



June 28, 2017

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

Re: CHPRC SAF S17-006  
Work Order: 424844  
SDG: GEL424844

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 07, 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: S17-006-226, S17-006-227, S17-006-238, S17-006-299, S17-006-301, S17-006-303,  
S17-006-305, S17-006-307, S17-006-338, S17-006-394, S17-006-396, S17-006-553 and S17-006-566  
Enclosures



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# Case Narrative

June 29, 2017

General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF S17-006  
SDG: GEL424844

June 28, 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 June 07, 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>
424844001	B39PJ9
424844002	B39PK7
424844003	B39PK8
424844004	B39PL6
424844005	B39PM2
424844006	B39R06
424844007	B39RL1
424844008	B39RL5
424844009	B39RW8
424844010	B39RM5
424844011	B39RM6
424844012	B39X23
424844013	B39X34

**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.

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Data Package

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: 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 29, 2017

Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL424844  
Work Order #: 424844

**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**

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.

**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 1203805951 (B39R06DUP), 1203805952 (B39R06PS), 424844005 (B39PM2) and 424844006 (B39R06) were diluted because target analyte concentrations exceeded the calibration range.

Analyte	424844	
	005	006
Chloride	10X	10X
Nitrate	10X	1X
Sulfate	10X	10X

**Miscellaneous Information**

**Manual Integrations**

June 29, 2017

Samples 1203805951 (B39R06DUP) and 424844002 (B39PK7) were manually integrated to correctly position the baseline as set in the calibration standards.

## **Radiochemistry**

### **I129LL\_SEP\_LEPS\_GS: COMMON (low level)**

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.

### **9310\_ALPHABETA\_GPC: COMMON**

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

### **Technical Information**

#### **Gross Alpha/Beta Preparation Information**

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

### **Miscellaneous Information**

#### **Additional Comments**

The matrix spike and matrix spike duplicate, 1203806626 (B39TH9MS) and 1203806627 (B39TH9MSD), aliquots were reduced to conserve sample volume.

### **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.

### **TC99\_EIE\_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.

June 29, 2017

**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.

**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 29, 2017

CH2M Hill Plateau Remediation Company		C.O.C.# S17-006-299	
424844		Page 1 of 1	
Collector	Larry Rosane CHPRC	Contact/Requester	Karen Waters-Husted
SAF No.	S17-006	Telephone No.	509-376-4650
Project Title	SURV, JUNE 2017	Sampling Origin	Hanford Site
Shipped To (Lab)	GEL Laboratories, LLC	Logbook No.	HNF-N-506 93 / 46
Protocol	SURV	Method of Shipment	Commercial Carrier
<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		Priority:	30 Days
SPECIAL INSTRUCTIONS		Hold Time	
N/A		Offsite Property No.	8003
Total Activity Exemption: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>			
Sample No.	B39PJ9	Filter	N
*	W	Date	6-6-17
No/Type Container	1x125-mL G/P	Time	0915
Sample Analysis	9056_ANIONS_IC: COMMON	Holding Time	48 Hours
Preservative		Cool <=6C	

Relinquished By	Larry Rosane CHPRC	Print	Jerry Rosane	Sign	[Signature]	Date/Time	JUN 06 2017 1110
Received By	Janelle Zunker CHPRC	Print	Janelle Zunker	Sign	[Signature]	Date/Time	JUN 06 2017 1110
Relinquished By	Janelle Zunker CHPRC	Print	[Signature]	Sign	[Signature]	Date/Time	JUN 06 2017 1110
Received By	STACY BOONE	Print	STACY BOONE	Sign	[Signature]	Date/Time	6-7-17 8:55
Relinquished By	[Signature]	Print	[Signature]	Sign	[Signature]	Date/Time	[Date/Time]
Received By	[Signature]	Print	[Signature]	Sign	[Signature]	Date/Time	[Date/Time]

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June 29, 2017

CH2M Hill Plateau Remediation Company		C.O.C.# S17-006-301	
424844		Page 1 of 1	
Collector	Larry Rosano CHPRC	Contact/Requester	Karen Waters-Husted
SAF No.	S17-006	Sampling Origin	Hanford Site
Project Title	SURV, JUNE 2017	Logbook No.	HNF-N-506 93 / 46
Shipped To (Lab)	GEL Laboratories, LLC	Method of Shipment	Commercial Carrier
Protocol	SURV	Priority:	30 Days
<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		<b>SPECIAL INSTRUCTIONS</b> N/A	
Sample No.	B39PK7	No/Type Container	1x125-mL G/P
Filter	N	Time	0805
Date	6-6-17	Sample Analysis	9056_ANIONS_IC: COMMON
Time	0805	Holding Time	48 Hours
Preservative		Preservative	Cool <=6C
Total Activity Exemption: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>			

Relinquished By Larry Rosano CHPRC	Print <i>Larry Rosano</i>	Sign	Date/Time JUN 06 2017 1110	Received By Janelle Zunker CHPRC	Print <i>Janelle Zunker</i>	Sign	Date/Time JUN 06 2017 1110	Matrix *
Relinquished By Janelle Zunker CHPRC	Print <i>Janelle Zunker</i>	Sign	Date/Time JUN 06 2017 1400	Received By FEDEX	Print FEDEX	Sign	Date/Time JUN 06 2017 1110	S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air
Relinquished By	Print	Sign	Date/Time JUN 06 2017 1400	Received By <i>STACY BOONE</i>	Print <i>STACY BOONE</i>	Sign	Date/Time 6-7-17 8:55	DS = Drum Solids DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation X = Other
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	
<b>FINAL SAMPLE DISPOSITION</b>				Disposal Method (e.g., Return to customer, per lab procedure, used in process)				Date/Time

June 29, 2017

<b>CH2M Hill Plateau Remediation Company</b>		<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b> 424844		C.O.C.# <b>S17-006-303</b>	Page 1 of 1
Collector Larry Rosans CHPRC	Contact/Requester Karen Waters-Husted	Telephone No. 509-376-4650	Purchase Order/Charge Code 300071	Ice Chest No. 6WS-334	Bill of Lading/Air Bill No. 779315186642
SAF No. S17-006	Sampling Origin Hanford Site	Logbook No. HNF-N-506 93 / 46	Method of Shipment Commercial Carrier	Priority: 30 Days	Offsite Property No. 8003
Project Title SURV, JUNE 2017	Shipped To (Lab) GEL Laboratories, LLC	SPECIAL INSTRUCTIONS Hold Time N/A	SPECIAL INSTRUCTIONS Hold Time N/A	Total Activity Exemption: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	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
Protocol SURV	Priority: 30 Days	No/Type Container 1x125-mL GIP	Sample Analysis COMMON	Holding Time 48 Hours	Preservative Cool <=6C
Sample No. B39PK8	Filter N	Date 6-6-17	Time 0904	Date/Time JUN 06 2017 1110	Sign [Signature]
Relinquished By Larry Rosans CHPRC	Received By Janelle Zunker CHPRC	Date/Time JUN 06 2017 1110	Date/Time JUN 06 2017 1110	Sign [Signature]	Date/Time JUN 06 2017 1110
Relinquished By Janelle Zunker CHPRC	Received By FEDEX	Date/Time JUN 06 2017 1400	Date/Time JUN 06 2017 1400	Sign [Signature]	Date/Time JUN 06 2017 1400
Relinquished By [Signature]	Received By STACY BOONE	Date/Time FEDEX	Date/Time 6-7-17 8:50	Sign [Signature]	Date/Time 6-7-17 8:50
Relinquished By [Signature]	Received By [Signature]	Date/Time [Signature]	Date/Time [Signature]	Sign [Signature]	Date/Time [Signature]
<b>FINAL SAMPLE DISPOSITION</b>	Disposal Method (e.g., Return to customer, per lab procedure, used in process)	Disposed By	Date/Time	Matrix *	S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air DS = Drum Solids DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation X = Other

FRS ID = FSR44656

PRINTED ON 4/26/2017

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CH2M Hill Plateau Remediation Company		C.O.C. # S17-006-305	
424844		Page 1 of 1	
Collector	Larry Rosar, CHPRC	Contact/Requester	Karen Waters-Husted
SAF No.	S17-006	Sampling Origin	Hanford Site
Project Title	SURV, JUNE 2017	Logbook No.	HNF-N-506 93 / 46
Shipped To (Lab)	GEL Laboratories, LLC	Method of Shipment	Commercial Carrier
Protocol	SURV	Priority:	30 Days <b>PRIORITY</b>
<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		<b>SPECIAL INSTRUCTIONS</b> Hold Time N/A	Total Activity Exemption: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Sample No.	Filter	Date	Time
B39PL6	N	W 6-6-17	0926
No/Type Container	1x125-mL GIP	Sample Analysis	9056_ANIONS_IC: COMMON
Holding Time	48 Hours	Preservative	Cool <=6C

Relinquished By	Larry Rosar, CHPRC	Print	Jerry Rosar	Sign	Jerry Rosar	Date/Time	JUN 06 2017 1110
Relinquished By	Janelle Junker, CHPRC	Print	Janelle Junker	Sign	Janelle Junker	Date/Time	JUN 06 2017 1400
Relinquished By	Janelle Junker, CHPRC	Print	FEDEX	Sign	FEDEX	Date/Time	6/7/17 8:55
Relinquished By	Janelle Junker, CHPRC	Print	STACY BOONE	Sign	STACY BOONE	Date/Time	6/7/17 8:55

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

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

FSR ID = FSR37990

PRINTED ON 4/26/2017

A-6004-842 (REV 2)





CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # S17-006-226  
Page 1 of 1

424844

Collector: Juan Aguilar /CHPRC  
 SAF No.: S17-006  
 Project Title: SURV, JUNE 2017  
 Shipped To (Lab): GEL Laboratories, LLC  
 Protocol: SURV

Contact/Requester: Karen Waters-Husted  
 Sampling Origin: Hanford Site  
 Logbook No.: HNF-N-506 88 / 71  
 Method of Shipment: Commercial Carrier  
 Priority: 30 Days

Telephone No.: 509-376-4650  
 Purchase Order/Charge Code: 300071  
 Ice Chest No.: 605-334  
 Bill of Lading/Air Bill No.: 779315186642  
 Offsite Property No.: 8003

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

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

Sample No.	Filter	* Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B39RL1	N	6-6-17	1033	1X1-LP	9310_ALPHA_BETA_GPC: COMMON	6 Months	HNO3 to pH <2
B39RL1	N	6-6-17	1033	4X1-L G/P	1129LL_SEP_LEPS_GS_LL: COMMON	6 Months	None
B39RL1	N	6-6-17	1033	1X250-mL P	TRITIUM_DIST_LSC: COMMON	6 Months	None

Relinquished By: Juan Aguilar /CHPRC  
 Received By: Leahy Wall /CHPRC  
 Date/Time: JUN 06 2017 1220  
 Sign: [Signature]

Relinquished By: Leahy Wall /CHPRC  
 Received By: FEDEX  
 Date/Time: JUN 06 2017 1400  
 Sign: [Signature]

Relinquished By: [Signature]  
 Received By: STACY BOWNE  
 Date/Time: 6/7/17 8:55  
 Sign: [Signature]

Relinquished By: [Signature]  
 Received By: [Signature]  
 Date/Time: [Signature]

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

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

June 29, 2017

CH2M Hill Plateau Remediation Company		<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b> 424844				C.O.C.# <b>S17-006-227</b>
Collector Juan Aguilar /CHPRC	Contact/Requester Karen Waters-Husted	Telephone No.	509-376-4650		Page 1 of 1	
SAF No. S17-006	Sampling Origin Hanford Site	Purchase Order/Charge Code	300071			
Project Title SURV, JUNE 2017	Logbook No. HNF-N-506 88/69	Ice Chest No.	6WS-315			
Shipped To (Lab) GEL Laboratories, LLC	Method of Shipment Commercial Carrier	Bill of Lading/Air Bill No.	77931222 0090			
Protocol SURV	Priority: 30 Days	Offsite Property No.	8002			
<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		<b>SPECIAL INSTRUCTIONS</b> N/A		Hold Time	Total Activity Exemption: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Sample No. B39RL5	Filter N	Date 6-5-17	Time 1158	No/Type Container 1x500-mL G/P	Sample Analysis TC99_EIE_LSC: COMMON	
				Holding Time 6 Months	Preservative HNO3 to pH <2	

Relinquished By Juan Aguilar /CHPRC	Print	Sign	Date JUN 05 2017	Received By SSU-1	Print	Sign	Date JUN 05 2017	Date/Time 1425	Matrix *
Relinquished By SSU-1				Received By Janelle Zunker /CHPRC				Date/Time JUN 06 2017 1015	S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air
Relinquished By Janelle Zunker /CHPRC				Received By SSU-1				Date/Time JUN 06 2017 1400	DS = Drum Solids DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation X = Other
Relinquished By				Received By GEBN STACY BOONE				Date/Time 6/7/17 8:50	

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

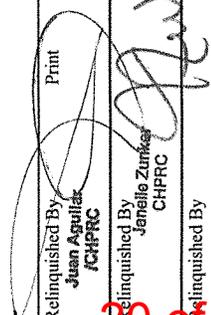
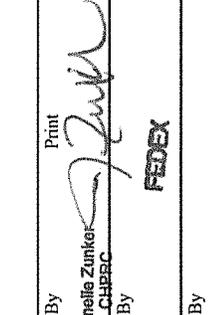
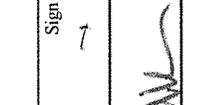
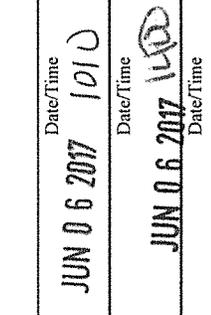
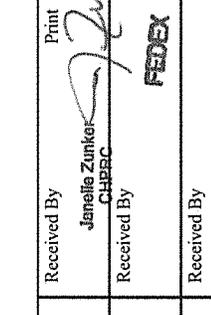




June 29, 2017

<b>CH2M Hill Plateau Remediation Company</b>		<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b> 424844				C.O.C.# <b>S17-006-396</b> Page 1 of 1
Collector Juan Aguilar /CHPRC	Contact/Requester Karen Waters-Husted	Telephone No. 509-376-4650				
SAF No. S17-006	Sampling Origin Hanford Site	Purchase Order/Charge Code 300071				
Project Title SURV, JUNE 2017	Logbook No. HNF-N-506 88 / 71	Ice Chest No. GWS-315				
Shipped To (Lab) GEL Laboratories, LLC	Method of Shipment Commercial Carrier	Bill of Lading/Air Bill No. 7931222 0090				
Protocol SURV	Priority: 30 Days	Offsite Property No. 8002				
<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						
<b>SPECIAL INSTRUCTIONS</b> N/A						
Total Activity Exemption: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>						
Sample No.	Filter *	Date	Time	No/Type Container	Sample Analysis	Holding Time
B39RM6	N	6-6-17	0900	1x500-mL G/P	C14_LSC: COMMON	6 Months
B39RM6	N	6-6-17	0900	4x1-L G/P	I129LL_SEP_LEPS_GS_LL: COMMON	6 Months
Preservative None None						

Relinquished By Juan Aguilar /CHPRC	Print 	Sign →	Date JUN 06 2017	Time 1010	Received By Janelle Zunker /CHPRC	Print 	Sign JUN 06 2017	Date/Time JUN 06 2017 1010	Matrix * S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air	DS = Drum Solids DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation X = Other
Relinquished By Janelle Zunker /CHPRC	Print 	Sign →	Date JUN 06 2017	Time 1100	Received By FEDEX	Print FEDEX	Sign JUN 06 2017	Date/Time JUN 06 2017 1100		
Relinquished By Janelle Zunker /CHPRC	Print 	Sign →	Date JUN 06 2017	Time 1400	Received By STACY BOJMS	Print STACY BOJMS	Sign JUN 06 2017	Date/Time JUN 06 2017 1400		
Relinquished By Janelle Zunker /CHPRC	Print 	Sign →	Date JUN 06 2017	Time 1700	Received By STACY BOJMS	Print STACY BOJMS	Sign JUN 06 2017	Date/Time JUN 06 2017 1700		

<b>FINAL SAMPLE DISPOSITION</b>	Disposal Method (e.g., Return to customer, per lab procedure, used in process)	Disposed By	Date/Time
PRINTED ON 5/15/2017	FSR ID = FSR31484	A-6004-842 (REV 2)	

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CH2M Hill Plateau Remediation Company		C.O.C.# S17-006-553 Page 1 of 1	
<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b> 424844			
Collector	Juan Aguilar CHPRC	Contact/Requester	Karen Waters-Husted
SAF No.	S17-006	Sampling Origin	Hanford Site
Project Title	SURV, JUNE 2017	Logbook No.	HNF-N-506 88/71
Shipped To (Lab)	GEL Laboratories, LLC	Method of Shipment	Commercial Carrier
Protocol	SURV	Priority:	30 Days <b>PRIORITY</b>
<b>POSSIBLE SAMPLE HAZARDS/REMARKS</b>		<b>SPECIAL INSTRUCTIONS</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		N/A	
Sample No.	B39X23	No/Type Container	4x1-L G/P
Filter	N	Time	0931
Date	6-17-17	Sample Analysis	H29LL_SEP_LEPS_GS_LL: COMMON
Date	6-17-17	Holding Time	6 Months
Date	6-17-17	Preservative	None
Total Activity Exemption: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>			

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Juan Aguilar CHPRC			JUN 06 2017 1010	Janelle Zunker CHPRC			JUN 06 2017 1010
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Janelle Zunker CHPRC			JUN 06 2017 1400	FEDEX			
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Janelle Zunker CHPRC			JUN 06 2017 1400	STACY MOONE			6/7/17 8:55
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Janelle Zunker CHPRC			JUN 06 2017 1400	STACY MOONE			6/7/17 8:55

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

78165

June 29, 2017

CH2M Hill Plateau Remediation Company

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C.# S17-006-566  
Page 1 of 1

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

SAF No.: S17-006  
 Sampling Origin: Hanford Site  
 Purchase Order/Charge Code: 300071

Project Title: SURV, JUNE 2017  
 Logbook No.: HNF-N-506 88/71  
 Ice Chest No.: 605-334

Shipped To (Lab): GEL Laboratories, LLC  
 Method of Shipment: Commercial Carrier  
 Bill of Lading/Air Bill No.: 779315186642

Protocol: SURV  
 Priority: 30 Days  
 Priority: **PRIORITY**  
 Offsite Property No.: 8003

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

SPECIAL INSTRUCTIONS: Hold Time  
 N/A

Total Activity Exemption: Yes  No

Sample No.	Filter	* Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B39X34	N	W 6-6-17	1125	4X1-L GIP	I129LL_SEP_LEPS_GS_LL: COMMON	6 Months	None

Relinquished By: Juan Aguilar /CHPRC	Print	Sign	Date/Time	1220	JUN 06 2017	Received By: Leahy Wall /CHPRC	Print	Sign	Date/Time	1224	JUN 06 2017	Matrix *
Relinquished By: Leahy Wall /CHPRC	Print	Sign	Date/Time	1400	JUN 06 2017	Received By: FEDEX	Print	Sign	Date/Time			S = Soil
Relinquished By: Leahy Wall /CHPRC	Print	Sign	Date/Time	FED EX		Received By: Leahy Wall /CHPRC	Print	Sign	Date/Time	8:55	6/7/17	SE = Sediment
Relinquished By:	Print	Sign	Date/Time			Received By:	Print	Sign	Date/Time			SO = Solid
	Print	Sign	Date/Time			Received By:	Print	Sign	Date/Time			SL = Sludge
	Print	Sign	Date/Time			Received By:	Print	Sign	Date/Time			W = Water
	Print	Sign	Date/Time			Received By:	Print	Sign	Date/Time			O = Oil
	Print	Sign	Date/Time			Received By:	Print	Sign	Date/Time			A = Air
	Print	Sign	Date/Time			Received By:	Print	Sign	Date/Time			DS = Drum Solids
	Print	Sign	Date/Time			Received By:	Print	Sign	Date/Time			DL = Drum Liquids
	Print	Sign	Date/Time			Received By:	Print	Sign	Date/Time			T = Tissue
	Print	Sign	Date/Time			Received By:	Print	Sign	Date/Time			WI = Wipe
	Print	Sign	Date/Time			Received By:	Print	Sign	Date/Time			L = Liquid
	Print	Sign	Date/Time			Received By:	Print	Sign	Date/Time			V = Vegetation
	Print	Sign	Date/Time			Received By:	Print	Sign	Date/Time			X = Other

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

Disposed By: \_\_\_\_\_ Date/Time: \_\_\_\_\_

FINAL SAMPLE DISPOSITION

PRINTED ON 4/26/2017

FSR ID = FSR31657

A-6004-842 (REV 2)



# **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 29, 2017

# Laboratory Certifications

List of current GEL Certifications as of 28 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

# Metals Analysis

# Case Narrative

June 29, 2017

Metals

Technical Case Narrative

CH2MHill Plateau Remediation Company (CPRC)

SDG #: GEL424844

Work Order #: 424844

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

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

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

**Analytical Batch:** 1671869

**Preparation Method:** SW846 3005A

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

**Preparation Batch:** 1671868

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>
424844009	B39RW8
1203805953	Method Blank (MB)ICP-MS
1203805954	Laboratory Control Sample (LCS)
1203805957	424843017(NonSDGL) Serial Dilution (SD)
1203805955	424843017(NonSDGS) Matrix Spike (MS)
1203805956	424843017(NonSDGSD) Matrix Spike Duplicate (MSD)

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

**Data Summary:**

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

**Calibration Information**

**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 29, 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: GEL424844 GEL Work Order: 424844

**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.

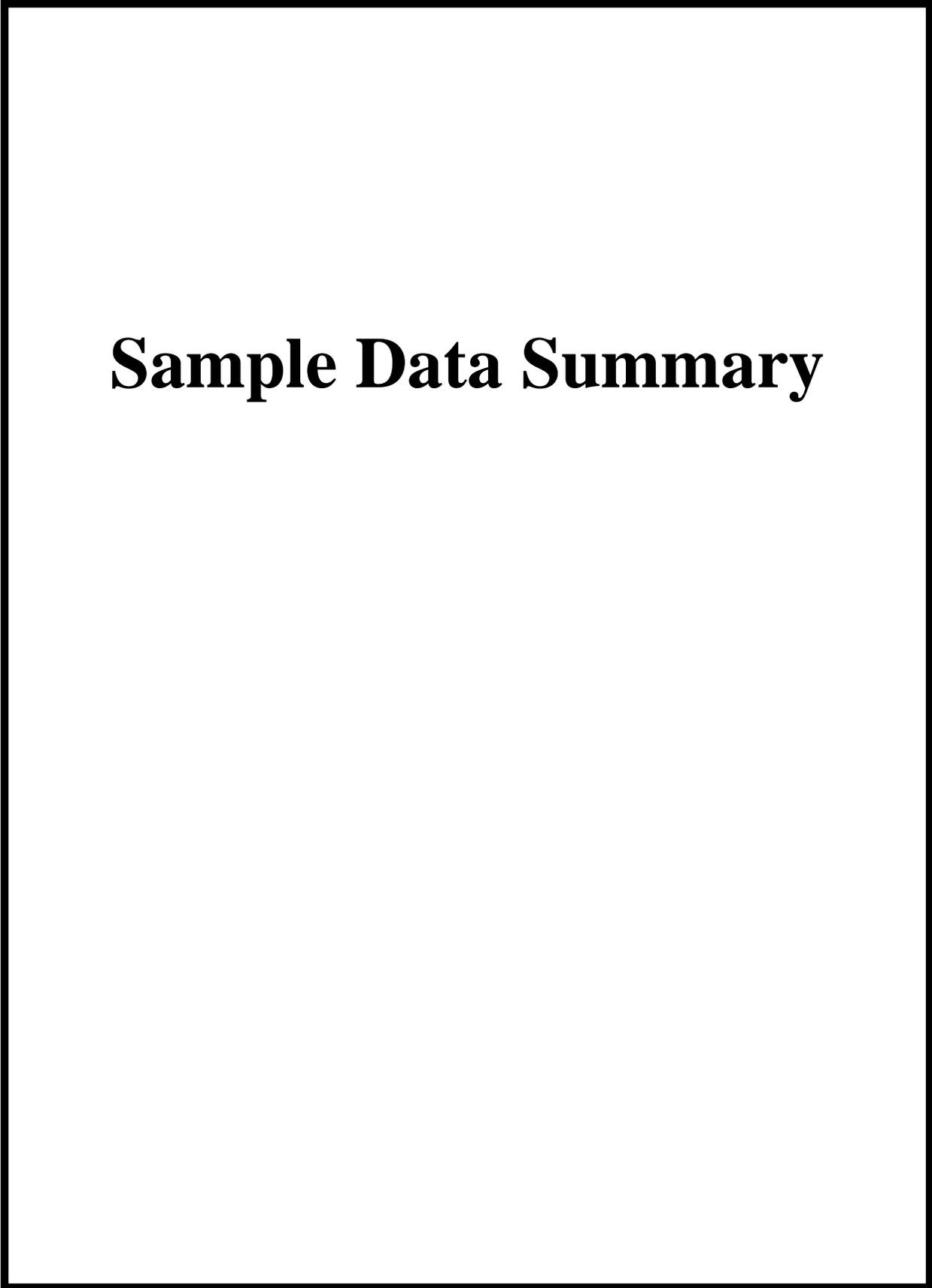
The following data validator verified the information presented in this data report:

**Signature:** 

**Name:** Nik-Cole Elmore

**Date:** 26 JUN 2017

**Title:** Data Validator



# Sample Data Summary

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

**SDG No:** GEL424844

**CONTRACT:** CPRC0S17006

**METHOD TYPE:** SW846

**SAMPLE ID:**424844009

**BASIS:** As Received

**DATE COLLECTED** 05-JUN-17

**CLIENT ID:** B39RW8

**LEVEL:** Low

**DATE RECEIVED** 07-JUN-17

**MATRIX:** WATER

**%SOLIDS:** 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-61-1	Uranium	5.71	ug/L		0.067	0.2	15	1	MS	SKJ	06/13/17 21:41	170613-1	1671869

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1671869	1671868	SW846 3005A	50	mL	50	mL	06/07/17	CXW4

**\*Analytical Methods:**

MS SW846 3005A/6020B

# Quality Control Summary

# June 29, 2017 GEL LABORATORIES LLC

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

## QC Summary

Report Date: June 26, 2017

Page 1 of 2

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

**Contact: Mr. Scot Fitzgerald**

**Workorder: 424844**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1671869										
QC1203805954	LCS										
Uranium	50.0			53.6	ug/L		107	(80%-120%)	SKJ	06/13/17	20:34
QC1203805953	MB										
Uranium			U	0.067	ug/L					06/13/17	20:30
QC1203805955	424843017	MS									
Uranium	50.0	1.03		55.0	ug/L		108	(75%-125%)		06/13/17	20:42
QC1203805956	424843017	MSD									
Uranium	50.0	1.03		54.5	ug/L	0.912	107	(0%-20%)		06/13/17	20:46
QC1203805957	424843017	SDILT									
Uranium		1.03	D	0.221	ug/L	7.8		(0%-20%)		06/13/17	20:54

**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 29, 2017

**GEL LABORATORIES LLC**

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

**QC Summary**

Workorder: 424844

Page 2 of 2

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

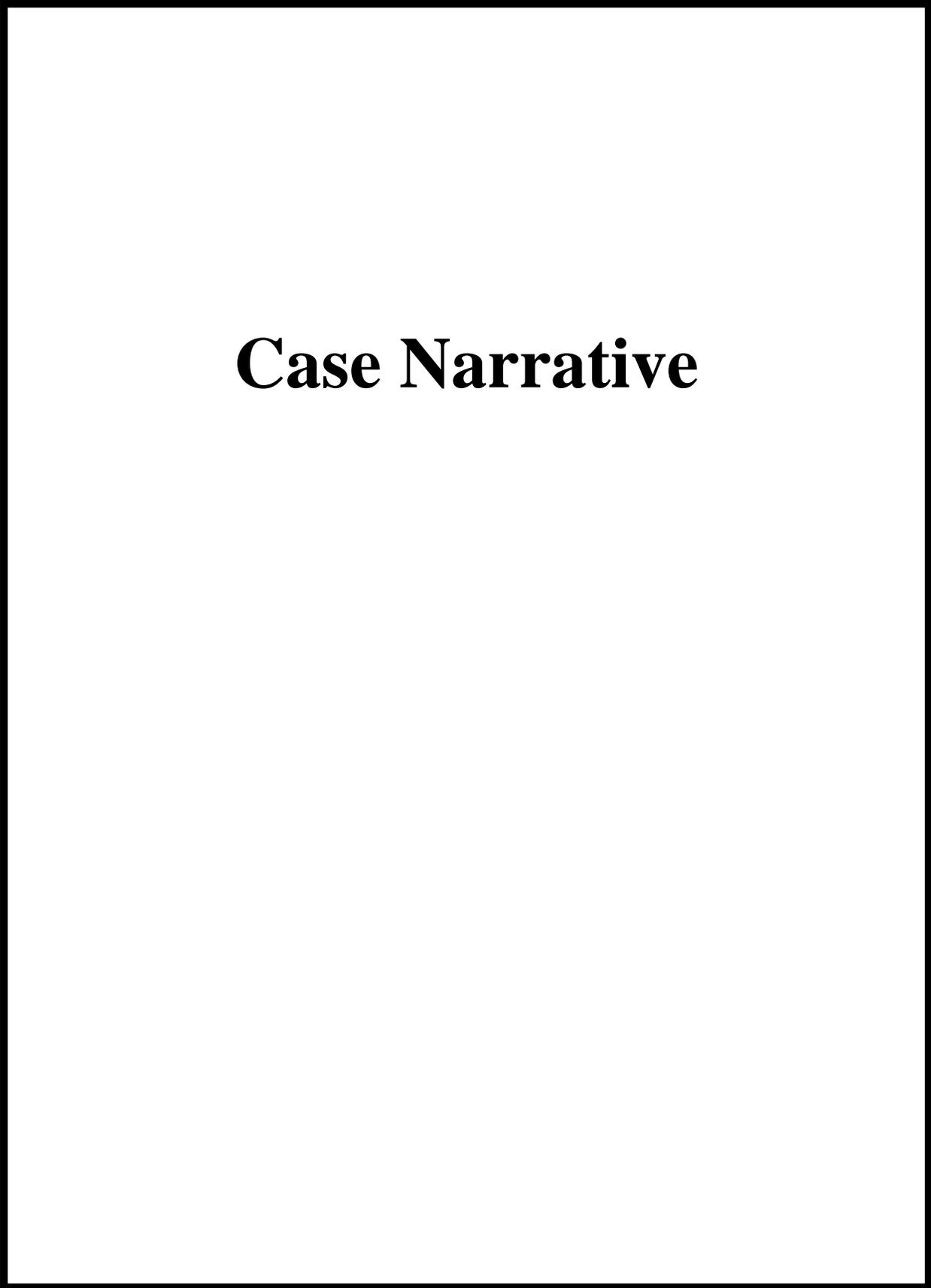
Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

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.

# General Chem Analysis



# Case Narrative

**General Chemistry**  
**Technical Case Narrative**  
**CH2MHill Plateau Remediation Company (CPRC)**  
**SDG #: GEL424844**  
**Work Order #: 424844**

**Product: Ion Chromatography**

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

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

**Analytical Batches:** 1671864 and 1671866

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>
424844001	B39PJ9
424844002	B39PK7
424844003	B39PK8
424844004	B39PL6
424844005	B39PM2
424844006	B39R06
1203805939	Method Blank (MB)
1203805940	Laboratory Control Sample (LCS)
1203805941	424844001(B39PJ9) Sample Duplicate (DUP)
1203805942	424844001(B39PJ9) Post Spike (PS)
1203805949	Method Blank (MB)
1203805950	Laboratory Control Sample (LCS)
1203805951	424844006(B39R06) Sample Duplicate (DUP)
1203805952	424844006(B39R06) 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 1203805951 (B39R06DUP), 1203805952 (B39R06PS), 424844005 (B39PM2) and 424844006 (B39R06) 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	424844	
	005	006
Chloride	10X	10X
Nitrate	10X	1X
Sulfate	10X	10X

**Miscellaneous Information**

**Manual Integrations**

Samples 1203805951 (B39R06DUP) and 424844002 (B39PK7) were manually integrated to correctly position the baseline as set in the calibration standards.

**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 29, 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: GEL424844 GEL Work Order: 424844

**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.

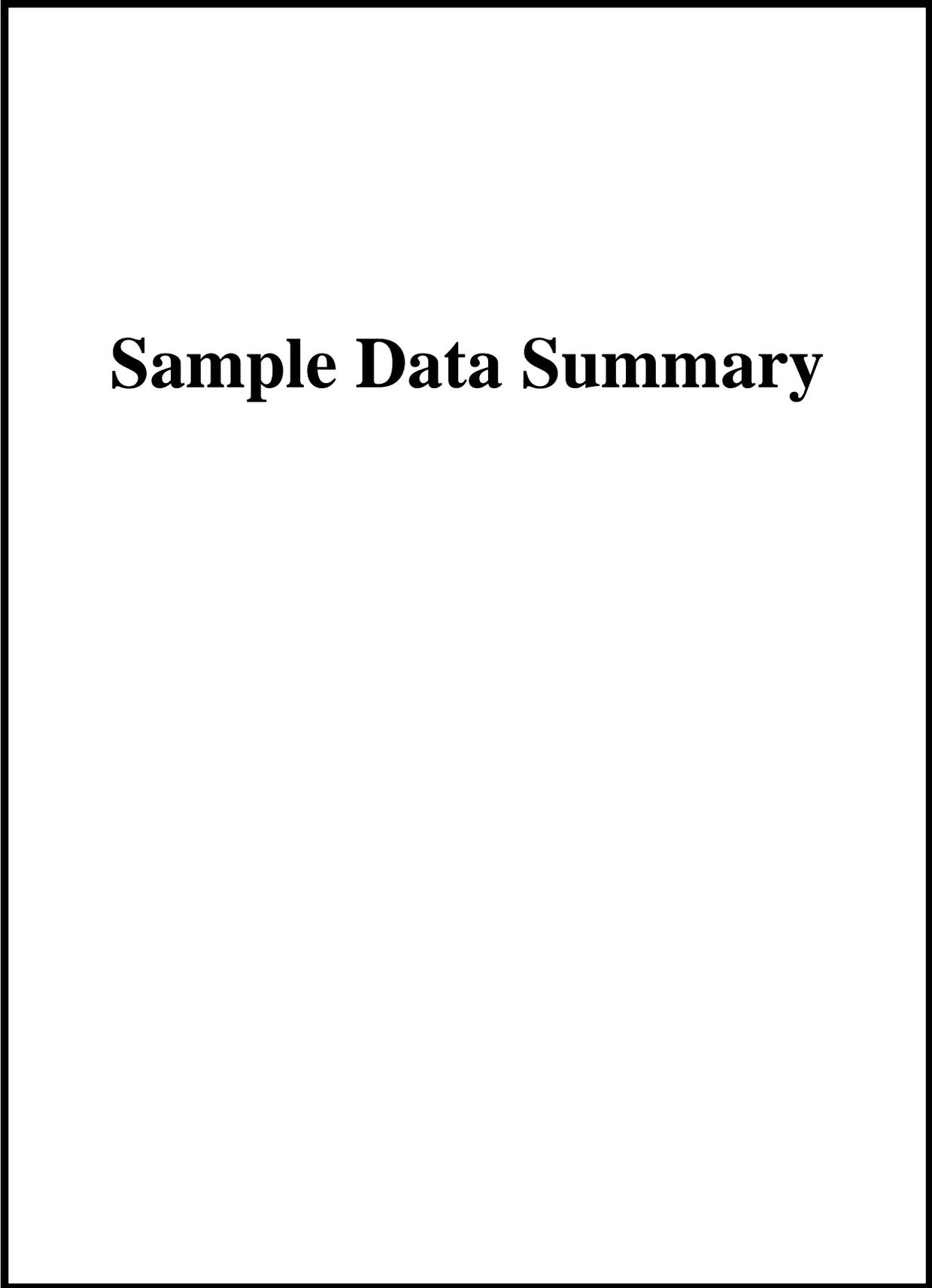
The following data validator verified the information presented in this data report:

**Signature:** 

**Name:** Kristen Mizzell

**Date:** 26 JUN 2017

**Title:** Analyst I



# Sample Data Summary

## Certificate of Analysis

Report Date: June 26, 2017

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF S17-006

Client Sample ID: B39PJ9	Project: CPRC0S17006
Sample ID: 424844001	Client ID: CPRC001
Matrix: WATER	
Collect Date: 06-JUN-17 09:15	
Receive Date: 07-JUN-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		2330	67.0	200	ug/L		1	MXL2	06/07/17	1621	1671864	1
Fluoride	B	124	33.0	500	ug/L		1					
Nitrate-N		710	33.0	250	ug/L		1					
Nitrite-N	U	33.0	33.0	250	ug/L		1					
Sulfate		13500	133	500	ug/L		1					

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	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 |

## Certificate of Analysis

Report Date: June 26, 2017

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF S17-006

Client Sample ID: B39PK7	Project: CPRC0S17006
Sample ID: 424844002	Client ID: CPRC001
Matrix: WATER	
Collect Date: 06-JUN-17 08:05	
Receive Date: 07-JUN-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	B	97.9	67.0	200	ug/L		1	MXL2	06/07/17	1257	1671866	1
Fluoride	U	33.0	33.0	500	ug/L		1					
Nitrate-N	B	39.2	33.0	250	ug/L		1					
Nitrite-N	U	33.0	33.0	250	ug/L		1					
Sulfate	U	133	133	500	ug/L		1					

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	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 |

## Certificate of Analysis

Report Date: June 26, 2017

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF S17-006

Client Sample ID: B39PK8	Project: CPRC0S17006
Sample ID: 424844003	Client ID: CPRC001
Matrix: WATER	
Collect Date: 06-JUN-17 09:04	
Receive Date: 07-JUN-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		1530	67.0	200	ug/L		1	MXL2	06/07/17	1326	1671866	1
Fluoride	B	86.9	33.0	500	ug/L		1					
Nitrate-N		622	33.0	250	ug/L		1					
Nitrite-N	U	33.0	33.0	250	ug/L		1					
Sulfate		10800	133	500	ug/L		1					

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	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

## Certificate of Analysis

Report Date: June 26, 2017

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF S17-006

Client Sample ID: B39PL6	Project: CPRC0S17006
Sample ID: 424844004	Client ID: CPRC001
Matrix: WATER	
Collect Date: 06-JUN-17 09:26	
Receive Date: 07-JUN-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		1680	67.0	200	ug/L		1	MXL2	06/07/17	1355	1671866	1
Fluoride	B	78.5	33.0	500	ug/L		1					
Nitrate-N		792	33.0	250	ug/L		1					
Nitrite-N	U	33.0	33.0	250	ug/L		1					
Sulfate		11500	133	500	ug/L		1					

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	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 |

## Certificate of Analysis

Report Date: June 26, 2017

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF S17-006

Client Sample ID: B39PM2	Project: CPRC0S17006
Sample ID: 424844005	Client ID: CPRC001
Matrix: WATER	
Collect Date: 06-JUN-17 11:15	
Receive Date: 07-JUN-17	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
9056_ANIONS_IC: COMMON "As Received"												
Fluoride	B	155	33.0	500	ug/L		1	MXL2	06/07/17	1424	1671866	1
Nitrite-N	U	33.0	33.0	250	ug/L		1					
Chloride	D	16000	670	2000	ug/L		10	MXL2	06/07/17	1718	1671866	2
Nitrate-N	D	5560	330	1000	ug/L		10					
Sulfate	D	166000	1330	4000	ug/L		10					

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

## Certificate of Analysis

Report Date: June 26, 2017

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF S17-006

Client Sample ID: B39R06	Project: CPRC0S17006
Sample ID: 424844006	Client ID: CPRC001
Matrix: WATER	
Collect Date: 06-JUN-17 12:10	
Receive Date: 07-JUN-17	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
9056_ANIONS_IC: COMMON "As Received"												
Fluoride	B	216	33.0	500	ug/L		1	MXL2	06/07/17	1453	1671866	1
Nitrate-N		4580	33.0	250	ug/L		1					
Nitrite-N	U	33.0	33.0	250	ug/L		1					
Chloride	D	12400	670	2000	ug/L		10	MXL2	06/07/17	1747	1671866	2
Sulfate	D	156000	1330	4000	ug/L		10					

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 29, 2017

## GEL LABORATORIES LLC

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

### QC Summary

Report Date: June 26, 2017

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

Contact: Mr. Scot Fitzgerald

Workorder: 424844

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1671864										
QC1203805941	424844001	DUP									
Chloride		2330		2320	ug/L	0.382		(0%-20%)	MXL2	06/07/17	16:50
Fluoride	B	124	B	124	ug/L	0	^	(+/-500)			
Nitrate-N		710		710	ug/L	0.0704	^	(+/-250)			
Nitrite-N	U	33.0	U	33.0	ug/L	N/A					
Sulfate		13500		13500	ug/L	0.176		(0%-20%)			
QC1203805940	LCS										
Chloride	5000			4610	ug/L			92.1	(80%-120%)	06/07/17	10:34
Fluoride	2500			2320	ug/L			92.8	(80%-120%)		
Nitrate-N	2500			2310	ug/L			92.4	(80%-120%)		
Nitrite-N	2500			2320	ug/L			92.7	(80%-120%)		
Sulfate	10000			9410	ug/L			94.1	(80%-120%)		
QC1203805939	MB										
Chloride			U	67.0	ug/L					06/07/17	10:05
Fluoride			U	33.0	ug/L						
Nitrate-N			U	33.0	ug/L						

June 29, 2017

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QC Summary

Workorder: 424844

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1671864										
Nitrite-N			U	33.0	ug/L				MXL2	06/07/17	10:05
Sulfate			U	133	ug/L						
QC1203805942 424844001 PS											
Chloride	5.00	2.33		7.16	mg/L		96.5	(75%-125%)		06/07/17	17:19
Fluoride	2.50	B	0.124	2.43	mg/L		92.3	(75%-125%)			
Nitrate-N	2.50		0.710	3.06	mg/L		94.2	(75%-125%)			
Nitrite-N	2.50	U	0.00	2.32	mg/L		93	(75%-125%)			
Sulfate	10.0		13.5	24.2	mg/L		107	(75%-125%)			
Batch 1671866											
QC1203805951 424844006 DUP											
Chloride		D	12400	D	12400	ug/L	0.0805	(0%-20%)	MXL2	06/07/17	18:15
Fluoride		B	216	B	217	ug/L	0.185 ^	(+/-500)		06/07/17	15:22
Nitrate-N			4580		4580	ug/L	0.0437	(0%-20%)			
Nitrite-N		U	33.0	U	33.0	ug/L	N/A				
Sulfate		D	156000	D	156000	ug/L	0.0691	(0%-20%)		06/07/17	18:15
QC1203805950 LCS											
Chloride	5000			4570	ug/L		91.5	(80%-120%)		06/07/17	12:29
Fluoride	2500			2370	ug/L		94.8	(80%-120%)			

June 29, 2017

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QC Summary

Workorder: 424844

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1671866										
Nitrate-N	2500			2300	ug/L		92.1	(80%-120%)	MXL2	06/07/17	12:29
Nitrite-N	2500			2190	ug/L		87.5	(80%-120%)			
Sulfate	10000			9370	ug/L		93.7	(80%-120%)			
QC1203805949 MB											
Chloride			U	67.0	ug/L					06/07/17	12:00
Fluoride			U	33.0	ug/L						
Nitrate-N			U	33.0	ug/L						
Nitrite-N			U	33.0	ug/L						
Sulfate			U	133	ug/L						
QC1203805952 424844006 PS											
Chloride	5.00	D	1.24	D	5.97	mg/L	94.6	(75%-125%)		06/07/17	18:44
Fluoride	2.50	B	0.216		2.63	mg/L	96.6	(75%-125%)		06/07/17	15:51
Nitrate-N	2.50		4.58		7.28	mg/L	108	(75%-125%)			
Nitrite-N	2.50	U	0.00		2.23	mg/L	89	(75%-125%)			
Sulfate	10.0	D	15.6	D	26.5	mg/L	109	(75%-125%)		06/07/17	18:44

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

June 29, 2017

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QC Summary

Workorder: 424844

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
B	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).										
C	Target analyte was detected in the sample and the associated blank. The associated blank concentration is $\geq$ EQL or is $>$ 5% of the measured concentration and/or decision level for associated samples.										
D	Results are reported from a diluted aliquot of sample.										
N	Spike Sample recovery is outside control limits.										
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.  
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.  
\* Indicates that a Quality Control parameter was not within specifications.  
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

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

# Radiological Analysis

# Case Narrative

June 29, 2017

Radiochemistry  
Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL424844  
Work Order #: 424844

**Product:** I129LL\_SEP\_LEPS\_GS: COMMON (low level)  
**Analytical Method:** DOE EML HASL-300,I-01 Modified  
**Analytical Procedure:** GL-RAD-A-006 REV# 21  
**Analytical Batch:** 1672238

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
424844007	B39RL1
424844010	B39RM5
424844011	B39RM6
424844012	B39X23
424844013	B39X34
1203806881	Method Blank (MB)
1203806882	424844011(B39RM6) Sample Duplicate (DUP)
1203806883	424844011(B39RM6) Matrix Spike (MS)
1203806884	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.

**Qualifier Information**

<b>Qualifier</b>	<b>Reason</b>	<b>Analyte</b>	<b>Sample</b>	<b>Client Sample</b>
X	Results are considered a false positive due to high counting uncertainty.	Iodine-129	424844012	B39X23

**Product:** 9310\_ALPHABETA\_GPC: COMMON  
**Analytical Method:** 9310\_ALPHABETA\_GPC  
**Analytical Procedure:** GL-RAD-A-001 REV# 19  
**Analytical Batch:** 1672138

June 29, 2017

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
424844007	B39RL1
1203806624	Method Blank (MB)
1203806625	424707004(B39TH9) Sample Duplicate (DUP)
1203806626	424707004(B39TH9) Matrix Spike (MS)
1203806627	424707004(B39TH9) Matrix Spike Duplicate (MSD)
1203806628	Laboratory Control Sample (LCS)

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

**Data Summary:**

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

**Technical Information**

**Gross Alpha/Beta Preparation Information**

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

**Miscellaneous Information**

**Additional Comments**

The matrix spike and matrix spike duplicate, 1203806626 (B39TH9MS) and 1203806627 (B39TH9MSD), aliquots were reduced to conserve sample volume.

**Product: C14\_LSC: COMMON**

**Analytical Method: C14\_LSC**

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

**Analytical Batch: 1672415**

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
424844010	B39RM5
424844011	B39RM6
1203807372	Method Blank (MB)
1203807373	424658001(B39RM1) Sample Duplicate (DUP)
1203807374	424658001(B39RM1) Matrix Spike (MS)
1203807375	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:** TC99\_EIE\_LSC: COMMON

**Analytical Method:** TC99\_EIE\_LSC

**Analytical Procedure:** GL-RAD-A-059 REV# 5

**Analytical Batch:** 1673290

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>
424844008	B39RL5
424844009	B39RW8
1203809519	Method Blank (MB)
1203809520	425104001(NonSDG) Sample Duplicate (DUP)
1203809521	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:** TRITIUM\_DIST\_LSC: COMMON

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

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

**Analytical Batch:** 1673328

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>
424844007	B39RL1
424844009	B39RW8
1203809663	Method Blank (MB)
1203809664	424663001(NonSDG) Sample Duplicate (DUP)
1203809665	424663001(NonSDG) Matrix Spike (MS)
1203809666	Laboratory Control Sample (LCS)

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

June 29, 2017

**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 29, 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: GEL424844 GEL Work Order: 424844

**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.

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

**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.

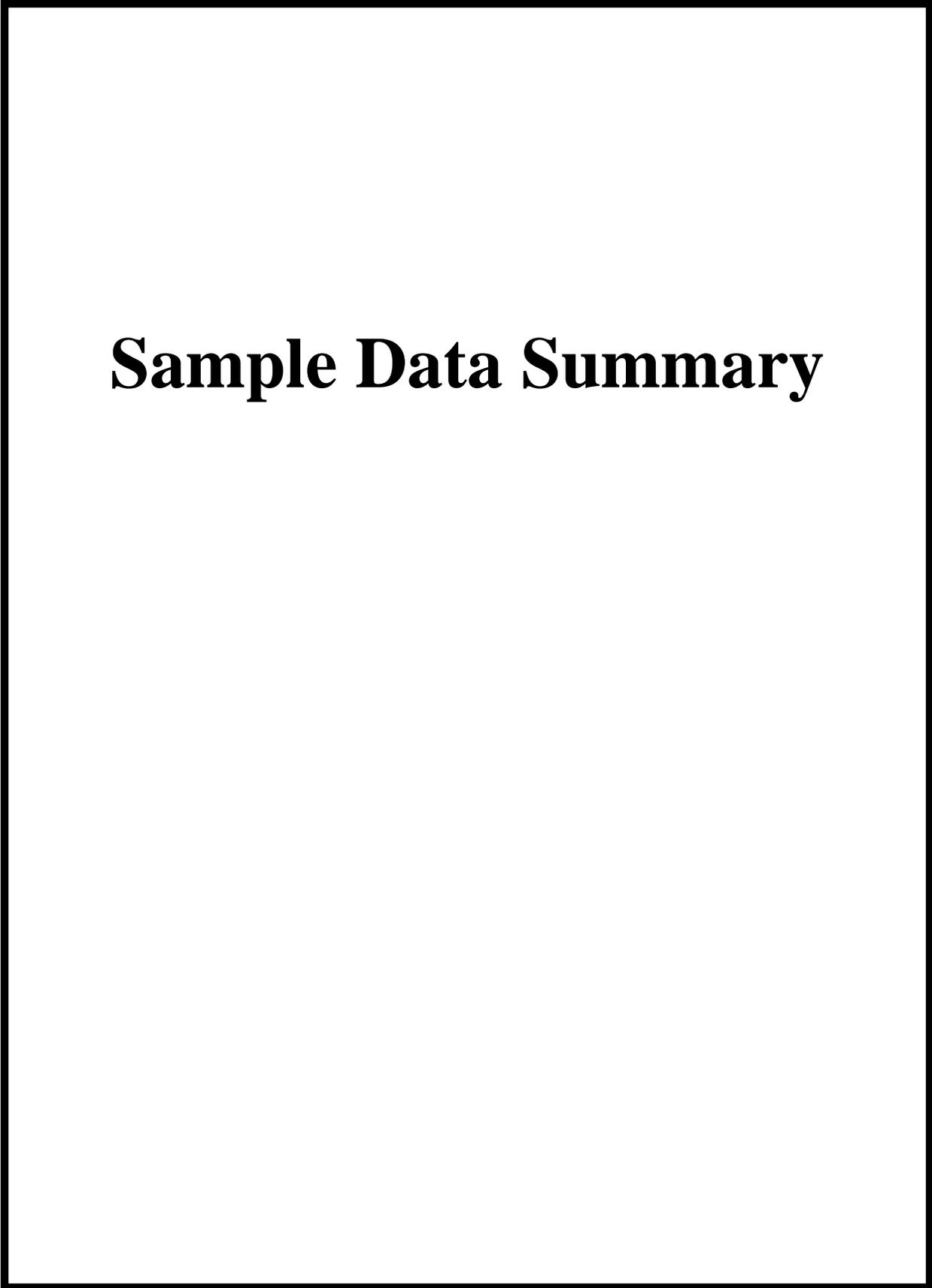
The following data validator verified the information presented in this data report:

**Signature:** 

**Name:** Kate Gellatly

**Date:** 28 JUN 2017

**Title:** Analyst I



# Sample Data Summary

June 29, 2017

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL424844	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0S17006
<b>Lab Sample ID:</b> 424844007	<b>Date Collected:</b> 06/06/2017 10:33	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/07/2017 08:55	
<b>Client ID:</b> B39RL1		<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1672138	<b>Method:</b> 9310_ALPHABETA_GPC	<b>SOP Ref:</b> GL-RAD-A-001
<b>Run Date:</b> 06/10/2017 12:05	<b>Analyst:</b> LXB3	<b>Instrument:</b> LB4100J2
<b>Data File:</b> AB1672138.xls	<b>Aliquot:</b> 150 mL	<b>Count Time:</b> 500 min
<b>Prep Batch:</b> 1672138	<b>Prep Method:</b> EPA 900.0/SW846 9310	
<b>Prep Date:</b> 06/09/2017 06:49		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-46-1	Alpha ALPHA		3.86	pCi/L	+/-1.49	1.62	2.16	3.00
12587-47-2	Beta BETA		244	pCi/L	+/-3.54	39.8	1.25	4.00

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

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

June 29, 2017

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL424844	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0S17006
<b>Lab Sample ID:</b> 424844007	<b>Date Collected:</b> 06/06/2017 10:33	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/07/2017 08:55	
<b>Client ID:</b> B39RL1	<b>Method:</b> DOE EML HASL-300,I-01 Mo	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1672238	<b>Analyst:</b> MJH1	<b>SOP Ref:</b> GL-RAD-A-006
<b>Run Date:</b> 06/13/2017 09:57	<b>Aliquot:</b> 1.6 L	<b>Instrument:</b> XRAY5
<b>Data File:</b> I424844007.CNF;1	<b>Prep Method:</b> DOE EML HASL-300,I-01 M	<b>Count Time:</b> 60 min
<b>Prep Batch:</b> 1672238		
<b>Prep Date:</b> 06/12/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129		2.38	pCi/L	+/-1.33	1.35	1.06	1.00

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

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

June 29, 2017  
Rad

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL424844	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0S17006
<b>Lab Sample ID:</b> 424844007	<b>Date Collected:</b> 06/06/2017 10:33	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/07/2017 08:55	
<b>Client ID:</b> B39RL1	<b>Method:</b> TRITIUM_DIST_LSC	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1673328	<b>Analyst:</b> BXM4	<b>SOP Ref:</b> GL-RAD-A-002
<b>Run Date:</b> 06/23/2017 18:43	<b>Aliquot:</b> 50 mL	<b>Instrument:</b> LSCBROWN
<b>Data File:</b> T1673328.xls	<b>Prep Method:</b> EPA 906.0 Modified	<b>Count Time:</b> 45 min
<b>Prep Batch:</b> 1673328		
<b>Prep Date:</b> 06/23/2017 13:02		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		3200	pCi/L	+/-346	708	377	400

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

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

June 29, 2017

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL424844	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0S17006
<b>Lab Sample ID:</b> 424844008	<b>Date Collected:</b> 06/05/2017 11:58	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/07/2017 08:55	
<b>Client ID:</b> B39RL5	<b>Method:</b> TC99_EIE_LSC	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1673290	<b>Analyst:</b> CXS7	<b>SOP Ref:</b> GL-RAD-A-059
<b>Run Date:</b> 06/19/2017 05:34	<b>Aliquot:</b> 100 mL	<b>Instrument:</b> LSCGOLD
<b>Data File:</b> E1673290.xls	<b>Prep Method:</b> DOE EML HASL-300, Tc-02-	<b>Count Time:</b> 25 min
<b>Prep Batch:</b> 1673290		
<b>Prep Date:</b> 06/13/2017 13:27		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	10.6	pCi/L	+/-20.2	20.3	34.4	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	34000	36900	CPM	92.1	(30%-105%)

**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 29, 2017  
Rad

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL424844	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0S17006
<b>Lab Sample ID:</b> 424844009	<b>Date Collected:</b> 06/05/2017 14:19	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/07/2017 08:55	
<b>Client ID:</b> B39RW8	<b>Method:</b> TC99_EIE_LSC	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1673290	<b>Analyst:</b> CXS7	<b>SOP Ref:</b> GL-RAD-A-059
<b>Run Date:</b> 06/19/2017 06:01	<b>Aliquot:</b> 100 mL	<b>Instrument:</b> LSCGOLD
<b>Data File:</b> E1673290.xls	<b>Prep Method:</b> DOE EML HASL-300, Tc-02-	<b>Count Time:</b> 25 min
<b>Prep Batch:</b> 1673290		
<b>Prep Date:</b> 06/13/2017 13:27		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99		109	pCi/L	+/-23.3	26.3	34.4	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	33900	36900	CPM	91.8	(30%-105%)

**Comments:**

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

The MDC is a sample specific MDC.

June 29, 2017  
Rad

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL424844	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0S17006
<b>Lab Sample ID:</b> 424844009	<b>Date Collected:</b> 06/05/2017 14:19	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/07/2017 08:55	
<b>Client ID:</b> B39RW8	<b>Method:</b> TRITIUM_DIST_LSC	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1673328	<b>Analyst:</b> BXM4	<b>SOP Ref:</b> GL-RAD-A-002
<b>Run Date:</b> 06/23/2017 19:30	<b>Aliquot:</b> 50 mL	<b>Instrument:</b> LSCBROWN
<b>Data File:</b> T1673328.xls	<b>Prep Method:</b> EPA 906.0 Modified	<b>Count Time:</b> 45 min
<b>Prep Batch:</b> 1673328		
<b>Prep Date:</b> 06/23/2017 13:02		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		53700	pCi/L	+/-1140	10500	381	400

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

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

June 29, 2017

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL424844	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0S17006
<b>Lab Sample ID:</b> 424844010	<b>Date Collected:</b> 06/06/2017 07:15	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/07/2017 08:55	
<b>Client ID:</b> B39RM5	<b>Method:</b> DOE EML HASL-300,I-01 Mo	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1672238	<b>Analyst:</b> MJH1	<b>SOP Ref:</b> GL-RAD-A-006
<b>Run Date:</b> 06/13/2017 10:16	<b>Aliquot:</b> 1.6 L	<b>Instrument:</b> XRAY3
<b>Data File:</b> I424844010.CNF;1	<b>Prep Method:</b> DOE EML HASL-300,I-01 M	<b>Count Time:</b> 60 min
<b>Prep Batch:</b> 1672238		
<b>Prep Date:</b> 06/12/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129	U	0.128	pCi/L	+/-0.185	0.194	0.508	1.00

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

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

June 29, 2017

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL424844	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0S17006
<b>Lab Sample ID:</b> 424844010	<b>Date Collected:</b> 06/06/2017 07:15	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/07/2017 08:55	
<b>Client ID:</b> B39RM5	<b>Method:</b> C14_LSC	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1672415	<b>Analyst:</b> TXJ1	<b>SOP Ref:</b> GL-RAD-A-003
<b>Run Date:</b> 06/27/2017 17:58	<b>Aliquot:</b> 100 mL	<b>Instrument:</b> LSCRED
<b>Data File:</b> C1672415.xls	<b>Prep Method:</b> EPA EERF C-01 Modified	<b>Count Time:</b> 15 min
<b>Prep Batch:</b> 1672415		
<b>Prep Date:</b> 06/27/2017 14:50		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	-8.24	pCi/L	+/-15.9	15.9	28.7	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 29, 2017

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL424844	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0S17006
<b>Lab Sample ID:</b> 424844011	<b>Date Collected:</b> 06/06/2017 09:00	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/07/2017 08:55	
<b>Client ID:</b> B39RM6	<b>Method:</b> DOE EML HASL-300,I-01 Mo	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1672238	<b>Analyst:</b> MJH1	<b>SOP Ref:</b> GL-RAD-A-006
<b>Run Date:</b> 06/13/2017 10:17	<b>Aliquot:</b> 1.3 L	<b>Instrument:</b> XRAY4
<b>Data File:</b> I424844011.CNF;2	<b>Prep Method:</b> DOE EML HASL-300,I-01 M	<b>Count Time:</b> 120 min
<b>Prep Batch:</b> 1672238		
<b>Prep Date:</b> 06/12/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129		2.94	pCi/L	+/-1.24	1.28	1.01	1.00

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

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

June 29, 2017

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL424844	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0S17006
<b>Lab Sample ID:</b> 424844011	<b>Date Collected:</b> 06/06/2017 09:00	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/07/2017 08:55	
<b>Client ID:</b> B39RM6	<b>Method:</b> C14_LSC	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1672415	<b>Analyst:</b> TXJ1	<b>SOP Ref:</b> GL-RAD-A-003
<b>Run Date:</b> 06/27/2017 18:14	<b>Aliquot:</b> 100 mL	<b>Instrument:</b> LSCRED
<b>Data File:</b> C1672415.xls	<b>Prep Method:</b> EPA EERF C-01 Modified	<b>Count Time:</b> 15 min
<b>Prep Batch:</b> 1672415		
<b>Prep Date:</b> 06/27/2017 14:50		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	-14.1	pCi/L	+/-15.9	15.9	29.3	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.

June 29, 2017

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL424844	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0S17006
<b>Lab Sample ID:</b> 424844012	<b>Date Collected:</b> 06/06/2017 09:31	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/07/2017 08:55	
<b>Client ID:</b> B39X23	<b>Method:</b> DOE EML HASL-300,I-01 Mo	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1672238	<b>Analyst:</b> MJH1	<b>SOP Ref:</b> GL-RAD-A-006
<b>Run Date:</b> 06/13/2017 10:17	<b>Aliquot:</b> 1.6 L	<b>Instrument:</b> XRAY6
<b>Data File:</b> I424844012.CNF;2	<b>Prep Method:</b> DOE EML HASL-300,I-01 M	<b>Count Time:</b> 90 min
<b>Prep Batch:</b> 1672238		
<b>Prep Date:</b> 06/12/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129	UX	0.00	pCi/L	+/-1.36	1.37	0.990	1.00

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

- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
  - X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).  
The MDC is a sample specific MDC.

June 29, 2017  
Rad

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL424844	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0S17006
<b>Lab Sample ID:</b> 424844013	<b>Date Collected:</b> 06/06/2017 11:25	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/07/2017 08:55	
<b>Client ID:</b> B39X34		<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1672238	<b>Method:</b> DOE EML HASL-300,I-01 Mo	<b>SOP Ref:</b> GL-RAD-A-006
<b>Run Date:</b> 06/13/2017 11:48	<b>Analyst:</b> MJH1	<b>Instrument:</b> XRAY3
<b>Data File:</b> I424844013.CNF;1	<b>Aliquot:</b> 1.6 L	<b>Count Time:</b> 120 min
<b>Prep Batch:</b> 1672238	<b>Prep Method:</b> DOE EML HASL-300,I-01 M	
<b>Prep Date:</b> 06/12/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129		0.602	pCi/L	+/-0.319	0.325	0.366	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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**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 28, 2017  
Page 1 of 4

**Client :** CH2MHill Plateau Remediation Company  
**MSIN R3-50 CHPRC**  
**PO Box 1600**  
**Richland, Washington 99352**  
**Contact:** Mr. Scot Fitzgerald  
**Workorder:** 424844

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Gamma Spec</b>									
Batch	1672238								
QC1203806881	MB								
Iodine-129			U	0.0782	pCi/L			MJH1	06/13/1713:04
				Uncert: +/-0.406					
				TPU: +/-0.408					
QC1203806882	424844011	DUP							
Iodine-129		2.94		3.32	pCi/L				06/13/1713:54
				Uncert: +/-1.24		RPD: 12 (0% - 100%)			
				TPU: +/-1.28		RER: 0.448 (0-2)			
QC1203806883	424844011	MS							
Iodine-129		32.0	2.94	31.5	pCi/L	REC: 89 (75%-125%)			06/13/1713:54
				Uncert: +/-1.24					
				TPU: +/-1.28					
QC1203806884	LCS								
Iodine-129		26.0		24.8	pCi/L	REC: 95 (80%-120%)			06/13/1714:08
				Uncert: +/-3.28					
				TPU: +/-4.11					
<b>Rad Gas Flow</b>									
Batch	1672138								
QC1203806624	MB								
Alpha			U	-0.228	pCi/L			LXB3	06/10/1712:18
				Uncert: +/-0.500					
				TPU: +/-0.500					
Beta			U	0.222	pCi/L				
				Uncert: +/-0.781					
				TPU: +/-0.782					
QC1203806625	424707004	DUP							
Alpha		13.2		14.1	pCi/L				06/10/1712:18
				Uncert: +/-1.30		RPD: 6 (0% - 20%)			
				TPU: +/-2.53		RER: 0.457 (0-2)			
Beta		4.28		4.32	pCi/L				
				Uncert: +/-0.846		RPD: 1 (0% - 100%)			
				TPU: +/-1.11		RER: 0.0496 (0-2)			
QC1203806626	424707004	MS							
Alpha		242	13.2	276	pCi/L	REC: 109 (75%-125%)			06/12/1709:09
				Uncert: +/-1.30					
				TPU: +/-2.53					
Beta		875	4.28	970	pCi/L	REC: 110 (75%-125%)			
				Uncert: +/-0.846					
				TPU: +/-1.11					
QC1203806627	424707004	MSD							
Alpha		242	13.2	261	pCi/L	REC: 102 (75%-125%)			06/12/1709:14
				Uncert: +/-1.30		RPD: 6 (0%-20%)			
				TPU: +/-2.53		RER: 0.427 (0-2)			
Beta		875	4.28	980	pCi/L	REC: 111 (75%-125%)			
				Uncert: +/-0.846		RPD: 1 (0%-20%)			

**QC Summary**

Workorder: 424844

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Gas Flow</b>									
Batch	1672138								
		TPU:	+/-1.11	+/-168					
						RER:	0.0803 (0-2)		
QC1203806628	LCS								
Alpha	80.6			82.9	pCi/L	REC:	103 (80%-120%)		06/12/1709:14
		Uncert:		+/-7.55					
		TPU:		+/-15.7					
Beta	292			323	pCi/L	REC:	111 (80%-120%)		
		Uncert:		+/-11.2					
		TPU:		+/-55.4					
<b>Rad Liquid Scintillation</b>									
Batch	1672415								
QC1203807372	MB								
Carbon-14			U	-0.207	pCi/L			TXJ1	06/27/1718:30
		Uncert:		+/-16.3					
		TPU:		+/-16.3					
QC1203807373	424658001	DUP							
Carbon-14		U	-7.29	U	6.81	pCi/L			06/27/1718:47
		Uncert:	+/-16.0		+/-16.7	RPD:	0 N/A		
		TPU:	+/-16.0		+/-16.7	RER:	1.19 (0-2)		
QC1203807374	424658001	MS							
Carbon-14	751	U	-7.29		705	pCi/L	REC:	94 (75%-125%)	06/27/1719:03
		Uncert:	+/-16.0		+/-38.2				
		TPU:	+/-16.0		+/-136				
QC1203807375	LCS								
Carbon-14	751				751	pCi/L	REC:	100 (80%-120%)	06/27/1719:19
		Uncert:			+/-39.3				
		TPU:			+/-145				
Batch	1673290								
QC1203809519	MB								
Technetium-99			U	7.31	pCi/L			CXS7	06/19/1710:30
		Uncert:		+/-19.9					
		TPU:		+/-20.0					
**Technetium-99m Tracer	36900				34300	CPM	REC:	93 (30%-105%)	
QC1203809520	425104001	DUP							
Technetium-99			48.5	U	39.9	pCi/L			06/19/1710:57
		Uncert:	+/-21.8		+/-25.6	RPD:	19 (0% - 100%)		
		TPU:	+/-22.5		+/-26.0	RER:	0.488 (0-2)		
**Technetium-99m Tracer	36900		33200		27800	CPM	REC:	75 (30%-105%)	
QC1203809521	LCS								
Technetium-99	861				795	pCi/L	REC:	92 (80%-120%)	06/19/1711:24
		Uncert:			+/-42.8				
		TPU:			+/-98.1				
**Technetium-99m Tracer	36900				29300	CPM	REC:	79 (30%-105%)	
Batch	1673328								
QC1203809663	MB								
Tritium			U	-85.5	pCi/L			BXM4	06/24/1700:12
		Uncert:		+/-195					
		TPU:		+/-195					

## QC Summary

Workorder: 424844

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
<b>Rad Liquid Scintillation</b>										
Batch	1673328									
QC1203809664	424663001	DUP								
Tritium		1600		1660	pCi/L					06/24/1700:59
		Uncert:	+/-284	+/-281		RPD:	4	(0% - 100%)		
		TPU:	+/-420	+/-426		RER:	0.199	(0-2)		
QC1203809665	424663001	MS								
Tritium	2240	1600		3380	pCi/L	REC:	79	(75%-125%)		06/24/1701:46
		Uncert:	+/-284	+/-345						
		TPU:	+/-420	+/-738						
QC1203809666	LCS									
Tritium	2240			1900	pCi/L	REC:	85	(80%-120%)		06/24/1702:33
		Uncert:		+/-294						
		TPU:		+/-471						

**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
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- B The associated QC sample blank has a result >= 2X the MDA and, after corrections, result is >= MDA for this sample
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.
- E Reported value is estimated due to interferences. See comment in narrative.
- M Duplicate precision not met.
- N Spike Sample recovery is outside control limits.
- S Reported value determined by the Method of Standard Additions (MSA)
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- UX Gamma Spectroscopy--Uncertain identification
- W Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

### QC Summary

Workorder: 424844

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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.