



June 22, 2017

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

Re: CHPRC SAF I17-006  
Work Order: 424307  
SDG: GEL424307

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on May 31, 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,

*B Luthman*  
Brielle Luthman for  
Heather Shaffer  
Project Manager

Purchase Order: 300071 - 7H  
Chain of Custody: I17-006-070, I17-006-081 and I17-006-090  
Enclosures



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# Case Narrative

June 26, 2017

General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF I17-006  
SDG: GEL424307

June 22, 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 May 31, 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:

<b><u>Laboratory Identification</u></b>	<b><u>Sample Description</u></b>
424307001	B39F74
424307002	B39FH8
424307003	B39FM6

**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.

June 26, 2017

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, General Chemistry, Metals and Radiochemistry.

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

  
Brielle Luthman for  
Heather Shaffer  
Project Manager

June 26, 2017

Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL424307  
Work Order #: 424307

## 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.

### 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
1203806007 (B39FH3PS)	2-Butanone	62* (70%-130%)
	Acetone	40* (70%-130%)
1203806008 (B39FH3PSD)	2-Butanone	59* (70%-130%)
	Acetone	43* (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.

## General Chemistry

### **Ion Chromatography**

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**

**Sample Dilutions**

The following samples 1203800929 (B39F74DUP), 1203800930 (B39F74PS) and 424307001 (B39F74) were diluted because target analyte concentrations exceeded the calibration range.

Analyte	424307 001
Sulfate	5X

**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**

Additional clean up steps were performed on sample 424307003 (B39FM6) in order to confirm sample results.

**TRITIUM\_DIST\_LSC: COMMON**

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

**C14\_LSC: COMMON**

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

**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**

June 26, 2017

CH2M Hill Plateau Remediation Company		C.O.C. # <b>II7-006-070</b>	
424307		Page 1 of 1	
Collector Dan Woehle CHPRC	Contact/Requester Karen Waters-Husted	Telephone No. 509-376-4650	
SAF No. II7-006	Sampling Origin Hanford Site	Purchase Order/Charge Code 300071	
Project Title 100KR4, May 2017	Logbook No. HNF-N-5069343	Ice Chest No. 625-604	
Shipped To (Lab) GEL Laboratories, LLC	Method of Shipment Commercial Carrier	Bill of Lading/Air Bill No. 77925830700	
Protocol CERCLA	Priority: 30 Days	Offsite Property No. 17958	
<b>POSSIBLE SAMPLE HAZARDS/REMARKS</b> *** 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		Hold Time	Total Activity Exemption: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
SPECIAL INSTRUCTIONS N/A		Sample Analysis	Preservative
Sample No. B39F74	No/Type Container 1x125-mL G/P	Holding Time 48 Hours	Preservative Cool <=6C

Relinquished By Dan Woehle CHPRC	Print <i>Dan Woehle</i>	Sign	Date/Time MAY 30 2017 1150	Received By Janelle Zunker CHPRC	Print <i>Janelle Zunker</i>	Sign	Date/Time MAY 30 2017 1150	Matrix *
Relinquished By 9 Janelle Zunker CHPRC	Print <i>Janelle Zunker</i>	Sign	Date/Time MAY 30 2017 1150	Received By FBIEX	Print FBIEX	Sign	Date/Time MAY 30 2017 1150	S = Soil
Relinquished By 10 Janelle Zunker CHPRC	Print <i>Janelle Zunker</i>	Sign	Date/Time MAY 30 2017 1150	Received By STACY BOONE	Print <i>Stacy Boone</i>	Sign	Date/Time 5/31/17 8:50	SE = Sediment
Relinquished By				Received By				SO = Solid
								SL = Sludge
								W = Water
								O = Oil
								A = Air
								DS = Drum Solids
								DL = Drum Liquids
								T = Tissue
								WI = Wipe
								L = Liquid
								V = Vegetation
								X = Other

FINAL SAMPLE DISPOSITION

PRINTED ON 4/4/2017

FSR ID = FSR43589

A-6004-842 (REV 2)

June 26, 2017

**CH2M Hill Plateau Remediation Company**

**CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**

C.O.C.# **117-006-081**

Page 1 of 1

Collector: Dan Woehle  
CHPRC

Contact/Requester: Karen Waters-Husted

Telephone No. 509-376-4650

SAF No. 117-006

Sampling Origin: Hanford Site

Purchase Order/Charge Code: 300071

Project Title: 100KR4, May 2017

Logbook No. HNF-N-50693143

Ice Chest No. 605-604

Shipped To (Lab): GEL Laboratories, LLC

Method of Shipment: Commercial Carrier

Bill of Lading/Air Bill No. 79258307706

Protocol: CERCLA

Priority: 30 Days

Offsite Property No. 7956

SPECIAL INSTRUCTIONS: **PRIORITY**

Hold Time: Total Activity Exemption: Yes  No

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

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B39FH8	N	W	5/30/17	0830	1x500-mL G/P	6020_METALS_ICPMS: Chromium (1)	6 Months	HNO3 to pH <2
B39FH8	N	W			5x40-mL aGs*	8260_VOA_GCMS: COMMON	14 Days	HCl or H2SO4 to pH <2/Cool <=6C
B39FH8	N	W			1x500-mL G/P	C14_LSC: COMMON	6 Months	None
B39FH8	N	W			1x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2
B39FH8	N	W			1x250-mL P	TRITIUM_DIST_LSC: COMMON	6 Months	None

Relinquished By: Dan Woehle CHPRC	Print: Dan Woehle	Sign: Dan Woehle	Date/Time: MAY 30 2017 1:50	Received By: Janelle Zunker CHPRC	Print: Janelle Zunker CHPRC	Sign: Janelle Zunker	Date/Time: MAY 30 2017	Matrix * S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air
Relinquished By: Janelle Zunker CHPRC	Print: Janelle Zunker	Sign: Janelle Zunker	Date/Time: MAY 30 2017 1:00	Received By: FEDEX	Print: FEDEX	Sign: FEDEX	Date/Time: 11:50	DS = Drum Solids DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation X = Other
Relinquished By: 10 of 64	Print: 10 of 64	Sign: 10 of 64	Date/Time: FEB EX	Received By: 178 STACY BOONE	Print: STACY BOONE	Sign: STACY BOONE	Date/Time: 5/31/17 8:50	
Relinquished By:	Print:	Sign:	Date/Time:	Received By:	Print:	Sign:	Date/Time:	
FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process)							Date/Time
PRINTED ON 3/27/2017	FSR ID = FSR43321							A-6004-842 (REV 2)

June 26, 2017

CH2M Hill Plateau Remediation Company		C.O.C.# I17-006-090	
424307		Page 1 of 1	
Collector	Dan Woehle CHPRC	Contact/Requester	Karen Waters-Husted
SAF No.	I17-006	Telephone No.	509-376-4650
Project Title	100KR4, May 2017	Purchase Order/Charge Code	300071
Shipped To (Lab)	GEL Laboratories, LLC	Ice Chest No.	GWS-6004
Protocol	CERCLA	Bill of Lading/Air Bill No.	7762, 5830, 7700
		Offsite Property No.	7956
<b>POSSIBLE SAMPLE HAZARDS/REMARKS</b> *** 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	Hold Time Total Activity Exemption: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Sample No.	B39FM6	Filter	N
		Date	5/30/17 1208
		Time	
		No/Type Container	1x1-L G/P
		Sample Analysis	SRISO_SEP_PRECIP_GPC: COMMON
		Holding Time	6 Months
		Preservative	HNO3 to pH <2

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix *
Dan Woehle CHPRC			MAY 30 2017 1210	Janelle Zunker CHPRC			MAY 30 2017 1210	S = Soil DS = Drum Solids SE = Sediment DL = Drum Liquids SO = Solid T = Tissue SL = Sludge WI = Wipe W = Water L = Liquid O = Oil V = Vegetation A = Air X = Other
Relinquished By			MAY 30 2017 1400	Received By	FEDEX			
Janelle Zunker CHPRC				Received By			5/31/17 8:51	
Relinquished By			FED EX	Received By				
				Received By				
FINAL SAMPLE DISPOSITION		Disposal Method (e.g., Return to customer, per lab procedure, used in process)		Disposed By		Date/Time		

PRINTED ON 3/27/2017

FSR ID = FSR33812

A-6004-842 (REV 2)

Client: <b>CPRC</b>		SDG/AR/COC/Work Order: <b>424307</b>
Received By: <b>Stacy Boons</b>		Date Received: <b>31-MAY-17</b>
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  <b>7792 5830 7706</b>
Suspected Hazard Information	Yes <input type="checkbox"/> No <input 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 checked="" type="checkbox"/> No <input type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____
COC/Samples marked or classified as radioactive?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <input checked="" type="checkbox"/> CPM / mR/Hr Classified as: Rad 1    Rad 2    Rad 3
Is package, COC, and/or Samples marked HAZ?	Yes <input checked="" type="checkbox"/> No <input 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	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken    Damaged container    Leaking container    Other (describe)
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Preservation Method: <u>Wet Ice</u> Ice Packs    Dry ice    None    Other: *all temperatures are recorded in Celsius    TEMP: <u>10</u>
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>1R3-17</u> Secondary Temperature Device Serial # (If Applicable): _____
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken    Damaged container    Leaking container    Other (describe)
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and Containers Affected: If Preservation added, Lot#: _____
7 Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	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"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected: _____
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected: _____
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected: _____
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected: _____
12 Are sample containers identifiable as GEL provided?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials DS Date 5/31/17 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	

June 26, 2017

# Laboratory Certifications

## List of current GEL Certifications as of 22 June 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	SC000122017-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-17-12
Utah NELAP	SC000122017-22
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

# **Volatile Analysis**

# Case Narrative

June 26, 2017

GC/MS Volatile

Technical Case Narrative

CH2MHill Plateau Remediation Company (CPRC)

SDG #: GEL424307

Work Order #: 424307

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

**Analytical Method:** SW846 8260C

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

**Analytical Batch:** 1671888

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
424307002	B39FH8
1203806005	Method Blank (MB)
1203806006	Laboratory Control Sample (LCS)
1203806007	424245003(B39FH3) Post Spike (PS)
1203806008	424245003(B39FH3) Post Spike Duplicate (PSD)

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

**Data Summary:**

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

**Quality Control (QC) Information**

**Matrix Spike/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
1203806007 (B39FH3PS)	2-Butanone	62* (70%-130%)
	Acetone	40* (70%-130%)
1203806008 (B39FH3PSD)	2-Butanone	59* (70%-130%)
	Acetone	43* (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.

June 26, 2017

**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: GEL424307 GEL Work Order: 424307

**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.

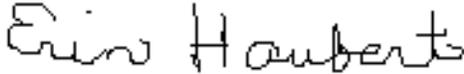
RA Indicates that sample is re-analyzed without re-extraction.

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.

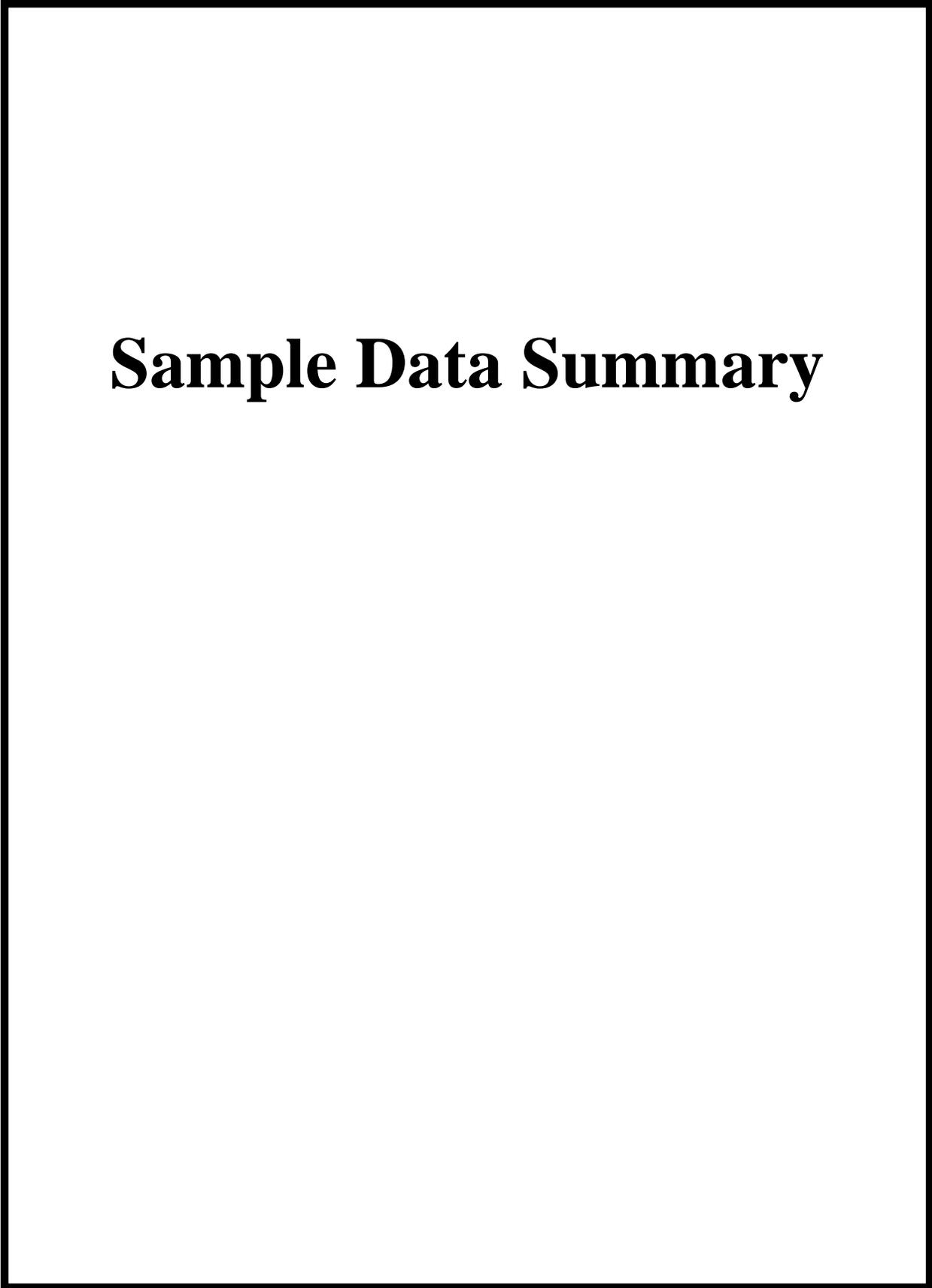
The following data validator verified the information presented in this data report:

Signature: 

Name: Erin Haubert

Date: 22 JUN 2017

Title: Data Validator



# Sample Data Summary

June 26, 2017

Page 1 of 1

Volatile  
**Certificate of Analysis**  
**Sample Summary**

<b>SDG Number:</b> GEL424307	<b>Date Collected:</b> 05/30/2017 08:36	<b>Matrix:</b> WATER
<b>Lab Sample ID:</b> 424307002	<b>Date Received:</b> 05/31/2017 08:50	
<b>Client ID:</b> B39FH8	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0117006
<b>Batch ID:</b> 1671888	<b>Method:</b> SW846 8260C	<b>SOP Ref:</b> GL-OA-E-038
<b>Run Date:</b> 06/07/2017 14:00	<b>Inst:</b> VOA3.I	<b>Dilution:</b> 1
<b>Prep Date:</b> 06/07/2017 14:00	<b>Analyst:</b> VXY1	<b>Purge Vol:</b> 5 mL
<b>Data File:</b> 060717V3\3G309.D	<b>Column:</b> 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	U	0.300	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	3.40	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

# June 26, 2017

## GEL LABORATORIES LLC

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

### QC Summary

Report Date: June 15, 2017

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 424307

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Volatile-GC/MS</b>											
Batch	1671888										
QC1203806006	LCS										
1,1,1-Trichloroethane	50.0			48.3	ug/L		97	(70%-130%)	VXY1	06/07/17	10:56
1,1,2-Trichloroethane	50.0			48.6	ug/L		97	(70%-130%)			
1,1-Dichloroethane	50.0			51.1	ug/L		102	(70%-130%)			
1,1-Dichloroethylene	50.0			46.5	ug/L		93	(70%-130%)			
1,2-Dichloroethane	50.0			46.9	ug/L		94	(70%-130%)			
2-Butanone	250			264	ug/L		106	(70%-130%)			
4-Methyl-2-pentanone	250			233	ug/L		93	(70%-130%)			
Acetone	250			273	ug/L		109	(70%-130%)			
Benzene	50.0			46.1	ug/L		92	(70%-130%)			
Carbon disulfide	250			231	ug/L		92	(70%-130%)			
Carbon tetrachloride	50.0			48.2	ug/L		96	(70%-130%)			
Chlorobenzene	50.0			47.4	ug/L		95	(70%-130%)			
Chloroform	50.0			46.2	ug/L		92	(70%-130%)			

June 26, 2017

GEL LABORATORIES LLC

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QC Summary

Workorder: 424307

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Volatile-GC/MS</b>											
Batch	1671888										
Ethylbenzene	50.0			45.1	ug/L		90	(70%-130%)	VXY1	06/07/17	10:56
Methylene chloride	50.0			44.4	ug/L		89	(70%-130%)			
Tetrachloroethylene	50.0			46.0	ug/L		92	(70%-130%)			
Toluene	50.0			48.1	ug/L		96	(70%-130%)			
Trichloroethylene	50.0			49.1	ug/L		98	(70%-130%)			
Vinyl chloride	50.0			45.7	ug/L		91	(70%-130%)			
Xylenes (total)	150			141	ug/L		94	(70%-130%)			
**1,2-Dichloroethane-d4	50.0			44.1	ug/L		88	(70%-130%)			
**Bromofluorobenzene	50.0			53.7	ug/L		107	(70%-130%)			
**Toluene-d8	50.0			46.9	ug/L		94	(70%-130%)			
QC1203806005 MB											
1,1,1-Trichloroethane			U	0.300	ug/L					06/07/17	12:28
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						

June 26, 2017

GEL LABORATORIES LLC

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QC Summary

Workorder: 424307

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Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Volatile-GC/MS</b>											
Batch	1671888										
2-Butanone			U	3.00	ug/L				VXY1	06/07/17	12:28
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						
Xylenes (total)			U	0.300	ug/L						

June 26, 2017

GEL LABORATORIES LLC

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

QC Summary

Workorder: 424307

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Volatile-GC/MS</b>											
Batch	1671888										
**1,2-Dichloroethane-d4	50.0			46.7	ug/L		93	(70%-130%)	VXY1	06/07/17	12:28
**Bromofluorobenzene	50.0			49.7	ug/L		99	(70%-130%)			
**Toluene-d8	50.0			50.9	ug/L		102	(70%-130%)			
QC1203806007 424245003 PS											
1,1,1-Trichloroethane	50.0	U	0.00	40.5	ug/L		81	(70%-130%)		06/07/17	20:08
1,1,2-Trichloroethane	50.0	U	0.00	49.5	ug/L		99	(70%-130%)			
1,1-Dichloroethane	50.0	U	0.00	46.8	ug/L		94	(70%-130%)			
1,1-Dichloroethylene	50.0	U	0.00	41.6	ug/L		83	(70%-130%)			
1,2-Dichloroethane	50.0	U	0.00	44.5	ug/L		89	(70%-130%)			
2-Butanone	250	TU	0.00 T	154	ug/L		62*	(70%-130%)			
4-Methyl-2-pentanone	250	U	0.00	224	ug/L		89	(70%-130%)			
Acetone	250	TU	0.00 T	101	ug/L		40*	(70%-130%)			
Benzene	50.0	U	0.00	44.4	ug/L		89	(70%-130%)			
Carbon disulfide	250	U	0.00	224	ug/L		89	(70%-130%)			
Carbon tetrachloride	50.0	U	0.00	41.6	ug/L		83	(70%-130%)			
Chlorobenzene	50.0	U	0.00	46.6	ug/L		93	(70%-130%)			

# June 26, 2017

## GEL LABORATORIES LLC

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

### QC Summary

Workorder: 424307

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Volatile-GC/MS</b>											
Batch	1671888										
Chloroform	50.0	J	0.310	42.6	ug/L		85	(70%-130%)	VXY1	06/07/17	20:08
Ethylbenzene	50.0	U	0.00	47.1	ug/L		94	(70%-130%)			
Methylene chloride	50.0	U	0.00	43.1	ug/L		86	(70%-130%)			
Tetrachloroethylene	50.0	U	0.00	42.9	ug/L		86	(70%-130%)			
Toluene	50.0	U	0.00	46.8	ug/L		94	(70%-130%)			
Trichloroethylene	50.0	J	3.88	47.4	ug/L		87	(70%-130%)			
Vinyl chloride	50.0	U	0.00	42.7	ug/L		85	(70%-130%)			
Xylenes (total)	150	U	0.00	136	ug/L		91	(70%-130%)			
**1,2-Dichloroethane-d4	50.0		44.3	38.5	ug/L		77	(70%-130%)			
**Bromofluorobenzene	50.0		48.8	49.3	ug/L		99	(70%-130%)			
**Toluene-d8	50.0		46.7	47.2	ug/L		94	(70%-130%)			
QC1203806008 424245003 PSD											
1,1,1-Trichloroethane	50.0	U	0.00	43.7	ug/L	8	87	(0%-20%)		06/07/17	20:38
1,1,2-Trichloroethane	50.0	U	0.00	48.0	ug/L	3	96	(0%-20%)			
1,1-Dichloroethane	50.0	U	0.00	46.5	ug/L	1	93	(0%-20%)			
1,1-Dichloroethylene	50.0	U	0.00	42.9	ug/L	3	86	(0%-20%)			

June 26, 2017

GEL LABORATORIES LLC

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QC Summary

Workorder: 424307

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Volatile-GC/MS</b>											
Batch 1671888											
1,2-Dichloroethane	50.0	U	0.00		45.0	ug/L	1	90	(0%-20%)	VXY1	06/07/17 20:38
2-Butanone	250	TU	0.00	T	148	ug/L	4	59*	(0%-20%)		
4-Methyl-2-pentanone	250	U	0.00		214	ug/L	4	86	(0%-20%)		
Acetone	250	TU	0.00	T	108	ug/L	7	43*	(0%-20%)		
Benzene	50.0	U	0.00		44.4	ug/L	0	89	(0%-20%)		
Carbon disulfide	250	U	0.00		218	ug/L	3	87	(0%-20%)		
Carbon tetrachloride	50.0	U	0.00		43.1	ug/L	4	86	(0%-20%)		
Chlorobenzene	50.0	U	0.00		44.4	ug/L	5	89	(0%-20%)		
Chloroform	50.0	J	0.310		44.6	ug/L	4	89	(0%-20%)		
Ethylbenzene	50.0	U	0.00		42.1	ug/L	11	84	(0%-20%)		
Methylene chloride	50.0	U	0.00		43.0	ug/L	0	86	(0%-20%)		
Tetrachloroethylene	50.0	U	0.00		42.0	ug/L	2	84	(0%-20%)		
Toluene	50.0	U	0.00		44.7	ug/L	4	89	(0%-20%)		
Trichloroethylene	50.0	J	3.88		47.3	ug/L	0	87	(0%-20%)		
Vinyl chloride	50.0	U	0.00		43.7	ug/L	2	87	(0%-20%)		

June 26, 2017

GEL LABORATORIES LLC

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

QC Summary

Workorder: 424307

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Table with columns: Parmname, NOM, Sample, Qual, QC, Units, RPD%, REC%, Range, Anlst, Date, Time. Rows include Volatile-GC/MS, Xylenes (total), \*\*1,2-Dichloroethane-d4, \*\*Bromofluorobenzene, and \*\*Toluene-d8.

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.

June 26, 2017  
 Volatile  
 Surrogate Recovery Report

SDG Number: GEL424307

Matrix Type: LIQUID

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203806006	LCS for batch 1671888	88	94	107
1203806005	MB for batch 1671888	93	102	99
424307002	B39FH8	89	89	92
1203806007	B39FH3PS	77	94	99
1203806008	B39FH3PSD	80	90	101

**Surrogate****Acceptance Limits**

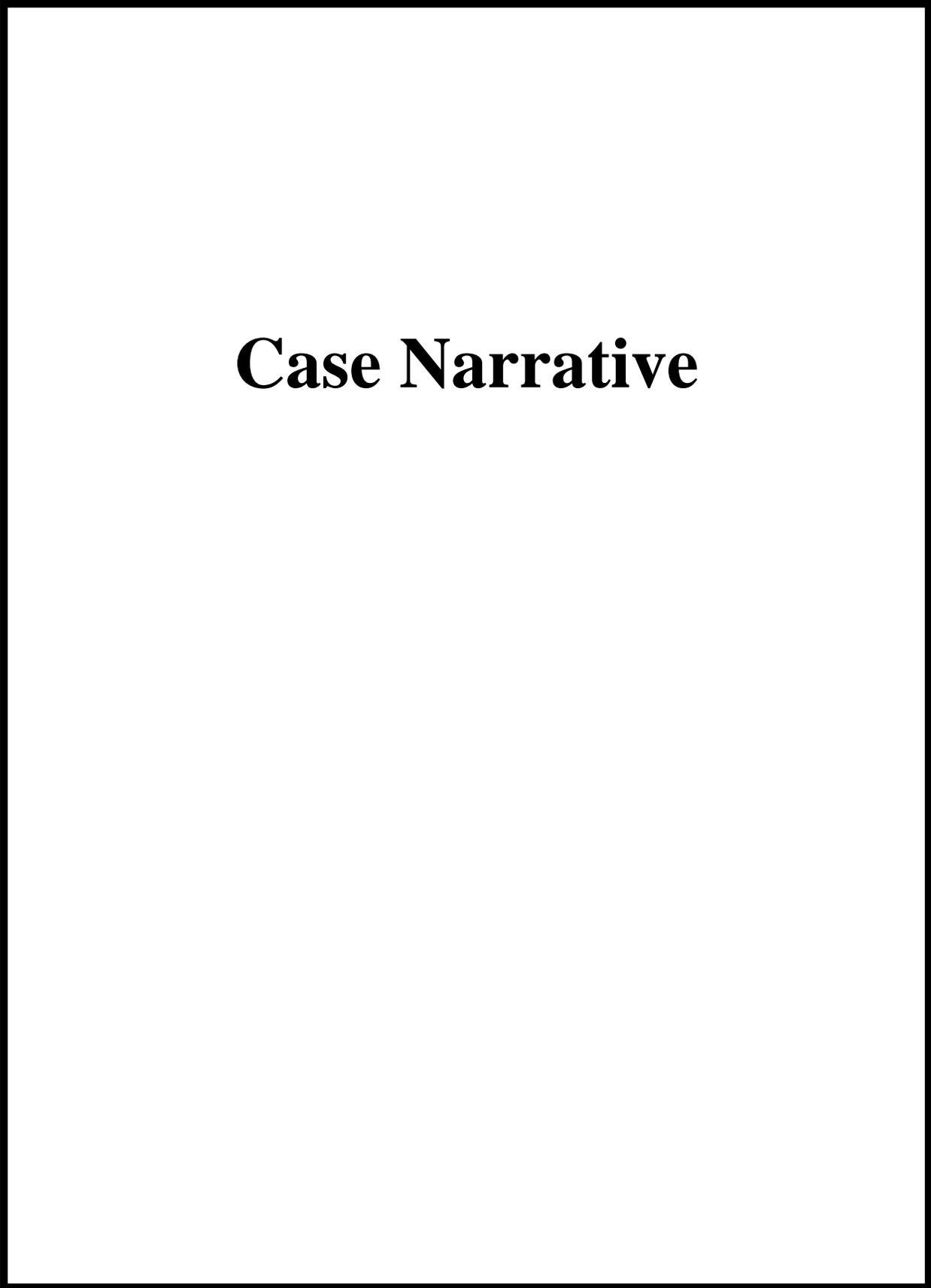
DCED4 = 1,2-Dichloroethane-d4	(70%-130%)
TOL = Toluene-d8	(70%-130%)
BFB = Bromofluorobenzene	(70%-130%)

\* Recovery outside Acceptance Limits

# Column to be used to flag recovery values

D Sample Diluted

# Metals Analysis



# Case Narrative

June 26, 2017

Metals

Technical Case Narrative

CH2MHill Plateau Remediation Company (CPRC)

SDG #: GEL424307

Work Order #: 424307

**Product:** Determination of Metals by ICP-MS

**Analytical Method:** SW846 3005A/6020B

**Analytical Procedure:** GL-MA-E-014 REV# 29

**Analytical Batch:** 1669767

**Preparation Method:** SW846 3005A

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

**Preparation Batch:** 1669764

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
424307002	B39FH8
1203800931	Method Blank (MB)ICP-MS
1203800932	Laboratory Control Sample (LCS)
1203800935	424307002(B39FH8L) Serial Dilution (SD)
1203800933	424307002(B39FH8S) Matrix Spike (MS)
1203800934	424307002(B39FH8SD) 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.

June 26, 2017

**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: GEL424307 GEL Work Order: 424307

**The Qualifiers in this report are defined as follows:**

- \* Duplicate analysis not within control limits
- 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.

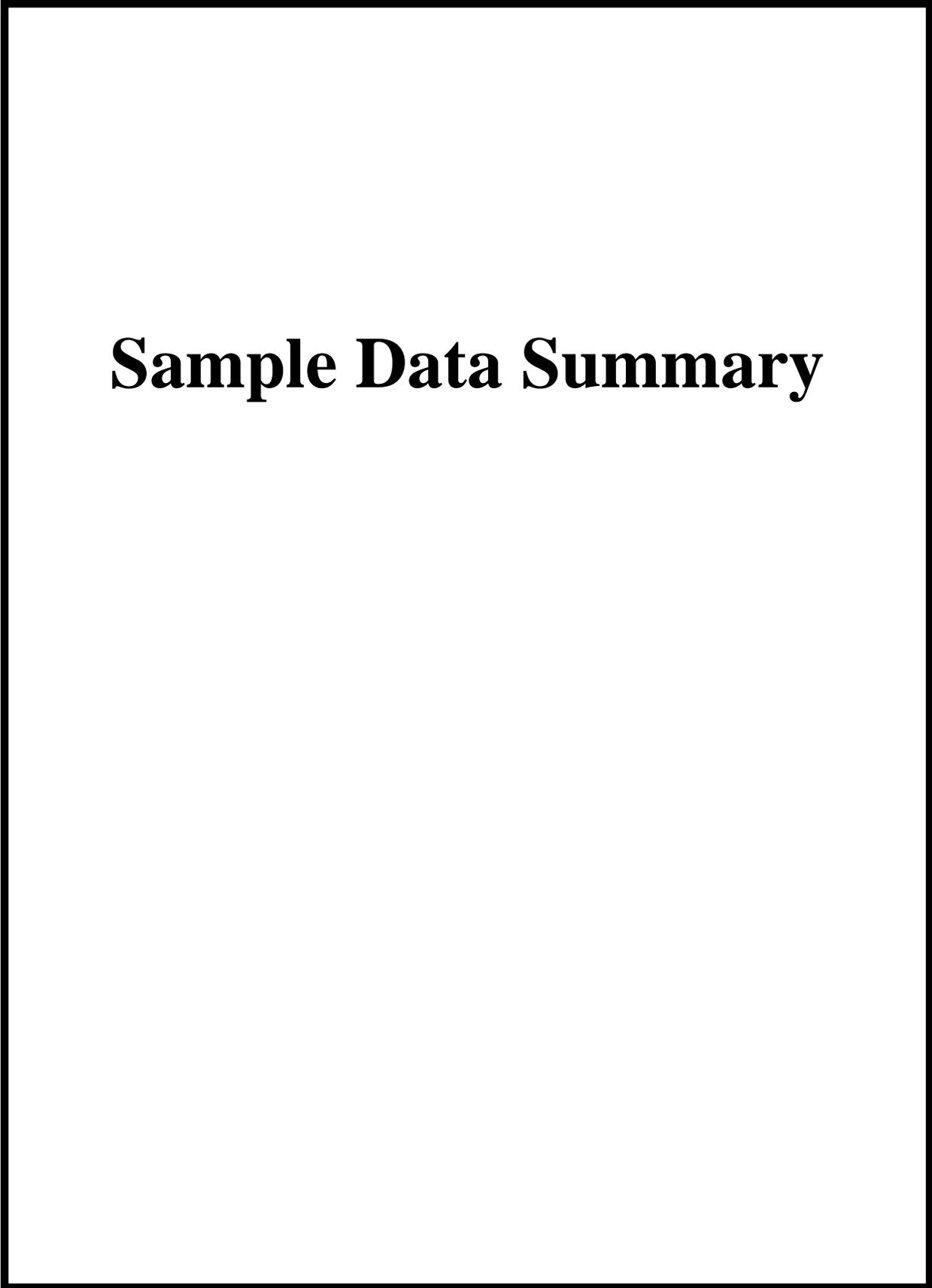
The following data validator verified the information presented in this data report:

**Signature:** 

**Name:** Nik-Cole Elmore

**Date:** 20 JUN 2017

**Title:** Data Validator



# Sample Data Summary

**METALS**  
-1-  
**INORGANICS ANALYSIS DATA PACKAGE**

**SDG No:** GEL424307

**CONTRACT:** CPRC0117006

**METHOD TYPE:** SW846

**SAMPLE ID:**424307002

**BASIS:** As Received

**DATE COLLECTED** 30-MAY-17

**CLIENT ID:** B39FH8

**LEVEL:** Low

**DATE RECEIVED** 31-MAY-17

**MATRIX:** WATER

**%SOLIDS:** 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-47-3	Chromium	12.4	ug/L		3	10	10	1	MS	PRB	06/03/17 12:50	170603-1	1669767

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1669767	1669764	SW846 3005A	50	mL	50	mL	05/31/17	CXW4

**\*Analytical Methods:**

MS SW846 3005A/6020B

# Quality Control Summary

# June 26, 2017 GEL LABORATORIES LLC

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

## QC Summary

Report Date: June 20, 2017

Page 1 of 2

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

**Contact: Mr. Scot Fitzgerald**

**Workorder: 424307**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1669767										
QC1203800932	LCS										
Chromium	50.0			47.3	ug/L		94.5	(80%-120%)	PRB	06/03/17	12:48
QC1203800931	MB										
Chromium			U	3.00	ug/L					06/03/17	12:46
QC1203800933	424307002	MS									
Chromium	50.0	12.4		59.1	ug/L		93.4	(75%-125%)		06/03/17	12:52
QC1203800934	424307002	MSD									
Chromium	50.0	12.4		59.5	ug/L	0.585	94.1	(0%-20%)		06/03/17	12:55
QC1203800935	424307002	SDILT									
Chromium		12.4	DU	15.0	ug/L	N/A		(0%-20%)		06/03/17	12:57

**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

June 26, 2017

**GEL LABORATORIES LLC**

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

**QC Summary**

Workorder: 424307

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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.

June 26, 2017

# General Chem Analysis

# Case Narrative

General Chemistry  
Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL424307  
Work Order #: 424307

**Product: Ion Chromatography**

**Analytical Method:** 9056\_ANIONS\_IC

**Analytical Procedure:** GL-GC-E-086 REV# 25

**Analytical Batch:** 1669761

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
424307001	B39F74
1203800927	Method Blank (MB)
1203800928	Laboratory Control Sample (LCS)
1203800929	424307001(B39F74) Sample Duplicate (DUP)
1203800930	424307001(B39F74) Post Spike (PS)

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

**Data Summary:**

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

**Technical Information**

**Sample Dilutions**

The following samples 1203800929 (B39F74DUP), 1203800930 (B39F74PS) and 424307001 (B39F74) were diluted because target analyte concentrations exceeded the calibration range. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

Analyte	424307
	001
Sulfate	5X

**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.

June 26, 2017

**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: GEL424307 GEL Work Order: 424307

**The Qualifiers in this report are defined as follows:**

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: **Aubrey Kingsbury**

Date: **21 JUN 2017**

Title: **Analyst I**

# Sample Data Summary

## Certificate of Analysis

Report Date: June 21, 2017

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF I17-006

Client Sample ID: B39F74	Project: CPRC0I17006
Sample ID: 424307001	Client ID: CPRC001
Matrix: WATER	
Collect Date: 30-MAY-17 10:00	
Receive Date: 31-MAY-17	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
9056_ANIONS_IC: COMMON "As Received"												
Chloride		9940	67.0	200	ug/L		1	MXL2	05/31/17	1201	1669761	1
Fluoride	B	263	33.0	500	ug/L		1					
Nitrate-N		4170	33.0	250	ug/L		1					
Nitrite-N	U	33.0	33.0	250	ug/L		1					
Sulfate	D	32000	665	2000	ug/L		5	MXL2	06/01/17	1133	1669761	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	9056_ANIONS_IC	
2	9056_ANIONS_IC	

**Notes:**

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# Quality Control Summary

# June 26, 2017 GEL LABORATORIES LLC

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

## QC Summary

Report Date: June 21, 2017

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

Contact: Mr. Scot Fitzgerald

Workorder: 424307

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1669761										
QC1203800929	424307001	DUP									
Chloride		9940		9910	ug/L	0.295		(0%-20%)	MXL2	05/31/17	12:31
Fluoride	B	263	B	256	ug/L	2.85	^	(+/-500)			
Nitrate-N		4170		4170	ug/L	0.0672		(0%-20%)			
Nitrite-N	U	33.0	U	33.0	ug/L	N/A					
Sulfate	D	32000	D	32100	ug/L	0.125		(0%-20%)		06/01/17	12:02
QC1203800928	LCS										
Chloride	5000			4620	ug/L		92.4	(80%-120%)		05/31/17	11:32
Fluoride	2500			2370	ug/L		94.6	(80%-120%)			
Nitrate-N	2500			2310	ug/L		92.6	(80%-120%)			
Nitrite-N	2500			2380	ug/L		95.2	(80%-120%)			
Sulfate	10000			9600	ug/L		96	(80%-120%)			
QC1203800927	MB										
Chloride			U	67.0	ug/L					05/31/17	11:02
Fluoride			U	33.0	ug/L						
Nitrate-N			U	33.0	ug/L						

June 26, 2017

GEL LABORATORIES LLC

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QC Summary

Workorder: 424307

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1669761										
Nitrite-N			U	33.0	ug/L				MXL2	05/31/17	11:02
Sulfate			U	133	ug/L						
QC1203800930	424307001 PS										
Chloride	5.00		9.94	15.5	mg/L		111	(75%-125%)		05/31/17	13:00
Fluoride	2.50	B	0.263	2.59	mg/L		93.2	(75%-125%)			
Nitrate-N	2.50		4.17	6.79	mg/L		105	(75%-125%)			
Nitrite-N	2.50	U	0.00	2.35	mg/L		94	(75%-125%)			
Sulfate	10.0	D	6.41 D	16.4	mg/L		100	(75%-125%)		06/01/17	12:31

Notes:

The Qualifiers in this report are defined as follows:

- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.
- N Spike Sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

June 26, 2017

**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 424307

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<b>Parmname</b>	<b>NOM</b>	<b>Sample</b>	<b>Qual</b>	<b>QC</b>	<b>Units</b>	<b>RPD%</b>	<b>REC%</b>	<b>Range</b>	<b>Anlst</b>	<b>Date</b>	<b>Time</b>
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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.  
^ 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

June 26, 2017

Radiochemistry

Technical Case Narrative

CH2MHill Plateau Remediation Company (CPRC)

SDG #: GEL424307

Work Order #: 424307

**Product:** SRISO\_SEP\_PRECIP\_GPC: COMMON

**Analytical Method:** SRISO\_SEP\_PRECIP\_GPC

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

**Analytical Batch:** 1669683

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
424307002	B39FH8
424307003	B39FM6
1203800632	Method Blank (MB)
1203800633	423799010(B39FL5) Sample Duplicate (DUP)
1203800634	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**

Additional clean up steps were performed on sample 424307003 (B39FM6) in order to confirm sample results.

**Product:** TRITIUM\_DIST\_LSC: COMMON

**Analytical Method:** TRITIUM\_DIST\_LSC

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

**Analytical Batch:** 1670731

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
424307002	B39FH8
1203803163	Method Blank (MB)
1203803164	424396002(NonSDG) Sample Duplicate (DUP)
1203803165	424396002(NonSDG) Matrix Spike (MS)
1203803166	Laboratory Control Sample (LCS)

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

**Data Summary:**

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

**Product:** C14\_LSC: COMMON

**Analytical Method:** C14\_LSC

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

**Analytical Batch:** 1670749

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
424307002	B39FH8
1203803225	Method Blank (MB)
1203803226	424396002(NonSDG) Sample Duplicate (DUP)
1203803227	424396002(NonSDG) Matrix Spike (MS)
1203803228	Laboratory Control Sample (LCS)

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

**Data Summary:**

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

**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.

June 26, 2017

**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: GEL424307 GEL Work Order: 424307

**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.

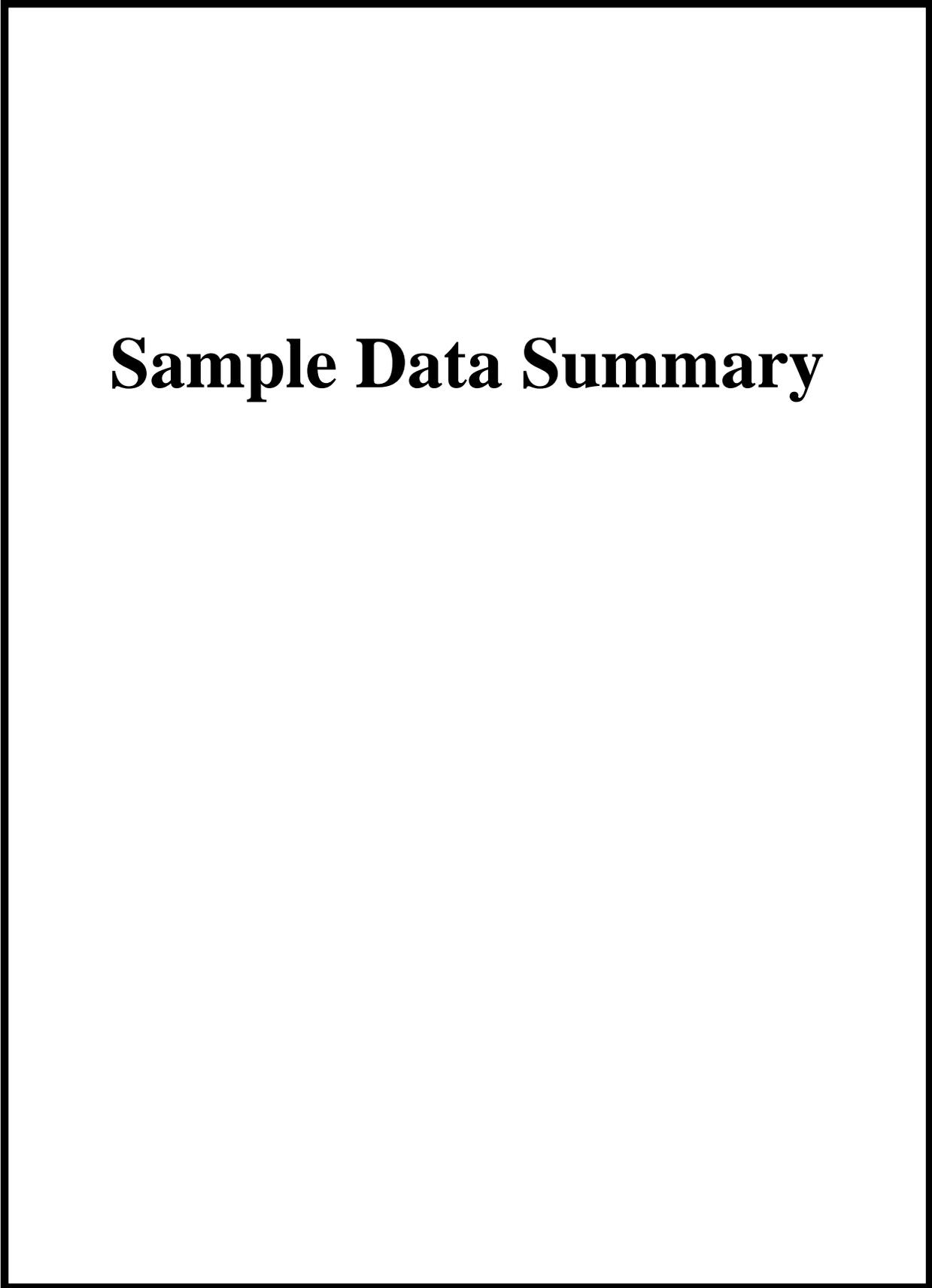
The following data validator verified the information presented in this data report:

Signature: 

Name: **Spencer Collins**

Date: **21 JUN 2017**

Title: **Analyst I**



# Sample Data Summary

June 26, 2017

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL424307	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0117006
<b>Lab Sample ID:</b> 424307002	<b>Date Collected:</b> 05/30/2017 08:36	<b>Matrix:</b> WATER
	<b>Date Received:</b> 05/31/2017 08:50	
<b>Client ID:</b> B39FH8	<b>Method:</b> SRISO_SEP_PRECIP_GPC	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1669683	<b>Analyst:</b> KSD1	<b>SOP Ref:</b> GL-RAD-A-004
<b>Run Date:</b> 06/12/2017 17:02	<b>Aliquot:</b> 300 mL	<b>Instrument:</b> PIC8A
<b>Data File:</b> S1669683r.xls	<b>Prep Method:</b> EPA 905.0 Modified/DOE RP5	<b>Count Time:</b> 60 min
<b>Prep Batch:</b> 1669683		
<b>Prep Date:</b> 06/08/2017 13:47		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90	U	-0.383	pCi/L	+/-0.966	0.966	1.91	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	6.30	7.75	mg	81.3	(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.

June 26, 2017

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL424307	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0117006
<b>Lab Sample ID:</b> 424307002	<b>Date Collected:</b> 05/30/2017 08:36	<b>Matrix:</b> WATER
	<b>Date Received:</b> 05/31/2017 08:50	
<b>Client ID:</b> B39FH8	<b>Method:</b> TRITIUM_DIST_LSC	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1670731	<b>Analyst:</b> BXM4	<b>SOP Ref:</b> GL-RAD-A-002
<b>Run Date:</b> 06/08/2017 22:33	<b>Aliquot:</b> 50 mL	<b>Instrument:</b> LSCBLUE
<b>Data File:</b> T1670731.xls	<b>Prep Method:</b> EPA 906.0 Modified	<b>Count Time:</b> 45 min
<b>Prep Batch:</b> 1670731		
<b>Prep Date:</b> 06/08/2017 10:01		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		2110	pCi/L	+/-311	514	390	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.

June 26, 2017

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL424307	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0117006
<b>Lab Sample ID:</b> 424307002	<b>Date Collected:</b> 05/30/2017 08:36	<b>Matrix:</b> WATER
	<b>Date Received:</b> 05/31/2017 08:50	
<b>Client ID:</b> B39FH8	<b>Method:</b> C14_LSC	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1670749	<b>Analyst:</b> BXM4	<b>SOP Ref:</b> GL-RAD-A-003
<b>Run Date:</b> 06/09/2017 19:30	<b>Aliquot:</b> 60.02 mL	<b>Instrument:</b> LSCGREEN
<b>Data File:</b> C1670749.xls	<b>Prep Method:</b> EPA EERF C-01 Modified	<b>Count Time:</b> 45 min
<b>Prep Batch:</b> 1670749		
<b>Prep Date:</b> 06/09/2017 09:17		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14		335	pCi/L	+/-25.4	67.1	31.5	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.

June 26, 2017

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL424307	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0117006
<b>Lab Sample ID:</b> 424307003	<b>Date Collected:</b> 05/30/2017 12:08	<b>Matrix:</b> WATER
	<b>Date Received:</b> 05/31/2017 08:50	
<b>Client ID:</b> B39FM6	<b>Method:</b> SRISO_SEP_PRECIP_GPC	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1669683	<b>Analyst:</b> KSD1	<b>SOP Ref:</b> GL-RAD-A-004
<b>Run Date:</b> 06/14/2017 15:05	<b>Aliquot:</b> 300 mL	<b>Instrument:</b> PIC9A
<b>Data File:</b> S1669683r.xls	<b>Prep Method:</b> EPA 905.0 Modified/DOE RP5	<b>Count Time:</b> 60 min
<b>Prep Batch:</b> 1669683		
<b>Prep Date:</b> 06/08/2017 13:47		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90		9.99	pCi/L	+/-1.78	2.37	1.45	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	6.40	7.75	mg	82.6	(40%-110%)

**Comments:**

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

# Quality Control Summary

# GEL LABORATORIES LLC

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

## QC Summary

Report Date: June 15, 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:** 424307

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Gas Flow</b>									
Batch	1669683								
QC1203800632	MB								
Strontium-90			U	0.843	pCi/L			KSD1	06/12/1717:01
				Uncert: +/-0.712					
				TPU: +/-0.724					
**Strontium Carrier		7.75		8.00	mg	REC: 103	(40%-110%)		
QC1203800633	423799010	DUP							
Strontium-90		U	0.211	U	0.265				06/12/1717:01
				Uncert: +/-0.648		RPD: 0	N/A		
				TPU: +/-0.649		RER: 0.114	(0-2)		
**Strontium Carrier		7.75	7.50	7.60	mg	REC: 98	(40%-110%)		
QC1203800634	LCS								
Strontium-90				72.9	pCi/L	REC: 108	(80%-120%)		06/12/1717:01
				Uncert: +/-4.48					
				TPU: +/-13.1					
**Strontium Carrier		7.75		6.80	mg	REC: 88	(40%-110%)		
<b>Rad Liquid Scintillation</b>									
Batch	1670731								
QC1203803163	MB								
Tritium			U	-60.1	pCi/L			BXM4	06/09/1700:54
				Uncert: +/-222					
				TPU: +/-222					
QC1203803164	424396002	DUP							
Tritium			955		983				06/09/1702:52
				Uncert: +/-273		RPD: 3	(0% - 100%)		
				TPU: +/-330		RER: 0.119	(0-2)		
QC1203803165	424396002	MS							
Tritium		2240	955		2670	pCi/L	REC: 77	(75%-125%)	06/09/1703:39
				Uncert: +/-273					
				TPU: +/-330					
QC1203803166	LCS								
Tritium		2240			1970	pCi/L	REC: 88	(80%-120%)	06/09/1704:26
				Uncert: +/-310					
				TPU: +/-490					
Batch	1670749								
QC1203803225	MB								
Carbon-14			U	-5.32	pCi/L			BXM4	06/10/1709:05
				Uncert: +/-18.3					
				TPU: +/-18.3					
QC1203803226	424396002	DUP							
Carbon-14			202		193	pCi/L			06/10/1709:52
				Uncert: +/-22.9		RPD: 5	(0% - 20%)		
				TPU: +/-44.0		RER: 0.317	(0-2)		
QC1203803227	424396002	MS							
Carbon-14		1250	202		1380	pCi/L	REC: 94	(75%-125%)	06/10/1710:39

## QC Summary

Workorder: 424307

Page 2 of 3

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Liquid Scintillation</b>									
Batch									
				Uncert:					
				TPU:					
QC1203803228	LCS								
Carbon-14	1250				1170	pCi/L REC:	94 (80%-120%)		06/10/1711:26
				Uncert:					
				TPU:					

**Notes:**

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

The Qualifiers in this report are defined as follows:

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

### QC Summary

Workorder: 424307

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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.