GEL Laboratories LLC

a member of The GEL Group INC

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

www.gel.com

September 26, 2014

Mr. Scot Fitzgerald
CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352

Re: CHPRC SAF S14-009
Work Order: 356063
SDG: GEL356063

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on September 05, 2014. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4505.

Sincerely,

Heather Shaffer

Heather Shaffer
Project Manager

Purchase Order: 300071ES20
Chain of Custody: S14-009-244, S14-009-247 and S14-009-249
Enclosures

# Table of Contents

# Case Narrative

**General Narrative**
**for**
**Hanford MSA (51204)**
**CHPRC SAF S14-009**
**SDG: GEL356063**

**October 02, 2014**

**Laboratory Identification:**

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

**Summary**

**Sample receipt**

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on September 05, 2014, for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

**Items of Note** All efforts were made by the lab to meet any short hold times. Samples that were analyzed outside of the initial hold time but still within 2X hold time will be noted in the lab case narrative and DER.

**Sample Identification**
The laboratory received the following samples:

| Laboratory Identification | Sample Description |
|---|---|
| 356063001 | B2XCW2 |
| 356063002 | B2XD11 |
| 356063003 | B2XD12 |

**Case Narrative**

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) 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.

**Data Package**

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: General Chemistry. This package, to the best of my knowledge, is in compliance with technical and administrative requirements.

Heather Shaffer
Project Manager

# Chain of Custody and Supporting Documentation

SUBSET

**CH2MHill Plateau Remediation Company**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # **S14-009-244**



| | | | | | |
|---|---|---|---|---|---|
| **Collector** | M.A. White CHPRC | **Contact/Requester** | Karen Waters-Husted | **Telephone No.** | 509-376-4650 |
| **SAF No.** | S14-009 | **Sampling Origin** | Hanford Site | **Purchase Order/Charge Code** | 300071ES20 |
| **Project Title** | SURV, SEPTEMBER 2014 | **Logbook No.** | HNF-N-506 67/14 | **Ice Chest No.** | GWS-092 |
| **Shipped To (Lab)** | ~~TestAmerica St. Louis~~ GEL KS 9/3/14 | **Method of Shipment** | Commercial Carrier | **Bill of Lading/Air Bill No.** | 771048680375 |
| **Protocol** | SURV | **Priority:** | 30 Days **PRIORITY** | **Offsite Property No.** | 5060 |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

** ** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1

**SPECIAL INSTRUCTIONS** **Hold Time** Total Activity Exemption: Yes ☑ No ☐

| Sample No. | Filter | * | Date | Time | No/Type Container | Sample Analysis | Holding Time | Preservative |
|---|---|---|---|---|---|---|---|---|
| B2XCW2 | N | W | 9-4-14 | 1014 | 1x500-mL P | 300.0_ANIONS_IC: COMMON; 300.0_ANIONS_IC: GW 02 | 48 Hours | Cool <=6C |

| Relinquished By | Print | Sign | Date/Time | Received By | Print | Sign | Date/Time |
|---|---|---|---|---|---|---|---|
| M.A. White CHPRC | | | SEP 04 2014 1109 | L.D. Wall CHPRC | | | SEP 04 2014 1109 |
| L.D. Wall CHPRC | | | SEP 04 2014 1400 | | | FEDEX | |
| | | FED X | | | | | |
| | | | | | | | |

Matrix *

| | | | | | |
|---|---|---|---|---|---|
| S | = Soil | | DS | = Drum Solids | |
| SE | = Sediment | | DL | = Drum Liquids | |
| SO | = Solid | | T | = Tissue | |
| SL | = Sludge | | WI | = Wipe | |
| W | = Water | | L | = Liquid | |
| O | = Oil | | V | = Vegetation | |
| A | = Air | | X | = Other | |

**FINAL SAMPLE DISPOSITION** Disposal Method (e.g., Return to customer, per lab procedure, used in process) Disposed By Date/Time

PRINTED O 7/16/2014

A-6004-842 (REV 2)

CH2MHill Plateau Remediation Company

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # S14-009-249

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| | | | | | |
|---|---|---|---|---|---|
| **Collector** | D.L. Floyd CHPRC | **Contact/Requester** | Karen Waters-Husted | **Telephone No.** | 509-376-4650 |
| **SAF No.** | S14-009 | **Sampling Origin** | Hanford Site | **Purchase Order/Charge Code** | 300071ES20 |
| **Project Title** | SURV, SEPTEMBER 2014 | **Logbook No.** | HNF-N-506 66/63 | **Ice Chest No.** | GWS-092 |
| **Shipped To (Lab)** | ~~TestAmerica St. Louis~~ GEL KS 9/3/14 | **Method of Shipment** | Commercial Carrier | **Bill of Lading/Air Bill No.** | 7710 4868 0375 |
| **Protocol** | SURV | **Priority:** | 30 Days **PRIORITY** | **Offsite Property No.** | 5060 |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

** ** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1

**SPECIAL INSTRUCTIONS** **Hold Time** Total Activity Exemption: Yes ☑ No ☐

| Sample No. | Filter | * | Date | Time | No/Type Container | Sample Analysis | Holding Time | Preservative |
|---|---|---|---|---|---|---|---|---|
| B2XD12 | N | W | SEP 0 4 2014 | 1010 | 1x500-mL P | 300.0_ANIONS_IC: COMMON; 300.0_ANIONS_IC: GW 02 | 48 Hours | Cool <=6C |

| Relinquished By | Print / Sign | Date/Time | Received By | Print / Sign | Date/Time |
|---|---|---|---|---|---|
| D.L. Floyd CHPRC | | SEP 0 4 2014 1130 | L.D. Wall CHPRC | L.D. Wall | SEP 0 4 2014 1130 |
| L.D. Wall CHPRC | L.D. Wall | SEP 0 4 2014 1400 | | FEDEX | |
| FED X | | | Robert Patterson Dewt | | 9/5/14 0930 |

Matrix *

| | | | | | |
|---|---|---|---|---|---|
| S | = Soil | DS | = Drum Solids | | |
| SE | = Sediment | DL | = Drum Liquids | | |
| SO | = Solid | T | = Tissue | | |
| SL | = Sludge | WI | = Wipe | | |
| W | = Water | L | = Liquid | | |
| O | = Oil | V | = Vegetation | | |
| A | = Air | X | = Other | | |

**FINAL SAMPLE DISPOSITION** Disposal Method (e.g., Return to customer, per lab procedure, used in process) | Disposed By | Date/Time

PRINTED O 7/17/2014

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OCTOBER 2, 2014

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CH2MHill Plateau Remediation Company

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # S14-009-247

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| | | | | | |
|---|---|---|---|---|---|
| **Collector** | D.L. Floyd CHPRC | **Contact/Requester** | Karen Waters-Husted | **Telephone No.** | 509-376-4650 |
| **SAF No.** | S14-009 | **Sampling Origin** | Hanford Site | **Purchase Order/Charge Code** | 300071ES20 |
| **Project Title** | SURV, SEPTEMBER 2014 | **Logbook No.** | HNF-N-506 66/63 | **Ice Chest No.** | GWS-092 |
| **Shipped To (Lab)** | ~~TestAmerica St. Louis~~ GEL KS 9/3/14 | **Method of Shipment** | Commercial Carrier | **Bill of Lading/Air Bill No.** | 771048680375 |
| **Protocol** | SURV | **Priority:** | 30 Days **PRIORITY** | **Offsite Property No.** | 5060 |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

** ** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1

**SPECIAL INSTRUCTIONS** **Hold Time** Total Activity Exemption: Yes ☑ No ☐

| Sample No. | Filter | * | Date | Time | No/Type Container | Sample Analysis | Holding Time | Preservative |
|---|---|---|---|---|---|---|---|---|
| B2XD11 | N | W | SEP 04 2014 | 0700 | 1x500-mL P | 300.0_ANIONS_IC: COMMON; 300.0_ANIONS_IC: GW 02 | 48 Hours | Cool <=6C |

| Relinquished By | Print | Sign | Date/Time | Received By | Print | Sign | Date/Time |
|---|---|---|---|---|---|---|---|
| D.L. Floyd CHPRC | | | SEP 04 2014 1130 | L.D. Wall CHPRC | L.D. Wall | | SEP 04 2014 1130 |
| L.D. Wall CHPRC | L.D. Wall | | SEP 04 2014 1400 | FEDEX | | | |
| FED X | | | | P. Went | Patricia Dent | | 9/5/14 0930 |

Matrix *

| | | | | | |
|---|---|---|---|---|---|
| S | = Soil | DS | = Drum Solids | | |
| SE | = Sediment | DL | = Drum Liquids | | |
| SO | = Solid | T | = Tissue | | |
| SL | = Sludge | WI | = Wipe | | |
| W | = Water | L | = Liquid | | |
| O | = Oil | V | = Vegetation | | |
| A | = Air | X | = Other | | |

**FINAL SAMPLE DISPOSITION** Disposal Method (e.g., Return to customer, per lab procedure, used in process) Disposed By Date/Time

PRINTED O 7/17/2014

A-6004-842 (REV 2)

OCTOBER 2, 2014

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GEL Laboratories LLC

# SAMPLE RECEIPT & REVIEW FORM

| | |
|---|---|
| **Client:** HMSA | **SDG/AR/COC/Work Order:** 356063 |
| **Received By:** P. Dent | **Date Received:** 9/5/14 |

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

| | Sample Receipt Criteria | Yes | NA | No | Comments/Qualifiers (Required for Non-Conforming Items) |
|---|---|---|---|---|---|
| 1 | Shipping containers received intact and sealed? | X | | | Circle Applicable: Seals broken Damaged container Leaking container Other (describe) |
| 2 | Samples requiring cold preservation within (0 ≤ 6 deg. C)?* | X | | | Preservation Method: Ice bags Blue ice Dry ice None Other (describe) 2c *all temperatures are recorded in Celsius |
| 2a | Daily check performed and passed on IR temperature gun? | X | | | Temperature Device Serial #: Secondary Temperature Device Serial # (If Applicable): 130462966 |
| 3 | Chain of custody documents included with shipment? | X | | | |
| 4 | Sample containers intact and sealed? | X | | | Circle Applicable: Seals broken Damaged container Leaking container Other (describe) |
| 5 | Samples requiring chemical preservation at proper pH? | | X | | Sample ID's, containers affected and observed pH: If Preservation added, Lot#: |
| 6 | VOA vials free of headspace (defined as < 6mm bubble)? | | X | | Sample ID's and containers affected: |
| 7 | Are Encore containers present? | | | X | (If yes, immediately deliver to Volatiles laboratory) |
| 8 | Samples received within holding time? | X | | | ID's and tests affected: |
| 9 | Sample ID's on COC match ID's on bottles? | X | | | Sample ID's and containers affected: |
| 10 | Date & time on COC match date & time on bottles? | X | | | Sample ID's affected: |
| 11 | Number of containers received match number indicated on COC? | X | | | Sample ID's affected: |
| 12 | Are sample containers identifiable as GEL provided? | | | X | |
| 13 | COC form is properly signed in relinquished/received sections? | X | | | |
| | | | | | Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other |
| 14 | Carrier and tracking number. | X | | | 7710 4868 0375 |

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials PD Date 9/5/14 Page 1 of 1

# Data Review Qualifier Definitions

**GEL LABORATORIES LLC**
2040 Savage Road Charleston, SC 29407 (843) 556−8171

Report Date: 26−SEP−14

# Project Specific Qualifier Definitions for GEL Client Code: HMSA

| Code | Status | Qualifier Definition | CofA | Department | Fraction | Additional Comments |
|---|---|---|---|---|---|---|
| U | Programmed | Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error. | Y | | | Includes MDA, TPU, count uncert. |
| J | Programmed | 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 | Y | Organics | | Organics only |
| P | Programmed | Aroclor target analyte with greater than 25% difference between column analyses. | Y | Organics | | PCB only |
| C | Manual | Analyte has been confirmed by GC/MS analysis | Y | Organics | Pesticide | IF GC/MS confirmation was attempted but unsuccessful do not qualify with C |
| B | Programmed | The analyte was detected in both the associated QC blank and in the sample. | Y | Organics | | |
| E | Manual | Concentration exceeds the calibration range of the instrument | Y | Organics | | Qualifier Uploaded |
| A | Manual | The TIC is a suspected aldol−condensation product | Y | Organics | Semi−Volatile | Uploaded with TIC |
| X | Programmed | Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier | Y | | | Replaces H Hold Date In RAD replaces UI. Same usage as standard X as well. |
| N | Programmed | Spike Sample recovery is outside control limits. | Y | | | |
| * | Programmed | Duplicate analysis not within control limits | Y | Inorganics | | |
| > | Programmed | Result greater than quantifiable range or greater than upper limit of the analysis range | Y | General Chemistry | | |
| Z | Manual | Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier | Y | | | |
| B | Programmed | 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). | Y | Inorganics | Metals | Replaces J Estimated Value |
| D | Programmed | Results are reported from a diluted aliquot of sample. | Y | | | Dilution |
| E | Programmed | Reported value is estimated due to interferences. See comment in narrative. | Y | Inorganics | Metals | GEL E |
| M | Manual | Duplicate precision not met. | Y | Inorganics | Metals | Replaces * |
| o | Programmed | Analyte failed to recover within LCS limits (0rganics only) | Y | Organics | | |
| S | Manual | Reported value determined by the Method of Standard Additions (MSA) | Y | Inorganics | | Not coded B/C Rarely preformed |
| T | Programmed | Spike and/or spike duplicate sample recovery is outside control limits. | Y | Organics | | GC/MS only |
| W | Manual | Post−digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency. | Y | Inorganics | | No GFAA in house. |
| B | Programmed | The associated QC sample blank has a result >= 2X the MDA and, after corrections, result is >= MDA for this sample | Y | Radiological | | |
| Y | Manual | Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier | Y | | | |
| + | Manual | Correlation coefficient for Method of Standard Additions (MSA) is < 0.995 | Y | Inorganics | | |
| B | Programmed | 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). | Y | General Chemistry | | Replaces J Estimated Value |
| C | Programmed | Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples. | Y | Inorganics | Metals | Replaces B Blank Detection |
| C | Programmed | Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples. | Y | General Chemistry | | Replaces B Blank Detection |
| < | Programmed | Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide | Y | General Chemistry | | for Reactive CN/S |

# Laboratory Certifications

**List of current GEL Certifications as of 26 September 2014**

| State | Certification |
|---|---|
| Alaska | UST−110 |
| Arkansas | 88−0651 |
| CLIA | 42D0904046 |
| California NELAP | 01151CA |
| Colorado | SC00012 |
| Connecticut | PH−0169 |
| Delaware | SC000122013−10 |
| DoD ELAP/ ISO17025 A2LA | 2567.01 |
| Florida NELAP | E87156 |
| Foreign Soils Permit | P330−12−00283, P330−12−00284 |
| Georgia | SC00012 |
| Georgia SDWA | 967 |
| Hawaii | SC000122013−10 |
| Idaho Chemistry | SC00012 |
| Idaho Radiochemistry | SC00012 |
| Illinois NELAP | 200029 |
| Indiana | C−SC−01 |
| Kansas NELAP | E−10332 |
| Kentucky | 90129 |
| Louisiana NELAP | 03046 (AI33904) |
| Louisiana SDWA | LA130005 |
| Maryland | 270 |
| Massachusetts | M−SC012 |
| Michigan | 9976 |
| Mississippi | SC000122013−10 |
| Nebraska | NE−OS−26−13 |
| Nevada | SC000122014−1 |
| New Hampshire NELAP | 2054 |
| New Jersey NELAP | SC002 |
| New Mexico | SC00012 |
| New York NELAP | 11501 |
| North Carolina | 233 |
| North Carolina SDWA | 45709 |
| Oklahoma | 9904 |
| Pennsylvania NELAP | 68−00485 |
| Plant Material Permit | PDEP−12−00260 |
| South Carolina Chemistry | 10120001 |
| South Carolina GVL | 23611001 |
| South Carolina Radiochemi | 10120002 |
| Tennessee | TN 02934 |
| Texas NELAP | T104704235−14−9 |
| Utah NELAP | SC000122014−14 |
| Vermont | VT87156 |
| Virginia NELAP | 460202 |
| Washington | C780−12 |
| Wisconsin | 999887790 |

# General Chem Analysis

# Case Narrative

**General Chemistry Narrative**
**Hanford MSA (HMSA)**
**SDG GEL356063**

## Method/Analysis Information

| | | | |
|---|---|---|---|
| **Product:** | **Ion Chromatography** | | |
| **Analytical Batch:** | 1416896 | **Method:** | 9056_ANIONS_IC: COMMON + GW 02 |

## Sample Analysis

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

| Sample ID | Client ID |
|---|---|
| 356063001 | B2XCW2 |
| 356063002 | B2XD11 |
| 356063003 | B2XD12 |
| 1203161806 | MB for batch 1416896 |
| 1203161807 | Laboratory Control Sample (LCS) |
| 1203161808 | 356063002(B2XD11) Sample Duplicate (DUP) |
| 1203161809 | 356063003(B2XD12) Sample Duplicate (DUP) |
| 1203161810 | 356063002(B2XD11) Post Spike (PS) |
| 1203161811 | 356063003(B2XD12) Post Spike (PS) |

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

**SOP Reference**
Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-086 REV# 23.

**Preparation/Analytical Method Verification**

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

## Calibration Information

The Ion Chromatography analysis was performed on a Dionex ICS-3000 Ion Chromatograph.

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

**Continuing Calibration Blanks**

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

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

**Y Intercept Rule**
The absolute value of the intercept is less than 3 times the MDL.

**Quality Control (QC) Information**

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

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

**Quality Control (QC) Designation**
The following samples were selected for QC analysis: 356063002 (B2XD11) and 356063003 (B2XD12).

**Matrix Spike (MS)/Post Spike (PS) Recovery Statement**
The spike recovery falls outside of the established acceptance limits due to matrix interference: 1203161811 (B2XD12). The spike recovery falls outside of the GEL acceptance limits but within the client specified limits. 1203161811 (B2XD12).

**Duplicate Relative Percent Difference (RPD) Statement**
The RPD between the sample and its duplicate met the acceptance limits.

**Technical Information**

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

**Holding Times**
All samples in this SDG met the specified holding time.

**Sample Dilutions**
The following samples in this sample group were diluted due to high concentration: 356063001 (B2XCW2) and 356063003 (B2XD12). All samples diluted at a 2X per client request. 1203161808 (B2XD11), 1203161809 (B2XD12), 1203161810 (B2XD11), 1203161811 (B2XD12), 356063001 (B2XCW2), 356063002 (B2XD11) and 356063003 (B2XD12).

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

**Miscellaneous Information**

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

**Manual Integrations**
The following samples from this sample group had to be manually integrated due to errors in the instrument software peak integration: 1203161809 (B2XD12), 1203161811 (B2XD12), 356063001 (B2XCW2) and 356063003 (B2XD12).

**Additional Comments**
Additional comments were not required for this SDG.

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

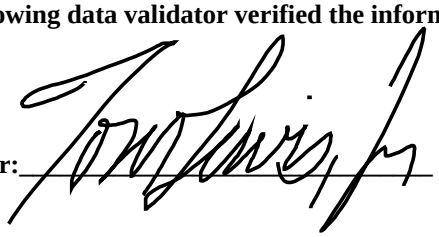
**Certification Statement**

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

**Review Validation:**

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

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

**Reviewer:**  **Date:** 02Oct14

# Sample Data Summary

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

# Certificate of Analysis Report
for

HMSA001 Hanford MSA (51204)

Client SDG: GEL356063 GEL Work Order: 356063

**The Qualifiers in this report are defined as follows:**

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

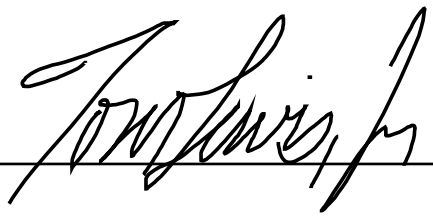
D Results are reported from a diluted aliquot of sample.

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

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

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

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

Reviewed by 

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

# Certificate of Analysis

Company : CH2MHill Plateau Remediation Company
Address : MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Project: **CHPRC SAF S14-009**

Report Date: September 29, 2014

Client Sample ID: B2XCW2
Lab Sample ID: 356063001
Matrix: Ground Water
Collect Date: 04-SEP-14 10:14
Receive Date: 05-SEP-14
Collector: Client

Proiect: HMSA00194
Client ID: HMSA001
Client SDG: GEL356063

| Parameter | Qualifier | Result | MDL | RL | CRDL | Units | DF | Analyst | Date | Time | Batch | Method |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Ion Chromatography** | | | | | | | | | | | | |
| *9056_ANIONS_IC: COMMON + GW 02 "As Received"* | | | | | | | | | | | | |
| Bromide | BD | 135 | 134 | 400 | 250 | ug/L | 2 | RXB5 | 09/05/14 | 20:17 | 1416896 | 1 |
| Chloride | D | 17000 | 134 | 400 | 200 | ug/L | 2 | | | | | |
| Fluoride | BD | 91.4 | 66.0 | 200 | 500 | ug/L | 2 | | | | | |
| Nitrate-N | D | 8030 | 66.0 | 200 | 250 | ug/L | 2 | | | | | |
| Nitrite-N | DU | 76.0 | 76.0 | 200 | 250 | ug/L | 2 | | | | | |
| Phosphorus in phosphate | DU | 134 | 134 | 400 | 500 | ug/L | 2 | | | | | |
| Sulfate | D | 163000 | 2660 | 8000 | 500 | ug/L | 20 | RXB5 | 09/06/14 | 19:09 | 1416896 | 2 |

**The following Analytical Methods were performed**

| Method | Description | Analyst Comments |
|---|---|---|
| 1 | SW846 9056A | |
| 2 | SW846 9056A | |

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# Certificate of Analysis

Company : CH2MHill Plateau Remediation Company
Address : MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Project: **CHPRC SAF S14-009**

Report Date: September 29, 2014

Client Sample ID: B2XD11
Lab Sample ID: 356063002
Matrix: Ground Water
Collect Date: 04-SEP-14 07:00
Receive Date: 05-SEP-14
Collector: Client

Proiect: HMSA00194
Client ID: HMSA001
Client SDG: GEL356063

| Parameter | Qualifier | Result | MDL | RL | CRDL | Units | DF | Analyst | Date | Time | Batch | Method |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Ion Chromatography** | | | | | | | | | | | | |
| *9056_ANIONS_IC: COMMON + GW 02 "As Received"* | | | | | | | | | | | | |
| Bromide | DU | 134 | 134 | 400 | 250 | ug/L | 2 | RXB5 | 09/05/14 | 20:48 | 1416896 | 1 |
| Chloride | DU | 134 | 134 | 400 | 200 | ug/L | 2 | | | | | |
| Fluoride | DU | 66.0 | 66.0 | 200 | 500 | ug/L | 2 | | | | | |
| Nitrate-N | DU | 66.0 | 66.0 | 200 | 250 | ug/L | 2 | | | | | |
| Nitrite-N | DU | 76.0 | 76.0 | 200 | 250 | ug/L | 2 | | | | | |
| Phosphorus in phosphate | DU | 134 | 134 | 400 | 500 | ug/L | 2 | | | | | |
| Sulfate | DU | 266 | 266 | 800 | 500 | ug/L | 2 | | | | | |

**The following Analytical Methods were performed**

| Method | Description | Analyst Comments |
|---|---|---|
| 1 | SW846 9056A | |

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# Certificate of Analysis

Company : CH2MHill Plateau Remediation Company
Address : MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Project: **CHPRC SAF S14-009**

Report Date: September 29, 2014

Client Sample ID: B2XD12
Lab Sample ID: 356063003
Matrix: Ground Water
Collect Date: 04-SEP-14 10:10
Receive Date: 05-SEP-14
Collector: Client

Proiect: HMSA00194
Client ID: HMSA001
Client SDG: GEL356063

| Parameter | Qualifier | Result | MDL | RL | CRDL | Units | DF | Analyst | Date | Time | Batch | Method |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Ion Chromatography** | | | | | | | | | | | | |
| *9056_ANIONS_IC: COMMON + GW 02 "As Received"* | | | | | | | | | | | | |
| Bromide | DU | 134 | 134 | 400 | 250 | ug/L | 2 | RXB5 | 09/05/14 | 22:20 | 1416896 | 1 |
| Chloride | D | 16500 | 134 | 400 | 200 | ug/L | 2 | | | | | |
| Fluoride | BD | 112 | 66.0 | 200 | 500 | ug/L | 2 | | | | | |
| Nitrate-N | D | 6200 | 66.0 | 200 | 250 | ug/L | 2 | | | | | |
| Nitrite-N | DU | 76.0 | 76.0 | 200 | 250 | ug/L | 2 | | | | | |
| Phosphorus in phosphate | DU | 134 | 134 | 400 | 500 | ug/L | 2 | | | | | |
| Sulfate | D | 165000 | 2660 | 8000 | 500 | ug/L | 20 | RXB5 | 09/06/14 | 19:40 | 1416896 | 2 |

**The following Analytical Methods were performed**

| Method | Description | Analyst Comments |
|---|---|---|
| 1 | SW846 9056A | |
| 2 | SW846 9056A | |

# Quality Control Summary

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

# QC Summary

**Report Date: September 29, 2014**



**CH2MHill Plateau Remediation Company**
**MSIN R3-50 CHPRC**
**PO Box 1600**
**Richland, Washington**

**Contact:** **Mr. Scot Fitzgerald**

**Workorder:** **356063**

| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date Time |
|---|---|---|---|---|---|---|---|---|---|---|
| **Ion Chromatography** | | | | | | | | | | |
| Batch 1416896 | | | | | | | | | | |
| QC1203161808 356063002 DUP | | | | | | | | | | |
| Bromide | DU | ND | DU | ND | ug/L | N/A | | | RXB5 | 09/05/14 21:19 |
| Chloride | DU | ND | DU | ND | ug/L | N/A | | | | |
| Fluoride | DU | ND | DU | ND | ug/L | N/A | | | | |
| Nitrate-N | DU | ND | DU | ND | ug/L | N/A | | | | |
| Nitrite-N | DU | ND | DU | ND | ug/L | N/A | | | | |
| Phosphorus in phosphate | DU | ND | DU | ND | ug/L | N/A | | | | |
| Sulfate | DU | ND | DU | ND | ug/L | N/A | | | | |
| QC1203161809 356063003 DUP | | | | | | | | | | |
| Bromide | DU | ND | DU | ND | ug/L | N/A | | | | 09/05/14 22:51 |
| Chloride | D | 16500 | D | 16500 | ug/L | 0.302 | | (0%-20%) | | |
| Fluoride | BD | 112 | BD | 115 | ug/L | 2.46 ^ | | (+/-500) | | |
| Nitrate-N | D | 6200 | D | 6210 | ug/L | 0.139 | | (0%-20%) | | |
| Nitrite-N | DU | ND | DU | ND | ug/L | N/A | | | | |
| Phosphorus in phosphate | DU | ND | DU | ND | ug/L | N/A | | | | |
| Sulfate | D | 165000 | D | 163000 | ug/L | 1.21 | | (0%-20%) | | 09/06/14 20:11 |
| QC1203161807 LCS | | | | | | | | | | |
| Bromide | 1250 | | | 1270 | ug/L | | 101 | (90%-110%) | | 09/06/14 05:34 |
| Chloride | 5000 | | | 4710 | ug/L | | 94.3 | (90%-110%) | | |
| Fluoride | 2500 | | | 2460 | ug/L | | 98.3 | (90%-110%) | | |
| Nitrate-N | 2500 | | | 2350 | ug/L | | 94.2 | (90%-110%) | | |
| Nitrite-N | 2500 | | | 2340 | ug/L | | 93.7 | (90%-110%) | | |

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# QC Summary

**Workorder:** **356063**



| Parmname | NOM | | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date Time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Ion Chromatography** | | | | | | | | | | | |
| Batch 1416896 | | | | | | | | | | | |
| Phosphorus in phosphate | 1250 | | | | 1330 | ug/L | | 107 | (90%-110%) | RXB5 | 09/06/14 05:34 |
| Sulfate | 10000 | | | | 9730 | ug/L | | 97.3 | (90%-110%) | | |
| QC1203161806 MB | | | | | | | | | | | |
| Bromide | | | | U | ND | ug/L | | | | | 09/06/14 05:03 |
| Chloride | | | | U | ND | ug/L | | | | | |
| Fluoride | | | | U | ND | ug/L | | | | | |
| Nitrate-N | | | | U | ND | ug/L | | | | | |
| Nitrite-N | | | | U | ND | ug/L | | | | | |
| Phosphorus in phosphate | | | | U | ND | ug/L | | | | | |
| Sulfate | | | | U | ND | ug/L | | | | | |
| QC1203161810 356063002 PS | | | | | | | | | | | |
| Bromide | 1.25 | DU | ND | D | 1.28 | mg/L | | 103 | (90%-110%) | | 09/05/14 21:49 |
| Chloride | 5.00 | DU | ND | D | 4.69 | mg/L | | 93.8 | (90%-110%) | | |
| Fluoride | 2.50 | DU | ND | D | 2.42 | mg/L | | 96.8 | (90%-110%) | | |
| Nitrate-N | 2.50 | DU | ND | D | 2.38 | mg/L | | 95.1 | (90%-110%) | | |
| Nitrite-N | 2.50 | DU | ND | D | 2.35 | mg/L | | 93.8 | (90%-110%) | | |
| Phosphorus in phosphate | 1.25 | DU | ND | D | 1.25 | mg/L | | 99.9 | (90%-110%) | | |
| Sulfate | 10.0 | DU | ND | D | 9.69 | mg/L | | 96.9 | (90%-110%) | | |
| QC1203161811 356063003 PS | | | | | | | | | | | |
| Bromide | 1.25 | DU | ND | D | 1.35 | mg/L | | 105 | (90%-110%) | | 09/05/14 23:22 |
| Chloride | 5.00 | D | 8.23 | D | 13.9 | mg/L | | 113* | (90%-110%) | | |
| Fluoride | 2.50 | BD | 0.0561 | D | 2.46 | mg/L | | 96.1 | (90%-110%) | | |
| Nitrate-N | 2.50 | D | 3.10 | D | 5.78 | mg/L | | 107 | (90%-110%) | | |

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# QC Summary

**Workorder:** **356063**



| Parmname | NOM | | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Ion Chromatography** | | | | | | | | | | | | |
| Batch 1416896 | | | | | | | | | | | | |
| Nitrite-N | 2.50 | DU | ND | D | 2.39 | mg/L | | 95.7 | (90%-110%) | | | |
| Phosphorus in phosphate | 1.25 | DU | ND | D | 1.21 | mg/L | | 96.8 | (90%-110%) | RXB5 | 09/05/14 | 23:22 |
| Sulfate | 10.0 | D | 8.27 | D | 18.4 | mg/L | | 101 | (90%-110%) | | 09/06/14 | 20:42 |

**Notes:**

The Qualifiers in this report are defined as follows:

- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.
- 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.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

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