GEL Laboratories LLC
a member of The GEL Group INC

January 4, 2016

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

gel.com

December 30, 2015

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

Re: CHPRC SAF S16-012
Work Order: 387916
SDG: GEL387916

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on December 22, 2015. 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: 300071 - 7H
Chain of Custody: S16-012-221 and S16-012-224
Enclosures

Table of Contents

Case Narrative.....1

Chain of Custody and Supporting Documentation.....5

Data Review Qualifier Definitions.....9

Laboratory Certifications.....12

Volatile Analysis.....14

- Case Narrative.....15
- Sample Data Summary.....20
- Quality Control Summary.....23
- Miscellaneous.....31

Metals Analysis.....33

- Case Narrative.....34
- Sample Data Summary.....39
- Quality Control Summary.....42

Radiological Analysis.....45

- Sample Data Summary.....51
- Quality Control Data.....56

# Case Narrative

**General Narrative**
**for**
**CH2MHill Plateau Remediation Company**
**CHPRC SAF S16-012**
**SDG: GEL387916**

**December 30, 2015**

**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 December 22, 2015, 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 |
|---|---|
| 387916001 | B33J71 |
| 387916002 | B33J82 |

**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: GC/MS Volatile, Metals and Radiochemistry.

This package is in compliance with the SOW, both technically and for completeness, including a full description of, explanation of, and corrective actions for, any and all deviations, from either the analyses requested or the case narrative requested. Release of the data contained in this hard copy data package has been authorized by the Laboratory Analytical Manager (or designee) and the laboratory's client services representative as verified by their signatures on this report.

January 4, 2016

Heather Shaffer
Project Manager

January 4, 2016

**Subject:** Groundwater packages
**From:** "Waters-husted, Karen S" <Karen_S_Waters-husted@rl.gov>
**Date:** 11/10/2015 12:25 PM
**To:** "Awalt, Jayna" <Jayna.Awalt@testamericainc.com>, "Franks, Mike" <Mike.Franks@testamericainc.com>, "Heather Shaffer (heather.shaffer@gel.com)" <heather.shaffer@gel.com>, Julie Ellingson <Julie.Ellingson@ALSGlobal.com>, Nancy Mattern <Nancy.Mattern@gel.com>, "Ritari, Whitney" <Whitney.Ritari@testamericainc.com>, "Sandra Seger (Sandra.Seger@testamericainc.com)" <Sandra.Seger@testamericainc.com>, "Wagar, Rhonda" <Rhonda.Wagar@testamericainc.com>, "Waters-husted, Karen S" <Karen_S_Waters-husted@rl.gov>
**CC:** "Ayres, Doris E" <Doris_E_Ayres@rl.gov>, "Sumner, Laine C" <Laine_C_Sumner@rl.gov>, "Gibson, Gayelyn G" <Gayelyn_G_Gibson@rl.gov>, "Lynch, Sherry A" <Sherry_A_Lynch@rl.gov>, "Medley, Heather A" <Heather_A_Medley@rl.gov>, "Fitzgerald, Scot L" <Scot_L_Fitzgerald@rl.gov>, ^CPP Sample Management <CPP_Sample_Management@rl.gov>

The GW annual report is written for a calendar year. This means that we have requested all the samples collected through December 31 to be reported by January 31. However, this year our sampling work load is higher than normal for November and December. In order to meet the GW reporting needs and the large sampling events, CHPRC needs all GW (SAFs A, I, S, W, and some X) SDGs to be on 15 day TATs starting with samples received on 11-16-15 through 1-31-16. I will be adding the new TAT to the SAFs and re-sending them shortly.

Currently, all the November and December paperwork is out in the field, so we will not be recalling it all and making the changes on the chains due to the volume of paperwork impacted.

Please include this email in the data packages as the direction for the TAT change. A SIR will not be necessary.

Please let me know if you have any questions or any problems arise that will impact these packages.

Thank you,

*Karen Waters-Husted*
CH2M Plateau Remediation Company
Sample Management and Reporting
Groundwater Project Coordinator
200 East / MO-277 / 108
509-376-4650
Karen_S_Waters-husted@rl.gov

# Chain of Custody and Supporting Documentation

**CH2MHill Plateau Remediation Company**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

387916

C.O.C. # **S16-012-221**

Page 1 of 1

| | | | | | |
|---|---|---|---|---|---|
| **Collector** | M.A. White CHPRC | **Contact/Requester** | Karen Waters-Husted | **Telephone No.** | 509-376-4650 |
| **SAF No.** | S16-012 | **Sampling Origin** | Hanford Site | **Purchase Order/Charge Code** | 300071 |
| **Project Title** | SURV, DECEMBER 2016 | **Logbook No.** | HNF-N-506-82 / 23 | **Ice Chest No.** | GWS-121 |
| **Shipped To (Lab)** | GEL Laboratories, LLC | **Method of Shipment** | Commercial Carrier | **Bill of Lading/Air Bill No.** | 7752 6216 4623 |
| **Protocol** | SURV | **Priority:** | 30 Days **PRIORITY** | **Offsite Property No.** | N/A |

**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 |
|---|---|---|---|---|---|---|---|---|
| B33J71 | N | W | DEC 18 2015 | 1258 | 1x500-mL G/P | 6020_METALS_ICPMS: Uranium (1) | 6 Months | HNO3 to pH <2 |
| B33J71 | N | W | ↓ | ↓ | 4x40-mL aGs* | 8260_VOA_GCMS: COMMON | 14 Days | HCl or H2SO4 to pH <2/Cool <=6C |
| B33J71 | N | W | ↓ | ↓ | 2x1-L P | 9310_ALPHABETA_GPC: COMMON | 6 Months | HNO3 to pH <2 |
| B33J71 | N | W | DEC 18 2015 | 1258 | 1x500-mL P | TRITIUM_DIST_LSC: COMMON | 6 Months | None |

January 4, 2016

| Relinquished By | Print / Sign | Date/Time | Received By | Print / Sign | Date/Time |
|---|---|---|---|---|---|
| M.A. White CHPRC | M.A. White | DEC 18 2015 1530 | SSU-1 | | DEC 18 2015 1530 |
| SSU-1 | | DEC 20 2015 0930 | M.A. White CHPRC | M.A. White | DEC 20 2015 0930 |
| M.A. White CHPRC | M.A. White | DEC 20 2015 1400 | FEDEX | | |
| FedEx | | | C. Seagle / Cheyakoege | | 12/22/15 1140 |

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 ON** 10/22/2015

**FSR ID = FSR8587**

A-6004-842 (REV 2)

4716s

| CH2MHill Plateau Remediation Company | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 387916 | C.O.C. # S16-012-224 Page 1 of 1 |
|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| **Collector** | M.A. White CHPRC | **Contact/Requester** | Karen Waters-Husted | **Telephone No.** | 509-376-4650 |
| **SAF No.** | S16-012 | **Sampling Origin** | Hanford Site | **Purchase Order/Charge Code** | 300071 |
| **Project Title** | SURV, DECEMBER 2016 | **Logbook No.** | HNF-N-506 82123 | **Ice Chest No.** | GWS-121 |
| **Shipped To (Lab)** | GEL Laboratories, LLC | **Method of Shipment** | Commercial Carrier | **Bill of Lading/Air Bill No.** | 7752 6216 4623 |
| **Protocol** | SURV | **Priority:** | 30 Days **PRIORITY** | **Offsite Property No.** | N/A |

**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 |
|---|---|---|---|---|---|---|---|---|
| B33J82 | N | W | DEC 18 2015 | 1347 | 1x500-mL G/P | 6020_METALS_ICPMS: Uranium (1) | 6 Months | HNO3 to pH <2 |
| B33J82 | N | W | ↓ | ↓ | 4x40-mL aGs* | 8260_VOA_GCMS: COMMON | 14 Days | HCl or H2SO4 to pH <2/Cool <=6C |
| B33J82 | N | W | ↓ | ↓ | 2x1-L P | 9310_ALPHABETA_GPC: COMMON | 6 Months | HNO3 to pH <2 |
| B33J82 | N | W | DEC 18 2015 | 1347 | 1x500-mL P | TRITIUM_DIST_LSC: COMMON | 6 Months | None |

| Relinquished By | Print | Sign | Date/Time | Received By | Print | Sign | Date/Time |
|---|---|---|---|---|---|---|---|
| M.A. White CHPRC | M.A. White | M.A. White | DEC 18 2015 1530 | SSU-1 | | | DEC 18 2015 1530 |
| SSU-1 | | | DEC 20 2015 0930 | M.A. White CHPRC | M.A. White | M.A. White | DEC 20 2015 0930 |
| M.A. White CHPRC | M.A. White | M.A. White | DEC 20 2015 1400 | FEDEX | | | |
| Fedex | | | | C-Seagle/Cheyenne | | | 12/22/15 1140 |

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

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 | | |

PRINTED ON 10/22/2015 FSR ID = FSR8592 A-6004-842 (REV 2)



January 4, 2016

GEL Laboratories LLC

# SAMPLE RECEIPT & REVIEW FORM

| | |
|---|---|
| **Client:** CPRC | **SDG/AR/COC/Work Order:** 387916 |
| **Received By:** CAY | **Date Received:** 12/22/15 |

| **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? | | ✓ | Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 cpm |
| Classified Radioactive II or III by RSO? | | ✓ | If yes, Were swipes taken of sample containers < action levels? |
| COC/Samples marked containing PCBs? | | ✓ | |
| Package, COC, and/or Samples marked as beryllium or asbestos containing? | | ✓ | If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group. |
| Shipped as a DOT Hazardous? | | ✓ | Hazard Class Shipped: UN#: |
| Samples identified as Foreign Soil? | | ✓ | |

| | **Sample Receipt Criteria** | Yes | NA | No | **Comments/Qualifiers (Required for Non-Conforming Items)** |
|---|---|---|---|---|---|
| 1 | Shipping containers received intact and sealed? | ✓ | | | Circle Applicable: Seals broken Damaged container Leaking container Other (describe) |
| 2 | Samples requiring cold preservation within (0 ≤ 6 deg. C)?* | ✓ | | | Preservation Method: (Ice bags) Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius |
| 2a | Daily check performed and passed on IR temperature gun? | ✓ | | | Temperature Device Serial #: 2.3°C Secondary Temperature Device Serial # (If Applicable): 201404337 |
| 3 | Chain of custody documents included with shipment? | ✓ | | | |
| 4 | Sample containers intact and sealed? | ✓ | | | Circle Applicable: Seals broken Damaged container Leaking container Other (describe) |
| 5 | Samples requiring chemical preservation at proper pH? | ✓ | | | Sample ID's, containers affected and observed pH: If Preservation added, Lot#: |
| 6 | Do Low Level Perchlorate samples have headspace as required? | ✓ | | | Sample ID's and containers affected: |
| 7 | VOA vials contain acid preservation? | ✓ | | | (If unknown, select No) |
| 8 | VOA vials free of headspace (defined as < 6mm bubble)? | ✓ | | | Sample ID's and containers affected: |
| 9 | Are Encore containers present? | | | ✓ | (If yes, immediately deliver to Volatiles laboratory) |
| 10 | Samples received within holding time? | ✓ | | | ID's and tests affected: |
| 11 | Sample ID's on COC match ID's on bottles? | ✓ | | | Sample ID's and containers affected: |
| 12 | Date & time on COC match date & time on bottles? | ✓ | | | Sample ID's affected: |
| 13 | Number of containers received match number indicated on COC? | ✓ | | | Sample ID's affected: |
| 14 | Are sample containers identifiable as GEL provided? | ✓ | | | |
| 15 | COC form is properly signed in relinquished/received sections? | ✓ | | | |
| 16 | Carrier and tracking number. | ✓ | | | Circle Applicable: (FedEx Air) FedEx Ground UPS Field Services Courier Other 7752 6216 4623 |

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials DS Date 12/22/15 Page 1 of 1 GL-CHL-SR-001 Rev 2

# Data Review Qualifier Definitions

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 (843) 556−8171

Report Date: 30−DEC−15

## Project Specific Qualifier Definitions for GEL Client Code: CPRC

| 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 |

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 (843) 556−8171

Report Date: 30−DEC−15

## Project Specific Qualifier Definitions for GEL Client Code: CPRC

| Code | Status | Qualifier Definition | CofA | Department | Fraction | Additional Comments |
|---|---|---|---|---|---|---|
| UX | Manual | Gamma Spectroscopy−−Uncertain identification | Y | Radiological | | |

# Laboratory Certifications

**List of current GEL Certifications as of 30 December 2015**

| State | Certification |
|---|---|
| Alaska | UST−110 |
| Arkansas | 88−0651 |
| CLIA | 42D0904046 |
| California | 2940 Interim |
| Colorado | SC00012 |
| Connecticut | PH−0169 |
| Delaware | SC000122013−10 |
| DoD ELAP/ ISO17025 A2LA | 2567.01 |
| Florida NELAP | E87156 |
| Foreign Soils Permit | P330−15−00283, P330−15−00253 |
| 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 SDWA | 90129 |
| Kentucky Wastewater | 90129 |
| Louisiana NELAP | 03046 (AI33904) |
| Louisiana SDWA | LA150001 |
| Maryland | 270 |
| Massachusetts | M−SC012 |
| Michigan | 9976 |
| Mississippi | SC000122013−10 |
| Nebraska | NE−OS−26−13 |
| Nevada | SC000122016−1 |
| New Hampshire NELAP | 2054 |
| New Jersey NELAP | SC002 |
| New Mexico | SC00012 |
| New York NELAP | 11501 |
| North Carolina | 233 |
| North Carolina SDWA | 45709 |
| North Dakota | R−158 |
| Oklahoma | 9904 |
| Pennsylvania NELAP | 68−00485 |
| S.Carolina Radchem | 10120002 |
| South Carolina Chemistry | 10120001 |
| Tennessee | TN 02934 |
| Texas NELAP | T104704235−15−10 |
| Utah NELAP | SC000122015−19 |
| Vermont | VT87156 |
| Virginia NELAP | 460202 |
| Washington | C780 |
| West Virginia | 997404 |

# Volatile Analysis

# Case Narrative

**GC/MS Volatile**
**Technical Case Narrative**
**CH2MHill Plateau Remediation Company (CPRC)**
**SDG #: GEL387916**
**Work Order #: 387916**

## Method/Analysis Information

| | |
|---|---|
| **Procedure:** | **Volatile Organic Compounds (VOC) by Gas Chromatograph/Mass Spectrometer** |
| Analytical Method: | SW846 8260C |
| Analytical Batch Number: | 1533949 |

## Sample Analysis

The following client and quality control samples were analyzed to complete this SDG using the methods referenced in the Analysis Information section:

| Sample ID | Client ID |
|---|---|
| 387916001 | B33J71 |
| 387916002 | B33J82 |
| 1203460553 | Method Blank (MB) |
| 1203460554 | Laboratory Control Sample (LCS) |
| 1203460556 | 387668001(B33Y13) Post Spike (PS) |
| 1203460558 | 387668001(B33Y13) Post Spike Duplicate (PSD) |

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

The data results reported met all SOP and method criteria, unless otherwise discussed below.

**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-038 REV# 21.

## Calibration Information

A complete list of the initial calibration data files with the correct dates and times of analysis are shown in the Calibration History report located in the Standard Data section of the data package. The surrogate compounds were calibrated using a minimum five-point calibration curve. The surrogates were added by the auto sampler at a concentration of 50 ug/L or 20 ug/L for low level analyses. GEL Laboratories LLC will not have surrogate recoveries reported for Dibromofluoromethane. This is due to increased regulations for this analyte and an industry shortage.

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

**Continuing Calibration Verification Requirements**

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

**Quality Control (QC) Information**

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

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

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

**QC Sample Designation**
Sample 387668001 (B33Y13) was designated for spike analysis.

**Matrix Spike/Matrix Spike Duplicate Recovery Statement**
The matrix spike (MS) and matrix spike duplicate (MSD) recoveries were within the required acceptance limits.

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

**Internal Standard (ISTD) Acceptance**
The internal standard responses in all client and quality control samples met the required acceptance criteria.

**Technical Information**

**Holding Time Specifications**
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. Preservation for samples 1203460556 (Non SDG 387668001PS) and 1203460558 (Non SDG 387668001PSD) were indicated on the vials, however the sample pH values were above 2. The samples were analyzed beyond the 7th day from collection, consequently the holding time was exceeded for un-preserved Volatile analysis. The results are qualified with an 'X'.

**Sample Preservation and Integrity**
Preservation for samples 1203460556 (Non SDG 387668001PS) and 1203460558 (Non SDG 387668001PSD) were indicated on the vials, however the sample pH values were above 2. The samples were analyzed beyond the 7th day from collection, consequently the holding time was exceeded for un-preserved Volatile analysis.

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

**Sample Re-extraction/Re-analysis**
Re-analyses were not required for samples in this SDG.

**Miscellaneous Information**

**Data Exception (DER) Documentation**
A data exception report (DER) 1480514 was generated for samples 1203460556 (Non SDG 387668001PS) and 1203460558 (Non SDG 387668001PSD) in this SDG/batch.

**Manual Integrations**
Data files associated with the initial calibration, continuing calibration check, and samples did not require manual integrations.

**TIC Comment**
Tentatively identified compounds (TIC) were not required for this SDG.

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

**Residual Chlorine**
Residual Chlorine was not detected in any of the samples in this SDG.

**System Configuration**

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

| Instrument ID | Instrument | System Configuration | Column ID | Column Description | P & T Trap |
|---|---|---|---|---|---|
| VOA3.I | Agilent 6890/5973 GC/MS w/ OI 4560/Archon Autosampler | HP6890/HP5973 | DB-624 | J&W, 60m x 0.25mm x 1.4um | Trap 10 |

**Certification Statement**

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

# GEL LABORATORIES LLC

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

## Qualifier Definition Report
for

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL387916 GEL Work Order: 387916

**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

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

**Date: 30 DEC 2015** **Title: Data Validator**

# Sample Data Summary

**Volatile**
**Certificate of Analysis**
**Sample Summary**

| | | | | | |
|---|---|---|---|---|---|
| **SDG Number:** | **GEL387916** | **Date Collected:** | **12/18/2015 12:58** | **Matrix:** | **WATER** |
| **Lab Sample ID:** | **387916001** | **Date Received:** | **12/22/2015 11:40** | | |
| | | **Client:** | **CPRC001** | **Project:** | **CPRC0S16012** |
| **Client ID:** | **B33J71** | **Method:** | **SW846 8260C** | **SOP Ref:** | **GL-OA-E-038** |
| **Batch ID:** | **1533949** | **Inst:** | **VOA3.I** | **Dilution:** | **1** |
| **Run Date:** | **12/29/2015 12:43** | **Analyst:** | **CDS1** | **Purge Vol:** | **5 mL** |
| **Prep Date:** | **12/29/2015 12:43** | | | | |
| **Data File:** | **122915V3\3P211.D** | **Column:** | **DB-624** | | |

| CAS No. | Parmname | Qualifier | Result | Units | MDL/LOD | PQL/LOQ | RDL |
|---|---|---|---|---|---|---|---|
| 71-55-6 | 1,1,1-Trichloroethane | U | 0.300 | ug/L | 0.300 | 2.00 | 5.00 |
| 79-00-5 | 1,1,2-Trichloroethane | U | 0.300 | ug/L | 0.300 | 2.00 | 5.00 |
| 107-06-2 | 1,2-Dichloroethane | U | 0.300 | ug/L | 0.300 | 2.00 | 5.00 |
| 71-43-2 | Benzene | U | 0.300 | ug/L | 0.300 | 2.00 | 5.00 |
| 75-15-0 | Carbon disulfide | U | 1.60 | ug/L | 1.60 | 10.0 | 5.00 |
| 56-23-5 | Carbon tetrachloride | U | 0.300 | ug/L | 0.300 | 2.00 | 5.00 |
| 108-90-7 | Chlorobenzene | U | 0.300 | ug/L | 0.300 | 2.00 | 5.00 |
| 67-66-3 | Chloroform | U | 0.300 | ug/L | 0.300 | 2.00 | 5.00 |
| 100-41-4 | Ethylbenzene | U | 0.300 | ug/L | 0.300 | 2.00 | 5.00 |
| 75-09-2 | Methylene chloride | U | 1.60 | ug/L | 1.60 | 5.00 | 5.00 |
| 127-18-4 | Tetrachloroethylene | U | 0.300 | ug/L | 0.300 | 2.00 | 5.00 |
| 108-88-3 | Toluene | U | 0.300 | ug/L | 0.300 | 2.00 | 5.00 |
| 79-01-6 | Trichloroethylene | J | 0.530 | ug/L | 0.300 | 2.00 | 5.00 |
| 75-34-3 | 1,1-Dichloroethane | U | 0.300 | ug/L | 0.300 | 2.00 | 10.0 |
| 75-35-4 | 1,1-Dichloroethylene | U | 0.300 | ug/L | 0.300 | 2.00 | 10.0 |
| 78-93-3 | 2-Butanone | U | 3.00 | ug/L | 3.00 | 10.0 | 10.0 |
| 108-10-1 | 4-Methyl-2-pentanone | U | 3.00 | ug/L | 3.00 | 10.0 | 10.0 |
| 75-01-4 | Vinyl chloride | U | 0.300 | ug/L | 0.300 | 2.00 | 10.0 |
| 1330-20-7 | Xylenes (total) | U | 0.300 | ug/L | 0.300 | 6.00 | 10.0 |
| 67-64-1 | Acetone | TU | 3.00 | ug/L | 3.00 | 10.0 | 20.0 |

**Volatile**
**Certificate of Analysis**
**Sample Summary**

| | | | | | |
|---|---|---|---|---|---|
| **SDG Number:** | **GEL387916** | **Date Collected:** | **12/18/2015 13:47** | **Matrix:** | **WATER** |
| **Lab Sample ID:** | **387916002** | **Date Received:** | **12/22/2015 11:40** | | |
| | | **Client:** | **CPRC001** | **Project:** | **CPRC0S16012** |
| **Client ID:** | **B33J82** | **Method:** | **SW846 8260C** | **SOP Ref:** | **GL-OA-E-038** |
| **Batch ID:** | **1533949** | **Inst:** | **VOA3.I** | **Dilution:** | **1** |
| **Run Date:** | **12/29/2015 13:14** | **Analyst:** | **CDS1** | **Purge Vol:** | **5 mL** |
| **Prep Date:** | **12/29/2015 13:14** | | | | |
| **Data File:** | **122915V3\3P212.D** | **Column:** | **DB-624** | | |

| CAS No. | Parmname | Qualifier | Result | Units | MDL/LOD | PQL/LOQ | RDL |
|---|---|---|---|---|---|---|---|
| 71-55-6 | 1,1,1-Trichloroethane | U | 0.300 | ug/L | 0.300 | 2.00 | 5.00 |
| 79-00-5 | 1,1,2-Trichloroethane | U | 0.300 | ug/L | 0.300 | 2.00 | 5.00 |
| 107-06-2 | 1,2-Dichloroethane | U | 0.300 | ug/L | 0.300 | 2.00 | 5.00 |
| 71-43-2 | Benzene | U | 0.300 | ug/L | 0.300 | 2.00 | 5.00 |
| 75-15-0 | Carbon disulfide | U | 1.60 | ug/L | 1.60 | 10.0 | 5.00 |
| 56-23-5 | Carbon tetrachloride | U | 0.300 | ug/L | 0.300 | 2.00 | 5.00 |
| 108-90-7 | Chlorobenzene | U | 0.300 | ug/L | 0.300 | 2.00 | 5.00 |
| 67-66-3 | Chloroform | U | 0.300 | ug/L | 0.300 | 2.00 | 5.00 |
| 100-41-4 | Ethylbenzene | U | 0.300 | ug/L | 0.300 | 2.00 | 5.00 |
| 75-09-2 | Methylene chloride | U | 1.60 | ug/L | 1.60 | 5.00 | 5.00 |
| 127-18-4 | Tetrachloroethylene | U | 0.300 | ug/L | 0.300 | 2.00 | 5.00 |
| 108-88-3 | Toluene | U | 0.300 | ug/L | 0.300 | 2.00 | 5.00 |
| 79-01-6 | Trichloroethylene | J | 0.560 | ug/L | 0.300 | 2.00 | 5.00 |
| 75-34-3 | 1,1-Dichloroethane | U | 0.300 | ug/L | 0.300 | 2.00 | 10.0 |
| 75-35-4 | 1,1-Dichloroethylene | U | 0.300 | ug/L | 0.300 | 2.00 | 10.0 |
| 78-93-3 | 2-Butanone | U | 3.00 | ug/L | 3.00 | 10.0 | 10.0 |
| 108-10-1 | 4-Methyl-2-pentanone | U | 3.00 | ug/L | 3.00 | 10.0 | 10.0 |
| 75-01-4 | Vinyl chloride | U | 0.300 | ug/L | 0.300 | 2.00 | 10.0 |
| 1330-20-7 | Xylenes (total) | U | 0.300 | ug/L | 0.300 | 6.00 | 10.0 |
| 67-64-1 | Acetone | TU | 3.00 | ug/L | 3.00 | 10.0 | 20.0 |

# Quality Control Summary

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

# QC Summary

**Report Date: December 30, 2015**



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

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

**Workorder:** **387916**

| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date Time |
|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile-GC/MS** | | | | | | | | | | |
| Batch 1533949 | | | | | | | | | | |
| QC1203460554 LCS | | | | | | | | | | |
| 1,1,1-Trichloroethane | 50.0 | | | 59.9 | ug/L | | 120 | (70%-130%) | CDS1 | 12/29/15 08:12 |
| 1,1,2-Trichloroethane | 50.0 | | | 49.8 | ug/L | | 100 | (70%-130%) | | |
| 1,1-Dichloroethane | 50.0 | | | 50.6 | ug/L | | 101 | (70%-130%) | | |
| 1,1-Dichloroethylene | 50.0 | | | 53.3 | ug/L | | 107 | (70%-130%) | | |
| 1,2-Dichloroethane | 50.0 | | | 45.7 | ug/L | | 91 | (70%-130%) | | |
| 2-Butanone | 250 | | | 247 | ug/L | | 99 | (70%-130%) | | |
| 4-Methyl-2-pentanone | 250 | | | 223 | ug/L | | 89 | (70%-130%) | | |
| Acetone | 250 | | | 235 | ug/L | | 94 | (70%-130%) | | |
| Benzene | 50.0 | | | 52.0 | ug/L | | 104 | (70%-130%) | | |
| Carbon disulfide | 250 | | | 278 | ug/L | | 111 | (70%-130%) | | |
| Carbon tetrachloride | 50.0 | | | 55.5 | ug/L | | 111 | (70%-130%) | | |
| Chlorobenzene | 50.0 | | | 52.4 | ug/L | | 105 | (70%-130%) | | |
| Chloroform | 50.0 | | | 51.4 | ug/L | | 103 | (70%-130%) | | |
| Ethylbenzene | 50.0 | | | 54.4 | ug/L | | 109 | (70%-130%) | | |
| Methylene chloride | 50.0 | | | 49.2 | ug/L | | 98 | (70%-130%) | | |
| Tetrachloroethylene | 50.0 | | | 55.6 | ug/L | | 111 | (70%-130%) | | |
| Toluene | 50.0 | | | 51.8 | ug/L | | 104 | (70%-130%) | | |
| Trichloroethylene | 50.0 | | | 55.8 | ug/L | | 112 | (70%-130%) | | |
| Vinyl chloride | 50.0 | | | 45.0 | ug/L | | 90 | (70%-130%) | | |
| Xylenes (total) | 150 | | | 157 | ug/L | | 105 | (70%-130%) | | |

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

# QC Summary

**Workorder:** **387916**



| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date Time |
|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile-GC/MS** | | | | | | | | | | |
| Batch 1533949 | | | | | | | | | | |
| **1,2-Dichloroethane-d4 | 50.0 | | | 46.7 | ug/L | | 93 | (71%-134%) | CDS1 | 12/29/15 08:12 |
| **Bromofluorobenzene | 50.0 | | | 51.5 | ug/L | | 103 | (70%-131%) | | |
| **Toluene-d8 | 50.0 | | | 49.0 | ug/L | | 98 | (74%-124%) | | |
| QC1203460553 MB | | | | | | | | | | |
| 1,1,1-Trichloroethane | | | U | 0.300 | ug/L | | | | | 12/29/15 09:20 |
| 1,1,2-Trichloroethane | | | U | 0.300 | ug/L | | | | | |
| 1,1-Dichloroethane | | | U | 0.300 | ug/L | | | | | |
| 1,1-Dichloroethylene | | | U | 0.300 | ug/L | | | | | |
| 1,2-Dichloroethane | | | U | 0.300 | ug/L | | | | | |
| 2-Butanone | | | U | 3.00 | ug/L | | | | | |
| 4-Methyl-2-pentanone | | | U | 3.00 | ug/L | | | | | |
| Acetone | | | U | 3.00 | ug/L | | | | | |
| Benzene | | | U | 0.300 | ug/L | | | | | |
| Carbon disulfide | | | U | 1.60 | ug/L | | | | | |
| Carbon tetrachloride | | | U | 0.300 | ug/L | | | | | |
| Chlorobenzene | | | U | 0.300 | ug/L | | | | | |
| Chloroform | | | U | 0.300 | ug/L | | | | | |
| Ethylbenzene | | | U | 0.300 | ug/L | | | | | |
| Methylene chloride | | | U | 1.60 | ug/L | | | | | |
| Tetrachloroethylene | | | U | 0.300 | ug/L | | | | | |
| Toluene | | | U | 0.300 | ug/L | | | | | |
| Trichloroethylene | | | U | 0.300 | ug/L | | | | | |

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

# QC Summary

**Workorder:** **387916**



| Parmname | NOM | | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date Time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile-GC/MS** | | | | | | | | | | | |
| Batch 1533949 | | | | | | | | | | | |
| Vinyl chloride | | | | U | 0.300 | ug/L | | | | CDS1 | 12/29/15 09:20 |
| Xylenes (total) | | | | U | 0.300 | ug/L | | | | | |
| **1,2-Dichloroethane-d4 | 50.0 | | | | 48.5 | ug/L | | 97 | (71%-134%) | | |
| **Bromofluorobenzene | 50.0 | | | | 48.2 | ug/L | | 96 | (70%-131%) | | |
| **Toluene-d8 | 50.0 | | | | 51.2 | ug/L | | 102 | (74%-124%) | | |
| QC1203460556 387668001 PS | | | | | | | | | | | |
| 1,1,1-Trichloroethane | 50.0 | UX | 0.00 | X | 50.5 | ug/L | | 101 | (70%-130%) | | 12/29/15 13:45 |
| 1,1,2-Trichloroethane | 50.0 | UX | 0.00 | X | 47.6 | ug/L | | 95 | (70%-130%) | | |
| 1,1-Dichloroethane | 50.0 | UX | 0.00 | X | 45.0 | ug/L | | 90 | (70%-130%) | | |
| 1,1-Dichloroethylene | 50.0 | UX | 0.00 | X | 46.3 | ug/L | | 93 | (70%-130%) | | |
| 1,2-Dichloroethane | 50.0 | UX | 0.00 | X | 42.4 | ug/L | | 85 | (70%-130%) | | |
| 2-Butanone | 250 | UX | 0.00 | X | 191 | ug/L | | 76 | (70%-130%) | | |
| 4-Methyl-2-pentanone | 250 | UX | 0.00 | X | 235 | ug/L | | 94 | (70%-130%) | | |
| Acetone | 250 | JTX | 3.05 | TX | 161 | ug/L | | 63* | (70%-130%) | | |
| Benzene | 50.0 | UX | 0.00 | X | 47.8 | ug/L | | 96 | (70%-130%) | | |
| Carbon disulfide | 250 | UX | 0.00 | X | 251 | ug/L | | 100 | (70%-130%) | | |
| Carbon tetrachloride | 50.0 | UX | 0.00 | X | 47.2 | ug/L | | 94 | (70%-130%) | | |
| Chlorobenzene | 50.0 | UX | 0.00 | X | 48.0 | ug/L | | 96 | (70%-130%) | | |
| Chloroform | 50.0 | UX | 0.00 | X | 44.7 | ug/L | | 89 | (70%-130%) | | |
| Ethylbenzene | 50.0 | UX | 0.00 | X | 48.7 | ug/L | | 97 | (70%-130%) | | |
| Methylene chloride | 50.0 | UX | 0.00 | X | 43.5 | ug/L | | 87 | (70%-130%) | | |
| Tetrachloroethylene | 50.0 | UX | 0.00 | X | 52.2 | ug/L | | 104 | (70%-130%) | | |

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

# QC Summary

**Workorder:** **387916**



| Parmname | NOM | | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date Time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile-GC/MS** | | | | | | | | | | | |
| Batch 1533949 | | | | | | | | | | | |
| Toluene | 50.0 | UX | 0.00 | X | 48.1 | ug/L | | 96 | (70%-130%) | CDS1 | 12/29/15 13:45 |
| Trichloroethylene | 50.0 | UX | 0.00 | X | 47.9 | ug/L | | 96 | (70%-130%) | | |
| Vinyl chloride | 50.0 | UX | 0.00 | X | 45.0 | ug/L | | 90 | (70%-130%) | | |
| Xylenes (total) | 150 | UX | 0.00 | X | 146 | ug/L | | 97 | (70%-130%) | | |
| **1,2-Dichloroethane-d4 | 50.0 | X | 52.3 | X | 52.2 | ug/L | | 104 | (71%-134%) | | |
| **Bromofluorobenzene | 50.0 | X | 47.3 | X | 52.3 | ug/L | | 105 | (70%-131%) | | |
| **Toluene-d8 | 50.0 | X | 51.3 | X | 53.2 | ug/L | | 106 | (74%-124%) | | |
| QC1203460558 387668001 PSD | | | | | | | | | | | |
| 1,1,1-Trichloroethane | 50.0 | UX | 0.00 | X | 52.0 | ug/L | 3 | 104 | (0%-20%) | | 12/29/15 14:15 |
| 1,1,2-Trichloroethane | 50.0 | UX | 0.00 | X | 47.8 | ug/L | 0 | 96 | (0%-20%) | | |
| 1,1-Dichloroethane | 50.0 | UX | 0.00 | X | 46.1 | ug/L | 3 | 92 | (0%-20%) | | |
| 1,1-Dichloroethylene | 50.0 | UX | 0.00 | X | 47.5 | ug/L | 3 | 95 | (0%-20%) | | |
| 1,2-Dichloroethane | 50.0 | UX | 0.00 | X | 43.5 | ug/L | 3 | 87 | (0%-20%) | | |
| 2-Butanone | 250 | UX | 0.00 | X | 174 | ug/L | 9 | 70 | (0%-20%) | | |
| 4-Methyl-2-pentanone | 250 | UX | 0.00 | X | 222 | ug/L | 6 | 89 | (0%-20%) | | |
| Acetone | 250 | JTX | 3.05 | TX | 145 | ug/L | 10 | 57* | (0%-20%) | | |
| Benzene | 50.0 | UX | 0.00 | X | 48.0 | ug/L | 0 | 96 | (0%-20%) | | |
| Carbon disulfide | 250 | UX | 0.00 | X | 253 | ug/L | 1 | 101 | (0%-20%) | | |
| Carbon tetrachloride | 50.0 | UX | 0.00 | X | 47.9 | ug/L | 1 | 96 | (0%-20%) | | |
| Chlorobenzene | 50.0 | UX | 0.00 | X | 49.5 | ug/L | 3 | 99 | (0%-20%) | | |
| Chloroform | 50.0 | UX | 0.00 | X | 45.1 | ug/L | 1 | 90 | (0%-20%) | | |
| Ethylbenzene | 50.0 | UX | 0.00 | X | 49.1 | ug/L | 1 | 98 | (0%-20%) | | |

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

# QC Summary

**Workorder:** **387916**



| Parmname | NOM | | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile-GC/MS** | | | | | | | | | | | | |
| Batch 1533949 | | | | | | | | | | | | |
| Methylene chloride | 50.0 | UX | 0.00 | X | 46.4 | ug/L | 6 | 93 | (0%-20%) | CDS1 | 12/29/15 | 14:15 |
| Tetrachloroethylene | 50.0 | UX | 0.00 | X | 50.0 | ug/L | 4 | 100 | (0%-20%) | | | |
| Toluene | 50.0 | UX | 0.00 | X | 47.1 | ug/L | 2 | 94 | (0%-20%) | | | |
| Trichloroethylene | 50.0 | UX | 0.00 | X | 48.5 | ug/L | 1 | 97 | (0%-20%) | | | |
| Vinyl chloride | 50.0 | UX | 0.00 | X | 50.5 | ug/L | 12 | 101 | (0%-20%) | | | |
| Xylenes (total) | 150 | UX | 0.00 | X | 148 | ug/L | 1 | 98 | (0%-20%) | | | |
| **1,2-Dichloroethane-d4 | 50.0 | X | 52.3 | X | 48.5 | ug/L | | 97 | (71%-134%) | | | |
| **Bromofluorobenzene | 50.0 | X | 47.3 | X | 49.6 | ug/L | | 99 | (70%-131%) | | | |
| **Toluene-d8 | 50.0 | X | 51.3 | X | 48.7 | ug/L | | 97 | (74%-124%) | | | |

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

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

# QC Summary

**Workorder:** **387916**



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

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.

**Volatile**

## Surrogate Recovery Report

**SDG Number: GEL387916**

**Matrix Type: LIQUID**

| Sample ID | Client ID | DCED4 %REC | TOL %REC | BFB %REC |
|---|---|---|---|---|
| 1203460554 | LCS for batch 1533949 | 93 | 98 | 103 |
| 1203460553 | MB for batch 1533949 | 97 | 102 | 96 |
| 387916001 | B33J71 | 96 | 103 | 89 |
| 387916002 | B33J82 | 96 | 103 | 87 |
| 1203460556 | B33Y13PS | 104 | 106 | 105 |
| 1203460558 | B33Y13PSD | 97 | 97 | 99 |

| Surrogate | | Acceptance Limits |
|---|---|---|
| DCED4 | = 1,2-Dichloroethane-d4 | (71%-134%) |
| TOL | = Toluene-d8 | (74%-124%) |
| BFB | = Bromofluorobenzene | (70%-131%) |

* Recovery outside Acceptance Limits
# Column to be used to flag recovery values
D Sample Diluted

# Miscellaneous

GEL Laboratories LLC
Form GEL-DER

DER Report No.: 1480514
Revision No.: 1

## DATA EXCEPTION REPORT

| Mo.Day Yr. | Division: | Quality Criteria: | Type: |
|---|---|---|---|
| 30-DEC-15 | Industrial | Specifications | Process |
| **Instrument Type:** | **Test / Method:** | **Matrix Type:** | **Client Code:** |
| VOA GC/MS | SW846 8260C | Liquid | CPRC |
| **Batch ID:** | **Sample Numbers:** | | |
| 1533949 | See Below | | |

**Potentially affected work order(s)(SDG): 387668(GEL387668),387831(GEL387831),387834(GEL387834),387916(GEL387916),387917(GEL387917)**

**Application Issues:**

Failed Recovery for MS/MSD, or PS/PSD

Sample Analyzed out of Holding

| Specification and Requirements Exception Description: | DER Disposition: |
|---|---|
| 1. Failed Recovery for MS/MSD, or PS/PSD:<br><br>QC 1203460556PS,1203460558PSD<br><br>2. All vials of sample 387668001 (and the associated MS/MSD pair) were pH 7. The samples were analyzed past the seventh day from collection. | 1. The spike and/or spike duplicate (See Below) recoveries were not all within the acceptance limits. The recoveries were similar. It is believed possible matrix interference has been demonstrated.<br>1203460556 (B33Y13PS) Acetone [63* (70%-130%)].<br>1203460558 (B33Y13PSD) Acetone [57* (70%-130%)].<br><br>2. The holding time for un-preserved sample analysis was exceeded. The data results were qualified accordingly with an 'X'. |

**Originator's Name:**

Crystal Stacey 30-DEC-15

**Data Validator/Group Leader:**

Erin Haubert 30-DEC-15

# Metals Analysis

# Case Narrative

**Metals**
**Technical Case Narrative**
**CH2MHill Plateau Remediation Company (CPRC)**
**SDG #: GEL387916**
**Work Order #: 387916**

| Sample ID | Client ID |
|---|---|
| 387916001 | B33J71 |
| 387916002 | B33J82 |
| 1203458403 | Method Blank (MB)**ICP-MS** |
| 1203458404 | Laboratory Control Sample (LCS) |
| 1203458407 | 387916001(B33J71L) Serial Dilution (SD) |
| 1203458405 | 387916001(B33J71S) Matrix Spike (MS) |
| 1203458406 | 387916001(B33J71SD) Matrix Spike Duplicate (MSD) |

**Sample Analysis**

Samples 387916 001 and 002 in this SDG were analyzed for metals on an "as received" basis.

**Method/Analysis Information**

| | |
|---|---|
| **Analytical Batch:** | 1533144 |
| **Prep Batch :** | 1533143 |
| **Standard Operating Procedures:** | GL-MA-E-014 REV# 26 and GL-MA-E-006 REV# 13 |
| **Analytical Method:** | 6020_METALS_ICPMS |
| **Prep Method :** | SW846 3005A |

**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 - ICPMS was performed on a Perkin Elmer ELAN 9000 inductively coupled plasma mass spectrometer (ICP-MS). The instrument is equipped with a cross-flow nebulizer, quadrupole mass spectrometer, and dual mode electron multiplier detector. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum.

**Calibration Information**

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

**CRDL/PQL Requirements**
The CRDL standard recoveries for SW846 6020A met the advisory control limits with the exception of uranium. Client sample concentrations were greater than two times the PQL; therefore the data were not adversely

affected.

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

**Continuing Calibration Blanks (CCB) Requirements**
All continuing calibration blanks (CCB) bracketing this batch met the established acceptance criteria.

**Continuing Calibration Verification (CCV) Requirements**
All continuing calibration verifications (CCV) bracketing this SDG met the acceptance criteria.

**Quality Control (QC) Information**

**Method Blank (MB) Statement**
The MB 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: 387916001 (B33J71).

**Matrix Spike (MS/MSD) Recovery Statement**
The percent recoveries (%R) obtained from the MS/MSD analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The matrix spike met the recommended quality control acceptance criteria for percent recoveries for all applicable analytes.

**MS/MSD Relative Percent Difference (RPD) Statement**
The relative percent difference (RPD) obtained from the designated matrix spike duplicate (MSD) is evaluated based on acceptance criteria of 20%. The RPD values between qualifying analyte results in the MS and MSD were within the acceptance limits.

**Serial Dilution % Difference Statement**
All applicable analytes in the serial dilution (SDILT) demonstrated acceptable correlation to its associated sample and met the established acceptance percent difference criteria.

**Technical Information**

**Holding Time Specifications**
GEL assigns holding times based on the associated methodology. Holding time is measured by comparison of the date and time of sample collection to the date and time of sample preparation and analysis. 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.

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

**Preparation Information**
The samples in this SDG were not diluted and prepared 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**

A data exception report was not required for this SDG.

**Additional Comments**

Additional comments were not required for this SDG.

**Certification Statement**

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

# GEL LABORATORIES LLC

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

## Qualifier Definition Report
for

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL387916 GEL Work Order: 387916

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

* Duplicate analysis not within control limits

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

D Results are reported from a diluted aliquot of sample.

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

**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: Nik-Cole Elmore**

**Date: 04 JAN 2016** **Title: Data Validator**

# Sample Data Summary

**METALS**
**−1−**
**INORGANICS ANALYSIS DATA PACKAGE**

**SDG No:** GEL387916 **METHOD TYPE:** SW846

**SAMPLE ID:** 387916001 **CLIENT ID:** B33J71

**CONTRACT:** CPRC0S16012

**MATRIX:** WATER **DATE RECEIVED** 22−DEC−15 **LEVEL:** Low

| CAS No | Analyte | Result | Units | C | Qual | M* | MDL | DF | Inst ID | Analytical Run |
|---|---|---|---|---|---|---|---|---|---|---|
| 7440−61−1 | Uranium | 10.8 | ug/L | | | MS | 0.067 | 1 | ICPMS7 | 151228−1 |

***Analytical Methods:**

**MS SW846 3005A/6020A**

**METALS**
**−1−**
**INORGANICS ANALYSIS DATA PACKAGE**

**SDG No:** GEL387916 **METHOD TYPE:** SW846

**SAMPLE ID:** 387916002 **CLIENT ID:** B33J82

**CONTRACT:** CPRC0S16012

**MATRIX:** WATER **DATE RECEIVED** 22−DEC−15 **LEVEL:** Low

| CAS No | Analyte | Result | Units | C | Qual | M* | MDL | DF | Inst ID | Analytical Run |
|---|---|---|---|---|---|---|---|---|---|---|
| 7440−61−1 | Uranium | 33 | ug/L | | | MS | 0.067 | 1 | ICPMS7 | 151228−1 |

***Analytical Methods:**

**MS SW846 3005A/6020A**

# Quality Control Summary

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

# QC Summary

**Report Date: January 4, 2016**



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

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

**Workorder:** **387916**

| Parmname | | | NOM | Sample | Qual | QC | Units | RPD/D% | REC% | Range | Anlst | Date | Time |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Metals Analysis - ICPMS** | | | | | | | | | | | | | |
| Batch 1533144 | | | | | | | | | | | | | |
| QC1203458404 | LCS | | | | | | | | | | | | |
| Uranium | | | 50.0 | | | 49.4 | ug/L | | 98.9 | (80%-120%) | SKJ | 12/28/15 | 17:34 |
| QC1203458403 | MB | | | | | | | | | | | | |
| Uranium | | | | | U | 0.067 | ug/L | | | | | 12/28/15 | 17:30 |
| QC1203458405 | 387916001 | MS | | | | | | | | | | | |
| Uranium | | | 50.0 | 10.8 | | 61.8 | ug/L | | 102 | (75%-125%) | | 12/28/15 | 17:50 |
| QC1203458406 | 387916001 | MSD | | | | | | | | | | | |
| Uranium | | | 50.0 | 10.8 | | 60.1 | ug/L | 2.69 | 98.6 | (0%-20%) | | 12/28/15 | 17:54 |
| QC1203458407 | 387916001 | SDILT | | | | | | | | | | | |
| Uranium | | | | 10.8 | D | 2.26 | ug/L | 4.32 | | (0%-10%) | | 12/28/15 | 18:02 |

**Notes:**

The Qualifiers in this report are defined as follows:

| | |
|---|---|
| * | Duplicate analysis not within control limits |
| + | Correlation coefficient for Method of Standard Additions (MSA) is < 0.995 |
| B | The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). |
| C | Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples. |
| D | Results are reported from a diluted aliquot of sample. |
| E | Reported value is estimated due to interferences. See comment in narrative. |
| M | Duplicate precision not met. |
| 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 |

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

# QC Summary

**Workorder:** **387916**



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

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.

# Radiological Analysis

**Radiochemistry**
**Technical Case Narrative**
**CH2MHill Plateau Remediation Company (CPRC)**
**SDG #: GEL387916**
**Work Order #: 387916**

**Method/Analysis Information**

| | |
|---|---|
| **Product:** | **9310_ALPHABETA_GPC: COMMON** |
| Analytical Method: | BETA_GPC |
| Analytical Batch Number: | 1533762 |

| Sample ID | Client ID |
|---|---|
| 387916001 | B33J71 |
| 387916002 | B33J82 |
| 1203459964 | Method Blank (MB) |
| 1203459968 | Laboratory Control Sample (LCS) |
| 1203459965 | 387916002(B33J82) Sample Duplicate (DUP) |
| 1203459966 | 387916002(B33J82) Matrix Spike (MS) |
| 1203459967 | 387916002(B33J82) Matrix Spike Duplicate (MSD) |

Samples 387916 001 and 002 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-RAD-A-001 REV# 18.

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

**Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

**Quality Control (QC) Information:**

**Blank Information**

The blank volume is representative of the sample volume in this batch.

**QC Information**

All of the QC samples met the required acceptance limits.

**Designated QC**
The following sample was used for QC: 387916002 (B33J82).

**Technical Information:**

**Holding Time**
All sample procedures for this sample set were performed within the required holding time.

**Sample Re-prep/Re-analysis**
None of the samples in this sample set required reprep or reanalysis.

**Chemical Recoveries**
All chemical recoveries meet the required acceptance limits for this sample set.

**Gross Alpha/Beta Preparation Information**
High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating.

**Recounts**
None of the samples in this sample set were recounted.

**Miscellaneous Information:**

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

**Sample-Specific MDA/MDC**
The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

**Additional Comments**
The matrix spike and matrix spike duplicate, 1203459966 (B33J82MS) and 1203459967 (B33J82MSD), aliquots were reduced to conserve sample volume.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

| | |
|---|---|
| **Product:** | **TRITIUM_DIST_LSC: COMMON** |
| Analytical Method: | TRITIUM_DIST_LSC |
| Analytical Batch Number: | 1533228 |

| Sample ID | Client ID |
|---|---|

| | |
|---|---|
| 387916001 | B33J71 |
| 387916002 | B33J82 |
| 1203458580 | Method Blank (MB) |
| 1203458583 | Laboratory Control Sample (LCS) |
| 1203458581 | 387916001(B33J71) Sample Duplicate (DUP) |
| 1203458582 | 387916001(B33J71) Matrix Spike (MS) |

Samples 387916 001 and 002 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-RAD-A-002 REV# 21.

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

**Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

**Quality Control (QC) Information:**

**Blank Information**

The blank volume is representative of the sample volume in this batch.

**QC Information**

All of the QC samples met the required acceptance limits.

**Designated QC**

The following sample was used for QC: 387916001 (B33J71).

**Technical Information:**

**Holding Time**

All sample procedures for this sample set were performed within the required holding time.

**Sample Re-prep/Re-analysis**

None of the samples in this sample set required reprep or reanalysis.

**Recounts**

None of the samples in this sample set were recounted.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**

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

**Sample-Specific MDA/MDC**

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Certification Statement**

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

# GEL LABORATORIES LLC

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

## Qualifier Definition Report
for

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL387916 GEL Work Order: 387916

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

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.

**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: Kate Gellatly**

**Date: 31 DEC 2015** **Title: Analyst I**

# Sample Data Summary

**Rad**

## Certificate of Analysis
## Sample Summary

| | | | | | |
|---|---|---|---|---|---|
| **SDG Number:** | **GEL387916** | **Client:** | **CPRC001** | **Project:** | **CPRC0S16012** |
| **Lab Sample ID:** | **387916001** | **Date Collected:** | **12/18/2015 12:58** | **Matrix:** | **WATER** |
| | | **Date Received:** | **12/22/2015 11:40** | | |
| **Client ID:** | **B33J71** | | | **Prep Basis:** | **"As Received"** |
| **Batch ID:** | **1533762** | **Method:** | **BETA_GPC** | **SOP Ref:** | **GL-RAD-A-001** |
| **Run Date:** | **12/29/2015 10:23** | **Analyst:** | **JXB7** | **Instrument:** | **PIC12B** |
| **Data File:** | **AB1533762.xls** | **Aliquot:** | **150 mL** | **Count Time:** | **170 min** |
| **Prep Batch:** | **1533762** | **Prep Method:** | **EPA 900.0/SW846 9310** | | |
| **Prep Date:** | **12/28/2015 14:47** | | | | |

| CAS No. | Parmname | Qual | Result | Units | Uncert | TPU | MDC | RDL |
|---|---|---|---|---|---|---|---|---|
| 12587-46-1 | Alpha<br>*ALPHA* | | 11.8 | pCi/L | +/-3.05 | 3.61 | 2.99 | 3.00 |
| 12587-47-2 | Beta<br>*BETA* | | 27.0 | pCi/L | +/-2.66 | 5.21 | 2.55 | 4.00 |

| Surrogate/Tracer recovery | Result | Nominal | Units | Recovery% | Acceptable Limits |
|---|---|---|---|---|---|

**Comments:**

**TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).**

**Rad**

## Certificate of Analysis
## Sample Summary

| | | | | | |
|---|---|---|---|---|---|
| **SDG Number:** | **GEL387916** | **Client:** | **CPRC001** | **Project:** | **CPRC0S16012** |
| **Lab Sample ID:** | **387916001** | **Date Collected:** | **12/18/2015 12:58** | **Matrix:** | **WATER** |
| | | **Date Received:** | **12/22/2015 11:40** | | |
| **Client ID:** | **B33J71** | | | **Prep Basis:** | **"As Received"** |
| **Batch ID:** | **1533228** | **Method:** | **TRITIUM_DIST_LSC** | **SOP Ref:** | **GL-RAD-A-002** |
| **Run Date:** | **12/28/2015 01:38** | **Analyst:** | **TXJ1** | **Instrument:** | **LSCORANGE** |
| **Data File:** | **T1533228.xls** | **Aliquot:** | **50 mL** | **Count Time:** | **120.0296 min** |
| **Prep Batch:** | **1533228** | **Prep Method:** | **EPA 906.0 Modified** | | |
| **Prep Date:** | **12/24/2015 00:00** | | | | |

| CAS No. | Parmname | Qual | Result | Units | Uncert | TPU | MDC | RDL |
|---|---|---|---|---|---|---|---|---|
| 10028-17-8 | Tritium | | 88.9 | pCi/L | +/-48.4 | 51.4 | 76.3 | 100 |

| Surrogate/Tracer recovery | Result | Nominal | Units | Recovery% | Acceptable Limits |
|---|---|---|---|---|---|

**Comments:**

**TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).**

**Rad**

## Certificate of Analysis
## Sample Summary

| | | | | | |
|---|---|---|---|---|---|
| **SDG Number:** | **GEL387916** | **Client:** | **CPRC001** | **Project:** | **CPRC0S16012** |
| **Lab Sample ID:** | **387916002** | **Date Collected:** | **12/18/2015 13:47** | **Matrix:** | **WATER** |
| | | **Date Received:** | **12/22/2015 11:40** | | |
| **Client ID:** | **B33J82** | | | **Prep Basis:** | **"As Received"** |
| **Batch ID:** | **1533762** | **Method:** | **BETA_GPC** | **SOP Ref:** | **GL-RAD-A-001** |
| **Run Date:** | **12/29/2015 10:23** | **Analyst:** | **JXB7** | **Instrument:** | **PIC12D** |
| **Data File:** | **AB1533762.xls** | **Aliquot:** | **150 mL** | **Count Time:** | **170 min** |
| **Prep Batch:** | **1533762** | **Prep Method:** | **EPA 900.0/SW846 9310** | | |
| **Prep Date:** | **12/28/2015 14:47** | | | | |

| CAS No. | Parmname | Qual | Result | Units | Uncert | TPU | MDC | RDL |
|---|---|---|---|---|---|---|---|---|
| 12587-46-1 | Alpha<br>*ALPHA* | | 54.0 | pCi/L | +/-5.93 | 10.8 | 2.96 | 3.00 |
| 12587-47-2 | Beta<br>*BETA* | | 29.8 | pCi/L | +/-2.72 | 5.91 | 2.41 | 4.00 |

| Surrogate/Tracer recovery | Result | Nominal | Units | Recovery% | Acceptable Limits |
|---|---|---|---|---|---|

**Comments:**

**U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.**
**TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).**

**Rad**

## Certificate of Analysis
## Sample Summary

| | | | | | |
|---|---|---|---|---|---|
| **SDG Number:** | **GEL387916** | **Client:** | **CPRC001** | **Project:** | **CPRC0S16012** |
| **Lab Sample ID:** | **387916002** | **Date Collected:** | **12/18/2015 13:47** | **Matrix:** | **WATER** |
| | | **Date Received:** | **12/22/2015 11:40** | | |
| **Client ID:** | **B33J82** | | | **Prep Basis:** | **"As Received"** |
| **Batch ID:** | **1533228** | **Method:** | **TRITIUM_DIST_LSC** | **SOP Ref:** | **GL-RAD-A-002** |
| **Run Date:** | **12/28/2015 04:56** | **Analyst:** | **TXJ1** | **Instrument:** | **LSCORANGE** |
| **Data File:** | **T1533228.xls** | **Aliquot:** | **50 mL** | **Count Time:** | **120.0297 min** |
| **Prep Batch:** | **1533228** | **Prep Method:** | **EPA 906.0 Modified** | | |
| **Prep Date:** | **12/24/2015 00:00** | | | | |

| CAS No. | Parmname | Qual | Result | Units | Uncert | TPU | MDC | RDL |
|---|---|---|---|---|---|---|---|---|
| 10028-17-8 | Tritium | U | 56.2 | pCi/L | +/-45.6 | 46.9 | 74.8 | 100 |

| Surrogate/Tracer recovery | Result | Nominal | Units | Recovery% | Acceptable Limits |
|---|---|---|---|---|---|

**Comments:**

**U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.**
**TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).**

# Quality Control Data

# GEL LABORATORIES LLC

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

## QC Summary

**Client :** CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352

**Contact:** Mr. Scot Fitzgerald

**Workorder:** 387916

**Report Date: December 31, 2015**


| Parmname | NOM | Sample | Qual | QC | Units | QC Criteria | Range | Analyst | Date Time |
|---|---|---|---|---|---|---|---|---|---|
| **Rad Gas Flow** | | | | | | | | | |
| Batch 1533762 | | | | | | | | | |
| QC1203459964 MB | | | | | | | | | |
| Alpha | | | U | 0.103 | pCi/L | | | JXB7 | 12/29/1510:23 |
| Uncert: | | | | +/-1.06 | | | | | |
| TPU: | | | | +/-1.06 | | | | | |
| Beta | | | U | -1.63 | pCi/L | | | | |
| Uncert: | | | | +/-1.51 | | | | | |
| TPU: | | | | +/-1.51 | | | | | |
| QC1203459965 387916002 DUP | | | | | | | | | |
| Alpha | | 54.0 | | 47.4 | pCi/L | | | | 12/29/1510:24 |
| Uncert: | | +/-5.93 | | +/-6.42 | | RPD: | 13 (0% - 20%) | | |
| TPU: | | +/-10.8 | | +/-10.3 | | RER: | 0.868 (0-2) | | |
| Beta | | 29.8 | | 31.4 | pCi/L | | | | |
| Uncert: | | +/-2.72 | | +/-2.92 | | RPD: | 5 (0% - 20%) | | |
| TPU: | | +/-5.91 | | +/-6.33 | | RER: | 0.365 (0-2) | | |
| QC1203459966 387916002 MS | | | | | | | | | |
| Alpha | 240 | 54.0 | | 370 | pCi/L | REC: | 132 (60%-140%) | | 12/29/1510:13 |
| Uncert: | | +/-5.93 | | +/-35.3 | | | | | |
| TPU: | | +/-10.8 | | +/-69.9 | | | | | |
| Beta | 864 | 29.8 | | 1060 | pCi/L | REC: | 119 (60%-140%) | | |
| Uncert: | | +/-2.72 | | +/-38.0 | | | | | |
| TPU: | | +/-5.91 | | +/-175 | | | | | |
| QC1203459967 387916002 MSD | | | | | | | | | |
| Alpha | 240 | 54.0 | | 377 | pCi/L | REC: | 135 (60%-140%) | | |
| Uncert: | | +/-5.93 | | +/-36.1 | | RPD: | 2 (0%-20%) | | |
| TPU: | | +/-10.8 | | +/-71.6 | | RER: | 0.142 (0-2) | | |
| Beta | 864 | 29.8 | | 1110 | pCi/L | REC: | 125 (60%-140%) | | |
| Uncert: | | +/-2.72 | | +/-39.6 | | RPD: | 5 (0%-20%) | | |
| TPU: | | +/-5.91 | | +/-185 | | RER: | 0.403 (0-2) | | |
| QC1203459968 LCS | | | | | | | | | |
| Alpha | 79.9 | | | 76.7 | pCi/L | REC: | 96 (70%-130%) | | 12/29/1510:13 |
| Uncert: | | | | +/-7.10 | | | | | |
| TPU: | | | | +/-14.4 | | | | | |
| Beta | 288 | | | 332 | pCi/L | REC: | 115 (70%-130%) | | |
| Uncert: | | | | +/-12.1 | | | | | |
| TPU: | | | | +/-55.5 | | | | | |
| **Rad Liquid Scintillation** | | | | | | | | | |
| Batch 1533228 | | | | | | | | | |
| QC1203458580 MB | | | | | | | | | |
| Tritium | | | U | -18.6 | pCi/L | | | TXJ1 | 12/28/1509:22 |
| Uncert: | | | | +/-41.2 | | | | | |
| TPU: | | | | +/-41.2 | | | | | |
| QC1203458581 387916001 DUP | | | | | | | | | |
| Tritium | | 88.9 | U | 55.0 | pCi/L | | | | 12/28/1511:25 |
| Uncert: | | +/-48.4 | | +/-46.5 | | RPD: | 47 (0% - 100%) | | |
| TPU: | | +/-51.4 | | +/-47.7 | | RER: | 0.948 (0-2) | | |

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

# QC Summary

**Workorder:** 387916



| Parmname | NOM | Sample | Qual | QC | Units | QC Criteria | Range | Analyst | Date Time |
|---|---|---|---|---|---|---|---|---|---|
| **Rad Liquid Scintillation** | | | | | | | | | |
| Batch 1533228 | | | | | | | | | |
| QC1203458582 387916001 MS | | | | | | | | | |
| Tritium | 2400 | 88.9 | | 1980 | pCi/L | REC: 79 | (75%-125%) | | 12/28/1513:27 |
| | Uncert: | +/-48.4 | | +/-320 | | | | | |
| | TPU: | +/-51.4 | | +/-499 | | | | | |
| QC1203458583 LCS | | | | | | | | | |
| Tritium | 2400 | | | 2200 | pCi/L | REC: 92 | (70%-130%) | | 12/28/1513:45 |
| | Uncert: | | | +/-328 | | | | | |
| | TPU: | | | +/-537 | | | | | |

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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 |
| A | The TIC is a suspected aldol-condensation product |
| 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). |
| B | The analyte was detected in both the associated QC blank and in the sample. |
| B | The associated QC sample blank has a result >= 2X the MDA and, after corrections, result is >= MDA for this sample |
| C | Analyte has been confirmed by GC/MS analysis |
| C | Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples. |
| D | Results are reported from a diluted aliquot of sample. |
| E | Concentration exceeds the calibration range of the instrument |
| E | Reported value is estimated due to interferences. See comment in narrative. |
| 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 |
| M | Duplicate precision not met. |
| N | Spike Sample recovery is outside control limits. |
| P | Aroclor target analyte with greater than 25% difference between column analyses. |
| S | Reported value determined by the Method of Standard Additions (MSA) |
| 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. |
| UX | Gamma Spectroscopy--Uncertain identification |
| 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 |
| o | Analyte failed to recover within LCS limits (0rganics only) |

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

# QC Summary

**Workorder:** **387916**



| Parmname | NOM | Sample | Qual | QC | Units | QC Criteria | Range | Analyst | Date | Time |
|---|---|---|---|---|---|---|---|---|---|---|

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.
** Indicates analyte is a surrogate compound.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptence 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.
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.