

7/15/2016



July 12, 2016

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

Re: CHPRC SAF S16-006
Work Order: 399651
SDG: GEL399651

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 18, 2016. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,

B Luthman
Brielle Luthman for
Heather Shaffer
Project Manager

Purchase Order: 300071 - 7H
Chain of Custody: S16-006-230, S16-006-283 and S16-006-285
Enclosures



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Sample Issue Resolution

SAMPLE ISSUE RESOLUTION	SIR NUM	SIR16-458
	REV NUM	0
	DATE INITIATED	7/5/2016

SAMPLE EVENT INFORMATION

SAF NUM(S) S16-006
OPERABLE UNIT(S) NONE
PROJECT(S) SURV16
SAMPLE EVENT TITLE(S) SURV16
LABORATORY GEL Laboratories, LLC

SAMPLING INFORMATION

NUMBER OF SAMPLES 2
SAMPLE NUMBERS B35CD8, B35CH0
SAMPLE MATRIX WATER
COLLECTION DATE 6/17/2016 - 6/17/2016
SDG NUM GEL399651

ISSUE BACKGROUND

CLASS Laboratory Issue

TYPE Quality Control Failure

DESCRIPTION The Se-79 batch for the listed SDGs had an LCS recovery of 121% that does not meet the client recovery range of 80-120%; however, it does meet our standard requirement of 125%. All of the sample results in the batch are less than MDA; therefore, this high bias does not impact the data.

DISPOSITION

DESCRIPTION Proposed Resolution: Initiate SIR, report results and include a detailed comment in the case narrative.

JUSTIFICATION Final Disposition: Accept proposed resolution.

SUBMITTED BY: Heather Shaffer DATE: 07/01/2016
ACCEPTED BY: Sarah Nagel DATE: 07/05/2016

Case Narrative

**General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF S16-006
SDG: GEL399651**

July 12, 2016

Laboratory Identification:

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

Summary

Sample receipt

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on June 18, 2016, 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. Please see the enclosed SIR regarding a QC issue for Se79 analysis.

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:

<u>Laboratory Identification</u>	<u>Sample Description</u>
399651001	B359N5
399651002	B359N2
399651003	B35CD8
399651004	B35CH0

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 and Radiochemistry.

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


Brielle Luthman for
Heather Shaffer
Project Manager

Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL399651
Work Order #: 399651

General Chemistry

Alkalinity

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

Quality Control (QC) Information

Method Blank (MB) Statement

The method blank associated with this data was slightly above the normal acceptance limits. The data for sample 1203572189 (MB) was deemed acceptable because the values for all reported samples were more than 10 times the value of the method blank.

Radiochemistry

GAMMA_GS:COMMON + GW 01

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

Quality Control (QC) Information

QC Information

The sample and the duplicate, 1203570526 (B35C93DUP), did not meet the Cs-137 relative error ratio requirement; however, both results are less than their respective MDCs.

I129LL_SEP_LEPS_GS: COMMON (low level)

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

9310_ALPHABETA_GPC: Gross Beta

All sample data provided in this report met the acceptance criteria specified in the analytical methods and

procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Gross Alpha/Beta Preparation Information

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

Recounts

Samples 1203574715 (B35D60MSD) and 1203574716 (LCS) were recounted due to high recovery. The recounts are reported.

Miscellaneous Information

Additional Comments

The matrix spike and matrix spike duplicate, 1203574714 (B35D60MS) and 1203574715 (B35D60MSD), aliquots were reduced to conserve sample volume.

SE79_SEP_IE_LSC: COMMON

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

Quality Control (QC) Information

QC Information

The laboratory control sample 1203570474 (LCS) does not meet the client's LCS requirement of 80-120%; however, it does meet GEL's standard LCS requirement of 75-125%. Reporting results.

Technical Information

Recounts

Sample 1203570474 (LCS) was recounted due to high recovery. The recount is reported.

Miscellaneous Information

TC99_EIE_LSC: COMMON

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

TRITIUM_DIST_LSC: COMMON

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

C14_LSC: COMMON

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

Technical Information

Recounts

Sample 399651003 (B35CD8) was recounted due to the quench number being outside the calibration range. The recount is reported.

Certification Statement

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

Chain of Custody and Supporting Documentation

83105

CH2M Hill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # **S16-006-283** Page 1 of 1

Collector: **Will Wise CHPRC** Telephone No. **509-376-4650**

SAF No. **S16-006** Contact/Requester: **Karen Waters-Husted** Purchase Order/Charge Code: **300071**

Project Title: **SURV, JUNE 2016** Sampling Origin: **Hanford Site** Ice Chest No. **6005-513**

Shipped To (Lab): **GEL Laboratories, LLC** Logbook No. **HNF-N-506 86132** Bill of Lading/Air Bill No. **7765 5216 0106**

Protocol: **SURV** Priority: **30 Days** Method of Shipment: **Commercial Carrier** Offsite Property No. **6742**

PRIORITY

SPECIAL INSTRUCTIONS Hold Time: Total Activity Exemption: Yes No

POSSIBLE SAMPLE HAZARDS/REMARKS N/A

*** 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
B35CD8	N	W	6-17-16	0859	2x1-L P	9310_ALPHA BETA_GPC: Gross Beta	6 Months	HNO3 to pH <2
B35CD8	N	W	/	/	1x500-mL G/P	C14_LSC: COMMON	6 Months	None
B35CD8	N	W	/	/	1x4-L G/P	GAMMA_GS: COMMON; GAMMA_GS: GW 01	6 Months	HNO3 to pH <2
B35CD8	N	W	/	/	2x4-L G/P	I129LL_SEP_LEPS_GS_LL: COMMON	6 Months	None
B35CD8	N	W	/	/	1x1-L G/P	SE79_SEP_IE_LSC: COMMON	6 Months	HNO3 to pH <2
B35CD8	N	W	6-17-16	0859	1x500-mL G/P	TC99_EIE_LSC: COMMON	6 Months	HNO3 to pH <2

Relinquished By: **Will Wise CHPRC** (Print) Sign: *[Signature]* Date/Time: **JUN 17 2016 1120**

Relinquished By: **Will Wise CHPRC** (Print) Sign: *[Signature]* Date/Time: **JUN 17 2016 1400**

Relinquished By: **Will Wise CHPRC** (Print) Sign: *[Signature]* Date/Time: **JUN 17 2016 0905**

Relinquished By: **Will Wise CHPRC** (Print) Sign: *[Signature]* Date/Time: **JUN 17 2016 0905**

Received By: **Will Wise CHPRC** (Print) Sign: *[Signature]* Date/Time: **JUN 17 2016 1120**

Received By: **FEDEX** (Print) Sign: *[Signature]* Date/Time: **JUN 17 2016 1120**

Received By: **McKinstry Publications** (Print) Sign: *[Signature]* Date/Time: **6-18-16 0905**

Received By: **McKinstry Publications** (Print) Sign: *[Signature]* Date/Time: **6-18-16 0905**

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

PRINTED ON 4/28/2016 FSR ID = FSR31651 A-6004-842 (REV 2)

CH2M Hill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C.# **S16-006-285**
Page 1 of 1

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

SAF No. S16-006
 Sampling Origin: Hanford Site
 Purchase Order/Charge Code: 300071

Project Title: SURV, JUNE 2016
 Logbook No. HNF-N-506 86 / 32
 Ice Chest No. 605-513

Shipped To (Lab): GEL Laboratories, LLC
 Method of Shipment: Commercial Carrier
 Bill of Lading/Air Bill No. 77655216 0106

Protocol: SURV
 Priority: 30 Days
 SPECIAL INSTRUCTIONS: **PRIORITY**
 Offsite Property No. 6742

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
B35CH0	N	W	6-17-16	0813	2x1-L P	9310_ALPHABETA_GPC: Gross Beta	6 Months	HNO3 to pH <2
B35CH0	N	W			1x500-mL G/P	C14_LSC: COMMON	6 Months	None
B35CH0	N	W			1x4-L G/P	GAMMA_GS: COMMON; GAMMA_GS: GW 01	6 Months	HNO3 to pH <2
B35CH0	N	W			2x4-L G/P	1129LL_SEP_LEPS_GS_LL: COMMON	6 Months	None
B35CH0	N	W			1x1-L G/P	SE79_SEP_IE_LSC: COMMON	6 Months	HNO3 to pH <2
B35CH0	N	W	6-17-16	0813	1x500-mL G/P	TC99_EIE_LSC: COMMON	6 Months	HNO3 to pH <2

Relinquished By Will Wise CHPRC	Print <i>Will Wise</i>	Sign <i>Will Wise</i>	Date/Time JUN 17 2016 1120	Received By Lesly West CHPRC	Print <i>Lesly West</i>	Sign <i>Lesly West</i>	Date/Time JUN 17 2016 1120
Relinquished By Will Wise CHPRC	Print <i>Lesly West</i>	Sign <i>Lesly West</i>	Date/Time JUN 17 2016 1400	Received By FEDEX	Print FEDEX	Sign <i>FEDEX</i>	Date/Time JUN 17 2016 1400
Relinquished By	Print <i>Will Wise</i>	Sign <i>Will Wise</i>	Date/Time 17	Received By <i>Waters-Husted</i>	Print <i>Waters-Husted</i>	Sign <i>Waters-Husted</i>	Date/Time 6-18-16 0905
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time

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

Disposed By

Disposal Date/Time

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

SAMPLE RECEIPT & REVIEW FORM

Client: <u>APRC</u>		SDG/AR/COC/Work Order: <u>399(05)</u>	
Received By: <u>MF</u>		Date Received: <u>6-18-16</u>	
Suspected Hazard Information		Yes	No
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Classified Radioactive II or III by RSO?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
COC/Samples marked containing PCBs?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Package, COC, and/or Samples marked as beryllium or asbestos containing?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Samples identified as Foreign Soil?		<input checked="" type="checkbox"/>	<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 checked="" 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 checked="" type="checkbox"/>	<input type="checkbox"/>	Preservation Method: Ice bags 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 type="checkbox"/>	Temperature Device Serial #: <u>130461062</u> Secondary Temperature Device Serial # (If Applicable): <u>2C</u>
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input 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 type="checkbox"/>	Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 Do Low Level Perchlorate samples have headspace as required?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
7 VOA vials contain acid preservation?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(If unknown, select No)
8 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
9 Are Encore containers present?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
10 Samples received within holding time?	<input checked="" type="checkbox"/>	<input checked="" 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 checked="" 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 checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
13 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
14 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
15 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
16 Carrier and tracking number.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other <u>7765 5216 0106 21^c NO ICE</u> <u>0437 2C</u>

Comments (Use Continuation Form if needed):

Data Review Qualifier Definitions

Project Specific Qualifier Definitions for GEL Client Code: CPRC

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

Laboratory Certifications

List of current GEL Certifications as of 12 July 2016

State	Certification
Alaska	UST-0110
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA160006
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122016-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-16-11
Utah NELAP	SC000122016-20
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

General Chem Analysis

Case Narrative

**General Chemistry
 Technical Case Narrative
 CH2MHill Plateau Remediation Company (CPRC)
 SDG #: GEL399651
 Work Order #: 399651**

Product: Alkalinity**Analytical Method:** 2320_ALKALINITY**Analytical Procedure:** GL-GC-E-033 REV# 12**Analytical Batch:** 1576390

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
399651001	B359N5
1203572189	Method Blank (MB)
1203572190	Laboratory Control Sample (LCS)
1203572191	399217001(NonSDG) Sample Duplicate (DUP)
1203572192	399279001(NonSDG) Sample Duplicate (DUP)

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

Data Summary:

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

Quality Control (QC) Information**Method Blank (MB) Statement**

The method blank associated with this data was slightly above the normal acceptance limits. The data for sample 1203572189 (MB) was deemed acceptable because the values for all reported samples were more than 10 times the value of the method blank.

Certification Statement

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

GEL LABORATORIES LLC

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

**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL399651 GEL Work Order: 399651

The Qualifiers in this report are defined as follows:

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.

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

Review/Validation

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

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

Signature: 

Name: Aubrey Kingsbury

Date: 27 JUN 2016

Title: Analyst I

Sample Data Summary

7/15/2016

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: June 27, 2016

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF S16-006

Client Sample ID:	B359N5	Project:	CPRC0S16006
Sample ID:	399651001	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	17-JUN-16 11:39		
Receive Date:	18-JUN-16		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Titration and Ion Analysis											
2320_ALKALINITY: GW 01 "As Received"											
Alkalinity, Total as CaCO3	C	90400	725	1000	ug/L		KLP1	06/23/16	1453	1576390	1
Bicarbonate alkalinity (CaCO3)	C	90400	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

GEL LABORATORIES LLC

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

QC Summary

Report Date: June 27, 2016

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CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 399651

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
Batch	1576390										
QC1203572191	399217001	DUP									
Alkalinity, Total as CaCO3	C	141000		142000	ug/L	1.08		(0%-20%)	KLP1	06/23/16	13:59
Bicarbonate alkalinity (CaCO3)	C	141000		142000	ug/L	1.08		(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					
QC1203572192	399279001	DUP									
Alkalinity, Total as CaCO3	C	110000		108000	ug/L	1.87		(0%-20%)		06/23/16	14:09
Bicarbonate alkalinity (CaCO3)	C	110000		108000	ug/L	1.87		(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					
QC1203572190	LCS										
Alkalinity, Total as CaCO3		50000		52100	ug/L		104	(80%-120%)		06/23/16	13:46
QC1203572189	MB										
Alkalinity, Total as CaCO3				2040	ug/L					06/23/16	13:44
Bicarbonate alkalinity (CaCO3)				2040	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 \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.

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QC Summary

Workorder: 399651

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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

Case Narrative

Radiochemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL399651
Work Order #: 399651

Product: GAMMA_GS:COMMON + GW 01
Analytical Method: 901.1_GAMMA_GS
Analytical Procedure: GL-RAD-A-013 REV# 25
Analytical Batch: 1575754

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
399651003	B35CD8
399651004	B35CH0
1203570525	Method Blank (MB)
1203570526	399283007(B35C93) Sample Duplicate (DUP)
1203570527	Laboratory Control Sample (LCS)

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

Data Summary:

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

Product: I129LL_SEP_LEPS_GS: COMMON (low level)
Analytical Method: DOE EML HASL-300,I-01 Modified
Analytical Procedure: GL-RAD-A-006 REV# 21
Analytical Batch: 1575923

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
399651003	B35CD8
399651004	B35CH0
1203571035	Method Blank (MB)
1203571036	399283007(B35C93) Sample Duplicate (DUP)
1203571037	399283007(B35C93) Matrix Spike (MS)
1203571038	Laboratory Control Sample (LCS)

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

Data Summary:

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

continuing calibration, instrument controls and process controls where applicable.

Qualifier Information

Qualifier	Reason	Analyte	Sample	Client Sample
X	Data rejected due to high counting uncertainty.	Iodine-129	399651003	B35CD8

Product: 9310_ALPHABETA_GPC: Gross Beta

Analytical Method: 9310_ALPHABETA_GPC

Analytical Procedure: GL-RAD-A-001 REV# 18

Analytical Batch: 1577403

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
399651003	B35CD8
399651004	B35CH0
1203574712	Method Blank (MB)
1203574713	399366006(B35D60) Sample Duplicate (DUP)
1203574714	399366006(B35D60) Matrix Spike (MS)
1203574715	399366006(B35D60) Matrix Spike Duplicate (MSD)
1203574716	Laboratory Control Sample (LCS)

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

Data Summary:

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

Technical Information

Gross Alpha/Beta Preparation Information

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

Recounts

Samples 1203574715 (B35D60MSD) and 1203574716 (LCS) were recounted due to high recovery. The recounts are reported.

Miscellaneous Information

Additional Comments

The matrix spike and matrix spike duplicate, 1203574714 (B35D60MS) and 1203574715 (B35D60MSD), aliquots were reduced to conserve sample volume.

Product: SE79_SEP_IE_LSC: COMMON

Analytical Method: SE79_SEP_IE_LSC

Analytical Procedure: GL-RAD-A-031 REV# 11

Analytical Batch: 1575739

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
399651003	B35CD8
399651004	B35CH0
1203570472	Method Blank (MB)
1203570473	398770001(B35D12) Sample Duplicate (DUP)
1203570474	Laboratory Control Sample (LCS)

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

Data Summary:

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

Quality Control (QC) Information

QC Information

All of the QC samples meet the required acceptance limits with the following exceptions: The laboratory control sample 1203570474 (LCS) does not meet the client's LCS requirement of 80-120%; however, it does meet GEL's standard LCS requirement of 75-125%. Reporting results.

Technical Information

Recounts

Sample 1203570474 (LCS) was recounted due to high recovery. The recount is reported.

Product: TC99_EIE_LSC: COMMON

Analytical Method: TC99_EIE_LSC

Analytical Procedure: GL-RAD-A-059 REV# 4

Analytical Batch: 1575749

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
399651003	B35CD8
399651004	B35CH0
1203570510	Method Blank (MB)
1203570511	399283007(B35C93) Sample Duplicate (DUP)
1203570512	Laboratory Control Sample (LCS)

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

Data Summary:

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

Product: TRITIUM_DIST_LSC: COMMON
Analytical Method: TRITIUM_DIST_LSC
Analytical Procedure: GL-RAD-A-002 REV# 21
Analytical Batch: 1576839

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
399651002	B359N2
1203573300	Method Blank (MB)
1203573301	399283007(B35C93) Sample Duplicate (DUP)
1203573302	399283007(B35C93) Matrix Spike (MS)
1203573303	Laboratory Control Sample (LCS)

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

Data Summary:

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

Product: C14_LSC: COMMON
Analytical Method: C14_LSC
Analytical Procedure: GL-RAD-A-003 REV# 15
Analytical Batch: 1576854

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
399651003	B35CD8
399651004	B35CH0
1203573364	Method Blank (MB)
1203573365	399283007(B35C93) Sample Duplicate (DUP)
1203573367	399283007(B35C93) Matrix Spike (MS)
1203573369	Laboratory Control Sample (LCS)

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

Data Summary:

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

Technical Information

Recounts

Sample 399651003 (B35CD8) was recounted due to the quench number being outside the calibration range. The recount is reported.

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.

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL399651 GEL Work Order: 399651

The Qualifiers in this report are defined as follows:

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

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: Theresa Austin

Date: 08 JUL 2016

Title: Group Leader

Sample Data Summary

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL399651	Client: CPRC001	Project: CPRC0S16006
Lab Sample ID: 399651002	Date Collected: 06/17/2016 11:39	Matrix: WATER
Client Sample: S16-006-230	Date Received: 06/18/2016 09:05	
Client ID: B359N2		Prep Basis: "As Received"
Batch ID: 1576839	Method: TRITIUM_DIST_LSC	SOP Ref: GL-RAD-A-002
Run Date: 06/30/2016 13:37	Analyst: TXJ1	Instrument: LSCRED
Data File: T1576839.xls	Aliquot: 50 mL	Count Time: 40 min
Prep Batch: 1576839	Prep Method: EPA 906.0 Modified	
Prep Date: 06/29/2016 15:40		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		1600	pCi/L	+/-266	407	340	400

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits

Comments:

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL399651	Client: CPRC001	Project: CPRC0S16006
Lab Sample ID: 399651003	Date Collected: 06/17/2016 08:59	Matrix: WATER
Client Sample: S16-006-283	Date Received: 06/18/2016 09:05	
Client ID: B35CD8		Prep Basis: "As Received"
Batch ID: 1577403	Method: 9310_ALPHABETA_GPC	SOP Ref: GL-RAD-A-001
Run Date: 07/01/2016 11:30	Analyst: JXC9	Instrument: PIC2C
Data File: AB1577403rr.xls	Aliquot: 125 mL	Count Time: 60 min
Prep Batch: 1577403	Prep Method: EPA 900.0/SW846 9310	
Prep Date: 06/30/2016 14:18		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-47-2	Beta BETA		3480	pCi/L	+/-44.7	568	3.39	4.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits

Comments:

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

**Rad
Certificate of Analysis
Sample Summary**

SDG Number: GEL399651
 Lab Sample ID: 399651003
 Client Sample: S16-006-283
 Client ID: B35CD8
 Batch ID: 1575754
 Run Date: 06/29/2016 12:27
 Data File: G399651003.CNF;1
 Prep Batch: 1575754
 Prep Date: 06/24/2016 00:00

Client: CPRC001
 Date Collected: 06/17/2016 08:59
 Date Received: 06/18/2016 09:05
 Method: 901.1_GAMMA_GS
 Analyst: MXR1
 Aliquot: 2 L
 Prep Method: EPA 901.1

Project: CPRC0S16006
 Matrix: WATER
 Prep Basis: "As Received"
 SOP Ref: GL-RAD-A-013
 Instrument: GAM25
 Count Time: 120 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14234-35-6	Antimony-125	U	0.0291	pCi/L	+/-8.07	8.07	14.9	
13967-70-9	Cesium-134	U	-1.57	pCi/L	+/-2.73	2.82	4.82	
10045-97-3	Cesium-137	U	0.613	pCi/L	+/-3.26	3.27	6.07	15.0
10198-40-0	Cobalt-60	U	0.692	pCi/L	+/-2.83	2.85	5.90	
14683-23-9	Europium-152	U	9.37	pCi/L	+/-8.92	9.90	17.2	
15585-10-1	Europium-154	U	-1.75	pCi/L	+/-8.74	8.78	16.6	
14391-16-3	Europium-155	U	-5.15	pCi/L	+/-9.07	9.37	14.9	
13966-00-2	Potassium-40	U	11.3	pCi/L	+/-36.9	37.2	77.2	

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

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL399651	Client: CPRC001	Project: CPRC0S16006
Lab Sample ID: 399651003	Date Collected: 06/17/2016 08:59	Matrix: WATER
Client Sample: S16-006-283	Date Received: 06/18/2016 09:05	
Client ID: B35CD8		Prep Basis: "As Received"
Batch ID: 1575923	Method: DOE EML HASL-300,I-01 Mo	SOP Ref: GL-RAD-A-006
Run Date: 07/01/2016 06:56	Analyst: MJH1	Instrument: XRAY4
Data File: I399651003.CNF;1	Aliquot: 1.5 L	Count Time: 120 min
Prep Batch: 1575923	Prep Method: DOE EML HASL-300,I-01 M	
Prep Date: 06/29/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129	UX	0.00	pCi/L	+/-0.992	1.00	0.983	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits

Comments:

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL399651	Client: CPRC001	Project: CPRC0S16006
Lab Sample ID: 399651003	Date Collected: 06/17/2016 08:59	Matrix: WATER
Client Sample: S16-006-283	Date Received: 06/18/2016 09:05	
Client ID: B35CD8		Prep Basis: "As Received"
Batch ID: 1575739	Method: SE79_SEP_IE_LSC	SOP Ref: GL-RAD-A-031
Run Date: 06/24/2016 21:30	Analyst: CXS7	Instrument: LSCBLUE
Data File: SE1575739R2.xls	Aliquot: 0.1 L	Count Time: 60 min
Prep Batch: 1575739	Prep Method: NERC ORD	
Prep Date: 06/22/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15758-45-9	Selenium-79	NU	-6.17	pCi/L	+/-9.76	9.76	16.8	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Selenium Carrier	18.3	20.0	mg	91.5	(40%-110%)

Comments:

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL399651	Client: CPRC001	Project: CPRC0S16006
Lab Sample ID: 399651003	Date Collected: 06/17/2016 08:59	Matrix: WATER
Client Sample: S16-006-283	Date Received: 06/18/2016 09:05	
Client ID: B35CD8		Prep Basis: "As Received"
Batch ID: 1575749	Method: TC99_EIE_LSC	SOP Ref: GL-RAD-A-059
Run Date: 07/05/2016 21:16	Analyst: CXS7	Instrument: LSCBLUE
Data File: E1575749.xls	Aliquot: 100 mL	Count Time: 13.8000001907349 min
Prep Batch: 1575749	Prep Method: DOE EML HASL-300, Tc-02-	
Prep Date: 06/30/2016 12:36		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99		6350	pCi/L	+/-127	716	37.8	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	38800	43800	CPM	88.5	(30%-105%)

Comments:

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL399651	Client: CPRC001	Project: CPRC0S16006
Lab Sample ID: 399651003	Date Collected: 06/17/2016 08:59	Matrix: WATER
Client Sample: S16-006-283	Date Received: 06/18/2016 09:05	
Client ID: B35CD8		Prep Basis: "As Received"
Batch ID: 1576854	Method: C14_LSC	SOP Ref: GL-RAD-A-003
Run Date: 07/03/2016 19:09	Analyst: TXJ1	Instrument: LSCBROWN
Data File: C1576854R.xls	Aliquot: 60 mL	Count Time: 30 min
Prep Batch: 1576854	Prep Method: EPA EERF C-01 Modified	
Prep Date: 06/30/2016 16:07		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	6.18	pCi/L	+/-18.9	19.0	32.4	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits

Comments:

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL399651	Client: CPRC001	Project: CPRC0S16006
Lab Sample ID: 399651004	Date Collected: 06/17/2016 08:13	Matrix: WATER
Client Sample: S16-006-285	Date Received: 06/18/2016 09:05	
Client ID: B35CH0		Prep Basis: "As Received"
Batch ID: 1577403	Method: 9310_ALPHABETA_GPC	SOP Ref: GL-RAD-A-001
Run Date: 07/01/2016 11:30	Analyst: JXC9	Instrument: PIC1D
Data File: AB1577403rr.xls	Aliquot: 125 mL	Count Time: 100 min
Prep Batch: 1577403	Prep Method: EPA 900.0/SW846 9310	
Prep Date: 06/30/2016 14:18		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-47-2	Beta BETA		28.0	pCi/L	+/-3.80	5.93	3.97	4.00

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

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL399651	Client: CPRC001	Project: CPRC0S16006
Lab Sample ID: 399651004	Date Collected: 06/17/2016 08:13	Matrix: WATER
Client Sample: S16-006-285	Date Received: 06/18/2016 09:05	
Client ID: B35CH0		Prep Basis: "As Received"
Batch ID: 1575754	Method: 901.1_GAMMA_GS	SOP Ref: GL-RAD-A-013
Run Date: 06/29/2016 12:28	Analyst: MXR1	Instrument: GAM33
Data File: G399651004.CNF;1	Aliquot: 2 L	Count Time: 120 min
Prep Batch: 1575754	Prep Method: EPA 901.1	
Prep Date: 06/24/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14234-35-6	Antimony-125	U	2.77	pCi/L	+/-7.10	7.21	13.6	
13967-70-9	Cesium-134	U	-2.98	pCi/L	+/-2.81	3.11	4.51	
10045-97-3	Cesium-137	U	-0.26	pCi/L	+/-2.56	2.56	4.87	15.0
10198-40-0	Cobalt-60	U	-0.694	pCi/L	+/-2.36	2.38	4.53	
14683-23-9	Europium-152	U	-0.963	pCi/L	+/-8.40	8.41	15.1	
15585-10-1	Europium-154	U	7.60	pCi/L	+/-6.77	7.59	15.9	
14391-16-3	Europium-155	U	9.63	pCi/L	+/-10.2	11.2	19.3	
13966-00-2	Potassium-40	U	14.9	pCi/L	+/-32.4	33.1	72.1	

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

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL399651	Client: CPRC001	Project: CPRC0S16006
Lab Sample ID: 399651004	Date Collected: 06/17/2016 08:13	Matrix: WATER
Client Sample: S16-006-285	Date Received: 06/18/2016 09:05	
Client ID: B35CH0		Prep Basis: "As Received"
Batch ID: 1575923	Method: DOE EML HASL-300,I-01 Mo	SOP Ref: GL-RAD-A-006
Run Date: 07/01/2016 07:33	Analyst: MJH1	Instrument: XRAY2
Data File: I399651004.CNF;1	Aliquot: 1.5 L	Count Time: 120 min
Prep Batch: 1575923	Prep Method: DOE EML HASL-300,I-01 M	
Prep Date: 06/29/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129		1.65	pCi/L	+/-0.699	0.718	0.889	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits

Comments:

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL399651	Client: CPRC001	Project: CPRC0S16006
Lab Sample ID: 399651004	Date Collected: 06/17/2016 08:13	Matrix: WATER
Client Sample: S16-006-285	Date Received: 06/18/2016 09:05	
Client ID: B35CH0		Prep Basis: "As Received"
Batch ID: 1575739	Method: SE79_SEP_IE_LSC	SOP Ref: GL-RAD-A-031
Run Date: 06/24/2016 22:32	Analyst: CXS7	Instrument: LSCBLUE
Data File: SE1575739R2.xls	Aliquot: 0.1 L	Count Time: 60 min
Prep Batch: 1575739	Prep Method: NERC ORD	
Prep Date: 06/22/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15758-45-9	Selenium-79	NU	10.4	pCi/L	+/-10.5	10.5	17.5	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Selenium Carrier	17.5	20.0	mg	87.5	(40%-110%)

Comments:

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL399651	Client: CPRC001	Project: CPRC0S16006
Lab Sample ID: 399651004	Date Collected: 06/17/2016 08:13	Matrix: WATER
Client Sample: S16-006-285	Date Received: 06/18/2016 09:05	
Client ID: B35CH0		Prep Basis: "As Received"
Batch ID: 1575749	Method: TC99_EIE_LSC	SOP Ref: GL-RAD-A-059
Run Date: 07/05/2016 21:32	Analyst: CXS7	Instrument: LSCBLUE
Data File: E1575749.xls	Aliquot: 100 mL	Count Time: 30 min
Prep Batch: 1575749	Prep Method: DOE EML HASL-300, Tc-02-	
Prep Date: 06/30/2016 12:36		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	16.3	pCi/L	+/-18.0	18.0	30.1	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	35700	43800	CPM	81.4	(30%-105%)

Comments:

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL399651	Client: CPRC001	Project: CPRC0S16006
Lab Sample ID: 399651004	Date Collected: 06/17/2016 08:13	Matrix: WATER
Client Sample: S16-006-285	Date Received: 06/18/2016 09:05	
Client ID: B35CH0		Prep Basis: "As Received"
Batch ID: 1576854	Method: C14_LSC	SOP Ref: GL-RAD-A-003
Run Date: 07/01/2016 10:43	Analyst: TXJ1	Instrument: LSCBROWN
Data File: C1576854.xls	Aliquot: 60 mL	Count Time: 30 min
Prep Batch: 1576854	Prep Method: EPA EERF C-01 Modified	
Prep Date: 06/30/2016 16:07		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	-10.6	pCi/L	+/-18.5	18.5	32.7	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits

Comments:

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

Quality Control Summary

7/15/2016

GEL LABORATORIES LLC

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QC Summary

Report Date: July 8, 2016
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Client : CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Workorder: 399651

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1575754								
QC1203570525	MB								
Antimony-125			U	-3.53	pCi/L			MXR1	06/29/1612:28
				Uncert: +/-6.33					
				TPU: +/-6.53					
Cesium-134			U	2.72	pCi/L				
				Uncert: +/-2.58					
				TPU: +/-2.86					
Cesium-137			U	0.0772	pCi/L				
				Uncert: +/-2.19					
				TPU: +/-2.19					
Cobalt-60			U	0.786	pCi/L				
				Uncert: +/-2.51					
				TPU: +/-2.53					
Europium-152			U	-1.29	pCi/L				
				Uncert: +/-6.43					
				TPU: +/-6.46					
Europium-154			U	-1.19	pCi/L				
				Uncert: +/-6.57					
				TPU: +/-6.59					
Europium-155			U	-3.92	pCi/L				
				Uncert: +/-7.68					
				TPU: +/-7.88					
Potassium-40			U	17.2	pCi/L				
				Uncert: +/-30.0					
				TPU: +/-31.0					
QC1203570526	399283007	DUP							
Antimony-125		U	-2.48	U	7.46	pCi/L			06/29/1612:59
			Uncert: +/-7.56		+/-10.3		RPD: 0	N/A	
			TPU: +/-7.64		+/-10.9		RER: 1.47	(0-2)	
Cesium-134		U	-1.86	U	2.17	pCi/L			
			Uncert: +/-2.81		+/-5.31		RPD: 0	N/A	
			TPU: +/-2.94		+/-5.40		RER: 1.28	(0-2)	
Cesium-137		U	0.109	U	6.40	pCi/L			
			Uncert: +/-2.76		+/-4.63		RPD: 0	N/A	
			TPU: +/-2.76		+/-4.64		RER: 2.28	(0-2)	
Cobalt-60		U	-1.37	U	-0.538	pCi/L			
			Uncert: +/-3.43		+/-4.49		RPD: 0	N/A	
			TPU: +/-3.49		+/-4.50		RER: 0.287	(0-2)	
Europium-152		U	2.60	U	-4.35	pCi/L			
			Uncert: +/-10.9		+/-11.1		RPD: 0	N/A	
			TPU: +/-11.0		+/-11.2		RER: 0.869	(0-2)	
Europium-154		U	-7.55	U	6.91	pCi/L			
			Uncert: +/-11.0		+/-10.6		RPD: 0	N/A	
			TPU: +/-11.5		+/-11.1		RER: 1.78	(0-2)	
Europium-155		U	-3.02	U	-1.94	pCi/L			

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1575754								
		Uncert:	+/-12.3	+/-12.8					
		TPU:	+/-12.4	+/-12.8		RPD: 0	N/A		
						RER: 0.12	(0-2)		
Potassium-40		U	26.9	U	8.19	pCi/L			
		Uncert:	+/-38.7	+/-46.2		RPD: 0	N/A		
		TPU:	+/-38.8	+/-46.2		RER: 0.61	(0-2)		
QC1203570527	LCS								
Americium-241	34400			36200	pCi/L	REC: 105	(80%-120%)		06/29/1614:35
		Uncert:		+/-917					
		TPU:		+/-2850					
Antimony-125			U	45.9	pCi/L				
		Uncert:		+/-200					
		TPU:		+/-201					
Cesium-134			U	41.9	pCi/L				
		Uncert:		+/-71.5					
		TPU:		+/-74.0					
Cesium-137	13400			14500	pCi/L	REC: 108	(80%-120%)		
		Uncert:		+/-310					
		TPU:		+/-695					
Cobalt-60	13500			13700	pCi/L	REC: 101	(80%-120%)		
		Uncert:		+/-326					
		TPU:		+/-600					
Europium-152			U	-52.7	pCi/L				
		Uncert:		+/-186					
		TPU:		+/-188					
Europium-154			U	35.6	pCi/L				
		Uncert:		+/-122					
		TPU:		+/-123					
Europium-155			U	-60.5	pCi/L				
		Uncert:		+/-216					
		TPU:		+/-218					
Potassium-40			U	-41.8	pCi/L				
		Uncert:		+/-237					
		TPU:		+/-237					
Batch	1575923								
QC1203571035	MB								
Iodine-129			U	0.0646	pCi/L			MJH1	07/01/1611:02
		Uncert:		+/-0.323					
		TPU:		+/-0.324					
QC1203571036	399283007	DUP							
Iodine-129		U	0.166	U	0.134	pCi/L			07/01/1611:02
		Uncert:	+/-0.361	+/-0.218		RPD: 0	N/A		
		TPU:	+/-0.369	+/-0.226		RER: 0.145	(0-2)		
QC1203571037	399283007	MS							
Iodine-129	27.7	U	0.166	25.2	pCi/L	REC: 90	(75%-125%)		07/01/1611:03
		Uncert:	+/-0.361	+/-3.28					
		TPU:	+/-0.369	+/-4.14					
QC1203571038	LCS								
Iodine-129	27.7			26.2	pCi/L	REC: 95	(80%-120%)		07/01/1611:08
		Uncert:		+/-2.90					

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QC Summary

Workorder: 399651

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1575923								
		TPU:		+/-3.88					
Rad Gas Flow									
Batch	1577403								
QC1203574712	MB								
Beta			U	-0.345	pCi/L			JXC9	07/01/1611:46
		Uncert:		+/-1.58					
		TPU:		+/-1.58					
QC1203574713	399366006	DUP							
Beta		49.0		48.8	pCi/L				07/01/1611:46
		Uncert:	+/-3.23	+/-5.21		RPD: 0	(0% - 20%)		
		TPU:	+/-8.75	+/-9.63		RER: 0.0305	(0-2)		
QC1203574714	399366006	MS							
Beta		876	49.0	1130	pCi/L	REC: 124	(75%-125%)		07/01/1611:50
		Uncert:	+/-3.23	+/-41.0					
		TPU:	+/-8.75	+/-193					
QC1203574715	399366006	MSD							
Beta		876	49.0	925	pCi/L	REC: 100	(75%-125%)		07/06/1614:30
		Uncert:	+/-3.23	+/-36.7		RPD: 20	(0%-20%)		
		TPU:	+/-8.75	+/-158		RER: 1.64	(0-2)		
QC1203574716	LCS								
Beta		292		345	pCi/L	REC: 118	(80%-120%)		07/07/1610:00
		Uncert:		+/-12.3					
		TPU:		+/-58.2					
Rad Liquid Scintillation									
Batch	1575739								
QC1203570472	MB								
Selenium-79			U	5.06	pCi/L			CXS7	06/24/1623:35
		Uncert:		+/-10.5					
		TPU:		+/-10.5					
**Selenium Carrier		20.0		17.3	mg	REC: 87	(40%-110%)		
QC1203570473	398770001	DUP							
Selenium-79		NU	1.64	NU	5.80	pCi/L			06/25/1600:37
		Uncert:	+/-11.3	+/-10.0		RPD: 0	N/A		
		TPU:	+/-11.3	+/-10.0		RER: 0.54	(0-2)		
**Selenium Carrier		20.0	16.0	18.1	mg	REC: 91	(40%-110%)		
QC1203570474	LCS								
Selenium-79		866	N	1050	pCi/L	REC: 121*	(80%-120%)		06/30/1619:28
		Uncert:		+/-30.7					
		TPU:		+/-42.8					
**Selenium Carrier		20.0		18.6	mg	REC: 93	(40%-110%)		
Batch	1575749								
QC1203570510	MB								
Technetium-99			U	-10.7	pCi/L			CXS7	07/05/1622:04
		Uncert:		+/-15.4					
		TPU:		+/-15.4					
**Technetium-99m Tracer		43800		39300	CPM	REC: 90	(30%-105%)		
QC1203570511	399283007	DUP							
Technetium-99		U	-17.2	U	-2.88	pCi/L			07/05/1622:36
		Uncert:	+/-15.6	+/-15.6		RPD: 0	N/A		

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QC Summary

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Liquid Scintillation									
Batch	1575749								
		TPU:	+/-15.6	+/-15.6					
**Technetium-99m Tracer	43800	38400		39600	CPM	RER: 1.28 REC: 90	(0-2) (30%-105%)		
QC1203570512 LCS									
Technetium-99	861			837	pCi/L	REC: 97	(80%-120%)		07/05/1623:08
		Uncert:		+/-34.4					
		TPU:		+/-99.0					
**Technetium-99m Tracer	43800			39600	CPM	REC: 90	(30%-105%)		
Batch	1576839								
QC1203573300 MB									
Tritium			U	-159	pCi/L			TXJ1	06/30/1618:31
		Uncert:		+/-185					
		TPU:		+/-185					
QC1203573301 399283007 DUP									
Tritium		U	0.624	U	70.2				06/30/1619:13
		Uncert:	+/-189	+/-196		RPD: 0	N/A		
		TPU:	+/-189	+/-197		RER: 0.499	(0-2)		
QC1203573302 399283007 MS									
Tritium	2330	U	0.624	1890	pCi/L	REC: 81	(75%-125%)		06/30/1619:55
		Uncert:	+/-189	+/-279					
		TPU:	+/-189	+/-459					
QC1203573303 LCS									
Tritium	2330			2090	pCi/L	REC: 90	(80%-120%)		06/30/1620:37
		Uncert:		+/-287					
		TPU:		+/-495					
Batch	1576854								
QC1203573364 MB									
Carbon-14			U	-8.98	pCi/L			TXJ1	07/01/1613:51
		Uncert:		+/-18.5					
		TPU:		+/-18.5					
QC1203573365 399283007 DUP									
Carbon-14		U	0.650	U	1.82				07/01/1614:22
		Uncert:	+/-18.9	+/-18.9		RPD: 0	N/A		
		TPU:	+/-18.9	+/-18.9		RER: 0.0861	(0-2)		
QC1203573367 399283007 MS									
Carbon-14	1260	U	0.650	1210	pCi/L	REC: 96	(75%-125%)		07/01/1614:53
		Uncert:	+/-18.9	+/-43.1					
		TPU:	+/-18.9	+/-229					
QC1203573369 LCS									
Carbon-14	1260			1250	pCi/L	REC: 99	(80%-120%)		07/01/1615:25
		Uncert:		+/-43.7					
		TPU:		+/-237					

Notes:

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

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

QC Summary

Workorder: 399651

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
>						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.				
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.				
UX						Gamma Spectroscopy--Uncertain identification				
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.