

7/25/2018

REV.0



a member of **The GEL Group** INC



PO Box 30712 Charleston, SC 29417
2040 Savage Road Charleston, SC 29407
P 843.556.8171
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gel.com

July 24, 2018

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

Re: CHPRC SAF F18-029
Work Order: 454434
SDG: GEL454434

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on July 12, 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,

A handwritten signature in cursive script that reads "Anna Dupree".

Anna Dupree for
Heather Shaffer
Project Manager

Purchase Order: 302938
Chain of Custody: F18-029-031, F18-029-032, F18-029-034, F18-029-038, F18-029-039 and F18-029-041
Enclosures

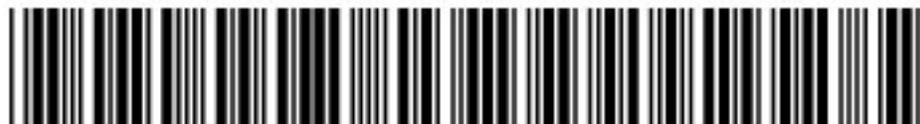


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Case Narrative

**General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF F18-029
SDG: GEL454434**

July 24, 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 July 12, 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:

<u>Laboratory Identification</u>	<u>Sample Description</u>
454434001	B3JHV0
454434002	B3JHV8
454434003	B3JHV1
454434004	B3JHV9
454434005	B3JHV3
454434006	B3JHW1

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.



Anna Dupree for
Heather Shaffer
Project Manager

Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL454434
Work Order #: 454434

Metals

Determination of Metals by ICP-MS

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

General Chemistry

Solids, Total Dissolved

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 MB (See Below) analyzed with this SDG met the acceptance criteria. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data.

Sample	Analyte	Value
1204067996 (MB)	Total Dissolved Solids	5.71 between (3.4 - 14.3)

Sulfide, 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.

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.

Radiochemistry

I129LL_SEP_LEPS_GS: COMMON (low level)

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.

TC99_EIE_LSC: COMMON

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

Technical Information

Recounts

Sample 1204068729 (LCS) was recounted due to low recovery. The recount is reported. Samples 454434005 (B3JHV3) and 454434006 (B3JHW1) were recounted to verify sample results. Recounts are reported.

TRITIUM_DIST_LSC: COMMON

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

Miscellaneous Information

Additional Comments

The matrix spike, 1204068732 (Non SDG 454359001MS), aliquot was reduced to conserve sample volume.

Certification Statement

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

Chain of Custody and Supporting Documentation

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 454434		F18-029-038	PAGE 1 OF 1
COLLECTOR Kevin Patterson /CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	REQUIRED TAT 15 Days	
SAMPLING LOCATION C9878, I-009 DUP	PROJECT DESIGNATION 200-ZP-1 Injection Wells Sampling and Analysis - Water	SAF NO. F18-029		METHOD OF SHIPMENT FEDERAL EXPRESS	
ICE CHEST NO. 6WS-374	FIELD LOGBOOK NO. HNF-N-645 12-32	ACTUAL SAMPLE DEPTH 415.9'	PURCHASE ORDER/CHARGE CODE 302938	ORIGINAL	
SHIPPED TO GEL Laboratories, LLC	OFFSITE PROPERTY NO. 9678	BILL OF LADING/AIR BILL NO. 7724 7807 5055			
MATRIX* A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	POSSIBLE SAMPLE HAZARDS/ REMARKS *Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.	PRESERVATION None	HOLDING TIME 6 Months		
		TYPE OF CONTAINER G/P	NO. OF CONTAINER(S) 1		
		VOLUME 4L	SAMPLE ANALYSIS IL29LL_SEP_LE PS_GS: COMMON {code=129};		
SPECIAL HANDLING AND/OR STORAGE N/A					
SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B3JHV8	No	WATER	7-10-18	1715	✓

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM Kevin Patterson /CHPRC	DATE/TIME JUL 10 2018	SIGN/ PRINT NAMES RECEIVED BY/STORED IN SSU-1	DATE/TIME JUL 10 2018	SPECIAL INSTRUCTIONS TRVL-18-113
SSU-1	JUL 11 2018	Christina Aguilar /CHPRC	JUL 11 2018	
Christina Aguilar /CHPRC	JUL 11 2018	Christina Aguilar /CHPRC	JUL 11 2018	
		FEDEX		
		Chakeris Tarpin/ GEL Laboratories	7/12/18	
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME	
PRINTED ON 4/19/2018				

FRS ID = FSR59684 TRVL NUM = TRVL-18-113 A-6003-618 (REV 3)

CH2M Hill Plateau Remediation Company

COLLECTOR Kevin Patterson /CHPRC

SAMPLING LOCATION C9878, I-009 DUP

ICE CHEST NO. AWS-374

SHIPPED TO GEL Laboratories, LLC

COMPANY CONTACT SUMNER, LC

TELEPHONE NO. 376-3922

PROJECT COORDINATOR SUMNER, LC

PROJECT DESIGNATION 200-ZP-1 Injection Wells Sampling and Analysis - Water

FIELD LOGBOOK NO. HNF-N-645 12.32

ACTUAL SAMPLE DEPTH 415.9'

OFFSITE PROPERTY NO. 9678

SAF NO. F18-029

PURCHASE ORDER/CHARGE CODE 302938

BILL OF LADING/AIR BILL NO. 77246 78075056

F18-029-039

PAGE 1 OF 1

REQUIRED TAT 15 Days

METHOD OF SHIPMENT ORIGINAL FEDERAL EXPRESS

MATRIX*	POSSIBLE SAMPLE HAZARDS/ REMARKS	PRESERVATION	HOLDING TIME	TYPE OF CONTAINER	NO. OF CONTAINER(S)	VOLUME	SAMPLE ANALYSIS	SAMPLE DATE	SAMPLE TIME
A=Air DL=Drum L=Liquid DS=Drum S=Soil T=Tissue V=Vegetation W=Water WI=Wipe X=Other	*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.	HNO3 to pH <2	6 Months	G/P	1	500mL	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	7-10-18	1715
SPECIAL HANDLING AND/OR STORAGE		N/A							
SAMPLE NO.	FILTERED	MATRIX*							
B3JHV9	No	WATER							

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM: Kevin Patterson /CHPRC

DATE/TIME: JUL 10 2018 1402

SSU-1

RECEIVED BY/STORED IN: Christina Aguilera /CHPRC

DATE/TIME: JUL 11 2018 0640

SSU-1

RECEIVED BY/STORED IN: Christina Aguilera /CHPRC

DATE/TIME: JUL 11 2018 0640

Fed Ex

RECEIVED BY/STORED IN: Chakeris Tarplin /GEL Laboratories

DATE/TIME: 7/12/18 915

SPECIAL INSTRUCTIONS

TRVL-18-113

(1) 6020_METALS_ICPMS: COMMON {Chromium}; 6020_METALS_ICPMS: COMMON (Add-on) {Iron, Manganese};

DISPOSAL METHOD

DISPOSED BY

DATE/TIME

PRINTED ON 4/19/2018

FSR ID = FSR59684

TRVL NUM = TRVL-18-113

A-6003-618 (REV 3)

CH2MHill Plateau Remediation Company

COLLECTOR
Kevin Patterson /CHPRC

SAMPLING LOCATION
C9878, I-009

ICE CHEST NO. 2-11-18
625341 GWS-418

SHIPPED TO
GEL Laboratories, LLC

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 454434

COMPANY CONTACT
SUMNER, LC

PROJECT DESIGNATION
200-ZP-1 Injection Wells Sampling and Analysis - Water

FIELD LOGBOOK NO.
HNF-N-645 12.32

OFFSITE PROPERTY NO.

TELEPHONE NO.
376-3922

PROJECT COORDINATOR
SUMNER, LC

SAF NO.
F18-029

PURCHASE ORDER/CHARGE CODE
302938

METHOD OF SHIPMENT
FEDERAL EXPRESS

REQUIRED TAT
15 Days

ORIGINAL

BILL OF LADING/AIR BILL NO.
77266 7996 7404

MATRIX*	POSSIBLE SAMPLE HAZARDS/ REMARKS	PRESERVATION	HOLDING TIME	TYPE OF CONTAINER	NO. OF CONTAINER(S)	VOLUME	SAMPLE ANALYSIS	SPECIAL HANDLING AND/OR STORAGE	SAMPLE NO.	FILTERED	MATRIX*
A=Air DL=Drum L=Liquid DS=Drum S=Soil O=Oil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.	Cool <=6C Cool <=6C	7 Days	G/P	1	250mL	160.L.TDS: COMMON (Total dissolved solids);	N/A	B3JHV3	No	WATER
		ZnAc+NaOH to pH > 9/Cool <=6C	7 Days	G/P	1	1000mL	9034_SULFIDE: COMMON (Sulfide);				
		HN03 to pH <2	6 Months	G/P	1	500mL	TC99_EIE_LSC: COMMON (Tritium-99);				
		None	6 Months	P	1	250mL	906.0_TITANIUM_LSC: COMMON (Tritium);				

CHAIN OF POSSESSION
RELINQUISHED BY/REMOVED FROM
Kevin Patterson /CHPRC

DATE/TIME
JUL 10 2018 1805

SIGN/ PRINT NAMES
RECEIVED BY/STORED IN
SSU-1 Christina Aguilar /CHPRC

DATE/TIME
JUL 11 2018 0640

SPECIAL INSTRUCTIONS
TRVL-18-113 (1) 2320_ALKALINITY: COMMON {Alkalinity}; 2320_ALKALINITY: COMMON (Add-on) {Bicarbonate, Carbonate alkalinity};

FINAL SAMPLE DISPOSITION
Christina Aguilar /CHPRC

DATE/TIME
JUL 11 2018 1400

DISPOSAL METHOD
Fed Ex

DISPOSED BY
Chakeris Tarpim/ GEL Laboratories

DATE/TIME
JUL 11 2018 0640

PRINTED ON 4/19/2018

FRS ID = FSR59683

TRVL NUM = TRVL-18-113

A-6003-618 (REV 3)



SAMPLE RECEIPT & REVIEW FORM

Client: CPRC SDG/AR/COC/Work Order: 454434

Received By: C. Tarplin Date Received: 7/12/2018 HS

Carrier and Tracking Number
Circle Applicable:
FedEx Express FedEx Ground UPS Field Services Courier Other
7726 8138 9170(3)-4.c 7726 7996 7409(3)-2.c
7726 7807 5055(4)-2.c 7726 8246 7598(3)-1.c

Suspected Hazard Information Yes No
*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.

Shipped as a DOT Hazardous? Hazard Class Shipped: UN#:

COC/Samples marked or classified as radioactive? Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 (CPM)/mR/Hr
Classified as: Rad 1 Rad 2 Rad 3

Is package, COC, and/or Samples marked HAZ? 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? Circle Applicable: Seals broken Damaged container Leaking container Other (describe)

2 Chain of custody documents included with shipment?

3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?* Preservation Method: Wet Ice Ice Packs Dry ice None Other:
*all temperatures are recorded in Celsius TEMP: _____

4 Daily check performed and passed on IR temperature gun? Temperature Device Serial #: IR4-17
Secondary Temperature Device Serial # (If Applicable):

5 Sample containers intact and sealed? Circle Applicable: Seals broken Damaged container Leaking container Other (describe)

6 Samples requiring chemical preservation at proper pH? Sample ID's and Containers Affected:

7 Do any samples require Volatile Analysis? If Preservation added, Lot#: _____
If Yes, Are Encores or Soil Kits present? Yes ___ No ✓ (If yes, take to VOA Freezer)
Do VOA vials contain acid preservation? Yes ___ No ___ N/A ___ (If unknown, select No)
VOA vials free of headspace? Yes ___ No ___ N/A ___
Sample ID's and containers affected:
B3K4T7 1 g 4 B3K4R7 1 g 4
B3K4T3 1 g 4

8 Samples received within holding time? ID's and tests affected:

9 Sample ID's on COC match ID's on bottles? Sample ID's and containers affected:

10 Date & time on COC match date & time on bottles? Sample ID's affected:

11 Number of containers received match number indicated on COC? Sample ID's affected: B3K4R3 samples not received, CFT
W2/18 BS

12 Are sample containers identifiable as GEL provided?

13 COC form is properly signed in relinquished/received sections?

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials WEL Date 7/13/18 Page 1 of 1

Data Review Qualifier Definitions

GEL LABORATORIES LLC

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

Report Date: 24-JUL-18

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	
o	Analyte failed to recover within LCS limits	Radiological	Rad

Laboratory Certifications

List of current GEL Certifications as of 24 July 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	SC000122018-26
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
CH2M Hill Plateau Remediation Company (CPRC)
SDG #: GEL454434
Work Order #: 454434

Product: Determination of Metals by ICP-MS**Analytical Method:** SW846 3005A/6020B**Analytical Procedure:** GL-MA-E-014 REV# 32**Analytical Batch:** 1781652**Preparation Method:** SW846 3005A**Preparation Procedure:** GL-MA-E-006 REV# 14**Preparation Batch:** 1781651

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
454434003	B3JHV1
454434004	B3JHV9
1204067973	Method Blank (MB)ICP-MS
1204067974	Laboratory Control Sample (LCS)
1204067977	454434003(B3JHV1L) Serial Dilution (SD)
1204067975	454434003(B3JHV1S) Matrix Spike (MS)
1204067976	454434003(B3JHV1SD) 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.

Calibration Information**ICSA/ICSAB Statement**

For the ICP-MS analysis, the ICSA solution contains analyte concentrations which are verified trace impurities indigenous to the purchased standard.

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: GEL454434 GEL Work Order: 454434

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- 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: Nik-Cole Elmore****Date: 23 JUL 2018****Title: Data Validator**

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL454434

CONTRACT: CPRC0F18029

METHOD TYPE: SW846

SAMPLE ID:454434003

BASIS: As Received

DATE COLLECTED 10-JUL-18

CLIENT ID: B3JHV1

LEVEL: Low

DATE RECEIVED 12-JUL-18

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	07/13/18 16:19	180713-1	1781652
7439-89-6	Iron	1370	ug/L		33	100	100	1	MS	BAJ	07/13/18 16:19	180713-1	1781652
7439-96-5	Manganese	120	ug/L		1	5	5	1	MS	BAJ	07/13/18 16:19	180713-1	1781652

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1781652	1781651	SW846 3005A	50	mL	50	mL	07/12/18	JXM8

***Analytical Methods:**

MS SW846 3005A/6020B

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL454434

CONTRACT: CPRC0F18029

METHOD TYPE: SW846

SAMPLE ID:454434004

BASIS: As Received

DATE COLLECTED 10-JUL-18

CLIENT ID: B3JHV9

LEVEL: Low

DATE RECEIVED 12-JUL-18

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	07/13/18 16:35	180713-1	1781652
7439-89-6	Iron	1440	ug/L		33	100	100	1	MS	BAJ	07/13/18 16:35	180713-1	1781652
7439-96-5	Manganese	122	ug/L		1	5	5	1	MS	BAJ	07/13/18 16:35	180713-1	1781652

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1781652	1781651	SW846 3005A	50	mL	50	mL	07/12/18	JXM8

***Analytical Methods:**

MS SW846 3005A/6020B

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 23, 2018

Page 1 of 2

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 454434

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1781652										
QC1204067974	LCS										
Chromium	50.0			50.4	ug/L		101	(80%-120%)	BAJ	07/13/18	16:15
Iron	2000			2090	ug/L		104	(80%-120%)			
Manganese	50.0			51.3	ug/L		103	(80%-120%)			
QC1204067973	MB										
Chromium			U	3.00	ug/L					07/13/18	16:12
Iron			U	33.0	ug/L						
Manganese			U	1.00	ug/L						
QC1204067975	454434003 MS										
Chromium	50.0	U	3.00	51.9	ug/L		99.7	(75%-125%)		07/13/18	16:22
Iron	2000		1370	3400	ug/L		101	(75%-125%)			
Manganese	50.0		120	170	ug/L		99.7	(75%-125%)			
QC1204067976	454434003 MSD										
Chromium	50.0	U	3.00	52.1	ug/L	0.471	100	(0%-20%)		07/13/18	16:25
Iron	2000		1370	3420	ug/L	0.637	102	(0%-20%)			
Manganese	50.0		120	164	ug/L	3.25	88.8	(0%-20%)			

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QC Summary

Workorder: 454434

Page 2 of 2

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1781652										
QC1204067977	454434003	SDILT									
Chromium	U	2.05	DU	15.0	ug/L	N/A		(0%-20%)	BAJ	07/13/18	16:32
Iron		1370	D	266	ug/L	3.01		(0%-20%)			
Manganese		120	D	23.9	ug/L	.295		(0%-20%)			

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.
- 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 #: GEL454434
Work Order #: 454434**

Product: Solids, Total Dissolved

Analytical Method: 160.1_TDS

Analytical Procedure: GL-GC-E-001 REV# 15

Analytical Batch: 1781661

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
454434005	B3JHV3
454434006	B3JHW1
1204067996	Method Blank (MB)
1204067997	Laboratory Control Sample (LCS)
1204067999	454434005(B3JHV3) 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.

Quality Control (QC) Information

Method Blank (MB) Statement

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

Sample	Analyte	Value
1204067996 (MB)	Total Dissolved Solids	5.71 between (3.4 - 14.3)

Product: Sulfide, Total

Analytical Method: 4500D_SULFIDE

Analytical Procedure: GL-GC-E-052 REV# 10

Analytical Batch: 1782163

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
454434005	B3JHV3
454434006	B3JHW1
1204069129	Method Blank (MB)
1204069130	Laboratory Control Sample (LCS)
1204069132	454434005(B3JHV3) Sample Duplicate (DUP)
1204069134	454434005(B3JHV3) Post Spike (PS)

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: Alkalinity**Analytical Method:** 2320_ALKALINITY**Analytical Procedure:** GL-GC-E-033 REV# 13**Analytical Batch:** 1781659

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
454434005	B3JHV3
454434006	B3JHW1
1204067983	Laboratory Control Sample (LCS)
1204067984	454170001(NonSDG) Sample Duplicate (DUP)
1204067985	454170003(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.

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL454434 GEL Work Order: 454434

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: Kristen Mizzell

Date: 17 JUL 2018

Title: Team Leader

Sample Data Summary

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: July 17, 2018

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F18-029

Client Sample ID: B3JHV3 Project: CPRC0F18029
 Sample ID: 454434005 Client ID: CPRC001
 Matrix: WATER
 Collect Date: 10-JUL-18 17:15
 Receive Date: 12-JUL-18
 Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Solids Analysis												
160.1_TDS:COMMON "As Received"												
Total Dissolved Solids		346000	3400	14300	ug/L			KLP1	07/13/18	1003	1781661	1
Spectrometric Analysis												
4500_Sulfide: COMMON "As Received"												
Total Sulfide	U	33.0	33.0	500	ug/L		1	VH1	07/16/18	1545	1782163	2
Titration and Ion Analysis												
2320_ALKALINITY: COMMON + (Add-on) "As Received"												
Alkalinity, Total as CaCO3		116000	1450	4000	ug/L			RXB5	07/13/18	1433	1781659	3
Bicarbonate alkalinity (CaCO3)		116000	1450	4000	ug/L							
Carbonate alkalinity (CaCO3)	U	1450	1450	4000	ug/L							

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	160.1_TDS	
2	4500D_SULFIDE	
3	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

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Certificate of Analysis

Report Date: July 17, 2018

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F18-029

Client Sample ID: B3JHW1 Project: CPRC0F18029
 Sample ID: 454434006 Client ID: CPRC001
 Matrix: WATER
 Collect Date: 10-JUL-18 17:15
 Receive Date: 12-JUL-18
 Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Solids Analysis												
160.1_TDS:COMMON "As Received"												
Total Dissolved Solids		353000	3400	14300	ug/L			KLP1	07/13/18	1003	1781661	1
Spectrometric Analysis												
4500_Sulfide: COMMON "As Received"												
Total Sulfide	U	33.0	33.0	500	ug/L		1	VH1	07/16/18	1545	1782163	2
Titration and Ion Analysis												
2320_ALKALINITY: COMMON + (Add-on) "As Received"												
Alkalinity, Total as CaCO3		117000	1450	4000	ug/L			RXB5	07/13/18	1435	1781659	3
Bicarbonate alkalinity (CaCO3)		117000	1450	4000	ug/L							
Carbonate alkalinity (CaCO3)	U	1450	1450	4000	ug/L							

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	160.1_TDS	
2	4500D_SULFIDE	
3	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

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 17, 2018

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 454434

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Solids Analysis											
Batch	1781661										
QC1204067999	454434005	DUP									
Total Dissolved Solids		346000		347000	ug/L	0.826		(0%-20%)	KLP1	07/13/18	10:03
QC1204067997	LCS										
Total Dissolved Solids	300000			299000	ug/L		99.5	(80%-120%)		07/13/18	10:03
QC1204067996	MB										
Total Dissolved Solids			B	5710	ug/L					07/13/18	10:03
Spectrometric Analysis											
Batch	1782163										
QC1204069132	454434005	DUP									
Total Sulfide		U	33.0	U	33.0	ug/L	N/A		VH1	07/16/18	15:45
QC1204069130	LCS										
Total Sulfide	400			393	ug/L		98.2	(80%-120%)		07/16/18	15:43
QC1204069129	MB										
Total Sulfide			U	33.0	ug/L					07/16/18	15:43
QC1204069134	454434005	PS									
Total Sulfide	0.400	U	0.00637	B	0.396	mg/L		97.4	(75%-125%)	07/16/18	15:45
Titration and Ion Analysis											
Batch	1781659										
QC1204067984	454170001	DUP									
Alkalinity, Total as CaCO3		U	1450	U	1450	ug/L	N/A		RXB5	07/13/18	13:57
Bicarbonate alkalinity (CaCO3)		U	1450	U	1450	ug/L	N/A				

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QC Summary

Workorder: 454434

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
Batch	1781659										
Carbonate alkalinity (CaCO3)	U	1450	U	1450	ug/L	N/A			RXB5	07/13/18	13:57
QC1204067985 454170003 DUP											
Alkalinity, Total as CaCO3		292000		291000	ug/L	0.275		(0%-20%)		07/13/18	14:02
Bicarbonate alkalinity (CaCO3)		292000		291000	ug/L	0.275		(0%-20%)			
Carbonate alkalinity (CaCO3)	U	1450	U	1450	ug/L	N/A					
QC1204067983 LCS											
Alkalinity, Total as CaCO3	100000			105000	ug/L		105	(80%-120%)		07/13/18	13:52

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 #: GEL454434
Work Order #: 454434

Product: I129LL_SEP_LEPS_GS: COMMON (low level)

Analytical Method: DOE EML HASL-300,I-01 Modified

Analytical Procedure: GL-RAD-A-006 REV# 21

Analytical Batch: 1781931

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
454434001	B3JHV0
454434002	B3JHV8
1204068596	Method Blank (MB)
1204068597	454357006(NonSDG) Sample Duplicate (DUP)
1204068598	454357006(NonSDG) Matrix Spike (MS)
1204068599	Laboratory Control Sample (LCS)

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.

Qualifier Information

Qualifier	Reason	Analyte	Sample	Client Sample
X	Results are considered a false positive due to high counting uncertainty.	Iodine-129	454434002	B3JHV8

Product: TC99_EIE_LSC: COMMON

Analytical Method: TC99_EIE_LSC

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

Analytical Batch: 1781988

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
454434005	B3JHV3
454434006	B3JHW1
1204068727	Method Blank (MB)

1204068728 454359001(NonSDG) Sample Duplicate (DUP)
 1204068729 Laboratory Control Sample (LCS)

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

Data Summary:

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

Technical Information

Recounts

Sample 1204068729 (LCS) was recounted due to low recovery. The recount is reported. Samples 454434005 (B3JHV3) and 454434006 (B3JHW1) were recounted to verify sample results. Recounts are reported.

Product: TRITIUM_DIST_LSC: COMMON

Analytical Method: TRITIUM_DIST_LSC

Analytical Procedure: GL-RAD-A-002 REV# 22

Analytical Batch: 1781989

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
454434005	B3JHV3
454434006	B3JHW1
1204068730	Method Blank (MB)
1204068731	454359001(NonSDG) Sample Duplicate (DUP)
1204068732	454359001(NonSDG) Matrix Spike (MS)
1204068733	Laboratory Control Sample (LCS)

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

Data Summary:

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

Miscellaneous Information

Additional Comments

The matrix spike, 1204068732 (Non SDG 454359001MS), aliquot was reduced to conserve sample volume.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the

requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL454434 GEL Work Order: 454434

The Qualifiers in this report are defined as follows:

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

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

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature:**Name: Kate Gellatly****Date: 25 JUL 2018****Title: Analyst I**

Sample Data Summary

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL454434	Client: CPRC001	Project: CPRC0F18029
Lab Sample ID: 454434001	Date Collected: 07/10/2018 17:15	Matrix: WATER
	Date Received: 07/12/2018 09:15	
Client ID: B3JHV0	Method: DOE EML HASL-300,I-01 Mo	Prep Basis: "As Received"
Batch ID: 1781931	Analyst: BSW1	SOP Ref: GL-RAD-A-006
Run Date: 07/16/2018 19:35	Aliquot: 1.2 L	Instrument: XRAY5
Data File: I454434001.CNF;1	Prep Method: DOE EML HASL-300,I-01 M	Count Time: 240 min
Prep Batch: 1781931		
Prep Date: 07/13/2018 08:58		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129	U	0.157	pCi/L	+/-0.274	0.283	0.581	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits

Comments:

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
 TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
 The MDC is a sample specific MDC.

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL454434	Client: CPRC001	Project: CPRC0F18029
Lab Sample ID: 454434002	Date Collected: 07/10/2018 17:15	Matrix: WATER
	Date Received: 07/12/2018 09:15	
Client ID: B3JHV8	Method: DOE EML HASL-300,I-01 Mo	Prep Basis: "As Received"
Batch ID: 1781931	Analyst: BSW1	SOP Ref: GL-RAD-A-006
Run Date: 07/16/2018 19:35	Aliquot: 1.2 L	Instrument: XRAY6
Data File: I454434002.CNF;1	Prep Method: DOE EML HASL-300,I-01 M	Count Time: 240 min
Prep Batch: 1781931		
Prep Date: 07/13/2018 08:58		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129	UX	0.324	pCi/L	+/-0.389	0.391	0.303	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits

Comments:

- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
 - X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
The MDC is a sample specific MDC.

Rad
Certificate of Analysis
Sample Summary

Page 1 of 1

SDG Number: GEL454434	Client: CPRC001	Project: CPRC0F18029
Lab Sample ID: 454434005	Date Collected: 07/10/2018 17:15	Matrix: WATER
	Date Received: 07/12/2018 09:15	
Client ID: B3JHV3	Method: TC99_EIE_LSC	Prep Basis: "As Received"
Batch ID: 1781988	Analyst: CXS7	SOP Ref: GL-RAD-A-059
Run Date: 07/23/2018 07:34	Aliquot: 100 mL	Instrument: LSCGREEN
Data File: E1781988R2.xls	Prep Method: DOE EML HASL-300, Tc-02-	Count Time: 15 min
Prep Batch: 1781988		
Prep Date: 07/17/2018 13:52		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	32.8	pCi/L	+/-26.5	26.7	43.8	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	42000	43500	CPM	96.5	(30%-105%)

Comments:

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

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

The MDC is a sample specific MDC.

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL454434	Client: CPRC001	Project: CPRC0F18029
Lab Sample ID: 454434005	Date Collected: 07/10/2018 17:15	Matrix: WATER
	Date Received: 07/12/2018 09:15	
Client ID: B3JHV3	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1781989	Analyst: MXH8	SOP Ref: GL-RAD-A-002
Run Date: 07/16/2018 14:04	Aliquot: 50 mL	Instrument: LSCBROWN
Data File: T1781989.xls	Prep Method: EPA 906.0 Modified	Count Time: 50 min
Prep Batch: 1781989		
Prep Date: 07/16/2018 08:07		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		1110	pCi/L	+/-218	305	292	400

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits

Comments:

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
 TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
 The MDC is a sample specific MDC.

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL454434	Client: CPRC001	Project: CPRC0F18029
Lab Sample ID: 454434006	Date Collected: 07/10/2018 17:15	Matrix: WATER
	Date Received: 07/12/2018 09:15	
Client ID: B3JHW1	Method: TC99_EIE_LSC	Prep Basis: "As Received"
Batch ID: 1781988	Analyst: CXS7	SOP Ref: GL-RAD-A-059
Run Date: 07/23/2018 07:50	Aliquot: 100 mL	Instrument: LSCGREEN
Data File: E1781988R2.xls	Prep Method: DOE EML HASL-300, Tc-02-	Count Time: 15 min
Prep Batch: 1781988		
Prep Date: 07/17/2018 13:52		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	30.6	pCi/L	+/-27.2	27.4	45.2	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	40500	43500	CPM	93.2	(30%-105%)

Comments:

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
 TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
 The MDC is a sample specific MDC.

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL454434	Client: CPRC001	Project: CPRC0F18029
Lab Sample ID: 454434006	Date Collected: 07/10/2018 17:15	Matrix: WATER
	Date Received: 07/12/2018 09:15	
Client ID: B3JHW1	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1781989	Analyst: MXH8	SOP Ref: GL-RAD-A-002
Run Date: 07/16/2018 14:57	Aliquot: 50 mL	Instrument: LSCBROWN
Data File: T1781989.xls	Prep Method: EPA 906.0 Modified	Count Time: 50 min
Prep Batch: 1781989		
Prep Date: 07/16/2018 08:07		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		1330	pCi/L	+/-221	339	283	400

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits

Comments:

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error. TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma). The MDC is a sample specific MDC.

Quality Control Summary

GEL LABORATORIES LLC

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QC Summary

Report Date: July 25, 2018

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

Contact: Mr. Scot Fitzgerald

Workorder: 454434

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1781931								
QC1204068596	MB								
Iodine-129			U	-0.109	pCi/L			BSW1	07/17/1804:03
				Uncert: +/-0.254					
				TPU: +/-0.259					
QC1204068597	454357006	DUP							
Iodine-129		U	0.0131	U	0.091				07/17/1804:25
				Uncert: +/-0.344		RPD: 0	N/A		
				TPU: +/-0.344		RER: 0.353	(0-2)		
QC1204068598	454357006	MS							
Iodine-129		U	0.0131		36.8	REC: 97.9	(75%-125%)		07/17/1806:21
				Uncert: +/-0.344					
				TPU: +/-0.344					
QC1204068599	LCS								
Iodine-129					35.8	REC: 95.3	(80%-120%)		07/17/1806:29
				Uncert: +/-4.80					
				TPU: +/-5.99					
Rad Liquid Scintillation									
Batch	1781988								
QC1204068727	MB								
Technetium-99			U	8.10	pCi/L			CXS7	07/22/1808:51
				Uncert: +/-25.6					
				TPU: +/-25.6					
**Technetium-99m Tracer	43500				41400	CPM	REC: 95	(30%-105%)	
QC1204068728	454359001	DUP							
Technetium-99		U	2.98	U	20.9				07/22/1809:08
				Uncert: +/-25.3		RPD: 0	N/A		
				TPU: +/-25.3		RER: 0.943	(0-2)		
**Technetium-99m Tracer	43500				41600	CPM	REC: 92	(30%-105%)	
QC1204068729	LCS								
Technetium-99			888		713	pCi/L	REC: 80.3	(80%-120%)	07/23/1812:41
				Uncert: +/-42.0					
				TPU: +/-89.2					
**Technetium-99m Tracer	43500				41500	CPM	REC: 96	(30%-105%)	
Batch	1781989								
QC1204068730	MB								
Tritium			U	85.7	pCi/L			MXH8	07/16/1815:49
				Uncert: +/-160					
				TPU: +/-161					
QC1204068731	454359001	DUP							
Tritium		U	254		312				07/16/1816:41
				Uncert: +/-178		RPD: 21	(0% - 100%)		
				TPU: +/-185		RER: 0.434	(0-2)		
QC1204068732	454359001	MS							
Tritium		U	254		5110	pCi/L	REC: 101	(75%-125%)	07/16/1817:33

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QC Summary

Workorder: 454434

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Liquid Scintillation										
Batch										
				Uncert:						
			+/-178							
			TPU:							
			+/-185							
QC1204068733	LCS									
Tritium	2520			2530	pCi/L	REC: 100 (80%-120%)			07/16/1818:25	
				Uncert:						
				TPU:						

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 analyte was detected in the associated method blank >= MDC or >5% sample activity.
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.
- E Reported value is estimated due to interferences. See comment in narrative.
- M Duplicate precision not met.
- N Spike Sample recovery is outside control limits.
- S Reported value determined by the Method of Standard Additions (MSA)
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- 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
- o Analyte failed to recover within LCS limits

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.