

September 14, 2017

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

Re: CHPRC SAF S17-008
Work Order: 430973
SDG: GEL430973

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on August 18, 2017. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,



Heather Shaffer
Project Manager

Purchase Order: 300071 - 7H
Chain of Custody: S17-008-254, S17-008-259, S17-008-262, S17-008-263, S17-008-264, S17-008-266,
S17-008-267, S17-008-322, S17-008-323 and S17-008-721
Enclosures



SAMPLE ISSUE RESOLUTION (SIR) REPORT

SIR Number: SIR18-0463
Rev. Number: 0
Date Initiated: 02/12/2018

SAMPLE EVENT INFORMATION

SAF NUM(S): S17-008
LABORATORY: GEL

SAMPLING INFORMATION

NUMBER OF SAMPLES: 1
SAMPLE NUMBERS: B3BFP8
SAMPLE MATRIX: WATER
SDG NUM(S): GEL430973

ISSUE BACKGROUND

CLASS: Chain of Custody Issue (Field)
TYPE: Sample Time is Illegible
DESCRIPTION: COC S17-008-259, SAMPLE B3BFP8; Sample time is illegible.

RESOLUTION

PROPOSED RESOLUTION: Sample time will be recored as 09:41 per groundwater sample report 49439.

FINAL RESOLUTION: DOCUMENT AND CLOSE

SUBMITTED BY:

GIBSON, GG

02/12/2018

ACCEPTED BY:

KILLAND, KE

02/12/2018

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Case Narrative

**General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF S17-008
SDG: GEL430973**

September 14, 2017

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 August 18, 2017, for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

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

Sample Identification

The laboratory received the following samples:

<u>Laboratory Identification</u>	<u>Sample Description</u>
430973001	B3BKD9
430973002	B3BFJ8
430973003	B3BFP8
430973004	B3BKJ9
430973005	B3BFT9
430973006	B3BFW0
430973007	B3BKK3
430973008	B3BFW3
430973009	B3BFX9
430973010	B3BM56
430973011	B3BFY0
430973012	B3BM60
430973013	B3BJ38
430973014	B3BLF4
430973015	B3BJ39
430973016	B3BLF3
430973017	B3BN72
430973018	B3BN73

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: GC/MS Volatile, Metals and Radiochemistry.

We certify that this package is in compliance with the SOW, both technically and for completeness, including a full description of, explanation of, and corrective actions for, any and all deviations, from either the analyses requested or the case narrative requested. Release of the data contained in this hard copy data package has been authorized by the Laboratory Analytical Manager (or designee) and the laboratory's client services representative as verified by their signatures on this report.



Heather Shaffer
Project Manager

Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL430973
Work Order #: 430973

GC/MS Volatile

Volatile Organic Compounds (VOC) by Gas Chromatograph/Mass Spectrometer

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

Continuing Calibration Verification Requirements

The calibration verification standard requirements were not all met for samples . Acetone recovered at 26.4%D/drift; 1,1,1-Trichloroethane recovered at 21.5%D/drift and Bromoform recovered at 24.5%D/drift in the daily CCV analyzed on 8/28/17. Acetone recovered at 24.8%D/drift in the daily CCV analyzed on 8/29/17. There were no positive results for any of the analytes that were outside the calibration criteria. The results are reported.

Quality Control (QC) Information

Matrix Spike/Matrix Spike Duplicate Recovery Statement

The spike and/or spike duplicate (See Below) recoveries were not all within the acceptance limits. The recoveries were similar. It is believed possible matrix interference has been demonstrated.

Sample	Analyte	Value
1203864669 (Non SDG 431261001PS)	2-Butanone	51* (70%-130%)
	Acetone	43* (70%-130%)
1203864670 (Non SDG 431261001PSD)	2-Butanone	62* (70%-130%)
	Acetone	51* (70%-130%)

Metals

Determination of Metals by ICP-MS

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

Radiochemistry

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**

Sample 430973018 (B3BN73) was recounted due to results more negative than the three sigma TPU. The second count is reported. Sample 1203859731 (MB) was taken through additional clean-up steps and recounted due to a suspected blank false positive. The recount is reported. Sample 430973006 (B3BFW0) was taken through additional clean-up steps and recounted to confirm the result. The recount is reported.

C14_LSC: COMMON

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

Miscellaneous Information**Additional Comments**

The matrix spike, 1203862461 (B3BFP1MS), aliquot was reduced to conserve sample volume.

TRITIUM_DIST_LSC: COMMON

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

Miscellaneous Information**Additional Comments**

The matrix spike, 1203868438 (Non SDG 430607001MS), aliquot was reduced to conserve sample volume.

Certification Statement

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

Chain of Custody and Supporting Documentation

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		C.O.C.# S17-008-259 Page 1 of 1																											
CH2M Hill Plateau Remediation Company 430973		Telephone No.: 509-376-4650 Purchase Order/Charge Code: 300071																											
Collector: MIKE ESPARZA CHPRC S17-008	Contact/Requester: Karen Waters-Husted Hanford Site	Ice Chest No.: 6WS-565 Bill of Lading/Air Bill No.: 7700 43B232 Offsite Property No.: 8379																											
SAF No.: SURV, AUGUST 2017	Sampling Origin: Hanford Site																												
Project Title: SURV, AUGUST 2017	Logbook No.: HNF-N-506 - 95-21																												
Shipped To (Lab): GEL Laboratories, LLC	Method of Shipment: Commercial Carrier																												
Protocol: SURV	Priority: 30 Days																												
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																													
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Sample No.</th> <th>Filter</th> <th>*</th> <th>Date</th> <th>Time</th> <th>No/Type Container</th> <th>Sample Analysis</th> <th>Holding Time</th> <th>Preservative</th> </tr> </thead> <tbody> <tr> <td>B3BFP8</td> <td>N</td> <td>W</td> <td>AUG 17 2017</td> <td>09:11</td> <td>1x500-mL G/P</td> <td>C14_LSC: COMMON</td> <td>6 Months</td> <td>None</td> </tr> <tr> <td>B3BFP8</td> <td>N</td> <td>W</td> <td></td> <td></td> <td>1x1-L G/P</td> <td>SRISO_SEP_PRECIP_GPC: COMMON</td> <td>6 Months</td> <td>HNO3 to pH <2</td> </tr> </tbody> </table>			Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative	B3BFP8	N	W	AUG 17 2017	09:11	1x500-mL G/P	C14_LSC: COMMON	6 Months	None	B3BFP8	N	W			1x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2
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CH2MHill Plateau Remediation Company
 C.O.C.# S17-008-264
 Page 1 of 1

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

430973

Collector: Juan Aguilar
 Contact/Requester: Karen Waters-Husted
 Telephone No.: 509-376-4650
 SAF No.: S17-008
 Sampling Origin: Hanford Site
 Purchase Order/Charge Code: 300071
 Project Title: SURV, AUGUST 2017
 Logbook No.: HNF-N-506 - 9426-27
 Ice Chest No.: CWS-399
 Shipped To (Lab): GEL Laboratories, LLC
 Method of Shipment: Commercial Carrier
 Bill of Lading/Air Bill No.: 770050472776
 Protocol: SURV
 Priority: 30 Days
 Offsite Property No.: 8333

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
B3BKK3	Y	W	8-17-17	1252	1x500-mL G/P	6020_METALS_ICPMS: Chromium (1)	6 Months	HNO3 to pH <2
B3BFW3	N	W			1x500-mL G/P	6020_METALS_ICPMS: Chromium (1)	6 Months	HNO3 to pH <2
B3BFW3	N	W			5x40-mL aGS*	8260_VOA_GCMS: COMMON	14 Days	HCl or H2SO4 to pH <2 / Cool <=6C
B3BFW3	N	W			1x500-mL G/P	C14_LSC: COMMON	6 Months	None
B3BFW3	N	W	8-17-17	1252	1x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2

Relinquished By: Juan Aguilar
 Signature: [Signature] Date/Time: AUG 17 2017 1300
 Print First and Last Name: Juan Aguilar
 Received By: Janelle Zunker
 Signature: [Signature] Date/Time: AUG 17 2017 1300
 Print First and Last Name: Janelle Zunker
 Relinquished By: Janelle Zunker
 Signature: [Signature] Date/Time: AUG 17 2017 1400
 Print First and Last Name: Janelle Zunker
 Received By: FEDEX
 Signature: [Signature] Date/Time: 8/18/17 9:08 AM
 Print First and Last Name: FEDEX
 Relinquished By: Janelle Zunker
 Signature: [Signature] Date/Time: 8/18/17 9:08 AM
 Print First and Last Name: Janelle Zunker
 Received By: Janelle Zunker
 Signature: [Signature] Date/Time: 8/18/17 9:08 AM
 Print First and Last Name: Janelle Zunker

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

FINAL SAMPLE DISPOSITION
 Disposal Method (e.g., Return to customer, per lab procedure, used in process):
 Disposed By:
 Date/Time:

CH2MH11 Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST
4309473

C.O.C. # **S17-008-267**
Page 1 of 1

Collector: MIKE ESPARZA
CHPRC

SAF No.: S17-008

Project Title: SURV, AUGUST 2017

Shipped To (Lab): GEL Laboratories, LLC

Protocol: SURV

Contact/Requester: Karen Waters-Husted

Sampling Origin: Hanford Site

Logbook No.: HNF-N-506 95-21

Method of Shipment: Commercial Carrier

Priority: 30 Days

Telephone No.: 509-376-4650

Purchase Order/Charge Code: 300071

Ice Chest No.: 605399

Bill of Lading/Air Bill No.: 77005047.2716

Offsite Property No.: 8333

SPECIAL INSTRUCTIONS
N/A

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

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3BFY0	N	W	AUG 17 2017	1239	1x500-mL G/P	6020_METALS_ICPMS: Chromium (1)	6 Months	HNO3 to pH <2
B3BFY0	N	W			1x500-mL G/P	C14_LSC: COMMON	6 Months	None
B3BFY0	N	W			1x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2
B3BFY0	N	W			1x250-mL P	TRITIUM_DIST_LSC: COMMON	6 Months	None
B3BM60	Y	W			1x500-mL G/P	6020_METALS_ICPMS: Chromium (1)	6 Months	HNO3 to pH <2

Received By: *Janelle Zunker* Signature
Print First and Last Name: Janelle Zunker
CHPRC
Date/Time: AUG 17 2017 1239

Received By: *Chesha Gaines* Signature
Print First and Last Name: Chesha Gaines
Date/Time: 8/17/17 9:58 AM

Received By: *Mike Esparza* Signature
Print First and Last Name: Mike Esparza
CHPRC
Date/Time: AUG 17 2017 1239

Received By: *Janelle Zunker* Signature
Print First and Last Name: Janelle Zunker
CHPRC
Date/Time: AUG 17 2017 1239

Relinquished By: MIKE ESPARZA
Signature: *Mike Esparza*
Date/Time: AUG 17 2017 1239

Relinquished By: Janelle Zunker
Signature: *Janelle Zunker*
Date/Time: AUG 17 2017 1239

Relinquished By: Chesha Gaines
Signature: *Chesha Gaines*
Date/Time: 8/17/17 9:58 AM

Relinquished By: *Janelle Zunker*
Signature: *Janelle Zunker*
Date/Time: AUG 17 2017 1239

Relinquished By: *Chesha Gaines*
Signature: *Chesha Gaines*
Date/Time: 8/17/17 9:58 AM

Relinquished By: *Mike Esparza*
Signature: *Mike Esparza*
Date/Time: AUG 17 2017 1239

FINAL SAMPLE DISPOSITION

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

Disposed By: _____

Date/Time: _____

CH2M Hill Plateau Remediation Company C.O.C.# S17-008-323
Page 1 of 1

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

09/160 430973

Collector: Juan Aguilar #CHPRC **Contact/Requester:** Karen Waters-Husted **Telephone No.:** 509-376-4650

SAF No.: S17-008 **Sampling Origin:** Hanford Site **Purchase Order/Charge Code:** 300071

Project Title: SURV, AUGUST 2017 **Logbook No.:** HNF-N-506-94/26 **Ice Chest No.:** 6WS-565

Shipped To (Lab): GEL Laboratories, LLC **Method of Shipment:** Commercial Carrier **Bill of Lading/Air Bill No.:** 7700 4313 3032

Protocol: SURV **Priority:** 30 Days **Offsite Property No.:** 8329

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
B3BJ39	N	W	8-17-17	0936	1x500-mL G/P	6020_METALS_ICPMS: Chromium (1)	6 Months	HN03 to pH <2
B3BJ39	N	W			1x500-mL G/P	C14_LSC: COMMON	6 Months	None
B3BJ39	N	W			1x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON	6 Months	HN03 to pH <2
B3BJ39	N	W			1x250-mL P	TRITIUM_DIST_LSC: COMMON	6 Months	None
B3BLF3	Y	W	8-17-17	0936	1x500-mL G/P	6020_METALS_ICPMS: Chromium (1)	6 Months	HN03 to pH <2

Relinquished By: Juan Aguilar #CHPRC Signature: [Signature] Date/Time: AUG 17 2017 0957	Received By: Janelle Zuniga #CHPRC Signature: [Signature] Date/Time: AUG 17 2017 0957
Relinquished By: Janelle Zuniga #CHPRC Signature: [Signature] Date/Time: AUG 17 2017 1100	Received By: FEDEX Signature: [Signature] Date/Time: 8/18/17 9:05 AM
Relinquished By: [Signature] Date/Time: [Date/Time]	Received By: [Signature] Date/Time: [Date/Time]
Relinquished By: [Signature] Date/Time: [Date/Time]	Received By: [Signature] Date/Time: [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
 V = Vegetation
 X = Other

FINAL SAMPLE DISPOSITION
 Disposal Method (e.g., Return to customer, per lab procedure, used in process):
 Disposed By: [Signature] Date/Time: [Date/Time]

Printed On 6/21/2017 FSR ID = FSR47131 A-6004-842 (REV 2)

SAMPLE RECEIPT & REVIEW FORM

Client: <u>CPRC</u>		SDG/AR/COC/Work Order: <u>420973</u>		
Received By: <u>CHRISTIE GAMES</u>		Date Received: <u>August 18, 2017</u>		
Carrier and Tracking Number		Circle Applicable: <input checked="" type="checkbox"/> FedEx Express <input type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other <u>7700 4373 3032 → 3°C</u> <u>7700 5047 2776 → 2°C</u>		
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.		
Shipped as a DOT Hazardous?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____		
COC/Samples marked or classified as radioactive?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> CPM mR/Hr Classified as: Rad 1 Rad 2 Rad 3		
Is package, COC, and/or Samples marked HAZ?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:		
Sample Receipt Criteria	Yes	NA	N	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: <u>Wet Ice</u> Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: <u>IR1-17</u> Secondary Temperature Device Serial # (If Applicable):
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's and Containers Affected:
7 Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>			If Preservation added, Lot#: _____ If Yes, Are Encores or Soil Kits present? Yes ___ No <input checked="" type="checkbox"/> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes <input checked="" type="checkbox"/> No ___ N/A (If unknown, select No) VOA vials free of headspace? Yes <input checked="" type="checkbox"/> No ___ N/A Sample ID's and containers affected:
8 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
12 Are sample containers identifiable as GEL provided?			<input checked="" type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
Comments (Use Continuation Form if needed):				

TEMP: SEE ABOVE

PM (or PMA) review: Initials CS Date 8/19/17 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 14 September 2017

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	LA170010
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122018-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-17-12
Utah NELAP	SC000122017-23
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Volatile Analysis

Case Narrative

**GC/MS Volatile
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL430973
Work Order #: 430973**

Product: Volatile Organic Compounds (VOC) by Gas Chromatograph/Mass Spectrometer

Analytical Method: SW846 8260C

Analytical Procedure: GL-OA-E-038 REV# 26

Analytical Batch: 1696381

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
430973002	B3BFJ8
430973005	B3BFT9
430973008	B3BFW3
1203864667	Method Blank (MB)
1203864668	Laboratory Control Sample (LCS)
1203864669	431261001(NonSDG) Post Spike (PS)
1203864670	431261001(NonSDG) Post Spike Duplicate (PSD)
1203865227	Method Blank (MB)
1203865228	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.

Calibration Information

Continuing Calibration Verification Requirements

The calibration verification standard requirements were not all met for samples . Acetone recovered at 26.4%D/drift; 1,1,1-Trichloroethane recovered at 21.5%D/drift and Bromoform recovered at 24.5%D/drift in the daily CCV analyzed on 8/28/.17. Acetone recovered at 24.8%D/drift in the daily CCV analyzed on 8/29/.17. There were no positive results for any of the analytes that were outside the calibration criteria. The results are reported.

Quality Control (QC) Information

Matrix Spike/Matrix Spike Duplicate Recovery Statement

The spike and/or spike duplicate (See Below) recoveries were not all within the acceptance limits. The recoveries were similar. It is believed possible matrix interference has been demonstrated.

Sample	Analyte	Value
1203864669 (Non SDG 431261001PS)	2-Butanone	51* (70%-130%)
	Acetone	43* (70%-130%)
1203864670 (Non SDG 431261001PSD)	2-Butanone	62* (70%-130%)
	Acetone	51* (70%-130%)

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: GEL430973 GEL Work Order: 430973

The Qualifiers in this report are defined as follows:

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

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.

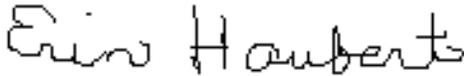
RA Indicates that sample is re-analyzed without re-extraction.

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:** Erin Haubert**Date:** 09 SEP 2017**Title:** Data Validator

Sample Data Summary

02/12/2018

REV. 1
Page 1 of 1Certificate of Analysis
Sample Summary

SDG Number: GEL430973	Date Collected: 08/17/2017 11:06	Matrix: WATER
Lab Sample ID: 430973002	Date Received: 08/18/2017 09:05	
Client ID: B3BFJ8	Client: CPRC001	Project: CPRC0S17008
Batch ID: 1696381	Method: SW846 8260C	SOP Ref: GL-OA-E-038
Run Date: 08/28/2017 13:53	Inst: VOA3.I	Dilution: 1
Prep Date: 08/28/2017 13:53	Analyst: JP1	Purge Vol: 5 mL
Data File: 082817V3\3S108.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	RDL
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	2.00	5.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	2.00	5.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	2.00	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	2.00	5.00
75-15-0	Carbon disulfide	U	1.60	ug/L	1.60	10.0	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	2.00	5.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	2.00	5.00
67-66-3	Chloroform	J	0.410	ug/L	0.300	2.00	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	2.00	5.00
75-09-2	Methylene chloride	U	1.60	ug/L	1.60	5.00	5.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	2.00	5.00
108-88-3	Toluene	U	0.300	ug/L	0.300	2.00	5.00
79-01-6	Trichloroethylene	J	4.85	ug/L	0.300	2.00	5.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	2.00	10.0
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	2.00	10.0
78-93-3	2-Butanone	TU	3.00	ug/L	3.00	10.0	10.0
108-10-1	4-Methyl-2-pentanone	U	3.00	ug/L	3.00	10.0	10.0
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	2.00	10.0
1330-20-7	Xylenes (total)	U	0.300	ug/L	0.300	6.00	10.0
67-64-1	Acetone	TU	3.00	ug/L	3.00	10.0	20.0

02/12/2018

REV. 1
Page 1 of 1

Certificate of Analysis
Sample Summary

SDG Number: GEL430973	Date Collected: 08/17/2017 10:26	Matrix: WATER
Lab Sample ID: 430973005	Date Received: 08/18/2017 09:05	
Client ID: B3BFT9	Client: CPRC001	Project: CPRC0S17008
Batch ID: 1696381	Method: SW846 8260C	SOP Ref: GL-OA-E-038
Run Date: 08/28/2017 14:24	Inst: VOA3.I	Dilution: 1
Prep Date: 08/28/2017 14:24	Analyst: JP1	Purge Vol: 5 mL
Data File: 082817V3\3S109.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	RDL
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	2.00	5.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	2.00	5.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	2.00	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	2.00	5.00
75-15-0	Carbon disulfide	U	1.60	ug/L	1.60	10.0	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	2.00	5.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	2.00	5.00
67-66-3	Chloroform	J	0.350	ug/L	0.300	2.00	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	2.00	5.00
75-09-2	Methylene chloride	U	1.60	ug/L	1.60	5.00	5.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	2.00	5.00
108-88-3	Toluene	U	0.300	ug/L	0.300	2.00	5.00
79-01-6	Trichloroethylene	J	4.07	ug/L	0.300	2.00	5.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	2.00	10.0
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	2.00	10.0
78-93-3	2-Butanone	TU	3.00	ug/L	3.00	10.0	10.0
108-10-1	4-Methyl-2-pentanone	U	3.00	ug/L	3.00	10.0	10.0
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	2.00	10.0
1330-20-7	Xylenes (total)	U	0.300	ug/L	0.300	6.00	10.0
67-64-1	Acetone	TU	3.00	ug/L	3.00	10.0	20.0

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REV. 1
Page 1 of 1Certificate of Analysis
Sample Summary

SDG Number: GEL430973	Date Collected: 08/17/2017 12:52	Matrix: WATER
Lab Sample ID: 430973008	Date Received: 08/18/2017 09:05	
Client ID: B3BFW3	Client: CPRC001	Project: CPRC0S17008
Batch ID: 1696381	Method: SW846 8260C	SOP Ref: GL-OA-E-038
Run Date: 08/28/2017 14:54	Inst: VOA3.I	Dilution: 1
Prep Date: 08/28/2017 14:54	Analyst: JP1	Purge Vol: 5 mL
Data File: 082817V3\3S110.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	RDL
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	2.00	5.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	2.00	5.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	2.00	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	2.00	5.00
75-15-0	Carbon disulfide	U	1.60	ug/L	1.60	10.0	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	2.00	5.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	2.00	5.00
67-66-3	Chloroform	J	0.620	ug/L	0.300	2.00	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	2.00	5.00
75-09-2	Methylene chloride	U	1.60	ug/L	1.60	5.00	5.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	2.00	5.00
108-88-3	Toluene	U	0.300	ug/L	0.300	2.00	5.00
79-01-6	Trichloroethylene	J	0.370	ug/L	0.300	2.00	5.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	2.00	10.0
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	2.00	10.0
78-93-3	2-Butanone	TU	3.00	ug/L	3.00	10.0	10.0
108-10-1	4-Methyl-2-pentanone	U	3.00	ug/L	3.00	10.0	10.0
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	2.00	10.0
1330-20-7	Xylenes (total)	U	0.300	ug/L	0.300	6.00	10.0
67-64-1	Acetone	TU	3.00	ug/L	3.00	10.0	20.0

Quality Control Summary

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GEL LABORATORIES LLC

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

QC Summary

Report Date: September 8, 2017

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 430973

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1696381										
QC1203864668	LCS										
1,1,1-Trichloroethane	50.0			56.6	ug/L		113	(70%-130%)	JP1	08/28/17	12:31
1,1,2-Trichloroethane	50.0			42.1	ug/L		84	(70%-130%)			
1,1-Dichloroethane	50.0			48.2	ug/L		96	(70%-130%)			
1,1-Dichloroethylene	50.0			51.6	ug/L		103	(70%-130%)			
1,2-Dichloroethane	50.0			50.1	ug/L		100	(70%-130%)			
2-Butanone	250			247	ug/L		99	(70%-130%)			
4-Methyl-2-pentanone	250			291	ug/L		116	(70%-130%)			
Acetone	250			305	ug/L		122	(70%-130%)			
Benzene	50.0			43.5	ug/L		87	(70%-130%)			
Carbon disulfide	250			199	ug/L		80	(70%-130%)			
Carbon tetrachloride	50.0			56.0	ug/L		112	(70%-130%)			
Chlorobenzene	50.0			47.4	ug/L		95	(70%-130%)			
Chloroform	50.0			47.0	ug/L		94	(70%-130%)			

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1696381										
Ethylbenzene	50.0			47.1	ug/L		94	(70%-130%)	JP1	08/28/17	12:31
Methylene chloride	50.0			39.8	ug/L		80	(70%-130%)			
Tetrachloroethylene	50.0			46.7	ug/L		93	(70%-130%)			
Toluene	50.0			43.7	ug/L		87	(70%-130%)			
Trichloroethylene	50.0			49.5	ug/L		99	(70%-130%)			
Vinyl chloride	50.0			47.2	ug/L		94	(70%-130%)			
Xylenes (total)	150			131	ug/L		87	(70%-130%)			
**1,2-Dichloroethane-d4	50.0			45.0	ug/L		90	(70%-130%)			
**Bromofluorobenzene	50.0			54.6	ug/L		109	(70%-130%)			
**Toluene-d8	50.0			42.4	ug/L		85	(70%-130%)			
QC1203865228 LCS											
1,1,1-Trichloroethane	50.0			59.4	ug/L		119	(70%-130%)		08/29/17	13:15
1,1,2-Trichloroethane	50.0			45.9	ug/L		92	(70%-130%)			
1,1-Dichloroethane	50.0			51.5	ug/L		103	(70%-130%)			
1,1-Dichloroethylene	50.0			54.7	ug/L		109	(70%-130%)			
1,2-Dichloroethane	50.0			52.7	ug/L		105	(70%-130%)			

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1696381										
2-Butanone	250			283	ug/L		113	(70%-130%)	JP1	08/29/17	13:15
4-Methyl-2-pentanone	250			277	ug/L		111	(70%-130%)			
Acetone	250			312	ug/L		125	(70%-130%)			
Benzene	50.0			48.3	ug/L		97	(70%-130%)			
Carbon disulfide	250			217	ug/L		87	(70%-130%)			
Carbon tetrachloride	50.0			57.4	ug/L		115	(70%-130%)			
Chlorobenzene	50.0			50.0	ug/L		100	(70%-130%)			
Chloroform	50.0			49.0	ug/L		98	(70%-130%)			
Ethylbenzene	50.0			48.3	ug/L		97	(70%-130%)			
Methylene chloride	50.0			44.2	ug/L		88	(70%-130%)			
Tetrachloroethylene	50.0			49.6	ug/L		99	(70%-130%)			
Toluene	50.0			46.2	ug/L		92	(70%-130%)			
Trichloroethylene	50.0			53.9	ug/L		108	(70%-130%)			
Vinyl chloride	50.0			52.6	ug/L		105	(70%-130%)			
Xylenes (total)	150			138	ug/L		92	(70%-130%)			

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1696381										
**1,2-Dichloroethane-d4	50.0			47.9	ug/L		96	(70%-130%)	JP1	08/29/17	13:15
**Bromofluorobenzene	50.0			54.2	ug/L		108	(70%-130%)			
**Toluene-d8	50.0			43.8	ug/L		88	(70%-130%)			
QC1203864667	MB										
1,1,1-Trichloroethane			U	0.300	ug/L					08/28/17	13:02
1,1,2-Trichloroethane			U	0.300	ug/L						
1,1-Dichloroethane			U	0.300	ug/L						
1,1-Dichloroethylene			U	0.300	ug/L						
1,2-Dichloroethane			U	0.300	ug/L						
2-Butanone			U	3.00	ug/L						
4-Methyl-2-pentanone			U	3.00	ug/L						
Acetone			U	3.00	ug/L						
Benzene			U	0.300	ug/L						
Carbon disulfide			U	1.60	ug/L						
Carbon tetrachloride			U	0.300	ug/L						
Chlorobenzene			U	0.300	ug/L						

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1696381										
Chloroform			U	0.300	ug/L				JP1	08/28/17	13:02
Ethylbenzene			U	0.300	ug/L						
Methylene chloride			U	1.60	ug/L						
Tetrachloroethylene			U	0.300	ug/L						
Toluene			U	0.300	ug/L						
Trichloroethylene			U	0.300	ug/L						
Vinyl chloride			U	0.300	ug/L						
Xylenes (total)			U	0.300	ug/L						
**1,2-Dichloroethane-d4	50.0			46.8	ug/L		94	(70%-130%)			
**Bromofluorobenzene	50.0			50.2	ug/L		100	(70%-130%)			
**Toluene-d8	50.0			45.4	ug/L		91	(70%-130%)			
QC1203865227 MB											
1,1,1-Trichloroethane			U	0.300	ug/L					08/29/17	14:47
1,1,2-Trichloroethane			U	0.300	ug/L						
1,1-Dichloroethane			U	0.300	ug/L						
1,1-Dichloroethylene			U	0.300	ug/L						

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1696381										
1,2-Dichloroethane			U	0.300	ug/L				JP1	08/29/17	14:47
2-Butanone			U	3.00	ug/L						
4-Methyl-2-pentanone			U	3.00	ug/L						
Acetone			U	3.00	ug/L						
Benzene			U	0.300	ug/L						
Carbon disulfide			U	1.60	ug/L						
Carbon tetrachloride			U	0.300	ug/L						
Chlorobenzene			U	0.300	ug/L						
Chloroform			U	0.300	ug/L						
Ethylbenzene			U	0.300	ug/L						
Methylene chloride			U	1.60	ug/L						
Tetrachloroethylene			U	0.300	ug/L						
Toluene			U	0.300	ug/L						
Trichloroethylene			U	0.300	ug/L						
Vinyl chloride			U	0.300	ug/L						

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QC Summary

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Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1696381										
Xylenes (total)			U	0.300	ug/L				JP1	08/29/17	14:47
**1,2-Dichloroethane-d4	50.0			51.9	ug/L		104	(70%-130%)			
**Bromofluorobenzene	50.0			51.1	ug/L		102	(70%-130%)			
**Toluene-d8	50.0			45.1	ug/L		90	(70%-130%)			
QC1203864669 431261001 PS											
1,1,1-Trichloroethane	50.0	U	0.00	56.8	ug/L		114	(70%-130%)		08/29/17	18:22
1,1,2-Trichloroethane	50.0	U	0.00	47.7	ug/L		95	(70%-130%)			
1,1-Dichloroethane	50.0	U	0.00	53.8	ug/L		108	(70%-130%)			
1,1-Dichloroethylene	50.0	U	0.00	52.4	ug/L		105	(70%-130%)			
1,2-Dichloroethane	50.0	U	0.00	55.2	ug/L		110	(70%-130%)			
2-Butanone	250	TU	0.00 T	126	ug/L		51 *	(70%-130%)			
4-Methyl-2-pentanone	250	U	0.00	231	ug/L		92	(70%-130%)			
Acetone	250	TU	0.00 T	108	ug/L		43 *	(70%-130%)			
Benzene	50.0	U	0.00	47.1	ug/L		94	(70%-130%)			
Carbon disulfide	250	U	0.00	211	ug/L		84	(70%-130%)			
Carbon tetrachloride	50.0	U	0.00	56.1	ug/L		112	(70%-130%)			

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QC Summary

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Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1696381										
Chlorobenzene	50.0	U	0.00	49.3	ug/L		99	(70%-130%)	JP1	08/29/17	18:22
Chloroform	50.0	U	0.00	51.0	ug/L		102	(70%-130%)			
Ethylbenzene	50.0	U	0.00	47.3	ug/L		95	(70%-130%)			
Methylene chloride	50.0	J	1.75	45.9	ug/L		88	(70%-130%)			
Tetrachloroethylene	50.0	U	0.00	48.4	ug/L		97	(70%-130%)			
Toluene	50.0	U	0.00	46.4	ug/L		93	(70%-130%)			
Trichloroethylene	50.0	U	0.00	52.0	ug/L		104	(70%-130%)			
Vinyl chloride	50.0	U	0.00	42.7	ug/L		85	(70%-130%)			
Xylenes (total)	150	U	0.00	138	ug/L		92	(70%-130%)			
**1,2-Dichloroethane-d4	50.0		47.1	48.3	ug/L		97	(70%-130%)			
**Bromofluorobenzene	50.0		49.4	55.8	ug/L		112	(70%-130%)			
**Toluene-d8	50.0		50.0	43.6	ug/L		87	(70%-130%)			
QC1203864670 431261001 PSD											
1,1,1-Trichloroethane	50.0	U	0.00	57.2	ug/L	1	114	(0%-20%)		08/29/17	18:53
1,1,2-Trichloroethane	50.0	U	0.00	48.4	ug/L	1	97	(0%-20%)			
1,1-Dichloroethane	50.0	U	0.00	52.8	ug/L	2	106	(0%-20%)			

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QC Summary

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Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1696381										
1,1-Dichloroethylene	50.0	U	0.00		53.3	ug/L	2	107	(0%-20%)	JP1	08/29/17 18:53
1,2-Dichloroethane	50.0	U	0.00		56.0	ug/L	1	112	(0%-20%)		
2-Butanone	250	TU	0.00	T	154	ug/L	20	62 *	(0%-20%)		
4-Methyl-2-pentanone	250	U	0.00		259	ug/L	11	103	(0%-20%)		
Acetone	250	TU	0.00	T	128	ug/L	17	51 *	(0%-20%)		
Benzene	50.0	U	0.00		46.2	ug/L	2	92	(0%-20%)		
Carbon disulfide	250	U	0.00		206	ug/L	3	82	(0%-20%)		
Carbon tetrachloride	50.0	U	0.00		55.9	ug/L	0	112	(0%-20%)		
Chlorobenzene	50.0	U	0.00		48.4	ug/L	2	97	(0%-20%)		
Chloroform	50.0	U	0.00		51.9	ug/L	2	104	(0%-20%)		
Ethylbenzene	50.0	U	0.00		45.4	ug/L	4	91	(0%-20%)		
Methylene chloride	50.0	J	1.75		45.8	ug/L	0	88	(0%-20%)		
Tetrachloroethylene	50.0	U	0.00		47.0	ug/L	3	94	(0%-20%)		
Toluene	50.0	U	0.00		46.3	ug/L	0	93	(0%-20%)		
Trichloroethylene	50.0	U	0.00		50.0	ug/L	4	100	(0%-20%)		

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1696381										
Vinyl chloride	50.0	U	0.00	44.3	ug/L	4	89	(0%-20%)	JP1	08/29/17	18:53
Xylenes (total)	150	U	0.00	133	ug/L	4	89	(0%-20%)			
**1,2-Dichloroethane-d4	50.0		47.1	49.4	ug/L		99	(70%-130%)			
**Bromofluorobenzene	50.0		49.4	55.2	ug/L		110	(70%-130%)			
**Toluene-d8	50.0		50.0	45.9	ug/L		92	(70%-130%)			

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
- 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.

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Surrogate Recovery Report

SDG Number: GEL430973

Matrix Type: LIQUID

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203864668	LCS for batch 1696381	90	85	109
1203864667	MB for batch 1696381	94	91	100
430973002	B3BFJ8	103	86	102
430973005	B3BFT9	98	88	99
430973008	B3BFW3	95	88	104
1203865228	LCS for batch 1696381	96	88	108
1203865227	MB for batch 1696381	104	90	102
1203864669	B3B960PS	97	87	112
1203864670	B3B960PSD	99	92	110

Surrogate

DCED4 = 1,2-Dichloroethane-d4

TOL = Toluene-d8

BFB = Bromofluorobenzene

Acceptance Limits

(70%-130%)

(70%-130%)

(70%-130%)

* 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 #: GEL430973

Work Order #: 430973

Product: Determination of Metals by ICP-MS**Analytical Method:** SW846 3005A/6020B**Analytical Procedure:** GL-MA-E-014 REV# 31**Analytical Batch:** 1693337**Preparation Method:** SW846 3005A**Preparation Procedure:** GL-MA-E-006 REV# 13**Preparation Batch:** 1693336

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
430973001	B3BKD9
430973002	B3BFJ8
430973004	B3BKJ9
430973005	B3BFT9
430973007	B3BKK3
430973008	B3BFW3
430973009	B3BFX9
430973010	B3BM56
430973011	B3BFY0
430973012	B3BM60
430973013	B3BJ38
430973014	B3BLF4
430973015	B3BJ39
430973016	B3BLF3
430973017	B3BN72
430973018	B3BN73
1203857941	Method Blank (MB)ICP-MS
1203857942	Laboratory Control Sample (LCS)
1203857945	430973001(B3BKD9L) Serial Dilution (SD)
1203857943	430973001(B3BKD9S) Matrix Spike (MS)
1203857944	430973001(B3BKD9SD) Matrix Spike Duplicate (MSD)

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

Data Summary:

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

Calibration Information**ICSA/ICSAB Statement**

For the ICP-MS analysis, the ICSA solution contains analyte concentrations which are verified trace impurities

indigenous to the purchased standard.

Certification Statement

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

GEL LABORATORIES LLC

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

**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL430973 GEL Work Order: 430973

The Qualifiers in this report are defined as follows:

* Duplicate analysis not within control limits

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

D Results are reported from a diluted aliquot of sample.

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: 13 SEP 2017****Title: Data Validator**

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL430973

CONTRACT: CPRC0S17008

METHOD TYPE: SW846

SAMPLE ID:430973001

BASIS: As Received

DATE COLLECTED 17-AUG-17

CLIENT ID: B3BKD9

LEVEL: Low

DATE RECEIVED 18-AUG-17

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-47-3	Chromium	6.7	ug/L	B	3	10	10	1	MS	SKJ	08/24/17 17:41	170824-1	1693337

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1693337	1693336	SW846 3005A	50	mL	50	mL	08/18/17	JXM8

***Analytical Methods:**

MS SW846 3005A/6020B

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL430973

CONTRACT: CPRC0S17008

METHOD TYPE: SW846

SAMPLE ID:430973002

BASIS: As Received

DATE COLLECTED 17-AUG-17

CLIENT ID: B3BFJ8

LEVEL: Low

DATE RECEIVED 18-AUG-17

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-47-3	Chromium	7.58	ug/L	B	3	10	10	1	MS	SKJ	08/24/17 18:09	170824-1	1693337

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1693337	1693336	SW846 3005A	50	mL	50	mL	08/18/17	JXM8

***Analytical Methods:**

MS SW846 3005A/6020B

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL430973

CONTRACT: CPRC0S17008

METHOD TYPE: SW846

SAMPLE ID:430973004

BASIS: As Received

DATE COLLECTED 17-AUG-17

CLIENT ID: B3BKJ9

LEVEL: Low

DATE RECEIVED 18-AUG-17

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-47-3	Chromium	4.99	ug/L	B	3	10	10	1	MS	SKJ	08/24/17 18:13	170824-1	1693337

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1693337	1693336	SW846 3005A	50	mL	50	mL	08/18/17	JXM8

***Analytical Methods:**

MS SW846 3005A/6020B

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL430973

CONTRACT: CPRC0S17008

METHOD TYPE: SW846

SAMPLE ID:430973005

BASIS: As Received

DATE COLLECTED 17-AUG-17

CLIENT ID: B3BFT9

LEVEL: Low

DATE RECEIVED 18-AUG-17

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-47-3	Chromium	5.03	ug/L	B	3	10	10	1	MS	SKJ	08/24/17 18:17	170824-1	1693337

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1693337	1693336	SW846 3005A	50	mL	50	mL	08/18/17	JXM8

***Analytical Methods:**

MS SW846 3005A/6020B

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL430973

CONTRACT: CPRC0S17008

METHOD TYPE: SW846

SAMPLE ID:430973007

BASIS: As Received

DATE COLLECTED 17-AUG-17

CLIENT ID: B3BKK3

LEVEL: Low

DATE RECEIVED 18-AUG-17

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-47-3	Chromium	9.25	ug/L	B	3	10	10	1	MS	SKJ	08/24/17 18:20	170824-1	1693337

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1693337	1693336	SW846 3005A	50	mL	50	mL	08/18/17	JXM8

***Analytical Methods:**

MS SW846 3005A/6020B

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL430973

CONTRACT: CPRC0S17008

METHOD TYPE: SW846

SAMPLE ID:430973008

BASIS: As Received

DATE COLLECTED 17-AUG-17

CLIENT ID: B3BFW3

LEVEL: Low

DATE RECEIVED 18-AUG-17

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-47-3	Chromium	12.6	ug/L		3	10	10	1	MS	SKJ	08/24/17 18:24	170824-1	1693337

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1693337	1693336	SW846 3005A	50	mL	50	mL	08/18/17	JXM8

***Analytical Methods:**

MS SW846 3005A/6020B

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL430973

CONTRACT: CPRC0S17008

METHOD TYPE: SW846

SAMPLE ID:430973009

BASIS: As Received

DATE COLLECTED 17-AUG-17

CLIENT ID: B3BFX9

LEVEL: Low

DATE RECEIVED 18-AUG-17

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-47-3	Chromium	90.4	ug/L		3	10	10	1	MS	SKJ	08/24/17 18:28	170824-1	1693337

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1693337	1693336	SW846 3005A	50	mL	50	mL	08/18/17	JXM8

***Analytical Methods:**

MS SW846 3005A/6020B

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL430973

CONTRACT: CPRC0S17008

METHOD TYPE: SW846

SAMPLE ID:430973010

BASIS: As Received

DATE COLLECTED 17-AUG-17

CLIENT ID: B3BM56

LEVEL: Low

DATE RECEIVED 18-AUG-17

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-47-3	Chromium	92.5	ug/L		3	10	10	1	MS	SKJ	08/24/17 18:40	170824-1	1693337

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1693337	1693336	SW846 3005A	50	mL	50	mL	08/18/17	JXM8

***Analytical Methods:**

MS SW846 3005A/6020B

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL430973

CONTRACT: CPRC0S17008

METHOD TYPE: SW846

SAMPLE ID:430973011

BASIS: As Received

DATE COLLECTED 17-AUG-17

CLIENT ID: B3BFY0

LEVEL: Low

DATE RECEIVED 18-AUG-17

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-47-3	Chromium	98.2	ug/L		3	10	10	1	MS	SKJ	08/24/17 18:44	170824-1	1693337

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1693337	1693336	SW846 3005A	50	mL	50	mL	08/18/17	JXM8

***Analytical Methods:**

MS SW846 3005A/6020B

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL430973

CONTRACT: CPRC0S17008

METHOD TYPE: SW846

SAMPLE ID:430973012

BASIS: As Received

DATE COLLECTED 17-AUG-17

CLIENT ID: B3BM60

LEVEL: Low

DATE RECEIVED 18-AUG-17

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-47-3	Chromium	95	ug/L		3	10	10	1	MS	SKJ	08/24/17 18:48	170824-1	1693337

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1693337	1693336	SW846 3005A	50	mL	50	mL	08/18/17	JXM8

***Analytical Methods:**

MS SW846 3005A/6020B

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL430973

CONTRACT: CPRC0S17008

METHOD TYPE: SW846

SAMPLE ID:430973013

BASIS: As Received

DATE COLLECTED 17-AUG-17

CLIENT ID: B3BJ38

LEVEL: Low

DATE RECEIVED 18-AUG-17

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	SKJ	08/24/17 18:52	170824-1	1693337

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1693337	1693336	SW846 3005A	50	mL	50	mL	08/18/17	JXM8

***Analytical Methods:**

MS SW846 3005A/6020B

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL430973

CONTRACT: CPRC0S17008

METHOD TYPE: SW846

SAMPLE ID:430973014

BASIS: As Received

DATE COLLECTED 17-AUG-17

CLIENT ID: B3BLF4

LEVEL: Low

DATE RECEIVED 18-AUG-17

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	SKJ	08/24/17 18:56	170824-1	1693337

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1693337	1693336	SW846 3005A	50	mL	50	mL	08/18/17	JXM8

***Analytical Methods:**

MS SW846 3005A/6020B

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL430973

CONTRACT: CPRC0S17008

METHOD TYPE: SW846

SAMPLE ID:430973015

BASIS: As Received

DATE COLLECTED 17-AUG-17

CLIENT ID: B3BJ39

LEVEL: Low

DATE RECEIVED 18-AUG-17

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-47-3	Chromium	3.41	ug/L	B	3	10	10	1	MS	SKJ	08/24/17 19:08	170824-1	1693337

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1693337	1693336	SW846 3005A	50	mL	50	mL	08/18/17	JXM8

***Analytical Methods:**

MS SW846 3005A/6020B

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL430973

CONTRACT: CPRC0S17008

METHOD TYPE: SW846

SAMPLE ID:430973016

BASIS: As Received

DATE COLLECTED 17-AUG-17

CLIENT ID: B3BLF3

LEVEL: Low

DATE RECEIVED 18-AUG-17

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	SKJ	08/24/17 19:12	170824-1	1693337

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1693337	1693336	SW846 3005A	50	mL	50	mL	08/18/17	JXM8

***Analytical Methods:**

MS SW846 3005A/6020B

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL430973

CONTRACT: CPRC0S17008

METHOD TYPE: SW846

SAMPLE ID:430973017

BASIS: As Received

DATE COLLECTED 17-AUG-17

CLIENT ID: B3BN72

LEVEL: Low

DATE RECEIVED 18-AUG-17

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	SKJ	08/24/17 19:16	170824-1	1693337

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1693337	1693336	SW846 3005A	50	mL	50	mL	08/18/17	JXM8

***Analytical Methods:**

MS SW846 3005A/6020B

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL430973

CONTRACT: CPRC0S17008

METHOD TYPE: SW846

SAMPLE ID:430973018

BASIS: As Received

DATE COLLECTED 17-AUG-17

CLIENT ID: B3BN73

LEVEL: Low

DATE RECEIVED 18-AUG-17

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	SKJ	08/24/17 19:20	170824-1	1693337

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1693337	1693336	SW846 3005A	50	mL	50	mL	08/18/17	JXM8

***Analytical Methods:**

MS SW846 3005A/6020B

Quality Control Summary

02/12/2018

REV. 1

GEL LABORATORIES LLC

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

QC Summary

Report Date: September 13, 2017

Page 1 of 2

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 430973

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1693337										
QC1203857942	LCS										
Chromium	50.0			50.4	ug/L		101	(80%-120%)	SKJ	08/24/17	17:37
QC1203857941	MB										
Chromium			U	3.00	ug/L					08/24/17	17:33
QC1203857943	430973001	MS									
Chromium	50.0	B	6.70	57.1	ug/L		101	(75%-125%)		08/24/17	17:45
QC1203857944	430973001	MSD									
Chromium	50.0	B	6.70	54.1	ug/L	5.24	94.9	(0%-20%)		08/24/17	17:49
QC1203857945	430973001	SDILT									
Chromium		B	6.70	DU	15.0	ug/L	N/A	(0%-20%)		08/24/17	17:57

Notes:

The Qualifiers in this report are defined as follows:

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

GEL LABORATORIES LLC

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

QC Summary

Workorder: 430973

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

Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

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

Radiological Analysis

Case Narrative

Radiochemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL430973
Work Order #: 430973

Product: SRISO_SEP_PRECIP_GPC: COMMON

Analytical Method: SRISO_SEP_PRECIP_GPC

Analytical Procedure: GL-RAD-A-004 REV# 18

Analytical Batch: 1694205

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
430973002	B3BFJ8
430973003	B3BFP8
430973005	B3BFT9
430973006	B3BFW0
430973008	B3BFW3
430973009	B3BFX9
430973011	B3BFY0
430973013	B3BJ38
430973015	B3BJ39
430973018	B3BN73
1203859731	Method Blank (MB)
1203859732	430366010(B3BH91) Sample Duplicate (DUP)
1203859733	Laboratory Control Sample (LCS)

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

Data Summary:

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

Technical Information

Recounts

Sample 430973018 (B3BN73) was recounted due to results more negative than the three sigma TPU. The second count is reported. Sample 1203859731 (MB) was taken through additional clean-up steps and recounted due to a suspected blank false positive. The recount is reported. Sample 430973006 (B3BFW0) was taken through additional clean-up steps and recounted to confirm the result. The recount is reported.

Product: C14_LSC: COMMON

Analytical Method: C14_LSC

Analytical Procedure: GL-RAD-A-003 REV# 15

Analytical Batch: 1695439

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
430973002	B3BFJ8
430973003	B3BFP8
430973005	B3BFT9
430973008	B3BFW3
430973009	B3BFX9
430973011	B3BFY0
430973013	B3BJ38
430973015	B3BJ39
430973018	B3BN73
1203862459	Method Blank (MB)
1203862460	430614002(B3BFP1) Sample Duplicate (DUP)
1203862461	430614002(B3BFP1) Matrix Spike (MS)
1203862462	Laboratory Control Sample (LCS)

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

Data Summary:

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

Miscellaneous Information

Additional Comments

The matrix spike, 1203862461 (B3BFP1MS), aliquot was reduced to conserve sample volume.

Product: TRITIUM_DIST_LSC: COMMON

Analytical Method: TRITIUM_DIST_LSC

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

Analytical Batch: 1697980

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
430973009	B3BFX9
430973011	B3BFY0
430973013	B3BJ38
430973015	B3BJ39
430973018	B3BN73
1203868436	Method Blank (MB)
1203868437	430607001(NonSDG) Sample Duplicate (DUP)
1203868438	430607001(NonSDG) Matrix Spike (MS)
1203868439	Laboratory Control Sample (LCS)

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

Data Summary:

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

Miscellaneous Information**Additional Comments**

The matrix spike, 1203868438 (Non SDG 430607001MS), aliquot was reduced to conserve sample volume.

Certification Statement

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

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: GEL430973 GEL Work Order: 430973

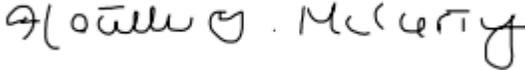
The Qualifiers in this report are defined as follows:

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: 

Name: Heather McCarty

Date: 12 SEP 2017

Title: Analyst II

Sample Data Summary

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL430973	Client: CPRC001	Project: CPRC0S17008
Lab Sample ID: 430973002	Date Collected: 08/17/2017 11:06	Matrix: WATER
	Date Received: 08/18/2017 09:05	
Client ID: B3BFJ8	Prep Basis: "As Received"	
Batch ID: 1694205	Method: SRISO_SEP_PRECIP_GPC	SOP Ref: GL-RAD-A-004
Run Date: 08/26/2017 13:34	Analyst: LXB3	Instrument: PIC4B
Data File: S1694205c11.xls	Aliquot: 300 mL	Count Time: 60 min
Prep Batch: 1694205	Prep Method: EPA 905.0 Modified/DOE RP5	
Prep Date: 08/24/2017 11:42		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90	U	-0.473	pCi/L	+/-0.608	0.608	1.28	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	7.00	7.75	mg	90.3	(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.

02/12/2018

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Certificate of Analysis
Sample Summary

SDG Number: GEL430973	Client: CPRC001	Project: CPRC0S17008
Lab Sample ID: 430973002	Date Collected: 08/17/2017 11:06	Matrix: WATER
	Date Received: 08/18/2017 09:05	
Client ID: B3BFJ8	Method: C14_LSC	Prep Basis: "As Received"
Batch ID: 1695439	Analyst: BXM4	SOP Ref: GL-RAD-A-003
Run Date: 09/06/2017 12:48	Aliquot: 100.03 mL	Instrument: LSCGOLD
Data File: C1695439.xls	Prep Method: EPA EERF C-01 Modified	Count Time: 15 min
Prep Batch: 1695439		
Prep Date: 09/06/2017 07:09		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14		464	pCi/L	+/-33.6	92.4	34.2	50.0

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.

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL430973	Client: CPRC001	Project: CPRC0S17008
Lab Sample ID: 430973003	Date Collected: 08/17/2017 09:11	Matrix: WATER
	Date Received: 08/18/2017 09:05	
Client ID: B3BFP8	Method: SRISO_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1694205	Analyst: LXB3	SOP Ref: GL-RAD-A-004
Run Date: 08/26/2017 13:34	Aliquot: 300 mL	Instrument: PIC4C
Data File: S1694205c11.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1694205		
Prep Date: 08/24/2017 11:42		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90	U	-0.211	pCi/L	+/-0.419	0.419	0.911	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	7.40	7.75	mg	95.5	(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.

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL430973	Client: CPRC001	Project: CPRC0S17008
Lab Sample ID: 430973003	Date Collected: 08/17/2017 09:11	Matrix: WATER
	Date Received: 08/18/2017 09:05	
Client ID: B3BFP8	Method: C14_LSC	Prep Basis: "As Received"
Batch ID: 1695439	Analyst: BXM4	SOP Ref: GL-RAD-A-003
Run Date: 09/06/2017 13:04	Aliquot: 100.01 mL	Instrument: LSCGOLD
Data File: C1695439.xls	Prep Method: EPA EERF C-01 Modified	Count Time: 15 min
Prep Batch: 1695439		
Prep Date: 09/06/2017 07:09		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14		4920	pCi/L	+/-90.9	919	34.1	50.0

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.

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL430973	Client: CPRC001	Project: CPRC0S17008
Lab Sample ID: 430973005	Date Collected: 08/17/2017 10:26	Matrix: WATER
	Date Received: 08/18/2017 09:05	
Client ID: B3BFT9	Method: SRISO_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1694205	Analyst: LXB3	SOP Ref: GL-RAD-A-004
Run Date: 08/26/2017 13:34	Aliquot: 300 mL	Instrument: PIC5B
Data File: S1694205c11.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1694205		
Prep Date: 08/24/2017 11:42		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90	U	0.563	pCi/L	+/-0.688	0.694	1.17	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	6.60	7.75	mg	85.2	(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.

02/12/2018

REV 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL430973	Client: CPRC001	Project: CPRC0S17008
Lab Sample ID: 430973005	Date Collected: 08/17/2017 10:26	Matrix: WATER
	Date Received: 08/18/2017 09:05	
Client ID: B3BFT9	Method: C14_LSC	Prep Basis: "As Received"
Batch ID: 1695439	Analyst: BXM4	SOP Ref: GL-RAD-A-003
Run Date: 09/06/2017 13:20	Aliquot: 100.04 mL	Instrument: LSCGOLD
Data File: C1695439.xls	Prep Method: EPA EERF C-01 Modified	Count Time: 15 min
Prep Batch: 1695439		
Prep Date: 09/06/2017 07:09		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14		365	pCi/L	+/-31.2	74.6	34.2	50.0

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.

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL430973	Client: CPRC001	Project: CPRC0S17008
Lab Sample ID: 430973006	Date Collected: 08/17/2017 10:26	Matrix: WATER
	Date Received: 08/18/2017 09:05	
Client ID: B3BFW0	Prep Basis: "As Received"	
Batch ID: 1694205	Method: SRISO_SEP_PRECIP_GPC	SOP Ref: GL-RAD-A-004
Run Date: 08/28/2017 19:52	Analyst: LXB3	Instrument: PIC8A
Data File: S1694205c11.xls	Aliquot: 300 mL	Count Time: 60 min
Prep Batch: 1694205	Prep Method: EPA 905.0 Modified/DOE RP5	
Prep Date: 08/24/2017 11:42		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90		15.8	pCi/L	+/-2.25	3.39	1.53	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	5.90	7.75	mg	76.1	(40%-110%)

Comments:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
The MDC is a sample specific MDC.

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL430973	Client: CPRC001	Project: CPRC0S17008
Lab Sample ID: 430973008	Date Collected: 08/17/2017 12:52	Matrix: WATER
	Date Received: 08/18/2017 09:05	
Client ID: B3BFW3	Method: SRISO_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1694205	Analyst: LXB3	SOP Ref: GL-RAD-A-004
Run Date: 08/26/2017 13:42	Aliquot: 300 mL	Instrument: PIC14C
Data File: S1694205c11.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1694205		
Prep Date: 08/24/2017 11:42		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90	U	1.45	pCi/L	+/-0.981	1.01	1.55	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	7.40	7.75	mg	95.5	(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.

02/12/2018

REV 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL430973	Client: CPRC001	Project: CPRC0S17008
Lab Sample ID: 430973008	Date Collected: 08/17/2017 12:52	Matrix: WATER
	Date Received: 08/18/2017 09:05	
Client ID: B3BFW3	Method: C14_LSC	Prep Basis: "As Received"
Batch ID: 1695439	Analyst: BXM4	SOP Ref: GL-RAD-A-003
Run Date: 09/06/2017 13:36	Aliquot: 100.06 mL	Instrument: LSCGOLD
Data File: C1695439.xls	Prep Method: EPA EERF C-01 Modified	Count Time: 15 min
Prep Batch: 1695439		
Prep Date: 09/06/2017 07:09		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14		2410	pCi/L	+/-65.1	451	34.1	50.0

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.

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL430973	Client: CPRC001	Project: CPRC0S17008
Lab Sample ID: 430973009	Date Collected: 08/17/2017 12:39	Matrix: WATER
	Date Received: 08/18/2017 09:05	
Client ID: B3BFX9		Prep Basis: "As Received"
Batch ID: 1694205	Method: SRISO_SEP_PRECIP_GPC	SOP Ref: GL-RAD-A-004
Run Date: 08/26/2017 13:47	Analyst: LXB3	Instrument: PIC9C
Data File: S1694205c11.xls	Aliquot: 300 mL	Count Time: 60 min
Prep Batch: 1694205	Prep Method: EPA 905.0 Modified/DOE RP5	
Prep Date: 08/24/2017 11:42		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90	U	0.182	pCi/L	+/-0.608	0.609	1.11	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	7.60	7.75	mg	98.1	(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.

02/12/2018

REV 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL430973	Client: CPRC001	Project: CPRC0S17008
Lab Sample ID: 430973009	Date Collected: 08/17/2017 12:39	Matrix: WATER
	Date Received: 08/18/2017 09:05	
Client ID: B3BFX9	Method: C14_LSC	Prep Basis: "As Received"
Batch ID: 1695439	Analyst: BXM4	SOP Ref: GL-RAD-A-003
Run Date: 09/06/2017 13:53	Aliquot: 100.07 mL	Instrument: LSCGOLD
Data File: C1695439.xls	Prep Method: EPA EERF C-01 Modified	Count Time: 15 min
Prep Batch: 1695439		
Prep Date: 09/06/2017 07:09		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14		277	pCi/L	+/-28.6	58.8	34.0	50.0

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.

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL430973	Client: CPRC001	Project: CPRC0S17008
Lab Sample ID: 430973009	Date Collected: 08/17/2017 12:39	Matrix: WATER
	Date Received: 08/18/2017 09:05	
Client ID: B3BFX9	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1697980	Analyst: BXM4	SOP Ref: GL-RAD-A-002
Run Date: 09/05/2017 14:04	Aliquot: 50 mL	Instrument: LSCRED
Data File: T1697980.xls	Prep Method: EPA 906.0 Modified	Count Time: 11.3500003814697 min
Prep Batch: 1697980		
Prep Date: 09/05/2017 09:05		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		2.44E+05	pCi/L	+/-4790	47400	613	400

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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Comments:

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

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL430973	Client: CPRC001	Project: CPRC0S17008
Lab Sample ID: 430973011	Date Collected: 08/17/2017 12:39	Matrix: WATER
	Date Received: 08/18/2017 09:05	
Client ID: B3BFY0	Method: SRISO_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1694205	Analyst: LXB3	SOP Ref: GL-RAD-A-004
Run Date: 08/26/2017 13:48	Aliquot: 300 mL	Instrument: PIC11D
Data File: S1694205c11.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1694205		
Prep Date: 08/24/2017 11:42		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90	U	0.752	pCi/L	+/-0.846	0.854	1.42	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	7.20	7.75	mg	92.9	(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.

02/12/2018

REV 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL430973	Client: CPRC001	Project: CPRC0S17008
Lab Sample ID: 430973011	Date Collected: 08/17/2017 12:39	Matrix: WATER
	Date Received: 08/18/2017 09:05	
Client ID: B3BFY0	Method: C14_LSC	Prep Basis: "As Received"
Batch ID: 1695439	Analyst: BXM4	SOP Ref: GL-RAD-A-003
Run Date: 09/06/2017 14:09	Aliquot: 100.07 mL	Instrument: LSCGOLD
Data File: C1695439.xls	Prep Method: EPA EERF C-01 Modified	Count Time: 15 min
Prep Batch: 1695439		
Prep Date: 09/06/2017 07:09		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14		290	pCi/L	+/-29.2	61.2	34.2	50.0

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.

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL430973	Client: CPRC001	Project: CPRC0S17008
Lab Sample ID: 430973011	Date Collected: 08/17/2017 12:39	Matrix: WATER
	Date Received: 08/18/2017 09:05	
Client ID: B3BFY0	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1697980	Analyst: BXM4	SOP Ref: GL-RAD-A-002
Run Date: 09/05/2017 14:16	Aliquot: 50 mL	Instrument: LSCRED
Data File: T1697980.xls	Prep Method: EPA 906.0 Modified	Count Time: 10.8500003814697 min
Prep Batch: 1697980		
Prep Date: 09/05/2017 09:05		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		2.59E+05	pCi/L	+/-5090	50200	634	400

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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Comments:

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

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL430973	Client: CPRC001	Project: CPRC0S17008
Lab Sample ID: 430973013	Date Collected: 08/17/2017 07:00	Matrix: WATER
	Date Received: 08/18/2017 09:05	
Client ID: B3BJ38	Prep Basis: "As Received"	
Batch ID: 1694205	Method: SRISO_SEP_PRECIP_GPC	SOP Ref: GL-RAD-A-004
Run Date: 08/26/2017 14:08	Analyst: LXB3	Instrument: PIC6B
Data File: S1694205c11.xls	Aliquot: 300 mL	Count Time: 60 min
Prep Batch: 1694205	Prep Method: EPA 905.0 Modified/DOE RP5	
Prep Date: 08/24/2017 11:42		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90	U	0.557	pCi/L	+/-0.787	0.791	1.35	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	6.90	7.75	mg	89	(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.

02/12/2018

REV 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL430973	Client: CPRC001	Project: CPRC0S17008
Lab Sample ID: 430973013	Date Collected: 08/17/2017 07:00	Matrix: WATER
	Date Received: 08/18/2017 09:05	
Client ID: B3BJ38	Method: C14_LSC	Prep Basis: "As Received"
Batch ID: 1695439	Analyst: BXM4	SOP Ref: GL-RAD-A-003
Run Date: 09/06/2017 14:25	Aliquot: 100.04 mL	Instrument: LSCGOLD
Data File: C1695439.xls	Prep Method: EPA EERF C-01 Modified	Count Time: 15 min
Prep Batch: 1695439		
Prep Date: 09/06/2017 07:09		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	7.60	pCi/L	+/-19.9	20.0	34.2	50.0

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.

02/12/2018

REV 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL430973	Client: CPRC001	Project: CPRC0S17008
Lab Sample ID: 430973013	Date Collected: 08/17/2017 07:00	Matrix: WATER
	Date Received: 08/18/2017 09:05	
Client ID: B3BJ38	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1697980	Analyst: BXM4	SOP Ref: GL-RAD-A-002
Run Date: 09/05/2017 14:29	Aliquot: 50 mL	Instrument: LSCRED
Data File: T1697980.xls	Prep Method: EPA 906.0 Modified	Count Time: 50 min
Prep Batch: 1697980		
Prep Date: 09/05/2017 09:05		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium	U	14.9	pCi/L	+/-205	205	361	400

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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Comments:

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

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL430973	Client: CPRC001	Project: CPRC0S17008
Lab Sample ID: 430973015	Date Collected: 08/17/2017 09:36	Matrix: WATER
	Date Received: 08/18/2017 09:05	
Client ID: B3BJ39	Prep Basis: "As Received"	
Batch ID: 1694205	Method: SRISO_SEP_PRECIP_GPC	SOP Ref: GL-RAD-A-004
Run Date: 08/26/2017 14:08	Analyst: LXB3	Instrument: PIC6C
Data File: S1694205c11.xls	Aliquot: 300 mL	Count Time: 60 min
Prep Batch: 1694205	Prep Method: EPA 905.0 Modified/DOE RP5	
Prep Date: 08/24/2017 11:42		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90	U	0.264	pCi/L	+/-0.682	0.684	1.22	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	8.10	7.75	mg	105	(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.

02/12/2018

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL430973	Client: CPRC001	Project: CPRC0S17008
Lab Sample ID: 430973015	Date Collected: 08/17/2017 09:36	Matrix: WATER
	Date Received: 08/18/2017 09:05	
Client ID: B3BJ39	Method: C14_LSC	Prep Basis: "As Received"
Batch ID: 1695439	Analyst: BXM4	SOP Ref: GL-RAD-A-003
Run Date: 09/06/2017 14:42	Aliquot: 100.07 mL	Instrument: LSCGOLD
Data File: C1695439.xls	Prep Method: EPA EERF C-01 Modified	Count Time: 15 min
Prep Batch: 1695439		
Prep Date: 09/06/2017 07:09		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	15.3	pCi/L	+/-20.3	20.5	34.3	50.0

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.

02/12/2018

REV 1 of 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL430973	Client: CPRC001	Project: CPRC0S17008
Lab Sample ID: 430973015	Date Collected: 08/17/2017 09:36	Matrix: WATER
	Date Received: 08/18/2017 09:05	
Client ID: B3BJ39	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1697980	Analyst: BXM4	SOP Ref: GL-RAD-A-002
Run Date: 09/05/2017 15:21	Aliquot: 50 mL	Instrument: LSCRED
Data File: T1697980.xls	Prep Method: EPA 906.0 Modified	Count Time: 50 min
Prep Batch: 1697980		
Prep Date: 09/05/2017 09:05		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		5780	pCi/L	+/-392	1180	333	400

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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Comments:

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

02/12/2018

REV 1 of 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL430973	Client: CPRC001	Project: CPRC0S17008
Lab Sample ID: 430973018	Date Collected: 08/17/2017 08:55	Matrix: WATER
	Date Received: 08/18/2017 09:05	
Client ID: B3BN73	Method: SRISO_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1694205	Analyst: LXB3	SOP Ref: GL-RAD-A-004
Run Date: 08/28/2017 08:35	Aliquot: 300 mL	Instrument: PIC10A
Data File: S1694205c11.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1694205		
Prep Date: 08/24/2017 11:42		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90	U	-0.621	pCi/L	+/-0.451	0.451	1.10	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	6.40	7.75	mg	82.6	(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.

02/12/2018

REV 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL430973	Client: CPRC001	Project: CPRC0S17008
Lab Sample ID: 430973018	Date Collected: 08/17/2017 08:55	Matrix: WATER
	Date Received: 08/18/2017 09:05	
Client ID: B3BN73	Method: C14_LSC	Prep Basis: "As Received"
Batch ID: 1695439	Analyst: BXM4	SOP Ref: GL-RAD-A-003
Run Date: 09/06/2017 14:58	Aliquot: 100.03 mL	Instrument: LSCGOLD
Data File: C1695439.xls	Prep Method: EPA EERF C-01 Modified	Count Time: 15 min
Prep Batch: 1695439		
Prep Date: 09/06/2017 07:09		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14		63.2	pCi/L	+/-22.0	24.9	34.1	50.0

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.

02/12/2018

REV 1 of 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL430973	Client: CPRC001	Project: CPRC0S17008
Lab Sample ID: 430973018	Date Collected: 08/17/2017 08:55	Matrix: WATER
	Date Received: 08/18/2017 09:05	
Client ID: B3BN73	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1697980	Analyst: BXM4	SOP Ref: GL-RAD-A-002
Run Date: 09/05/2017 16:14	Aliquot: 50 mL	Instrument: LSCRED
Data File: T1697980.xls	Prep Method: EPA 906.0 Modified	Count Time: 50 min
Prep Batch: 1697980		
Prep Date: 09/05/2017 09:05		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		2200	pCi/L	+/-299	520	357	400

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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Comments:

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

Quality Control Summary

QC Summary

Report Date: September 12, 2017
 Page 1 of 3

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

Contact: Mr. Scot Fitzgerald

Workorder: 430973

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gas Flow									
Batch	1694205								
QC1203859731	MB								
Strontium-90			U	-2.45	pCi/L			LXB3	08/28/1719:51
				Uncert: +/-0.526					
				TPU: +/-0.526					
**Strontium Carrier		7.75		7.30	mg	REC: 94	(40%-110%)		
QC1203859732	430366010	DUP							
Strontium-90		U	0.330	U	-0.372	pCi/L			08/26/1714:09
				Uncert: +/-0.663	+/-0.425	RPD: 0	N/A		
				TPU: +/-0.665	+/-0.425	RER: 1.74	(0-2)		
**Strontium Carrier		7.75	8.20	7.30	mg	REC: 94	(40%-110%)		
QC1203859733	LCS								
Strontium-90		79.4		67.7	pCi/L	REC: 85	(80%-120%)		08/26/1714:09
				Uncert: +/-3.35					
				TPU: +/-11.4					
**Strontium Carrier		7.75		8.20	mg	REC: 106	(40%-110%)		
Rad Liquid Scintillation									
Batch	1695439								
QC1203862459	MB								
Carbon-14			U	31.3	pCi/L			BXM4	09/06/1715:47
				Uncert: +/-20.9					
				TPU: +/-21.7					
QC1203862460	430614002	DUP							
Carbon-14		353		329	pCi/L				09/06/1716:03
				Uncert: +/-31.0	+/-30.2	RPD: 7	(0%-20%)		
				TPU: +/-72.5	+/-68.2	RER: 0.473	(0-2)		
QC1203862461	430614002	MS							
Carbon-14		2500	353	2720	pCi/L	REC: 95	(75%-125%)		09/06/1716:20
				Uncert: +/-31.0	+/-137				
				TPU: +/-72.5	+/-524				
QC1203862462	LCS								
Carbon-14		750		706	pCi/L	REC: 94	(80%-120%)		09/06/1716:36
				Uncert: +/-39.0					
				TPU: +/-137					
Batch	1697980								
QC1203868436	MB								
Tritium			U	-56.2	pCi/L			BXM4	09/05/1720:34
				Uncert: +/-196					
				TPU: +/-196					
QC1203868437	430607001	DUP							
Tritium		2300		2420	pCi/L				09/05/1721:27
				Uncert: +/-301	+/-309	RPD: 5	(0%-20%)		
				TPU: +/-537	+/-560	RER: 0.298	(0-2)		
QC1203868438	430607001	MS							
Tritium		4440	2300	7070	pCi/L	REC: 108	(75%-125%)		09/05/1722:19

QC Summary

Workorder: 430973

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Liquid Scintillation									
Batch	1697980								
		Uncert:	+/-301	+/-710					
		TPU:	+/-537	+/-1540					
QC1203868439	LCS								
Tritium	2210			2180	pCi/L	REC: 99 (80%-120%)			09/05/1723:11
		Uncert:		+/-302					
		TPU:		+/-518					

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 >= 2X the MDA and, after corrections, result is >= 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 >= 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)

QC Summary

Workorder: 430973

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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.