

6/20/2016



a member of **The GEL Group** INC



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June 20, 2016

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

Re: CHPRC SAF F16-043  
Work Order: 398774  
SDG: GEL398774

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 07, 2016. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,

  
Brielle Luthman for  
Heather Shaffer  
Project Manager

Purchase Order: 304070 - 8C  
Chain of Custody: F16-043-022  
Enclosures



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# Case Narrative

**General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF F16-043  
SDG: GEL398774**

**June 20, 2016**

**Laboratory Identification:**

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

**Summary**

**Sample receipt**

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on June 07, 2016, for analysis. The sample was delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

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

**Sample Identification**

The laboratory received the following sample:

<b>Laboratory Identification</b>	<b>Sample Description</b>
398774001	B35VM8

**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.

6/20/2016

*B. Luthman*  
Brielle Luthman for  
Heather Shaffer  
Project Manager

**Technical Case Narrative**  
**CH2MHill Plateau Remediation Company (CPRC)**  
**SDG #: GEL398774**  
**Work Order #: 398774**

## **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 exception criteria with the exception of sodium. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data. 1203563288 (MB).

### **Technical Information**

#### **Sample Dilutions**

Samples were diluted due to suppression of antimony. 1203563290 (B35VM8DUP), 1203563291 (B35VM8MS), 1203563292 (B35VM8SDILT) and 398774001 (B35VM8).

	<b>398774</b>
Analyte	<b>001</b>
Antimony	10X

### **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**

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

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

#### **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
1203563237 (B35VM8MS)	Copper	140* (75%-125%)
	Nickel	129* (75%-125%)

#### Serial Dilution % Difference Statement

Not all the applicable analytes were within the established acceptance criteria. Matrix suppression may be suspected. The data has been qualified.

Sample	Analyte	Value
1203563238 (B35VM8SDILT)	Aluminum	12.2 *(0%-10%)
	Copper	12.7 *(0%-10%)

#### Technical Information

##### Sample Dilutions

Sample 398774001 (B35VM8) was diluted to ensure that the analyte concentration was within the linear calibration range of the instrument. The ICPMS solid samples in this SDG were diluted the standard two times.

Analyte	398774
	001
Several	25X 2X

## General Chemistry

### pH

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

##### Holding Times

Samples (See Below) were received by the laboratory outside of the method specified holding time. The data is qualified.

Sample	Analyte	Value
1203563504 (B35VM8DUP)	pH	Received 07-JUN-16, out of holding 06-JUN-16
398774001 (B35VM8)	pH	Received 07-JUN-16, out of holding 06-JUN-16

## **Radiochemistry**

### **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.

### **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**



**SAMPLE RECEIPT & REVIEW FORM**

Client: <u>CPRC</u>		SDG/AR/COC/Work Order: <u>398774</u>
Received By: <u>MK</u>		Date Received: <u>6-7-16</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.
COC/Samples marked as radioactive?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>gmo</u>
Classified Radioactive II or III by RSO?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Preservation Method: Ice bags Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius <u>2c</u>
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>13044962</u> Secondary Temperature Device Serial # (if Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 Do Low Level Perchlorate samples have headspace as required?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
7 VOA vials contain acid preservation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(If unknown, select No)
8 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
9 Are Encore containers present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
10 Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
11 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
12 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
13 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
14 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
15 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

16 Carrier and tracking number.

Circle Applicable:  
 FedEx Air     FedEx Ground     UPS     Field Services     Courier     Other

7764 5527 5678

Comments (Use Continuation Form if needed):

# **Data Review Qualifier Definitions**

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

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

# Laboratory Certifications

**List of current GEL Certifications as of 20 June 2016**

<b>State</b>	<b>Certification</b>
Alaska	UST-0110
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA160006
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122016-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-16-11
Utah NELAP	SC000122016-20
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

# Metals Analysis

# Case Narrative

**Metals**  
**Technical Case Narrative**  
**CH2MHill Plateau Remediation Company (CPRC)**  
**SDG #: GEL398774**  
**Work Order #: 398774**

**Product:** Determination of Metals by ICP-MS  
**Analytical Method:** 6020\_METALS\_ICPMS  
**Analytical Procedure:** GL-MA-E-014 REV# 28  
**Analytical Batch:** 1572931

**Product:** Determination of Metals by ICP  
**Analytical Method:** 6010\_METALS\_ICP  
**Analytical Procedure:** GL-MA-E-013 REV# 26  
**Analytical Batch:** 1572951

**Preparation Method:** SW846 3050B  
**Preparation Procedure:** GL-MA-E-009 REV# 26  
**Preparation Batches:** 1572930 and 1572950

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
398774001	B35VM8
1203563288	Method Blank (MB)ICP
1203563289	Laboratory Control Sample (LCS)
1203563292	398774001(B35VM8L) Serial Dilution (SD)
1203563290	398774001(B35VM8D) Sample Duplicate (DUP)
1203563291	398774001(B35VM8S) Matrix Spike (MS)
1203563234	Method Blank (MB)ICP-MS
1203563235	Laboratory Control Sample (LCS)
1203563238	398774001(B35VM8L) Serial Dilution (SD)
1203563236	398774001(B35VM8D) Sample Duplicate (DUP)
1203563237	398774001(B35VM8S) Matrix Spike (MS)
1203566608	398774001(B35VM8PS) Post Spike (PS)

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

**Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

**Quality Control (QC) Information**

**Method Blank (MB) Statement**

The method blanks (MB) analyzed with this SDG met the exception criteria with the exception of sodium. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data. 1203563288 (MB)-ICP. The method blanks (MB) analyzed with this SDG met the exception criteria with the exception of zinc. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data. 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 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
1203563237 (B35VM8MS)	Copper	140* (75%-125%)
	Nickel	129* (75%-125%)

**Serial Dilution % Difference Statement**

The serial dilution is used to assess matrix suppression or enhancement. Raw element concentrations 25x the IDL/MDL for CVAA, 50X the IDL/MDL for ICP and 100X the IDL/MDL for ICP-MS analyses are applicable for serial dilution assessment. Not all the applicable analytes were within the established acceptance criteria. Matrix suppression may be suspected. The data has been qualified.

Sample	Analyte	Value
1203563238 (B35VM8SDILT)	Aluminum	12.2 *(0%-10%)
	Copper	12.7 *(0%-10%)

**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 are performed to minimize matrix interferences resulting from elevated mineral element concentrations present in solid samples and/or to bring over range target analyte concentrations into the linear calibration range of the instrument. Samples were diluted due to suppression of antimony. 1203563290 (B35VM8DUP), 1203563291 (B35VM8MS), 1203563292 (B35VM8SDILT) and 398774001 (B35VM8)-ICP. Sample 398774001 (B35VM8)-ICP-MS was diluted to ensure that the analyte concentration was within the linear calibration range of the instrument. The ICPMS solid samples in this SDG were diluted the standard two times. ICP-MS.

Analyte	398774
	001
Several	25X 2X 10X 1X

**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: GEL398774 GEL Work Order: 398774

**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.
- M Duplicate precision not met.
- 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: 20 JUN 2016**

**Title: Data Validator**

# Sample Data Summary

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

SDG No: GEL398774

CONTRACT: CPRC0F16043

METHOD TYPE: SW846

SAMPLE ID: 398774001

BASIS: Dry Weight

DATE COLLECTED 06-JUN-16

CLIENT ID: B35VM8

LEVEL: Low

DATE RECEIVED 07-JUN-16

MATRIX: SOIL

%SOLIDS: 95.4

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	4390000	ug/kg	DM	3100	10300	50	2	MS	PRB	06/13/16 21:45	160613-2	1572931
7440-36-0	Antimony	3450	ug/kg	UD	3450	10400	10400	10	P	TXT1	06/09/16 16:41	060916-1	1572951
7440-38-2	Arsenic	742	ug/kg	BD	207	1030	10	2	MS	PRB	06/13/16 21:45	160613-2	1572931
7440-39-3	Barium	58200	ug/kg	D	103	414	20	2	MS	PRB	06/13/16 21:45	160613-2	1572931
7440-43-9	Cadmium	51.5	ug/kg	BD	20.7	207	5	2	MS	PRB	06/13/16 21:45	160613-2	1572931
7440-70-2	Calcium	5540000	ug/kg		8360	26100	26100	1	P	TXT1	06/09/16 16:13	060916-1	1572951
7440-47-3	Chromium	2550	ug/kg	D	207	620	10	2	MS	PRB	06/13/16 21:45	160613-2	1572931
7440-48-4	Cobalt	9080	ug/kg	D	62	207	20	2	MS	PRB	06/13/16 21:45	160613-2	1572931
7440-50-8	Copper	14400	ug/kg	DMN	68.3	207	8	2	MS	PRB	06/13/16 21:45	160613-2	1572931
7439-89-6	Iron	26000000	ug/kg		8360	26100	26100	1	P	TXT1	06/09/16 16:13	060916-1	1572951
7439-92-1	Lead	1840	ug/kg	D	103	414	15	2	MS	PRB	06/13/16 21:45	160613-2	1572931
7439-95-4	Magnesium	3930000	ug/kg		8880	31300	31300	1	P	TXT1	06/09/16 16:13	060916-1	1572951
7439-96-5	Manganese	310000	ug/kg	D	2590	12900	5	25	MS	PRB	06/14/16 18:00	160614-4	1572931
7439-98-7	Molybdenum	559	ug/kg	D	62	207	20	2	MS	PRB	06/13/16 21:45	160613-2	1572931
7440-02-0	Nickel	6310	ug/kg	DN	103	414	40	2	MS	PRB	06/13/16 21:45	160613-2	1572931
7723-14-0	Phosphorous	1420000	ug/kg		5220	15700	15700	1	P	TXT1	06/09/16 16:13	060916-1	1572951
7440-09-7	Potassium	440000	ug/kg		6680	26100	26100	1	P	TXT1	06/09/16 16:13	060916-1	1572951
7782-49-2	Selenium	890	ug/kg	BD	341	1030	50	2	MS	PRB	06/14/16 16:50	160614-3	1572931
7440-22-4	Silver	211	ug/kg	B	104	522	522	1	P	TXT1	06/09/16 16:13	060916-1	1572951
7440-23-5	Sodium	217000	ug/kg		7310	26100	26100	1	P	TXT1	06/09/16 16:13	060916-1	1572951
7440-24-6	Strontium	23200	ug/kg	D	414	2070	10	2	MS	PRB	06/13/16 21:45	160613-2	1572931
7440-62-2	Vanadium	53000	ug/kg	D	310	1030	1030	2	MS	PRB	06/13/16 21:45	160613-2	1572931
7440-66-6	Zinc	36500	ug/kg	D	414	2070	25	2	MS	PRB	06/13/16 21:45	160613-2	1572931

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1572931	1572930	SW846 3050B	0.507	g	50	mL	06/09/16	JP1
1572951	1572950	SW846 3050B	0.502	g	50	mL	06/08/16	JP1

**\*Analytical Methods:**

**P** SW846 3050B/6010C  
**MS** SW846 3050B/6020A

# Quality Control Summary

**GEL LABORATORIES LLC**

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

**QC Summary**

Report Date: June 20, 2016

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CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 398774

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1572931										
QC1203563236 398774001 DUP											
Aluminum	DM	4390000	D	4680000	ug/kg	6.38		(0%-20%)	PRB	06/13/16	21:49
Arsenic	BD	742	D	1030	ug/kg	32.9	^	(+/-1020)			
Barium	D	58200	D	61900	ug/kg	6.09		(0%-20%)			
Cadmium	BD	51.5	BD	57.3	ug/kg	10.7	^	(+/-203)			
Chromium	D	2550	D	2810	ug/kg	9.59	^	(+/-610)			
Cobalt	D	9080	D	10600	ug/kg	15.1		(0%-20%)			
Copper	DMN	14400	D	15700	ug/kg	8.81		(0%-20%)			
Lead	D	1840	D	1870	ug/kg	1.27	^	(+/-406)			
Manganese	D	310000	D	336000	ug/kg	7.94		(0%-20%)		06/14/16	18:03
Molybdenum	D	559	D	469	ug/kg	17.5	^	(+/-203)		06/13/16	21:49
Nickel	DN	6310	D	6980	ug/kg	10.1		(0%-20%)			
Selenium	BD	890	D	1030	ug/kg	14.3	^	(+/-1020)		06/14/16	16:53
Strontium	D	23200	D	25600	ug/kg	9.68		(0%-20%)		06/13/16	21:49
Vanadium	D	53000	D	54100	ug/kg	2.09		(0%-20%)			
Zinc	D	36500	D	38000	ug/kg	4.16		(0%-20%)			
QC1203563235 LCS											
Aluminum		198000	D	188000	ug/kg			94.8	(80%-120%)	06/13/16	21:42
Arsenic		4950	D	4030	ug/kg			81.4	(80%-120%)		
Barium		4950	D	4590	ug/kg			92.8	(80%-120%)		
Cadmium		4950	D	4330	ug/kg			87.4	(80%-120%)		

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**QC Summary**

Workorder: 398774

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Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1572931										
Chromium	4950		D	5130	ug/kg		104	(80%-120%)			
Cobalt	4950		D	4870	ug/kg		98.4	(80%-120%)	PRB	06/13/16	21:42
Copper	4950		D	4980	ug/kg		101	(80%-120%)			
Lead	4950		D	4940	ug/kg		99.7	(80%-120%)			
Manganese	4950		D	5200	ug/kg		105	(80%-120%)		06/14/16	17:57
Molybdenum	4950		D	4600	ug/kg		92.9	(80%-120%)		06/13/16	21:42
Nickel	4950		D	5070	ug/kg		102	(80%-120%)			
Selenium	4950		D	4110	ug/kg		83	(80%-120%)		06/14/16	16:47
Strontium	4950		D	4910	ug/kg		99.1	(80%-120%)		06/13/16	21:42
Vanadium	4950		D	5100	ug/kg		103	(80%-120%)			
Zinc	4950		D	4230	ug/kg		85.4	(80%-120%)			
QC1203563234	MB										
Aluminum			DU	2780	ug/kg					06/13/16	21:39
Arsenic			DU	185	ug/kg						
Barium			DU	92.6	ug/kg						
Cadmium			DU	18.5	ug/kg						
Chromium			DU	185	ug/kg						
Cobalt			DU	55.6	ug/kg						
Copper			DU	61.1	ug/kg						
Lead			DU	92.6	ug/kg						
Manganese			DU	185	ug/kg					06/14/16	17:54
Molybdenum			DU	55.6	ug/kg					06/13/16	21:39
Nickel			DU	92.6	ug/kg						

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**QC Summary**

Workorder: 398774

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1572931										
Selenium			DU	306	ug/kg				PRB	06/14/16	16:44
Strontium			DU	370	ug/kg					06/13/16	21:39
Vanadium			DU	278	ug/kg						
Zinc			BD	422	ug/kg						
QC1203563237 398774001 MS											
Aluminum	202000	DM	4390000	D	6230000	ug/kg	N/A	(75%-125%)		06/13/16	21:52
Arsenic	5050	BD	742	D	4990	ug/kg	84.2	(75%-125%)			
Barium	5050	D	58200	D	57500	ug/kg	N/A	(75%-125%)			
Cadmium	5050	BD	51.5	D	4710	ug/kg	92.2	(75%-125%)			
Chromium	5050	D	2550	D	8260	ug/kg	113	(75%-125%)			
Cobalt	5050	D	9080	D	14900	ug/kg	116	(75%-125%)			
Copper	5050	DMN	14400	DN	21500	ug/kg	140*	(75%-125%)			
Lead	5050	D	1840	D	6960	ug/kg	101	(75%-125%)			
Manganese	5050	D	310000	D	314000	ug/kg	N/A	(75%-125%)		06/14/16	18:07
Molybdenum	5050	D	559	D	5180	ug/kg	91.5	(75%-125%)		06/13/16	21:52
Nickel	5050	DN	6310	DN	12800	ug/kg	129*	(75%-125%)			
Selenium	5050	BD	890	D	5040	ug/kg	82.2	(75%-125%)		06/14/16	16:56
Strontium	5050	D	23200	D	34000	ug/kg	N/A	(75%-125%)		06/13/16	21:52
Vanadium	5050	D	53000	D	64400	ug/kg	N/A	(75%-125%)			
Zinc	5050	D	36500	D	40300	ug/kg	N/A	(75%-125%)			
QC1203566608 398774001 PS											
Copper	25.0	DMN	69.7	D	98.9	ug/L	117	(80%-120%)		06/13/16	21:55
Nickel	25.0	DN	30.5	D	60.3	ug/L	119	(80%-120%)			

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**QC Summary**

Workorder: 398774

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1572931										
QC1203563238	398774001	SDILT									
Aluminum	DM	21200	DM	4760	ug/L	12.2*		(0%-10%)	PRB	06/13/16	21:58
Arsenic	BD	3.59	DU	1030	ug/L	N/A		(0%-10%)			
Barium	D	282	D	57.3	ug/L	1.76		(0%-10%)			
Cadmium	BD	0.249	DU	103	ug/L	N/A		(0%-10%)			
Chromium	D	12.3	D	2.61	ug/L	5.93		(0%-10%)			
Cobalt	D	43.9	D	9.17	ug/L	4.34		(0%-10%)			
Copper	DMN	69.7	DM	15.7	ug/L	12.7*		(0%-10%)			
Lead	D	8.91	D	1.64	ug/L	8.14		(0%-10%)			
Manganese	D	120	D	23.9	ug/L	.483		(0%-10%)		06/14/16	18:10
Molybdenum	D	2.70	D	0.560	ug/L	3.59		(0%-10%)		06/13/16	21:58
Nickel	DN	30.5	D	6.85	ug/L	12.3		(0%-10%)			
Selenium	BD	4.30	DU	1710	ug/L	N/A		(0%-10%)		06/14/16	17:01
Strontium	D	112	D	22.4	ug/L	.383		(0%-10%)		06/13/16	21:58
Vanadium	D	256	D	53.6	ug/L	4.71		(0%-10%)			
Zinc	D	176	D	41.3	ug/L	17.1		(0%-10%)			

**Metals Analysis-ICP**

Batch 1572951

QC1203563290	398774001	DUP									
Antimony	DU	3450	DU	3410	ug/kg	N/A			TXT1	06/09/16	16:43
Calcium		5540000		5420000	ug/kg	2.18		(0%-20%)		06/09/16	16:15
Iron		26000000		23500000	ug/kg	9.79		(0%-20%)			
Magnesium		3930000		3260000	ug/kg	18.7		(0%-20%)			

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**QC Summary**

Workorder: 398774

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1572951										
Phosphorous		1420000		1400000	ug/kg	1.09		(0%-20%)			
Potassium		440000		408000	ug/kg	7.5		(0%-20%)	TXT1	06/09/16	16:15
Silver	B	211	B	214	ug/kg	1.27	^	(+/-517)			
Sodium		217000		239000	ug/kg	9.43		(0%-20%)			
QC1203563289	LCS										
Antimony	49000			46200	ug/kg		94.3	(80%-120%)		06/09/16	16:11
Calcium	490000			492000	ug/kg		100	(80%-120%)			
Iron	490000			479000	ug/kg		97.7	(80%-120%)			
Magnesium	490000			486000	ug/kg		99.1	(80%-120%)			
Phosphorous	49000			50000	ug/kg		102	(80%-120%)			
Potassium	490000			481000	ug/kg		98.1	(80%-120%)			
Silver	49000			46200	ug/kg		94.3	(80%-120%)			
Sodium	490000			486000	ug/kg		99.2	(80%-120%)			
QC1203563288	MB										
Antimony			U	327	ug/kg					06/09/16	16:08
Calcium			U	7920	ug/kg						
Iron			U	7920	ug/kg						
Magnesium			U	8420	ug/kg						
Phosphorous			U	4950	ug/kg						
Potassium			U	6340	ug/kg						
Silver			U	99.0	ug/kg						
Sodium			B	9420	ug/kg						
QC1203563291	398774001 MS										
Antimony	48600	DU	3450	D	38500	ug/kg	79.2	(75%-125%)		06/09/16	16:45

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**QC Summary**

Workorder: 398774

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1572951										
Calcium	486000	5540000		7000000	ug/kg		N/A	(75%-125%)		06/09/16	16:17
Iron	486000	26000000		26800000	ug/kg		N/A	(75%-125%)	TXT1		
Magnesium	486000	3930000		4820000	ug/kg		N/A	(75%-125%)			
Phosphorous	48600	1420000		1620000	ug/kg		N/A	(75%-125%)			
Potassium	486000	440000		946000	ug/kg		104	(75%-125%)			
Silver	48600	B 211		46400	ug/kg		95	(75%-125%)			
Sodium	486000	217000		773000	ug/kg		114	(75%-125%)			
QC1203563292 398774001 SDILT											
Antimony		DU	-6.56	DU	17200	ug/L	N/A	(0%-10%)		06/09/16	16:47
Calcium			53100	D	10400	ug/L	2.24	(0%-10%)		06/09/16	16:19
Iron			249000	D	49900	ug/L	.306	(0%-10%)			
Magnesium			37700	D	7410	ug/L	1.68	(0%-10%)			
Phosphorous			13600	D	2700	ug/L	.438	(0%-10%)			
Potassium			4210	D	829	ug/L	1.55	(0%-10%)			
Silver		B	2.02	D	1.02	ug/L	154	(0%-10%)			
Sodium			2080	D	405	ug/L	2.59	(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  $\geq$  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.

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**QC Summary**

Workorder: 398774

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
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 #: GEL398774  
 Work Order #: 398774**

**Product: pH****Analytical Method:** SW846 9045D**Analytical Procedure:** GL-GC-E-008 REV# 21**Analytical Batch:** 1572999

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
398774001	B35VM8
1203563434	Laboratory Control Sample (LCS)
1203563504	398774001(B35VM8) Sample Duplicate (DUP)

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****Holding Times**

Samples (See Below) were received by the laboratory outside of the method specified holding time. The data is qualified.

<b>Sample</b>	<b>Analyte</b>	<b>Value</b>
1203563504 (B35VM8DUP)	pH	Received 07-JUN-16, out of holding 06-JUN-16
398774001 (B35VM8)	pH	Received 07-JUN-16, out of holding 06-JUN-16

**Certification Statement**

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

**GEL LABORATORIES LLC**

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**Qualifier Definition Report  
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL398774 GEL Work Order: 398774

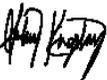
**The Qualifiers in this report are defined as follows:**

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:** Aubrey Kingsbury

**Date:** 14 JUN 2016

**Title:** Analyst I

# Sample Data Summary

6/20/2016

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: June 14, 2016

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF F16-043

---

Client Sample ID:	B35VM8	Project:	CPRC0F16043
Sample ID:	398774001	Client ID:	CPRC001
Matrix:	SOIL		
Collect Date:	06-JUN-16 10:30		
Receive Date:	07-JUN-16		
Collector:	Client		
Moisture:	4.63%		

---

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Titration and Ion Analysis											
9045_pH (Non-Aqueous):COMMON "As Received"											
pH at Temp 22.7C	X	9.05	0.010	0.100	SU	1	AMB	06/08/16	1055	1572999	1

The following Analytical Methods were performed:

---

Method	Description	Analyst Comments
1	SW846 9045D	

Notes:

# Quality Control Summary

**GEL LABORATORIES LLC**

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

**QC Summary**

Report Date: June 14, 2016

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 398774

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Titration and Ion Analysis</b>											
Batch	1572999										
QC1203563504	398774001	DUP									
pH	X	9.05	X	9.06	SU	0.11		(0%-30%)	AMB	06/08/16	11:00
QC1203563434	LCS										
pH	7.00			7.02	SU		100	(70%-130%)		06/08/16	10:39

**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  $\geq$  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.
- 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

**Radiochemistry  
Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL398774  
Work Order #: 398774**

**Product: Dry Weight**

**Analytical Method:** ASTM D 2216 (Modified)

**Analytical Procedure:** GL-OA-E-020 REV# 10

**Analytical Batch:** 1572979

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
398774001	B35VM8
1203563331	398774001(B35VM8) 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.

**Certification Statement**

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

**GEL LABORATORIES LLC**

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**Qualifier Definition Report  
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL398774 GEL Work Order: 398774

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

**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:** 15 JUN 2016

**Title:** Group Leader

# Sample Data Summary

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

SDG Number: GEL398774	Client: CPRC001	Project: CPRC0F16043
Lab Sample ID: 398774001	Date Collected: 06/06/2016 10:30	Matrix: SOIL
	Date Received: 06/07/2016 09:30	%Moisture: 4.6
Client ID: B35VM8		Prep Basis: "As Received"
Batch ID: 1572979	Method: ASTM D 2216 (Modified)	SOP Ref: GL-OA-E-020
Run Date: 06/08/2016 01:26	Analyst: LYT1	Instrument: SP-39020004
Data File:		Count Time:
Prep Batch: 1572979		
Prep Date: 06/08/2016 01:26		

CAS No.	Parmname	Qual	Result	Units	MDC		
	Moisture		4.63	percent	+/-		
<b>Surrogate/Tracer recovery</b>		<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>	<b>Acceptable Limits</b>	

**Comments:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).  
 The MDC is a sample specific MDC.

# Quality Control Summary

**GEL LABORATORIES LLC**

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

**QC Summary**Report Date: June 9, 2016  
Page 1 of 1

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

Contact: Mr. Scot Fitzgerald

Workorder: 398774

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
<b>Gravimetric Solids</b>										
Batch	1572979									
QC1203563331	398774001	DUP								
Moisture		4.63		4.93	percent	RPD: 6	(0%-20%)	LYT1	06/08/1601:26	

**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  $\geq 2X$  the MDA and, after corrections, result is  $\geq$  MDA for this sample
- 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 +/- 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.