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March 26, 2018

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

Re: CHPRC SAF W18-003  
Work Order: 445919  
SDG: GEL445919

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on March 15, 2018. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,

Heather Shaffer  
Project Manager

Purchase Order: 300071 - 7H  
Chain of Custody: W18-003-091 and W18-003-092  
Enclosures



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# Case Narrative

**General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF W18-003  
SDG: GEL445919**

**March 26, 2018**

**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 March 15, 2018, for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

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

**Sample Identification**

The laboratory received the following samples:

<b><u>Laboratory Identification</u></b>	<b><u>Sample Description</u></b>
445919001	B3HJM6
445919002	B3HJX0
445919003	B3HJM7
445919004	B3HJX1

**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.

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.



Heather Shaffer  
Project Manager

**General Chemistry  
Technical Case Narrative  
CH2M Hill Plateau Remediation Company (CPRC)  
SDG #: GEL445919  
Work Order #: 445919**

**Cyanide, Free**

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

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

Total CN levels above the MDL for Free CN were detected in samples 445919003 (B3HJM7) and 445919004 (B3HJX1). Free CN was performed per SOP (GL-GC-E-073).

**Cyanide, Chlorinated**

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.

**Cyanide, Amenable to Chlorination**

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.

**Cyanide, Total**

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**

<b>CH2MHill Plateau Remediation Company</b>	<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b>	C.O.C.# <b>W18-003-091</b>
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445919

<b>Collector:</b> Malcom Chunn CHPRC	<b>Contact/Requester:</b> Karen Waters-Husted	<b>Telephone No.:</b> 509-376-4650
<b>SAF No.:</b> W18-003	<b>Sampling Origin:</b> Hanford Site	<b>Purchase Order/Charge Code:</b> 300071
<b>Project Title:</b> RCRA, MARCH 2018	<b>Logbook No.:</b> HNF-N-506 99116	<b>Ice Chest No.:</b> GWS-527
<b>Shipped To (Lab):</b> GEL Laboratories, LLC	<b>Method of Shipment:</b> Commercial Carrier	<b>Bill of Lading/Air Bill No.:</b> 7800 Label 4354
<b>Protocol:</b> RCRA	<b>Priority:</b> 30 Days	<b>Offsite Property No.:</b> 91167

**POSSIBLE SAMPLE HAZARDS/REMARK**  
 \*\* \*\* 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**  
 N/A

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3HJM6	N	W	MAR 14 2018	0740	1x500-mL aG	9012_CN (AMENABLE): COMMON; 9012_CYANIDE (TOTAL): COMMON; 9014_CN (FREE): COMMON	14 Days	NaOH to pH >=12 / Cool <=6C
B3HJX0	Y	W	MAR 14 2018	0740	1x500-mL aG	9012_CN (AMENABLE): COMMON; 9012_CYANIDE (TOTAL): COMMON; 9014_CN (FREE): COMMON	14 Days	NaOH to pH >=12 / Cool <=6C

3/28/2018

Relinquished By: <u>MRC</u> Malcom Chunn Print First and Last Name Signature Date/Time	Received By: <u>D. Klug</u> Daniel Klug CHPRC Print First and Last Name Signature Date/Time	Matrix * S = Soil DS = Drum Solids SE = Sediment DL = Drum Liquid SO = Solid T = Tissue SL = Sludge WI = Wipe W = Water L = Liquid O = Oil V = Vegetation A = Air X = Other	
Relinquished By: <u>D. Klug</u> Daniel Klug CHPRC Print First and Last Name Signature Date/Time	Received By: <u>FEDEX</u> Print First and Last Name Signature Date/Time		
Relinquished By: <u>Fed Ex</u> Print First and Last Name Signature Date/Time	Received By: <u>Chakeris Tarplin</u> GEL Laboratories Print First and Last Name Signature Date/Time		
Relinquished By: _____ Print First and Last Name Signature Date/Time	Received By: _____ Print First and Last Name Signature Date/Time		
<b>FINAL SAMPLE DISPOSITION</b>		Disposal Method (e.g., Return to customer, per lab procedure, used in process): _____	Disposed By: _____ Date/Time: _____

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REV.0

<b>CH2M Hill Plateau Remediation Company</b>	<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b>	<b>C.O.C.#</b> <b>W18-003-092</b>
		Page 1 of 1

445919

<b>Collector:</b> Malcom Chunn CHPRC	<b>Contact/Requester:</b> Karen Waters-Husted	<b>Telephone No.:</b> 509-376-4650
<b>SAF No.:</b> W18-003	<b>Sampling Origin:</b> Hanford Site	<b>Purchase Order/Charge Code:</b> 300071
<b>Project Title:</b> RCRA, MARCH 2018	<b>Logbook No.:</b> HNF-N-506 99/14	<b>Ice Chest No.:</b> GCS-527
<b>Shipped To (Lab):</b> GEL Laboratories, LLC	<b>Method of Shipment:</b> Commercial Carrier	<b>Bill of Lading/Air Bill No.:</b> 1800 1610 4354
<b>Protocol:</b> RCRA	<b>Priority:</b> 30 Days	<b>Offsite Property No.:</b> 9167

<b>POSSIBLE SAMPLE HAZARDS/REMARK</b> ** ** 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	<b>SPECIAL INSTRUCTIONS</b> N/A
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Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3HJM7	N	W	MAR 14 2018	0913	1x500-mL aG	9012_CN (AMENABLE): COMMON; 9012_CYANIDE (TOTAL): COMMON; 9014_CN (FREE): COMMON	14 Days	NaOH to pH >=12 / Cool <=6C
B3HJX1	Y	W	MAR 14 2018	0913	1x500-mL aG	9012_CN (AMENABLE): COMMON; 9012_CYANIDE (TOTAL): COMMON; 9014_CN (FREE): COMMON	14 Days	NaOH to pH >=12 / Cool <=6C

3/28/2018

Relinquished By: <i>MRC</i> Print First and Last Name: <i>MRC</i> Signature: _____ Date/Time: MAR 14 2018 1000	Received By: Daniel Klug Print First and Last Name: Daniel Klug Signature: <i>D. Klug</i> Date/Time: MAR 14 2018 1000	<b>Matrix *</b> S = Soil DS = Drum Solids SE = Sediment DL = Drum Liquid SO = Solid T = Tissue SL = Sludge WI = Wipe W = Water L = Liquid O = Oil V = Vegetation A = Air X = Other	
Relinquished By: Daniel Klug Print First and Last Name: Daniel Klug Signature: <i>D. Klug</i> Date/Time: MAR 14 2018 1400	Received By: FEDEX Print First and Last Name: FEDEX Signature: _____ Date/Time: _____		
Relinquished By: Fed Ex Print First and Last Name: Fed Ex Signature: _____ Date/Time: _____	Received By: Chakeris Tarplin Print First and Last Name: Chakeris Tarplin Signature: <i>Chakeris Tarplin</i> Date/Time: 3/15/18 0905		
Relinquished By: _____ Print First and Last Name: _____ Signature: _____ Date/Time: _____	Received By: _____ Print First and Last Name: _____ Signature: _____ Date/Time: _____		
<b>FINAL SAMPLE DISPOSITION</b>		Disposal Method (e.g., Return to customer, per lab procedure, used in process): _____ Disposed By: _____ Date/Time: _____	

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SAMPLE RECEIPT & REVIEW FORM

HS

Client: <u>CPRC</u>		SDG/AR/COC/Work Order: <u>445919</u>		
Received By: <u>C. Tarplin</u>		Date Received: <u>03-15-2018</u>		
Carrier and Tracking Number		Circle Applicable: FedEx Express    FedEx Ground    UPS    Field Services    Courier    Other  <u>7800 5304 2493</u> <u>7800 6606 4354</u>		
Suspected Hazard Information	Yes <input type="checkbox"/> No <input type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.		
Shipped as a DOT Hazardous?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____		
COC/Samples marked or classified as radioactive?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> <u>CPM</u> mR/Hr Classified as: <u>Rad 1</u> Rad 2 Rad 3		
Is package, COC, and/or Samples marked HAZ?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:		
Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: <u>Wet Ice</u> Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius      TEMP: <u>2°C</u>
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: <u>IR4-17</u> Secondary Temperature Device Serial # (If Applicable): _____
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's and Containers Affected: If Preservation added Lot#: _____
7 Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>			If Yes, Are Encores or Soil Kits present? Yes _____ No <input checked="" type="checkbox"/> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes <input checked="" type="checkbox"/> No _____ N/A _____ (If unknown, select No) VOA vials free of headspace? Yes <input checked="" type="checkbox"/> No _____ N/A _____ Sample ID's and containers affected: _____
8 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected: _____
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected: _____
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected: _____
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected: _____
12 Are sample containers identifiable as GEL provided?	<input type="checkbox"/>		<input checked="" type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
Comments (Use Continuation Form if needed):				

PM (or PMA) review: Initials ASD Date 3/16/18 Page 1 of 1

# **Data Review Qualifier Definitions**

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

Qualifier	Qualifier Definition	Department	Fraction
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.		
J	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated	Organics	
P	Aroclor target analyte with greater than 25% difference between column analyses.	Organics	
C	Analyte has been confirmed by GC/MS analysis	Organics	Pesticide
B	The analyte was detected in both the associated QC blank and in the sample.	Organics	
E	Concentration exceeds the calibration range of the instrument	Organics	
A	The TIC is a suspected aldol-condensation product	Organics	Semi-Volatile
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
N	Spike Sample recovery is outside control limits.		
*	Duplicate analysis not within control limits	Inorganics	
>	Result greater than quantifiable range or greater than upper limit of the analysis range	General Chemistry	
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
B	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).	Inorganics	Metals
D	Results are reported from a diluted aliquot of sample.		
E	Reported value is estimated due to interferences. See comment in narrative.	Inorganics	Metals
M	Duplicate precision not met.	Inorganics	Metals
o	Analyte failed to recover within LCS limits (Organics only)	Organics	
S	Reported value determined by the Method of Standard Additions (MSA)	Inorganics	
T	Spike and/or spike duplicate sample recovery is outside control limits.	Organics	
W	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.	Inorganics	
B	The analyte was detected in the associated method blank $\geq$ MDC or $>5\%$ sample activity.	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 26 March 2018**

<b>State</b>	<b>Certification</b>
Alaska	17-018
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	LA180011
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122018-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-18-13
Utah NELAP	SC000122018-26
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

# General Chem Analysis

# Case Narrative

**General Chemistry  
Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL445919  
Work Order #: 445919**

**Product:** Cyanide, Free

**Analytical Method:** 9014\_CYANIDE

**Analytical Procedure:** GL-GC-E-073 REV# 8

**Analytical Batch:** 1747345

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>
445919003	B3HJM7
445919004	B3HJX1
1203989998	Method Blank (MB)
1203989999	Laboratory Control Sample (LCS)
1203990000	445848001(NonSDG) 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.

**Miscellaneous Information**

**Additional Comments**

Total CN levels above the MDL for Free CN were detected in samples 445919003 (B3HJM7) and 445919004 (B3HJX1). Free CN was performed per SOP (GL-GC-E-073).

**Product:** Cyanide, Amenable to Chlorination

**Analytical Method:** 9012\_CYANIDE

**Analytical Procedure:** GL-GC-E-107 REV# 10

**Analytical Batches:** 1747805, 1747804 and 1747803

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>
445919001	B3HJM6
445919002	B3HJX0
445919003	B3HJM7
445919004	B3HJX1

**Data Summary:**

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

**Product:** Cyanide, Total

**Analytical Method:** 9012\_CYANIDE

**Analytical Procedure:** GL-GC-E-095 REV# 22

**Analytical Batches:** 1749716 and 1749715

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>
445919001	B3HJM6
445919002	B3HJX0
445919003	B3HJM7
445919004	B3HJX1
1203995306	Method Blank (MB)
1203995307	Laboratory Control Sample (LCS)
1203995308	445936001(NonSDG) Sample Duplicate (DUP)
1203995309	445936001(NonSDG) Matrix Spike (MS)

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

**Data Summary:**

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

**Product:** Cyanide, Chlorinated

**Analytical Method:** 9012\_CYANIDE

**Analytical Procedure:** GL-GC-E-095 REV# 22

**Analytical Batches:** 1747804 and 1747803

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>
445919001	B3HJM6
445919002	B3HJX0
445919003	B3HJM7
445919004	B3HJX1
1203990992	Method Blank (MB)
1203990993	Laboratory Control Sample (LCS)
1203990994	445936001(NonSDG) Sample Duplicate (DUP)

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

**Data Summary:**

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

**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: GEL445919 GEL Work Order: 445919

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

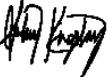
B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).

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:** Aubrey Kingsbury**Date:** 26 MAR 2018**Title:** Analyst I

# Sample Data Summary

**GEL LABORATORIES LLC**

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

**Certificate of Analysis**

Report Date: March 26, 2018

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF W18-003

Client Sample ID: B3HJM6 Project: CPRCOW18003  
 Sample ID: 445919001 Client ID: CPRC001  
 Matrix: WATER  
 Collect Date: 14-MAR-18 07:40  
 Receive Date: 15-MAR-18  
 Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Flow Injection Analysis												
9012_CYANIDE (TOTAL): COMMON "As Received"												
Cyanide, Total	U	1.67	1.67	5.00	ug/L	1.00	1	AXH3	03/26/18	0552	1749716	1
9014_CN (FREE): COMMON "As Received"												
Free Cyanide	U	1.00	1.00	2.00	ug/L		1	AXH3	03/26/18	0603	1750121	2
9012_CN (AMENABLE): COMMON "See Parent Products"												
Cyanide amenable to chlorination	U	1.67	1.67	5.00	ug/L		1	AXH3	03/26/18	0726	1747805	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 9010C Distillation	SW846 9010C Prep	KLP1	03/23/18	1425	1749715
SW846 9012B	SW846 9012B Cyanide, Chlorinated Prep	KLP1	03/23/18	1507	1747803

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	9012_CYANIDE	
2	9014_CYANIDE	
3	9012_CYANIDE	

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

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

**GEL LABORATORIES LLC**

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

**Certificate of Analysis**

Report Date: March 26, 2018

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF W18-003

Client Sample ID: B3HJX0 Project: CPRCOW18003  
 Sample ID: 445919002 Client ID: CPRC001  
 Matrix: WATER  
 Collect Date: 14-MAR-18 07:40  
 Receive Date: 15-MAR-18  
 Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Flow Injection Analysis												
9012_CYANIDE (TOTAL): COMMON "As Received"												
Cyanide, Total	U	1.67	1.67	5.00	ug/L	1.00	1	AXH3	03/26/18	0553	1749716	1
9014_CN (FREE): COMMON "As Received"												
Free Cyanide	U	1.00	1.00	2.00	ug/L		1	AXH3	03/26/18	0603	1750121	2
9012_CN (AMENABLE): COMMON "See Parent Products"												
Cyanide amenable to chlorination	U	1.67	1.67	5.00	ug/L		1	AXH3	03/26/18	0726	1747805	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 9010C Distillation	SW846 9010C Prep	KLP1	03/23/18	1425	1749715
SW846 9012B	SW846 9012B Cyanide, Chlorinated Prep	KLP1	03/23/18	1507	1747803

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	9012_CYANIDE	
2	9014_CYANIDE	
3	9012_CYANIDE	

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

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

**GEL LABORATORIES LLC**

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

**Certificate of Analysis**

Report Date: March 26, 2018

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF W18-003

Client Sample ID: B3HJM7 Project: CPRCOW18003  
 Sample ID: 445919003 Client ID: CPRC001  
 Matrix: WATER  
 Collect Date: 14-MAR-18 09:13  
 Receive Date: 15-MAR-18  
 Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Flow Injection Analysis												
9012_CYANIDE (TOTAL): COMMON "As Received"												
Cyanide, Total		18.3	1.67	5.00	ug/L	1.00	1	AXH3	03/26/18	0554	1749716	1
9014_CN (FREE): COMMON "As Received"												
Free Cyanide	U	1.00	1.00	2.00	ug/L		1	AXH3	03/26/18	1038	1747345	2
9012_CN (AMENABLE): COMMON "See Parent Products"												
Cyanide amenable to chlorination	B	1.70	1.67	5.00	ug/L		1	AXH3	03/26/18	0726	1747805	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 9010C Distillation	SW846 9010C Prep	KLP1	03/23/18	1425	1749715
SW846 9012B	SW846 9012B Cyanide, Chlorinated Prep	KLP1	03/23/18	1507	1747803

The following Analytical Methods were performed:

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**Notes:**

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# Quality Control Summary

**GEL LABORATORIES LLC**

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

**QC Summary**

Report Date: March 26, 2018

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CH2M Hill Plateau Remediation Company  
 MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 445919

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Flow Injection Analysis</b>											
Batch 1747345											
QC1203990000	445848001	DUP									
Free Cyanide		2.77		2.28	ug/L	19.2 ^		(+/-2.00)	AXH3	03/26/18	10:38
QC1203989999	LCS										
Free Cyanide	25.0			24.9	ug/L		99.4	(80%-120%)		03/26/18	10:38
QC1203989998	MB										
Free Cyanide			U	1.00	ug/L					03/26/18	10:38
Batch 1747804											
QC1203990994	445936001	DUP									
Cyanide, Chlorinated		U	1.67 B	2.63	ug/L	74.7 ^		(+/-5.00)	AXH3	03/26/18	07:07
QC1203990993	LCS										
Cyanide, Chlorinated	50.0		U	1.67	ug/L		0	(-200%-200%)		03/26/18	06:57
QC1203990992	MB										
Cyanide, Chlorinated			U	1.67	ug/L					03/26/18	06:56
Batch 1749716											
QC1203995308	445936001	DUP									
Cyanide, Total		U	1.67 U	1.67	ug/L	N/A			AXH3	03/26/18	05:57
QC1203995307	LCS										
Cyanide, Total	50.0			46.3	ug/L		92.6	(80%-120%)		03/26/18	05:51
QC1203995306	MB										
Cyanide, Total			U	1.67	ug/L					03/26/18	05:50

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**QC Summary**

Workorder: 445919

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Flow Injection Analysis</b>											
Batch	1749716										
QC1203995309	445936001	MS									
Cyanide, Total	100	U	1.67	107	ug/L		106	(75%-125%)	AXH3	03/26/18	05:58

**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.