ug/kg	1					
Benzo(ghi)perylene	PX	28.9	0.597	1.86	ug/kg	1					
Benzo(k)fluoranthene	PX	19.3	0.298	0.932	ug/kg	1					
Chrysene	U	0.597	0.597	1.86	ug/kg	1					
Dibenzo(a,h)anthracene	U	0.597	0.597	1.86	ug/kg	1					
Fluoranthene	U	0.597	0.597	1.86	ug/kg	1					
Fluorene	U	5.59	5.59	18.6	ug/kg	1					
Indeno(1,2,3-cd)pyrene	U	0.597	0.597	1.86	ug/kg	1					
Naphthalene	U	5.59	5.59	18.6	ug/kg	1					
Phenanthrene	U	5.59	5.59	18.6	ug/kg	1					
Pyrene	U	0.597	0.597	1.86	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	02/03/14	1835	1364015

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8310	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Decafluorobiphenyl	8310/3550 PAH Std list Soil "Dry Weight Corrected"	6680 ug/kg	9320	71.6	(23%-104%)

Notes:

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Certificate of Analysis

Report Date: February 12, 2014

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

Client SDG: XP0044

Client Sample ID: J1T5R5	Project: WCHN00213
Sample ID: 342221008	Client ID: WCHN001
Matrix: SOIL	
Collect Date: 29-JAN-14 11:36	
Receive Date: 31-JAN-14	
Collector: Client	
Moisture: 10.1%	

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	5.54	5.54	18.5	ug/kg	1	CWW	02/06/14	1906	1364016	1
Acenaphthylene	U	5.54	5.54	18.5	ug/kg	1					
Anthracene	U	1.85	1.85	18.5	ug/kg	1					
Benzo(a)anthracene	U	0.591	0.591	1.85	ug/kg	1					
Benzo(a)pyrene	U	0.591	0.591	1.85	ug/kg	1					
Benzo(b)fluoranthene	U	0.591	0.591	1.85	ug/kg	1					
Benzo(ghi)perylene	PX	20.0	0.591	1.85	ug/kg	1					
Benzo(k)fluoranthene	U	0.296	0.296	0.924	ug/kg	1					
Chrysene	U	0.591	0.591	1.85	ug/kg	1					
Dibenzo(a,h)anthracene	U	0.591	0.591	1.85	ug/kg	1					
Fluoranthene	U	0.591	0.591	1.85	ug/kg	1					
Fluorene	U	5.54	5.54	18.5	ug/kg	1					
Indeno(1,2,3-cd)pyrene	U	0.591	0.591	1.85	ug/kg	1					
Naphthalene	U	5.54	5.54	18.5	ug/kg	1					
Phenanthrene	U	5.54	5.54	18.5	ug/kg	1					
Pyrene	U	0.591	0.591	1.85	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	02/03/14	1835	1364015

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"	6060 ug/kg	9240	65.6	(23%-104%)

Notes:

QC Summary

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QC Summary

Report Date: February 12, 2014

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

Contact: Joan Kessner

Workorder: 342221

Client SDG: XP0044

Project Description: RC-232 Soil

Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH										
Batch	1364016									
QC1203029273	LCS									
Acenaphthene	1670		1330	ug/kg		79.6	(58%-99%)	CWW	02/05/14	15:21
Acenaphthylene	1670		1320	ug/kg		79.2	(58%-98%)			
Anthracene	1670		1480	ug/kg		88.9	(63%-94%)			
Benzo(a)anthracene	167		138	ug/kg		83.1	(73%-98%)			
Benzo(a)pyrene	167		134	ug/kg		80.5	(63%-99%)			
Benzo(b)fluoranthene	167		135	ug/kg		81	(70%-130%)			
Benzo(ghi)perylene	167		134	ug/kg		80.6	(70%-130%)			
Benzo(k)fluoranthene	83.3		62.8	ug/kg		75.4	(70%-130%)			
Chrysene	167		152	ug/kg		91.5	(70%-130%)			
Dibenzo(a,h)anthracene	167		158	ug/kg		94.7	(70%-130%)			
Fluoranthene	167		132	ug/kg		79.1	(70%-130%)			
Fluorene	1670		1360	ug/kg		81.6	(65%-130%)			
Indeno(1,2,3-cd)pyrene	167		144	ug/kg		86.3	(70%-130%)			
Naphthalene	1670		1280	ug/kg		76.6	(57%-130%)			
Phenanthrene	1670		1360	ug/kg		81.4	(70%-130%)			
Pyrene	167	B	143	ug/kg		85.9	(70%-130%)			
**Decafluorobiphenyl	8330		6390	ug/kg		76.7	(23%-104%)			
QC1203029272	MB									
Acenaphthene		U	5.00	ug/kg					02/05/14	14:39
Acenaphthylene		U	5.00	ug/kg						

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QC Summary

Workorder: 342221

Client SDG: XP0044

Project Description: RC-232 Soil

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Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH											
Batch	1364016										
Anthracene			U	1.67	ug/kg						
Benzo(a)anthracene			U	0.533	ug/kg				CWW	02/05/14	14:39
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			J	0.987	ug/kg						
**Decafluorobiphenyl	8330			6410	ug/kg		77	(23%-104%)			
QC1203029276	342221001	MS									
Acenaphthene	1800	U	5.38	1280	ug/kg		71.3	(49%-90%)		02/05/14	16:45
Acenaphthylene	1800	U	5.38	1280	ug/kg		71	(48%-97%)			
Anthracene	1800	U	1.79	1460	ug/kg		81	(49%-91%)			
Benzo(a)anthracene	180	U	0.574	145	ug/kg		80.6	(29%-126%)			
Benzo(a)pyrene	180	J	0.821	147	ug/kg		81.2	(26%-130%)			
Benzo(b)fluoranthene	180	U	0.574	142	ug/kg		79.1	(32%-135%)			
Benzo(ghi)perylene	180	J	0.904	139	ug/kg		76.8	(34%-125%)			

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QC Summary

Workorder: 342221

Client SDG: XP0044

Project Description: RC-232 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH											
Batch	1364016										
Benzo(k)fluoranthene	89.9	U	0.287	69.0	ug/kg		76.7	(48%-142%)	CWW	02/05/14	16:45
Chrysene	180	U	0.574	159	ug/kg		88.6	(39%-127%)			
Dibenzo(a,h)anthracene	180	U	0.574	160	ug/kg		89	(38%-130%)			
Fluoranthene	180	U	0.574	141	ug/kg		78.6	(20%-139%)			
Fluorene	1800	U	5.38	1330	ug/kg		74	(51%-90%)			
Indeno(1,2,3-cd)pyrene	180	U	0.574	148	ug/kg		82.3	(41%-145%)			
Naphthalene	1800	U	5.38	1200	ug/kg		66.8	(43%-87%)			
Phenanthrene	1800	U	5.38	1340	ug/kg		74.7	(50%-100%)			
Pyrene	180	U	0.574	B 157	ug/kg		87.1	(18%-149%)			
**Decafluorobiphenyl	8990		5910	5950	ug/kg		66.1	(23%-104%)			
QC1203029277 342221001 MSD											
Acenaphthene	1800	U	5.38	1280	ug/kg	0.318	71.2	(0%-30%)		02/05/14	17:27
Acenaphthylene	1800	U	5.38	1280	ug/kg	0.239	71.2	(0%-30%)			
Anthracene	1800	U	1.79	1480	ug/kg	1.38	82.2	(0%-30%)			
Benzo(a)anthracene	180	U	0.574	136	ug/kg	6.27	75.8	(0%-30%)			
Benzo(a)pyrene	180	J	0.821	136	ug/kg	7.99	75	(0%-30%)			
Benzo(b)fluoranthene	180	U	0.574	133	ug/kg	6.74	74	(0%-30%)			
Benzo(ghi)perylene	180	J	0.904	132	ug/kg	5.42	72.9	(0%-30%)			
Benzo(k)fluoranthene	89.8	U	0.287	61.8	ug/kg	11.0	68.8	(0%-30%)			
Chrysene	180	U	0.574	151	ug/kg	5.13	84.3	(0%-30%)			
Dibenzo(a,h)anthracene	180	U	0.574	155	ug/kg	3.29	86.2	(0%-30%)			
Fluoranthene	180	U	0.574	130	ug/kg	7.99	72.6	(0%-30%)			

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QC Summary

Workorder: 342221

Client SDG: XP0044

Project Description: RC-232 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH											
Batch	1364016										
Fluorene	1800	U	5.38		1320	ug/kg	0.710	73.5	(0%-30%)	CWW	02/05/14 17:27
Indeno(1,2,3-cd)pyrene	180	U	0.574		142	ug/kg	4.50	78.8	(0%-30%)		
Naphthalene	1800	U	5.38		1220	ug/kg	1.35	67.8	(0%-30%)		
Phenanthrene	1800	U	5.38		1340	ug/kg	0.646	74.4	(0%-30%)		
Pyrene	180	U	0.574	B	143	ug/kg	9.40	79.4	(0%-30%)		
**Decafluorobiphenyl	8980		5910		6010	ug/kg		66.9	(23%-104%)		
Batch	1365317										
QC1203032444	LCS										
Acenaphthene	1660				1350	ug/kg		81	(58%-99%)	CWW	02/11/14 12:12
Acenaphthylene	1660				1340	ug/kg		80.7	(58%-98%)		
Anthracene	1660				1490	ug/kg		89.7	(63%-94%)		
Benzo(a)anthracene	166				140	ug/kg		83.8	(73%-98%)		
Benzo(a)pyrene	166				136	ug/kg		81.5	(63%-99%)		
Benzo(b)fluoranthene	166				138	ug/kg		82.7	(70%-130%)		
Benzo(ghi)perylene	166				135	ug/kg		81	(70%-130%)		
Benzo(k)fluoranthene	83.2				63.0	ug/kg		75.7	(70%-130%)		
Chrysene	166				156	ug/kg		93.9	(70%-130%)		
Dibenzo(a,h)anthracene	166				160	ug/kg		96.3	(70%-130%)		
Fluoranthene	166				133	ug/kg		80.1	(70%-130%)		
Fluorene	1660				1380	ug/kg		82.8	(65%-130%)		
Indeno(1,2,3-cd)pyrene	166				148	ug/kg		88.7	(70%-130%)		
Naphthalene	1660				1290	ug/kg		77.4	(57%-130%)		

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QC Summary

Workorder: 342221

Client SDG: XP0044

Project Description: RC-232 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH											
Batch	1365317										
Phenanthrene	1660			1370	ug/kg		82.2	(70%-130%)			
Pyrene	166			145	ug/kg		87.1	(70%-130%)	CWW	02/11/14	12:12
**Decafluorobiphenyl	8320			6630	ug/kg		79.7	(23%-104%)			
QC1203032443	MB										
Acenaphthene			U	5.00	ug/kg					02/11/14	11:30
Acenaphthylene			U	5.00	ug/kg						
Anthracene			U	1.67	ug/kg						
Benzo(a)anthracene			U	0.533	ug/kg						
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			6530	ug/kg		78.4	(23%-104%)			
QC1203032445	342221003	MS									
Acenaphthene	1770	U	5.32	1300	ug/kg		73.2	(49%-90%)		02/11/14	13:37
Acenaphthylene	1770	U	5.32	1300	ug/kg		73.3	(48%-97%)			

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QC Summary

Workorder: 342221

Client SDG: XP0044

Project Description: RC-232 Soil

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Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH											
Batch	1365317										
Anthracene	1770	U	1.77	1470	ug/kg		82.8	(49%-91%)	CWW	02/11/14	13:37
Benzo(a)anthracene	177	U	0.568	139	ug/kg		78.3	(29%-126%)			
Benzo(a)pyrene	177	U	0.568	137	ug/kg		77.4	(26%-130%)			
Benzo(b)fluoranthene	177	U	0.568	137	ug/kg		77.1	(32%-135%)			
Benzo(ghi)perylene	177	U	0.568	133	ug/kg		74.9	(34%-125%)			
Benzo(k)fluoranthene	88.6	U	0.284	63.3	ug/kg		71.4	(48%-142%)			
Chrysene	177	U	0.568	153	ug/kg		86.5	(39%-127%)			
Dibenzo(a,h)anthracene	177	U	0.568	159	ug/kg		89.7	(38%-130%)			
Fluoranthene	177	U	0.568	134	ug/kg		75.8	(20%-139%)			
Fluorene	1770	U	5.32	1330	ug/kg		75.1	(51%-90%)			
Indeno(1,2,3-cd)pyrene	177	U	0.568	144	ug/kg		81.4	(41%-145%)			
Naphthalene	1770	U	5.32	1240	ug/kg		70	(43%-87%)			
Phenanthrene	1770	U	5.32	1340	ug/kg		75.7	(50%-100%)			
Pyrene	177	U	0.568	150	ug/kg		84.8	(18%-149%)			
**Decafluorobiphenyl	8860		6600	6250	ug/kg		70.5	(23%-104%)			
QC1203032446 342221003 MSD											
Acenaphthene	1770	U	5.32	1330	ug/kg	2.54	75.2	(0%-30%)		02/11/14	14:19
Acenaphthylene	1770	U	5.32	1330	ug/kg	2.66	75.3	(0%-30%)			
Anthracene	1770	U	1.77	1510	ug/kg	2.94	85.3	(0%-30%)			
Benzo(a)anthracene	177	U	0.568	144	ug/kg	3.80	81.4	(0%-30%)			
Benzo(a)pyrene	177	U	0.568	141	ug/kg	2.92	79.7	(0%-30%)			
Benzo(b)fluoranthene	177	U	0.568	138	ug/kg	1.32	78.2	(0%-30%)			

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QC Summary

Workorder: 342221

Client SDG: XP0044

Project Description: RC-232 Soil

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Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH											
Batch	1365317										
Benzo(ghi)perylene	177	U	0.568	137	ug/kg	2.77	77.1	(0%-30%)	CWW	02/11/14	14:19
Benzo(k)fluoranthene	88.6	U	0.284	64.1	ug/kg	1.25	72.3	(0%-30%)			
Chrysene	177	U	0.568	156	ug/kg	1.69	88	(0%-30%)			
Dibenzo(a,h)anthracene	177	U	0.568	161	ug/kg	1.28	90.9	(0%-30%)			
Fluoranthene	177	U	0.568	136	ug/kg	0.920	76.5	(0%-30%)			
Fluorene	1770	U	5.32	1360	ug/kg	2.32	76.9	(0%-30%)			
Indeno(1,2,3-cd)pyrene	177	U	0.568	148	ug/kg	2.74	83.7	(0%-30%)			
Naphthalene	1770	U	5.32	1280	ug/kg	2.77	72	(0%-30%)			
Phenanthrene	1770	U	5.32	1370	ug/kg	2.22	77.4	(0%-30%)			
Pyrene	177	U	0.568	150	ug/kg	0.201	84.7	(0%-30%)			
**Decafluorobiphenyl	8860		6600	6450	ug/kg		72.8	(23%-104%)			

Notes:

The Qualifiers in this report are defined as follows:

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

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QC Summary

Workorder: 342221

Client SDG: XP0044

Project Description: RC-232 Soil

Page 8 of 8

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

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

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

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

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

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

Miscellaneous Data

Prep Logbook

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

Batch ID: 1364015 Verified by: _____
 Analyst: Alberto Velasco
 Method: SW846 3550B

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

Sample ID	Run Date	Aliquot (g)	Prepped Aliquot (mL)	Prepped Factor (mL/g)
1203029272 MB	03-FEB-2014 18:35:00	30.03	1	0.0333
1203029273 LCS	03-FEB-2014 18:35:00	30.02	1	0.03331
342221001	03-FEB-2014 18:35:00	30.08	1	0.03324
1203029276 MS (342221001)	03-FEB-2014 18:35:00	30.01	1	0.03332
1203029277 MSD (342221001)	03-FEB-2014 18:35:00	30.05	1	0.03328
342221002	03-FEB-2014 18:35:00	30.02	1	0.03331
342221003	03-FEB-2014 18:35:00	30.07	1	0.03326
342221004	03-FEB-2014 18:35:00	30.01	1	0.03332
342221005	03-FEB-2014 18:35:00	30.14	1	0.03318
342221006	03-FEB-2014 18:35:00	30.16	1	0.03316
342221007	03-FEB-2014 18:35:00	30	1	0.03333
342221008	03-FEB-2014 18:35:00	30.11	1	0.03321

Type	Sample Id	Description	Serial Number	Spike Amt	Units	Comments:
LCS	1203029273	8310 PAH SPIKE	UE131224-15	1	mL	Verified By: SLW Final Solvent: Acetonitrile
MS	1203029276	8310 PAH SPIKE	UE131224-15	1	mL	
MSD	1203029277	8310 PAH SPIKE	UE131224-15	1	mL	
SURR	All	Decafluorobiphenyl 250 mg/L	UE140131-25	1	mL	
REGNT	All	HPLC Grade Acetonitrile	2052359	5	mL	
REGNT	All	Methylene Chloride	2062205-D	300	mL	
SOURC	All	SODIUM SULFATE	2051933	30	g	

Prep Logbook

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

Batch ID: 1365316 Verified by: _____
 Analyst: Alberto Velasco
 Method: SW846 3550B

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

Sample ID	Run Date	Aliquot (g)	Prepped Aliquot (mL)	Prepped Factor (mL/g)
1203032443 MB	07-FEB-2014 18:35:00	30.03	1	0.0333
1203032444 LCS	07-FEB-2014 18:35:00	30.05	1	0.03328
342221003 - 2	07-FEB-2014 18:35:00	30.01	1	0.03332
1203032445 - 2 MS (342221003)	07-FEB-2014 18:35:00	30.03	1	0.0333
1203032446 - 2 MSD (342221003)	07-FEB-2014 18:35:00	30.05	1	0.03328
342554001	07-FEB-2014 18:35:00	30.12	1	0.0332
1203032447 MS (342554001)	07-FEB-2014 18:35:00	30.16	1	0.03316
1203032448 MSD (342554001)	07-FEB-2014 18:35:00	30.05	1	0.03328

Type	Sample Id	Description	Serial Number	Spike Amt	Units	Comments:
LCS	1203032444	8310 PAH SPIKE	UE131224-15	1	mL	Final Solvent: Acetonitrile Verified By: SLW
MS	1203032445	8310 PAH SPIKE	UE131224-15	1	mL	
MS	1203032447	8310 PAH SPIKE	UE131224-15	1	mL	
MSD	1203032446	8310 PAH SPIKE	UE131224-15	1	mL	
MSD	1203032448	8310 PAH SPIKE	UE131224-15	1	mL	
SURR	All	Decafluorobiphenyl 250 mg/L	UE140131-25	1	mL	
REGNT	All	HPLC Grade Acetonitrile	2052359	5	mL	
REGNT	All	Methylene Chloride	2066898-D	300	mL	
SOURC	All	SODIUM SULFATE	2051933	30	g	

FID Diesel Range Organics Analysis

Case Narrative

**FID Diesel Range Organics
WC-HANFORD, INC. (WCHN)
SDG XP0044**

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: 1364394
Prep Batch Number: 1364393

Sample Analysis

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

Sample ID	Client ID
342221001	J1T5P8
342221002	J1T5P9
342221003	J1T5R0
342221004	J1T5R1
342221005	J1T5R2
342221006	J1T5R3
342221007	J1T5R4
342221008	J1T5R5
1203030229	Method Blank (MB)
1203030230	Laboratory Control Sample (LCS)
1203030231	342221002(J1T5P9) Matrix Spike (MS)
1203030232	342221002(J1T5P9) 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

Not all calibration verification standards (CCV) requirements have been met for this SDG. Several target analytes failed with a positive bias in the standards bracketing the samples in this SDG. The QC and samples were re-analyzed following a passing CCV and the failure was confirmed and attributed to matrix interference.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

Samples 342221005 (J1T5R2), 342221006 (J1T5R3), 342221007 (J1T5R4) and 342221008 (J1T5R5) were diluted due to over-range target analyte. As a result, the surrogate was diluted out of the acceptance limits. Data were reported.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 342221002 (J1T5P9) 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

Samples 342221005 (J1T5R2), 342221006 (J1T5R3), 342221007 (J1T5R4) and 342221008 (J1T5R5) were diluted due to the presence of over-range target analytes.

Sample Re-extraction/Re-analysis

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

Miscellaneous Information

Electronic Package Comment

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

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

Data Exception (DER) Documentation

The following DER was generated for this SDG: 1265933

Manual Integrations

Manual integration was required for surrogates.

Additional Comments

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

System Configuration

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

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

Certification Statement

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

DATA EXCEPTION REPORT

Mo.Day Yr. 08-FEB-14	Division: Federal	Quality Criteria: Specifications	Type: Process
Instrument Type: GC/FID	Test / Method: NWTPH-Dx in Soil	Matrix Type: Solid	Client Code: WCHN
Batch ID: 1364394	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 342221(XP0044)			
Application Issues: Failed Yield for Surrogates			
Specification and Requirements		DER Disposition:	
Exception Description:			
1. Multiple samples recovered o-Terphenyl at 0%(SPC Limit: 50%-150%). Please see the data report for specific failures.		1. Samples were diluted due to overrange target analyte. As a result, the surrogate was diluted out of the acceptance limits. Data were reported.	

Originator's Name:
Benjamin Taft 08-FEB-14

Data Validator/Group Leader:
Cameron Bearden 10-FEB-14

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Qualifier Definition Report for

WCHN001 WC-HANFORD, INC.

Client SDG: XP0044 GEL Work Order: 342221 Project: RC-232 Soil

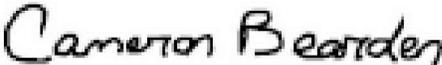
The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Cameron Bearden

Date: 10 FEB 2014

Title: Group Leader

Sample Data Summary

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: February 10, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5P8
 Sample ID: 342221001
 Matrix: SOIL
 Collect Date: 29-JAN-14 15:09
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 7.37%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Diesel Range Organics											
SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"											
Diesel Range Organics (C10-C20)	U	2340	2340	7190	ug/kg	1	BYT1	02/06/14	1200	1364394	1
Motor Oil (C20-C36)		8490	2340	7190	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	3541 DRO IN SOIL PREP	CXR2	02/05/14	1050	1364393

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"	661 ug/kg	719	92.0	(50%-150%)

Notes:

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Certificate of Analysis

Report Date: February 10, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5P9
 Sample ID: 342221002
 Matrix: SOIL
 Collect Date: 29-JAN-14 14:48
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 5.77%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Diesel Range Organics											
SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"											
Diesel Range Organics (C10-C20)	U	2300	2300	7070	ug/kg	1	BYT1	02/06/14	1239	1364394	1
Motor Oil (C20-C36)	J	4570	2300	7070	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	3541 DRO IN SOIL PREP	CXR2	02/05/14	1050	1364393

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"	648 ug/kg	707	91.6	(50%-150%)

Notes:

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Certificate of Analysis

Report Date: February 10, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5R0
 Sample ID: 342221003
 Matrix: SOIL
 Collect Date: 29-JAN-14 14:36
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 6.08%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Diesel Range Organics											
SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"											
Diesel Range Organics (C10-C20)	U	2300	2300	7080	ug/kg	1	BYT1	02/06/14	1437	1364394	1
Motor Oil (C20-C36)	J	5100	2300	7080	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	3541 DRO IN SOIL PREP	CXR2	02/05/14	1050	1364393

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"	580 ug/kg	708	81.9	(50%-150%)

Notes:

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Certificate of Analysis

Report Date: February 10, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5R1
 Sample ID: 342221004
 Matrix: SOIL
 Collect Date: 29-JAN-14 13:51
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 12.7%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Diesel Range Organics											
SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"											
Diesel Range Organics (C10-C20)	U	2480	2480	7620	ug/kg	1	BYT1	02/06/14	1516	1364394	1
Motor Oil (C20-C36)	U	2480	2480	7620	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	3541 DRO IN SOIL PREP	CXR2	02/05/14	1050	1364393

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"	658 ug/kg	762	86.4	(50%-150%)

Notes:

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Certificate of Analysis

Report Date: February 10, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5R2
 Sample ID: 342221005
 Matrix: SOIL
 Collect Date: 29-JAN-14 14:03
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 8.58%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Diesel Range Organics											
SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"											
Diesel Range Organics (C10-C20)	DJ	164000	118000	364000	ug/kg	50	BYT1	02/07/14	2225	1364394	1
Motor Oil (C20-C36)	D	918000	118000	364000	ug/kg	50					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	3541 DRO IN SOIL PREP	CXR2	02/05/14	1050	1364393

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	NWTPH-Dx in Soil		

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
o-Terphenyl	SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"	0.00 ug/kg	728	0.00*	(50%-150%)

Notes:

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Certificate of Analysis

Report Date: February 10, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5R3
 Sample ID: 342221006
 Matrix: SOIL
 Collect Date: 29-JAN-14 13:26
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 16.1%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Diesel Range Organics											
SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"											
Diesel Range Organics (C10-C20)	DJ	40300	25800	79300	ug/kg	10	BYT1	02/07/14	2304	1364394	1
Motor Oil (C20-C36)	D	261000	25800	79300	ug/kg	10					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	3541 DRO IN SOIL PREP	CXR2	02/05/14	1050	1364393

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	NWTPH-Dx in Soil		

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
o-Terphenyl	SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"	0.00 ug/kg	793	0.00*	(50%-150%)

Notes:

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: February 10, 2014

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

Client SDG: XP0044

Client Sample ID: J1T5R4
 Sample ID: 342221007
 Matrix: SOIL
 Collect Date: 29-JAN-14 11:36
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 10.6%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Diesel Range Organics											
SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"											
Diesel Range Organics (C10-C20)	DU	60600	60600	186000	ug/kg	25	BYT1	02/07/14	2342	1364394	1
Motor Oil (C20-C36)	D	1000000	60600	186000	ug/kg	25					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	3541 DRO IN SOIL PREP	CXR2	02/05/14	1050	1364393

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	NWTPH-Dx in Soil		

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
o-Terphenyl	SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"	0.00 ug/kg	745	0.00*	(50%-150%)

Notes:

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: February 10, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5R5
 Sample ID: 342221008
 Matrix: SOIL
 Collect Date: 29-JAN-14 11:36
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 10.1%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Diesel Range Organics											
SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"											
Diesel Range Organics (C10-C20)	DU	48200	48200	148000	ug/kg	20	BYT1	02/08/14	0021	1364394	1
Motor Oil (C20-C36)	D	508000	48200	148000	ug/kg	20					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	3541 DRO IN SOIL PREP	CXR2	02/05/14	1050	1364393

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	NWTPH-Dx in Soil		

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
o-Terphenyl	SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"	0.00 ug/kg	742	0.00*	(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: February 10, 2014

Page 1 of 2

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

Contact: Joan Kessner

Workorder: 342221

Client SDG: XP0044

Project Description: RC-232 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Diesel Range Organics											
Batch	1364394										
QC1203030230	LCS										
Diesel Range Organics (C10-C20)	66500			52300	ug/kg		78.6	(70%-130%)	BYT1	02/06/14	11:21
Motor Oil (C20-C36)	66500			60500	ug/kg		90.9	(70%-130%)			
**o-Terphenyl	665			514	ug/kg		77.2	(50%-150%)			
QC1203030229	MB										
Diesel Range Organics (C10-C20)			U	2160	ug/kg					02/06/14	10:42
Motor Oil (C20-C36)			U	2160	ug/kg						
**o-Terphenyl	666			461	ug/kg		69.3	(50%-150%)			
QC1203030231	342221002	MS									
Diesel Range Organics (C10-C20)	70700	U	2300	70300	ug/kg		99.4	(70%-130%)		02/06/14	13:18
Motor Oil (C20-C36)	70700	J	4570	93400	ug/kg		126	(70%-130%)			
**o-Terphenyl	707		648	749	ug/kg		106	(50%-150%)			
QC1203030232	342221002	MSD									
Diesel Range Organics (C10-C20)	70600	U	2300	62600	ug/kg	11.5	88.7	(0%-20%)		02/06/14	13:57
Motor Oil (C20-C36)	70600	J	4570	78400	ug/kg	17.5	104	(0%-20%)			
**o-Terphenyl	706		648	638	ug/kg		90.3	(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

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QC Summary

Workorder: 342221

Client SDG: XP0044

Project Description: RC-232 Soil

Page 2 of 2

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

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

^ 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: 1364393 Verified by: _____
 Analyst: Courtney Robinson
 Method: SW846 3541

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

Sample ID	Run Date	Aliquot (g)	Prepped Aliquot (mL)	Prepped Factor (mL/g)
1203030229 MB	05-FEB-2014 10:50:00	30.05	1	0.03328
1203030230 LCS	05-FEB-2014 10:50:00	30.06	1	0.03327
342221001	05-FEB-2014 10:50:00	30.05	1	0.03328
342221002	05-FEB-2014 10:50:00	30.03	1	0.0333
1203030231 MS (342221002)	05-FEB-2014 10:50:00	30.02	1	0.03331
1203030232 MSD (342221002)	05-FEB-2014 10:50:00	30.05	1	0.03328
342221003	05-FEB-2014 10:50:00	30.08	1	0.03324
342221004	05-FEB-2014 10:50:00	30.09	1	0.03323
342221005	05-FEB-2014 10:50:00	30.05	1	0.03328
342221006	05-FEB-2014 10:50:00	30.07	1	0.03326
342221007	05-FEB-2014 10:50:00	30.01	1	0.03332
342221008	05-FEB-2014 10:50:00	30.01	1	0.03332

Type	Sample Id	Description	Serial Number	Spike Amt	Units	Comments:
LCS	1203030230	AZDRO SPIKE LCS STD,4000ug/ml	WF1140114-52	1	mL	Final Solvent: CH2Cl2
MS	1203030231	AZDRO SPIKE LCS STD,4000ug/ml	WF1140114-52	1	mL	Verified By: SJW
MSD	1203030232	AZDRO SPIKE LCS STD,4000ug/ml	WF1140114-52	1	mL	Samples 342221005,342221006,342221007,342221008 converted from a liquid to a thick oily substance while on the Turbo-Vap units.
SURR	All	20 ppm surrogate	WE140131-04	1	mL	
REGNT	All	Methylene Chloride	2062205-D	120	mL	
SOURC	All	SODIUM SULFATE	2051933	30	g	

Pesticide Analysis

Case Narrative

**Pesticide Case Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0044**

Method/Analysis Information

Procedure: Organochlorine Pesticides and Chlorinated Hydrocarbons
Analytical Method: SW846 3541/8081B
Prep Method: SW846 3541
Analytical Batch Number: 1363806
Prep Batch Number: 1363805

Sample Analysis

Sample ID	Client ID
342221001	J1T5P8
342221002	J1T5P9
342221003	J1T5R0
342221004	J1T5R1
342221005	J1T5R2
342221006	J1T5R3
342221007	J1T5R4
342221008	J1T5R5
1203028694	Method Blank (MB)
1203028695	Laboratory Control Sample (LCS)
1203028696	342221001(J1T5P8) Matrix Spike (MS)
1203028697	342221001(J1T5P8) 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

All calibration verification standards (CVS, ICV, or CCV) requirements have not been met for samples 1203028694 (MB), 1203028695 (LCS), 1203028696 (J1T5P8), 1203028697 (J1T5P8), 342221001 (J1T5P8), 342221002 (J1T5P9), 342221003 (J1T5R0) and 342221004 (J1T5R1) for this SDG. 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. These target analytes were not detected above the PQL in the samples; therefore, the non-compliance has no adverse effects on the data.

All calibration verification standards (CVS, ICV, or CCV) requirements have not been met for this SDG. The bracketing standard failed with a negative bias for one or more target analytes. Samples 342221005 (J1T5R2), 342221006 (J1T5R3), 342221007 (J1T5R4) and 342221008 (J1T5R5) in this bracket were re-analyzed. The bracketing standard failed in the same manner; therefore, the standard failure is attributed to matrix interference. The re-analysis bracket is reported.

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 342221001 (J1T5P8) 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

Samples 342221005 (J1T5R2), 342221006 (J1T5R3), 342221007 (J1T5R4) and 342221008 (J1T5R5) were diluted due to high concentrations of non-target analytes within the retention time window of interest. The data from the diluted analysis are reported.

Sample Re-extraction/Re-analysis

Sulfur cleanup with copper was performed on samples . They were re-analyzed and the re-analysis data are reported.

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 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

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)
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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: XP0044 GEL Work Order: 342221 Project: RC-232 Soil

The Qualifiers in this report are defined as follows:

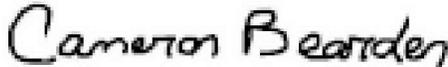
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

Review/Validation

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

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

Signature:



Name: Cameron Bearden

Date: 13 FEB 2014

Title: Group Leader

Sample Data Summary

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: February 7, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5P8
 Sample ID: 342221001
 Matrix: SOIL
 Collect Date: 29-JAN-14 15:09
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 7.37%

Project: WCHN00213
 Client ID: WCHN001

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	0.360	0.360	1.44	ug/kg	1	LOF	02/04/14	2350	1363806	1
4,4'-DDE	U	0.360	0.360	1.44	ug/kg	1					
4,4'-DDT	U	0.360	0.360	1.44	ug/kg	1					
Aldrin	U	0.180	0.180	0.719	ug/kg	1					
Dieldrin	U	0.360	0.360	1.44	ug/kg	1					
Endosulfan I	U	0.180	0.180	0.719	ug/kg	1					
Endosulfan II	U	0.360	0.360	1.44	ug/kg	1					
Endosulfan sulfate	U	0.360	0.360	1.44	ug/kg	1					
Endrin	U	0.360	0.360	1.44	ug/kg	1					
Endrin aldehyde	U	0.360	0.360	1.44	ug/kg	1					
Endrin ketone	U	0.360	0.360	1.44	ug/kg	1					
Heptachlor	U	0.180	0.180	0.719	ug/kg	1					
Heptachlor epoxide	U	0.180	0.180	0.719	ug/kg	1					
Methoxychlor	U	1.80	1.80	7.19	ug/kg	1					
Toxaphene	U	5.99	5.99	18.0	ug/kg	1					
alpha-BHC	U	0.180	0.180	0.719	ug/kg	1					
alpha-Chlordane	U	0.180	0.180	0.719	ug/kg	1					
beta-BHC	U	0.180	0.180	0.719	ug/kg	1					
delta-BHC	U	0.180	0.180	0.719	ug/kg	1					
gamma-BHC (Lindane)	U	0.180	0.180	0.719	ug/kg	1					
gamma-Chlordane	U	0.180	0.180	0.719	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 8081B Prep Soil	SJW1	02/03/14	1055	1363805

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"	26.6 ug/kg	36.0	73.9	(32%-120%)
Decachlorobiphenyl	8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"	28.7 ug/kg	36.0	79.8	(37%-129%)

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Certificate of Analysis

Report Date: February 7, 2014

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

Client SDG: XP0044

Client Sample ID: J1T5P8
Sample ID: 342221001

Project: WCHN00213
Client ID: WCHN001

Notes:

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: February 7, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5P9
 Sample ID: 342221002
 Matrix: SOIL
 Collect Date: 29-JAN-14 14:48
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 5.77%

Project: WCHN00213
 Client ID: WCHN001

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	0.354	0.354	1.41	ug/kg	1	LOF	02/05/14	0035	1363806	1
4,4'-DDE	U	0.354	0.354	1.41	ug/kg	1					
4,4'-DDT	U	0.354	0.354	1.41	ug/kg	1					
Aldrin	U	0.177	0.177	0.707	ug/kg	1					
Dieldrin	U	0.354	0.354	1.41	ug/kg	1					
Endosulfan I	U	0.177	0.177	0.707	ug/kg	1					
Endosulfan II	U	0.354	0.354	1.41	ug/kg	1					
Endosulfan sulfate	U	0.354	0.354	1.41	ug/kg	1					
Endrin	U	0.354	0.354	1.41	ug/kg	1					
Endrin aldehyde	U	0.354	0.354	1.41	ug/kg	1					
Endrin ketone	U	0.354	0.354	1.41	ug/kg	1					
Heptachlor	U	0.177	0.177	0.707	ug/kg	1					
Heptachlor epoxide	U	0.177	0.177	0.707	ug/kg	1					
Methoxychlor	U	1.77	1.77	7.07	ug/kg	1					
Toxaphene	U	5.89	5.89	17.7	ug/kg	1					
alpha-BHC	U	0.177	0.177	0.707	ug/kg	1					
alpha-Chlordane	U	0.177	0.177	0.707	ug/kg	1					
beta-BHC	U	0.177	0.177	0.707	ug/kg	1					
delta-BHC	U	0.177	0.177	0.707	ug/kg	1					
gamma-BHC (Lindane)	U	0.177	0.177	0.707	ug/kg	1					
gamma-Chlordane	U	0.177	0.177	0.707	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 8081B Prep Soil	SJW1	02/03/14	1055	1363805

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
Decachlorobiphenyl	8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"	30.9 ug/kg	35.4	87.4	(37%-129%)
4cmx	8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"	27.0 ug/kg	35.4	76.4	(32%-120%)

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Certificate of Analysis

Report Date: February 7, 2014

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

Client SDG: XP0044

Client Sample ID: J1T5P9
Sample ID: 342221002

Project: WCHN00213
Client ID: WCHN001

Notes:

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Certificate of Analysis

Report Date: February 7, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5R0
 Sample ID: 342221003
 Matrix: SOIL
 Collect Date: 29-JAN-14 14:36
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 6.08%

Project: WCHN00213
 Client ID: WCHN001

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	0.354	0.354	1.41	ug/kg	1	LOF	02/05/14	0050	1363806	1
4,4'-DDE	U	0.354	0.354	1.41	ug/kg	1					
4,4'-DDT	U	0.354	0.354	1.41	ug/kg	1					
Aldrin	U	0.177	0.177	0.707	ug/kg	1					
Dieldrin	U	0.354	0.354	1.41	ug/kg	1					
Endosulfan I	U	0.177	0.177	0.707	ug/kg	1					
Endosulfan II	U	0.354	0.354	1.41	ug/kg	1					
Endosulfan sulfate	U	0.354	0.354	1.41	ug/kg	1					
Endrin	U	0.354	0.354	1.41	ug/kg	1					
Endrin aldehyde	U	0.354	0.354	1.41	ug/kg	1					
Endrin ketone	U	0.354	0.354	1.41	ug/kg	1					
Heptachlor	U	0.177	0.177	0.707	ug/kg	1					
Heptachlor epoxide	U	0.177	0.177	0.707	ug/kg	1					
Methoxychlor	U	1.77	1.77	7.07	ug/kg	1					
Toxaphene	U	5.89	5.89	17.7	ug/kg	1					
alpha-BHC	U	0.177	0.177	0.707	ug/kg	1					
alpha-Chlordane	U	0.177	0.177	0.707	ug/kg	1					
beta-BHC	U	0.177	0.177	0.707	ug/kg	1					
delta-BHC	U	0.177	0.177	0.707	ug/kg	1					
gamma-BHC (Lindane)	U	0.177	0.177	0.707	ug/kg	1					
gamma-Chlordane	U	0.177	0.177	0.707	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 8081B Prep Soil	SJW1	02/03/14	1055	1363805

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"	26.7 ug/kg	35.4	75.6	(32%-120%)
Decachlorobiphenyl	8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"	31.6 ug/kg	35.4	89.3	(37%-129%)

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Certificate of Analysis

Report Date: February 7, 2014

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

Client SDG: XP0044

Client Sample ID: J1T5R0
Sample ID: 342221003

Project: WCHN00213
Client ID: WCHN001

Notes:

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Certificate of Analysis

Report Date: February 7, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5R1
 Sample ID: 342221004
 Matrix: SOIL
 Collect Date: 29-JAN-14 13:51
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 12.7%

Project: WCHN00213
 Client ID: WCHN001

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	0.381	0.381	1.52	ug/kg	1	LOF	02/05/14	0105	1363806	1
4,4'-DDE	U	0.381	0.381	1.52	ug/kg	1					
4,4'-DDT	U	0.381	0.381	1.52	ug/kg	1					
Aldrin	U	0.190	0.190	0.761	ug/kg	1					
Dieldrin	U	0.381	0.381	1.52	ug/kg	1					
Endosulfan I	U	0.190	0.190	0.761	ug/kg	1					
Endosulfan II	U	0.381	0.381	1.52	ug/kg	1					
Endosulfan sulfate	U	0.381	0.381	1.52	ug/kg	1					
Endrin	U	0.381	0.381	1.52	ug/kg	1					
Endrin aldehyde	U	0.381	0.381	1.52	ug/kg	1					
Endrin ketone	U	0.381	0.381	1.52	ug/kg	1					
Heptachlor	U	0.190	0.190	0.761	ug/kg	1					
Heptachlor epoxide	U	0.190	0.190	0.761	ug/kg	1					
Methoxychlor	U	1.90	1.90	7.61	ug/kg	1					
Toxaphene	U	6.34	6.34	19.0	ug/kg	1					
alpha-BHC	U	0.190	0.190	0.761	ug/kg	1					
alpha-Chlordane	U	0.190	0.190	0.761	ug/kg	1					
beta-BHC	U	0.190	0.190	0.761	ug/kg	1					
delta-BHC	U	0.190	0.190	0.761	ug/kg	1					
gamma-BHC (Lindane)	U	0.190	0.190	0.761	ug/kg	1					
gamma-Chlordane	U	0.190	0.190	0.761	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 8081B Prep Soil	SJW1	02/03/14	1055	1363805

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"	15.0 ug/kg	38.1	39.4	(32%-120%)
Decachlorobiphenyl	8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"	28.5 ug/kg	38.1	74.8	(37%-129%)

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: February 7, 2014

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

Client SDG: XP0044

Client Sample ID: J1T5R1
Sample ID: 342221004

Project: WCHN00213
Client ID: WCHN001

Notes:

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Certificate of Analysis

Report Date: February 7, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5R2
 Sample ID: 342221005
 Matrix: SOIL
 Collect Date: 29-JAN-14 14:03
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 8.58%

Project: WCHN00213
 Client ID: WCHN001

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	DU	7.28	7.28	29.1	ug/kg	20	LOF	02/05/14	1618	1363806	1
4,4'-DDE	DU	7.28	7.28	29.1	ug/kg	20					
4,4'-DDT	DU	7.28	7.28	29.1	ug/kg	20					
Aldrin	DU	3.64	3.64	14.6	ug/kg	20					
Dieldrin	DU	7.28	7.28	29.1	ug/kg	20					
Endosulfan I	DU	3.64	3.64	14.6	ug/kg	20					
Endosulfan II	DU	7.28	7.28	29.1	ug/kg	20					
Endosulfan sulfate	DU	7.28	7.28	29.1	ug/kg	20					
Endrin	DU	7.28	7.28	29.1	ug/kg	20					
Endrin aldehyde	DU	7.28	7.28	29.1	ug/kg	20					
Endrin ketone	DU	7.28	7.28	29.1	ug/kg	20					
Heptachlor	DU	3.64	3.64	14.6	ug/kg	20					
Heptachlor epoxide	DU	3.64	3.64	14.6	ug/kg	20					
Methoxychlor	DU	36.4	36.4	146	ug/kg	20					
Toxaphene	DU	121	121	364	ug/kg	20					
alpha-BHC	DU	3.64	3.64	14.6	ug/kg	20					
alpha-Chlordane	DU	3.64	3.64	14.6	ug/kg	20					
beta-BHC	DU	3.64	3.64	14.6	ug/kg	20					
delta-BHC	DU	3.64	3.64	14.6	ug/kg	20					
gamma-BHC (Lindane)	DU	3.64	3.64	14.6	ug/kg	20					
gamma-Chlordane	DU	3.64	3.64	14.6	ug/kg	20					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 8081B Prep Soil	SJW1	02/03/14	1055	1363805

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3541/8081B	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
4cmx	8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"	21.8 ug/kg	36.4	59.9	(32%-120%)
Decachlorobiphenyl	8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"	43.7 ug/kg	36.4	120	(37%-129%)

Notes:

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Certificate of Analysis

Report Date: February 7, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5R3
 Sample ID: 342221006
 Matrix: SOIL
 Collect Date: 29-JAN-14 13:26
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 16.1%

Project: WCHN00213
 Client ID: WCHN001

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	DU	0.794	0.794	3.18	ug/kg	2	LOF	02/05/14	1633	1363806	1
4,4'-DDE	DU	0.794	0.794	3.18	ug/kg	2					
4,4'-DDT	DU	0.794	0.794	3.18	ug/kg	2					
Aldrin	DU	0.397	0.397	1.59	ug/kg	2					
Dieldrin	DU	0.794	0.794	3.18	ug/kg	2					
Endosulfan I	DU	0.397	0.397	1.59	ug/kg	2					
Endosulfan II	DU	0.794	0.794	3.18	ug/kg	2					
Endosulfan sulfate	DU	0.794	0.794	3.18	ug/kg	2					
Endrin	DU	0.794	0.794	3.18	ug/kg	2					
Endrin aldehyde	DU	0.794	0.794	3.18	ug/kg	2					
Endrin ketone	DU	0.794	0.794	3.18	ug/kg	2					
Heptachlor	DU	0.397	0.397	1.59	ug/kg	2					
Heptachlor epoxide	DU	0.397	0.397	1.59	ug/kg	2					
Methoxychlor	DU	3.97	3.97	15.9	ug/kg	2					
Toxaphene	DU	13.2	13.2	39.7	ug/kg	2					
alpha-BHC	DU	0.397	0.397	1.59	ug/kg	2					
alpha-Chlordane	DU	0.397	0.397	1.59	ug/kg	2					
beta-BHC	DU	0.397	0.397	1.59	ug/kg	2					
delta-BHC	DU	0.397	0.397	1.59	ug/kg	2					
gamma-BHC (Lindane)	DU	0.397	0.397	1.59	ug/kg	2					
gamma-Chlordane	DU	0.397	0.397	1.59	ug/kg	2					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 8081B Prep Soil	SJW1	02/03/14	1055	1363805

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"	25.8 ug/kg	39.7	64.8	(32%-120%)
Decachlorobiphenyl	8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"	21.5 ug/kg	39.7	54.0	(37%-129%)

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Certificate of Analysis

Report Date: February 7, 2014

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

Client SDG: XP0044

Client Sample ID: J1T5R3
Sample ID: 342221006

Project: WCHN00213
Client ID: WCHN001

Notes:

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Certificate of Analysis

Report Date: February 7, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5R4
 Sample ID: 342221007
 Matrix: SOIL
 Collect Date: 29-JAN-14 11:36
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 10.6%

Project: WCHN00213
 Client ID: WCHN001

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	DU	3.72	3.72	14.9	ug/kg	10	LOF	02/05/14	1648	1363806	1
4,4'-DDE	DU	3.72	3.72	14.9	ug/kg	10					
4,4'-DDT	DU	3.72	3.72	14.9	ug/kg	10					
Aldrin	DU	1.86	1.86	7.45	ug/kg	10					
Dieldrin	DU	3.72	3.72	14.9	ug/kg	10					
Endosulfan I	DU	1.86	1.86	7.45	ug/kg	10					
Endosulfan II	DU	3.72	3.72	14.9	ug/kg	10					
Endosulfan sulfate	DU	3.72	3.72	14.9	ug/kg	10					
Endrin	DU	3.72	3.72	14.9	ug/kg	10					
Endrin aldehyde	DU	3.72	3.72	14.9	ug/kg	10					
Endrin ketone	DU	3.72	3.72	14.9	ug/kg	10					
Heptachlor	DU	1.86	1.86	7.45	ug/kg	10					
Heptachlor epoxide	DU	1.86	1.86	7.45	ug/kg	10					
Methoxychlor	DU	18.6	18.6	74.5	ug/kg	10					
Toxaphene	DU	62.0	62.0	186	ug/kg	10					
alpha-BHC	DU	1.86	1.86	7.45	ug/kg	10					
alpha-Chlordane	DU	1.86	1.86	7.45	ug/kg	10					
beta-BHC	DU	1.86	1.86	7.45	ug/kg	10					
delta-BHC	DU	1.86	1.86	7.45	ug/kg	10					
gamma-BHC (Lindane)	DU	1.86	1.86	7.45	ug/kg	10					
gamma-Chlordane	DU	1.86	1.86	7.45	ug/kg	10					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 8081B Prep Soil	SJW1	02/03/14	1055	1363805

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"	26.2 ug/kg	37.2	70.5	(32%-120%)
Decachlorobiphenyl	8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"	23.6 ug/kg	37.2	63.4	(37%-129%)

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Certificate of Analysis

Report Date: February 7, 2014

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

Client SDG: XP0044

Client Sample ID: J1T5R4
Sample ID: 342221007

Project: WCHN00213
Client ID: WCHN001

Notes:

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Certificate of Analysis

Report Date: February 7, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5R5
 Sample ID: 342221008
 Matrix: SOIL
 Collect Date: 29-JAN-14 11:36
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 10.1%

Project: WCHN00213
 Client ID: WCHN001

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	DU	3.70	3.70	14.8	ug/kg	10	LOF	02/05/14	1703	1363806	1
4,4'-DDE	DU	3.70	3.70	14.8	ug/kg	10					
4,4'-DDT	DU	3.70	3.70	14.8	ug/kg	10					
Aldrin	DU	1.85	1.85	7.41	ug/kg	10					
Dieldrin	DU	3.70	3.70	14.8	ug/kg	10					
Endosulfan I	DU	1.85	1.85	7.41	ug/kg	10					
Endosulfan II	DU	3.70	3.70	14.8	ug/kg	10					
Endosulfan sulfate	DU	3.70	3.70	14.8	ug/kg	10					
Endrin	DU	3.70	3.70	14.8	ug/kg	10					
Endrin aldehyde	DU	3.70	3.70	14.8	ug/kg	10					
Endrin ketone	DU	3.70	3.70	14.8	ug/kg	10					
Heptachlor	DU	1.85	1.85	7.41	ug/kg	10					
Heptachlor epoxide	DU	1.85	1.85	7.41	ug/kg	10					
Methoxychlor	DU	18.5	18.5	74.1	ug/kg	10					
Toxaphene	DU	61.7	61.7	185	ug/kg	10					
alpha-BHC	DU	1.85	1.85	7.41	ug/kg	10					
alpha-Chlordane	DU	1.85	1.85	7.41	ug/kg	10					
beta-BHC	DU	1.85	1.85	7.41	ug/kg	10					
delta-BHC	DU	1.85	1.85	7.41	ug/kg	10					
gamma-BHC (Lindane)	DU	1.85	1.85	7.41	ug/kg	10					
gamma-Chlordane	DU	1.85	1.85	7.41	ug/kg	10					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 8081B Prep Soil	SJW1	02/03/14	1055	1363805

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"	21.6 ug/kg	37.0	58.4	(32%-120%)
Decachlorobiphenyl	8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"	22.7 ug/kg	37.0	61.2	(37%-129%)

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: February 7, 2014

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

Client SDG: XP0044

Client Sample ID: J1T5R5
Sample ID: 342221008

Project: WCHN00213
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: February 7, 2014

Page 1 of 5

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

Contact: Joan Kessner

Workorder: 342221

Client SDG: XP0044

Project Description: RC-232 Soil

Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-Pesticide										
Batch	1363806									
QC1203028695	LCS									
4,4'-DDD	41.6		37.4	ug/kg		89.8	(51%-124%)	LOF	02/04/14	23:35
4,4'-DDE	41.6		35.5	ug/kg		85.3	(51%-119%)			
4,4'-DDT	41.6		40.4	ug/kg		97	(50%-128%)			
Aldrin	16.7		13.1	ug/kg		78.6	(48%-113%)			
Dieldrin	41.6		32.8	ug/kg		78.7	(51%-112%)			
Endosulfan I	16.7		12.6	ug/kg		75.9	(43%-110%)			
Endosulfan II	41.6		33.5	ug/kg		80.4	(49%-111%)			
Endosulfan sulfate	41.6		36.6	ug/kg		88	(54%-121%)			
Endrin	41.6		40.6	ug/kg		97.6	(54%-134%)			
Endrin aldehyde	41.6		37.7	ug/kg		90.5	(49%-117%)			
Endrin ketone	41.6		33.1	ug/kg		79.4	(48%-110%)			
Heptachlor	16.7		15.0	ug/kg		90.2	(52%-117%)			
Heptachlor epoxide	16.7		12.7	ug/kg		76.5	(53%-115%)			
Methoxychlor	16.7		17.4	ug/kg		104	(48%-117%)			
alpha-BHC	16.7		13.2	ug/kg		79.5	(50%-122%)			
alpha-Chlordane	16.7		13.2	ug/kg		79.3	(52%-113%)			
beta-BHC	16.7		13.4	ug/kg		80.2	(54%-110%)			
delta-BHC	16.7		14.2	ug/kg		85.4	(53%-117%)			
gamma-BHC (Lindane)	16.7		13.2	ug/kg		79.3	(53%-120%)			
gamma-Chlordane	16.7		13.9	ug/kg		83.7	(52%-117%)			

GEL LABORATORIES LLC

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QC Summary

Workorder: 342221

Client SDG: XP0044

Project Description: RC-232 Soil

Page 2 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-Pesticide											
Batch	1363806										
**4cmx	33.3			28.9	ug/kg		86.7	(32%-120%)	LOF	02/04/14	23:35
**Decachlorobiphenyl	33.3			30.2	ug/kg		90.7	(37%-129%)			
QC1203028694	MB										
4,4'-DDD			U	0.333	ug/kg					02/04/14	23:20
4,4'-DDE			U	0.333	ug/kg						
4,4'-DDT			U	0.333	ug/kg						
Aldrin			U	0.167	ug/kg						
Dieldrin			U	0.333	ug/kg						
Endosulfan I			U	0.167	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	0.167	ug/kg						
Heptachlor epoxide			U	0.167	ug/kg						
Methoxychlor			U	1.67	ug/kg						
Toxaphene			U	5.55	ug/kg						
alpha-BHC			U	0.167	ug/kg						
alpha-Chlordane			U	0.167	ug/kg						
beta-BHC			U	0.167	ug/kg						
delta-BHC			U	0.167	ug/kg						

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QC Summary

Workorder: 342221

Client SDG: XP0044

Project Description: RC-232 Soil

Page 3 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-Pesticide											
Batch	1363806										
gamma-BHC (Lindane)			U	0.167	ug/kg				LOF	02/04/14	23:20
gamma-Chlordane			U	0.167	ug/kg						
**4cmx	33.3			28.8	ug/kg		86.4	(32%-120%)			
**Decachlorobiphenyl	33.3			29.1	ug/kg		87.4	(37%-129%)			
QC1203028696 342221001 MS											
4,4'-DDD	44.8	U	0.360	34.9	ug/kg		77.9	(37%-134%)		02/05/14	00:05
4,4'-DDE	44.8	U	0.360	33.4	ug/kg		74.6	(33%-133%)			
4,4'-DDT	44.8	U	0.360	35.2	ug/kg		78.5	(21%-149%)			
Aldrin	17.9	U	0.180	14.0	ug/kg		77.8	(34%-134%)			
Dieldrin	44.8	U	0.360	29.9	ug/kg		66.7	(36%-132%)			
Endosulfan I	17.9	U	0.180	11.0	ug/kg		61.5	(36%-125%)			
Endosulfan II	44.8	U	0.360	30.4	ug/kg		67.9	(37%-129%)			
Endosulfan sulfate	44.8	U	0.360	31.4	ug/kg		70	(31%-140%)			
Endrin	44.8	U	0.360	38.9	ug/kg		86.7	(45%-142%)			
Endrin aldehyde	44.8	U	0.360	33.0	ug/kg		73.6	(31%-133%)			
Endrin ketone	44.8	U	0.360	30.6	ug/kg		68.2	(30%-139%)			
Heptachlor	17.9	U	0.180	11.5	ug/kg		64.4	(32%-137%)			
Heptachlor epoxide	17.9	U	0.180	11.1	ug/kg		62	(36%-130%)			
Methoxychlor	179	U	1.80	141	ug/kg		78.6	(28%-143%)			
alpha-BHC	17.9	U	0.180	11.5	ug/kg		64.2	(37%-129%)			
alpha-Chlordane	17.9	U	0.180	12.0	ug/kg		66.7	(29%-141%)			
beta-BHC	17.9	U	0.180	12.3	ug/kg		68.4	(33%-136%)			

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QC Summary

Workorder: 342221

Client SDG: XP0044

Project Description: RC-232 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-Pesticide											
Batch	1363806										
delta-BHC	17.9	U	0.180	12.8	ug/kg		71.2	(37%-136%)	LOF	02/05/14	00:05
gamma-BHC (Lindane)	17.9	U	0.180	11.7	ug/kg		65.5	(35%-130%)			
gamma-Chlordane	17.9	U	0.180	11.7	ug/kg		65.1	(30%-139%)			
**4cmx	35.9		26.6	23.9	ug/kg		66.7	(32%-120%)			
**Decachlorobiphenyl	35.9		28.7	27.9	ug/kg		77.8	(37%-129%)			
QC1203028697	342221001	MSD									
4,4'-DDD	44.9	U	0.360	43.5	ug/kg	21.9	96.9	(0%-30%)		02/05/14	00:20
4,4'-DDE	44.9	U	0.360	40.5	ug/kg	19.1	90.1	(0%-30%)			
4,4'-DDT	44.9	U	0.360	38.8	ug/kg	9.69	86.3	(0%-30%)			
Aldrin	18.0	U	0.180	12.9	ug/kg	7.83	71.8	(0%-30%)			
Dieldrin	44.9	U	0.360	36.5	ug/kg	19.8	81.2	(0%-30%)			
Endosulfan I	18.0	U	0.180	13.3	ug/kg	18.5	73.9	(0%-30%)			
Endosulfan II	44.9	U	0.360	36.8	ug/kg	19.0	82	(0%-30%)			
Endosulfan sulfate	44.9	U	0.360	37.5	ug/kg	17.8	83.6	(0%-30%)			
Endrin	44.9	U	0.360	47.3	ug/kg	19.7	105	(0%-30%)			
Endrin aldehyde	44.9	U	0.360	38.8	ug/kg	16.3	86.5	(0%-30%)			
Endrin ketone	44.9	U	0.360	37.0	ug/kg	19.1	82.4	(0%-30%)			
Heptachlor	18.0	U	0.180	13.3	ug/kg	14.4	74.3	(0%-30%)			
Heptachlor epoxide	18.0	U	0.180	12.8	ug/kg	13.8	71.1	(0%-30%)			
Methoxychlor	180	U	1.80	166	ug/kg	16.6	92.7	(0%-30%)			
alpha-BHC	18.0	U	0.180	15.0	ug/kg	26.6	83.7	(0%-30%)			
alpha-Chlordane	18.0	U	0.180	14.4	ug/kg	18.2	79.9	(0%-30%)			

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QC Summary

Workorder: 342221

Client SDG: XP0044

Project Description: RC-232 Soil

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Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-Pesticide											
Batch	1363806										
beta-BHC	18.0	U	0.180	14.3	ug/kg	15.6	79.9	(0%-30%)	LOF	02/05/14	00:20
delta-BHC	18.0	U	0.180	16.0	ug/kg	22.2	88.8	(0%-30%)			
gamma-BHC (Lindane)	18.0	U	0.180	14.5	ug/kg	21.1	80.8	(0%-30%)			
gamma-Chlordane	18.0	U	0.180	13.8	ug/kg	16.4	76.6	(0%-30%)			
**4cmx	35.9		26.6	31.7	ug/kg		88.2	(32%-120%)			
**Decachlorobiphenyl	35.9		28.7	30.1	ug/kg		83.8	(37%-129%)			

Notes:

The Qualifiers in this report are defined as follows:

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

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

^ 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: 1363805
Analyst: Sirena White
Method: SW846 3541

Verified by: _____

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)
1203028694 MB	03-FEB-2014 10:55:00	30.02	5	0.16656
1203028695 LCS	03-FEB-2014 10:55:00	30.02	5	0.16656
342221001	03-FEB-2014 10:55:00	30.03	5	0.1665
1203028696 MS (342221001)	03-FEB-2014 10:55:00	30.1	5	0.16611
1203028697 MSD (342221001)	03-FEB-2014 10:55:00	30.05	5	0.16639
342221002	03-FEB-2014 10:55:00	30	5	0.16667
342221003	03-FEB-2014 10:55:00	30.1	5	0.16611
342221004	03-FEB-2014 10:55:00	30.11	5	0.16606
342221005	03-FEB-2014 10:55:00	30.05	5	0.16639
342221006	03-FEB-2014 10:55:00	30.01	5	0.16661
342221007	03-FEB-2014 10:55:00	30.03	5	0.1665
342221008	03-FEB-2014 10:55:00	30.04	5	0.16644
342231006	03-FEB-2014 10:55:00	1.04	5	4.80769

Type	Sample Id	Description	Serial Number	Spike Amt	Units	Comments:
LCS	1203028695	PESTSPIKE	WE131213-05	1	mL	Final Solvent: Hexane Verified by: CR
MS	1203028696	PESTSPIKE	WE131213-05	1	mL	
MSD	1203028697	PESTSPIKE	WE131213-05	1	mL	Samples 342221005 - 342221008 turned into a slight oil mix on the TurboVap.
SURR	All	PEST SURROGATE 1000 UG/L	WE131218-08	1	mL	
REGNT	All	Hexane	2048613-B4	60	mL	
REGNT	All	Acetone	2058011-B1	60	mL	
SOURC	All	SODIUM SULFATE	2051933	30	g	

PCB Analysis

Case Narrative

**PCB Case Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0044**

Method/Analysis Information

Procedure: Analysis of Polychlorinated Biphenyls by ECD
Analytical Method: SW846 3541/8082A
Prep Method: SW846 3541
Analytical Batch Number: 1364213
Prep Batch Number: 1364212

Sample Analysis

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

Sample ID	Client ID
342221001	J1T5P8
342221002	J1T5P9
342221003	J1T5R0
342221004	J1T5R1
342221005	J1T5R2
342221006	J1T5R3
342221007	J1T5R4
342221008	J1T5R5
1203029741	Method Blank (MB)
1203029742	Laboratory Control Sample (LCS)
1203029743	342221004(J1T5R1) Matrix Spike (MS)
1203029744	342221004(J1T5R1) 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.

One of the five quantified peaks did not meet the acceptance criteria in one of Aroclor-1016 standards analyzed for this SDG; however, the average concentration of the five quantified peaks met the acceptance criteria.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

Sample 342221005 (J1T5R2) did not meet surrogate recovery acceptance criteria due to dilution and sample matrix interference. Sample became viscous and thick on the TurboVap during sample preparation.

Sample 342221006 (J1T5R3) did not meet surrogate recovery acceptance criteria on one analytical column. This non-compliance had no adverse effects on the data as the Aroclors were not detected on either of the columns in the sample.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 342221004 (J1T5R1) 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. Additionally, copper was added to all sample extracts to remove sulfur.

Sample Dilutions

Samples 342221005 (J1T5R2), 342221007 (J1T5R4) and 342221008 (J1T5R5) were were diluted at 1:5 due to the thickness of the extracts.

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. DER #1265497 was generated for this SDG.

Manual Integrations

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

ECD8A.I_1	Agilent 6890 Gas Chromatograph/Dual ECD w/ 7683 Autosampler	HP6890 Series ECD	Rtx-CLP I	30m x 0.25mm, 0.25um (Rtx-CLPesticide I)
ECD8A.I_2	Agilent 6890 Gas Chromatograph/Dual ECD w/ 7683 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.

DATA EXCEPTION REPORT

Mo.Day Yr. 07-FEB-14	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: GC/ECD	Test / Method: SW846 3541/8082A	Matrix Type: Solid	Client Code: WCHN
Batch ID: 1364213	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 342221(XP0044)			
Application Issues: Failed Yield for Surrogates			
Specification and Requirements		DER Disposition:	
Exception Description:			
Sample 342221005 and 342221006 did not meet surrogate recovery acceptance criteria on one or both analytical columns.		Sample 342221005 failed the surrogate recoveries due to dilution and sample matrix interference. Sample 342221005 became viscous and thick on the TurboVap during sample preparation. The data were reported. Sample 342221006 recovered slightly below the acceptance limits for 4cmx on one analytical column while recovered within the acceptance limits on the other column. This non-compliance had no adverse effects on the data as the Aroclors were not detected on either of the columns in the sample. The data were reported.	

Originator's Name:

James Maestas 07-FEB-14

Data Validator/Group Leader:

Jimin Cao 07-FEB-14

GEL LABORATORIES LLC

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Qualifier Definition Report for

WCHN001 WC-HANFORD, INC.

Client SDG: XP0044 GEL Work Order: 342221 Project: RC-232 Soil

The Qualifiers in this report are defined as follows:

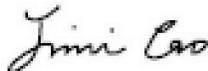
- D Results are reported from a diluted aliquot of sample.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE 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:



Name: Jimin Cao

Date: 07 FEB 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: February 7, 2014

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

Client SDG: XP0044

Client Sample ID: J1T5R4
 Sample ID: 342221007
 Matrix: SOIL
 Collect Date: 29-JAN-14 11:36
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 10.6%

Project: WCHN00213
 Client ID: WCHN001

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	DU	6.20	6.20	18.6	ug/kg	5	JXM	02/06/14	1324	1364213	1
Aroclor-1221	DU	6.20	6.20	18.6	ug/kg	5					
Aroclor-1232	DU	6.20	6.20	18.6	ug/kg	5					
Aroclor-1242	DU	6.20	6.20	18.6	ug/kg	5					
Aroclor-1248	DU	6.20	6.20	18.6	ug/kg	5					
Aroclor-1254	DU	6.20	6.20	18.6	ug/kg	5					
Aroclor-1260	DU	6.20	6.20	18.6	ug/kg	5					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 PCB Prep Soil	SJW1	02/05/14	1020	1364212

The following Analytical Methods were performed:

Method	Description	Analyst Comments				
1	SW846 3541/8082A					
Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits	
4cmx	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	4.56 ug/kg	7.45	61.2	(44%-106%)	
Decachlorobiphenyl	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	4.25 ug/kg	7.45	57.1	(35%-119%)	

Notes:

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: February 7, 2014

Page 1

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

Contact:

Workorder: 342221

Client SDG: XP0044

Project Description: RC-232 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Tr
Semi-Volatiles-PCB											
Batch	1364213										
QC1203029742	LCS										
Aroclor-1016	33.3			21.6	ug/kg		64.9	(39%-120%)	JXM	02/06/14	10
Aroclor-1260	33.3			26.8	ug/kg		80.4	(50%-116%)			
**4cmx	6.66			4.96	ug/kg		74.4	(44%-106%)			
**Decachlorobiphenyl	6.66			5.93	ug/kg		89.1	(35%-119%)			
QC1203029741	MB										
Aroclor-1016			U	1.11	ug/kg					02/06/14	10
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						
**4cmx	6.66			5.07	ug/kg		76.1	(44%-106%)			
**Decachlorobiphenyl	6.66			6.50	ug/kg		97.6	(35%-119%)			
QC1203029743	342221004 MS										
Aroclor-1016	38.1	U	1.27	23.2	ug/kg		60.7	(25%-125%)		02/06/14	10
Aroclor-1260	38.1	U	1.27	32.7	ug/kg		85.7	(28%-127%)			
**4cmx	7.63		4.40	5.18	ug/kg		68	(44%-106%)			
**Decachlorobiphenyl	7.63		6.65	7.50	ug/kg		98.4	(35%-119%)			
QC1203029744	342221004 MSD										
Aroclor-1016	38.2	U	1.27	23.6	ug/kg	1.75	61.7	(0%-30%)		02/06/14	10

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QC Summary

Workorder: **342221** Client SDG: **XP0044** Project Description: **RC-232 Soil** Page 2 of 2

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-PCB											
Batch	1364213										
Aroclor-1260	38.2	U	1.27	32.0	ug/kg	2.25	83.7	(0%-30%)			
**4cmx	7.63		4.40	5.44	ug/kg		71.3	(44%-106%)	JXM	02/06/14	11:00
**Decachlorobiphenyl	7.63		6.65	6.73	ug/kg		88.1	(35%-119%)			

Notes:

The Qualifiers in this report are defined as follows:

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

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

^ 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: 1364212 Verified by: _____
 Analyst: Sirena White
 Method: SW846 3541

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

Sample ID	Run Date	Aliquot (g)	Clean Up 1 Amount 1 (mL)	Clean Up 2 Amount 1 (mL)	Post Clean Up Amount 1 (mL)	Final Volume (mL)	Prepped Factor (mL/g)
1203029741 MB	05-FEB-2014 10:20:00	30.05	H2SO4/KM 2 nO4		9	1	0.03328
1203029742 LCS	05-FEB-2014 10:20:00	30.03	H2SO4/KM 2 nO4		9	1	0.0333
342221001	05-FEB-2014 10:20:00	30.02	H2SO4/KM 2 nO4		9	1	0.03331
342221002	05-FEB-2014 10:20:00	30.09	H2SO4/KM 2 nO4		9	1	0.03323
342221003	05-FEB-2014 10:20:00	30.05	H2SO4/KM 2 nO4		9	1	0.03328
342221004	05-FEB-2014 10:20:00	30.02	H2SO4/KM 2 nO4		9	1	0.03331
1203029743 MS (342221004)	05-FEB-2014 10:20:00	30.05	H2SO4/KM 2 nO4		9	1	0.03328
1203029744 MSD (342221004)	05-FEB-2014 10:20:00	30.02	H2SO4/KM 2 nO4		9	1	0.03331
342221005	05-FEB-2014 10:20:00	30	H2SO4/KM 2 nO4		9	1	0.03333
342221006	05-FEB-2014 10:20:00	30.01	H2SO4/KM 2 nO4		9	1	0.03332
342221007	05-FEB-2014 10:20:00	30.02	H2SO4/KM 2 nO4		9	1	0.03331
342221008	05-FEB-2014 10:20:00	30.01	H2SO4/KM 2 nO4		9	1	0.03332

Type	Sample Id	Description	Serial Number	Spike Amt	Units	Comments:
LCS	1203029742	PCB Laboratory Control	WE140123-04	1	mL	Final Solvent: Hexane
MS	1203029743	PCB Laboratory Control	WE140123-04	1	mL	Verified by: CR
MSD	1203029744	PCB Laboratory Control	WE140123-04	1	mL	Clean-up Initials: SJW
SURR	All	PEST LOW LEVEL SURROGATE 200 UG/L	WE140108-01	1	mL	Clean-up SOP: GL-OA-E-037 REV.1
REGNT	All	50g KMnO4 per 1L DI H2O	1976146	5	mL	Clean-up date: 02/05/2014
REGNT	All	Hexane	2048613-B4	120	mL	Sample 342221005 became viscous and thick on the TurboVap.
REGNT	All	1:1 sulfuric acid	2057316	5	mL	
SOURC	All	SODIUM SULFATE	2051933	30	g	

Herbicide Analysis

Case Narrative

**Herbicide Case Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0044**

Method/Analysis Information

Procedure: Analysis of Chlorophenoxy Acid Herbicides by ECD
Analytical Method: SW846 8151A
Prep Method: SW846 8151A
Analytical Batch Number: 1364088
Prep Batch Number: 1364087

Sample Analysis

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

Sample ID	Client ID
342221001	J1T5P8
342221002	J1T5P9
342221003	J1T5R0
342221004	J1T5R1
342221005	J1T5R2
342221006	J1T5R3
342221007	J1T5R4
342221008	J1T5R5
1203029433	Method Blank (MB)
1203029434	Laboratory Control Sample (LCS)
1203029439	342221003(J1T5R0) Matrix Spike (MS)
1203029440	342221003(J1T5R0) 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.

The Calibration Verification Standards (CCV) requirements were not met. Several target analytes failed to meet the acceptance criteria with positive bias in one of the CCV standards and failed with negative bias on one analytical column in another CCV standard. However, this positive and negative bias had no adverse effects on the data as the target analytes were not detected on either of the columns in the associates 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

Sample 342221005 (J1T5R2) failed to meet surrogate recovery acceptance criteria on one analytical column due to dilution and sample matrix interference.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 342221003 (J1T5R0) was selected for analysis as the matrix spike and matrix spike duplicate.

Matrix Spike (MS) Recovery Statement

The MS recovered above the acceptance limits for 2,4-D due to sample matrix interference as the MS and MSD displayed similar spike recovery.

Matrix Spike Duplicate (MSD) Recovery Statement

The MSD recovered above the acceptance limits for 2,4-D due to sample matrix interference as the MS and MSD displayed similar spike recovery.

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 target analyte concentrations were confirmed on a dissimilar column.

Sample Dilutions

Samples 342221005 (J1T5R2), 342221006 (J1T5R3), 342221007 (J1T5R4) and 342221008 (J1T5R5) were diluted prior to analysis due to the viscous nature of the matrix.

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

Data exception report (DER) is generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. DER #1265441 was generated for this SDG.

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. 06-FEB-14	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: GC/ECD	Test / Method: SW846 8151A	Matrix Type: Solid	Client Code: BETT, SSFL, WCHN
Batch ID: 1364088	Sample Numbers: See Below		

Potentially affected work order(s)(SDG): 341999,342221(XP0044),342231

Application Issues:

- Failed Recovery for MS/PS
- Failed Yield for Surrogates
- Failed Recovery for MSD/PSD

**Specification and Requirements
Exception Description:**

DER Disposition:

1. The MS(1203029435) and MS(1203029439) did not meet spike recovery acceptance limits.
2. Sample 342221005 did not meet surrogate recovery acceptance limits.

1. Multiple analytes failed to meet the acceptance criteria in the MS/MSD. As the MS/MSD exhibited similar recoveries, the failures were attributed to matrix interference and the data were reported.
2. The surrogate passed recovery on the reporting column and no target analytes were detected in the sample.

Originator's Name:

Lloyd O Fox 06-FEB-14

Data Validator/Group Leader:

Jimin Cao 13-FEB-14

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Qualifier Definition Report for

WCHN001 WC-HANFORD, INC.

Client SDG: XP0044 GEL Work Order: 342221 Project: RC-232 Soil

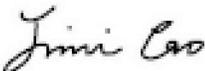
The Qualifiers in this report are defined as follows:

- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- 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.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

Review/Validation

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

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

Signature: 

Name: Jimin Cao

Date: 13 FEB 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: February 10, 2014

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

Client SDG: XP0044

Client Sample ID: J1T5P8	Project: WCHN00213
Sample ID: 342221001	Client ID: WCHN001
Matrix: SOIL	
Collect Date: 29-JAN-14 15:09	
Receive Date: 31-JAN-14	
Collector: Client	
Moisture: 7.37%	

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	1.79	1.79	5.40	ug/kg	1	RXE1	02/05/14	2259	1364088	1
2,4,5-TP	U	1.79	1.79	5.40	ug/kg	1					
2,4-D	TU	1.79	1.79	5.40	ug/kg	1					
2,4-DB	U	1.79	1.79	5.40	ug/kg	1					
Dalapon	U	37.8	37.8	108	ug/kg	1					
Dicamba	U	2.16	2.16	5.40	ug/kg	1					
Dichlorprop	U	2.44	2.44	5.40	ug/kg	1					
Dinoseb	U	1.79	1.79	5.40	ug/kg	1					
MCPA	U	248	248	1080	ug/kg	1					
MCPP	U	216	216	1080	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8151A	8151A Herbicides Prep in Soil	AXV1	02/03/14	1845	1364087

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"	87.4 ug/kg	108	80.9	(38%-142%)

Notes:

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Certificate of Analysis

Report Date: February 10, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5P9
 Sample ID: 342221002
 Matrix: SOIL
 Collect Date: 29-JAN-14 14:48
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 5.77%

Project: WCHN00213
 Client ID: WCHN001

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	1.76	1.76	5.30	ug/kg	1	RXE1	02/05/14	2327	1364088	1
2,4,5-TP	U	1.76	1.76	5.30	ug/kg	1					
2,4-D	TU	1.76	1.76	5.30	ug/kg	1					
2,4-DB	U	1.76	1.76	5.30	ug/kg	1					
Dalapon	U	37.1	37.1	106	ug/kg	1					
Dicamba	U	2.12	2.12	5.30	ug/kg	1					
Dichlorprop	U	2.40	2.40	5.30	ug/kg	1					
Dinoseb	U	1.76	1.76	5.30	ug/kg	1					
MCPA	U	244	244	1060	ug/kg	1					
MCPP	U	212	212	1060	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8151A	8151A Herbicides Prep in Soil	AXV1	02/03/14	1845	1364087

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"	86.9 ug/kg	106	81.9	(38%-142%)

Notes:

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Certificate of Analysis

Report Date: February 10, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5R0
 Sample ID: 342221003
 Matrix: SOIL
 Collect Date: 29-JAN-14 14:36
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 6.08%

Project: WCHN00213
 Client ID: WCHN001

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	1.77	1.77	5.32	ug/kg	1	RXE1	02/05/14	2354	1364088	1
2,4,5-TP	U	1.77	1.77	5.32	ug/kg	1					
2,4-D	TU	1.77	1.77	5.32	ug/kg	1					
2,4-DB	U	1.77	1.77	5.32	ug/kg	1					
Dalapon	U	37.3	37.3	106	ug/kg	1					
Dicamba	U	2.13	2.13	5.32	ug/kg	1					
Dichlorprop	U	2.41	2.41	5.32	ug/kg	1					
Dinoseb	U	1.77	1.77	5.32	ug/kg	1					
MCPA	U	245	245	1060	ug/kg	1					
MCPP	U	213	213	1060	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8151A	8151A Herbicides Prep in Soil	AXV1	02/03/14	1845	1364087

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8151A	
2	SW846 8151A	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
2,4-Dichlorophenylacetic acid	8151A Herbicides Soil "Dry Weight Corrected"	75.7 ug/kg	106	71.1	(38%-142%)

Notes:

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Certificate of Analysis

Report Date: February 10, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5R1
 Sample ID: 342221004
 Matrix: SOIL
 Collect Date: 29-JAN-14 13:51
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 12.7%

Project: WCHN00213
 Client ID: WCHN001

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	1.90	1.90	5.73	ug/kg	1	RXE1	02/06/14	0117	1364088	1
2,4,5-TP	U	1.90	1.90	5.73	ug/kg	1					
2,4-D	TU	1.90	1.90	5.73	ug/kg	1					
2,4-DB	U	1.90	1.90	5.73	ug/kg	1					
Dalapon	U	40.1	40.1	115	ug/kg	1					
Dicamba	U	2.29	2.29	5.73	ug/kg	1					
Dichlorprop	U	2.59	2.59	5.73	ug/kg	1					
Dinoseb	U	1.90	1.90	5.73	ug/kg	1					
MCPA	U	263	263	1150	ug/kg	1					
MCPP	U	229	229	1150	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8151A	8151A Herbicides Prep in Soil	AXV1	02/03/14	1845	1364087

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"	76.3 ug/kg	115	66.7	(38%-142%)

Notes:

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Certificate of Analysis

Report Date: February 10, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5R2
 Sample ID: 342221005
 Matrix: SOIL
 Collect Date: 29-JAN-14 14:03
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 8.58%

Project: WCHN00213
 Client ID: WCHN001

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	DU	18.2	18.2	54.7	ug/kg	10	RXE1	02/06/14	0145	1364088	1
2,4,5-TP	DU	18.2	18.2	54.7	ug/kg	10					
2,4-D	DTU	18.2	18.2	54.7	ug/kg	10					
2,4-DB	DU	18.2	18.2	54.7	ug/kg	10					
Dalapon	DU	383	383	1090	ug/kg	10					
Dicamba	DU	21.9	21.9	54.7	ug/kg	10					
Dichlorprop	DU	24.7	24.7	54.7	ug/kg	10					
Dinoseb	DU	18.2	18.2	54.7	ug/kg	10					
MCPA	DU	2510	2510	10900	ug/kg	10					
MCPP	DU	2190	2190	10900	ug/kg	10					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8151A	8151A Herbicides Prep in Soil	AXV1	02/03/14	1845	1364087

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"	47.0 ug/kg	109	42.9	(38%-142%)

Notes:

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Certificate of Analysis

Report Date: February 10, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5R3
 Sample ID: 342221006
 Matrix: SOIL
 Collect Date: 29-JAN-14 13:26
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 16.1%

Project: WCHN00213
 Client ID: WCHN001

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	DU	9.88	9.88	29.7	ug/kg	5	RXE1	02/06/14	0212	1364088	1
2,4,5-TP	DU	9.88	9.88	29.7	ug/kg	5					
2,4-D	DTU	9.88	9.88	29.7	ug/kg	5					
2,4-DB	DU	9.88	9.88	29.7	ug/kg	5					
Dalapon	DU	208	208	595	ug/kg	5					
Dicamba	DU	11.9	11.9	29.7	ug/kg	5					
Dichlorprop	DU	13.4	13.4	29.7	ug/kg	5					
Dinoseb	DU	9.88	9.88	29.7	ug/kg	5					
MCPA	DU	1370	1370	5950	ug/kg	5					
MCPP	DU	1190	1190	5950	ug/kg	5					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8151A	8151A Herbicides Prep in Soil	AXV1	02/03/14	1845	1364087

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8151A	
2	SW846 8151A	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
2,4-Dichlorophenylacetic acid	8151A Herbicides Soil "Dry Weight Corrected"	92.0 ug/kg	119	77.3	(38%-142%)

Notes:

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: February 10, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5R4
 Sample ID: 342221007
 Matrix: SOIL
 Collect Date: 29-JAN-14 11:36
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 10.6%

Project: WCHN00213
 Client ID: WCHN001

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	DU	18.5	18.5	55.7	ug/kg	10	RXE1	02/06/14	0240	1364088	1
2,4,5-TP	DU	18.5	18.5	55.7	ug/kg	10					
2,4-D	DTU	18.5	18.5	55.7	ug/kg	10					
2,4-DB	DU	18.5	18.5	55.7	ug/kg	10					
Dalapon	DU	390	390	1110	ug/kg	10					
Dicamba	DU	22.3	22.3	55.7	ug/kg	10					
Dichlorprop	DU	25.2	25.2	55.7	ug/kg	10					
Dinoseb	DU	18.5	18.5	55.7	ug/kg	10					
MCPA	DU	2560	2560	11100	ug/kg	10					
MCPP	DU	2230	2230	11100	ug/kg	10					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8151A	8151A Herbicides Prep in Soil	AXV1	02/03/14	1845	1364087

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8151A	
2	SW846 8151A	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
2,4-Dichlorophenylacetic acid	8151A Herbicides Soil "Dry Weight Corrected"	56.4 ug/kg	111	50.6	(38%-142%)

Notes:

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: February 10, 2014

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

Client SDG: XP0044

Client Sample ID: J1T5R5	Project: WCHN00213
Sample ID: 342221008	Client ID: WCHN001
Matrix: SOIL	
Collect Date: 29-JAN-14 11:36	
Receive Date: 31-JAN-14	
Collector: Client	
Moisture: 10.1%	

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	DU	18.5	18.5	55.6	ug/kg	10	RXE1	02/06/14	0307	1364088	1
2,4,5-TP	DU	18.5	18.5	55.6	ug/kg	10					
2,4-D	DTU	18.5	18.5	55.6	ug/kg	10					
2,4-DB	DU	18.5	18.5	55.6	ug/kg	10					
Dalapon	DU	389	389	1110	ug/kg	10					
Dicamba	DU	22.2	22.2	55.6	ug/kg	10					
Dichlorprop	DU	25.1	25.1	55.6	ug/kg	10					
Dinoseb	DU	18.5	18.5	55.6	ug/kg	10					
MCPA	DU	2560	2560	11100	ug/kg	10					
MCPP	DU	2220	2220	11100	ug/kg	10					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8151A	8151A Herbicides Prep in Soil	AXV1	02/03/14	1845	1364087

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8151A	
2	SW846 8151A	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
2,4-Dichlorophenylacetic acid	8151A Herbicides Soil "Dry Weight Corrected"	49.5 ug/kg	111	44.5	(38%-142%)

Notes:

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: February 10, 2014

Page 1 of 3

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

Contact: Joan Kessner

Workorder: 342221

Client SDG: XP0044

Project Description: RC-232 Soil

Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB										
Batch	1364088									
QC1203029434	LCS									
2,4,5-T	40.0		35.9	ug/kg		89.8	(52%-137%)	RXE1	02/05/14	20:25
2,4,5-TP	40.0		37.2	ug/kg		93	(58%-133%)			
2,4-D	40.0		36.1	ug/kg		90.4	(53%-139%)			
2,4-DB	40.0		41.7	ug/kg		104	(61%-139%)			
Dalapon	400		231	ug/kg		57.7	(39%-113%)			
Dicamba	40.0		31.9	ug/kg		79.8	(54%-118%)			
Dichlorprop	40.0		36.7	ug/kg		91.8	(59%-126%)			
Dinoseb	40.0		26.9	ug/kg		67.3	(39%-94%)			
MCPA	4000		3020	ug/kg		75.5	(60%-120%)			
MCPP	4000		3100	ug/kg		77.6	(50%-123%)			
*2,4-Dichlorophenylacetic acid	99.9		96.4	ug/kg		96.4	(38%-142%)			
QC1203029433	MB									
2,4,5-T		U	1.66	ug/kg					02/05/14	19:58
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						

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QC Summary

Workorder: 342221

Client SDG: XP0044

Project Description: RC-232 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch	1364088										
MCPA			U	230	ug/kg						
MCPP			U	200	ug/kg				RXE1	02/05/14	19:58
**2,4-Dichlorophenylacetic acid	99.9			92.2	ug/kg		92.3	(38%-142%)			
QC1203029439 342221003 MS											
2,4,5-T	42.6	U	1.77	39.6	ug/kg		93.1	(45%-131%)		02/06/14	00:22
2,4,5-TP	42.6	U	1.77	31.7	ug/kg		74.4	(49%-135%)			
2,4-D	42.6	TU	1.77 EPT	407	ug/kg		956*	(53%-135%)			
2,4-DB	42.6	U	1.77 P	58.8	ug/kg		138	(61%-139%)			
Dalapon	426	U	37.3	257	ug/kg		60.5	(30%-113%)			
Dicamba	42.6	U	2.13	33.3	ug/kg		78.2	(48%-124%)			
Dichlorprop	42.6	U	2.41	37.1	ug/kg		87.1	(46%-138%)			
Dinoseb	42.6	U	1.77	25.6	ug/kg		60.1	(25%-130%)			
MCPA	4260	U	245	3180	ug/kg		74.7	(50%-133%)			
MCPP	4260	U	213	2880	ug/kg		67.6	(47%-123%)			
**2,4-Dichlorophenylacetic acid	106		75.7	87.8	ug/kg		82.5	(38%-142%)			
QC1203029440 342221003 MSD											
2,4,5-T	42.5	U	1.77	33.5	ug/kg	16.8	78.7	(0%-32%)		02/06/14	00:49
2,4,5-TP	42.5	U	1.77	31.5	ug/kg	0.537	74.1	(0%-31%)			
2,4-D	42.5	TU	1.77 EPT	475	ug/kg	15.3	1120*	(0%-70%)			
2,4-DB	42.5	U	1.77 P	47.5	ug/kg	21.3	112	(0%-27%)			
Dalapon	425	U	37.3	265	ug/kg	2.91	62.3	(0%-18%)			
Dicamba	42.5	U	2.13	33.4	ug/kg	0.257	78.5	(0%-41%)			
Dichlorprop	42.5	U	2.41	35.8	ug/kg	3.54	84.1	(0%-40%)			
Dinoseb	42.5	U	1.77	20.8	ug/kg	20.6	48.9	(0%-169%)			

GEL LABORATORIES LLC

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

QC Summary

Workorder: 342221

Client SDG: XP0044

Project Description: RC-232 Soil

Page 3 of 3

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch	1364088										
MCPA	4250	U	245	3180	ug/kg	0.0162	74.8	(0%-38%)	RXE1	02/06/14	00:49
MCPP	4250	U	213	2730	ug/kg	5.31	64.1	(0%-30%)			
*2,4-Dichlorophenylacetic acid	106		75.7	88.8	ug/kg		83.5	(38%-142%)			

Notes:

The Qualifiers in this report are defined as follows:

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

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

^ 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: 1364087 Verified by: _____
 Analyst: Alberto Velasco
 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)
1203029433 MB	03-FEB-2014 18:45:00	50.07	7	2	0	10	0.19972
1203029434 LCS	03-FEB-2014 18:45:00	50.03	7	2	0	10	0.19988
341999001	03-FEB-2014 18:45:00	50.01	7	2	0	10	0.19996
1203029435 MS (341999001)	03-FEB-2014 18:45:00	50.03	7	2	0	10	0.19988
1203029436 MSD (341999001)	03-FEB-2014 18:45:00	50.08	7	2	0	10	0.19968
342221001	03-FEB-2014 18:45:00	50	7	2	0	10	0.2
342221002	03-FEB-2014 18:45:00	50.01	7	2	0	10	0.19996
342221003	03-FEB-2014 18:45:00	50	7	2	0	10	0.2
1203029439 MS (342221003)	03-FEB-2014 18:45:00	50.01	7	2	0	10	0.19996
1203029440 MSD (342221003)	03-FEB-2014 18:45:00	50.07	7	2	0	10	0.19972
342221004	03-FEB-2014 18:45:00	50.04	7	2	0	10	0.19984
342221005	03-FEB-2014 18:45:00	50.02	7	2	0	10	0.19992
342221006	03-FEB-2014 18:45:00	50.09	7	2	0	10	0.19964
342221007	03-FEB-2014 18:45:00	50.2	7	2	0	10	0.1992
342221008	03-FEB-2014 18:45:00	50.02	7	2	0	10	0.19992
342231005	03-FEB-2014 18:45:00	1.19	7	2	0	10	8.40336

Type	Sample Id	Description	Serial Number	Spike Amt	Units	Comments:
LCS	1203029434	HERBICIDE LCS	WE140130-04	1	mL	Clean up Date: 04-FEB-2014 15:19:04
MS	1203029435	HERBICIDE LCS	WE140130-04	1	mL	Hydrolysis Analyst: Sharlene Robinson
MS	1203029439	HERBICIDE LCS	WE140130-04	1	mL	Hydrolysis Date: 04-FEB-2014 15:19:04
MSD	1203029436	HERBICIDE LCS	WE140130-04	1	mL	Verified By: SLW
MSD	1203029440	HERBICIDE LCS	WE140130-04	1	mL	Final Solvent: Hexane
SURR	All	HERBICIDE SURROGATE	WE140130-03	.05	mL	
REGNT	All	37g KOH to 100mL DI H2O	130923A	5	mL	
REGNT	All	Iso-octane	1980438-A	1	mL	
REGNT	All	Hexane	2042624-B4	54	mL	
REGNT	All	Acetone	2042626-B1	20	mL	
REGNT	All	acidified sodium sulfate	2059336	10	g	
REGNT	All	Sulfuric Acid Sol., 12N For Herbicides	2060754	17	mL	
REGNT	All	Methanol	2061311-C	.5	mL	
REGNT	All	Methylene Chloride	2062205-D	280	mL	

Prep Logbook

Batch ID: 1364087

Verified by: _____

Analyst: Alberto Velasco

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

Method: SW846 8151A

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	N-METHYL-N-NITROSO-P-TOLUENESULFON-AMIDE			2066707	2	mL	
REGNT All	Ethyl ether			UN2060428a	80	mL	
SOURC All	SODIUM SULFATE			2051933	50	g	
WORK All	HERBICIDE SURROGATE			WE140130-03	.05	mL	

Metals Analysis

Case Narrative

**Metals Fractional Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0044**

Sample Analysis

Sample ID	Client ID
342221001	J1T5P8
342221002	J1T5P9
342221003	J1T5R0
342221004	J1T5R1
342221005	J1T5R2
342221006	J1T5R3
342221007	J1T5R4
342221008	J1T5R5
342221009	J1T5R6
1203028287	Method Blank (MB) ICP
1203028288	Laboratory Control Sample (LCS)
1203028291	342221001(J1T5P8L) Serial Dilution (SD)
1203028289	342221001(J1T5P8D) Sample Duplicate (DUP)
1203028290	342221001(J1T5P8S) Matrix Spike (MS)
1203032463	342221001(J1T5P8PS) Post Spike (PS)
1203028391	Method Blank (MB) ICP-MS
1203028392	Laboratory Control Sample (LCS)
1203028395	342221001(J1T5P8L) Serial Dilution (SD)
1203028393	342221001(J1T5P8D) Sample Duplicate (DUP)
1203028394	342221001(J1T5P8S) Matrix Spike (MS)
1203029144	Method Blank (MB) CVAA
1203029145	Laboratory Control Sample (LCS)
1203029148	342221001(J1T5P8L) Serial Dilution (SD)
1203029146	342221001(J1T5P8D) Sample Duplicate (DUP)
1203029147	342221001(J1T5P8S) Matrix Spike (MS)

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

Method/Analysis Information

Analytical Batch: 1363646, 1363689 and 1363966

Prep Batch : 1363645, 1363688 and 1363965
Standard Operating Procedures: GL-MA-E-013 REV# 22, GL-MA-E-009 REV# 22, GL-MA-E-014 REV# 25 and GL-MA-E-010 REV# 27
Analytical Method: SW846 3050B/6010C, SW846 3050B/6020A and SW846 7471B
Prep Method : SW846 3050B and SW846 7471B Prep

Preparation/Analytical Method Verification

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

System Configuration

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

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

The Metals analysis - ICPMS was performed on a Perkin Elmer ELAN 6100E inductively coupled plasma mass spectrometer (ICP-MS). The instrument is equipped with a cross-flow nebulizer, quadrupole mass spectrometer, and dual mode electron multiplier detector. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum. Operating conditions are set at 1400W power and combined argon pressures of 360+/-7 kPa for the plasma and auxiliary gases, and 0.85 L/min carrier gas flow, and an initial lens voltage of 5.2.

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

Calibration Information

Instrument Calibration

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

CRDL Requirements

The CRDL standards met the advisory control limits except for the following:

Aluminum recovered high in file 020614-1 at 13:24 and 20:41. The client sample concentrations for aluminum were greater than two times the PQL.

Sodium recovered high in file 020714A-3 at 14:53. The client sample concentrations for sodium were greater than two times the PQL.

Potassium recovered high in file 020714B-4 at 09:51 and 12:14 and file 021014C-5 at 14:16. The client sample concentrations for sodium were greater than two times the PQL.

ICSA/ICSAB Statement

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

Continuing Calibration Blank (CCB) Requirements

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

Continuing Calibration Verification (CCV) Requirements

All continuing calibration verifications (CCV) bracketing this SDG met the acceptance criteria.

Quality Control (QC) Information

Method Blank (MB) Statement

The MBs analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Sample Statement

The following samples were selected as the quality control (QC) samples for this SDG: 342221001 (J1T5P8)-ICP, ICP-MS and CVAA.

Matrix Spike (MS) Recovery Statement

The percent recoveries (%R) obtained from the MS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The MS did not meet all the recommended quality control acceptance criteria for percent recoveries for the applicable analytes. The silicon recovery was not within the acceptance limits in sample 1203028290 (J1T5P8)-ICP. See data exception report (DER ID 1266258) behind the case narrative in this data package.

Duplicate Relative Percent Difference (RPD) Statement

The relative percent difference (RPD) obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required reporting limit (RL). In cases where either the sample or duplicate value is less than 5X the contract required detection limit (RL), a control of +/-RL is used to evaluate the DUP results. Not all applicable analytes met these requirements. The RPD value for silicon was not within the acceptance limits in sample 1203028289 (J1T5P8)-ICP. See data exception report (DER ID 1266258) behind the case narrative in this data package.

Post Spike (PS) Recovery Statement

The percent recoveries (%R) obtained from the PS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The PS did not meet the recommended quality control acceptance criteria for percent recoveries for silicon and verifies the presence of matrix interferences. See data exception report (DER ID 1266258) behind the case narrative in this data package.

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. Not all applicable analytes met the established criteria of less than 10% difference (%D). The %D value for aluminum was not within the acceptance criteria in sample 1203028291 (J1T5P8)-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 instruments. Dilutions were required for this SDG in order to minimize suppression due to matrix interferences. Samples 342221001 (J1T5P8), 342221002 (J1T5P9), 342221003 (J1T5R0), 342221004 (J1T5R1), 342221005 (J1T5R2), 342221007 (J1T5R4), and 342221008 (J1T5R5)-ICP were diluted because the titanium concentration exceeded the linear range of the instrument which affected antimony, cobalt, lead, vanadium, potassium, and zinc. Sample 342221006 (J1T5R3)-ICP was diluted

because antimony was suppressed. Samples in this SDG were diluted the standard two times for solids analyzed on the ICPMS.

Preparation Information

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

Miscellaneous Information

Electronic Packaging Comment

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

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

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. Data exception report (DER ID 1266258) was generated for this SDG.

Additional Comments

Additional comments were not required for this SDG.

Certification Statement

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

Review Validation:

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

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

Reviewer: _____ **Date:** _____

DATA EXCEPTION REPORT

Mo.Day Yr. 10-FEB-14	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: ICP	Test / Method: SW846 3050B/6010C	Matrix Type: Solid	Client Code: WCHN
Batch ID: 1363646	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 342221(XP0044),342226(XP0045)			
Application Issues: Failed Recovery for MS/PS Method Blank contamination Failed RPD for DUP			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Failed Recovery for MS/PS: QC 1203028290MS,1203028293MS,</p> <p>2. Failed RPD for DUP: QC 1203028289DUP, 1203028292DUP</p>		<p>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. Per GEL's accredited methods and SOPs, a corrective action is not required and the data is qualified and reported.</p> <p>2. The sample and sample duplicate % RPD failed outside the control limits for silicon due to possible sample non-homogeneity and/or matrix interference. Per GEL's accredited methods and SOPs, a corrective action is not required and the data is qualified and reported.</p> <p>Sample #342221001 is a multi colored granular solid.</p> <p>Sample #342226001 is a dark brown granular solid.</p>	

Originator's Name:

Helen Camello 10-FEB-14

Data Validator/Group Leader:

Theresa McKelvey 11-FEB-14

Sample Data Summary

GEL LABORATORIES LLC

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

Qualifier Definition Report for

WCHN001 WC-HANFORD, INC.

Client SDG: XP0044 GEL Work Order: 342221 Project: RC-232 Soil

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank, and the sample concentration was ≤ 5 times the blank concentration.
- D Results are reported from a diluted aliquot of sample.
- E Reported value is estimated due to interferences. See comment in narrative.
- M Duplicate precision not met.
- N Spike Sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

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

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

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

Reviewed by _____

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: February 11, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5P8
 Sample ID: 342221001
 Matrix: SOIL
 Collect Date: 29-JAN-14 15:09
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 7.37%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	U	0.00431	0.00431	0.0129	mg/kg	1	NOR1	02/04/14	1028	1363966	1
Metals Analysis-ICP											
ICP METALS 6010TR Close-out List "Dry Weight Corrected"											
Arsenic	B	1.51	0.519	3.11	mg/kg	1	HSC	02/05/14	1656	1363646	2
Barium		48.2	0.104	0.519	mg/kg	1					
Beryllium		0.701	0.104	0.519	mg/kg	1					
Boron	U	1.04	1.04	5.19	mg/kg	1					
Cadmium	U	0.104	0.104	0.519	mg/kg	1					
Calcium		4950	8.30	26.0	mg/kg	1					
Copper		11.6	0.311	1.04	mg/kg	1					
Iron		20300	8.30	26.0	mg/kg	1					
Magnesium		3990	8.82	31.1	mg/kg	1					
Manganese		265	0.208	1.04	mg/kg	1					
Molybdenum	B	0.240	0.208	1.04	mg/kg	1					
Nickel		9.42	0.156	0.519	mg/kg	1					
Silicon	*N	508	1.56	10.4	mg/kg	1					
Silver	U	0.104	0.104	0.519	mg/kg	1					
Aluminum	M	4690	7.06	20.8	mg/kg	1	HSC	02/06/14	1916	1363646	3
Chromium		8.21	0.156	0.519	mg/kg	1					
Antimony	DU	3.43	3.43	10.4	mg/kg	10	JWJ	02/07/14	1027	1363646	4
Cobalt	D	11.5	1.56	5.19	mg/kg	10					
Lead	BD	4.62	3.43	10.4	mg/kg	10					
Potassium	D	1320	66.4	260	mg/kg	10					
Vanadium	D	62.6	1.04	5.19	mg/kg	10					
Zinc	D	39.7	4.15	10.4	mg/kg	10					
Sodium		170	7.27	26.0	mg/kg	1	HSC	02/07/14	1322	1363646	5
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.351	0.351	1.06	mg/kg	2	SKJ	02/06/14	0220	1363689	6

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	MTM1	02/03/14	1000	1363688
SW846 3050B	SW846 3050B Prep for 6010C	MTM1	02/03/14	1000	1363645
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	02/03/14	1619	1363965

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Certificate of Analysis

Report Date: February 11, 2014

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

Client SDG: XP0044

Client Sample ID: J1T5P8
Sample ID: 342221001

Project: WCHN00213
Client ID: WCHN001

The following Analytical Methods were performed:

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

Notes:

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Certificate of Analysis

Report Date: February 11, 2014

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

Client SDG: XP0044

Client Sample ID: J1T5P9	Project: WCHN00213
Sample ID: 342221002	Client ID: WCHN001
Matrix: SOIL	
Collect Date: 29-JAN-14 14:48	
Receive Date: 31-JAN-14	
Collector: Client	
Moisture: 5.77%	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	U	0.00427	0.00427	0.0127	mg/kg	1	NOR1	02/04/14	1037	1363966	1
Metals Analysis-ICP											
ICP METALS 6010TR Close-out List "Dry Weight Corrected"											
Arsenic	B	2.40	0.488	2.93	mg/kg	1	HSC	02/05/14	1708	1363646	2
Barium		54.1	0.0975	0.488	mg/kg	1					
Beryllium		0.603	0.0975	0.488	mg/kg	1					
Boron	U	0.975	0.975	4.88	mg/kg	1					
Cadmium	U	0.0975	0.0975	0.488	mg/kg	1					
Calcium		3620	7.80	24.4	mg/kg	1					
Copper		12.0	0.293	0.975	mg/kg	1					
Iron		18700	7.80	24.4	mg/kg	1					
Magnesium		4080	8.29	29.3	mg/kg	1					
Manganese		265	0.195	0.975	mg/kg	1					
Molybdenum	B	0.249	0.195	0.975	mg/kg	1					
Nickel		11.0	0.146	0.488	mg/kg	1					
Silicon	*N	804	1.46	9.75	mg/kg	1					
Silver	U	0.0975	0.0975	0.488	mg/kg	1					
Aluminum	M	5050	6.63	19.5	mg/kg	1	HSC	02/06/14	1927	1363646	3
Chromium		9.74	0.146	0.488	mg/kg	1					
Antimony	DU	3.22	3.22	9.75	mg/kg	10	JWJ	02/07/14	1039	1363646	4
Cobalt	D	9.44	1.46	4.88	mg/kg	10					
Lead	DU	3.22	3.22	9.75	mg/kg	10					
Potassium	D	1080	62.4	244	mg/kg	10					
Vanadium	D	48.3	0.975	4.88	mg/kg	10					
Zinc	D	35.8	3.90	9.75	mg/kg	10					
Sodium		119	6.83	24.4	mg/kg	1	HSC	02/07/14	1336	1363646	5
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.303	0.303	1.00	mg/kg	2	SKJ	02/06/14	0302	1363689	6

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	MTM1	02/03/14	1000	1363688
SW846 3050B	SW846 3050B Prep for 6010C	MTM1	02/03/14	1000	1363645
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	02/03/14	1619	1363965

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Report Date: February 11, 2014

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

Client SDG: XP0044

Client Sample ID: J1T5P9
Sample ID: 342221002

Project: WCHN00213
Client ID: WCHN001

The following Analytical Methods were performed:

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

Notes:

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Certificate of Analysis

Report Date: February 11, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5R0
 Sample ID: 342221003
 Matrix: SOIL
 Collect Date: 29-JAN-14 14:36
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 6.08%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	U	0.00408	0.00408	0.0122	mg/kg	1	NOR1	02/04/14	1038	1363966	1
Metals Analysis-ICP											
ICP METALS 6010TR Close-out List "Dry Weight Corrected"											
Arsenic	B	2.51	0.508	3.05	mg/kg	1	HSC	02/05/14	1710	1363646	2
Barium		53.4	0.102	0.508	mg/kg	1					
Beryllium		0.671	0.102	0.508	mg/kg	1					
Boron	U	1.02	1.02	5.08	mg/kg	1					
Cadmium	U	0.102	0.102	0.508	mg/kg	1					
Calcium		4540	8.13	25.4	mg/kg	1					
Copper		11.7	0.305	1.02	mg/kg	1					
Iron		20400	8.13	25.4	mg/kg	1					
Magnesium		4120	8.64	30.5	mg/kg	1					
Manganese		281	0.203	1.02	mg/kg	1					
Molybdenum	B	0.328	0.203	1.02	mg/kg	1					
Nickel		10.6	0.152	0.508	mg/kg	1					
Silicon	*N	404	1.52	10.2	mg/kg	1					
Silver	U	0.102	0.102	0.508	mg/kg	1					
Aluminum	M	5050	6.91	20.3	mg/kg	1	HSC	02/06/14	1929	1363646	3
Chromium		9.62	0.152	0.508	mg/kg	1					
Antimony	DU	3.35	3.35	10.2	mg/kg	10	JWJ	02/07/14	1048	1363646	4
Cobalt	D	11.4	1.52	5.08	mg/kg	10					
Lead	DU	3.35	3.35	10.2	mg/kg	10					
Potassium	D	1190	65.0	254	mg/kg	10					
Vanadium	D	61.1	1.02	5.08	mg/kg	10					
Zinc	D	39.4	4.06	10.2	mg/kg	10					
Sodium		139	7.11	25.4	mg/kg	1	HSC	02/07/14	1338	1363646	5
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.317	0.317	1.00	mg/kg	2	SKJ	02/06/14	0308	1363689	6

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	MTM1	02/03/14	1000	1363688
SW846 3050B	SW846 3050B Prep for 6010C	MTM1	02/03/14	1000	1363645
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	02/03/14	1619	1363965

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Certificate of Analysis

Report Date: February 11, 2014

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

Client SDG: XP0044

Client Sample ID: J1T5R0
Sample ID: 342221003

Project: WCHN00213
Client ID: WCHN001

The following Analytical Methods were performed:

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

Notes:

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Certificate of Analysis

Report Date: February 11, 2014

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

Client SDG: XP0044

Client Sample ID: J1T5R1
 Sample ID: 342221004
 Matrix: SOIL
 Collect Date: 29-JAN-14 13:51
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 12.7%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	U	0.00457	0.00457	0.0136	mg/kg	1	NOR1	02/04/14	1040	1363966	1
Metals Analysis-ICP											
ICP METALS 6010TR Close-out List "Dry Weight Corrected"											
Arsenic		5.65	0.565	3.39	mg/kg	1	HSC	02/05/14	1713	1363646	2
Barium		92.4	0.113	0.565	mg/kg	1					
Beryllium		0.785	0.113	0.565	mg/kg	1					
Boron	U	1.13	1.13	5.65	mg/kg	1					
Cadmium	U	0.113	0.113	0.565	mg/kg	1					
Calcium		3490	9.04	28.3	mg/kg	1					
Copper		14.4	0.339	1.13	mg/kg	1					
Iron		23100	9.04	28.3	mg/kg	1					
Magnesium		5160	9.61	33.9	mg/kg	1					
Manganese		360	0.226	1.13	mg/kg	1					
Molybdenum	B	0.282	0.226	1.13	mg/kg	1					
Nickel		12.7	0.170	0.565	mg/kg	1					
Silicon	*N	686	1.70	11.3	mg/kg	1					
Silver	U	0.113	0.113	0.565	mg/kg	1					
Aluminum	M	7900	7.68	22.6	mg/kg	1	HSC	02/06/14	1932	1363646	3
Chromium		12.2	0.170	0.565	mg/kg	1					
Antimony	DU	3.73	3.73	11.3	mg/kg	10	JWJ	02/07/14	1051	1363646	4
Cobalt	D	12.3	1.70	5.65	mg/kg	10					
Lead	BD	7.43	3.73	11.3	mg/kg	10					
Potassium	D	2420	72.3	283	mg/kg	10					
Vanadium	D	55.4	1.13	5.65	mg/kg	10					
Zinc	D	45.9	4.52	11.3	mg/kg	10					
Sodium		155	7.91	28.3	mg/kg	1	HSC	02/07/14	1341	1363646	5
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.326	0.326	1.00	mg/kg	2	SKJ	02/06/14	0314	1363689	6

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	MTM1	02/03/14	1000	1363688
SW846 3050B	SW846 3050B Prep for 6010C	MTM1	02/03/14	1000	1363645
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	02/03/14	1619	1363965

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Certificate of Analysis

Report Date: February 11, 2014

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

Client SDG: XP0044

Client Sample ID: J1T5R1
Sample ID: 342221004

Project: WCHN00213
Client ID: WCHN001

The following Analytical Methods were performed:

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

Notes:

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Certificate of Analysis

Report Date: February 11, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5R2
 Sample ID: 342221005
 Matrix: SOIL
 Collect Date: 29-JAN-14 14:03
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 8.58%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	B	0.0115	0.004	0.0119	mg/kg	1	NOR1	02/04/14	1042	1363966	1
Metals Analysis-ICP											
ICP METALS 6010TR Close-out List "Dry Weight Corrected"											
Arsenic		5.71	0.499	2.99	mg/kg	1	HSC	02/05/14	1722	1363646	2
Barium		108	0.0998	0.499	mg/kg	1					
Beryllium		0.677	0.0998	0.499	mg/kg	1					
Boron	B	1.46	0.998	4.99	mg/kg	1					
Cadmium	B	0.269	0.0998	0.499	mg/kg	1					
Calcium		4570	7.98	25.0	mg/kg	1					
Copper		19.0	0.299	0.998	mg/kg	1					
Iron		20100	7.98	25.0	mg/kg	1					
Magnesium		4180	8.48	29.9	mg/kg	1					
Manganese		369	0.200	0.998	mg/kg	1					
Molybdenum	B	0.365	0.200	0.998	mg/kg	1					
Nickel		14.4	0.150	0.499	mg/kg	1					
Silicon	*N	1080	1.50	9.98	mg/kg	1					
Silver	U	0.0998	0.0998	0.499	mg/kg	1					
Aluminum	M	6880	6.79	20.0	mg/kg	1	HSC	02/06/14	1941	1363646	3
Chromium		11.2	0.150	0.499	mg/kg	1					
Antimony	DU	3.29	3.29	9.98	mg/kg	10	JWJ	02/07/14	1054	1363646	4
Cobalt	D	10.7	1.50	4.99	mg/kg	10					
Lead	D	80.7	3.29	9.98	mg/kg	10					
Potassium	D	2410	63.9	250	mg/kg	10					
Vanadium	D	48.7	0.998	4.99	mg/kg	10					
Zinc	D	108	3.99	9.98	mg/kg	10					
Sodium		149	6.99	25.0	mg/kg	1	HSC	02/07/14	1350	1363646	5
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.355	0.355	1.07	mg/kg	2	SKJ	02/06/14	0320	1363689	6

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	MTM1	02/03/14	1000	1363688
SW846 3050B	SW846 3050B Prep for 6010C	MTM1	02/03/14	1000	1363645
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	02/03/14	1619	1363965

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Certificate of Analysis

Report Date: February 11, 2014

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

Client SDG: XP0044

Client Sample ID: J1T5R2
Sample ID: 342221005

Project: WCHN00213
Client ID: WCHN001

The following Analytical Methods were performed:

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

Notes:

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Certificate of Analysis

Report Date: February 11, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5R3
 Sample ID: 342221006
 Matrix: SOIL
 Collect Date: 29-JAN-14 13:26
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 16.1%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury		0.0171	0.00432	0.0129	mg/kg	1	NOR1	02/04/14	1047	1363966	1
Metals Analysis-ICP											
ICP METALS 6010TR Close-out List "Dry Weight Corrected"											
Arsenic		4.64	0.579	3.47	mg/kg	1	HSC	02/05/14	1725	1363646	2
Barium		96.5	0.116	0.579	mg/kg	1					
Beryllium		0.681	0.116	0.579	mg/kg	1					
Boron	U	1.16	1.16	5.79	mg/kg	1					
Cadmium	B	0.169	0.116	0.579	mg/kg	1					
Calcium		4040	9.26	28.9	mg/kg	1					
Copper		12.5	0.347	1.16	mg/kg	1					
Iron		18500	9.26	28.9	mg/kg	1					
Magnesium		4170	9.84	34.7	mg/kg	1					
Manganese		342	0.231	1.16	mg/kg	1					
Molybdenum	B	0.375	0.231	1.16	mg/kg	1					
Nickel		11.6	0.174	0.579	mg/kg	1					
Silicon	*N	452	1.74	11.6	mg/kg	1					
Silver	U	0.116	0.116	0.579	mg/kg	1					
Aluminum	M	6320	7.87	23.1	mg/kg	1	HSC	02/06/14	1943	1363646	3
Chromium		10.8	0.174	0.579	mg/kg	1					
Cobalt		9.50	0.174	0.579	mg/kg	1	JWJ	02/07/14	1057	1363646	4
Lead		26.4	0.382	1.16	mg/kg	1					
Potassium		2260	7.41	28.9	mg/kg	1					
Vanadium		41.7	0.116	0.579	mg/kg	1					
Zinc		53.7	0.463	1.16	mg/kg	1					
Antimony	DU	3.82	3.82	11.6	mg/kg	10	JWJ	02/07/14	1108	1363646	5
Sodium		150	8.10	28.9	mg/kg	1	HSC	02/07/14	1352	1363646	6
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.364	0.364	1.10	mg/kg	2	SKJ	02/06/14	0338	1363689	7

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	MTM1	02/03/14	1000	1363688
SW846 3050B	SW846 3050B Prep for 6010C	MTM1	02/03/14	1000	1363645
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	02/03/14	1619	1363965

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Certificate of Analysis

Report Date: February 11, 2014

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

Client SDG: XP0044

Client Sample ID: J1T5R3
Sample ID: 342221006

Project: WCHN00213
Client ID: WCHN001

The following Analytical Methods were performed:

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

Notes:

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Certificate of Analysis

Report Date: February 11, 2014

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

Client SDG: XP0044

Client Sample ID: J1T5R4
 Sample ID: 342221007
 Matrix: SOIL
 Collect Date: 29-JAN-14 11:36
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 10.6%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	U	0.00443	0.00443	0.0132	mg/kg	1	NOR1	02/04/14	1049	1363966	1
Metals Analysis-ICP											
ICP METALS 6010TR Close-out List "Dry Weight Corrected"											
Arsenic		3.41	0.528	3.17	mg/kg	1	HSC	02/05/14	1727	1363646	2
Barium		78.7	0.106	0.528	mg/kg	1					
Beryllium		0.776	0.106	0.528	mg/kg	1					
Boron	U	1.06	1.06	5.28	mg/kg	1					
Cadmium	U	0.106	0.106	0.528	mg/kg	1					
Calcium		4570	8.44	26.4	mg/kg	1					
Copper		15.8	0.317	1.06	mg/kg	1					
Iron		23000	8.44	26.4	mg/kg	1					
Magnesium		5050	8.97	31.7	mg/kg	1					
Manganese		340	0.211	1.06	mg/kg	1					
Molybdenum	B	0.381	0.211	1.06	mg/kg	1					
Nickel		12.5	0.158	0.528	mg/kg	1					
Silicon	*N	415	1.58	10.6	mg/kg	1					
Silver	U	0.106	0.106	0.528	mg/kg	1					
Aluminum	M	6680	7.18	21.1	mg/kg	1	HSC	02/06/14	1946	1363646	3
Chromium		11.6	0.158	0.528	mg/kg	1					
Antimony	DU	3.48	3.48	10.6	mg/kg	10	JWJ	02/07/14	1059	1363646	4
Cobalt	D	12.8	1.58	5.28	mg/kg	10					
Lead	BD	9.70	3.48	10.6	mg/kg	10					
Potassium	D	1820	67.5	264	mg/kg	10					
Vanadium	D	63.6	1.06	5.28	mg/kg	10					
Zinc	D	47.2	4.22	10.6	mg/kg	10					
Sodium		150	7.39	26.4	mg/kg	1	HSC	02/07/14	1355	1363646	5
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.339	0.339	1.03	mg/kg	2	SKJ	02/06/14	0344	1363689	6

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	MTM1	02/03/14	1000	1363688
SW846 3050B	SW846 3050B Prep for 6010C	MTM1	02/03/14	1000	1363645
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	02/03/14	1619	1363965

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: February 11, 2014

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

Client SDG: XP0044

Client Sample ID: J1T5R4
Sample ID: 342221007

Project: WCHN00213
Client ID: WCHN001

The following Analytical Methods were performed:

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

Notes:

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Certificate of Analysis

Report Date: February 11, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5R5
 Sample ID: 342221008
 Matrix: SOIL
 Collect Date: 29-JAN-14 11:36
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 10.1%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	U	0.00417	0.00417	0.0124	mg/kg	1	NOR1	02/04/14	1050	1363966	1
Metals Analysis-ICP											
ICP METALS 6010TR Close-out List "Dry Weight Corrected"											
Arsenic	B	3.11	0.543	3.26	mg/kg	1	HSC	02/05/14	1730	1363646	2
Barium		80.3	0.109	0.543	mg/kg	1					
Beryllium		0.835	0.109	0.543	mg/kg	1					
Boron	U	1.09	1.09	5.43	mg/kg	1					
Cadmium	B	0.125	0.109	0.543	mg/kg	1					
Calcium		4440	8.69	27.2	mg/kg	1					
Copper		16.8	0.326	1.09	mg/kg	1					
Iron		24500	8.69	27.2	mg/kg	1					
Magnesium		5110	9.24	32.6	mg/kg	1					
Manganese		366	0.217	1.09	mg/kg	1					
Molybdenum	U	0.217	0.217	1.09	mg/kg	1					
Nickel		12.6	0.163	0.543	mg/kg	1					
Silicon	*N	489	1.63	10.9	mg/kg	1					
Silver	U	0.109	0.109	0.543	mg/kg	1					
Aluminum	M	7040	7.39	21.7	mg/kg	1	HSC	02/06/14	1948	1363646	3
Chromium		10.8	0.163	0.543	mg/kg	1					
Antimony	DU	3.59	3.59	10.9	mg/kg	10	JWJ	02/07/14	1102	1363646	4
Cobalt	D	13.4	1.63	5.43	mg/kg	10					
Lead	BD	6.36	3.59	10.9	mg/kg	10					
Potassium	D	1750	69.6	272	mg/kg	10					
Vanadium	D	65.4	1.09	5.43	mg/kg	10					
Zinc	D	49.2	4.35	10.9	mg/kg	10					
Sodium		149	7.61	27.2	mg/kg	1	HSC	02/07/14	1357	1363646	5
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.334	0.334	1.01	mg/kg	2	SKJ	02/06/14	0350	1363689	6

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	MTM1	02/03/14	1000	1363688
SW846 3050B	SW846 3050B Prep for 6010C	MTM1	02/03/14	1000	1363645
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	02/03/14	1619	1363965

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Certificate of Analysis

Report Date: February 11, 2014

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

Client SDG: XP0044

Client Sample ID: J1T5R5
Sample ID: 342221008

Project: WCHN00213
Client ID: WCHN001

The following Analytical Methods were performed:

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

Notes:

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Certificate of Analysis

Report Date: February 11, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5R6
 Sample ID: 342221009
 Matrix: SOIL
 Collect Date: 29-JAN-14 10:35
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: <0.1%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	U	0.00393	0.00393	0.0117	mg/kg	1	NOR1	02/04/14	1052	1363966	1
Metals Analysis-ICP											
ICP METALS 6010TR Close-out List "Dry Weight Corrected"											
Arsenic	U	0.481	0.481	2.88	mg/kg	1	HSC	02/05/14	1732	1363646	2
Barium		1.35	0.0962	0.481	mg/kg	1					
Beryllium	U	0.0962	0.0962	0.481	mg/kg	1					
Boron	U	0.962	0.962	4.81	mg/kg	1					
Cadmium	U	0.0962	0.0962	0.481	mg/kg	1					
Calcium		26.1	7.69	24.0	mg/kg	1					
Copper	U	0.288	0.288	0.962	mg/kg	1					
Iron		183	7.69	24.0	mg/kg	1					
Magnesium	U	8.17	8.17	28.8	mg/kg	1					
Manganese		4.15	0.192	0.962	mg/kg	1					
Molybdenum	U	0.192	0.192	0.962	mg/kg	1					
Nickel	U	0.144	0.144	0.481	mg/kg	1					
Silicon	*N	96.4	1.44	9.62	mg/kg	1					
Silver	U	0.0962	0.0962	0.481	mg/kg	1					
Aluminum	M	82.4	6.54	19.2	mg/kg	1	HSC	02/06/14	1951	1363646	3
Chromium	U	0.144	0.144	0.481	mg/kg	1					
Antimony	U	0.317	0.317	0.962	mg/kg	1	JWJ	02/07/14	1105	1363646	4
Cobalt	U	0.144	0.144	0.481	mg/kg	1					
Lead	U	0.317	0.317	0.962	mg/kg	1					
Vanadium	B	0.189	0.0962	0.481	mg/kg	1					
Zinc	C	2.02	0.385	0.962	mg/kg	1					
Sodium	B	7.68	6.73	24.0	mg/kg	1	HSC	02/07/14	1400	1363646	5
Potassium		51.5	6.15	24.0	mg/kg	1	JWJ	02/10/14	1406	1363646	6

Metals Analysis-ICP-MS

SW846 3050B/6020A Selenium "Dry Weight Corrected"

Selenium	DU	0.297	0.297	1.00	mg/kg	2	SKJ	02/06/14	0356	1363689	7
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The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	MTM1	02/03/14	1000	1363688
SW846 3050B	SW846 3050B Prep for 6010C	MTM1	02/03/14	1000	1363645
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	02/03/14	1619	1363965

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Certificate of Analysis

Report Date: February 11, 2014

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

Client SDG: XP0044

Client Sample ID: J1T5R6
Sample ID: 342221009

Project: WCHN00213
Client ID: WCHN001

The following Analytical Methods were performed:

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

Notes:

Quality Control Summary

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QC Summary

Report Date: February 13, 2014

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

Contact: Joan Kessner

Workorder: 342221

Client SDG: XP0044

Project Description: RC-232 Soil

Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch 1363689											
QC1203028393	342221001	DUP									
Selenium		DU	0.351	DU	0.332	mg/kg	N/A ^		SKJ	02/06/14	02:26
QC1203028392	LCS										
Selenium	4.69		D	4.65	mg/kg		99	(80%-120%)		02/06/14	02:02
QC1203028391	MB										
Selenium		DU		0.308	mg/kg					02/06/14	01:56
QC1203028394	342221001	MS									
Selenium	4.85	DU	0.351	D	4.35	mg/kg	88	(75%-125%)		02/06/14	02:32
QC1203028395	342221001	SDILT									
Selenium		DU	0.389	DU	1.75	ug/L	N/A	(0%-10%)		02/06/14	02:44
Metals Analysis-ICP											
Batch 1363646											
QC1203028289	342221001	DUP									
Aluminum		M	4690		4620	mg/kg	1.52	(0%-20%)	HSC	02/06/14	19:18
Antimony		DU	3.43	DU	3.41	mg/kg	N/A ^		JWJ	02/07/14	10:30
Arsenic		B	1.51	B	1.89	mg/kg	22.3 ^	(+/-3.10)	HSC	02/05/14	16:59
Barium			48.2		54.3	mg/kg	11.9	(0%-20%)			
Beryllium			0.701		0.677	mg/kg	3.46 ^	(+/-0.516)			
Boron		U	1.04	U	1.03	mg/kg	N/A ^				
Cadmium		U	0.104	U	0.103	mg/kg	N/A ^				
Calcium			4950		4940	mg/kg	0.330	(0%-20%)			
Chromium			8.21		8.41	mg/kg	2.39	(0%-20%)		02/06/14	19:18
Cobalt		D	11.5	D	10.7	mg/kg	6.96 ^	(+/-5.16)	JWJ	02/07/14	10:30
Copper			11.6		12.5	mg/kg	7.38	(0%-20%)	HSC	02/05/14	16:59
Iron			20300		19200	mg/kg	5.30	(0%-20%)			

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QC Summary

Workorder: 342221

Client SDG: XP0044

Project Description: RC-232 Soil

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Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1363646										
Lead	BD	4.62	BD	6.59	mg/kg	35.0 ^		(+/-10.3)	JWJ	02/07/14	10:30
Magnesium		3990		3900	mg/kg	2.28		(0%-20%)	HSC	02/05/14	16:59
Manganese		265		259	mg/kg	1.93		(0%-20%)			
Molybdenum	B	0.240	B	0.333	mg/kg	32.5 ^		(+/-1.03)			
Nickel		9.42		9.55	mg/kg	1.32		(0%-20%)			
Potassium	D	1320	D	1280	mg/kg	3.02 ^		(+/-258)	JWJ	02/07/14	10:30
Silicon	*N	508	*	838	mg/kg	48.9*		(0%-20%)	HSC	02/05/14	16:59
Silver	U	0.104	U	0.103	mg/kg	N/A ^					
Sodium		170		165	mg/kg	2.74		(0%-20%)		02/07/14	13:24
Vanadium	D	62.6	D	57.1	mg/kg	9.17		(0%-20%)	JWJ	02/07/14	10:30
Zinc	D	39.7	D	36.3	mg/kg	8.86 ^		(+/-10.3)			
QC1203028288	LCS										
Aluminum		473		454	mg/kg		96.1	(80%-120%)	HSC	02/06/14	19:12
Antimony		47.3		50.0	mg/kg		106	(80%-120%)	JWJ	02/07/14	10:24
Arsenic		47.3		45.8	mg/kg		96.9	(80%-120%)	HSC	02/05/14	16:53
Barium		47.3		48.3	mg/kg		102	(80%-120%)			
Beryllium		47.3		50.3	mg/kg		107	(80%-120%)			
Boron		47.3		46.7	mg/kg		98.7	(80%-120%)			
Cadmium		47.3		48.2	mg/kg		102	(80%-120%)			
Calcium		473		505	mg/kg		107	(80%-120%)			
Chromium		47.3		44.3	mg/kg		93.8	(80%-120%)		02/06/14	19:12
Cobalt		47.3		48.3	mg/kg		102	(80%-120%)	JWJ	02/07/14	10:24

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QC Summary

Workorder: 342221

Client SDG: XP0044

Project Description: RC-232 Soil

Page 3 of 7

Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1363646										
Copper	47.3			49.8	mg/kg		105	(80%-120%)	HSC	02/05/14	16:53
Iron	473			507	mg/kg		107	(80%-120%)			
Lead	47.3			49.4	mg/kg		104	(80%-120%)	JWJ	02/07/14	10:24
Magnesium	473			520	mg/kg		110	(80%-120%)	HSC	02/05/14	16:53
Manganese	47.3			49.1	mg/kg		104	(80%-120%)			
Molybdenum	47.3			48.0	mg/kg		101	(80%-120%)			
Nickel	47.3			49.4	mg/kg		105	(80%-120%)			
Potassium	473			493	mg/kg		104	(80%-120%)	JWJ	02/07/14	10:24
Silicon	473			417	mg/kg		88.3	(80%-120%)	HSC	02/05/14	16:53
Silver	47.3			48.4	mg/kg		102	(80%-120%)			
Sodium	473			458	mg/kg		96.8	(80%-120%)		02/07/14	13:18
Vanadium	47.3			49.0	mg/kg		104	(80%-120%)	JWJ	02/07/14	10:24
Zinc	47.3			50.5	mg/kg		107	(80%-120%)			
QC1203028287	MB										
Aluminum			U	6.48	mg/kg				HSC	02/06/14	19:09
Antimony			B	0.373	mg/kg				JWJ	02/07/14	10:21
Arsenic			U	0.476	mg/kg				HSC	02/05/14	16:50
Barium			U	0.0952	mg/kg						
Beryllium			U	0.0952	mg/kg						
Boron			U	0.952	mg/kg						
Cadmium			U	0.0952	mg/kg						
Calcium			U	7.62	mg/kg						

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QC Summary

Workorder: 342221

Client SDG: XP0044

Project Description: RC-232 Soil

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Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1363646										
Chromium			U	0.143	mg/kg				HSC	02/06/14	19:09
Cobalt			U	0.143	mg/kg				JWJ	02/07/14	10:21
Copper			U	0.286	mg/kg				HSC	02/05/14	16:50
Iron			U	7.62	mg/kg						
Lead			U	0.314	mg/kg				JWJ	02/07/14	10:21
Magnesium			U	8.10	mg/kg				HSC	02/05/14	16:50
Manganese			U	0.190	mg/kg						
Molybdenum			U	0.190	mg/kg						
Nickel			U	0.143	mg/kg						
Potassium			B	8.95	mg/kg				JWJ	02/07/14	10:21
Silicon			U	1.43	mg/kg				HSC	02/05/14	16:50
Silver			U	0.0952	mg/kg						
Sodium			B	-9.48	mg/kg					02/07/14	13:15
Vanadium			U	0.0952	mg/kg				JWJ	02/07/14	10:21
Zinc			B	0.739	mg/kg						
QC1203028290 342221001 MS											
Aluminum	523	M		4690		5710	mg/kg	N/A (75%-125%)	HSC	02/06/14	19:21
Antimony	52.3	DU		3.43	D	49.4	mg/kg	94.5 (75%-125%)	JWJ	02/07/14	10:33
Arsenic	52.3	B		1.51		52.8	mg/kg	98.1 (75%-125%)	HSC	02/05/14	17:02
Barium	52.3			48.2		114	mg/kg	125 (75%-125%)			
Beryllium	52.3			0.701		55.3	mg/kg	104 (75%-125%)			
Boron	52.3	U		1.04		50.8	mg/kg	97.2 (75%-125%)			

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QC Summary

Workorder: 342221

Client SDG: XP0044

Project Description: RC-232 Soil

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Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1363646										
Cadmium	52.3	U	0.104		51.4	mg/kg	98.1	(75%-125%)	HSC	02/05/14	17:02
Calcium	523		4950		6470	mg/kg	N/A	(75%-125%)			
Chromium	52.3		8.21		55.9	mg/kg	91.1	(75%-125%)		02/06/14	19:21
Cobalt	52.3	D	11.5	D	66.1	mg/kg	104	(75%-125%)	JWJ	02/07/14	10:33
Copper	52.3		11.6		68.6	mg/kg	109	(75%-125%)	HSC	02/05/14	17:02
Iron	523		20300		21100	mg/kg	N/A	(75%-125%)			
Lead	52.3	BD	4.62	D	61.6	mg/kg	109	(75%-125%)	JWJ	02/07/14	10:33
Magnesium	523		3990		5010	mg/kg	N/A	(75%-125%)	HSC	02/05/14	17:02
Manganese	52.3		265		333	mg/kg	N/A	(75%-125%)			
Molybdenum	52.3	B	0.240		52.3	mg/kg	99.5	(75%-125%)			
Nickel	52.3		9.42		63.5	mg/kg	103	(75%-125%)			
Potassium	523	D	1320	D	1750	mg/kg	82.3	(75%-125%)	JWJ	02/07/14	10:33
Silicon	523	*N	508	N	797	mg/kg	55.1*	(75%-125%)	HSC	02/05/14	17:02
Silver	52.3	U	0.104		52.8	mg/kg	101	(75%-125%)			
Sodium	523		170		707	mg/kg	103	(75%-125%)		02/07/14	13:27
Vanadium	52.3	D	62.6	D	119	mg/kg	108	(75%-125%)	JWJ	02/07/14	10:33
Zinc	52.3	D	39.7	D	96.9	mg/kg	109	(75%-125%)			
QC1203032463 342221001 PS											
Silicon	5000	*N	4900		14800	ug/L	198*	(80%-120%)	HSC	02/07/14	13:30
QC1203028291 342221001 SDILT											
Aluminum		M	45200	DM	10800	ug/L	19*	(0%-10%)		02/06/14	19:24
Antimony		DU	-7.49	DU	17.1	ug/L	N/A	(0%-10%)	JWJ	02/07/14	10:36
Arsenic		B	14.5	DU	2.60	ug/L	N/A	(0%-10%)	HSC	02/05/14	17:04

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QC Summary

Workorder: 342221

Client SDG: XP0044

Project Description: RC-232 Soil

Page 6 of 7

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1363646										
Barium		465	D	89.9	ug/L	3.24		(0%-10%)	HSC	02/05/14	17:04
Beryllium		6.75	D	1.87	ug/L	38.8		(0%-10%)			
Boron	U	0.114	DU	5.19	ug/L	N/A		(0%-10%)			
Cadmium	U	0.604	DU	0.519	ug/L	N/A		(0%-10%)			
Calcium		47700	D	9820	ug/L	2.9		(0%-10%)			
Chromium		79.1	D	15.5	ug/L	2.28		(0%-10%)		02/06/14	19:24
Cobalt	D	11.0	D	2.18	ug/L	1.52		(0%-10%)	JWJ	02/07/14	10:36
Copper		111	D	20.4	ug/L	8.24		(0%-10%)	HSC	02/05/14	17:04
Iron		195000	D	40300	ug/L	2.96		(0%-10%)			
Lead	BD	4.45	DU	17.1	ug/L	N/A		(0%-10%)	JWJ	02/07/14	10:36
Magnesium		38400	D	7870	ug/L	2.4		(0%-10%)	HSC	02/05/14	17:04
Manganese		2550	D	526	ug/L	3.28		(0%-10%)			
Molybdenum	B	2.31	DU	1.04	ug/L	N/A		(0%-10%)			
Nickel		90.8	D	18.2	ug/L	.022		(0%-10%)			
Potassium	D	1270	D	295	ug/L	16.3		(0%-10%)	JWJ	02/07/14	10:36
Silicon	*N	4900	D	978	ug/L	.126		(0%-10%)	HSC	02/05/14	17:04
Silver	U	-3.43	DU	0.519	ug/L	N/A		(0%-10%)			
Sodium		1630	D	501	ug/L	53.4		(0%-10%)		02/07/14	13:32
Vanadium	D	60.3	D	12.2	ug/L	1.16		(0%-10%)	JWJ	02/07/14	10:36
Zinc	D	38.3	D	7.78	ug/L	1.64		(0%-10%)			

Metals Analysis-Mercury
Batch 1363966

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QC Summary

Workorder: 342221 **Client SDG:** XP0044 **Project Description:** RC-232 Soil **Page 7 of 7**

Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-Mercury											
Batch 1363966											
QC1203029146	342221001	DUP									
Mercury		U	0.00431	U	0.00425	mg/kg	N/A ^		NOR1	02/04/14	10:30
QC1203029145	LCS										
Mercury			0.120		0.117	mg/kg	98	(80%-120%)		02/04/14	10:21
QC1203029144	MB										
Mercury				U	0.00384	mg/kg				02/04/14	10:20
QC1203029147	342221001	MS									
Mercury			0.126	U	0.00431	mg/kg	98.6	(80%-120%)		02/04/14	10:32
QC1203029148	342221001	SDILT									
Mercury				U	-0.011	DU	0.0216	ug/L	N/A	(0%-10%)	02/04/14 10:33

Notes:

The Qualifiers in this report are defined as follows:

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

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

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

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

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

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

Miscellaneous

Prep Logbook

Acid Digestion of Sediments, Sludges, and Soils

Batch ID:	1363645	Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
Analyst:	Monifa Basdeo	LCS	1203028288	Metals Spike Mix I	UI2047539-01	.25	mL
Method:	SW846 3050B	LCS	1203028288	Metals Spike Mix II	UI2065983-06	.25	mL
Lab SOP:	GL-MA-E-009 REV# 22	MS	1203028290	Metals Spike Mix I	UI2047539-01	.25	mL
Instrument:	BAL-001	MS	1203028290	Metals Spike Mix II	UI2065983-06	.25	mL
		MS	1203028293	Metals Spike Mix I	UI2047539-01	.25	mL
		MS	1203028293	Metals Spike Mix II	UI2065983-06	.25	mL

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)	pH Check
1203028287 MB	03-FEB-2014 10:00:27	Soil	0.525	50	95.2381	<2
1203028288 LCS	03-FEB-2014 10:00:27	Soil	0.529	50	94.51796	<2
342221001	03-FEB-2014 10:00:27	Soil	0.52	50	96.15385	<2
1203028289 DUP (342221001)	03-FEB-2014 10:00:27	Soil	0.523	50	95.60229	<2
1203028290 MS (342221001)	03-FEB-2014 10:00:27	Soil	0.516	50	96.89922	<2
1203028291 SDILT (342221001)	03-FEB-2014 10:00:27	Soil	0.52	50	96.15385	<2
342221002	03-FEB-2014 10:00:27	Soil	0.544	50	91.91176	<2
342221003	03-FEB-2014 10:00:27	Soil	0.524	50	95.41985	<2
342221004	03-FEB-2014 10:00:27	Soil	0.507	50	98.61933	<2
342221005	03-FEB-2014 10:00:27	Soil	0.548	50	91.24088	<2
342221006	03-FEB-2014 10:00:27	Soil	0.515	50	97.08738	<2
342221007	03-FEB-2014 10:00:27	Soil	0.53	50	94.33962	<2
342221008	03-FEB-2014 10:00:27	Soil	0.512	50	97.65625	<2
342221009	03-FEB-2014 10:00:27	Soil	0.52	50	96.15385	<2
342226001	03-FEB-2014 10:00:27	Soil	0.571	50	87.56567	<2
1203028292 DUP (342226001)	03-FEB-2014 10:00:27	Soil	0.501	50	99.8004	<2
1203028293 MS (342226001)	03-FEB-2014 10:00:27	Soil	0.509	50	98.23183	<2
1203028294 SDILT (342226001)	03-FEB-2014 10:00:27	Soil	0.571	50	87.56567	<2
342226002	03-FEB-2014 10:00:27	Soil	0.529	50	94.51796	<2
342226003	03-FEB-2014 10:00:27	Soil	0.517	50	96.7118	<2
342226004	03-FEB-2014 10:00:27	Soil	0.548	50	91.24088	<2
342226005	03-FEB-2014 10:00:27	Soil	0.564	50	88.65248	<2
342226006	03-FEB-2014 10:00:27	Soil	0.562	50	88.96797	<2
342226007	03-FEB-2014 10:00:27	Soil	0.528	50	94.69697	<2
342226008	03-FEB-2014 10:00:27	Soil	0.53	50	94.33962	<2

Prep Logbook

Batch ID: 1363645
Analyst: Monifa Basdeo
Method: SW846 3050B
Lab SOP: GL-MA-E-009 REV# 22
Instrument: BAL-001

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1203028288	Metals Spike Mix I	UI2047539-01	.25	mL
LCS	1203028288	Metals Spike Mix II	UI2065983-06	.25	mL
MS	1203028290	Metals Spike Mix I	UI2047539-01	.25	mL
MS	1203028290	Metals Spike Mix II	UI2065983-06	.25	mL
MS	1203028293	Metals Spike Mix I	UI2047539-01	.25	mL
MS	1203028293	Metals Spike Mix II	UI2065983-06	.25	mL

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)	pH Check
342226009	03-FEB-2014 10:00:27	Soil	0.5	50	100	<2
342226010	03-FEB-2014 10:00:27	Soil	0.559	50	89.44544	<2
342226011	03-FEB-2014 10:00:27	Soil	0.507	50	98.61933	<2

Reagent/Solvent Lot ID	Description	Amount	Comments:
1961850	Concentrated Nitric Acid	1.25 mL	Block Temperature: 93 C
2056579	HYDROCHLORIC ACID	10 mL	Thermometer ID: 119015 Hot Block ID: 13 qc is a multi-colored granular solid.

Prep Logbook

Acid Digestion of Sediments, Sludges, and Soils

Batch ID:	1363688	Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
Analyst:	Monifa Basdeo	LCS	1203028392	ICP-MS spiking soluiton A	UI1960544-A	.25	mL
Method:	SW846 3050B	LCS	1203028392	ICP-MS spiking solution B	UI1960549-B	.25	mL
Lab SOP:	GL-MA-E-009 REV# 22	MS	1203028394	ICP-MS spiking soluiton A	UI1960544-A	.25	mL
Instrument:	BAL-001	MS	1203028394	ICP-MS spiking solution B	UI1960549-B	.25	mL
		MS	1203028397	ICP-MS spiking soluiton A	UI1960544-A	.25	mL
		MS	1203028397	ICP-MS spiking solution B	UI1960549-B	.25	mL

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)
1203028391 MB	03-FEB-2014 10:00:27	Soil	0.536	50	93.28358
1203028392 LCS	03-FEB-2014 10:00:27	Soil	0.533	50	93.80863
342221001	03-FEB-2014 10:00:27	Soil	0.508	50	98.4252
1203028393 DUP (342221001)	03-FEB-2014 10:00:27	Soil	0.537	50	93.10987
1203028394 MS (342221001)	03-FEB-2014 10:00:27	Soil	0.557	50	89.76661
1203028395 SDILT (342221001)	03-FEB-2014 10:00:27	Soil	0.508	50	98.4252
342221002	03-FEB-2014 10:00:27	Soil	0.577	50	86.65511
342221003	03-FEB-2014 10:00:27	Soil	0.554	50	90.25271
342221004	03-FEB-2014 10:00:27	Soil	0.58	50	86.2069
342221005	03-FEB-2014 10:00:27	Soil	0.509	50	98.23183
342221006	03-FEB-2014 10:00:27	Soil	0.54	50	92.59259
342221007	03-FEB-2014 10:00:27	Soil	0.545	50	91.74312
342221008	03-FEB-2014 10:00:27	Soil	0.549	50	91.07468
342221009	03-FEB-2014 10:00:27	Soil	0.556	50	89.92806
342226001	03-FEB-2014 10:00:27	Soil	0.54	50	92.59259
1203028396 DUP (342226001)	03-FEB-2014 10:00:27	Soil	0.539	50	92.76438
1203028397 MS (342226001)	03-FEB-2014 10:00:27	Soil	0.516	50	96.89922
1203028398 SDILT (342226001)	03-FEB-2014 10:00:27	Soil	0.54	50	92.59259
342226002	03-FEB-2014 10:00:27	Soil	0.514	50	97.27626
342226003	03-FEB-2014 10:00:27	Soil	0.51	50	98.03922
342226004	03-FEB-2014 10:00:27	Soil	0.556	50	89.92806
342226005	03-FEB-2014 10:00:27	Soil	0.551	50	90.7441
342226006	03-FEB-2014 10:00:27	Soil	0.514	50	97.27626
342226007	03-FEB-2014 10:00:27	Soil	0.517	50	96.7118
342226008	03-FEB-2014 10:00:27	Soil	0.518	50	96.5251

Prep Logbook

Batch ID: 1363688
Analyst: Monifa Basdeo
Method: SW846 3050B
Lab SOP: GL-MA-E-009 REV# 22
Instrument: BAL-001

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1203028392	ICP-MS spiking soluiton A	UI1960544-A	.25	mL
LCS	1203028392	ICP-MS spiking solution B	UI1960549-B	.25	mL
MS	1203028394	ICP-MS spiking soluiton A	UI1960544-A	.25	mL
MS	1203028394	ICP-MS spiking solution B	UI1960549-B	.25	mL
MS	1203028397	ICP-MS spiking soluiton A	UI1960544-A	.25	mL
MS	1203028397	ICP-MS spiking solution B	UI1960549-B	.25	mL

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)
342226009	03-FEB-2014 10:00:27	Soil	0.519	50	96.33911
342226010	03-FEB-2014 10:00:27	Soil	0.58	50	86.2069
342226011	03-FEB-2014 10:00:27	Soil	0.544	50	91.91176

Reagent/Solvent Lot ID	Description	Amount	Comments:
1961850	Concentrated Nitric Acid	5 mL	Block Temperature: 94 C
1976094-02	Hydrogen Peroxide 30%	1.5 mL	Thermometer ID: 118680 Hot Block ID: 14 342221001 is a multi colored granular solid. 342226001 is dark colored brown granular solid.

Prep Logbook

Mercury Analysis Using the Perkin Elmer Automated Mercury Analyzer

Batch ID: 1363965	<u>Type</u>	<u>Sample Id</u>	<u>Description</u>	<u>Serial Number</u>	<u>Spike Amount</u>	<u>Spike Units</u>
Analyst: Alan Stanley	LCS	1203029145	MHGSOILMSSPIKE	WHG140203-14	.3	mL
Method: SW846 7471B Prep	MS	1203029147	MHGSOILMSSPIKE	WHG140203-14	.3	mL
Lab SOP: GL-MA-E-010 REV# 27						
Instrument: Metals Manual Instrument						

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)
1203029144 MB	03-FEB-2014 16:19:07	Soil	0.524	30	57.25191
1203029145 LCS	03-FEB-2014 16:19:07	Soil	0.501	30	59.88024
342184001	03-FEB-2014 16:19:07	Misc Solid	0.53	30	56.60377
342221001	03-FEB-2014 16:19:07	Soil	0.503	30	59.64215
1203029146 DUP (342221001)	03-FEB-2014 16:19:07	Soil	0.51	30	58.82353
1203029147 MS (342221001)	03-FEB-2014 16:19:07	Soil	0.514	30	58.36576
1203029148 SDILT (342221001)	03-FEB-2014 16:19:07	Soil	0.503	30	59.64215
342221002	03-FEB-2014 16:19:07	Soil	0.5	30	60
342221003	03-FEB-2014 16:19:07	Soil	0.525	30	57.14286
342221004	03-FEB-2014 16:19:07	Soil	0.504	30	59.52381
342221005	03-FEB-2014 16:19:07	Soil	0.55	30	54.54545
342221006	03-FEB-2014 16:19:07	Soil	0.555	30	54.05405
342221007	03-FEB-2014 16:19:07	Soil	0.508	30	59.05512
342221008	03-FEB-2014 16:19:07	Soil	0.537	30	55.86592
342221009	03-FEB-2014 16:19:07	Soil	0.511	30	58.70841

Reagent/Solvent Lot ID	Description	Amount	Comments:
1968546-C	5% KMnO4 solution	7.5 mL	Digestion Start Date: 03-FEB-2014 16:19
1982278-C	Hg reducing agent	2 mL	Digestion End Date: 03-FEB-2014 16:49
2055709-1	NITRIC ACID	.375 mL	Block Temperature: 95 C
2058346-A	Hydrochloric Acid Conc.	1.125 mL	Thermometer ID: 119131
WHG140131-08	Mercury Working Standard 1st Source CAL S 0.5	75 uL	Hot Block ID: 6
WHG140203-07	Mercury Working Standard 1st Source CAL S 0.2/CRA	30 uL	The QC was a sand and soil like material.
WHG140203-09	Mercury Working 1st Source CAL S 2.0	300 uL	
WHG140203-10	Mercury Working 1st Source CAL S 5.0/CCV	750 uL	

Prep Logbook

Batch ID: 1363965
Analyst: Alan Stanley
Method: SW846 7471B Prep
Lab SOP: GL-MA-E-010 REV# 27
Instrument: Metals Manual Instrument

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1203029145	MHGSOILMSSPIKE	WHG140203-14	.3	mL
MS	1203029147	MHGSOILMSSPIKE	WHG140203-14	.3	mL

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)
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Reagent/Solvent Lot ID	Description	Amount	Comments:
WHG140203-11	Mercury Working 1st Source CAL S 10.0	1500 uL	
WHG140203-12	Mercury Working 2nd Source S 5.0/ICV	750 uL	

General Chem Analysis

Case Narrative

**General Chemistry Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0044**

Method/Analysis Information

Product: Cyanide and Total
Analytical Batch: 1363948 **Method:** SW9012B Cyanide and Total
Prep Batch : 1363947 **Method:** SSW846 9010C Distillation

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 9012B:

Sample ID	Client ID
342221001	J1T5P8
342221002	J1T5P9
342221003	J1T5R0
342221004	J1T5R1
342221005	J1T5R2
342221006	J1T5R3
342221007	J1T5R4
342221008	J1T5R5
1203029094	Method Blank (MB)
1203029096	342221002(J1T5P9) Sample Duplicate (DUP)
1203029098	342221002(J1T5P9) Matrix Spike (MS)
1203029099	Laboratory Control Sample (LCS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-095 REV# 17.

Preparation/Analytical Method Verification

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

Calibration Information

The Flow Injection analysis was performed on a Lachat QuickChem FIA+ 8000 Series.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

All continuing calibration blanks (CCBs) associated with reported data from this batch were within acceptance limits.

Calibration Verification Information (CCV)

All continuing calibration verification standards (CCVs) associated with reported data from this batch were within acceptance limits.

Y Intercept Rule

The absolute value of the intercept is less than 3 times the MDL.

Quality Control (QC) Information**Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 342221002 (J1T5P9).

Matrix Spike (MS)/Post Spike (PS) Recovery Statement

The MS/PS recovery for this sample set was within the required acceptance limits.

Duplicate Relative Percent Difference (RPD) Statement

The RPD between the sample and its duplicate met the acceptance limits.

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

All the samples from this sample group met the preservation and integrity requirements of the method.

Sample Dilutions

The following sample in this sample group was diluted due to high concentration: 1203029099 (LCS).

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Method/Analysis Information

Product: Ion Chromatography
Analytical Batch: 1363618 **Method:** SW846 9056A Anions
Prep Batch : 1363617 **Method:** SW846 9056A

Sample Analysis

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

Sample ID	Client ID
342221001	J1T5P8
342221002	J1T5P9
342221003	J1T5R0
342221004	J1T5R1
342221005	J1T5R2
342221006	J1T5R3
342221007	J1T5R4
342221008	J1T5R5
1203028212	Method Blank (MB)
1203028213	342221008(J1T5R5) Sample Duplicate (DUP)
1203028214	342221008(J1T5R5) Matrix Spike (MS)
1203028215	Laboratory Control Sample (LCS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-086 REV# 22.

Preparation/Analytical Method Verification

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

Calibration Information

The Ion Chromatography analysis was performed on a Dionex ICS-5000 Ion Chromatograph.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

All continuing calibration blanks (CCBs) associated with reported data from this batch were within acceptance limits.

Calibration Verification Information (CCV)

All continuing calibration verification standards (CCVs) associated with reported data from this batch were within acceptance limits.

Y Intercept Rule

The absolute value of the intercept is less than 3 times the MDL.

Quality Control (QC) Information**Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 342221008 (J1T5R5).

Matrix Spike (MS)/Post Spike (PS) Recovery Statement

The MS/PS recovery for this sample set was within the required acceptance limits.

Duplicate Relative Percent Difference (RPD) Statement

The RPD between the sample and its duplicate met the acceptance limits.

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The following sample in this sample group was diluted due to high concentration: 342221002 (J1T5P9).

Sample Re-analysis

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

Miscellaneous Information**Data Exception (DER) Documentation**

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

Manual Integrations

The following samples from this sample group had to be manually integrated due to errors in the instrument software

peak integration: 1203028213 (J1T5R5), 342221001 (J1T5P8), 342221002 (J1T5P9), 342221003 (J1T5R0), 342221004 (J1T5R1), 342221005 (J1T5R2), 342221006 (J1T5R3) and 342221008 (J1T5R5).

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Method/Analysis Information

Product: Nitrate + Nitrite
Analytical Batch: 1364255 **Method:** EPA 353.2 Nitrogen and Nitrate/Nitrite
Prep Batch : 1364254 **Method:** EEPA 353.2 Modified

Sample Analysis

The following samples were analyzed using the analytical protocol as established in EPA 353.2 Modified:

Sample ID	Client ID
342221001	J1T5P8
342221002	J1T5P9
342221003	J1T5R0
342221004	J1T5R1
342221005	J1T5R2
342221006	J1T5R3
342221007	J1T5R4
342221008	J1T5R5
1203029863	Method Blank (MB)
1203029864	Laboratory Control Sample (LCS)
1203029865	342221001(J1T5P8) Sample Duplicate (DUP)
1203029866	342221001(J1T5P8) Matrix Spike (MS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-128 REV# 8.

Preparation/Analytical Method Verification

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

Calibration Information

The Nutrient analysis was performed on a Lachat QuickChem FIA+ 8500 Series.

Calibration Verification Information

All associated calibration verification standard(s) (ICV or CCV) met the acceptance criteria.

Continuing Calibration Blanks

All continuing calibration blanks (CCBs) associated with reported data from this batch were within acceptance limits.

Y Intercept Rule

The absolute value of the intercept is less than 3 times the MDL.

Quality Control (QC) Information**Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 342221001 (J1T5P8).

Matrix Spike (MS)/Post Spike (PS) Recovery Statement

The MS/PS recovery for this sample set was within the required acceptance limits.

Duplicate Relative Percent Difference (RPD) Statement

The RPD between the sample and its duplicate met the acceptance limits.

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information**Data Exception (DER) Documentation**

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an

effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted: Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

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: 13Feb14

Sample Data Summary

GEL LABORATORIES LLC

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

**Certificate of Analysis Report
for**

WCHN001 WC-HANFORD, INC.

Client SDG: XP0044 GEL Work Order: 342221 Project: RC-232 Soil

The Qualifiers in this report are defined as follows:

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

D Results are reported from a diluted aliquot of sample.

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

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

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

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

Reviewed by _____

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: February 10, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5P8
 Sample ID: 342221001
 Matrix: SOIL
 Collect Date: 29-JAN-14 15:09
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 7.37%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Flow Injection Analysis											
SW9012B Cyanide, Total "Dry Weight Corrected"											
Cyanide, Total	U	77.7	77.7	233	ug/kg	1	AXH3	02/04/14	1244	1363948	1
Ion Chromatography											
SW846 9056A Anions "Dry Weight Corrected"											
Bromide	U	0.714	0.714	2.13	mg/kg	1	DM	01/31/14	1922	1363618	2
Chloride		5.96	0.714	2.13	mg/kg	1					
Fluoride		1.52	0.352	1.07	mg/kg	1					
Nitrate-N	B	1.06	0.352	1.07	mg/kg	1					
Nitrite-N	U	0.352	0.352	1.07	mg/kg	1					
O-Phosphate as P	U	0.714	0.714	2.13	mg/kg	1					
Sulfate		169	1.42	4.27	mg/kg	1					
Nutrient Analysis											
EPA 353.2 Nitrogen, Nitrate/Nitrite "Dry Weight Corrected"											
Nitrogen, Nitrate/Nitrite	U	0.184	0.184	0.540	mg/kg	1	KLP1	02/04/14	1534	1364255	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 353.2 Modified	EPA 353.2 Modified Nitrate/Nitrite	AXH3	02/04/14	1430	1364254
SW846 9010C Distillation	SW846 9010C Prep	AXH3	02/04/14	0903	1363947
SW846 9056A	SW846 9056A Total Anions in Soil	DM	01/31/14	1315	1363617

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9012B	
2	SW846 9056A	
3	EPA 353.2 Modified	

Notes:

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: February 10, 2014

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

Client SDG: XP0044

Client Sample ID: J1T5P9
 Sample ID: 342221002
 Matrix: SOIL
 Collect Date: 29-JAN-14 14:48
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 5.77%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Flow Injection Analysis											
SW9012B Cyanide, Total "Dry Weight Corrected"											
Cyanide, Total	U	83.6	83.6	250	ug/kg	1	AXH3	02/04/14	1245	1363948	1
Ion Chromatography											
SW846 9056A Anions "Dry Weight Corrected"											
Bromide	U	0.711	0.711	2.12	mg/kg	1	DM	01/31/14	1953	1363618	2
Chloride	B	0.799	0.711	2.12	mg/kg	1					
Fluoride	B	0.675	0.350	1.06	mg/kg	1					
Nitrate-N	U	0.350	0.350	1.06	mg/kg	1					
Nitrite-N	U	0.350	0.350	1.06	mg/kg	1					
O-Phosphate as P	U	0.711	0.711	2.12	mg/kg	1					
Sulfate	D	359	7.06	21.2	mg/kg	5	DM	02/04/14	1325	1363618	3
Nutrient Analysis											
EPA 353.2 Nitrogen, Nitrate/Nitrite "Dry Weight Corrected"											
Nitrogen, Nitrate/Nitrite	U	0.175	0.175	0.514	mg/kg	1	KLP1	02/04/14	1537	1364255	4

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 353.2 Modified	EPA 353.2 Modified Nitrate/Nitrite	AXH3	02/04/14	1430	1364254
SW846 9010C Distillation	SW846 9010C Prep	AXH3	02/04/14	0903	1363947
SW846 9056A	SW846 9056A Total Anions in Soil	DM	01/31/14	1315	1363617

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9012B	
2	SW846 9056A	
3	SW846 9056A	
4	EPA 353.2 Modified	

Notes:

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: February 10, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5R0
 Sample ID: 342221003
 Matrix: SOIL
 Collect Date: 29-JAN-14 14:36
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 6.08%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Flow Injection Analysis											
SW9012B Cyanide, Total "Dry Weight Corrected"											
Cyanide, Total	U	76.6	76.6	229	ug/kg	1	AXH3	02/04/14	1248	1363948	1
Ion Chromatography											
SW846 9056A Anions "Dry Weight Corrected"											
Bromide	U	0.705	0.705	2.10	mg/kg	1	DM	01/31/14	2025	1363618	2
Chloride	B	0.750	0.705	2.10	mg/kg	1					
Fluoride	B	0.910	0.347	1.05	mg/kg	1					
Nitrate-N	B	0.454	0.347	1.05	mg/kg	1					
Nitrite-N	U	0.347	0.347	1.05	mg/kg	1					
O-Phosphate as P	U	0.705	0.705	2.10	mg/kg	1					
Sulfate		169	1.40	4.21	mg/kg	1					
Nutrient Analysis											
EPA 353.2 Nitrogen, Nitrate/Nitrite "Dry Weight Corrected"											
Nitrogen, Nitrate/Nitrite	U	0.176	0.176	0.518	mg/kg	1	KLP1	02/04/14	1538	1364255	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 353.2 Modified	EPA 353.2 Modified Nitrate/Nitrite	AXH3	02/04/14	1430	1364254
SW846 9010C Distillation	SW846 9010C Prep	AXH3	02/04/14	0903	1363947
SW846 9056A	SW846 9056A Total Anions in Soil	DM	01/31/14	1315	1363617

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9012B	
2	SW846 9056A	
3	EPA 353.2 Modified	

Notes:

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: February 10, 2014

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

Client SDG: XP0044

Client Sample ID: J1T5R1
 Sample ID: 342221004
 Matrix: SOIL
 Collect Date: 29-JAN-14 13:51
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 12.7%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Flow Injection Analysis											
SW9012B Cyanide, Total "Dry Weight Corrected"											
Cyanide, Total	U	81.1	81.1	243	ug/kg	1	AXH3	02/04/14	1253	1363948	1
Ion Chromatography											
SW846 9056A Anions "Dry Weight Corrected"											
Bromide	U	0.753	0.753	2.25	mg/kg	1	DM	01/31/14	2056	1363618	2
Chloride	B	0.844	0.753	2.25	mg/kg	1					
Fluoride	B	0.498	0.371	1.12	mg/kg	1					
Nitrate-N	U	0.371	0.371	1.12	mg/kg	1					
Nitrite-N	U	0.371	0.371	1.12	mg/kg	1					
O-Phosphate as P	U	0.753	0.753	2.25	mg/kg	1					
Sulfate	B	2.53	1.49	4.49	mg/kg	1					
Nutrient Analysis											
EPA 353.2 Nitrogen, Nitrate/Nitrite "Dry Weight Corrected"											
Nitrogen, Nitrate/Nitrite	U	0.192	0.192	0.566	mg/kg	1	KLP1	02/04/14	1539	1364255	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 353.2 Modified	EPA 353.2 Modified Nitrate/Nitrite	AXH3	02/04/14	1430	1364254
SW846 9010C Distillation	SW846 9010C Prep	AXH3	02/04/14	0903	1363947
SW846 9056A	SW846 9056A Total Anions in Soil	DM	01/31/14	1315	1363617

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9012B	
2	SW846 9056A	
3	EPA 353.2 Modified	

Notes:

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: February 10, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5R2
 Sample ID: 342221005
 Matrix: SOIL
 Collect Date: 29-JAN-14 14:03
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 8.58%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Flow Injection Analysis											
SW9012B Cyanide, Total "Dry Weight Corrected"											
Cyanide, Total	B	161	89.5	268	ug/kg	1	AXH3	02/04/14	1254	1363948	1
Ion Chromatography											
SW846 9056A Anions "Dry Weight Corrected"											
Bromide	U	0.722	0.722	2.16	mg/kg	1	DM	01/31/14	2128	1363618	2
Chloride		13.3	0.722	2.16	mg/kg	1					
Fluoride	B	0.550	0.356	1.08	mg/kg	1					
Nitrate-N		14.4	0.356	1.08	mg/kg	1					
Nitrite-N	U	0.356	0.356	1.08	mg/kg	1					
O-Phosphate as P		9.55	0.722	2.16	mg/kg	1					
Sulfate		40.1	1.43	4.31	mg/kg	1					
Nutrient Analysis											
EPA 353.2 Nitrogen, Nitrate/Nitrite "Dry Weight Corrected"											
Nitrogen, Nitrate/Nitrite		9.27	0.180	0.530	mg/kg	1	KLP1	02/04/14	1540	1364255	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 353.2 Modified	EPA 353.2 Modified Nitrate/Nitrite	AXH3	02/04/14	1430	1364254
SW846 9010C Distillation	SW846 9010C Prep	AXH3	02/04/14	0903	1363947
SW846 9056A	SW846 9056A Total Anions in Soil	DM	01/31/14	1315	1363617

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9012B	
2	SW846 9056A	
3	EPA 353.2 Modified	

Notes:

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Certificate of Analysis

Report Date: February 10, 2014

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

Client SDG: XP0044

Client Sample ID: J1T5R3
 Sample ID: 342221006
 Matrix: SOIL
 Collect Date: 29-JAN-14 13:26
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 16.1%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Flow Injection Analysis											
SW9012B Cyanide, Total "Dry Weight Corrected"											
Cyanide, Total	B	202	88.9	266	ug/kg	1	AXH3	02/04/14	1254	1363948	1
Ion Chromatography											
SW846 9056A Anions "Dry Weight Corrected"											
Bromide	U	0.781	0.781	2.33	mg/kg	1	DM	01/31/14	2159	1363618	2
Chloride	B	1.22	0.781	2.33	mg/kg	1					
Fluoride	B	0.732	0.385	1.17	mg/kg	1					
Nitrate-N		2.24	0.385	1.17	mg/kg	1					
Nitrite-N	U	0.385	0.385	1.17	mg/kg	1					
O-Phosphate as P		9.44	0.781	2.33	mg/kg	1					
Sulfate		8.68	1.55	4.66	mg/kg	1					
Nutrient Analysis											
EPA 353.2 Nitrogen, Nitrate/Nitrite "Dry Weight Corrected"											
Nitrogen, Nitrate/Nitrite		1.75	0.201	0.590	mg/kg	1	KLP1	02/04/14	1541	1364255	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 353.2 Modified	EPA 353.2 Modified Nitrate/Nitrite	AXH3	02/04/14	1430	1364254
SW846 9010C Distillation	SW846 9010C Prep	AXH3	02/04/14	0903	1363947
SW846 9056A	SW846 9056A Total Anions in Soil	DM	01/31/14	1315	1363617

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9012B	
2	SW846 9056A	
3	EPA 353.2 Modified	

Notes:

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: February 10, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5R4
 Sample ID: 342221007
 Matrix: SOIL
 Collect Date: 29-JAN-14 11:36
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 10.6%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
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Flow Injection Analysis

SW9012B Cyanide, Total "Dry Weight Corrected"

Cyanide, Total	U	88.1	88.1	264	ug/kg	1	AXH3	02/04/14	1255	1363948	1
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Ion Chromatography

SW846 9056A Anions "Dry Weight Corrected"

Bromide	U	0.749	0.749	2.24	mg/kg	1	DM	01/31/14	2231	1363618	2
Chloride	B	1.32	0.749	2.24	mg/kg	1					
Fluoride		1.34	0.369	1.12	mg/kg	1					
Nitrate-N		1.65	0.369	1.12	mg/kg	1					
Nitrite-N	U	0.369	0.369	1.12	mg/kg	1					
O-Phosphate as P	B	1.04	0.749	2.24	mg/kg	1					
Sulfate		4.56	1.49	4.47	mg/kg	1					

Nutrient Analysis

EPA 353.2 Nitrogen, Nitrate/Nitrite "Dry Weight Corrected"

Nitrogen, Nitrate/Nitrite		0.638	0.184	0.540	mg/kg	1	KLP1	02/04/14	1547	1364255	3
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The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 353.2 Modified	EPA 353.2 Modified Nitrate/Nitrite	AXH3	02/04/14	1430	1364254
SW846 9010C Distillation	SW846 9010C Prep	AXH3	02/04/14	0903	1363947
SW846 9056A	SW846 9056A Total Anions in Soil	DM	01/31/14	1315	1363617

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9012B	
2	SW846 9056A	
3	EPA 353.2 Modified	

Notes:

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: February 10, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0044

Client Sample ID: J1T5R5
 Sample ID: 342221008
 Matrix: SOIL
 Collect Date: 29-JAN-14 11:36
 Receive Date: 31-JAN-14
 Collector: Client
 Moisture: 10.1%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
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Flow Injection Analysis

SW9012B Cyanide, Total "Dry Weight Corrected"

Cyanide, Total	U	72.6	72.6	217	ug/kg	1	AXH3	02/04/14	1256	1363948	1
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Ion Chromatography

SW846 9056A Anions "Dry Weight Corrected"

Bromide	U	0.738	0.738	2.20	mg/kg	1	DM	02/01/14	0005	1363618	2
Chloride	B	1.20	0.738	2.20	mg/kg	1					
Fluoride		1.18	0.364	1.10	mg/kg	1					
Nitrate-N		1.65	0.364	1.10	mg/kg	1					
Nitrite-N	U	0.364	0.364	1.10	mg/kg	1					
O-Phosphate as P	B	1.30	0.738	2.20	mg/kg	1					
Sulfate		4.45	1.47	4.41	mg/kg	1					

Nutrient Analysis

EPA 353.2 Nitrogen, Nitrate/Nitrite "Dry Weight Corrected"

Nitrogen, Nitrate/Nitrite		0.636	0.174	0.512	mg/kg	1	KLP1	02/04/14	1548	1364255	3
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The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 353.2 Modified	EPA 353.2 Modified Nitrate/Nitrite	AXH3	02/04/14	1430	1364254
SW846 9010C Distillation	SW846 9010C Prep	AXH3	02/04/14	0903	1363947
SW846 9056A	SW846 9056A Total Anions in Soil	DM	01/31/14	1315	1363617

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9012B	
2	SW846 9056A	
3	EPA 353.2 Modified	

Notes:

Quality Control Summary

GEL LABORATORIES LLC

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QC Summary

Report Date: February 10, 2014

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

Contact: Joan Kessner

Workorder: 342221

Client SDG: XP0044

Project Description: RC-232 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Flow Injection Analysis											
Batch	1363948										
QC1203029096	342221002	DUP									
Cyanide, Total		U	83.6	U	85.2	ug/kg	N/A ^		AXH3	02/04/14	12:46
QC1203029099	LCS										
Cyanide, Total	90600			D	94700	ug/kg		105 (68%-140%)		02/04/14	12:28
QC1203029094	MB										
Cyanide, Total				U	83.5	ug/kg				02/04/14	12:27
QC1203029098	342221002	MS									
Cyanide, Total	4650	U	83.6		4060	ug/kg		87.3 (55%-125%)		02/04/14	12:47
Ion Chromatography											
Batch	1363618										
QC1203028213	342221008	DUP									
Bromide		U	0.738	U	0.738	mg/kg	N/A ^		DM	02/01/14	00:36
Chloride		B	1.20	B	1.27	mg/kg	6.24 ^	(+/-2.20)			
Fluoride			1.18		1.17	mg/kg	1.22 ^	(+/-1.10)			
Nitrate-N			1.65		1.70	mg/kg	2.83 ^	(+/-1.10)			
Nitrite-N		U	0.364	U	0.364	mg/kg	N/A ^				
O-Phosphate as P		B	1.30	B	1.26	mg/kg	2.92 ^	(+/-2.20)			
Sulfate			4.45	B	4.40	mg/kg	1.25 ^	(+/-4.41)			
QC1203028215	LCS										
Bromide	12.5				12.3	mg/kg		98.4 (90%-110%)		01/31/14	18:51
Chloride	50.0				47.0	mg/kg		94 (90%-110%)			
Fluoride	25.0				24.2	mg/kg		97 (90%-110%)			
Nitrate-N	25.0				24.1	mg/kg		96.5 (90%-110%)			
Nitrite-N	25.0				23.9	mg/kg		95.5 (90%-110%)			
O-Phosphate as P	12.5				12.1	mg/kg		97.2 (90%-110%)			

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QC Summary

Workorder: 342221

Client SDG: XP0044

Project Description: RC-232 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1363618										
Sulfate	100			98.7	mg/kg		98.7	(90%-110%)	DM	01/31/14	18:51
QC1203028212 MB											
Bromide			U	0.670	mg/kg					01/31/14	18:19
Chloride			U	0.670	mg/kg						
Fluoride			U	0.330	mg/kg						
Nitrate-N			U	0.330	mg/kg						
Nitrite-N			U	0.330	mg/kg						
O-Phosphate as P			U	0.670	mg/kg						
Sulfate			U	1.33	mg/kg						
QC1203028214 342221008 MS											
Bromide	13.8	U	0.738	14.0	mg/kg		101	(70%-134%)		02/01/14	01:08
Chloride	55.2	B	1.20	54.5	mg/kg		96.5	(46%-150%)			
Fluoride	27.6		1.18	25.6	mg/kg		88.5	(34%-134%)			
Nitrate-N	27.6		1.65	29.1	mg/kg		99.3	(68%-129%)			
Nitrite-N	27.6	U	0.364	27.4	mg/kg		99.4	(68%-130%)			
O-Phosphate as P	13.8	B	1.30	14.1	mg/kg		92.4	(26%-124%)			
Sulfate	110		4.45	117	mg/kg		102	(50%-151%)			
Nutrient Analysis											
Batch	1364255										
QC1203029865 342221001 DUP											
Nitrogen, Nitrate/Nitrite		U	0.184	U	0.176	mg/kg	N/A ^		KLP1	02/04/14	15:35
QC1203029864 LCS											
Nitrogen, Nitrate/Nitrite	10.0			10.0	mg/kg		100	(90%-110%)		02/04/14	15:33
QC1203029863 MB											
Nitrogen, Nitrate/Nitrite			B	-0.225	mg/kg					02/04/14	15:31
QC1203029866 342221001 MS											

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QC Summary

Workorder: 342221

Client SDG: XP0044

Project Description: RC-232 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1364255										
Nitrogen, Nitrate/Nitrite	10.8	U	0.184	10.3	mg/kg		95.3	(75%-125%)		02/04/14	15:36

Notes:

The Qualifiers in this report are defined as follows:

- > Result greater than quantifiable range or greater than upper limit of the analysis range
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank, and the sample concentration was ≤ 5 times the blank concentration.
- D Results are reported from a diluted aliquot of sample.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

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

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

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

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

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

Miscellaneous

Moisture LogBook

Batch: 1363619

Analyst: LYT1

Date/Time: 31-JAN-2014

Procedure Code DRY WEIGHT

Procedure Description Dry Weight-Percent Moisture

Lab Sop: GL-OA-E-020

Sample St	Sample Id	Rpd(%)
DUP	1203028216	.48

Sample Id	Sample Type	Original Hsn	Instrument	Run Time	Container Wt	Initial Wt	Final Wt (g)	Net Initial Wt (g)	Net Final Wt (g)	Moisture (%)
342221001	SAMPLE		BALHD2000D	12:20	7.05	27.609	26.093	20.559	19.043	7.37
342221002	SAMPLE		BALHD2000D	12:20	7.302	30.176	28.857	22.874	21.555	5.77
342221003	SAMPLE		BALHD2000D	12:20	7.349	25.822	24.699	18.473	17.35	6.08
342221004	SAMPLE		BALHD2000D	12:20	7.22	28.556	25.839	21.336	18.619	12.7
342221005	SAMPLE		BALHD2000D	12:20	7.267	22.487	21.181	15.22	13.914	8.58
342221006	SAMPLE		BALHD2000D	12:20	7.098	27.272	24.021	20.174	16.923	16.1
342221007	SAMPLE		BALHD2000D	12:20	7.183	25.923	23.938	18.74	16.755	10.6
342221008	SAMPLE		BALHD2000D	12:20	7.073	32.236	29.683	25.163	22.61	10.1
342221009	SAMPLE		BALHD2000D	12:20	7.182	24.826	24.824	17.644	17.642	.011
1203028216	DUP	342221001	BALHD2000D	12:20	7.174	25.826	24.444	18.652	17.27	7.41

Comments:

A) Result = (Net Initial - Net Final) /Net Initial * 100

Note: Aliquot is used for the determination of the effective MDL and PQL in LIMS

Prep Logbook

Cyanide Sample Distillation

Batch ID: 1363947	Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
Analyst: Aubrey Kingsbury	LCS	1203029099	Total Cyanide Solid LCS	URF1836614-01	.2505	g
Method: SW846 9010C Distillation SW846 9010B Prep	MS	1203029097	RFASPIKE-2	URF1918671-02	.025	mL
Lab SOP: GL-GC-E-067 REV# 19	MS	1203029098	RFASPIKE-2	URF1918671-02	.025	mL
Instrument: Sartorius Balance B-001						

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)	pH Check
1203029094 MB	04-FEB-2014 09:03:00	Soil	0.5	25	50	
1203029099 LCS	04-FEB-2014 09:03:00	Soil	0.2505	25	99.8004	
342088001	04-FEB-2014 09:03:00	Soil	0.56	25	44.64286	
342088002	04-FEB-2014 09:03:00	Soil	0.57	25	43.85965	
342088003	04-FEB-2014 09:03:00	Soil	0.5	25	50	
342096001	04-FEB-2014 09:03:00	Soil	0.52	25	48.07692	
1203029095 DUP (342096001)	04-FEB-2014 09:03:00	Soil	0.5	25	50	
1203029097 MS (342096001)	04-FEB-2014 09:03:00	Soil	0.54	25	46.2963	
342096002	04-FEB-2014 09:03:00	Soil	0.57	25	43.85965	
342096003	04-FEB-2014 09:03:00	Soil	0.51	25	49.01961	
342096004	04-FEB-2014 09:03:00	Soil	0.53	25	47.16981	
342096005	04-FEB-2014 09:03:00	Soil	0.51	25	49.01961	
342096007	04-FEB-2014 09:03:00	Soil	0.57	25	43.85965	
342179001	04-FEB-2014 09:03:00	Soil	0.52	25	48.07692	
342180001	04-FEB-2014 09:03:00	Soil	0.56	25	44.64286	
342221001	04-FEB-2014 09:03:00	Soil	0.58	25	43.10345	
342221002	04-FEB-2014 09:03:00	Soil	0.53	25	47.16981	
1203029096 DUP (342221002)	04-FEB-2014 09:03:00	Soil	0.52	25	48.07692	
1203029098 MS (342221002)	04-FEB-2014 09:03:00	Soil	0.57	25	43.85965	
342221003	04-FEB-2014 09:03:00	Soil	0.58	25	43.10345	
342221004	04-FEB-2014 09:03:00	Soil	0.59	25	42.37288	
342221005	04-FEB-2014 09:03:00	Soil	0.51	25	49.01961	
342221006	04-FEB-2014 09:03:00	Soil	0.56	25	44.64286	
342221007	04-FEB-2014 09:03:00	Soil	0.53	25	47.16981	
342221008	04-FEB-2014 09:03:00	Soil	0.64	25	39.0625	

Reagent/Solvent Lot ID	Description	Amount	Comments:
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Prep Logbook

Batch ID: 1363947
Analyst: Aubrey Kingsbury
Method: SW846 9010C Distillation SW846 9010B Prep
Lab SOP: GL-GC-E-067 REV# 19
Instrument: Sartorius Balance B-001

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1203029099	Total Cyanide Solid LCS	URF1836614-01	.2505	g
MS	1203029097	RFASPIKE-2	URF1918671-02	.025	mL
MS	1203029098	RFASPIKE-2	URF1918671-02	.025	mL

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)	pH Check
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Reagent/Solvent Lot ID	Description	Amount	Comments:
2053192-C	0.8N H3NO3S	1.25 mL	
2053208-C	Bismuth Nitrate Solution	1.25 mL	
2060677-C	51% MgCl2 Soln	1 mL	
2060680-C	0.25N Sodium Hydroxide Solution	25 mL	
2065629-C	50% H2SO4 CN Prep	2.5 mL	
WCN140204-07	150 ppb CN Distilled ICV Standard	.0375 mL	

Prep Logbook

Nitrate/Nitrite (NO₃+NO₂) Analysis Using the Lachat QuikChem FIA+ 8000 Series Instrument

Batch ID: 1364254	<u>Type</u>	<u>Sample Id</u>	<u>Description</u>	<u>Serial Number</u>	<u>Spike Amount</u>	<u>Spike Units</u>
Analyst: Aubrey Kingsbury	LCS	1203029864	TRASPIKE2	UTR1960897-02	.4	mL
Method: EPA 353.2 Modified	MS	1203029866	TRASPIKE2	UTR1960897-02	.4	mL
Lab SOP: GL-GC-E-128 REV# 8						
Instrument: Sartorius Balance B-001						

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)	pH Check
1203029863 MB	04-FEB-2014 14:30:00	Soil	4	40	10	
1203029864 LCS	04-FEB-2014 14:30:00	Soil	4	40	10	
342221001	04-FEB-2014 14:30:00	Soil	4	40	10	
1203029865 DUP (342221001)	04-FEB-2014 14:30:00	Soil	4.16	40	9.61538	
1203029866 MS (342221001)	04-FEB-2014 14:30:00	Soil	4	40	10	
342221002	04-FEB-2014 14:30:00	Soil	4.13	40	9.68523	
342221003	04-FEB-2014 14:30:00	Soil	4.11	40	9.73236	
342221004	04-FEB-2014 14:30:00	Soil	4.05	40	9.87654	
342221005	04-FEB-2014 14:30:00	Soil	4.13	40	9.68523	
342221006	04-FEB-2014 14:30:00	Soil	4.04	40	9.90099	
342221007	04-FEB-2014 14:30:00	Soil	4.14	40	9.66184	
342221008	04-FEB-2014 14:30:00	Soil	4.35	40	9.1954	
342285001	04-FEB-2014 14:30:00	Sludge	4.02	40	9.95025	
342285002	04-FEB-2014 14:30:00	Sludge	4	40	10	

Reagent/Solvent Lot ID	Description	Amount	Comments:
2051169-C	0.04N H2SO4 Solution	40 mL	

Prep Logbook

Ion Chromatography (IC)

Batch ID: 1363617
Analyst: Dustin Miller
Method: SW846 9056A
Lab SOP: GL-GC-E-086 REV# 22
Instrument: No analytical instrument

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1203028215	Spiking Solution	UIC140123SPK	.4	mL
MS	1203028214	Spiking Solution	UIC140123SPK	.4	mL

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)
1203028212 MB	31-JAN-2014 13:15:52	Soil	4	40	10
1203028215 LCS	31-JAN-2014 13:15:52	Soil	4	40	10
342221001	31-JAN-2014 13:15:52	Soil	4.05	40	9.87654
342221002	31-JAN-2014 13:15:52	Soil	4	40	10
342221003	31-JAN-2014 13:15:52	Soil	4.05	40	9.87654
342221004	31-JAN-2014 13:15:52	Soil	4.08	40	9.80392
342221005	31-JAN-2014 13:15:52	Soil	4.06	40	9.85222
342221006	31-JAN-2014 13:15:52	Soil	4.09	40	9.77995
342221007	31-JAN-2014 13:15:52	Soil	4	40	10
342221008	31-JAN-2014 13:15:52	Soil	4.04	40	9.90099
1203028213 DUP (342221008)	31-JAN-2014 13:15:52	Soil	4.04	40	9.90099
1203028214 MS (342221008)	31-JAN-2014 13:15:52	Soil	4.03	40	9.92556

Reagent/Solvent Lot ID	Description	Amount	Comments:
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