



August 02, 2017

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

Re: CHPRC SAF F17-038  
Work Order: 428313  
SDG: GEL428313

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on July 20, 2017. 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  
Project Manager

Purchase Order: 304528 - 8C  
Chain of Custody: F17-038-039 and F17-038-040  
Enclosures



## Table of Contents

|  |    |
|--|----|
| Case Narrative.....                                | 1  |
| Chain of Custody and Supporting Documentation..... | 10 |
| Data Review Qualifier Definitions.....             | 14 |
| Laboratory Certifications.....                     | 16 |
| Metals Analysis.....                               | 18 |
| Case Narrative.....                                | 19 |
| Sample Data Summary.....                           | 24 |
| Quality Control Summary.....                       | 26 |
| General Chem Analysis.....                         | 36 |
| Case Narrative.....                                | 37 |
| Sample Data Summary.....                           | 43 |
| Quality Control Summary.....                       | 46 |
| Radiological Analysis.....                         | 52 |
| Case Narrative.....                                | 53 |
| Sample Data Summary.....                           | 62 |
| Quality Control Summary.....                       | 74 |

# Case Narrative

**General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF F17-038  
SDG: GEL428313**

**August 02, 2017**

**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 July 20, 2017, 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.

**Sample Identification**

The laboratory received the following samples:

| <b>Laboratory<br/>Identification</b> | <b>Sample<br/>Description</b> |
|--------------------------------------|-------------------------------|
| 428313001                            | B3BBH9                        |
| 428313002                            | B3BBJ0                        |

**Case Narrative**

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

**Data Package**

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: General Chemistry, Metals and 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.

08/03/2017

REV.0

*Heather Shaffer*

Heather Shaffer  
Project Manager

**Technical Case Narrative**  
**CH2M Hill Plateau Remediation Company (CPRC)**  
**SDG #: GEL428313**  
**Work Order #: 428313**

## Metals

### **Determination of Metals by ICP**

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, with the following exceptions.

### Calibration Information

#### **CRDL/PQL Requirements**

The PQL standard recoveries for SW846 6010C or 6010D met the control limits with the exception of sodium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 428313002 (B3BBJ0).

### Quality Control (QC) Information

#### **Method Blank (MB) Statement**

The samples in this SDG contained analytes at concentrations more than ten times the amount present in the method blank, therefore the data was not adversely affected.

| Sample          | Analyte | Value                     |
|-----------------|---------|---------------------------|
| 1203834864 (MB) | Calcium | 10900 betw (7950 - 12400) |

The method blanks (MB) analyzed with this SDG met the acceptance criteria. However, where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data.

| Sample          | Analyte | Value                     |
|-----------------|---------|---------------------------|
| 1203834864 (MB) | Sodium  | 10000 betw (6960 - 12400) |

#### **Matrix Spike (MS/MSD) Recovery Statement**

The MS/MSD (See Below) did not meet the recommended quality control acceptance criteria for percent recoveries for the following applicable analytes. The post spike recoveries were within the required control limits. This verifies the absence of a matrix interference in the post-spike digested sample. The recoveries may be attributed to possible sample matrix interference and/or non-homogeneity.

| Sample                | Analyte   | Value           |
|-----------------------|-----------|-----------------|
| 1203834867 (B3BBJ0MS) | Barium    | 138* (75%-125%) |
|                       | Manganese | 180* (75%-125%) |
|                       | Potassium | 134* (75%-125%) |

**Duplicate Relative Percent Difference (RPD) Statement**

Not all the applicable analyte RPD values were within the acceptance criteria.

| Sample                 | Analyte   | Value          |
|------------------------|-----------|----------------|
| 1203834866 (B3BBJ0DUP) | Chromium  | 38.1* (0%-35%) |
|                        | Potassium | 55.4* (0%-35%) |
|                        | Sodium    | 56.7* (0%-35%) |

**Determination of Metals by ICP-MS**

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, with the following exceptions.

**Quality Control (QC) Information****Duplicate Relative Percent Difference (RPD) Statement**

Not all the applicable analyte RPD values were within the acceptance criteria.

| Sample                 | Analyte | Value                            |
|------------------------|---------|----------------------------------|
| 1203834889 (B3BBJ0DUP) | Arsenic | abs(3230 - 679)* (+/-1030 ug/kg) |

**Technical Information****Sample Dilutions**

The ICPMS solid samples in this SDG were diluted the standard two times.

|            |        |
|------------|--------|
| Analyte    | 428313 |
|            | 002    |
| Arsenic    | 2X     |
| Molybdenum | 2X     |
| Selenium   | 2X     |

**Mercury Analysis Using the Perkin Elmer Automated Mercury Analyzer**

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.

## **General Chemistry**

### **Cyanide, Total**

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, with the following exceptions.

### **Technical Information**

#### **Sample Dilutions**

The following sample 1203834033 (LCS) was diluted because target analyte concentrations exceeded the calibration range.

### **Ion Chromatography**

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, with the following exceptions.

### **Miscellaneous Information**

#### **Manual Integrations**

Samples 1203838988 (LCS) and 1203838990 (B3BBJ4MS) were manually integrated to correctly position the baseline as set in the calibration standards.

### **Ammonia Nitrogen**

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, with the following exceptions.

### **Quality Control (QC) Information**

#### **Method Blank (MB) Statement**

The MB 1203834002 (MB) analyzed with this SDG met the acceptance criteria. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data.

### **Technical Information**

#### **Sample Re-analysis**

Samples 1203834002 (MB) and 1203834003 (LCS) were re-analyzed due to (its) proximity to an overrange sample. The results from the reanalysis are reported.

### **Hexavalent Chromium**

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.

## **Radiochemistry**

### **AMCMISO\_EIE\_PRECIP\_AEA: COMMON**

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, with the following exceptions.

#### **Technical Information**

##### **Recounts**

Sample 1203835458 (LCS) was recounted due to low recovery. The recount is reported.

#### **Miscellaneous Information**

##### **Manual Integration**

Manual integration of alpha spectroscopy spectra 1203835458 (LCS) was performed to fully separate counts in Regions of Interest which would have been biased.

### **NP237\_IE\_PRECIP\_AEA: COMMON**

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, with the following exceptions.

#### **Technical Information**

##### **Recounts**

Sample 1203835459 (MB) was recounted due to high carrier/tracer yield. The recount is reported.

### **PUISO\_PRECIP\_AEA: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.

### **UIISO\_IE\_PRECIP\_AEA: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.

### **Dry Weight**

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.

### **Dry Weight**

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.

### **GAMMA\_GS: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.

### **SRTOT\_SEP\_PRECIP\_GPC: COMMON**

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, with the following exceptions.

#### **Quality Control (QC) Information**

##### **QC Information**

The sample and the duplicate, 1203835310 (B3BBH5DUP), did not meet the relative error ratio requirement; however both results are less than their respective MDCs.

### **TC99\_SEP\_GPC**

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, with the following exceptions.

**Technical Information****Recounts**

Sample 1203836937 (LCS) was recounted due to low recovery. The recount is reported.

**NI63\_LSC**

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.

**TRITIUM\_DIST\_LSC: COMMON**

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, with the following exceptions.

**Technical Information****Recounts**

Samples were recounted due to high MDCs and low recovery. Recounts are reported.

**Miscellaneous Information****Additional Comments**

The matrix spike, 1203837770 (B3BBH9MS), aliquot was reduced to conserve sample volume.

**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**

**CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**

CH2MHill Plateau Remediation Company  
 COLLECTOR: Jeff Tuckesen, CHPRC  
 COMPANY CONTACT: LYNCH, SA (373-5586)  
 PROJECT COORDINATOR: LYNCH, SA  
 PROJECT DESIGNATION: 200-EA-1 OPPORTUNISTIC SAMPLING AT C9617 - SOIL  
 TELEPHONE NO.: 373-5586  
 SAF NO.: F17-038  
 PRICE CODE: 8C  
 AIR QUALITY:   
 TURNAROUND: 15 Days / 15 Days  
 ICE CHEST NO.: BLOS-415  
 FIELD LOGBOOK NO.: HNF-N-495-12  
 ACTUAL SAMPLE DEPTH: 252 7' - 254 2'  
 COA: 304528  
 METHOD OF SHIPMENT: FEDERAL EXPRESS  
 ORIGINAL

SHIPMENT TO: GEL Laboratories, LLC  
 OFFSITE PROPERTY NO.: 8202  
 BILL OF LADING/AIR BILL NO.: 1796 8757 8097

428313

| MATRIX*   | POSSIBLE SAMPLE HAZARDS/ REMARKS   | PRESERVATION | HOLDING TIME | TYPE OF CONTAINER | NO. OF CONTAINER(S) | VOLUME | SAMPLE ANALYSIS                      | SAMPLE DATE | SAMPLE TIME | DATE/TIME   |
|---|--|--------------|--------------|-------------------|---------------------|--------|--------------------------------------|-------------|-------------|-------------|
| A=Air<br>DL=Drum<br>L=Liquid<br>O=Oil<br>S=Soil<br>SE=Sediment<br>T=Tissue<br>V=Vegetation<br>W=Water<br>WI=Wipe<br>X=Other | *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. | None         | 6 Months     | G/P               | 1                   | 125mL  | GAMMA, GS: COMMON;                   | JUL 10 2017 | 1025        | JUL 19 2017 |
|   |  | None         | 30 Days      | G/P               | 1                   | 60mL   | 7196 CRG: COMMON;                    |             |             | JUL 19 2017 |
|   |  | None         | 6 Months     | G/P               | 1                   | 60mL   | SEE ITEM (1) IN SPECIAL INSTRUCTIONS |             |             | JUL 19 2017 |
|   |  | None         | 6 Months     | G/P               | 1                   | 60mL   | SEE ITEM (2) IN SPECIAL INSTRUCTIONS |             |             | JUL 19 2017 |

**CHAIN OF POSSESSION**

**SIGN/ PRINT NAMES**

RELINQUISHED BY/REMOVED FROM: Jeff Tuckesen, CHPRC  
 DATE/TIME: JUL 19 2017 1130  
 RECEIVED BY/STORED IN: Frank Haag, CHPRC  
 DATE/TIME: JUL 19 2017 1130

RELINQUISHED BY/REMOVED FROM: Frank Haag, CHPRC  
 DATE/TIME: JUL 19 2017 1400  
 RECEIVED BY/STORED IN: [Signature]  
 DATE/TIME: [Signature]

RELINQUISHED BY/REMOVED FROM: [Signature]  
 DATE/TIME: [Signature]

**SPECIAL INSTRUCTIONS**  
 TRVL-17-159:\*\* Analyses are listed in order of priority if reduced sample volume is collected  
 (1) AMCMISO\_IE\_PRECIP\_AEA: COMMON; NP237\_IE\_PRECIP\_AEA: COMMON; PUIISO\_IE\_PRECIP\_AEA: COMMON; UIISO\_IE\_PRECIP\_AEA: COMMON; TRITIUM\_DIST\_LSC: COMMON;  
 (2) TC99\_SEP\_GPC: COMMON; NI63\_LSC: COMMON; SRTOT\_SEP\_PRECIP\_GPC: COMMON;

9:10am

**LABORATORY SECTION** RECEIVED BY: [Signature] DATE/TIME: [Signature]

**FINAL SAMPLE DISPOSITION** DISPOSAL METHOD: [Signature] DATE/TIME: [Signature]

PRINTED ON 6/29/2017 FSR ID = FSR46070 TRVL NUM = TRVL-17-159 A-6003-618 (REV 2)

**CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**

CH2M Hill Plateau Remediation Company  
 COLLECTOR Jeff Tuckesen  
 CHPRC

COMPANY CONTACT LYNCH, SA  
 TELEPHONE NO. 373-5586

PROJECT COORDINATOR LYNCH, SA

PRICE CODE 8C  
 AIR QUALITY

SAF NO. F17-038  
 COA 304528

PROJECT DESIGNATION 200-EA-1 OPPORTUNISTIC SAMPLING AT C9617 - SOIL

FIELD LOGBOOK NO. HNF-N-645-12  
 ACTUAL SAMPLE DEPTH 25.7' - 254.2'

ICE CHEST NO. 645-415  
 OFFSITE PROPERTY NO. 8202

METHOD OF SHIPMENT FEDERAL EXPRESS  
**ORIGINAL**

BILL OF LADING/AIR BILL NO. 77916 8757 8697

428313

| MATRIX*   | POSSIBLE SAMPLE HAZARDS/ REMARKS  | PRESERVATION      | HOLDING TIME     | TYPE OF CONTAINER | NO. OF CONTAINER(S) | VOLUME | SAMPLE ANALYSIS                      | SAMPLE DATE | SAMPLE TIME | DATE/TIME        |
|---|---|-------------------|------------------|-------------------|---------------------|--------|--------------------------------------|-------------|-------------|------------------|
| A=Air<br>DL=Drum<br>Liquids<br>DS=Drum<br>Solids<br>L=Liquid<br>O=Oil<br>S=Soil<br>SE=Sediment<br>T=Tissue<br>V=Vegetation<br>W=Water<br>WI=Wipe<br>X=Other | *Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1. | Cool <-6C<br>None | 28 Days/48 Hours | G/P               | 1                   | 125mL  | SEE ITEM (1) IN SPECIAL INSTRUCTIONS | JUL 19 2017 | 1025        | JUL 19 2017 1130 |
| B3BBJ0  | SPECIAL HANDLING AND/OR STORAGE<br>N/A  |                   |                  |                   |                     |        |                                      |             |             | JUL 19 2017 1130 |

| CHAIN OF POSSESSION                        | SIGN/ PRINT NAMES                   | DATE/TIME        | DATE/TIME        |
|--|-------------------------------------|------------------|------------------|
| RELINQUISHED BY/REMOVED FROM<br>CHPRC      | RECEIVED BY/STORED IN<br>Frank Hall | JUL 19 2017 1130 | JUL 19 2017 1130 |
| RELINQUISHED BY/REMOVED FROM<br>Frank Hall | RECEIVED BY/STORED IN<br>FEDEX      | JUL 19 2017 1400 | JUL 19 2017 1400 |
| RELINQUISHED BY/REMOVED FROM<br>CHPRC      | RECEIVED BY/STORED IN<br>Christie   | JUL 19 2017      | JUL 19 2017      |
| RELINQUISHED BY/REMOVED FROM               | RECEIVED BY/STORED IN               |                  |                  |
| RELINQUISHED BY/REMOVED FROM               | RECEIVED BY/STORED IN               |                  |                  |
| RELINQUISHED BY/REMOVED FROM               | RECEIVED BY/STORED IN               |                  |                  |
| RELINQUISHED BY/REMOVED FROM               | RECEIVED BY/STORED IN               |                  |                  |

**SPECIAL INSTRUCTIONS**  
 TRVL-17-159,\*\* Analyses are listed in order of priority if reduced sample volume is collected  
 (1) 300.0\_ANIONS\_IC: COMMON; 300.0\_ANIONS\_IC: COMMON (Add-on); 9012\_CYANIDE (TOTAL): COMMON; 350.1\_AMMONIA: COMMON;  
 6010\_MERCURY\_CV: COMMON (SOLIDS); 6010\_METALS\_ICP: COMMON {Antimony, Barium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Magnesium, Manganese, Nickel, Potassium, Silver, Sodium, Vanadium, Zinc}; 6010\_METALS\_ICP: COMMON (Add-on) {Beryllium, Lead}; 6020\_METALS\_ICPMS: COMMON {Molybdenum, Selenium}; 6020\_METALS\_ICPMS: COMMON (Add-on) {Arsenic};



SAMPLE RECEIPT & REVIEW FORM

Client: CPRC SDG/AR/COC/Work Order: 428313

Received By: Chester Gaines Date Received: July 20, 2017

Carrier and Tracking Number  
Circle Applicable:  
FedEx Express FedEx Ground UPS Field Services Courier Other  
7796 8266 5036 → 2°C 7796 8266 5209 → 3°C  
7796 8266 5080 → 2°C 7796 8434 6572 → 3°C  
7796 8266 5378 → 4°C 7796 8757 8697 → 4°C

Suspected Hazard Information Yes No   \*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.

Shipped as a DOT Hazardous?   Hazard Class Shipped: UN#:

COC/Samples marked or classified as radioactive?   Maximum Net Counts Observed\* (Observed Counts - Area Background Counts): 0 CPM mR/Hr  
Classified as: Rad 1 Rad 2 Rad 3

Is package, COC, and/or Samples marked HAZ?   If yes, select Hazards below, and contact the GEL Safety Group.  
PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:

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 Chain of custody documents included with shipment?

3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?\*    Preservation Method: Wet Ice Ice Packs Dry Ice None Other:  
\*all temperatures are recorded in Celsius TEMP: SEE ABOVE  
↓ BELOW

4 Daily check performed and passed on IR temperature gun?    Temperature Device Serial #: IRI-17  
Secondary Temperature Device Serial # (if Applicable):

5 Sample containers intact and sealed?    Circle Applicable: Seals broken Damaged container Leaking container Other (describe)

6 Samples requiring chemical preservation at proper pH?    Sample ID's and Containers Affected:  
If Preservation added, Lot#:

7 Do any samples require Volatile Analysis?    If Yes, Are Encores or Soil Kits present? Yes \_\_\_ No X (If yes, take to VOA Freezer)  
Do VOA vials contain acid preservation? Yes X No \_\_\_ N/A (If unknown, select No)  
VOA vials free of headspace? Yes X No \_\_\_ N/A  
Sample ID's and containers affected:

8 Samples received within holding time?    ID's and tests affected:

9 Sample ID's on COC match ID's on bottles?    Sample ID's and containers affected:

10 Date & time on COC match date & time on bottles?    Sample ID's affected:

11 Number of containers received match number indicated on COC?    Sample ID's affected:

12 Are sample containers identifiable as GEL provided?

13 COC form is properly signed in relinquished/received sections?

Comments (Use Continuation Form if needed):  
7796 8434 6767 → 3°C

PM (or PMA) review: Initials DS Date 7/20/17 Page 1 of 1

# **Data Review Qualifier Definitions**

## GEL LABORATORIES LLC

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

Report Date: 02-AUG-17

## 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 02 August 2017

| 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           | LA170010                     |
| Maryland                 | 270                          |
| Massachusetts            | M-SC012                      |
| Michigan                 | 9976                         |
| Mississippi              | SC00012                      |
| Nebraska                 | NE-OS-26-13                  |
| Nevada                   | SC000122018-1                |
| 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              | T104704235-17-12             |
| Utah NELAP               | SC000122017-23               |
| Vermont                  | VT87156                      |
| Virginia NELAP           | 460202                       |
| Washington               | C780                         |
| West Virginia            | 997404                       |

# Metals Analysis

# Case Narrative

**Metals**  
**Technical Case Narrative**  
**CH2MHill Plateau Remediation Company (CPRC)**  
**SDG #: GEL428313**  
**Work Order #: 428313**

**Product: Determination of Metals by ICP****Analytical Method:** SW846 3050B/6010D**Analytical Procedure:** GL-MA-E-013 REV# 28**Analytical Batch:** 1683869**Product: Determination of Metals by ICP-MS****Analytical Method:** SW846 3050B/6020B**Analytical Procedure:** GL-MA-E-014 REV# 30**Analytical Batch:** 1683875**Product: Mercury Analysis Using the Perkin Elmer Automated Mercury Analyzer****Analytical Method:** 7471\_HG\_CVAA**Analytical Procedure:** GL-MA-E-010 REV# 34**Analytical Batch:** 1684344**Preparation Method:** SW846 3050B**Preparation Procedure:** GL-MA-E-009 REV# 26**Preparation Batches:** 1683868 and 1683874**Preparation Method:** SW846 7471B Prep**Preparation Procedure:** GL-MA-E-010 REV# 34**Preparation Batch:** 1684333

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

| <b><u>GEL Sample ID#</u></b> | <b><u>Client Sample Identification</u></b> |
|------------------------------|--|
| 428313002                    | B3BBJ0                                     |
| 1203834864                   | Method Blank (MB) <b>ICP</b>               |
| 1203834865                   | Laboratory Control Sample (LCS)            |
| 1203834868                   | 428313002(B3BBJ0L) Serial Dilution (SD)    |
| 1203834866                   | 428313002(B3BBJ0D) Sample Duplicate (DUP)  |
| 1203834867                   | 428313002(B3BBJ0S) Matrix Spike (MS)       |
| 1203835796                   | 428313002(B3BBJ0PS) Post Spike (PS)        |
| 1203834887                   | Method Blank (MB) <b>ICP-MS</b>            |
| 1203834888                   | Laboratory Control Sample (LCS)            |
| 1203834891                   | 428313002(B3BBJ0L) Serial Dilution (SD)    |
| 1203834889                   | 428313002(B3BBJ0D) Sample Duplicate (DUP)  |
| 1203834890                   | 428313002(B3BBJ0S) Matrix Spike (MS)       |
| 1203836044                   | Method Blank (MB) <b>CVAA</b>              |
| 1203836045                   | Laboratory Control Sample (LCS)            |
| 1203836048                   | 428197003(B3BBH2L) Serial Dilution (SD)    |
| 1203836046                   | 428197003(B3BBH2D) Sample Duplicate (DUP)  |
| 1203836047                   | 428197003(B3BBH2S) Matrix Spike (MS)       |

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

**Data Summary:**

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, with the following exceptions.

**Calibration Information****CRDL/PQL Requirements**

The PQL standard recoveries for SW846 6010C or 6010D met the control limits with the exception of sodium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 428313002 (B3BBJ0)-ICP.

**ICSA/ICSAB Statement**

For the ICP-MS analysis, the ICSA solution contains analyte concentrations which are verified trace impurities indigenous to the purchased standard.

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

The samples in this SDG contained analytes at concentrations more than ten times the amount present in the method blank, therefore the data was not adversely affected.

| Sample          | Analyte | Value                     |
|-----------------|---------|---------------------------|
| 1203834864 (MB) | Calcium | 10900 betw (7950 - 12400) |

The method blanks (MB) analyzed with this SDG met the acceptance criteria. However, where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data.

| Sample          | Analyte | Value                     |
|-----------------|---------|---------------------------|
| 1203834864 (MB) | Sodium  | 10000 betw (6960 - 12400) |

**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 MS/MSD (See Below) did not meet the recommended quality control acceptance criteria for percent recoveries for the following applicable analytes. The post spike recoveries were within the required control limits. This verifies the absence of a matrix interference in the post-spike digested sample. The recoveries may be attributed to possible sample matrix interference and/or non-homogeneity.

| Sample                | Analyte   | Value           |
|-----------------------|-----------|-----------------|
| 1203834867 (B3BBJ0MS) | Barium    | 138* (75%-125%) |
|                       | Manganese | 180* (75%-125%) |
|                       | Potassium | 134* (75%-125%) |

**Duplicate Relative Percent Difference (RPD) Statement**

The RPD obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required reporting limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control of +/-RL is used to evaluate the DUP results. Not all the applicable

analyte RPD values were within the acceptance criteria.

| Sample                 | Analyte   | Value                            |
|------------------------|-----------|----------------------------------|
| 1203834866 (B3BBJ0DUP) | Chromium  | 38.1* (0%-35%)                   |
|                        | Potassium | 55.4* (0%-35%)                   |
|                        | Sodium    | 56.7* (0%-35%)                   |
| 1203834889 (B3BBJ0DUP) | Arsenic   | abs(3230 - 679)* (+/-1030 ug/kg) |

### **Technical Information**

#### **Preparation/Analytical Method Verification**

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

#### **Sample Dilutions**

Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range. The ICPMS solid samples in this SDG were diluted the standard two times. ICP-MS.

|            |        |
|------------|--------|
| Analyte    | 428313 |
|            | 002    |
| Arsenic    | 2X     |
| Molybdenum | 2X     |
| Selenium   | 2X     |

### **Certification Statement**

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

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**Qualifier Definition Report  
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL428313 GEL Work Order: 428313

**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.
- 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: Nik-Cole Elmore****Date: 03 AUG 2017****Title: Data Validator**

# Sample Data Summary

**METALS**  
-1-  
**INORGANICS ANALYSIS DATA PACKAGE**

**SDG No:** GEL428313

**CONTRACT:** CPRC0F17038

**METHOD TYPE:** SW846

**SAMPLE ID:**428313002

**BASIS:** Dry Weight

**DATE COLLECTED** 19-JUL-17

**CLIENT ID:** B3BBJ0

**LEVEL:** Low

**DATE RECEIVED** 20-JUL-17

**MATRIX:** SOIL

**%SOLIDS:** 94.5

| CAS No.   | Analyte    | Result  | Units | Qual | MDL  | PQL   | CRDL  | DF | M* | Analyst | Run Date       | Analytical Run | Analytical Batch |
|-----------|------------|---------|-------|------|------|-------|-------|----|----|---------|----------------|----------------|------------------|
| 7440-36-0 | Antimony   | 482     | ug/kg | B    | 334  | 1010  | 1010  | 1  | P  | HSC     | 07/21/17 17:10 | 072117A-2      | 1683869          |
| 7440-38-2 | Arsenic    | 679     | ug/kg | BD*  | 327  | 967   | 967   | 2  | MS | BAJ     | 07/26/17 19:14 | 170726-3       | 1683875          |
| 7440-39-3 | Barium     | 39600   | ug/kg | N    | 101  | 506   | 506   | 1  | P  | HSC     | 07/21/17 17:10 | 072117A-2      | 1683869          |
| 7440-41-7 | Beryllium  | 344     | ug/kg | B    | 101  | 506   | 506   | 1  | P  | HSC     | 07/21/17 17:10 | 072117A-2      | 1683869          |
| 7440-43-9 | Cadmium    | 149     | ug/kg | B    | 101  | 506   | 506   | 1  | P  | HSC     | 07/21/17 17:10 | 072117A-2      | 1683869          |
| 7440-70-2 | Calcium    | 4320000 | ug/kg |      | 8090 | 25300 | 25300 | 1  | P  | HSC     | 07/25/17 13:28 | 072517-1       | 1683869          |
| 7440-47-3 | Chromium   | 6150    | ug/kg | *    | 152  | 506   | 506   | 1  | P  | HSC     | 07/21/17 17:10 | 072117A-2      | 1683869          |
| 7440-48-4 | Cobalt     | 3630    | ug/kg |      | 152  | 506   | 506   | 1  | P  | HSC     | 07/21/17 17:10 | 072117A-2      | 1683869          |
| 7440-50-8 | Copper     | 8020    | ug/kg |      | 304  | 1010  | 1010  | 1  | P  | HSC     | 07/21/17 17:10 | 072117A-2      | 1683869          |
| 7439-89-6 | Iron       | 9420000 | ug/kg |      | 8090 | 25300 | 25300 | 1  | P  | HSC     | 07/21/17 17:10 | 072117A-2      | 1683869          |
| 7439-92-1 | Lead       | 334     | ug/kg | U    | 334  | 1010  | 1010  | 1  | P  | HSC     | 07/21/17 17:10 | 072117A-2      | 1683869          |
| 7439-95-4 | Magnesium  | 2580000 | ug/kg |      | 8600 | 30400 | 30400 | 1  | P  | HSC     | 07/25/17 13:28 | 072517-1       | 1683869          |
| 7439-96-5 | Manganese  | 133000  | ug/kg | N    | 202  | 1010  | 1010  | 1  | P  | HSC     | 07/21/17 17:10 | 072117A-2      | 1683869          |
| 7439-97-6 | Mercury    | 4.14    | ug/kg | U    | 4.14 | 12.4  | 12.4  | 1  | AV | MTM1    | 07/24/17 10:31 | 072417S1-6     | 1684344          |
| 7439-98-7 | Molybdenum | 351     | ug/kg | D    | 77.4 | 193   | 193   | 2  | MS | BAJ     | 07/26/17 19:14 | 170726-3       | 1683875          |
| 7440-02-0 | Nickel     | 4610    | ug/kg |      | 152  | 506   | 506   | 1  | P  | HSC     | 07/21/17 17:10 | 072117A-2      | 1683869          |
| 7440-09-7 | Potassium  | 469000  | ug/kg | *N   | 6480 | 25300 | 25300 | 1  | P  | HSC     | 07/25/17 13:28 | 072517-1       | 1683869          |
| 7782-49-2 | Selenium   | 348     | ug/kg | UD   | 348  | 967   | 967   | 2  | MS | BAJ     | 07/27/17 09:09 | 170726-5       | 1683875          |
| 7440-22-4 | Silver     | 101     | ug/kg | U    | 101  | 506   | 506   | 1  | P  | HSC     | 07/21/17 17:10 | 072117A-2      | 1683869          |
| 7440-23-5 | Sodium     | 467000  | ug/kg | *    | 7080 | 25300 | 25300 | 1  | P  | HSC     | 07/25/17 13:28 | 072517-1       | 1683869          |
| 7440-62-2 | Vanadium   | 21800   | ug/kg |      | 101  | 506   | 506   | 1  | P  | HSC     | 07/21/17 17:10 | 072117A-2      | 1683869          |
| 7440-66-6 | Zinc       | 16500   | ug/kg |      | 405  | 1010  | 1010  | 1  | P  | HSC     | 07/21/17 17:10 | 072117A-2      | 1683869          |

**Prep Information:**

| Analytical Batch | Prep Batch | Prep Method      | Initial wt./vol. | Units | Final wt./vol. | Units | Date     | Analyst |
|------------------|------------|------------------|------------------|-------|----------------|-------|----------|---------|
| 1683869          | 1683868    | SW846 3050B      | 0.523            | g     | 50             | mL    | 07/20/17 | JXM8    |
| 1683875          | 1683874    | SW846 3050B      | 0.547            | g     | 50             | mL    | 07/20/17 | SXW1    |
| 1684344          | 1684333    | SW846 7471B Prep | 0.514            | g     | 30             | mL    | 07/21/17 | AXS5    |

**\*Analytical Methods:**

AV      **SW846 7471B**  
 P        **SW846 3050B/6010D**  
 MS      **SW846 3050B/6020B**

# Quality Control Summary

**GEL LABORATORIES LLC**

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**QC Summary**

Report Date: August 3, 2017

Page 1 of 9

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 428313

| Parmname                       | NOM       | Sample | Qual | QC   | Units | RPD/D% | REC% | Range      | Anlst      | Date     | Time  |
|--------------------------------|-----------|--------|------|------|-------|--------|------|------------|------------|----------|-------|
| <b>Metals Analysis - ICPMS</b> |           |        |      |      |       |        |      |            |            |          |       |
| Batch                          | 1683875   |        |      |      |       |        |      |            |            |          |       |
| QC1203834889                   | 428313002 | DUP    |      |      |       |        |      |            |            |          |       |
| Arsenic                        | *BD       | 679    | *D   | 3230 | ug/kg | 131*^  |      | (+/-1030)  | BAJ        | 07/26/17 | 19:17 |
| Molybdenum                     | D         | 351    | BD   | 194  | ug/kg | 57.7 ^ |      | (+/-206)   |            |          |       |
| Selenium                       | DU        | 348    | DU   | 371  | ug/kg | N/A    |      |            |            | 07/27/17 | 09:11 |
| QC1203834888                   | LCS       |        |      |      |       |        |      |            |            |          |       |
| Arsenic                        | 4690      |        | D    | 4130 | ug/kg |        | 88   | (80%-120%) |            | 07/26/17 | 19:10 |
| Molybdenum                     | 4690      |        | D    | 4460 | ug/kg |        | 95.1 | (80%-120%) |            |          |       |
| Selenium                       | 4690      |        | D    | 4110 | ug/kg |        | 87.6 | (80%-120%) |            | 07/27/17 | 09:06 |
| QC1203834887                   | MB        |        |      |      |       |        |      |            |            |          |       |
| Arsenic                        |           |        | DU   | 310  | ug/kg |        |      |            |            | 07/26/17 | 19:07 |
| Molybdenum                     |           |        | DU   | 73.4 | ug/kg |        |      |            |            |          |       |
| Selenium                       |           |        | DU   | 330  | ug/kg |        |      |            |            | 07/27/17 | 09:04 |
| QC1203834890                   | 428313002 | MS     |      |      |       |        |      |            |            |          |       |
| Arsenic                        | 4880      | *BD    | 679  | D    | 4780  | ug/kg  |      | 83.9       | (75%-125%) | 07/26/17 | 19:20 |
| Molybdenum                     | 4880      | D      | 351  | D    | 5010  | ug/kg  |      | 95.5       | (75%-125%) |          |       |
| Selenium                       | 4880      | DU     | 348  | D    | 4330  | ug/kg  |      | 88.6       | (75%-125%) | 07/27/17 | 09:12 |

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**QC Summary**

Workorder: 428313

Page 2 of 9

| Parname                        | NOM       | Sample  | Qual | QC      | Units | RPD/D% | REC% | Range    | Anlst | Date     | Time  |
|--------------------------------|-----------|---------|------|---------|-------|--------|------|----------|-------|----------|-------|
| <b>Metals Analysis - ICPMS</b> |           |         |      |         |       |        |      |          |       |          |       |
| Batch                          | 1683875   |         |      |         |       |        |      |          |       |          |       |
| QC1203834891                   | 428313002 | SDILT   |      |         |       |        |      |          |       |          |       |
| Arsenic                        | *BD       | 3.51    | DU   | 1630    | ug/L  | N/A    |      | (0%-10%) | BAJ   | 07/26/17 | 19:27 |
| Molybdenum                     | D         | 1.81    | DU   | 387     | ug/L  | N/A    |      | (0%-10%) |       |          |       |
| Selenium                       | DU        | -0.515  | DU   | 1740    | ug/L  | N/A    |      | (0%-10%) |       | 07/27/17 | 09:15 |
| <b>Metals Analysis-ICP</b>     |           |         |      |         |       |        |      |          |       |          |       |
| Batch                          | 1683869   |         |      |         |       |        |      |          |       |          |       |
| QC1203834866                   | 428313002 | DUP     |      |         |       |        |      |          |       |          |       |
| Antimony                       | B         | 482     | U    | 325     | ug/kg | 169    | ^    | (+/-984) | HSC   | 07/21/17 | 17:14 |
| Barium                         | N         | 39600   |      | 46000   | ug/kg | 15.1   |      | (0%-35%) |       |          |       |
| Beryllium                      | B         | 344     | B    | 276     | ug/kg | 21.7   | ^    | (+/-492) |       |          |       |
| Cadmium                        | B         | 149     | U    | 98.4    | ug/kg | 47.6   | ^    | (+/-492) |       |          |       |
| Calcium                        |           | 4320000 |      | 4050000 | ug/kg | 6.38   |      | (0%-35%) |       | 07/25/17 | 13:32 |
| Chromium                       | *         | 6150    | *    | 4180    | ug/kg | 38.1   | *    | (0%-35%) |       | 07/21/17 | 17:14 |
| Cobalt                         | *         | 3630    | *    | 2910    | ug/kg | 22     |      | (0%-35%) |       |          |       |
| Copper                         | *         | 8020    | *    | 6350    | ug/kg | 23.1   |      | (0%-35%) |       |          |       |
| Iron                           |           | 9420000 |      | 9440000 | ug/kg | 0.158  |      | (0%-35%) |       |          |       |
| Lead                           | U         | 334     | B    | -604    | ug/kg | 193    | ^    | (+/-984) |       |          |       |
| Magnesium                      | *         | 2580000 | *    | 2090000 | ug/kg | 21.1   |      | (0%-35%) |       | 07/25/17 | 13:32 |

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**QC Summary**

Workorder: 428313

Page 3 of 9

| Parmname                   | NOM     | Sample | Qual | QC     | Units | RPD/D% | REC% | Range      | Anlst | Date     | Time  |
|----------------------------|---------|--------|------|--------|-------|--------|------|------------|-------|----------|-------|
| <b>Metals Analysis-ICP</b> |         |        |      |        |       |        |      |            |       |          |       |
| Batch                      | 1683869 |        |      |        |       |        |      |            |       |          |       |
| Manganese                  | N       | 133000 |      | 142000 | ug/kg | 6.88   |      | (0%-35%)   | HSC   | 07/21/17 | 17:14 |
| Nickel                     |         | 4610   |      | 5090   | ug/kg | 9.92   |      | (0%-35%)   |       |          |       |
| Potassium                  | *N      | 469000 | *    | 829000 | ug/kg | 55.4*  |      | (0%-35%)   |       | 07/25/17 | 13:32 |
| Silver                     | B       | -215   | B    | -238   | ug/kg | 10.2 ^ |      | (+/-492)   |       | 07/21/17 | 17:14 |
| Sodium                     | *       | 467000 | *    | 261000 | ug/kg | 56.7*  |      | (0%-35%)   |       | 07/25/17 | 13:32 |
| Vanadium                   |         | 21800  |      | 22100  | ug/kg | 1.26   |      | (0%-35%)   |       | 07/21/17 | 17:14 |
| Zinc                       |         | 16500  |      | 16500  | ug/kg | 0.0271 |      | (0%-35%)   |       |          |       |
| QC1203834865               | LCS     |        |      |        |       |        |      |            |       |          |       |
| Antimony                   | 48100   |        |      | 46200  | ug/kg |        | 96.1 | (80%-120%) |       | 07/21/17 | 17:07 |
| Barium                     | 48100   |        |      | 46500  | ug/kg |        | 96.8 | (80%-120%) |       |          |       |
| Beryllium                  | 48100   |        |      | 46700  | ug/kg |        | 97.2 | (80%-120%) |       |          |       |
| Cadmium                    | 48100   |        |      | 46300  | ug/kg |        | 96.4 | (80%-120%) |       |          |       |
| Calcium                    | 481000  |        |      | 482000 | ug/kg |        | 100  | (80%-120%) |       | 07/25/17 | 13:25 |
| Chromium                   | 48100   |        |      | 46800  | ug/kg |        | 97.3 | (80%-120%) |       | 07/21/17 | 17:07 |
| Cobalt                     | 48100   |        |      | 46800  | ug/kg |        | 97.4 | (80%-120%) |       |          |       |
| Copper                     | 48100   |        |      | 46800  | ug/kg |        | 97.3 | (80%-120%) |       |          |       |

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**QC Summary**

Workorder: 428313

Page 4 of 9

| Parmname                   | NOM     | Sample | Qual | QC     | Units | RPD/D% | REC% | Range      | Anlst | Date     | Time  |
|----------------------------|---------|--------|------|--------|-------|--------|------|------------|-------|----------|-------|
| <b>Metals Analysis-ICP</b> |         |        |      |        |       |        |      |            |       |          |       |
| Batch                      | 1683869 |        |      |        |       |        |      |            |       |          |       |
| Iron                       | 481000  |        |      | 474000 | ug/kg |        | 98.6 | (80%-120%) | HSC   | 07/21/17 | 17:07 |
| Lead                       | 48100   |        |      | 45900  | ug/kg |        | 95.5 | (80%-120%) |       |          |       |
| Magnesium                  | 481000  |        |      | 489000 | ug/kg |        | 102  | (80%-120%) |       | 07/25/17 | 13:25 |
| Manganese                  | 48100   |        |      | 46400  | ug/kg |        | 96.5 | (80%-120%) |       | 07/21/17 | 17:07 |
| Nickel                     | 48100   |        |      | 46800  | ug/kg |        | 97.4 | (80%-120%) |       |          |       |
| Potassium                  | 481000  |        |      | 472000 | ug/kg |        | 98.3 | (80%-120%) |       | 07/25/17 | 13:25 |
| Silver                     | 48100   |        |      | 45200  | ug/kg |        | 94   | (80%-120%) |       | 07/21/17 | 17:07 |
| Sodium                     | 481000  |        |      | 505000 | ug/kg |        | 105  | (80%-120%) |       | 07/25/17 | 13:25 |
| Vanadium                   | 48100   |        |      | 46200  | ug/kg |        | 96   | (80%-120%) |       | 07/21/17 | 17:07 |
| Zinc                       | 48100   |        |      | 45400  | ug/kg |        | 94.5 | (80%-120%) |       |          |       |
| QC1203834864               | MB      |        |      |        |       |        |      |            |       |          |       |
| Antimony                   |         |        | U    | 328    | ug/kg |        |      |            |       | 07/21/17 | 17:04 |
| Barium                     |         |        | U    | 99.4   | ug/kg |        |      |            |       |          |       |
| Beryllium                  |         |        | U    | 99.4   | ug/kg |        |      |            |       |          |       |
| Cadmium                    |         |        | U    | 99.4   | ug/kg |        |      |            |       |          |       |
| Calcium                    |         |        | B    | 10900  | ug/kg |        |      |            |       | 07/25/17 | 13:22 |

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**QC Summary**

Workorder: 428313

Page 5 of 9

| Parmname                   | NOM       | Sample | Qual  | QC    | Units  | RPD/D% | REC% | Range      | Anlst | Date     | Time  |
|----------------------------|-----------|--------|-------|-------|--------|--------|------|------------|-------|----------|-------|
| <b>Metals Analysis-ICP</b> |           |        |       |       |        |        |      |            |       |          |       |
| Batch                      | 1683869   |        |       |       |        |        |      |            |       |          |       |
| Chromium                   |           |        | U     | 149   | ug/kg  |        |      |            | HSC   | 07/21/17 | 17:04 |
| Cobalt                     |           |        | U     | 149   | ug/kg  |        |      |            |       |          |       |
| Copper                     |           |        | U     | 298   | ug/kg  |        |      |            |       |          |       |
| Iron                       |           |        | U     | 7950  | ug/kg  |        |      |            |       |          |       |
| Lead                       |           |        | U     | 328   | ug/kg  |        |      |            |       |          |       |
| Magnesium                  |           |        | U     | 8450  | ug/kg  |        |      |            |       | 07/25/17 | 13:22 |
| Manganese                  |           |        | U     | 199   | ug/kg  |        |      |            |       | 07/21/17 | 17:04 |
| Nickel                     |           |        | U     | 149   | ug/kg  |        |      |            |       |          |       |
| Potassium                  |           |        | U     | 6360  | ug/kg  |        |      |            |       | 07/25/17 | 13:22 |
| Silver                     |           |        | U     | 99.4  | ug/kg  |        |      |            |       | 07/21/17 | 17:04 |
| Sodium                     |           |        | B     | 10000 | ug/kg  |        |      |            |       | 07/25/17 | 13:22 |
| Vanadium                   |           |        | U     | 99.4  | ug/kg  |        |      |            |       | 07/21/17 | 17:04 |
| Zinc                       |           |        | U     | 398   | ug/kg  |        |      |            |       |          |       |
| QC1203834867               | 428313002 | MS     |       |       |        |        |      |            |       |          |       |
| Antimony                   | 48400     | B      | 482   | 43000 | ug/kg  |        | 87.9 | (75%-125%) |       | 07/21/17 | 17:17 |
| Barium                     | 48400     | N      | 39600 | N     | 106000 | ug/kg  | 138* | (75%-125%) |       |          |       |

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**QC Summary**

Workorder: 428313

Page 6 of 9

| Parmname                   | NOM     | Sample | Qual    | QC       | Units   | RPD/D% | REC% | Range      | Anlst | Date     | Time  |
|----------------------------|---------|--------|---------|----------|---------|--------|------|------------|-------|----------|-------|
| <b>Metals Analysis-ICP</b> |         |        |         |          |         |        |      |            |       |          |       |
| Batch                      | 1683869 |        |         |          |         |        |      |            |       |          |       |
| Beryllium                  | 48400   | B      | 344     | 46100    | ug/kg   |        | 94.7 | (75%-125%) | HSC   | 07/21/17 | 17:17 |
| Cadmium                    | 48400   | B      | 149     | 45000    | ug/kg   |        | 92.8 | (75%-125%) |       |          |       |
| Calcium                    | 484000  |        | 4320000 | 4430000  | ug/kg   |        | N/A  | (75%-125%) |       | 07/25/17 | 13:35 |
| Chromium                   | 48400   | *      | 6150    | 51100    | ug/kg   |        | 92.8 | (75%-125%) |       | 07/21/17 | 17:17 |
| Cobalt                     | 48400   | *      | 3630    | 49300    | ug/kg   |        | 94.4 | (75%-125%) |       |          |       |
| Copper                     | 48400   | *      | 8020    | 56100    | ug/kg   |        | 99.4 | (75%-125%) |       |          |       |
| Iron                       | 484000  |        | 9420000 | 12400000 | ug/kg   |        | N/A  | (75%-125%) |       |          |       |
| Lead                       | 48400   | U      | 334     | 45200    | ug/kg   |        | 93.5 | (75%-125%) |       |          |       |
| Magnesium                  | 484000  | *      | 2580000 | 2990000  | ug/kg   |        | N/A  | (75%-125%) |       | 07/25/17 | 13:35 |
| Manganese                  | 48400   | N      | 133000  | N        | 220000  | ug/kg  | 180* | (75%-125%) |       | 07/21/17 | 17:17 |
| Nickel                     | 48400   |        | 4610    | 49700    | ug/kg   |        | 93.2 | (75%-125%) |       |          |       |
| Potassium                  | 484000  | *N     | 469000  | N        | 1120000 | ug/kg  | 134* | (75%-125%) |       | 07/25/17 | 13:35 |
| Silver                     | 48400   | B      | -215    | 44000    | ug/kg   |        | 90.9 | (75%-125%) |       | 07/21/17 | 17:17 |
| Sodium                     | 484000  | *      | 467000  | 866000   | ug/kg   |        | 82.5 | (75%-125%) |       | 07/25/17 | 13:35 |
| Vanadium                   | 48400   |        | 21800   | 79900    | ug/kg   |        | 120  | (75%-125%) |       | 07/21/17 | 17:17 |

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**QC Summary**

Workorder: 428313

Page 7 of 9

| Parmname                     | NOM     | Sample | Qual  | QC    | Units | RPD/D% | REC% | Range      | Anlst | Date     | Time  |
|------------------------------|---------|--------|-------|-------|-------|--------|------|------------|-------|----------|-------|
| <b>Metals Analysis-ICP</b>   |         |        |       |       |       |        |      |            |       |          |       |
| Batch                        | 1683869 |        |       |       |       |        |      |            |       |          |       |
| Zinc                         | 48400   | 16500  |       | 65800 | ug/kg |        | 102  | (75%-125%) | HSC   | 07/21/17 | 17:17 |
| QC1203835796 428313002 PS    |         |        |       |       |       |        |      |            |       |          |       |
| Barium                       | 500     | N      | 391   | 876   | ug/L  |        | 96.9 | (75%-125%) |       | 07/21/17 | 17:20 |
| Manganese                    | 500     | N      | 1310  | 1790  | ug/L  |        | 96.5 | (75%-125%) |       |          |       |
| Potassium                    | 5000    | *N     | 4640  | 9040  | ug/L  |        | 88   | (75%-125%) |       |          |       |
| QC1203834868 428313002 SDILT |         |        |       |       |       |        |      |            |       |          |       |
| Antimony                     |         | B      | 4.76  | DU    | 1670  | ug/L   | N/A  | (0%-10%)   |       | 07/21/17 | 17:23 |
| Barium                       |         | N      | 391   | D     | 80.1  | ug/L   | 2.42 | (0%-10%)   |       |          |       |
| Beryllium                    |         | B      | 3.40  | DU    | 506   | ug/L   | N/A  | (0%-10%)   |       |          |       |
| Cadmium                      |         | B      | 1.47  | DU    | 506   | ug/L   | N/A  | (0%-10%)   |       |          |       |
| Calcium                      |         |        | 42700 | D     | 8470  | ug/L   | .758 | (0%-10%)   |       | 07/25/17 | 13:39 |
| Chromium                     |         | *      | 60.8  | D     | 13.0  | ug/L   | 6.89 | (0%-10%)   |       | 07/21/17 | 17:23 |
| Cobalt                       |         | *      | 35.9  | D     | 7.65  | ug/L   | 6.49 | (0%-10%)   |       |          |       |
| Copper                       |         | *      | 79.2  | D     | 15.1  | ug/L   | 4.48 | (0%-10%)   |       |          |       |
| Iron                         |         |        | 93100 | D     | 19600 | ug/L   | 5.18 | (0%-10%)   |       |          |       |
| Lead                         |         | U      | -0.11 | DU    | 1670  | ug/L   | N/A  | (0%-10%)   |       |          |       |

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**QC Summary**

Workorder: 428313

Page 8 of 9

| Parmname                   | NOM     | Sample | Qual | QC   | Units | RPD/D% | REC% | Range    | Anlst | Date     | Time  |
|----------------------------|---------|--------|------|------|-------|--------|------|----------|-------|----------|-------|
| <b>Metals Analysis-ICP</b> |         |        |      |      |       |        |      |          |       |          |       |
| Batch                      | 1683869 |        |      |      |       |        |      |          |       |          |       |
| Magnesium                  | *       | 25500  | D    | 5050 | ug/L  | 1.21   |      | (0%-10%) | HSC   | 07/25/17 | 13:39 |
| Manganese                  | N       | 1310   | D    | 274  | ug/L  | 4.39   |      | (0%-10%) |       | 07/21/17 | 17:23 |
| Nickel                     |         | 45.6   | D    | 9.42 | ug/L  | 3.33   |      | (0%-10%) |       |          |       |
| Potassium                  | *N      | 4640   | D    | 963  | ug/L  | 3.82   |      | (0%-10%) |       | 07/25/17 | 13:39 |
| Silver                     | B       | -2.13  | DU   | 506  | ug/L  | N/A    |      | (0%-10%) |       | 07/21/17 | 17:23 |
| Sodium                     | *       | 4620   | D    | 960  | ug/L  | 3.98   |      | (0%-10%) |       | 07/25/17 | 13:39 |
| Vanadium                   |         | 215    | D    | 43.2 | ug/L  | .307   |      | (0%-10%) |       | 07/21/17 | 17:23 |
| Zinc                       |         | 163    | D    | 37.7 | ug/L  | 15.5   |      | (0%-10%) |       |          |       |

**Metals Analysis-Mercury**

Batch 1684344

|              |           |       |    |      |       |      |   |            |      |          |       |
|--------------|-----------|-------|----|------|-------|------|---|------------|------|----------|-------|
| QC1203836046 | 428197003 | DUP   |    |      |       |      |   |            |      |          |       |
| Mercury      | B         | 5.01  | B  | 4.30 | ug/kg | 15.4 | ^ | (+/-12.3)  | MTM1 | 07/24/17 | 10:23 |
| QC1203836045 | LCS       |       |    |      |       |      |   |            |      |          |       |
| Mercury      |           | 118   |    | 128  | ug/kg |      |   | (80%-120%) |      | 07/24/17 | 10:20 |
| QC1203836044 | MB        |       |    |      |       |      |   |            |      |          |       |
| Mercury      |           |       | U  | 3.98 | ug/kg |      |   |            |      | 07/24/17 | 10:18 |
| QC1203836047 | 428197003 | MS    |    |      |       |      |   |            |      |          |       |
| Mercury      |           | 111   | B  | 5.01 | ug/kg |      |   | (75%-125%) |      | 07/24/17 | 10:25 |
| QC1203836048 | 428197003 | SDILT |    |      |       |      |   |            |      |          |       |
| Mercury      | B         | 0.088 | DU | 19.1 | ug/L  | N/A  |   | (0%-10%)   |      | 07/24/17 | 10:26 |

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**QC Summary**

Workorder: 428313

Page 9 of 9

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

**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  $\geq$  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

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  $\pm$  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.

# General Chem Analysis

# Case Narrative

**General Chemistry  
 Technical Case Narrative  
 CH2MHill Plateau Remediation Company (CPRC)  
 SDG #: GEL428313  
 Work Order #: 428313**

**Product:** Cyanide, Total

**Analytical Method:** 9012\_CYANIDE

**Analytical Procedure:** GL-GC-E-095 REV# 20

**Analytical Batches:** 1683519 and 1683518

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

| <b><u>GEL Sample ID#</u></b> | <b><u>Client Sample Identification</u></b> |
|------------------------------|--|
| 428313002                    | B3BBJ0                                     |
| 1203834032                   | Method Blank (MB)                          |
| 1203834033                   | Laboratory Control Sample (LCS)            |
| 1203834034                   | 428197003(B3BBH2) Sample Duplicate (DUP)   |
| 1203834035                   | 428197003(B3BBH2) Matrix Spike (MS)        |
| 1203835189                   | 428313002(B3BBJ0) Sample Duplicate (DUP)   |
| 1203835190                   | 428313002(B3BBJ0) Matrix Spike (MS)        |

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

**Data Summary:**

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, with the following exceptions.

**Technical Information**

**Sample Dilutions**

The following sample 1203834033 (LCS) was diluted because target analyte concentrations exceeded the calibration range. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

**Product: Ion Chromatography****Analytical Method:** 300.0\_ANIONS\_IC**Analytical Procedure:** GL-GC-E-086 REV# 25**Analytical Batch:** 1685540**Preparation Method:** EPA 300.0 PREP**Preparation Procedure:** GL-GC-E-086 REV# 25**Preparation Batch:** 1685539

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

| <b><u>GEL Sample ID#</u></b> | <b><u>Client Sample Identification</u></b> |
|------------------------------|--|
| 428313002                    | B3BBJ0                                     |
| 1203838987                   | Method Blank (MB)                          |
| 1203838988                   | Laboratory Control Sample (LCS)            |
| 1203838989                   | 428482007(B3BBJ4) Sample Duplicate (DUP)   |
| 1203838990                   | 428482007(B3BBJ4) Matrix Spike (MS)        |

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

**Data Summary:**

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, with the following exceptions.

**Miscellaneous Information****Manual Integrations**

Samples 1203838988 (LCS) and 1203838990 (B3BBJ4MS) were manually integrated to correctly position the baseline as set in the calibration standards.

**Product:** Ammonia Nitrogen

**Preparation Method:** 350.1\_AMMONIA

**Preparation Procedure:** GL-GC-E-106 REV# 9

**Preparation Batch:** 1683503

**Preparation Method:** EPA 350.2 Modified Prep

**Preparation Procedure:** GL-GC-E-072 REV# 17

**Preparation Batch:** 1683502

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

| <b><u>GEL Sample ID#</u></b> | <b><u>Client Sample Identification</u></b> |
|------------------------------|--|
| 428313002                    | B3BBJ0                                     |
| 1203834002                   | Method Blank (MB)                          |
| 1203834003                   | Laboratory Control Sample (LCS)            |
| 1203834004                   | 428197003(B3BBH2) Sample Duplicate (DUP)   |
| 1203834005                   | 428197003(B3BBH2) Matrix Spike (MS)        |

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

#### **Data Summary:**

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, with the following exceptions.

#### **Quality Control (QC) Information**

##### **Method Blank (MB) Statement**

The MB 1203834002 (MB) analyzed with this SDG met the acceptance criteria. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data.

#### **Technical Information**

##### **Sample Re-analysis**

Samples 1203834002 (MB) and 1203834003 (LCS) were re-analyzed due to (its) proximity to an overrange sample. The results from the reanalysis are reported.

**Product: Hexavalent Chromium****Analytical Method:** 7196\_CR6**Analytical Procedure:** GL-GC-E-044 REV# 22**Analytical Batch:** 1683182**Preparation Method:** SW846 3060A**Preparation Procedure:** GL-GC-E-044 REV# 22**Preparation Batch:** 1683176

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

| <b><u>GEL Sample ID#</u></b> | <b><u>Client Sample Identification</u></b>     |
|------------------------------|--|
| 428313001                    | B3BBH9   |
| 1203833176                   | Method Blank (MB)                              |
| 1203833177                   | Laboratory Control Sample (LCS)                |
| 1203833178                   | Insoluble Lab Control Sample (ILCS)            |
| 1203833180                   | 428015006(B3BBF7) Sample Duplicate (DUP)       |
| 1203833182                   | 428015006(B3BBF7) Matrix Spike (MS)            |
| 1203833186                   | 428015006(B3BBF7) Matrix Spike Duplicate (MSD) |

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

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**Qualifier Definition Report  
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL428313 GEL Work Order: 428313

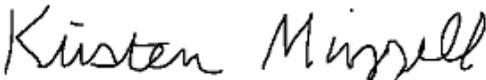
**The Qualifiers in this report are defined as follows:**

- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- 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.
- 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:** Kristen Mizzell**Date:** 01 AUG 2017**Title:** Analyst I

# Sample Data Summary

**GEL LABORATORIES LLC**

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**Certificate of Analysis**

Report Date: August 1, 2017

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF F17-038

Client Sample ID: B3BBH9 Project: CPRC0F17038  
 Sample ID: 428313001 Client ID: CPRC001  
 Matrix: SOIL  
 Collect Date: 19-JUL-17 10:25  
 Receive Date: 20-JUL-17  
 Collector: Client  
 Moisture: 7.57%

| Parameter                               | Qualifier | Result | DL  | RL  | Units | PF   | DF | Analyst | Date     | Time | Batch   | Method |
|---|-----------|--------|-----|-----|-------|------|----|---------|----------|------|---------|--------|
| Spectrometric Analysis                  |           |        |     |     |       |      |    |         |          |      |         |        |
| 7196_CR6: COMMON "Dry Weight Corrected" |           |        |     |     |       |      |    |         |          |      |         |        |
| Hexavalent Chromium                     | U         | 160    | 160 | 401 | ug/Kg | 37.1 | 1  | VH1     | 07/24/17 | 1100 | 1683182 | 1      |

The following Prep Methods were performed:

| Method      | Description                             | Analyst | Date     | Time | Prep Batch |
|-------------|---|---------|----------|------|------------|
| SW846 3060A | SW846_7196A Hexavalent Chromium in Soil | RXB5    | 07/20/17 | 1208 | 1683176    |

The following Analytical Methods were performed:

| Method | Description | Analyst Comments |
|--------|-------------|------------------|
| 1      | 7196_CR6    |                  |

**Notes:**

Column headers are defined as follows:

|                                       |                                |
|---------------------------------------|--------------------------------|
| DF: Dilution Factor                   | Lc/LC: Critical Level          |
| DL: Detection Limit                   | PF: Prep Factor                |
| MDA: Minimum Detectable Activity      | RL: Reporting Limit            |
| MDC: Minimum Detectable Concentration | SQL: Sample Quantitation Limit |

**GEL LABORATORIES LLC**

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**Certificate of Analysis**

Report Date: August 1, 2017

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF F17-038

Client Sample ID: B3BBJ0 Project: CPRC0F17038  
 Sample ID: 428313002 Client ID: CPRC001  
 Matrix: SOIL  
 Collect Date: 19-JUL-17 10:25  
 Receive Date: 20-JUL-17  
 Collector: Client  
 Moisture: 5.52%

| Parameter   | Qualifier | Result | DL   | RL   | Units | PF   | DF | Analyst | Date     | Time | Batch   | Method |
|---|-----------|--------|------|------|-------|------|----|---------|----------|------|---------|--------|
| Flow Injection Analysis   |           |        |      |      |       |      |    |         |          |      |         |        |
| 9012_CYANIDE (TOTAL): COMMON "Dry Weight Corrected"             |           |        |      |      |       |      |    |         |          |      |         |        |
| Cyanide, Total  | U         | 72.4   | 72.4 | 217  | ug/kg | 41.0 | 1  | AXH3    | 07/21/17 | 1435 | 1683519 | 1      |
| Ion Chromatography  |           |        |      |      |       |      |    |         |          |      |         |        |
| EPA 300.0 Anions, Solid (Br, Cl, F, SO4) "Dry Weight Corrected" |           |        |      |      |       |      |    |         |          |      |         |        |
| Bromide   | U         | 692    | 692  | 2070 | ug/kg | 9.76 | 1  | MAR1    | 07/27/17 | 1343 | 1685540 | 2      |
| Chloride  | B         | 1450   | 743  | 2070 | ug/kg | 9.76 | 1  |         |          |      |         |        |
| Fluoride  | B         | 502    | 351  | 1030 | ug/kg | 9.76 | 1  |         |          |      |         |        |
| Nitrate-N   | U         | 341    | 341  | 1030 | ug/kg | 9.76 | 1  |         |          |      |         |        |
| Nitrite-N   | U         | 341    | 341  | 1030 | ug/kg | 9.76 | 1  |         |          |      |         |        |
| Phosphorus in phosphate   | U         | 692    | 692  | 2070 | ug/kg | 9.76 | 1  |         |          |      |         |        |
| Sulfate   |           | 19800  | 1370 | 4130 | ug/kg | 9.76 | 1  |         |          |      |         |        |
| Nutrient Analysis   |           |        |      |      |       |      |    |         |          |      |         |        |
| 350.1_AMMONIA: COMMON "Dry Weight Corrected"                    |           |        |      |      |       |      |    |         |          |      |         |        |
| Nitrogen in Ammonia   | C         | 3870   | 866  | 2410 | ug/Kg | 45.5 | 1  | KLP1    | 07/21/17 | 1331 | 1683503 | 3      |

The following Prep Methods were performed:

| Method                   | Description                          | Analyst | Date     | Time | Prep Batch |
|--------------------------|--------------------------------------|---------|----------|------|------------|
| EPA 300.0 PREP           | EPA 300.0 Total Anions in Soil       | MAR1    | 07/27/17 | 1035 | 1685539    |
| EPA 350.2 Modified Prep  | EPA 350.1 Mod. Ammonia Nitrogen Prep | AXH3    | 07/20/17 | 1413 | 1683502    |
| SW846 9010C Distillation | SW846 9010C Prep                     | AXH3    | 07/20/17 | 1416 | 1683518    |

The following Analytical Methods were performed:

| Method | Description     | Analyst Comments |
|--------|-----------------|------------------|
| 1      | 9012_CYANIDE    |                  |
| 2      | 300.0_ANIONS_IC |                  |
| 3      | 350.1_AMMONIA   |                  |

**Notes:**Column headers are defined as follows:

DF: Dilution Factor                      Lc/LC: Critical Level  
 DL: Detection Limit                      PF: Prep Factor  
 MDA: Minimum Detectable Activity      RL: Reporting Limit  
 MDC: Minimum Detectable Concentration      SQL: Sample Quantitation Limit

# Quality Control Summary

**GEL LABORATORIES LLC**

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

**QC Summary**

Report Date: August 1, 2017

Page 1 of 5

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 428313

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

**Flow Injection Analysis**

|                |           |     |      |   |       |       |     |      |            |          |                |
|----------------|-----------|-----|------|---|-------|-------|-----|------|------------|----------|----------------|
| Batch          | 1683519   |     |      |   |       |       |     |      |            |          |                |
| QC1203834034   | 428197003 | DUP |      |   |       |       |     |      |            |          |                |
| Cyanide, Total |           | U   | 71.6 | U | 64.1  | ug/kg | N/A |      | AXH3       | 07/21/17 | 14:33          |
| QC1203835189   | 428313002 | DUP |      |   |       |       |     |      |            |          |                |
| Cyanide, Total |           | U   | 72.4 | U | 76.2  | ug/kg | N/A |      |            | 07/21/17 | 14:36          |
| QC1203834033   | LCS       |     |      |   |       |       |     |      |            |          |                |
| Cyanide, Total | 108000    |     |      | D | 94300 | ug/kg |     | 87.3 | (80%-120%) |          | 07/21/17 14:27 |
| QC1203834032   | MB        |     |      |   |       |       |     |      |            |          |                |
| Cyanide, Total |           |     |      | U | 83.5  | ug/kg |     |      |            |          | 07/21/17 14:26 |
| QC1203834035   | 428197003 | MS  |      |   |       |       |     |      |            |          |                |
| Cyanide, Total | 4600      | U   | 71.6 |   | 5280  | ug/kg |     | 115  | (75%-125%) |          | 07/21/17 14:33 |
| QC1203835190   | 428313002 | MS  |      |   |       |       |     |      |            |          |                |
| Cyanide, Total | 5190      | U   | 72.4 |   | 5710  | ug/kg |     | 110  | (75%-125%) |          | 07/21/17 14:37 |

**Ion Chromatography**

|              |           |     |      |   |      |       |        |  |           |          |       |
|--------------|-----------|-----|------|---|------|-------|--------|--|-----------|----------|-------|
| Batch        | 1685540   |     |      |   |      |       |        |  |           |          |       |
| QC1203838989 | 428482007 | DUP |      |   |      |       |        |  |           |          |       |
| Bromide      |           | U   | 757  | U | 756  | ug/kg | N/A    |  | MAR1      | 07/27/17 | 15:10 |
| Chloride     |           | B   | 1350 | B | 1290 | ug/kg | 4.26 ^ |  | (+/-2260) |          |       |
| Fluoride     |           |     | 1460 |   | 1320 | ug/kg | 9.84 ^ |  | (+/-1130) |          |       |
| Nitrate-N    |           | U   | 373  | U | 372  | ug/kg | N/A    |  |           |          |       |
| Nitrite-N    |           | U   | 373  | U | 372  | ug/kg | N/A    |  |           |          |       |

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**QC Summary**

Workorder: 428313

Page 2 of 5

| Parmname                  | NOM     | Sample | Qual  | QC | Units | RPD%  | REC%   | Range      | Anlst | Date     | Time  |
|---------------------------|---------|--------|-------|----|-------|-------|--------|------------|-------|----------|-------|
| <b>Ion Chromatography</b> |         |        |       |    |       |       |        |            |       |          |       |
| Batch                     | 1685540 |        |       |    |       |       |        |            |       |          |       |
| Phosphorus in phosphate   |         | U      | 757   | U  | 756   | ug/kg | N/A    |            | MAR1  | 07/27/17 | 15:10 |
| Sulfate                   |         |        | 10600 |    | 10100 | ug/kg | 4.34 ^ | (+/-4510)  |       |          |       |
| QC1203838988              | LCS     |        |       |    |       |       |        |            |       |          |       |
| Bromide                   | 12500   |        |       |    | 12400 | ug/kg | 99.2   | (80%-120%) |       | 07/27/17 | 13:14 |
| Chloride                  | 50000   |        |       |    | 46100 | ug/kg | 92.2   | (80%-120%) |       |          |       |
| Fluoride                  | 25000   |        |       |    | 23700 | ug/kg | 94.7   | (80%-120%) |       |          |       |
| Nitrate-N                 | 25000   |        |       |    | 23000 | ug/kg | 92     | (80%-120%) |       |          |       |
| Nitrite-N                 | 25000   |        |       |    | 23500 | ug/kg | 93.9   | (80%-120%) |       |          |       |
| Phosphorus in phosphate   | 12500   |        |       |    | 12000 | ug/kg | 96.2   | (80%-120%) |       |          |       |
| Sulfate                   | 100000  |        |       |    | 95500 | ug/kg | 95.5   | (80%-120%) |       |          |       |
| QC1203838987              | MB      |        |       |    |       |       |        |            |       |          |       |
| Bromide                   |         |        | U     |    | 670   | ug/kg |        |            |       | 07/27/17 | 12:45 |
| Chloride                  |         |        | U     |    | 720   | ug/kg |        |            |       |          |       |
| Fluoride                  |         |        | U     |    | 340   | ug/kg |        |            |       |          |       |
| Nitrate-N                 |         |        | U     |    | 330   | ug/kg |        |            |       |          |       |
| Nitrite-N                 |         |        | U     |    | 330   | ug/kg |        |            |       |          |       |
| Phosphorus in phosphate   |         |        | U     |    | 670   | ug/kg |        |            |       |          |       |

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**QC Summary**

Workorder: 428313

Page 3 of 5

| Parmname                  | NOM       | Sample | Qual  | QC     | Units | RPD% | REC% | Range      | Anlst | Date     | Time  |
|---------------------------|-----------|--------|-------|--------|-------|------|------|------------|-------|----------|-------|
| <b>Ion Chromatography</b> |           |        |       |        |       |      |      |            |       |          |       |
| Batch                     | 1685540   |        |       |        |       |      |      |            |       |          |       |
| Sulfate                   |           |        | U     | 1330   | ug/kg |      |      |            | MAR1  | 07/27/17 | 12:45 |
| QC1203838990              | 428482007 | MS     |       |        |       |      |      |            |       |          |       |
| Bromide                   | 14100     | U      | 757   | 13200  | ug/kg |      | 93.6 | (75%-125%) |       | 07/27/17 | 15:39 |
| Chloride                  | 56500     | B      | 1350  | 51800  | ug/kg |      | 89.3 | (75%-125%) |       |          |       |
| Fluoride                  | 28300     |        | 1460  | 24200  | ug/kg |      | 80.5 | (75%-125%) |       |          |       |
| Nitrate-N                 | 28300     | U      | 373   | 25600  | ug/kg |      | 90.7 | (75%-125%) |       |          |       |
| Nitrite-N                 | 28300     | U      | 373   | 26200  | ug/kg |      | 92.8 | (75%-125%) |       |          |       |
| Phosphorus in phosphate   | 14100     | U      | 757   | 11200  | ug/kg |      | 79.6 | (75%-125%) |       |          |       |
| Sulfate                   | 113000    |        | 10600 | 118000 | ug/kg |      | 95   | (75%-125%) |       |          |       |
| <b>Nutrient Analysis</b>  |           |        |       |        |       |      |      |            |       |          |       |
| Batch                     | 1683503   |        |       |        |       |      |      |            |       |          |       |
| QC1203834004              | 428197003 | DUP    |       |        |       |      |      |            |       |          |       |
| Nitrogen in Ammonia       |           | C      | 6600  | 4340   | ug/Kg | 41.4 | ^    | (+/-2380)  | KLP1  | 07/21/17 | 13:23 |
| QC1203834003              | LCS       |        |       |        |       |      |      |            |       |          |       |
| Nitrogen in Ammonia       | 50000     |        |       | 54500  | ug/Kg |      | 109  | (80%-120%) |       | 07/21/17 | 13:28 |
| QC1203834002              | MB        |        |       |        |       |      |      |            |       |          |       |
| Nitrogen in Ammonia       |           | B      |       | 1370   | ug/Kg |      |      |            |       | 07/21/17 | 13:27 |
| QC1203834005              | 428197003 | MS     |       |        |       |      |      |            |       |          |       |
| Nitrogen in Ammonia       | 50500     | C      | 6600  | 60000  | ug/Kg |      | 106  | (75%-125%) |       | 07/21/17 | 13:29 |

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Workorder: 428313

| Parmname                      | NOM       | Sample | Qual | QC | Units | RPD%  | REC% | Range      | Anlst    | Date     | Time  |
|-------------------------------|-----------|--------|------|----|-------|-------|------|------------|----------|----------|-------|
| <b>Spectrometric Analysis</b> |           |        |      |    |       |       |      |            |          |          |       |
| Batch                         | 1683182   |        |      |    |       |       |      |            |          |          |       |
| QC1203833180                  | 428015006 | DUP    |      |    |       |       |      |            |          |          |       |
| Hexavalent Chromium           |           | U      | 112  | U  | 112   | ug/Kg | N/A  |            | VH1      | 07/24/17 | 10:58 |
| QC1203833178                  | ILCS      |        |      |    |       |       |      |            |          |          |       |
| Hexavalent Chromium           | 7520      |        |      |    | 6460  | ug/Kg | 85.9 | (80%-120%) |          | 07/24/17 | 10:53 |
| QC1203833177                  | LCS       |        |      |    |       |       |      |            |          |          |       |
| Hexavalent Chromium           | 3650      |        |      |    | 3480  | ug/Kg | 95.4 | (80%-120%) |          | 07/24/17 | 10:53 |
| QC1203833176                  | MB        |        |      |    |       |       |      |            |          |          |       |
| Hexavalent Chromium           |           |        | U    |    | 152   | ug/Kg |      |            |          | 07/24/17 | 10:53 |
| QC1203833182                  | 428015006 | MS     |      |    |       |       |      |            |          |          |       |
| Hexavalent Chromium           | 3190      | U      | 112  |    | 3170  | ug/Kg | 96.2 | (75%-125%) |          | 07/24/17 | 10:59 |
| QC1203833186                  | 428015006 | MSD    |      |    |       |       |      |            |          |          |       |
| Hexavalent Chromium           | 3190      | U      | 112  |    | 3210  | ug/Kg | 1.03 | 97.2       | (0%-35%) | 07/24/17 | 10:59 |

**Notes:**

The Qualifiers in this report are defined as follows:

- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.
- N Spike Sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

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## QC Summary

Workorder: 428313

Page 5 of 5

| 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.

# Radiological Analysis

# Case Narrative

**Radiochemistry**  
**Technical Case Narrative**  
**CH2MHill Plateau Remediation Company (CPRC)**  
**SDG #: GEL428313**  
**Work Order #: 428313**

**Product:** AMCMISO\_EIE\_PRECIP\_AEA: COMMON

**Analytical Method:** AMCMISO\_EIE\_PREC\_AEA

**Analytical Procedure:** GL-RAD-A-011 REV# 26

**Analytical Batch:** 1684092

**Preparation Method:** Dry Soil Prep

**Preparation Procedure:** GL-RAD-A-021 REV# 21

**Preparation Batch:** 1683931

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

| <b><u>GEL Sample ID#</u></b> | <b><u>Client Sample Identification</u></b> |
|------------------------------|--|
| 428313001                    | B3BBH9                                     |
| 1203835456                   | Method Blank (MB)                          |
| 1203835457                   | 428197002(B3BBH1) Sample Duplicate (DUP)   |
| 1203835458                   | Laboratory Control Sample (LCS)            |

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

**Data Summary:**

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, with the following exceptions.

**Technical Information**

**Recounts**

Sample 1203835458 (LCS) was recounted due to low recovery. The recount is reported.

**Miscellaneous Information**

**Manual Integration**

Manual integration of alpha spectroscopy spectra 1203835458 (LCS) was performed to fully separate counts in Regions of Interest which would have been biased.

**Product:** NP237\_IE\_PRECIP\_AEA: COMMON

**Analytical Method:** ASTM C 1475-00 Modified

**Analytical Procedure:** GL-RAD-A-032 REV# 21

**Analytical Batch:** 1684093

**Preparation Method:** Dry Soil Prep

**Preparation Procedure:** GL-RAD-A-021 REV# 21

**Preparation Batch:** 1683931

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

| <b><u>GEL Sample ID#</u></b> | <b><u>Client Sample Identification</u></b> |
|------------------------------|--|
| 428313001                    | B3BBH9                                     |
| 1203835459                   | Method Blank (MB)                          |
| 1203835460                   | 428197002(B3BBH1) Sample Duplicate (DUP)   |
| 1203835461                   | Laboratory Control Sample (LCS)            |

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

**Data Summary:**

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, with the following exceptions.

**Technical Information**

**Recounts**

Sample 1203835459 (MB) was recounted due to high carrier/tracer yield. The recount is reported.

**Product:** PUIISO\_PRECIP\_AEA:COMMON

**Analytical Method:** PUIISO\_PRECIP\_AEA

**Analytical Procedure:** GL-RAD-A-011 REV# 26

**Analytical Batch:** 1684094

**Preparation Method:** Dry Soil Prep

**Preparation Procedure:** GL-RAD-A-021 REV# 21

**Preparation Batch:** 1683931

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

| <b><u>GEL Sample ID#</u></b> | <b><u>Client Sample Identification</u></b> |
|------------------------------|--|
| 428313001                    | B3BBH9                                     |
| 1203835462                   | Method Blank (MB)                          |
| 1203835463                   | 428197002(B3BBH1) Sample Duplicate (DUP)   |
| 1203835464                   | Laboratory Control Sample (LCS)            |

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

**Product:** UISO\_IE\_PRECIP\_AEA:COMMON

**Analytical Method:** UISO\_IE\_PRECIP\_AEA

**Analytical Procedure:** GL-RAD-A-011 REV# 26

**Analytical Batch:** 1684096

**Preparation Method:** Dry Soil Prep

**Preparation Procedure:** GL-RAD-A-021 REV# 21

**Preparation Batch:** 1683931

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

| <b><u>GEL Sample ID#</u></b> | <b><u>Client Sample Identification</u></b> |
|------------------------------|--|
| 428313001                    | B3BBH9                                     |
| 1203835465                   | Method Blank (MB)                          |
| 1203835466                   | 428197002(B3BBH1) Sample Duplicate (DUP)   |
| 1203835467                   | Laboratory Control Sample (LCS)            |

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

**Product:** Dry Weight

**Analytical Method:** Dry Soil Prep

**Analytical Procedure:** GL-OA-E-020 REV# 11

**Analytical Batch:** 1683931

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

| <b><u>GEL Sample ID#</u></b> | <b><u>Client Sample Identification</u></b> |
|------------------------------|--|
| 428313001                    | B3BBH9                                     |
| 1203835011                   | 428313001(B3BBH9) Sample Duplicate (DUP)   |

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.

**Product: Dry Weight****Analytical Method:** ASTM D 2216 (Modified)**Analytical Procedure:** GL-OA-E-020 REV# 11**Analytical Batch:** 1683933

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

| <b><u>GEL Sample ID#</u></b> | <b><u>Client Sample Identification</u></b> |
|------------------------------|--|
| 428313002                    | B3BBJ0                                     |
| 1203835012                   | 428379001(NonSDG) Sample Duplicate (DUP)   |

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.

**Product: GAMMA\_GS:COMMON****Analytical Method:** GAMMA\_GS**Analytical Procedure:** GL-RAD-A-013 REV# 27**Analytical Batch:** 1683993**Preparation Method:** Dry Soil Prep**Preparation Procedure:** GL-RAD-A-021 REV# 21**Preparation Batch:** 1683931

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

| <b><u>GEL Sample ID#</u></b> | <b><u>Client Sample Identification</u></b> |
|------------------------------|--|
| 428313001                    | B3BBH9                                     |
| 1203835171                   | Method Blank (MB)                          |
| 1203835172                   | 428313001(B3BBH9) Sample Duplicate (DUP)   |
| 1203835173                   | Laboratory Control Sample (LCS)            |

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

**Product:** SRTOT\_SEP\_PRECIP\_GPC: COMMON

**Analytical Method:** SRTOT\_SEP\_PRECIP\_GPC

**Analytical Procedure:** GL-RAD-A-004 REV# 18

**Analytical Batch:** 1684045

**Preparation Method:** Dry Soil Prep

**Preparation Procedure:** GL-RAD-A-021 REV# 21

**Preparation Batch:** 1683931

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

| <b><u>GEL Sample ID#</u></b> | <b><u>Client Sample Identification</u></b> |
|------------------------------|--|
| 428313001                    | B3BBH9                                     |
| 1203835309                   | Method Blank (MB)                          |
| 1203835310                   | 428197005(B3BBH5) Sample Duplicate (DUP)   |
| 1203835311                   | Laboratory Control Sample (LCS)            |

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

#### **Data Summary:**

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, with the following exceptions.

#### **Quality Control (QC) Information**

##### **QC Information**

All of the QC samples meet the required acceptance limits with the following exceptions: The sample and the duplicate, 1203835310 (B3BBH5DUP), did not meet the relative error ratio requirement; however both results are less than their respective MDCs.

**Product:** TC99\_SEP\_GPC

**Analytical Method:** TC99\_EIE\_LSC

**Analytical Procedure:** GL-RAD-A-059 REV# 5

**Analytical Batch:** 1684727

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

| <b><u>GEL Sample ID#</u></b> | <b><u>Client Sample Identification</u></b> |
|------------------------------|--|
| 428313001                    | B3BBH9                                     |
| 1203836935                   | Method Blank (MB)                          |
| 1203836936                   | 428197002(B3BBH1) Sample Duplicate (DUP)   |
| 1203836937                   | Laboratory Control Sample (LCS)            |

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

**Data Summary:**

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, with the following exceptions.

**Technical Information****Recounts**

Sample 1203836937 (LCS) was recounted due to low recovery. The recount is reported.

**Product: NI63\_LSC**

**Analytical Method:** NI63\_LSC

**Analytical Procedure:** GL-RAD-A-022 REV# 18

**Analytical Batch:** 1684890

**Preparation Method:** Dry Soil Prep

**Preparation Procedure:** GL-RAD-A-021 REV# 21

**Preparation Batch:** 1683931

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

| <b><u>GEL Sample ID#</u></b> | <b><u>Client Sample Identification</u></b> |
|------------------------------|--|
| 428313001                    | B3BBH9                                     |
| 1203837480                   | Method Blank (MB)                          |
| 1203837481                   | 428197002(B3BBH1) Sample Duplicate (DUP)   |
| 1203837482                   | Laboratory Control Sample (LCS)            |

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

**Product: TRITIUM\_DIST\_LSC: COMMON**

**Analytical Method:** TRITIUM\_DIST\_LSC

**Analytical Procedure:** GL-RAD-A-002 REV# 22

**Analytical Batch:** 1684988

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

| <b><u>GEL Sample ID#</u></b> | <b><u>Client Sample Identification</u></b> |
|------------------------------|--|
| 428313001                    | B3BBH9                                     |

|            |  |
|------------|--|
| 1203837768 | Method Blank (MB)                        |
| 1203837769 | 428313001(B3BBH9) Sample Duplicate (DUP) |
| 1203837770 | 428313001(B3BBH9) Matrix Spike (MS)      |
| 1203837771 | Laboratory Control Sample (LCS)          |

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

**Data Summary:**

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, with the following exceptions.

**Technical Information**

**Recounts**

Samples were recounted due to high MDCs and low recovery. Recounts are reported.

**Miscellaneous Information**

**Additional Comments**

The matrix spike, 1203837770 (B3BBH9MS), aliquot was reduced to conserve sample volume.

**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**

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**Qualifier Definition Report  
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL428313 GEL Work Order: 428313

**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:** Theresa Austin**Date:** 01 AUG 2017**Title:** Group Leader

# Sample Data Summary

**Rad**  
**Certificate of Analysis**  
**Sample Summary**

|  |   |   |
|--|---|---|
| <b>SDG Number:</b> GEL428313             | <b>Client:</b> CPRC001                      | <b>Project:</b> CPRC0F17038               |
| <b>Lab Sample ID:</b> 428313001          | <b>Date Collected:</b> 07/19/2017 10:25     | <b>Matrix:</b> SOIL                       |
|  | <b>Date Received:</b> 07/20/2017 09:10      | <b>%Moisture:</b> 7.6                     |
| <b>Client ID:</b> B3BBH9                 | <b>Method:</b> AMCMISO_EIE_PREC_AEA         | <b>Prep Basis:</b> "Dry Weight Corrected" |
| <b>Batch ID:</b> 1684092                 | <b>Analyst:</b> HAKB                        | <b>SOP Ref:</b> GL-RAD-A-011              |
| <b>Run Date:</b> 07/25/2017 09:04        | <b>Aliquot:</b> 0.112 g                     | <b>Instrument:</b> 1078                   |
| <b>Data File:</b> S0428313001_AM.1A.gcnf | <b>Prep Method:</b> DOE EML HASL-300, Am-05 | <b>Count Time:</b> 240 min                |
| <b>Prep Batch:</b> 1684092               |   | <b>Prep SOP Ref:</b> GL-RAD-A-021         |
| <b>Prep Date:</b> 07/24/2017 00:00       |   |   |

| CAS No.    | Parmname      | Qual | Result | Units | Uncert   | TPU   | MDC   | RDL  |
|------------|---------------|------|--------|-------|----------|-------|-------|------|
| 14596-10-2 | Americium-241 | U    | 0.0681 | pCi/g | +/-0.340 | 0.340 | 0.680 | 1.00 |

| Surrogate/Tracer recovery | Result | Nominal | Units | Recovery% | Acceptable Limits |
|---------------------------|--------|---------|-------|-----------|-------------------|
| Americium-243 Tracer      | 12.9   | 18.7    | pCi/g | 68.9      | (30%-105%)        |

**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).  
 The MDC is a sample specific MDC.

**Rad  
Certificate of Analysis  
Sample Summary**

SDG Number: GEL428313  
Lab Sample ID: 428313001

Client: CPRC001  
Date Collected: 07/19/2017 10:25  
Date Received: 07/20/2017 09:10

Project: CPRC0F17038  
Matrix: SOIL  
%Moisture: 7.6

Client ID: B3BBH9  
Batch ID: 1684093  
Run Date: 07/24/2017 15:30  
Data File: S0428313001\_NP.1A.gcnf  
Prep Batch: 1684093  
Prep Date: 07/24/2017 00:00

Method: ASTM C 1475-00 Modified  
Analyst: HAKB  
Aliquot: 0.101 g  
Prep Method: ASTM C 1475-00 Modified

Prep Basis: "Dry Weight Corrected"  
SOP Ref: GL-RAD-A-032  
Instrument: 1079  
Count Time: 239.9998 min  
Prep SOP Ref: GL-RAD-A-021

| CAS No.    | Parmname      | Qual | Result  | Units | Uncert   | TPU   | MDC   | RDL  |
|------------|---------------|------|---------|-------|----------|-------|-------|------|
| 13994-20-2 | Neptunium-237 | U    | -0.0446 | pCi/g | +/-0.202 | 0.202 | 0.508 | 1.00 |

| Surrogate/Tracer recovery | Result | Nominal | Units | Recovery% | Acceptable Limits |
|---------------------------|--------|---------|-------|-----------|-------------------|
| Americium-243 Tracer      | 2090   | 2120    | pCi/g | 98.7      | (30%-105%)        |

**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).  
The MDC is a sample specific MDC.

**Rad  
Certificate of Analysis  
Sample Summary**

SDG Number: GEL428313  
Lab Sample ID: 428313001

Client: CPRC001  
Date Collected: 07/19/2017 10:25  
Date Received: 07/20/2017 09:10

Project: CPRC0F17038  
Matrix: SOIL  
%Moisture: 7.6

Client ID: B3BBH9  
Batch ID: 1684094  
Run Date: 07/25/2017 09:04  
Data File: S0428313001\_PU.1A.gcnf  
Prep Batch: 1684094  
Prep Date: 07/24/2017 00:00

Method: PUIISO\_PRECIP\_AEA  
Analyst: HAKB  
Aliquot: 0.112 g  
Prep Method: DOE EML HASL-300, Pu-11-

Prep Basis: "Dry Weight Corrected"  
SOP Ref: GL-RAD-A-011  
Instrument: 1085  
Count Time: 240 min  
Prep SOP Ref: GL-RAD-A-021

| CAS No.    | Parmname          | Qual | Result | Units | Uncert   | TPU   | MDC   | RDL  |
|------------|-------------------|------|--------|-------|----------|-------|-------|------|
| I3981-16-3 | Plutonium-238     | U    | 0.373  | pCi/g | +/-0.493 | 0.496 | 0.788 | 1.00 |
| OER-100-70 | Plutonium-239/240 | U    | -0.161 | pCi/g | +/-0.249 | 0.249 | 0.717 | 1.00 |

| Surrogate/Tracer recovery | Result | Nominal | Units | Recovery% | Acceptable Limits |
|---------------------------|--------|---------|-------|-----------|-------------------|
| Plutonium-242 Tracer      | 11.0   | 17.6    | pCi/g | 62.6      | (30%-105%)        |

**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).  
The MDC is a sample specific MDC.

**Rad**  
**Certificate of Analysis**  
**Sample Summary**

SDG Number: GEL428313  
 Lab Sample ID: 428313001

Client: CPRC001  
 Date Collected: 07/19/2017 10:25  
 Date Received: 07/20/2017 09:10

Project: CPRC0F17038  
 Matrix: SOIL  
 %Moisture: 7.6

Client ID: B3BBH9  
 Batch ID: 1684096  
 Run Date: 07/25/2017 09:04  
 Data File: S0428313001\_UU.1A.gcnf  
 Prep Batch: 1684096  
 Prep Date: 07/24/2017 00:00

Method: UIISO\_IE\_PRECIP\_AEA  
 Analyst: HAKB  
 Aliquot: 0.112 g  
 Prep Method: DOE EML HASL-300, U-02-R

Prep Basis: "Dry Weight Corrected"  
 SOP Ref: GL-RAD-A-011  
 Instrument: 1014  
 Count Time: 240 min  
 Prep SOP Ref: GL-RAD-A-021

| CAS No.   | Parmname        | Qual | Result  | Units | Uncert   | TPU   | MDC   | RDL  |
|---|-----------------|------|---------|-------|----------|-------|-------|------|
| U-233/234<br><small>13968-55-3/13966-29-5</small> | Uranium-233/234 |      | 1.06    | pCi/g | +/-0.527 | 0.545 | 0.418 | 1.00 |
| 15117-96-1/13982-7                                | Uranium-235/236 | U    | -0.0707 | pCi/g | +/-0.164 | 0.164 | 0.485 | 1.00 |
| 7440-61-1   | Uranium-238     |      | 0.598   | pCi/g | +/-0.409 | 0.417 | 0.392 | 1.00 |

| Surrogate/Tracer recovery | Result | Nominal | Units | Recovery% | Acceptable Limits |
|---------------------------|--------|---------|-------|-----------|-------------------|
| Uranium-232 Tracer        | 16.3   | 18.8    | pCi/g | 87        | (30%-105%)        |

**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). The MDC is a sample specific MDC.

**Rad**  
**Certificate of Analysis**  
**Sample Summary**

SDG Number: GEL428313  
 Lab Sample ID: 428313001

Client: CPRC001  
 Date Collected: 07/19/2017 10:25  
 Date Received: 07/20/2017 09:10

Project: CPRC0F17038  
 Matrix: SOIL  
 %Moisture: 7.6

Client ID: B3BBH9  
 Batch ID: 1684045  
 Run Date: 07/25/2017 13:01  
 Data File: S1684045.xls  
 Prep Batch: 1684045  
 Prep Date: 07/21/2017 09:00

Method: SRTOT\_SEP\_PRECIP\_GPC  
 Analyst: LXB3  
 Aliquot: 0.326 g  
 Prep Method: EPA 905.0 Modified/DOE RP5

Prep Basis: "Dry Weight Corrected"  
 SOP Ref: GL-RAD-A-004  
 Instrument: PIC8D  
 Count Time: 60 min  
 Prep SOP Ref: GL-RAD-A-021

| CAS No. | Parmname        | Qual | Result | Units | Uncert   | TPU   | MDC  | RDL  |
|---------|-----------------|------|--------|-------|----------|-------|------|------|
| SR-RAD  | Total Strontium | U    | -0.693 | pCi/g | +/-0.746 | 0.746 | 1.63 | 2.00 |

| Surrogate/Tracer recovery | Result | Nominal | Units | Recovery% | Acceptable Limits |
|---------------------------|--------|---------|-------|-----------|-------------------|
| Strontium Carrier         | 6.20   | 7.75    | mg    | 80        | (40%-110%)        |

**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).  
 The MDC is a sample specific MDC.

**Rad**  
**Certificate of Analysis**  
**Sample Summary**

SDG Number: GEL428313  
 Lab Sample ID: 428313001  
  
 Client ID: B3BBH9  
 Batch ID: 1683993  
 Run Date: 07/21/2017 15:42  
 Data File: G428313001.CNF;1  
 Prep Batch: 1683993  
 Prep Date: 07/21/2017 00:00

Client: CPRC001  
 Date Collected: 07/19/2017 10:25  
 Date Received: 07/20/2017 09:10  
  
 Method: GAMMA\_GS  
 Analyst: MXR1  
 Aliquot: 44.021 g  
 Prep Method: DOE HASL 300, 4.5.2.3/Ga-01

Project: CPRC0F17038  
 Matrix: SOIL  
 %Moisture: 7.6  
  
 Prep Basis: "Dry Weight Corrected"  
 SOP Ref: GL-RAD-A-013  
 Instrument: GAM28  
 Count Time: 180 min  
 Prep SOP Ref: GL-RAD-A-021

| CAS No.    | Parmname     | Qual | Result   | Units | Uncert    | TPU    | MDC    | RDL   |
|------------|--------------|------|----------|-------|-----------|--------|--------|-------|
| 10045-97-3 | Cesium-137   | U    | -0.00112 | pCi/g | +/-0.0254 | 0.0254 | 0.0463 | 0.100 |
| 10198-40-0 | Cobalt-60    | U    | 0.0007   | pCi/g | +/-0.0314 | 0.0314 | 0.0607 |       |
| 14683-23-9 | Europium-152 | U    | 0.0185   | pCi/g | +/-0.0614 | 0.0619 | 0.117  |       |
| 15585-10-1 | Europium-154 | U    | 0.067    | pCi/g | +/-0.0845 | 0.090  | 0.181  |       |
| 14391-16-3 | Europium-155 | U    | 0.024    | pCi/g | +/-0.0617 | 0.0627 | 0.111  |       |

| 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).  
 The MDC is a sample specific MDC.

**Rad**  
**Certificate of Analysis**  
**Sample Summary**

|                             |                                       |                           |
|-----------------------------|---------------------------------------|---------------------------|
| SDG Number: GEL428313       | Client: CPRC001                       | Project: CPRC0F17038      |
| Lab Sample ID: 428313001    | Date Collected: 07/19/2017 10:25      | Matrix: SOIL              |
|                             | Date Received: 07/20/2017 09:10       | %Moisture: 7.6            |
| Client ID: B3BBH9           |                                       | Prep Basis: "As Received" |
| Batch ID: 1684727           | Method: TC99_EIE_LSC                  | SOP Ref: GL-RAD-A-059     |
| Run Date: 07/30/2017 07:26  | Analyst: CXS7                         | Instrument: LSCGREEN      |
| Data File: E1684727R.xls    | Aliquot: 1.369 g                      | Count Time: 15 min        |
| Prep Batch: 1684727         | Prep Method: DOE EML HASL-300, Tc-02- |                           |
| Prep Date: 07/25/2017 15:42 |                                       |                           |

| CAS No.    | Parmname      | Qual | Result | Units | Uncert  | TPU  | MDC  | RDL  |
|------------|---------------|------|--------|-------|---------|------|------|------|
| 14133-76-7 | Technetium-99 | U    | -0.533 | pCi/g | +/-1.83 | 1.83 | 3.24 | 5.00 |

| Surrogate/Tracer recovery | Result   | Nominal  | Units | Recovery% | Acceptable Limits |
|---------------------------|----------|----------|-------|-----------|-------------------|
| Technetium-99m Tracer     | 3.85E+05 | 4.22E+05 | CPM   | 91.3      | (30%-105%)        |

**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).  
 The MDC is a sample specific MDC.

**Rad**  
**Certificate of Analysis**  
**Sample Summary**

SDG Number: GEL428313  
Lab Sample ID: 428313001

Client: CPRC001  
Date Collected: 07/19/2017 10:25  
Date Received: 07/20/2017 09:10

Project: CPRC0F17038  
Matrix: SOIL  
%Moisture: 7.6

Client ID: B3BBH9  
Batch ID: 1684890  
Run Date: 07/26/2017 18:56  
Data File: N1684890.xls  
Prep Batch: 1684890  
Prep Date: 07/25/2017 10:02

Method: NI63\_LSC  
Analyst: TXJ1  
Aliquot: 0.505 g  
Prep Method: DOE RESL Ni-1, Modified

Prep Basis: "Dry Weight Corrected"  
SOP Ref: GL-RAD-A-022  
Instrument: LSCGOLD  
Count Time: 30 min  
Prep SOP Ref: GL-RAD-A-021

| CAS No. | Parmname  | Qual | Result | Units | Uncert  | TPU  | MDC  | RDL  |
|---------|-----------|------|--------|-------|---------|------|------|------|
| NI-63   | Nickel-63 | U    | -5.73  | pCi/g | +/-4.60 | 4.60 | 8.26 | 10.0 |

| Surrogate/Tracer recovery | Result | Nominal | Units | Recovery% | Acceptable Limits |
|---------------------------|--------|---------|-------|-----------|-------------------|
| Nickel Carrier            | 17.8   | 25.2    | mg    | 70.6      | (40%-110%)        |

**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).  
The MDC is a sample specific MDC.

**Rad**  
**Certificate of Analysis**  
**Sample Summary**

|                             |                                  |                           |
|-----------------------------|----------------------------------|---------------------------|
| SDG Number: GEL428313       | Client: CPRC001                  | Project: CPRC0F17038      |
| Lab Sample ID: 428313001    | Date Collected: 07/19/2017 10:25 | Matrix: SOIL              |
|                             | Date Received: 07/20/2017 09:10  | %Moisture: 7.6            |
| Client ID: B3BBH9           |                                  | Prep Basis: "As Received" |
| Batch ID: 1684988           | Method: TRITIUM_DIST_LSC         | SOP Ref: GL-RAD-A-002     |
| Run Date: 07/26/2017 08:59  | Analyst: BXM4                    | Instrument: LSCBLUE       |
| Data File: T1684988R2.xls   | Aliquot: 1.25 g                  | Count Time: 20 min        |
| Prep Batch: 1684988         | Prep Method: EPA 906.0 Modified  |                           |
| Prep Date: 07/25/2017 09:02 |                                  |                           |

| CAS No.    | Parmname | Qual | Result | Units | Uncert  | TPU  | MDC  | RDL  |
|------------|----------|------|--------|-------|---------|------|------|------|
| 10028-17-8 | Tritium  | U    | -6.71  | pCi/g | +/-13.1 | 13.1 | 24.4 | 30.0 |

| 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).  
 The MDC is a sample specific MDC.

**Rad**  
**Certificate of Analysis**  
**Sample Summary**

SDG Number: GEL428313  
Lab Sample ID: 428313001

Client: CPRC001  
Date Collected: 07/19/2017 10:25  
Date Received: 07/20/2017 09:10

Project: CPRC0F17038  
Matrix: SOIL  
%Moisture: 7.6

**Rad**  
**Certificate of Analysis**  
**Sample Summary**

**SDG Number:** GEL428313  
**Lab Sample ID:** 428313002

**Client:** CPRC001  
**Date Collected:** 07/19/2017 10:25  
**Date Received:** 07/20/2017 09:10

**Project:** CPRC0F17038  
**Matrix:** SOIL  
**%Moisture:** 5.5

# Quality Control Summary

## GEL LABORATORIES LLC

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

QC Summary

Report Date: August 1, 2017

Page 1 of 6

Client : CH2MHill Plateau Remediation Company  
 MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Workorder: 428313

| Parmname               | NOM       | Sample | Qual   | QC      | Units    | QC Criteria | Range      | Analyst    | Date Time     |
|------------------------|-----------|--------|--------|---------|----------|-------------|------------|------------|---------------|
| <b>Rad Alpha Spec</b>  |           |        |        |         |          |             |            |            |               |
| Batch                  | 1684092   |        |        |         |          |             |            |            |               |
| QC1203835456           | MB        |        |        |         |          |             |            |            |               |
| Americium-241          |           |        | U      | 0.0585  | pCi/g    |             |            | HAKB       | 07/25/1709:04 |
|                        |           |        |        | Uncert: |          |             |            |            |               |
|                        |           |        |        | TPU:    |          |             |            |            |               |
| **Americium-243 Tracer | 18.7      |        |        | 15.2    | pCi/g    | REC: 81     | (30%-105%) |            |               |
|                        |           |        |        | Uncert: |          |             |            |            |               |
|                        |           |        |        | TPU:    |          |             |            |            |               |
| QC1203835457           | 428197002 | DUP    |        |         |          |             |            |            |               |
| Americium-241          |           | U      | 0.171  | U       | 0.0628   | pCi/g       |            |            | 07/25/1709:04 |
|                        |           |        |        | Uncert: | +/-0.277 |             |            | RPD: 0     | N/A           |
|                        |           |        |        | TPU:    | +/-0.278 |             |            | RER: 0.582 | (0-2)         |
| **Americium-243 Tracer | 20.0      |        | 17.6   | 15.3    | pCi/g    | REC: 77     | (30%-105%) |            |               |
|                        |           |        |        | Uncert: | +/-2.13  |             |            |            |               |
|                        |           |        |        | TPU:    | +/-3.28  |             |            |            |               |
| QC1203835458           | LCS       |        |        |         |          |             |            |            |               |
| Americium-241          |           |        |        | 15.2    | pCi/g    | REC: 86     | (80%-120%) |            | 07/25/1714:26 |
|                        |           |        |        | Uncert: | +/-2.03  |             |            |            |               |
|                        |           |        |        | TPU:    | +/-2.91  |             |            |            |               |
| **Americium-243 Tracer | 18.7      |        |        | 17.8    | pCi/g    | REC: 95     | (30%-105%) |            |               |
|                        |           |        |        | Uncert: | +/-2.23  |             |            |            |               |
|                        |           |        |        | TPU:    | +/-3.40  |             |            |            |               |
| Batch                  | 1684093   |        |        |         |          |             |            |            |               |
| QC1203835459           | MB        |        |        |         |          |             |            |            |               |
| Neptunium-237          |           |        | U      | -0.0222 | pCi/g    |             |            | HAKB       | 07/25/1709:54 |
|                        |           |        |        | Uncert: | +/-0.154 |             |            |            |               |
|                        |           |        |        | TPU:    | +/-0.154 |             |            |            |               |
| **Americium-243 Tracer | 1890      |        |        | 1930    | pCi/g    | REC: 102    | (30%-105%) |            |               |
| QC1203835460           | 428197002 | DUP    |        |         |          |             |            |            |               |
| Neptunium-237          |           | U      | 0.0382 | U       | -0.0383  | pCi/g       |            |            | 07/24/1715:30 |
|                        |           |        |        | Uncert: | +/-0.171 |             |            | RPD: 0     | N/A           |
|                        |           |        |        | TPU:    | +/-0.171 |             |            | RER: 0.615 | (0-2)         |
| **Americium-243 Tracer | 2060      |        | 1930   | 2030    | pCi/g    | REC: 99     | (30%-105%) |            |               |
| QC1203835461           | LCS       |        |        |         |          |             |            |            |               |
| Neptunium-237          |           |        |        | 45.3    | pCi/g    | REC: 115    | (80%-120%) |            | 07/24/1715:30 |
|                        |           |        |        | Uncert: | +/-3.66  |             |            |            |               |
|                        |           |        |        | TPU:    | +/-6.16  |             |            |            |               |
| **Americium-243 Tracer | 1890      |        |        | 1610    | pCi/g    | REC: 85     | (30%-105%) |            |               |
| Batch                  | 1684094   |        |        |         |          |             |            |            |               |
| QC1203835462           | MB        |        |        |         |          |             |            |            |               |
| Plutonium-238          |           |        | U      | 0.188   | pCi/g    |             |            | HAKB       | 07/25/1709:04 |
|                        |           |        |        | Uncert: | +/-0.257 |             |            |            |               |
|                        |           |        |        | TPU:    | +/-0.258 |             |            |            |               |
| Plutonium-239/240      |           |        | U      | -0.138  | pCi/g    |             |            |            |               |
|                        |           |        |        | Uncert: | +/-0.144 |             |            |            |               |

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**QC Summary**

Workorder: 428313

Page 2 of 6

| Parname                    | NOM     | Sample   | Qual | QC       | Units | QC Criteria | Range          | Analyst | Date Time     |
|----------------------------|---------|----------|------|----------|-------|-------------|----------------|---------|---------------|
| <b>Rad Alpha Spec</b>      |         |          |      |          |       |             |                |         |               |
| Batch                      | 1684094 |          |      |          |       |             |                |         |               |
| **Plutonium-242 Tracer     | TPU:    |          |      | +/-0.144 |       |             |                |         |               |
|                            | 17.6    |          |      | 15.9     | pCi/g | REC:        | 90 (30%-105%)  |         |               |
|                            | Uncert: |          |      | +/-1.97  |       |             |                |         |               |
|                            | TPU:    |          |      | +/-2.97  |       |             |                |         |               |
| QC1203835463 428197002 DUP |         |          |      |          |       |             |                |         |               |
| Plutonium-238              | U       | 0.101    | U    | -0.38    | pCi/g |             |                |         | 07/25/1709:04 |
|                            | Uncert: | +/-0.279 |      | +/-0.443 |       | RPD:        | 0 N/A          |         |               |
|                            | TPU:    | +/-0.279 |      | +/-0.443 |       | RER:        | 1.8 (0-2)      |         |               |
| Plutonium-239/240          | U       | -0.263   | U    | -0.0216  | pCi/g |             |                |         |               |
|                            | Uncert: | +/-0.273 |      | +/-0.324 |       | RPD:        | 0 N/A          |         |               |
|                            | TPU:    | +/-0.273 |      | +/-0.325 |       | RER:        | 1.11 (0-2)     |         |               |
| **Plutonium-242 Tracer     | 18.7    | 11.0     |      | 10.7     | pCi/g | REC:        | 57 (30%-105%)  |         |               |
|                            | Uncert: | +/-2.37  |      | +/-2.81  |       |             |                |         |               |
|                            | TPU:    | +/-3.51  |      | +/-4.11  |       |             |                |         |               |
| QC1203835464 LCS           |         |          |      |          |       |             |                |         |               |
| Plutonium-238              |         |          | U    | 0.0581   | pCi/g |             |                |         |               |
|                            | Uncert: |          |      | +/-0.163 |       |             |                |         |               |
|                            | TPU:    |          |      | +/-0.164 |       |             |                |         |               |
| Plutonium-239/240          | 17.6    |          |      | 17.9     | pCi/g | REC:        | 102 (80%-120%) |         |               |
|                            | Uncert: |          |      | +/-2.01  |       |             |                |         |               |
|                            | TPU:    |          |      | +/-3.04  |       |             |                |         |               |
| **Plutonium-242 Tracer     | 17.6    |          |      | 16.3     | pCi/g | REC:        | 93 (30%-105%)  |         |               |
|                            | Uncert: |          |      | +/-2.00  |       |             |                |         |               |
|                            | TPU:    |          |      | +/-3.00  |       |             |                |         |               |
| Batch                      | 1684096 |          |      |          |       |             |                |         |               |
| QC1203835465 MB            |         |          |      |          |       |             |                |         |               |
| Uranium-233/234            |         |          | U    | 0.280    | pCi/g |             |                | HAKB    | 07/25/1709:04 |
|                            | Uncert: |          |      | +/-0.286 |       |             |                |         |               |
|                            | TPU:    |          |      | +/-0.289 |       |             |                |         |               |
| Uranium-235/236            |         |          | U    | 0.172    | pCi/g |             |                |         |               |
|                            | Uncert: |          |      | +/-0.248 |       |             |                |         |               |
|                            | TPU:    |          |      | +/-0.249 |       |             |                |         |               |
| Uranium-238                |         |          | U    | 0.0141   | pCi/g |             |                |         |               |
|                            | Uncert: |          |      | +/-0.148 |       |             |                |         |               |
|                            | TPU:    |          |      | +/-0.148 |       |             |                |         |               |
| **Uranium-232 Tracer       | 18.8    |          |      | 19.1     | pCi/g | REC:        | 102 (30%-105%) |         |               |
|                            | Uncert: |          |      | +/-1.93  |       |             |                |         |               |
|                            | TPU:    |          |      | +/-3.06  |       |             |                |         |               |
| QC1203835466 428197002 DUP |         |          |      |          |       |             |                |         |               |
| Uranium-233/234            |         | 0.775    |      | 0.545    | pCi/g |             |                |         |               |
|                            | Uncert: | +/-0.517 |      | +/-0.422 |       | RPD:        | 35 (0% - 100%) |         |               |
|                            | TPU:    | +/-0.529 |      | +/-0.428 |       | RER:        | 0.662 (0-2)    |         |               |
| Uranium-235/236            | U       | 0.0708   | U    | 0.308    | pCi/g |             |                |         |               |
|                            | Uncert: | +/-0.266 |      | +/-0.352 |       | RPD:        | 0 N/A          |         |               |
|                            | TPU:    | +/-0.266 |      | +/-0.355 |       | RER:        | 1.05 (0-2)     |         |               |
| Uranium-238                |         | 0.567    |      | 0.513    | pCi/g |             |                |         |               |
|                            | Uncert: | +/-0.448 |      | +/-0.385 |       | RPD:        | 10 (0% - 100%) |         |               |
|                            | TPU:    | +/-0.455 |      | +/-0.390 |       | RER:        | 0.177 (0-2)    |         |               |
| **Uranium-232 Tracer       | 20.0    | 17.0     |      | 18.3     | pCi/g | REC:        | 92 (30%-105%)  |         |               |
|                            | Uncert: | +/-2.39  |      | +/-2.14  |       |             |                |         |               |

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

**QC Summary**

Workorder: 428313

Page 3 of 6

| Parmname              | NOM       | Sample  | Qual      | QC        | Units     | QC Criteria | Range       | Analyst | Date          | Time          |
|-----------------------|-----------|---------|-----------|-----------|-----------|-------------|-------------|---------|---------------|---------------|
| <b>Rad Alpha Spec</b> |           |         |           |           |           |             |             |         |               |               |
| Batch                 | 1684096   |         |           |           |           |             |             |         |               |               |
| QC1203835467          | LCS       | TPU:    | +/-3.68   | +/-3.38   |           |             |             |         |               |               |
| Uranium-233/234       |           |         |           | 23.9      | pCi/g     |             |             |         |               |               |
|                       |           | Uncert: |           | +/-2.18   |           |             |             |         |               |               |
|                       |           | TPU:    |           | +/-3.74   |           |             |             |         |               |               |
| Uranium-235/236       |           |         |           | 1.81      | pCi/g     |             |             |         |               |               |
|                       |           | Uncert: |           | +/-0.685  |           |             |             |         |               |               |
|                       |           | TPU:    |           | +/-0.723  |           |             |             |         |               |               |
| Uranium-238           | 24.1      |         |           | 23.6      | pCi/g     | REC: 98     | (80%-120%)  |         |               |               |
|                       |           | Uncert: |           | +/-2.16   |           |             |             |         |               |               |
|                       |           | TPU:    |           | +/-3.71   |           |             |             |         |               |               |
| **Uranium-232 Tracer  | 18.8      |         |           | 19.5      | pCi/g     | REC: 104    | (30%-105%)  |         |               |               |
|                       |           | Uncert: |           | +/-1.95   |           |             |             |         |               |               |
|                       |           | TPU:    |           | +/-3.09   |           |             |             |         |               |               |
| <b>Rad Gamma Spec</b> |           |         |           |           |           |             |             |         |               |               |
| Batch                 | 1683993   |         |           |           |           |             |             |         |               |               |
| QC1203835171          | MB        |         |           |           |           |             |             |         |               |               |
| Cesium-137            |           |         | U         | -0.0244   | pCi/g     |             |             | MXR1    | 07/25/1708:54 |               |
|                       |           | Uncert: |           | +/-0.0263 |           |             |             |         |               |               |
|                       |           | TPU:    |           | +/-0.0286 |           |             |             |         |               |               |
| Cobalt-60             |           |         | U         | -0.0136   | pCi/g     |             |             |         |               |               |
|                       |           | Uncert: |           | +/-0.0284 |           |             |             |         |               |               |
|                       |           | TPU:    |           | +/-0.0291 |           |             |             |         |               |               |
| Europium-152          |           |         | U         | 0.0184    | pCi/g     |             |             |         |               |               |
|                       |           | Uncert: |           | +/-0.0606 |           |             |             |         |               |               |
|                       |           | TPU:    |           | +/-0.0612 |           |             |             |         |               |               |
| Europium-154          |           |         | U         | -0.0422   | pCi/g     |             |             |         |               |               |
|                       |           | Uncert: |           | +/-0.0688 |           |             |             |         |               |               |
|                       |           | TPU:    |           | +/-0.0715 |           |             |             |         |               |               |
| Europium-155          |           |         | U         | 0.0166    | pCi/g     |             |             |         |               |               |
|                       |           | Uncert: |           | +/-0.0556 |           |             |             |         |               |               |
|                       |           | TPU:    |           | +/-0.0561 |           |             |             |         |               |               |
| QC1203835172          | 428313001 | DUP     |           |           |           |             |             |         |               |               |
| Cesium-137            |           | U       | -0.00112  | U         | 0.0108    | pCi/g       |             |         |               | 07/25/1708:55 |
|                       |           | Uncert: | +/-0.0254 |           | +/-0.0311 |             | RPD: 0      | N/A     |               |               |
|                       |           | TPU:    | +/-0.0254 |           | +/-0.0315 |             | RER: 0.579  | (0-2)   |               |               |
| Cobalt-60             |           | U       | 0.0007    | U         | -0.0317   | pCi/g       |             |         |               |               |
|                       |           | Uncert: | +/-0.0314 |           | +/-0.0413 |             | RPD: 0      | N/A     |               |               |
|                       |           | TPU:    | +/-0.0314 |           | +/-0.0438 |             | RER: 1.18   | (0-2)   |               |               |
| Europium-152          |           | U       | 0.0185    | U         | 0.0218    | pCi/g       |             |         |               |               |
|                       |           | Uncert: | +/-0.0614 |           | +/-0.0912 |             | RPD: 0      | N/A     |               |               |
|                       |           | TPU:    | +/-0.0619 |           | +/-0.0917 |             | RER: 0.0597 | (0-2)   |               |               |
| Europium-154          |           | U       | 0.067     | U         | 0.0298    | pCi/g       |             |         |               |               |
|                       |           | Uncert: | +/-0.0845 |           | +/-0.102  |             | RPD: 0      | N/A     |               |               |
|                       |           | TPU:    | +/-0.090  |           | +/-0.103  |             | RER: 0.534  | (0-2)   |               |               |
| Europium-155          |           | U       | 0.024     | U         | 0.0398    | pCi/g       |             |         |               |               |
|                       |           | Uncert: | +/-0.0617 |           | +/-0.0745 |             | RPD: 0      | N/A     |               |               |
|                       |           | TPU:    | +/-0.0627 |           | +/-0.0767 |             | RER: 0.313  | (0-2)   |               |               |
| QC1203835173          | LCS       |         |           |           |           |             |             |         |               |               |
| Americium-241         | 686       |         |           | 713       | pCi/g     | REC: 104    | (80%-120%)  |         |               | 07/25/1708:55 |

**GEL LABORATORIES LLC**

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

**QC Summary**

Workorder: 428313

Page 4 of 6

| Parmname                        | NOM       | Sample | Qual    | QC       | Units    | QC Criteria | Range      | Analyst | Date Time     |
|---------------------------------|-----------|--------|---------|----------|----------|-------------|------------|---------|---------------|
| <b>Rad Gamma Spec</b>           |           |        |         |          |          |             |            |         |               |
| Batch                           | 1683993   |        |         |          |          |             |            |         |               |
|                                 |           |        |         | Uncert:  |          |             |            |         |               |
|                                 |           |        |         | TPU:     |          |             |            |         |               |
| Cesium-137                      | 220       |        |         | 245      | pCi/g    | REC: 111    | (80%-120%) |         |               |
|                                 |           |        |         | Uncert:  |          |             |            |         |               |
|                                 |           |        |         | TPU:     |          |             |            |         |               |
| Cobalt-60                       | 126       |        |         | 135      | pCi/g    | REC: 107    | (80%-120%) |         |               |
|                                 |           |        |         | Uncert:  |          |             |            |         |               |
|                                 |           |        |         | TPU:     |          |             |            |         |               |
| Europium-152                    |           |        | U       | 0.202    | pCi/g    |             |            |         |               |
|                                 |           |        |         | Uncert:  |          |             |            |         |               |
|                                 |           |        |         | TPU:     |          |             |            |         |               |
| Europium-154                    |           |        | U       | -0.00766 | pCi/g    |             |            |         |               |
|                                 |           |        |         | Uncert:  |          |             |            |         |               |
|                                 |           |        |         | TPU:     |          |             |            |         |               |
| Europium-155                    |           |        | U       | 1.12     | pCi/g    |             |            |         |               |
|                                 |           |        |         | Uncert:  |          |             |            |         |               |
|                                 |           |        |         | TPU:     |          |             |            |         |               |
| <b>Rad Gas Flow</b>             |           |        |         |          |          |             |            |         |               |
| Batch                           | 1684045   |        |         |          |          |             |            |         |               |
| QC1203835309                    | MB        |        |         |          |          |             |            |         |               |
| Total Strontium                 |           |        | U       | 1.02     | pCi/g    |             |            | LXB3    | 07/25/1713:01 |
|                                 |           |        |         | Uncert:  |          |             |            |         |               |
|                                 |           |        |         | TPU:     |          |             |            |         |               |
| **Strontium Carrier             |           |        |         | 7.75     | mg       | REC: 94     | (40%-110%) |         |               |
| QC1203835310                    | 428197005 | DUP    |         |          |          |             |            |         |               |
| Total Strontium                 |           | U      | 0.122   | U        | -0.897   |             |            |         | 07/25/1713:01 |
|                                 |           |        | Uncert: | +/-0.769 | +/-0.627 | RPD: 0      | N/A        |         |               |
|                                 |           |        | TPU:    | +/-0.769 | +/-0.627 | RER: 2.01   | (0-2)      |         |               |
| **Strontium Carrier             |           |        |         | 7.75     | mg       | REC: 89     | (40%-110%) |         |               |
| QC1203835311                    | LCS       |        |         |          |          |             |            |         |               |
| Total Strontium                 |           |        |         | 68.4     | pCi/g    | REC: 114    | (80%-120%) |         | 07/25/1713:01 |
|                                 |           |        |         | Uncert:  | +/-4.52  |             |            |         |               |
|                                 |           |        |         | TPU:     | +/-20.3  |             |            |         |               |
| **Strontium Carrier             |           |        |         | 7.75     | mg       | REC: 77     | (40%-110%) |         |               |
| <b>Rad Liquid Scintillation</b> |           |        |         |          |          |             |            |         |               |
| Batch                           | 1684727   |        |         |          |          |             |            |         |               |
| QC1203836935                    | MB        |        |         |          |          |             |            |         |               |
| Technetium-99                   |           |        | U       | 0.525    | pCi/g    |             |            | CXS7    | 07/30/1708:31 |
|                                 |           |        |         | Uncert:  | +/-1.81  |             |            |         |               |
|                                 |           |        |         | TPU:     | +/-1.81  |             |            |         |               |
| **Technetium-99m Tracer         |           |        |         | 4.22E+05 | CPM      | REC: 90     | (30%-105%) |         |               |
| QC1203836936                    | 428197002 | DUP    |         |          |          |             |            |         |               |
| Technetium-99                   |           | U      | -0.455  | U        | 1.37     |             |            |         | 07/30/1708:47 |
|                                 |           |        | Uncert: | +/-1.75  | +/-2.26  | RPD: 0      | N/A        |         |               |
|                                 |           |        | TPU:    | +/-1.75  | +/-2.27  | RER: 1.25   | (0-2)      |         |               |
| **Technetium-99m Tracer         |           |        |         | 4.22E+05 | CPM      | REC: 87     | (30%-105%) |         |               |
| QC1203836937                    | LCS       |        |         |          |          |             |            |         |               |
| Technetium-99                   |           |        |         | 59.3     | pCi/g    | REC: 89     | (80%-120%) |         | 08/01/1706:53 |
|                                 |           |        |         | Uncert:  | +/-3.56  |             |            |         |               |

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

**QC Summary**

Workorder: 428313

Page 5 of 6

| Parname                         | NOM       | Sample  | Qual    | QC       | Units   | QC Criteria | Range      | Analyst    | Date Time     |
|---------------------------------|-----------|---------|---------|----------|---------|-------------|------------|------------|---------------|
| <b>Rad Liquid Scintillation</b> |           |         |         |          |         |             |            |            |               |
| Batch                           | 1684727   |         |         |          |         |             |            |            |               |
|                                 |           | TPU:    |         | +/-6.99  |         |             |            |            |               |
| **Technetium-99m Tracer         | 4.22E+05  |         |         | 3.46E+05 | CPM     | REC: 82     | (30%-105%) |            |               |
| Batch                           | 1684890   |         |         |          |         |             |            |            |               |
| QC1203837480                    | MB        |         |         |          |         |             |            |            |               |
| Nickel-63                       |           |         | U       | -1.04    | pCi/g   |             |            | TXJ1       | 07/26/1721:03 |
|                                 |           | Uncert: |         | +/-3.86  |         |             |            |            |               |
|                                 |           | TPU:    |         | +/-3.86  |         |             |            |            |               |
| **Nickel Carrier                | 25.2      |         |         | 21.1     | mg      | REC: 84     | (40%-110%) |            |               |
| QC1203837481                    | 428197002 | DUP     |         |          |         |             |            |            |               |
| Nickel-63                       |           | U       | -5.74   | U        | -2.56   |             |            |            | 07/26/1721:35 |
|                                 |           | Uncert: | +/-4.29 |          | +/-4.14 | RPD: 0      | N/A        |            |               |
|                                 |           | TPU:    | +/-4.29 |          | +/-4.14 | RER: 1.05   | (0-2)      |            |               |
| **Nickel Carrier                | 25.2      |         | 18.8    |          | 19.8    | mg          | REC: 79    | (40%-110%) |               |
| QC1203837482                    | LCS       |         |         |          |         |             |            |            |               |
| Nickel-63                       |           |         |         |          | 233     | pCi/g       | REC: 91    | (80%-120%) | 07/26/1722:06 |
|                                 |           | Uncert: |         |          | +/-8.80 |             |            |            |               |
|                                 |           | TPU:    |         |          | +/-43.9 |             |            |            |               |
| **Nickel Carrier                | 25.2      |         |         |          | 20.3    | mg          | REC: 81    | (40%-110%) |               |
| Batch                           | 1684988   |         |         |          |         |             |            |            |               |
| QC1203837768                    | MB        |         |         |          |         |             |            |            |               |
| Tritium                         |           |         | U       | -3.81    | pCi/g   |             |            | BXM4       | 07/26/1710:25 |
|                                 |           | Uncert: |         | +/-11.6  |         |             |            |            |               |
|                                 |           | TPU:    |         | +/-11.6  |         |             |            |            |               |
| QC1203837769                    | 428313001 | DUP     |         |          |         |             |            |            |               |
| Tritium                         |           | U       | -6.71   | U        | -5.17   | pCi/g       |            |            | 07/26/1710:47 |
|                                 |           | Uncert: | +/-13.1 |          | +/-11.5 | RPD: 0      | N/A        |            |               |
|                                 |           | TPU:    | +/-13.1 |          | +/-11.5 | RER: 0.173  | (0-2)      |            |               |
| QC1203837770                    | 428313001 | MS      |         |          |         |             |            |            |               |
| Tritium                         |           | 150     | U       | -6.71    | 154     | pCi/g       | REC: 103   | (75%-125%) | 07/26/1707:55 |
|                                 |           | Uncert: | +/-13.1 |          | +/-33.4 |             |            |            |               |
|                                 |           | TPU:    | +/-13.1 |          | +/-48.4 |             |            |            |               |
| QC1203837771                    | LCS       |         |         |          |         |             |            |            |               |
| Tritium                         |           | 88.0    |         |          | 71.8    | pCi/g       | REC: 82    | (80%-120%) | 07/27/1707:44 |
|                                 |           | Uncert: |         |          | +/-20.8 |             |            |            |               |
|                                 |           | TPU:    |         |          | +/-26.4 |             |            |            |               |

**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
- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- B The associated QC sample blank has a result >= 2X the MDA and, after corrections, result is >= MDA for this sample
- 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.

**GEL LABORATORIES LLC**

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

**QC Summary**

Workorder: 428313

Page 6 of 6

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

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.