GEL Laboratories LLC
a member of The GEL Group INC

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2040 Savage Road Charleston, SC 29407
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gel.com

July 18, 2019

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

Re: CHPRC SAF S19-006
Work Order: 482811
SDG: GEL482811

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 25, 2019. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at www.gel.com.

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,

Anna Dupree for
Heather Shaffer
Project Manager

Purchase Order: 300071 + 7H
Chain of Custody: S19-006-049, S19-006-111, S19-006-112 and S19-006-141
Enclosures

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Case Narrative

General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF S19-006
SDG: GEL482811

July 18, 2019

Laboratory Identification:

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

Summary

Sample receipt

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on June 25, 2019, for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Items of Note All efforts were made by the lab to meet any short hold times. Samples that were analyzed outside of the initial hold time but still within 2X hold time will be noted in the lab case narrative.

Sample Identification
The laboratory received the following samples:

Laboratory Identification	Sample Description
482811001	B3PD28
482811002	B3PD27
482811003	B3PD31
482811004	B3PD29
482811005	B3PD03
482811006	B3PD04

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.

Anna Dupree for
Heather Shaffer
Project Manager

Technical Case Narrative
CH2MHill Plateau Remediation Company
SDG #: GEL482811
Work Order #: 482811

Metals

Determination of Metals by ICP

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

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
1204321404 (Non SDG 482810001MS)	Strontium	68.3* (75%-125%)
1204321405 (Non SDG 482810001MSD)	Strontium	55.6* (75%-125%)

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 acceptance criteria. However, where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data.

Sample	Analyte	Value
1204326880 (MB)	Molybdenum	0.327 between (0.2 - 0.5)
	Uranium	0.073 between (0.067 - 0.1)

Radiochemistry

9310_ALPHABETA_GPC: Gross Alpha

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
Samples 1204318196 (Non SDG 482958002MS) and 1204318197 (Non SDG 482958002MSD) were recounted due to high recovery. The recounts are reported. Sample 1204318195 (Non SDG 482958002DUP) was recounted due to high relative percent difference/relative error ratio. The recount is reported.

Miscellaneous Information

Additional Comments
The matrix spike and matrix spike duplicate, 1204318196 (Non SDG 482958002MS) and 1204318197 (Non SDG 482958002MSD), aliquots were reduced to conserve sample volume.

Certification Statement

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

Chain of Custody and Supporting Documentation

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	C.O.C. # S19-006-049
	8611605 482811	Page 1 of 1

Collector: Barb Briggs /CHPRC	**Contact/Requester:** Karen Waters-Husted	**Telephone No.:** 509-376-4650
SAF No.: S19-006	**Sampling Origin:** Hanford Site	**Purchase Order/Charge Code:** 300071
Project Title: SURV, JUNE 2019	**Logbook No.:** HNF-N-506 1012	**Ice Chest No.:** GWS-684
Shipped To (Lab): GEL Laboratories, LLC	**Method of Shipment** Commercial Carrier	**Bill of Lading/Air Bill No.:** 7755 5217 0398
Protocol: SURV	**Priority:** 30 Days	**Offsite Property No.:** 11246

POSSIBLE SAMPLE HAZARDS/REMARK
** ** 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
N/A

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3PD28	Y	W	JUN 24 2019	1039	1x500-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: GW 01	6 Months	HNO3 to pH <2
B3PD27	N	W	JUN 24 2019	1039	1x500-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: GW 01	6 Months	HNO3 to pH <2

Relinquished By	Print First and Last Name	Signature	Date/Time	Received By	Print First and Last Name	Signature	Date/Time
Relinquished By:	Barb Briggs /CHPRC	BeBriggs	JUN 24 2019 1140	Received By:	Janelle Zunker CHPRC	Janelle Zunker	JUN 24 2019 1140
Relinquished By:	Janelle Zunker CHPRC	Janelle Zunker	JUN 24 2019 1140	Received By:	FEDEX		
Relinquished By:	Fed Ex			Received By:	T-Tatum	T-Tatum	06/25/19 8:55
Relinquished By:				Received By:			

Matrix *

S	= Soil	DS	= Drum Solids
SE	= Sediment	DL	= Drum Liquid
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 4/15/2019

FSR ID = FSR79264

A-6004-842 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 482811	C.O.C. # S19-006-141 Page 1 of 1

Collector: Barb Briggs /CHPRC	**Contact/Requester:** Karen Waters-Husted	**Telephone No.:** 509-376-4650
SAF No.: S19-006	**Sampling Origin:** Hanford Site	**Purchase Order/Charge Code:** 300071
Project Title: SURV, JUNE 2019	**Logbook No.:** HNF-N-506 110/2	**Ice Chest No.:** GWS-684
Shipped To (Lab): GEL Laboratories, LLC	**Method of Shipment** Commercial Carrier	**Bill of Lading/Air Bill No.:** 775552170328
Protocol: SURV	**Priority:** 30 Days	**Offsite Property No.:** 11240

POSSIBLE SAMPLE HAZARDS/REMARK
** ** 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
N/A

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3PD31	Y	W	JUN 24 2019	1003	1x500-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: GW 01	6 Months	HNO3 to pH <2
B3PD29	N	W	JUN 24 2019	1003	1x500-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: GW 01	6 Months	HNO3 to pH <2

Relinquished By: Barb Briggs /CHPRC	Barb Briggs	JUN 24 2019 1140	Received By: Janelle Zunker CHPRC
Print First and Last Name	Signature	Date/Time	Print First and Last Name / Signature / Date/Time
Relinquished By: Janelle Zunker CHPRC	Janelle Zunker	JUN 24 2019 1140	Received By:
Print First and Last Name	Signature	Date/Time	Print First and Last Name / Signature / Date/Time
Relinquished By: FedEx	FedEx		Received By: FEDEX T Tatum J Tatum 06/25/19 8:55
Print First and Last Name	Signature	Date/Time	Print First and Last Name / Signature / Date/Time
Relinquished By:			Received By:
Print First and Last Name	Signature	Date/Time	Print First and Last Name / Signature / Date/Time

Matrix *

S = Soil	DS = Drum Solids
SE = Sediment	DL = Drum Liquid
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 6/17/2019

FSR ID = FSR81216

A-6004-842 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 482811	C.O.C. # S19-006-111 Page 1 of 1

Collector: Malcom Chunn CHPRC	**Contact/Requester:** Karen Waters-Husted	**Telephone No.:** 509-376-4650
SAF No.: S19-006	**Sampling Origin:** Hanford Site	**Purchase Order/Charge Code:** 300071
Project Title: SURV, JUNE 2019	**Logbook No.:** HNF-N-506 -110 PG 1	**Ice Chest No.:** 6W5-047
Shipped To (Lab): GEL Laboratories, LLC	**Method of Shipment** Commercial Carrier	**Bill of Lading/Air Bill No.:** 7750 4783 4536
Protocol: SURV	**Priority:** 30 Days	**Offsite Property No.:** 11238

POSSIBLE SAMPLE HAZARDS/REMARK
** ** 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
N/A

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3PD03	N		JUN 2 3 2019	0700	1x1-L P	9310_ALPHABETA_GPC: Gross Alpha	6 Months	HNO3 to pH <2

Relinquished By: Malcom Chunn CHPRC — Print First and Last Name / Signature / Date/Time: JUN 2 3 2019 1400	Received By: SSU-1 — Print First and Last Name / Signature / Date/Time: JUN 2 3 2019 1400	Matrix *	
Relinquished By: SSU-1 — Print First and Last Name / Signature / Date/Time: JUN 2 4 2019 0700	Received By: Lesly Wall /CHPRC — Print First and Last Name / Signature / Date/Time: JUN 2 4 2019 0700	S = Soil	DS = Drum Solids
Relinquished By: Lesly Wall /CHPRC — Print First and Last Name / Signature / Date/Time: JUN 2 4 2019 1400	Received By: FEDEX — Print First and Last Name / Signature / Date/Time	SE = Sediment	DL = Drum Liquid
Relinquished By: — Print First and Last Name / Signature: FedEx / Date/Time	Received By: Stacy Boone/ GEL Laboratories — Print First and Last Name / Signature / Date/Time: JUN 2 5 2019 855	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 4/11/2019 FSR ID = FSR79290 A-6004-842 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 482811	C.O.C. # S19-006-112 Page 1 of 1

Collector: Malcom Chunn CHPRC	**Contact/Requester:** Karen Waters-Husted	**Telephone No.:** 509-376-4650
SAF No.: S19-006	**Sampling Origin:** Hanford Site	**Purchase Order/Charge Code:** 300071
Project Title: SURV, JUNE 2019	**Logbook No.:** HNF-N-506 - 40 PG 1	**Ice Chest No.:** GWS-047
Shipped To (Lab): GEL Laboratories, LLC	**Method of Shipment** Commercial Carrier	**Bill of Lading/Air Bill No.:** 7755 4783 4536
Protocol: SURV	**Priority:** 30 Days	**Offsite Property No.:** 11236

POSSIBLE SAMPLE HAZARDS/REMARK
** ** 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
N/A

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3PD04	N	W	JUN 23 2019	0907	1x1-L P	9310_ALPHABETA_GPC: Gross Alpha	6 Months	HNO3 to pH <2

Relinquished By: Malcom Chunn CHPRC	MRC	JUN 23 2019 1400	Received By: SSU-1	JUN 23 2019 1400
Relinquished By: SSU-1		JUN 24 2019 0700	Received By: Lesly Wall /CHPRC	JUN 24 2019 0700
Relinquished By: Lesly Wall /CHPRC		JUN 24 2019 1400	Received By: FEDEX	
Relinquished By: FedEx			Received By: Stacy Boone GEL	JUN 25 2019 855

Matrix *

S = Soil	DS = Drum Solids
SE = Sediment	DL = Drum Liquid
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 4/11/2019 FSR ID = FSR79291 A-6004-842 (REV 3)

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: CPRC	SDG/AR/COC/Work Order: 482811
Received By: SL BOONE	Date Received: JUNE 25, 2019
Carrier and Tracking Number	Circle Applicable: FedEx Express FedEx Ground UPS Field Services Courier Other 7755 4783 4065 - 1c 7755 4783 4330 - 1c 7755 4783 4536 - 1c 7755 4783 3952 - 1c

Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
A)Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#: If UN2910, Is the Radioactive Shipment Survey Compliant? Yes___ No___
B) Did the client designate the samples are to be received as radioactive?	✓		COC notation or radioactive stickers on containers equal client designation
C) Did the RSO classify the samples as radioactive?	✓		Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 CPM / mR/Hr Classified as: Rad 1 Rad 2 Rad 3
D) Did the client designate samples are hazardous?		✓	COC notation or hazard labels on containers equal client designation.
E) Did the RSO identify possible hazards?		✓	If D or E is yes, select Hazards below. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	✓			Circle Applicable: Client contacted and provided COC COC created upon receipt
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	✓			Preservation Method: Wet Ice Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius TEMP:___
4	Daily check performed and passed on IR temperature gun?	✓			Temperature Device Serial #: IR1-19 Secondary Temperature Device Serial # (If Applicable):
5	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?	✓			Sample ID's and Containers Affected: If Preservation added, Lot#:
7	Do any samples require Volatile Analysis?			✓	If Yes, are Encores or Soil Kits present for solids? Yes___ No___ NA___(If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes ✓ No___ NA___(If unknown, select No) Are liquid VOA vials free of headspace? Yes___ No___ NA___ Sample ID's and containers affected:
8	Samples received within holding time?	✓			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			ID's and containers affected:
10	Date & time on COC match date & time on bottles?	✓			Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
11	Number of containers received match number indicated on COC?	✓			Circle Applicable: No container count on COC Other (describe)
12	Are sample containers identifiable as GEL provided?			✓	
13	COC form is properly signed in relinquished/received sections?	✓			Circle Applicable: Not relinquished Other (describe)

Comments (Use Continuation Form if needed):

7755 4783 4238 - 1c 7755 4783 3390 - 1c 7755 4783 3974 - 1c

PM (or PMA) review: Initials KS Date 10/20/19 Page 1 of 2

GL-CHL-SR-001 Rev 6

GEL Laboratories, LLC

SAMPLE RECEIPT & REVIEW FORM

Client: CPRC	SDG/AR/COC/Work Order: 482811
Received By: KR	Date Received: 10/25/19
Carrier and Tracking Number	Circle Applicable: FedEx Express / FedEx Ground / UPS / Field Services / Courier / Other

Suspected Hazard Information	Yes	No	
			*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
A)Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#: If UN2910, Is the Radioactive Shipment Survey Compliant? Yes___ No___
B) Did the client designate the samples are to be received as radioactive?		✓	COC notation or radioactive stickers on containers equal client designation.
C) Did the RSO classify the samples as radioactive?		✓	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 CPM / mR/Hr. Classified as: Rad 1 Rad 2 Rad 3
D) Did the client designate samples are hazardous?		✓	COC notation or hazard labels on containers equal client designation.
E) Did the RSO identify possible hazards?		✓	If D or E is yes, select Hazards below. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	✓			Circle Applicable: Client contacted and provided COC COC created upon receipt
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	✓			Preservation Method: Wet Ice / Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius TEMP: See Below
4	Daily check performed and passed on IR temperature gun?	✓			Temperature Device Serial #: IR4-15 Secondary Temperature Device Serial # (If Applicable):
5	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?	✓			Sample ID's and Containers Affected: If Preservation added, Lot#:
7	Do any samples require Volatile Analysis?	✓			If Yes, are Encores or Soil Kits present for solids? Yes___ No___ NA___ (If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes ✓ No___ NA___ (If unknown, select No) Are liquid VOA vials free of headspace? Yes ✓ No___ NA___ Sample ID's and containers affected:
8	Samples received within holding time?	✓			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			ID's and containers affected:
10	Date & time on COC match date & time on bottles?	✓			Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
11	Number of containers received match number indicated on COC?	✓			Circle Applicable: No container count on COC Other (describe)
12	Are sample containers identifiable as GEL provided?			✓	
13	COC form is properly signed in relinquished/received sections?	✓			Circle Applicable: Not relinquished Other (describe)

Comments (Use Continuation Form if needed):

*7755 4783 4271-3°C
*7755 4783 3665-4°C
*7755 5217 0328-1°C
*7755 5217 1092-3°C

PM (or PMA) review: Initials KS Date 10/28/19 Page 2 of 2

GL-CHL-SR-001 Rev 6

Data Review Qualifier Definitions

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

Report Date: 18−JUL−19

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.		
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 analyte was detected in the associated method blank >/= MDC or >5% sample activity.	Radiological	
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
+	Correlation coefficient for Method of Standard Additions (MSA) is < 0.995	Inorganics	
B	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).	General Chemistry	
C	Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= 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	
o	Analyte failed to recover within LCS limits	Radiological	Rad

Laboratory Certifications

List of current GEL Certifications as of 18 July 2019

State	Certification
Alaska	17−018
Arkansas	88−0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH−0169
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	SC00012
Illinois NELAP	200029
Indiana	C−SC−01
Kansas NELAP	E−10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana Drinking Water	LA024
Louisiana NELAP	03046 (AI33904)
Maine	2019020
Maryland	270
Massachusetts	M−SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE−OS−26−13
Nevada	SC000122019−3
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R−158
Oklahoma	9904
Pennsylvania NELAP	68−00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235−19−15
Utah NELAP	SC000122019−28
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
CH2MHill Plateau Remediation Company
SDG #: GEL482811
Work Order #: 482811

Product: **Determination of Metals by ICP**
Analytical Method: SW846 3005A/6010D
Analytical Procedure: GL-MA-E-013 REV# 31
Analytical Batch: 1892371

Product: **Determination of Metals by ICP-MS**
Analytical Method: SW846 3005A/6020B
Analytical Procedure: GL-MA-E-014 REV# 33
Analytical Batches: 1892196 and 1894518

Preparation Method: SW846 3005A
Preparation Procedure: GL-MA-E-006 REV# 14
Preparation Batches: 1892195, 1892370 and 1894517

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

GEL Sample ID#	Client Sample Identification
482811001	B3PD28
482811002	B3PD27
482811003	B3PD31
482811004	B3PD29
1204321888	Method Blank (MB)**ICP**
1204321889	Laboratory Control Sample (LCS)
1204321892	482810001(NonSDGL) Serial Dilution (SD)
1204321890	482810001(NonSDGS) Matrix Spike (MS)
1204321891	482810001(NonSDGSD) Matrix Spike Duplicate (MSD)
1204321402	Method Blank (MB)**ICP-MS**
1204326880	Method Blank (MB)**ICP-MS**
1204321403	Laboratory Control Sample (LCS)
1204326881	Laboratory Control Sample (LCS)
1204321406	482810001(NonSDGL) Serial Dilution (SD)
1204326884	482811002(B3PD27L) Serial Dilution (SD)
1204321404	482810001(NonSDGS) Matrix Spike (MS)
1204326882	482811002(B3PD27S) Matrix Spike (MS)
1204321405	482810001(NonSDGSD) Matrix Spike Duplicate (MSD)
1204326883	482811002(B3PD27SD) Matrix Spike Duplicate (MSD)
1204329796	482810001(NonSDGPS) 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.

Calibration Information

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

Quality Control (QC) Information

Method Blank (MB) Statement
The method blanks (MB) analyzed with this SDG met the acceptance criteria. However, where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data.

Sample	Analyte	Value
1204326880 (MB)	Molybdenum	0.327 between (0.2 - 0.5)
	Uranium	0.073 between (0.067 - 0.1)

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
1204321404 (Non SDG 482810001MS)	Strontium	68.3* (75%-125%)
1204321405 (Non SDG 482810001MSD)	Strontium	55.6* (75%-125%)

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: GEL482811 GEL Work Order: 482811

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 >= 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: Edmund Frampton**

Date: 19 JUL 2019 **Title: Team Leader**

Sample Data Summary

GEL Laboratories LLC

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL482811 **CONTRACT:** CPRC0S19006 **METHOD TYPE:** SW846

SAMPLE ID: 482811001 **BASIS:** As Received **DATE COLLECTED** 24−JUN−19

CLIENT ID: B3PD28 **LEVEL:** Low **DATE RECEIVED** 25−JUN−19

MATRIX: WATER **%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429−90−5	Aluminum	19.3	ug/L	U	19.3	50	50	1	MS	SKJ	07/12/19 18:28	190712−4	1892196
7440−36−0	Antimony	1	ug/L	U	1	3	3	1	MS	SKJ	07/12/19 18:28	190712−4	1892196
7440−38−2	Arsenic	6.15	ug/L		2	5	5	1	MS	SKJ	07/12/19 18:28	190712−4	1892196
7440−39−3	Barium	49.9	ug/L		0.67	4	4	1	MS	SKJ	07/12/19 18:28	190712−4	1892196
7440−41−7	Beryllium	0.20	ug/L	U	0.2	0.5	0.5	1	MS	SKJ	07/12/19 18:28	190712−4	1892196
7440−42−8	Boron	41.4	ug/L	B	15	50	50	1	P	HSC	07/17/19 12:33	071719−1	1892371
7440−43−9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	SKJ	07/12/19 18:28	190712−4	1892196
7440−70−2	Calcium	53300	ug/L		50	200	200	1	P	HSC	07/17/19 12:33	071719−1	1892371
7440−47−3	Chromium	3.36	ug/L	B	3	10	10	1	MS	SKJ	07/12/19 18:28	190712−4	1892196
7440−48−4	Cobalt	0.30	ug/L	U	0.3	1	1	1	MS	SKJ	07/12/19 18:28	190712−4	1892196
7440−50−8	Copper	0.520	ug/L	B	0.3	2	2	1	MS	SKJ	07/15/19 10:24	190715−5	1892196
7439−89−6	Iron	30	ug/L	U	30	100	100	1	P	HSC	07/17/19 12:33	071719−1	1892371
7439−92−1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	SKJ	07/12/19 18:28	190712−4	1892196
7439−95−4	Magnesium	17800	ug/L		110	300	300	1	P	HSC	07/17/19 12:33	071719−1	1892371
7439−96−5	Manganese	8.08	ug/L		1	5	5	1	MS	SKJ	07/12/19 18:28	190712−4	1892196
7439−98−7	Molybdenum	6.86	ug/L		0.2	1	1	1	MS	SKJ	07/12/19 18:28	190712−4	1892196
7440−02−0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	SKJ	07/12/19 18:28	190712−4	1892196
7440−09−7	Potassium	12800	ug/L		50	150	150	1	P	HSC	07/17/19 12:33	071719−1	1892371
7782−49−2	Selenium	5.81	ug/L		2	5	5	1	MS	SKJ	07/12/19 18:28	190712−4	1892196
7440−22−4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	SKJ	07/12/19 18:28	190712−4	1892196
7440−23−5	Sodium	33800	ug/L		100	300	300	1	P	HSC	07/17/19 12:33	071719−1	1892371
7440−24−6	Strontium	291	ug/L		2	10	10	1	MS	SKJ	07/12/19 18:28	190712−4	1892196
7440−28−0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	SKJ	07/12/19 18:28	190712−4	1892196
7440−29−1	Thorium	0.70	ug/L	U	0.7	2	2	1	MS	SKJ	07/12/19 18:28	190712−4	1892196
7440−31−5	Tin	1	ug/L	U	1	5	5	1	MS	SKJ	07/12/19 18:28	190712−4	1892196
7440−61−1	Uranium	14.8	ug/L		0.067	0.2	0.2	1	MS	SKJ	07/15/19 10:24	190715−5	1892196
7440−62−2	Vanadium	14.8	ug/L		1	5	5	1	P	HSC	07/17/19 12:33	071719−1	1892371
7440−66−6	Zinc	7.18	ug/L	B	3.3	20	20	1	MS	SKJ	07/12/19 18:28	190712−4	1892196

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1892196	1892195	SW846 3005A	50	mL	50	mL	07/09/19	HH1
1892371	1892370	SW846 3005A	50	mL	50	mL	07/09/19	HH1

***Analytical Methods:**

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

P	**SW846 3005A/6010D**
MS	**SW846 3005A/6020B**

GEL Laboratories LLC

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL482811 **CONTRACT:** CPRC0S19006 **METHOD TYPE:** SW846

SAMPLE ID: 482811002 **BASIS:** As Received **DATE COLLECTED** 24−JUN−19

CLIENT ID: B3PD27 **LEVEL:** Low **DATE RECEIVED** 25−JUN−19

MATRIX: WATER **%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429−90−5	Aluminum	19.3	ug/L	U	19.3	50	50	1	MS	PRB	07/12/19 02:58	190711−2	1894518
7440−36−0	Antimony	1	ug/L	U	1	3	3	1	MS	PRB	07/12/19 02:58	190711−2	1894518
7440−38−2	Arsenic	6.39	ug/L		2	5	5	1	MS	PRB	07/12/19 02:58	190711−2	1894518
7440−39−3	Barium	48.9	ug/L		0.67	4	4	1	MS	PRB	07/12/19 02:58	190711−2	1894518
7440−41−7	Beryllium	0.20	ug/L	U	0.2	0.5	0.5	1	MS	PRB	07/12/19 02:58	190711−2	1894518
7440−42−8	Boron	41.2	ug/L	B	15	50	50	1	P	HSC	07/17/19 12:37	071719−1	1892371
7440−43−9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	PRB	07/12/19 02:58	190711−2	1894518
7440−70−2	Calcium	52300	ug/L		50	200	200	1	P	HSC	07/17/19 12:37	071719−1	1892371
7440−47−3	Chromium	3.15	ug/L	B	3	10	10	1	MS	PRB	07/12/19 02:58	190711−2	1894518
7440−48−4	Cobalt	0.30	ug/L	U	0.3	1	1	1	MS	PRB	07/12/19 02:58	190711−2	1894518
7440−50−8	Copper	0.928	ug/L	B	0.3	2	2	1	MS	PRB	07/12/19 02:58	190711−2	1894518
7439−89−6	Iron	46.8	ug/L	B	30	100	100	1	P	HSC	07/17/19 12:37	071719−1	1892371
7439−92−1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	PRB	07/12/19 02:58	190711−2	1894518
7439−95−4	Magnesium	17700	ug/L		110	300	300	1	P	HSC	07/17/19 12:37	071719−1	1892371
7439−96−5	Manganese	14	ug/L		1	5	5	1	MS	PRB	07/12/19 02:58	190711−2	1894518
7439−98−7	Molybdenum	6.47	ug/L	C	0.2	1	1	1	MS	PRB	07/12/19 02:58	190711−2	1894518
7440−02−0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	PRB	07/12/19 02:58	190711−2	1894518
7440−09−7	Potassium	12700	ug/L		50	150	150	1	P	HSC	07/17/19 12:37	071719−1	1892371
7782−49−2	Selenium	5.65	ug/L		2	5	5	1	MS	PRB	07/12/19 02:58	190711−2	1894518
7440−22−4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	PRB	07/12/19 02:58	190711−2	1894518
7440−23−5	Sodium	33200	ug/L		100	300	300	1	P	HSC	07/17/19 12:37	071719−1	1892371
7440−24−6	Strontium	278	ug/L		2	10	10	1	MS	PRB	07/12/19 02:58	190711−2	1894518
7440−28−0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	PRB	07/12/19 02:58	190711−2	1894518
7440−29−1	Thorium	0.70	ug/L	U	0.7	2	2	1	MS	PRB	07/12/19 02:58	190711−2	1894518
7440−31−5	Tin	1	ug/L	U	1	5	5	1	MS	PRB	07/12/19 02:58	190711−2	1894518
7440−61−1	Uranium	13.8	ug/L		0.067	0.2	0.2	1	MS	PRB	07/12/19 04:47	190711−3	1894518
7440−62−2	Vanadium	15.2	ug/L		1	5	5	1	P	HSC	07/17/19 12:37	071719−1	1892371
7440−66−6	Zinc	9.99	ug/L	B	3.3	20	20	1	MS	PRB	07/12/19 02:58	190711−2	1894518

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1892371	1892370	SW846 3005A	50	mL	50	mL	07/09/19	HH1
1894518	1894517	SW846 3005A	50	mL	50	mL	07/10/19	HH1

***Analytical Methods:**

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

P	**SW846 3005A/6010D**
MS	**SW846 3005A/6020B**

GEL Laboratories LLC

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL482811 **CONTRACT:** CPRC0S19006 **METHOD TYPE:** SW846

SAMPLE ID: 482811003 **BASIS:** As Received **DATE COLLECTED** 24−JUN−19

CLIENT ID: B3PD31 **LEVEL:** Low **DATE RECEIVED** 25−JUN−19

MATRIX: WATER **%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429−90−5	Aluminum	19.3	ug/L	U	19.3	50	50	1	MS	SKJ	07/12/19 18:37	190712−4	1892196
7440−36−0	Antimony	1	ug/L	U	1	3	3	1	MS	SKJ	07/12/19 18:37	190712−4	1892196
7440−38−2	Arsenic	7.84	ug/L		2	5	5	1	MS	SKJ	07/12/19 18:37	190712−4	1892196
7440−39−3	Barium	42.3	ug/L		0.67	4	4	1	MS	SKJ	07/12/19 18:37	190712−4	1892196
7440−41−7	Beryllium	0.20	ug/L	U	0.2	0.5	0.5	1	MS	SKJ	07/12/19 18:37	190712−4	1892196
7440−42−8	Boron	36.5	ug/L	B	15	50	50	1	P	HSC	07/17/19 12:41	071719−1	1892371
7440−43−9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	SKJ	07/12/19 18:37	190712−4	1892196
7440−70−2	Calcium	42700	ug/L		50	200	200	1	P	HSC	07/17/19 12:41	071719−1	1892371
7440−47−3	Chromium	3.66	ug/L	B	3	10	10	1	MS	SKJ	07/12/19 18:37	190712−4	1892196
7440−48−4	Cobalt	0.30	ug/L	U	0.3	1	1	1	MS	SKJ	07/12/19 18:37	190712−4	1892196
7440−50−8	Copper	0.30	ug/L	U	0.3	2	2	1	MS	SKJ	07/15/19 10:31	190715−5	1892196
7439−89−6	Iron	30	ug/L	U	30	100	100	1	P	HSC	07/17/19 12:41	071719−1	1892371
7439−92−1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	SKJ	07/12/19 18:37	190712−4	1892196
7439−95−4	Magnesium	12900	ug/L		110	300	300	1	P	HSC	07/17/19 12:41	071719−1	1892371
7439−96−5	Manganese	1.67	ug/L	B	1	5	5	1	MS	SKJ	07/12/19 18:37	190712−4	1892196
7439−98−7	Molybdenum	6.86	ug/L		0.2	1	1	1	MS	SKJ	07/12/19 18:37	190712−4	1892196
7440−02−0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	SKJ	07/12/19 18:37	190712−4	1892196
7440−09−7	Potassium	6550	ug/L		50	150	150	1	P	HSC	07/17/19 12:41	071719−1	1892371
7782−49−2	Selenium	3.42	ug/L	B	2	5	5	1	MS	SKJ	07/12/19 18:37	190712−4	1892196
7440−22−4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	SKJ	07/12/19 18:37	190712−4	1892196
7440−23−5	Sodium	23800	ug/L		100	300	300	1	P	HSC	07/17/19 12:41	071719−1	1892371
7440−24−6	Strontium	202	ug/L		2	10	10	1	MS	SKJ	07/12/19 18:37	190712−4	1892196
7440−28−0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	SKJ	07/12/19 18:37	190712−4	1892196
7440−29−1	Thorium	0.70	ug/L	U	0.7	2	2	1	MS	SKJ	07/12/19 18:37	190712−4	1892196
7440−31−5	Tin	1	ug/L	U	1	5	5	1	MS	SKJ	07/12/19 18:37	190712−4	1892196
7440−61−1	Uranium	8.78	ug/L		0.067	0.2	0.2	1	MS	SKJ	07/15/19 10:31	190715−5	1892196
7440−62−2	Vanadium	19.1	ug/L		1	5	5	1	P	HSC	07/17/19 12:41	071719−1	1892371
7440−66−6	Zinc	6.1	ug/L	B	3.3	20	20	1	MS	SKJ	07/12/19 18:37	190712−4	1892196

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1892196	1892195	SW846 3005A	50	mL	50	mL	07/09/19	HH1
1892371	1892370	SW846 3005A	50	mL	50	mL	07/09/19	HH1

***Analytical Methods:**

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

P	**SW846 3005A/6010D**
MS	**SW846 3005A/6020B**

GEL Laboratories LLC

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL482811 **CONTRACT:** CPRC0S19006 **METHOD TYPE:** SW846

SAMPLE ID: 482811004 **BASIS:** As Received **DATE COLLECTED** 24−JUN−19

CLIENT ID: B3PD29 **LEVEL:** Low **DATE RECEIVED** 25−JUN−19

MATRIX: WATER **%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429−90−5	Aluminum	19.3	ug/L	U	19.3	50	50	1	MS	SKJ	07/12/19 18:41	190712−4	1892196
7440−36−0	Antimony	1	ug/L	U	1	3	3	1	MS	SKJ	07/12/19 18:41	190712−4	1892196
7440−38−2	Arsenic	7.94	ug/L		2	5	5	1	MS	SKJ	07/12/19 18:41	190712−4	1892196
7440−39−3	Barium	42.7	ug/L		0.67	4	4	1	MS	SKJ	07/12/19 18:41	190712−4	1892196
7440−41−7	Beryllium	0.20	ug/L	U	0.2	0.5	0.5	1	MS	SKJ	07/12/19 18:41	190712−4	1892196
7440−42−8	Boron	35.3	ug/L	B	15	50	50	1	P	HSC	07/17/19 12:44	071719−1	1892371
7440−43−9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	SKJ	07/12/19 18:41	190712−4	1892196
7440−70−2	Calcium	40600	ug/L		50	200	200	1	P	HSC	07/17/19 12:44	071719−1	1892371
7440−47−3	Chromium	3.8	ug/L	B	3	10	10	1	MS	SKJ	07/12/19 18:41	190712−4	1892196
7440−48−4	Cobalt	0.30	ug/L	U	0.3	1	1	1	MS	SKJ	07/12/19 18:41	190712−4	1892196
7440−50−8	Copper	0.30	ug/L	U	0.3	2	2	1	MS	SKJ	07/15/19 10:33	190715−5	1892196
7439−89−6	Iron	135	ug/L		30	100	100	1	P	HSC	07/17/19 12:44	071719−1	1892371
7439−92−1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	SKJ	07/12/19 18:41	190712−4	1892196
7439−95−4	Magnesium	12000	ug/L		110	300	300	1	P	HSC	07/17/19 12:44	071719−1	1892371
7439−96−5	Manganese	15.9	ug/L		1	5	5	1	MS	SKJ	07/12/19 18:41	190712−4	1892196
7439−98−7	Molybdenum	6.78	ug/L		0.2	1	1	1	MS	SKJ	07/12/19 18:41	190712−4	1892196
7440−02−0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	SKJ	07/12/19 18:41	190712−4	1892196
7440−09−7	Potassium	6260	ug/L		50	150	150	1	P	HSC	07/17/19 12:44	071719−1	1892371
7782−49−2	Selenium	2.81	ug/L	B	2	5	5	1	MS	SKJ	07/12/19 18:41	190712−4	1892196
7440−22−4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	SKJ	07/12/19 18:41	190712−4	1892196
7440−23−5	Sodium	22700	ug/L		100	300	300	1	P	HSC	07/17/19 12:44	071719−1	1892371
7440−24−6	Strontium	208	ug/L		2	10	10	1	MS	SKJ	07/12/19 18:41	190712−4	1892196
7440−28−0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	SKJ	07/12/19 18:41	190712−4	1892196
7440−29−1	Thorium	0.70	ug/L	U	0.7	2	2	1	MS	SKJ	07/12/19 18:41	190712−4	1892196
7440−31−5	Tin	1	ug/L	U	1	5	5	1	MS	SKJ	07/12/19 18:41	190712−4	1892196
7440−61−1	Uranium	8.78	ug/L		0.067	0.2	0.2	1	MS	SKJ	07/15/19 10:33	190715−5	1892196
7440−62−2	Vanadium	18.8	ug/L		1	5	5	1	P	HSC	07/17/19 12:44	071719−1	1892371
7440−66−6	Zinc	6.12	ug/L	B	3.3	20	20	1	MS	SKJ	07/12/19 18:41	190712−4	1892196

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1892196	1892195	SW846 3005A	50	mL	50	mL	07/09/19	HH1
1892371	1892370	SW846 3005A	50	mL	50	mL	07/09/19	HH1

***Analytical Methods:**

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

P	**SW846 3005A/6010D**
MS	**SW846 3005A/6020B**

Quality Control Summary

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

QC Summary

Report Date: July 19, 2019

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

Contact: **Mr. Scot Fitzgerald**

Workorder: **482811**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch 1892196											
QC1204321403 LCS											
Aluminum	2000			2080	ug/L		104	(80%-120%)	SKJ	07/12/19	17:19
Antimony	50.0			51.3	ug/L		103	(80%-120%)			
Arsenic	50.0			53.5	ug/L		107	(80%-120%)			
Barium	50.0			53.3	ug/L		107	(80%-120%)			
Beryllium	50.0			57.1	ug/L		114	(80%-120%)			
Cadmium	50.0			53.5	ug/L		107	(80%-120%)			
Chromium	50.0			51.8	ug/L		104	(80%-120%)			
Cobalt	50.0			51.3	ug/L		103	(80%-120%)			
Copper	50.0			53.8	ug/L		108	(80%-120%)		07/15/19	09:36
Lead	50.0			49.9	ug/L		99.9	(80%-120%)		07/12/19	17:19
Manganese	50.0			51.1	ug/L		102	(80%-120%)			
Molybdenum	50.0			52.8	ug/L		106	(80%-120%)			
Nickel	50.0			51.8	ug/L		104	(80%-120%)			

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QC Summary

Workorder: **482811**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS										
Batch 1892196										
Selenium	50.0			52.1	ug/L		104	(80%-120%)	SKJ	07/12/19 17:19
Silver	50.0			55.5	ug/L		111	(80%-120%)		
Strontium	50.0			51.2	ug/L		102	(80%-120%)		
Thallium	50.0			47.2	ug/L		94.4	(80%-120%)		
Thorium	50.0			49.7	ug/L		99.4	(80%-120%)		
Tin	50.0			52.0	ug/L		104	(80%-120%)		
Uranium	50.0			52.2	ug/L		104	(80%-120%)		07/15/19 09:36
Zinc	50.0			57.6	ug/L		115	(80%-120%)		07/12/19 17:19
QC1204321402 MB										
Aluminum			U	19.3	ug/L					07/12/19 17:16
Antimony			U	1.00	ug/L					
Arsenic			U	2.00	ug/L					
Barium			U	0.670	ug/L					
Beryllium			U	0.200	ug/L					
Cadmium			U	0.300	ug/L					
Chromium			U	3.00	ug/L					

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QC Summary

Workorder: **482811**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS										
Batch 1892196										
Cobalt			U	0.300	ug/L				SKJ	07/12/19 17:16
Copper			U	0.300	ug/L					07/15/19 09:34
Lead			U	0.500	ug/L					07/12/19 17:16
Manganese			U	1.00	ug/L					
Molybdenum			U	0.200	ug/L					
Nickel			U	0.600	ug/L					
Selenium			U	2.00	ug/L					
Silver			U	0.300	ug/L					
Strontium			U	2.00	ug/L					
Thallium			U	0.600	ug/L					
Thorium			U	0.700	ug/L					
Tin			U	1.00	ug/L					
Uranium			U	0.067	ug/L					07/15/19 09:34
Zinc			U	3.30	ug/L					07/12/19 17:16
QC1204321404 482810001 MS										
Aluminum	2000	U	19.3	1940	ug/L		97	(75%-125%)		07/12/19 17:26

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QC Summary

Workorder: **482811**

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS												
Batch 1892196												
Antimony	50.0	U	1.00		50.0	ug/L		98.7	(75%-125%)	SKJ	07/12/19	17:26
Arsenic	50.0		21.1		69.2	ug/L		96.2	(75%-125%)			
Barium	50.0		22.1		70.5	ug/L		96.8	(75%-125%)			
Beryllium	50.0	U	0.200		51.5	ug/L		103	(75%-125%)			
Cadmium	50.0	U	0.300		49.2	ug/L		98.4	(75%-125%)			
Chromium	50.0	B	3.75		51.4	ug/L		95.3	(75%-125%)			
Cobalt	50.0	U	0.300		47.7	ug/L		95.1	(75%-125%)			
Copper	50.0	B	1.93		49.5	ug/L		95.2	(75%-125%)		07/15/19	09:41
Lead	50.0	U	0.500		45.8	ug/L		91.6	(75%-125%)		07/12/19	17:26
Manganese	50.0	U	1.00		47.6	ug/L		94.3	(75%-125%)			
Molybdenum	50.0		11.8		63.8	ug/L		104	(75%-125%)			
Nickel	50.0	B	0.605		46.5	ug/L		91.7	(75%-125%)			
Selenium	50.0	B	3.37		51.3	ug/L		95.8	(75%-125%)			
Silver	50.0	U	0.300		49.3	ug/L		98.6	(75%-125%)			
Strontium	50.0	N	199	N	233	ug/L		68.3*	(75%-125%)			

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QC Summary

Workorder: **482811**

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS											
Batch 1892196											
Thallium	50.0	U	0.600		43.0	ug/L		86	(75%-125%)	SKJ	07/12/19 17:26
Thorium	50.0	U	0.700		48.8	ug/L		97.6	(75%-125%)		
Tin	50.0	B	1.68		50.8	ug/L		98.2	(75%-125%)		
Uranium	50.0		23.6		72.0	ug/L		96.8	(75%-125%)		07/15/19 09:41
Zinc	50.0	B	5.89		52.1	ug/L		92.4	(75%-125%)		07/12/19 17:26
QC1204321405 482810001 MSD											
Aluminum	2000	U	19.3		1820	ug/L	6.77	90.6	(0%-20%)		07/12/19 17:29
Antimony	50.0	U	1.00		48.1	ug/L	4.05	94.8	(0%-20%)		
Arsenic	50.0		21.1		66.5	ug/L	4.05	90.7	(0%-20%)		
Barium	50.0		22.1		66.6	ug/L	5.82	88.8	(0%-20%)		
Beryllium	50.0	U	0.200		49.0	ug/L	4.85	98	(0%-20%)		
Cadmium	50.0	U	0.300		47.4	ug/L	3.68	94.8	(0%-20%)		
Chromium	50.0	B	3.75		48.8	ug/L	5.13	90.2	(0%-20%)		
Cobalt	50.0	U	0.300		45.6	ug/L	4.43	90.9	(0%-20%)		
Copper	50.0	B	1.93		46.2	ug/L	7	88.5	(0%-20%)		07/15/19 09:43
Lead	50.0	U	0.500		42.4	ug/L	7.65	84.8	(0%-20%)		07/12/19 17:29

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QC Summary

Workorder: **482811**

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS											
Batch 1892196											
Manganese	50.0	U	1.00		45.9	ug/L	3.6	91	(0%-20%)	SKJ	07/12/19 17:29
Molybdenum	50.0		11.8		60.2	ug/L	5.78	96.8	(0%-20%)		
Nickel	50.0	B	0.605		44.0	ug/L	5.53	86.7	(0%-20%)		
Selenium	50.0	B	3.37		49.8	ug/L	2.98	92.8	(0%-20%)		
Silver	50.0	U	0.300		46.9	ug/L	4.92	93.8	(0%-20%)		
Strontium	50.0	N	199	N	227	ug/L	2.77	55.6 *	(0%-20%)		
Thallium	50.0	U	0.600		40.1	ug/L	7	80.2	(0%-20%)		
Thorium	50.0	U	0.700		44.6	ug/L	9.02	89.2	(0%-20%)		
Tin	50.0	B	1.68		49.1	ug/L	3.31	94.9	(0%-20%)		
Uranium	50.0		23.6		68.1	ug/L	5.51	89.1	(0%-20%)		07/15/19 09:43
Zinc	50.0	B	5.89		51.9	ug/L	0.321	92.1	(0%-20%)		07/12/19 17:29
QC1204329796 482810001 PS											
Strontium	50.0	N	199		243	ug/L		86.9	(75%-125%)		07/12/19 17:32
QC1204321406 482810001 SDILT											
Aluminum		U	4.58	DU	96.5	ug/L	N/A		(0%-20%)		07/12/19 17:35
Antimony		U	0.670	DU	5.00	ug/L	N/A		(0%-20%)		
Arsenic			21.1	BD	4.11	ug/L	2.8		(0%-20%)		

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QC Summary

Workorder: **482811**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS										
Batch 1892196										
Barium		22.1	D	4.34	ug/L	2.1		(0%-20%)	SKJ	07/12/19 17:35
Beryllium	U	0.006	DU	1.00	ug/L	N/A		(0%-20%)		
Cadmium	U	0.011	DU	1.50	ug/L	N/A		(0%-20%)		
Chromium	B	3.75	DU	15.0	ug/L	N/A		(0%-20%)		
Cobalt	U	0.170	DU	1.50	ug/L	N/A		(0%-20%)		
Copper	B	1.93	BD	0.416	ug/L	8		(0%-20%)		07/15/19 09:47
Lead	U	0.018	DU	2.50	ug/L	N/A		(0%-20%)		07/12/19 17:35
Manganese	U	0.419	DU	5.00	ug/L	N/A		(0%-20%)		
Molybdenum		11.8	D	2.20	ug/L	7.08		(0%-20%)		
Nickel	B	0.605	DU	3.00	ug/L	N/A		(0%-20%)		
Selenium	B	3.37	DU	10.0	ug/L	N/A		(0%-20%)		
Silver	U	0.007	DU	1.50	ug/L	N/A		(0%-20%)		
Strontium	N	199	D	35.3	ug/L	11.3		(0%-20%)		
Thallium	U	0.028	DU	3.00	ug/L	N/A		(0%-20%)		
Thorium	U	0.047	DU	3.50	ug/L	N/A		(0%-20%)		

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QC Summary

Workorder: **482811**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS										
Batch 1892196										
Tin	B	1.68	DU	5.00	ug/L	N/A		(0%-20%)	SKJ	07/12/19 17:35
Uranium		23.6	D	4.81	ug/L	1.89		(0%-20%)		07/15/19 09:47
Zinc	B	5.89	DU	16.5	ug/L	N/A		(0%-20%)		07/12/19 17:35
Batch 1894518										
QC1204326881 LCS										
Aluminum	2000			1950	ug/L		97.4	(80%-120%)	PRB	07/12/19 02:55
Antimony	50.0			48.4	ug/L		96.8	(80%-120%)		
Arsenic	50.0			49.0	ug/L		98	(80%-120%)		
Barium	50.0			50.3	ug/L		101	(80%-120%)		
Beryllium	50.0			55.9	ug/L		112	(80%-120%)		
Cadmium	50.0			50.3	ug/L		101	(80%-120%)		
Chromium	50.0			48.0	ug/L		95.9	(80%-120%)		
Cobalt	50.0			48.3	ug/L		96.6	(80%-120%)		
Copper	50.0			47.8	ug/L		95.7	(80%-120%)		
Lead	50.0			47.4	ug/L		94.9	(80%-120%)		
Manganese	50.0			47.0	ug/L		93.9	(80%-120%)		
Molybdenum	50.0			50.5	ug/L		101	(80%-120%)		

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QC Summary

Workorder: **482811**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS										
Batch 1894518										
Nickel	50.0			47.5	ug/L		95.1	(80%-120%)	PRB	07/12/19 02:55
Selenium	50.0			48.5	ug/L		96.9	(80%-120%)		
Silver	50.0			52.0	ug/L		104	(80%-120%)		
Strontium	50.0			50.0	ug/L		99.9	(80%-120%)		
Thallium	50.0			45.2	ug/L		90.3	(80%-120%)		
Thorium	50.0			48.0	ug/L		96	(80%-120%)		
Tin	50.0			49.0	ug/L		98	(80%-120%)		
Uranium	50.0			48.7	ug/L		97.4	(80%-120%)		07/12/19 04:44
Zinc	50.0			50.2	ug/L		100	(80%-120%)		07/12/19 02:55
QC1204326880 MB										
Aluminum			U	19.3	ug/L					07/12/19 02:52
Antimony			U	1.00	ug/L					
Arsenic			U	2.00	ug/L					
Barium			U	0.670	ug/L					
Beryllium			U	0.200	ug/L					
Cadmium			U	0.300	ug/L					

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QC Summary

Workorder: **482811**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch 1894518											
Chromium			U	3.00	ug/L				PRB	07/12/19	02:52
Cobalt			U	0.300	ug/L						
Copper			U	0.300	ug/L						
Lead			U	0.500	ug/L						
Manganese			U	1.00	ug/L						
Molybdenum			B	0.327	ug/L						
Nickel			U	0.600	ug/L						
Selenium			U	2.00	ug/L						
Silver			U	0.300	ug/L						
Strontium			U	2.00	ug/L						
Thallium			U	0.600	ug/L						
Thorium			U	0.700	ug/L						
Tin			U	1.00	ug/L						
Uranium			B	0.073	ug/L					07/12/19	04:41
Zinc			U	3.30	ug/L					07/12/19	02:52

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QC Summary

Workorder: **482811**

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS											
Batch 1894518											
QC1204326882 482811002 MS											
Aluminum	2000	U	19.3		1890	ug/L		94.4	(75%-125%)	PRB	07/12/19 03:01
Antimony	50.0	U	1.00		48.6	ug/L		96.4	(75%-125%)		
Arsenic	50.0		6.39		53.4	ug/L		94.1	(75%-125%)		
Barium	50.0		48.9		98.1	ug/L		98.4	(75%-125%)		
Beryllium	50.0	U	0.200		53.9	ug/L		108	(75%-125%)		
Cadmium	50.0	U	0.300		49.6	ug/L		99.2	(75%-125%)		
Chromium	50.0	B	3.15		48.8	ug/L		91.3	(75%-125%)		
Cobalt	50.0	U	0.300		45.5	ug/L		90.8	(75%-125%)		
Copper	50.0	B	0.928		43.4	ug/L		85	(75%-125%)		
Lead	50.0	U	0.500		44.8	ug/L		89.4	(75%-125%)		
Manganese	50.0		14.0		58.8	ug/L		89.6	(75%-125%)		
Molybdenum	50.0	C	6.47		58.0	ug/L		103	(75%-125%)		
Nickel	50.0	U	0.600		44.0	ug/L		87.3	(75%-125%)		
Selenium	50.0		5.65		53.4	ug/L		95.4	(75%-125%)		
Silver	50.0	U	0.300		49.7	ug/L		99.5	(75%-125%)		

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QC Summary

Workorder: **482811**

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS											
Batch 1894518											
Strontium	50.0		278		344	ug/L		N/A	(75%-125%)	PRB	07/12/19 03:01
Thallium	50.0	U	0.600		43.4	ug/L		86.2	(75%-125%)		
Thorium	50.0	U	0.700		47.4	ug/L		94.6	(75%-125%)		
Tin	50.0	U	1.00		50.3	ug/L		100	(75%-125%)		
Uranium	50.0		13.8		62.6	ug/L		97.6	(75%-125%)		07/12/19 04:50
Zinc	50.0	B	9.99		54.2	ug/L		88.3	(75%-125%)		07/12/19 03:01
QC1204326883 482811002 MSD											
Aluminum	2000	U	19.3		1830	ug/L	3.33	91.3	(0%-20%)		07/12/19 03:04
Antimony	50.0	U	1.00		47.4	ug/L	2.59	93.9	(0%-20%)		
Arsenic	50.0		6.39		54.1	ug/L	1.23	95.4	(0%-20%)		
Barium	50.0		48.9		97.1	ug/L	1	96.4	(0%-20%)		
Beryllium	50.0	U	0.200		50.7	ug/L	6.08	101	(0%-20%)		
Cadmium	50.0	U	0.300		47.4	ug/L	4.66	94.7	(0%-20%)		
Chromium	50.0	B	3.15		48.0	ug/L	1.78	89.6	(0%-20%)		
Cobalt	50.0	U	0.300		44.5	ug/L	2.26	88.8	(0%-20%)		
Copper	50.0	B	0.928		43.5	ug/L	0.092	85.1	(0%-20%)		

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QC Summary

Workorder: **482811**

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS											
Batch 1894518											
Lead	50.0	U	0.500		44.2	ug/L	1.44	88.1	(0%-20%)	PRB	07/12/19 03:04
Manganese	50.0		14.0		57.5	ug/L	2.22	87	(0%-20%)		
Molybdenum	50.0	C	6.47		56.2	ug/L	3.18	99.5	(0%-20%)		
Nickel	50.0	U	0.600		43.2	ug/L	1.89	85.6	(0%-20%)		
Selenium	50.0		5.65		53.4	ug/L	0.103	95.5	(0%-20%)		
Silver	50.0	U	0.300		47.7	ug/L	4.1	95.5	(0%-20%)		
Strontium	50.0		278		331	ug/L	3.84	N/A	(0%-20%)		
Thallium	50.0	U	0.600		42.7	ug/L	1.51	84.9	(0%-20%)		
Thorium	50.0	U	0.700		46.9	ug/L	1.12	93.5	(0%-20%)		
Tin	50.0	U	1.00		48.8	ug/L	3.16	96.8	(0%-20%)		
Uranium	50.0		13.8		62.0	ug/L	0.97	96.4	(0%-20%)		07/12/19 04:54
Zinc	50.0	B	9.99		54.6	ug/L	0.817	89.2	(0%-20%)		07/12/19 03:04
QC1204326884 482811002 SDILT											
Aluminum		U	3.95	DU	96.5	ug/L	N/A		(0%-20%)		07/12/19 03:11
Antimony		U	0.400	DU	5.00	ug/L	N/A		(0%-20%)		
Arsenic			6.39	DU	10.0	ug/L	N/A		(0%-20%)		

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QC Summary

Workorder: **482811**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS										
Batch 1894518										
Barium		48.9	D	9.37	ug/L	4.26		(0%-20%)	PRB	07/12/19 03:11
Beryllium	U	0.025	DU	1.00	ug/L	N/A		(0%-20%)		
Cadmium	U	0.018	DU	1.50	ug/L	N/A		(0%-20%)		
Chromium	B	3.15	DU	15.0	ug/L	N/A		(0%-20%)		
Cobalt	U	0.085	DU	1.50	ug/L	N/A		(0%-20%)		
Copper	B	0.928	DU	1.50	ug/L	N/A		(0%-20%)		
Lead	U	0.164	DU	2.50	ug/L	N/A		(0%-20%)		
Manganese		14.0	BD	2.74	ug/L	2.24		(0%-20%)		
Molybdenum	C	6.47	D	1.28	ug/L	.974		(0%-20%)		
Nickel	U	0.353	DU	3.00	ug/L	N/A		(0%-20%)		
Selenium		5.65	DU	10.0	ug/L	N/A		(0%-20%)		
Silver	U	0.005	DU	1.50	ug/L	N/A		(0%-20%)		
Strontium		278	D	52.3	ug/L	6.07		(0%-20%)		
Thallium	U	0.294	DU	3.00	ug/L	N/A		(0%-20%)		
Thorium	U	0.109	DU	3.50	ug/L	N/A		(0%-20%)		

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QC Summary

Workorder: **482811**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS										
Batch 1894518										
Tin	U	0.347	DU	5.00	ug/L	N/A		(0%-20%)	PRB	07/12/19 03:11
Uranium		13.8	D	2.75	ug/L	.283		(0%-20%)		07/12/19 05:00
Zinc	B	9.99	DU	16.5	ug/L	N/A		(0%-20%)		07/12/19 03:11
Metals Analysis-ICP										
Batch 1892371										
QC1204321889 LCS										
Boron	500			474	ug/L		94.8	(80%-120%)	HSC	07/17/19 11:17
Calcium	5000			4680	ug/L		93.5	(80%-120%)		
Iron	5000			4620	ug/L		92.4	(80%-120%)		
Magnesium	5000			4560	ug/L		91.1	(80%-120%)		
Potassium	5000			4420	ug/L		88.3	(80%-120%)		
Sodium	5000			4520	ug/L		90.5	(80%-120%)		
Vanadium	500			481	ug/L		96.2	(80%-120%)		
QC1204321888 MB										
Boron			U	15.0	ug/L					07/17/19 11:14
Calcium			U	50.0	ug/L					
Iron			U	30.0	ug/L					
Magnesium			U	110	ug/L					

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QC Summary

Workorder: **482811**

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1892371											
Potassium				U	50.0	ug/L				HSC	07/17/19 11:14
Sodium				U	100	ug/L					
Vanadium				U	1.00	ug/L					
QC1204321890 482810001 MS											
Boron	500		135		657	ug/L		104	(75%-125%)		07/17/19 11:24
Calcium	5000		35700		40300	ug/L		N/A	(75%-125%)		
Iron	5000	U	30.0		5080	ug/L		101	(75%-125%)		
Magnesium	5000		9740		14800	ug/L		101	(75%-125%)		
Potassium	5000		9580		14400	ug/L		96.9	(75%-125%)		
Sodium	5000		99500		105000	ug/L		N/A	(75%-125%)		
Vanadium	500		15.2		526	ug/L		102	(75%-125%)		
QC1204321891 482810001 MSD											
Boron	500		135		658	ug/L	0.131	105	(0%-20%)		07/17/19 11:28
Calcium	5000		35700		38600	ug/L	4.15	N/A	(0%-20%)		
Iron	5000	U	30.0		5060	ug/L	0.284	101	(0%-20%)		
Magnesium	5000		9740		14300	ug/L	2.98	92	(0%-20%)		
Potassium	5000		9580		14000	ug/L	2.95	88.5	(0%-20%)		

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QC Summary

Workorder: **482811**

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP												
Batch 1892371												
Sodium	5000		99500		99800	ug/L	5.25	N/A	(0%-20%)	HSC	07/17/19	11:28
Vanadium	500		15.2		533	ug/L	1.34	104	(0%-20%)			
QC1204321892 482810001 SDILT												
Boron			135	BD	27.3	ug/L	.877		(0%-20%)		07/17/19	11:31
Calcium			35700	D	6790	ug/L	4.77		(0%-20%)			
Iron		U	6.25	DU	150	ug/L	N/A		(0%-20%)			
Magnesium			9740	D	1850	ug/L	4.9		(0%-20%)			
Potassium			9580	D	1870	ug/L	2.31		(0%-20%)			
Sodium			99500	D	19200	ug/L	3.68		(0%-20%)			
Vanadium			15.2	BD	3.06	ug/L	.886		(0%-20%)			

Notes:

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.
- E Reported value is estimated due to interferences. See comment in narrative.
- M Duplicate precision not met.
- N Spike Sample recovery is outside control limits.
- S Reported value determined by the Method of Standard Additions (MSA)
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- W Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.

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QC Summary

Workorder: **482811**

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

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
SDG #: GEL482811
Work Order #: 482811

Product: **9310_ALPHABETA_GPC: Gross Alpha**
Analytical Method: 9310_ALPHABETA_GPC
Analytical Procedure: GL-RAD-A-001 REV# 20
Analytical Batch: 1890915

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

GEL Sample ID#	Client Sample Identification
482811005	B3PD03
482811006	B3PD04
1204318194	Method Blank (MB)
1204318195	482958002(NonSDG) Sample Duplicate (DUP)
1204318196	482958002(NonSDG) Matrix Spike (MS)
1204318197	482958002(NonSDG) Matrix Spike Duplicate (MSD)
1204318198	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
Samples 1204318196 (Non SDG 482958002MS) and 1204318197 (Non SDG 482958002MSD) were recounted due to high recovery. The recounts are reported. Sample 1204318195 (Non SDG 482958002DUP) was recounted due to high relative percent difference/relative error ratio. The recount is reported.

Miscellaneous Information

Additional Comments
The matrix spike and matrix spike duplicate, 1204318196 (Non SDG 482958002MS) and 1204318197 (Non SDG 482958002MSD), aliquots were reduced to conserve sample volume.

Certification Statement

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

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Qualifier Definition Report
for

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL482811 GEL Work Order: 482811

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: 19 JUL 2019 **Title: Group Leader**

Sample Data Summary

Rad
Certificate of Analysis
Sample Summary

SDG Number:	**GEL482811**	**Client:**	**CPRC001**	**Project:**	**CPRC0S19006**
Lab Sample ID:	**482811005**	**Date Collected:**	**06/23/2019 07:00**	**Matrix:**	**WATER**
		Date Received:	**06/25/2019 08:55**		
Client ID:	**B3PD03**			**Prep Basis:**	**"As Received"**
Batch ID:	**1890915**	**Method:**	**9310_ALPHABETA_GPC**	**SOP Ref:**	**GL-RAD-A-001**
Run Date:	**07/01/2019 14:35**	**Analyst:**	**HXB2**	**Instrument:**	**PIC3C**
Data File:	**AB1890915r2.xls**	**Aliquot:**	**150 mL**	**Count Time:**	**70 min**
Prep Batch:	**1890915**	**Prep Method:**	**EPA 900.0/SW846 9310**		
Prep Date:	**07/01/2019 10:33**				

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-46-1	Alpha *ALPHA*	U	0.344	pCi/L	+/-1.53	1.53	2.91	3.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits

Comments:

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

Rad
Certificate of Analysis
Sample Summary

SDG Number:	**GEL482811**	**Client:**	**CPRC001**	**Project:**	**CPRC0S19006**
Lab Sample ID:	**482811006**	**Date Collected:**	**06/23/2019 09:07**	**Matrix:**	**WATER**
		Date Received:	**06/25/2019 08:55**		
Client ID:	**B3PD04**			**Prep Basis:**	**"As Received"**
Batch ID:	**1890915**	**Method:**	**9310_ALPHABETA_GPC**	**SOP Ref:**	**GL-RAD-A-001**
Run Date:	**07/01/2019 14:36**	**Analyst:**	**HXB2**	**Instrument:**	**PIC1C**
Data File:	**AB1890915r2.xls**	**Aliquot:**	**150 mL**	**Count Time:**	**90 min**
Prep Batch:	**1890915**	**Prep Method:**	**EPA 900.0/SW846 9310**		
Prep Date:	**07/01/2019 10:33**				

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-46-1	Alpha *ALPHA*		7.78	pCi/L	+/-3.16	3.44	2.84	3.00

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
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QC Summary

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

Workorder: **482811**

Report Date: July 2, 2019

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gas Flow									
Batch 1890915									
QC1204318194 MB									
Alpha			U	1.17	pCi/L			HXB2	07/01/1914:35
Uncert:				+/-1.47					
TPU:				+/-1.49					
QC1204318195 482958002 DUP									
Alpha		U 1.78	U	1.32	pCi/L				07/02/1909:33
Uncert:		+/-1.93		+/-1.79		RPD:	0	N/A	
TPU:		+/-1.96		+/-1.81		RER:	0.333	(0-2)	
QC1204318196 482958002 MS									
Alpha	251	U 1.78		305	pCi/L	REC:	122	(75%-125%)	07/02/1906:27
Uncert:		+/-1.93		+/-32.0					
TPU:		+/-1.96		+/-59.2					
QC1204318197 482958002 MSD									
Alpha	251	U 1.78		269	pCi/L	REC:	107	(75%-125%)	07/02/1906:27
Uncert:		+/-1.93		+/-28.3		RPD:	13	(0%-20%)	
TPU:		+/-1.96		+/-53.7		RER:	0.898	(0-2)	
QC1204318198 LCS									
Alpha	83.5			87.4	pCi/L	REC:	105	(80%-120%)	07/01/1914:35
Uncert:				+/-8.24					
TPU:				+/-16.9					

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 analyte was detected in the associated method blank >/= MDC or >5% sample activity.
C	Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples.
D	Results are reported from a diluted aliquot of sample.
E	Reported value is estimated due to interferences. See comment in narrative.
M	Duplicate precision not met.
N	Spike Sample recovery is outside control limits.
S	Reported value determined by the Method of Standard Additions (MSA)
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
UX	Gamma Spectroscopy--Uncertain identification
W	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

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QC Summary

Workorder: **482811**

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

o Analyte failed to recover within LCS limits

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
** Indicates analyte is a surrogate compound.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the 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.