

7/27/2016



July 26, 2016

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

Re: CHPRC SAF S16-006
Work Order: 400390
SDG: GEL400390

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 30, 2016. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,

B Luthman
Brielle Luthman for
Heather Shaffer
Project Manager

Purchase Order: 300071 - 7H
Chain of Custody: S16-006-250
Enclosures

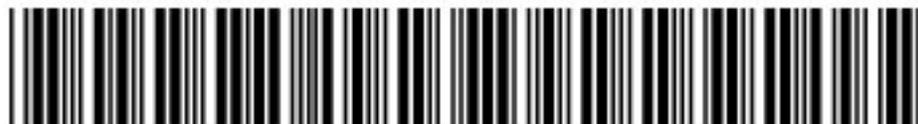


Table of Contents

Case Narrative.....	1
Chain of Custody and Supporting Documentation.....	6
Data Review Qualifier Definitions.....	9
Laboratory Certifications.....	11
Metals Analysis.....	13
Case Narrative.....	14
Sample Data Summary.....	17
Quality Control Summary.....	19
General Chem Analysis.....	22
Case Narrative.....	23
Sample Data Summary.....	26
Quality Control Summary.....	28
Radiological Analysis.....	31
Case Narrative.....	32
Sample Data Summary.....	36
Quality Control Summary.....	40

Case Narrative

**General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF S16-006
SDG: GEL400390**

July 26, 2016

Laboratory Identification:

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

Summary

Sample receipt

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on June 30, 2016, 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 and DER.

Sample Identification

The laboratory received the following samples:

Laboratory Identification	Sample Description
400390001	B35BC2
400390002	B35BB9

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.

7/27/2016

B. Luthman
Brielle Luthman for
Heather Shaffer
Project Manager

Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL400390
Work Order #: 400390

Metals

Determination of Metals by ICP-MS

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

Quality Control (QC) Information

Method Blank (MB) Statement

The method blanks (MB) analyzed with this SDG met the exception criteria with the exception of selenium, tin, and molybdenum. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data. 1203577380 (MB).

General Chemistry

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

SRISO_SEP_PRECIP_GPC: COMMON

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

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.

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.

Technical Information**Recounts**

Sample 400390002 (B35BB9) was recounted to verify sample results. The recount results are similar to the original results. Original results are reported.

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

93165
400390

CH2M Hill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C.# **S16-006-250** Page 1 of 1

Collector: Karen Campbell CHPRC
 Telephone No. 509-376-4650
 Contact/Requester: Karen Waters-Husted
 Purchase Order/Charge Code: 300071

SAF No. S16-006
 Sampling Origin: Hanford Site

Project Title: SURV, JUNE 2016
 Logbook No. HNF-N-506 85/84
 Ice Chest No. GWS-546

Shipped To (Lab): **GEL Laboratories, LLC**
 Method of Shipment: Commercial Carrier
 Bill of Lading/Air Bill No. 7769 3781 0790

Protocol: SURV
 Priority: 30 Days
 Offsite Property No. 6784

POSSIBLE SAMPLE HAZARDS/REMARKS
 SPECIAL INSTRUCTIONS: N/A
 Hold Time: Total Activity Exemption: Yes No

*** ** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1

Sample No.	Filter	* Date	Time	No./Type Container	Sample Analysis	Holding Time	Preservative
B35BC2	Y	6-29-16	0917	1x250-mL G/P	2320_ALKALINITY: GW 01	14 Days	Cool <=6C
B35BB9	N			1x500-mL G/P	6020_METALS_ICPMS: Uranium (1)	6 Months	HNO3 to pH <2
B35BB9	N			3x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2
B35BB9	N			1x500-mL G/P	TC99_EIE_LSC: COMMON	6 Months	HNO3 to pH <2
B35BB9	N	6-29-16	0917	1x500-mL P	TRITIUM_DIST_LSC: COMMON	6 Months	None

Relinquished By: Karen Campbell CHPRC
 Date/Time: JUN 29 2016 1225
 Sign: *Karen Campbell*

Received By: Christina Aguilar CHPRC
 Date/Time: JUN 29 2016 1225
 Sign: *Christina Aguilar*

Relinquished By: Christina Aguilar CHPRC
 Date/Time: JUN 29 2016 1400
 Sign: *Christina Aguilar*

Received By: FE OCY
 Date/Time: JUN 29 2016
 Sign: *FE OCY*

Relinquished By: *FE OCY*
 Date/Time: JUN 29 2016 0915
 Sign: *FE OCY*

Received By: *Christina Aguilar*
 Date/Time: 6-30-16 0915
 Sign: *Christina Aguilar*

Matrix *	S	SE	SO	SL	W	O	A	Soil	Sediment	Solid	Sludge	Water	Oil	Air	Drum Solids	Drum Liquids	Tissue	Wipe	Liquid	Vegetation	Other	

Relinquished By: Karen Campbell CHPRC
 Disposal Method (e.g., Return to customer, per lab procedure, used in process)

Final Sample Disposition: **DISPOSITION**

Printed On: 4/21/2016

Disposed By: *Christina Aguilar*

FRS ID = FSR31822

SAMPLE RECEIPT & REVIEW FORM

Client: <u>CPRC</u>		SDG/AR/COC/Work Order: <u>400390</u>	
Received By: <u>MLK</u>		Date Received: <u>6-30-16</u>	
Suspected Hazard Information		Yes	No
*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.			
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>	
Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>afm 0</u>			
Classified Radioactive II or III by RSO?		<input checked="" type="checkbox"/>	
If yes, Were swipes taken of sample containers < action levels?			
COC/Samples marked containing PCBs?		<input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		<input checked="" type="checkbox"/>	
If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.			
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	
Hazard Class Shipped:		UN#:	
Samples identified as Foreign Soil?		<input checked="" type="checkbox"/>	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: Ice bags Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius <u>2 C</u>
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: <u>150462912</u> Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 Do Low Level Perchlorate samples have headspace as required?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
7 VOA vials contain acid preservation?	<input checked="" type="checkbox"/>			(If unknown, select No)
8 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
9 Are Encore containers present?	<input checked="" type="checkbox"/>			(If yes, immediately deliver to Volatiles laboratory)
10 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
11 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
12 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
13 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
14 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>			
15 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
16 Carrier and tracking number.				Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other <u>7766 3981 0790</u>

Comments (Use Continuation Form if needed):

Data Review Qualifier Definitions

Project Specific Qualifier Definitions for GEL Client Code: CPRC

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

Laboratory Certifications

List of current GEL Certifications as of 26 July 2016

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

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL400390
Work Order #: 400390

Product: Determination of Metals by ICP-MS

Analytical Method: 6020_METALS_ICPMS

Analytical Procedure: GL-MA-E-014 REV# 28

Analytical Batch: 1578532

Preparation Method: SW846 3005A

Preparation Procedure: GL-MA-E-006 REV# 13

Preparation Batch: 1578530

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
400390002	B35BB9
1203577380	Method Blank (MB)ICP-MS
1203577381	Laboratory Control Sample (LCS)
1203577384	400390002(B35BB9L) Serial Dilution (SD)
1203577382	400390002(B35BB9S) Matrix Spike (MS)
1203577383	400390002(B35BB9SD) 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.

Quality Control (QC) Information

Method Blank (MB) Statement

The method blanks (MB) analyzed with this SDG met the exception criteria with the exception of selenium, tin, and molybdenum. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data. 1203577380 (MB).

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: GEL400390 GEL Work Order: 400390

The Qualifiers in this report are defined as follows:

* Duplicate analysis not within control limits

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

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.

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 2016

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL400390

CONTRACT: CPRC0S16006

METHOD TYPE: SW846

SAMPLE ID:400390002

BASIS: As Received

DATE COLLECTED 29-JUN-16

CLIENT ID: B35BB9

LEVEL: Low

DATE RECEIVED 30-JUN-16

MATRIX: WATER

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-61-1	Uranium	2.89	ug/L		0.067	0.2	15	1	MS	SKJ	07/20/16 22:01	160720-1	1578532

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1578532	1578530	SW846 3005A	50	mL	50	mL	07/01/16	SXW1

***Analytical Methods:**

MS SW846 3005A/6020A

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 26, 2016

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 400390

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1578532										
QC1203577381	LCS										
Uranium	50.0			51.9	ug/L		104	(80%-120%)	SKJ	07/20/16	21:49
QC1203577380	MB										
Uranium			U	0.067	ug/L					07/20/16	21:45
QC1203577382	400390002	MS									
Uranium	50.0	2.89		55.7	ug/L		106	(75%-125%)		07/20/16	22:05
QC1203577383	400390002	MSD									
Uranium	50.0	2.89		56.6	ug/L	1.64	107	(0%-20%)		07/20/16	22:09
QC1203577384	400390002	SDILT									
Uranium		2.89	D	0.623	ug/L	7.82		(0%-10%)		07/20/16	22:17

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

GEL LABORATORIES LLC

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

QC Summary

Workorder: 400390

Page 2 of 2

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
-----------------	------------	---------------	-------------	-----------	--------------	---------------	-------------	--------------	--------------	-------------	-------------

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 #: GEL400390
Work Order #: 400390**

Product: Alkalinity

Analytical Method: 2320_ALKALINITY

Analytical Procedure: GL-GC-E-033 REV# 12

Analytical Batch: 1578692

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
400390001	B35BC2
1203577776	Method Blank (MB)
1203577777	Laboratory Control Sample (LCS)
1203577779	400390001(B35BC2) Sample Duplicate (DUP)

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

Data Summary:

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

Certification Statement

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

GEL LABORATORIES LLC

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

**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL400390 GEL Work Order: 400390

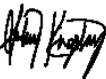
The Qualifiers in this report are defined as follows:

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: Aubrey Kingsbury

Date: 20 JUL 2016

Title: Analyst I

Sample Data Summary

7/27/2016

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: July 20, 2016

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF S16-006

Client Sample ID:	B35BC2	Project:	CPRC0S16006
Sample ID:	400390001	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	29-JUN-16 09:17		
Receive Date:	30-JUN-16		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Titration and Ion Analysis												
2320_ALKALINITY: GW 01 "As Received"												
Alkalinity, Total as CaCO3		124000	725	1000	ug/L			RXB5	06/30/16	1806	1578692	1
Bicarbonate alkalinity (CaCO3)		124000	725	1000	ug/L							
Carbonate alkalinity (CaCO3)	U	725	725	1000	ug/L							
Hydroxide alkalinity as CaCO3	U	725	725	1000	ug/L							

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	2320_ALKALINITY	

Notes:

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 20, 2016

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 400390

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
Batch	1578692										
QC1203577779	400390001	DUP									
Alkalinity, Total as CaCO3		124000		123000	ug/L	0.409		(0%-20%)	RXB5	06/30/16	18:09
Bicarbonate alkalinity (CaCO3)		124000		123000	ug/L	0.409		(0%-20%)			
Carbonate alkalinity (CaCO3)	U	725	U	725	ug/L	N/A					
Hydroxide alkalinity as CaCO3	U	725	U	725	ug/L	N/A					
QC1203577777	LCS										
Alkalinity, Total as CaCO3	50000			55000	ug/L		110	(80%-120%)		06/30/16	17:52
QC1203577776	MB										
Alkalinity, Total as CaCO3			U	725	ug/L					06/30/16	17:50
Bicarbonate alkalinity (CaCO3)			U	725	ug/L						
Carbonate alkalinity (CaCO3)			U	725	ug/L						
Hydroxide alkalinity as CaCO3			U	725	ug/L						

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

GEL LABORATORIES LLC

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

QC Summary

Workorder: 400390

Page 2 of 2

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
----------	-----	--------	------	----	-------	------	------	-------	-------	------	------

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 #: GEL400390
 Work Order #: 400390**

Product: SRISO_SEP_PRECIP_GPC: COMMON

Analytical Method: SRISO_SEP_PRECIP_GPC

Analytical Procedure: GL-RAD-A-004 REV# 17

Analytical Batch: 1579220

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
400390002	B35BB9
1203579106	Method Blank (MB)
1203579107	400141005(NonSDG) Sample Duplicate (DUP)
1203579108	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# 4

Analytical Batch: 1578958

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
400390002	B35BB9
1203578395	Method Blank (MB)
1203578396	399469035(NonSDG) Sample Duplicate (DUP)
1203578397	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: TRITIUM_DIST_LSC: COMMON

Analytical Method: TRITIUM_DIST_LSC

Analytical Procedure: GL-RAD-A-002 REV# 21

Analytical Batch: 1579141

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
400390002	B35BB9
1203578832	Method Blank (MB)
1203578833	400025001(NonSDG) Sample Duplicate (DUP)
1203578834	400025001(NonSDG) Matrix Spike (MS)
1203578835	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 400390002 (B35BB9) was recounted to verify sample results. The recount results are similar to the original results. Original results are reported.

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: GEL400390 GEL Work Order: 400390

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: Theresa Austin

Date: 21 JUL 2016

Title: Group Leader

Sample Data Summary

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL400390	Client: CPRC001	Project: CPRC0S16006
Lab Sample ID: 400390002	Date Collected: 06/29/2016 09:17	Matrix: WATER
	Date Received: 06/30/2016 09:15	
Client ID: B35BB9	Method: SRISO_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1579220	Analyst: BXF1	SOP Ref: GL-RAD-A-004
Run Date: 07/13/2016 13:40	Aliquot: 300 mL	Instrument: PIC13A
Data File: S1579220r1.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1579220		
Prep Date: 07/12/2016 14:13		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90	U	0.0768	pCi/L	+/-0.631	0.631	1.22	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	6.70	7.37	mg	91	(40%-110%)

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: GEL400390	Client: CPRC001	Project: CPRC0S16006
Lab Sample ID: 400390002	Date Collected: 06/29/2016 09:17	Matrix: WATER
	Date Received: 06/30/2016 09:15	
Client ID: B35BB9	Method: TC99_EIE_LSC	Prep Basis: "As Received"
Batch ID: 1578958	Analyst: CXS7	SOP Ref: GL-RAD-A-059
Run Date: 07/10/2016 10:19	Aliquot: 100 mL	Instrument: LSCGREEN
Data File: E1578958.xls	Prep Method: DOE EML HASL-300, Tc-02-	Count Time: 25 min
Prep Batch: 1578958		
Prep Date: 07/05/2016 12:46		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	13.9	pCi/L	+/-22.0	22.0	37.3	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	30900	35700	CPM	86.5	(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: GEL400390	Client: CPRC001	Project: CPRC0S16006
Lab Sample ID: 400390002	Date Collected: 06/29/2016 09:17	Matrix: WATER
	Date Received: 06/30/2016 09:15	
Client ID: B35BB9	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1579141	Analyst: TXJ1	SOP Ref: GL-RAD-A-002
Run Date: 07/14/2016 04:15	Aliquot: 50 mL	Instrument: LSCBROWN
Data File: T1579141.xls	Prep Method: EPA 906.0 Modified	Count Time: 45 min
Prep Batch: 1579141		
Prep Date: 07/13/2016 10:38		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		1410	pCi/L	+/-256	374	340	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

7/27/2016

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 19, 2016

Page 1 of 2

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

Contact: Mr. Scot Fitzgerald

Workorder: 400390

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gas Flow									
Batch	1579220								
QC1203579106	MB								
Strontium-90			U	0.441	pCi/L			BXF1	07/13/1613:40
				Uncert:					
				TPU:					
**Strontium Carrier		7.37		5.90	mg	REC:	80 (40%-110%)		
QC1203579107	400141005	DUP							
Strontium-90		U	-0.937	U	-0.00283	pCi/L			07/13/1613:40
			Uncert:	+/-0.740	+/-0.611	RPD:	0 N/A		
			TPU:	+/-0.740	+/-0.611	RER:	1.91 (0-2)		
**Strontium Carrier		7.37	6.90	7.10	mg	REC:	96 (40%-110%)		
QC1203579108	LCS								
Strontium-90				72.9		77.0	pCi/L	REC:	106 (80%-120%)
				Uncert:	+/-4.42				07/13/1613:32
				TPU:	+/-12.8				
**Strontium Carrier		7.37		7.30	mg	REC:	99 (40%-110%)		
Rad Liquid Scintillation									
Batch	1578958								
QC1203578395	MB								
Technetium-99			U	-3.74	pCi/L			CXS7	07/10/1611:12
				Uncert:	+/-24.1				
				TPU:	+/-24.1				
**Technetium-99m Tracer		35700		27500	CPM	REC:	77 (30%-105%)		
QC1203578396	399469035	DUP							
Technetium-99			214	204	pCi/L				07/10/1611:38
			Uncert:	+/-27.3	+/-27.6	RPD:	5 (0% - 20%)		
			TPU:	+/-36.2	+/-35.7	RER:	0.4 (0-2)		
**Technetium-99m Tracer		35700	31300	30900	CPM	REC:	87 (30%-105%)		
QC1203578397	LCS								
Technetium-99				861		819	pCi/L	REC:	95 (80%-120%)
				Uncert:	+/-39.7				07/10/1612:05
				TPU:	+/-99.2				
**Technetium-99m Tracer		35700		31800	CPM	REC:	89 (30%-105%)		
Batch	1579141								
QC1203578832	MB								
Tritium			U	-4.81	pCi/L			TXJ1	07/14/1607:52
				Uncert:	+/-190				
				TPU:	+/-190				
QC1203578833	400025001	DUP							
Tritium			1460	1490	pCi/L				07/14/1608:39
			Uncert:	+/-246	+/-248	RPD:	2 (0% - 100%)		
			TPU:	+/-374	+/-380	RER:	0.109 (0-2)		
QC1203578834	400025001	MS							
Tritium		2330	1460	3380	pCi/L	REC:	82 (75%-125%)		07/14/1609:26
			Uncert:	+/-246	+/-316				

GEL LABORATORIES LLC

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

QC Summary

Workorder: 400390

Page 2 of 2

Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Liquid Scintillation										
Batch	1579141									
		TPU:	+/-374							
				+/-725						
QC1203578835	LCS									
Tritium	2320			1860	pCi/L	REC: 80 (80%-120%)			07/14/16	10:13
		Uncert:		+/-260						
		TPU:		+/-444						

Notes:

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

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- B The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is \geq EQL or is > 5% of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.
- E Reported value is estimated due to interferences. See comment in narrative.
- M Duplicate precision not met.
- N Spike Sample recovery is outside control limits.
- S Reported value determined by the Method of Standard Additions (MSA)
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- UX Gamma Spectroscopy--Uncertain identification
- W Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

** Indicates analyte is a surrogate compound.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.