

8/11/2016



August 10, 2016

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

Re: CHPRC SAF X16-033
Work Order: 401667
SDG: GEL401667

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on July 15, 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: 303064 - 7H
Chain of Custody: X16-033-152 and X16-033-155
Enclosures



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Case Narrative

**General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF X16-033
SDG: GEL401667**

August 10, 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 July 15, 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:

<u>Laboratory Identification</u>	<u>Sample Description</u>
401667001	B35H21
401667002	B35H22
401667003	B35H25
401667004	B35H26

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: Diesel Range Organics, 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.


Brielle Luthman for
Heather Shaffer
Project Manager

Technical Case Narrative
CH2M Hill Plateau Remediation Company (CPRC)
SDG #: GEL401667
Work Order #: 401667

Diesel Range Organics

Analysis of Diesel Range Organics by Flame Ionization Detector

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 and/or MSD (See Below) did not meet spike recovery acceptance limits. The failures were attributed to sample matrix interference as the MS and MSD displayed similar spike recovery.

Sample	Analyte	Value
1203586357 (B35H22MS)	Diesel Range Organics	68* (70%-130%)
1203586358 (B35H22MSD)	Diesel Range Organics	69* (70%-130%)

Miscellaneous Information

Manual Integrations

Samples 1203586356 (LCS), 1203586357 (B35H22MS) and 1203586358 (B35H22MSD) required manual integration to correctly position the baseline as set in the calibration standard injections.

Metals

Determination of Metals by ICP

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

CRDL/PQL Requirements

The PQL standard recoveries for SW846 6010C or 6010D met the control limits with the exception of sodium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 401667001 (B35H21), 401667002 (B35H22), 401667003 (B35H25) and 401667004 (B35H26).

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 arsenic. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data. 1203586147 (MB).

Radiochemistry**9310_ALPHABETA_GPC: 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**Gross Alpha/Beta Preparation Information**

High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating.

Recounts

Sample 1203586590 (LCS) was recounted due to high recovery. The recount is reported.

Miscellaneous Information**Additional Comments**

The matrix spike and matrix spike duplicate, 1203586588 (Non SDG 400886001MS) and 1203586589 (Non SDG 400886001MSD), aliquots were reduced to conserve sample volume.

SRISO_SEP_PRECIP_GPC: 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

Samples 401667002 (B35H22) and 401667004 (B35H26) were verified by recounting at least five days from the separation date. The recounts 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

CH2M Hill Plateau Remediation Company
CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST
 C.O.C.# **X16-033-152**
 Page 1 of 1

Collector J.R. Aguilera/CHPRC
Contact/Requester Karen Waters-Husted
Telephone No. 509-376-4650
SAF No. X16-033
Sampling Origin Hanford Site
Purchase Order/Charge Code 303064
Project Title AQUIFER TUBES, JUNE 2016
Logbook No. HNF-N-506 79/30
Ice Chest No. 6005-325
Shipped To (Lab) GEL Laboratories, LLC
Method of Shipment Commercial Carrier
Bill of Lading/Air Bill No. 177674931 5299
Offsite Property No. 6829

Protocol CERCLA
Priority: 30 Days
SPECIAL INSTRUCTIONS N/A
Hold Time
Total Activity Exemption: Yes No

Sample No.	Filter	* Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B35H21	Y	W JUL 14 2016	0903	1x500-mL G/P	6020_METALS_ICPMS: GW 01; 6010_METALS_ICP: GW 04	6 Months	HNO3 to pH <2
B35H22	N	W	↓	1x500-mL G/P	6020_METALS_ICPMS: GW 01; 6010_METALS_ICP: GW 04	6 Months	HNO3 to pH <2
B35H22	N	W	↓	2x1-L P	9310_ALPHABETA_GPC: COMMON	6 Months	HNO3 to pH <2
B35H22	N	W	↓	3x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2
B35H22	N	W JUL 14 2016	0903	3x1-L aG	WTPH_DIESEL: COMMON	14/40 Days	HCl to pH <2/Cool <=6C

Relinquished By	Print	Sign	Date/Time	Date/Time	Received By	Print	Sign	Date/Time	Date/Time	Matrix *
J.R. Aguilera/CHPRC			JUL 14 2016	1155	Lesly Wall/CHPRC			JUL 14 2016	1155	S = Soil, SE = Sediment, SO = Solid, SL = Sludge, W = Water, O = Oil, A = Air, DS = Drum Solids, DL = Drum Liquids, T = Tissue, WI = Wipe, L = Liquid, V = Vegetation, X = Other
Lesly Wall/CHPRC			JUL 14 2016	1400	FEDEX					
			JUL 14 2016	50	J. K. Fawcett			7-15-16 0910		

FINAL SAMPLE DISPOSITION
 Disposal Method (e.g., Return to customer, per lab procedure, used in process)
 Disposed By
 Date/Time
 PRINTED ON 4/28/2016
 FSR ID = FSR32078
 A-6004-842 (REV 2)

93165
401667

CH2M Hill Plateau Remediation Company
CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST
 C.O.C.# **X16-033-155**
 Page 1 of 1

Collector JR. Aguilera/CHPRC
Contact/Requester Karen Waters-Husted
Telephone No. 509-376-4650
SAF No. X16-033
Sampling Origin Hanford Site
Purchase Order/Charge Code 303064
Project Title AQUIFER TUBES, JUNE 2016
Logbook No. HNF-N-506 79 / 30
Ice Chest No. 6025-325
Shipped To (Lab) GEL Laboratories, LLC
Method of Shipment Commercial Carrier
Bill of Lading/Air Bill No. 77674931 5299
Protocol CERCLA
Priority: 30 Days
Offsite Property No. 6829

Special Instructions Hold Time
SPECIAL INSTRUCTIONS N/A
Hold Time
 Total Activity Exemption: Yes No

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

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B35H25	Y	W	JUL 14 2016	0938	1x500-mL G/P	6020_METALS_ICPMS: GW 01; 6010_METALS_ICP: GW 04	6 Months	HNO3 to pH <2
B35H26	N	W	↓	↓	1x500-mL G/P	6020_METALS_ICPMS: GW 01; 6010_METALS_ICP: GW 04	6 Months	HNO3 to pH <2
B35H26	N	W	↓	↓	2x1-L P	9310_ALPHABETA_GPC: COMMON	6 Months	HNO3 to pH <2
B35H26	N	W	↓	↓	3x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2
B35H26	N	W	JUL 14 2016	0938	3x1-L aG	WTPH_DIESEL: COMMON	14/40 Days	HCl to pH <2/Cool <=6C

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix *
JR. Aguilera/CHPRC			JUL 14 2016 1155	Leahy Wall/ACHPRC			JUL 14 2016 1155	S = Soil, SE = Sediment, SO = Solid, SL = Sludge, W = Water, O = Oil, A = Air, DS = Drum Solids, DL = Drum Liquids, T = Tissue, WI = Wipe, L = Liquid, V = Vegetation, X = Other
JR. Aguilera/CHPRC			JUL 14 2016 1400	FEDEX				
JR. Aguilera/CHPRC			JUL 14 2016	M. Gaspar			7-15-16 0920	

FINAL SAMPLE DISPOSITION
 Disposal Method (e.g., Return to customer, per lab procedure, used in process)
 Disposed By
 Date/Time
 FSR ID = FSR32080
 PRINTED ON 4/28/2016

SAMPLE RECEIPT & REVIEW FORM

Client: <u>OPRE</u>		SDG/AR/COC/Work Order: <u>4011067</u>	
Received By: <u>MF</u>		Date Received: <u>7-15-16</u>	
Suspected Hazard Information		Yes	No
COC/Samples marked as radioactive?			*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
Classified Radioactive II or III by RSO?			Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>CPM</u>
COC/Samples marked containing PCBs?			If yes, Were swipes taken of sample containers < action levels?
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
2a	Daily check performed and passed on IR temperature gun?	/			Temperature Device Serial #: <u>130462861</u> 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 <u>7767 8931 5299 2c</u> <u>7767 4415 3330 2c</u> <u>7767 4415 3318 2c</u>

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials DS Date 7/15/16 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 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 10 August 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

FID Diesel Range Organics Analysis

Case Narrative

**Diesel Range Organics
 Technical Case Narrative
 CH2MHill Plateau Remediation Company (CPRC)
 SDG #: GEL401667
 Work Order #: 401667**

Product: Analysis of Diesel Range Organics by Flame Ionization Detector
Analytical Method: NWTPH-Dx
Analytical Procedure: GL-OA-E-003 REV# 26
Analytical Batch: 1582342

Preparation Method: SW846 3535A
Preparation Procedure: GL-OA-E-013 REV# 29
Preparation Batch: 1582341

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
401667002	B35H22
401667004	B35H26
1203586355	Method Blank (MB)
1203586356	Laboratory Control Sample (LCS)
1203586357	401667002(B35H22) Matrix Spike (MS)
1203586358	401667002(B35H22) 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

Matrix Spike (MS/MSD) Recovery Statement

The MS and/or MSD (See Below) did not meet spike recovery acceptance limits. The failures were attributed to sample matrix interference as the MS and MSD displayed similar spike recovery.

Sample	Analyte	Value
1203586357 (B35H22MS)	Diesel Range Organics	68* (70%-130%)
1203586358 (B35H22MSD)	Diesel Range Organics	69* (70%-130%)

Miscellaneous Information

Manual Integrations

Samples 1203586356 (LCS), 1203586357 (B35H22MS) and 1203586358 (B35H22MSD) required manual integration to correctly position the baseline as set in the calibration standard injections.

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: GEL401667 GEL Work Order: 401667

The Qualifiers in this report are defined as follows:

T Spike and/or spike duplicate 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.

DL Indicates that sample is diluted.

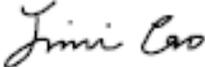
RA Indicates that sample is re-analyzed without re-extraction.

RE Indicates that sample is re-extracted.

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: Jimin Cao

Date: 10 AUG 2016

Title: Data Validator

Sample Data Summary

**FID Diesel Range Organics
Certificate of Analysis
Sample Summary**

Page 1 of 1

SDG Number: GEL401667	Date Collected: 07/14/2016 09:03	Matrix: WATER
Lab Sample ID: 401667002	Date Received: 07/15/2016 09:10	
Client ID: B35H22	Client: CPRC001	Project: CPRC0X16033
Batch ID: 1582342	Method: NWTPH-Dx	SOP Ref: GL-OA-E-003
Run Date: 07/23/2016 20:11	Inst: FID7.I	Dilution: 1
Prep Date: 07/18/2016 09:55	Analyst: LXA1	Inj. Vol: 1 uL
Data File: 072216DRO-MO\7g2251.D	Aliquot: 1050 mL	Final Volume: 1 mL
	Column: DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
68334-30-5	Diesel Range Organics	TU	47.6	ug/L	47.6	190

**FID Diesel Range Organics
Certificate of Analysis
Sample Summary**

Page 1 of 1

SDG Number: GEL401667	Date Collected: 07/14/2016 09:38	Matrix: WATER
Lab Sample ID: 401667004	Date Received: 07/15/2016 09:10	
	Client: CPRC001	Project: CPRC0X16033
Client ID: B35H26	Method: NWTPH-Dx	SOP Ref: GL-OA-E-003
Batch ID: 1582342	Inst: FID7.I	Dilution: 1
Run Date: 07/23/2016 22:08	Analyst: LXA1	Inj. Vol: 1 uL
Prep Date: 07/18/2016 09:55	Aliquot: 1010 mL	Final Volume: 1 mL
Data File: 072216DRO-MO\7g2254.D	Column: DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
68334-30-5	Diesel Range Organics	TU	49.5	ug/L	49.5	198

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 25, 2016

CH2M Hill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 401667

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Diesel Range Organics											
Batch	1582342										
QC1203586356	LCS										
Diesel Range Organics	2000			1670	ug/L		83	(70%-130%)	LXA1	07/23/16	19:33
**o-Terphenyl	20.0			18.6	ug/L		93	(60%-140%)			
QC1203586355	MB										
Diesel Range Organics			U	50.0	ug/L					07/23/16	18:54
**o-Terphenyl	20.0			15.8	ug/L		79	(60%-140%)			
QC1203586357	401667002	MS									
Diesel Range Organics	1900	TU	47.6	T	1300	ug/L	68*	(70%-130%)		07/23/16	20:50
**o-Terphenyl	19.0		12.6		13.1	ug/L	69	(60%-140%)			
QC1203586358	401667002	MSD									
Diesel Range Organics	1900	TU	47.6	T	1310	ug/L	1	69*	(0%-20%)	07/23/16	21:29
**o-Terphenyl	19.0		12.6		13.5	ug/L	71	(60%-140%)			

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- 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
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate 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: 401667

Page 2 of 2

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
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- o Analyte failed to recover within LCS limits (Organics only)

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.

FID Diesel Range Organics
Surrogate Recovery Report

SDG Number: GEL401667

Matrix Type: LIQUID

Sample ID	Client ID	OTP %REC
1203586355	MB for batch 1582341	79
1203586356	LCS for batch 1582341	93
401667002	B35H22	66
1203586357	B35H22MS	69
1203586358	B35H22MSD	71
401667004	B35H26	74

Surrogate

OTP = o-Terphenyl

Acceptance Limits

(60%-140%)

* Recovery outside Acceptance Limits

Column to be used to flag recovery values

D Sample Diluted

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL401667
Work Order #: 401667

Product: Determination of Metals by ICP-MS**Analytical Method:** 6020_METALS_ICPMS**Analytical Procedure:** GL-MA-E-014 REV# 28**Analytical Batch:** 1582235**Product: Determination of Metals by ICP****Analytical Method:** 6010_METALS_ICP**Analytical Procedure:** GL-MA-E-013 REV# 26**Analytical Batch:** 1582262**Preparation Method:** SW846 3005A**Preparation Procedure:** GL-MA-E-006 REV# 13**Preparation Batches:** 1582234 and 1582261

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
401667001	B35H21
401667002	B35H22
401667003	B35H25
401667004	B35H26
1203586202	Method Blank (MB) ICP
1203586203	Laboratory Control Sample (LCS)
1203586206	401646001(NonSDGL) Serial Dilution (SD)
1203586204	401646001(NonSDGS) Matrix Spike (MS)
1203586205	401646001(NonSDGSD) Matrix Spike Duplicate (MSD)
1203586147	Method Blank (MB) ICP-MS
1203586148	Laboratory Control Sample (LCS)
1203586151	401646001(NonSDGL) Serial Dilution (SD)
1203586149	401646001(NonSDGS) Matrix Spike (MS)
1203586150	401646001(NonSDGSD) 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**CRDL/PQL Requirements**

The PQL standard recoveries for SW846 6010C or 6010D met the control limits with the exception of sodium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 401667001 (B35H21), 401667002 (B35H22), 401667003 (B35H25) and 401667004

(B35H26)-ICP.

Quality Control (QC) Information

Method Blank (MB) Statement

The method blanks (MB) analyzed with this SDG met the exception criteria with the exception of arsenic. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data. 1203586147 (MB)-ICP-MS.

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: GEL401667 GEL Work Order: 401667

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: 10 AUG 2016

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL401667

CONTRACT: CPRC0X16033

METHOD TYPE: SW846

SAMPLE ID: 401667001

BASIS: As Received

DATE COLLECTED 14-JUL-16

CLIENT ID: B35H21

LEVEL: Low

DATE RECEIVED 15-JUL-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	SKJ	08/03/16 18:17	160803-7	1582235
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	PRB	08/05/16 16:48	160805-3	1582235
7440-38-2	Arsenic	1.79	ug/L	CB	1.7	5	5	1	MS	PRB	08/05/16 20:22	160805-6	1582235
7440-39-3	Barium	29.6	ug/L		0.6	2	2	1	MS	SKJ	08/03/16 18:17	160803-7	1582235
7440-41-7	Beryllium	0.20	ug/L	U	0.2	0.5	0.5	1	MS	SKJ	08/03/16 18:17	160803-7	1582235
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	07/21/16 12:09	072116-2	1582262
7440-43-9	Cadmium	0.110	ug/L	U	0.11	1	1	1	MS	SKJ	08/03/16 18:17	160803-7	1582235
7440-70-2	Calcium	22400	ug/L		50	200	200	1	P	HSC	07/19/16 16:12	071916-1	1582262
7440-47-3	Chromium	2	ug/L	U	2	10	10	1	MS	SKJ	08/03/16 18:17	160803-7	1582235
7440-48-4	Cobalt	0.155	ug/L	B	0.1	1	1	1	MS	SKJ	08/04/16 19:42	160804-8	1582235
7440-50-8	Copper	0.757	ug/L	B	0.35	1	1	1	MS	SKJ	08/04/16 19:42	160804-8	1582235
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	07/19/16 16:12	071916-1	1582262
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	SKJ	08/03/16 18:17	160803-7	1582235
7439-95-4	Magnesium	4920	ug/L		110	300	300	1	P	HSC	07/19/16 16:12	071916-1	1582262
7439-96-5	Manganese	1	ug/L	U	1	5	5	1	MS	SKJ	08/04/16 19:42	160804-8	1582235
7439-98-7	Molybdenum	0.554	ug/L		0.165	0.5	0.5	1	MS	SKJ	08/03/16 18:17	160803-7	1582235
7440-02-0	Nickel	0.564	ug/L	B	0.5	2	2	1	MS	SKJ	08/04/16 19:42	160804-8	1582235
7440-09-7	Potassium	1210	ug/L		50	150	150	1	P	HSC	07/19/16 16:12	071916-1	1582262
7782-49-2	Selenium	1.5	ug/L	U	1.5	5	5	1	MS	PRB	08/05/16 20:22	160805-6	1582235
7440-22-4	Silver	0.20	ug/L	U	0.2	1	1	1	MS	SKJ	08/03/16 18:17	160803-7	1582235
7440-23-5	Sodium	2920	ug/L		100	300	300	1	P	HSC	07/19/16 16:12	071916-1	1582262
7440-24-6	Strontium	111	ug/L		2	10	10	1	MS	PRB	08/05/16 20:22	160805-6	1582235
7440-28-0	Thallium	0.450	ug/L	U	0.45	2	2	1	MS	SKJ	08/03/16 18:17	160803-7	1582235
7440-29-1	Thorium	0.383	ug/L	U	0.383	2	2	1	MS	SKJ	08/03/16 18:17	160803-7	1582235
7440-31-5	Tin	1	ug/L	U	1	5	5	1	MS	SKJ	08/03/16 18:17	160803-7	1582235
7440-61-1	Uranium	0.189	ug/L	B	0.067	0.2	0.2	1	MS	SKJ	08/04/16 19:42	160804-8	1582235
7440-62-2	Vanadium	1.16	ug/L	B	1	5	5	1	P	HSC	07/19/16 16:12	071916-1	1582262
7440-66-6	Zinc	4.37	ug/L	B	3.5	10	10	1	MS	SKJ	08/04/16 19:42	160804-8	1582235

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1582235	1582234	SW846 3005A	50	mL	50	mL	07/18/16	SXW1
1582262	1582261	SW846 3005A	50	mL	50	mL	07/18/16	SXW1

***Analytical Methods:**

METALS

-1-

INORGANICS ANALYSIS DATA PACKAGE

P SW846 3005A/6010C
MS SW846 3005A/6020A

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL401667

CONTRACT: CPRC0X16033

METHOD TYPE: SW846

SAMPLE ID: 401667002

BASIS: As Received

DATE COLLECTED 14-JUL-16

CLIENT ID: B35H22

LEVEL: Low

DATE RECEIVED 15-JUL-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	1710	ug/L		15	50	50	1	MS	SKJ	08/03/16 18:21	160803-7	1582235
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	PRB	08/05/16 16:50	160805-3	1582235
7440-38-2	Arsenic	2.22	ug/L	CB	1.7	5	5	1	MS	PRB	08/05/16 20:24	160805-6	1582235
7440-39-3	Barium	51.3	ug/L		0.6	2	2	1	MS	SKJ	08/03/16 18:21	160803-7	1582235
7440-41-7	Beryllium	0.20	ug/L	U	0.2	0.5	0.5	1	MS	SKJ	08/03/16 18:21	160803-7	1582235
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	07/21/16 12:13	072116-2	1582262
7440-43-9	Cadmium	0.110	ug/L	U	0.11	1	1	1	MS	SKJ	08/03/16 18:21	160803-7	1582235
7440-70-2	Calcium	23100	ug/L		50	200	200	1	P	HSC	07/19/16 16:15	071916-1	1582262
7440-47-3	Chromium	2	ug/L	U	2	10	10	1	MS	SKJ	08/03/16 18:21	160803-7	1582235
7440-48-4	Cobalt	1.57	ug/L		0.1	1	1	1	MS	SKJ	08/04/16 19:46	160804-8	1582235
7440-50-8	Copper	3.98	ug/L		0.35	1	1	1	MS	SKJ	08/04/16 19:46	160804-8	1582235
7439-89-6	Iron	1740	ug/L		30	100	100	1	P	HSC	07/19/16 16:15	071916-1	1582262
7439-92-1	Lead	1.81	ug/L	B	0.5	2	2	1	MS	SKJ	08/03/16 18:21	160803-7	1582235
7439-95-4	Magnesium	5290	ug/L		110	300	300	1	P	HSC	07/19/16 16:15	071916-1	1582262
7439-96-5	Manganese	122	ug/L		1	5	5	1	MS	SKJ	08/04/16 19:46	160804-8	1582235
7439-98-7	Molybdenum	0.728	ug/L		0.165	0.5	0.5	1	MS	SKJ	08/03/16 18:21	160803-7	1582235
7440-02-0	Nickel	3.23	ug/L		0.5	2	2	1	MS	SKJ	08/04/16 19:46	160804-8	1582235
7440-09-7	Potassium	1450	ug/L		50	150	150	1	P	HSC	07/19/16 16:15	071916-1	1582262
7782-49-2	Selenium	1.5	ug/L	U	1.5	5	5	1	MS	PRB	08/05/16 20:24	160805-6	1582235
7440-22-4	Silver	0.20	ug/L	U	0.2	1	1	1	MS	SKJ	08/03/16 18:21	160803-7	1582235
7440-23-5	Sodium	3100	ug/L		100	300	300	1	P	HSC	07/19/16 16:15	071916-1	1582262
7440-24-6	Strontium	118	ug/L		2	10	10	1	MS	PRB	08/05/16 20:24	160805-6	1582235
7440-28-0	Thallium	0.450	ug/L	U	0.45	2	2	1	MS	SKJ	08/03/16 18:21	160803-7	1582235
7440-29-1	Thorium	0.383	ug/L	U	0.383	2	2	1	MS	SKJ	08/03/16 18:21	160803-7	1582235
7440-31-5	Tin	1	ug/L	U	1	5	5	1	MS	SKJ	08/03/16 18:21	160803-7	1582235
7440-61-1	Uranium	0.288	ug/L		0.067	0.2	0.2	1	MS	SKJ	08/04/16 19:46	160804-8	1582235
7440-62-2	Vanadium	4.21	ug/L	B	1	5	5	1	P	HSC	07/19/16 16:15	071916-1	1582262
7440-66-6	Zinc	15.8	ug/L		3.5	10	10	1	MS	SKJ	08/04/16 19:46	160804-8	1582235

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1582235	1582234	SW846 3005A	50	mL	50	mL	07/18/16	SXW1
1582262	1582261	SW846 3005A	50	mL	50	mL	07/18/16	SXW1

***Analytical Methods:**

METALS

-1-

INORGANICS ANALYSIS DATA PACKAGE

P SW846 3005A/6010C
MS SW846 3005A/6020A

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL401667

CONTRACT: CPRC0X16033

METHOD TYPE: SW846

SAMPLE ID: 401667003

BASIS: As Received

DATE COLLECTED 14-JUL-16

CLIENT ID: B35H25

LEVEL: Low

DATE RECEIVED 15-JUL-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	SKJ	08/03/16 18:25	160803-7	1582235
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	PRB	08/05/16 16:52	160805-3	1582235
7440-38-2	Arsenic	2.24	ug/L	CB	1.7	5	5	1	MS	PRB	08/05/16 20:26	160805-6	1582235
7440-39-3	Barium	22	ug/L		0.6	2	2	1	MS	SKJ	08/03/16 18:25	160803-7	1582235
7440-41-7	Beryllium	0.20	ug/L	U	0.2	0.5	0.5	1	MS	SKJ	08/03/16 18:25	160803-7	1582235
7440-42-8	Boron	15.4	ug/L	B	15	50	50	1	P	HSC	07/21/16 12:16	072116-2	1582262
7440-43-9	Cadmium	0.110	ug/L	U	0.11	1	1	1	MS	SKJ	08/03/16 18:25	160803-7	1582235
7440-70-2	Calcium	41600	ug/L		50	200	200	1	P	HSC	07/19/16 16:18	071916-1	1582262
7440-47-3	Chromium	2	ug/L	U	2	10	10	1	MS	SKJ	08/03/16 18:25	160803-7	1582235
7440-48-4	Cobalt	0.190	ug/L	B	0.1	1	1	1	MS	SKJ	08/04/16 19:50	160804-8	1582235
7440-50-8	Copper	0.688	ug/L	B	0.35	1	1	1	MS	SKJ	08/04/16 19:50	160804-8	1582235
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	07/19/16 16:18	071916-1	1582262
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	SKJ	08/03/16 18:25	160803-7	1582235
7439-95-4	Magnesium	7780	ug/L		110	300	300	1	P	HSC	07/19/16 16:18	071916-1	1582262
7439-96-5	Manganese	1	ug/L	U	1	5	5	1	MS	SKJ	08/04/16 19:50	160804-8	1582235
7439-98-7	Molybdenum	0.292	ug/L	B	0.165	0.5	0.5	1	MS	SKJ	08/03/16 18:25	160803-7	1582235
7440-02-0	Nickel	0.773	ug/L	B	0.5	2	2	1	MS	SKJ	08/04/16 19:50	160804-8	1582235
7440-09-7	Potassium	1760	ug/L		50	150	150	1	P	HSC	07/19/16 16:18	071916-1	1582262
7782-49-2	Selenium	1.73	ug/L	B	1.5	5	5	1	MS	PRB	08/05/16 20:26	160805-6	1582235
7440-22-4	Silver	0.20	ug/L	U	0.2	1	1	1	MS	SKJ	08/03/16 18:25	160803-7	1582235
7440-23-5	Sodium	3720	ug/L		100	300	300	1	P	HSC	07/19/16 16:18	071916-1	1582262
7440-24-6	Strontium	212	ug/L		2	10	10	1	MS	PRB	08/05/16 20:26	160805-6	1582235
7440-28-0	Thallium	0.450	ug/L	U	0.45	2	2	1	MS	SKJ	08/03/16 18:25	160803-7	1582235
7440-29-1	Thorium	0.383	ug/L	U	0.383	2	2	1	MS	SKJ	08/03/16 18:25	160803-7	1582235
7440-31-5	Tin	1	ug/L	U	1	5	5	1	MS	SKJ	08/03/16 18:25	160803-7	1582235
7440-61-1	Uranium	0.510	ug/L		0.067	0.2	0.2	1	MS	SKJ	08/04/16 19:50	160804-8	1582235
7440-62-2	Vanadium	2.09	ug/L	B	1	5	5	1	P	HSC	07/19/16 16:18	071916-1	1582262
7440-66-6	Zinc	4.34	ug/L	B	3.5	10	10	1	MS	SKJ	08/04/16 19:50	160804-8	1582235

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1582235	1582234	SW846 3005A	50	mL	50	mL	07/18/16	SXW1
1582262	1582261	SW846 3005A	50	mL	50	mL	07/18/16	SXW1

***Analytical Methods:**

METALS

-1-

INORGANICS ANALYSIS DATA PACKAGE

P SW846 3005A/6010C
MS SW846 3005A/6020A

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL401667

CONTRACT: CPRC0X16033

METHOD TYPE: SW846

SAMPLE ID: 401667004

BASIS: As Received

DATE COLLECTED 14-JUL-16

CLIENT ID: B35H26

LEVEL: Low

DATE RECEIVED 15-JUL-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	256	ug/L		15	50	50	1	MS	SKJ	08/03/16 18:28	160803-7	1582235
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	PRB	08/05/16 16:53	160805-3	1582235
7440-38-2	Arsenic	2.39	ug/L	CB	1.7	5	5	1	MS	PRB	08/05/16 20:28	160805-6	1582235
7440-39-3	Barium	24.6	ug/L		0.6	2	2	1	MS	SKJ	08/03/16 18:28	160803-7	1582235
7440-41-7	Beryllium	0.20	ug/L	U	0.2	0.5	0.5	1	MS	SKJ	08/03/16 18:28	160803-7	1582235
7440-42-8	Boron	15.2	ug/L	B	15	50	50	1	P	HSC	07/21/16 12:19	072116-2	1582262
7440-43-9	Cadmium	0.110	ug/L	U	0.11	1	1	1	MS	SKJ	08/03/16 18:28	160803-7	1582235
7440-70-2	Calcium	42500	ug/L		50	200	200	1	P	HSC	07/19/16 16:21	071916-1	1582262
7440-47-3	Chromium	2	ug/L	U	2	10	10	1	MS	SKJ	08/03/16 18:28	160803-7	1582235
7440-48-4	Cobalt	0.388	ug/L	B	0.1	1	1	1	MS	SKJ	08/04/16 19:54	160804-8	1582235
7440-50-8	Copper	1.89	ug/L		0.35	1	1	1	MS	SKJ	08/04/16 19:54	160804-8	1582235
7439-89-6	Iron	332	ug/L		30	100	100	1	P	HSC	07/19/16 16:21	071916-1	1582262
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	SKJ	08/03/16 18:28	160803-7	1582235
7439-95-4	Magnesium	7920	ug/L		110	300	300	1	P	HSC	07/19/16 16:21	071916-1	1582262
7439-96-5	Manganese	25.9	ug/L		1	5	5	1	MS	SKJ	08/04/16 19:54	160804-8	1582235
7439-98-7	Molybdenum	0.356	ug/L	B	0.165	0.5	0.5	1	MS	SKJ	08/03/16 18:28	160803-7	1582235
7440-02-0	Nickel	1.55	ug/L	B	0.5	2	2	1	MS	SKJ	08/04/16 19:54	160804-8	1582235
7440-09-7	Potassium	1820	ug/L		50	150	150	1	P	HSC	07/19/16 16:21	071916-1	1582262
7782-49-2	Selenium	2.01	ug/L	B	1.5	5	5	1	MS	PRB	08/05/16 20:28	160805-6	1582235
7440-22-4	Silver	0.20	ug/L	U	0.2	1	1	1	MS	SKJ	08/03/16 18:28	160803-7	1582235
7440-23-5	Sodium	3680	ug/L		100	300	300	1	P	HSC	07/19/16 16:21	071916-1	1582262
7440-24-6	Strontium	214	ug/L		2	10	10	1	MS	PRB	08/05/16 20:28	160805-6	1582235
7440-28-0	Thallium	0.450	ug/L	U	0.45	2	2	1	MS	SKJ	08/03/16 18:28	160803-7	1582235
7440-29-1	Thorium	0.383	ug/L	U	0.383	2	2	1	MS	SKJ	08/03/16 18:28	160803-7	1582235
7440-31-5	Tin	1	ug/L	U	1	5	5	1	MS	SKJ	08/03/16 18:28	160803-7	1582235
7440-61-1	Uranium	0.498	ug/L		0.067	0.2	0.2	1	MS	SKJ	08/04/16 19:54	160804-8	1582235
7440-62-2	Vanadium	2.52	ug/L	B	1	5	5	1	P	HSC	07/19/16 16:21	071916-1	1582262
7440-66-6	Zinc	11.9	ug/L		3.5	10	10	1	MS	SKJ	08/04/16 19:54	160804-8	1582235

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1582235	1582234	SW846 3005A	50	mL	50	mL	07/18/16	SXW1
1582262	1582261	SW846 3005A	50	mL	50	mL	07/18/16	SXW1

***Analytical Methods:**

METALS

-1-

INORGANICS ANALYSIS DATA PACKAGE

P SW846 3005A/6010C
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: August 10, 2016

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CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 401667

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1582235										
QC1203586148	LCS										
Aluminum	2000			2050	ug/L		102	(80%-120%)	SKJ	08/03/16	17:37
Antimony	50.0			50.4	ug/L		101	(80%-120%)	PRB	08/05/16	16:36
Arsenic	50.0			53.3	ug/L		107	(80%-120%)		08/05/16	20:02
Barium	50.0			47.5	ug/L		95	(80%-120%)	SKJ	08/03/16	17:37
Beryllium	50.0			56.1	ug/L		112	(80%-120%)			
Cadmium	50.0			50.7	ug/L		101	(80%-120%)			
Chromium	50.0			52.3	ug/L		105	(80%-120%)			
Cobalt	50.0			53.8	ug/L		108	(80%-120%)		08/04/16	19:03
Copper	50.0			54.8	ug/L		110	(80%-120%)			
Lead	50.0			49.6	ug/L		99.1	(80%-120%)		08/03/16	17:37
Manganese	50.0			55.5	ug/L		111	(80%-120%)		08/04/16	19:03
Molybdenum	50.0			52.0	ug/L		104	(80%-120%)		08/03/16	17:37
Nickel	50.0			54.0	ug/L		108	(80%-120%)		08/04/16	19:03
Selenium	50.0			53.4	ug/L		107	(80%-120%)	PRB	08/05/16	20:02
Silver	50.0			50.6	ug/L		101	(80%-120%)	SKJ	08/03/16	17:37
Strontium	50.0			54.2	ug/L		108	(80%-120%)	PRB	08/05/16	20:02
Thallium	50.0			47.8	ug/L		95.5	(80%-120%)	SKJ	08/03/16	17:37
Thorium	50.0			50.8	ug/L		102	(80%-120%)			
Tin	50.0			49.5	ug/L		99	(80%-120%)			
Uranium	50.0			50.0	ug/L		99.9	(80%-120%)		08/04/16	19:03

8/11/2016

GEL LABORATORIES LLC

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QC Summary

Workorder: 401667

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1582235										
Zinc	50.0			54.9	ug/L		110	(80%-120%)	SKJ	08/04/16	19:03
QC1203586147	MB										
Aluminum			U	15.0	ug/L					08/03/16	17:33
Antimony			U	1.00	ug/L				PRB	08/05/16	16:34
Arsenic			B	1.75	ug/L					08/05/16	20:00
Barium			U	0.600	ug/L				SKJ	08/03/16	17:33
Beryllium			U	0.200	ug/L						
Cadmium			U	0.110	ug/L						
Chromium			U	2.00	ug/L						
Cobalt			U	0.100	ug/L					08/04/16	18:59
Copper			U	0.350	ug/L						
Lead			U	0.500	ug/L					08/03/16	17:33
Manganese			U	1.00	ug/L					08/04/16	18:59
Molybdenum			U	0.165	ug/L					08/03/16	17:33
Nickel			U	0.500	ug/L					08/04/16	18:59
Selenium			U	1.50	ug/L				PRB	08/05/16	20:00
Silver			U	0.200	ug/L				SKJ	08/03/16	17:33
Strontium			U	2.00	ug/L				PRB	08/05/16	20:00
Thallium			U	0.450	ug/L				SKJ	08/03/16	17:33
Thorium			U	0.383	ug/L						
Tin			U	1.00	ug/L						
Uranium			U	0.067	ug/L					08/04/16	18:59

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QC Summary

Workorder: 401667

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1582235										
Zinc			U	3.50	ug/L				SKJ	08/04/16	18:59
QC1203586149 401646001 MS											
Aluminum	2000	78.0		1970	ug/L		94.4	(75%-125%)		08/03/16	17:45
Antimony	50.0	U	1.00	50.3	ug/L		99.8	(75%-125%)	PRB	08/05/16	16:39
Arsenic	50.0	C	11.9	61.0	ug/L		98.2	(75%-125%)		08/05/16	20:06
Barium	50.0		24.3	69.7	ug/L		90.8	(75%-125%)	SKJ	08/03/16	17:45
Beryllium	50.0	U	0.200	52.9	ug/L		106	(75%-125%)			
Cadmium	50.0	U	0.110	50.6	ug/L		101	(75%-125%)			
Chromium	50.0	U	2.00	52.8	ug/L		103	(75%-125%)			
Cobalt	50.0	B	0.408	51.4	ug/L		102	(75%-125%)		08/04/16	19:11
Copper	50.0		1.41	52.8	ug/L		103	(75%-125%)			
Lead	50.0	B	0.851	48.1	ug/L		94.4	(75%-125%)		08/03/16	17:45
Manganese	50.0		38.0	89.9	ug/L		104	(75%-125%)		08/04/16	19:11
Molybdenum	50.0		6.16	59.5	ug/L		107	(75%-125%)		08/03/16	17:45
Nickel	50.0	B	0.891	51.5	ug/L		101	(75%-125%)		08/04/16	19:11
Selenium	50.0	U	1.50	49.5	ug/L		96.5	(75%-125%)	PRB	08/05/16	20:06
Silver	50.0	U	0.200	49.9	ug/L		99.8	(75%-125%)	SKJ	08/03/16	17:45
Strontium	50.0		165	216	ug/L		103	(75%-125%)	PRB	08/05/16	20:06
Thallium	50.0	U	0.450	46.1	ug/L		92	(75%-125%)	SKJ	08/03/16	17:45
Thorium	50.0	U	0.383	49.0	ug/L		97.6	(75%-125%)			
Tin	50.0	U	1.00	50.4	ug/L		100	(75%-125%)			
Uranium	50.0		2.27	54.5	ug/L		104	(75%-125%)		08/04/16	19:11

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QC Summary

Workorder: 401667

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1582235										
Zinc	50.0	B	7.93	60.1	ug/L		104	(75%-125%)	SKJ	08/04/16	19:11
QC1203586150 401646001 MSD											
Aluminum	2000		78.0	2050	ug/L	3.98	98.4	(0%-20%)		08/03/16	17:49
Antimony	50.0	U	1.00	50.7	ug/L	0.792	101	(0%-20%)	PRB	08/05/16	16:40
Arsenic	50.0	C	11.9	62.4	ug/L	2.26	101	(0%-20%)		08/05/16	20:09
Barium	50.0		24.3	71.7	ug/L	2.83	94.8	(0%-20%)	SKJ	08/03/16	17:49
Beryllium	50.0	U	0.200	53.7	ug/L	1.65	107	(0%-20%)			
Cadmium	50.0	U	0.110	50.4	ug/L	0.452	101	(0%-20%)			
Chromium	50.0	U	2.00	55.7	ug/L	5.27	109	(0%-20%)			
Cobalt	50.0	B	0.408	51.1	ug/L	0.509	101	(0%-20%)		08/04/16	19:15
Copper	50.0		1.41	52.2	ug/L	1.17	102	(0%-20%)			
Lead	50.0	B	0.851	48.2	ug/L	0.26	94.7	(0%-20%)		08/03/16	17:49
Manganese	50.0		38.0	89.4	ug/L	0.505	103	(0%-20%)		08/04/16	19:15
Molybdenum	50.0		6.16	58.9	ug/L	1.06	105	(0%-20%)		08/03/16	17:49
Nickel	50.0	B	0.891	51.2	ug/L	0.624	101	(0%-20%)		08/04/16	19:15
Selenium	50.0	U	1.50	49.1	ug/L	0.9	95.6	(0%-20%)	PRB	08/05/16	20:09
Silver	50.0	U	0.200	48.6	ug/L	2.75	97.1	(0%-20%)	SKJ	08/03/16	17:49
Strontium	50.0		165	219	ug/L	1.65	110	(0%-20%)	PRB	08/05/16	20:09
Thallium	50.0	U	0.450	46.5	ug/L	0.974	92.9	(0%-20%)	SKJ	08/03/16	17:49
Thorium	50.0	U	0.383	49.7	ug/L	1.28	98.9	(0%-20%)			
Tin	50.0	U	1.00	50.5	ug/L	0.107	101	(0%-20%)			
Uranium	50.0		2.27	53.8	ug/L	1.26	103	(0%-20%)		08/04/16	19:15

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QC Summary

Workorder: 401667

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1582235										
Zinc	50.0	B	7.93	58.3	ug/L	2.96	101	(0%-20%)	SKJ	08/04/16	19:15
QC1203586151	401646001	SDILT									
Aluminum			78.0	DU	75.0	ug/L	N/A	(0%-10%)		08/03/16	17:57
Antimony		U	0.365	DU	5.00	ug/L	N/A	(0%-10%)	PRB	08/05/16	16:42
Arsenic		C	11.9	BD	2.38	ug/L	.452	(0%-10%)		08/05/16	20:11
Barium			24.3	D	4.72	ug/L	2.93	(0%-10%)	SKJ	08/03/16	17:57
Beryllium		U	0.083	DU	1.00	ug/L	N/A	(0%-10%)			
Cadmium		U	0.015	DU	0.550	ug/L	N/A	(0%-10%)			
Chromium		U	1.31	DU	10.0	ug/L	N/A	(0%-10%)			
Cobalt		B	0.408	BD	0.109	ug/L	33.6	(0%-10%)		08/04/16	19:23
Copper			1.41	DU	1.75	ug/L	N/A	(0%-10%)			
Lead		B	0.851	DU	2.50	ug/L	N/A	(0%-10%)		08/03/16	17:57
Manganese			38.0	D	7.85	ug/L	3.23	(0%-10%)		08/04/16	19:23
Molybdenum			6.16	D	1.12	ug/L	8.79	(0%-10%)		08/03/16	17:57
Nickel		B	0.891	DU	2.50	ug/L	N/A	(0%-10%)		08/04/16	19:23
Selenium		U	1.30	DU	7.50	ug/L	N/A	(0%-10%)	PRB	08/05/16	20:11
Silver		U	0.023	DU	1.00	ug/L	N/A	(0%-10%)	SKJ	08/03/16	17:57
Strontium			165	D	33.0	ug/L	.273	(0%-10%)	PRB	08/05/16	20:11
Thallium		U	0.090	DU	2.25	ug/L	N/A	(0%-10%)	SKJ	08/03/16	17:57
Thorium		U	0.220	DU	1.92	ug/L	N/A	(0%-10%)			
Tin		U	0.216	DU	5.00	ug/L	N/A	(0%-10%)			
Uranium			2.27	D	0.433	ug/L	4.46	(0%-10%)		08/04/16	19:23

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QC Summary

Workorder: 401667

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1582235										
Zinc		B	7.93	DU	17.5	ug/L	N/A	(0%-10%)	SKJ	08/04/16	19:23
Metals Analysis-ICP											
Batch	1582262										
QC1203586203	LCS										
Boron	500				538	ug/L		108 (80%-120%)	HSC	07/21/16	11:29
Calcium	5000				5080	ug/L		102 (80%-120%)		07/19/16	15:33
Iron	5000				5050	ug/L		101 (80%-120%)			
Magnesium	5000				5160	ug/L		103 (80%-120%)			
Potassium	5000				4870	ug/L		97.3 (80%-120%)			
Sodium	5000				5490	ug/L		110 (80%-120%)			
Vanadium	500				507	ug/L		101 (80%-120%)			
QC1203586202	MB										
Boron			U		15.0	ug/L				07/21/16	11:25
Calcium			U		50.0	ug/L				07/19/16	15:29
Iron			U		30.0	ug/L					
Magnesium			U		110	ug/L					
Potassium			U		50.0	ug/L					
Sodium			U		100	ug/L					
Vanadium			U		1.00	ug/L					
QC1203586204	401646001 MS										
Boron	500		17.5		575	ug/L		112 (75%-125%)		07/21/16	11:35
Calcium	5000		20300		25600	ug/L		N/A (75%-125%)		07/19/16	15:39
Iron	5000		154		5230	ug/L		101 (75%-125%)			
Magnesium	5000		4960		10100	ug/L		103 (75%-125%)			

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QC Summary

Workorder: 401667

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1582262										
Potassium	5000	4710		10100	ug/L		107	(75%-125%)			
Sodium	5000	108000		115000	ug/L		N/A	(75%-125%)	HSC	07/19/16	15:39
Vanadium	500	24.6		529	ug/L		101	(75%-125%)			
QC1203586205	401646001	MSD									
Boron	500	17.5		586	ug/L	1.78	114	(0%-20%)		07/21/16	11:39
Calcium	5000	20300		26100	ug/L	1.82	N/A	(0%-20%)		07/19/16	15:42
Iron	5000	154		5250	ug/L	0.458	102	(0%-20%)			
Magnesium	5000	4960		10200	ug/L	1.05	106	(0%-20%)			
Potassium	5000	4710		10200	ug/L	1.57	111	(0%-20%)			
Sodium	5000	108000		117000	ug/L	1.55	N/A	(0%-20%)			
Vanadium	500	24.6		531	ug/L	0.281	101	(0%-20%)			
QC1203586206	401646001	SDILT									
Boron		17.5	DU	75.0	ug/L		N/A	(0%-10%)		07/21/16	11:42
Calcium		20300	D	4120	ug/L	1.45		(0%-10%)		07/19/16	15:45
Iron		154	BD	35.6	ug/L	15.5		(0%-10%)			
Magnesium		4960	D	1040	ug/L	5.34		(0%-10%)			
Potassium		4710	D	881	ug/L	6.53		(0%-10%)			
Sodium		108000	D	21000	ug/L	2.98		(0%-10%)			
Vanadium		24.6	BD	4.94	ug/L	.521		(0%-10%)			

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

Radiological Analysis

Case Narrative

**Radiochemistry
 Technical Case Narrative
 CH2MHill Plateau Remediation Company (CPRC)
 SDG #: GEL401667
 Work Order #: 401667**

Product: 9310_ALPHABETA_GPC: COMMON

Analytical Method: 9310_ALPHABETA_GPC

Analytical Procedure: GL-RAD-A-001 REV# 18

Analytical Batch: 1582447

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
401667002	B35H22
401667004	B35H26
1203586586	Method Blank (MB)
1203586587	400886001(NonSDG) Sample Duplicate (DUP)
1203586588	400886001(NonSDG) Matrix Spike (MS)
1203586589	400886001(NonSDG) Matrix Spike Duplicate (MSD)
1203586590	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

Gross Alpha/Beta Preparation Information

High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating.

Recounts

Sample 1203586590 (LCS) was recounted due to high recovery. The recount is reported.

Miscellaneous Information

Additional Comments

The matrix spike and matrix spike duplicate, 1203586588 (Non SDG 400886001MS) and 1203586589 (Non SDG 400886001MSD), aliquots were reduced to conserve sample volume.

Product: SRISO_SEP_PRECIP_GPC: COMMON

Analytical Method: SRISO_SEP_PRECIP_GPC

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

Analytical Batch: 1582477

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
401667002	B35H22
401667004	B35H26
1203586675	Method Blank (MB)
1203586676	401516001(NonSDG) Sample Duplicate (DUP)
1203586677	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

Samples 401667002 (B35H22) and 401667004 (B35H26) were verified by recounting at least five days from the separation date. The recounts 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

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL401667 GEL Work Order: 401667

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: 10 AUG 2016

Title: Group Leader

Sample Data Summary

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL401667	Client: CPRC001	Project: CPRC0X16033
Lab Sample ID: 401667002	Date Collected: 07/14/2016 09:03	Matrix: WATER
	Date Received: 07/15/2016 09:10	
Client ID: B35H22		Prep Basis: "As Received"
Batch ID: 1582447	Method: 9310_ALPHABETA_GPC	SOP Ref: GL-RAD-A-001
Run Date: 07/28/2016 06:25	Analyst: JXC9	Instrument: LB4100B4
Data File: AB1582447r.xls	Aliquot: 150 mL	Count Time: 190 min
Prep Batch: 1582447	Prep Method: EPA 900.0/SW846 9310	
Prep Date: 07/26/2016 16:51		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-46-1	Alpha <i>ALPHA</i>	U	0.218	pCi/L	+/-1.04	1.05	1.86	3.00
12587-47-2	Beta <i>BETA</i>		386	pCi/L	+/-7.90	63.0	2.81	4.00

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: GEL401667	Client: CPRC001	Project: CPRC0X16033
Lab Sample ID: 401667002	Date Collected: 07/14/2016 09:03	Matrix: WATER
	Date Received: 07/15/2016 09:10	
Client ID: B35H22	Method: SRISO_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1582477	Analyst: KSD1	SOP Ref: GL-RAD-A-004
Run Date: 08/03/2016 12:34	Aliquot: 300 mL	Instrument: PIC1C
Data File: S1582477r.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1582477		
Prep Date: 07/28/2016 11:01		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90		193	pCi/L	+/-4.91	30.7	1.13	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	6.90	7.37	mg	93.7	(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: GEL401667	Client: CPRC001	Project: CPRC0X16033
Lab Sample ID: 401667004	Date Collected: 07/14/2016 09:38	Matrix: WATER
	Date Received: 07/15/2016 09:10	
Client ID: B35H26		Prep Basis: "As Received"
Batch ID: 1582447	Method: 9310_ALPHABETA_GPC	SOP Ref: GL-RAD-A-001
Run Date: 07/28/2016 06:32	Analyst: JXC9	Instrument: LB4100E2
Data File: AB1582447r.xls	Aliquot: 150 mL	Count Time: 150 min
Prep Batch: 1582447	Prep Method: EPA 900.0/SW846 9310	
Prep Date: 07/26/2016 16:51		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-46-1	Alpha <i>ALPHA</i>	U	1.77	pCi/L	+/-1.68	1.71	2.66	3.00
12587-47-2	Beta <i>BETA</i>		111	pCi/L	+/-4.73	18.9	2.95	4.00

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: GEL401667	Client: CPRC001	Project: CPRC0X16033
Lab Sample ID: 401667004	Date Collected: 07/14/2016 09:38	Matrix: WATER
	Date Received: 07/15/2016 09:10	
Client ID: B35H26	Method: SRISO_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1582477	Analyst: KSD1	SOP Ref: GL-RAD-A-004
Run Date: 08/03/2016 12:34	Aliquot: 300 mL	Instrument: PIC1D
Data File: S1582477r.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1582477		
Prep Date: 07/28/2016 11:01		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90		41.4	pCi/L	+/-2.45	6.92	1.08	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	6.30	7.37	mg	85.5	(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.

Quality Control Summary

8/11/2016

GEL LABORATORIES LLC

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QC Summary

Report Date: August 10, 2016

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Client : CH2M Hill Plateau Remediation Company
 MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352

Contact: Mr. Scot Fitzgerald

Workorder: 401667

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gas Flow									
Batch	1582447								
QC1203586586	MB								
Alpha			U	-0.0251	pCi/L			JXC9	07/28/1606:22
				Uncert: +/-0.906					
				TPU: +/-0.907					
Beta			U	-1.68	pCi/L				
				Uncert: +/-1.97					
				TPU: +/-1.97					
QC1203586587	400886001	DUP							
Alpha		U	-0.462	U	0.411	pCi/L			07/28/1606:36
			Uncert: +/-1.24		+/-1.52		RPD: 0	N/A	
			TPU: +/-1.24		+/-1.52		RER: 0.874	(0-2)	
Beta			11.5		12.0	pCi/L			
			Uncert: +/-1.91		+/-1.76		RPD: 4	(0% - 20%)	
			TPU: +/-2.69		+/-2.62		RER: 0.252	(0-2)	
QC1203586588	400886001	MS							
Alpha		240	U	-0.462	214	pCi/L	REC: 89	(75%-125%)	07/28/1606:18
				Uncert: +/-1.24	+/-24.8				
				TPU: +/-1.24	+/-42.9				
Beta		874		11.5	1020	pCi/L	REC: 115	(75%-125%)	
				Uncert: +/-1.91	+/-38.0				
				TPU: +/-2.69	+/-170				
QC1203586589	400886001	MSD							
Alpha		240	U	-0.462	234	pCi/L	REC: 98	(75%-125%)	07/28/1606:18
				Uncert: +/-1.24	+/-25.0		RPD: 9	(0%-20%)	
				TPU: +/-1.24	+/-45.7		RER: 0.625	(0-2)	
Beta		874		11.5	990	pCi/L	REC: 112	(75%-125%)	
				Uncert: +/-1.91	+/-36.4		RPD: 3	(0%-20%)	
				TPU: +/-2.69	+/-166		RER: 0.253	(0-2)	
QC1203586590	LCS								
Alpha		79.9			71.0	pCi/L	REC: 89	(80%-120%)	08/02/1611:17
				Uncert: +/-7.54					
				TPU: +/-13.9					
Beta		291			324	pCi/L	REC: 111	(80%-120%)	
				Uncert: +/-12.2					
				TPU: +/-55.1					
Batch	1582477								
QC1203586675	MB								
Strontium-90				U	-0.249	pCi/L		KSD1	07/30/1616:18
					Uncert: +/-0.431				
					TPU: +/-0.431				
**Strontium Carrier		7.37			6.60	mg	REC: 90	(40%-110%)	
QC1203586676	401516001	DUP							
Strontium-90		U	-0.666	U	-0.908	pCi/L			07/30/1616:18
			Uncert: +/-0.623		+/-0.629		RPD: 0	N/A	
			TPU: +/-0.623		+/-0.629		RER: 0.535	(0-2)	

QC Summary

Workorder: 401667

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Gas Flow										
Batch	1582477									
**Strontium Carrier	7.37	7.10		6.70	mg	REC: 91	(40%-110%)			
QC1203586677	LCS									
Strontium-90	72.8			68.9	pCi/L	REC: 95	(80%-120%)		07/30/16	16:18
	Uncert:			+/-3.55						
	TPU:			+/-11.3						
**Strontium Carrier	7.37			7.00	mg	REC: 95	(40%-110%)			

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
- A The TIC is a suspected aldol-condensation product
- 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 both the associated QC blank and in the sample.
- B The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample
- C Analyte has been confirmed by GC/MS analysis
- 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 Concentration exceeds the calibration range of the instrument
- E Reported value is estimated due to interferences. See comment in narrative.
- 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
- M Duplicate precision not met.
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- S Reported value determined by the Method of Standard Additions (MSA)
- T Spike and/or spike duplicate 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.
- 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 (Organics only)

8/11/2016

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QC Summary

Workorder: 401667

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
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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.