

6/16/2016



a member of **The GEL Group** INC



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June 16, 2016

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

Re: CHPRC SAF I16-021
Work Order: 397964
SDG: GEL397964

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on May 24, 2016. 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,


Brielle Luthman for
Heather Shaffer
Project Manager

Purchase Order: 300071JDBA 7H
Chain of Custody: I16-021-010
Enclosures



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Case Narrative

**General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF I16-021
SDG: GEL397964**

June 16, 2016

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 May 24, 2016, for analysis. The sample was 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 sample:

| Laboratory Identification | Sample Description |
|--------------------------------------|-------------------------------|
| 397964001 | B34XY5 |

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: Radiochemistry.

We certify that 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.

6/16/2016

B. Luthman
Brielle Luthman for
Heather Shaffer
Project Manager

6/16/2016

**Radiochemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL397964
Work Order #: 397964**

TC99_EIE_LSC: COMMON

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

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.

Chain of Custody and Supporting Documentation

65 lbs

C.O.C. #
I16-021-010
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CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

CH2M Hill Plateau Remediation
Company

397964

| | | | | | |
|--|-----------------------|------------------------------|---------------------|---|----------------------|
| Collector | Scott King CHPRC | Contact/Requester | Karen Waters-Husted | Telephone No. | 509-376-4650 |
| SAF No. | I16-021 | Sampling Origin | Hanford Site | Purchase Order/Charge Code | 300071 |
| Project Title | 200 UPL, MAY 2016 | Logbook No. | HNF-N-506 88174 | Ice Chest No. | 6005-536 |
| Shipped To (Lab) | GEL Laboratories, LLC | Method of Shipment | Commercial Carrier | Bill of Lading/Air Bill No. | 776348781124 |
| Protocol | CERCLA | Priority: | 30 Days | Offsite Property No. | 66655 |
| POSSIBLE SAMPLE HAZARDS/REMARKS | | SPECIAL INSTRUCTIONS | | Total Activity Exemption: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> | |
| *** 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 | | N/A Special Handling: N/A | | | |
| Sample No. | Filter | Date | Time | No/Type Container | Sample Analysis |
| B34XY5 | N | MAY 22 2016 | 1107 | 1x500-mL G/P | TC99_EIE_LSC: COMMON |
| | | | | Holding Time | Preservative |
| | | | | 6 Months | HNO3 to pH <2 |

| | | | | | | | | |
|---------------------------------|-------|--|---------------------|--------------------|------------|-----------|------------------|---|
| Relinquished By | Print | Sign | Date/Time | Received By | Print | Sign | Date/Time | Matrix * |
| Scott King CHPRC | | | 1450 MAY 22 2016 | SSU-1 | | | MAY 27 2016 | DS = Drum Solids DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation X = Other |
| Relinquished By | Print | Sign | Date/Time | Received By | Print | Sign | Date/Time | |
| SSU-1 | | | MAY 23 2016 0910 | L.D. Weil CHPRC | R. D. Ward | | MAY 23 2016 0910 | S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air |
| Relinquished By | Print | Sign | Date/Time | Received By | Print | Sign | Date/Time | |
| L.D. Weil CHPRC | | | 1400 MAY 23 2016 | FEDEX | | | MAY 24 2016 0910 | |
| Relinquished By | Print | Sign | Date/Time | Received By | Print | Sign | Date/Time | |
| FEDEX | | | | M. Ferguson | | | | |
| FINAL SAMPLE DISPOSITION | | Disposal Method (e.g., Return to customer, per lab procedure, used in process) | | Disposed By | | Date/Time | | |
| | | | | | | | | |

8 of 21

SAMPLE RECEIPT & REVIEW FORM

| | | | |
|--|---|--|--|
| Client: <u>CPRC</u> | | SDG/AR/COC/Work Order: <u>39796L</u> | |
| Received By: <u>MK</u> | | Date Received: <u>5-24-16</u> | |
| Suspected Hazard Information | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | *If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation. | |
| COC/Samples marked as radioactive? | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> | |
| Classified Radioactive II or III by RSO? | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | If yes, Were swipes taken of sample containers < action levels? | |
| COC/Samples marked containing PCBs? | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | | |
| Package, COC, and/or Samples marked as beryllium or asbestos containing? | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group. | |
| Shipped as a DOT Hazardous? | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | Hazard Class Shipped: UN#: | |
| Samples identified as Foreign Soil? | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | | |

| Sample Receipt Criteria | Yes | NA | No | Comments/Qualifiers (Required for Non-Conforming Items) |
|---|-------------------------------------|--------------------------|--------------------------|--|
| 1 Shipping containers received intact and sealed? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Circle Applicable: Seals broken Damaged container Leaking container Other (describe) |
| 2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?* | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Preservation Method: Ice bags Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius <u>1°C 2°C</u> |
| 2a Daily check performed and passed on IR temperature gun? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Temperature Device Serial #: <u>130462962</u> Secondary Temperature Device Serial # (if Applicable): |
| 3 Chain of custody documents included with shipment? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 4 Sample containers intact and sealed? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Circle Applicable: Seals broken Damaged container Leaking container Other (describe) |
| 5 Samples requiring chemical preservation at proper pH? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Sample ID's, containers affected and observed pH: If Preservation added, Lot#: |
| 6 Do Low Level Perchlorate samples have headspace as required? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Sample ID's and containers affected: |
| 7 VOA vials contain acid preservation? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | (if unknown, select No) |
| 8 VOA vials free of headspace (defined as < 6mm bubble)? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Sample ID's and containers affected: |
| 9 Are Encore containers present? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | (if yes, immediately deliver to Volatiles laboratory) |
| 10 Samples received within holding time? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ID's and tests affected: |
| 11 Sample ID's on COC match ID's on bottles? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Sample ID's and containers affected: |
| 12 Date & time on COC match date & time on bottles? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Sample ID's affected: |
| 13 Number of containers received match number indicated on COC? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Sample ID's affected: |
| 14 Are sample containers identifiable as GEL provided? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 15 COC form is properly signed in relinquished/received sections? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 16 Carrier and tracking number. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Circle Applicable: FedEx Air <u>7763</u> FedEx Ground 4378 UPS 1190 Field Services 14 ^c Courier 14 ^c Other NO ICE 4936 3887 2 ^c 4878 0838 14 ^c NO ICE 4936 8784 1 ^c 4878 1124 14 ^c NO ICE 4936 9313 2 ^c |

Comments (Use Continuation Form if needed):

Data Review Qualifier Definitions

Project Specific Qualifier Definitions for GEL Client Code: CPRC

| Qualifier | Qualifier Definition | Department | Fraction |
|-----------|---|-------------------|---------------|
| U | Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error. | | |
| 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 | Organics | |
| P | Aroclor target analyte with greater than 25% difference between column analyses. | Organics | |
| C | Analyte has been confirmed by GC/MS analysis | Organics | Pesticide |
| B | The analyte was detected in both the associated QC blank and in the sample. | Organics | |
| E | Concentration exceeds the calibration range of the instrument | Organics | |
| A | The TIC is a suspected aldol-condensation product | Organics | Semi-Volatile |
| X | Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier | | |
| N | Spike Sample recovery is outside control limits. | | |
| * | Duplicate analysis not within control limits | Inorganics | |
| > | Result greater than quantifiable range or greater than upper limit of the analysis range | General Chemistry | |
| Z | Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier | | |
| 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). | Inorganics | Metals |
| D | Results are reported from a diluted aliquot of sample. | | |
| E | Reported value is estimated due to interferences. See comment in narrative. | Inorganics | Metals |
| M | Duplicate precision not met. | Inorganics | Metals |
| o | Analyte failed to recover within LCS limits (Organics only) | Organics | |
| S | Reported value determined by the Method of Standard Additions (MSA) | Inorganics | |
| T | Spike and/or spike duplicate sample recovery is outside control limits. | Organics | |
| W | Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency. | Inorganics | |
| B | The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample | Radiological | |
| Y | Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier | | |
| + | Correlation coefficient for Method of Standard Additions (MSA) is < 0.995 | Inorganics | |
| 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). | General Chemistry | |
| C | Target analyte was detected in the sample and the associated blank. The associated blank concentration is \geq EQL or is > 5% of the measured concentration and/or decision level for associated samples. | Inorganics | Metals |
| C | Target analyte was detected in the sample and the associated blank. The associated blank concentration is \geq EQL or is > 5% of the measured concentration and/or decision level for associated samples. | General Chemistry | |
| < | Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide | General Chemistry | |
| UX | Gamma Spectroscopy--Uncertain identification | Radiological | |

Laboratory Certifications

List of current GEL Certifications as of 16 June 2016

| State | Certification |
|--------------------------|------------------------------|
| Alaska | UST-0110 |
| Arkansas | 88-0651 |
| CLIA | 42D0904046 |
| California | 2940 |
| Colorado | SC00012 |
| Connecticut | PH-0169 |
| Delaware | SC00012 |
| DoD ELAP/ ISO17025 A2LA | 2567.01 |
| Florida NELAP | E87156 |
| Foreign Soils Permit | P330-15-00283, P330-15-00253 |
| Georgia | SC00012 |
| Georgia SDWA | 967 |
| Hawaii | SC00012 |
| 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 | LA160006 |
| Maryland | 270 |
| Massachusetts | M-SC012 |
| Michigan | 9976 |
| Mississippi | SC00012 |
| Nebraska | NE-OS-26-13 |
| Nevada | SC000122016-1 |
| New Hampshire NELAP | 205415 |
| 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 | T104704235-16-11 |
| Utah NELAP | SC000122016-20 |
| Vermont | VT87156 |
| Virginia NELAP | 460202 |
| Washington | C780 |
| West Virginia | 997404 |

Radiological Analysis

Case Narrative

**Radiochemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL397964
Work Order #: 397964**

Product: TC99_EIE_LSC: COMMON
Analytical Method: TC99_EIE_LSC
Analytical Procedure: GL-RAD-A-059 REV# 4
Analytical Batch: 1570103

The following samples were analyzed using the above methods and analytical procedure(s).

| <u>GEL Sample ID#</u> | <u>Client Sample Identification</u> |
|------------------------------|--|
| 397964001 | B34XY5 |
| 1203555835 | Method Blank (MB) |
| 1203555836 | 397964001(B34XY5) Sample Duplicate (DUP) |
| 1203555837 | Laboratory Control Sample (LCS) |

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

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

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: GEL397964 GEL Work Order: 397964

The Qualifiers in this report are defined as follows:

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

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: 16 JUN 2016

Title: Analyst I

Sample Data Summary

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL397964
 Lab Sample ID: 397964001

Client: CPRC001
 Date Collected: 05/22/2016 11:07
 Date Received: 05/24/2016 09:10

Project: CPRC0116021
 Matrix: WATER

Client ID: B34XY5
 Batch ID: 1570103
 Run Date: 05/31/2016 06:16
 Data File: E1570103.xls
 Prep Batch: 1570103
 Prep Date: 05/27/2016 06:42

Method: TC99_EIE_LSC
 Analyst: MYM1
 Aliquot: 100 mL
 Prep Method: DOE EML HASL-300, Tc-02-

Prep Basis: "As Received"
 SOP Ref: GL-RAD-A-059
 Instrument: LSCRED
 Count Time: 20 min

| CAS No. | Parmname | Qual | Result | Units | Uncert | TPU | MDC | RDL |
|------------|---------------|------|--------|-------|---------|------|------|------|
| 14133-76-7 | Technetium-99 | | 490 | pCi/L | +/-34.9 | 64.6 | 37.1 | 50.0 |

| Surrogate/Tracer recovery | Result | Nominal | Units | Recovery% | Acceptable Limits |
|---------------------------|--------|---------|-------|-----------|-------------------|
| Technetium-99m Tracer | 77200 | 76200 | CPM | 101 | (30%-105%) |

Comments:

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

The MDC is a sample specific MDC.

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: June 16, 2016

Page 1 of 1

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

Contact: Mr. Scot Fitzgerald

Workorder: 397964

| Parmname | NOM | Sample | Qual | QC | Units | QC Criteria | Range | Analyst | Date | Time |
|---------------------------------|-----------|--------|------|-----------------|-------|-------------|------------|---------|---------------|------|
| Rad Liquid Scintillation | | | | | | | | | | |
| Batch | 1570103 | | | | | | | | | |
| QC1203555835 | MB | | | | | | | | | |
| Technetium-99 | | | U | -20.6 | pCi/L | | | MYM1 | 05/31/1608:49 | |
| | | | | Uncert: +/-21.8 | | | | | | |
| | | | | TPU: +/-21.8 | | | | | | |
| **Technetium-99m Tracer | 76200 | | | 72900 | CPM | REC: 96 | (30%-105%) | | | |
| QC1203555836 | 397964001 | DUP | | | | | | | | |
| Technetium-99 | | 490 | | 506 | pCi/L | | | | 05/31/1609:11 | |
| | | | | Uncert: +/-34.9 | | RPD: 3 | (0% - 20%) | | | |
| | | | | TPU: +/-64.6 | | RER: 0.343 | (0-2) | | | |
| **Technetium-99m Tracer | 76200 | 77200 | | 73900 | CPM | REC: 97 | (30%-105%) | | | |
| QC1203555837 | LCS | | | | | | | | | |
| Technetium-99 | 861 | | | 880 | pCi/L | REC: 102 | (80%-120%) | | 05/31/1609:33 | |
| | | | | Uncert: +/-43.9 | | | | | | |
| | | | | TPU: +/-107 | | | | | | |
| **Technetium-99m Tracer | 76200 | | | 74000 | CPM | REC: 97 | (30%-105%) | | | |

Notes:

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

The Qualifiers in this report are defined as follows:

- B The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample
- 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.
- UX Gamma Spectroscopy--Uncertain identification
- 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.

** Indicates analyte is a surrogate compound.

^ 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.

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.