



September 21, 2015

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

Re: CHPRC SAF F15-028
Work Order: 380339
SDG: GEL380339

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on September 01, 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,

Sarah Edwards for
Heather Shaffer
Project Manager

Purchase Order: 303581 - 7H
Chain of Custody: F15-028-037 and F15-028-042
Enclosures



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Sample Issue Resolution

September 25, 2015

SAMPLE ISSUE RESOLUTION

SIR NUM SIR15-453
REV NUM 0
DATE INITIATED 9/2/2015

SAMPLE EVENT INFORMATION

SAF NUM(S) F15-028
OPERABLE UNIT(S) 100-KR-2
PROJECT(S) 100-KE FSB
SAMPLE EVENT TITLE(S) Characterization Boreholes in UPR-100-K-1 and 1116-KE-3 Waste Sites
LABORATORY GEL Laboratories, LLC

SAMPLING INFORMATION

NUMBER OF SAMPLES 1
SAMPLE NUMBERS B31TW6
SAMPLE MATRIX
COLLECTION DATE -
SDG NUM GEL380339

ISSUE BACKGROUND

CLASS Field Sampling Issue
TYPE Incorrect Sample Preservation
DESCRIPTION The Metals container for B31TW6 was received at a pH of 5 instead of <2.

DISPOSITION

DESCRIPTION The lab will preserve to the correct pH and proceed with analysis.
JUSTIFICATION Final Disposition: Accept proposed resolution.

Submitted by: Heather Shaffer Date: 09/02/15
Accepted by: Scot Fitzgerald

Date: 09/02/2015

Case Narrative

September 25, 2015

General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF F15-028
SDG: GEL380339

September 21, 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 September 01, 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:

Laboratory Identification	Sample Description
380339001	B31TW6
380339002	B31TX1

Case Narrative

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

Data Package

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

Sarah M. Edwards
September 25, 2015

Sarah Edwards for
Heather Shaffer
Project Manager

Chain of Custody and Supporting Documentation

September 25, 2015

SAMPLE RECEIPT & REVIEW FORM

Client: <u>CPRC</u>		SDG/AR/COC/Work Order: <u>380339</u>
Received By: <u>mk</u>		Date Received: <u>9-1-15</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 type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts):
Classified Radioactive II or III by RSO?	<input type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?	<input type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?	<input 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 type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?	<input 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 type="checkbox"/>	<input 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 type="checkbox"/>	<input type="checkbox"/>	Preservation Method: <u>Ice bags</u> Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius <u>2C</u>
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>E5032015830</u> Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's, containers affected and observed pH: If Preservation added, Lot#: <u>* see Below</u>
6 Do Low Level Perchlorate samples have headspace as required?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's and containers affected:
7 VOA vials contain acid preservation?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(If unknown, select No)
8 VOA vials free of headspace (defined as < 6mm bubble)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's and containers affected:
9 Are Encore containers present?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
10 Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
11 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
12 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
13 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
14 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
15 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
16 Carrier and tracking number.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: <u>FedEx Air</u> FedEx Ground UPS Field Services Courier Other <u>7744 0638 9562</u>

Comments (Use Continuation Form if needed):
* METALS BOTTLE FOR B31TW6 pH = 5

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 21 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

September 25, 2015

Metals

Technical Case Narrative

CH2MHill Plateau Remediation Company (CPRC)

SDG #: GEL380339

Work Order #: 380339

Sample ID	Client ID
380339001	B31TW6
380339002	B31TX1
1203385294	Method Blank (MB)ICP
1203385295	Laboratory Control Sample (LCS)
1203385298	380339001(B31TW6L) Serial Dilution (SD)
1203385296	380339001(B31TW6S) Matrix Spike (MS)
1203385297	380339001(B31TW6SD) Matrix Spike Duplicate (MSD)

Sample Analysis

Samples 380339 001 and 002 in this SDG were analyzed for metals on an "as received" basis.

Method/Analysis Information

Analytical Batch:	1504584
Prep Batch :	1504583
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

September 25, 2015

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: 380339001 (B31TW6).

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

September 25, 2015

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 25, 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: GEL380339 GEL Work Order: 380339

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- D Results are reported from a diluted aliquot of sample.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

Review/Validation

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

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

Signature: 

Name: Nik-Cole Elmore

Date: 25 SEP 2015

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL380339

METHOD TYPE: SW846

SAMPLE ID: 380339001

CLIENT ID: B31TW6

CONTRACT: CPRC0F15028

MATRIX: WATER

DATE RECEIVED 01-SEP-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>
7440-47-3	Chromium	1	ug/L	U		P	1	1	OPTIMA3	090215A-1

*Analytical Methods:

P SW846 3005A/6010C

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL380339

METHOD TYPE: SW846

SAMPLE ID: 380339002

CLIENT ID: B31TX1

CONTRACT: CPRC0F15028

MATRIX: WATER

DATE RECEIVED 01-SEP-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>
7440-47-3	Chromium	1	ug/L	U		P	1	1	OPTIMA3	090215A-1

*Analytical Methods:

P SW846 3005A/6010C

Quality Control Summary

September 25, 2015
GEL LABORATORIES LLC

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

QC Summary

Report Date: September 25, 2015

Page 1 of 2

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 380339

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1504584										
QC1203385295	LCS										
Chromium	500			496	ug/L		99.1	(80%-120%)	HSC	09/02/15	12:44
QC1203385294	MB										
Chromium			U	ND	ug/L					09/02/15	12:41
QC1203385296	380339001	MS									
Chromium	500	U	ND	485	ug/L		96.9	(75%-125%)		09/02/15	12:54
QC1203385297	380339001	MSD									
Chromium	500	U	ND	484	ug/L	0.31	96.6	(0%-20%)		09/02/15	12:57
QC1203385298	380339001	SDILT									
Chromium		U	ND DU	ND	ug/L	N/A		(0%-10%)		09/02/15	13:00

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

September 25, 2015
GEL LABORATORIES LLC

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

QC Summary

Workorder: 380339

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

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 #: GEL380339
Work Order #: 380339**

Method/Analysis Information

Product: Alkalinity
Analytical Batch: 1506381 **Method:** 2320_ALKALINITY: COMMON + (ADD ON)

Sample Analysis

The following samples were analyzed using the analytical protocol as established in 2320_ALKALINITY:

Sample ID	Client ID
380339001	B31TW6
380339002	B31TX1
1203389817	Method Blank (MB)
1203389818	Laboratory Control Sample (LCS)
1203389819	380436001(B31TX4) Sample Duplicate (DUP)
1203389822	380343002(B32CB2) Sample Duplicate (DUP)

Samples 380339 001 and 002 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-033 REV# 11.

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 Titration and Ion analysis was performed on a manually operated buret.

Initial Standardization

The titrant was properly standardized

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

Samples 380343002 (B32CB2) and 380436001 (B31TX4) were selected for QC analysis.

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 25, 2015

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL380339 GEL Work Order: 380339

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: Thomas Lewis

Date: 24 SEP 2015

Title: Data Validator

Sample Data Summary

Certificate of Analysis

Report Date: September 24, 2015

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F15-028

Client Sample ID: B31TW6	Project: CPRC0F15028
Sample ID: 380339001	Client ID: CPRC001
Matrix: WATER	
Collect Date: 31-AUG-15 10:10	
Receive Date: 01-SEP-15	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Titration and Ion Analysis											
2320_ALKALINITY: COMMON + (ADD ON) "As Received"											
Alkalinity, Total as CaCO3		108000	725	1000	ug/L		AMB	09/10/15	1602	1506381	1
Bicarbonate alkalinity (CaCO3)		108000	725	1000	ug/L						
Carbonate alkalinity (CaCO3)	U	725	725	1000	ug/L						
Hydroxide alkalinity as CaCO3	U	725	725	1000	ug/L						

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	2320_ALKALINITY	

Notes:

Certificate of Analysis

Report Date: September 24, 2015

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F15-028

Client Sample ID: B31TX1	Project: CPRC0F15028
Sample ID: 380339002	Client ID: CPRC001
Matrix: WATER	
Collect Date: 31-AUG-15 10:10	
Receive Date: 01-SEP-15	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Titration and Ion Analysis											
2320_ALKALINITY: COMMON + (ADD ON) "As Received"											
Alkalinity, Total as CaCO3		107000	725	1000	ug/L		AMB	09/10/15	1605	1506381	1
Bicarbonate alkalinity (CaCO3)		107000	725	1000	ug/L						
Carbonate alkalinity (CaCO3)	U	725	725	1000	ug/L						
Hydroxide alkalinity as CaCO3	U	725	725	1000	ug/L						

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	2320_ALKALINITY	

Notes:

Quality Control Summary

September 25, 2015
GEL LABORATORIES LLC

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

QC Summary

Report Date: September 24, 2015

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CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 380339

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
Batch	1506381										
QC1203389819	380436001	DUP									
Alkalinity, Total as CaCO3		90300		90800	ug/L	0.554		(0%-20%)	AMB	09/10/15	16:57
Bicarbonate alkalinity (CaCO3)		90300		90800	ug/L	0.554		(0%-20%)			
Carbonate alkalinity (CaCO3)	U	725	U	725	ug/L	N/A					
Hydroxide alkalinity as CaCO3	U	725	U	725	ug/L	N/A					
QC1203389822	380343002	DUP									
Alkalinity, Total as CaCO3		106000		107000	ug/L	0.471		(0%-20%)		09/10/15	16:09
Bicarbonate alkalinity (CaCO3)		106000		107000	ug/L	0.471		(0%-20%)			
Carbonate alkalinity (CaCO3)	U	725	U	725	ug/L	N/A					
Hydroxide alkalinity as CaCO3	U	725	U	725	ug/L	N/A					
QC1203389818	LCS										
Alkalinity, Total as CaCO3	50000			52700	ug/L		105	(90%-110%)		09/10/15	15:39
QC1203389817	MB										
Alkalinity, Total as CaCO3			U	725	ug/L					09/10/15	15:30
Bicarbonate alkalinity (CaCO3)			U	725	ug/L						
Carbonate alkalinity (CaCO3)			U	725	ug/L						
Hydroxide alkalinity as CaCO3			U	725	ug/L						

Notes:

The Qualifiers in this report are defined as follows:

- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.

September 25, 2015
GEL LABORATORIES LLC

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

QC Summary

Workorder: 380339

Page 2 of 2

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

September 25, 2015

Radiochemistry

Technical Case Narrative

CH2M Hill Plateau Remediation Company (CPRC)

SDG #: GEL380339

Work Order #: 380339

Method/Analysis Information

Product: UISO_PLATE_AEA:COMMON

Analytical Method: UISO_IE_PRECIP_AEA

Analytical Batch Number: 1504653

Sample ID	Client ID
380339001	B31TW6
380339002	B31TX1
1203385526	Method Blank (MB)
1203385528	Laboratory Control Sample (LCS)
1203385527	380339001(B31TW6) Sample Duplicate (DUP)

Samples 380339 001 and 002 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-011 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 volumes in this batch.

Designated QC

The following sample was used for QC: 380339001 (B31TW6).

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 high relative percent difference/relative error ratio. 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.

Manual Integration

No manual integrations were performed on data in this batch.

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: PUIISO_PLATE_AEA:COMMON

Analytical Method: PUIISO_PLATE_AEA

Analytical Batch Number: 1504654

Sample ID	Client ID
380339001	B31TW6
380339002	B31TX1
1203385529	Method Blank (MB)
1203385531	Laboratory Control Sample (LCS)
1203385530	380339001(B31TW6) Sample Duplicate (DUP)

Samples 380339 001 and 002 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-011 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: 380339001 (B31TW6).

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

Sample 380339002 (B31TX1) was recounted due to a peak shift. The recount is 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.

Manual Integration

No manual integrations were performed on data in this batch.

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: AMCMISO_EIE_PRECIP_AEA: COMMON
Analytical Method: AMCMISO_EIE_PREC_AEA
Analytical Batch Number: 1504655

Sample ID	Client ID
380339001	B31TW6
380339002	B31TX1
1203385532	Method Blank (MB)
1203385534	Laboratory Control Sample (LCS)
1203385533	380339001(B31TW6) Sample Duplicate (DUP)

Samples 380339 001 and 002 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-011 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: 380339001 (B31TW6).

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

Sample 1203385533 (B31TW6DUP) was recounted due to poor resolution. The recount is 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.

Manual Integration

No manual integrations were performed on data in this batch.

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: I129_SEP_LEPS_GS: COMMON
Analytical Method: DOE EML HASL-300,I-01 Modified
Analytical Batch Number: 1504214

Sample ID	Client ID
380339001	B31TW6
380339002	B31TX1
1203384335	Method Blank (MB)
1203384338	Laboratory Control Sample (LCS)
1203384336	380251001(B31TW8) Sample Duplicate (DUP)
1203384337	380251001(B31TW8) Matrix Spike (MS)

Samples 380339 001 and 002 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-006 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: 380251001 (B31TW8).

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

September 25, 2015

Product: GAMMA_GS:COMMON (Cs137,Co60,Eu152,Eu154,Eu155)

Analytical Method: 901.1_GAMMA_GS

Analytical Batch Number: 1505824

Sample ID	Client ID
380339001	B31TW6
380339002	B31TX1
1203388290	Method Blank (MB)
1203388293	Laboratory Control Sample (LCS)
1203388291	380339001(B31TW6) Sample Duplicate (DUP)

Samples 380339 001 and 002 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: 380339001 (B31TW6).

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: SRTOT_SEP_PRECIP_GPC: COMMON
Analytical Method: SRTOT_SEP_PRECIP_GPC
Analytical Batch Number: 1506138

Sample ID	Client ID
380339001	B31TW6
380339002	B31TX1
1203389202	Method Blank (MB)
1203389204	Laboratory Control Sample (LCS)
1203389203	380709001(B31TX7) Sample Duplicate (DUP)

Samples 380339 001 and 002 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: 380709001 (B31TX7).

QC Information

All of the QC samples meet the required acceptance limits with the following exceptions: The sample and the duplicate, 1203389203 (B31TX7DUP) , did not meet the relative percent difference requirement; however, they do meet the relative error ratio requirement with a value of 1.77.

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 prep or reanalysis.

Chemical Recoveries

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

Recounts

Sample 1203389202 (MB) was recounted due to a suspected blank false positive. The recount is reported.
Sample 1203389203 (B31TX7DUP) was recounted due to high relative percent difference/relative error ratio.
The recount is 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

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: 1505369

Sample ID	Client ID
380339001	B31TW6
380339002	B31TX1
1203387208	Method Blank (MB)
1203387211	Laboratory Control Sample (LCS)
1203387209	380436001(B31TX4) Sample Duplicate (DUP)
1203387210	380525003(B32CJ6) Sample Duplicate (DUP)

Samples 380339 001 and 002 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 samples were used for QC: 380436001 (B31TX4) and 380525003 (B32CJ6).

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: 1506248

Sample ID	Client ID
380339001	B31TW6
380339002	B31TX1
1203389510	Method Blank (MB)
1203389513	Laboratory Control Sample (LCS)
1203389511	380709001(B31TX7) Sample Duplicate (DUP)
1203389512	380709001(B31TX7) Matrix Spike (MS)

Samples 380339 001 and 002 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: 380709001 (B31TX7).

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 380339001 (B31TW6) and 380339002 (B31TX1) were recounted to verify sample results. The recount results are similar to the original results. Original results 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, 1203389512 (B31TX7MS), aliquot was reduced to conserve sample volume.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: TRITIUM_DIST_LSC: COMMON
Analytical Method: TRITIUM_DIST_LSC
Analytical Batch Number: 1507565

Sample ID	Client ID
380339001	B31TW6
380339002	B31TX1
1203393075	Method Blank (MB)
1203393080	Laboratory Control Sample (LCS)
1203393076	380994002(B31TY6) Sample Duplicate (DUP)
1203393078	380994002(B31TY6) Matrix Spike (MS)

Samples 380339 001 and 002 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: 380994002 (B31TY6).

QC Information

All of the QC samples meet the required acceptance limits with the following exceptions: The blank, 1203393075 (MB), did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots. All other samples met the detection 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 low recovery. 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

Additional comments were not required for this sample set.

September 25, 2015

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 25, 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: GEL380339 GEL Work Order: 380339

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: 25 SEP 2015

Title: Analyst II

Sample Data Summary

September 25, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL380339	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 380339001	Date Collected: 08/31/2015 10:10	Matrix: WATER
	Date Received: 09/01/2015 08:50	
Client ID: B31TW6	Method: UIISO_IE_PRECIP_AEA	Prep Basis: "As Received"
Batch ID: 1504653	Analyst: MXS2	SOP Ref: GL-RAD-A-011
Run Date: 09/17/2015 16:23	Aliquot: 0.1 L	Instrument: 1009
Data File: S0380339001_UU.2A.gcnf	Prep Method: DOE EML HASL-300, U-02-R	Count Time: 359.9998 min
Prep Batch: 1504653		
Prep Date: 09/15/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
U-233/234 <small>13968-55-3/13966-29-5</small>	Uranium-233/234		1.22	pCi/L	+/-0.500	0.532	0.153	1.00
15117-96-1/13982-7	Uranium-235/236	U	0.269	pCi/L	+/-0.312	0.314	0.394	1.00
7440-61-1	Uranium-238		0.607	pCi/L	+/-0.380	0.390	0.356	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	15.3	21.2	pCi/L	72.1	(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 25, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL380339	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 380339001	Date Collected: 08/31/2015 10:10	Matrix: WATER
	Date Received: 09/01/2015 08:50	
Client ID: B31TW6	Method: PUIISO_PLATE_AEA	Prep Basis: "As Received"
Batch ID: 1504654	Analyst: MXS2	SOP Ref: GL-RAD-A-011
Run Date: 09/16/2015 15:32	Aliquot: 0.1 L	Instrument: 1210
Data File: S0380339001_PU.1A.gcnf	Prep Method: DOE EML HASL-300, Pu-11-	Count Time: 505 min
Prep Batch: 1504654		
Prep Date: 09/15/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	0.0205	pCi/L	+/-0.129	0.129	0.243	1.00
OER-100-70	Plutonium-239/240	U	0.0397	pCi/L	+/-0.234	0.234	0.460	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	16.8	19.8	pCi/L	84.8	(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 25, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL380339	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 380339001	Date Collected: 08/31/2015 10:10	Matrix: WATER
	Date Received: 09/01/2015 08:50	
Client ID: B31TW6	Method: AMCMISO_EIE_PREC_AEA	Prep Basis: "As Received"
Batch ID: 1504655	Analyst: MXS2	SOP Ref: GL-RAD-A-011
Run Date: 09/16/2015 09:31	Aliquot: 0.1 L	Instrument: 1078
Data File: S0380339001_AM.1A.gcnf	Prep Method: DOE EML HASL-300, Am-05	Count Time: 239.9998 min
Prep Batch: 1504655		
Prep Date: 09/15/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	-0.0349	pCi/L	+/-0.155	0.155	0.403	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	16.9	21.4	pCi/L	79.1	(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 25, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL380339	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 380339001	Date Collected: 08/31/2015 10:10	Matrix: WATER
	Date Received: 09/01/2015 08:50	
Client ID: B31TW6	Method: SRTOT_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1506138	Analyst: KSD1	SOP Ref: GL-RAD-A-004
Run Date: 09/22/2015 13:01	Aliquot: 300 mL	Instrument: LB4100H2
Data File: S1506138r1.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1506138		
Prep Date: 09/18/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium		20.1	pCi/L	+/-2.32	5.18	1.80	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	7.90	8.10	mg	97.5	(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 25, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL380339	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 380339001	Date Collected: 08/31/2015 10:10	Matrix: WATER
	Date Received: 09/01/2015 08:50	
Client ID: B31TW6	Method: DOE EML HASL-300,I-01 Mo	Prep Basis: "As Received"
Batch ID: 1504214	Analyst: MJH1	SOP Ref: GL-RAD-A-006
Run Date: 09/11/2015 13:59	Aliquot: 0.3 L	Instrument: GAM21
Data File: I380339001.CNF;1	Prep Method: DOE EML HASL-300,I-01 M	Count Time: 60 min
Prep Batch: 1504214		
Prep Date: 09/10/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129	U	1.08	pCi/L	+/-2.34	2.39	4.36	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 25, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL380339
 Lab Sample ID: 380339001

 Client ID: B31TW6
 Batch ID: 1505824
 Run Date: 09/11/2015 15:36
 Data File: G380339001.CNF;1
 Prep Batch: 1505824
 Prep Date: 09/11/2015 00:00

Client: CPRC001
 Date Collected: 08/31/2015 10:10
 Date Received: 09/01/2015 08:50

 Method: 901.1_GAMMA_GS
 Analyst: MJH1
 Aliquot: 2 L
 Prep Method: EPA 901.1

Project: CPRC0F15028
 Matrix: WATER

 Prep Basis: "As Received"
 SOP Ref: GL-RAD-A-013
 Instrument: GAM04
 Count Time: 120 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137	U	1.45	pCi/L	+/-2.96	3.03	6.08	10.0
10198-40-0	Cobalt-60	U	-1.67	pCi/L	+/-3.26	3.35	5.95	
14683-23-9	Europium-152	U	4.93	pCi/L	+/-8.26	8.57	16.3	
15585-10-1	Europium-154	U	-2.98	pCi/L	+/-8.81	8.91	16.7	
14391-16-3	Europium-155	U	11.0	pCi/L	+/-11.1	12.2	21.3	

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 25, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL380339	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 380339001	Date Collected: 08/31/2015 10:10	Matrix: WATER
	Date Received: 09/01/2015 08:50	
Client ID: B31TW6	Method: TC99_EIE_LSC	Prep Basis: "As Received"
Batch ID: 1505369	Analyst: MYM1	SOP Ref: GL-RAD-A-059
Run Date: 09/20/2015 13:53	Aliquot: 300 mL	Instrument: LSCGREEN
Data File: E1505369.xls	Prep Method: DOE EML HASL-300, Tc-02-	Count Time: 40 min
Prep Batch: 1505369		
Prep Date: 09/15/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	0.669	pCi/L	+/-5.34	5.34	9.18	15.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	99100	97200	CPM	102	(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 25, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL380339	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 380339001	Date Collected: 08/31/2015 10:10	Matrix: WATER
	Date Received: 09/01/2015 08:50	
Client ID: B31TW6	Method: C14_LSC	Prep Basis: "As Received"
Batch ID: 1506248	Analyst: GXR1	SOP Ref: GL-RAD-A-003
Run Date: 09/23/2015 04:25	Aliquot: 300 mL	Instrument: LSCTEAL
Data File: C1506248.xls	Prep Method: EPA EERF C-01 Modified	Count Time: 24.283332824707 min
Prep Batch: 1506248		
Prep Date: 09/22/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14		865	pCi/L	+/-17.5	162	5.72	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 25, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL380339	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 380339001	Date Collected: 08/31/2015 10:10	Matrix: WATER
	Date Received: 09/01/2015 08:50	
Client ID: B31TW6	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1507565	Analyst: GXR1	SOP Ref: GL-RAD-A-002
Run Date: 09/21/2015 11:41	Aliquot: 50 mL	Instrument: LSCPINK
Data File: T1507565R.xls	Prep Method: EPA 906.0 Modified	Count Time: 120.0297 min
Prep Batch: 1507565		
Prep Date: 09/17/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		170	pCi/L	+/-72.5	79.7	108	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).

September 25, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL380339	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 380339002	Date Collected: 08/31/2015 10:10	Matrix: WATER
	Date Received: 09/01/2015 08:50	
Client ID: B31TX1	Method: UIISO_IE_PRECIP_AEA	Prep Basis: "As Received"
Batch ID: 1504653	Analyst: MXS2	SOP Ref: GL-RAD-A-011
Run Date: 09/17/2015 16:23	Aliquot: 0.1 L	Instrument: 1010
Data File: S0380339002_UU.2A.gcnf	Prep Method: DOE EML HASL-300, U-02-R	Count Time: 359.9998 min
Prep Batch: 1504653		
Prep Date: 09/15/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
U-233/234 <small>13968-55-3/13966-29-5</small>	Uranium-233/234		1.44	pCi/L	+/-0.566	0.604	0.417	1.00
15117-96-1/13982-7	Uranium-235/236		0.483	pCi/L	+/-0.377	0.384	0.335	1.00
7440-61-1	Uranium-238		1.17	pCi/L	+/-0.507	0.536	0.358	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	16.5	21.2	pCi/L	78	(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 25, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL380339	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 380339002	Date Collected: 08/31/2015 10:10	Matrix: WATER
	Date Received: 09/01/2015 08:50	
Client ID: B31TX1	Method: PUIISO_PLATE_AEA	Prep Basis: "As Received"
Batch ID: 1504654	Analyst: MXS2	SOP Ref: GL-RAD-A-011
Run Date: 09/17/2015 15:22	Aliquot: 0.1 L	Instrument: 1222
Data File: S0380339002_PU.2A.gcnf	Prep Method: DOE EML HASL-300, Pu-11-	Count Time: 505 min
Prep Batch: 1504654		
Prep Date: 09/15/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	0.0966	pCi/L	+/-0.286	0.286	0.518	1.00
OER-100-70	Plutonium-239/240	U	0.259	pCi/L	+/-0.367	0.368	0.568	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	10.8	19.8	pCi/L	54.5	(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 25, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL380339	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 380339002	Date Collected: 08/31/2015 10:10	Matrix: WATER
	Date Received: 09/01/2015 08:50	
Client ID: B31TX1	Method: AMCMISO_EIE_PREC_AEA	Prep Basis: "As Received"
Batch ID: 1504655	Analyst: MXS2	SOP Ref: GL-RAD-A-011
Run Date: 09/16/2015 09:31	Aliquot: 0.1 L	Instrument: 1080
Data File: S0380339002_AM.1A.gcnf	Prep Method: DOE EML HASL-300, Am-05	Count Time: 239.9998 min
Prep Batch: 1504655		
Prep Date: 09/15/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	-0.0325	pCi/L	+/-0.144	0.144	0.375	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	17.6	21.4	pCi/L	82.1	(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 25, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL380339	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 380339002	Date Collected: 08/31/2015 10:10	Matrix: WATER
	Date Received: 09/01/2015 08:50	
Client ID: B31TX1	Method: SRTOT_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1506138	Analyst: KSD1	SOP Ref: GL-RAD-A-004
Run Date: 09/22/2015 13:01	Aliquot: 300 mL	Instrument: LB4100H3
Data File: S1506138r1.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1506138		
Prep Date: 09/18/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium		13.4	pCi/L	+/-1.93	3.65	1.80	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	8.20	8.10	mg	101	(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 25, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL380339	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 380339002	Date Collected: 08/31/2015 10:10	Matrix: WATER
	Date Received: 09/01/2015 08:50	
Client ID: B31TX1	Method: DOE EML HASL-300,I-01 Mo	Prep Basis: "As Received"
Batch ID: 1504214	Analyst: MJH1	SOP Ref: GL-RAD-A-006
Run Date: 09/11/2015 14:00	Aliquot: 0.3 L	Instrument: XRAY1
Data File: I380339002.CNF;1	Prep Method: DOE EML HASL-300,I-01 M	Count Time: 60 min
Prep Batch: 1504214		
Prep Date: 09/10/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129	U	-2.34	pCi/L	+/-3.04	3.23	4.94	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 25, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL380339
 Lab Sample ID: 380339002

 Client ID: B31TX1
 Batch ID: 1505824
 Run Date: 09/12/2015 10:02
 Data File: G380339002.CNF;1
 Prep Batch: 1505824
 Prep Date: 09/11/2015 00:00

Client: CPRC001
 Date Collected: 08/31/2015 10:10
 Date Received: 09/01/2015 08:50

 Method: 901.1_GAMMA_GS
 Analyst: MJH1
 Aliquot: 2 L
 Prep Method: EPA 901.1

Project: CPRC0F15028
 Matrix: WATER

 Prep Basis: "As Received"
 SOP Ref: GL-RAD-A-013
 Instrument: GAM24
 Count Time: 120 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137	U	1.93	pCi/L	+/-2.53	2.68	5.09	10.0
10198-40-0	Cobalt-60	U	-0.872	pCi/L	+/-3.16	3.18	5.59	
14683-23-9	Europium-152	U	1.97	pCi/L	+/-7.91	7.96	14.9	
15585-10-1	Europium-154	U	-1.37	pCi/L	+/-7.10	7.12	13.3	
14391-16-3	Europium-155	U	4.34	pCi/L	+/-10.4	10.6	16.9	

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 25, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL380339	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 380339002	Date Collected: 08/31/2015 10:10	Matrix: WATER
	Date Received: 09/01/2015 08:50	
Client ID: B31TX1	Method: TC99_EIE_LSC	Prep Basis: "As Received"
Batch ID: 1505369	Analyst: MYM1	SOP Ref: GL-RAD-A-059
Run Date: 09/20/2015 14:35	Aliquot: 300 mL	Instrument: LSCGREEN
Data File: E1505369.xls	Prep Method: DOE EML HASL-300, Tc-02-	Count Time: 40 min
Prep Batch: 1505369		
Prep Date: 09/15/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	0.126	pCi/L	+/-5.24	5.24	9.04	15.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	97700	97200	CPM	101	(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 25, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL380339	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 380339002	Date Collected: 08/31/2015 10:10	Matrix: WATER
	Date Received: 09/01/2015 08:50	
Client ID: B31TX1	Method: C14_LSC	Prep Basis: "As Received"
Batch ID: 1506248	Analyst: GXR1	SOP Ref: GL-RAD-A-003
Run Date: 09/23/2015 04:50	Aliquot: 300 mL	Instrument: LSCTEAL
Data File: C1506248.xls	Prep Method: EPA EERF C-01 Modified	Count Time: 24.5 min
Prep Batch: 1506248		
Prep Date: 09/22/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14		868	pCi/L	+/-17.6	162	5.75	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 25, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL380339	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 380339002	Date Collected: 08/31/2015 10:10	Matrix: WATER
	Date Received: 09/01/2015 08:50	
Client ID: B31TX1	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1507565	Analyst: GXR1	SOP Ref: GL-RAD-A-002
Run Date: 09/21/2015 13:43	Aliquot: 50 mL	Instrument: LSCPINK
Data File: T1507565R.xls	Prep Method: EPA 906.0 Modified	Count Time: 120.0297 min
Prep Batch: 1507565		
Prep Date: 09/17/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		131	pCi/L	+/-69.5	73.9	107	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

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

QC Summary

Report Date: September 25, 2015
Page 1 of 6

Client : CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Workorder: 380339

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1504653								
QC1203385526	MB								
Uranium-233/234			U	0.329	pCi/L			MXS2	09/17/1516:23
				Uncert: +/-0.404					
				TPU: +/-0.407					
Uranium-235/236			U	0.472	pCi/L				
				Uncert: +/-0.413					
				TPU: +/-0.419					
Uranium-238			U	0.161	pCi/L				
				Uncert: +/-0.254					
				TPU: +/-0.255					
**Uranium-232 Tracer	21.2			15.3	pCi/L	REC: 72	(15%-125%)		
				Uncert: +/-2.16					
				TPU: +/-3.85					
QC1203385527	380339001	DUP							
Uranium-233/234		1.22		1.24	pCi/L				
				Uncert: +/-0.500		RPD: 2	(0% - 20%)		
				TPU: +/-0.532		RER: 0.0558	(0-2)		
Uranium-235/236		U 0.269	U	0.275	pCi/L				
				Uncert: +/-0.312		RPD: 0	N/A		
				TPU: +/-0.314		RER: 0.0263	(0-2)		
Uranium-238		0.607		0.807	pCi/L				
				Uncert: +/-0.380		RPD: 28	(0% - 100%)		
				TPU: +/-0.390		RER: 0.665	(0-2)		
**Uranium-232 Tracer	21.2	15.3		18.8	pCi/L	REC: 89	(15%-125%)		
				Uncert: +/-2.07					
				TPU: +/-3.75					
QC1203385528	LCS								
Uranium-233/234				28.9	pCi/L				09/17/1516:23
				Uncert: +/-2.44					
				TPU: +/-4.93					
Uranium-235/236				1.61	pCi/L				
				Uncert: +/-0.666					
				TPU: +/-0.707					
Uranium-238	27.2			29.0	pCi/L	REC: 107	(80%-120%)		
				Uncert: +/-2.45					
				TPU: +/-4.96					
**Uranium-232 Tracer	21.2			17.6	pCi/L	REC: 83	(15%-125%)		
				Uncert: +/-2.09					
				TPU: +/-3.77					
Batch	1504654								
QC1203385529	MB								
Plutonium-238			U	0.110	pCi/L			MXS2	09/16/1515:32
				Uncert: +/-0.237					
				TPU: +/-0.238					

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1504654								
Plutonium-239/240			U	-0.0571	pCi/L				
				Uncert: +/-0.238					
				TPU: +/-0.238					
**Plutonium-242 Tracer	19.8			12.3	pCi/L	REC: 62	(15%-125%)		
				Uncert: +/-2.07					
				TPU: +/-3.12					
QC1203385530 380339001 DUP									
Plutonium-238		U 0.0205	U	0.0757	pCi/L				09/16/1515:31
				Uncert: +/-0.129		RPD: 0	N/A		
				TPU: +/-0.129		RER: 0.419	(0-2)		
Plutonium-239/240		U 0.0397	U	0.101	pCi/L				
				Uncert: +/-0.234		RPD: 0	N/A		
				TPU: +/-0.234		RER: 0.35	(0-2)		
**Plutonium-242 Tracer	19.8	16.8		13.8	pCi/L	REC: 70	(15%-125%)		
				Uncert: +/-1.78					
				TPU: +/-2.74					
QC1203385531 LCS									
Plutonium-238			U	0.161	pCi/L				09/16/1515:31
				Uncert: +/-0.228					
				TPU: +/-0.229					
Plutonium-239/240	19.7			20.1	pCi/L	REC: 102	(80%-120%)		
				Uncert: +/-1.78					
				TPU: +/-2.76					
**Plutonium-242 Tracer	19.8			16.9	pCi/L	REC: 86	(15%-125%)		
				Uncert: +/-1.77					
				TPU: +/-2.73					
Batch	1504655								
QC1203385532 MB									
Americium-241			U	-0.0788	pCi/L			MXS2	09/16/1509:31
				Uncert: +/-0.149					
				TPU: +/-0.149					
**Americium-243 Tracer	21.4			20.3	pCi/L	REC: 95	(15%-125%)		
				Uncert: +/-2.31					
				TPU: +/-3.48					
QC1203385533 380339001 DUP									
Americium-241		U -0.0349	U	0.0295	pCi/L				09/17/1514:59
				Uncert: +/-0.155		RPD: 0	N/A		
				TPU: +/-0.155		RER: 0.366	(0-2)		
**Americium-243 Tracer	21.4	16.9		14.6	pCi/L	REC: 68	(15%-125%)		
				Uncert: +/-2.44					
				TPU: +/-3.64					
QC1203385534 LCS									
Americium-241	19.7			19.1	pCi/L	REC: 97	(80%-120%)		09/16/1509:31
				Uncert: +/-2.31					
				TPU: +/-3.33					
**Americium-243 Tracer	21.4			17.7	pCi/L	REC: 83	(15%-125%)		
				Uncert: +/-2.42					
				TPU: +/-3.62					
Rad Gamma Spec									
Batch	1504214								

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1504214								
QC1203384335	MB								
Iodine-129			U	-0.0468	pCi/L			MJH1	09/11/1515:32
				Uncert: +/-0.390					
				TPU: +/-0.390					
QC1203384336	380251001	DUP							
Iodine-129		U	0.114	U	0.240				09/11/1515:32
				Uncert: +/-1.66		RPD: 0	N/A		
				TPU: +/-1.66		RER: 0.112	(0-2)		
QC1203384337	380251001	MS							
Iodine-129		139	U	0.114	132	pCi/L	REC: 95 (75%-125%)		09/11/1515:33
				Uncert: +/-1.66					
				TPU: +/-1.66					
QC1203384338	LCS								
Iodine-129		27.7			26.2	pCi/L	REC: 94 (80%-120%)		09/11/1515:33
				Uncert: +/-2.16					
				TPU: +/-3.39					
Batch	1505824								
QC1203388290	MB								
Cesium-137			U	-0.526	pCi/L			MJH1	09/14/1509:34
				Uncert: +/-2.44					
				TPU: +/-2.45					
Cobalt-60			U	1.88	pCi/L				
				Uncert: +/-2.78					
				TPU: +/-2.91					
Europium-152			U	-4.93	pCi/L				
				Uncert: +/-6.97					
				TPU: +/-7.33					
Europium-154			U	-1.83	pCi/L				
				Uncert: +/-6.46					
				TPU: +/-6.52					
Europium-155			U	-1.56	pCi/L				
				Uncert: +/-7.53					
				TPU: +/-7.57					
QC1203388291	380339001	DUP							
Cesium-137		U	1.45	U	1.85	pCi/L			09/14/1509:38
				Uncert: +/-2.96		RPD: 0	N/A		
				TPU: +/-3.03		RER: 0.166	(0-2)		
Cobalt-60		U	-1.67	U	1.68	pCi/L			
				Uncert: +/-3.26		RPD: 0	N/A		
				TPU: +/-3.35		RER: 1.39	(0-2)		
Europium-152		U	4.93	U	-3.67	pCi/L			
				Uncert: +/-8.26		RPD: 0	N/A		
				TPU: +/-8.57		RER: 1.3	(0-2)		
Europium-154		U	-2.98	U	6.33	pCi/L			
				Uncert: +/-8.81		RPD: 0	N/A		
				TPU: +/-8.91		RER: 1.6	(0-2)		
Europium-155		U	11.0	U	2.43	pCi/L			
				Uncert: +/-11.1		RPD: 0	N/A		
				TPU: +/-12.2		RER: 0.977	(0-2)		
QC1203388293	LCS								

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1505824								
Americium-241	34400			37600	pCi/L	REC: 109	(80%-120%)		
	Uncert:			+/-1270					
	TPU:			+/-4860					
Cesium-137	13700			14000	pCi/L	REC: 102	(80%-120%)		
	Uncert:			+/-327					
	TPU:			+/-1220					
Cobalt-60	15000			15200	pCi/L	REC: 102	(80%-120%)		
	Uncert:			+/-381					
	TPU:			+/-1240					
Europium-152			U	-44.2	pCi/L				
	Uncert:			+/-199					
	TPU:			+/-200					
Europium-154			U	63.0	pCi/L				
	Uncert:			+/-129					
	TPU:			+/-132					
Europium-155			U	53.0	pCi/L				
	Uncert:			+/-262					
	TPU:			+/-264					
Rad Gas Flow									
Batch	1506138								
QC1203389202	MB								
Total Strontium			U	1.65	pCi/L			KSD1	09/22/1515:22
	Uncert:			+/-1.19					
	TPU:			+/-1.25					
**Strontium Carrier	8.10			8.10	mg	REC: 100	(25%-125%)		
QC1203389203	380709001	DUP							
Total Strontium				27.5	pCi/L				09/23/1508:12
	Uncert:			+/-2.52		RPD: 32*	(0% - 20%)		
	TPU:			+/-6.96		RER: 1.77	(0-2)		
**Strontium Carrier	16.2	8.10		12.8	mg	REC: 79	(25%-125%)		
QC1203389204	LCS								
Total Strontium	72.4			73.9	pCi/L	REC: 102	(80%-120%)		09/22/1513:02
	Uncert:			+/-4.15					
	TPU:			+/-17.5					
**Strontium Carrier	8.10			8.30	mg	REC: 102	(25%-125%)		
Rad Liquid Scintillation									
Batch	1505369								
QC1203387208	MB								
Technetium-99			U	-0.272	pCi/L			MYM1	09/20/1516:43
	Uncert:			+/-5.54					
	TPU:			+/-5.54					
**Technetium-99m Tracer	97200			91200	CPM	REC: 94	(15%-125%)		
QC1203387209	380436001	DUP							
Technetium-99		U	0.794	U	-0.752	pCi/L			09/20/1517:25
	Uncert:		+/-8.09		+/-8.38		RPD: 0	N/A	
	TPU:		+/-8.09		+/-8.38		RER: 0.26	(0-2)	
**Technetium-99m Tracer	97200	97500		94200	CPM	REC: 97	(15%-125%)		
QC1203387210	380525003	DUP							
Technetium-99		U	2.64	U	4.99	pCi/L			09/20/1518:07

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Liquid Scintillation									
Batch	1505369								
		Uncert:	+/-7.73	+/-8.30					
		TPU:	+/-7.73	+/-8.32		RPD: 0	N/A		
						RER: 0.405	(0-2)		
**Technetium-99m Tracer	97200	98100		96500	CPM	REC: 99	(15%-125%)		
QC1203387211	LCS								
Technetium-99	287			263	pCi/L	REC: 92	(80%-120%)		09/20/1518:49
		Uncert:		+/-10.6					
		TPU:		+/-31.0					
**Technetium-99m Tracer	97200			95400	CPM	REC: 98	(15%-125%)		
Batch	1506248								
QC1203389510	MB								
Carbon-14			U	-0.612	pCi/L			GXR1	09/23/1507:58
		Uncert:		+/-1.91					
		TPU:		+/-1.91					
QC1203389511	380709001	DUP							
Carbon-14		143		130	pCi/L				09/23/1509:59
		Uncert:	+/-3.82	+/-13.6		RPD: 9	(0% - 20%)		
		TPU:	+/-26.8	+/-27.8		RER: 0.647	(0-2)		
QC1203389512	380709001	MS							
Carbon-14	1510	143		1690	pCi/L	REC: 102	(75%-125%)		09/23/1512:00
		Uncert:	+/-3.82	+/-37.9					
		TPU:	+/-26.8	+/-316					
QC1203389513	LCS								
Carbon-14	252			256	pCi/L	REC: 101	(80%-120%)		09/23/1513:11
		Uncert:		+/-5.84					
		TPU:		+/-47.9					
Batch	1507565								
QC1203393075	MB								
Tritium			U	23.8	pCi/L			GXR1	09/22/1509:21
		Uncert:		+/-62.3					
		TPU:		+/-62.5					
QC1203393076	380994002	DUP							
Tritium		133		164	pCi/L				09/22/1511:24
		Uncert:	+/-70.3	+/-73.0		RPD: 21	(0% - 100%)		
		TPU:	+/-74.8	+/-79.6		RER: 0.563	(0-2)		
QC1203393078	380994002	MS							
Tritium	1810	133		1510	pCi/L	REC: 76	(75%-125%)		09/21/1509:03
		Uncert:	+/-70.3	+/-360					
		TPU:	+/-74.8	+/-463					
QC1203393080	LCS								
Tritium	1800			1630	pCi/L	REC: 90	(80%-120%)		09/21/1509:20
		Uncert:		+/-376					
		TPU:		+/-491					

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

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
+	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.