

3/27/2018

REV.0



a member of **The GEL Group** INC



PO Box 30712 Charleston, SC 29417
2040 Savage Road Charleston, SC 29407
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March 23, 2018

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

Re: CHPRC SAF W18-002
Work Order: 445325
SDG: GEL445325

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on March 07, 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: W18-002-072
Enclosures

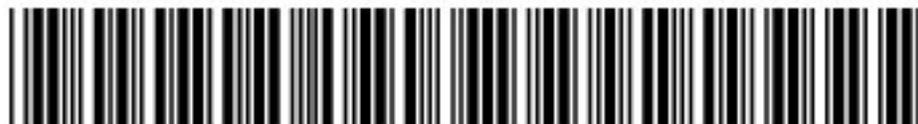


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Case Narrative

**General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF W18-002
SDG: GEL445325**

March 23, 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 07, 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:

Laboratory Identification	Sample Description
445325001	B3H391
445325002	B3H395

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.

3/27/2018

REV.0

Heather Shaffer

Heather Shaffer
Project Manager

**General Chemistry
 Technical Case Narrative
 CH2MHill Plateau Remediation Company (CPRC)
 SDG #: GEL445325
 Work Order #: 445325**

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 . Free CN was performed per SOP (GL-GC-E-073).

Cyanide, Total

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

Technical Information

Sample Dilutions

The following samples 445325001 (B3H391) and 445325002 (B3H395) were diluted because target analyte concentrations exceeded the calibration range.

Analyte	445325	
	001	002
Cyanide, Total	5X	5X

Cyanide, Chlorinated

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

Technical Information

Sample Dilutions

The following samples 445325001 (B3H391) and 445325002 (B3H395) were diluted because target analyte concentrations exceeded the calibration range.

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.

Alkalinity

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

9/1/18

CH2M Hill Plateau
Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

445325

C.O.C.#
W18-002-072

Page 1 of 1

Collector: Juan Aguilar CHPRC	Contact/Requester: Karen Waters-Husted	Telephone No.: 509-376-4650
SAF No.: W18-002	Sampling Origin: Hanford Site	Purchase Order/Charge Code: 300071
Project Title: RCRA, February 2018	Logbook No.: HNF-N-506-9917	Ice Chest No.: 605-592
Shipped To (Lab): GEL Laboratories, LLC	Method of Shipment: Commercial Carrier	Bill of Lading/Air Bill No.: 771733474017
Protocol: RCRA	Priority: 30 Days	Offsite Property No.: 9118

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
 Low Volume Wells. Do not use for QC.

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3H391	N	W	3-6-18	1105	1x125-mL G/P	2320_ALKALINITY: GW 01	14 Days	Cool <=6C
B3H391	N	W	3-6-18	1105	1x500-mL aG	9014_CN (FREE): COMMON; 9012_CYANIDE (TOTAL): COMMON; 9012_CN (AMENABLE): COMMON	14 Days	NaOH to pH >=12 / Cool <=6C
B3H395	Y	W	3-6-18	1105	1x500-mL aG	9014_CN (FREE): COMMON; 9012_CYANIDE (TOTAL): COMMON; 9012_CN (AMENABLE): COMMON	14 Days	NaOH to pH >=12 / Cool <=6C

3/27/2018

Relinquished By: Juan Aguilar Signature: [Signature] Date/Time: MAR 06 2018 1150	Received By: Troy Bacon Signature: [Signature] Date/Time: MAR 06 2018 1150	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: Troy Bacon Signature: [Signature] Date/Time: MAR 06 2018 1400	Received By: FEDEX Signature: [Signature] Date/Time: [Signature]		
Relinquished By: Fed Ex Signature: [Signature] Date/Time: [Signature]	Received By: C. Tardio Signature: [Signature] Date/Time: 3/7/18 0900		
Relinquished By: [Signature] Signature: [Signature] Date/Time: [Signature]	Received By: [Signature] Signature: [Signature] Date/Time: [Signature]		
FINAL SAMPLE DISPOSITION	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

#5

Client: <u>CPRC</u>		SDG/AR/COC/Work Order: <u>445325</u>		
Received By: <u>Chakeris Tarplin</u>		Date Received: <u>March 07, 2018</u>		
Carrier and Tracking Number		Circle Applicable: FedEx Express FedEx Ground UPS Field Services Courier Other <u>771730512354 (2c)</u> <u>771728511439 (2c)</u> <u>771728510888 (2c)</u> <u>771728511196 (2c)</u> <u>771735096241 (2c)</u> <u>771734188526 (2c)</u> <u>771728510947 (2c)</u> <u>771733474017 (2c)</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 <u>None</u> Other: _____ *all temperatures are recorded in Celsius TEMP: _____
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 <u>X</u> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes <u>X</u> No _____ N/A _____ (If unknown, select No) VOA vials free of headspace? Yes _____ No <u>X</u> N/A _____ Sample ID's and containers affected: <u>B3FVR8 126</u> <u>B3HW19 124</u>
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 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 MEH Date 3/8/18 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 23 March 2018

State	Certification
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	SC000122017-25
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 #: GEL445325
Work Order #: 445325**

Product: Cyanide, Free

Analytical Method: 9014_CYANIDE

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

Analytical Batch: 1743197

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
445325001	B3H391
445325002	B3H395
1203981194	Method Blank (MB)
1203981195	Laboratory Control Sample (LCS)
1203981196	444858001(NonSDG) Sample Duplicate (DUP)
1203985935	445222002(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 . 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: 1744583, 1744582 and 1744581

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
445325001	B3H391
445325002	B3H395

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# 21**Analytical Batches:** 1744580 and 1744579

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

GEL Sample ID#	Client Sample Identification
445325001	B3H391
445325002	B3H395
1203984180	Method Blank (MB)
1203984181	Laboratory Control Sample (LCS)
1203984182	445222002(NonSDG) Sample Duplicate (DUP)
1203984184	445222002(NonSDG) Matrix Spike (MS)
1203985068	445222002(NonSDG) Matrix Spike Duplicate (MSD)

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

Data Summary:

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

Technical Information**Sample Dilutions**

The following samples 445325001 (B3H391) and 445325002 (B3H395) were diluted because target analyte concentrations exceeded the calibration range. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

Analyte	445325	
	001	002
Cyanide, Total	5X	5X

Product: Cyanide, Chlorinated

Analytical Method: 9012_CYANIDE

Analytical Procedure: GL-GC-E-095 REV# 21

Analytical Batches: 1744582 and 1744581

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
445325001	B3H391
445325002	B3H395
1203984186	Method Blank (MB)
1203984187	Laboratory Control Sample (LCS)
1203984188	445222002(NonSDG) Sample Duplicate (DUP)
1203984189	445222003(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.

Technical Information

Sample Dilutions

The following samples 445325001 (B3H391) and 445325002 (B3H395) were diluted because target analyte concentrations exceeded the calibration range. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

Product: Alkalinity**Analytical Method:** 2320_ALKALINITY**Analytical Procedure:** GL-GC-E-033 REV# 13**Analytical Batch:** 1745547

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
445325001	B3H391
1203986246	Laboratory Control Sample (LCS)
1203986248	445545001(B3H3R1) 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: GEL445325 GEL Work Order: 445325

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).

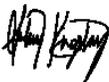
D Results are reported from a diluted aliquot of sample.

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: 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 W18-002

Client Sample ID: B3H391 Project: CPRCOW18002
 Sample ID: 445325001 Client ID: CPRC001
 Matrix: WATER
 Collect Date: 06-MAR-18 11:05
 Receive Date: 07-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	D	469	8.35	25.0	ug/L	1.00	5	AXH3	03/08/18	0729	1744580	1
9014_CN (FREE): COMMON "As Received"												
Free Cyanide		5.49	1.00	2.00	ug/L		1	AXH3	03/09/18	0956	1743197	2
9012_CN (AMENABLE): COMMON "See Parent Products"												
Cyanide amenable to chlorination		365	8.35	25.0	ug/L		1	AXH3	03/08/18	0810	1744583	3
Titration and Ion Analysis												
2320_ALKALINITY: GW 01 "As Received"												
Alkalinity, Total as CaCO3		124000	1450	4000	ug/L			RXB5	03/14/18	1528	1745547	4
Bicarbonate alkalinity (CaCO3)		124000	1450	4000	ug/L							
Carbonate alkalinity (CaCO3)	U	1450	1450	4000	ug/L							
Hydroxide alkalinity as CaCO3	U	1450	1450	4000	ug/L							

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 9010C Distillation	SW846 9010C Prep	AXH3	03/08/18	0650	1744579
SW846 9012B	SW846 9012B Cyanide, Chlorinated Prep	AXH3	03/08/18	0650	1744581

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	9012_CYANIDE	
2	9014_CYANIDE	
3	9012_CYANIDE	
4	2320_ALKALINITY	

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 W18-002

Client Sample ID: B3H395 Project: CPRCOW18002
 Sample ID: 445325002 Client ID: CPRC001
 Matrix: WATER
 Collect Date: 06-MAR-18 11:05
 Receive Date: 07-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	D	491	8.35	25.0	ug/L	1.00	5	AXH3	03/08/18	0730	1744580	1
9014_CN (FREE): COMMON "As Received"												
Free Cyanide		6.83	1.00	2.00	ug/L		1	AXH3	03/09/18	0956	1743197	2
9012_CN (AMENABLE): COMMON "See Parent Products"												
Cyanide amenable to chlorination		383	8.35	25.0	ug/L		1	AXH3	03/08/18	0810	1744583	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 9010C Distillation	SW846 9010C Prep	AXH3	03/08/18	0650	1744579
SW846 9012B	SW846 9012B Cyanide, Chlorinated Prep	AXH3	03/08/18	0650	1744581

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

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

Page 1 of 3

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 445325

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Flow Injection Analysis											
Batch	1743197										
QC1203981196	444858001	DUP									
Free Cyanide	B	1.91	B	1.46	ug/L	26.5	^	(+/-2.00)	AXH3	03/09/18	09:56
QC1203985935	445222002	DUP									
Free Cyanide	B	1.02	U	1.00	ug/L	56.5	^	(+/-2.00)		03/09/18	09:56
QC1203981195	LCS										
Free Cyanide	25.0			24.5	ug/L			98 (80%-120%)		03/09/18	09:56
QC1203981194	MB										
Free Cyanide			U	1.00	ug/L					03/09/18	09:56
Batch	1744580										
QC1203984182	445222002	DUP									
Cyanide, Total		27.1		26.2	ug/L	3.38		(0%-20%)	AXH3	03/08/18	06:58
QC1203984181	LCS										
Cyanide, Total	50.0			48.3	ug/L			96.6 (80%-120%)		03/08/18	06:55
QC1203984180	MB										
Cyanide, Total			U	1.67	ug/L					03/08/18	06:54
QC1203984184	445222002	MS									
Cyanide, Total	100	27.1		129	ug/L			102 (75%-125%)		03/08/18	06:59
QC1203985068	445222002	MSD									
Cyanide, Total	100	27.1		129	ug/L	0		102 (0%-20%)		03/08/18	07:00

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Flow Injection Analysis											
Batch	1744582										
QC1203984188	445222002	DUP									
Cyanide, Chlorinated		26.6		26.5	ug/L	0.377		(0%-20%)	AXH3	03/08/18	07:38
QC1203984189	445222003	DUP									
Cyanide, Chlorinated		26.5		26.7	ug/L	0.752		(0%-20%)		03/08/18	07:40
QC1203984187	LCS										
Cyanide, Chlorinated	50.0		U	1.67	ug/L		0	(-200%-200%)		03/08/18	07:32
QC1203984186	MB										
Cyanide, Chlorinated			U	1.67	ug/L					03/08/18	07:31
Titration and Ion Analysis											
Batch	1745547										
QC1203986248	445545001	DUP									
Alkalinity, Total as CaCO3		111000		111000	ug/L	0.36		(0%-20%)	RXB5	03/14/18	16:01
Bicarbonate alkalinity (CaCO3)		111000		111000	ug/L	0.36		(0%-20%)			
Carbonate alkalinity (CaCO3)		U	1450	U	1450	ug/L		N/A			
Hydroxide alkalinity as CaCO3		U	1450	U	1450	ug/L		N/A			
QC1203986246	LCS										
Alkalinity, Total as CaCO3	100000			107000	ug/L		107	(80%-120%)		03/14/18	15:05

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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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.