



September 08, 2015

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

Re: CHPRC SAF I15-034  
Work Order: 379195  
SDG: GEL379195

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on August 13, 2015. 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,

*Chelsea Seagle*  
Chelsea Seagle for  
Heather Shaffer  
Project Manager

Purchase Order: 300071JDBA 7H  
Chain of Custody: I15-034-057, I15-034-059 and I15-034-060  
Enclosures



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# Case Narrative

September 9, 2015

General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF I15-034  
SDG: GEL379195

September 08, 2015

**Laboratory Identification:**

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

**Summary**

**Sample receipt**

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on August 13, 2015, for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

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

**Sample Identification**

The laboratory received the following samples:

<b><u>Laboratory Identification</u></b>	<b><u>Sample Description</u></b>
379195001	B31XK6
379195002	B31XK3
379195003	B31XK4
379195004	B31XF4
379195005	B31XF6

**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.

This package, to the best of my knowledge, 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.

*Chelsea Seagle*  
Chelsea Seagle for  
Heather Shaffer  
Project Manager

# **Chain of Custody and Supporting Documentation**

September 9, 2015

**CH2M Hill Plateau Remediation Company**      **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**      C.O.C.# **115-034-059**  
 Page 1 of 1

**Collector:** S.W. King/CHPRC      **Contact/Requester:** Karen Waters-Husted      **Telephone No.:** 509-376-4650

**SAF No.:** 115-034      **Sampling Origin:** Hanford Site      **Purchase Order/Charge Code:** 300071

**Project Title:** 100KR4, AUGUST 2015      **Logbook No.:** HNF-N-506 77.24      **Ice Chest No.:** GWS-534

**Shipped To (Lab):** GEL Laboratories, LLC      **Method of Shipment:** Commercial Carrier      **Bill of Lading/Air Bill No.:** 77426831 5184

**Protocol:** CERCLA      **Priority:** 30 Days      **Offsite Property No.:** 5883

**POSSIBLE SAMPLE HAZARDS/REMARKS:** SPECIAL INSTRUCTIONS      **Hold Time:**      **Total Activity Exemption:** Yes  No   
 \*\*\* 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**      **KK**      **JUL 20 2015**

Sample No.	Filter	* Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B31XK6	Y	AUG 12 2015	0835	1x500-mL aG	7196_CR6: COMMON	24 Hours	Cool <=6C
B31XK3	N	W	Y	1x500-mL aG	7196_CR6: COMMON	24 Hours	Cool <=6C

**Relinquished By:** S.W. King/CHPRC      **Print:**      **Sign:**      **Date/Time:** 10/20/15      **Date/Time:** 08/12/2015

**Received By:** B.E. Briggs/CHPRC      **Received By:** FEDEX      **Received By:** M. Karbow      **Received By:**      **Date/Time:** 08/12/2015      **Date/Time:** 08/12/2015      **Date/Time:** 8-13-15      **Date/Time:** 08/15

**Relinquished By:**      **Relinquished By:**      **Relinquished By:**      **Relinquished By:**      **Date/Time:**      **Date/Time:**      **Date/Time:**      **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

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

PRINTED ON 6/25/2015      FSR ID = FSR1742      A-6004-842 (REV 2)

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CH2M Hill Plateau Remediation Company		C.O.C. # I15-034-060	
379195		Page 1 of 1	
Collector	S.W. King/CHPRC	Contact/Requester	Karen Waters-Husted
SAF No.	I15-034	Telephone No.	509-376-4650
Project Title	100KR4, AUGUST 2015	Purchase Order/Charge Code	300071
Shipped To (Lab)	GEL Laboratories, LLC	Ice Chest No.	GWS-534
Protocol	CERCLA	Bill of Lading/Air Bill No.	77426831 5184
<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		Offsite Property No.	5883
SPECIAL INSTRUCTIONS N/A KK JUL 20 2015		Hold Time	Total Activity Exemption: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Sample No.	B31XK4	Filter	N
Date	AUG 12 2015	Time	1835
No/Type Container	1x250-mL G/P	Sample Analysis	9056_ANIONS_IC: COMMON
Holding Time	28 Days/48 Hours	Preservative	Cool <=6C

Relinquished By S.W. King/CHPRC	Print <i>[Signature]</i>	Sign	Date/Time AUG 12 2015 1050
Received By CHPRC	Print <i>[Signature]</i>	Sign	Date/Time AUG 12 2015 1050
Relinquished By	Print <i>[Signature]</i>	Sign	Date/Time AUG 12 2015 1400
Received By CHPRC	Print <i>[Signature]</i>	Sign	Date/Time AUG 12 2015 1400
Relinquished By	Print <i>[Signature]</i>	Sign	Date/Time 8-13-15 0845
Received By	Print <i>[Signature]</i>	Sign	Date/Time 8-13-15 0845

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

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

Disposed By

Date/Time

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**CH2M Hill Plateau Remediation Company**

**CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**

C.O.C. # **II5-034-057** Page 1 of 1

399195

Collector: S.W. King/CHPRC  
 SAF No. II5-034  
 Project Title: 100KR4, AUGUST 2015  
 Shipped To (Lab): GEL Laboratories, LLC  
 Protocol: CERCLA

Contact/Requester: Karen Waters-Husted  
 Telephone No. 509-376-4650  
 Sampling Origin: Hanford Site  
 Purchase Order/Charge Code: 300071  
 Logbook No. HNF-N-506 7124  
 Ice Chest No. GWS-534  
 Method of Shipment: Commercial Carrier  
 Bill of Lading/Air Bill No. 77426881 5184  
 Priority: 30 Days  
 Offsite Property No. 5883

**PRIORITY**

SPECIAL INSTRUCTIONS: NA KK JUL 20 2015

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
B31XF4	N	AUG 17 2015	0945	1x500-mL G/P	6010_METALS_ICP: COMMON; 6010_METALS_ICP: GW 03	6 Months	HNO3 to pH <2
B31XF4	N	W		1x500-mL G/P	C14_LSC: COMMON	6 Months	None
B31XF4	N	W		1x4-L G/P	GAMMA_GS: COMMON; GAMMA_GS: GW 01	6 Months	HNO3 to pH <2
B31XF4	N	W		3x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2
B31XF4	N	W		1x500-mL G/P	TC99_EIE_LSC: COMMON	6 Months	HNO3 to pH <2
B31XF4	N	W		1x500-mL P	TRITIUM_DIST_LSC: COMMON	6 Months	None
B31XF6	Y	AUG 17 2015	0945	1x500-mL G/P	6010_METALS_ICP: COMMON; 6010_METALS_ICP: GW 03	6 Months	HNO3 to pH <2

Relinquished By: S.W. King/CHPRC	Date/Time: 1090 AUG 17 2015	Received By: B.E. Briggs/CHPRC	Date/Time: 1090 AUG 12 2015	Sign: [Signature]
Relinquished By: B.E. Briggs/CHPRC	Date/Time: 1400 AUG 12 2015	Received By: FEDEX	Date/Time: 1090 AUG 12 2015	Sign: [Signature]
Relinquished By: [Signature]	Date/Time: 1090	Received By: M. Gordon	Date/Time: 8-13-15 0845	Sign: [Signature]

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

Disposed By: [Signature]

Date/Time: [Blank]

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

PRINTED ON 6/25/2015 FSR ID = FSR1735 A-6004-842 (REV 2)

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SAMPLE RECEIPT & REVIEW FORM

Client: <u>gpra</u>		SDG/AR/COC/Work Order: <u>379195</u>
Received By: <u>ml</u>		Date Received: <u>8-13-15</u>
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?	<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>cpm=0</u>
Classified Radioactive II or III by RSO?	<input checked="" type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?	<input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?	<input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?	<input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?	<input checked="" type="checkbox"/>	

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 checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Preservation Method: <u>ice bags</u> Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Temperature Device Serial #: <u>ESD32015830</u> Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 Do Low Level Perchlorate samples (EPA 6850) have headspace as required?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's and containers affected:
7 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's and containers affected:
8 Are Encore containers present?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
9 Samples received within holding time?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	ID's and tests affected:
10 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's and containers affected:
11 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's affected:
12 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's affected:
13 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
14 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
15 Carrier and tracking number.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other <u>7742 6831 5184</u>

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials HS Date 8/13/15 Page 1 of 1 GL-CHL-SR-001 Rev 1

# **Data Review Qualifier Definitions**

## Project Specific Qualifier Definitions for GEL Client Code: **CPRC**

Code	Status	Qualifier Definition	CofA	Department	Fraction	Additional Comments
U	Programmed	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.	Y			Includes MDA, TPU, count uncert.
J	Programmed	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	Y	Organics		Organics only
P	Programmed	Aroclor target analyte with greater than 25% difference between column analyses.	Y	Organics		PCB only
C	Manual	Analyte has been confirmed by GC/MS analysis	Y	Organics	Pesticide	IF GC/MS confirmation was attempted but unsuccessful do not qualify with C
B	Programmed	The analyte was detected in both the associated QC blank and in the sample.	Y	Organics		
E	Manual	Concentration exceeds the calibration range of the instrument	Y	Organics		Qualifier Uploaded
A	Manual	The TIC is a suspected aldol-condensation product	Y	Organics	Semi-Volatile	Uploaded with TIC
X	Programmed	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier	Y			Replaces H Hold Date In RAD replaces UI. Same usage as standard X as well.
N	Programmed	Spike Sample recovery is outside control limits.	Y			
*	Programmed	Duplicate analysis not within control limits	Y	Inorganics		
>	Programmed	Result greater than quantifiable range or greater than upper limit of the analysis range	Y	General Chemistry		
Z	Manual	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier	Y			
B	Programmed	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).	Y	Inorganics	Metals	Replaces J Estimated Value
D	Programmed	Results are reported from a diluted aliquot of sample.	Y			Dilution
E	Programmed	Reported value is estimated due to interferences. See comment in narrative.	Y	Inorganics	Metals	GEL E
M	Manual	Duplicate precision not met.	Y	Inorganics	Metals	Replaces *
o	Programmed	Analyte failed to recover within LCS limits (Organics only)	Y	Organics		
S	Manual	Reported value determined by the Method of Standard Additions (MSA)	Y	Inorganics		Not coded B/C Rarely performed
T	Programmed	Spike and/or spike duplicate sample recovery is outside control limits.	Y	Organics		GC/MS only
W	Manual	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.	Y	Inorganics		No GFAA in house.
B	Programmed	The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is $\geq$ MDA for this sample	Y	Radiological		
Y	Manual	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier	Y			
+	Manual	Correlation coefficient for Method of Standard Additions (MSA) is < 0.995	Y	Inorganics		
B	Programmed	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).	Y	General Chemistry		Replaces J Estimated Value
C	Programmed	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.	Y	Inorganics	Metals	Replaces B Blank Detection
C	Programmed	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.	Y	General Chemistry		Replaces B Blank Detection
<	Programmed	Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide	Y	General Chemistry		for Reactive CN/S

## Project Specific Qualifier Definitions for GEL Client Code: **CPRC**

Code	Status	Qualifier Definition	CofA	Department	Fraction	Additional Comments
UX	Manual	Gamma Spectroscopy--Uncertain identification	Y	Radiological		

# Laboratory Certifications

## List of current GEL Certifications as of 08 September 2015

State	Certification
Alaska	UST-110
Arkansas	88-0651
CLIA	42D0904046
California	2940 Interim
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC000122013-10
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-12-00283, P330-12-00284
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC000122013-10
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	LA150001
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC000122013-10
Nebraska	NE-OS-26-13
Nevada	SC000122016-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
Oklahoma	9904
Pennsylvania NELAP	68-00485
Plant Material Permit	PDEP-12-00260
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-15-10
Utah NELAP	SC000122015-18
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

# Metals Analysis

# Case Narrative

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Metals

Technical Case Narrative

CH2MHill Plateau Remediation Company (CPRC)

SDG #: GEL379195

Work Order #: 379195

Sample ID	Client ID
379195004	B31XF4
379195005	B31XF6
1203373777	Method Blank (MB)ICP
1203373778	Laboratory Control Sample (LCS)
1203373781	379195004(B31XF4L) Serial Dilution (SD)
1203373779	379195004(B31XF4S) Matrix Spike (MS)
1203373780	379195004(B31XF4SD) Matrix Spike Duplicate (MSD)

**Sample Analysis**

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

**Method/Analysis Information**

Analytical Batch:	1500222
Prep Batch :	1500221
Standard Operating Procedures:	GL-MA-E-013 REV# 24 and GL-MA-E-006 REV# 12
Analytical Method:	6010_METALS_ICP
Prep Method :	SW846 3005A

**Preparation/Analytical Method Verification**

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

**System Configuration**

The Metals analysis-ICP was performed on a P E 5300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with an ESI SC-FAST introduction, cyclonic spray chamber, and yttrium or scandium internal standard.

**Calibration Information**

**Instrument Calibration**

All initial calibration requirements have been met for this sample delivery group (SDG).

**CRDL/PQL Requirements**

The CRDL/PQL standard recoveries met the referenced advisory control limits.

**ICSA/ICSAB Statement**

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All interference check samples (ICSA and ICSAB) associated with this SDG met the established acceptance criteria.

**Continuing Calibration Blanks (CCB) Requirements**

All continuing calibration blanks (CCB) bracketing this batch met the established acceptance criteria.

**Continuing Calibration Verification (CCV) Requirements**

All continuing calibration verifications (CCV) bracketing this SDG met the acceptance criteria.

**Quality Control (QC) Information**

**Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

**Quality Control (QC) Sample Statement**

The following sample was selected as the quality control (QC) sample for this SDG: 379195004 (B31XF4).

**Matrix Spike (MS/MSD) Recovery Statement**

The percent recoveries (%R) obtained from the MS/MSD analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The matrix spike met the recommended quality control acceptance criteria for percent recoveries for all applicable analytes.

**MS/MSD Relative Percent Difference (RPD) Statement**

The relative percent difference (RPD) obtained from the designated matrix spike duplicate (MSD) is evaluated based on acceptance criteria of 20%. The RPD values between qualifying analyte results in the MS and MSD were within the acceptance limits.

**Serial Dilution % Difference Statement**

All applicable analytes in the serial dilution (SDILT) demonstrated acceptable correlation to its associated sample and met the established acceptance percent difference criteria.

**Technical Information**

**Holding Time Specifications**

GEL assigns holding times based on the associated methodology. Holding time is measured by comparison of the date and time of sample collection to the date and time of sample preparation and analysis. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

**Preparation/Analytical Method Verification**

All procedures were performed as stated in the SOP.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Preparation Information**

The samples in this SDG were not diluted and prepared according to the cited SOP.

**Miscellaneous Information**

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages

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electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

**Data Exception (DER) Documentation**

A data exception report was not required for this SDG.

**Additional Comments**

Additional comments were not required for this SDG.

**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.

September 9, 2015

**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: GEL379195 GEL Work Order: 379195

**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.

N Spike Sample recovery is outside control limits.

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

**Review/Validation**

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

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

**Signature:** 

**Name:** Nik-Cole Elmore

**Date:** 09 SEP 2015

**Title:** Data Validator

# Sample Data Summary

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

SDG No: GEL379195

METHOD TYPE: SW846

SAMPLE ID: 379195004

CLIENT ID: B31XF4

CONTRACT: CPRC0115034

MATRIX: WATER

DATE RECEIVED 13-AUG-15

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-36-0	Antimony	3.5	ug/L	U		P	3.5	1	OPTIMA3	081915-1
7440-38-2	Arsenic	5	ug/L	U		P	5	1	OPTIMA3	081915-1
7440-39-3	Barium	35.3	ug/L			P	1	1	OPTIMA3	081915-1
7440-41-7	Beryllium	1	ug/L	U		P	1	1	OPTIMA3	081915-1
7440-43-9	Cadmium	1	ug/L	U		P	1	1	OPTIMA3	081915-1
7440-70-2	Calcium	42300	ug/L			P	50	1	OPTIMA3	081915-1
7440-47-3	Chromium	4.99	ug/L	B		P	1	1	OPTIMA3	081915-1
7440-48-4	Cobalt	1	ug/L	U		P	1	1	OPTIMA3	081915-1
7440-50-8	Copper	3.21	ug/L	B		P	3	1	OPTIMA3	081915-1
7439-89-6	Iron	30	ug/L	U		P	30	1	OPTIMA3	081915-1
7439-95-4	Magnesium	12300	ug/L			P	110	1	OPTIMA3	081915-1
7439-96-5	Manganese	2	ug/L	U		P	2	1	OPTIMA3	081915-1
7440-02-0	Nickel	1.5	ug/L	U		P	1.5	1	OPTIMA3	081915-1
7440-09-7	Potassium	4770	ug/L			P	50	1	OPTIMA3	081915-1
7440-22-4	Silver	1	ug/L	U		P	1	1	OPTIMA3	081915-1
7440-23-5	Sodium	7960	ug/L			P	100	1	OPTIMA3	081915-1
7440-24-6	Strontium	285	ug/L			P	1	1	OPTIMA3	081915-1
7440-62-2	Vanadium	13.6	ug/L			P	1	1	OPTIMA3	081915-1
7440-66-6	Zinc	7.03	ug/L	B		P	3.3	1	OPTIMA3	081915-1

## \*Analytical Methods:

P SW846 3005A/6010C

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

SDG No: GEL379195

METHOD TYPE: SW846

SAMPLE ID: 379195005

CLIENT ID: B31XF6

CONTRACT: CPRC0115034

MATRIX: WATER

DATE RECEIVED 13-AUG-15

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-36-0	Antimony	4.24	ug/L	B		P	3.5	1	OPTIMA3	081915-1
7440-38-2	Arsenic	5	ug/L	U		P	5	1	OPTIMA3	081915-1
7440-39-3	Barium	35.3	ug/L			P	1	1	OPTIMA3	081915-1
7440-41-7	Beryllium	1	ug/L	U		P	1	1	OPTIMA3	081915-1
7440-43-9	Cadmium	1	ug/L	U		P	1	1	OPTIMA3	081915-1
7440-70-2	Calcium	42400	ug/L			P	50	1	OPTIMA3	081915-1
7440-47-3	Chromium	5.07	ug/L			P	1	1	OPTIMA3	081915-1
7440-48-4	Cobalt	1	ug/L	U		P	1	1	OPTIMA3	081915-1
7440-50-8	Copper	3.97	ug/L	B		P	3	1	OPTIMA3	081915-1
7439-89-6	Iron	30	ug/L	U		P	30	1	OPTIMA3	081915-1
7439-95-4	Magnesium	12400	ug/L			P	110	1	OPTIMA3	081915-1
7439-96-5	Manganese	2	ug/L	U		P	2	1	OPTIMA3	081915-1
7440-02-0	Nickel	1.5	ug/L	U		P	1.5	1	OPTIMA3	081915-1
7440-09-7	Potassium	4740	ug/L			P	50	1	OPTIMA3	081915-1
7440-22-4	Silver	1	ug/L	U		P	1	1	OPTIMA3	081915-1
7440-23-5	Sodium	8160	ug/L			P	100	1	OPTIMA3	081915-1
7440-24-6	Strontium	285	ug/L			P	1	1	OPTIMA3	081915-1
7440-62-2	Vanadium	13.5	ug/L			P	1	1	OPTIMA3	081915-1
7440-66-6	Zinc	14.6	ug/L			P	3.3	1	OPTIMA3	081915-1

## \*Analytical Methods:

P SW846 3005A/6010C

# Quality Control Summary

**September 9, 2015**  
**GEL LABORATORIES LLC**

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

**QC Summary**

Report Date: September 9, 2015

Page 1 of 6

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 379195

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1500222										
QC1203373778	LCS										
Antimony	500			515	ug/L		103	(80%-120%)	HSC	08/19/15	08:09
Arsenic	500			524	ug/L		105	(80%-120%)			
Barium	500			533	ug/L		107	(80%-120%)			
Beryllium	500			528	ug/L		106	(80%-120%)			
Cadmium	500			526	ug/L		105	(80%-120%)			
Calcium	5000			5200	ug/L		104	(80%-120%)			
Chromium	500			529	ug/L		106	(80%-120%)			
Cobalt	500			528	ug/L		106	(80%-120%)			
Copper	500			537	ug/L		107	(80%-120%)			
Iron	5000			5340	ug/L		107	(80%-120%)			
Magnesium	5000			5350	ug/L		107	(80%-120%)			
Manganese	500			520	ug/L		104	(80%-120%)			
Nickel	500			541	ug/L		108	(80%-120%)			
Potassium	5000			5200	ug/L		104	(80%-120%)			
Silver	500			524	ug/L		105	(80%-120%)			
Sodium	5000			5230	ug/L		105	(80%-120%)			
Strontium	500			555	ug/L		111	(80%-120%)			
Vanadium	500			535	ug/L		107	(80%-120%)			
Zinc	500			513	ug/L		103	(80%-120%)			

QC1203373777 MB

September 9, 2015  
**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 379195

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1500222										
Antimony			U	ND	ug/L					08/19/15	08:06
Arsenic			U	ND	ug/L				HSC		
Barium			U	ND	ug/L						
Beryllium			U	ND	ug/L						
Cadmium			U	ND	ug/L						
Calcium			U	ND	ug/L						
Chromium			U	ND	ug/L						
Cobalt			U	ND	ug/L						
Copper			U	ND	ug/L						
Iron			U	ND	ug/L						
Magnesium			U	ND	ug/L						
Manganese			U	ND	ug/L						
Nickel			U	ND	ug/L						
Potassium			U	ND	ug/L						
Silver			U	ND	ug/L						
Sodium			U	ND	ug/L						
Strontium			U	ND	ug/L						
Vanadium			U	ND	ug/L						
Zinc			U	ND	ug/L						
QC1203373779 379195004 MS											
Antimony	500	U	ND	515	ug/L		102	(75%-125%)		08/19/15	08:18
Arsenic	500	U	ND	537	ug/L		107	(75%-125%)			
Barium	500		35.3	562	ug/L		105	(75%-125%)			

September 9, 2015  
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**QC Summary**

Workorder: 379195

Page 3 of 6

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1500222										
Beryllium	500	U	ND	530	ug/L		106	(75%-125%)	HSC	08/19/15	08:18
Cadmium	500	U	ND	514	ug/L		103	(75%-125%)			
Calcium	5000		42300	47400	ug/L		N/A	(75%-125%)			
Chromium	500	B	4.99	519	ug/L		103	(75%-125%)			
Cobalt	500	U	ND	494	ug/L		98.8	(75%-125%)			
Copper	500	B	3.21	536	ug/L		107	(75%-125%)			
Iron	5000	U	ND	5260	ug/L		105	(75%-125%)			
Magnesium	5000		12300	17600	ug/L		105	(75%-125%)			
Manganese	500	U	ND	514	ug/L		103	(75%-125%)			
Nickel	500	U	ND	504	ug/L		101	(75%-125%)			
Potassium	5000		4770	10100	ug/L		106	(75%-125%)			
Silver	500	U	ND	520	ug/L		104	(75%-125%)			
Sodium	5000		7960	12900	ug/L		98.8	(75%-125%)			
Strontium	500		285	807	ug/L		104	(75%-125%)			
Vanadium	500		13.6	548	ug/L		107	(75%-125%)			
Zinc	500	B	7.03	507	ug/L		100	(75%-125%)			
QC1203373780 379195004 MSD											
Antimony	500	U	ND	511	ug/L	0.77	102	(0%-20%)		08/19/15	08:21
Arsenic	500	U	ND	528	ug/L	1.79	105	(0%-20%)			
Barium	500		35.3	556	ug/L	1.15	104	(0%-20%)			
Beryllium	500	U	ND	523	ug/L	1.24	105	(0%-20%)			
Cadmium	500	U	ND	509	ug/L	1.02	102	(0%-20%)			

September 9, 2015  
**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 379195

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1500222										
Calcium	5000	42300		47500	ug/L	0.137	N/A	(0%-20%)	HSC	08/19/15	08:21
Chromium	500	B	4.99	522	ug/L	0.554	103	(0%-20%)			
Cobalt	500	U	ND	495	ug/L	0.249	99	(0%-20%)			
Copper	500	B	3.21	533	ug/L	0.494	106	(0%-20%)			
Iron	5000	U	ND	5350	ug/L	1.83	107	(0%-20%)			
Magnesium	5000		12300	17800	ug/L	1.28	109	(0%-20%)			
Manganese	500	U	ND	503	ug/L	2.09	101	(0%-20%)			
Nickel	500	U	ND	505	ug/L	0.0495	101	(0%-20%)			
Potassium	5000		4770	9990	ug/L	0.869	104	(0%-20%)			
Silver	500	U	ND	519	ug/L	0.264	104	(0%-20%)			
Sodium	5000		7960	13400	ug/L	3.8	109	(0%-20%)			
Strontium	500		285	839	ug/L	3.95	111	(0%-20%)			
Vanadium	500		13.6	546	ug/L	0.307	107	(0%-20%)			
Zinc	500	B	7.03	505	ug/L	0.504	99.5	(0%-20%)			
QC1203373781 379195004 SDILT											
Antimony		U	ND DU	ND	ug/L	N/A		(0%-10%)		08/19/15	08:25
Arsenic		U	ND DU	ND	ug/L	N/A		(0%-10%)			
Barium			35.3 D	7.02	ug/L	.485		(0%-10%)			
Beryllium		U	ND DU	ND	ug/L	N/A		(0%-10%)			
Cadmium		U	ND DU	ND	ug/L	N/A		(0%-10%)			
Calcium			42300 D	8420	ug/L	.42		(0%-10%)			
Chromium		B	4.99 D	1.02	ug/L	2.31		(0%-10%)			

**September 9, 2015**  
**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 379195

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1500222										
Cobalt	U	ND	DU	ND	ug/L	N/A		(0%-10%)	HSC	08/19/15	08:25
Copper	B	3.21	DU	ND	ug/L	N/A		(0%-10%)			
Iron	U	ND	DU	ND	ug/L	N/A		(0%-10%)			
Magnesium		12300	D	2490	ug/L	1.06		(0%-10%)			
Manganese	U	ND	DU	ND	ug/L	N/A		(0%-10%)			
Nickel	U	ND	DU	ND	ug/L	N/A		(0%-10%)			
Potassium		4770	D	971	ug/L	1.72		(0%-10%)			
Silver	U	ND	DU	ND	ug/L	N/A		(0%-10%)			
Sodium		7960	D	1550	ug/L	2.42		(0%-10%)			
Strontium		285	D	56.4	ug/L	1.05		(0%-10%)			
Vanadium		13.6	D	2.78	ug/L	2.27		(0%-10%)			
Zinc	B	7.03	D	3.67	ug/L	161		(0%-10%)			

**Notes:**

The Qualifiers in this report are defined as follows:

- \* Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured 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.

September 9, 2015  
**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 379195

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										

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

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

# General Chem Analysis

# Case Narrative

**General Chemistry  
Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL379195  
Work Order #: 379195**

**Method/Analysis Information**

**Product:** Ion Chromatography  
**Analytical Batch:** 1500150      **Method:** 9056\_ANIONS\_IC: COMMON

**Sample Analysis**

The following samples were analyzed using the analytical protocol as established in SW846 9056A:

<b>Sample ID</b>	<b>Client ID</b>
379195003	B31XK4
1203373570	Method Blank (MB)
1203373571	Laboratory Control Sample (LCS)
1203373572	379195003(B31XK4) Sample Duplicate (DUP)
1203373573	379195003(B31XK4) Post Spike (PS)

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

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-086 REV# 24.

**Preparation/Analytical Method Verification**

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

**Calibration Information**

The Ion Chromatography analysis was performed on a Dionex ICS-3000 Ion Chromatograph.

**Initial Calibration**

All initial calibration requirements have been met for this SDG.

**Continuing Calibration Blanks**

All continuing calibration blanks (CCBs) associated with reported data from this batch were within acceptance limits.

**Calibration Verification Information (CCV)**

All continuing calibration verification standards (CCVs) associated with reported data from this batch were within

acceptance limits.

**Y Intercept Rule**

The absolute value of the intercept is less than 3 times the MDL.

**Quality Control (QC) Information**

**Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 379195003 (B31XK4) was selected for QC analysis.

**Matrix Spike (MS)/Post Spike (PS) Recovery Statement**

The matrix spike recovered outside of the established acceptance limits due to matrix interference.

Analyte	Sample	Value
Chloride	1203373573 (B31XK4PS)	121* (90%-110%)

**Duplicate Relative Percent Difference (RPD) Statement**

The RPD between the sample and its duplicate met the acceptance limits.

**Technical Information**

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

**Holding Times**

Sample 1203373573 (B31XK4PS) was analyzed outside of the method specified holding time. The analysis was performed as soon as possible by the analyst. The data is qualified.

**Sample Dilutions**

The following samples were diluted because target analyte concentrations exceeded the calibration range. 1203373572 (B31XK4DUP), 1203373573 (B31XK4PS) and 379195003 (B31XK4).

Analyte	379195
	003
Sulfate	10X

**Sample Re-analysis**

Sample 1203373573 (B31XK4PS) was reanalyzed due to PS failure. The reanalysis data was reported.

**Miscellaneous Information**

**Data Exception (DER) Documentation**

A data exception report (DER) 1440442 was generated for samples 1203373573 (B31XK4PS) and 1203373573 (B31XK4PS) in this SDG/batch.

**Manual Integrations**

Samples 1203373572 (B31XK4DUP), 1203373573 (B31XK4PS) and 379195003 (B31XK4) were manually integrated to correctly position the baseline as set in the calibration standards.

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted: Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

**Method/Analysis Information**

**Product:** Hexavalent Chromium  
**Analytical Batch:** 1500147                      **Method:** 7196\_CR6: COMMON

**Sample Analysis**

The following samples were analyzed using the analytical protocol as established in 7196\_CR6 :

<b>Sample ID</b>	<b>Client ID</b>
379195001	B31XK6
379195002	B31XK3
1203373564	Method Blank (MB)
1203373565	Laboratory Control Sample (LCS)
1203373566	379195001(B31XK6) Sample Duplicate (DUP)
1203373567	379195001(B31XK6) Post Spike (PS)

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

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-044 REV# 21.

**Preparation/Analytical Method Verification**

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

**Calibration Information**

The Spectrometric analysis was performed on a Spectronic 20D+ Digital Spectrophotometer.

**Initial Calibration**

All initial calibration requirements have been met for this SDG.

**Continuing Calibration Blanks**

All continuing calibration blanks (CCBs) associated with reported data from this batch were within acceptance limits.

**Calibration Verification Information (CCV)**

All continuing calibration verification standards (CCVs) associated with reported data from this batch were within acceptance limits.

**Y Intercept Rule**

The absolute value of the intercept is less than 3 times the MDL.

**Quality Control (QC) Information**

**Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 379195001 (B31XK6) was selected for QC analysis.

**Matrix Spike (MS)/Post Spike (PS) Recovery Statement**

The MS/PS recovery for this sample set was within the required acceptance limits.

**Duplicate Relative Percent Difference (RPD) Statement**

The RPD between the sample and its duplicate met the acceptance limits.

**Technical Information**

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

The samples in this SDG did not require re-analysis.

**Miscellaneous Information**

**Data Exception (DER) Documentation**

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

**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.

September 9, 2015

**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: GEL379195 GEL Work Order: 379195

**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.
- 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:** Thomas Lewis

**Date:** 09 SEP 2015

**Title:** Data Validator

# Sample Data Summary

**Certificate of Analysis**

Report Date: September 9, 2015

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF I15-034

---

Client Sample ID: B31XK6	Project: CPRC0I15034
Sample ID: 379195001	Client ID: CPRC001
Matrix: WATER	
Collect Date: 12-AUG-15 08:35	
Receive Date: 13-AUG-15	
Collector: Client	

---

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Spectrometric Analysis											
7196_CR6: COMMON "As Received"											
Hexavalent Chromium	B	0.00938	0.003	0.010	mg/L	1	SXC5	08/13/15	1003	1500147	1

The following Analytical Methods were performed:

---

Method	Description	Analyst Comments
1	7196_CR6	

**Notes:**

**Certificate of Analysis**

Report Date: September 9, 2015

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF I15-034

---

Client Sample ID: B31XK3	Project: CPRC0115034
Sample ID: 379195002	Client ID: CPRC001
Matrix: WATER	
Collect Date: 12-AUG-15 08:35	
Receive Date: 13-AUG-15	
Collector: Client	

---

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time Batch	Method
Spectrometric Analysis										
7196_CR6: COMMON "As Received"										
Hexavalent Chromium		0.0118	0.003	0.010	mg/L	1	SXC5	08/13/15	1004 1500147	1

The following Analytical Methods were performed:

---

Method	Description	Analyst Comments
1	7196_CR6	

**Notes:**

**Certificate of Analysis**

Report Date: September 9, 2015

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF I15-034

Client Sample ID: B31XK4	Project: CPRC0I15034
Sample ID: 379195003	Client ID: CPRC001
Matrix: WATER	
Collect Date: 12-AUG-15 08:35	
Receive Date: 13-AUG-15	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
9056_ANIONS_IC: COMMON "As Received"											
Chloride		8990	67.0	200	ug/L	1	MXL2	08/13/15	1238	1500150	1
Fluoride	B	163	33.0	500	ug/L	1					
Nitrate-N		2060	33.0	250	ug/L	1					
Nitrite-N	U	38.0	38.0	250	ug/L	1					
Sulfate	D	38200	1330	4000	ug/L	10	MXL2	08/13/15	1414	1500150	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9056A	
2	SW846 9056A	

**Notes:**

# Quality Control Summary

**September 9, 2015**  
**GEL LABORATORIES LLC**

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

**QC Summary**

Report Date: September 9, 2015

Page 1 of 2

**CH2M Hill Plateau Remediation Company**

**MSIN R3-50 CHPRC**

**PO Box 1600**

**Richland, Washington**

**Contact: Mr. Scot Fitzgerald**

**Workorder: 379195**

<u>Parmname</u>	<u>NOM</u>	<u>Sample</u>	<u>Qual</u>	<u>QC</u>	<u>Units</u>	<u>RPD%</u>	<u>REC%</u>	<u>Range</u>	<u>Anlst</u>	<u>Date</u>	<u>Time</u>
<b>Ion Chromatography</b>											
Batch	1500150										
QC1203373572	379195003	DUP									
Chloride		8990		9000	ug/L	0.118		(0%-20%)	MXL2	08/13/15	13:10
Fluoride	B	163	B	166	ug/L	1.7 ^		(+/-500)			
Nitrate-N		2060		2050	ug/L	0.0827		(0%-20%)			
Nitrite-N	U	38.0	U	38.0	ug/L	N/A					
Sulfate	D	38200	D	38700	ug/L	1.44		(0%-20%)		08/13/15	14:46
QC1203373571	LCS										
Chloride	5000			4890	ug/L		97.8	(90%-110%)		08/13/15	12:07
Fluoride	2500			2600	ug/L		104	(90%-110%)			
Nitrate-N	2500			2580	ug/L		103	(90%-110%)			
Nitrite-N	2500			2560	ug/L		102	(90%-110%)			
Sulfate	10000			10400	ug/L		104	(90%-110%)			
QC1203373570	MB										
Chloride			U	67.0	ug/L					08/13/15	11:35
Fluoride			U	33.0	ug/L						
Nitrate-N			U	33.0	ug/L						
Nitrite-N			U	38.0	ug/L						
Sulfate			U	133	ug/L						
QC1203373573	379195003	PS									
Chloride	5.00	8.99		15.0	mg/L		121 *	(90%-110%)		08/14/15	17:55
Fluoride	2.50	B	0.163	2.77	mg/L		104	(90%-110%)			
Nitrate-N	2.50		2.06	X	4.74	mg/L	107	(90%-110%)			

September 9, 2015  
**GEL LABORATORIES LLC**

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

**QC Summary**

Workorder: 379195

Page 2 of 2

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1500150										
Nitrite-N	2.50	U	0.00	X	2.54	mg/L	101	(90%-110%)			
Sulfate	10.0	D	3.82	D	14.4	mg/L	106	(90%-110%)	MXL2	08/14/15	18:27
<b>Spectrometric Analysis</b>											
Batch	1500147										
QC1203373566	379195001	DUP									
Hexavalent Chromium		B	0.00938		0.0102	mg/L	8.38	^	(+/-0.010)	SXC5	08/13/15 10:03
QC1203373565	LCS										
Hexavalent Chromium	0.050				0.0504	mg/L	101	(85%-115%)			08/13/15 10:02
QC1203373564	MB										
Hexavalent Chromium			U		0.003	mg/L					08/13/15 10:02
QC1203373567	379195001	PS									
Hexavalent Chromium	0.050	B	0.00938		0.0603	mg/L	102	(85%-115%)			08/13/15 10:03

**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  $\geq$  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.

# Miscellaneous

**DATA EXCEPTION REPORT**

<b>Mo.Day Yr.</b> 19-AUG-15	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> IC	<b>Test / Method:</b> SW846 9056A	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> CPRC
<b>Batch ID:</b> 1500150	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 379195(GEL379195)</b>			
<b>Application Issues:</b> Failed Recovery for MS/MSD, or PS/PSD Sample Analyzed out of Holding			
<b>Specification and Requirements Exception Description:</b>		<b>DER Disposition:</b>	
<p>1. Failed Recovery for MS/MSD, or PS/PSD: QC 1203373573PS</p> <p>2. Sample Analyzed out of Holding: QC 1203373573PS</p>		<p>1. The matrix spike recovered outside of the established acceptance limits due to matrix interference. Chloride 1203373573 (B31XK4PS) [121* (90%-110%)].</p> <p>2. Sample 1203373573 (B31XK4PS) was analyzed outside of the method specified holding time. The analysis was performed as soon as possible by the analyst. The data is qualified.</p>	

**Originator's Name:**

Marcy Lamb 19-AUG-15

**Data Validator/Group Leader:**

Thomas Lewis 09-SEP-15

# Radiological Analysis

**September 9, 2015**  
**Radiochemistry**  
**Technical Case Narrative**  
**CH2MHill Plateau Remediation Company (CPRC)**  
**SDG #: GEL379195**  
**Work Order #: 379195**

**Method/Analysis Information**

**Product:** GAMMA\_GS:COMMON + GW 01

Analytical Method: 901.1\_GAMMA\_GS

Analytical Batch Number: 1501019

<b>Sample ID</b>	<b>Client ID</b>
379195004	B31XF4
1203375915	Method Blank (MB)
1203375917	Laboratory Control Sample (LCS)
1203375916	379443006(B31YM5) Sample Duplicate (DUP)

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

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-013 REV# 25.

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

**Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

**Quality Control (QC) Information:**

**Blank Information**

The blank volume is representative of the sample volume in this batch.

**Designated QC**

The following sample was used for QC: 379443006 (B31YM5).

**QC Information**

All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**

All sample procedures for this sample set were performed within the required holding time.

**Sample Re-prep/Re-analysis**

None of the samples in this sample set required reprep or reanalysis.

**Recounts**

None of the samples in this sample set were recounted.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**Sample-Specific MDA/MDC**

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** SRISO\_SEP\_PRECIP\_GPC: COMMON  
**Analytical Method:** SRISO\_SEP\_PRECIP\_GPC  
**Analytical Batch Number:** 1505342

<b>Sample ID</b>	<b>Client ID</b>
379195004	B31XF4
1203387139	Method Blank (MB)
1203387141	Laboratory Control Sample (LCS)
1203387140	379195004(B31XF4) Sample Duplicate (DUP)

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

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-004 REV# 17.

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

**Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

**Quality Control (QC) Information:**

**Blank Information**

The blank volume is representative of the sample volume in this batch.

**Designated QC**

The following sample was used for QC: 379195004 (B31XF4).

**QC Information**

All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**

All sample procedures for this sample set were performed within the required holding time.

**Sample Re-prep/Re-analysis**

Samples were re-prepped due to high blank activity. The re-analysis is being reported.

**Chemical Recoveries**

All chemical recoveries meet the required acceptance limits for this sample set.

**Recounts**

None of the samples in this sample set were recounted.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**Sample-Specific MDA/MDC**

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

Method/Analysis Information

**Product:** TC99\_EIE\_LSC: COMMON

Analytical Method: TC99\_EIE\_LSC

Analytical Batch Number: 1501163

<b>Sample ID</b>	<b>Client ID</b>
379195004	B31XF4
1203376274	Method Blank (MB)
1203376276	Laboratory Control Sample (LCS)
1203376275	379195004(B31XF4) Sample Duplicate (DUP)

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

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-059 REV# 3.

Calibration Information:

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

**Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

**Blank Information**

The blank volume is representative of the sample volume in this batch.

**Designated QC**

The following sample was used for QC: 379195004 (B31XF4).

**QC Information**

All of the QC samples met the required acceptance limits.

Technical Information:

**Holding Time**

All sample procedures for this sample set were performed within the required holding time.

**Sample Re-prep/Re-analysis**

None of the samples in this sample set required reprep or reanalysis.

**Recounts**

None of the samples in this sample set were recounted.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**Sample-Specific MDA/MDC**

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** C14\_LSC: COMMON

Analytical Method: C14\_LSC

Analytical Batch Number: 1501764

Sample ID	Client ID
379195004	B31XF4
1203377823	Method Blank (MB)
1203377826	Laboratory Control Sample (LCS)
1203377824	379365001(B31XB2) Sample Duplicate (DUP)
1203377825	379365001(B31XB2) Matrix Spike (MS)

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

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-003 REV# 15.

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

**Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

**Quality Control (QC) Information:**

**Blank Information**

The blank volume is representative of the sample volume in this batch.

**Designated QC**

The following sample was used for QC: 379365001 (B31XB2).

**QC Information**

All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**

All sample procedures for this sample set were performed within the required holding time.

**Sample Re-prep/Re-analysis**

None of the samples in this sample set required reprep or reanalysis.

**Recounts**

Samples were recounted due to a detector lock out condition. The recounts are reported.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**Sample-Specific MDA/MDC**

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

**Additional Comments**

The matrix spike, 1203377825 (B31XB2MS), aliquot was reduced to conserve sample volume.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

<b>Product:</b>	<b>TRITIUM_DIST_LSC: COMMON</b>
Analytical Method:	TRITIUM_DIST_LSC
Analytical Batch Number:	1501809

September 9, 2015

Sample ID	Client ID
379195004	B31XF4
1203377958	Method Blank (MB)
1203377961	Laboratory Control Sample (LCS)
1203377959	379095007(B31XD6) Sample Duplicate (DUP)
1203377960	379095007(B31XD6) Matrix Spike (MS)

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

#### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-002 REV# 21.

#### **Calibration Information:**

##### **Calibration Information**

All initial and continuing calibration requirements have been met.

##### **Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

##### **Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

#### **Quality Control (QC) Information:**

##### **Blank Information**

The blank volume is representative of the sample volume in this batch.

##### **Designated QC**

The following sample was used for QC: 379095007 (B31XD6).

##### **QC Information**

All of the QC samples met the required acceptance limits.

#### **Technical Information:**

##### **Holding Time**

All sample procedures for this sample set were performed within the required holding time.

##### **Sample Re-prep/Re-analysis**

None of the samples in this sample set required reprep or reanalysis.

##### **Recounts**

None of the samples in this sample set were recounted.

#### **Miscellaneous Information:**

##### **Data Exception (DER) Documentation**

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

September 9, 2015

**Sample-Specific MDA/MDC**

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**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.

September 9, 2015

**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: GEL379195 GEL Work Order: 379195

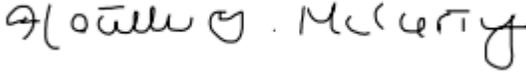
**The Qualifiers in this report are defined as follows:**

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

**Review/Validation**

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

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

**Signature:** 

**Name:** Heather McCarty

**Date:** 09 SEP 2015

**Title:** Analyst II

# Sample Data Summary

September 9, 2015

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL379195	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0115034
<b>Lab Sample ID:</b> 379195004	<b>Date Collected:</b> 08/12/2015 09:45	<b>Matrix:</b> WATER
	<b>Date Received:</b> 08/13/2015 08:45	
<b>Client ID:</b> B31XF4	<b>Method:</b> SRISO_SEP_PRECIP_GPC	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1505342	<b>Analyst:</b> KSD1	<b>SOP Ref:</b> GL-RAD-A-004
<b>Run Date:</b> 09/08/2015 12:49	<b>Aliquot:</b> 300 mL	<b>Instrument:</b> PIC7A
<b>Data File:</b> S1505342.xls	<b>Prep Method:</b> EPA 905.0 Modified/DOE RP5	<b>Count Time:</b> 60 min
<b>Prep Batch:</b> 1505342		
<b>Prep Date:</b> 09/04/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90	U	0.386	pCi/L	+/-0.901	0.903	1.61	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	7.80	8.10	mg	96.3	(25%-125%)

**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).

September 9, 2015

**Certificate of Analysis  
Sample Summary**

SDG Number: GEL379195  
 Lab Sample ID: 379195004  
  
 Client ID: B31XF4  
 Batch ID: 1501019  
 Run Date: 08/28/2015 06:36  
 Data File: G379195004.CNF;1  
 Prep Batch: 1501019  
 Prep Date: 08/19/2015 00:00

Client: CPRC001  
 Date Collected: 08/12/2015 09:45  
 Date Received: 08/13/2015 08:45  
  
 Method: 901.1\_GAMMA\_GS  
 Analyst: MJH1  
 Aliquot: 2 L  
 Prep Method: EPA 901.1

Project: CPRC0115034  
 Matrix: WATER  
  
 Prep Basis: "As Received"  
 SOP Ref: GL-RAD-A-013  
 Instrument: GAM32  
 Count Time: 120 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14234-35-6	Antimony-125	U	2.47	pCi/L	+/-7.41	7.50	13.8	
13967-70-9	Cesium-134	U	0.384	pCi/L	+/-3.05	3.05	5.83	
10045-97-3	Cesium-137	U	-1.82	pCi/L	+/-3.01	3.12	5.11	10.0
10198-40-0	Cobalt-60	U	-1.93	pCi/L	+/-2.44	2.59	4.11	
14683-23-9	Europium-152	U	3.97	pCi/L	+/-8.38	8.58	15.3	
15585-10-1	Europium-154	U	0.333	pCi/L	+/-7.55	7.55	15.2	
14391-16-3	Europium-155	U	4.71	pCi/L	+/-11.7	11.9	21.8	
13966-00-2	Potassium-40	U	-20	pCi/L	+/-33.5	34.7	63.5	

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).

September 9, 2015

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL379195	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0115034
<b>Lab Sample ID:</b> 379195004	<b>Date Collected:</b> 08/12/2015 09:45	<b>Matrix:</b> WATER
	<b>Date Received:</b> 08/13/2015 08:45	
<b>Client ID:</b> B31XF4	<b>Method:</b> TC99_EIE_LSC	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1501163	<b>Analyst:</b> MYM1	<b>SOP Ref:</b> GL-RAD-A-059
<b>Run Date:</b> 08/25/2015 19:05	<b>Aliquot:</b> 200 mL	<b>Instrument:</b> LSCRED
<b>Data File:</b> E1501163.xls	<b>Prep Method:</b> DOE EML HASL-300, Tc-02-	<b>Count Time:</b> 45 min
<b>Prep Batch:</b> 1501163		
<b>Prep Date:</b> 08/20/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	1.27	pCi/L	+/-7.59	7.59	13.0	15.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	65200	67100	CPM	97.1	(15%-125%)

**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).

September 9, 2015

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL379195	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0115034
<b>Lab Sample ID:</b> 379195004	<b>Date Collected:</b> 08/12/2015 09:45	<b>Matrix:</b> WATER
	<b>Date Received:</b> 08/13/2015 08:45	
<b>Client ID:</b> B31XF4	<b>Method:</b> C14_LSC	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1501764	<b>Analyst:</b> GXR1	<b>SOP Ref:</b> GL-RAD-A-003
<b>Run Date:</b> 08/30/2015 17:53	<b>Aliquot:</b> 0.25 L	<b>Instrument:</b> LSCTEAL
<b>Data File:</b> C1501764R.xls	<b>Prep Method:</b> EPA EERF C-01 Modified	<b>Count Time:</b> 120 min
<b>Prep Batch:</b> 1501764		
<b>Prep Date:</b> 08/26/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14		14.8	pCi/L	+/-2.51	3.72	3.83	5.00

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).

September 9, 2015

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL379195	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0115034
<b>Lab Sample ID:</b> 379195004	<b>Date Collected:</b> 08/12/2015 09:45	<b>Matrix:</b> WATER
	<b>Date Received:</b> 08/13/2015 08:45	
<b>Client ID:</b> B31XF4	<b>Method:</b> TRITIUM_DIST_LSC	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1501809	<b>Analyst:</b> GXR1	<b>SOP Ref:</b> GL-RAD-A-002
<b>Run Date:</b> 08/28/2015 16:07	<b>Aliquot:</b> 50 mL	<b>Instrument:</b> LSCORANGE
<b>Data File:</b> T1501809.xls	<b>Prep Method:</b> EPA 906.0 Modified	<b>Count Time:</b> 120.0296 min
<b>Prep Batch:</b> 1501809		
<b>Prep Date:</b> 08/26/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		7030	pCi/L	+/-206	1370	83.0	100

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).

# Quality Control Data

# GEL LABORATORIES LLC

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## QC Summary

Report Date: September 9, 2015

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Client : CH2MHill Plateau Remediation Company  
 MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Workorder: 379195

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Gamma Spec</b>									
Batch	1501019								
QC1203375915	MB								
Antimony-125			U	-1.42	pCi/L			MJH1	08/28/1507:09
				Uncert: +/-6.38					
				TPU: +/-6.41					
Cesium-134			U	-0.859	pCi/L				
				Uncert: +/-2.21					
				TPU: +/-2.25					
Cesium-137			U	2.76	pCi/L				
				Uncert: +/-3.93					
				TPU: +/-3.94					
Cobalt-60			U	-0.0234	pCi/L				
				Uncert: +/-2.18					
				TPU: +/-2.18					
Europium-152			U	-1.75	pCi/L				
				Uncert: +/-7.34					
				TPU: +/-7.38					
Europium-154			U	1.01	pCi/L				
				Uncert: +/-6.88					
				TPU: +/-6.89					
Europium-155			U	6.56	pCi/L				
				Uncert: +/-7.27					
				TPU: +/-7.88					
Potassium-40			U	-25.1	pCi/L				
				Uncert: +/-29.2					
				TPU: +/-31.4					
QC1203375916	379443006	DUP							
Antimony-125		U	3.05	U	-3.82	pCi/L			08/28/1508:41
					Uncert: +/-6.65				
					TPU: +/-6.80		RPD: 0	N/A	
							RER: 1.29	(0-2)	
Cesium-134		U	1.47	U	-0.90	pCi/L			
					Uncert: +/-2.83				
					TPU: +/-2.91		RPD: 0	N/A	
							RER: 1.15	(0-2)	
Cesium-137		U	1.67	U	-0.0357	pCi/L			
					Uncert: +/-2.79				
					TPU: +/-2.89		RPD: 0	N/A	
							RER: 0.803	(0-2)	
Cobalt-60			12.0		16.6	pCi/L			
					Uncert: +/-5.35				
					TPU: +/-5.43		RPD: 32	(0% - 100%)	
							RER: 1.16	(0-2)	
Europium-152		U	-2.2	U	-4.67	pCi/L			
					Uncert: +/-6.38				
					TPU: +/-6.46		RPD: 0	N/A	
							RER: 0.459	(0-2)	
Europium-154		U	1.25	U	-5.3	pCi/L			
					Uncert: +/-6.62				
					TPU: +/-6.64		RPD: 0	N/A	
							RER: 1.29	(0-2)	
Europium-155		U	-3.19	U	3.04	pCi/L			

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## QC Summary

Workorder: 379195

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Gamma Spec</b>									
Batch	1501019								
		Uncert:	+/-10.0	+/-11.4					
		TPU:	+/-10.1	+/-11.5		RPD: 0	N/A		
						RER: 0.796	(0-2)		
Potassium-40		U	-14.5	U	35.0	pCi/L			
		Uncert:	+/-34.6	+/-44.2		RPD: 0	N/A		
		TPU:	+/-35.2	+/-44.3		RER: 1.72	(0-2)		
QC1203375917	LCS								
Americium-241	34400			34900	pCi/L	REC: 101	(80%-120%)		08/28/1507:10
		Uncert:		+/-643					
		TPU:		+/-4120					
Antimony-125				U	49.4	pCi/L			
		Uncert:		+/-265					
		TPU:		+/-266					
Cesium-134				U	-41.8	pCi/L			
		Uncert:		+/-116					
		TPU:		+/-118					
Cesium-137	13700			14400	pCi/L	REC: 105	(80%-120%)		
		Uncert:		+/-386					
		TPU:		+/-1210					
Cobalt-60	15100			15500	pCi/L	REC: 103	(80%-120%)		
		Uncert:		+/-461					
		TPU:		+/-1290					
Europium-152				U	72.8	pCi/L			
		Uncert:		+/-245					
		TPU:		+/-247					
Europium-154				U	-268	pCi/L			
		Uncert:		+/-172					
		TPU:		+/-211					
Europium-155				U	-30.3	pCi/L			
		Uncert:		+/-229					
		TPU:		+/-230					
Potassium-40				U	220	pCi/L			
		Uncert:		+/-296					
		TPU:		+/-313					
<b>Rad Gas Flow</b>									
Batch	1505342								
QC1203387139	MB								
Strontium-90				U	-0.782	pCi/L		KSD1	09/08/1512:49
		Uncert:		+/-0.686					
		TPU:		+/-0.686					
**Strontium Carrier	8.10				8.00	mg	REC: 99	(25%-125%)	
QC1203387140	379195004	DUP							
Strontium-90		U	0.386	U	-0.0253	pCi/L			09/08/1512:49
		Uncert:	+/-0.901	+/-0.879		RPD: 0	N/A		
		TPU:	+/-0.903	+/-0.879		RER: 0.64	(0-2)		
**Strontium Carrier	8.10		7.80		7.50	mg	REC: 93	(25%-125%)	
QC1203387141	LCS								
Strontium-90	72.5				82.5	pCi/L	REC: 114	(80%-120%)	09/08/1512:49
		Uncert:		+/-5.24					
		TPU:		+/-14.7					

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## QC Summary

Workorder: 379195

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Gas Flow</b>									
Batch	1505342								
**Strontium Carrier	8.10			6.60	mg	REC:	82	(25%-125%)	
<b>Rad Liquid Scintillation</b>									
Batch	1501163								
QC1203376274 MB									
Technetium-99			U	-0.474	pCi/L			MYM1	08/25/1519:53
				Uncert: +/-5.04					
				TPU: +/-5.04					
**Technetium-99m Tracer	67100			64700	CPM	REC:	96	(15%-125%)	
QC1203376275 379195004 DUP									
Technetium-99		U	1.27	U	-5.11				08/25/1520:41
				Uncert: +/-7.59		RPD:	0	N/A	
				TPU: +/-7.59		RER:	1.17	(0-2)	
**Technetium-99m Tracer	67100	65200		64600	CPM	REC:	96	(15%-125%)	
QC1203376276 LCS									
Technetium-99	287			250	pCi/L	REC:	87	(80%-120%)	
				Uncert: +/-9.55					
				TPU: +/-29.4					
**Technetium-99m Tracer	67100			62800	CPM	REC:	94	(15%-125%)	
Batch	1501764								
QC1203377823 MB									
Carbon-14			U	0.762	pCi/L			GXR1	08/31/1505:12
				Uncert: +/-2.29					
				TPU: +/-2.29					
QC1203377824 379365001 DUP									
Carbon-14		U	-0.053	U	-0.596				08/31/1507:14
				Uncert: +/-2.82		RPD:	0	N/A	
				TPU: +/-2.82		RER:	0.268	(0-2)	
QC1203377825 379365001 MS									
Carbon-14	3030	U	-0.053	3060	pCi/L	REC:	101	(75%-125%)	
				Uncert: +/-2.82					
				TPU: +/-2.82					
QC1203377826 LCS									
Carbon-14	303			307	pCi/L	REC:	101	(80%-120%)	
				Uncert: +/-15.4					
				TPU: +/-59.0					
Batch	1501809								
QC1203377958 MB									
Tritium			U	-20	pCi/L			GXR1	08/29/1509:10
				Uncert: +/-45.3					
				TPU: +/-45.3					
QC1203377959 379095007 DUP									
Tritium		4980		4850	pCi/L				08/29/1511:13
				Uncert: +/-177		RPD:	3	(0% - 20%)	
				TPU: +/-979		RER:	0.19	(0-2)	
QC1203377960 379095007 MS									
Tritium	1810	4980		6400	pCi/L	REC:	78	(75%-125%)	
				Uncert: +/-177					
				TPU: +/-979					
QC1203377961 LCS									

REC:

## QC Summary

Workorder: 379195

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
<b>Rad Liquid Scintillation</b>										
Batch	1501809									
Tritium	1810			1610	pCi/L	89	(80%-120%)			
	Uncert:			+/-287						
	TPU:			+/-424						

**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  $\geq 2X$  the MDA and, after corrections, result is  $\geq$  MDA for this sample
- 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 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

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.