

July 22, 2015



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July 22, 2015

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

Re: CHPRC SAF F15-027  
Work Order: 377344  
SDG: GEL377344

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on July 16, 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 - C05  
Chain of Custody: F15-027-059 and F15-027-072  
Enclosures



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# Case Narrative

July 22, 2015

General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF F15-027  
SDG: GEL377344

July 22, 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 July 16, 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>
377344001	B30RK6
377344002	B30RL9

**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 22, 2015

Chelsea Seagle for  
Heather Shaffer  
Project Manager

# **Chain of Custody and Supporting Documentation**

July 22, 2015

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F15-027-059	PAGE 1 OF 1
COLLECTOR <b>KAUER</b>	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR TODAK, D	PRICE CODE JCH 7/15/15 84 C05	DATA TURNAROUND 30 Days / 30 Days / 15/15
SAMPLING LOCATION C8796, Interval 31	PROJECT DESIGNATION 100-KE Characterization Boreholes - Soil	ACTUAL SAMPLE DEPTH 4.1	SAF NO. F15-027	AIR QUALITY <input type="checkbox"/>	METHOD OF SHIPMENT FEDERAL EXPRESS
ICE CHEST NO. Glass - 433	FIELD LOGBOOK NO. HNF-N-645-3 Pg. 14	OFFSITE PROPERTY NO. 5193	COA 303581	ORIGINAL	
SHIPPED TO GEL Laboratories, LLC	BILL OF LADING/AIR BILL NO. 7740 5958 9137				

377344

MATRIX*	POSSIBLE SAMPLE HAZARDS/ REMARKS	PRESERVATION	HOLDING TIME	TYPE OF CONTAINER	NO. OF CONTAINER(S)	VOLUME	SAMPLE ANALYSIS	SAMPLE DATE	SAMPLE TIME
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.	None	None	P	1	125mL	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	6-29-15	11:12
B30RK6	SPECIAL HANDLING AND/OR STORAGE RADIOACTIVE TIE TO: B30RK4								J

CHAIN OF POSSESSION	SIGN/ PRINT NAMES	SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM E.L. Kauer/CHPRC	RECEIVED BY/STORED IN SSU #2	TRVL-15-037 (1) Moisture Content - D2216; 6010_METALS_ICP: COMMON {Chromium}; 7196_CR6: COMMON; GAMMA_GS: COMMON; C14_LSC: COMMON; AMCMISO_IE_PRECIP_AEA: COMMON; 1129_SEP_LEPS_GS: COMMON; PUIISO_PLATE_AEA: COMMON; SRTOT_SEP_PRECIP_GPC: COMMON; TC99_EIE_LSC: COMMON; TRITIUM_DIST_LSC: COMMON; UIISO_IE_PRECIP_AEA: COMMON;
DATE/TIME JUN 29 2015 1320	DATE/TIME JUN 29 2015 1330	
RELINQUISHED BY/REMOVED FROM SSU #2	RECEIVED BY/STORED IN E.L. Kauer/CHPRC	
DATE/TIME 7-15-15 1014	DATE/TIME 7-15-15 1014	
RELINQUISHED BY/REMOVED FROM E.L. Kauer/CHPRC	RECEIVED BY/STORED IN FEDEX	
DATE/TIME 7-15-15 1400	DATE/TIME 7-15-15 1400	
RELINQUISHED BY/REMOVED FROM FEDEX	RECEIVED BY/STORED IN M. Kasper/CHPRC	
DATE/TIME 7-15-15 1400	DATE/TIME 7-16-15 0845	
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	
DATE/TIME	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	
DATE/TIME	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	
DATE/TIME	DATE/TIME	
LABORATORY SECTION	RECEIVED BY	TITLE
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY
PRINTED ON 5/11/2015		

TRVL-15-037

July 22, 2015

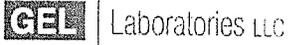
CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F15-027-072	PAGE 1 OF 1
COLLECTOR KAVER	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR TODAK, D	PRICE CODE 7/15/15 8H C05	DATA TURNAROUND 30-Days-30- Days 7/15/15
SAMPLING LOCATION C8796, Interval 37	PROJECT DESIGNATION 100-XE Characterization Boreholes - Soil	FIELD LOGBOOK NO. HNF-N-645-3 Pg 14	SAF NO. F15-027	AIR QUALITY <input type="checkbox"/>	METHOD OF SHIPMENT FEDERAL EXPRESS
ICE CHEST NO. Gws-433	ACTUAL SAMPLE DEPTH 101.2-104.6	OFFSITE PROPERTY NO. 5793	COA 303581	ORIGINAL	
SHIPPED TO GEL Laboratories, LLC	BILL OF LADING/AIR BILL NO. 7740 5958 9137				

MATRIX*	PRESERVATION	None
A=Air	HOLDING TIME	None
DL=Drum	TYPE OF CONTAINER	P
Liquids	NO. OF CONTAINER(S)	1
DS=Drum	VOLUME	125mL
Solids	SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS
L=Liquid	SAMPLE DATE	6-29-15
O=Oil	SAMPLE TIME	1153
S=Soil		
SE=Sediment		
T=Tissue		
V=Vegetation		
W=Water		
WI=Wipe		
X=Other		

SAMPLE NO.	MATRIX*	SOIL
B30RL9		
SPECIAL INSTRUCTIONS TRVL-15-037 (1) Moisture Content - D2216; 6010_METALS_ICP: COMMON {Chromium}; 7196 CR6: COMMON; GAMMA_GS: COMMON; C14_LSC: COMMON; AMCMISO_IE_PRECIP_AEA: COMMON; I129_SEP_LEPS_GS: COMMON; PUIISO_PLATE_AEA: COMMON; SRTOT_SEP_PRECIP_GPC: COMMON; TC99_EIE_LSC: COMMON; TRITIUM_DIST_LSC: COMMON; UIISO_IE_PRECIP_AEA: COMMON;		
RELINQUISHED BY/REMOVED FROM E.L. Kauer/CHPRC	DATE/TIME JUN 29 2015 1320	RECEIVED BY/STORED IN SSU
RELINQUISHED BY/REMOVED FROM SSU	DATE/TIME JUL 15 2015 10:14	RECEIVED BY/STORED IN T.L. BACON/CHPRC T.L. Bacon
RELINQUISHED BY/REMOVED FROM T.L. BACON/CHPRC	DATE/TIME JUL 15 2015 1544	RECEIVED BY/STORED IN FEDEX
RELINQUISHED BY/REMOVED FROM FEDEX	DATE/TIME JUL 15 2015 0845	RECEIVED BY/STORED IN M. Kessler/low
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN
LABORATORY SECTION	RECEIVED BY	TITLE
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DATE/TIME
		TRVL-15-037

377344

July 22, 2015



SAMPLE RECEIPT & REVIEW FORM

Client: <u>CPRC</u>		SDG/AR/COC/Work Order: <u>377344</u>
Received By: <u>MT</u>		Date Received: <u>7-16-15</u>
Suspected Hazard Information	Yes	No
COC/Samples marked as radioactive?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Classified Radioactive II or III by RSO?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
COC/Samples marked containing PCBs?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Package, COC, and/or Samples marked as beryllium or asbestos containing?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Shipped as a DOT Hazardous?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Samples identified as Foreign Soil?	<input checked="" type="checkbox"/>	<input type="checkbox"/>

\*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.

Maximum Net Counts Observed\* (Observed Counts - Area Background Counts): 0

If yes, Were swipes taken of sample containers < action levels?

If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.

Hazard Class Shipped: UN#:

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) an 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>E 5032015830</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  7740 5958 9137 2C 7740 6162 5390 2C

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 preformed
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 22 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

**Metals**  
**Technical Case Narrative**  
**CH2MHill Plateau Remediation Company (CPRC)**  
**SDG #: GEL377344**  
**Work Order #: 377344**

<b>Sample ID</b>	<b>Client ID</b>
377344001	B30RK6
377344002	B30RL9
1203356167	Method Blank (MB)ICP
1203356168	Laboratory Control Sample (LCS)
1203356171	377344001(B30RK6L) Serial Dilution (SD)
1203356169	377344001(B30RK6D) Sample Duplicate (DUP)
1203356170	377344001(B30RK6S) Matrix Spike (MS)

**Sample Analysis**

The samples in this SDG were analyzed on a "dry weight" basis.

**Method/Analysis Information**

<b>Analytical Batch:</b>	1493374
<b>Prep Batch :</b>	1493373
<b>Standard Operating Procedures:</b>	GL-MA-E-013 REV# 24 and GL-MA-E-009 REV# 25
<b>Analytical Method:</b>	6010_METALS_ICP
<b>Prep Method :</b>	SW846 3050B

**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 MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

**Quality Control (QC) Sample Statement**

The following sample was selected as the quality control (QC) sample for this SDG: 377344001 (B30RK6).

**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.

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

The RPD obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required reporting limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control of +/-RL is used to evaluate the DUP results. Not all the applicable analyte RPD values were within the acceptance criteria.

Sample	Analyte	Value
1203356169 (B30RK6DUP)	Chromium	27* (0%-20%)

**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. Method SW-846 3050B is not a total digestion technique for most samples. It is a very strong acid digestion that will dissolve almost all elements that could become environmentally available. By design, elements bound in silicate structures are not normally dissolved by this

procedure as they are not usually mobile in the environment.

**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 (DER) was generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) 1430821 was generated for sample 1203356169 (B30RK6DUP) in this SDG/batch.

**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 22, 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: GEL377344 GEL Work Order: 377344

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

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

**Review/Validation**

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

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

**Signature:** 

**Name: Jamie Johnson**

**Date: 21 JUL 2015**

**Title: Group Leader**

# Sample Data Summary

METALS  
-1-  
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL377344

METHOD TYPE: SW846

SAMPLE ID: 377344001

CLIENT ID: B30RK6

CONTRACT: CPRC0F15027

MATRIX:SOIL

DATE RECEIVED 16-JUL-15

LEVEL: Low %SOLIDS: 89

<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	5400	ug/kg		*	P	163	1	OPTIMA3	071715-1

\*Analytical Methods:

P SW846 3050B/6010C

METALS  
-1-  
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL377344

METHOD TYPE: SW846

SAMPLE ID: 377344002

CLIENT ID: B30RL9

CONTRACT: CPRC0F15027

MATRIX:SOIL

DATE RECEIVED 16-JUL-15

LEVEL: Low %SOLIDS: 87

<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	9090	ug/kg		*	P	168	1	OPTIMA3	071715-1

\*Analytical Methods:

P SW846 3050B/6010C

# Quality Control Summary

July 22, 2015

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 21, 2015

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 377344

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1493374										
QC1203356169	377344001	DUP									
Chromium	*	5400	*	7090	ug/kg	27.0*		(0%-20%)	HSC	07/17/15	07:06
QC1203356168	LCS										
Chromium	48600			46500	ug/kg		95.7	(80%-120%)		07/17/15	06:56
QC1203356167	MB										
Chromium			U	ND	ug/kg					07/17/15	06:53
QC1203356170	377344001	MS									
Chromium	54100	*	5400	57600	ug/kg		96.5	(75%-125%)		07/17/15	07:09
QC1203356171	377344001	SDILT									
Chromium	*	49.6	D	10.4	ug/L	4.88		(0%-10%)		07/17/15	09:18

Notes:

The Qualifiers in this report are defined as follows:

- \* Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.
- E Reported value is estimated due to interferences. See comment in narrative.
- M Duplicate precision not met.
- N Spike Sample recovery is outside control limits.
- S Reported value determined by the Method of Standard Additions (MSA)
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- W Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

July 22, 2015

**GEL LABORATORIES LLC**

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

**QC Summary**

Workorder: 377344

Page 2 of 2

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	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.

# Miscellaneous

**DATA EXCEPTION REPORT**

<b>Mo.Day Yr.</b> 17-JUL-15	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> ICP	<b>Test / Method:</b> SW846 3050B/6010C	<b>Matrix Type:</b> Solid	<b>Client Code:</b> CPRC
<b>Batch ID:</b> 1493374	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 377344(GEL377344)</b>			
<b>Application Issues:</b> Failed RPD for DUP			
<b>Specification and Requirements Exception Description:</b>		<b>DER Disposition:</b>	
<p>1. Failed RPD for DUP:</p> <p>QC 1203356169DUP</p>		<p>1. Not all the applicable analyte RPD values were within the acceptance criteria. 1203356169 (B30RK6DUP) Chromium [27* (0%-20%)].</p>	

**Originator's Name:**

Helen Camello 17-JUL-15

**Data Validator/Group Leader:**

Louise Smith 17-JUL-15

# General Chem Analysis

# Case Narrative

July 22, 2015

**General Chemistry  
Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL377344  
Work Order #: 377344**

**Method/Analysis Information**

**Product:** Hexavalent Chromium

**Analytical Batch:** 1493881                      **Method:** 7196\_CR6: COMMON

**Prep Batch :** 1493880                      **Method:** SW846 3060A

**Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
377344001	B30RK6
377344002	B30RL9
1203357472	Method Blank (MB)
1203357473	Laboratory Control Sample (LCS)
1203357475	377344001(B30RK6) Sample Duplicate (DUP)
1203357478	377344001(B30RK6) Matrix Spike (MS)
1203357482	377344001(B30RK6) Matrix Spike Duplicate (MSD)
1203357474	Insoluble Lab Control Sample (ILCS)

The samples in this SDG were analyzed on a "dry weight" basis.

**SOP Reference**

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

**Preparation/Analytical Method Verification**

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

**Calibration Information**

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

**Initial Calibration**

All initial calibration requirements have been met for this SDG.

**Continuing Calibration Blanks**

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

**Calibration Verification Information (CCV)**

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

**Y Intercept Rule**

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

**Quality Control (QC) Information**

**Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 377344001 (B30RK6) 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.

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

The RPD between the spike and spike duplicate met the acceptance limits.

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

**Miscellaneous Information**

**Data Exception (DER) Documentation**

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

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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

**Certification Statement**

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

July 22, 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: GEL377344 GEL Work Order: 377344

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

B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).

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:** 21 JUL 2015

**Title:** Data Validator

# Sample Data Summary

~~JUL 22, 2015~~  
**GEL LABORATORIES LLC**

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

**Certificate of Analysis**

Report Date: July 21, 2015

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF F15-027

---

Client Sample ID: B30RK6	Project: CPRC0F15027
Sample ID: 377344001	Client ID: CPRC001
Matrix: SOIL	
Collect Date: 29-JUN-15 11:12	
Receive Date: 16-JUL-15	
Collector: Client	
Moisture: 10.9%	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Spectrometric Analysis											
7196_CR6: COMMON "Dry Weight Corrected"											
Hexavalent Chromium	B	265	134	446	ug/Kg	1	SXC5	07/21/15	1047	1493881	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3060A	SW846_7196A Hexavalent Chromium in Soil	SXC5	07/20/15	1321	1493880

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	7196_CR6	

**Notes:**

~~JUL 22, 2015~~  
**GEL LABORATORIES LLC**

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

**Certificate of Analysis**

Report Date: July 21, 2015

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF F15-027

---

Client Sample ID: B30RL9	Project: CPRC0F15027
Sample ID: 377344002	Client ID: CPRC001
Matrix: SOIL	
Collect Date: 29-JUN-15 11:53	
Receive Date: 16-JUL-15	
Collector: Client	
Moisture: 12.8%	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Spectrometric Analysis											
7196_CR6: COMMON "Dry Weight Corrected"											
Hexavalent Chromium	U	137	137	456	ug/Kg	1	SXC5	07/21/15	1051	1493881	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3060A	SW846_7196A Hexavalent Chromium in Soil	SXC5	07/20/15	1333	1493880

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	7196_CR6	

**Notes:**

# Quality Control Summary

July 22, 2015

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 21, 2015

Page 1 of 1

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 377344

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Spectrometric Analysis</b>											
Batch	1493881										
QC1203357475 377344001 DUP											
Hexavalent Chromium		B	265 B	314	ug/Kg	16.9 ^		(+/-445)	SXC5	07/21/15	10:49
QC1203357474 ILCS	7940			7450	ug/Kg		93.8	(80%-120%)		07/21/15	10:42
QC1203357473 LCS	3980			3810	ug/Kg		95.7	(80%-120%)		07/21/15	10:41
QC1203357472 MB			U	120	ug/Kg					07/21/15	10:41
QC1203357478 377344001 MS	4350	B	265	3720	ug/Kg		79.5	(75%-125%)		07/21/15	10:49
QC1203357482 377344001 MSD	4390	B	265	3660	ug/Kg	1.57	77.3	(0%-30%)		07/21/15	10:50

Notes:

The Qualifiers in this report are defined as follows:

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 22, 2015**  
**Radiochemistry**  
**Technical Case Narrative**  
**CH2MHill Plateau Remediation Company (CPRC)**  
**SDG #: GEL377344**  
**Work Order #: 377344**

**Method/Analysis Information**

**Product:** Alphaspec Am241 Solid  
Analytical Method: AMCMISO\_EIE\_PREC\_AEA  
Prep Method: ASTM D 2216 (Modified)  
Analytical Batch Number: 1493304  
Prep Batch Number: 1493283

<b>Sample ID</b>	<b>Client ID</b>
377344001	B30RK6
377344002	B30RL9
1203356004	Method Blank (MB)
1203356006	Laboratory Control Sample (LCS)
1203356005	377344001(B30RK6) Sample Duplicate (DUP)

The samples in this SDG were analyzed on a "dry weight" 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: 377344001 (B30RK6).

**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**

<b>Product:</b>	<b>Alphaspec Pu, Solid</b>
Analytical Method:	PUISO_PLATE_AEA
Prep Method:	ASTM D 2216 (Modified)
Analytical Batch Number:	1493306
Prep Batch Number:	1493283

<b>Sample ID</b>	<b>Client ID</b>
377344001	B30RK6
377344002	B30RL9

July 22, 2015

1203356011 Method Blank (MB)  
1203356013 Laboratory Control Sample (LCS)  
1203356012 377344001(B30RK6) Sample Duplicate (DUP)

The samples in this SDG were analyzed on a "dry weight" 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: 377344001 (B30RK6).

##### **QC Information**

All of the QC samples met the required acceptance limits.

#### **Technical Information:**

##### **Holding Time**

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

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

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

##### **Recounts**

Samples 377344001 (B30RK6) and 377344002 (B30RL9) were recounted due to a peak shift. The recounts are reported. Sample 1203356012 (B30RK6DUP) 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**

July 22, 2015

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:** Alphaspec U, Solid  
Analytical Method: UIISO\_IE\_PRECIP\_AEA  
Prep Method: ASTM D 2216 (Modified)  
Analytical Batch Number: 1493309  
Prep Batch Number: 1493283

<b>Sample ID</b>	<b>Client ID</b>
377344001	B30RK6
377344002	B30RL9
1203356014	Method Blank (MB)
1203356016	Laboratory Control Sample (LCS)
1203356015	377344001(B30RK6) Sample Duplicate (DUP)

The samples in this SDG were analyzed on a "dry weight" 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: 377344001 (B30RK6).

**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**

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

**Recounts**

Sample 1203356014 (MB) was recounted due to a peak shift. The recount is reported. Sample 377344001 (B30RK6) was recounted due to detector error. The recount is reported.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**

A data exception report (DER) 1432096 was generated for sample 1203356014 (MB) in this SDG/batch. DER 1432096 was generated due to Method Blank contamination. 1. The Method blank 1203356014 has a U-235/236 result greater than the MDC. 1. The result is less than the detection limit, less than the MDC plus the Uncertainty, and there is no U-235/236 activity present in the samples. Project Manager notified, 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**

<b>Product:</b>	<b>Dry Weight-Percent Moisture</b>
Analytical Method:	ASTM D 2216 (Modified)
Analytical Batch Number:	1493283

<b>Sample ID</b>	<b>Client ID</b>
377344001	B30RK6
377344002	B30RL9
1203355959	377344001(B30RK6) 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-OA-E-020 REV# 10 and GL-RAD-A-021 REV# 20.

**Calibration Information:**

**Quality Control (QC) Information:**

**Designated QC**

The following sample was used for QC: 377344001 (B30RK6).

**Technical Information:**

**Holding Time**

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

**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.

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

<b>Product:</b>	<b>Gamma I129, Solid</b>
Analytical Method:	DOE EML HASL-300,I-01 Modified
Analytical Batch Number:	1493285

<b>Sample ID</b>	<b>Client ID</b>
377344001	B30RK6

July 22, 2015

377344002	B30RL9
1203355964	Method Blank (MB)
1203355967	Laboratory Control Sample (LCS)
1203355965	377344001(B30RK6) Sample Duplicate (DUP)
1203355966	377344001(B30RK6) 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-006 REV# 21.

#### **Calibration Information:**

##### **Calibration Information**

All initial and continuing calibration requirements have been met.

##### **Standards Information**

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

##### **Sample Geometry**

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

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

##### **Blank Information**

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

##### **Designated QC**

The following sample was used for QC: 377344001 (B30RK6).

##### **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**

July 22, 2015

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 Cs137,Co60,Eu152,Eu154,E155  
Analytical Method: GAMMA\_GS  
Prep Method: ASTM D 2216 (Modified)  
Analytical Batch Number: 1493286  
Prep Batch Number: 1493283

<b>Sample ID</b>	<b>Client ID</b>
377344001	B30RK6
377344002	B30RL9
1203355968	Method Blank (MB)
1203355970	Laboratory Control Sample (LCS)
1203355969	377344001(B30RK6) Sample Duplicate (DUP)

The samples in this SDG were analyzed on a "dry weight" 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**

July 22, 2015

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

**Designated QC**

The following sample was used for QC: 377344001 (B30RK6).

**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  
Prep Method: ASTM D 2216 (Modified)  
Analytical Batch Number: 1493482  
Prep Batch Number: 1493283

Sample ID	Client ID
377344001	B30RK6
377344002	B30RL9

July 22, 2015

1203356415 Method Blank (MB)  
1203356417 Laboratory Control Sample (LCS)  
1203356416 377344001(B30RK6) Sample Duplicate (DUP)

The samples in this SDG were analyzed on a "dry weight" basis.

**SOP Reference**

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

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

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

**Sample Geometry**

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

**Quality Control (QC) Information:**

**Blank Information**

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

**Designated QC**

The following sample was used for QC: 377344001 (B30RK6).

**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**

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:** Liquid Scint Te99, Solid  
Analytical Method: TC99\_EIE\_LSC  
Analytical Batch Number: 1493364

<b>Sample ID</b>	<b>Client ID</b>
377344001	B30RK6
377344002	B30RL9
1203356148	Method Blank (MB)
1203356150	Laboratory Control Sample (LCS)
1203356149	377344001(B30RK6) 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**

July 22, 2015

The following sample was used for QC: 377344001 (B30RK6).

**QC Information**

All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**

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

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

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

**Recounts**

Samples were recounted due to high MDCs. The recounts are reported.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**

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

**Sample-Specific MDA/MDC**

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

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** Liquid Scint C14, Solid  
**Analytical Method:** C14\_LSC  
**Analytical Batch Number:** 1493468

<b>Sample ID</b>	<b>Client ID</b>
377344001	B30RK6
377344002	B30RL9
1203356378	Method Blank (MB)
1203356381	Laboratory Control Sample (LCS)
1203356379	377344002(B30RL9) Sample Duplicate (DUP)
1203356380	377344002(B30RL9) 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: 377344002 (B30RL9).

**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:** LSC, Tritium Dist, Solid  
**Analytical Method:** TRITIUM\_DIST\_LSC  
**Analytical Batch Number:** 1494137

<b>Sample ID</b>	<b>Client ID</b>
377344001	B30RK6
377344002	B30RL9
1203358232	Method Blank (MB)
1203358235	Laboratory Control Sample (LCS)
1203358233	377459001(B320V6) Sample Duplicate (DUP)
1203358234	377459001(B320V6) 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: 377459001 (B320V6).

**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.

**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 22, 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: GEL377344 GEL Work Order: 377344

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

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

**Review/Validation**

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

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

**Signature:** 

**Name:** Heather McCarty

**Date:** 22 JUL 2015

**Title:** Analyst II

**DATA EXCEPTION REPORT**

<b>Mo.Day Yr.</b> 22-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, U-02-RC Modified	<b>Matrix Type:</b> Solid	<b>Client Code:</b> CPRC
<b>Batch ID:</b> 1493309	<b>Sample Numbers:</b> see below		
<b>Potentially affected work order(s)(SDG): 377344(GEL377344)</b>			
<b>Application Issues:</b> Method Blank contamination			
<b>Specification and Requirements Exception Description:</b>		<b>DER Disposition:</b>	
1. The Method blank 1203356014 has a U-235/236 result greater than the MDC.		1. The result is less than the detection limit, less than the MDC plus the Uncertainty, and there is no U-235/236 activity present in the samples. Project Manager notified, reporting results.	

**Originator's Name:**  
Jessica Downey      22-JUL-15

**Data Validator/Group Leader:**  
Melanie Aycock      22-JUL-15

# Sample Data Summary

July 22, 2015

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL377344	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15027
<b>Lab Sample ID:</b> 377344001	<b>Date Collected:</b> 06/29/2015 11:12	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 07/16/2015 08:45	<b>%Moisture:</b> 10.9
<b>Client ID:</b> B30RK6	<b>Method:</b> AMCMISO_EIE_PREC_AEA	<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 1493304	<b>Analyst:</b> HAKB	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 07/21/2015 15:52	<b>Aliquot:</b> 0.109 g	<b>Instrument:</b> 1090
<b>Data File:</b> S0377344001_AM.1A.gcnf	<b>Prep Method:</b> DOE EML HASL-300, Am-05	<b>Count Time:</b> 239.9998 min
<b>Prep Batch:</b> 1493304		<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 07/20/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	0.0824	pCi/g	+/-0.227	0.227	0.393	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	16.0	19.6	pCi/g	81.6	(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 22, 2015

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL377344	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15027
<b>Lab Sample ID:</b> 377344001	<b>Date Collected:</b> 06/29/2015 11:12	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 07/16/2015 08:45	<b>%Moisture:</b> 10.9
<b>Client ID:</b> B30RK6	<b>Method:</b> PUIISO_PLATE_AEA	<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 1493306	<b>Analyst:</b> HAKB	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 07/22/2015 11:00	<b>Aliquot:</b> 0.109 g	<b>Instrument:</b> 1066
<b>Data File:</b> S0377344001_PU.2A.gcnf	<b>Prep Method:</b> DOE EML HASL-300, Pu-11-	<b>Count Time:</b> 183.2197 min
<b>Prep Batch:</b> 1493306		<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 07/20/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	0.0498	pCi/g	+/-0.332	0.333	0.684	1.00
OER-100-70	Plutonium-239/240	U	0.218	pCi/g	+/-0.507	0.509	0.918	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-236 Tracer	10.3	13.2	pCi/g	78.5	(15%-125%)

**Comments:**

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

July 22, 2015

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL377344	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15027
<b>Lab Sample ID:</b> 377344001	<b>Date Collected:</b> 06/29/2015 11:12	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 07/16/2015 08:45	<b>%Moisture:</b> 10.9
<b>Client ID:</b> B30RK6	<b>Method:</b> UIISO_IE_PRECIP_AEA	<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 1493309	<b>Analyst:</b> HAKB	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 07/22/2015 11:00	<b>Aliquot:</b> 0.109 g	<b>Instrument:</b> 1003
<b>Data File:</b> S0377344001_UU.2A.gcnf	<b>Prep Method:</b> DOE EML HASL-300, U-02-R	<b>Count Time:</b> 183.7767 min
<b>Prep Batch:</b> 1493309		<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 07/20/2015 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	0.528	pCi/g	+/-0.499	0.507	0.633	1.00
15117-96-1/13982-7	Uranium-235/236	U	0.168	pCi/g	+/-0.355	0.356	0.532	1.00
7440-61-1	Uranium-238		0.833	pCi/g	+/-0.542	0.560	0.250	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	16.7	19.5	pCi/g	86.0	(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 22, 2015

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL377344	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15027
<b>Lab Sample ID:</b> 377344001	<b>Date Collected:</b> 06/29/2015 11:12	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 07/16/2015 08:45	<b>%Moisture:</b> 10.9
<b>Client ID:</b> B30RK6	<b>Method:</b> SRISO_SEP_PRECIP_GPC	<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 1493482	<b>Analyst:</b> KSD1	<b>SOP Ref:</b> GL-RAD-A-004
<b>Run Date:</b> 07/17/2015 16:37	<b>Aliquot:</b> 0.34 g	<b>Instrument:</b> PIC3B
<b>Data File:</b> S1493482.xls	<b>Prep Method:</b> EPA 905.0 Modified/DOE RP5	<b>Count Time:</b> 500 min
<b>Prep Batch:</b> 1493482		<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 07/17/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	0.317	pCi/g	+/-0.529	0.535	0.894	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	7.40	8.10	mg	91.4	(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 22, 2015

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL377344	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15027
<b>Lab Sample ID:</b> 377344001	<b>Date Collected:</b> 06/29/2015 11:12	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 07/16/2015 08:45	<b>%Moisture:</b> 10.9
<b>Client ID:</b> B30RK6	<b>Method:</b> DOE EML HASL-300,I-01 Mo	<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 1493285	<b>Analyst:</b> MJH1	<b>SOP Ref:</b> GL-RAD-A-006
<b>Run Date:</b> 07/17/2015 14:15	<b>Aliquot:</b> 1.049 g	<b>Instrument:</b> XRAY1
<b>Data File:</b> I377344001.CNF;1	<b>Prep Method:</b> DOE EML HASL-300,I-01 M	<b>Count Time:</b> 60 min
<b>Prep Batch:</b> 1493285		
<b>Prep Date:</b> 07/17/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129	U	-0.0222	pCi/g	+/-0.518	0.518	0.998	2.00

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).

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Page 1 of 1

**Certificate of Analysis**  
**Sample Summary**

SDG Number: GEL377344  
Lab Sample ID: 377344001  
  
Client ID: B30RK6  
Batch ID: 1493286  
Run Date: 07/17/2015 10:47  
Data File: G377344001.CNF;3  
Prep Batch: 1493286  
Prep Date: 07/17/2015 00:00

Client: CPRC001  
Date Collected: 06/29/2015 11:12  
Date Received: 07/16/2015 08:45  
  
Method: GAMMA\_GS  
Analyst: MXR1  
Aliquot: 40.25 g  
Prep Method: DOE HASL 300, 4.5.2.3/Ga-01

Project: CPRC0F15027  
Matrix: SOIL  
%Moisture: 10.9  
  
Prep Basis: Dry Weight  
SOP Ref: GL-RAD-A-013  
Instrument: GAM22  
Count Time: 720 min  
Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137	U	0.00508	pCi/g	+/-0.016	0.0161	0.0282	0.100
10198-40-0	Cobalt-60	U	0.00111	pCi/g	+/-0.0189	0.0189	0.0335	0.050
14683-23-9	Europium-152	U	-0.0229	pCi/g	+/-0.0576	0.0585	0.0707	0.100
15585-10-1	Europium-154	U	-0.0679	pCi/g	+/-0.0569	0.0649	0.0923	0.100
14391-16-3	Europium-155	U	0.039	pCi/g	+/-0.0438	0.0473	0.0761	0.100

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

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

July 22, 2015  
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**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL377344	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15027
<b>Lab Sample ID:</b> 377344001	<b>Date Collected:</b> 06/29/2015 11:12	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 07/16/2015 08:45	<b>%Moisture:</b> 10.9
<b>Client ID:</b> B30RK6		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 1493364	<b>Method:</b> TC99_EIE_LSC	<b>SOP Ref:</b> GL-RAD-A-059
<b>Run Date:</b> 07/22/2015 06:14	<b>Analyst:</b> MYM1	<b>Instrument:</b> LSCRED
<b>Data File:</b> E1493364R.xls	<b>Aliquot:</b> 2.144 g	<b>Count Time:</b> 30 min
<b>Prep Batch:</b> 1493364	<b>Prep Method:</b> DOE EML HASL-300, Tc-02-	
<b>Prep Date:</b> 07/17/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	0.168	pCi/g	+/-0.829	0.829	1.42	1.5

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	43400	44400	CPM	97.8	(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).

July 22, 2015

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL377344	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15027
<b>Lab Sample ID:</b> 377344001	<b>Date Collected:</b> 06/29/2015 11:12	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 07/16/2015 08:45	<b>%Moisture:</b> 10.9
<b>Client ID:</b> B30RK6		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 1493468	<b>Method:</b> C14_LSC	<b>SOP Ref:</b> GL-RAD-A-003
<b>Run Date:</b> 07/20/2015 06:23	<b>Analyst:</b> EXK2	<b>Instrument:</b> LSCTEAL
<b>Data File:</b> C1493468.xls	<b>Aliquot:</b> 0.5627 g	<b>Count Time:</b> 60 min
<b>Prep Batch:</b> 1493468	<b>Prep Method:</b> EPA EERF C-01 Modified	
<b>Prep Date:</b> 07/18/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	2.28	pCi/g	+/-1.41	1.42	2.33	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 22, 2015

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL377344	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15027
<b>Lab Sample ID:</b> 377344001	<b>Date Collected:</b> 06/29/2015 11:12	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 07/16/2015 08:45	<b>%Moisture:</b> 10.9
<b>Client ID:</b> B30RK6		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 1494137	<b>Method:</b> TRITIUM_DIST_LSC	<b>SOP Ref:</b> GL-RAD-A-002
<b>Run Date:</b> 07/22/2015 04:38	<b>Analyst:</b> GXR1	<b>Instrument:</b> LSCGREEN
<b>Data File:</b> T1494137.xls	<b>Aliquot:</b> 1.32 g	<b>Count Time:</b> 30 min
<b>Prep Batch:</b> 1494137	<b>Prep Method:</b> EPA 906.0 Modified	
<b>Prep Date:</b> 07/21/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium	U	-2.22	pCi/g	+/-10.4	10.4	18.8	30.0

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).

July 22, 2015

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL377344	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15027
<b>Lab Sample ID:</b> 377344001	<b>Date Collected:</b> 06/29/2015 11:12	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 07/16/2015 08:45	<b>%Moisture:</b> 10.9
<b>Client ID:</b> B30RK6		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 1493283	<b>Method:</b> ASTM D 2216 (Modified)	<b>SOP Ref:</b> GL-OA-E-020
<b>Run Date:</b> 07/16/2015 14:55	<b>Analyst:</b> CXC1	<b>Instrument:</b> SP-39020004
<b>Data File:</b>		<b>Count Time:</b>
<b>Prep Batch:</b> 1493283		
<b>Prep Date:</b> 07/16/2015 14:55		

CAS No.	Parmname	Qual	Result	Units	MDC	
	Moisture		10.9	percent +/-		
<b>Surrogate/Tracer recovery</b>		<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>	<b>Acceptable Limits</b>

**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 22, 2015

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL377344	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15027
<b>Lab Sample ID:</b> 377344002	<b>Date Collected:</b> 06/29/2015 11:53	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 07/16/2015 08:45	<b>%Moisture:</b> 12.8
<b>Client ID:</b> B30RL9	<b>Method:</b> AMCMISO_EIE_PREC_AEA	<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 1493304	<b>Analyst:</b> HAKB	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 07/21/2015 15:52	<b>Aliquot:</b> 0.104 g	<b>Instrument:</b> 1091
<b>Data File:</b> S0377344002_AM.1A.gcnf	<b>Prep Method:</b> DOE EML HASL-300, Am-05	<b>Count Time:</b> 239.9998 min
<b>Prep Batch:</b> 1493304		<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 07/20/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	-0.0568	pCi/g	+/-0.257	0.257	0.647	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	13.4	20.6	pCi/g	65.0	(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 22, 2015

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL377344	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15027
<b>Lab Sample ID:</b> 377344002	<b>Date Collected:</b> 06/29/2015 11:53	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 07/16/2015 08:45	<b>%Moisture:</b> 12.8
<b>Client ID:</b> B30RL9	<b>Method:</b> PUIISO_PLATE_AEA	<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 1493306	<b>Analyst:</b> HAKB	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 07/22/2015 11:00	<b>Aliquot:</b> 0.104 g	<b>Instrument:</b> 1067
<b>Data File:</b> S0377344002_PU.2A.gcnf	<b>Prep Method:</b> DOE EML HASL-300, Pu-11-	<b>Count Time:</b> 183.282 min
<b>Prep Batch:</b> 1493306		<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 07/20/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	-0.0425	pCi/g	+/-0.238	0.239	0.599	1.00
OER-100-70	Plutonium-239/240	U	0.189	pCi/g	+/-0.400	0.401	0.598	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-236 Tracer	8.75	13.8	pCi/g	63.3	(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 22, 2015

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL377344	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15027
<b>Lab Sample ID:</b> 377344002	<b>Date Collected:</b> 06/29/2015 11:53	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 07/16/2015 08:45	<b>%Moisture:</b> 12.8
<b>Client ID:</b> B30RL9	<b>Method:</b> UIISO_IE_PRECIP_AEA	<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 1493309	<b>Analyst:</b> HAKB	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 07/21/2015 11:27	<b>Aliquot:</b> 0.104 g	<b>Instrument:</b> 1124
<b>Data File:</b> S0377344002_UU.1A.gcnf	<b>Prep Method:</b> DOE EML HASL-300, U-02-R	<b>Count Time:</b> 240 min
<b>Prep Batch:</b> 1493309		<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 07/20/2015 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	0.357	pCi/g	+/-0.473	0.477	0.734	1.00
15117-96-1/13982-7	Uranium-235/236	U	0.231	pCi/g	+/-0.408	0.410	0.619	1.00
7440-61-1	Uranium-238		0.597	pCi/g	+/-0.488	0.498	0.501	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	18.1	20.4	pCi/g	89.0	(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 22, 2015

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL377344	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15027
<b>Lab Sample ID:</b> 377344002	<b>Date Collected:</b> 06/29/2015 11:53	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 07/16/2015 08:45	<b>%Moisture:</b> 12.8
<b>Client ID:</b> B30RL9	<b>Method:</b> SRISO_SEP_PRECIP_GPC	<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 1493482	<b>Analyst:</b> KSD1	<b>SOP Ref:</b> GL-RAD-A-004
<b>Run Date:</b> 07/17/2015 16:37	<b>Aliquot:</b> 0.314 g	<b>Instrument:</b> PIC4D
<b>Data File:</b> S1493482.xls	<b>Prep Method:</b> EPA 905.0 Modified/DOE RP5	<b>Count Time:</b> 500 min
<b>Prep Batch:</b> 1493482		<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 07/17/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	0.746	pCi/g	+/-0.749	0.773	1.26	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	6.20	8.10	mg	76.5	(25%-125%)

**Comments:**

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

July 22, 2015

**Certificate of Analysis  
Sample Summary**

SDG Number: GEL377344	Client: CPRC001	Project: CPRC0F15027
Lab Sample ID: 377344002	Date Collected: 06/29/2015 11:53	Matrix: SOIL
	Date Received: 07/16/2015 08:45	%Moisture: 12.8
Client ID: B30RL9	Method: DOE EML HASL-300,I-01 Mo	Prep Basis: Dry Weight
Batch ID: 1493285	Analyst: MJH1	SOP Ref: GL-RAD-A-006
Run Date: 07/17/2015 14:15	Aliquot: 1.056 g	Instrument: XRAY3
Data File: I377344002.CNF;1	Prep Method: DOE EML HASL-300,I-01 M	Count Time: 60 min
Prep Batch: 1493285		
Prep Date: 07/17/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129	U	-0.00181	pCi/g	+/-0.455	0.455	0.954	2.00

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 22, 2015

**Certificate of Analysis  
Sample Summary**

SDG Number: GEL377344  
 Lab Sample ID: 377344002  
  
 Client ID: B30RL9  
 Batch ID: 1493286  
 Run Date: 07/17/2015 10:57  
 Data File: G377344002.CNF;2  
 Prep Batch: 1493286  
 Prep Date: 07/17/2015 00:00

Client: CPRC001  
 Date Collected: 06/29/2015 11:53  
 Date Received: 07/16/2015 08:45  
  
 Method: GAMMA\_GS  
 Analyst: MXR1  
 Aliquot: 42.98 g  
 Prep Method: DOE HASL 300, 4.5.2.3/Ga-01

Project: CPRC0F15027  
 Matrix: SOIL  
 %Moisture: 12.8  
  
 Prep Basis: Dry Weight  
 SOP Ref: GL-RAD-A-013  
 Instrument: GAM23  
 Count Time: 1000 min  
 Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137	U	0.00431	pCi/g	+/-0.0157	0.0158	0.0278	0.100
10198-40-0	Cobalt-60	U	-0.00649	pCi/g	+/-0.019	0.0192	0.0324	0.050
14683-23-9	Europium-152	U	0.0436	pCi/g	+/-0.0384	0.0433	0.0648	0.100
15585-10-1	Europium-154	U	-0.0311	pCi/g	+/-0.0588	0.0605	0.0991	0.100
14391-16-3	Europium-155	U	0.0282	pCi/g	+/-0.0328	0.0353	0.0588	0.100

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

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

July 22, 2015

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL377344	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15027
<b>Lab Sample ID:</b> 377344002	<b>Date Collected:</b> 06/29/2015 11:53	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 07/16/2015 08:45	<b>%Moisture:</b> 12.8
<b>Client ID:</b> B30RL9		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 1493364	<b>Method:</b> TC99_EIE_LSC	<b>SOP Ref:</b> GL-RAD-A-059
<b>Run Date:</b> 07/22/2015 06:47	<b>Analyst:</b> MYM1	<b>Instrument:</b> LSCRED
<b>Data File:</b> E1493364R.xls	<b>Aliquot:</b> 2.585 g	<b>Count Time:</b> 30 min
<b>Prep Batch:</b> 1493364	<b>Prep Method:</b> DOE EML HASL-300, Tc-02-	
<b>Prep Date:</b> 07/17/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	0.281	pCi/g	+/-0.725	0.725	1.24	1.5

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	42000	44400	CPM	94.6	(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 22, 2015

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL377344	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15027
<b>Lab Sample ID:</b> 377344002	<b>Date Collected:</b> 06/29/2015 11:53	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 07/16/2015 08:45	<b>%Moisture:</b> 12.8
<b>Client ID:</b> B30RL9		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 1493468	<b>Method:</b> C14_LSC	<b>SOP Ref:</b> GL-RAD-A-003
<b>Run Date:</b> 07/20/2015 07:25	<b>Analyst:</b> EXK2	<b>Instrument:</b> LSCTEAL
<b>Data File:</b> C1493468.xls	<b>Aliquot:</b> 0.5524 g	<b>Count Time:</b> 60 min
<b>Prep Batch:</b> 1493468	<b>Prep Method:</b> EPA EERF C-01 Modified	
<b>Prep Date:</b> 07/18/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	0.236	pCi/g	+/-1.39	1.39	2.39	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 22, 2015  
Rad

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL377344	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15027
<b>Lab Sample ID:</b> 377344002	<b>Date Collected:</b> 06/29/2015 11:53	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 07/16/2015 08:45	<b>%Moisture:</b> 12.8
<b>Client ID:</b> B30RL9		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 1494137	<b>Method:</b> TRITIUM_DIST_LSC	<b>SOP Ref:</b> GL-RAD-A-002
<b>Run Date:</b> 07/22/2015 05:09	<b>Analyst:</b> GXR1	<b>Instrument:</b> LSCGREEN
<b>Data File:</b> T1494137.xls	<b>Aliquot:</b> 1.71 g	<b>Count Time:</b> 30 min
<b>Prep Batch:</b> 1494137	<b>Prep Method:</b> EPA 906.0 Modified	
<b>Prep Date:</b> 07/21/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium	U	3.73	pCi/g	+/-8.43	8.47	14.6	30.0

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).

July 22, 2015

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL377344	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15027
<b>Lab Sample ID:</b> 377344002	<b>Date Collected:</b> 06/29/2015 11:53	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 07/16/2015 08:45	<b>%Moisture:</b> 12.8
<b>Client ID:</b> B30RL9		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 1493283	<b>Method:</b> ASTM D 2216 (Modified)	<b>SOP Ref:</b> GL-OA-E-020
<b>Run Date:</b> 07/16/2015 14:55	<b>Analyst:</b> CXC1	<b>Instrument:</b> SP-39020004
<b>Data File:</b>		<b>Count Time:</b>
<b>Prep Batch:</b> 1493283		
<b>Prep Date:</b> 07/16/2015 14:55		

CAS No.	Parmname	Qual	Result	Units	MDC	
	Moisture		12.8	percent +/-		
<b>Surrogate/Tracer recovery</b>		<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>	<b>Acceptable Limits</b>

**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 22, 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:** 377344

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
<b>Rad Alpha Spec</b>										
Batch	1493304									
QC1203356004	MB									
Americium-241			U	0.109	pCi/g			HAKB	07/21/1515:52	
				Uncert: +/-0.343						
				TPU: +/-0.343						
**Americium-243 Tracer	19.6			12.5	pCi/g	REC: 64	(15%-125%)			
				Uncert: +/-2.49						
				TPU: +/-3.70						
QC1203356005	377344001	DUP								
Americium-241		U	0.0824	U	-0.0713	pCi/g				
				Uncert: +/-0.227	+/-0.322	RPD: 0	N/A			
				TPU: +/-0.227	+/-0.323	RER: 0.763	(0-2)			
**Americium-243 Tracer	20.8		16.0	12.4	pCi/g	REC: 60	(15%-125%)			
				Uncert: +/-2.19	+/-2.89					
				TPU: +/-3.30	+/-4.25					
QC1203356006	LCS									
Americium-241				18.1	pCi/g	REC: 83	(80%-120%)			
				Uncert: +/-2.00						
				TPU: +/-2.79						
**Americium-243 Tracer	19.6			16.9	pCi/g	REC: 86	(15%-125%)			
				Uncert: +/-2.27						
				TPU: +/-3.40						
Batch	1493306									
QC1203356011	MB									
Plutonium-238			U	0.250	pCi/g			HAKB	07/21/1511:29	
				Uncert: +/-0.317						
				TPU: +/-0.320						
Plutonium-239/240			U	0.00	pCi/g					
				Uncert: +/-0.143						
				TPU: +/-0.144						
**Plutonium-236 Tracer	13.0			9.06	pCi/g	REC: 70	(15%-125%)			
				Uncert: +/-1.90						
				TPU: +/-2.79						
QC1203356012	377344001	DUP								
Plutonium-238		U	0.0498	U	0.145	pCi/g				07/22/1511:00
				Uncert: +/-0.332	+/-0.468	RPD: 0	N/A			
				TPU: +/-0.333	+/-0.469	RER: 0.323	(0-2)			
Plutonium-239/240		U	0.218	U	0.180	pCi/g				
				Uncert: +/-0.507	+/-0.545	RPD: 0	N/A			
				TPU: +/-0.509	+/-0.546	RER: 0.0986	(0-2)			
**Plutonium-236 Tracer	14.0		10.3	9.02	pCi/g	REC: 65	(15%-125%)			
				Uncert: +/-2.24	+/-2.81					
				TPU: +/-3.26	+/-4.06					
QC1203356013	LCS									
Plutonium-238			U	0.257	pCi/g					07/21/1511:29
				Uncert: +/-0.283						

~~JUL 22, 2015~~  
**GEL LABORATORIES LLC**

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

**QC Summary**

Workorder: 377344

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Alpha Spec</b>									
Batch	1493306								
Plutonium-239/240	18.1	TPU:		+/-0.286					
		Uncert:		18.0	pCi/g	REC: 99	(80%-120%)		
		TPU:		+/-2.11					
**Plutonium-236 Tracer	13.0	TPU:		+/-3.43					
		Uncert:		10.4	pCi/g	REC: 80	(15%-125%)		
		TPU:		+/-1.80					
		TPU:		+/-2.66					
Batch	1493309								
QC1203356014	MB								
Uranium-233/234			U	0.326	pCi/g			HAKB	07/22/1511:00
		Uncert:		+/-0.397					
		TPU:		+/-0.401					
Uranium-235/236				0.554	pCi/g				
		Uncert:		+/-0.534					
		TPU:		+/-0.542					
Uranium-238			U	0.399	pCi/g				
		Uncert:		+/-0.435					
		TPU:		+/-0.441					
**Uranium-232 Tracer	19.5			19.2	pCi/g	REC: 99	(15%-125%)		
		Uncert:		+/-2.63					
		TPU:		+/-4.32					
QC1203356015	377344001	DUP							
Uranium-233/234		U	0.528	1.02	pCi/g				07/21/1511:27
		Uncert:	+/-0.499	+/-0.647		RPD: 47	(0% - 100%)		
		TPU:	+/-0.507	+/-0.669		RER: 1.15	(0-2)		
Uranium-235/236		U	0.168	0.176	pCi/g				
		Uncert:	+/-0.355	+/-0.346		RPD: 0	N/A		
		TPU:	+/-0.356	+/-0.347		RER: 0.0318	(0-2)		
Uranium-238			0.833	0.388	pCi/g				
		Uncert:	+/-0.542	+/-0.430		RPD: 38	(0% - 100%)		
		TPU:	+/-0.560	+/-0.435		RER: 1.23	(0-2)		
**Uranium-232 Tracer	20.6		16.7	18.1	pCi/g	REC: 88	(15%-125%)		
		Uncert:	+/-2.54	+/-2.57					
		TPU:	+/-4.21	+/-4.31					
QC1203356016	LCS								
Uranium-233/234				25.1	pCi/g				07/21/1511:27
		Uncert:		+/-2.75					
		TPU:		+/-5.02					
Uranium-235/236				2.07	pCi/g				
		Uncert:		+/-0.906					
		TPU:		+/-0.970					
Uranium-238	24.9			26.9	pCi/g	REC: 108	(80%-120%)		
		Uncert:		+/-2.84					
		TPU:		+/-5.30					
**Uranium-232 Tracer	19.5			16.7	pCi/g	REC: 86	(15%-125%)		
		Uncert:		+/-2.43					
		TPU:		+/-4.08					
<b>Rad Gamma Spec</b>									
Batch	1493285								

~~JUL 22, 2015~~  
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**QC Summary**

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Gamma Spec</b>									
Batch	1493285								
QC1203355964	MB								
Iodine-129			U	0.130	pCi/g			MJH1	07/17/1514:16
				Uncert: +/-0.539					
				TPU: +/-0.542					
QC1203355965	377344001	DUP							
Iodine-129		U	-0.0222	U	-0.092	pCi/g			07/17/1515:19
				Uncert: +/-0.518	+/-0.487	RPD: 0	N/A		
				TPU: +/-0.518	+/-0.489	RER: 0.192	(0-2)		
QC1203355966	377344001	MS							
Iodine-129		U	-0.0222		32.0	pCi/g	REC: 82 (75%-125%)		07/17/1515:20
				Uncert: +/-0.518	+/-3.73				
				TPU: +/-0.518	+/-4.92				
QC1203355967	LCS								
Iodine-129			38.5		35.0	pCi/g	REC: 91 (80%-120%)		07/17/1515:20
				Uncert: +/-2.92					
				TPU: +/-4.54					
Batch	1493286								
QC1203355968	MB								
Cesium-137			U	0.00482	pCi/g			MXR1	07/17/1510:58
				Uncert: +/-0.0184					
				TPU: +/-0.0185					
Cobalt-60			U	0.013	pCi/g				
				Uncert: +/-0.0198					
				TPU: +/-0.0207					
Europium-152			U	-0.0117	pCi/g				
				Uncert: +/-0.0447					
				TPU: +/-0.045					
Europium-154			U	-0.000134	pCi/g				
				Uncert: +/-0.0566					
				TPU: +/-0.0566					
Europium-155			U	0.041	pCi/g				
				Uncert: +/-0.0299					
				TPU: +/-0.0354					
QC1203355969	377344001	DUP							
Cesium-137		U	0.00508	U	0.000476	pCi/g			07/17/1514:54
				Uncert: +/-0.016	+/-0.0191	RPD: 0	N/A		
				TPU: +/-0.0161	+/-0.0191	RER: 0.362	(0-2)		
Cobalt-60		U	0.00111	U	0.0087	pCi/g			
				Uncert: +/-0.0189	+/-0.0189	RPD: 0	N/A		
				TPU: +/-0.0189	+/-0.0193	RER: 0.551	(0-2)		
Europium-152		U	-0.0229	U	-0.00482	pCi/g			
				Uncert: +/-0.0576	+/-0.0428	RPD: 0	N/A		
				TPU: +/-0.0585	+/-0.0429	RER: 0.489	(0-2)		
Europium-154		U	-0.0679	U	0.00168	pCi/g			
				Uncert: +/-0.0569	+/-0.0506	RPD: 0	N/A		
				TPU: +/-0.0649	+/-0.0506	RER: 1.66	(0-2)		
Europium-155		U	0.039	U	0.00204	pCi/g			
				Uncert: +/-0.0438	+/-0.0468	RPD: 0	N/A		
				TPU: +/-0.0473	+/-0.0468	RER: 1.09	(0-2)		
QC1203355970	LCS								

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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	1493286								
Americium-241	705			653	pCi/g	REC: 93	(80%-120%)		
	Uncert:			+/-7.86					
	TPU:			+/-70.1					
Cesium-137	236			224	pCi/g	REC: 95	(80%-120%)		
	Uncert:			+/-5.97					
	TPU:			+/-18.9					
Cobalt-60	168			158	pCi/g	REC: 94	(80%-120%)		
	Uncert:			+/-6.10					
	TPU:			+/-13.8					
Europium-152			U	0.856	pCi/g				
	Uncert:			+/-2.74					
	TPU:			+/-2.76					
Europium-154			U	0.506	pCi/g				
	Uncert:			+/-1.80					
	TPU:			+/-1.82					
Europium-155			U	-1.17	pCi/g				
	Uncert:			+/-1.83					
	TPU:			+/-1.91					
<b>Rad Gas Flow</b>									
Batch	1493482								
QC1203356415	MB								
Total Strontium			U	-1.15	pCi/g			KSD1	07/17/1516:37
	Uncert:			+/-0.475					
	TPU:			+/-0.475					
**Strontium Carrier	8.10			6.00	mg	REC: 74	(25%-125%)		
QC1203356416	377344001	DUP							
Total Strontium		U	0.317	U	0.0928	pCi/g			07/17/1516:37
	Uncert:		+/-0.529		+/-0.369		RPD: 0	N/A	
	TPU:		+/-0.535		+/-0.369		RER: 0.677	(0-2)	
**Strontium Carrier	8.10	7.40		6.30	mg	REC: 78	(25%-125%)		
QC1203356417	LCS								
Total Strontium	64.2			51.3	pCi/g	REC: 80	(80%-120%)		07/17/1516:37
	Uncert:			+/-3.53					
	TPU:			+/-13.5					
**Strontium Carrier	8.10			7.60	mg	REC: 94	(25%-125%)		
<b>Rad Liquid Scintillation</b>									
Batch	1493364								
QC1203356148	MB								
Technetium-99			U	0.258	pCi/g			MYM1	07/22/1507:20
	Uncert:			+/-0.725					
	TPU:			+/-0.725					
**Technetium-99m Tracer	44400			41300	CPM	REC: 93	(15%-125%)		
QC1203356149	377344001	DUP							
Technetium-99		U	0.168	U	0.595	pCi/g			07/22/1507:53
	Uncert:		+/-0.829		+/-0.792		RPD: 0	N/A	
	TPU:		+/-0.829		+/-0.795		RER: 0.729	(0-2)	
**Technetium-99m Tracer	44400	43400		43200	CPM	REC: 97	(15%-125%)		
QC1203356150	LCS								
Technetium-99	33.3			31.4	pCi/g	REC: 94	(80%-120%)		07/22/1508:26

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## QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Liquid Scintillation</b>									
Batch	1493364								
				Uncert:					
				TPU:					
**Technetium-99m Tracer	44400			42600	CPM	REC:	96 (15%-125%)		
Batch	1493468								
QC1203356378	MB								
Carbon-14			U	0.393	pCi/g			EXK2	07/20/1508:26
				Uncert:					
				TPU:					
QC1203356379	377344002	DUP							
Carbon-14		U	0.236	U	1.78				07/20/1509:27
				Uncert:					
				TPU:					
						RPD:	0	N/A	
						RER:	1.58	(0-2)	
QC1203356380	377344002	MS							
Carbon-14		145	U	0.236	150	pCi/g	REC:	103 (75%-125%)	07/20/1510:28
				Uncert:					
				TPU:					
QC1203356381	LCS								
Carbon-14		124			130	pCi/g	REC:	104 (80%-120%)	07/20/1511:30
				Uncert:					
				TPU:					
Batch	1494137								
QC1203358232	MB								
Tritium			U	-2.43	pCi/g			GXR1	07/22/1507:16
				Uncert:					
				TPU:					
QC1203358233	377459001	DUP							
Tritium		U	3.94	U	1.52	pCi/g			07/22/1507:47
				Uncert:					
				TPU:					
						RPD:	0	N/A	
						RER:	0.409	(0-2)	
QC1203358234	377459001	MS							
Tritium		120	U	3.94	122	pCi/g	REC:	102 (75%-125%)	07/22/1508:19
				Uncert:					
				TPU:					
QC1203358235	LCS								
Tritium		52.0			44.0	pCi/g	REC:	85 (80%-120%)	07/22/1508:50
				Uncert:					
				TPU:					

**Notes:**

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

The Qualifiers in this report are defined as follows:

- \* Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- 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.

## QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
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.