

6/27/2016

REV.1



a member of **The GEL Group** INC



PO Box 30712 Charleston, SC 29417
2040 Savage Road Charleston, SC 29407
P 843.556.8171
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gel.com

June 27, 2016

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

Re: CHPRC SAF S16-005
Work Order: 398194
SDG: GEL398194

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on May 26, 2016 and May 27, 2016. This revised data report has been prepared and reviewed in accordance with GEL's standard operating procedures. Per client P&D, Gross Beta results were missing from B35272.

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,

Heather Shaffer
Project Manager

Purchase Order: 300071JDBA 7H
Chain of Custody: S16-005-151 and S16-005-172
Enclosures



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Problem and Discrepancy Report

Problem and Discrepancy Report

GEL

SDG GEL398194

06/23/16

The data package has the following issues:

9310_ALPHABETA_GPC: COMMON was requested for sample B35272 however, only results for Gross Beta were returned

Resolution: *Provide correction.*

Lab Response:

The lab will correct and submit a revision.

Provide a resolution to each issue noted on the report

Page 1 of 1

Case Narrative

Per client P&D, Gross Beta results were missing from B35272.

**General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF S16-005
SDG: GEL398194**

June 27, 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 May 26, 2016 and May 27, 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. 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:

<u>Laboratory Identification</u>	<u>Sample Description</u>
398194001	B35177
398194002	B35272
398194003	B35174

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.



Heather Shaffer
Project Manager

Technical Case Narrative
CH2M Hill Plateau Remediation Company (CPRC)
SDG #: GEL398194
Work Order #: 398194

General Chemistry

Alkalinity

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.

Radiochemistry

9310_ALPHABETA_GPC: COMMON

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

Technical Information

Gross Alpha/Beta Preparation Information

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

Recounts

Samples 1203557830 (Non SDG 398180008MSD) and 1203557831 (LCS) were recounted due to high recovery. The recounts are reported.

Miscellaneous Information

Additional Comments

The matrix spike and matrix spike duplicate, 1203557829 (Non SDG 398180008MS) and 1203557830 (Non SDG 398180008MSD), aliquots were reduced to conserve sample volume.

SRISO_SEP_PRECIP_GPC: COMMON

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

Technical Information**Recounts**

Sample 398194002 (B35272) was verified by recounting at least five days from the separation date. The recount is reported.

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

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

Certification Statement

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

Chain of Custody and Supporting Documentation

CH2M Hill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # **S16-005-172**
Page 1 of 1

Telephone No. 509-376-4650
Purchase Order/Charge Code 300071
Ice Chest No. *GSWS-497*
Bill of Lading/Air Bill No. *776374721674*
Offsite Property No. *66665*

Contact/Requester **Karen Waters-Husted**
Sampling Origin **Hanford Site**
Logbook No. **HNF-N-506 83176**
Method of Shipment **Commercial Carrier**
Priority: **30 Days PRIORITY**

POSSIBLE SAMPLE HAZARDS/REMARKS
SPECIAL INSTRUCTIONS **HOLD TIME** Total Activity Exemption: Yes No
N/A
Special Handling: N/A

Sample No.	Filter	* Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B35272	N	<i>5-25-16</i>	<i>0826</i>	1x250-mL G/P	2320_ALKALINITY: GW 01	14 Days	Cool <=6C
B35272	N			2x1-L P	9310_ALPHABETA_GPC: COMMON	6 Months	HNO3 to pH <2
B35272	N			1x500-mL G/P	C14_LSC: COMMON	6 Months	None
B35272	N			3x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2
B35272	N			1x500-mL G/P	TC99_EIE_LSC: COMMON	6 Months	HNO3 to pH <2
B35272	N	<i>5-25-16</i>	<i>0826</i>	1x500-mL P	TRITIUM_DIST_LSC: COMMON	6 Months	None

Collector **Karen Campbell CHPRC**
SAF No. **S16-005**
Project Title **SURV, MAY 2016**
Shipped To (Lab) **GEL Laboratories, LLC**
Protocol **SURV**

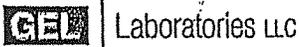
Received By **J.C. Fulton/CHPRC** Sign *[Signature]* Date/Time **MAY 25 2016 0905**
Received By **FEDEX** Date/Time
Received By *M. Kinslow* Sign *[Signature]* Date/Time **5-27-16 0932**
Received By Date/Time

Relinquished By **Karen Campbell CHPRC** Sign *[Signature]* Date/Time **MAY 25 2016 0905**
Relinquished By **J.C. Fulton/CHPRC** Sign *[Signature]* Date/Time **MAY 25 2016 1400**
Relinquished By **Fepe** Sign *[Signature]* Date/Time
Relinquished By Date/Time

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

FINAL SAMPLE DISPOSITION

PRINTED ON 3/21/2016 FSR ID = FSR26621 A-6004-842 (REV 2)



SAMPLE RECEIPT & REVIEW FORM

Client: <u>CPRC</u>		SDG/AR/COC/Work Order: <u>398194</u>
Received By: <u>MLC</u>		Date Received: <u>5-27-16</u>
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?	<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u>
Classified Radioactive II or III by RSO?	<input checked="" type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?	<input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?	<input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?	<input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?	<input checked="" type="checkbox"/>	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input 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: Ice bags Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius <u>2° 3°</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>130461462</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 checked="" type="checkbox"/>	<input 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 type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
7 VOA vials contain acid preservation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(If unknown, select No)
8 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
9 Are Encore containers present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input 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: FedEx Air <input checked="" type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other <input type="checkbox"/> <u>7763 8384 4157 20*</u> <u>7472 1516 3°</u> <u>7472 1674 3°</u> <u>8087 4849 20*</u>

Comments (Use Continuation Form if needed):

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				C.O.C. # S16-005-151
Collector <i>D.L. Floyd/CHPRC</i>		Contact/Requester Karen Waters-Husted	Telephone No.	509-376-4650		Page 1 of 1
SAF No.	S16-005	Sampling Origin	Hanford Site	Purchase Order/Charge Code	300071	
Project Title	SURV, MAY 2016	Logbook No.	HNF-N-506 <i>821 81</i>	Ice Chest No.	<i>605-458</i>	
Shipped To (Lab)	GEL Laboratories, LLC	Method of Shipment	Commercial Carrier	Bill of Lading/Air Bill No.	<i>776374722199</i>	
Protocol	SURV	Priority:	30 Days	Offsite Property No.	<i>6665</i>	
POSSIBLE SAMPLE HAZARDS/REMARKS		SPECIAL INSTRUCTIONS		Total Activity Exemption: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
*** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1		N/A Special Handling: N/A				
Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis
B35177	Y		<i>W</i> MAY 25 2016	<i>1029</i>	1x250-mL G/P	2320_ALKALINITY: GW 01
B35174	N		<i>W</i> <i>6</i>	<i>1029</i>	1x500-mL P	TRITIUM_DIST_LSC: COMMON
						Holding Time
						14 Days
						6 Months
						Cool <=6C
						None

Relinquished By <i>D.L. Floyd/CHPRC</i>	Print <i>[Signature]</i>	Sign MAY 25 2016	Date/Time 1150	Received By <i>L.D. Wall</i>	Print <i>[Signature]</i>	Sign MAY 25 2016	Date/Time 1150	Matrix * S = Soil = Drum Solids SE = Sediment = DL = Drum Liquids SO = Solid = T = Tissue SL = Sludge = WI = Wipe W = Water = L = Liquid O = Oil = V = Vegetation A = Air = X = Other
Relinquished By <i>L.D. Wall</i>	Print <i>[Signature]</i>	Sign MAY 25 2016	Date/Time 1400	Received By FEDEX	Print <i>[Signature]</i>	Sign MAY 25 2016	Date/Time	
Relinquished By <i>[Signature]</i>	Print <i>[Signature]</i>	Sign <i>[Signature]</i>	Date/Time	Received By <i>M. Kuslow</i>	Print <i>[Signature]</i>	Sign 52876	Date/Time 0930	
Relinquished By			Date/Time	Received By			Date/Time	
FINAL SAMPLE DISPOSITION		Disposal Method (e.g., Return to customer, per lab procedure, used in process)			Disposed By		Date/Time	

PRINTED ON 3/21/2016

FSR ID = FSR27983

A-6004-842 (REV 2)

SAMPLE RECEIPT & REVIEW FORM

Client: <u>OPRA</u>	SDG/AR/COC/Work Order: <u>398194</u>
Received By: <u>MIA</u>	Date Received: <u>5-26-16</u>
Suspected Hazard Information	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No *If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u>
Classified Radioactive II or III by RSO?	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Package, COC, and/or Samples marked as beryllium or asbestos containing?	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?	Hazard Class Shipped: _____ UN#: _____
Samples identified as Foreign Soil?	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Preservation Method: <u>ice bags</u> Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Temperature Device Serial #: <u>39161912</u> Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 Do Low Level Perchlorate samples have headspace as required?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's and containers affected: (If unknown, select No)
7 VOA vials contain acid preservation?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's and containers affected: (If yes, immediately deliver to Volatiles laboratory)
8 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	ID's and tests affected:
9 Are Encore containers present?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's and containers affected:
10 Samples received within holding time?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's affected:
11 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's affected:
12 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's affected:
13 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's affected:
14 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
15 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
16 Carrier and tracking number.				Circle Applicable: FedEx Air <u> </u> FedEx Ground <u> </u> UPS <u> </u> Field Services <u> </u> Courier <u> </u> Other <u> </u> <u>7763 7472 2199</u>

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials DS

Date 5/27/16

Page 1 of 1

GL-CHL-SR-001 Rev 3

Data Review Qualifier Definitions

Project Specific Qualifier Definitions for GEL Client Code: CPRC

Revision #1 27-JUN-2016

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 27 June 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 #: GEL398194
Work Order #: 398194**

Product: Alkalinity

Analytical Method: 2320_ALKALINITY

Analytical Procedure: GL-GC-E-033 REV# 12

Analytical Batch: 1572502

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
398194001	B35177
398194002	B35272
1203562040	Method Blank (MB)
1203562041	Laboratory Control Sample (LCS)
1203562042	398180009(NonSDG) Sample Duplicate (DUP)

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

Data Summary:

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

Certification Statement

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

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: GEL398194 GEL Work Order: 398194

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:** Aubrey Kingsbury**Date:** 09 JUN 2016**Title:** Analyst I

Sample Data Summary

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: June 9, 2016

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF S16-005

Client Sample ID: B35177 Project: CPRC0S16005
 Sample ID: 398194001 Client ID: CPRC001
 Matrix: WATER
 Collect Date: 25-MAY-16 10:29
 Receive Date: 26-MAY-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 CaCO ₃		102000	725	1000	ug/L		AMB	06/07/16	1026	1572502	1
Bicarbonate alkalinity (CaCO ₃)		102000	725	1000	ug/L						
Carbonate alkalinity (CaCO ₃)	U	725	725	1000	ug/L						
Hydroxide alkalinity as CaCO ₃	U	725	725	1000	ug/L						

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	2320_ALKALINITY	

Notes:

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Certificate of Analysis

Report Date: June 9, 2016

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF S16-005

Client Sample ID: B35272 Project: CPRC0S16005
 Sample ID: 398194002 Client ID: CPRC001
 Matrix: WATER
 Collect Date: 25-MAY-16 08:26
 Receive Date: 27-MAY-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		130000	725	1000	ug/L		AMB	06/07/16	1026	1572502	1
Bicarbonate alkalinity (CaCO3)		130000	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

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QC Summary

Report Date: June 9, 2016

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CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 398194

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
Batch	1572502										
QC1203562042	398180009	DUP									
Alkalinity, Total as CaCO3		97800		98300	ug/L	0.528		(0%-20%)	AMB	06/07/16	10:24
Bicarbonate alkalinity (CaCO3)		97800		98300	ug/L	0.528		(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					
QC1203562041	LCS										
Alkalinity, Total as CaCO3	50000			53800	ug/L		108	(80%-120%)		06/07/16	09:12
QC1203562040	MB										
Alkalinity, Total as CaCO3			U	725	ug/L					06/07/16	09:12
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 \geq EQL or is $>$ 5% of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.
- N Spike Sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

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QC Summary

Workorder: 398194

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
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N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ 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 #: GEL398194
Work Order #: 398194**

Product: 9310_ALPHABETA_GPC: Gross Beta
Analytical Method: 9310_ALPHABETA_GPC
Analytical Procedure: GL-RAD-A-001 REV# 18
Analytical Batch: 1570869

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
398194002	B35272
1203557827	Method Blank (MB)
1203557828	398180008(NonSDG) Sample Duplicate (DUP)
1203557829	398180008(NonSDG) Matrix Spike (MS)
1203557830	398180008(NonSDG) Matrix Spike Duplicate (MSD)
1203557831	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 1203557830 (Non SDG 398180008MSD) and 1203557831 (LCS) were recounted due to high recovery. The recounts are reported.

Miscellaneous Information

Additional Comments

The matrix spike and matrix spike duplicate, 1203557829 (Non SDG 398180008MS) and 1203557830 (Non SDG 398180008MSD), aliquots were reduced to conserve sample volume.

Product: SRISO_SEP_PRECIP_GPC: COMMON**Analytical Method:** SRISO_SEP_PRECIP_GPC**Analytical Procedure:** GL-RAD-A-004 REV# 17**Analytical Batch:** 1572720

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
398194002	B35272
1203562624	Method Blank (MB)
1203562625	397971005(B351V8) Sample Duplicate (DUP)
1203562626	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 398194002 (B35272) was verified by recounting at least five days from the separation date. The recount is reported.

Product: TC99_EIE_LSC: COMMON**Analytical Method:** TC99_EIE_LSC**Analytical Procedure:** GL-RAD-A-059 REV# 4**Analytical Batch:** 1571786

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
398194002	B35272
1203560316	Method Blank (MB)
1203560317	398180005(NonSDG) Sample Duplicate (DUP)
1203560318	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: 1572441

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
398194002	B35272
398194003	B35174
1203561879	Method Blank (MB)
1203561880	398168011(NonSDG) Sample Duplicate (DUP)
1203561881	398168011(NonSDG) Matrix Spike (MS)
1203561882	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: 1572447

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
398194002	B35272
1203561899	Method Blank (MB)
1203561900	398180005(NonSDG) Sample Duplicate (DUP)
1203561901	398180005(NonSDG) Matrix Spike (MS)
1203561902	Laboratory Control Sample (LCS)

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

Data Summary:

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

Certification Statement

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

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL398194 GEL Work Order: 398194

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: Kate Gellatly

Date: 22 JUN 2016

Title: Analyst I

Sample Data Summary

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL398194
 Lab Sample ID: 398194002

Client: CPRC001
 Date Collected: 05/25/2016 08:26
 Date Received: 05/27/2016 09:30

Project: CPRC0S16005
 Matrix: WATER

Client ID: B35272
 Batch ID: 1570869
 Run Date: 05/31/2016 17:06
 Data File: AB1570869r1.xls
 Prep Batch: 1570869
 Prep Date: 05/31/2016 09:55

Method: 9310_ALPHABETA_GPC
 Analyst: JXC9
 Aliquot: 125 mL
 Prep Method: EPA 900.0/SW846 9310

Prep Basis: "As Received"
 SOP Ref: GL-RAD-A-001
 Instrument: LB4100F2
 Count Time: 90 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-47-2	Beta BETA		168	pCi/L	+/-7.90	28.5	3.62	4.00
12587-46-1	Alpha ALPHA		5.68	pCi/L	+/-3.18	3.34	3.93	3.00

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

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL398194	Client: CPRC001	Project: CPRC0S16005
Lab Sample ID: 398194002	Date Collected: 05/25/2016 08:26	Matrix: WATER
	Date Received: 05/27/2016 09:30	
Client ID: B35272	Method: SRISO_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1572720	Analyst: KSD1	SOP Ref: GL-RAD-A-004
Run Date: 06/21/2016 08:33	Aliquot: 300 mL	Instrument: PIC3C
Data File: S1572720r2.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1572720		
Prep Date: 06/15/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90		73.0	pCi/L	+/-3.30	12.0	0.894	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	5.90	7.37	mg	80.1	(40%-110%)

Comments:

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

Rad
 Certificate of Analysis
 Sample Summary

SDG Number: GEL398194	Client: CPRC001	Project: CPRC0S16005
Lab Sample ID: 398194002	Date Collected: 05/25/2016 08:26	Matrix: WATER
	Date Received: 05/27/2016 09:30	
Client ID: B35272	Method: TC99_EIE_LSC	Prep Basis: "As Received"
Batch ID: 1571786	Analyst: GXR1	SOP Ref: GL-RAD-A-059
Run Date: 06/12/2016 10:17	Aliquot: 100 mL	Instrument: LSCSILVER
Data File: E1571786.xls	Prep Method: DOE EML HASL-300, Tc-02-	Count Time: 20 min
Prep Batch: 1571786		
Prep Date: 06/07/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	0.729	pCi/L	+/-20.9	20.9	36.4	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	28400	30300	CPM	93.7	(30%-105%)

Comments:

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

Rad
 Certificate of Analysis
 Sample Summary

SDG Number: GEL398194	Client: CPRC001	Project: CPRC0S16005
Lab Sample ID: 398194002	Date Collected: 05/25/2016 08:26	Matrix: WATER
	Date Received: 05/27/2016 09:30	
Client ID: B35272	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1572441	Analyst: TXJ1	SOP Ref: GL-RAD-A-002
Run Date: 06/15/2016 08:13	Aliquot: 50 mL	Instrument: LSCPINK
Data File: T1572441.xls	Prep Method: EPA 906.0 Modified	Count Time: 15.02965 min
Prep Batch: 1572441		
Prep Date: 06/13/2016 10:16		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		2550	pCi/L	+/-486	692	346	400

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

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL398194	Client: CPRC001	Project: CPRC0S16005
Lab Sample ID: 398194002	Date Collected: 05/25/2016 08:26	Matrix: WATER
	Date Received: 05/27/2016 09:30	
Client ID: B35272		Prep Basis: "As Received"
Batch ID: 1572447	Method: C14_LSC	SOP Ref: GL-RAD-A-003
Run Date: 06/14/2016 07:26	Analyst: TXJ1	Instrument: LSCTEAL
Data File: C1572447.xls	Aliquot: 60 mL	Count Time: 30 min
Prep Batch: 1572447	Prep Method: EPA EERF C-01 Modified	
Prep Date: 06/13/2016 09:21		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14		262	pCi/L	+/-27.0	55.6	33.1	50.0

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

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL398194	Client: CPRC001	Project: CPRC0S16005
Lab Sample ID: 398194003	Date Collected: 05/25/2016 10:29	Matrix: WATER
	Date Received: 05/26/2016 09:30	
Client ID: B35174		Prep Basis: "As Received"
Batch ID: 1572441	Method: TRITIUM_DIST_LSC	SOP Ref: GL-RAD-A-002
Run Date: 06/15/2016 08:30	Analyst: TXJ1	Instrument: LSCPINK
Data File: T1572441.xls	Aliquot: 50 mL	Count Time: 15.02965 min
Prep Batch: 1572441	Prep Method: EPA 906.0 Modified	
Prep Date: 06/13/2016 10:16		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		1850	pCi/L	+/-426	557	348	400

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

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

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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Client : CH2MHill Plateau Remediation Company
 MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352

Contact: Mr. Scot Fitzgerald

Workorder: 398194

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gas Flow									
Batch	1570869								
QC1203557827	MB								
Alpha			U	0.407	pCi/L			JXC9	05/31/1617:07
				Uncert: +/-1.19					
				TPU: +/-1.19					
Beta			U	-1.12	pCi/L				
				Uncert: +/-1.77					
				TPU: +/-1.77					
QC1203557828	398180008	DUP							
Alpha		3.01	U	1.72	pCi/L				05/31/1617:07
				Uncert: +/-2.10		RPD: 54	(0% - 100%)		
				TPU: +/-2.16		RER: 0.904	(0-2)		
Beta		23.9		23.6	pCi/L				
				Uncert: +/-3.32		RPD: 1	(0% - 20%)		
				TPU: +/-5.20		RER: 0.076	(0-2)		
QC1203557829	398180008	MS							
Alpha		240		3.01	pCi/L	REC: 101	(75%-125%)		05/31/1617:06
				Uncert: +/-2.10					
				TPU: +/-2.16					
Beta		877		23.9	pCi/L	REC: 112	(75%-125%)		
				Uncert: +/-3.32					
				TPU: +/-5.20					
QC1203557830	398180008	MSD							
Alpha		240		3.01	pCi/L	REC: 103	(75%-125%)		06/01/1606:55
				Uncert: +/-2.10		RPD: 2	(0%-20%)		
				TPU: +/-2.16		RER: 0.157	(0-2)		
Beta		877		23.9	pCi/L	REC: 119	(75%-125%)		
				Uncert: +/-3.32		RPD: 6	(0%-20%)		
				TPU: +/-5.20		RER: 0.475	(0-2)		
QC1203557831	LCS								
Alpha		79.9			pCi/L	REC: 98	(80%-120%)		06/01/1611:21
				Uncert: +/-7.72					
				TPU: +/-15.0					
Beta		292			pCi/L	REC: 120	(80%-120%)		
				Uncert: +/-12.7					
				TPU: +/-59.2					
Batch	1572720								
QC1203562624	MB								
Strontium-90			U	-0.738	pCi/L			KSD1	06/16/1617:19
				Uncert: +/-0.697					
				TPU: +/-0.697					
**Strontium Carrier		7.37		6.50	mg	REC: 88	(40%-110%)		
QC1203562625	397971005	DUP							
Strontium-90		U	0.620	U	1.32	pCi/L			06/16/1617:17
				Uncert: +/-0.841		RPD: 0	N/A		
				TPU: +/-0.847		RER: 1.04	(0-2)		

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QC Summary

Workorder: 398194

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gas Flow									
Batch	1572720								
**Strontium Carrier	7.37	5.70		5.80	mg	REC: 79	(40%-110%)		
QC1203562626 LCS									
Strontium-90	73.0			74.7	pCi/L	REC: 102	(80%-120%)		06/16/1617:19
	Uncert:			+/-4.40					
	TPU:			+/-13.0					
**Strontium Carrier	7.37			6.10	mg	REC: 83	(40%-110%)		
Rad Liquid Scintillation									
Batch	1571786								
QC1203560316 MB									
Technetium-99			U	-3.28	pCi/L			GXR1	06/12/1611:45
	Uncert:			+/-19.9					
	TPU:			+/-19.9					
**Technetium-99m Tracer	30300			29500	CPM	REC: 97	(30%-105%)		
QC1203560317 398180005 DUP									
Technetium-99		U	-11.8	U	1.48	pCi/L			06/12/1612:06
	Uncert:		+/-19.9		+/-20.9	RPD: 0	N/A		
	TPU:		+/-19.9		+/-20.9	RER: 0.902	(0-2)		
**Technetium-99m Tracer	30300	28500		28600	CPM	REC: 94	(30%-105%)		
QC1203560318 LCS									
Technetium-99	861			731	pCi/L	REC: 85	(80%-120%)		06/12/1612:28
	Uncert:			+/-39.0					
	TPU:			+/-90.0					
**Technetium-99m Tracer	30300			30100	CPM	REC: 100	(30%-105%)		
Batch	1572441								
QC1203561879 MB									
Tritium			U	108	pCi/L			TXJ1	06/15/1609:58
	Uncert:			+/-193					
	TPU:			+/-194					
QC1203561880 398168011 DUP									
Tritium		6280		5800	pCi/L				06/15/1610:15
	Uncert:		+/-746	+/-705	RPD: 8	(0% - 20%)			
	TPU:		+/-1430	+/-1320	RER: 0.489	(0-2)			
QC1203561881 398168011 MS									
Tritium	2340	6280		8790	pCi/L	REC: 107	(75%-125%)		06/15/1610:33
	Uncert:		+/-746	+/-876					
	TPU:		+/-1430	+/-1910					
QC1203561882 LCS									
Tritium	2330			2100	pCi/L	REC: 90	(80%-120%)		06/15/1610:50
	Uncert:			+/-435					
	TPU:			+/-594					
Batch	1572447								
QC1203561899 MB									
Carbon-14			U	-0.941	pCi/L			TXJ1	06/14/1608:28
	Uncert:			+/-19.1					
	TPU:			+/-19.1					
QC1203561900 398180005 DUP									
Carbon-14		245		272	pCi/L				06/14/1608:59
	Uncert:		+/-26.5	+/-27.0	RPD: 10	(0% - 20%)			
	TPU:		+/-52.6	+/-57.2	RER: 0.673	(0-2)			

GEL LABORATORIES LLC

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QC Summary

Workorder: 398194

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Liquid Scintillation										
Batch	1572447									
QC1203561901	398180005	MS								
Carbon-14	1260	245		1500	pCi/L	REC: 100	(75%-125%)		06/14/1609:31	
	Uncert:	+/-26.5		+/-49.5						
	TPU:	+/-52.6		+/-283						
QC1203561902	LCS									
Carbon-14	1260			1270	pCi/L	REC: 101	(80%-120%)		06/14/1610:02	
	Uncert:			+/-46.2						
	TPU:			+/-241						

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
- > 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.