GEL Laboratories LLC
a member of The GEL Group INC

PO Box 30712 Charleston, SC 29417
2040 Savage Road Charleston, SC 29407
P 843.556.8171
F 843.766.1178

gel.com

April 18, 2016

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

Re: CHPRC SAF I16-016
Work Order: 393598
SDG: GEL393598

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on March 22, 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,

Heather Shaffer

Heather Shaffer
Project Manager

Purchase Order: 300071JDBA
Chain of Custody: I16-016-005
Enclosures

Table of Contents

Case Narrative

General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF I16-016
SDG: GEL393598

April 18, 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 March 22, 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
393598001	B34C76
393598002	B34C78

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: 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.

April 18, 2016

Heather Shaffer

Heather Shaffer
Project Manager

Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL393598
Work Order #: 393598

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

Matrix Spike (MS/MSD) Recovery Statement
The MS/MSD (See Below) did not meet the recommended quality control acceptance criteria for percent recoveries for the following applicable analytes. The post spike recoveries were within the required control limits. This verifies the absence of a matrix interference in the post-spike digested sample. The recoveries may be attributed to possible sample matrix interference and/or non-homogeneity.

Sample	Analyte	Value
1203513284 (B34C76MSD)	Beryllium	129* (75%-125%)
	Nickel	140* (75%-125%)

The MS/MSD (See Below) did not meet the recommended quality control acceptance criteria for percent recoveries for the following applicable analytes. The post spike also did not meet the required control limits; thus, confirming matrix interferences and/or sample non-homogeneity.

Sample	Analyte	Value
1203513283 (B34C76MS)	Chromium	137* (75%-125%)
1203513284 (B34C76MSD)	Chromium	181* (75%-125%)

Post Spike (PS) Recovery Statement
The PS did not meet the recommended quality control acceptance criteria for percent recoveries for all applicable analytes and verifies the presence of matrix interferences.

Sample	Analyte	Value
1203517642 (B34C76PS)	Chromium	129* (80%-120%)

Radiochemistry

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 393598001 (B34C76) was recounted to verify sample results. The recount results are similar to the original results. Original results are reported.

Miscellaneous Information

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

CH2MHill Plateau Remediation Company 393598

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # **I16-016-005**

Page 1 of 1

Collector	Dan Woehle CHPRC	**Contact/Requester**	Karen Waters-Husted	**Telephone No.**	509-376-4650
SAF No.	I16-016	**Sampling Origin**	Hanford Site	**Purchase Order/Charge Code**	300071
Project Title	200-UP-1, MARCH 2016	**Logbook No.**	HNF-N-506 83147	**Ice Chest No.**	GWS-378
Shipped To (Lab)	GEL Laboratories, LLC	**Method of Shipment**	Commercial Carrier	**Bill of Lading/Air Bill No.**	775926120826
Protocol	CERCLA	**Priority:**	30 Days **PRIORITY**	**Offsite Property No.**	6452

POSSIBLE SAMPLE HAZARDS/REMARKS

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

SPECIAL INSTRUCTIONS **Hold Time**

N/A

Total Activity Exemption: Yes ☑ No ☐

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B34C76	N	W	3.17.16	1531	1x500-mL G/P	6020_METALS_ICPMS: GW 01	6 Months	HNO3 to pH <2
B34C76	N	W	3.17.16	1531	1x500-mL P	TRITIUM_DIST_LSC: COMMON	6 Months	None
B34C78	Y	W	3.17.16	1531	1x500-mL G/P	6020_METALS_ICPMS: GW 01	6 Months	HNO3 to pH <2

Relinquished By	Print / Sign	Date/Time	Received By	Print / Sign	Date/Time
Dan Woehle CHPRC	Dan Woehle	MAR 17 2016 1555	SSU-1	SSU-1	MAR 17 2016 1555
SSU-1	SSU-1	MAR 21 2016 0900	Troy Bacon CHPRC	Troy L. Bacon	MAR 21 2016 0900
Troy Bacon CHPRC	Troy L. Bacon	MAR 21 2016 1400	FEDEX	FEDEX	Date/Time
FEDEX	FEDEX	Date/Time	M. Kinsław	M. Kinsław	3-22-16 0915

Matrix *

S = Soil	DS = Drum Solids		
SE = Sediment	DL = Drum Liquids		
SO = Solid	T = Tissue		
SL = Sludge	WI = Wipe		
W = Water	L = Liquid		
O = Oil	V = Vegetation		
A = Air	X = Other		

FINAL SAMPLE DISPOSITION Disposal Method (e.g., Return to customer, per lab procedure, used in process)

Disposed By: _____ Date/Time: _____

PRINTED ON 1/19/2016

FSR ID = FSR22335

A-6004-842 (REV 2)

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April 18, 2016

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: CPRG	**SDG/AR/COC/Work Order:** 393598
Received By: MK	**Date Received:** 3-22-16

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?		✓	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): Cpm 0
Classified Radioactive II or III by RSO?		✓	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?		✓	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		✓	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		✓	

	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	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	✓			Preservation Method: Ice bags / Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius 2C
2a	Daily check performed and passed on IR temperature gun?	✓			Temperature Device Serial #: 130462962 Secondary Temperature Device Serial # (If Applicable):
3	Chain of custody documents included with shipment?	✓			
4	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?	✓			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	Do Low Level Perchlorate samples have headspace as required?		✓		Sample ID's and containers affected:
7	VOA vials contain acid preservation?		✓		(If unknown, select No)
8	VOA vials free of headspace (defined as < 6mm bubble)?		✓		Sample ID's and containers affected:
9	Are Encore containers present?			✓	(If yes, immediately deliver to Volatiles laboratory)
10	Samples received within holding time?	✓			ID's and tests affected:
11	Sample ID's on COC match ID's on bottles?	✓			Sample ID's and containers affected:
12	Date & time on COC match date & time on bottles?	✓			Sample ID's affected:
13	Number of containers received match number indicated on COC?	✓			Sample ID's affected:
14	Are sample containers identifiable as GEL provided?			✓	
15	COC form is properly signed in relinquished/received sections?	✓			
16	Carrier and tracking number.	✓			Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other 7759 2612 0820

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials CLY Date 03/22/16 Page 1 of 1 GL-CHL-SR-001 Rev 2

Data Review Qualifier Definitions

GEL LABORATORIES LLC
2040 Savage Road Charleston, SC 29407 (843) 556−8171

Report Date: 08−APR−16

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 (0rganics 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 >= 2X the MDA and, after corrections, result is >= 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 >= 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 >= 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 18 April 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 #: GEL393598
Work Order #: 393598

Product: **Determination of Metals by ICP-MS**
Analytical Method: 6020_METALS_ICPMS
Analytical Procedure: GL-MA-E-014 REV# 27
Analytical Batch: 1554132

Preparation Method: SW846 3005A
Preparation Procedure: GL-MA-E-006 REV# 13
Preparation Batch: 1554130

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

GEL Sample ID#	Client Sample Identification
393598001	B34C76
393598002	B34C78
1203513281	Method Blank (MB)**ICP-MS**
1203513282	Laboratory Control Sample (LCS)
1203513285	393598001(B34C76L) Serial Dilution (SD)
1203513283	393598001(B34C76S) Matrix Spike (MS)
1203513284	393598001(B34C76SD) Matrix Spike Duplicate (MSD)
1203517642	393598001(B34C76PS) Post Spike (PS)

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

Matrix Spike (MS/MSD) Recovery Statement
The percent recoveries (%R) obtained from the MS/MSD analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The MS/MSD (See Below) did not meet the recommended quality control acceptance criteria for percent recoveries for the following applicable analytes. The post spike recoveries were within the required control limits. This verifies the absence of a matrix interference in the post-spike digested sample. The recoveries may be attributed to possible sample matrix interference and/or non-homogeneity.

Sample	Analyte	Value
1203513284 (B34C76MSD)	Beryllium	129* (75%-125%)
	Nickel	140* (75%-125%)

The MS/MSD (See Below) did not meet the recommended quality control acceptance criteria for percent recoveries for the following applicable analytes. The post spike also did not meet the required control limits; thus, confirming matrix interferences and/or sample non-homogeneity.

Sample	Analyte	Value
1203513283 (B34C76MS)	Chromium	137* (75%-125%)
1203513284 (B34C76MSD)	Chromium	181* (75%-125%)

Post Spike (PS) Recovery Statement
The percent recoveries (%R) obtained from the PS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The PS did not meet the recommended quality control acceptance criteria for percent recoveries for all applicable analytes and verifies the presence of matrix interferences.

Sample	Analyte	Value
1203517642 (B34C76PS)	Chromium	129* (80%-120%)

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: GEL393598 GEL Work Order: 393598

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).

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: Nik-Cole A. Elmore **Name: Nik-Cole Elmore**

Date: 15 APR 2016 **Title: Data Validator**

Sample Data Summary

GEL Laboratories LLC

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL393598 **CONTRACT:** CPRC0I16016 **METHOD TYPE:** SW846

SAMPLE ID: 393598001 **BASIS:** As Received **DATE COLLECTED** 17−MAR−16

CLIENT ID: B34C76 **LEVEL:** Low **DATE RECEIVED** 22−MAR−16

MATRIX: WATER **%SOLIDS:** 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429−90−5	Aluminum	61.6	ug/L		15	50	50	1	MS	PRB	03/29/16 18:11	160329−1	1554132
7440−36−0	Antimony	1	ug/L	U	1	3	3	1	MS	PRB	03/30/16 00:03	160329−4	1554132
7440−38−2	Arsenic	4.21	ug/L	B	1.7	5	5	1	MS	PRB	03/29/16 18:11	160329−1	1554132
7440−39−3	Barium	38.8	ug/L		0.6	2	2	1	MS	PRB	03/29/16 18:11	160329−1	1554132
7440−41−7	Beryllium	0.20	ug/L	UN	0.2	0.5	0.5	1	MS	SKJ	03/31/16 12:44	160331−6	1554132
7440−43−9	Cadmium	0.206	ug/L	B	0.11	1	1	1	MS	PRB	03/29/16 18:11	160329−1	1554132
7440−47−3	Chromium	131	ug/L	N	2	10	10	1	MS	PRB	03/30/16 20:10	160330−5	1554132
7440−48−4	Cobalt	0.919	ug/L	B	0.1	1	1	1	MS	PRB	03/29/16 18:11	160329−1	1554132
7440−50−8	Copper	3.85	ug/L		0.35	1	1	1	MS	PRB	03/30/16 00:03	160329−4	1554132
7439−92−1	Lead	0.897	ug/L	B	0.5	2	2	1	MS	PRB	03/29/16 18:11	160329−1	1554132
7439−96−5	Manganese	11.7	ug/L		1	5	5	1	MS	PRB	03/29/16 18:11	160329−1	1554132
7439−98−7	Molybdenum	11.9	ug/L		0.165	0.5	0.5	1	MS	PRB	03/29/16 18:11	160329−1	1554132
7440−02−0	Nickel	40.9	ug/L	N	0.5	2	2	1	MS	PRB	03/29/16 18:11	160329−1	1554132
7782−49−2	Selenium	3.06	ug/L	B	1.5	5	5	1	MS	PRB	03/29/16 18:11	160329−1	1554132
7440−22−4	Silver	0.354	ug/L	B	0.2	1	1	1	MS	PRB	03/29/16 18:11	160329−1	1554132
7440−24−6	Strontium	168	ug/L		2	10	10	1	MS	PRB	03/29/16 18:11	160329−1	1554132
7440−28−0	Thallium	0.450	ug/L	U	0.45	2	2	1	MS	PRB	03/29/16 18:11	160329−1	1554132
7440−29−1	Thorium	0.383	ug/L	U	0.383	2	2	1	MS	PRB	03/30/16 00:03	160329−4	1554132
7440−31−5	Tin	1	ug/L	U	1	5	5	1	MS	PRB	03/30/16 00:03	160329−4	1554132
7440−61−1	Uranium	1.84	ug/L		0.067	0.2	0.2	1	MS	PRB	03/30/16 00:03	160329−4	1554132
7440−66−6	Zinc	8.96	ug/L	B	3.5	10	10	1	MS	PRB	03/29/16 18:11	160329−1	1554132

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1554132	1554130	SW846 3005A	50	mL	50	mL	03/23/16	JXM5

***Analytical Methods:**

MS **SW846 3005A/6020A**

GEL Laboratories LLC

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL393598 **CONTRACT:** CPRC0I16016 **METHOD TYPE:** SW846

SAMPLE ID: 393598002 **BASIS:** As Received **DATE COLLECTED** 17−MAR−16

CLIENT ID: B34C78 **LEVEL:** Low **DATE RECEIVED** 22−MAR−16

MATRIX: WATER **%SOLIDS:** 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429−90−5	Aluminum	15	ug/L	U	15	50	50	1	MS	PRB	03/29/16 18:27	160329−1	1554132
7440−36−0	Antimony	1	ug/L	U	1	3	3	1	MS	PRB	03/30/16 00:18	160329−4	1554132
7440−38−2	Arsenic	4.19	ug/L	B	1.7	5	5	1	MS	PRB	03/29/16 18:27	160329−1	1554132
7440−39−3	Barium	39.4	ug/L		0.6	2	2	1	MS	PRB	03/29/16 18:27	160329−1	1554132
7440−41−7	Beryllium	0.20	ug/L	UN	0.2	0.5	0.5	1	MS	SKJ	03/31/16 12:52	160331−6	1554132
7440−43−9	Cadmium	0.110	ug/L	B	0.11	1	1	1	MS	PRB	03/29/16 18:27	160329−1	1554132
7440−47−3	Chromium	62.7	ug/L	N	2	10	10	1	MS	PRB	03/30/16 20:19	160330−5	1554132
7440−48−4	Cobalt	0.309	ug/L	B	0.1	1	1	1	MS	PRB	03/29/16 18:27	160329−1	1554132
7440−50−8	Copper	1.12	ug/L		0.35	1	1	1	MS	PRB	03/30/16 00:18	160329−4	1554132
7439−92−1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	PRB	03/29/16 18:27	160329−1	1554132
7439−96−5	Manganese	3.22	ug/L	B	1	5	5	1	MS	PRB	03/29/16 18:27	160329−1	1554132
7439−98−7	Molybdenum	10.7	ug/L		0.165	0.5	0.5	1	MS	PRB	03/29/16 18:27	160329−1	1554132
7440−02−0	Nickel	11	ug/L	N	0.5	2	2	1	MS	PRB	03/29/16 18:27	160329−1	1554132
7782−49−2	Selenium	3.71	ug/L	B	1.5	5	5	1	MS	PRB	03/29/16 18:27	160329−1	1554132
7440−22−4	Silver	0.20	ug/L	U	0.2	1	1	1	MS	PRB	03/29/16 18:27	160329−1	1554132
7440−24−6	Strontium	175	ug/L		2	10	10	1	MS	PRB	03/29/16 18:27	160329−1	1554132
7440−28−0	Thallium	0.450	ug/L	U	0.45	2	2	1	MS	PRB	03/29/16 18:27	160329−1	1554132
7440−29−1	Thorium	0.383	ug/L	U	0.383	2	2	1	MS	PRB	03/30/16 00:18	160329−4	1554132
7440−31−5	Tin	1	ug/L	U	1	5	5	1	MS	PRB	03/30/16 00:18	160329−4	1554132
7440−61−1	Uranium	1.81	ug/L		0.067	0.2	0.2	1	MS	PRB	03/30/16 00:18	160329−4	1554132
7440−66−6	Zinc	3.5	ug/L	U	3.5	10	10	1	MS	PRB	03/29/16 18:27	160329−1	1554132

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1554132	1554130	SW846 3005A	50	mL	50	mL	03/23/16	JXM5

***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: April 15, 2016

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

Contact: Mr. Scot Fitzgerald

Workorder: 393598

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS										
Batch 1554132										
QC1203513282 LCS										
Aluminum	2000			2020	ug/L		101	(80%-120%)	PRB	03/29/16 18:08
Antimony	50.0			49.0	ug/L		98	(80%-120%)		03/30/16 00:00
Arsenic	50.0			51.3	ug/L		103	(80%-120%)		03/29/16 18:08
Barium	50.0			46.9	ug/L		93.7	(80%-120%)		
Beryllium	50.0			59.9	ug/L		120	(80%-120%)	SKJ	03/31/16 12:42
Cadmium	50.0			48.2	ug/L		96.5	(80%-120%)	PRB	03/29/16 18:08
Chromium	50.0			48.3	ug/L		96.7	(80%-120%)		03/30/16 20:08
Cobalt	50.0			47.7	ug/L		95.4	(80%-120%)		03/29/16 18:08
Copper	50.0			50.4	ug/L		101	(80%-120%)		03/30/16 00:00
Lead	50.0			50.5	ug/L		101	(80%-120%)		03/29/16 18:08
Manganese	50.0			47.9	ug/L		95.9	(80%-120%)		
Molybdenum	50.0			50.9	ug/L		102	(80%-120%)		
Nickel	50.0			50.2	ug/L		100	(80%-120%)		
Selenium	50.0			48.8	ug/L		97.7	(80%-120%)		
Silver	50.0			48.7	ug/L		97.3	(80%-120%)		
Strontium	50.0			47.7	ug/L		95.3	(80%-120%)		
Thallium	50.0			48.6	ug/L		97.1	(80%-120%)		
Thorium	50.0			48.6	ug/L		97.2	(80%-120%)		03/30/16 00:00
Tin	50.0			50.4	ug/L		101	(80%-120%)		
Uranium	50.0			48.9	ug/L		97.7	(80%-120%)		

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

QC Summary

Workorder: **393598**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS										
Batch 1554132										
Zinc	50.0			48.7	ug/L		97.4	(80%-120%)	PRB	03/29/16 18:08
QC1203513281 MB										
Aluminum			U	15.0	ug/L					03/29/16 18:05
Antimony			U	1.00	ug/L					03/29/16 23:56
Arsenic			U	1.70	ug/L					03/29/16 18:05
Barium			U	0.600	ug/L					
Beryllium			U	0.200	ug/L				SKJ	03/31/16 12:41
Cadmium			U	0.110	ug/L				PRB	03/29/16 18:05
Chromium			U	2.00	ug/L					03/30/16 20:06
Cobalt			U	0.100	ug/L					03/29/16 18:05
Copper			U	0.350	ug/L					03/29/16 23:56
Lead			U	0.500	ug/L					03/29/16 18:05
Manganese			U	1.00	ug/L					
Molybdenum			U	0.165	ug/L					
Nickel			U	0.500	ug/L					
Selenium			U	1.50	ug/L					
Silver			U	0.200	ug/L					
Strontium			U	2.00	ug/L					
Thallium			U	0.450	ug/L					
Thorium			U	0.383	ug/L					03/29/16 23:56
Tin			U	1.00	ug/L					
Uranium			U	0.067	ug/L					

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QC Summary

Workorder: 393598

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS											
Batch 1554132											
Zinc				U	3.50	ug/L				PRB	03/29/16 18:05
QC1203513283 393598001 MS											
Aluminum	2000		61.6		2040	ug/L		98.8	(75%-125%)		03/29/16 18:15
Antimony	50.0	U	1.00		48.9	ug/L		97.4	(75%-125%)		03/30/16 00:06
Arsenic	50.0	B	4.21		56.2	ug/L		104	(75%-125%)		03/29/16 18:15
Barium	50.0		38.8		89.7	ug/L		102	(75%-125%)		
Beryllium	50.0	NU	0.200		61.9	ug/L		124	(75%-125%)	SKJ	03/31/16 12:45
Cadmium	50.0	B	0.206		48.7	ug/L		97	(75%-125%)	PRB	03/29/16 18:15
Chromium	50.0	N	131	N	200	ug/L		137*	(75%-125%)		03/30/16 20:12
Cobalt	50.0	B	0.919		47.9	ug/L		93.9	(75%-125%)		03/29/16 18:15
Copper	50.0		3.85		51.3	ug/L		95	(75%-125%)		03/30/16 00:06
Lead	50.0	B	0.897		46.4	ug/L		91.1	(75%-125%)		03/29/16 18:15
Manganese	50.0		11.7		59.7	ug/L		95.9	(75%-125%)		
Molybdenum	50.0		11.9		64.2	ug/L		105	(75%-125%)		
Nickel	50.0	N	40.9		95.1	ug/L		108	(75%-125%)		
Selenium	50.0	B	3.06		52.1	ug/L		98	(75%-125%)		
Silver	50.0	B	0.354		51.9	ug/L		103	(75%-125%)		
Strontium	50.0		168		225	ug/L		114	(75%-125%)		
Thallium	50.0	U	0.450		45.3	ug/L		90.5	(75%-125%)		
Thorium	50.0	U	0.383		47.8	ug/L		95.2	(75%-125%)		03/30/16 00:06
Tin	50.0	U	1.00		51.0	ug/L		101	(75%-125%)		
Uranium	50.0		1.84		49.5	ug/L		95.4	(75%-125%)		

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QC Summary

Workorder: 393598

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS											
Batch 1554132											
Zinc	50.0	B	8.96		60.1	ug/L		102	(75%-125%)	PRB	03/29/16 18:15
QC1203513284 393598001 MSD											
Aluminum	2000		61.6		2000	ug/L	1.66	97.1	(0%-20%)		03/29/16 18:18
Antimony	50.0	U	1.00		49.7	ug/L	1.57	98.9	(0%-20%)		03/30/16 00:09
Arsenic	50.0	B	4.21		54.2	ug/L	3.67	100	(0%-20%)		03/29/16 18:18
Barium	50.0		38.8		87.4	ug/L	2.64	97.1	(0%-20%)		
Beryllium	50.0	NU	0.200	N	64.7	ug/L	4.29	129*	(0%-20%)	SKJ	03/31/16 12:47
Cadmium	50.0	B	0.206		47.4	ug/L	2.71	94.4	(0%-20%)	PRB	03/29/16 18:18
Chromium	50.0	N	131	N	222	ug/L	10.6	181*	(0%-20%)		03/30/16 20:14
Cobalt	50.0	B	0.919		48.0	ug/L	0.311	94.2	(0%-20%)		03/29/16 18:18
Copper	50.0		3.85		52.5	ug/L	2.27	97.3	(0%-20%)		03/30/16 00:09
Lead	50.0	B	0.897		46.6	ug/L	0.295	91.4	(0%-20%)		03/29/16 18:18
Manganese	50.0		11.7		62.5	ug/L	4.65	102	(0%-20%)		
Molybdenum	50.0		11.9		65.6	ug/L	2.11	107	(0%-20%)		
Nickel	50.0	N	40.9	N	111	ug/L	15.4	140*	(0%-20%)		
Selenium	50.0	B	3.06		52.2	ug/L	0.318	98.4	(0%-20%)		
Silver	50.0	B	0.354		47.4	ug/L	9.07	94.1	(0%-20%)		
Strontium	50.0		168		220	ug/L	2.09	105	(0%-20%)		
Thallium	50.0	U	0.450		45.1	ug/L	0.469	90.1	(0%-20%)		
Thorium	50.0	U	0.383		48.2	ug/L	0.833	96	(0%-20%)		03/30/16 00:09
Tin	50.0	U	1.00		50.6	ug/L	0.766	100	(0%-20%)		
Uranium	50.0		1.84		49.1	ug/L	0.868	94.5	(0%-20%)		

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QC Summary

Workorder: 393598

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS											
Batch 1554132											
Zinc	50.0	B	8.96		55.3	ug/L	8.43	92.6	(0%-20%)	PRB	03/29/16 18:18
QC1203517642 393598001 PS											
Beryllium	50.0	NU	0.002		57.9	ug/L		116	(80%-120%)	SKJ	03/31/16 13:01
Chromium	50.0	N	131		196	ug/L		129*	(80%-120%)	PRB	03/30/16 20:15
Nickel	50.0	N	40.9		86.2	ug/L		90.6	(80%-120%)		03/29/16 18:21
QC1203513285 393598001 SDILT											
Aluminum			61.6	DU	75.0	ug/L	N/A		(0%-10%)		03/29/16 18:24
Antimony		U	0.249	DU	5.00	ug/L	N/A		(0%-10%)		03/30/16 00:15
Arsenic		B	4.21	DU	8.50	ug/L	N/A		(0%-10%)		03/29/16 18:24
Barium			38.8	D	7.57	ug/L	2.55		(0%-10%)		
Beryllium		NU	0.002	DU	1.00	ug/L	N/A		(0%-10%)	SKJ	03/31/16 12:48
Cadmium		B	0.206	DU	0.550	ug/L	N/A		(0%-10%)	PRB	03/29/16 18:24
Chromium		N	131	D	26.7	ug/L	1.69		(0%-10%)		03/30/16 20:17
Cobalt		B	0.919	D	0.178	ug/L	3.16		(0%-10%)		03/29/16 18:24
Copper			3.85	D	0.814	ug/L	5.6		(0%-10%)		03/30/16 00:15
Lead		B	0.897	DU	2.50	ug/L	N/A		(0%-10%)		03/29/16 18:24
Manganese			11.7	D	2.39	ug/L	1.56		(0%-10%)		
Molybdenum			11.9	D	2.24	ug/L	5.98		(0%-10%)		
Nickel		N	40.9	D	8.34	ug/L	1.95		(0%-10%)		
Selenium		B	3.06	DU	7.50	ug/L	N/A		(0%-10%)		
Silver		B	0.354	DU	1.00	ug/L	N/A		(0%-10%)		
Strontium			168	D	31.0	ug/L	7.45		(0%-10%)		
Thallium		U	0.063	D	0.521	ug/L	N/A		(0%-10%)		

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QC Summary

Workorder: 393598

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS										
Batch 1554132										
Thorium	U	0.172	DU	1.92	ug/L	N/A		(0%-10%)	PRB	03/30/16 00:15
Tin	U	0.377	DU	5.00	ug/L	N/A		(0%-10%)		
Uranium		1.84	D	0.376	ug/L	2.45		(0%-10%)		
Zinc	B	8.96	D	6.07	ug/L	238		(0%-10%)		03/29/16 18:24

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.

Radiological Analysis

Case Narrative

Radiochemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL393598
Work Order #: 393598

Product: **TRITIUM_DIST_LSC: COMMON**
Analytical Method: TRITIUM_DIST_LSC
Analytical Procedure: GL-RAD-A-002 REV# 21
Analytical Batch: 1555221

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

GEL Sample ID#	Client Sample Identification
393598001	B34C76
1203516066	Method Blank (MB)
1203516067	393104001(NonSDG) Sample Duplicate (DUP)
1203516068	393104001(NonSDG) Matrix Spike (MS)
1203516069	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 393598001 (B34C76) was recounted to verify sample results. The recount results are similar to the original results. Original results are reported.

Miscellaneous Information

1. Sample 1203516066 does not meet the required detection limit. The sample was counted the maximum count time of 120 minutes to achieve the best possible results. 1. Reporting results.

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: GEL393598 GEL Work Order: 393598

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: 05 APR 2016 **Title: Group Leader**

Sample Data Summary

Rad
Certificate of Analysis
Sample Summary

SDG Number:	**GEL393598**	**Client:**	**CPRC001**	**Project:**	**CPRC0I16016**
Lab Sample ID:	**393598001**	**Date Collected:**	**03/17/2016 15:31**	**Matrix:**	**WATER**
		Date Received:	**03/22/2016 09:15**		
Client ID:	**B34C76**			**Prep Basis:**	**"As Received"**
Batch ID:	**1555221**	**Method:**	**TRITIUM_DIST_LSC**	**SOP Ref:**	**GL-RAD-A-002**
Run Date:	**03/31/2016 15:35**	**Analyst:**	**TXJ1**	**Instrument:**	**LSCPINK**
Data File:	**T1555221.xls**	**Aliquot:**	**50 mL**	**Count Time:**	**120.0297 min**
Prep Batch:	**1555221**	**Prep Method:**	**EPA 906.0 Modified**		
Prep Date:	**03/30/2016 00:00**				

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		8380	pCi/L	+/-289	1650	106	100

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits

Comments:

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

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

Workorder: 393598

Report Date: April 5, 2016

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Liquid Scintillation									
Batch 1555221									
QC1203516066 MB									
Tritium			U	-34.2	pCi/L			TXJ1	04/01/1614:01
	Uncert:			+/-56.5					
	TPU:			+/-56.5					
QC1203516067 393104001 DUP									
Tritium		4640		3800	pCi/L				04/01/1616:03
	Uncert:	+/-224		+/-201		RPD: 20	(0% - 20%)		
	TPU:	+/-924		+/-761		RER: 1.38	(0-2)		
QC1203516068 393104001 MS									
Tritium	2370	4640		6770	pCi/L	REC: 90	(75%-125%)		04/01/1618:06
	Uncert:	+/-224		+/-743					
	TPU:	+/-924		+/-1500					
QC1203516069 LCS									
Tritium	2360			2430	pCi/L	REC: 103	(80%-120%)		04/01/1618:23
	Uncert:			+/-454					
	TPU:			+/-653					

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
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 >= 2X the MDA and, after corrections, result is >= MDA for this sample
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

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

QC Summary

Workorder: **393598**

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	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.
** Indicates analyte is a surrogate compound.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptence 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.