

July 27, 2015



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July 20, 2015

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

Re: CHPRC SAF F15-028  
Work Order: 375889  
SDG: GEL375889

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 30, 2015. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,

*Chelsea Seagle*  
Chelsea Seagle for  
Heather Shaffer  
Project Manager

Purchase Order: 303581 - 7H  
Chain of Custody: F15-028-022 and F15-028-033  
Enclosures



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# Case Narrative

July 27, 2015

General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF F15-028  
SDG: GEL375889

July 20, 2015

**Laboratory Identification:**

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

**Summary**

**Sample receipt**

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on June 30, 2015, for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

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

**Sample Identification**

The laboratory received the following samples:

<b>Laboratory Identification</b>	<b>Sample Description</b>
375889001	B30RT1
375889002	B30T37

**Case Narrative**

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

**Data Package**

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

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

*Chelsea Seagle*  
July 27, 2015

Chelsea Seagle for  
Heather Shaffer  
Project Manager

# **Chain of Custody and Supporting Documentation**



July 27, 2015

**CH2MHill Plateau Remediation Company**  
**COLLECTOR** T.L. BACON/CHPRC  
**SAMPLING LOCATION** C8796, Interval 41 REQ  
**ICE CHEST NO.** 605-392  
**SHIPPED TO** GEL Laboratories, LLC  
**CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** PROJECT COORDINATOR TODAY, D  
**COMPANY CONTACT** SUMNER, LC  
**TELEPHONE NO.** 376-3922  
**PROJECT DESIGNATION** 100-KE Characterization Boreholes - Water  
**FIELD LOGBOOK NO.** HMF-N-645-3  
**ACTUAL SAMPLE DEPTH** 102.18 ft  
**OFFSITE PROPERTY NO.** 5756  
**PRICE CODE** 7H  
**AIR QUALITY**   
**METHOD OF SHIPMENT** FEDERAL EXPRESS  
**F15-028-033**  
**7739 3881 4229**  
**PAGE 1 OF 1**  
**DATA TURNAROUND** 30 Days / 30 Days  
**ORIGINAL**

MATRIX*	POSSIBLE SAMPLE HAZARDS/ REMARKS	PRESERVATION	HOLDING TIME	TYPE OF CONTAINER	NO. OF CONTAINER(S)	VOLUME	SAMPLE ANALYSIS
A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.	Cool <=6C	14 Days	G/P	1	250ml	SEE ITEM (1) IN SPECIAL INSTRUCTIONS
<b>SAMPLE NO.</b>	<b>MATRIX*</b>	<b>SAMPLE DATE</b>	<b>SAMPLE TIME</b>				
B31T37	WATER	6-25-15	1449	✓			

**CHAIN OF POSSESSION**

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
T.L. BACON/CHPRC	6/25/15 1540	SSU-1	6-25-15 1540
SSU-1	JUN 29 2015 1035	L.D. WALKER	JUN 29 2015 1035
L.D. WALKER	JUN 29 2015 1400	FEDEX	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

**SPECIAL INSTRUCTIONS**  
 TRVL-15-037  
 (1) 2320\_ALKALINITY: COMMON {Alkalinity}; 2320\_ALKALINITY: COMMON (Add-on) {Bicarbonate, Carbonate alkalinity, Hydroxylon};

**LABORATORY SECTION** RECEIVED BY  
**FINAL SAMPLE DISPOSITION** DISPOSAL METHOD  
**PRINTED ON** 6/17/2015  
**FRS ID = FSR1160**  
**TRVL NUM = TRVL-15-037**  
 A-6003-618 (REV 2)

July 27, 2015

Client: <u>CPRC</u>		SDG/AR/COC/Work Order: <u>375889</u>
Received By: <u>mic</u>		Date Received: <u>6-30-15</u>
Suspected Hazard Information	Yes <input type="checkbox"/> No <input 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>open</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: <u>ice bags</u> Blue ice Dry ice None Other (describe) <u>dc</u> all temperatures are recorded in Celsius
2a	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>ES032015830</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 (EPA 6850) have headspace as required?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
7	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:
8	Are Encore containers present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
9	Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
10	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:
11	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
12	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
13	Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
14	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
15	Carrier and tracking number.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other <u>7739 3881 3406 2<sup>c</sup></u> <u>4229 2<sup>c</sup></u>

Comments (Use Continuation Form if needed):

# **Data Review Qualifier Definitions**

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

Code	Status	Qualifier Definition	CofA	Department	Fraction	Additional Comments
U	Programmed	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.	Y			Includes MDA, TPU, count uncert.
J	Programmed	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated	Y	Organics		Organics only
P	Programmed	Aroclor target analyte with greater than 25% difference between column analyses.	Y	Organics		PCB only
C	Manual	Analyte has been confirmed by GC/MS analysis	Y	Organics	Pesticide	IF GC/MS confirmation was attempted but unsuccessful do not qualify with C
B	Programmed	The analyte was detected in both the associated QC blank and in the sample.	Y	Organics		
E	Manual	Concentration exceeds the calibration range of the instrument	Y	Organics		Qualifier Uploaded
A	Manual	The TIC is a suspected aldol-condensation product	Y	Organics	Semi-Volatile	Uploaded with TIC
X	Programmed	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier	Y			Replaces H Hold Date In RAD replaces UI. Same usage as standard X as well.
N	Programmed	Spike Sample recovery is outside control limits.	Y			
*	Programmed	Duplicate analysis not within control limits	Y	Inorganics		
>	Programmed	Result greater than quantifiable range or greater than upper limit of the analysis range	Y	General Chemistry		
Z	Manual	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier	Y			
B	Programmed	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).	Y	Inorganics	Metals	Replaces J Estimated Value
D	Programmed	Results are reported from a diluted aliquot of sample.	Y			Dilution
E	Programmed	Reported value is estimated due to interferences. See comment in narrative.	Y	Inorganics	Metals	GEL E
M	Manual	Duplicate precision not met.	Y	Inorganics	Metals	Replaces *
o	Programmed	Analyte failed to recover within LCS limits (Organics only)	Y	Organics		
S	Manual	Reported value determined by the Method of Standard Additions (MSA)	Y	Inorganics		Not coded B/C Rarely performed
T	Programmed	Spike and/or spike duplicate sample recovery is outside control limits.	Y	Organics		GC/MS only
W	Manual	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.	Y	Inorganics		No GFAA in house.
B	Programmed	The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is $\geq$ MDA for this sample	Y	Radiological		
Y	Manual	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier	Y			
+	Manual	Correlation coefficient for Method of Standard Additions (MSA) is < 0.995	Y	Inorganics		
B	Programmed	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).	Y	General Chemistry		Replaces J Estimated Value
C	Programmed	Target analyte was detected in the sample and the associated blank. The associated blank concentration is $\geq$ EQL or is > 5% of the measured concentration and/or decision level for associated samples.	Y	Inorganics	Metals	Replaces B Blank Detection
C	Programmed	Target analyte was detected in the sample and the associated blank. The associated blank concentration is $\geq$ EQL or is > 5% of the measured concentration and/or decision level for associated samples.	Y	General Chemistry		Replaces B Blank Detection
<	Programmed	Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide	Y	General Chemistry		for Reactive CN/S

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

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

# Laboratory Certifications

**List of current GEL Certifications as of 20 July 2015**

<b>State</b>	<b>Certification</b>
Alaska	UST-110
Arkansas	88-0651
CLIA	42D0904046
California	2940 Interim
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC000122013-10
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-12-00283, P330-12-00284
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC000122013-10
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA150001
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC000122013-10
Nebraska	NE-OS-26-13
Nevada	SC000122014-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
Oklahoma	9904
Pennsylvania NELAP	68-00485
Plant Material Permit	PDEP-12-00260
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-15-10
Utah NELAP	SC000122015-17
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

# Metals Analysis

# Case Narrative

July 27, 2015

Metals

Technical Case Narrative

CH2MHill Plateau Remediation Company (CPRC)

SDG #: GEL375889

Work Order #: 375889

<b>Sample ID</b>	<b>Client ID</b>
375889001	B30RT1
1203346254	Method Blank (MB)ICP
1203346255	Laboratory Control Sample (LCS)
1203346258	375891001(B317N4L) Serial Dilution (SD)
1203346261	375889001(B30RT1L) Serial Dilution (SD)
1203346264	375890001(B30T67L) Serial Dilution (SD)
1203346256	375891001(B317N4S) Matrix Spike (MS)
1203346259	375889001(B30RT1S) Matrix Spike (MS)
1203346262	375890001(B30T67S) Matrix Spike (MS)
1203346257	375891001(B317N4SD) Matrix Spike Duplicate (MSD)
1203346260	375889001(B30RT1SD) Matrix Spike Duplicate (MSD)
1203346263	375890001(B30T67SD) Matrix Spike Duplicate (MSD)

### Sample Analysis

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

### Method/Analysis Information

<b>Analytical Batch:</b>	1489297
<b>Prep Batch :</b>	1489296
<b>Standard Operating Procedures:</b>	GL-MA-E-013 REV# 24 and GL-MA-E-006 REV# 12
<b>Analytical Method:</b>	6010_METALS_ICP
<b>Prep Method :</b>	SW846 3005A

### Preparation/Analytical Method Verification

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

### System Configuration

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

### Calibration Information

#### **Instrument Calibration**

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

**CRDL/PQL Requirements**

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

**ICSA/ICSAB Statement**

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

**Continuing Calibration Blanks (CCB) Requirements**

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

**Continuing Calibration Verification (CCV) Requirements**

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

**Quality Control (QC) Information**

**Method Blank (MB) Statement**

The MBs analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

**Quality Control (QC) Sample Statement**

The following samples were selected as the quality control (QC) samples for this SDG: 375889001 (B30RT1), 375890001 (B30T67) and 375891001 (B317N4).

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

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

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

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

**Serial Dilution % Difference Statement**

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

**Technical Information**

**Holding Time Specifications**

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

**Preparation/Analytical Method Verification**

All procedures were performed as stated in the SOP.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Preparation Information**

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

**Miscellaneous Information**

**Electronic Packaging Comment**

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

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

**Data Exception (DER) Documentation**

A data exception report was not required for this SDG.

**Additional Comments**

Additional comments were not required for this SDG.

**Certification Statement**

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

July 27, 2015

## GEL LABORATORIES LLC

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

### Qualifier Definition Report for

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL375889 GEL Work Order: 375889

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

- \* Duplicate analysis not within control limits
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- D Results are reported from a diluted aliquot of sample.
- N Spike Sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

#### Review/Validation

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

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

Signature: 

Name: Nik-Cole Elmore

Date: 27 JUL 2015

Title: Data Validator

# Sample Data Summary

METALS  
-1-  
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL375889

METHOD TYPE: SW846

SAMPLE ID: 375889001

CLIENT ID: B30RT1

CONTRACT: CPRC0F15028

MATRIX: WATER

DATE RECEIVED 30-JUN-15

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-47-3	Chromium	4.91	ug/L	B		P	1	1	OPTIMA3	070215-1

\*Analytical Methods:

P SW846 3005A/6010C

# Quality Control Summary

July 27, 2015

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 27, 2015

Page 1 of 2

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 375889

Table with columns: Parmname, NOM, Sample, Qual, QC, Units, RPD/D%, REC%, Range, Anlst, Date, Time. Rows include Metals Analysis-ICP, Chromium, and various sample IDs like QC1203346255.

Notes:

The Qualifiers in this report are defined as follows:

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

July 27, 2015

**GEL LABORATORIES LLC**

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

**QC Summary**

Workorder: 375889

Page 2 of 2

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
D	Results are reported from a diluted aliquot of sample.										
E	Reported value is estimated due to interferences. See comment in narrative.										
M	Duplicate precision not met.										
N	Spike Sample recovery is outside control limits.										
S	Reported value determined by the Method of Standard Additions (MSA)										
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.										
W	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										

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

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

# General Chem Analysis

# Case Narrative

July 27, 2015

**General Chemistry  
Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL375889  
Work Order #: 375889**

**Method/Analysis Information**

**Product:** Alkalinity  
**Analytical Batch:** 1489415      **Method:** 2320\_ALKALINITY: COMMON + (ADD ON)

**Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
375889002	B30T37
1203346511	Method Blank (MB)
1203346513	Laboratory Control Sample (LCS)
1203346516	375888005(B31LB8) Sample Duplicate (DUP)
1203346518	375888005(B31LB8) Matrix Spike (MS)

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

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-033 REV# 11.

**Preparation/Analytical Method Verification**

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

**Calibration Information**

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

**Initial Standardization**

The titrant was properly standardized

**Quality Control (QC) Information**

**Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 375888005 (B31LB8) was selected for QC analysis.

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

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

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

**Miscellaneous Information**

**Data Exception (DER) Documentation**

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

**Additional Comments**

50mL of sample was used due to limited sample quantity and selection for QC. 1203346516 (Non SDG 375888005DUP) and 1203346518 (Non SDG 375888005MS).

**Electronic Packaging Comment**

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

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

**Certification Statement**

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

July 27, 2015

**GEL LABORATORIES LLC**

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

**Qualifier Definition Report  
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL375889 GEL Work Order: 375889

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

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

**Review/Validation**

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

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

**Signature:** 

**Name:** Thomas Lewis

**Date:** 23 JUL 2015

**Title:** Data Validator

# Sample Data Summary

~~JUL 27 2015~~  
**GEL LABORATORIES LLC**

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

**Certificate of Analysis**

Report Date: July 23, 2015

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

Client Sample ID: B30T37	Project: CPRC0F15028
Sample ID: 375889002	Client ID: CPRC001
Matrix: WATER	
Collect Date: 25-JUN-15 14:49	
Receive Date: 30-JUN-15	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Titration and Ion Analysis											
2320_ALKALINITY: COMMON + (ADD ON) "As Received"											
Alkalinity, Total as CaCO3		111000	725	1000	ug/L		PX01	07/01/15	1734	1489415	1
Bicarbonate alkalinity (CaCO3)		111000	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

July 27, 2015

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 23, 2015

Page 1 of 2

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 375889

Table with columns: Parmname, NOM, Sample, Qual, QC, Units, RPD%, REC%, Range, Anlst, Date, Time. Rows include Titration and Ion Analysis, Alkalinity, Total as CaCO3, Bicarbonate alkalinity (CaCO3), Carbonate alkalinity (CaCO3), Hydroxide alkalinity as CaCO3 for various samples.

Notes:

The Qualifiers in this report are defined as follows:

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

July 27, 2015

**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 375889

Page 2 of 2

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

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

**July 27, 2015**  
**Radiochemistry**  
**Technical Case Narrative**  
**CH2MHill Plateau Remediation Company (CPRC)**  
**SDG #: GEL375889**  
**Work Order #: 375889**

**Method/Analysis Information**

**Product:** AMCMISO\_EIE\_PRECIP\_AEA: COMMON

Analytical Method: AMCMISO\_EIE\_PREC\_AEA

Analytical Batch Number: 1489314

<b>Sample ID</b>	<b>Client ID</b>
375889001	B30RT1
1203346289	Method Blank (MB)
1203346292	Laboratory Control Sample (LCS)
1203346291	375889001(B30RT1) Sample Duplicate (DUP)

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

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-011 REV# 25.

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

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

**Sample Geometry**

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

**Quality Control (QC) Information:**

**Blank Information**

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

**Designated QC**

The following sample was used for QC: 375889001 (B30RT1).

**QC Information**

All of the QC samples meet the required acceptance limits with the following exceptions: Refer to Data

Exception Report (DER).

**Technical Information:**

**Holding Time**

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

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

The batch was repped due to elevated MDC's. The reanalysis is being reported.

**Recounts**

Sample 1203346289 (MB) was recounted due to high MDC. The recount is reported.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. The following DER was generated for this SDG: DER 1427256 was generated due to RDL less than MDA. 1. Duplicate Sample 1203346290 does not meet the detection limits for Cm-243/244 due to lower tracer yield recovery. 1. The tracer yield recovery does meet the client acceptance criteria. Sample was recounted for the maximum count time of 1000 minutes in order to achieve the best possible MDC's. The QC sample 374612011 does meet the detection limits and there is no reportable activity present in either of the samples. Reporting results.

**Manual Integration**

No manual integrations were performed on data in this batch.

**Sample-Specific MDA/MDC**

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

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** PUIISO\_PRECIP\_AEA:COMMON  
**Analytical Method:** PUIISO\_PLATE\_AEA  
**Analytical Batch Number:** 1489315

<b>Sample ID</b>	<b>Client ID</b>
375889001	B30RT1
1203346295	Method Blank (MB)
1203346298	Laboratory Control Sample (LCS)
1203346297	375889001(B30RT1) Sample Duplicate (DUP)

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

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-011 REV# 25.

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

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

**Sample Geometry**

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

**Quality Control (QC) Information:**

**Blank Information**

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

**Designated QC**

The following sample was used for QC: 375889001 (B30RT1).

**QC Information**

All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**

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

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

Batch was reprepared due to elevated MDC's. The reanalysis is being reported.

**Recounts**

Sample 1203346295 (MB) was recounted due to high MDC. The recount is reported.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**

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

**Manual Integration**

No manual integrations were performed on data in this batch.

**Sample-Specific MDA/MDC**

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

**Additional Comments**

July 27, 2015

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** UISO\_IE\_PRECIP\_AEA:COMMON

Analytical Method: UISO\_IE\_PRECIP\_AEA

Analytical Batch Number: 1489317

<b>Sample ID</b>	<b>Client ID</b>
375889001	B30RT1
1203346299	Method Blank (MB)
1203346302	Laboratory Control Sample (LCS)
1203346301	375889001(B30RT1) Sample Duplicate (DUP)

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

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-011 REV# 25.

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

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

**Sample Geometry**

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

**Quality Control (QC) Information:**

**Blank Information**

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

**Designated QC**

The following sample was used for QC: 375889001 (B30RT1).

**QC Information**

All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**

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

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

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

**Recounts**

None of the samples in this sample set were recounted.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**

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

**Manual Integration**

No manual integrations were performed on data in this batch.

**Sample-Specific MDA/MDC**

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

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** I129\_SEP\_LEPS\_GS: COMMON  
**Analytical Method:** DOE EML HASL-300,I-01 Modified  
**Analytical Batch Number:** 1488741

<b>Sample ID</b>	<b>Client ID</b>
375889001	B30RT1
1203344746	Method Blank (MB)
1203344749	Laboratory Control Sample (LCS)
1203346888	Laboratory Control Sample Duplicate (LCSD)

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

**SOP Reference**

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

GL-RAD-A-006 REV# 21.

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

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

**Sample Geometry**

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

**Quality Control (QC) Information:**

**Blank Information**

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

**Designated QC**

A laboratory control sample and duplicate, 1203344749 (LCS) and 1203346888 (LCSD), were analyzed for precision.

**QC Information**

All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**

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

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

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

**Recounts**

None of the samples in this sample set were recounted.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**

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

**Sample-Specific MDA/MDC**

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

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

Method/Analysis Information

**Product:** GAMMA\_GS:COMMON (Cs137,Co60,Eu152,Eu154,Eu155)  
**Analytical Method:** 901.1\_GAMMA\_GS  
**Analytical Batch Number:** 1489509

<b>Sample ID</b>	<b>Client ID</b>
375889001	B30RT1
1203346732	Method Blank (MB)
1203346735	Laboratory Control Sample (LCS)
1203346733	375889001(B30RT1) Sample Duplicate (DUP)

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

**SOP Reference**

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

Calibration Information:

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

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

**Sample Geometry**

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

Quality Control (QC) Information:

**Blank Information**

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

**Designated QC**

The following sample was used for QC: 375889001 (B30RT1).

**QC Information**

All of the QC samples met the required acceptance limits.

Technical Information:

**Holding Time**

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

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

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

**Recounts**

None of the samples in this sample set were recounted.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**

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

**Sample-Specific MDA/MDC**

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

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** SRTOT\_SEP\_PRECIP\_GPC: COMMON

Analytical Method: SRISO\_SEP\_PRECIP\_GPC

Analytical Batch Number: 1491695

<b>Sample ID</b>	<b>Client ID</b>
375889001	B30RT1
1203351615	Method Blank (MB)
1203351618	Laboratory Control Sample (LCS)
1203351617	375889001(B30RT1) Sample Duplicate (DUP)

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

**SOP Reference**

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

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

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

July 27, 2015

**Sample Geometry**

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

**Quality Control (QC) Information:**

**Blank Information**

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

**Designated QC**

The following sample was used for QC: 375889001 (B30RT1).

**QC Information**

All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**

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

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

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

**Chemical Recoveries**

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

**Recounts**

Sample 375889001 (B30RT1) was recounted due to results more negative than the three sigma TPU. The second count is reported. Sample 1203351617 (B30RT1DUP) was recounted due to a suspected false positive. The recount is reported.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**

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

**Manual Integration**

No manual integrations were performed on data in this batch.

**Sample-Specific MDA/MDC**

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

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

July 27, 2015

**Product:** TRITIUM\_DIST\_LSC: COMMON  
**Analytical Method:** TRITIUM\_DIST\_LSC  
**Analytical Batch Number:** 1489694

<b>Sample ID</b>	<b>Client ID</b>
375889001	B30RT1
1203347160	Method Blank (MB)
1203347163	Laboratory Control Sample (LCS)
1203347161	375889001(B30RT1) Sample Duplicate (DUP)
1203347162	375889001(B30RT1) Matrix Spike (MS)

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

#### **SOP Reference**

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

#### **Calibration Information:**

##### **Calibration Information**

All initial and continuing calibration requirements have been met.

##### **Standards Information**

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

##### **Sample Geometry**

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

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

##### **Blank Information**

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

##### **Designated QC**

The following sample was used for QC: 375889001 (B30RT1).

##### **QC Information**

All of the QC samples met the required acceptance limits.

#### **Technical Information:**

##### **Holding Time**

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

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

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

##### **Recounts**

None of the samples in this sample set were recounted.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**

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

**Sample-Specific MDA/MDC**

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

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** C14\_LSC: COMMON

Analytical Method: C14\_LSC

Analytical Batch Number: 1489699

Sample ID	Client ID
375889001	B30RT1
1203347173	Method Blank (MB)
1203347176	Laboratory Control Sample (LCS)
1203347174	375889001(B30RT1) Sample Duplicate (DUP)
1203347175	375889001(B30RT1) Matrix Spike (MS)

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

**SOP Reference**

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

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

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

**Sample Geometry**

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

**Quality Control (QC) Information:**

**Blank Information**

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

**Designated QC**

The following sample was used for QC: 375889001 (B30RT1).

**QC Information**

All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**

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

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

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

**Recounts**

None of the samples in this sample set were recounted.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**

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

**Sample-Specific MDA/MDC**

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

**Additional Comments**

The matrix spike, 1203347175 (B30RT1MS), aliquot was reduced to conserve sample volume.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** TC99\_EIE\_LSC: COMMON  
**Analytical Method:** TC99\_EIE\_LSC  
**Analytical Batch Number:** 1490616

<b>Sample ID</b>	<b>Client ID</b>
375889001	B30RT1
1203349274	Method Blank (MB)
1203349277	Laboratory Control Sample (LCS)

July 27, 2015

1203349276 375889001(B30RT1) Sample Duplicate (DUP)

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

**SOP Reference**

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

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

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

**Sample Geometry**

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

**Quality Control (QC) Information:**

**Blank Information**

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

**Designated QC**

The following sample was used for QC: 375889001 (B30RT1).

**QC Information**

All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**

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

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

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

**Recounts**

None of the samples in this sample set were recounted.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**

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

**Sample-Specific MDA/MDC**

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

**Additional Comments**

Additional comments were not required for this sample set.

July 27, 2015

**Qualifier Information**

Manual qualifiers were not required.

**Certification Statement**

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

July 27, 2015

**GEL LABORATORIES LLC**

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

**Qualifier Definition Report  
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL375889 GEL Work Order: 375889

**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:** 23 JUL 2015

**Title:** Analyst I

**DATA EXCEPTION REPORT**

<b>Mo.Day Yr.</b> 06-JUL-15	<b>Division:</b> Radiochemistry	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> ALPHA SPECTROMETER	<b>Test / Method:</b> DOE EML HASL-300, Am-05-RC Modified	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> CPRC
<b>Batch ID:</b> 1489314	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG):</b> 374557(GEL374557),374612(GEL374612),374830(GEL374830),375052(GEL375052),375432(GEL375432),375706(GEL375706),375889(GEL375889)			
<b>Application Issues:</b>  RDL less than MDA			
<b>Specification and Requirements Exception Description:</b>		<b>DER Disposition:</b>	
1. Duplicate Sample 1203346290 does not meet the detection limits for Cm-243/244 due to lower tracer yield recovery.		1. The tracer yield recovery does meet the client acceptance criteria. Sample was recounted for the maximum count time of 1000 minutes in order to achieve the best possible MDC's. The QC sample 374612011 does meet the detection limits and there is no reportable activity present in either of the samples. Reporting results.	

**Originator's Name:**  
Jessica Downey      06-JUL-15

**Data Validator/Group Leader:**  
Jessica Davis      06-JUL-15

# Sample Data Summary

July 27 2015  
Rad

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL375889	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15028
<b>Lab Sample ID:</b> 375889001	<b>Date Collected:</b> 06/25/2015 14:49	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/30/2015 10:45	
<b>Client ID:</b> B30RT1	<b>Method:</b> AMCMISO_EIE_PREC_AEA	<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 1489314	<b>Analyst:</b> MXS2	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 07/01/2015 10:04	<b>Aliquot:</b> 0.05 L	<b>Instrument:</b> 1088
<b>Data File:</b> S0375889001_AM.1A.gcnf	<b>Prep Method:</b> DOE EML HASL-300, Am-05	<b>Count Time:</b> 239.9998 min
<b>Prep Batch:</b> 1489314		
<b>Prep Date:</b> 06/30/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	-0.12	pCi/L	+/-0.363	0.364	1.02	1.00
	Curium-243/244	U	0.00659	pCi/L	+/-0.489	0.489	1.09	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	31.3	42.8	pCi/L	73.2	(15%-125%)

**Comments:**

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

July 27 2015

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL375889	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15028
<b>Lab Sample ID:</b> 375889001	<b>Date Collected:</b> 06/25/2015 14:49	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/30/2015 10:45	
<b>Client ID:</b> B30RT1	<b>Method:</b> PUIISO_PLATE_AEA	<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 1489315	<b>Analyst:</b> MXS2	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 07/01/2015 10:04	<b>Aliquot:</b> 0.05 L	<b>Instrument:</b> 1073
<b>Data File:</b> S0375889001_PU.1A.gcnf	<b>Prep Method:</b> DOE EML HASL-300, Pu-11-	<b>Count Time:</b> 240 min
<b>Prep Batch:</b> 1489315		
<b>Prep Date:</b> 06/30/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	0.138	pCi/L	+/-0.471	0.472	0.874	1.00
OER-100-70	Plutonium-239/240	U	-0.053	pCi/L	+/-0.495	0.496	1.15	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	32.8	39.4	pCi/L	83.3	(15%-125%)

**Comments:**

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

July 27, 2015

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL375889	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15028
<b>Lab Sample ID:</b> 375889001	<b>Date Collected:</b> 06/25/2015 14:49	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/30/2015 10:45	
<b>Client ID:</b> B30RT1	<b>Method:</b> UIISO_IE_PRECIP_AEA	<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 1489317	<b>Analyst:</b> MXS2	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 07/01/2015 10:04	<b>Aliquot:</b> 0.05 L	<b>Instrument:</b> 1014
<b>Data File:</b> S0375889001_UU.1A.gcnf	<b>Prep Method:</b> DOE EML HASL-300, U-02-R	<b>Count Time:</b> 240 min
<b>Prep Batch:</b> 1489317		
<b>Prep Date:</b> 06/30/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
U-233/234 <small>13968-55-3/13966-29-5</small>	Uranium-233/234	U	0.335	pCi/L	+/-0.542	0.545	0.839	1.00
15117-96-1/13982-7	Uranium-235/236	U	0.0769	pCi/L	+/-0.427	0.428	0.819	1.00
7440-61-1	Uranium-238	U	0.512	pCi/L	+/-0.585	0.591	0.731	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	40.4	42.4	pCi/L	95.1	(15%-125%)

**Comments:**

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

July 27 2015  
Rad

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL375889	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15028
<b>Lab Sample ID:</b> 375889001	<b>Date Collected:</b> 06/25/2015 14:49	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/30/2015 10:45	
<b>Client ID:</b> B30RT1	<b>Method:</b> SRISO_SEP_PRECIP_GPC	<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 1491695	<b>Analyst:</b> KSD1	<b>SOP Ref:</b> GL-RAD-A-004
<b>Run Date:</b> 07/16/2015 14:51	<b>Aliquot:</b> 0.3 L	<b>Instrument:</b> PIC4C
<b>Data File:</b> S1491695r1.xls	<b>Prep Method:</b> EPA 905.0 Modified/DOE RP5	<b>Count Time:</b> 60 min
<b>Prep Batch:</b> 1491695		
<b>Prep Date:</b> 07/14/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	0.0109	pCi/L	+/-0.635	0.636	1.23	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	7.10	8.10	mg	87.7	(25%-125%)

**Comments:**

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

July 27 2015

**Certificate of Analysis  
Sample Summary**

SDG Number: GEL375889	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 375889001	Date Collected: 06/25/2015 14:49	Matrix: WATER
	Date Received: 06/30/2015 10:45	
Client ID: B30RT1	Method: DOE EML HASL-300,I-01 Mo	Prep Basis: As Received
Batch ID: 1488741	Analyst: MJH1	SOP Ref: GL-RAD-A-006
Run Date: 07/07/2015 14:58	Aliquot: 1.5 L	Instrument: XRAY1
Data File: I375889001.CNF;1	Prep Method: DOE EML HASL-300,I-01 M	Count Time: 60 min
Prep Batch: 1488741		
Prep Date: 07/01/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129	U	0.134	pCi/L	+/-0.446	0.451	0.883	5.00

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

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

July 27 2015  
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**Certificate of Analysis  
Sample Summary**

SDG Number: GEL375889  
Lab Sample ID: 375889001  
  
Client ID: B30RT1  
Batch ID: 1489509  
Run Date: 07/08/2015 07:24  
Data File: G375889001.CNF;1  
Prep Batch: 1489509  
Prep Date: 07/02/2015 00:00

Client: CPRC001  
Date Collected: 06/25/2015 14:49  
Date Received: 06/30/2015 10:45  
  
Method: 901.1\_GAMMA\_GS  
Analyst: MJH1  
Aliquot: 2 L  
Prep Method: EPA 901.1

Project: CPRC0F15028  
Matrix: WATER  
  
Prep Basis: As Received  
SOP Ref: GL-RAD-A-013  
Instrument: GAM29  
Count Time: 120 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137	U	0.954	pCi/L	+/-2.38	2.42	4.58	10.0
10198-40-0	Cobalt-60	U	0.537	pCi/L	+/-2.26	2.27	4.60	
14683-23-9	Europium-152	U	-0.84	pCi/L	+/-7.23	7.24	13.2	
15585-10-1	Europium-154	U	-2.57	pCi/L	+/-6.53	6.64	11.8	
14391-16-3	Europium-155	U	-0.363	pCi/L	+/-9.71	9.72	17.1	

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).

July 27 2015  
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**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL375889	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15028
<b>Lab Sample ID:</b> 375889001	<b>Date Collected:</b> 06/25/2015 14:49	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/30/2015 10:45	
<b>Client ID:</b> B30RT1	<b>Method:</b> TRITIUM_DIST_LSC	<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 1489694	<b>Analyst:</b> TYJ1	<b>SOP Ref:</b> GL-RAD-A-002
<b>Run Date:</b> 07/14/2015 22:58	<b>Aliquot:</b> 50 mL	<b>Instrument:</b> LSCPINK
<b>Data File:</b> T1489694.xls	<b>Prep Method:</b> EPA 906.0 Modified	<b>Count Time:</b> 180.0297 min
<b>Prep Batch:</b> 1489694		
<b>Prep Date:</b> 07/09/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		172	pCi/L	+/-51.2	61.1	73.1	100

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

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

July 27 2015

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL375889	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15028
<b>Lab Sample ID:</b> 375889001	<b>Date Collected:</b> 06/25/2015 14:49	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/30/2015 10:45	
<b>Client ID:</b> B30RT1	<b>Method:</b> C14_LSC	<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 1489699	<b>Analyst:</b> EXK2	<b>SOP Ref:</b> GL-RAD-A-003
<b>Run Date:</b> 07/12/2015 16:17	<b>Aliquot:</b> 0.2 L	<b>Instrument:</b> LSCYELLOW
<b>Data File:</b> C1489699.xls	<b>Prep Method:</b> EPA EERF C-01 Modified	<b>Count Time:</b> 150 min
<b>Prep Batch:</b> 1489699		
<b>Prep Date:</b> 07/11/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14		76.7	pCi/L	+/-3.54	14.7	4.24	5.00

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

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

July 27 2015  
Rad

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL375889	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15028
<b>Lab Sample ID:</b> 375889001	<b>Date Collected:</b> 06/25/2015 14:49	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/30/2015 10:45	
<b>Client ID:</b> B30RT1	<b>Method:</b> TC99_EIE_LSC	<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 1490616	<b>Analyst:</b> MYM1	<b>SOP Ref:</b> GL-RAD-A-059
<b>Run Date:</b> 07/14/2015 07:06	<b>Aliquot:</b> 0.3 L	<b>Instrument:</b> LSCBLUE
<b>Data File:</b> E1490616.xls	<b>Prep Method:</b> DOE EML HASL-300, Tc-02-	<b>Count Time:</b> 30 min
<b>Prep Batch:</b> 1490616		
<b>Prep Date:</b> 07/09/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	3.56	pCi/L	+/-5.74	5.75	9.72	15.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	61600	63600	CPM	96.8	(15%-125%)

**Comments:**

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

# Quality Control Data

# GEL LABORATORIES LLC

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

## QC Summary

Report Date: July 23, 2015  
Page 1 of 6

**Client :** CH2MHill Plateau Remediation Company  
**MSIN R3-50 CHPRC**  
**PO Box 1600**  
**Richland, Washington 99352**  
**Contact: Mr. Scot Fitzgerald**  
**Workorder: 375889**

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Alpha Spec</b>									
Batch	1489314								
QC1203346289	MB								
Americium-241			U	0.257	pCi/L			MXS2	07/02/1515:48
				Uncert: +/-0.302					
				TPU: +/-0.303					
Curium-243/244			U	0.00	pCi/L				
				Uncert: +/-0.199					
				TPU: +/-0.199					
**Americium-243 Tracer	42.8			29.0	pCi/L	REC: 68	(15%-125%)		
				Uncert: +/-2.91					
				TPU: +/-4.75					
QC1203346291	375889001	DUP							
Americium-241		U	-0.12	U	0.0952	pCi/L			07/01/1510:04
				Uncert: +/-0.363	+/-0.615		RPD: 0	N/A	
				TPU: +/-0.364	+/-0.615		RER: 0.591	(0-2)	
Curium-243/244		U	0.00659	U	0.382	pCi/L			
				Uncert: +/-0.489	+/-0.676		RPD: 0	N/A	
				TPU: +/-0.489	+/-0.678		RER: 0.881	(0-2)	
**Americium-243 Tracer	42.8		31.3		28.1	pCi/L	REC: 66	(15%-125%)	
				Uncert: +/-5.22	+/-5.29				
				TPU: +/-7.75	+/-7.85				
QC1203346292	LCS								
Americium-241					36.0	pCi/L	REC: 91	(80%-120%)	
				Uncert: +/-4.62					
				TPU: +/-6.56					
Curium-243/244					57.4	pCi/L	REC: 105	(80%-120%)	
				Uncert: +/-5.78					
				TPU: +/-9.41					
**Americium-243 Tracer	42.8				35.7	pCi/L	REC: 84	(15%-125%)	
				Uncert: +/-5.00					
				TPU: +/-7.46					
Batch	1489315								
QC1203346295	MB								
Plutonium-238			U	-0.365	pCi/L			MXS2	07/02/1515:54
				Uncert: +/-0.334					
				TPU: +/-0.334					
Plutonium-239/240			U	-0.182	pCi/L				
				Uncert: +/-0.419					
				TPU: +/-0.419					
**Plutonium-242 Tracer	39.4				25.3	pCi/L	REC: 64	(15%-125%)	
				Uncert: +/-2.67					
				TPU: +/-4.35					
QC1203346297	375889001	DUP							
Plutonium-238		U	0.138	U	0.0465	pCi/L			07/01/1510:04
				Uncert: +/-0.471	+/-0.486		RPD: 0	N/A	
				TPU: +/-0.472	+/-0.487		RER: 0.264	(0-2)	

~~JUL 27 2015~~  
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**QC Summary**

Workorder: 375889

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
<b>Rad Alpha Spec</b>										
Batch	1489315									
Plutonium-239/240		U	-0.053	U	0.0863	pCi/L				
		Uncert:	+/-0.495		+/-0.480		RPD:	0	N/A	
		TPU:	+/-0.496		+/-0.480		RER:	0.396	(0-2)	
**Plutonium-242 Tracer	39.4		32.8		29.0	pCi/L	REC:	74	(15%-125%)	
		Uncert:	+/-4.50		+/-5.04					
		TPU:	+/-6.72		+/-7.45					
QC1203346298	LCS									
Plutonium-238					0.889	pCi/L				07/01/1510:31
		Uncert:			+/-0.734					
		TPU:			+/-0.743					
Plutonium-239/240	39.4				33.4	pCi/L	REC:	85	(80%-120%)	
		Uncert:			+/-4.14					
		TPU:			+/-5.92					
**Plutonium-242 Tracer	39.4				33.7	pCi/L	REC:	86	(15%-125%)	
		Uncert:			+/-4.49					
		TPU:			+/-6.70					
Batch	1489317									
QC1203346299	MB									
Uranium-233/234				U	0.211	pCi/L			MXS2	07/01/1510:04
		Uncert:			+/-0.479					
		TPU:			+/-0.480					
Uranium-235/236				U	0.400	pCi/L				
		Uncert:			+/-0.576					
		TPU:			+/-0.579					
Uranium-238				U	0.206	pCi/L				
		Uncert:			+/-0.406					
		TPU:			+/-0.407					
**Uranium-232 Tracer	42.4				41.9	pCi/L	REC:	99	(15%-125%)	
		Uncert:			+/-4.39					
		TPU:			+/-7.78					
QC1203346301	375889001	DUP								
Uranium-233/234		U	0.335	U	0.790	pCi/L				
		Uncert:	+/-0.542		+/-0.807		RPD:	0	N/A	
		TPU:	+/-0.545		+/-0.817		RER:	0.908	(0-2)	
Uranium-235/236		U	0.0769	U	0.309	pCi/L				
		Uncert:	+/-0.427		+/-0.607		RPD:	0	N/A	
		TPU:	+/-0.428		+/-0.609		RER:	0.611	(0-2)	
Uranium-238		U	0.512		0.960	pCi/L				
		Uncert:	+/-0.585		+/-0.793		RPD:	27	(0% - 100%)	
		TPU:	+/-0.591		+/-0.808		RER:	0.878	(0-2)	
**Uranium-232 Tracer	42.4		40.4		37.9	pCi/L	REC:	89	(15%-125%)	
		Uncert:	+/-4.47		+/-4.86					
		TPU:	+/-7.87		+/-8.32					
QC1203346302	LCS									
Uranium-233/234					60.2	pCi/L				
		Uncert:			+/-5.75					
		TPU:			+/-11.2					
Uranium-235/236					2.73	pCi/L				
		Uncert:			+/-1.43					
		TPU:			+/-1.49					

# GEL LABORATORIES LLC

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## QC Summary

Workorder: 375889

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Alpha Spec</b>									
Batch	1489317								
Uranium-238	54.3			60.9	pCi/L	REC: 112	(80%-120%)		
	Uncert:			+/-5.78					
	TPU:			+/-11.3					
**Uranium-232 Tracer									
	42.4			35.4	pCi/L	REC: 83	(15%-125%)		
	Uncert:			+/-4.88					
	TPU:			+/-8.34					
<b>Rad Gamma Spec</b>									
Batch	1488741								
QC1203344746	MB								
Iodine-129			U	-0.003	pCi/L			MJH1	07/07/1514:59
	Uncert:			+/-0.267					
	TPU:			+/-0.267					
QC1203344749	LCS								
Iodine-129	27.7			26.6	pCi/L	REC: 96	(80%-120%)		07/07/1516:11
	Uncert:			+/-2.76					
	TPU:			+/-3.83					
QC1203346888	LCSD								
Iodine-129	27.7			26.2	pCi/L	REC: 95	(80%-120%)		07/07/1516:12
	Uncert:			+/-2.84		RPD: 1	(0%-20%)		
	TPU:			+/-3.87		RER: 0.115	(0-2)		
Batch	1489509								
QC1203346732	MB								
Cesium-137			U	-1.11	pCi/L			MJH1	07/08/1508:46
	Uncert:			+/-3.76					
	TPU:			+/-3.80					
Cobalt-60			U	-1.56	pCi/L				
	Uncert:			+/-4.48					
	TPU:			+/-4.54					
Europium-152			U	-5.39	pCi/L				
	Uncert:			+/-9.17					
	TPU:			+/-9.51					
Europium-154			U	-2.07	pCi/L				
	Uncert:			+/-7.85					
	TPU:			+/-7.91					
Europium-155			U	-11.7	pCi/L				
	Uncert:			+/-8.65					
	TPU:			+/-10.2					
QC1203346733	375889001	DUP							
Cesium-137		U	0.954	U	2.92	pCi/L			07/08/1512:02
	Uncert:		+/-2.38		+/-2.69		RPD: 0	N/A	
	TPU:		+/-2.42		+/-2.70		RER: 1.07	(0-2)	
Cobalt-60		U	0.537	U	1.82	pCi/L			
	Uncert:		+/-2.26		+/-2.43		RPD: 0	N/A	
	TPU:		+/-2.27		+/-2.57		RER: 0.730	(0-2)	
Europium-152		U	-0.84	U	0.819	pCi/L			
	Uncert:		+/-7.23		+/-6.41		RPD: 0	N/A	
	TPU:		+/-7.24		+/-6.43		RER: 0.336	(0-2)	
Europium-154		U	-2.57	U	4.41	pCi/L			
	Uncert:		+/-6.53		+/-6.51		RPD: 0	N/A	

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## QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Gamma Spec</b>									
Batch	1489509								
		TPU:	+/-6.64	+/-6.81					
Europium-155		U	-0.363	U	-4.08	pCi/L			
		Uncert:	+/-9.71	+/-9.01		RER:	1.44	(0-2)	
		TPU:	+/-9.72	+/-9.21		RPD:	0	N/A	
QC1203346735	LCS					RER:	0.544	(0-2)	
Americium-241		34400			34500	pCi/L	REC:	100	(80%-120%)
		Uncert:			+/-1740				07/08/1512:03
		TPU:			+/-3200				
Cesium-137		13700			14300	pCi/L	REC:	104	(80%-120%)
		Uncert:			+/-356				
		TPU:			+/-1260				
Cobalt-60		15400			15800	pCi/L	REC:	103	(80%-120%)
		Uncert:			+/-398				
		TPU:			+/-1330				
Europium-152				U	-88.6	pCi/L			
		Uncert:			+/-256				
		TPU:			+/-259				
Europium-154				U	102	pCi/L			
		Uncert:			+/-267				
		TPU:			+/-271				
Europium-155				U	-195	pCi/L			
		Uncert:			+/-352				
		TPU:			+/-364				
<b>Rad Gas Flow</b>									
Batch	1491695								
QC1203351615	MB								
Total Strontium				U	1.22	pCi/L		KSD1	07/16/1512:01
		Uncert:			+/-0.845				
		TPU:			+/-0.890				
**Strontium Carrier		8.10			6.90	mg	REC:	85	(25%-125%)
QC1203351617	375889001	DUP							
Total Strontium		U	0.0109	U	1.23	pCi/L			07/16/1514:51
		Uncert:	+/-0.635		+/-1.13		RPD:	0	N/A
		TPU:	+/-0.636		+/-1.16		RER:	1.80	(0-2)
**Strontium Carrier		8.10	7.10		7.20	mg	REC:	89	(25%-125%)
QC1203351618	LCS								
Total Strontium		72.8			61.2	pCi/L	REC:	84	(80%-120%)
		Uncert:			+/-3.68				07/16/1512:01
		TPU:			+/-14.5				
**Strontium Carrier		8.10			7.00	mg	REC:	86	(25%-125%)
<b>Rad Liquid Scintillation</b>									
Batch	1489694								
QC1203347160	MB								
Tritium				U	15.1	pCi/L		TYJ1	07/15/1502:00
		Uncert:			+/-42.3				
		TPU:			+/-42.4				
QC1203347161	375889001	DUP							

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Liquid Scintillation</b>									
Batch	1489694								
Tritium		172		196	pCi/L				
		Uncert:	+/-51.2	+/-53.9		RPD: 13	(0% - 100%)		
		TPU:	+/-61.1	+/-65.8		RER: 0.505	(0-2)		
QC1203347162	375889001	MS							
Tritium	1830	172		1880	pCi/L	REC: 94	(75%-125%)		07/15/1508:06
		Uncert:	+/-51.2	+/-374					
		TPU:	+/-61.1	+/-522					
QC1203347163	LCS								
Tritium	1820			1540	pCi/L	REC: 85	(80%-120%)		07/15/1508:23
		Uncert:		+/-332					
		TPU:		+/-446					
Batch	1489699								
QC1203347173	MB								
Carbon-14			U	-0.60	pCi/L			EXX2	07/12/1518:49
		Uncert:		+/-2.00					
		TPU:		+/-2.00					
QC1203347174	375889001	DUP							
Carbon-14		76.7		71.9	pCi/L				07/12/1521:20
		Uncert:	+/-3.54	+/-3.52		RPD: 6	(0% - 20%)		
		TPU:	+/-14.7	+/-13.8		RER: 0.464	(0-2)		
QC1203347175	375889001	MS							
Carbon-14	3030	76.7		3160	pCi/L	REC: 102	(75%-125%)		07/12/1523:52
		Uncert:	+/-3.54	+/-151					
		TPU:	+/-14.7	+/-606					
QC1203347176	LCS								
Carbon-14	303			311	pCi/L	REC: 103	(80%-120%)		07/13/1500:08
		Uncert:		+/-15.2					
		TPU:		+/-59.7					
Batch	1490616								
QC1203349274	MB								
Technetium-99			U	0.255	pCi/L			MYM1	07/14/1509:28
		Uncert:		+/-5.96					
		TPU:		+/-5.96					
**Technetium-99m Tracer	63600			57400	CPM	REC: 90	(15%-125%)		
QC1203349276	375889001	DUP							
Technetium-99		U	3.56	U	2.43	pCi/L			07/14/1510:34
		Uncert:	+/-5.74	+/-5.77		RPD: 0	N/A		
		TPU:	+/-5.75	+/-5.77		RER: 0.270	(0-2)		
**Technetium-99m Tracer	63600	61600		60400	CPM	REC: 95	(15%-125%)		
QC1203349277	LCS								
Technetium-99	287			268	pCi/L	REC: 93	(80%-120%)		07/14/1511:07
		Uncert:		+/-11.2					
		TPU:		+/-31.7					
**Technetium-99m Tracer	63600			61000	CPM	REC: 96	(15%-125%)		

**Notes:**

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

The Qualifiers in this report are defined as follows:

- \* Duplicate analysis not within control limits

## QC Summary

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
+						Correlation coefficient for Method of Standard Additions (MSA) is < 0.995				
<						Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide				
>						Result greater than quantifiable range or greater than upper limit of the analysis range				
B						The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).				
B						The associated QC sample blank has a result >= 2X the MDA and, after corrections, result is >= MDA for this sample				
C						Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples.				
D						Results are reported from a diluted aliquot of sample.				
E						Reported value is estimated due to interferences. See comment in narrative.				
M						Duplicate precision not met.				
N						Spike Sample recovery is outside control limits.				
S						Reported value determined by the Method of Standard Additions (MSA)				
U						Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.				
UX						Gamma Spectroscopy--Uncertain identification				
W						Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.				
X						Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier				
Y						Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier				
Z						Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier				

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.