GEL Laboratories LLC
a member of The GEL Group INC

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2040 Savage Road Charleston, SC 29407
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August 24, 2015

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

Re: CHPRC SAF S15-007
Work Order: 378034
SDG: GEL378034

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on July 28, 2015. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,

Chelsea Seagle

Chelsea Seagle for
Heather Shaffer
Project Manager

Purchase Order: 300071 7H
Chain of Custody: S15-007-099 and S15-007-100
Enclosures

# Table of Contents

Case Narrative.....1

Chain of Custody and Supporting Documentation.....4

Data Review Qualifier Definitions.....8

Laboratory Certifications.....11

Metals Analysis.....13

- Case Narrative.....14
- Sample Data Summary.....19
- Quality Control Summary.....24

General Chem Analysis.....33

- Case Narrative.....34
- Sample Data Summary.....41
- Quality Control Summary.....44

# Case Narrative

**General Narrative**
**for**
**CH2MHill Plateau Remediation Company**
**CHPRC SAF S15-007**
**SDG: GEL378034**

**August 24, 2015**

**Laboratory Identification:**

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

**Summary**

**Sample receipt**

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on July 28, 2015, for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

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

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

| Laboratory Identification | Sample Description |
|---|---|
| 378034001 | B31L45 |
| 378034002 | B31L44 |
| 378034003 | B31L47 |

**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 and Metals.

This package, to the best of my knowledge, 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 Manger (or designee) and the laboratory's client services representative as verified by their signatures on this report.

Chelsea Seagle

Chelsea Seagle for
Heather Shaffer
Project Manager

# Chain of Custody and Supporting Documentation

**CH2MHill Plateau Remediation Company**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

378034

C.O.C. # **S15-007-099**

Page 1 of 1

| | | | | | |
|---|---|---|---|---|---|
| **Collector** | K.C. Patterson/CHPRC | **Contact/Requester** | Karen Waters-Husted | **Telephone No.** | 509-376-4650 |
| **SAF No.** | S15-007 | **Sampling Origin** | Hanford Site | **Purchase Order/Charge Code** | 300071 WO 7.27.15 |
| **Project Title** | CERCLA, JULY 2015 | **Logbook No.** | HNF-N-506 77116 | **Ice Chest No.** | GWS-2939 |
| **Shipped To (Lab)** | GEL Laboratories, LLC | **Method of Shipment** | Commercial Carrier | **Bill of Lading/Air Bill No.** | 774145194017 |
| **Protocol** | SURV | **Priority:** | **30 Days** PRIORITY | **Offsite Property No.** | 5824 |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

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

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

N/A

| Sample No. | Filter | * | Date | Time | No/Type Container | Sample Analysis | Holding Time | Preservative |
|---|---|---|---|---|---|---|---|---|
| B31L44 | N | W | 7-27-15 | 1057 | 1x500-mL G/P | 6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: GW 01 | 6 Months | HNO3 to pH <2 |
| B31L47 | Y | W | 1 | 1 | 1x250-mL G/P | 2320_ALKALINITY: GW 01 | 14 Days | Cool <=6C |
| B31L47 | Y | W | 7-27-15 | 1057 | 1x500-mL G/P | 6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: GW 01 | 6 Months | HNO3 to pH <2 |

August 24, 2015

| Relinquished By | Print / Sign | Date/Time | Received By | Print / Sign | Date/Time |
|---|---|---|---|---|---|
| K.C. Patterson/CHPRC | | JUL 27 2015 1240 | B.E. Briggs CHPRC | B.E. Briggs | JUL 27 2015 1240 |
| B.E. Briggs CHPRC | B.E. Briggs | JUL 27 2015 1400 | FEDEX | | |
| | | | | | |
| | | | | | |

Matrix *

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

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



PRINTED ON 5/27/2015 FSR ID = FSR39 A-6004-842 (REV 2)

**CH2MHill Plateau Remediation Company**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

378034

C.O.C. # **S15-007-100**

Page 1 of 1

| | | | | | |
|---|---|---|---|---|---|
| **Collector** | K.C. Patterson/CHPRC | **Contact/Requester** | Karen Waters-Husted | **Telephone No.** | 509-376-4650 |
| **SAF No.** | S15-007 | **Sampling Origin** | Hanford Site | **Purchase Order/Charge Code** | 300076 7-27-15 |
| **Project Title** | CERCLA, JULY 2015 | **Logbook No.** | HNF-N-506 77/16 | **Ice Chest No.** | GWS-2939 |
| **Shipped To (Lab)** | GEL Laboratories, LLC | **Method of Shipment** | Commercial Carrier | **Bill of Lading/Air Bill No.** | 774145194017 |
| **Protocol** | SURV | **Priority:** | 30 Days **PRIORITY** | **Offsite Property No.** | 5824 |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

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

**SPECIAL INSTRUCTIONS** **Hold Time**

N/A

Total Activity Exemption: Yes ☑ No ☐

| Sample No. | Filter | * | Date | Time | No/Type Container | Sample Analysis | Holding Time | Preservative |
|---|---|---|---|---|---|---|---|---|
| B31L45 | N | W | 7-27-15 | 1057 | 1x250-mL G/P | 9056_ANIONS_IC: COMMON; 9056_ANIONS_IC: GW 02 | 28 Days/48 Hours | Cool <=6C |

August 24, 2015

| Relinquished By | Print / Sign | Date/Time | Received By | Print / Sign | Date/Time |
|---|---|---|---|---|---|
| K.C. Patterson/CHPRC | | JUL 27 2015 1240 | B.E. Briggs CHPRC | B.E. Briggs | JUL 27 2015 1240 |
| B.E. Briggs CHPRC | B.E. Briggs | JUL 27 2015 1400 | FEDEX | | |
| | Fed ex | | | | |
| | | | M. Kanslow | | 7-28-15 0850 |

Matrix *

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

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

**PRINTED ON** 5/27/2015 **FSR ID = FSR39** A-6004-842 (REV 2)

GEL Laboratories LLC

# SAMPLE RECEIPT & REVIEW FORM

| | | | |
|---|---|---|---|
| **Client:** | QARC | **SDG/AR/COC/Work Order:** | 378034 |
| **Received By:** | MK | **Date Received:** | 7-28-15 |

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

| | Sample Receipt Criteria | Yes | NA | No | Comments/Qualifiers (Required for Non-Conforming Items) |
|---|---|---|---|---|---|
| 1 | Shipping containers received intact and sealed? | ✓ | | | Circle Applicable: Seals broken Damaged container Leaking container Other (describe) |
| 2 | Samples requiring cold preservation within (0 ≤ 6 deg. C)?* | ✓ | | | Preservation Method: Ice bags Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius 1C |
| 2a | Daily check performed and passed on IR temperature gun? | ✓ | | | Temperature Device Serial #: ES05201583O Secondary Temperature Device Serial # (If Applicable): |
| 3 | Chain of custody documents included with shipment? | ✓ | | | |
| 4 | Sample containers intact and sealed? | ✓ | | | Circle Applicable: Seals broken Damaged container Leaking container Other (describe) |
| 5 | Samples requiring chemical preservation at proper pH? | ✓ | | | Sample ID's, containers affected and observed pH: If Preservation added, Lot#: |
| 6 | Do Low Level Perchlorate samples (EPA 6850) have headspace as required? | | ✓ | | Sample ID's and containers affected: |
| 7 | VOA vials free of headspace (defined as < 6mm bubble)? | | ✓ | | Sample ID's and containers affected: |
| 8 | Are Encore containers present? | | | ✓ | (If yes, immediately deliver to Volatiles laboratory) |
| 9 | Samples received within holding time? | ✓ | | | ID's and tests affected: |
| 10 | Sample ID's on COC match ID's on bottles? | ✓ | | | Sample ID's and containers affected: |
| 11 | Date & time on COC match date & time on bottles? | ✓ | | | Sample ID's affected: |
| 12 | Number of containers received match number indicated on COC? | ✓ | | | Sample ID's affected: |
| 13 | Are sample containers identifiable as GEL provided? | ✓ | | | |
| 14 | COC form is properly signed in relinquished/received sections? | ✓ | | | |
| 15 | Carrier and tracking number. | ✓ | | | Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other 7741 4519 4017 |

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials HS Date 7/28/15 Page 1 of 1

GL-CHL-SR-001 Rev 1

# Data Review Qualifier Definitions

# GEL LABORATORIES LLC

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

Report Date: 24−AUG−15

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

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

**GEL LABORATORIES LLC**

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

Report Date: 24−AUG−15

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

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

# Laboratory Certifications

**List of current GEL Certifications as of 24 August 2015**

| State | Certification |
|---|---|
| Alaska | UST−110 |
| Arkansas | 88−0651 |
| CLIA | 42D0904046 |
| California | 2940 Interim |
| Colorado | SC00012 |
| Connecticut | PH−0169 |
| Delaware | SC000122013−10 |
| DoD ELAP/ ISO17025 A2LA | 2567.01 |
| Florida NELAP | E87156 |
| Foreign Soils Permit | P330−12−00283, P330−12−00284 |
| Georgia | SC00012 |
| Georgia SDWA | 967 |
| Hawaii | SC000122013−10 |
| Idaho Chemistry | SC00012 |
| Idaho Radiochemistry | SC00012 |
| Illinois NELAP | 200029 |
| Indiana | C−SC−01 |
| Kansas NELAP | E−10332 |
| Kentucky SDWA | 90129 |
| Kentucky Wastewater | 90129 |
| Louisiana NELAP | 03046 (AI33904) |
| Louisiana SDWA | LA150001 |
| Maryland | 270 |
| Massachusetts | M−SC012 |
| Michigan | 9976 |
| Mississippi | SC000122013−10 |
| Nebraska | NE−OS−26−13 |
| Nevada | SC000122014−1 |
| New Hampshire NELAP | 2054 |
| New Jersey NELAP | SC002 |
| New Mexico | SC00012 |
| New York NELAP | 11501 |
| North Carolina | 233 |
| North Carolina SDWA | 45709 |
| Oklahoma | 9904 |
| Pennsylvania NELAP | 68−00485 |
| Plant Material Permit | PDEP−12−00260 |
| S.Carolina Radchem | 10120002 |
| South Carolina Chemistry | 10120001 |
| Tennessee | TN 02934 |
| Texas NELAP | T104704235−15−10 |
| Utah NELAP | SC000122015−18 |
| Vermont | VT87156 |
| Virginia NELAP | 460202 |
| Washington | C780 |
| West Virginia | 997404 |

# Metals Analysis

# Case Narrative

**Metals**
**Technical Case Narrative**
**CH2MHill Plateau Remediation Company (CPRC)**
**SDG #: GEL378034**
**Work Order #: 378034**

| Sample ID | Client ID |
|---|---|
| 378034002 | B31L44 |
| 378034003 | B31L47 |
| 1203363116 | Method Blank (MB)**ICP** |
| 1203363117 | Laboratory Control Sample (LCS) |
| 1203363120 | 378034002(B31L44L) Serial Dilution (SD) |
| 1203363118 | 378034002(B31L44S) Matrix Spike (MS) |
| 1203363119 | 378034002(B31L44SD) Matrix Spike Duplicate (MSD) |
| 1203363090 | Method Blank (MB)**ICP-MS** |
| 1203363091 | Laboratory Control Sample (LCS) |
| 1203363094 | 378034002(B31L44L) Serial Dilution (SD) |
| 1203363092 | 378034002(B31L44S) Matrix Spike (MS) |
| 1203363093 | 378034002(B31L44SD) Matrix Spike Duplicate (MSD) |

**Sample Analysis**

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

**Method/Analysis Information**

| | |
|---|---|
| **Analytical Batch:** | 1496042 and 1496031 |
| **Prep Batch :** | 1496041 and 1496030 |
| **Standard Operating Procedures:** | GL-MA-E-013 REV# 24, GL-MA-E-006 REV# 12 and GL-MA-E-014 REV# 26 |
| **Analytical Method:** | 6010_METALS_ICP and 6020_METALS_ICPMS |
| **Prep Method :** | SW846 3005A |

**Preparation/Analytical Method Verification**

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

**System Configuration**

The Metals analysis-ICP was performed on a P E 5300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with an ESI SC-FAST introduction, cyclonic spray chamber, and yttrium or scandium internal standard.

The Metals analysis - ICPMS was performed on a PerkinElmer NexION 300X ICPMS. The instrument is equipped with a ESI PFA-ST nebulizer, quadrupole mass spectrometer, dual mode electron multiplier detector, and Kinetic Energy Discrimination (KED) technology. Internal standards of scandium, germanium, indium,

tantalum, and/or lutetium were utilized to cover the mass spectrum.

The Metals analysis - ICPMS was performed on a PerkinElmer NexION 350X ICPMS. The instrument is equipped with a ESI PFA-ST nebulizer, quadrupole mass spectrometer, dual mode electron multiplier detector, and Kinetic Energy Discrimination (KED) technology. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum.

## Calibration Information

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

**CRDL/PQL Requirements**
The PQL standard recoveries for SW846 6010C 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. 378034002 (B31L44) and 378034003 (B31L47)-ICP.

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

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

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

## Quality Control (QC) Information

**Method Blank (MB) Statement**
The method blanks (MB) analyzed with this SDG met the acceptance criteria with the exception of sodium. The analyte concentration was greater than the MDL. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data. 1203363116 (MB)-ICP.

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

**Quality Control (QC) Sample Statement**
The following samples were selected as the quality control (QC) samples for this SDG: 378034002 (B31L44)-ICP and ICP-MS.

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

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

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

## Technical Information

**Holding Time Specifications**
GEL assigns holding times based on the associated methodology. Holding time is measured by comparison of the date and time of sample collection to the date and time of sample preparation and analysis. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

**Preparation/Analytical Method Verification**
All procedures were performed as stated in the SOP.

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

**Preparation Information**
The samples in this SDG were not diluted and prepared according to the cited SOP.

## Miscellaneous Information

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

**Data Exception (DER) Documentation**
A data exception report was not required for this SDG.

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

## Certification Statement

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

# GEL LABORATORIES LLC

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

## Qualifier Definition Report
for

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL378034 GEL Work Order: 378034

**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: 24 AUG 2015** **Title: Data Validator**

# Sample Data Summary

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

**SDG No:** GEL378034 **METHOD TYPE:** SW846

**SAMPLE ID:** 378034002 **CLIENT ID:** B31L44

**CONTRACT:** CPRC0S15007

**MATRIX:** WATER **DATE RECEIVED** 28−JUL−15 **LEVEL:** Low

| CAS No | Analyte | Result | Units | C | Qual | M* | MDL | DF | Inst ID | Analytical Run |
|---|---|---|---|---|---|---|---|---|---|---|
| 7429−90−5 | Aluminum | 15 | ug/L | B | | MS | 15 | 1 | ICPMS11 | 150820−3 |
| 7440−36−0 | Antimony | 1 | ug/L | U | | MS | 1 | 1 | ICPMS11 | 150821−4 |
| 7440−38−2 | Arsenic | 1.7 | ug/L | U | | MS | 1.7 | 1 | ICPMS11 | 150820−3 |
| 7440−39−3 | Barium | 101 | ug/L | | | MS | 0.6 | 1 | ICPMS11 | 150820−3 |
| 7440−41−7 | Beryllium | 0.2 | ug/L | U | | MS | 0.2 | 1 | ICPMS11 | 150821−7 |
| 7440−42−8 | Boron | 75.1 | ug/L | | | P | 15 | 1 | OPTIMA3 | 080415−1 |
| 7440−43−9 | Cadmium | 0.11 | ug/L | U | | MS | 0.11 | 1 | ICPMS11 | 150820−3 |
| 7440−70−2 | Calcium | 97200 | ug/L | | | P | 50 | 1 | OPTIMA3 | 080415−1 |
| 7440−47−3 | Chromium | 258 | ug/L | | | MS | 2 | 1 | ICPMS11 | 150820−3 |
| 7440−48−4 | Cobalt | 0.1 | ug/L | U | | MS | 0.1 | 1 | ICPMS11 | 150820−3 |
| 7440−50−8 | Copper | 7.58 | ug/L | | | MS | 0.35 | 1 | ICPMS11 | 150820−3 |
| 7439−89−6 | Iron | 30 | ug/L | U | | P | 30 | 1 | OPTIMA3 | 080415−1 |
| 7439−92−1 | Lead | 0.5 | ug/L | U | | MS | 0.5 | 1 | ICPMS11 | 150820−3 |
| 7439−95−4 | Magnesium | 23900 | ug/L | | | P | 110 | 1 | OPTIMA3 | 080415−1 |
| 7439−96−5 | Manganese | 1 | ug/L | U | | MS | 1 | 1 | ICPMS11 | 150820−3 |
| 7439−98−7 | Molybdenum | 1.4 | ug/L | | | MS | 0.165 | 1 | ICPMS12 | 150824−2 |
| 7440−02−0 | Nickel | 1.3 | ug/L | B | | MS | 0.5 | 1 | ICPMS11 | 150820−3 |
| 7440−09−7 | Potassium | 4930 | ug/L | | | P | 50 | 1 | OPTIMA3 | 080415−1 |
| 7782−49−2 | Selenium | 2.88 | ug/L | B | | MS | 1.5 | 1 | ICPMS11 | 150821−4 |
| 7440−22−4 | Silver | 0.2 | ug/L | U | | MS | 0.2 | 1 | ICPMS11 | 150821−4 |
| 7440−23−5 | Sodium | 18800 | ug/L | | | P | 100 | 1 | OPTIMA3 | 080415−1 |
| 7440−24−6 | Strontium | 627 | ug/L | | | MS | 2 | 1 | ICPMS11 | 150820−3 |
| 7440−28−0 | Thallium | 0.45 | ug/L | U | | MS | 0.45 | 1 | ICPMS11 | 150820−3 |
| 7440−29−1 | Thorium | 0.383 | ug/L | U | | MS | 0.383 | 1 | ICPMS11 | 150821−11 |
| 7440−31−5 | Tin | 1 | ug/L | U | | MS | 1 | 1 | ICPMS11 | 150821−4 |
| 7440−61−1 | Uranium | 2.97 | ug/L | | | MS | 0.067 | 1 | ICPMS11 | 150821−11 |

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

**SDG No:** GEL378034 **METHOD TYPE:** SW846

**SAMPLE ID:** 378034002 **CLIENT ID:** B31L44

**CONTRACT:** CPRC0S15007

**MATRIX:** WATER **DATE RECEIVED** 28−JUL−15 **LEVEL:** Low

| CAS No | Analyte | Result | Units | C | Qual | M* | MDL | DF | Inst ID | Analytical Run |
|---|---|---|---|---|---|---|---|---|---|---|
| 7440−62−2 | Vanadium | 5.06 | ug/L | | | P | 1 | 1 | OPTIMA3 | 080415−1 |
| 7440−66−6 | Zinc | 3.5 | ug/L | U | | MS | 3.5 | 1 | ICPMS11 | 150820−3 |

***Analytical Methods:**

| | |
|---|---|
| **P** | **SW846 3005A/6010C** |
| **MS** | **SW846 3005A/6020A** |

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

**SDG No:** GEL378034 **METHOD TYPE:** SW846

**SAMPLE ID:** 378034003 **CLIENT ID:** B31L47

**CONTRACT:** CPRC0S15007

**MATRIX:** WATER **DATE RECEIVED** 28−JUL−15 **LEVEL:** Low

| CAS No | Analyte | Result | Units | C | Qual | M* | MDL | DF | Inst ID | Analytical Run |
|---|---|---|---|---|---|---|---|---|---|---|
| 7429−90−5 | Aluminum | 15 | ug/L | U | | MS | 15 | 1 | ICPMS11 | 150820−3 |
| 7440−36−0 | Antimony | 1 | ug/L | U | | MS | 1 | 1 | ICPMS11 | 150821−4 |
| 7440−38−2 | Arsenic | 1.77 | ug/L | B | | MS | 1.7 | 1 | ICPMS11 | 150820−3 |
| 7440−39−3 | Barium | 104 | ug/L | | | MS | 0.6 | 1 | ICPMS11 | 150820−3 |
| 7440−41−7 | Beryllium | 0.2 | ug/L | U | | MS | 0.2 | 1 | ICPMS11 | 150821−7 |
| 7440−42−8 | Boron | 75.3 | ug/L | | | P | 15 | 1 | OPTIMA3 | 080415−1 |
| 7440−43−9 | Cadmium | 0.11 | ug/L | U | | MS | 0.11 | 1 | ICPMS11 | 150820−3 |
| 7440−70−2 | Calcium | 98200 | ug/L | | | P | 50 | 1 | OPTIMA3 | 080415−1 |
| 7440−47−3 | Chromium | 260 | ug/L | | | MS | 2 | 1 | ICPMS11 | 150820−3 |
| 7440−48−4 | Cobalt | 0.1 | ug/L | U | | MS | 0.1 | 1 | ICPMS11 | 150820−3 |
| 7440−50−8 | Copper | 6.31 | ug/L | | | MS | 0.35 | 1 | ICPMS11 | 150820−3 |
| 7439−89−6 | Iron | 30 | ug/L | U | | P | 30 | 1 | OPTIMA3 | 080415−1 |
| 7439−92−1 | Lead | 0.5 | ug/L | U | | MS | 0.5 | 1 | ICPMS11 | 150820−3 |
| 7439−95−4 | Magnesium | 24500 | ug/L | | | P | 110 | 1 | OPTIMA3 | 080415−1 |
| 7439−96−5 | Manganese | 1 | ug/L | U | | MS | 1 | 1 | ICPMS11 | 150820−3 |
| 7439−98−7 | Molybdenum | 1.35 | ug/L | | | MS | 0.165 | 1 | ICPMS12 | 150824−2 |
| 7440−02−0 | Nickel | 1.45 | ug/L | B | | MS | 0.5 | 1 | ICPMS11 | 150820−3 |
| 7440−09−7 | Potassium | 5010 | ug/L | | | P | 50 | 1 | OPTIMA3 | 080415−1 |
| 7782−49−2 | Selenium | 2.24 | ug/L | B | | MS | 1.5 | 1 | ICPMS11 | 150821−4 |
| 7440−22−4 | Silver | 0.2 | ug/L | U | | MS | 0.2 | 1 | ICPMS11 | 150821−4 |
| 7440−23−5 | Sodium | 18900 | ug/L | | | P | 100 | 1 | OPTIMA3 | 080415−1 |
| 7440−24−6 | Strontium | 633 | ug/L | | | MS | 2 | 1 | ICPMS11 | 150820−3 |
| 7440−28−0 | Thallium | 0.45 | ug/L | U | | MS | 0.45 | 1 | ICPMS11 | 150820−3 |
| 7440−29−1 | Thorium | 0.383 | ug/L | U | | MS | 0.383 | 1 | ICPMS11 | 150821−11 |
| 7440−31−5 | Tin | 1 | ug/L | U | | MS | 1 | 1 | ICPMS11 | 150821−4 |
| 7440−61−1 | Uranium | 2.95 | ug/L | | | MS | 0.067 | 1 | ICPMS11 | 150821−11 |

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

**SDG No:** GEL378034 **METHOD TYPE:** SW846

**SAMPLE ID:** 378034003 **CLIENT ID:** B31L47

**CONTRACT:** CPRC0S15007

**MATRIX:** WATER **DATE RECEIVED** 28−JUL−15 **LEVEL:** Low

| CAS No | Analyte | Result | Units | C | Qual | M* | MDL | DF | Inst ID | Analytical Run |
|---|---|---|---|---|---|---|---|---|---|---|
| 7440−62−2 | Vanadium | 5.09 | ug/L | | | P | 1 | 1 | OPTIMA3 | 080415−1 |
| 7440−66−6 | Zinc | 3.5 | ug/L | U | | MS | 3.5 | 1 | ICPMS11 | 150820−3 |

***Analytical Methods:**

| | |
|---|---|
| **P** | **SW846 3005A/6010C** |
| **MS** | **SW846 3005A/6020A** |

# Quality Control Summary

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

# QC Summary

**Report Date: August 24, 2015**



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

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

**Workorder:** **378034**

| Parmname | NOM | Sample | Qual | QC | Units | RPD/D% | REC% | Range | Anlst | Date Time |
|---|---|---|---|---|---|---|---|---|---|---|
| **Metals Analysis - ICPMS** | | | | | | | | | | |
| Batch 1496031 | | | | | | | | | | |
| QC1203363091 LCS | | | | | | | | | | |
| Aluminum | 2000 | | | 1970 | ug/L | | 98.7 | (80%-120%) | PRB | 08/21/15 02:00 |
| Antimony | 50.0 | | | 49.8 | ug/L | | 99.6 | (80%-120%) | | 08/21/15 20:12 |
| Arsenic | 50.0 | | | 47.9 | ug/L | | 95.8 | (80%-120%) | | 08/21/15 02:00 |
| Barium | 50.0 | | | 51.8 | ug/L | | 104 | (80%-120%) | | |
| Beryllium | 50.0 | | | 59.6 | ug/L | | 119 | (80%-120%) | | 08/22/15 04:01 |
| Cadmium | 50.0 | | | 48.6 | ug/L | | 97.2 | (80%-120%) | | 08/21/15 02:00 |
| Chromium | 50.0 | | | 50.0 | ug/L | | 99.9 | (80%-120%) | | |
| Cobalt | 50.0 | | | 50.6 | ug/L | | 101 | (80%-120%) | | |
| Copper | 50.0 | | | 50.3 | ug/L | | 101 | (80%-120%) | | |
| Lead | 50.0 | | | 42.3 | ug/L | | 84.5 | (80%-120%) | | |
| Manganese | 50.0 | | | 47.1 | ug/L | | 94.3 | (80%-120%) | | |
| Molybdenum | 50.0 | | | 53.0 | ug/L | | 106 | (80%-120%) | BAJ | 08/24/15 12:30 |
| Nickel | 50.0 | | | 51.5 | ug/L | | 103 | (80%-120%) | PRB | 08/21/15 02:00 |
| Selenium | 50.0 | | | 52.7 | ug/L | | 105 | (80%-120%) | | 08/21/15 20:12 |
| Silver | 50.0 | | | 50.6 | ug/L | | 101 | (80%-120%) | | |
| Strontium | 50.0 | | | 48.2 | ug/L | | 96.4 | (80%-120%) | | 08/21/15 02:00 |
| Thallium | 50.0 | | | 41.7 | ug/L | | 83.3 | (80%-120%) | | |
| Thorium | 50.0 | | | 50.7 | ug/L | | 101 | (80%-120%) | | 08/24/15 12:46 |
| Tin | 50.0 | | | 50.6 | ug/L | | 101 | (80%-120%) | | 08/21/15 20:12 |
| Uranium | 50.0 | | | 51.5 | ug/L | | 103 | (80%-120%) | | 08/24/15 12:46 |

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# QC Summary

**Workorder:** **378034**



| Parmname | NOM | Sample | Qual | QC | Units | RPD/D% | REC% | Range | Anlst | Date Time |
|---|---|---|---|---|---|---|---|---|---|---|
| **Metals Analysis - ICPMS** | | | | | | | | | | |
| Batch 1496031 | | | | | | | | | | |
| Zinc | 50.0 | | | 45.0 | ug/L | | 89.9 | (80%-120%) | PRB | 08/21/15 02:00 |
| QC1203363090 MB | | | | | | | | | | |
| Aluminum | | | U | ND | ug/L | | | | | 08/21/15 01:57 |
| Antimony | | | U | ND | ug/L | | | | | 08/21/15 20:09 |
| Arsenic | | | U | ND | ug/L | | | | | 08/21/15 01:57 |
| Barium | | | U | ND | ug/L | | | | | |
| Beryllium | | | U | ND | ug/L | | | | | 08/22/15 03:58 |
| Cadmium | | | U | ND | ug/L | | | | | 08/21/15 01:57 |
| Chromium | | | U | ND | ug/L | | | | | |
| Cobalt | | | U | ND | ug/L | | | | | |
| Copper | | | U | ND | ug/L | | | | | |
| Lead | | | U | ND | ug/L | | | | | |
| Manganese | | | U | ND | ug/L | | | | | |
| Molybdenum | | | U | ND | ug/L | | | | BAJ | 08/24/15 12:29 |
| Nickel | | | U | ND | ug/L | | | | PRB | 08/21/15 01:57 |
| Selenium | | | U | ND | ug/L | | | | | 08/21/15 20:09 |
| Silver | | | U | ND | ug/L | | | | | |
| Strontium | | | U | ND | ug/L | | | | | 08/21/15 01:57 |
| Thallium | | | U | ND | ug/L | | | | | |
| Thorium | | | U | ND | ug/L | | | | | 08/24/15 12:45 |
| Tin | | | U | ND | ug/L | | | | | 08/21/15 20:09 |
| Uranium | | | U | ND | ug/L | | | | | 08/24/15 12:45 |

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# QC Summary

**Workorder:** **378034**



| Parmname | NOM | | Sample | Qual | QC | Units | RPD/D% | REC% | Range | Anlst | Date Time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Metals Analysis - ICPMS** | | | | | | | | | | | |
| Batch 1496031 | | | | | | | | | | | |
| Zinc | | | | U | ND | ug/L | | | | PRB | 08/21/15 01:57 |
| QC1203363092 378034002 MS | | | | | | | | | | | |
| Aluminum | 2000 | B | 15.0 | | 1940 | ug/L | | 96.3 | (75%-125%) | | 08/21/15 02:06 |
| Antimony | 50.0 | U | ND | | 51.1 | ug/L | | 102 | (75%-125%) | | 08/21/15 20:19 |
| Arsenic | 50.0 | U | ND | | 51.3 | ug/L | | 99.2 | (75%-125%) | | 08/21/15 02:06 |
| Barium | 50.0 | | 101 | | 154 | ug/L | | 106 | (75%-125%) | | |
| Beryllium | 50.0 | U | ND | | 55.2 | ug/L | | 110 | (75%-125%) | | 08/22/15 04:06 |
| Cadmium | 50.0 | U | ND | | 46.5 | ug/L | | 93 | (75%-125%) | | 08/21/15 02:06 |
| Chromium | 50.0 | | 258 | | 309 | ug/L | | N/A | (75%-125%) | | |
| Cobalt | 50.0 | U | ND | | 50.8 | ug/L | | 101 | (75%-125%) | | |
| Copper | 50.0 | | 7.58 | | 57.2 | ug/L | | 99.2 | (75%-125%) | | |
| Lead | 50.0 | U | ND | | 41.9 | ug/L | | 83.7 | (75%-125%) | | |
| Manganese | 50.0 | U | ND | | 48.1 | ug/L | | 95 | (75%-125%) | | |
| Molybdenum | 50.0 | | 1.40 | | 54.6 | ug/L | | 107 | (75%-125%) | BAJ | 08/24/15 12:33 |
| Nickel | 50.0 | B | 1.30 | | 52.1 | ug/L | | 102 | (75%-125%) | PRB | 08/21/15 02:06 |
| Selenium | 50.0 | B | 2.88 | | 54.5 | ug/L | | 103 | (75%-125%) | | 08/21/15 20:19 |
| Silver | 50.0 | U | ND | | 49.5 | ug/L | | 99 | (75%-125%) | | |
| Strontium | 50.0 | | 627 | | 659 | ug/L | | N/A | (75%-125%) | | 08/21/15 02:06 |
| Thallium | 50.0 | U | ND | | 41.7 | ug/L | | 83.2 | (75%-125%) | | |
| Thorium | 50.0 | U | ND | | 51.4 | ug/L | | 103 | (75%-125%) | | 08/24/15 12:49 |
| Tin | 50.0 | U | ND | | 50.1 | ug/L | | 99.9 | (75%-125%) | | 08/21/15 20:19 |
| Uranium | 50.0 | | 2.97 | | 54.5 | ug/L | | 103 | (75%-125%) | | 08/24/15 12:49 |

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# QC Summary

**Workorder:** **378034**



| Parmname | NOM | | Sample | Qual | QC | Units | RPD/D% | REC% | Range | Anlst | Date Time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Metals Analysis - ICPMS** | | | | | | | | | | | |
| Batch 1496031 | | | | | | | | | | | |
| Zinc | 50.0 | U | ND | | 46.3 | ug/L | | 85.6 | (75%-125%) | PRB | 08/21/15 02:06 |
| QC1203363093 378034002 MSD | | | | | | | | | | | |
| Aluminum | 2000 | B | 15.0 | | 1910 | ug/L | 1.66 | 94.7 | (0%-20%) | | 08/21/15 02:09 |
| Antimony | 50.0 | U | ND | | 50.4 | ug/L | 1.42 | 100 | (0%-20%) | | 08/21/15 20:22 |
| Arsenic | 50.0 | U | ND | | 50.1 | ug/L | 2.35 | 96.8 | (0%-20%) | | 08/21/15 02:09 |
| Barium | 50.0 | | 101 | | 154 | ug/L | 0.127 | 106 | (0%-20%) | | |
| Beryllium | 50.0 | U | ND | | 54.4 | ug/L | 1.4 | 109 | (0%-20%) | | 08/22/15 04:09 |
| Cadmium | 50.0 | U | ND | | 46.4 | ug/L | 0.163 | 92.9 | (0%-20%) | | 08/21/15 02:09 |
| Chromium | 50.0 | | 258 | | 304 | ug/L | 1.51 | N/A | (0%-20%) | | |
| Cobalt | 50.0 | U | ND | | 50.4 | ug/L | 0.735 | 101 | (0%-20%) | | |
| Copper | 50.0 | | 7.58 | | 56.5 | ug/L | 1.25 | 97.8 | (0%-20%) | | |
| Lead | 50.0 | U | ND | | 42.1 | ug/L | 0.426 | 84 | (0%-20%) | | |
| Manganese | 50.0 | U | ND | | 47.5 | ug/L | 1.38 | 93.7 | (0%-20%) | | |
| Molybdenum | 50.0 | | 1.40 | | 55.1 | ug/L | 0.82 | 107 | (0%-20%) | BAJ | 08/24/15 12:35 |
| Nickel | 50.0 | B | 1.30 | | 51.6 | ug/L | 1.09 | 101 | (0%-20%) | PRB | 08/21/15 02:09 |
| Selenium | 50.0 | B | 2.88 | | 53.6 | ug/L | 1.65 | 102 | (0%-20%) | | 08/21/15 20:22 |
| Silver | 50.0 | U | ND | | 49.8 | ug/L | 0.54 | 99.5 | (0%-20%) | | |
| Strontium | 50.0 | | 627 | | 662 | ug/L | 0.382 | N/A | (0%-20%) | | 08/21/15 02:09 |
| Thallium | 50.0 | U | ND | | 41.1 | ug/L | 1.26 | 82.2 | (0%-20%) | | |
| Thorium | 50.0 | U | ND | | 51.0 | ug/L | 0.824 | 102 | (0%-20%) | | 08/24/15 12:51 |
| Tin | 50.0 | U | ND | | 50.5 | ug/L | 0.73 | 101 | (0%-20%) | | 08/21/15 20:22 |
| Uranium | 50.0 | | 2.97 | | 54.4 | ug/L | 0.206 | 103 | (0%-20%) | | 08/24/15 12:51 |

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# QC Summary

**Workorder:** **378034**



| Parmname | NOM | | Sample | Qual | QC | Units | RPD/D% | REC% | Range | Anlst | Date Time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Metals Analysis - ICPMS** | | | | | | | | | | | |
| Batch 1496031 | | | | | | | | | | | |
| Zinc | 50.0 | U | ND | | 45.0 | ug/L | 2.8 | 83 | (0%-20%) | PRB | 08/21/15 02:09 |
| QC1203363094 378034002 SDILT | | | | | | | | | | | |
| Aluminum | | B | 15.0 | DU | ND | ug/L | N/A | | (0%-10%) | | 08/21/15 02:15 |
| Antimony | | U | ND | DU | ND | ug/L | N/A | | (0%-10%) | | 08/21/15 20:28 |
| Arsenic | | U | ND | DU | ND | ug/L | N/A | | (0%-10%) | | 08/21/15 02:15 |
| Barium | | | 101 | D | 20.0 | ug/L | .915 | | (0%-10%) | | |
| Beryllium | | U | ND | DU | ND | ug/L | N/A | | (0%-10%) | | 08/22/15 04:15 |
| Cadmium | | U | ND | DU | ND | ug/L | N/A | | (0%-10%) | | 08/21/15 02:15 |
| Chromium | | | 258 | D | 51.0 | ug/L | 1.21 | | (0%-10%) | | |
| Cobalt | | U | ND | DU | ND | ug/L | N/A | | (0%-10%) | | |
| Copper | | | 7.58 | D | 1.58 | ug/L | 4.16 | | (0%-10%) | | |
| Lead | | U | ND | DU | ND | ug/L | N/A | | (0%-10%) | | |
| Manganese | | U | ND | DU | ND | ug/L | N/A | | (0%-10%) | | |
| Molybdenum | | | 1.40 | D | 0.268 | ug/L | 3.94 | | (0%-10%) | BAJ | 08/24/15 12:38 |
| Nickel | | B | 1.30 | DU | ND | ug/L | N/A | | (0%-10%) | PRB | 08/21/15 02:15 |
| Selenium | | B | 2.88 | DU | ND | ug/L | N/A | | (0%-10%) | | 08/21/15 20:28 |
| Silver | | U | ND | DU | ND | ug/L | N/A | | (0%-10%) | | |
| Strontium | | | 627 | D | 120 | ug/L | 4.39 | | (0%-10%) | | 08/21/15 02:15 |
| Thallium | | U | ND | DU | ND | ug/L | N/A | | (0%-10%) | | |
| Thorium | | U | ND | DU | ND | ug/L | N/A | | (0%-10%) | | 08/24/15 12:54 |
| Tin | | U | ND | DU | ND | ug/L | N/A | | (0%-10%) | | 08/21/15 20:28 |
| Uranium | | | 2.97 | D | 0.633 | ug/L | 6.57 | | (0%-10%) | | 08/24/15 12:54 |

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# QC Summary

**Workorder:** **378034**



| Parmname | NOM | | Sample | Qual | QC | Units | RPD/D% | REC% | Range | Anlst | Date Time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Metals Analysis - ICPMS** | | | | | | | | | | | |
| Batch 1496031 | | | | | | | | | | | |
| Zinc | | U | ND | DU | ND | ug/L | N/A | | (0%-10%) | PRB | 08/21/15 02:15 |
| **Metals Analysis-ICP** | | | | | | | | | | | |
| Batch 1496042 | | | | | | | | | | | |
| QC1203363117 LCS | | | | | | | | | | | |
| Boron | 500 | | | | 516 | ug/L | | 103 | (80%-120%) | HSC | 08/04/15 17:40 |
| Calcium | 5000 | | | | 5140 | ug/L | | 103 | (80%-120%) | | |
| Iron | 5000 | | | | 5370 | ug/L | | 107 | (80%-120%) | | |
| Magnesium | 5000 | | | | 5240 | ug/L | | 105 | (80%-120%) | | |
| Potassium | 5000 | | | | 5350 | ug/L | | 107 | (80%-120%) | | |
| Sodium | 5000 | | | | 5480 | ug/L | | 110 | (80%-120%) | | |
| Vanadium | 500 | | | | 509 | ug/L | | 102 | (80%-120%) | | |
| QC1203363116 MB | | | | | | | | | | | |
| Boron | | | | U | ND | ug/L | | | | | 08/04/15 17:36 |
| Calcium | | | | U | ND | ug/L | | | | | |
| Iron | | | | U | ND | ug/L | | | | | |
| Magnesium | | | | U | ND | ug/L | | | | | |
| Potassium | | | | U | ND | ug/L | | | | | |
| Sodium | | | | B | 238 | ug/L | | | | | |
| Vanadium | | | | U | ND | ug/L | | | | | |
| QC1203363118 378034002 MS | | | | | | | | | | | |
| Boron | 500 | | 75.1 | | 612 | ug/L | | 107 | (75%-125%) | | 08/04/15 17:46 |
| Calcium | 5000 | | 97200 | | 103000 | ug/L | | N/A | (75%-125%) | | |
| Iron | 5000 | U | ND | | 5330 | ug/L | | 106 | (75%-125%) | | |
| Magnesium | 5000 | | 23900 | | 29500 | ug/L | | N/A | (75%-125%) | | |

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# QC Summary

**Workorder:** **378034**



| Parmname | NOM | | Sample | Qual | QC | Units | RPD/D% | REC% | Range | Anlst | Date Time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Metals Analysis-ICP** | | | | | | | | | | | |
| Batch 1496042 | | | | | | | | | | | |
| Potassium | 5000 | | 4930 | | 10300 | ug/L | | 108 | (75%-125%) | | |
| Sodium | 5000 | | 18800 | | 24200 | ug/L | | 109 | (75%-125%) | HSC | 08/04/15 17:46 |
| Vanadium | 500 | | 5.06 | | 523 | ug/L | | 104 | (75%-125%) | | |
| QC1203363119 378034002 MSD | | | | | | | | | | | |
| Boron | 500 | | 75.1 | | 610 | ug/L | 0.363 | 107 | (0%-20%) | | 08/04/15 17:49 |
| Calcium | 5000 | | 97200 | | 100000 | ug/L | 2.38 | N/A | (0%-20%) | | |
| Iron | 5000 | U | ND | | 5210 | ug/L | 2.13 | 104 | (0%-20%) | | |
| Magnesium | 5000 | | 23900 | | 28800 | ug/L | 2.59 | N/A | (0%-20%) | | |
| Potassium | 5000 | | 4930 | | 10100 | ug/L | 2.3 | 103 | (0%-20%) | | |
| Sodium | 5000 | | 18800 | | 23400 | ug/L | 3.51 | 92 | (0%-20%) | | |
| Vanadium | 500 | | 5.06 | | 520 | ug/L | 0.65 | 103 | (0%-20%) | | |
| QC1203363120 378034002 SDILT | | | | | | | | | | | |
| Boron | | | 75.1 | D | 17.3 | ug/L | 15.4 | | (0%-10%) | | 08/04/15 17:52 |
| Calcium | | | 97200 | D | 18800 | ug/L | 3.36 | | (0%-10%) | | |
| Iron | | U | ND | DU | ND | ug/L | N/A | | (0%-10%) | | |
| Magnesium | | | 23900 | D | 4690 | ug/L | 1.97 | | (0%-10%) | | |
| Potassium | | | 4930 | D | 949 | ug/L | 3.64 | | (0%-10%) | | |
| Sodium | | | 18800 | D | 3520 | ug/L | 6.41 | | (0%-10%) | | |
| Vanadium | | | 5.06 | D | 1.07 | ug/L | 6.12 | | (0%-10%) | | |

**Notes:**

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured

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# QC Summary

**Workorder:** **378034**



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

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.

# General Chem Analysis

# Case Narrative

**General Chemistry**
**Technical Case Narrative**
**CH2MHill Plateau Remediation Company (CPRC)**
**SDG #: GEL378034**
**Work Order #: 378034**

## Method/Analysis Information

| | | | |
|---|---|---|---|
| **Product:** | **Ion Chromatography** | | |
| **Analytical Batch:** | 1496071 | **Method:** | 9056_ANIONS_IC: COMMON + GW 02 |

## Sample Analysis

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

| Sample ID | Client ID |
|---|---|
| 378034001 | B31L45 |
| 1203363180 | Method Blank (MB) |
| 1203363181 | Laboratory Control Sample (LCS) |
| 1203363182 | 378034001(B31L45) Sample Duplicate (DUP) |
| 1203363183 | 378034001(B31L45) Post Spike (PS) |

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

**SOP Reference**
Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-086 REV# 24.

**Preparation/Analytical Method Verification**

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

## Calibration Information

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

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

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

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

acceptance limits.

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

**Quality Control (QC) Information**

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

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

**Quality Control (QC) Designation**
Sample 378034001 (B31L45) was selected for QC analysis.

**Matrix Spike (MS)/Post Spike (PS) Recovery Statement**
The MS/PS recoveries for this sample set were within the required acceptance limits.

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

**Technical Information**

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

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

**Sample Dilutions**
The following samples were diluted because target analyte concentrations exceeded the calibration range. 1203363182 (B31L45DUP), 1203363183 (B31L45PS) and 378034001 (B31L45).

| Analyte | 378034 001 |
|---|---|
| Chloride | 10X |
| Nitrate | 10X |
| Sulfate | 20X |

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

**Miscellaneous Information**

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

**Manual Integrations**
Samples 1203363182 (B31L45DUP), 1203363183 (B31L45PS) and 378034001 (B31L45) were manually integrated to correctly position the baseline as set in the calibration standards.

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

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

**Method/Analysis Information**

| | | | |
|---|---|---|---|
| **Product:** | **Alkalinity** | | |
| **Analytical Batch:** | 1497066 | **Method:** | 2320_ALKALINITY: COMMON (Alkalinity only) |

**Sample Analysis**

The following samples were analyzed using the analytical protocol as established in 2320_ALKALINITY:

| Sample ID | Client ID |
|---|---|
| 378034003 | B31L47 |
| 1203365662 | Method Blank (MB) |
| 1203365664 | Laboratory Control Sample (LCS) |
| 1203365667 | 378034003(B31L47) Sample Duplicate (DUP) |
| 1203365669 | 378034003(B31L47) Matrix Spike (MS) |

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

**SOP Reference**
Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-033 REV# 11.

**Preparation/Analytical Method Verification**

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

**Calibration Information**

The Titration and Ion analysis was performed on a manually operated buret.

**Initial Standardization**
The titrant was properly standardized

**Quality Control (QC) Information**

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

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

**Quality Control (QC) Designation**
Sample 378034003 (B31L47) was selected for QC analysis.

**Matrix Spike (MS)/Post Spike (PS) Recovery Statement**
The MS/PS recovery for this sample set was within the required acceptance limits.

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

**Technical Information**

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

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

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

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

**Miscellaneous Information**

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

**Additional Comments**
50mL of sample was used due to limited sample quantity and selection for QC. 1203365667 (B31L47DUP), 1203365669 (B31L47MS) and 378034003 (B31L47).

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

**Certification Statement**

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

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## Qualifier Definition Report
for

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL378034 GEL Work Order: 378034

**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: Thomas Lewis**

**Date: 21 AUG 2015** **Title: Data Validator**

# Sample Data Summary

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# Certificate of Analysis

Report Date: August 21, 2015

Company : CH2MHill Plateau Remediation Company
Address : MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Project: CHPRC SAF S15-007

Client Sample ID: B31L45
Sample ID: 378034001
Matrix: WATER
Collect Date: 27-JUL-15 10:57
Receive Date: 28-JUL-15
Collector: Client

Project: CPRC0S15007
Client ID: CPRC001

| Parameter | Qualifier | Result | DL | RL | Units | DF | Analyst | Date | Time | Batch | Method |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ion Chromatography | | | | | | | | | | | |
| 9056_ANIONS_IC: COMMON + GW 02 "As Received" | | | | | | | | | | | |
| Bromide | B | 197 | 67.0 | 250 | ug/L | 1 | MXL2 | 07/28/15 | 1542 | 1496071 | 1 |
| Fluoride | B | 98.6 | 33.0 | 500 | ug/L | 1 | | | | | |
| Nitrite-N | U | 38.0 | 38.0 | 250 | ug/L | 1 | | | | | |
| Phosphorus in phosphate | U | 67.0 | 67.0 | 500 | ug/L | 1 | | | | | |
| Chloride | D | 19000 | 670 | 2000 | ug/L | 10 | MXL2 | 07/28/15 | 1718 | 1496071 | 2 |
| Nitrate-N | D | 7850 | 330 | 1000 | ug/L | 10 | | | | | |
| Sulfate | D | 204000 | 2660 | 8000 | ug/L | 20 | MXL2 | 07/30/15 | 0010 | 1496071 | 3 |

The following Analytical Methods were performed:

| Method | Description | Analyst Comments |
|---|---|---|
| 1 | SW846 9056A | |
| 2 | SW846 9056A | |
| 3 | SW846 9056A | |

**Notes:**

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

# Certificate of Analysis

Report Date: August 21, 2015

| | |
|---|---|
| Company : | CH2MHill Plateau Remediation Company |
| Address : | MSIN R3-50 CHPRC<br>PO Box 1600<br>Richland, Washington 99352 |
| Contact: | Mr. Scot Fitzgerald |
| Project: | CHPRC SAF S15-007 |

| | | | |
|---|---|---|---|
| Client Sample ID: | B31L47 | Project: | CPRC0S15007 |
| Sample ID: | 378034003 | Client ID: | CPRC001 |
| Matrix: | WATER | | |
| Collect Date: | 27-JUL-15 10:57 | | |
| Receive Date: | 28-JUL-15 | | |
| Collector: | Client | | |

| Parameter | Qualifier | Result | DL | RL | Units | DF | Analyst | Date | Time | Batch | Method |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Titration and Ion Analysis | | | | | | | | | | | |
| 2320_ALKALINITY: COMMON (Alkalinity only) "As Received" | | | | | | | | | | | |
| Alkalinity, Total as CaCO3 | | 106000 | 1450 | 2000 | ug/L | | PXO1 | 07/31/15 | 1644 | 1497066 | 1 |

The following Analytical Methods were performed:

| Method | Description | Analyst Comments |
|---|---|---|
| 1 | 2320_ALKALINITY | |

**Notes:**

# Quality Control Summary

**GEL LABORATORIES LLC**
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# QC Summary

**Report Date: August 21, 2015**



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

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

**Workorder:** **378034**

| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date Time |
|---|---|---|---|---|---|---|---|---|---|---|
| **Ion Chromatography** | | | | | | | | | | |
| Batch 1496071 | | | | | | | | | | |
| QC1203363182 378034001 DUP | | | | | | | | | | |
| Bromide | B | 197 | B | 199 | ug/L | 0.656 ^ | | (+/-250) | MXL2 | 07/28/15 16:14 |
| Chloride | D | 19000 | D | 18900 | ug/L | 0.706 | | (0%-20%) | | 07/28/15 17:50 |
| Fluoride | B | 98.6 | B | 99.5 | ug/L | 0.909 ^ | | (+/-500) | | 07/28/15 16:14 |
| Nitrate-N | D | 7850 | D | 7640 | ug/L | 2.82 | | (0%-20%) | | 07/28/15 17:50 |
| Nitrite-N | U | 38.0 | U | 38.0 | ug/L | N/A | | | | 07/28/15 16:14 |
| Phosphorus in phosphate | U | 67.0 | U | 67.0 | ug/L | N/A | | | | |
| Sulfate | D | 204000 | D | 204000 | ug/L | 0.145 | | (0%-20%) | | 07/30/15 00:42 |
| QC1203363181 LCS | | | | | | | | | | |
| Bromide | 1250 | | | 1280 | ug/L | | 103 | (90%-110%) | | 07/28/15 15:11 |
| Chloride | 5000 | | | 4660 | ug/L | | 93.2 | (90%-110%) | | |
| Fluoride | 2500 | | | 2450 | ug/L | | 97.9 | (90%-110%) | | |
| Nitrate-N | 2500 | | | 2430 | ug/L | | 97.1 | (90%-110%) | | |
| Nitrite-N | 2500 | | | 2410 | ug/L | | 96.5 | (90%-110%) | | |
| Phosphorus in phosphate | 1250 | | | 1270 | ug/L | | 101 | (90%-110%) | | |
| Sulfate | 10000 | | | 9700 | ug/L | | 97 | (90%-110%) | | |
| QC1203363180 MB | | | | | | | | | | |
| Bromide | | | U | 67.0 | ug/L | | | | | 07/28/15 14:40 |
| Chloride | | | U | 67.0 | ug/L | | | | | |
| Fluoride | | | U | 33.0 | ug/L | | | | | |
| Nitrate-N | | | U | 33.0 | ug/L | | | | | |
| Nitrite-N | | | U | 38.0 | ug/L | | | | | |

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# QC Summary

**Workorder:** **378034**



| Parmname | NOM | | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date Time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Ion Chromatography** | | | | | | | | | | | |
| Batch 1496071 | | | | | | | | | | | |
| Phosphorus in phosphate | | | | U | 67.0 | ug/L | | | | MXL2 | 07/28/15 14:40 |
| Sulfate | | | | U | 133 | ug/L | | | | | |
| QC1203363183 378034001 PS | | | | | | | | | | | |
| Bromide | 1.25 | B | 0.197 | | 1.48 | mg/L | | 103 | (90%-110%) | | 07/28/15 16:46 |
| Chloride | 5.00 | D | 1.90 | D | 6.84 | mg/L | | 98.7 | (90%-110%) | | 07/28/15 18:22 |
| Fluoride | 2.50 | B | 0.0986 | | 2.50 | mg/L | | 95.9 | (90%-110%) | | 07/28/15 16:46 |
| Nitrate-N | 2.50 | D | 0.785 | D | 3.21 | mg/L | | 96.9 | (90%-110%) | | 07/28/15 18:22 |
| Nitrite-N | 2.50 | U | 0.00 | | 2.44 | mg/L | | 97.4 | (90%-110%) | | 07/28/15 16:46 |
| Phosphorus in phosphate | 1.25 | U | 0.00 | | 1.16 | mg/L | | 93 | (90%-110%) | | |
| Sulfate | 10.0 | D | 10.2 | D | 20.9 | mg/L | | 107 | (90%-110%) | | 07/30/15 01:13 |
| **Titration and Ion Analysis** | | | | | | | | | | | |
| Batch 1497066 | | | | | | | | | | | |
| QC1203365667 378034003 DUP | | | | | | | | | | | |
| Alkalinity, Total as CaCO3 | | | 106000 | | 106000 | ug/L | 0 | | (0%-20%) | PXO1 | 07/31/15 16:46 |
| QC1203365664 LCS | | | | | | | | | | | |
| Alkalinity, Total as CaCO3 | 50000 | | | | 53300 | ug/L | | 107 | (90%-110%) | | 07/31/15 16:17 |
| QC1203365662 MB | | | | | | | | | | | |
| Alkalinity, Total as CaCO3 | | | | U | 725 | ug/L | | | | | 07/31/15 16:17 |
| QC1203365669 378034003 MS | | | | | | | | | | | |
| Alkalinity, Total as CaCO3 | 100000 | | 106000 | | 209000 | ug/L | | 104 | (80%-120%) | | 07/31/15 16:54 |

**Notes:**

The Qualifiers in this report are defined as follows:

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

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# QC Summary

**Workorder:** **378034**



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

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.