

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 9/24/13
INITIAL/DATE

COMMENTS:

SDG XP0003

SAF-RC-232

Rad only

Chem only

Rad & Chem

Complete

Partial

**REVISED TO INCLUDE TCLP METALS AND TCLP
MERCURY**

Sample Location: 600-373



August 08, 2013

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

Re: RC-232 Soil
Work Order: 330227
SDG: XP0003

Dear Joan Kessner:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on July 25, 2013. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,

Orlette Johnson
Project Manager

Purchase Order: 1510
Chain of Custody: RC-232-042
Enclosures



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Case Narrative

**Receipt Narrative
for
WC-HANFORD, INC.
SDG: XP0003
Work Order: 330227**

August 08, 2013

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary:

Sample receipt: The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on July 25, 2013 for analysis.

Sample Identification: The laboratory received the following samples:

| <u>Laboratory ID</u> | <u>Client ID</u> |
|-----------------------------|-------------------------|
| 330227001 | J1RVK5 |
| 330227002 | J1RVK6 |
| 330227003 | J1RVK7 |

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 PCB, HPLC Polynuclear Aromatic Hydrocarbon and Metals.



Orlette Johnson
Project Manager

Chain of Custody and Supporting Documentation

SAMPLE RECEIPT & REVIEW FORM

| | | |
|--|--------------------------|--------------------------------------|
| Client: <u>WCHN</u> | | SDG/AR/COC/Work Order: <u>330227</u> |
| Received By: <u>JP</u> | | Date Received: <u>7-25-13</u> |
| Suspected Hazard Information | Yes | No |
| COC/Samples marked as radioactive? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Classified Radioactive II or III by RSO? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| COC/Samples marked containing PCBs? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Package, COC, and/or Samples marked as beryllium or asbestos containing? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Shipped as a DOT Hazardous? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Samples identified as Foreign Soil? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

| Sample Receipt Criteria | Yes | NA | No | Comments/Qualifiers (Required for Non-Conforming Items) |
|---|-------------------------------------|-------------------------------------|--------------------------|---|
| 1 Shipping containers received intact and sealed? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Circle Applicable: Seals broken Damaged container Leaking container Other (describe) |
| 2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?* | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Preservation Method: <u>Ice bags</u> Blue ice Dry ice None Other (describe) *All temperatures are recorded in Celsius |
| 2a Daily check performed and passed on IR temperature gun? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Temperature Device Serial # <u>41502209</u> Secondary Temperature Device Serial # (If Applicable): |
| 3 Chain of custody documents included with shipment? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 4 Sample containers intact and sealed? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Circle Applicable: Seals broken Damaged container Leaking container Other (describe) |
| 5 Samples requiring chemical preservation at proper pH? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Sample ID's, containers affected and observed pH: If Preservation added, Lot#: |
| 6 VOA vials free of headspace (defined as < 6mm bubble)? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Sample ID's and containers affected: |
| 7 Are Encore containers present? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | (If yes, immediately deliver to Volatiles laboratory) |
| 8 Samples received within holding time? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ID's and tests affected: |
| 9 Sample ID's on COC match ID's on bottles? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Sample ID's and containers affected: |
| 10 Date & time on COC match date & time on bottles? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Sample ID's affected: |
| 11 Number of containers received match number indicated on COC? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Sample ID's affected: |
| 12 Are sample containers identifiable as GEL provided? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 13 COC form is properly signed in relinquished/received sections? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 14 Carrier and tracking number. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Circle Applicable: <u>FedEx Air</u> FedEx Ground UPS Field Services Courier Other |

7463 0580 2629

Comments (Use Continuation Form if needed):

Laboratory Certifications

List of current GEL Certifications as of 08 August 2013

| State | Certification |
|---------------------------|------------------------------|
| Alaska | UST-110 |
| Arkansas | 88-0651 |
| CLIA | 42D0904046 |
| California NELAP | 01151CA |
| Colorado | SC00012 |
| Connecticut | PH-0169 |
| Delaware | SC00012 |
| DoD ELAP A2LA ISO 17025 | 2567.01 |
| Florida NELAP | E87156 |
| Foreign Soils Permit | P330-12-00283, P330-12-00284 |
| Georgia | SC00012 |
| Georgia SDWA | 967 |
| Hawaii | SC00012 |
| Idaho | SC00012 |
| Illinois NELAP | 200029 |
| Indiana | C-SC-01 |
| Kansas NELAP | E-10332 |
| Kentucky | 90129 |
| Louisiana NELAP | 03046 (AI33904) |
| Louisiana SDWA | LA130005 |
| Maryland | 270 |
| Massachusetts | M-SC012 |
| Nevada | SC000122011-1 |
| New Hampshire NELAP | 2054 |
| New Jersey NELAP | SC002 |
| New Mexico | SC00012 |
| New York NELAP | 11501 |
| North Carolina | 233 |
| North Carolina SDWA | 45709 |
| Oklahoma | 9904 |
| Pennsylvania NELAP | 68-00485 |
| Plant Material Permit | PDEP-12-00260 |
| South Carolina Chemistry | 10120001 |
| South Carolina Radiochemi | 10120002 |
| Tennessee | TN 02934 |
| Texas NELAP | T104704235-13-8 |
| Utah NELAP | SC000122013-8 |
| Vermont | VT87156 |
| Virginia NELAP | 460202 |
| Washington | C780-12 |
| Wisconsin | 999887790 |

HPLC Polynuclear Aromatic Hydrocarbon Analysis

**HPLC-PAH
WC-HANFORD, INC. (WCHN)
SDG XP0003**

Method/Analysis Information

Procedure: Polynuclear Aromatic Hydrocarbons
Analytical Method: SW846 8310
Prep Method: SW846 3550B
Analytical Batch Number: 1318151
Prep Batch Number: 1318150

Sample Analysis

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

| Sample ID | Client ID |
|------------------|--|
| 330227002 | J1RVK6 |
| 330227003 | J1RVK7 |
| 1202916848 | Method Blank (MB) |
| 1202916849 | Laboratory Control Sample (LCS) |
| 1202917768 | 330227003(J1RVK7) Matrix Spike (MS) |
| 1202917771 | 330227003(J1RVK7) Matrix Spike Duplicate (MSD) |

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

Preparation/Analytical Method Verification

SOP Reference

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

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

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

Calibration Information

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

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

CCV Requirements

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

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

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Laboratory Control Sample Duplicate (LCSD) Recovery

An LCSD was not extracted.

LCS/LCSD Relative Percent Difference (RPD) Statement

An LCSD was not extracted.

QC Sample Designation

Sample 330227003 (J1RVK7) 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

High recoveries for several target analytes were observed in 1202917771 (MSD). The recovery for Fluoranthene was 152% and the acceptance range is 20-139%, for Pyrene, the recovery was 175% and the acceptance range is 18-149%, and for Chrysene, the recovery was 129% and the acceptance range is 39-127%. The high recoveries observed in the MSD may be the result of the nature of the sample matrix. Only a detection for Fluoranthene was observed in the parent sample, 330227003 (J1RVK7). The other two high recoveries may be the result of unknown sample matrix interference. All spike recoveries in 1202916849 (LCS) were acceptable. The data are reported with the appropriate DER. The affected target analytes for the samples in SDG# XP0003 were qualified with a 'T' qualifier.

MS/MSD Relative Percent Difference (RPD) Statement

High RPD values for several target analytes were observed in the 1202917768 (MS) and 1202917771 (MSD) pair. The RPD recovery for Fluoranthene was 65%, for Pyrene, it was 68%, for Chrysene, it was 35% and for Benzo(k)fluoranthene, it was 43%. The acceptance range for all target analytes is 0-30%. The high RPD values were the result of higher recoveries observed in the MSD. The high recoveries may be the result of the background concentration present in the parent sample, 330227003 (J1RVK7) or unknown sample matrix interference. The data are reported with the appropriate DER.

Technical Information:

Holding Time Specifications

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

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

Miscellaneous Information:

Data Exception (DER) Documentation

Data Exception Report 1207171 was generated for this SDG.

High recoveries for several target analytes were observed in 1202917771 (MSD). The recovery for Fluoranthene was 152% and the acceptance range is 20-139%, for Pyrene, the recovery was 175% and the acceptance range is 18-149%, and for Chrysene, the recovery was 129% and the acceptance range is 39-127%. The high recoveries observed in the MSD may be the result of the nature of the sample matrix. Only a detection for Fluoranthene was observed in the parent sample, 330227003 (J1RVK7). The other two high recoveries may be the result of unknown sample matrix interference. All spike recoveries in 1202916849 (LCS) were acceptable. The data are reported with the appropriate DER. The affected target analytes for the samples in SDG# XP0003 were qualified with a 'T' qualifier.

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Manual Integrations

Some initial calibration standards, continuing calibration standards, and/or samples required manual integrations due to software limitations.

Please see the raw data in the Miscellaneous Section.

Additional Comments

One or more analytes were detected on both columns or detectors that indicated an acceptable peak within the retention time window and acceptable concentration match in samples 330227002 (J1RVK6) and 330227003 (J1RVK7). 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 1202917771 (J1RVK7) and 330227003 (J1RVK7). Because both columns or detectors indicated an acceptable peak in the appropriate retention time window for these analytes, the analytes are reported as positive results. Due to the high percent difference or RPD between the two columns, it is indicated as such on the appropriate Form I/Certificate of Analysis (C of A) with a 'P' qualifier. Those analytes reported with a percent difference or RPD greater than 40% but less than 70% are qualified as presumptive evidence of the presence of the material.

Electronic Package Comment

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

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

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

System Configuration

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

The chromatographic hardware system consists of a HP Model 1100 HPLC with programmable gradient pumping and a 100 uL loop injector. The HPLC 1100 is coupled to a HP Model G1315A Diode Array UV detector which monitors absorbance at the following five wavelengths: 1) 224 nm; 2) 250 nm; 3) 270 nm; 4) 234 nm; 5) 300 nm.

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

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

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

Chromatographic Columns

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

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

Certification Statement

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

DATA EXCEPTION REPORT

| | | | |
|---------------------------------|-------------------------------------|--|-----------------------------|
| Mo.Day Yr. 01-AUG-13 | Division: Industrial | Quality Criteria: Specifications | Type: Process |
| Instrument Type: HPLC | Test / Method: SW846 8310 | Matrix Type: Solid | Client Code: WCHN |
| Batch ID: 1318151 | Sample Numbers: See Below | | |

Potentially affected work order(s)(SDG): 330221(XP0002),330227(XP0003),330229(X0010),330324(XP0004)

Application Issues:

Failed RPD for MS/MSD, or PS/PSD

Failed Recovery for MSD/PSD

**Specification and Requirements
Exception Description:**

This DER is only for SDG# XP0003 (COC# 330227) in this batch.

1. High recoveries for several target analytes were observed in 1202917771 (MSD). The recovery for Fluoranthene was 152% and the acceptance range is 20-139%, for Pyrene, the recovery was 175% and the acceptance range is 18-149%, and for Chrysene, the recovery was 129% and the acceptance range is 39-127%.
2. High RPD values for several target analytes were observed for the 1202917768 (MS) and 1202917771 (MSD) pair. The RPD value for Fluoranthene was 65%, for Pyrene, it was 68%, for Chrysene, it was 35% and for Benzo(k)fluoranthene, it was 43%. The acceptance range for all target analytes is 0-30%.

DER Disposition:

1. The high recoveries observed in the MSD may be the result of the nature of the sample matrix. Only a detection for Fluoranthene was observed in the parent sample, 330227003. The other two high recoveries may be the result of unknown sample matrix interference. All spike recoveries in 1202916849 (LCS) were acceptable. The data are reported with the appropriate DER.
2. The high RPD values were the result of higher recoveries observed in the MSD. The high recoveries may be the result of the background concentration present in the parent sample, 330227003 or unknown sample matrix interference. The data are reported with the appropriate DER.

Originator's Name:

Charles Wilson 02-AUG-13

Data Validator/Group Leader:

Michael Penny 02-AUG-13

GEL LABORATORIES LLC

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

Qualifier Definition Report for

WCHN001 WC-HANFORD, INC.

Client SDG: XP0003 GEL Work Order: 330227 Project: RC-232 Soil

The Qualifiers in this report are defined as follows:

- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

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

Review/Validation

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

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

Signature: 

Name: Michael Penny

Date: 03 AUG 2013

Title: Group Leader

Roadmap for WCHN XP0003 HPLC_PAH

This roadmap was analyzed by cww on 08-02-2013, 10:05.

This roadmap was reviewed by map on 08-02-2013, 11:46.

This roadmap was packaged by map on 08-03-2013, 09:31.

Sample

| exclude | manual | datafile | smpid | injdate | injtime | sublist | clientid | dilution | batchid | comment |
|-------------------------------------|--------|------------------------------------|-----------|-------------|---------|------------|----------|----------|---------|---------|
| <input checked="" type="checkbox"/> | N | /chem/hplce.i/p072913.b/ph5g2914.d | 330227002 | 29-JUL-2013 | 19:51 | XP0003.sub | J1RVK6 | 1 | 1317520 | Duse |
| <input type="checkbox"/> | N | /chem/hplce.i/p073113.b/ph5g3110.d | 330227002 | 31-JUL-2013 | 13:43 | XP0003.sub | J1RVK6 | 1 | 1318151 | |
| <input checked="" type="checkbox"/> | N | /chem/hplce.i/p072913.b/ph5g2917.d | 330227003 | 29-JUL-2013 | 21:58 | XP0003.sub | J1RVK7 | 1 | 1317520 | Duse |
| <input type="checkbox"/> | N | /chem/hplce.i/p073113.b/ph5g3114.d | 330227003 | 31-JUL-2013 | 16:31 | XP0003.sub | J1RVK7 | 1 | 1318151 | |

QC Sample

| exclude | manual | datafile | smpid | sampletype | injdate | injtime | sublist | clientid | dilution | batchid | comment |
|-------------------------------------|--------|-------------------------------------|------------|------------|-------------|---------|------------|-------------|----------|---------|-----------------------|
| <input checked="" type="checkbox"/> | N | /chem/hplce.i/p072913.b/ph5g2904A.d | 1202915415 | mb | 29-JUL-2013 | 12:50 | XP0003.sub | PAHBLK01 | 1 | 1317520 | Duse |
| <input checked="" type="checkbox"/> | N | /chem/hplce.i/p072913.b/ph5g2905A.d | 1202915416 | lcs | 29-JUL-2013 | 13:32 | XP0003.sub | PAHBLK01LCS | 1 | 1317520 | Duse, ONE ANALYTE LOW |
| <input checked="" type="checkbox"/> | N | /chem/hplce.i/p072913.b/ph5g2915.d | 1202915421 | ms | 29-JUL-2013 | 20:33 | XP0003.sub | J1RVK6MS | 1 | 1317520 | Duse |
| <input checked="" type="checkbox"/> | N | /chem/hplce.i/p072913.b/ph5g2916.d | 1202915422 | msd | 29-JUL-2013 | 21:15 | XP0003.sub | J1RVK6MSD | 1 | 1317520 | Duse |
| <input type="checkbox"/> | N | /chem/hplce.i/p073113.b/ph5g3104A.d | 1202916848 | mb | 31-JUL-2013 | 09:30 | XP0003.sub | PAHBLK01 | 1 | 1318151 | |
| <input type="checkbox"/> | N | /chem/hplce.i/p073113.b/ph5g3105A.d | 1202916849 | lcs | 31-JUL-2013 | 10:12 | XP0003.sub | PAHBLK01LCS | 1 | 1318151 | Pass |
| <input type="checkbox"/> | N | /chem/hplce.i/p073113.b/ph5g3115.d | 1202917768 | ms | 31-JUL-2013 | 17:14 | XP0003.sub | J1RVK7MS | 1 | 1318151 | Pass |
| <input type="checkbox"/> | N | /chem/hplce.i/p073113.b/ph5g3116.d | 1202917771 | msd | 31-JUL-2013 | 17:56 | XP0003.sub | J1RVK7MSD | 1 | 1318151 | 3 high recoveries |

Sample Data Summary

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: August 2, 2013

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

Client SDG: XP0003

| | |
|-------------------------------|--------------------|
| Client Sample ID: J1RVK6 | Project: WCHN00213 |
| Sample ID: 330227002 | Client ID: WCHN001 |
| Matrix: SOIL | |
| Collect Date: 23-JUL-13 10:25 | |
| Receive Date: 25-JUL-13 | |
| Collector: Client | |
| Moisture: 3.66% | |

| 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 | 5.18 | 5.18 | 17.3 | ug/kg | 1 | LER | 07/31/13 | 1343 | 1318151 | 1 |
| Acenaphthylene | U | 5.18 | 5.18 | 17.3 | ug/kg | 1 | | | | | |
| Anthracene | U | 1.73 | 1.73 | 17.3 | ug/kg | 1 | | | | | |
| Benzo(a)anthracene | U | 0.552 | 0.552 | 1.73 | ug/kg | 1 | | | | | |
| Benzo(a)pyrene | U | 0.552 | 0.552 | 1.73 | ug/kg | 1 | | | | | |
| Benzo(b)fluoranthene | U | 0.552 | 0.552 | 1.73 | ug/kg | 1 | | | | | |
| Benzo(ghi)perylene | X | 4.62 | 0.552 | 1.73 | ug/kg | 1 | | | | | |
| Benzo(k)fluoranthene | U | 0.276 | 0.276 | 0.863 | ug/kg | 1 | | | | | |
| Chrysene | TU | 0.552 | 0.552 | 1.73 | ug/kg | 1 | | | | | |
| Dibenzo(a,h)anthracene | U | 0.552 | 0.552 | 1.73 | ug/kg | 1 | | | | | |
| Fluoranthene | TX | 4.39 | 0.552 | 1.73 | ug/kg | 1 | | | | | |
| Fluorene | U | 5.18 | 5.18 | 17.3 | ug/kg | 1 | | | | | |
| Indeno(1,2,3-cd)pyrene | U | 0.552 | 0.552 | 1.73 | ug/kg | 1 | | | | | |
| Naphthalene | U | 5.18 | 5.18 | 17.3 | ug/kg | 1 | | | | | |
| Phenanthrene | U | 5.18 | 5.18 | 17.3 | ug/kg | 1 | | | | | |
| Pyrene | TU | 0.552 | 0.552 | 1.73 | 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 | 07/29/13 | 1820 | 1318150 |
| SW846 3550B | 3550B PAH BY HPLC Prep in soil | MXS4 | 07/25/13 | 1750 | 1317518 |

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" | 6030 ug/kg | 8630 | 69.8 | (23%-104%) |

Notes:

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: August 2, 2013

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

Client SDG: XP0003

| | |
|-------------------------------|--------------------|
| Client Sample ID: J1RVK7 | Project: WCHN00213 |
| Sample ID: 330227003 | Client ID: WCHN001 |
| Matrix: SOIL | |
| Collect Date: 23-JUL-13 10:25 | |
| Receive Date: 25-JUL-13 | |
| Collector: Client | |
| Moisture: 3.86% | |

| 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 | 5.19 | 5.19 | 17.3 | ug/kg | 1 | CWW | 07/31/13 | 1631 | 1318151 | 1 |
| Acenaphthylene | U | 5.19 | 5.19 | 17.3 | ug/kg | 1 | | | | | |
| Anthracene | U | 1.73 | 1.73 | 17.3 | ug/kg | 1 | | | | | |
| Benzo(a)anthracene | X | 3.58 | 0.553 | 1.73 | ug/kg | 1 | | | | | |
| Benzo(a)pyrene | X | 3.42 | 0.553 | 1.73 | ug/kg | 1 | | | | | |
| Benzo(b)fluoranthene | | 3.24 | 0.553 | 1.73 | ug/kg | 1 | | | | | |
| Benzo(ghi)perylene | X | 2.33 | 0.553 | 1.73 | ug/kg | 1 | | | | | |
| Benzo(k)fluoranthene | U | 0.277 | 0.277 | 0.864 | ug/kg | 1 | | | | | |
| Chrysene | T | 5.96 | 0.553 | 1.73 | ug/kg | 1 | | | | | |
| Dibenzo(a,h)anthracene | PX | 2.16 | 0.553 | 1.73 | ug/kg | 1 | | | | | |
| Fluoranthene | T | 3.97 | 0.553 | 1.73 | ug/kg | 1 | | | | | |
| Fluorene | U | 5.19 | 5.19 | 17.3 | ug/kg | 1 | | | | | |
| Indeno(1,2,3-cd)pyrene | U | 0.553 | 0.553 | 1.73 | ug/kg | 1 | | | | | |
| Naphthalene | U | 5.19 | 5.19 | 17.3 | ug/kg | 1 | | | | | |
| Phenanthrene | J | 5.39 | 5.19 | 17.3 | ug/kg | 1 | | | | | |
| Pyrene | PT | 6.83 | 0.553 | 1.73 | 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 | 07/29/13 | 1820 | 1318150 |
| SW846 3550B | 3550B PAH BY HPLC Prep in soil | MXS4 | 07/25/13 | 1750 | 1317518 |

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" | 6540 ug/kg | 8640 | 75.7 | (23%-104%) |

Notes:

QC Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: August 2, 2013

Page 1 of 4

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

Workorder: 330227

Client SDG: XP0003

Project Description: RC-232 Soil

| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|------------------------|---------|--------|------|------|-------|------|------|------------|-------|----------|-------|
| HPLC-PAH | | | | | | | | | | | |
| Batch | 1318151 | | | | | | | | | | |
| QC1202916849 | LCS | | | | | | | | | | |
| Acenaphthene | 1670 | | | 1350 | ug/kg | | 81.1 | (58%-99%) | LER | 07/31/13 | 10:12 |
| Acenaphthylene | 1670 | | | 1350 | ug/kg | | 81 | (58%-98%) | | | |
| Anthracene | 1670 | | | 1410 | ug/kg | | 84.4 | (63%-94%) | | | |
| Benzo(a)anthracene | 167 | | | 137 | ug/kg | | 82.1 | (73%-98%) | | | |
| Benzo(a)pyrene | 167 | | | 134 | ug/kg | | 80.2 | (63%-99%) | | | |
| Benzo(b)fluoranthene | 167 | | | 136 | ug/kg | | 81.8 | (70%-130%) | | | |
| Benzo(ghi)perylene | 167 | | | 133 | ug/kg | | 80.1 | (70%-130%) | | | |
| Benzo(k)fluoranthene | 83.3 | | | 62.5 | ug/kg | | 75 | (70%-130%) | | | |
| Chrysene | 167 | | | 155 | ug/kg | | 93.1 | (70%-130%) | | | |
| Dibenzo(a,h)anthracene | 167 | | | 160 | ug/kg | | 95.8 | (70%-130%) | | | |
| Fluoranthene | 167 | | | 132 | ug/kg | | 79.4 | (70%-130%) | | | |
| Fluorene | 1670 | | | 1370 | ug/kg | | 82.2 | (65%-130%) | | | |
| Indeno(1,2,3-cd)pyrene | 167 | | | 145 | ug/kg | | 86.9 | (70%-130%) | | | |
| Naphthalene | 1670 | | | 1300 | ug/kg | | 78.3 | (57%-130%) | | | |
| Phenanthrene | 1670 | | | 1360 | ug/kg | | 81.7 | (70%-130%) | | | |
| Pyrene | 167 | | | 143 | ug/kg | | 85.8 | (70%-130%) | | | |
| **Decafluorobiphenyl | 8330 | | | 6870 | ug/kg | | 82.5 | (23%-104%) | | | |
| QC1202916848 | MB | | | | | | | | | | |
| Acenaphthene | | | U | 5.00 | ug/kg | | | | | 07/31/13 | 09:30 |
| Acenaphthylene | | | U | 5.00 | ug/kg | | | | | | |

GEL LABORATORIES LLC

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

QC Summary

Workorder: 330227

Client SDG: XP0003

Project Description: RC-232 Soil

Page 2 of 4

| Parname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|---------------------------|---------|--------|------|-------|-------|------|------|------------|-------|----------|-------|
| HPLC-PAH | | | | | | | | | | | |
| Batch | 1318151 | | | | | | | | | | |
| Anthracene | | | U | 1.67 | ug/kg | | | | | | |
| Benzo(a)anthracene | | | U | 0.533 | ug/kg | | | | LER | 07/31/13 | 09:30 |
| 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 | 0.267 | 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 | | | 6980 | ug/kg | | 83.8 | (23%-104%) | | | |
| QC1202917768 330227003 MS | | | | | | | | | | | |
| Acenaphthene | 1730 | U | 5.19 | 1370 | ug/kg | | 79.1 | (49%-90%) | CWW | 07/31/13 | 17:14 |
| Acenaphthylene | 1730 | U | 5.19 | 1360 | ug/kg | | 79 | (48%-97%) | | | |
| Anthracene | 1730 | U | 1.73 | 1450 | ug/kg | | 83.8 | (49%-91%) | | | |
| Benzo(a)anthracene | 173 | X | 3.58 | 142 | ug/kg | | 79.9 | (29%-126%) | | | |
| Benzo(a)pyrene | 173 | X | 3.42 | 137 | ug/kg | | 77.2 | (26%-130%) | | | |
| Benzo(b)fluoranthene | 173 | | 3.24 | 142 | ug/kg | | 80.4 | (32%-135%) | | | |
| Benzo(ghi)perylene | 173 | X | 2.33 | 133 | ug/kg | | 75.5 | (34%-125%) | | | |

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QC Summary

Workorder: 330227

Client SDG: XP0003

Project Description: RC-232 Soil

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| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|----------------------------|---------|--------|-------|------|-------|-------|-------|------------|-------|----------|-------|
| HPLC-PAH | | | | | | | | | | | |
| Batch | 1318151 | | | | | | | | | | |
| Benzo(k)fluoranthene | 86.4 | U | 0.277 | 63.7 | ug/kg | | 73.8 | (48%-142%) | CWW | 07/31/13 | 17:14 |
| Chrysene | 173 | T | 5.96 | 161 | ug/kg | | 89.9 | (39%-127%) | | | |
| Dibenzo(a,h)anthracene | 173 | PX | 2.16 | 165 | ug/kg | | 94.1 | (38%-130%) | | | |
| Fluoranthene | 173 | T | 3.97 | 135 | ug/kg | | 76.1 | (20%-139%) | | | |
| Fluorene | 1730 | U | 5.19 | 1400 | ug/kg | | 80.8 | (51%-90%) | | | |
| Indeno(1,2,3-cd)pyrene | 173 | U | 0.553 | 147 | ug/kg | | 85.1 | (41%-145%) | | | |
| Naphthalene | 1730 | U | 5.19 | 1340 | ug/kg | | 77.8 | (43%-87%) | | | |
| Phenanthrene | 1730 | J | 5.39 | 1400 | ug/kg | | 80.9 | (50%-100%) | | | |
| Pyrene | 173 | PT | 6.83 | 151 | ug/kg | | 83.8 | (18%-149%) | | | |
| **Decafluorobiphenyl | 8640 | | 6540 | 6890 | ug/kg | | 79.8 | (23%-104%) | | | |
| QC1202917771 330227003 MSD | | | | | | | | | | | |
| Acenaphthene | 1730 | U | 5.19 | 1340 | ug/kg | 1.89 | 77.6 | (0%-30%) | | 07/31/13 | 17:56 |
| Acenaphthylene | 1730 | U | 5.19 | 1310 | ug/kg | 3.70 | 76.1 | (0%-30%) | | | |
| Anthracene | 1730 | U | 1.73 | 1390 | ug/kg | 4.08 | 80.4 | (0%-30%) | | | |
| Benzo(a)anthracene | 173 | X | 3.58 | 188 | ug/kg | 28.0 | 107 | (0%-30%) | | | |
| Benzo(a)pyrene | 173 | X | 3.42 | 178 | ug/kg | 26.4 | 101 | (0%-30%) | | | |
| Benzo(b)fluoranthene | 173 | | 3.24 | 180 | ug/kg | 23.8 | 103 | (0%-30%) | | | |
| Benzo(ghi)perylene | 173 | X | 2.33 | 155 | ug/kg | 15.2 | 88.1 | (0%-30%) | | | |
| Benzo(k)fluoranthene | 86.4 | U | 0.277 | 98.9 | ug/kg | 43.3* | 115 | (0%-30%) | | | |
| Chrysene | 173 | T | 5.96 | T | 229 | ug/kg | 34.9* | 129* | | | |
| Dibenzo(a,h)anthracene | 173 | PX | 2.16 | 174 | ug/kg | 5.64 | 99.6 | (0%-30%) | | | |
| Fluoranthene | 173 | T | 3.97 | T | 267 | ug/kg | 65.3* | 152* | | | |

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QC Summary

Workorder: 330227

Client SDG: XP0003

Project Description: RC-232 Soil

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| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|------------------------|---------|--------|-------|----|-------|-------|---------|-------|------------|------|----------------|
| HPLC-PAH | | | | | | | | | | | |
| Batch | 1318151 | | | | | | | | | | |
| Fluorene | 1730 | U | 5.19 | | 1400 | ug/kg | 0.00377 | 80.8 | (0%-30%) | CWW | 07/31/13 17:56 |
| Indeno(1,2,3-cd)pyrene | 173 | U | 0.553 | P | 167 | ug/kg | 12.9 | 96.8 | (0%-30%) | | |
| Naphthalene | 1730 | U | 5.19 | | 1230 | ug/kg | 9.02 | 71 | (0%-30%) | | |
| Phenanthrene | 1730 | J | 5.39 | | 1610 | ug/kg | 13.7 | 92.9 | (0%-30%) | | |
| Pyrene | 173 | PT | 6.83 | T | 308 | ug/kg | 68.3* | 175* | (0%-30%) | | |
| *Decafluorobiphenyl | 8640 | | 6540 | | 6410 | ug/kg | | 74.3 | (23%-104%) | | |

Notes:

The Qualifiers in this report are defined as follows:

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

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

^ 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: 1318150 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) |
|-----------------------------------|----------------------|-------------|----------------------|-----------------------|
| 1202916848 MB | 29-JUL-2013 18:20:00 | 30 | 1 | 0.03333 |
| 1202916849 LCS | 29-JUL-2013 18:20:00 | 30.02 | 1 | 0.03331 |
| 330221002 - 2 | 29-JUL-2013 18:20:00 | 30.06 | 1 | 0.03327 |
| 330221003 - 2 | 29-JUL-2013 18:20:00 | 30.05 | 1 | 0.03328 |
| 1202917766 - 2 MS (330221003) | 29-JUL-2013 18:20:00 | 30.01 | 1 | 0.03332 |
| 1202917769 - 2 MSD (330221003) | 29-JUL-2013 18:20:00 | 30.03 | 1 | 0.0333 |
| 330227002 - 2 | 29-JUL-2013 18:20:00 | 30.07 | 1 | 0.03326 |
| 330227003 - 2 | 29-JUL-2013 18:20:00 | 30.09 | 1 | 0.03323 |
| 1202917768 - 2 MS (330227003) | 29-JUL-2013 18:20:00 | 30.11 | 1 | 0.03321 |
| 1202917771 - 2 MSD (330227003) | 29-JUL-2013 18:20:00 | 30.1 | 1 | 0.03322 |
| 330229006 - 2 | 29-JUL-2013 18:20:00 | 30.07 | 1 | 0.03326 |
| 1202917772 - 2 MS (330229006) | 29-JUL-2013 18:20:00 | 30.03 | 1 | 0.0333 |
| 1202917773 - 2 MSD (330229006) | 29-JUL-2013 18:20:00 | 30.01 | 1 | 0.03332 |
| 330324002 | 29-JUL-2013 18:20:00 | 30.02 | 1 | 0.03331 |
| 1202916850 MS (330324002) | 29-JUL-2013 18:20:00 | 30.11 | 1 | 0.03321 |
| 1202916851 MSD (330324002) | 29-JUL-2013 18:20:00 | 30.1 | 1 | 0.03322 |
| 330324003 | 29-JUL-2013 18:20:00 | 30.13 | 1 | 0.03319 |
| 330324004 | 29-JUL-2013 18:20:00 | 30.16 | 1 | 0.03316 |
| 330324005 | 29-JUL-2013 18:20:00 | 30.15 | 1 | 0.03317 |
| 330324006 | 29-JUL-2013 18:20:00 | 30.12 | 1 | 0.0332 |
| 330324007 | 29-JUL-2013 18:20:00 | 30.18 | 1 | 0.03313 |
| 330324008 | 29-JUL-2013 18:20:00 | 30.16 | 1 | 0.03316 |
| 330324009 | 29-JUL-2013 18:20:00 | 30.15 | 1 | 0.03317 |
| 330324010 | 29-JUL-2013 18:20:00 | 30.17 | 1 | 0.03315 |
| 330324011 | 29-JUL-2013 18:20:00 | 30.18 | 1 | 0.03313 |
| 330324012 | 29-JUL-2013 18:20:00 | 30.09 | 1 | 0.03323 |
| 330324013 | 29-JUL-2013 18:20:00 | 30.13 | 1 | 0.03319 |
| 330324014 | 29-JUL-2013 18:20:00 | 30.1 | 1 | 0.03322 |
| 330324015 | 29-JUL-2013 18:20:00 | 30.11 | 1 | 0.03321 |

Prep Logbook

Batch ID: 1318150
Analyst: Alberto Velasco
Method: SW846 3550B

Verified by: _____

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) | | | |
|-----------|------------|-----------------------------|----------------------|-----------------------|-------|-----------------------------|--|
| Type | Sample Id | Description | Serial Number | Spike Amt | Units | Comments: | |
| LCS | 1202916849 | 8310 PAH SPIKE | UE130325-15 | 1 | mL | Verified By: MJS | |
| MS | 1202916850 | 8310 PAH SPIKE | UE130325-15 | 1 | mL | Final Solvent: Acetonitrile | |
| MS | 1202917766 | 8310 PAH SPIKE | UE130325-15 | 1 | mL | | |
| MS | 1202917768 | 8310 PAH SPIKE | UE130325-15 | 1 | mL | | |
| MS | 1202917772 | 8310 PAH SPIKE | UE130325-15 | 1 | mL | | |
| MSD | 1202916851 | 8310 PAH SPIKE | UE130325-15 | 1 | mL | | |
| MSD | 1202917769 | 8310 PAH SPIKE | UE130325-15 | 1 | mL | | |
| MSD | 1202917771 | 8310 PAH SPIKE | UE130325-15 | 1 | mL | | |
| MSD | 1202917773 | 8310 PAH SPIKE | UE130325-15 | 1 | mL | | |
| SURR | All | Decafluorobiphenyl 250 mg/L | UE120907-07 | 1 | mL | | |
| REGNT | All | HPLC Grade Acetonitrile | 1929229 | 5 | mL | | |
| REGNT | All | Methylene Chloride | 1935652-D | 300 | mL | | |
| SOURC | All | SODIUM SULFATE | 1897902 | 30 | g | | |

FID Diesel Range Organics Analysis

Case Narrative

**FID Case Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0003**

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: 1317735

Prep Batch Number: 1317734

Sample Analysis

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

| Sample ID | Client ID |
|------------------|--|
| 330227002 | J1RVK6 |
| 330227003 | J1RVK7 |
| 1202915877 | Method Blank (MB) |
| 1202915878 | Laboratory Control Sample (LCS) |
| 1202915883 | 330227002(J1RVK6) Matrix Spike (MS) |
| 1202915884 | 330227002(J1RVK6) Matrix Spike Duplicate (MSD) |

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

Preparation/Analytical Method Verification

SOP Reference

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

Raw data reports are processed and reviewed by the analyst using ChemStation software package. False positives have been removed from the quantitation reports per standard operating procedures (SOP) section 23.0.

Calibration Information

Initial Calibration

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

Continuing Calibration Verification (CCV) Requirements

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

MS1202915883 (J1RVK6) exceeded surrogate recovery limits for o-Terphenyl at 179%. Surrogate recovery limits are 50%-150%. The positive bias in surrogate recovery is attributed to matrix interference associated with an elevated baseline during the retention time of the surrogate. Both the parent sample and MSD displayed similarly high, but passing, surrogate recovery. The data have been reported.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 330227002 (J1RVK6) 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

MSD1202915884 (J1RVK6) did not meet spike recovery limits for Diesel Range Organics at 65% and Motor Oil at -25%. Spike recovery limit are 70%-130%. The parent sample, MS and MSD were each analyzed at a dilution due to the presence of over-range target analytes. The spiking analytes were therefore diluted outside the acceptance limits. The data have been reported.

MS/MSD Relative Percent Difference (RPD) Statement

The relative percent difference between 1202915883 (J1RVK6) and 1202915884 (J1RVK6) did not meet acceptance limits for Diesel Range Organics at 22% and Motor Oil at 31.4%. RPD limits are 0.0%-20.0%. The parent sample, MS and MSD were each analyzed at a dilution due to the presence of over-range target analytes. The spiking analytes were therefore diluted outside the acceptance limits. The data have been reported.

Technical Information

Holding Time Specifications

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

Preparation/Analytical Method Verification

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

Sample Dilutions

Samples 1202915883 (J1RVK6), 1202915884 (J1RVK6) and 330227002 (J1RVK6) were diluted due to the presence of over-range target analytes.

Sample Re-extraction/Re-analysis

Sample 330227003 (J1RVK7) was re-analyzed due to the potential for carryover from an over-range target analyte hit in the previous injected sample. The re-analysis data results are reported.

Miscellaneous Information

Data Exception (DER) Documentation

The following DER was generated for this SDG: 1206718 1202915883 (J1RVK6) and 1202915884 (J1RVK6).

Manual Integrations

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

Additional Comments

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

System Configuration

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

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

DATA EXCEPTION REPORT

| | | | |
|-----------------------------------|---|--|-----------------------------|
| Mo.Day Yr. 31-JUL-13 | 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: 1317735 | Sample Numbers: See Below | | |

Potentially affected work order(s)(SDG): 330221(XP0002),330227(XP0003),330229(X0010)

Application Issues:

Failed RPD for MS/MSD, or PS/PSD

Failed Yield for Surrogates

Failed Recovery for MSD/PSD

**Specification and Requirements
Exception Description:**

1. MS(1202915883) exceeded surrogate recovery limits for o-Terphenyl at 179%. Surrogate recovery limits are 50%-150%.
2. MSD(1202915884) did not meet spike recovery limits for Diesel Range Organics at 65% and Motor Oil at -25%. Spike recovery limit are 70%-130%.
3. The relative percent difference between MS(1202915883) and MSD(1202915884) did not meet acceptance limits for Diesel Range Organics at 22% and Motor Oil at 31.4%. RPD limits are 0.0%-20.0%.

DER Disposition:

1. The positive bias in surrogate recovery is attributed to matrix interference associated with an elevated baseline during the retention time of the surrogate. Both the parent sample and MSD displayed similarly high, but passing, surrogate recovery. The data have been reported.
- 2,3. Parent sample WCHN(330227002), MS(1202915883) and MSD(1202915884) were each analyzed at a dilution due to the presence of over-range target analytes. The spiking analytes were therefore diluted outside the acceptance limits. The data have been reported.

Originator's Name:

Benjamin Taft 31-JUL-13

Data Validator/Group Leader:

Josh Brooks 31-JUL-13

GEL LABORATORIES LLC

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Qualifier Definition Report for

WCHN001 WC-HANFORD, INC.

Client SDG: XP0003 GEL Work Order: 330227 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
- 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: Cameron Bearden

Date: 08 AUG 2013

Title: Group Leader

Sample Data Summary

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: August 8, 2013

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

Client SDG: XP0003

Client Sample ID: J1RVK6
Sample ID: 330227002
Matrix: SOIL
Collect Date: 23-JUL-13 10:25
Receive Date: 25-JUL-13
Collector: Client
Moisture: 3.66%

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) | DJT | 14800 | 6730 | 20700 | UG/KG | 3 | BYT1 | 07/30/13 | 1025 | 1317735 | 1 |
| Motor Oil (C20-C36) | DT | 215000 | 6730 | 20700 | UG/KG | 3 | | | | | |

The following Prep Methods were performed:

| Method | Description | Analyst | Date | Time | Prep Batch |
|------------|-----------------------|---------|----------|------|------------|
| SW846 3541 | 3541 DRO IN SOIL PREP | MXS4 | 07/26/13 | 1745 | 1317734 |

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" | 907 UG/KG | 690 | 131 | (50%-150%) |

Notes:

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: August 7, 2013

Page 1 of 2

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

Workorder: 330227

Client SDG: XP0003

Project Description: RC-232 Soil

| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|---------------------------------|---------------|--------|-----------|--------|-------|-------|-------|------------|-------|----------|-------|
| Diesel Range Organics | | | | | | | | | | | |
| Batch | 1317735 | | | | | | | | | | |
| QC1202915878 | LCS | | | | | | | | | | |
| Diesel Range Organics (C10-C20) | 66600 | | | 59400 | UG/KG | | 89.2 | (70%-130%) | BYT1 | 07/29/13 | 17:07 |
| Motor Oil (C20-C36) | 66600 | | | 61500 | UG/KG | | 92.3 | (70%-130%) | | | |
| **o-Terphenyl | 666 | | | 733 | UG/KG | | 110 | (50%-150%) | | | |
| QC1202915877 | MB | | | | | | | | | | |
| Diesel Range Organics (C10-C20) | | | U | 2160 | UG/KG | | | | | 07/29/13 | 16:30 |
| Motor Oil (C20-C36) | | | U | 2160 | UG/KG | | | | | | |
| **o-Terphenyl | 665 | | | 474 | UG/KG | | 71.3 | (50%-150%) | | | |
| QC1202915883 | 330227002 MS | | | | | | | | | | |
| Diesel Range Organics (C10-C20) | 68900 | DJT | 14800 D | 75600 | UG/KG | | 88.2 | (70%-130%) | | 07/30/13 | 11:02 |
| Motor Oil (C20-C36) | 68900 | DT | 215000 D | 271000 | UG/KG | | 81.1 | (70%-130%) | | | |
| **o-Terphenyl | 689 | | 907 | 1230 | UG/KG | | 179* | (50%-150%) | | | |
| QC1202915884 | 330227002 MSD | | | | | | | | | | |
| Diesel Range Organics (C10-C20) | 69100 | DJT | 14800 DT | 60300 | UG/KG | 22.5* | 65.8* | (0%-20%) | | 07/30/13 | 11:38 |
| Motor Oil (C20-C36) | 69100 | DT | 215000 DT | 197000 | UG/KG | 31.4* | 0* | (0%-20%) | | | |
| **o-Terphenyl | 691 | | 907 | 902 | UG/KG | | 131 | (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: 330227

Client SDG: XP0003

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: 1317734 Verified by: _____
 Analyst: Matthew Selepack
 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) |
|----------------------------|----------------------|-------------|----------------------|-----------------------|
| 1202915877 MB | 26-JUL-2013 17:45:00 | 30.06 | 1 | 0.03327 |
| 1202915878 LCS | 26-JUL-2013 17:45:00 | 30.03 | 1 | 0.0333 |
| 330221002 | 26-JUL-2013 17:45:00 | 30.05 | 1 | 0.03328 |
| 1202915881 MS (330221002) | 26-JUL-2013 17:45:00 | 30.14 | 1 | 0.03318 |
| 1202915882 MSD (330221002) | 26-JUL-2013 17:45:00 | 30.01 | 1 | 0.03332 |
| 330221003 | 26-JUL-2013 17:45:00 | 30.15 | 1 | 0.03317 |
| 330227002 | 26-JUL-2013 17:45:00 | 30.07 | 1 | 0.03326 |
| 1202915883 MS (330227002) | 26-JUL-2013 17:45:00 | 30.11 | 1 | 0.03321 |
| 1202915884 MSD (330227002) | 26-JUL-2013 17:45:00 | 30.03 | 1 | 0.0333 |
| 330227003 | 26-JUL-2013 17:45:00 | 30.07 | 1 | 0.03326 |
| 330229006 | 26-JUL-2013 17:45:00 | 30.05 | 1 | 0.03328 |
| 1202915879 MS (330229006) | 26-JUL-2013 17:45:00 | 30.07 | 1 | 0.03326 |
| 1202915880 MSD (330229006) | 26-JUL-2013 17:45:00 | 30.03 | 1 | 0.0333 |

| Type | Sample Id | Description | Serial Number | Spike Amt | Units | Comments: |
|-------|------------|-------------------------------|---------------|-----------|-------|--|
| LCS | 1202915878 | AZDRO SPIKE LCS STD,4000ug/ml | WFI130716-52 | 1 | mL | Final Solvent: CH2Cl2 Verified By: AV |
| MS | 1202915879 | AZDRO SPIKE LCS STD,4000ug/ml | WFI130716-52 | 1 | mL | |
| MS | 1202915881 | AZDRO SPIKE LCS STD,4000ug/ml | WFI130716-52 | 1 | mL | |
| MS | 1202915883 | AZDRO SPIKE LCS STD,4000ug/ml | WFI130716-52 | 1 | mL | |
| MSD | 1202915880 | AZDRO SPIKE LCS STD,4000ug/ml | WFI130716-52 | 1 | mL | |
| MSD | 1202915882 | AZDRO SPIKE LCS STD,4000ug/ml | WFI130716-52 | 1 | mL | |
| MSD | 1202915884 | AZDRO SPIKE LCS STD,4000ug/ml | WFI130716-52 | 1 | mL | |
| SURR | All | 20 ppm surrogate | WE130618-04 | 1 | mL | |
| REGNT | All | Methylene Chloride | 1935652-D | 120 | mL | |
| SOURC | All | SODIUM SULFATE | 1897902 | 30 | g | |

PCB Analysis

Case Narrative

**PCB Case Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0003**

Method/Analysis Information

Procedure: Analysis of Polychlorinated Biphenyls by ECD

Analytical Method: SW846 3541/8082A

Prep Method: SW846 3541

Analytical Batch Number: 1317567

Prep Batch Number: 1317565

Sample Analysis

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

| Sample ID | Client ID |
|------------------|--|
| 330227002 | J1RVK6 |
| 330227003 | J1RVK7 |
| 1202915534 | Method Blank (MB) |
| 1202915535 | Laboratory Control Sample (LCS) |
| 1202915540 | 330227002(J1RVK6) Matrix Spike (MS) |
| 1202915541 | 330227002(J1RVK6) Matrix Spike Duplicate (MSD) |

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

Preparation/Analytical Method Verification

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-040 REV# 20.

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

Calibration Information

A complete list of the initial calibration data files are shown in the Calibration History report located in the Standard Data section of the data package.

Initial Calibration

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

Continuing Calibration Verification (CCV) Requirements

All associated calibration verification standards (ICV or CCV) met the acceptance criteria. All analytes were within the established retention time windows for this method.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

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

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 330227002 (J1RVK6) 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

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

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

Miscellaneous Information

Electronic Package Comment

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

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

Data Exception (DER) Documentation

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

Manual Integrations

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

Additional Comments

The additional comments field is used to address special issues associated with each analysis, clarify method/contractual issues pertaining to the analysis, and to list any report documents generated as a result of sample analysis or review. The following additional comments were required:

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

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

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

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

System Configuration

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

| Instrument ID | Instrument | System Configuration | Column ID | Column Description |
|----------------------|---|-----------------------------|------------------|---|
| 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.

Sample Data Summary

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: July 31, 2013

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

Client SDG: XP0003

| | |
|-------------------------------|--------------------|
| Client Sample ID: J1RVK6 | Project: WCHN00213 |
| Sample ID: 330227002 | Client ID: WCHN001 |
| Matrix: SOIL | |
| Collect Date: 23-JUL-13 10:25 | |
| Receive Date: 25-JUL-13 | |
| Collector: Client | |
| Moisture: 3.66% | |

| Parameter | Qualifier | Result | DL | RL | Units | DF | Analyst | Date | Time | Batch | Method |
|--|-----------|--------|------|------|-------|----|---------|----------|------|---------|--------|
| Semi-Volatiles-PCB | | | | | | | | | | | |
| SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected" | | | | | | | | | | | |
| Aroclor-1016 | U | 1.15 | 1.15 | 3.46 | ug/kg | 1 | JXM | 07/29/13 | 0841 | 1317567 | 1 |
| Aroclor-1221 | U | 1.15 | 1.15 | 3.46 | ug/kg | 1 | | | | | |
| Aroclor-1232 | U | 1.15 | 1.15 | 3.46 | ug/kg | 1 | | | | | |
| Aroclor-1242 | U | 1.15 | 1.15 | 3.46 | ug/kg | 1 | | | | | |
| Aroclor-1248 | U | 1.15 | 1.15 | 3.46 | ug/kg | 1 | | | | | |
| Aroclor-1254 | U | 1.15 | 1.15 | 3.46 | ug/kg | 1 | | | | | |
| Aroclor-1260 | U | 1.15 | 1.15 | 3.46 | ug/kg | 1 | | | | | |

The following Prep Methods were performed:

| Method | Description | Analyst | Date | Time | Prep Batch |
|------------|--------------------------------|---------|----------|------|------------|
| SW846 3541 | Prep Method 3541 PCB Prep Soil | AXV1 | 07/26/13 | 1655 | 1317565 |

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" | 4.68 ug/kg | 6.91 | 67.8 | (37%-121%) | |
| Decachlorobiphenyl | SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected" | 4.03 ug/kg | 6.91 | 58.3 | (34%-121%) | |

Notes:

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: July 31, 2013

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

Client SDG: XP0003

| | |
|-------------------------------|--------------------|
| Client Sample ID: J1RVK7 | Project: WCHN00213 |
| Sample ID: 330227003 | Client ID: WCHN001 |
| Matrix: SOIL | |
| Collect Date: 23-JUL-13 10:25 | |
| Receive Date: 25-JUL-13 | |
| Collector: Client | |
| Moisture: 3.86% | |

| Parameter | Qualifier | Result | DL | RL | Units | DF | Analyst | Date | Time | Batch | Method |
|--|-----------|--------|------|------|-------|----|---------|----------|------|---------|--------|
| Semi-Volatiles-PCB | | | | | | | | | | | |
| SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected" | | | | | | | | | | | |
| Aroclor-1016 | U | 1.15 | 1.15 | 3.46 | ug/kg | 1 | JXM | 07/29/13 | 0924 | 1317567 | 1 |
| Aroclor-1221 | U | 1.15 | 1.15 | 3.46 | ug/kg | 1 | | | | | |
| Aroclor-1232 | U | 1.15 | 1.15 | 3.46 | ug/kg | 1 | | | | | |
| Aroclor-1242 | U | 1.15 | 1.15 | 3.46 | ug/kg | 1 | | | | | |
| Aroclor-1248 | U | 1.15 | 1.15 | 3.46 | ug/kg | 1 | | | | | |
| Aroclor-1254 | U | 1.15 | 1.15 | 3.46 | ug/kg | 1 | | | | | |
| Aroclor-1260 | U | 1.15 | 1.15 | 3.46 | ug/kg | 1 | | | | | |

The following Prep Methods were performed:

| Method | Description | Analyst | Date | Time | Prep Batch |
|------------|--------------------------------|---------|----------|------|------------|
| SW846 3541 | Prep Method 3541 PCB Prep Soil | AXV1 | 07/26/13 | 1655 | 1317565 |

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" | 4.71 ug/kg | 6.92 | 68.0 | (37%-121%) | |
| Decachlorobiphenyl | SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected" | 4.10 ug/kg | 6.92 | 59.2 | (34%-121%) | |

Notes:

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 31, 2013

Page 1 of 2

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

Workorder: 330227

Client SDG: XP0003

Project Description: RC-232 Soil

| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|---------------------------|-----------|--------|------|------|-------|------|------|------------|-------|----------|-------|
| Semi-Volatiles-PCB | | | | | | | | | | | |
| Batch | 1317567 | | | | | | | | | | |
| QC1202915535 | LCS | | | | | | | | | | |
| Aroclor-1016 | 33.3 | | | 21.5 | ug/kg | | 64.6 | (43%-120%) | JXM | 07/29/13 | 07:39 |
| Aroclor-1260 | 33.3 | | | 21.3 | ug/kg | | 63.9 | (45%-127%) | | | |
| **4cmx | 6.66 | | | 4.70 | ug/kg | | 70.5 | (37%-121%) | | | |
| **Decachlorobiphenyl | 6.66 | | | 4.35 | ug/kg | | 65.3 | (34%-121%) | | | |
| QC1202915534 | MB | | | | | | | | | | |
| Aroclor-1016 | | | U | 1.11 | ug/kg | | | | | 07/29/13 | 07:26 |
| 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 | 6.65 | | | 4.53 | ug/kg | | 68.1 | (37%-121%) | | | |
| **Decachlorobiphenyl | 6.65 | | | 4.55 | ug/kg | | 68.4 | (34%-121%) | | | |
| QC1202915540 | 330227002 | MS | | | | | | | | | |
| Aroclor-1016 | 34.4 | U | 1.15 | 21.0 | ug/kg | | 61 | (21%-132%) | | 07/29/13 | 08:55 |
| Aroclor-1260 | 34.4 | U | 1.15 | 18.1 | ug/kg | | 52.6 | (24%-126%) | | | |
| **4cmx | 6.88 | | 4.68 | 5.16 | ug/kg | | 75 | (37%-121%) | | | |
| **Decachlorobiphenyl | 6.88 | | 4.03 | 4.24 | ug/kg | | 61.6 | (34%-121%) | | | |
| QC1202915541 | 330227002 | MSD | | | | | | | | | |
| Aroclor-1016 | 34.5 | U | 1.15 | 19.6 | ug/kg | 6.71 | 56.9 | (0%-30%) | | 07/29/13 | 09:09 |

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QC Summary

Workorder: 330227

Client SDG: XP0003

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 | 1317567 | | | | | | | | | | |
| Aroclor-1260 | 34.5 | U | 1.15 | 17.0 | ug/kg | 6.07 | 49.4 | (0%-30%) | | | |
| **4cmx | 6.89 | | 4.68 | 4.80 | ug/kg | | 69.7 | (37%-121%) | JXM | 07/29/13 | 09:09 |
| **Decachlorobiphenyl | 6.89 | | 4.03 | 4.11 | ug/kg | | 59.5 | (34%-121%) | | | |

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: 1317565 Verified by: _____
 Analyst: Alberto Velasco
 Method: SW846 3541

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

| Sample ID | Run Date | Aliquot (g) | Clean Up | Amount 1 (mL) | Amount 2 (mL) | Amount 3 (mL) | Prepped Aliquot (mL) | Prepped Factor (mL/g) |
|----------------------------|----------------------|-------------|----------------|---------------|---------------|---------------|----------------------|-----------------------|
| 1202915534 MB | 26-JUL-2013 16:55:00 | 30.06 | H2SO4/KM 2 nO4 | 2 | 9 | 1 | | 0.03327 |
| 1202915535 LCS | 26-JUL-2013 16:55:00 | 30.02 | H2SO4/KM 2 nO4 | 2 | 9 | 1 | | 0.03331 |
| 330221002 | 26-JUL-2013 16:55:00 | 30.03 | H2SO4/KM 2 nO4 | 2 | 9 | 1 | | 0.0333 |
| 1202915538 MS (330221002) | 26-JUL-2013 16:55:00 | 30.11 | H2SO4/KM 2 nO4 | 2 | 9 | 1 | | 0.03321 |
| 1202915539 MSD (330221002) | 26-JUL-2013 16:55:00 | 30.05 | H2SO4/KM 2 nO4 | 2 | 9 | 1 | | 0.03328 |
| 330221003 | 26-JUL-2013 16:55:00 | 30.01 | H2SO4/KM 2 nO4 | 2 | 9 | 1 | | 0.03332 |
| 330227002 | 26-JUL-2013 16:55:00 | 30.03 | H2SO4/KM 2 nO4 | 2 | 9 | 1 | | 0.0333 |
| 1202915540 MS (330227002) | 26-JUL-2013 16:55:00 | 30.16 | H2SO4/KM 2 nO4 | 2 | 9 | 1 | | 0.03316 |
| 1202915541 MSD (330227002) | 26-JUL-2013 16:55:00 | 30.11 | H2SO4/KM 2 nO4 | 2 | 9 | 1 | | 0.03321 |
| 330227003 | 26-JUL-2013 16:55:00 | 30.04 | H2SO4/KM 2 nO4 | 2 | 9 | 1 | | 0.03329 |
| 330229006 | 26-JUL-2013 16:55:00 | 30.17 | H2SO4/KM 2 nO4 | 2 | 9 | 1 | | 0.03315 |
| 1202915536 MS (330229006) | 26-JUL-2013 16:55:00 | 30.09 | H2SO4/KM 2 nO4 | 2 | 9 | 1 | | 0.03323 |
| 1202915537 MSD (330229006) | 26-JUL-2013 16:55:00 | 30.05 | H2SO4/KM 2 nO4 | 2 | 9 | 1 | | 0.03328 |

| Type | Sample Id | Description | Serial Number | Spike Amt | Units | Comments: |
|-------|------------|-----------------------------------|---------------|-----------|-------|---|
| LCS | 1202915535 | PCB Laboratory Control | WE130711-04 | 1 | mL | Final Solvent: Hexane Clean up Initials: AV Verified By: MJS Clean up SOP: GL-OA-E-037 Clean up Date: 7-26-13 |
| MS | 1202915536 | PCB Laboratory Control | WE130711-04 | 1 | mL | |
| MS | 1202915538 | PCB Laboratory Control | WE130711-04 | 1 | mL | |
| MS | 1202915540 | PCB Laboratory Control | WE130711-04 | 1 | mL | |
| MSD | 1202915537 | PCB Laboratory Control | WE130711-04 | 1 | mL | |
| MSD | 1202915539 | PCB Laboratory Control | WE130711-04 | 1 | mL | |
| MSD | 1202915541 | PCB Laboratory Control | WE130711-04 | 1 | mL | |
| SURR | All | PEST LOW LEVEL SURROGATE 200 UG/L | WE130702-01 | 1 | mL | |
| REGNT | All | Hexane | 130710-B4 | 120 | mL | |
| REGNT | All | 50g KMnO4 per 1L DI H2O | 1883656 | 5 | mL | |
| REGNT | All | 1:1 sulfuric acid | 1943550 | 5 | mL | |
| SOURC | All | SODIUM SULFATE | 1897902 | 30 | g | |

Metals Analysis

Case Narrative

**Metals Fractional Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0003**

Sample Analysis

| Sample ID | Client ID |
|------------------|---|
| 330227001 | J1RVK5 |
| 330227002 | J1RVK6 |
| 330227003 | J1RVK7 |
| 1202915432 | Method Blank (MB) ICP |
| 1202915433 | Laboratory Control Sample (LCS) |
| 1202915442 | 330227001(J1RVK5L) Serial Dilution (SD) |
| 1202915440 | 330227001(J1RVK5D) Sample Duplicate (DUP) |
| 1202915441 | 330227001(J1RVK5S) Matrix Spike (MS) |
| 1202920308 | 330227001(J1RVK5PS) Post Spike (PS) |
| 1202915936 | Method Blank (MB) CVAA |
| 1202915937 | Laboratory Control Sample (LCS) |
| 1202915946 | 330227001(J1RVK5L) Serial Dilution (SD) |
| 1202915944 | 330227001(J1RVK5D) Sample Duplicate (DUP) |
| 1202915945 | 330227001(J1RVK5S) Matrix Spike (MS) |

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

Method/Analysis Information

| | |
|---------------------------------------|--|
| Analytical Batch: | 1317524 and 1317755 |
| Prep Batch : | 1317523 and 1317753 |
| Standard Operating Procedures: | GL-MA-E-013 REV# 22, GL-MA-E-009 REV# 22 and GL-MA-E-010 REV# 26 |
| Analytical Method: | SW846 3050B/6010C 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-Mercury was performed on a Perkin-Elmer Flow Injection Mercury System (FIMS-100) automated mercury analyzer. The instrument consists of a cold vapor atomic absorption spectrometer set to detect mercury at a wavelength of 253.7 nm. Sample introduction through the flow injection system is performed via a peristaltic pump at 9 mL/min and nitrogen carrier gas rate of 80 mL/min.

Calibration Information

Instrument Calibration

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

CRDL Requirements

All CRDL standards met the advisory control limits with the exception of antimony. PQL03 (analyzed at 14:20 on 08/01/13) and PQL04 (analyzed at 14:59 on 08/01/13) recovered high for antimony; however, the sample results were less than the MDL, therefore the data is reported.

ICSA/ICSAB Statement

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

Continuing Calibration Blank (CCB) Requirements

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

Continuing Calibration Verification (CCV) Requirements

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MBs analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Sample Statement

The following sample was selected as the quality control (QC) sample for this SDG: 330227001 (J1RVK5).

Matrix Spike (MS) Recovery Statement

The percent recoveries (%R) obtained from the MS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The MS met the recommended quality control acceptance criteria for percent recoveries for all applicable analytes with the exception of aluminum, iron, and silicon.

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 detection limit (RL). In cases where either the sample or duplicate value is less than 5X the contract required detection limit (RL), a control of +/-RL is used to evaluate the DUP results. All applicable analytes met these requirements with the exception of iron and manganese.

Post Spike (PS) Recovery Statement

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

Serial Dilution % Difference Statement

The serial dilution is used to assess matrix suppression or enhancement. Raw element concentrations that are 25X the IDL/MDL for CVAA, 50X the IDL/MDL for ICP, and 100X the IDL/MDL for ICP-MS analyses are applicable for serial dilution assessment. All applicable analytes met the acceptance criteria of less than 10% difference (%D).

Technical Information

Holding Time Specifications

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP. Method SW-846 3050B is not a total digestion technique for most samples. It is a very strong acid digestion that will dissolve almost all elements that could become environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Sample Dilutions

Dilutions are performed to minimize matrix interferences resulting from elevated mineral element concentrations present in solid samples and/or to bring over range target analyte concentrations into the linear calibration range of the instrument. Samples 330227002 and 330227003 required dilutions in order to bring raw values of titanium within the linear range of the instrument, and for the analytes antimony, cobalt, lead, vanadium, and zinc that titanium interferes with, in order to ensure that the inter-element correction factors were valid on the ICP.

Preparation Information

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

Miscellaneous Information

Electronic Packaging Comment

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

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

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may

deviate from referenced SOP or contractual documents. The following DER was generated for this SDG: 1207485. A copy is included in the Miscellaneous Data section of this package.

Additional Comments

Additional comments were not required for this SDG.


Certification Statement

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

Review Validation:

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

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

Reviewer:  Date: 08/05/13

DATA EXCEPTION REPORT

| | | | |
|--------------------------------|--|--|-----------------------------|
| Mo.Day Yr. 01-AUG-13 | Division: Industrial | Quality Criteria: Specifications | Type: Process |
| Instrument Type: ICP | Test / Method: SW846 3050B/6010C | Matrix Type: Solid | Client Code: WCHN |
| Batch ID: 1317524 | Sample Numbers: See Below | | |

Potentially affected work order(s)(SDG): 330215(XP0001),330221(XP0002),330227(XP0003)

Application Issues:

Failed Recovery for MS/PS

Failed RPD for DUP

Other

Specification and Requirements Exception Description:

DER Disposition:

1. Failed Recovery for MS/PS:
 QC 1202915435MS,1202915438MS,
 1202915441MS
2. Failed RPD for DUP:
 QC 1202915434DUP,
 1202915440DUP
3. Low level PQL recovered high for lead:

1. The matrix spike recovery failed outside of the control limits for aluminum and silicon for 330221 and aluminum, iron, and silicon for 330215 and 330227. The post spike passed the required control limits for all analytes. This verifies the absence of a matrix interference. Per GEL's accredited methods and SOPs, a corrective action is not required and the data is qualified and reported.
2. The sample and sample duplicate % RPD failed outside the control limits for iron and manganese for 330227 and manganese for 330215 due to possible sample non-homogeneity. Per GEL's accredited methods and SOPs, a corrective action is not required and the data is qualified and reported.
3. The samples were analyzed on 3 separate passing calibrations. A bracketing PQL recovered high for lead in all 3 analyses due to possible matrix interactions. Samples 330215001, 002, 003, 004, 005, 006 and 330221001 were not less than the MDL or 2x greater than the PQL. The lead results could be biased slightly high. The data is being reported.

Originator's Name:

Helen Camello 01-AUG-13

Data Validator/Group Leader:

Jamie Johnson 01-AUG-13

Sample Data Summary

GEL LABORATORIES LLC

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Qualifier Definition Report for

WCHN001 WC-HANFORD, INC.

Client SDG: XP0003 GEL Work Order: 330227 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.

N Spike Sample recovery is outside control limits.

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

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

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

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

Reviewed by



08/05/13

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: August 2, 2013

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

Client SDG: XP0003

Client Sample ID: J1RVK5
Sample ID: 330227001

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 | |

Notes:

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: August 2, 2013

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

Client SDG: XP0003

Client Sample ID: J1RVK6
Sample ID: 330227002

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 | |

Notes:

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: August 2, 2013

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

Client SDG: XP0003

Client Sample ID: J1RVK7
Sample ID: 330227003

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 | |

Notes:

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: August 2, 2013

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

Workorder: 330227

Client SDG: XP0003

Project Description: RC-232 Soil

| Parmname | NOM | Sample | Qual | QC | Units | RPD/D% | REC% | Range | Anlst | Date | Time |
|----------------------------|---------|--------|------|---------|-------|--------|------|------------|-------|----------|-------|
| Metals Analysis-ICP | | | | | | | | | | | |
| Batch | 1317524 | | | | | | | | | | |
| QC1202915440 330227001 DUP | | | | | | | | | | | |
| Aluminum | N | 142000 | | 155000 | ug/kg | 9.02 | | (0%-20%) | HSC | 07/31/13 | 15:19 |
| Antimony | U | 324 | U | 318 | ug/kg | N/A | ^ | | | 08/01/13 | 14:38 |
| Arsenic | B | 495 | B | 720 | ug/kg | 37.1 | ^ | (+/-2890) | | 07/31/13 | 15:19 |
| Barium | | 1770 | | 1970 | ug/kg | 10.8 | ^ | (+/-482) | | | |
| Beryllium | U | 98.2 | U | 96.3 | ug/kg | N/A | ^ | | | | |
| Boron | U | 982 | U | 963 | ug/kg | N/A | ^ | | | | |
| Cadmium | U | 98.2 | U | 96.3 | ug/kg | N/A | ^ | | | | |
| Calcium | | 37700 | | 37700 | ug/kg | 0.106 | ^ | (+/-24100) | | | |
| Chromium | U | 147 | U | 145 | ug/kg | N/A | ^ | | | | |
| Cobalt | U | 147 | U | 145 | ug/kg | N/A | ^ | | | 08/01/13 | 14:38 |
| Copper | U | 295 | U | 289 | ug/kg | N/A | ^ | | | 07/31/13 | 15:54 |
| Iron | *N | 254000 | * | 1040000 | ug/kg | 122* | | (0%-20%) | | 07/31/13 | 15:19 |
| Lead | BC | 677 | BC | 659 | ug/kg | 2.58 | ^ | (+/-963) | | 08/01/13 | 14:38 |
| Magnesium | B | 21000 | B | 22500 | ug/kg | 6.74 | ^ | (+/-28900) | | 07/31/13 | 15:19 |
| Manganese | * | 6830 | * | 16000 | ug/kg | 80.6* | | (0%-20%) | | | |
| Molybdenum | U | 196 | U | 193 | ug/kg | N/A | ^ | | | | |
| Nickel | B | 156 | U | 145 | ug/kg | 16.4 | ^ | (+/-482) | | | |
| Potassium | | 43300 | | 44500 | ug/kg | 2.74 | ^ | (+/-24100) | | | |
| Selenium | B | 500 | B | 535 | ug/kg | 6.70 | ^ | (+/-2890) | | | |
| Silicon | N | 161000 | | 156000 | ug/kg | 2.98 | | (0%-20%) | | | |

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QC Summary

Workorder: 330227

Client SDG: XP0003

Project Description: RC-232 Soil

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| Parmname | NOM | Sample | Qual | QC | Units | RPD/D% | REC% | Range | Anlst | Date | Time |
|----------------------------|---------|--------|------|----|--------|--------|------|-------|----------|------------|----------------|
| Metals Analysis-ICP | | | | | | | | | | | |
| Batch | 1317524 | | | | | | | | | | |
| Silver | | U | 98.2 | U | 96.3 | ug/kg | N/A | ^ | HSC | 07/31/13 | 15:19 |
| Sodium | | U | 6880 | U | 6740 | ug/kg | N/A | ^ | | | |
| Vanadium | | B | 231 | | 519 | ug/kg | 77.0 | ^ | (+/-482) | 08/01/13 | 14:38 |
| Zinc | | C | 1780 | | 2640 | ug/kg | 38.8 | ^ | (+/-963) | | |
| QC1202915433 | LCS | | | | | | | | | | |
| Aluminum | 500000 | | | | 465000 | ug/kg | | | 93 | (80%-120%) | 07/31/13 14:02 |
| Antimony | 50000 | | | | 49000 | ug/kg | | | 98 | (80%-120%) | 08/01/13 13:18 |
| Arsenic | 50000 | | | | 50400 | ug/kg | | | 101 | (80%-120%) | 07/31/13 14:02 |
| Barium | 50000 | | | | 48300 | ug/kg | | | 96.6 | (80%-120%) | |
| Beryllium | 50000 | | | | 50200 | ug/kg | | | 100 | (80%-120%) | |
| Boron | 50000 | | | | 46400 | ug/kg | | | 92.7 | (80%-120%) | |
| Cadmium | 50000 | | | | 50500 | ug/kg | | | 101 | (80%-120%) | |
| Calcium | 500000 | | | | 489000 | ug/kg | | | 97.8 | (80%-120%) | |
| Chromium | 50000 | | | | 48300 | ug/kg | | | 96.5 | (80%-120%) | |
| Cobalt | 50000 | | | | 48600 | ug/kg | | | 97.1 | (80%-120%) | 08/01/13 13:18 |
| Copper | 50000 | | | | 48200 | ug/kg | | | 96.5 | (80%-120%) | 07/31/13 14:46 |
| Iron | 500000 | | | | 490000 | ug/kg | | | 97.9 | (80%-120%) | 07/31/13 14:02 |
| Lead | 50000 | | | | 49300 | ug/kg | | | 98.6 | (80%-120%) | 08/01/13 13:18 |
| Magnesium | 500000 | | | | 499000 | ug/kg | | | 99.8 | (80%-120%) | 07/31/13 14:02 |
| Manganese | 50000 | | | | 49200 | ug/kg | | | 98.3 | (80%-120%) | |
| Molybdenum | 50000 | | | | 48000 | ug/kg | | | 96.1 | (80%-120%) | |
| Nickel | 50000 | | | | 49400 | ug/kg | | | 98.7 | (80%-120%) | |

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QC Summary

Workorder: 330227

Client SDG: XP0003

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 | 1317524 | | | | | | | | | | |
| Potassium | 500000 | | | 492000 | ug/kg | | 98.4 | (80%-120%) | HSC | 07/31/13 | 14:02 |
| Selenium | 50000 | | | 53500 | ug/kg | | 107 | (80%-120%) | | | |
| Silicon | 500000 | | | 438000 | ug/kg | | 87.6 | (80%-120%) | | | |
| Silver | 50000 | | | 48300 | ug/kg | | 96.6 | (80%-120%) | | | |
| Sodium | 500000 | | | 466000 | ug/kg | | 93.2 | (80%-120%) | | | |
| Vanadium | 50000 | | | 50100 | ug/kg | | 100 | (80%-120%) | | 08/01/13 | 13:18 |
| Zinc | 50000 | | | 51300 | ug/kg | | 103 | (80%-120%) | | | |
| QC1202915432 | MB | | | | | | | | | | |
| Aluminum | | | U | 6720 | ug/kg | | | | | 07/31/13 | 13:58 |
| Antimony | | | U | 326 | ug/kg | | | | | 08/01/13 | 13:14 |
| Arsenic | | | U | 494 | ug/kg | | | | | 07/31/13 | 13:58 |
| Barium | | | U | 98.8 | ug/kg | | | | | | |
| Beryllium | | | U | 98.8 | ug/kg | | | | | | |
| Boron | | | U | 988 | ug/kg | | | | | | |
| Cadmium | | | U | 98.8 | ug/kg | | | | | | |
| Calcium | | | U | 7910 | ug/kg | | | | | | |
| Chromium | | | U | 148 | ug/kg | | | | | | |
| Cobalt | | | U | 148 | ug/kg | | | | | 08/01/13 | 13:14 |
| Copper | | | U | 296 | ug/kg | | | | | 07/31/13 | 14:43 |
| Iron | | | U | 7910 | ug/kg | | | | | 07/31/13 | 13:58 |
| Lead | | | B | 456 | ug/kg | | | | | 08/01/13 | 13:14 |
| Magnesium | | | U | 8400 | ug/kg | | | | | 07/31/13 | 13:58 |

GEL LABORATORIES LLC

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

QC Summary

Workorder: 330227

Client SDG: XP0003

Project Description: RC-232 Soil

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| Parmname | NOM | Sample | Qual | QC | Units | RPD/D% | REC% | Range | Anlst | Date | Time |
|----------------------------|---------|--------|--------|------|---------|--------|-------|------------|-------|----------|-------|
| Metals Analysis-ICP | | | | | | | | | | | |
| Batch | 1317524 | | | | | | | | | | |
| Manganese | | | U | 198 | ug/kg | | | | HSC | 07/31/13 | 13:58 |
| Molybdenum | | | U | 198 | ug/kg | | | | | | |
| Nickel | | | U | 148 | ug/kg | | | | | | |
| Potassium | | | U | 6320 | ug/kg | | | | | | |
| Selenium | | | U | 494 | ug/kg | | | | | | |
| Silicon | | | U | 1480 | ug/kg | | | | | | |
| Silver | | | U | 98.8 | ug/kg | | | | | | |
| Sodium | | | U | 6920 | ug/kg | | | | | | |
| Vanadium | | | U | 98.8 | ug/kg | | | | | 08/01/13 | 13:14 |
| Zinc | | | B | 472 | ug/kg | | | | | | |
| QC1202915441 330227001 MS | | | | | | | | | | | |
| Aluminum | 477000 | N | 142000 | N | 1010000 | ug/kg | 181 * | (75%-125%) | | 07/31/13 | 15:23 |
| Antimony | 47700 | U | 324 | | 48500 | ug/kg | 102 | (75%-125%) | | 08/01/13 | 14:42 |
| Arsenic | 47700 | B | 495 | | 49000 | ug/kg | 102 | (75%-125%) | | 07/31/13 | 15:23 |
| Barium | 47700 | | 1770 | | 50700 | ug/kg | 102 | (75%-125%) | | | |
| Beryllium | 47700 | U | 98.2 | | 50300 | ug/kg | 105 | (75%-125%) | | | |
| Boron | 47700 | U | 982 | | 46200 | ug/kg | 96.6 | (75%-125%) | | | |
| Cadmium | 47700 | U | 98.2 | | 49700 | ug/kg | 104 | (75%-125%) | | | |
| Calcium | 477000 | | 37700 | | 530000 | ug/kg | 103 | (75%-125%) | | | |
| Chromium | 47700 | U | 147 | | 48700 | ug/kg | 102 | (75%-125%) | | | |
| Cobalt | 47700 | U | 147 | | 48900 | ug/kg | 102 | (75%-125%) | | 08/01/13 | 14:42 |
| Copper | 47700 | U | 295 | | 48600 | ug/kg | 102 | (75%-125%) | | 07/31/13 | 15:57 |

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QC Summary

Workorder: 330227

Client SDG: XP0003

Project Description: RC-232 Soil

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| Parmname | NOM | Sample | Qual | QC | Units | RPD/D% | REC% | Range | Anlst | Date | Time |
|------------------------------|---------|--------|--------|----|---------|--------|------|------------|-------|----------|-------|
| Metals Analysis-ICP | | | | | | | | | | | |
| Batch | 1317524 | | | | | | | | | | |
| Iron | 477000 | *N | 254000 | N | 1270000 | ug/kg | 212* | (75%-125%) | HSC | 07/31/13 | 15:23 |
| Lead | 47700 | BC | 677 | | 49500 | ug/kg | 102 | (75%-125%) | | 08/01/13 | 14:42 |
| Magnesium | 477000 | B | 21000 | | 528000 | ug/kg | 106 | (75%-125%) | | 07/31/13 | 15:23 |
| Manganese | 47700 | * | 6830 | | 56500 | ug/kg | 104 | (75%-125%) | | | |
| Molybdenum | 47700 | U | 196 | | 48000 | ug/kg | 101 | (75%-125%) | | | |
| Nickel | 47700 | B | 156 | | 49700 | ug/kg | 104 | (75%-125%) | | | |
| Potassium | 477000 | | 43300 | | 555000 | ug/kg | 107 | (75%-125%) | | | |
| Selenium | 47700 | B | 500 | | 52600 | ug/kg | 109 | (75%-125%) | | | |
| Silicon | 477000 | N | 161000 | N | 842000 | ug/kg | 143* | (75%-125%) | | | |
| Silver | 47700 | U | 98.2 | | 48500 | ug/kg | 102 | (75%-125%) | | | |
| Sodium | 477000 | U | 6880 | | 514000 | ug/kg | 106 | (75%-125%) | | | |
| Vanadium | 47700 | B | 231 | | 50600 | ug/kg | 106 | (75%-125%) | | 08/01/13 | 14:42 |
| Zinc | 47700 | C | 1780 | | 52600 | ug/kg | 107 | (75%-125%) | | | |
| QC1202920308 330227001 PS | | | | | | | | | | | |
| Aluminum | 5000 | N | 1440 | | 6350 | ug/L | 98.2 | (80%-120%) | | 08/01/13 | 16:57 |
| Iron | 5000 | *N | 2580 | | 7740 | ug/L | 103 | (80%-120%) | | | |
| Silicon | 5000 | N | 1640 | | 6980 | ug/L | 107 | (80%-120%) | | | |
| QC1202915442 330227001 SDILT | | | | | | | | | | | |
| Aluminum | | N | 1440 | D | 286 | ug/L | .892 | (0%-10%) | | 07/31/13 | 15:26 |
| Antimony | | U | -0.954 | DU | 1620 | ug/L | N/A | (0%-10%) | | 08/01/13 | 14:45 |
| Arsenic | | B | 5.04 | DU | 2460 | ug/L | N/A | (0%-10%) | | 07/31/13 | 15:26 |
| Barium | | | 18.0 | D | 3.81 | ug/L | 5.55 | (0%-10%) | | | |
| Beryllium | | U | 0.243 | DU | 491 | ug/L | N/A | (0%-10%) | | | |

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QC Summary

Workorder: 330227

Client SDG: XP0003

Project Description: RC-232 Soil

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| Parmname | NOM | Sample | Qual | QC | Units | RPD/D% | REC% | Range | Anlst | Date | Time |
|--------------------------------|---------------|---------|------|-------|-------|--------|------|-----------|-------|----------|-------|
| Metals Analysis-ICP | | | | | | | | | | | |
| Batch | 1317524 | | | | | | | | | | |
| Boron | U | 1.19 | DU | 4910 | ug/L | N/A | | (0%-10%) | HSC | 07/31/13 | 15:26 |
| Cadmium | U | -0.168 | DU | 491 | ug/L | N/A | | (0%-10%) | | | |
| Calcium | | 383 | D | 104 | ug/L | 35.1 | | (0%-10%) | | | |
| Chromium | U | 0.899 | DU | 737 | ug/L | N/A | | (0%-10%) | | | |
| Cobalt | U | 1.18 | DU | 737 | ug/L | N/A | | (0%-10%) | | 08/01/13 | 14:45 |
| Copper | U | -2.38 | DU | 1470 | ug/L | N/A | | (0%-10%) | | 07/31/13 | 16:01 |
| Iron | *N | 2580 | D | 512 | ug/L | .916 | | (0%-10%) | | 07/31/13 | 15:26 |
| Lead | BC | 6.89 | DU | 1620 | ug/L | N/A | | (0%-10%) | | 08/01/13 | 14:45 |
| Magnesium | B | 214 | DU | 41800 | ug/L | N/A | | (0%-10%) | | 07/31/13 | 15:26 |
| Manganese | * | 69.5 | D | 13.7 | ug/L | 1.48 | | (0%-10%) | | | |
| Molybdenum | U | -0.0611 | DU | 982 | ug/L | N/A | | (0%-10%) | | | |
| Nickel | B | 1.59 | DU | 737 | ug/L | N/A | | (0%-10%) | | | |
| Potassium | | 440 | D | 71.1 | ug/L | 19.2 | | (0%-10%) | | | |
| Selenium | B | 5.09 | DU | 2460 | ug/L | N/A | | (0%-10%) | | | |
| Silicon | N | 1640 | D | 326 | ug/L | .529 | | (0%-10%) | | | |
| Silver | U | -0.023 | DU | 491 | ug/L | N/A | | (0%-10%) | | | |
| Sodium | U | 63.3 | DU | 34400 | ug/L | N/A | | (0%-10%) | | | |
| Vanadium | B | 2.35 | DU | 491 | ug/L | N/A | | (0%-10%) | | 08/01/13 | 14:45 |
| Zinc | C | 18.1 | DU | 1960 | ug/L | N/A | | (0%-10%) | | | |
| Metals Analysis-Mercury | | | | | | | | | | | |
| Batch | 1317755 | | | | | | | | | | |
| QC1202915944 | 330227001 DUP | | | | | | | | | | |
| Mercury | B | 4.28 | U | 3.84 | ug/kg | 455 | ^ | (+/-11.5) | NOR1 | 07/29/13 | 17:02 |

GEL LABORATORIES LLC

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QC Summary

Workorder: 330227

Client SDG: XP0003

Project Description: RC-232 Soil

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| Parname | NOM | Sample | Qual | QC | Units | RPD/D% | REC% | Range | Anlst | Date | Time |
|--------------------------------|-----------|--------|-------|------|-------|--------|------|------------|-------|----------|-------|
| Metals Analysis-Mercury | | | | | | | | | | | |
| Batch | 1317755 | | | | | | | | | | |
| QC1202915937 | LCS | | | | | | | | | | |
| Mercury | 117 | | | 120 | ug/kg | | 103 | (80%-120%) | NOR1 | 07/29/13 | 16:26 |
| QC1202915936 | MB | | | | | | | | | | |
| Mercury | | | U | 3.96 | ug/kg | | | | | 07/29/13 | 16:25 |
| QC1202915945 | 330227001 | MS | | | | | | | | | |
| Mercury | 119 | B | 4.28 | 124 | ug/kg | | 100 | (80%-120%) | | 07/29/13 | 17:03 |
| QC1202915946 | 330227001 | SDILT | | | | | | | | | |
| Mercury | | B | 0.074 | DU | 19.4 | ug/L | N/A | (0%-10%) | | 07/29/13 | 17:05 |

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.



September 18, 2013

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

Re: RC-232 Soil
Work Order: 333342
SDG: XP0003A

Dear Joan Kessner:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on July 25, 2013. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,

Orlette Johnson
Project Manager

Purchase Order: 1510
Chain of Custody: RC-232-042
Enclosures



Table of Contents

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Case Narrative

**Receipt Narrative
for
WC-HANFORD, INC.
SDG: XP0003A
Work Order: 333342**

September 18, 2013

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary:

Sample receipt: The sample arrived at GEL Laboratories LLC, Charleston, South Carolina on July 25, 2013 for analysis.

Sample Identification: The laboratory received the following sample:

| <u>Laboratory ID</u> | <u>Client ID</u> |
|-----------------------------|-------------------------|
| 333342001 | J1RVK6 |

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: Metals.



Orlette Johnson
Project Manager

Chain of Custody and Supporting Documentation

330227

| | | | | | |
|--|--|---|-------------------------------------|---------------------------------|-----------------|
| Washington Closure Hanford | | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | | RC-232-042 | Page 1 of 1 |
| Collector <i>A. DUNNUM</i> | Company Contact Joan Kessner | Telephone No. 375-4688 | Project Coordinator KESSNER, JH | Price Code 8C | Data Turnaround |
| Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites | Sampling Location 600-373 | Field Logbook No. EL 1666 | SAF No. RC-232 | 7 16 Days MAY 7-23-13 | |
| Ice Chest No. <i>WCH-11-009</i> | Offsite Property No. <i>A120 893</i> | COA <i>0603332000</i> | Method of Shipment <i>fed EX</i> | | |
| Shipped To Eberline - GEL | Bill of Lading/Air Bill No. <i>See OSPC</i> | | | | |

| Sample No. | Matrix | Sample Date | Sample Time | Preservation | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | SPECIAL INSTRUCTIONS | | |
|------------------------|--------|-------------|-------------|--------------|---------|---------|---------|---------|---------|---------|---------|-----------------------------|-------------|-------------|
| | | | | | | | | | | | | TPH-Diesel Range - WTPH-D + | PAHs - 8310 | PCBs - 8082 |
| J1RVK5 | SOIL | 7-23-13 | 0955 | | | | | | | | | | | |
| J1RVK6 | SOIL | 7-23-13 | 1025 | | | | | | | | | | | |
| J1RVK7 | SOIL | 7-23-13 | 1025 | | | | | | | | | | | |
| SAMPLE ANALYSIS | | | | | | | | | | | | | | |
| SAMPLE ANALYSIS | | | | | | | | | | | | | | |

| CHAIN OF POSSESSION | | Sign/Print Names | |
|------------------------------|--------------|--------------------------------|--------------|
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| <i>A. Dunnum</i> | 7-23-13 1045 | <i>Bob Fahler</i> | 7-23-13 1045 |
| <i>R. Fahler</i> | 7-23-13 1515 | <i>John Haraice</i> | 7-23-13 1505 |
| <i>John Haraice</i> | 7-23-13 1650 | <i>Fig #3A</i> | 7-23-13 1650 |
| <i>Fig #3A</i> | 7-23-13 1014 | <i>John Haraice</i> | 7-24-13 1014 |
| <i>John Haraice</i> | 7-24-13 1015 | <i>Fed Ex</i> | 7-24-13 1015 |
| <i>John Haraice</i> | 7-24-13 0855 | <i>JJ. Jennifer Pellegrini</i> | 7-25-13 0855 |

FINAL SAMPLE DISPOSITION

WCH-EE-011

XP0003

REVIEWED BY

[Signature]

DATE

7-24-13

REVIEWED BY

[Signature]

DATE

7-24-13

Generated Date/Time: 07/22/2013 16:25, PDT

SAMPLE RECEIPT & REVIEW FORM

| | | |
|--|--------------------------|--------------------------------------|
| Client: <u>WCHN</u> | | SDG/AR/COC/Work Order: <u>330227</u> |
| Received By: <u>JP</u> | | Date Received: <u>7-25-13</u> |
| Suspected Hazard Information | Yes | No |
| COC/Samples marked as radioactive? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Classified Radioactive II or III by RSO? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| COC/Samples marked containing PCBs? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Package, COC, and/or Samples marked as beryllium or asbestos containing? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Shipped as a DOT Hazardous? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Samples identified as Foreign Soil? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

| Sample Receipt Criteria | Yes | NA | No | Comments/Qualifiers (Required for Non-Conforming Items) |
|---|-------------------------------------|-------------------------------------|--------------------------|---|
| 1 Shipping containers received intact and sealed? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Circle Applicable: Seals broken Damaged container Leaking container Other (describe) |
| 2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?* | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Preservation Method: <u>Ice bags</u> Blue ice Dry ice None Other (describe) *All temperatures are recorded in Celsius |
| 2a Daily check performed and passed on IR temperature gun? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Temperature Device Serial # <u>41502209</u> Secondary Temperature Device Serial # (If Applicable): |
| 3 Chain of custody documents included with shipment? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 4 Sample containers intact and sealed? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Circle Applicable: Seals broken Damaged container Leaking container Other (describe) |
| 5 Samples requiring chemical preservation at proper pH? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Sample ID's, containers affected and observed pH: If Preservation added, Lot#: |
| 6 VOA vials free of headspace (defined as < 6mm bubble)? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Sample ID's and containers affected: |
| 7 Are Encore containers present? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | (If yes, immediately deliver to Volatiles laboratory) |
| 8 Samples received within holding time? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ID's and tests affected: |
| 9 Sample ID's on COC match ID's on bottles? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Sample ID's and containers affected: |
| 10 Date & time on COC match date & time on bottles? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Sample ID's affected: |
| 11 Number of containers received match number indicated on COC? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Sample ID's affected: |
| 12 Are sample containers identifiable as GEL provided? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 13 COC form is properly signed in relinquished/received sections? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 14 Carrier and tracking number. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Circle Applicable: <u>FedEx Air</u> FedEx Ground UPS Field Services Courier Other |

7463 0580 2629

Comments (Use Continuation Form if needed):

Laboratory Certifications

List of current GEL Certifications as of 18 September 2013

| State | Certification |
|---------------------------|------------------------------|
| Alaska | UST-110 |
| Arkansas | 88-0651 |
| CLIA | 42D0904046 |
| California NELAP | 01151CA |
| Colorado | SC00012 |
| Connecticut | PH-0169 |
| Delaware | SC00012 |
| DoD ELAP A2LA ISO 17025 | 2567.01 |
| Florida NELAP | E87156 |
| Foreign Soils Permit | P330-12-00283, P330-12-00284 |
| Georgia | SC00012 |
| Georgia SDWA | 967 |
| Hawaii | SC00012 |
| Idaho | SC00012 |
| Illinois NELAP | 200029 |
| Indiana | C-SC-01 |
| Kansas NELAP | E-10332 |
| Kentucky | 90129 |
| Louisiana NELAP | 03046 (AI33904) |
| Louisiana SDWA | LA130005 |
| Maryland | 270 |
| Massachusetts | M-SC012 |
| Nevada | SC000122011-1 |
| New Hampshire NELAP | 2054 |
| New Jersey NELAP | SC002 |
| New Mexico | SC00012 |
| New York NELAP | 11501 |
| North Carolina | 233 |
| North Carolina SDWA | 45709 |
| Oklahoma | 9904 |
| Pennsylvania NELAP | 68-00485 |
| Plant Material Permit | PDEP-12-00260 |
| South Carolina Chemistry | 10120001 |
| South Carolina Radiochemi | 10120002 |
| Tennessee | TN 02934 |
| Texas NELAP | T104704235-13-8 |
| Utah NELAP | SC000122013-8 |
| Vermont | VT87156 |
| Virginia NELAP | 460202 |
| Washington | C780-12 |
| Wisconsin | 999887790 |

Metals Analysis

Case Narrative

**Metals Fractional Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0003A**

Sample Analysis

| Sample ID | Client ID |
|------------------|---|
| 333342001 | J1RVK6 |
| 1202947383 | Tumbling Blank (TB) |
| 1202948696 | Method Blank (MB) ICP |
| 1202948697 | Laboratory Control Sample (LCS) |
| 1202948704 | 333342001(J1RVK6L) Serial Dilution (SD) |
| 1202948702 | 333342001(J1RVK6D) Sample Duplicate (DUP) |
| 1202947384 | 333342001(J1RVK6S) Matrix Spike (MS) |
| 1202947383 | Tumbling Blank (TB) |
| 1202948752 | Method Blank (MB) CVAA |
| 1202948753 | Laboratory Control Sample (LCS) |
| 1202948756 | 333342001(J1RVK6L) Serial Dilution (SD) |
| 1202948754 | 333342001(J1RVK6D) Sample Duplicate (DUP) |
| 1202947384 | 333342001(J1RVK6S) Matrix Spike (MS) |

The samples in this SDG were analyzed on an "as received" basis.

Method/Analysis Information

| | |
|---------------------------------------|---|
| Analytical Batch: | 1331520 and 1331538 |
| Prep Batch : | 1331519 and 1331537 |
| TCLP Prep Batch : | 1330986 |
| Standard Operating Procedures: | GL-MA-E-013 REV# 22, GL-MA-E-008 REV# 14, GL-LB-E-006 REV# 19 and GL-MA-E-010 REV# 26 |
| Analytical Method: | SW846 3010A/6010C and SW846 7470A |
| Prep Method : | SW846 3010A and SW846 7470A Prep |
| TCLP Prep Method : | SW846 1311 |

Preparation/Analytical Method Verification

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

System Configuration

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

Calibration Information

Instrument Calibration

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

CRDL Requirements

All CRDL standard(s) met the referenced advisory control limits.

ICSA/ICSAB Statement

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

Continuing Calibration Blank (CCB) Requirements

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

Continuing Calibration Verification (CCV) Requirements

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MBs analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Sample Statement

The following sample was selected as the quality control (QC) sample for this SDG: 333342001 (J1RVK6).

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. All applicable elements met the acceptance criteria.

Duplicate Relative Percent Difference (RPD) Statement

The RPD obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required reporting limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control of +/-RL is used to evaluate the DUP results. All applicable analytes met these requirements.

Serial Dilution % Difference Statement

The serial dilution is used to assess matrix suppression or enhancement. Raw element concentrations that are 25X the IDL/MDL for CVAA, 50X the IDL/MDL for ICP, and 100X the IDL/MDL for ICP-MS analyses are applicable for serial dilution assessment. All applicable analytes met the acceptance criteria of less than 10% difference (%D).

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. Samples in this SDG for CVAA did not meet holding time requirements because the laboratory received them after the holding time had expired.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

Dilutions are performed to minimize matrix interferences resulting from elevated mineral element concentrations present in solid samples and/or to bring over range target analyte concentrations into the linear calibration range of the instrument. The samples in this SDG did not require dilutions.

Preparation Information

The samples and associated matrix QC were prepared at a 10x factor for ICP/ICPMS to

minimize potential interferences arising from the high sodium content in the TCLP leaching solution. The samples and associated matrix QC were prepared at a 10x factor for CVAA analysis due to matrix interferences associated with TCLP extracts.

Miscellaneous Information

Electronic Packaging Comment

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

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

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. The following DERs were generated for this SDG: 1221930 and 1222467. A copy of each DER is included in the Miscellaneous Data section of this package.

Additional Comments

Additional comments were not required for this SDG.


Certification Statement

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

Review Validation:

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

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

Reviewer:  Date: 09/18/13

DATA EXCEPTION REPORT

| | | | |
|--|--|--|-----------------------------|
| Mo.Day Yr. 16-SEP-13 | Division: | Quality Criteria: SOP | Type: Process |
| Instrument Type: TCLP TUMBLER | Test / Method: SW846 1311 | Matrix Type: Solid | Client Code: WCHN |
| Batch ID: 1330986 | Sample Numbers: 333337006, 333342001, 1202947382, 1202947384 | | |
| Potentially affected work order(s)(SDG): 333337(X0010A),333342(XP0003A) | | | |
| Application Issues: <100 grams for TCLP tumbling | | | |
| Specification and Requirements Exception Description: | | DER Disposition: | |
| 1. <100 grams for TCLP tumbling | | 1. <100 grams for TCLP tumbling due to limited sample volume | |

Originator's Name:
Edmund Frampton 16-SEP-13

Data Validator/Group Leader:
Richard Dollinger 16-SEP-13

DATA EXCEPTION REPORT

| | | | |
|---|--------------------------------------|--|-----------------------------|
| Mo.Day Yr. 18-SEP-13 | Division: Industrial | Quality Criteria: Specifications | Type: Process |
| Instrument Type: MERCURY | Test / Method: SW846 7470A | Matrix Type: Solid | Client Code: WCHN |
| Batch ID: 1331538 | Sample Numbers: See Below | | |
| Potentially affected work order(s)(SDG): 333342(XP0003A) | | | |
| Application Issues: Sample Logged out of Holding | | | |
| Specification and Requirements Exception Description: | | DER Disposition: | |
| 1. Sample Logged out of Holding: 333342 001 QC 1202947384MS | | Sample Logged out of holding | |

Originator's Name:
Nik-Cole Elmore 18-SEP-13

Data Validator/Group Leader:
Jamie Johnson 18-SEP-13

Sample Data Summary

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Qualifier Definition Report for

WCHN001 WC-HANFORD, INC.

Client SDG: XP0003A GEL Work Order: 333342 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.

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

 _____ 09/18/13

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: September 18, 2013

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

Client SDG: XP0003A

Client Sample ID: J1RVK6
Sample ID: 333342001
Matrix: SOIL
Collect Date: 23-JUL-13 10:25
Receive Date: 25-JUL-13
Collector: Client

Project: WCHN00213
Client ID: WCHN001

| Parameter | Qualifier | Result | DL | RL | Units | DF | Analyst | Date | Time | Batch | Method |
|--|-----------|---------|---------|-------|-------|----|---------|----------|------|---------|--------|
| Mercury Analysis-CVAA | | | | | | | | | | | |
| TCLP Hg in Solid "As Received" | | | | | | | | | | | |
| Mercury | U | 0.00067 | 0.00067 | 0.002 | mg/L | 1 | NOR1 | 09/18/13 | 1049 | 1331538 | 1 |
| Metals Analysis-ICP | | | | | | | | | | | |
| TCLP ICP Metals - 1311/3010A/6010C "As Received" | | | | | | | | | | | |
| Arsenic | | 4.03 | 0.050 | 0.300 | mg/L | 1 | HSC | 09/17/13 | 1650 | 1331520 | 2 |
| Barium | | 0.428 | 0.010 | 0.050 | mg/L | 1 | | | | | |
| Cadmium | U | 0.010 | 0.010 | 0.050 | mg/L | 1 | | | | | |
| Chromium | U | 0.010 | 0.010 | 0.050 | mg/L | 1 | | | | | |
| Lead | | 1.77 | 0.033 | 0.100 | mg/L | 1 | | | | | |
| Selenium | U | 0.060 | 0.060 | 0.300 | mg/L | 1 | | | | | |
| Silver | B | 0.0131 | 0.010 | 0.050 | mg/L | 1 | | | | | |

The following Prep Methods were performed:

| Method | Description | Analyst | Date | Time | Prep Batch |
|------------------|------------------------------------|---------|----------|------|------------|
| SW846 1311 | SW846 1311 TCLP Leaching | EXF1 | 09/16/13 | 1600 | 1330986 |
| SW846 3010A | ICP-TRACE TCLP by SW846 3010A | AXG2 | 09/17/13 | 0900 | 1331519 |
| SW846 7470A Prep | EPA 7470A Mercury Prep TCLP Liquid | AXS5 | 09/17/13 | 1659 | 1331537 |

The following Analytical Methods were performed:

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

Notes:

Quality Control Summary

GEL LABORATORIES LLC

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QC Summary

Report Date: September 18, 2013

Page 1 of 4

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

Workorder: 333342

Client SDG: XP0003A

Project Description: RC-232 Soil

| Parmname | NOM | Sample | Qual | QC | Units | RPD/D% | REC% | Range | Anlst | Date | Time |
|----------------------------|---------------|--------|------|--------|-------|--------|------|------------|-------|----------|-------|
| Metals Analysis-ICP | | | | | | | | | | | |
| Batch | 1331520 | | | | | | | | | | |
| QC1202948702 | 333342001 DUP | | | | | | | | | | |
| Arsenic | | 4.03 | | 4.09 | mg/L | 1.37 | | (0%-20%) | HSC | 09/17/13 | 16:53 |
| Barium | | 0.428 | | 0.434 | mg/L | 1.51 | | (0%-20%) | | | |
| Cadmium | U | 0.010 | U | 0.010 | mg/L | N/A | ^ | | | | |
| Chromium | U | 0.010 | U | 0.010 | mg/L | N/A | ^ | | | | |
| Lead | | 1.77 | | 1.78 | mg/L | 0.141 | | (0%-20%) | | | |
| Selenium | U | 0.060 | U | 0.060 | mg/L | N/A | ^ | | | | |
| Silver | B | 0.0131 | U | 0.010 | mg/L | 32.0 | ^ | (+/-0.050) | | | |
| QC1202948697 | LCS | | | | | | | | | | |
| Arsenic | 5.00 | | | 4.95 | mg/L | | 99 | (80%-120%) | | 09/17/13 | 16:28 |
| Barium | 5.00 | | | 4.99 | mg/L | | 99.7 | (80%-120%) | | | |
| Cadmium | 5.00 | | | 5.08 | mg/L | | 102 | (80%-120%) | | | |
| Chromium | 5.00 | | | 4.90 | mg/L | | 97.9 | (80%-120%) | | | |
| Lead | 5.00 | | | 5.19 | mg/L | | 104 | (80%-120%) | | | |
| Selenium | 5.00 | | | 4.76 | mg/L | | 95.2 | (80%-120%) | | | |
| Silver | 5.00 | | | 4.90 | mg/L | | 98.1 | (80%-120%) | | | |
| QC1202948696 | MB | | | | | | | | | | |
| Arsenic | | | U | 0.050 | mg/L | | | | | 09/17/13 | 16:22 |
| Barium | | | B | 0.0143 | mg/L | | | | | | |
| Cadmium | | | U | 0.010 | mg/L | | | | | | |
| Chromium | | | U | 0.010 | mg/L | | | | | | |
| Lead | | | U | 0.033 | mg/L | | | | | | |

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QC Summary

Workorder: 333342

Client SDG: XP0003A

Project Description: RC-232 Soil

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| Parmname | NOM | Sample | Qual | QC | Units | RPD/D% | REC% | Range | Anlst | Date | Time |
|------------------------------|---------|--------|---------|--------|-------|--------|------|------------|-------|----------|-------|
| Metals Analysis-ICP | | | | | | | | | | | |
| Batch | 1331520 | | | | | | | | | | |
| Selenium | | | U | 0.060 | mg/L | | | | HSC | 09/17/13 | 16:22 |
| Silver | | | U | 0.010 | mg/L | | | | | | |
| QC1202947384 333342001 MS | | | | | | | | | | | |
| Arsenic | 5.00 | 4.03 | | 8.89 | mg/L | | 97.1 | (75%-125%) | | 09/17/13 | 16:56 |
| Barium | 10.0 | 0.428 | | 9.49 | mg/L | | 90.6 | (75%-125%) | | | |
| Cadmium | 1.00 | U | 0.010 | 0.979 | mg/L | | 97.9 | (75%-125%) | | | |
| Chromium | 5.00 | U | 0.010 | 4.81 | mg/L | | 96 | (75%-125%) | | | |
| Lead | 5.00 | | 1.77 | 6.90 | mg/L | | 102 | (75%-125%) | | | |
| Selenium | 1.00 | U | 0.060 | 0.963 | mg/L | | 96.3 | (75%-125%) | | | |
| Silver | 0.503 | B | 0.0131 | 0.502 | mg/L | | 97.3 | (75%-125%) | | | |
| QC1202948704 333342001 SDILT | | | | | | | | | | | |
| Arsenic | | 403 | D | 85.3 | ug/L | 5.75 | | (0%-10%) | | 09/17/13 | 16:59 |
| Barium | | 42.8 | CD | 8.64 | ug/L | .977 | | (0%-10%) | | | |
| Cadmium | | U | -0.0666 | DU | 0.050 | ug/L | N/A | (0%-10%) | | | |
| Chromium | | U | 0.650 | DU | 0.050 | ug/L | N/A | (0%-10%) | | | |
| Lead | | | 177 | D | 34.7 | ug/L | 2.01 | (0%-10%) | | | |
| Selenium | | U | -4.79 | DU | 0.300 | ug/L | N/A | (0%-10%) | | | |
| Silver | | B | 1.31 | DU | 0.050 | ug/L | N/A | (0%-10%) | | | |
| QC1202947383 TB | | | | | | | | | | | |
| Arsenic | | | U | 0.050 | mg/L | | | | | 09/17/13 | 16:25 |
| Barium | | | BC | 0.0183 | mg/L | | | | | | |
| Cadmium | | | U | 0.010 | mg/L | | | | | | |
| Chromium | | | U | 0.010 | mg/L | | | | | | |

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QC Summary

Workorder: 333342

Client SDG: XP0003A

Project Description: RC-232 Soil

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| Parmname | NOM | Sample | Qual | QC | Units | RPD/D% | REC% | Range | Anlst | Date | Time |
|--------------------------------|-----------|--------|---------|---------|---------|--------|-------|----------------|-------|----------|-------|
| Metals Analysis-ICP | | | | | | | | | | | |
| Batch | 1331520 | | | | | | | | | | |
| Lead | | | U | 0.033 | mg/L | | | | | | |
| Selenium | | | U | 0.060 | mg/L | | | | HSC | 09/17/13 | 16:25 |
| Silver | | | U | 0.010 | mg/L | | | | | | |
| Metals Analysis-Mercury | | | | | | | | | | | |
| Batch | 1331538 | | | | | | | | | | |
| QC1202948754 | 333342001 | DUP | | | | | | | | | |
| Mercury | | U | 0.00067 | U | 0.00067 | mg/L | N/A ^ | | NOR1 | 09/18/13 | 10:52 |
| QC1202948753 | LCS | | | | | | | | | | |
| Mercury | 0.020 | | | | 0.0202 | mg/L | | 101 (80%-120%) | | 09/18/13 | 10:47 |
| QC1202948752 | MB | | | | | | | | | | |
| Mercury | | | U | 0.00067 | mg/L | | | | | 09/18/13 | 10:44 |
| QC1202947384 | 333342001 | MS | | | | | | | | | |
| Mercury | 0.020 | U | 0.00067 | | 0.0172 | mg/L | | 86 (75%-125%) | | 09/18/13 | 10:51 |
| QC1202948756 | 333342001 | SDILT | | | | | | | | | |
| Mercury | | U | -0.004 | DU | 0.00335 | ug/L | N/A | (0%-10%) | | 09/18/13 | 10:54 |
| QC1202947383 | TB | | | | | | | | | | |
| Mercury | | | U | 0.00067 | mg/L | | | | | 09/18/13 | 10:46 |

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

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QC Summary

Workorder: 333342

Client SDG: XP0003A

Project Description: RC-232 Soil

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| Parmname | NOM | Sample | Qual | QC | Units | RPD/D% | REC% | Range | Anlst | Date | Time |
|----------|--|--------|------|----|-------|--------|------|-------|-------|------|------|
| 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 Total Metals in Aqueous Samples and Extracts for Analysis by ICP and ICP-MS

| | | | | | | |
|--------------------------------------|-------------|------------------|---------------------|----------------------|---------------------|--------------------|
| Batch ID: 1331519.0 | <u>Type</u> | <u>Sample Id</u> | <u>Description</u> | <u>Serial Number</u> | <u>Spike Amount</u> | <u>Spike Units</u> |
| Analyst: Anthony Green | LCS | 1202948697 | Metals Spike Mix I | UI1943364-01 | .25 | mL |
| Method: SW846 3010A | LCS | 1202948697 | Metals Spike Mix II | UI1943367-06 | .25 | mL |
| Lab SOP: GL-MA-E-008 REV# 14 | | | | | | |
| Instrument: Metals Manual Instrument | | | | | | |

| Sample ID | Run Date | Matrix | Initial Volume (mL) | Final Volume (mL) | Prep Factor (mL/mL) | pH Check |
|------------------------------|----------------------|--------|---------------------|-------------------|---------------------|----------|
| 1202948696 MB | 17-SEP-2013 09:00:50 | Soil | 5 | 50 | 10 | <2 |
| 1202947383 TB | 17-SEP-2013 09:00:50 | Soil | 5 | 50 | 10 | <2 |
| 1202948697 LCS | 17-SEP-2013 09:00:50 | Soil | 5 | 50 | 10 | <2 |
| 333337006 | 17-SEP-2013 09:00:50 | Soil | 5 | 50 | 10 | <2 |
| 1202947382 MS (333337006) | 17-SEP-2013 09:00:50 | Soil | 5 | 50 | 10 | <2 |
| 1202948698 DUP (333337006) | 17-SEP-2013 09:00:50 | Soil | 5 | 50 | 10 | <2 |
| 1202948700 SDILT (333337006) | 17-SEP-2013 09:00:50 | Soil | 5 | 50 | 10 | <2 |
| 333342001 | 17-SEP-2013 09:00:50 | Soil | 5 | 50 | 10 | <2 |
| 1202947384 MS (333342001) | 17-SEP-2013 09:00:50 | Soil | 5 | 50 | 10 | <2 |
| 1202948702 DUP (333342001) | 17-SEP-2013 09:00:50 | Soil | 5 | 50 | 10 | <2 |
| 1202948704 SDILT (333342001) | 17-SEP-2013 09:00:50 | Soil | 5 | 50 | 10 | <2 |

| Reagent/Solvent Lot ID | Description | Amount | Comments: |
|------------------------|--------------------------|--------|--|
| 1924940 | Concentrated Nitric Acid | 3 mL | Block Temperature: 93 C |
| 1961852 | HYDROCHLORIC ACID | 2.5 mL | Thermometer ID: 119015 Hot Block ID: 13 |

Prep Logbook

Mercury Analysis Using the Perkin Elmer Automated Mercury Analyzer

Batch ID: 1331537.0
Analyst: Alan Stanley
Method: SW846 7470A Prep
Lab SOP: GL-MA-E-010 REV# 26
Instrument: Metals Manual Instrument

| Type | Sample Id | Description | Serial Number | Spike Amount | Spike Units |
|------|------------|------------------|---------------|--------------|-------------|
| LCS | 1202948753 | MHGLIQLCSMSSPIKE | WHG130917-13 | .2 | mL |

| Sample ID | Run Date | Matrix | Initial Volume (mL) | Final Volume (mL) | Prep Factor (mL/mL) | pH Check |
|------------------------------|----------------------|--------|---------------------|-------------------|---------------------|----------|
| 1202948752 MB | 17-SEP-2013 16:59:26 | Soil | 2 | 20 | 10 | <2 |
| 1202947383 TB | 17-SEP-2013 16:59:26 | Soil | 2 | 20 | 10 | <2 |
| 1202948753 LCS | 17-SEP-2013 16:59:26 | Soil | 2 | 20 | 10 | <2 |
| 333342001 | 17-SEP-2013 16:59:26 | Soil | 2 | 20 | 10 | <2 |
| 1202947384 MS (333342001) | 17-SEP-2013 16:59:26 | Soil | 2 | 20 | 10 | <2 |
| 1202948754 DUP (333342001) | 17-SEP-2013 16:59:26 | Soil | 2 | 20 | 10 | <2 |
| 1202948756 SDILT (333342001) | 17-SEP-2013 16:59:26 | Soil | 2 | 20 | 10 | <2 |

| Reagent/Solvent Lot ID | Description | Amount | Comments: |
|------------------------|--|--------|---|
| 130717-1 | NITRIC ACID | .5 mL | Digestion Start Date: 17-SEP-2013 14:59 |
| 1895265-C | Hg reducing agent | 1 mL | Digestion End Date: 17-SEP-2013 16:59 |
| 1948209 | Sulfuric Acid, Concentrated | 1 mL | Block Temperature: 95 C |
| 1952486-C | 5% KMnO4 solution | 3 mL | Thermometer ID: 118533 |
| 1963497-C | 5% Potassium Persulfate | 1.5 mL | Hot Block ID: 12 |
| WHG130917-01A | Mercury Working 1st Source CAL 0.2/CRA | 20 uL | |
| WHG130917-02 | Mercury Working 1st Source CAL 0.5 | 50 uL | |
| WHG130917-03 | Mercury Working 1st Source CAL 2.0 | 200 uL | |
| WHG130917-04 | Mercury Working 1st Source CAL 5.0/CCV | 500 uL | |
| WHG130917-05 | Mercury Working 1st Source CAL 10.0 | 1 mL | |
| WHG130917-06 | Mercury Working 2nd Source 5.0/ICV | 500 uL | |

Prep Logbook

Toxicity Characteristic Leaching Procedure Preparation

Batch ID: 1330986.0 **Verified by:** _____
Analyst: Edmund Frampton
Method: SW846 1311

Lab SOP: GL-LB-E-006 REV# 19
Instrument: TCLP Tumbler # 101

| Sample ID | 1202947383 TB | 333337006 | 1202947382 MS (333337006) | 333342001 |
|---|----------------------|----------------------|---------------------------|----------------------|
| Analysis Start Date | 16-SEP-2013 16:00:00 | 16-SEP-2013 16:00:00 | 16-SEP-2013 16:00:00 | 16-SEP-2013 16:00:00 |
| 100% Solid Y/N | | y | y | y |
| (I) Sub Sample Aliquot I=G-H (g) | | 40 | 40 | 95 |
| Initial pH (su) | 4.89 | 9.85 | 9.85 | 8.87 |
| pH Temperature (celsius) | | 50 | 50 | 50 |
| Filtrate pH (su) | | 6 | 6 | 4 |
| Final pH (su) | | 2.46 | 2.46 | 1.48 |
| Tumbler Speed | 28 | 28 | 28 | 28 |
| Sample Properties \leq Water | TCLP 1 | Solid | Solid | Solid |
| (J) 10X Wet Solid Weight 20XI (g) | 2000 | 800 | 800 | 1900 |
| Filtrate Volume (mL) | 500 | 100 | 100 | 100 |

| Type | Sample Id | Description | Spike Amt | Units | Comments: |
|-------|------------|---------------------------|-------------|---------|---|
| MS | 1202947382 | TCLP Spiking Solution A/B | UI130117 | .25 mL | Extraction End Date: 17-SEP-2013 08:00:00 |
| MS | 1202947382 | TCLP Spiking Solution Hg | UI1870161 | .25 mL | Filtration End Date: 17-SEP-2013 08:30:13 |
| MS | 1202947384 | TCLP Spiking Solution A/B | UI130117 | .25 mL | Bottle Lot Number: 41061300 |
| MS | 1202947384 | TCLP Spiking Solution Hg | UI1870161 | .25 mL | Filter Lot Number: 400043-3224 |
| RGNT | All | 1N HCl for pH testing | 130814 | 3.5 mL | Extraction Start Temperature: 23 C |
| RGNT | All | TCLP EXTRACTION FLUID 1 | T130913-1-1 | 2000 mL | Extraction End Temperature: 23 C |
| REGNT | All | Concentrated Nitric Acid | 130814-tclp | 2 mL | Filtration End Temperature: 23 C |

Prep Logbook

Toxicity Characteristic Leaching Procedure Preparation

Batch ID: 1330986.0 **Verified by:** _____
Analyst: Edmund Frampton
Method: SW846 1311

Lab SOP: GL-LB-E-006 REV# 19
Instrument: TCLP Tumbler # 101

Sample ID 1202947384 MS (333342001)
Analysis Start Date 16-SEP-2013 16:00:00

| | |
|---|-------|
| 100% Solid Y/N | y |
| (I) Sub Sample Aliquot I=G-H (g) | 95 |
| Initial pH (su) | 8.87 |
| pH Temperature (celsius) | 50 |
| Filtrate pH (su) | 4 |
| Final pH (su) | 1.48 |
| Tumbler Speed | 28 |
| Sample Properties \neq Water | Solid |
| (J) 10X Wet Solid Weight 20XI (g) | 1900 |
| Filtrate Volume (mL) | 100 |

| Type | Sample Id | Description | Serial Number | Spike Amt | Units | Comments: |
|-------|------------|---------------------------|---------------|-----------|-------|---|
| MS | 1202947382 | TCLP Spiking Solution A/B | UI130117 | .25 | mL | Extraction End Date: 17-SEP-2013 08:00:00 |
| MS | 1202947382 | TCLP Spiking Solution Hg | UI1870161 | .25 | mL | Filtration End Date: 17-SEP-2013 08:30:13 |
| MS | 1202947384 | TCLP Spiking Solution A/B | UI130117 | .25 | mL | Bottle Lot Number: 41061300 |
| MS | 1202947384 | TCLP Spiking Solution Hg | UI1870161 | .25 | mL | Filter Lot Number: 400043-3224 |
| RGNT | All | 1N HCl for pH testing | 130814 | 3.5 | mL | Extraction Start Temperature: 23 C |
| RGNT | All | TCLP EXTRACTION FLUID 1 | T130913-1-1 | 2000 | mL | Extraction End Temperature: 23 C |
| REGNT | All | Concentrated Nitric Acid | 130814-tclp | 2 | mL | Filtration End Temperature: 23 C |