

July 14, 2017



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July 13, 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: 426775
SDG: GEL426775

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 30, 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,

B Luthman
Brielle Luthman for
Heather Shaffer
Project Manager

Purchase Order: 304528 - 8C
Chain of Custody: F17-038-003 and F17-038-004
Enclosures



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Case Narrative

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General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF F17-038
SDG: GEL426775

July 13, 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 June 30, 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:

| Laboratory Identification | Sample Description |
|----------------------------------|---------------------------|
| 426775001 | B3BBC3 |
| 426775002 | B3BBC4 |

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.

July 14, 2017

B. Luthman
Brielle Luthman for
Heather Shaffer
Project Manager

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Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL426775
Work Order #: 426775

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.

Quality Control (QC) Information

Method Blank (MB) Statement

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 |
|-----------------|-----------|--------------------------|
| 1203822689 (MB) | Potassium | 6060 betw (5960 - 11600) |

Technical Information

Sample Dilutions

Sample was diluted for titanium in order to bring raw values within the linear range of the instrument, and for the analytes interfered with, in order to ensure that the inter-element correction factors were valid. 426775002 (B3BBC4).

| Analyte | 426775 |
|----------|--------|
| | 002 |
| Antimony | 5X |
| Cadmium | 5X |
| Cobalt | 5X |
| Lead | 5X |
| Vanadium | 5X |
| Zinc | 5X |

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. 426775002 (B3BBC4).

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

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 analyte. The post spike recovery was within the required control limits. This verifies the absence of a matrix interference in the post-spike digested sample. The recovery may be attributed to possible sample matrix interference and/or non-homogeneity.

| Sample | Analyte | Value |
|-----------------------|----------|------------------|
| 1203822717 (B3BBC4MS) | Selenium | 73.8* (75%-125%) |

Technical Information

Sample Dilutions

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

| | |
|------------|--------|
| Analyte | 426775 |
| | 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 samples 1203822466 (LCS) and 1203822467 (LCSD) were 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 1203823415 (B3BBC4DUP) and 426775002 (B3BBC4) 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

Duplicate Relative Percent Difference (RPD) Statement

The Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample:

| Analyte | Sample | Value |
|-------------------|------------------------|----------------------------------|
| Nitrogen, Ammonia | 1203822805 (B3BBC4DUP) | abs(6.59 - 3.3)* (+/-2.32 mg/kg) |

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

UIISO_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 1203824495 (MB) was recounted due to a peak shift. The recount is reported.

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

Samples 1203824512 (LCS) and 426775001 (B3BBC3) were recounted due to a peak shift. The recounts are reported. Sample 1203824510 (MB) was recounted due to poor resolution. The recount is reported.

NP237_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.

PUISO_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.

Quality Control (QC) Information

QC Information

Refer to Miscellaneous Information section.

Technical Information

Recounts

Sample 426775001 (B3BBC3) was recounted due to a peak shift. The recount is reported.

Miscellaneous Information

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

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, 1203823037 (B3BBC3DUP) and 426775001 (B3BBC3), Cs137 relative error ratio is greater than 2; however, both results are less than their respective MDCs.

SRTOT_SEP_PRECIP_GPC: 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.

NI63_LSC

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

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applicable, with the following exceptions.

Technical Information

Recounts

Sample 1203822860 (MB) was recounted due to a suspected blank false positive. The recount is reported.

TC99_SEP_GPC

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

Sample Re-prep/Re-analysis

Samples were reprepared due to low recovery. The re-analysis is being reported.

Miscellaneous Information

Additional Comments

The matrix spike, 1203827285 (B3BBC3MS), 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

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| | | | | | |
|---------------------------------------|------------------------------------------------------------------------|-----------------------------------------------|----------------------------------|----------------------------------------------------------|-----------------------------------------|
| CH2M Hill Plateau Remediation Company | | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | | F17-038-003 | PAGE 1 OF 1 |
| COLLECTOR Malcom Chum CHPRC | COMPANY CONTACT LYNCH, SA | TELEPHONE NO. 373-5586 | PROJECT COORDINATOR LYNCH, SA | PRICE CODE 8C | DATA TURNAROUND 15 Days / 15 Days |
| SAMPLING LOCATION C9617, I-001 | PROJECT DESIGNATION 200-EA-1 OPPORTUNISTIC SAMPLING AT C9617 - SOIL | SAF NO. F17-038 | | AIR QUALITY | |
| ICE CHEST NO. 6ws 609 | FIELD LOGBOOK NO. HNF-6454 | ACTUAL SAMPLE DEPTH 35.5-38' | COA 304528 | METHOD OF SHIPMENT FEDERAL EXPRESS ORIGINAL | |
| SHIPPED TO GEL Laboratories, LLC | OFFSITE PROPERTY NO. 8123 | BILL OF LADING/AIR BILL NO. 7796 2800 0400 | | | |

| MATRIX* | POSSIBLE SAMPLE HAZARDS/ REMARKS | PRESERVATION | HOLDING TIME | TYPE OF CONTAINER | NO. OF CONTAINER(S) | VOLUME | SAMPLE ANALYSIS | SAMPLE DATE | SAMPLE TIME | MATRIX* |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------|-------------------|---------------------|--------|--------------------------------------------|-------------|-------------|---------|
| A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe 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. | None | 6 Months | G/P | 1 | 125mL | GAMMA_GS: COMMON; | JUN 29 2017 | 0935 | SOIL |
| | SPECIAL HANDLING AND/OR STORAGE RADIOACTIVE THE TO: B3BBCT 426/8/17 | None | 30 Days | G/P | 1 | 60mL | 7196_CRB: COMMON; | | | |
| B3BBCT | | None | 6 Months | G/P | 1 | 60mL | SEE ITEM (1) IN SPECIAL INSTRUCTIONS | | | |
| | | None | 6 Months | G/P | 1 | 60mL | SEE ITEM (2) IN SPECIAL INSTRUCTIONS | | | |

| CHAIN OF POSSESSION | SIGN/ PRINT NAMES | SPECIAL INSTRUCTIONS |
|---------------------------------------------------------|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| RELINQUISHED BY/REMOVED FROM Malcom Chum CHPRC | RECEIVED BY/STORED IN Janelle Zunker | TRVL-17-159;** Analyses are listed in order of priority if reduced sample volume is collected |
| RELINQUISHED BY/REMOVED FROM Janelle Zunker CHPRC | RECEIVED BY/STORED IN FEDEX | (1) AMCMISO_IE_PRECIP_AEA: COMMON; NP237_IE_PRECIP_AEA: COMMON; PUIISO_IE_PRECIP_AEA: COMMON; UISO_IE_PRECIP_AEA: COMMON; TRITIUM_DIST_LSC: COMMON; |
| RELINQUISHED BY/REMOVED FROM F E D E X | RECEIVED BY/STORED IN STACY BOONC | (2) TC99_SEP_GPC: COMMON; NI63_LSC: COMMON; SRTOT_SEP_PRECIP_GPC: COMMON; |
| 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 | |
| LABORATORY SECTION | RECEIVED BY | TITLE |
| FINAL SAMPLE DISPOSITION | DISPOSAL METHOD | DATE/TIME |
| PRINTED ON 6/8/2017 | FSR ID = FSR46063 | TRVL NUM = TRVL-17-159 |

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| | | | | | |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-------------------------------------------------|-----------------------------------------------|-------------|
| CH2M Hill Plateau Remediation Company | | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | | FL17-038-004 | PAGE 1 OF 1 |
| COLLECTOR | Malcolm Chamm CHPRC | COMPANY CONTACT | LYNCH, SA | PROJECT COORDINATOR | LYNCH, SA |
| SAMPLING LOCATION | C9617, I-001 | PROJECT DESIGNATION | 200-EA-1 OPPORTUNISTIC SAMPLING AT C9617 - SOIL | SAF NO. | FL17-038 |
| ICE CHEST NO. | 6WS-609 | FIELD LOGBOOK NO. | #INF-645-4 | COA | 304528 |
| SHIPPED TO | GEL Laboratories, LLC | OFFSITE PROPERTY NO. | 8123 | BILL OF LADING/AIR BILL NO. 7795 2800 0400 | |
| MATRIX* | A=Air DL=Drum L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other | PRESCRIPTION | None | | |
| POSSIBLE SAMPLE HAZARDS/REMARKS | *Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1. | HOLDING TIME | 28 Days/48 Hours | | |
| SPECIAL HANDLING AND/OR STORAGE | -RADIOACTIVE- DO-6/29/17 | TYPE OF CONTAINER | G/P | | |
| | | NO. OF CONTAINER(S) | 1 | | |
| | | VOLUME | 125mL | | |
| | | SAMPLE ANALYSIS | SEE ITEM (1) IN SPECIAL INSTRUCTIONS | | |
| | | | SEE ITEM (2) IN SPECIAL INSTRUCTIONS | | |
| SAMPLE NO. | B3BBC4 | SAMPLE DATE | JUN 29 2017 0935 | | |
| MATRIX* | SOIL | | | | |

| RELINQUISHED BY/REMOVED FROM | DATE/TIME | SIGN/PRINT NAMES | RECEIVED BY/STORED IN | DATE/TIME |
|------------------------------|------------------|------------------|-------------------------|------------------|
| Malcolm Chamm CHPRC | JUN 29 2017 1050 | <i>M R Chamm</i> | Janelle Zunker CHPRC | JUN 29 2017 0935 |
| Janelle Zunker CHPRC | JUN 29 2017 1400 | <i>J Zunker</i> | FEDEX | |
| | | | STACY BOONC | 6/30/17 1950 |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| | | | |
|-----------------|--------------------------|--------------------|-----------------|
| PRICE CODE | 8C | METHOD OF SHIPMENT | FEDERAL EXPRESS |
| AIR QUALITY | <input type="checkbox"/> | | |
| DATA TURNAROUND | 15 Days / 15 Days | | |
| ORIGINAL | | | |

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;
 (2) 7471_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};

TRVL NUM = TRVL-17-159
 FSR ID = FSR46063
 PRINTED ON 6/8/2017
 A-6003-618 (REV 2)

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SAMPLE RECEIPT & REVIEW FORM

| Client: <u>CPRC</u> | | SDG/AR/COC/Work Order: <u>426775</u> | | |
|-------------------------------------------------------------------|---------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Received By: <u>Hay Bom</u> | | Date Received: <u>30-JUN-17</u> | | |
| Carrier and Tracking Number | | Circle Applicable: <input checked="" type="checkbox"/> FedEx Express <input type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other <u>7795 2302 9133 -10</u> <u>7795 2800 0400 -10</u> | | |
| Suspected Hazard Information | Yes <input type="checkbox"/> No <input type="checkbox"/> | *If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation. | | |
| Shipped as a DOT Hazardous? | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | Hazard Class Shipped: _____ UN#: _____ | | |
| COC/Samples marked or classified as radioactive? | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> CPM / mR/Hr Classified as: Rad 1 Rad 2 Rad 3 | | |
| Is package, COC, and/or Samples marked HAZ? | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | 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? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Circle Applicable: Seals broken Damaged container Leaking container Other (describe) |
| 2 Chain of custody documents included with shipment? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?* | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Preservation Method: <u>Wet Ice</u> Ice Packs Dry Ice None Other: *all temperatures are recorded in Celsius TEMP: _____ |
| 4 Daily check performed and passed on IR temperature gun? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Temperature Device Serial #: <u>123-17</u> Secondary Temperature Device Serial # (If Applicable): _____ |
| 5 Sample containers intact and sealed? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Circle Applicable: Seals broken Damaged container Leaking container Other (describe) |
| 6 Samples requiring chemical preservation at proper pH? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Sample ID's and Containers Affected: <u>B39J13 C2 (LITERS)</u> If Preservation added, Lot#: <u>1705308D</u> |
| 7 Do any samples require Volatile Analysis? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | If Yes, Are Encores or Soil Kits present? Yes ___ No ___ (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes ___ No ___ N/A (If unknown, select No) VOA vials free of headspace? Yes ___ No ___ N/A Sample ID's and containers affected: _____ |
| 8 Samples received within holding time? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ID's and tests affected: _____ |
| 9 Sample ID's on COC match ID's on bottles? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Sample ID's and containers affected: _____ |
| 10 Date & time on COC match date & time on bottles? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Sample ID's affected: _____ |
| 11 Number of containers received match number indicated on COC? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Sample ID's affected: _____ |
| 12 Are sample containers identifiable as GEL provided? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 13 COC form is properly signed in relinquished/received sections? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Comments (Use Continuation Form if needed): | | | | |

PM (or PMA) review: Initials DS Date 6/30/17 Page 1 of 1

Data Review Qualifier Definitions

Project Specific Qualifier Definitions for GEL Client Code: CPRC

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

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Laboratory Certifications

List of current GEL Certifications as of 13 July 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 | SC000122017-1 |
| 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 | SC000122017-22 |
| Vermont | VT87156 |
| Virginia NELAP | 460202 |
| Washington | C780 |
| West Virginia | 997404 |

Metals Analysis

Case Narrative

July 14, 2017

Metals

Technical Case Narrative

CH2MHill Plateau Remediation Company (CPRC)

SDG #: GEL426775

Work Order #: 426775

Product: Determination of Metals by ICP

Analytical Method: SW846 3050B/6010D

Analytical Procedure: GL-MA-E-013 REV# 28

Analytical Batches: 1678798 and 1681846

Product: Determination of Metals by ICP-MS

Analytical Method: SW846 3050B/6020B

Analytical Procedure: GL-MA-E-014 REV# 30

Analytical Batch: 1678808

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: 1679480

Preparation Method: SW846 3050B

Preparation Procedure: GL-MA-E-009 REV# 26

Preparation Batches: 1678797, 1678807 and 1681845

Preparation Method: SW846 7471B Prep

Preparation Procedure: GL-MA-E-010 REV# 34

Preparation Batch: 1679479

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

| <u>GEL Sample ID#</u> | <u>Client Sample Identification</u> |
|------------------------------|--------------------------------------------|
| 426775002 | B3BBC4 |
| 1203822689 | Method Blank (MB)ICP |
| 1203829762 | Method Blank (MB)ICP |
| 1203822690 | Laboratory Control Sample (LCS) |
| 1203829763 | Laboratory Control Sample (LCS) |
| 1203822693 | 426775002(B3BBC4L) Serial Dilution (SD) |
| 1203822691 | 426775002(B3BBC4D) Sample Duplicate (DUP) |
| 1203822692 | 426775002(B3BBC4S) Matrix Spike (MS) |
| 1203822714 | Method Blank (MB)ICP-MS |
| 1203822715 | Laboratory Control Sample (LCS) |
| 1203822718 | 426775002(B3BBC4L) Serial Dilution (SD) |
| 1203822716 | 426775002(B3BBC4D) Sample Duplicate (DUP) |
| 1203822717 | 426775002(B3BBC4S) Matrix Spike (MS) |
| 1203825551 | 426775002(B3BBC4PS) Post Spike (PS) |
| 1203824100 | Method Blank (MB)CVAA |
| 1203824101 | Laboratory Control Sample (LCS) |
| 1203824107 | 426775002(B3BBC4L) Serial Dilution (SD) |
| 1203824105 | 426775002(B3BBC4D) Sample Duplicate (DUP) |
| 1203824106 | 426775002(B3BBC4S) 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 antimony. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 426775002 (B3BBC4)-ICP. 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. 426775002 (B3BBC4)-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 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 |
|-----------------|-----------|--------------------------|
| 1203822689 (MB) | Potassium | 6060 betw (5960 - 11600) |

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 analyte. The post spike recovery was within the required control limits. This verifies the absence of a matrix interference in the post-spike digested sample. The recovery may be attributed to possible sample matrix interference and/or non-homogeneity.

| Sample | Analyte | Value |
|-----------------------|----------|------------------|
| 1203822717 (B3BBC4MS) | Selenium | 73.8* (75%-125%) |

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. Sample was diluted for titanium in order to bring

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raw values within the linear range of the instrument, and for the analytes interfered with, in order to ensure that the inter-element correction factors were valid. 426775002 (B3BBC4)-ICP. The ICPMS solid samples in this SDG were diluted the standard two times. ICP-MS.

| | |
|------------|---------------|
| Analyte | 426775 |
| | 002 |
| Antimony | 5X |
| Arsenic | 2X |
| Cadmium | 5X |
| Cobalt | 5X |
| Lead | 5X |
| Molybdenum | 2X |
| Selenium | 2X |
| Vanadium | 5X |
| Zinc | 5X |

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: GEL426775 GEL Work Order: 426775

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: 13 JUL 2017

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL426775

CONTRACT: CPCR0F17038

METHOD TYPE: SW846

SAMPLE ID: 426775002

BASIS: Dry Weight

DATE COLLECTED 29-JUN-17

CLIENT ID: B3BBC4

LEVEL: Low

DATE RECEIVED 30-JUN-17

MATRIX: SOIL

%SOLIDS: 94.6

| CAS No. | Analyte | Result | Units | Qual | MDL | PQL | CRDL | DF | M* | Analyst | Run Date | Analytical Run | Analytical Batch |
|-----------|------------|----------|-------|------|------|-------|-------|----|----|---------|----------------|----------------|------------------|
| 7440-36-0 | Antimony | 1730 | ug/kg | UD | 1730 | 5250 | 5250 | 5 | P | HSC | 07/10/17 14:25 | 071017A-2 | 1678798 |
| 7440-38-2 | Arsenic | 2350 | ug/kg | D | 355 | 1050 | 1050 | 2 | MS | PRB | 07/08/17 00:31 | 170707-4 | 1678808 |
| 7440-39-3 | Barium | 97000 | ug/kg | | 105 | 525 | 525 | 1 | P | HSC | 07/06/17 14:51 | 070617-1 | 1678798 |
| 7440-41-7 | Beryllium | 1380 | ug/kg | | 105 | 525 | 525 | 1 | P | HSC | 07/06/17 14:51 | 070617-1 | 1678798 |
| 7440-43-9 | Cadmium | 525 | ug/kg | UD | 525 | 2620 | 2620 | 5 | P | HSC | 07/10/17 14:25 | 071017A-2 | 1678798 |
| 7440-70-2 | Calcium | 10600000 | ug/kg | | 8390 | 26200 | 26200 | 1 | P | HSC | 07/06/17 14:51 | 070617-1 | 1678798 |
| 7440-47-3 | Chromium | 5940 | ug/kg | | 157 | 525 | 525 | 1 | P | HSC | 07/06/17 14:51 | 070617-1 | 1678798 |
| 7440-48-4 | Cobalt | 9410 | ug/kg | D | 787 | 2620 | 2620 | 5 | P | HSC | 07/10/17 14:25 | 071017A-2 | 1678798 |
| 7440-50-8 | Copper | 14600 | ug/kg | | 315 | 1050 | 1050 | 1 | P | HSC | 07/06/17 14:51 | 070617-1 | 1678798 |
| 7439-89-6 | Iron | 31300000 | ug/kg | | 8390 | 26200 | 26200 | 1 | P | HSC | 07/06/17 14:51 | 070617-1 | 1678798 |
| 7439-92-1 | Lead | 1730 | ug/kg | UD | 1730 | 5250 | 5250 | 5 | P | HSC | 07/10/17 14:25 | 071017A-2 | 1678798 |
| 7439-95-4 | Magnesium | 4570000 | ug/kg | | 8920 | 31500 | 31500 | 1 | P | HSC | 07/06/17 14:51 | 070617-1 | 1678798 |
| 7439-96-5 | Manganese | 397000 | ug/kg | | 210 | 1050 | 1050 | 1 | P | HSC | 07/06/17 14:51 | 070617-1 | 1678798 |
| 7439-97-6 | Mercury | 5.99 | ug/kg | B | 3.72 | 11.1 | 11.1 | 1 | AV | MTM1 | 07/05/17 11:23 | 070517S1-5 | 1679480 |
| 7439-98-7 | Molybdenum | 455 | ug/kg | D | 83.9 | 210 | 210 | 2 | MS | PRB | 07/08/17 00:31 | 170707-4 | 1678808 |
| 7440-02-0 | Nickel | 5670 | ug/kg | | 157 | 525 | 525 | 1 | P | HSC | 07/06/17 14:51 | 070617-1 | 1678798 |
| 7440-09-7 | Potassium | 908000 | ug/kg | | 6710 | 26200 | 26200 | 1 | P | HSC | 07/06/17 14:51 | 070617-1 | 1678798 |
| 7782-49-2 | Selenium | 1100 | ug/kg | DN | 378 | 1050 | 1050 | 2 | MS | PRB | 07/08/17 00:31 | 170707-4 | 1678808 |
| 7440-22-4 | Silver | 105 | ug/kg | U | 105 | 525 | 525 | 1 | P | HSC | 07/06/17 14:51 | 070617-1 | 1678798 |
| 7440-23-5 | Sodium | 243000 | ug/kg | | 7060 | 25200 | 25200 | 1 | P | HSC | 07/13/17 09:04 | 071317A-3 | 1681846 |
| 7440-62-2 | Vanadium | 119000 | ug/kg | D | 525 | 2620 | 2620 | 5 | P | HSC | 07/10/17 14:25 | 071017A-2 | 1678798 |
| 7440-66-6 | Zinc | 66800 | ug/kg | D | 2100 | 5250 | 5250 | 5 | P | HSC | 07/10/17 14:25 | 071017A-2 | 1678798 |

Prep Information:

| Analytical Batch | Prep Batch | Prep Method | Initial wt./vol. | Units | Final wt./vol. | Units | Date | Analyst |
|------------------|------------|------------------|------------------|-------|----------------|-------|----------|---------|
| 1678798 | 1678797 | SW846 3050B | 0.504 | g | 50 | mL | 07/03/17 | CXW4 |
| 1678808 | 1678807 | SW846 3050B | 0.504 | g | 50 | mL | 07/03/17 | CXW4 |
| 1679480 | 1679479 | SW846 7471B Prep | 0.572 | g | 30 | mL | 07/04/17 | AXS5 |
| 1681846 | 1681845 | SW846 3050B | 0.524 | g | 50 | mL | 07/13/17 | SXW1 |

***Analytical Methods:**

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

Quality Control Summary

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QC Summary

Report Date: July 13, 2017

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CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 426775

| Parmname | NOM | Sample | Qual | QC | Units | RPD/D% | REC% | Range | Anlst | Date | Time |
|--------------------------------|---------|--------|------|------|-------|---------|-------|------------|-------|----------|-------|
| Metals Analysis - ICPMS | | | | | | | | | | | |
| Batch | 1678808 | | | | | | | | | | |
| QC1203822716 426775002 DUP | | | | | | | | | | | |
| Arsenic | D | 2350 | D | 2350 | ug/kg | 0.139 ^ | | (+/-994) | PRB | 07/08/17 | 00:34 |
| Molybdenum | D | 455 | D | 394 | ug/kg | 14.3 ^ | | (+/-199) | | | |
| Selenium | DN | 1100 | D | 1080 | ug/kg | 1.87 ^ | | (+/-994) | | | |
| QC1203822715 LCS | | | | | | | | | | | |
| Arsenic | | 4890 | D | 4850 | ug/kg | | 99.1 | (80%-120%) | | 07/08/17 | 00:25 |
| Molybdenum | | 4890 | D | 5280 | ug/kg | | 108 | (80%-120%) | | | |
| Selenium | | 4890 | D | 4110 | ug/kg | | 84 | (80%-120%) | | | |
| QC1203822714 MB | | | | | | | | | | | |
| Arsenic | | | DU | 315 | ug/kg | | | | | 07/08/17 | 00:22 |
| Molybdenum | | | DU | 74.5 | ug/kg | | | | | | |
| Selenium | | | DU | 335 | ug/kg | | | | | | |
| QC1203822717 426775002 MS | | | | | | | | | | | |
| Arsenic | 5090 | D | 2350 | D | 6500 | ug/kg | 81.5 | (75%-125%) | | 07/08/17 | 00:37 |
| Molybdenum | 5090 | D | 455 | D | 5210 | ug/kg | 93.4 | (75%-125%) | | | |
| Selenium | 5090 | DN | 1100 | DN | 4860 | ug/kg | 73.8* | (75%-125%) | | | |

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| Parmname | NOM | Sample | Qual | QC | Units | RPD/D% | REC% | Range | Anlst | Date | Time |
|--------------------------------|------|--------|----------|----|----------|--------|--------|------------|-------|----------|-------|
| Metals Analysis - ICPMS | | | | | | | | | | | |
| Batch 1678808 | | | | | | | | | | | |
| QC1203825551 426775002 PS | | | | | | | | | | | |
| Selenium | 25.0 | DN | 5.25 | D | 25.8 | ug/L | 82.3 | (75%-125%) | PRB | 07/08/17 | 00:40 |
| QC1203822718 426775002 SDILT | | | | | | | | | | | |
| Arsenic | | D | 11.2 | BD | 2.79 | ug/L | 24.5 | (0%-10%) | | 07/08/17 | 00:44 |
| Molybdenum | | D | 2.17 | BD | 0.419 | ug/L | 3.32 | (0%-10%) | | | |
| Selenium | | DN | 5.25 | DU | 1890 | ug/L | N/A | (0%-10%) | | | |
| Metals Analysis-ICP | | | | | | | | | | | |
| Batch 1678798 | | | | | | | | | | | |
| QC1203822691 426775002 DUP | | | | | | | | | | | |
| Antimony | | DU | 1730 | DU | 1640 | ug/kg | N/A | | HSC | 07/10/17 | 14:29 |
| Barium | | | 97000 | | 108000 | ug/kg | 10.6 | (0%-35%) | | 07/06/17 | 14:55 |
| Beryllium | | | 1380 | | 1350 | ug/kg | 2.27 ^ | (+/-497) | | | |
| Cadmium | | DU | 525 | DU | 497 | ug/kg | N/A | | | 07/10/17 | 14:29 |
| Calcium | | | 10600000 | | 10400000 | ug/kg | 2.68 | (0%-35%) | | 07/06/17 | 14:55 |
| Chromium | | | 5940 | | 5320 | ug/kg | 11 | (0%-35%) | | | |
| Cobalt | | D | 9410 | D | 9100 | ug/kg | 3.29 ^ | (+/-2480) | | 07/10/17 | 14:29 |
| Copper | | | 14600 | | 15200 | ug/kg | 4.2 | (0%-35%) | | 07/06/17 | 14:55 |
| Iron | | | 31300000 | | 31600000 | ug/kg | 1.01 | (0%-35%) | | | |
| Lead | | BD | -2730 | BD | -3420 | ug/kg | 22.7 ^ | (+/-4970) | | 07/10/17 | 14:29 |

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QC Summary

Workorder: 426775

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| Parmname | NOM | Sample | Qual | QC | Units | RPD/D% | REC% | Range | Anlst | Date | Time |
|----------------------------|---------|---------|------|---------|-------|--------|------|------------|-------|----------|-------|
| Metals Analysis-ICP | | | | | | | | | | | |
| Batch | 1678798 | | | | | | | | | | |
| Magnesium | | 4570000 | | 4380000 | ug/kg | 4.24 | | (0%-35%) | HSC | 07/06/17 | 14:55 |
| Manganese | | 397000 | | 381000 | ug/kg | 4.08 | | (0%-35%) | | | |
| Nickel | | 5670 | | 5610 | ug/kg | 1.02 | | (0%-35%) | | | |
| Potassium | | 908000 | | 801000 | ug/kg | 12.6 | | (0%-35%) | | | |
| Silver | B | -370 | B | -404 | ug/kg | 8.7 | ^ | (+/-497) | | | |
| Vanadium | D | 119000 | D | 113000 | ug/kg | 5.06 | | (0%-35%) | | 07/10/17 | 14:29 |
| Zinc | D | 66800 | D | 56200 | ug/kg | 17.2 | | (0%-35%) | | | |
| QC1203822690 | LCS | | | | | | | | | | |
| Antimony | 48900 | | | 48700 | ug/kg | | 99.5 | (80%-120%) | | 07/06/17 | 14:48 |
| Barium | 48900 | | | 49500 | ug/kg | | 101 | (80%-120%) | | | |
| Beryllium | 48900 | | | 50100 | ug/kg | | 103 | (80%-120%) | | | |
| Cadmium | 48900 | | | 50200 | ug/kg | | 103 | (80%-120%) | | | |
| Calcium | 489000 | | | 516000 | ug/kg | | 105 | (80%-120%) | | | |
| Chromium | 48900 | | | 50000 | ug/kg | | 102 | (80%-120%) | | | |
| Cobalt | 48900 | | | 50300 | ug/kg | | 103 | (80%-120%) | | | |
| Copper | 48900 | | | 49100 | ug/kg | | 100 | (80%-120%) | | | |

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QC Summary

Workorder: 426775

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| Parmname | NOM | Sample | Qual | QC | Units | RPD/D% | REC% | Range | Anlst | Date | Time |
|----------------------------|---------|--------|------|--------|-------|--------|------|------------|-------|----------|-------|
| Metals Analysis-ICP | | | | | | | | | | | |
| Batch | 1678798 | | | | | | | | | | |
| Iron | 489000 | | | 486000 | ug/kg | | 99.4 | (80%-120%) | HSC | 07/06/17 | 14:48 |
| Lead | 48900 | | | 49600 | ug/kg | | 101 | (80%-120%) | | | |
| Magnesium | 489000 | | | 515000 | ug/kg | | 105 | (80%-120%) | | | |
| Manganese | 48900 | | | 49300 | ug/kg | | 101 | (80%-120%) | | | |
| Nickel | 48900 | | | 50900 | ug/kg | | 104 | (80%-120%) | | | |
| Potassium | 489000 | | | 511000 | ug/kg | | 105 | (80%-120%) | | | |
| Silver | 48900 | | | 48200 | ug/kg | | 98.6 | (80%-120%) | | | |
| Vanadium | 48900 | | | 48700 | ug/kg | | 99.6 | (80%-120%) | | | |
| Zinc | 48900 | | | 48000 | ug/kg | | 98.2 | (80%-120%) | | | |
| QC1203822689 | MB | | | | | | | | | | |
| Antimony | | | U | 307 | ug/kg | | | | | 07/06/17 | 14:45 |
| Barium | | | U | 93.1 | ug/kg | | | | | | |
| Beryllium | | | U | 93.1 | ug/kg | | | | | | |
| Cadmium | | | U | 93.1 | ug/kg | | | | | | |
| Calcium | | | U | 7450 | ug/kg | | | | | | |
| Chromium | | | U | 140 | ug/kg | | | | | | |

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| Parmname | NOM | Sample | Qual | QC | Units | RPD/D% | REC% | Range | Anlst | Date | Time |
|----------------------------|---------|--------|-------|------|--------|--------|------|------------|-------|----------|-------|
| Metals Analysis-ICP | | | | | | | | | | | |
| Batch | 1678798 | | | | | | | | | | |
| Cobalt | | | U | 140 | ug/kg | | | | HSC | 07/06/17 | 14:45 |
| Copper | | | U | 279 | ug/kg | | | | | | |
| Iron | | | U | 7450 | ug/kg | | | | | | |
| Lead | | | U | 307 | ug/kg | | | | | | |
| Magnesium | | | U | 7910 | ug/kg | | | | | | |
| Manganese | | | U | 186 | ug/kg | | | | | | |
| Nickel | | | U | 140 | ug/kg | | | | | | |
| Potassium | | | B | 6060 | ug/kg | | | | | | |
| Silver | | | U | 93.1 | ug/kg | | | | | | |
| Vanadium | | | U | 93.1 | ug/kg | | | | | | |
| Zinc | | | U | 372 | ug/kg | | | | | | |
| QC1203822692 426775002 MS | | | | | | | | | | | |
| Antimony | 50900 | DU | 1730 | D | 45800 | ug/kg | 89 | (75%-125%) | | 07/10/17 | 14:32 |
| Barium | 50900 | | 97000 | | 140000 | ug/kg | 83.5 | (75%-125%) | | 07/06/17 | 14:58 |
| Beryllium | 50900 | | 1380 | | 50900 | ug/kg | 97.2 | (75%-125%) | | | |
| Cadmium | 50900 | DU | 525 | D | 52200 | ug/kg | 103 | (75%-125%) | | 07/10/17 | 14:32 |

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| Parmname | NOM | Sample | Qual | QC | Units | RPD/D% | REC% | Range | Anlst | Date | Time |
|------------------------------|---------|----------|------|----------|-------|--------|------|------------|-------|----------|-------|
| Metals Analysis-ICP | | | | | | | | | | | |
| Batch | 1678798 | | | | | | | | | | |
| Calcium | 509000 | 10600000 | | 13900000 | ug/kg | | N/A | (75%-125%) | HSC | 07/06/17 | 14:58 |
| Chromium | 50900 | 5940 | | 53700 | ug/kg | | 93.7 | (75%-125%) | | | |
| Cobalt | 50900 | D 9410 | D | 63300 | ug/kg | | 106 | (75%-125%) | | 07/10/17 | 14:32 |
| Copper | 50900 | 14600 | | 66100 | ug/kg | | 101 | (75%-125%) | | 07/06/17 | 14:58 |
| Iron | 509000 | 31300000 | | 32000000 | ug/kg | | N/A | (75%-125%) | | | |
| Lead | 50900 | BD -2730 | D | 49800 | ug/kg | | 97.8 | (75%-125%) | | 07/10/17 | 14:32 |
| Magnesium | 509000 | 4570000 | | 5070000 | ug/kg | | N/A | (75%-125%) | | 07/06/17 | 14:58 |
| Manganese | 50900 | 397000 | | 478000 | ug/kg | | N/A | (75%-125%) | | | |
| Nickel | 50900 | 5670 | | 53500 | ug/kg | | 93.8 | (75%-125%) | | | |
| Potassium | 509000 | 908000 | | 1350000 | ug/kg | | 86.6 | (75%-125%) | | | |
| Silver | 50900 | B -370 | | 52600 | ug/kg | | 103 | (75%-125%) | | | |
| Vanadium | 50900 | D 119000 | D | 173000 | ug/kg | | 105 | (75%-125%) | | 07/10/17 | 14:32 |
| Zinc | 50900 | D 66800 | D | 114000 | ug/kg | | 92 | (75%-125%) | | | |
| QC1203822693 426775002 SDILT | | | | | | | | | | | |
| Antimony | | DU 0.865 | BD | -4.58 | ug/L | | N/A | (0%-10%) | | 07/10/17 | 14:35 |
| Barium | | 925 | D | 192 | ug/L | | 4.03 | (0%-10%) | | 07/06/17 | 15:05 |

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QC Summary

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| Parmname | NOM | Sample | Qual | QC | Units | RPD/D% | REC% | Range | Anlst | Date | Time |
|----------------------------|---------|--------|------|-------|-------|--------|------|----------|-------|----------|-------|
| Metals Analysis-ICP | | | | | | | | | | | |
| Batch | 1678798 | | | | | | | | | | |
| Beryllium | | 13.1 | BD | 2.65 | ug/L | 1.16 | | (0%-10%) | HSC | 07/06/17 | 15:05 |
| Cadmium | DU | -0.389 | DU | 2620 | ug/L | N/A | | (0%-10%) | | 07/10/17 | 14:35 |
| Calcium | | 101000 | D | 21100 | ug/L | 3.96 | | (0%-10%) | | 07/06/17 | 15:05 |
| Chromium | | 56.6 | D | 11.7 | ug/L | 3.53 | | (0%-10%) | | | |
| Cobalt | D | 17.9 | BD | 3.72 | ug/L | 3.73 | | (0%-10%) | | 07/10/17 | 14:35 |
| Copper | | 139 | D | 27.7 | ug/L | .328 | | (0%-10%) | | 07/06/17 | 15:05 |
| Iron | | 298000 | D | 63800 | ug/L | 6.99 | | (0%-10%) | | | |
| Lead | BD | -5.2 | DU | 8650 | ug/L | N/A | | (0%-10%) | | 07/10/17 | 14:35 |
| Magnesium | | 43600 | D | 9110 | ug/L | 4.59 | | (0%-10%) | | 07/06/17 | 15:05 |
| Manganese | | 3780 | D | 807 | ug/L | 6.67 | | (0%-10%) | | | |
| Nickel | | 54.1 | D | 11.5 | ug/L | 6.01 | | (0%-10%) | | | |
| Potassium | | 8660 | D | 1780 | ug/L | 2.7 | | (0%-10%) | | | |
| Silver | B | -3.53 | DU | 525 | ug/L | N/A | | (0%-10%) | | | |
| Vanadium | D | 227 | D | 45.5 | ug/L | .0769 | | (0%-10%) | | 07/10/17 | 14:35 |
| Zinc | D | 127 | D | 28.4 | ug/L | 11.5 | | (0%-10%) | | | |

July 14, 2017

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QC Summary

Workorder: 426775

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| Parmname | NOM | Sample | Qual | QC | Units | RPD/D% | REC% | Range | Anlst | Date | Time |
|--------------------------------|-----------|--------|-------|--------|-------|--------|--------|------------|-------|----------|-------|
| Metals Analysis-ICP | | | | | | | | | | | |
| Batch 1681846 | | | | | | | | | | | |
| QC1203822691 | 426775002 | DUP | | | | | | | | | |
| Sodium | | 243000 | | 237000 | ug/kg | 2.68 | | (0%-35%) | HSC | 07/13/17 | 09:08 |
| QC1203829763 | LCS | | | | | | | | | | |
| Sodium | 457000 | | | 482000 | ug/kg | | 106 | (80%-120%) | | 07/13/17 | 09:01 |
| QC1203829762 | MB | | | | | | | | | | |
| Sodium | | | U | 6900 | ug/kg | | | | | 07/13/17 | 08:58 |
| QC1203822692 | 426775002 | MS | | | | | | | | | |
| Sodium | 512000 | 243000 | | 758000 | ug/kg | | 100 | (75%-125%) | | 07/13/17 | 09:11 |
| QC1203822693 | 426775002 | SDILT | | | | | | | | | |
| Sodium | | 2410 | D | 677 | ug/L | 40.4 | | (0%-10%) | | 07/13/17 | 09:14 |
| Metals Analysis-Mercury | | | | | | | | | | | |
| Batch 1679480 | | | | | | | | | | | |
| QC1203824105 | 426775002 | DUP | | | | | | | | | |
| Mercury | | B | 5.99 | B | 4.18 | ug/kg | 35.5 ^ | (+/-11.6) | MTM1 | 07/05/17 | 11:25 |
| QC1203824101 | LCS | | | | | | | | | | |
| Mercury | 103 | | | 103 | ug/kg | | 99.1 | (80%-120%) | | 07/05/17 | 11:05 |
| QC1203824100 | MB | | | | | | | | | | |
| Mercury | | | U | 3.96 | ug/kg | | | | | 07/05/17 | 11:03 |
| QC1203824106 | 426775002 | MS | | | | | | | | | |
| Mercury | 124 | B | 5.99 | 132 | ug/kg | | 101 | (75%-125%) | | 07/05/17 | 11:27 |
| QC1203824107 | 426775002 | SDILT | | | | | | | | | |
| Mercury | | B | 0.108 | DU | 18.6 | ug/L | N/A | (0%-10%) | | 07/05/17 | 11:28 |

Notes:

The Qualifiers in this report are defined as follows:

July 14, 2017

GEL LABORATORIES LLC

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QC Summary

Workorder: 426775

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| Parmname | NOM | Sample | Qual | QC | Units | RPD/D% | REC% | Range | Anlst | Date | Time |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|----|-------|--------|------|-------|-------|------|------|
| * | Duplicate analysis not within control limits | | | | | | | | | | |
| + | Correlation coefficient for Method of Standard Additions (MSA) is < 0.995 | | | | | | | | | | |
| B | The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). | | | | | | | | | | |
| C | Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples. | | | | | | | | | | |
| D | Results are reported from a diluted aliquot of sample. | | | | | | | | | | |
| E | Reported value is estimated due to interferences. See comment in narrative. | | | | | | | | | | |
| M | Duplicate precision not met. | | | | | | | | | | |
| N | Spike Sample recovery is outside control limits. | | | | | | | | | | |
| S | Reported value determined by the Method of Standard Additions (MSA) | | | | | | | | | | |
| U | Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error. | | | | | | | | | | |
| W | Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency. | | | | | | | | | | |
| X | Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier | | | | | | | | | | |
| Y | Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier | | | | | | | | | | |
| Z | Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier | | | | | | | | | | |

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.

July 14, 2017

General Chem Analysis

Case Narrative

July 14, 2017

General Chemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL426775
Work Order #: 426775

Product: Cyanide, Total

Analytical Method: 9012_CYANIDE

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

Analytical Batches: 1678717 and 1678716

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

| <u>GEL Sample ID#</u> | <u>Client Sample Identification</u> |
|------------------------------|--------------------------------------------|
| 426775002 | B3BBC4 |
| 1203822465 | Method Blank (MB) |
| 1203822466 | Laboratory Control Sample (LCS) |
| 1203822467 | Laboratory Control Sample Duplicate (LCSD) |
| 1203822468 | 426633003(NonSDG) Sample Duplicate (DUP) |
| 1203822469 | 426633003(NonSDG) Matrix Spike (MS) |
| 1203823137 | 426775002(B3BBC4) Sample Duplicate (DUP) |
| 1203823138 | 426775002(B3BBC4) 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 samples 1203822466 (LCS) and 1203822467 (LCSD) were 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: 1679119

Preparation Method: EPA 300.0 PREP

Preparation Procedure: GL-GC-E-086 REV# 25

Preparation Batch: 1679118

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

| <u>GEL Sample ID#</u> | <u>Client Sample Identification</u> |
|------------------------------|--------------------------------------------|
| 426775002 | B3BBC4 |
| 1203823413 | Method Blank (MB) |
| 1203823414 | Laboratory Control Sample (LCS) |
| 1203823415 | 426775002(B3BBC4) Sample Duplicate (DUP) |
| 1203823416 | 426775002(B3BBC4) 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 1203823415 (B3BBC4DUP) and 426775002 (B3BBC4) 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: 1678854

Preparation Method: EPA 350.2 Modified Prep

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

Preparation Batch: 1678853

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

| GEL Sample ID# | Client Sample Identification |
|-----------------------|------------------------------------------|
| 426775002 | B3BBC4 |
| 1203822803 | Method Blank (MB) |
| 1203822804 | Laboratory Control Sample (LCS) |
| 1203822805 | 426775002(B3BBC4) Sample Duplicate (DUP) |
| 1203822806 | 426775002(B3BBC4) 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

Duplicate Relative Percent Difference (RPD) Statement

The Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample:

| Analyte | Sample | Value |
|-------------------|------------------------|----------------------------------|
| Nitrogen, Ammonia | 1203822805 (B3BBC4DUP) | abs(6.59 - 3.3)* (+/-2.32 mg/kg) |

Product: Hexavalent Chromium

Analytical Method: 7196_CR6

Analytical Procedure: GL-GC-E-044 REV# 22

Analytical Batch: 1678669

Preparation Method: SW846 3060A

Preparation Procedure: GL-GC-E-044 REV# 22

Preparation Batch: 1678668

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

| <u>GEL Sample ID#</u> | <u>Client Sample Identification</u> |
|------------------------------|------------------------------------------------|
| 426775001 | B3BBC3 |
| 1203822319 | Method Blank (MB) |
| 1203822320 | Laboratory Control Sample (LCS) |
| 1203822322 | Insoluble Lab Control Sample (ILCS) |
| 1203823008 | 426736001(NonSDG) Sample Duplicate (DUP) |
| 1203823009 | 426775001(B3BBC3) Sample Duplicate (DUP) |
| 1203823010 | 426736001(NonSDG) Matrix Spike (MS) |
| 1203823011 | 426775001(B3BBC3) Matrix Spike (MS) |
| 1203823014 | 426736001(NonSDG) Matrix Spike Duplicate (MSD) |
| 1203823015 | 426775001(B3BBC3) 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.

July 14, 2017

GEL LABORATORIES LLC

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL426775 GEL Work Order: 426775

The Qualifiers in this report are defined as follows:

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

D Results are reported from a diluted aliquot of sample.

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

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: 11 JUL 2017

Title: Analyst I

Sample Data Summary

Certificate of Analysis

Report Date: July 11, 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: B3BBC3 | Project: CPRC0F17038 |
| Sample ID: 426775001 | Client ID: CPRC001 |
| Matrix: SOIL | |
| Collect Date: 29-JUN-17 09:35 | |
| Receive Date: 30-JUN-17 | |
| Collector: Client | |
| Moisture: 6.05% | |

| Parameter | Qualifier | Result | DL | RL | Units | PF | DF | Analyst | Date | Time | Batch | Method |
|-----------------------------------------|-----------|--------|-----|-----|-------|------|----|---------|----------|------|---------|--------|
| Spectrometric Analysis | | | | | | | | | | | | |
| 7196_CR6: COMMON "Dry Weight Corrected" | | | | | | | | | | | | |
| Hexavalent Chromium | U | 164 | 164 | 410 | ug/Kg | 38.6 | 1 | VH1 | 07/06/17 | 1524 | 1678669 | 1 |

The following Prep Methods were performed:

| Method | Description | Analyst | Date | Time | Prep Batch |
|-------------|-----------------------------------------|---------|----------|------|------------|
| SW846 3060A | SW846_7196A Hexavalent Chromium in Soil | RXB5 | 07/05/17 | 1218 | 1678668 |

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 |

Certificate of Analysis

Report Date: July 11, 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: B3BBC4 | Project: CPRC0F17038 |
| Sample ID: 426775002 | Client ID: CPRC001 |
| Matrix: SOIL | |
| Collect Date: 29-JUN-17 09:35 | |
| Receive Date: 30-JUN-17 | |
| Collector: Client | |
| Moisture: 5.44% | |

| 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 | 80.3 | 80.3 | 240 | ug/kg | 45.5 | 1 | AXH3 | 07/03/17 | 0826 | 1678717 | 1 |
| Ion Chromatography | | | | | | | | | | | | |
| EPA 300.0 Anions, Solid (Br, Cl, F, SO4) "Dry Weight Corrected" | | | | | | | | | | | | |
| Bromide | U | 707 | 707 | 2110 | ug/kg | 9.98 | 1 | MAR1 | 07/06/17 | 2214 | 1679119 | 2 |
| Chloride | | 2130 | 759 | 2110 | ug/kg | 9.98 | 1 | | | | | |
| Fluoride | B | 426 | 359 | 1050 | ug/kg | 9.98 | 1 | | | | | |
| Nitrate-N | B | 502 | 348 | 1050 | ug/kg | 9.98 | 1 | | | | | |
| Nitrite-N | U | 348 | 348 | 1050 | ug/kg | 9.98 | 1 | | | | | |
| Phosphorus in phosphate | U | 707 | 707 | 2110 | ug/kg | 9.98 | 1 | | | | | |
| Sulfate | B | 3910 | 1400 | 4220 | ug/kg | 9.98 | 1 | | | | | |
| Nutrient Analysis | | | | | | | | | | | | |
| 350.1_AMMONIA: COMMON "Dry Weight Corrected" | | | | | | | | | | | | |
| Nitrogen in Ammonia | | 3300 | 865 | 2400 | ug/Kg | 45.5 | 1 | KLP1 | 07/06/17 | 1125 | 1678854 | 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 | 07/06/17 | 1035 | 1679118 |
| EPA 350.2 Modified Prep | EPA 350.1 Mod. Ammonia Nitrogen Prep | AXH3 | 07/06/17 | 0730 | 1678853 |
| SW846 9010C Distillation | SW846 9010C Prep | AXH3 | 07/03/17 | 0651 | 1678716 |

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

July 14, 2017

GEL LABORATORIES LLC

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QC Summary

Report Date: July 11, 2017

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 426775

| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|--------------------------------|-----------|--------|------|-------|-------|-------|------|-----------------|-------|----------|-------|
| Flow Injection Analysis | | | | | | | | | | | |
| Batch | 1678717 | | | | | | | | | | |
| QC1203822468 | 426633003 | DUP | | | | | | | | | |
| Cyanide, Total | | 583 | | 650 | ug/kg | 10.8 | ^ | (+/-208) | AXH3 | 07/03/17 | 08:23 |
| QC1203823137 | 426775002 | DUP | | | | | | | | | |
| Cyanide, Total | U | 80.3 | U | 81.8 | ug/kg | N/A | | | | 07/03/17 | 08:27 |
| QC1203822466 | LCS | | | | | | | | | | |
| Cyanide, Total | 108000 | | D | 97000 | ug/kg | | | 89.8 (80%-120%) | | 07/03/17 | 08:19 |
| QC1203822467 | LCSD | | | | | | | | | | |
| Cyanide, Total | 108000 | | D | 97700 | ug/kg | 0.719 | | 90.5 (0%-35%) | | 07/03/17 | 08:20 |
| QC1203822465 | MB | | | | | | | | | | |
| Cyanide, Total | | | U | 83.5 | ug/kg | | | | | 07/03/17 | 08:18 |
| QC1203822469 | 426633003 | MS | | | | | | | | | |
| Cyanide, Total | 4240 | 583 | | 4230 | ug/kg | | | 86 (75%-125%) | | 07/03/17 | 08:24 |
| QC1203823138 | 426775002 | MS | | | | | | | | | |
| Cyanide, Total | 4720 | U | 80.3 | 4860 | ug/kg | | | 103 (75%-125%) | | 07/03/17 | 08:32 |

Ion Chromatography

| | | | | | | | | | | | |
|--------------|-----------|------|---|------|-------|------|---|-----------|------|----------|-------|
| Batch | 1679119 | | | | | | | | | | |
| QC1203823415 | 426775002 | DUP | | | | | | | | | |
| Bromide | U | 707 | U | 705 | ug/kg | N/A | | | MAR1 | 07/06/17 | 22:43 |
| Chloride | | 2130 | B | 2090 | ug/kg | 2.25 | ^ | (+/-2100) | | | |
| Fluoride | B | 426 | B | 431 | ug/kg | 1.23 | ^ | (+/-1050) | | | |

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GEL LABORATORIES LLC

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QC Summary

Workorder: 426775

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| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|---------------------------|---------|--------|------|-------|-------|------|------|-----------|------------|----------|----------------|
| Ion Chromatography | | | | | | | | | | | |
| Batch | 1679119 | | | | | | | | | | |
| Nitrate-N | B | 502 | B | 492 | ug/kg | 1.94 | ^ | (+/-1050) | MAR1 | 07/06/17 | 22:43 |
| Nitrite-N | U | 348 | U | 347 | ug/kg | N/A | | | | | |
| Phosphorus in phosphate | U | 707 | U | 705 | ug/kg | N/A | | | | | |
| Sulfate | B | 3910 | B | 3440 | ug/kg | 12.5 | ^ | (+/-4210) | | | |
| QC1203823414 | LCS | | | | | | | | | | |
| Bromide | 12500 | | | 12400 | ug/kg | | | 99.4 | (80%-120%) | | 07/06/17 21:45 |
| Chloride | 50000 | | | 46800 | ug/kg | | | 93.6 | (80%-120%) | | |
| Fluoride | 25000 | | | 23700 | ug/kg | | | 94.7 | (80%-120%) | | |
| Nitrate-N | 25000 | | | 23400 | ug/kg | | | 93.7 | (80%-120%) | | |
| Nitrite-N | 25000 | | | 23700 | ug/kg | | | 94.9 | (80%-120%) | | |
| Phosphorus in phosphate | 12500 | | | 12500 | ug/kg | | | 99.7 | (80%-120%) | | |
| Sulfate | 100000 | | | 96000 | ug/kg | | | 96 | (80%-120%) | | |
| QC1203823413 | MB | | | | | | | | | | |
| Bromide | | | U | 670 | ug/kg | | | | | | 07/06/17 21:17 |
| Chloride | | | U | 720 | ug/kg | | | | | | |
| Fluoride | | | U | 340 | ug/kg | | | | | | |
| Nitrate-N | | | U | 330 | ug/kg | | | | | | |

July 14, 2017

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QC Summary

Workorder: 426775

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| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|----------------------------|---------|--------|------|--------|-------|--------|------|------------|-------|----------|-------|
| Ion Chromatography | | | | | | | | | | | |
| Batch | 1679119 | | | | | | | | | | |
| Nitrite-N | | | U | 330 | ug/kg | | | | MAR1 | 07/06/17 | 21:17 |
| Phosphorus in phosphate | | | U | 670 | ug/kg | | | | | | |
| Sulfate | | | U | 1330 | ug/kg | | | | | | |
| QC1203823416 426775002 MS | | | | | | | | | | | |
| Bromide | 13200 | U | 707 | 12800 | ug/kg | | 97 | (75%-125%) | | 07/06/17 | 23:12 |
| Chloride | 52700 | | 2130 | 51100 | ug/kg | | 92.9 | (75%-125%) | | | |
| Fluoride | 26400 | B | 426 | 24500 | ug/kg | | 91.3 | (75%-125%) | | | |
| Nitrate-N | 26400 | B | 502 | 24700 | ug/kg | | 91.9 | (75%-125%) | | | |
| Nitrite-N | 26400 | U | 348 | 25200 | ug/kg | | 94.2 | (75%-125%) | | | |
| Phosphorus in phosphate | 13200 | U | 707 | 12100 | ug/kg | | 89.6 | (75%-125%) | | | |
| Sulfate | 105000 | B | 3910 | 105000 | ug/kg | | 96.2 | (75%-125%) | | | |
| Nutrient Analysis | | | | | | | | | | | |
| Batch | 1678854 | | | | | | | | | | |
| QC1203822805 426775002 DUP | | | | | | | | | | | |
| Nitrogen in Ammonia | | | 3300 | 6590 | ug/Kg | 66.4*^ | | (+/-2320) | KLP1 | 07/06/17 | 11:30 |
| QC1203822804 LCS | | | | | | | | | | | |
| Nitrogen in Ammonia | 50000 | | | 53500 | ug/Kg | | 107 | (80%-120%) | | 07/06/17 | 11:24 |
| QC1203822803 MB | | | | | | | | | | | |
| Nitrogen in Ammonia | | | U | 900 | ug/Kg | | | | | 07/06/17 | 11:23 |

July 14, 2017

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QC Summary

Workorder: 426775

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| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|-------------------------------|-----------|--------|------|-------|-------|-------|------|------------|-------|----------|-------|
| Nutrient Analysis | | | | | | | | | | | |
| Batch 1678854 | | | | | | | | | | | |
| QC1203822806 | 426775002 | MS | | | | | | | | | |
| Nitrogen in Ammonia | 41300 | 3300 | | 48300 | ug/Kg | | 109 | (75%-125%) | KLP1 | 07/06/17 | 11:31 |
| Spectrometric Analysis | | | | | | | | | | | |
| Batch 1678669 | | | | | | | | | | | |
| QC1203823008 | 426736001 | DUP | | | | | | | | | |
| Hexavalent Chromium | | U | 194 | U | 194 | ug/Kg | N/A | | VH1 | 07/06/17 | 15:23 |
| QC1203823009 | 426775001 | DUP | | | | | | | | | |
| Hexavalent Chromium | | U | 164 | U | 155 | ug/Kg | N/A | | | 07/06/17 | 15:24 |
| QC1203822322 | ILCS | | | | | | | | | | |
| Hexavalent Chromium | 6850 | | | 6310 | ug/Kg | | 92.2 | (80%-120%) | | 07/06/17 | 15:11 |
| QC1203822320 | LCS | | | | | | | | | | |
| Hexavalent Chromium | 3610 | | | 3490 | ug/Kg | | 96.9 | (80%-120%) | | 07/06/17 | 15:10 |
| QC1203822319 | MB | | | | | | | | | | |
| Hexavalent Chromium | | | U | 144 | ug/Kg | | | | | 07/06/17 | 15:10 |
| QC1203823010 | 426736001 | MS | | | | | | | | | |
| Hexavalent Chromium | 5040 | U | 194 | 4790 | ug/Kg | | 95 | (75%-125%) | | 07/06/17 | 15:23 |
| QC1203823011 | 426775001 | MS | | | | | | | | | |
| Hexavalent Chromium | 4220 | U | 164 | 3770 | ug/Kg | | 89.4 | (75%-125%) | | 07/06/17 | 15:24 |
| QC1203823014 | 426736001 | MSD | | | | | | | | | |
| Hexavalent Chromium | 5040 | U | 194 | 4840 | ug/Kg | 0.985 | 94.1 | (0%-35%) | | 07/06/17 | 15:23 |
| QC1203823015 | 426775001 | MSD | | | | | | | | | |
| Hexavalent Chromium | 4220 | U | 164 | 3850 | ug/Kg | 2.07 | 91.3 | (0%-35%) | | 07/06/17 | 15:24 |

Notes:

The Qualifiers in this report are defined as follows:

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

QC Summary

Workorder: 426775

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

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

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

Radiological Analysis

Case Narrative

July 14, 2017

Radiochemistry

Technical Case Narrative

CH2MHill Plateau Remediation Company (CPRC)

SDG #: GEL426775

Work Order #: 426775

Product: UISO_IE_PRECIP_AEA:COMMON

Analytical Method: UISO_IE_PRECIP_AEA

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

Analytical Batch: 1679643

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1678780

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

| <u>GEL Sample ID#</u> | <u>Client Sample Identification</u> |
|------------------------------|--------------------------------------------|
| 426775001 | B3BBC3 |
| 1203824495 | Method Blank (MB) |
| 1203824496 | 426775001(B3BBC3) Sample Duplicate (DUP) |
| 1203824497 | 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 1203824495 (MB) was recounted due to a peak shift. The recount is reported.

Product: AMCMISO_EIE_PRECIP_AEA: COMMON

Analytical Method: AMCMISO_EIE_PRECIP_AEA

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

Analytical Batch: 1679649

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1678780

July 14, 2017

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

| <u>GEL Sample ID#</u> | <u>Client Sample Identification</u> |
|-----------------------|------------------------------------------|
| 426775001 | B3BBC3 |
| 1203824510 | Method Blank (MB) |
| 1203824511 | 426775001(B3BBC3) Sample Duplicate (DUP) |
| 1203824512 | 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

Samples 1203824512 (LCS) and 426775001 (B3BBC3) were recounted due to a peak shift. The recounts are reported. Sample 1203824510 (MB) was recounted due to poor resolution. The recount is reported.

Product: NP237_IE_PRECIP_AEA: COMMON

Analytical Method: ASTM C 1475-00 Modified

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

Analytical Batch: 1679650

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1678780

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

| <u>GEL Sample ID#</u> | <u>Client Sample Identification</u> |
|-----------------------|------------------------------------------|
| 426775001 | B3BBC3 |
| 1203824513 | Method Blank (MB) |
| 1203824514 | 426775001(B3BBC3) Sample Duplicate (DUP) |
| 1203824515 | 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: PUISO_PRECIP_AEA:COMMON
Analytical Method: PUISO_PRECIP_AEA
Analytical Procedure: GL-RAD-A-011 REV# 26
Analytical Batch: 1679651

Preparation Method: Dry Soil Prep
Preparation Procedure: GL-RAD-A-021 REV# 21
Preparation Batch: 1678780

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

| <u>GEL Sample ID#</u> | <u>Client Sample Identification</u> |
|------------------------------|--------------------------------------------|
| 426775001 | B3BBC3 |
| 1203824516 | Method Blank (MB) |
| 1203824517 | 426775001(B3BBC3) Sample Duplicate (DUP) |
| 1203824518 | 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: Refer to Miscellaneous Information section.

Technical Information

Recounts

Sample 426775001 (B3BBC3) was recounted due to a peak shift. The recount is reported.

Miscellaneous Information

1. Sample 426775001 does not meet the resolution requirement of having a full width half maximum of 100 keV or less for the Pu-242 tracer. 1. The sample does meet the tracer yield requirement, the detection limits, and its tracer peak is within the Pu-242 region of interest. Reporting results.

Product: Dry Weight
Analytical Method: Dry Soil Prep
Analytical Procedure: GL-OA-E-020 REV# 11
Analytical Batch: 1678780

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

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

July 14, 2017

426775001 B3BBC3
1203822656 426736001(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: Dry Weight

Analytical Method: ASTM D 2216 (Modified)

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

Analytical Batch: 1679630

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

| <u>GEL Sample ID#</u> | <u>Client Sample Identification</u> |
|------------------------------|--------------------------------------------|
| 426775002 | B3BBC4 |
| 1203824475 | 426443001(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: 1678945

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1678780

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

| <u>GEL Sample ID#</u> | <u>Client Sample Identification</u> |
|------------------------------|--------------------------------------------|
| 426775001 | B3BBC3 |
| 1203823036 | Method Blank (MB) |
| 1203823037 | 426775001(B3BBC3) Sample Duplicate (DUP) |

July 14, 2017

1203823038

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, 1203823037 (B3BBC3DUP) and 426775001 (B3BBC3), Cs137 relative error ratio is greater than 2; however, both results are less than their respective MDCs.

Qualifier Information

| Qualifier | Reason | Analyte | Sample | Client Sample |
|-----------|---------------------------------------------------------------------------|------------|------------|----------------------|
| X | Results are considered a false positive due to high counting uncertainty. | Cesium-137 | 1203823037 | B3BBC3(426775001DUP) |

Product: SRTOT_SEP_PRECIP_GPC: COMMON

Analytical Method: SRTOT_SEP_PRECIP_GPC

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

Analytical Batch: 1678784

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1678780

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

| <u>GEL Sample ID#</u> | <u>Client Sample Identification</u> |
|------------------------------|--------------------------------------------|
| 426775001 | B3BBC3 |
| 1203822661 | Method Blank (MB) |
| 1203822662 | 426736001(NonSDG) Sample Duplicate (DUP) |
| 1203822663 | 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: NI63_LSC

Analytical Method: NI63_LSC

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

Analytical Batch: 1678884

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1678780

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

| <u>GEL Sample ID#</u> | <u>Client Sample Identification</u> |
|------------------------------|--------------------------------------------|
| 426775001 | B3BBC3 |
| 1203822860 | Method Blank (MB) |
| 1203822861 | 426633001(NonSDG) Sample Duplicate (DUP) |
| 1203822862 | 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 1203822860 (MB) was recounted due to a suspected blank false positive. The recount is reported.

Product: TC99_SEP_GPC

Analytical Method: TC99_EIE_LSC

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

Analytical Batch: 1678899

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

| <u>GEL Sample ID#</u> | <u>Client Sample Identification</u> |
|------------------------------|--------------------------------------------|
| 426775001 | B3BBC3 |
| 1203822903 | Method Blank (MB) |
| 1203822904 | 426736001(NonSDG) Sample Duplicate (DUP) |
| 1203822906 | Laboratory Control Sample (LCS) |

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

July 14, 2017

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: 1680886

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

| <u>GEL Sample ID#</u> | <u>Client Sample Identification</u> |
|------------------------------|--------------------------------------------|
| 426775001 | B3BBC3 |
| 1203827282 | Method Blank (MB) |
| 1203827283 | 426775001(B3BBC3) Sample Duplicate (DUP) |
| 1203827285 | 426775001(B3BBC3) Matrix Spike (MS) |
| 1203827287 | 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

Sample Re-prep/Re-analysis

Samples were re-prepped due to low recovery. The re-analysis is being reported.

Miscellaneous Information

Additional Comments

The matrix spike, 1203827285 (B3BBC3MS), 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.

July 14, 2017

GEL LABORATORIES LLC

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

**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL426775 GEL Work Order: 426775

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.

X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

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: 12 JUL 2017

Title: Group Leader

Sample Data Summary

July 14, 2017

**Certificate of Analysis
Sample Summary**

| | | |
|------------------------------------------|----------------------------------------------|-------------------------------------------|
| SDG Number: GEL426775 | Client: CPRC001 | Project: CPRC0F17038 |
| Lab Sample ID: 426775001 | Date Collected: 06/29/2017 09:35 | Matrix: SOIL |
| | Date Received: 06/30/2017 09:05 | %Moisture: 6 |
| Client ID: B3BBC3 | | Prep Basis: "Dry Weight Corrected" |
| Batch ID: 1679643 | Method: UIISO_IE_PRECIP_AEA | SOP Ref: GL-RAD-A-011 |
| Run Date: 07/08/2017 11:01 | Analyst: BXA4 | Instrument: 1135 |
| Data File: S0426775001_UU.1A.gcnf | Aliquot: 0.103 g | Count Time: 240 min |
| Prep Batch: 1679643 | Prep Method: DOE EML HASL-300, U-02-R | Prep SOP Ref: GL-RAD-A-021 |
| Prep Date: 07/06/2017 00:00 | | |

| CAS No. | Parmname | Qual | Result | Units | Uncert | TPU | MDC | RDL |
|---------------------------------------------------|-----------------|------|--------|-------|----------|-------|-------|------|
| U-233/234 <small>13968-55-3/13966-29-5</small> | Uranium-233/234 | | 0.446 | pCi/g | +/-0.405 | 0.410 | 0.371 | 1.00 |
| 15117-96-1/13982-7 | Uranium-235/236 | U | 0.00 | pCi/g | +/-0.193 | 0.193 | 0.287 | 1.00 |
| 7440-61-1 | Uranium-238 | | 0.387 | pCi/g | +/-0.374 | 0.378 | 0.232 | 1.00 |

| Surrogate/Tracer recovery | Result | Nominal | Units | Recovery% | Acceptable Limits |
|---------------------------|--------|---------|-------|-----------|-------------------|
| Uranium-232 Tracer | 19.3 | 20.2 | pCi/g | 95.4 | (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.

July 14, 2017

**Certificate of Analysis
Sample Summary**

| | | |
|------------------------------------------|---------------------------------------------|-------------------------------------------|
| SDG Number: GEL426775 | Client: CPRC001 | Project: CPRC0F17038 |
| Lab Sample ID: 426775001 | Date Collected: 06/29/2017 09:35 | Matrix: SOIL |
| | Date Received: 06/30/2017 09:05 | %Moisture: 6 |
| Client ID: B3BBC3 | | Prep Basis: "Dry Weight Corrected" |
| Batch ID: 1679649 | Method: AMCMISO_EIE_PREC_AEA | SOP Ref: GL-RAD-A-011 |
| Run Date: 07/10/2017 13:54 | Analyst: BXA4 | Instrument: 1104 |
| Data File: S0426775001_AM.1B.gcnf | Aliquot: 0.103 g | Count Time: 239.9998 min |
| Prep Batch: 1679649 | Prep Method: DOE EML HASL-300, Am-05 | Prep SOP Ref: GL-RAD-A-021 |
| Prep Date: 07/06/2017 00:00 | | |

| CAS No. | Parmname | Qual | Result | Units | Uncert | TPU | MDC | RDL |
|------------|---------------|------|--------|-------|----------|-------|-------|------|
| 14596-10-2 | Americium-241 | U | 0.103 | pCi/g | +/-0.284 | 0.284 | 0.493 | 1.00 |

| Surrogate/Tracer recovery | Result | Nominal | Units | Recovery% | Acceptable Limits |
|---------------------------|--------|---------|-------|-----------|-------------------|
| Americium-243 Tracer | 14.5 | 20.4 | pCi/g | 71.3 | (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.

July 14, 2017

**Certificate of Analysis
Sample Summary**

| | | |
|------------------------------------------|---------------------------------------------|-------------------------------------------|
| SDG Number: GEL426775 | Client: CPRC001 | Project: CPRC0F17038 |
| Lab Sample ID: 426775001 | Date Collected: 06/29/2017 09:35 | Matrix: SOIL |
| | Date Received: 06/30/2017 09:05 | %Moisture: 6 |
| Client ID: B3BBC3 | Method: ASTM C 1475-00 Modified | Prep Basis: "Dry Weight Corrected" |
| Batch ID: 1679650 | Analyst: BXA4 | SOP Ref: GL-RAD-A-032 |
| Run Date: 07/07/2017 08:28 | Aliquot: 0.109 g | Instrument: 1162 |
| Data File: S0426775001_NP.1A.gcnf | Prep Method: ASTM C 1475-00 Modified | Count Time: 240 min |
| Prep Batch: 1679650 | | Prep SOP Ref: GL-RAD-A-021 |
| Prep Date: 07/06/2017 00:00 | | |

| CAS No. | Parmname | Qual | Result | Units | Uncert | TPU | MDC | RDL |
|------------|---------------|------|--------|-------|----------|-------|-------|------|
| 13994-20-2 | Neptunium-237 | U | 0.0811 | pCi/g | +/-0.223 | 0.223 | 0.387 | 1.00 |

| Surrogate/Tracer recovery | Result | Nominal | Units | Recovery% | Acceptable Limits |
|---------------------------|--------|---------|-------|-----------|-------------------|
| Americium-243 Tracer | 1990 | 1960 | pCi/g | 102 | (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.

July 14, 2017

**Certificate of Analysis
Sample Summary**

| | | |
|------------------------------------------|----------------------------------------------|-------------------------------------------|
| SDG Number: GEL426775 | Client: CPRC001 | Project: CPRC0F17038 |
| Lab Sample ID: 426775001 | Date Collected: 06/29/2017 09:35 | Matrix: SOIL |
| | Date Received: 06/30/2017 09:05 | %Moisture: 6 |
| Client ID: B3BBC3 | | Prep Basis: "Dry Weight Corrected" |
| Batch ID: 1679651 | Method: PUIISO_PRECIP_AEA | SOP Ref: GL-RAD-A-011 |
| Run Date: 07/10/2017 13:54 | Analyst: BXA4 | Instrument: 1102 |
| Data File: S0426775001_PU.1B.gcnf | Aliquot: 0.103 g | Count Time: 239.9998 min |
| Prep Batch: 1679651 | Prep Method: DOE EML HASL-300, Pu-11- | Prep SOP Ref: GL-RAD-A-021 |
| Prep Date: 07/06/2017 00:00 | | |

| CAS No. | Parmname | Qual | Result | Units | Uncert | TPU | MDC | RDL |
|------------|-------------------|------|---------|-------|----------|-------|-------|------|
| I3981-16-3 | Plutonium-238 | U | -0.0383 | pCi/g | +/-0.170 | 0.170 | 0.442 | 1.00 |
| OER-100-70 | Plutonium-239/240 | U | -0.0767 | pCi/g | +/-0.178 | 0.178 | 0.526 | 1.00 |

| Surrogate/Tracer recovery | Result | Nominal | Units | Recovery% | Acceptable Limits |
|---------------------------|--------|---------|-------|-----------|-------------------|
| Plutonium-242 Tracer | 13.8 | 19.1 | pCi/g | 72 | (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.

July 14, 2017

**Certificate of Analysis
Sample Summary**

| | | |
|------------------------------------|------------------------------------------------|-------------------------------------------|
| SDG Number: GEL426775 | Client: CPRC001 | Project: CPRC0F17038 |
| Lab Sample ID: 426775001 | Date Collected: 06/29/2017 09:35 | Matrix: SOIL |
| | Date Received: 06/30/2017 09:05 | %Moisture: 6 |
| Client ID: B3BBC3 | Method: SRTOT_SEP_PRECIP_GPC | Prep Basis: "Dry Weight Corrected" |
| Batch ID: 1678784 | Analyst: KSD1 | SOP Ref: GL-RAD-A-004 |
| Run Date: 07/06/2017 16:03 | Aliquot: 0.55 g | Instrument: PIC10C |
| Data File: S1678784.xls | Prep Method: EPA 905.0 Modified/DOE RP5 | Count Time: 60 min |
| Prep Batch: 1678784 | | Prep SOP Ref: GL-RAD-A-021 |
| Prep Date: 07/05/2017 11:15 | | |

| CAS No. | Parmname | Qual | Result | Units | Uncert | TPU | MDC | RDL |
|---------|-----------------|------|---------|-------|----------|-------|-------|------|
| SR-RAD | Total Strontium | U | -0.0446 | pCi/g | +/-0.365 | 0.365 | 0.743 | 2.00 |

| Surrogate/Tracer recovery | Result | Nominal | Units | Recovery% | Acceptable Limits |
|---------------------------|--------|---------|-------|-----------|-------------------|
| Strontium Carrier | 6.30 | 7.75 | mg | 81.3 | (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.

July 14, 2017

**Certificate of Analysis
Sample Summary**

| | | |
|------------------------------------|-------------------------------------------------|-------------------------------------------|
| SDG Number: GEL426775 | Client: CPRC001 | Project: CPRC0F17038 |
| Lab Sample ID: 426775001 | Date Collected: 06/29/2017 09:35 | Matrix: SOIL |
| | Date Received: 06/30/2017 09:05 | %Moisture: 6 |
| Client ID: B3BBC3 | | Prep Basis: "Dry Weight Corrected" |
| Batch ID: 1678945 | Method: GAMMA_GS | SOP Ref: GL-RAD-A-013 |
| Run Date: 07/05/2017 16:53 | Analyst: MJH1 | Instrument: GAM08 |
| Data File: G426775001.CNF;1 | Aliquot: 44.211 g | Count Time: 120 min |
| Prep Batch: 1678945 | Prep Method: DOE HASL 300, 4.5.2.3/Ga-01 | Prep SOP Ref: GL-RAD-A-021 |
| Prep Date: 07/03/2017 00:00 | | |

| CAS No. | Parmname | Qual | Result | Units | Uncert | TPU | MDC | RDL |
|------------|--------------|------|---------|-------|-----------|--------|--------|-------|
| 10045-97-3 | Cesium-137 | U | -0.0194 | pCi/g | +/-0.0443 | 0.0452 | 0.0792 | 0.100 |
| 10198-40-0 | Cobalt-60 | U | 0.0117 | pCi/g | +/-0.0469 | 0.0472 | 0.0956 | |
| 14683-23-9 | Europium-152 | U | -0.0342 | pCi/g | +/-0.110 | 0.111 | 0.174 | |
| 15585-10-1 | Europium-154 | U | 0.0854 | pCi/g | +/-0.145 | 0.150 | 0.305 | |
| 14391-16-3 | Europium-155 | U | 0.0377 | pCi/g | +/-0.0976 | 0.0991 | 0.175 | |

| 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.

July 14, 2017

**Certificate of Analysis
Sample Summary**

| | | |
|------------------------------------|---------------------------------------------|-------------------------------------------|
| SDG Number: GEL426775 | Client: CPRC001 | Project: CPRC0F17038 |
| Lab Sample ID: 426775001 | Date Collected: 06/29/2017 09:35 | Matrix: SOIL |
| | Date Received: 06/30/2017 09:05 | %Moisture: 6 |
| Client ID: B3BBC3 | | Prep Basis: "Dry Weight Corrected" |
| Batch ID: 1678884 | Method: NI63_LSC | SOP Ref: GL-RAD-A-022 |
| Run Date: 07/06/2017 18:08 | Analyst: TXJ1 | Instrument: LSCSILVER |
| Data File: N1678884R.xls | Aliquot: 0.221 g | Count Time: 120 min |
| Prep Batch: 1678884 | Prep Method: DOE RESL Ni-1, Modified | Prep SOP Ref: GL-RAD-A-021 |
| Prep Date: 07/03/2017 15:45 | | |

| CAS No. | Parmname | Qual | Result | Units | Uncert | TPU | MDC | RDL |
|---------|-----------|------|--------|-------|---------|------|------|------|
| NI-63 | Nickel-63 | U | -1.0 | pCi/g | +/-4.66 | 4.66 | 7.95 | 10.0 |

| Surrogate/Tracer recovery | Result | Nominal | Units | Recovery% | Acceptable Limits |
|---------------------------|--------|---------|-------|-----------|-------------------|
| Nickel Carrier | 19.2 | 25.2 | mg | 76.2 | (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.

July 14, 2017

**Certificate of Analysis
Sample Summary**

| | | |
|------------------------------------|----------------------------------------------|----------------------------------|
| SDG Number: GEL426775 | Client: CPRC001 | Project: CPRC0F17038 |
| Lab Sample ID: 426775001 | Date Collected: 06/29/2017 09:35 | Matrix: SOIL |
| | Date Received: 06/30/2017 09:05 | %Moisture: 6 |
| Client ID: B3BBC3 | | Prep Basis: "As Received" |
| Batch ID: 1678899 | Method: TC99_EIE_LSC | SOP Ref: GL-RAD-A-059 |
| Run Date: 07/10/2017 06:58 | Analyst: GXR1 | Instrument: LSCGREEN |
| Data File: E1678899.xls | Aliquot: 1.235 g | Count Time: 25 min |
| Prep Batch: 1678899 | Prep Method: DOE EML HASL-300, Tc-02- | |
| Prep Date: 07/06/2017 11:53 | | |

| CAS No. | Parmname | Qual | Result | Units | Uncert | TPU | MDC | RDL |
|------------|---------------|------|--------|-------|---------|------|------|------|
| 14133-76-7 | Technetium-99 | U | -0.505 | pCi/g | +/-1.56 | 1.56 | 2.72 | 5.00 |

| Surrogate/Tracer recovery | Result | Nominal | Units | Recovery% | Acceptable Limits |
|---------------------------|--------|---------|-------|-----------|-------------------|
| Technetium-99m Tracer | 25500 | 25800 | CPM | 99.2 | (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.

July 14, 2017

**Certificate of Analysis
Sample Summary**

| | | |
|------------------------------------|-----------------------------------------|----------------------------------|
| SDG Number: GEL426775 | Client: CPRC001 | Project: CPRC0F17038 |
| Lab Sample ID: 426775001 | Date Collected: 06/29/2017 09:35 | Matrix: SOIL |
| | Date Received: 06/30/2017 09:05 | %Moisture: 6 |
| Client ID: B3BBC3 | Method: TRITIUM_DIST_LSC | Prep Basis: "As Received" |
| Batch ID: 1680886 | Analyst: BXM4 | SOP Ref: GL-RAD-A-002 |
| Run Date: 07/11/2017 19:26 | Aliquot: 1.253 g | Instrument: LSCRED |
| Data File: T1680886.xls | Prep Method: EPA 906.0 Modified | Count Time: 20 min |
| Prep Batch: 1680886 | | |
| Prep Date: 07/11/2017 10:05 | | |

| CAS No. | Parmname | Qual | Result | Units | Uncert | TPU | MDC | RDL |
|------------|----------|------|--------|-------|---------|------|------|------|
| 10028-17-8 | Tritium | U | -1.22 | pCi/g | +/-12.6 | 12.6 | 23.1 | 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.

July 14, 2017
Rad

**Certificate of Analysis
Sample Summary**

SDG Number: GEL426775
Lab Sample ID: 426775001

Client: CPRC001
Date Collected: 06/29/2017 09:35
Date Received: 06/30/2017 09:05

Project: CPRC0F17038
Matrix: SOIL
%Moisture: 6

July 14, 2017

Kad

Certificate of Analysis

Sample Summary

SDG Number: GEL426775
Lab Sample ID: 426775002

Client: CPRC001
Date Collected: 06/29/2017 09:35
Date Received: 06/30/2017 09:05

Project: CPRC0F17038
Matrix: SOIL
%Moisture: 5.4

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 12, 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: 426775

| Parmname | NOM | Sample | Qual | QC | Units | QC Criteria | Range | Analyst | Date Time |
|-----------------------|-----------|--------|------|------------------|-------|-------------|-------------|---------|---------------|
| Rad Alpha Spec | | | | | | | | | |
| Batch | 1679643 | | | | | | | | |
| QC1203824495 | MB | | | | | | | | |
| Uranium-233/234 | | | U | 0.0531 | pCi/g | | | BXA4 | 07/10/1711:15 |
| | | | | Uncert: +/-0.199 | | | | | |
| | | | | TPU: +/-0.199 | | | | | |
| Uranium-235/236 | | | U | 0.111 | pCi/g | | | | |
| | | | | Uncert: +/-0.304 | | | | | |
| | | | | TPU: +/-0.305 | | | | | |
| Uranium-238 | | | U | 0.176 | pCi/g | | | | |
| | | | | Uncert: +/-0.280 | | | | | |
| | | | | TPU: +/-0.281 | | | | | |
| **Uranium-232 Tracer | 19.7 | | | 17.5 | pCi/g | REC: 89 | (30%-105%) | | |
| | | | | Uncert: +/-2.30 | | | | | |
| | | | | TPU: +/-3.57 | | | | | |
| QC1203824496 | 426775001 | DUP | | | | | | | |
| Uranium-233/234 | | 0.446 | U | 0.421 | pCi/g | | | | 07/08/1711:01 |
| | | | | Uncert: +/-0.405 | | RPD: 45 | (0% - 100%) | | |
| | | | | TPU: +/-0.410 | | RER: 0.0775 | (0-2) | | |
| Uranium-235/236 | | U 0.00 | U | -0.0466 | pCi/g | | | | |
| | | | | Uncert: +/-0.193 | | RPD: 0 | N/A | | |
| | | | | TPU: +/-0.193 | | RER: 0.323 | (0-2) | | |
| Uranium-238 | | 0.387 | | 0.393 | pCi/g | | | | |
| | | | | Uncert: +/-0.374 | | RPD: 1 | (0% - 100%) | | |
| | | | | TPU: +/-0.378 | | RER: 0.0201 | (0-2) | | |
| **Uranium-232 Tracer | 19.7 | 19.3 | | 17.6 | pCi/g | REC: 89 | (30%-105%) | | |
| | | | | Uncert: +/-2.47 | | | | | |
| | | | | TPU: +/-3.81 | | | | | |
| QC1203824497 | LCS | | | | | | | | |
| Uranium-233/234 | | | | 26.7 | pCi/g | | | | 07/08/1711:01 |
| | | | | Uncert: +/-2.78 | | | | | |
| | | | | TPU: +/-4.72 | | | | | |
| Uranium-235/236 | | | | 1.58 | pCi/g | | | | |
| | | | | Uncert: +/-0.775 | | | | | |
| | | | | TPU: +/-0.807 | | | | | |
| Uranium-238 | 25.5 | | | 26.0 | pCi/g | REC: 102 | (80%-120%) | | |
| | | | | Uncert: +/-2.75 | | | | | |
| | | | | TPU: +/-4.62 | | | | | |
| **Uranium-232 Tracer | 19.7 | | | 17.8 | pCi/g | REC: 91 | (30%-105%) | | |
| | | | | Uncert: +/-2.40 | | | | | |
| | | | | TPU: +/-3.70 | | | | | |
| Batch | 1679649 | | | | | | | | |
| QC1203824510 | MB | | | | | | | | |
| Americium-241 | | | U | 0.161 | pCi/g | | | BXA4 | 07/10/1713:54 |
| | | | | Uncert: +/-0.232 | | | | | |
| | | | | TPU: +/-0.233 | | | | | |
| | | | | | | REC: | | | |

QC Summary

Workorder: 426775

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| Parmname | NOM | Sample | Qual | QC | Units | QC Criteria | Range | Analyst | Date Time |
|----------------------------|---------|----------|------|----------|-------|-------------|------------|---------|---------------|
| Rad Alpha Spec | | | | | | | | | |
| Batch | 1679649 | | | | | | | | |
| **Americium-243 Tracer | 19.8 | | | 18.0 | pCi/g | 91 | (30%-105%) | | |
| | Uncert: | | | +/-2.10 | | | | | |
| | TPU: | | | +/-3.25 | | | | | |
| QC1203824511 426775001 DUP | | | | | | | | | |
| Americium-241 | U | 0.103 | U | -0.0223 | pCi/g | | | | 07/08/1711:47 |
| | Uncert: | +/-0.284 | | +/-0.192 | | RPD: 0 | N/A | | |
| | TPU: | +/-0.284 | | +/-0.193 | | RER: 0.716 | (0-2) | | |
| **Americium-243 Tracer | 19.8 | 14.5 | | 15.9 | pCi/g | REC: 81 | (30%-105%) | | |
| | Uncert: | +/-2.50 | | +/-2.65 | | | | | |
| | TPU: | +/-3.80 | | +/-3.98 | | | | | |
| QC1203824512 LCS | | | | | | | | | |
| Americium-241 | 18.6 | | | 17.7 | pCi/g | REC: 95 | (80%-120%) | | 07/10/1713:54 |
| | Uncert: | | | +/-3.48 | | | | | |
| | TPU: | | | +/-4.92 | | | | | |
| **Americium-243 Tracer | 19.8 | | | 6.24 | pCi/g | REC: 32 | (30%-105%) | | |
| | Uncert: | | | +/-3.65 | | | | | |
| | TPU: | | | +/-5.33 | | | | | |
| Batch | 1679650 | | | | | | | | |
| QC1203824513 MB | | | | | | | | | |
| Neptunium-237 | | | U | -0.0333 | pCi/g | | | BXA4 | 07/07/1708:28 |
| | Uncert: | | | +/-0.147 | | | | | |
| | TPU: | | | +/-0.148 | | | | | |
| **Americium-243 Tracer | 1960 | | | 1820 | pCi/g | REC: 93 | (30%-105%) | | |
| QC1203824514 426775001 DUP | | | | | | | | | |
| Neptunium-237 | U | 0.0811 | U | 0.126 | pCi/g | | | | 07/07/1708:28 |
| | Uncert: | +/-0.223 | | +/-0.248 | | RPD: 0 | N/A | | |
| | TPU: | +/-0.223 | | +/-0.248 | | RER: 0.264 | (0-2) | | |
| **Americium-243 Tracer | 2100 | 1990 | | 2050 | pCi/g | REC: 98 | (30%-105%) | | |
| QC1203824515 LCS | | | | | | | | | |
| Neptunium-237 | 41.0 | | | 41.5 | pCi/g | REC: 101 | (80%-120%) | | 07/07/1708:28 |
| | Uncert: | | | +/-3.66 | | | | | |
| | TPU: | | | +/-5.83 | | | | | |
| **Americium-243 Tracer | 1960 | | | 1570 | pCi/g | REC: 80 | (30%-105%) | | |
| Batch | 1679651 | | | | | | | | |
| QC1203824516 MB | | | | | | | | | |
| Plutonium-238 | | | U | -0.055 | pCi/g | | | BXA4 | 07/08/1711:46 |
| | Uncert: | | | +/-0.166 | | | | | |
| | TPU: | | | +/-0.166 | | | | | |
| Plutonium-239/240 | | | U | 0.0427 | pCi/g | | | | |
| | Uncert: | | | +/-0.276 | | | | | |
| | TPU: | | | +/-0.276 | | | | | |
| **Plutonium-242 Tracer | 18.6 | | | 18.1 | pCi/g | REC: 98 | (30%-105%) | | |
| | Uncert: | | | +/-2.35 | | | | | |
| | TPU: | | | +/-3.49 | | | | | |
| QC1203824517 426775001 DUP | | | | | | | | | |
| Plutonium-238 | U | -0.0383 | U | 0.00 | pCi/g | | | | 07/08/1711:46 |
| | Uncert: | +/-0.170 | | +/-0.268 | | RPD: 0 | N/A | | |
| | TPU: | +/-0.170 | | +/-0.269 | | RER: 0.236 | (0-2) | | |
| Plutonium-239/240 | U | -0.0767 | U | 0.202 | pCi/g | | | | |
| | Uncert: | +/-0.178 | | +/-0.463 | | RPD: 0 | N/A | | |

QC Summary

Workorder: 426775

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| Parmname | NOM | Sample | Qual | QC | Units | QC Criteria | Range | Analyst | Date Time |
|------------------------|-----------|---------|-----------|-----------|-----------|---------------------|---------------------|---------|---------------|
| Rad Alpha Spec | | | | | | | | | |
| Batch | | 1679651 | | | | | | | |
| | | TPU: | +/-0.178 | +/-0.465 | | | | | |
| **Plutonium-242 Tracer | 18.6 | 13.8 | | 9.95 | pCi/g | RER: 1.1 REC: 54 | (0-2) (30%-105%) | | |
| | | Uncert: | +/-2.43 | +/-3.10 | | | | | |
| | | TPU: | +/-3.61 | +/-4.51 | | | | | |
| QC1203824518 | LCS | | | | | | | | |
| Plutonium-238 | | | | 0.444 | pCi/g | | | | 07/08/1711:46 |
| | | Uncert: | | +/-0.428 | | | | | |
| | | TPU: | | +/-0.433 | | | | | |
| Plutonium-239/240 | 18.6 | | | 22.3 | pCi/g | REC: 120 | (80%-120%) | | |
| | | Uncert: | | +/-2.77 | | | | | |
| | | TPU: | | +/-4.31 | | | | | |
| **Plutonium-242 Tracer | 18.6 | | | 14.3 | pCi/g | REC: 77 | (30%-105%) | | |
| | | Uncert: | | +/-2.53 | | | | | |
| | | TPU: | | +/-3.73 | | | | | |
| Rad Gamma Spec | | | | | | | | | |
| Batch | | 1678945 | | | | | | | |
| QC1203823036 | MB | | | | | | | | |
| Cesium-137 | | | U | 0.0112 | pCi/g | | | MJH1 | 07/05/1716:54 |
| | | Uncert: | | +/-0.0274 | | | | | |
| | | TPU: | | +/-0.0279 | | | | | |
| Cobalt-60 | | | U | 0.032 | pCi/g | | | | |
| | | Uncert: | | +/-0.0276 | | | | | |
| | | TPU: | | +/-0.0313 | | | | | |
| Europium-152 | | | U | -0.0327 | pCi/g | | | | |
| | | Uncert: | | +/-0.0617 | | | | | |
| | | TPU: | | +/-0.0635 | | | | | |
| Europium-154 | | | U | -0.0101 | pCi/g | | | | |
| | | Uncert: | | +/-0.0696 | | | | | |
| | | TPU: | | +/-0.0698 | | | | | |
| Europium-155 | | | U | -0.00865 | pCi/g | | | | |
| | | Uncert: | | +/-0.0538 | | | | | |
| | | TPU: | | +/-0.0539 | | | | | |
| QC1203823037 | 426775001 | DUP | | | | | | | |
| Cesium-137 | | U | -0.0194 | UX | 0.00 | pCi/g | | | 07/06/1708:19 |
| | | Uncert: | +/-0.0443 | | +/-0.057 | | RPD: 0 | N/A | |
| | | TPU: | +/-0.0452 | | +/-0.0575 | | RER: 2.27 | (0-2) | |
| Cobalt-60 | | U | 0.0117 | U | 0.0193 | pCi/g | | | |
| | | Uncert: | +/-0.0469 | | +/-0.032 | | RPD: 0 | N/A | |
| | | TPU: | +/-0.0472 | | +/-0.0332 | | RER: 0.259 | (0-2) | |
| Europium-152 | | U | -0.0342 | U | -0.0145 | pCi/g | | | |
| | | Uncert: | +/-0.110 | | +/-0.0758 | | RPD: 0 | N/A | |
| | | TPU: | +/-0.111 | | +/-0.0761 | | RER: 0.286 | (0-2) | |
| Europium-154 | | U | 0.0854 | U | -0.031 | pCi/g | | | |
| | | Uncert: | +/-0.145 | | +/-0.123 | | RPD: 0 | N/A | |
| | | TPU: | +/-0.150 | | +/-0.124 | | RER: 1.17 | (0-2) | |
| Europium-155 | | U | 0.0377 | U | 0.0208 | pCi/g | | | |
| | | Uncert: | +/-0.0976 | | +/-0.0732 | | RPD: 0 | N/A | |
| | | TPU: | +/-0.0991 | | +/-0.0738 | | RER: 0.269 | (0-2) | |

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QC Summary

Workorder: 426775

Page 4 of 6

| Parname | NOM | Sample | Qual | QC | Units | QC Criteria | Range | Analyst | Date Time |
|---------------------------------|-----------|--------|----------|----------|----------|--------------------|---------------------|---------|---------------|
| Rad Gamma Spec | | | | | | | | | |
| Batch | 1678945 | | | | | | | | |
| QC1203823038 | LCS | | | | | | | | |
| Americium-241 | 683 | | | 621 | pCi/g | REC: 91 (80%-120%) | | | 07/06/1708:21 |
| | Uncert: | | | +/-8.77 | | | | | |
| | TPU: | | | +/-61.9 | | | | | |
| Cesium-137 | 219 | | | 198 | pCi/g | REC: 90 (80%-120%) | | | |
| | Uncert: | | | +/-3.02 | | | | | |
| | TPU: | | | +/-19.0 | | | | | |
| Cobalt-60 | 126 | | | 118 | pCi/g | REC: 94 (80%-120%) | | | |
| | Uncert: | | | +/-3.04 | | | | | |
| | TPU: | | | +/-12.3 | | | | | |
| Europium-152 | | | U | 0.365 | pCi/g | | | | |
| | Uncert: | | | +/-1.19 | | | | | |
| | TPU: | | | +/-1.20 | | | | | |
| Europium-154 | | | U | -0.0991 | pCi/g | | | | |
| | Uncert: | | | +/-0.922 | | | | | |
| | TPU: | | | +/-0.924 | | | | | |
| Europium-155 | | | U | 0.335 | pCi/g | | | | |
| | Uncert: | | | +/-0.939 | | | | | |
| | TPU: | | | +/-0.952 | | | | | |
| Rad Gas Flow | | | | | | | | | |
| Batch | 1678784 | | | | | | | | |
| QC1203822661 | MB | | | | | | | | |
| Total Strontium | | | U | 0.00763 | pCi/g | | | KSD1 | 07/06/1716:03 |
| | Uncert: | | | +/-0.449 | | | | | |
| | TPU: | | | +/-0.449 | | | | | |
| **Strontium Carrier | 7.75 | | | 6.70 | mg | REC: 87 (40%-110%) | | | |
| QC1203822662 | 426736001 | DUP | | | | | | | |
| Total Strontium | | U | 0.235 | U | -0.122 | pCi/g | | | 07/06/1716:04 |
| | Uncert: | | +/-0.845 | | +/-0.604 | | RPD: 0 | N/A | |
| | TPU: | | +/-0.847 | | +/-0.604 | | RER: 0.671 | (0-2) | |
| **Strontium Carrier | 7.75 | | 6.20 | | 6.80 | mg | REC: 88 (40%-110%) | | |
| QC1203822663 | LCS | | | | | | | | |
| Total Strontium | 39.7 | | | | 39.8 | pCi/g | REC: 100 (80%-120%) | | 07/06/1716:04 |
| | Uncert: | | | | +/-2.31 | | | | |
| | TPU: | | | | +/-10.3 | | | | |
| **Strontium Carrier | 7.75 | | | | 6.70 | mg | REC: 87 (40%-110%) | | |
| Rad Liquid Scintillation | | | | | | | | | |
| Batch | 1678884 | | | | | | | | |
| QC1203822860 | MB | | | | | | | | |
| Nickel-63 | | | U | 0.683 | pCi/g | | | TXJ1 | 07/07/1708:12 |
| | Uncert: | | | +/-4.22 | | | | | |
| | TPU: | | | +/-4.22 | | | | | |
| **Nickel Carrier | 25.2 | | | | 19.4 | mg | REC: 77 (40%-110%) | | |
| QC1203822861 | 426633001 | DUP | | | | | | | |
| Nickel-63 | | U | 2.22 | U | 1.72 | pCi/g | | | 07/06/1721:14 |
| | Uncert: | | +/-6.87 | | +/-6.33 | | RPD: 0 | N/A | |
| | TPU: | | +/-6.88 | | +/-6.33 | | RER: 0.104 | (0-2) | |
| **Nickel Carrier | 25.2 | | 20.1 | | 21.3 | mg | REC: 85 (40%-110%) | | |
| QC1203822862 | LCS | | | | | | | | |
| | | | | | | | REC: | | |

QC Summary

Workorder: 426775

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| Parname | NOM | Sample | Qual | QC | Units | QC Criteria | Range | Analyst | Date Time |
|---------------------------------|-----------|--------|---------|---------|---------|-------------|------------|------------|---------------|
| Rad Liquid Scintillation | | | | | | | | | |
| Batch | 1678884 | | | | | | | | |
| Nickel-63 | 479 | | | 482 | pCi/g | 101 | (80%-120%) | | |
| | Uncert: | | | +/-18.7 | | | | | |
| | TPU: | | | +/-91.4 | | | | | |
| **Nickel Carrier | 25.2 | | | 21.1 | mg | REC: | 84 | (40%-110%) | |
| Batch | 1678899 | | | | | | | | |
| QC1203822903 | MB | | | | | | | | |
| Technetium-99 | | | U | 0.136 | pCi/g | | | GXR1 | 07/10/1707:24 |
| | Uncert: | | | +/-1.51 | | | | | |
| | TPU: | | | +/-1.51 | | | | | |
| **Technetium-99m Tracer | 25800 | | | 24900 | CPM | REC: | 97 | (30%-105%) | |
| QC1203822904 | 426736001 | DUP | | | | | | | |
| Technetium-99 | | U | 0.575 | U | -0.15 | | | | 07/10/1707:51 |
| | Uncert: | | +/-1.58 | | +/-1.57 | RPD: | 0 | N/A | |
| | TPU: | | +/-1.59 | | +/-1.57 | RER: | 0.637 | (0-2) | |
| **Technetium-99m Tracer | 25800 | | 25700 | | 25300 | CPM | REC: | 98 | (30%-105%) |
| QC1203822906 | LCS | | | | | | | | |
| Technetium-99 | 68.2 | | | 58.5 | pCi/g | REC: | 86 | (80%-120%) | 07/10/1708:17 |
| | Uncert: | | | +/-2.79 | | | | | |
| | TPU: | | | +/-7.28 | | | | | |
| **Technetium-99m Tracer | 25800 | | | 25800 | CPM | REC: | 100 | (30%-105%) | |
| Batch | 1680886 | | | | | | | | |
| QC1203827282 | MB | | | | | | | | |
| Tritium | | | U | 1.63 | pCi/g | | | BXM4 | 07/11/1719:47 |
| | Uncert: | | | +/-12.9 | | | | | |
| | TPU: | | | +/-12.9 | | | | | |
| QC1203827283 | 426775001 | DUP | | | | | | | |
| Tritium | | U | -1.22 | U | -5.05 | pCi/g | | | 07/11/1720:08 |
| | Uncert: | | +/-12.6 | | +/-12.4 | RPD: | 0 | N/A | |
| | TPU: | | +/-12.6 | | +/-12.4 | RER: | 0.423 | (0-2) | |
| QC1203827285 | 426775001 | MS | | | | | | | |
| Tritium | 148 | U | -1.22 | | 147 | pCi/g | REC: | 100 | (75%-125%) |
| | Uncert: | | +/-12.6 | | +/-31.6 | | | | |
| | TPU: | | +/-12.6 | | +/-46.0 | | | | |
| QC1203827287 | LCS | | | | | | | | |
| Tritium | 88.9 | | | 80.0 | pCi/g | REC: | 90 | (80%-120%) | 07/11/1720:51 |
| | Uncert: | | | +/-18.2 | | | | | |
| | TPU: | | | +/-25.7 | | | | | |

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

QC Summary

Workorder: 426775

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