

July 27, 2018

Rev 0



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July 27, 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: 454617
SDG: GEL454617

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on July 14, 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 "Heather Shaffer".

Heather Shaffer
Project Manager

Purchase Order: 302938
Chain of Custody: F18-029-046, F18-029-047 and F18-029-049
Enclosures



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Case Narrative

**General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF F18-029
SDG: GEL454617**

July 27, 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 14, 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>
454617001	B3JHW6
454617002	B3JHW7
454617003	B3JHW9

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.



Heather Shaffer
Project Manager

Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL454617
Work Order #: 454617

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

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.

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.

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, 1204070322 (B3JHW9MS), 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		F18-029-046	PAGE 1 OF 1
COLLECTOR	Jeff Tucksen CHPRC	COMPANY CONTACT	SUMNER, LC	PROJECT COORDINATOR	654617
SAMPLING LOCATION	C9878, I-011	PROJECT DESIGNATION	200-ZP-1 Injection Wells Sampling and Analysis - Water	SAF NO.	F18-029
ICE CHEST NO.	625623	FIELD LOGBOOK NO.	HNF-N-645 12-33	PURCHASE ORDER/CHARGE CODE	302938
SHIPPED TO	GEL Laboratories, LLC	OFFSITE PROPERTY NO.	91888	BILL OF LADING/AIR BILL NO.	7727 0007 0798
MATRIX*	A=Air DL=Drum L=Liquids DS=Drum S=Solids L=Liquid O=Oil S=Soil SF=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.		
SPECIAL HANDLING AND/OR STORAGE	N/A	PRESERVATION	None		
		HOLDING TIME	6 Months		
		TYPE OF CONTAINER	G/P		
		NO. OF CONTAINER(S)	1		
		VOLUME	4L		
		SAMPLE ANALYSIS	I129U_SEP_LE PS_GS: COMMON (Iodine-129);		
SAMPLE NO.	3B3HW6	FILTERED	No	WATER	
		MATRIX*			
		SAMPLE DATE	JUL 12 2018	SAMPLE TIME	1415

CHAIN OF POSSESSION		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Jeff Tucksen CHPRC	JUL 12 2018	SSU-1 Janelle Zunker CHPRC	JUL 12 2018
SSU-1 Janelle Zunker CHPRC	JUL 13 2018	FEDEX	JUL 13 2018
	JUL 13 2018		
FINAL SAMPLE DISPOSITION		DISPOSED BY	
PRINTED ON 4/5/2018	FSR ID = FSR59688	TRVL NUM = TRVL-18-113	A-6003-618 (REV 3)

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F18-029-047	PAGE 1 OF 1
COLLECTOR	Jeff Tuckesen CHPRC	COMPANY CONTACT	SUMNER, LC	PROJECT COORDINATOR	SUMNER, LC
SAMPLING LOCATION	C9878, I-011	PROJECT DESIGNATION	200-ZP-1 Injection Wells Sampling and Analysis - Water	SAF NO.	F18-029
ICE CHEST NO.	6ws-623	FIELD LOGBOOK NO.	HNF-N-645 12-33	PURCHASE ORDER/CHARGE CODE	302938
SHIPPED TO	GEL Laboratories, LLC	OFFSITE PROPERTY NO.	9088	BILL OF LADING/AIR BILL NO.	1727 0067 0790
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.		
SPECIAL HANDLING AND/OR STORAGE	N/A	PRESERVATION	HM03 to pH <2		
HOLDING TIME	6 Months	TYPE OF CONTAINER	G/P		
NO. OF CONTAINER(S)	1	VOLUME	500ml		
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SAMPLE DATE	JUL 12 2018	SAMPLE TIME	1415
B3JHW7	No	MATRIX*	WATER		✓

CH2M Hill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F18-029-047	PAGE 1 OF 1
COLLECTOR	Jeff Tuckesen CHPRC	COMPANY CONTACT	SUMNER, LC
SAMPLING LOCATION	C9878, I-011	PROJECT DESIGNATION	200-ZP-1 Injection Wells Sampling and Analysis - Water
ICE CHEST NO.	6ws-623	FIELD LOGBOOK NO.	HNF-N-645 12-33
SHIPPED TO	GEL Laboratories, LLC	OFFSITE PROPERTY NO.	9088
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.
SPECIAL HANDLING AND/OR STORAGE	N/A	PRESERVATION	HM03 to pH <2
HOLDING TIME	6 Months	TYPE OF CONTAINER	G/P
NO. OF CONTAINER(S)	1	VOLUME	500ml
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SAMPLE DATE	JUL 12 2018
B3JHW7	No	MATRIX*	WATER

CHAIN OF POSSESSION	RELINQUISHED BY/REMOVED FROM	DATE/TIME	DATE/TIME
Jeff Tuckesen CHPRC	SSU-1 Janelle Zunker CHPRC	JUL 12 2018 1450	JUL 12 2018 1450
SSU-1	SSU-1 Janelle Zunker CHPRC	JUL 13 2018 0700	JUL 13 2018 0700
Janelle Zunker CHPRC	SSU-1 Janelle Zunker CHPRC	JUL 13 2018 1400	JUL 13 2018 0700

SIGN/ PRINT NAMES	RECEIVED BY/STORED IN
SSU-1 Janelle Zunker CHPRC	SSU-1 Janelle Zunker CHPRC
FEDEX	FEDEX
179 A - SBOONE	179 A - SBOONE
7/14/18 905	7/14/18 905

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME
PRINTED ON 4/5/2018			

FRS ID = FSR59688 TRVL NUM = TRVL-18-113 A-6003-618 (REV 3)

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F18-029-049	PAGE 1 OF 1
COLLECTOR	Jeff Tucksen CHPRC	COMPANY CONTACT	SUMNER, LC	PROJECT COORDINATOR	SUMNER, LC
SAMPLING LOCATION	C9878, I-011	PROJECT DESIGNATION	200-ZP-1 Injection Wells Sampling and Analysis - Water	SAF NO.	F18-029
ICE CHEST NO.	GWS-623	FIELD LOGBOOK NO.	HNF-N-64512.33	PURCHASE ORDER/CHARGE CODE	302938
SHIPPED TO	GEL Laboratories, LLC	OFFSITE PROPERTY NO.	91688	BILL OF LADING/AIR BILL NO.	7727 0067 0798
MATRIX*	A=Air DL=Drum L=Liquid S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	PRESERVATION	ZnAc+NaOH to pH > 9/Cool <=6C	HNO3 to pH <2	None
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.	HOLDING TIME	7 Days	6 Months	6 Months
SPECIAL HANDLING AND/OR STORAGE	N/A	TYPE OF CONTAINER	G/P	G/P	P
NO. OF CONTAINER(S)	1	NO. OF CONTAINER(S)	1	1	1
VOLUME	250ml	VOLUME	250ml	500ml	250ml
SAMPLE ANALYSIS	160.1_TDS: COMMON (Total dissolved solids);	SAMPLE ANALYSIS	9034_SULFIDE: COMMON (Sulfide);	TC99_EIE_LSC: COMMON (Technetium-99);	906-0_TRITIUM_LSC: COMMON (Tritium);
SAMPLE NO.	B3JHW9	SAMPLE DATE	JUL 12 2018	SAMPLE TIME	1415
FILTERED	No	MATRIX*	WATER		

CHAIN OF POSSESSION	RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/PRINT NAMES	RECEIVED BY/STORED IN	DATE/TIME
Jeff Tucksen CHPRC	[Signature]	JUL 12 2018 1450	SSU [Signature]	Janelle Zunker CHPRC	JUL 12 2018 1450
Janelle Zunker CHPRC	[Signature]	JUL 13 2018 0900	FEDEX	[Signature]	JUL 13 2018 0900
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DATE/TIME	SPECIAL INSTRUCTIONS		
PRINTED ON 4/5/2018			TRVL-18-113 (1) 2320_ALKALINITY: COMMON (Alkalinity); 2320_ALKALINITY: COMMON (Add-on) (Bicarbonate, Carbonate alkalinity);		
FRS ID = FSR59688		TRVL NUM = TRVL-18-113		A-6003-618 (REV 3)	



SAMPLE RECEIPT & REVIEW FORM

Client: CPRC		SDG/AR/COC/Work Order: 454615, 616, 617 + 618		
Received By: STACY BOONE		Date Received: 7-14-18 HXS		
Carrier and Tracking Number		Circle Applicable: FedEx Express FedEx Ground UPS Field Services Courier Other 7727 0067 0938 - 1c 7727 0067 0798 - 1c 7727 0309 5750 - 1c		
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" 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> CPM / 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"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Preservation Method: <u>Wet Ice</u> Ice Packs Dry ice None Other: _____ *all temperatures are recorded in Celsius TEMP: _____
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>1R3-17</u> Secondary Temperature Device Serial # (If Applicable): _____
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and Containers Affected: _____ If Preservation added, Lot#: _____
7 Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input 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 _____ No <input checked="" type="checkbox"/> N/A (If unknown, select No) VOA vials free of headspace? Yes _____ No <input checked="" type="checkbox"/> N/A _____ Sample ID's and containers affected: _____
8 Samples received within holding time?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected: _____
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected: _____
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected: _____
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected: _____
12 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Comments (Use Continuation Form if needed):				

PM (or PMA) review: Initials ast Date 7/16/18 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	
o	Analyte failed to recover within LCS limits	Radiological	Rad

Laboratory Certifications

List of current GEL Certifications as of 27 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
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL454617
Work Order #: 454617

Product: Determination of Metals by ICP-MS**Analytical Method:** SW846 3005A/6020B**Analytical Procedure:** GL-MA-E-014 REV# 32**Analytical Batch:** 1782309**Preparation Method:** SW846 3005A**Preparation Procedure:** GL-MA-E-006 REV# 14**Preparation Batch:** 1782308

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
454617002	B3JHW7
1204069464	Method Blank (MB)ICP-MS
1204069465	Laboratory Control Sample (LCS)
1204069468	454617002(B3JHW7L) Serial Dilution (SD)
1204069466	454617002(B3JHW7S) Matrix Spike (MS)
1204069467	454617002(B3JHW7SD) 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: GEL454617 GEL Work Order: 454617

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: 26 JUL 2018

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL454617

CONTRACT: CPRC0F18029

METHOD TYPE: SW846

SAMPLE ID:454617002

BASIS: As Received

DATE COLLECTED 12-JUL-18

CLIENT ID: B3JHW7

LEVEL: Low

DATE RECEIVED 14-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	07/18/18 11:43	180718-1	1782309
7439-89-6	Iron	1900	ug/L		33	100	100	1	MS	BAJ	07/18/18 11:43	180718-1	1782309
7439-96-5	Manganese	44.9	ug/L		1	5	5	1	MS	BAJ	07/18/18 11:43	180718-1	1782309

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1782309	1782308	SW846 3005A	50	mL	50	mL	07/16/18	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 26, 2018

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CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 454617

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1782309										
QC1204069465	LCS										
Chromium	50.0			50.3	ug/L		101	(80%-120%)	BAJ	07/18/18	11:39
Iron	2000			2000	ug/L		100	(80%-120%)			
Manganese	50.0			48.2	ug/L		96.4	(80%-120%)			
QC1204069464	MB										
Chromium			U	3.00	ug/L					07/18/18	11:36
Iron			U	33.0	ug/L						
Manganese			U	1.00	ug/L						
QC1204069466	454617002	MS									
Chromium	50.0	U	3.00	51.7	ug/L		101	(75%-125%)		07/18/18	11:46
Iron	2000		1900	3770	ug/L		93.5	(75%-125%)			
Manganese	50.0		44.9	91.8	ug/L		93.8	(75%-125%)			
QC1204069467	454617002	MSD									
Chromium	50.0	U	3.00	51.5	ug/L	0.376	101	(0%-20%)		07/18/18	11:49
Iron	2000		1900	3980	ug/L	5.2	104	(0%-20%)			
Manganese	50.0		44.9	87.7	ug/L	4.48	85.7	(0%-20%)			

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QC Summary

Workorder: 454617

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1782309										
	QC1204069468 454617002 SDILT										
Chromium	U	1.05	DU	15.0	ug/L	N/A		(0%-20%)	BAJ	07/18/18	11:56
Iron		1900	D	357	ug/L	6.17		(0%-20%)			
Manganese		44.9	D	8.29	ug/L	7.65		(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 >= 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 #: GEL454617
Work Order #: 454617

Product: Solids, Total Dissolved

Analytical Method: 160.1_TDS

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

Analytical Batch: 1783075

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
454617003	B3JHW9
1204071131	Method Blank (MB)
1204071132	Laboratory Control Sample (LCS)
1204071134	454617003(B3JHW9) 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.

Product: Sulfide, Total

Analytical Method: 4500D_SULFIDE

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

Analytical Batch: 1783238

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
454617003	B3JHW9
1204071489	Method Blank (MB)
1204071490	Laboratory Control Sample (LCS)
1204071491	454617003(B3JHW9) Sample Duplicate (DUP)
1204071492	454617003(B3JHW9) 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:** 1782162

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
454617003	B3JHW9
1204069124	Laboratory Control Sample (LCS)
1204069501	454617003(B3JHW9) 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: GEL454617 GEL Work Order: 454617

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: 26 JUL 2018

Title: Team Leader

Sample Data Summary

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: July 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 F18-029

Client Sample ID: B3JHW9 Project: CPRC0F18029
 Sample ID: 454617003 Client ID: CPRC001
 Matrix: WATER
 Collect Date: 12-JUL-18 14:15
 Receive Date: 14-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		273000	3400	14300	ug/L			KLP1	07/19/18	1552	1783075	1
Spectrometric Analysis												
4500_Sulfide: COMMON "As Received"												
Total Sulfide	U	33.0	33.0	500	ug/L		1	VH1	07/19/18	1332	1783238	2
Titration and Ion Analysis												
2320_ALKALINITY: COMMON + (Add-on) "As Received"												
Alkalinity, Total as CaCO3		131000	1450	4000	ug/L			RXB5	07/14/18	1407	1782162	3
Bicarbonate alkalinity (CaCO3)		131000	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 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: 454617

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Solids Analysis											
Batch	1783075										
QC1204071134	454617003	DUP									
Total Dissolved Solids		273000		283000	ug/L	5.71		(0%-20%)	KLP1	07/19/18	15:52
QC1204071132	LCS										
Total Dissolved Solids	300000			300000	ug/L		100	(80%-120%)		07/19/18	15:52
QC1204071131	MB										
Total Dissolved Solids			U	3400	ug/L					07/19/18	15:52
Spectrometric Analysis											
Batch	1783238										
QC1204071491	454617003	DUP									
Total Sulfide		U	33.0	U	33.0	ug/L	N/A		VH1	07/19/18	13:32
QC1204071490	LCS										
Total Sulfide	400		B	389	ug/L		97.2	(80%-120%)		07/19/18	13:32
QC1204071489	MB										
Total Sulfide			U	33.0	ug/L					07/19/18	13:32
QC1204071492	454617003	PS									
Total Sulfide	0.400	U	-0.00219	B	0.340	mg/L		85.1	(75%-125%)	07/19/18	13:32
Titration and Ion Analysis											
Batch	1782162										
QC1204069501	454617003	DUP									
Alkalinity, Total as CaCO3		131000		131000	ug/L	0.305		(0%-20%)	RXB5	07/14/18	14:09
Bicarbonate alkalinity (CaCO3)		131000		131000	ug/L	0.305		(0%-20%)			

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QC Summary

Workorder: 454617

Page 2 of 2

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
Batch	1782162										
Carbonate alkalinity (CaCO3)	U	1450	U	1450	ug/L	N/A			RXB5	07/14/18	14:09
QC1204069124 LCS											
Alkalinity, Total as CaCO3	100000			105000	ug/L		105	(80%-120%)		07/14/18	11:54

Notes:

The Qualifiers in this report are defined as follows:

- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.
- 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 #: GEL454617
Work Order #: 454617

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: 1782350

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
454617001	B3JHW6
1204069559	Method Blank (MB)
1204069560	454546001(NonSDG) Sample Duplicate (DUP)
1204069561	454546001(NonSDG) Matrix Spike (MS)
1204069562	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.

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>
454617003	B3JHW9
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.

Product: TRITIUM_DIST_LSC: COMMON

Analytical Method: TRITIUM_DIST_LSC

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

Analytical Batch: 1782665

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
454617003	B3JHW9
1204070320	Method Blank (MB)
1204070321	454617003(B3JHW9) Sample Duplicate (DUP)
1204070322	454617003(B3JHW9) Matrix Spike (MS)
1204070323	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, 1204070322 (B3JHW9MS), 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: GEL454617 GEL Work Order: 454617

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.

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: Heather McCarty

Date: 26 JUL 2018

Title: Analyst II

Sample Data Summary

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL454617	Client: CPRC001	Project: CPRC0F18029
Lab Sample ID: 454617001	Date Collected: 07/12/2018 14:15	Matrix: WATER
	Date Received: 07/14/2018 09:05	
Client ID: B3JHW6	Method: DOE EML HASL-300,I-01 Mo	Prep Basis: "As Received"
Batch ID: 1782350	Analyst: BSW1	SOP Ref: GL-RAD-A-006
Run Date: 07/20/2018 08:41	Aliquot: 1.2 L	Instrument: XRAY4
Data File: I454617001.CNF;1	Prep Method: DOE EML HASL-300,I-01 M	Count Time: 120 min
Prep Batch: 1782350		
Prep Date: 07/19/2018 11:16		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129	U	0.0796	pCi/L	+/-0.352	0.354	0.698	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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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: GEL454617	Client: CPRC001	Project: CPRC0F18029
Lab Sample ID: 454617003	Date Collected: 07/12/2018 14:15	Matrix: WATER
	Date Received: 07/14/2018 09:05	
Client ID: B3JHW9		Prep Basis: "As Received"
Batch ID: 1781988	Method: TC99_EIE_LSC	SOP Ref: GL-RAD-A-059
Run Date: 07/22/2018 08:35	Analyst: CXS7	Instrument: LSCGOLD
Data File: E1781988R2.xls	Aliquot: 100 mL	Count Time: 15 min
Prep Batch: 1781988	Prep Method: DOE EML HASL-300, Tc-02-	
Prep Date: 07/17/2018 13:52		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	-6.33	pCi/L	+/-25.8	25.8	45.4	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	40200	43500	CPM	92.6	(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: GEL454617	Client: CPRC001	Project: CPRC0F18029
Lab Sample ID: 454617003	Date Collected: 07/12/2018 14:15	Matrix: WATER
	Date Received: 07/14/2018 09:05	
Client ID: B3JHW9	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1782665	Analyst: BXM4	SOP Ref: GL-RAD-A-002
Run Date: 07/18/2018 14:12	Aliquot: 50 mL	Instrument: LSCRED
Data File: T1782665.xls	Prep Method: EPA 906.0 Modified	Count Time: 75 min
Prep Batch: 1782665		
Prep Date: 07/18/2018 08:02		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		548	pCi/L	+/-169	199	256	400

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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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

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

QC Summary

Report Date: July 26, 2018
Page 1 of 2

Client : CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Workorder: 454617

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1782350								
QC1204069559	MB								
Iodine-129			U	0.392	pCi/L			BSW1	07/20/1811:03
				Uncert: +/-0.412					
				TPU: +/-0.414					
QC1204069560	454546001	DUP							
Iodine-129		U	0.246	U	0.0368				07/20/1811:04
				Uncert: +/-0.452		RPD: 0	N/A		
				TPU: +/-0.466		RER: 0.646	(0-2)		
QC1204069561	454546001	MS							
Iodine-129		U	0.246		29.5	REC: 77.8	(75%-125%)		07/20/1811:05
				Uncert: +/-0.452					
				TPU: +/-0.466					
QC1204069562	LCS								
Iodine-129				37.5	43.1	REC: 115	(80%-120%)		07/20/1814:34
				Uncert: +/-3.89					
				TPU: +/-5.81					
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	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	1782665								
QC1204070320	MB								
Tritium			U	-58.1	pCi/L			BXM4	07/18/1816:47
				Uncert: +/-143					
				TPU: +/-143					
QC1204070321	454617003	DUP							
Tritium			548		349				07/18/1818:05
				Uncert: +/-169		RPD: 44	(0% - 100%)		
				TPU: +/-199		RER: 1.48	(0-2)		
QC1204070322	454617003	MS							
Tritium			5050	548	5000	REC: 88.2	(75%-125%)		07/18/1819:22

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QC Summary

Workorder: 454617

Page 2 of 2

Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Liquid Scintillation										
Batch	1782665									
		Uncert:	+/-169	+/-456						
		TPU:	+/-199	+/-1070						
QC1204070323	LCS									
Tritium	2520			2270	pCi/L	REC: 90	(80%-120%)		07/18/1820:40	
		Uncert:		+/-224						
		TPU:		+/-493						

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.