

8/1/2016



July 29, 2016

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

Re: CHPRC SAF F14-021  
Work Order: 400883  
SDG: GEL400883

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on July 06, 2016. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,

*B Luthman*  
Brielle Luthman for  
Heather Shaffer  
Project Manager

Purchase Order: 300416ES20 - 7H  
Chain of Custody: F14-021-103, F14-021-104, F14-021-105 and F14-021-106  
Enclosures



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# Sample Issue Resolution

**SAMPLE ISSUE RESOLUTION**

<b>SIR NUM</b>	SIR16-511
<b>REV NUM</b>	0
<b>DATE INITIATED</b>	7/21/2016

**SAMPLE EVENT INFORMATION**

**SAF NUM(S)** F14-021  
**OPERABLE UNIT(S)** NONE  
**PROJECT(S)** 105KW Basin  
**SAMPLE EVENT TITLE(S)** 105KW Sampling  
**LABORATORY** GEL Laboratories, LLC

**SAMPLING INFORMATION**

**NUMBER OF SAMPLES** 1  
**SAMPLE NUMBERS** B362W6  
**SAMPLE MATRIX** WATER  
**COLLECTION DATE** 7/5/2016 - 7/5/2016  
**SDG NUM** GEL400883

**ISSUE BACKGROUND**

**CLASS** Laboratory Issue

**TYPE** Quality Control Failure

**DESCRIPTION** The duplicate sample in our Am batch for QC sample B362W6 (400883002) has a high Am-243 tracer yield of 111% ( client requirement is 30 to105%). The QC sample however does meet the client's tracer yield requirement at 99.2% and the QC sample and duplicate do meet all duplication requirements. They also both meet the Am-241 detection limit; however, neither meet the Cm-243/244 detection limit since the aliquots were reduced due to the Am-241 activity.

**DISPOSITION**

**DESCRIPTION** Proposed Resolution: The lab is requesting relief to report.

**JUSTIFICATION** Final Disposition: Accept lab proposal to report data as is.

SUBMITTED BY: Heather Shaffer DATE: 07/20/2016

ACCEPTED BY: Scot Fitzgerald DATE: 07/21/2016

# Case Narrative

**General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF F14-021  
SDG: GEL400883**

**July 29, 2016**

**Laboratory Identification:**

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

**Summary**

**Sample receipt**

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on July 06, 2016, for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. Please see the enclosed SIR for Alphaspec QC issues.

**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><u>Laboratory Identification</u></b>	<b><u>Sample Description</u></b>
400883001	B362W5
400883002	B362W6
400883003	B362W7
400883004	B362W8

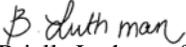
**Case Narrative**

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

**Data Package**

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

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

  
Brielle Luthman for  
Heather Shaffer  
Project Manager

**Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL400883  
Work Order #: 400883**

## **General Chemistry**

### **Ion Chromatography**

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

### **Miscellaneous Information**

#### **Manual Integrations**

Sample 400883001 (B362W5) were manually integrated to correctly position the baseline as set in the calibration standards.

### **Specific Conductivity**

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

## **Radiochemistry**

### **PUISO\_PLATE\_AEA:COMMON (HIGH RAD)**

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

### **Miscellaneous Information**

### **UIISO\_PLATE\_AEA:COMMON (HIGH RAD)**

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

**Technical Information****Recounts**

Sample 400883003 (B362W7) was recounted due to a suspected false positive. The recount is reported. Sample 400883002 (B362W6) was recounted to verify the result. The recount is reported.

**Miscellaneous Information****AMCMISO\_EIE\_PLATE\_AEA: (HIGH RAD)**

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

**Technical Information****Sample Re-prep/Re-analysis**

Samples were reprepared due to high blank activity. The re-analysis is being reported.

**Recounts**

Sample 400883002 (B362W6) was recounted due to high carrier/tracer yield. The recount is reported. Samples 1203586084 (B362W6DUP) and 400883003 (B362W7) were recounted twice due to high tracer yields. The third counts are reported. Sample 1203586085 (LCS) was recounted due to a detector error. The recount is reported.

**Miscellaneous Information****Manual Integration**

Manual integrations of alpha spectroscopy spectra 1203586084 (B362W6DUP) and 400883003 (B362W7) were performed to fully separate counts in Regions of Interest which would have been biased.

**GAMMA\_GS:COMMON (Cs137) HIGH RAD**

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

**Quality Control (QC) Information****QC Information**

The blank, 1203580201 (MB), did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots. All other samples met the detection limits.

**SRTOT\_SEP\_PRECIP\_GPC: COMMON (HIGH RAD)**

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

applicable, with the following exceptions.

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

##### **QC Information**

The blank, 1203580221 (MB), did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots. All other samples met the detection limits. The blank, 1203580221 (MB), result is greater than the required detection limit but less than the MDC.

#### **TRITIUM\_DIST\_LSC: COMMON (HIGH RAD)**

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

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

##### **QC Information**

The blank, 1203580224 (MB), did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots. All other samples met the detection limits.

#### **Laboratory Comp for preserved & unpres analysis**

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

#### **Certification Statement**

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

# **Chain of Custody and Supporting Documentation**



CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F14-021-103	PAGE 1 OF 1
COLLECTOR <i>RS HAWKEY</i>	COMPANY CONTACT TODAK, D	TELEPHONE NO. 376-6427	PROJECT COORDINATOR TODAK, D	PRICE CODE 7H	DATA TURNAROUND 30 Days / 30 Days
SAMPLING LOCATION 105KW Monthly, Pt 10	PROJECT DESIGNATION 105KW Monthly Sampling - Water	FIELD LOGBOOK NO. HNF-N-251	SAF NO. F14-021	AIR QUALITY <input type="checkbox"/>	METHOD OF SHIPMENT FEDERAL EXPRESS
ICE CHEST NO. 6205-431	ACTUAL SAMPLE DEPTH	COA 301348	BILL OF LADING / AIR BILL NO. <i>7766 20374280</i>		
SHIPPED TO GEL Laboratories, LLC	OFFSITE PROPERTY NO. <i>6797</i>				

MATRIX* A=Air DL=Drum L=Liquids DS=Drum S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	POSSIBLE SAMPLE HAZARDS/ REMARKS *Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.	PRESERVATION Cool <=6C	HOLDING TIME 28 Days/48 Hours	TYPE OF CONTAINER G/P	NO. OF CONTAINER(S) 1	VOLUME 250ml	SAMPLE ANALYSIS SEE ITEM (1) IN SPECIAL INSTRUCTIONS
SPECIAL HANDLING AND/OR STORAGE							
SAMPLE NO. B362W5	MATRIX* WATER	SAMPLE DATE <i>07-05-16</i>	SAMPLE TIME <i>0830</i>				

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM <i>RS Hawkey</i>	DATE/TIME <i>07-05-16</i>	RECEIVED BY/STORED IN Janelle Zunker	DATE/TIME <i>7-6-16</i>	NA	
RELINQUISHED BY/REMOVED FROM Janelle Zunker CHPRC	DATE/TIME <i>7-6-16</i>	RECEIVED BY/STORED IN <i>M. G. ...</i>	DATE/TIME <i>09:10</i>	(1) 9056_ANIONS_IC: COMMON; 9056_ANIONS_IC: COMMON (Add-on) {Bromide, Phosphorus in phosphate}; 120.1_CONDUCTIVITY: COMMON; TRITIUM_DIST_LSC: COMMON;	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
LABORATORY SECTION	RECEIVED BY	TITLE		DATE/TIME	
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY		DATE/TIME	
PRINTED ON 6/23/2016	FSR ID = FSR33547	TRVL NUM = TRVL-16-185		A-6003-618 (REV 2)	

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F14-021-106	PAGE 1 OF 1
COLLECTOR <i>P.S. HAWKEY</i>	COMPANY CONTACT TODAK, D	TELEPHONE NO. 376-6427	PROJECT COORDINATOR TODAK, D	PRICE CODE 7H	DATA TURNAROUND 30 Days / 30 Days
SAMPLING LOCATION 105KW Monthly, Pt 16	PROJECT DESIGNATION 105KW Monthly Sampling - Water	FIELD LOGBOOK NO. <i>HNF-N-251</i>	SAF NO. F14-021	AIR QUALITY <input type="checkbox"/>	METHOD OF SHIPMENT FEDERAL EXPRESS
ICE CHEST NO. <i>6WS-431</i>	OFFSITE PROPERTY NO. <i>62797</i>	ACTUAL SAMPLE DEPTH	COA 301348	BILL OF LADING/AIR BILL NO. <i>7766 9037 4280</i>	
SHIPPED TO GEL Laboratories, LLC					

MATRIX* A=Air DL=Drum L=Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	POSSIBLE SAMPLE HAZARDS/ REMARKS *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.	PRESERVATION Cool <=6C	HOLDING TIME 28 Days	TYPE OF CONTAINER G/P	NO. OF CONTAINER(S) 1	VOLUME 1L	SAMPLE ANALYSIS SEE ITEM (1) IN SPECIAL INSTRUCTIONS
SPECIAL HANDLING AND/OR STORAGE		SAMPLE DATE <i>07-05-14</i>	SAMPLE TIME <i>0830</i>				
SAMPLE NO. B362W8	MATRIX* WATER						

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM <i>P.S. HAWKEY</i>	DATE/TIME <i>8-7-05-16</i>	RECEIVED BY/STORED IN Janelle Zunker	DATE/TIME <i>1005</i>	Lab advised to remove tritium and conductivity aliquots prior to preservation.	
RELINQUISHED BY/REMOVED FROM Janelle Zunker	DATE/TIME <i>1025</i>	RECEIVED BY/STORED IN <b>FEDEX</b>	DATE/TIME <i>7-6-16</i>	(1) 120.1 CONDUCTIVITY: COMMON; AMCMISO_EIE_PLATE_AEA: COMMON {Americium-241}; GAMMA_GS: COMMON {Cesium-137}; PUISO_PLATE_AEA: COMMON; SRTOT_SEP_PRECIP_GPC: COMMON; TRITIUM_DIST_LSC: COMMON; UIISO_PLATE_AEA: COMMON;	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
LABORATORY SECTION	RECEIVED BY	TITLE		DATE/TIME	
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY		DATE/TIME	
PRINTED ON 6/23/2016	FSR ID = FSR33549	TRVL NUM = TRVL-16-185		A-6003-618 (REV 2)	

**CHAIN OF CUSTODY / SAMPLE ANALYSIS REQUEST**

CH2M Hill Plateau Remediation Company  
 COLLECTOR: P.S. HAWKEY  
 SAMPLING LOCATION: 105KW Monthly, Pt 12  
 ICE CHEST NO.: 6005-431  
 SHIPPED TO: GEL Laboratories, LLC

COMPANY CONTACT: TODAYAK, D  
 TELEPHONE NO.: 376-6427  
 PROJECT DESIGNATION: 105KW Monthly Sampling - Water  
 FIELD LOGBOOK NO.: HNF-N-251  
 OFFSITE PROPERTY NO.: 0797

PROJECT COORDINATOR: TODAYAK, D  
 SAF NO.: F14-021  
 COA: 301348  
 BILL OF LADING/AIR BILL NO.: 77764 7037 4280

F14-021-105  
 PRICE CODE: 7H  
 AIR QUALITY:   
 METHOD OF SHIPMENT: FEDERAL EXPRESS  
 DATA TURNAROUND: 30 Days / 30 Days  
 PAGE 1 OF 1  
**ORIGINAL**

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.	Cool <=6C	28 Days	G/P	1	1L	SEE ITEM (1) IN SPECIAL INSTRUCTIONS		
B362W7	WATER							0830	

CHAIN OF POSSESSION	SIGN/ PRINT NAMES	DATE/TIME	DATE/TIME
RELINQUISHED BY/REMOVED FROM P.S. HAWKEY	RECEIVED BY/STORED IN Janelle Junker CHPRC	07-25-16	1005
RELINQUISHED BY/REMOVED FROM Janelle Junker CHPRC	RECEIVED BY/STORED IN FEDER	1005	
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN M/G as below	1005	7-6-16 0910
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
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	DATE/TIME	DATE/TIME

**SPECIAL INSTRUCTIONS**  
 Lab advised to remove tritium and conductivity aliquots prior to preservation.  
 (1) 120.1 CONDUCTIVITY: COMMON; AMCMISO\_EIE\_PLATE\_AEA: COMMON {Americium-241}; GAMMA\_GS: COMMON {Cesium-137}; PUIISO\_PLATE\_AEA: COMMON; SRTOT\_SEP\_PRECIP\_GPC: COMMON; TRITIUM\_DIST\_LSC: COMMON; UIISO\_PLATE\_AEA: COMMON;

LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

FRS ID = FSR33548  
 TRVL NUM = TRVL-16-185  
 PRINTED ON 6/23/2016  
 A-6003-618 (REV 2)

**SAMPLE RECEIPT & REVIEW FORM**

Client: <u>OPCC</u>		SDG/AR/COC/Work Order:	
Received By: <u>MK</u>		Date Received: <u>7-6-16</u>	
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.	
COC/Samples marked as radioactive?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>4pm-200</u>	
Classified Radioactive (I or III by RSO)?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?	
COC/Samples marked containing PCBs?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
Package, COC, and/or Samples marked as beryllium or asbestos containing?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.	
Shipped as a DOT Hazardous?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Hazard Class Shipped: UN#: <u>2910</u>	
Samples identified as Foreign Soil?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Preservation Method: <u>Ice bags</u> Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius
2a	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>130532790</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#: <u>RAD II</u>
6	Do Low Level Perchlorate samples have headspace as required?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
7	VOA vials contain acid preservation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(If unknown, select No)
8	VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
9	Are Encore containers present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
10	Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
11	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
12	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
13	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
14	Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
15	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
16	Carrier and tracking number.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: <u>FedEx Air</u> FedEx Ground UPS Field Services Courier Other <u>7766 7073 4280</u>

Comments (Use Continuation Form if needed):

# **Data Review Qualifier Definitions**

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

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

# Laboratory Certifications

## List of current GEL Certifications as of 29 July 2016

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

# General Chem Analysis

# Case Narrative

**General Chemistry  
Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL400883  
Work Order #: 400883**

**Product: Ion Chromatography**

**Analytical Method:** 9056\_ANIONS\_IC

**Analytical Procedure:** GL-GC-E-086 REV# 25

**Analytical Batch:** 1579737

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
400883001	B362W5
1203580048	Method Blank (MB)
1203580049	Laboratory Control Sample (LCS)
1203580050	Laboratory Control Sample Duplicate (LCSD)

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

**Data Summary:**

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

**Miscellaneous Information**

**Manual Integrations**

Sample 400883001 (B362W5) were manually integrated to correctly position the baseline as set in the calibration standards.

**Product:** Specific Conductivity

**Analytical Method:** EPA 120.1

**Analytical Procedure:** GL-GC-E-009 REV# 12

**Analytical Batch:** 1581884

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
400883001	B362W5
400883003	B362W7
400883004	B362W8
1203585265	Laboratory Control Sample (LCS)
1203585267	400883001(B362W5) Sample Duplicate (DUP)

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

**Data Summary:**

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

**Certification Statement**

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

**GEL LABORATORIES LLC**

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

**Qualifier Definition Report  
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL400883 GEL Work Order: 400883

**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:** Kristen Mizzell

**Date:** 19 JUL 2016

**Title:** Analyst I

# Sample Data Summary

8/1/2016

**GEL LABORATORIES LLC**

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

**Certificate of Analysis**

Report Date: July 19, 2016

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF F14-021

Client Sample ID: B362W5 Project: CPRC0F14021  
 Sample ID: 400883001 Client ID: CPRC001  
 Matrix: WATER  
 Collect Date: 05-JUL-16 08:30  
 Receive Date: 06-JUL-16  
 Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
9056_ANIONS_IC: COMMON + (add-on) "As Received"												
Bromide	U	67.0	67.0	250	ug/L		1	MXL2	07/06/16	1655	1579737	1
Chloride	B	128	67.0	200	ug/L		1					
Fluoride	U	33.0	33.0	500	ug/L		1					
Nitrate-N	B	72.6	33.0	250	ug/L		1					
Nitrite-N	U	33.0	33.0	250	ug/L		1					
Phosphorus in phosphate	U	67.0	67.0	500	ug/L		1					
Sulfate	B	159	133	500	ug/L		1					

**Titration and Ion Analysis**

120.1_CONDUCTIVITY: COMMON "As Received"												
Conductivity	U	3.63	3.63	14.5	umhos/cm		1	RXB5	07/14/16	1905	1581884	2

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	9056_ANIONS_IC		
2	EPA 120.1		

**Notes:**

8/1/2016

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: July 19, 2016

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF F14-021

---

Client Sample ID:	B362W7	Project:	CPRC0F14021
Sample ID:	400883003	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	05-JUL-16 08:30		
Receive Date:	06-JUL-16		
Collector:	Client		

---

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Titration and Ion Analysis												
120.1_CONDUCTIVITY: COMMON "As Received"												
Conductivity	U	3.63	3.63	14.5	umhos/cm		1	RXB5	07/14/16	1909	1581884	1

The following Analytical Methods were performed:

---

Method	Description	Analyst	Comments
1	EPA 120.1		

Notes:

8/1/2016

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: July 19, 2016

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF F14-021

---

Client Sample ID:	B362W8	Project:	CPRC0F14021
Sample ID:	400883004	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	05-JUL-16 08:30		
Receive Date:	06-JUL-16		
Collector:	Client		

---

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Titration and Ion Analysis												
120.1_CONDUCTIVITY: COMMON "As Received"												
Conductivity	U	3.63	3.63	14.5	umhos/cm		1	RXB5	07/14/16	1910	1581884	1

The following Analytical Methods were performed:

---

Method	Description	Analyst	Comments
1	EPA 120.1		

Notes:

# Quality Control Summary

**GEL LABORATORIES LLC**

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

**QC Summary**

Report Date: July 19, 2016

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 400883

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1579737										
QC1203580049	LCS										
Bromide	1250			1330	ug/L		106	(80%-120%)	MXL2	07/06/16	15:55
Chloride	5000			4890	ug/L		97.8	(80%-120%)			
Fluoride	2500			2480	ug/L		99.1	(80%-120%)			
Nitrate-N	2500			2520	ug/L		101	(80%-120%)			
Nitrite-N	2500			2490	ug/L		99.5	(80%-120%)			
Phosphorus in phosphate	1250			1360	ug/L		109	(80%-120%)			
Sulfate	10000			10000	ug/L		100	(80%-120%)			
QC1203580050	LCSD										
Bromide	1250			1310	ug/L	1.57	105	(0%-20%)		07/06/16	16:25
Chloride	5000			4900	ug/L	0.317	98.1	(0%-20%)			
Fluoride	2500			2460	ug/L	0.79	98.4	(0%-20%)			
Nitrate-N	2500			2500	ug/L	0.88	100	(0%-20%)			
Nitrite-N	2500			2480	ug/L	0.27	99.3	(0%-20%)			
Phosphorus in phosphate	1250			1340	ug/L	1.52	107	(0%-20%)			
Sulfate	10000			10000	ug/L	0.432	100	(0%-20%)			
QC1203580048	MB										
Bromide			U	67.0	ug/L					07/06/16	15:25
Chloride			U	67.0	ug/L						
Fluoride			U	33.0	ug/L						
Nitrate-N			U	33.0	ug/L						
Nitrite-N			U	33.0	ug/L						

**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 400883

Page 2 of 2

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1579737										
Phosphorus in phosphate			U	67.0	ug/L				MXL2	07/06/16	15:25
Sulfate			U	133	ug/L						
<b>Titration and Ion Analysis</b>											
Batch	1581884										
QC1203585267	400883001	DUP									
Conductivity		U	3.63	U	3.63	umhos/cm	N/A		RXB5	07/14/16	19:08
QC1203585265	LCS										
Conductivity	1410				1390	umhos/cm	98.7	(80%-120%)		07/14/16	19:04

**Notes:**

The Qualifiers in this report are defined as follows:

- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is  $\geq$  EQL or is  $>$  5% of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.
- N Spike Sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

\* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

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

# Radiological Analysis

# Case Narrative

**Radiochemistry  
Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL400883  
Work Order #: 400883**

**Product:** PUIISO\_PLATE\_AEA:COMMON (HIGH RAD)

**Analytical Method:** PUIISO\_PRECIP\_AEA

**Analytical Procedure:** GL-RAD-A-011 REV# 26

**Analytical Batch:** 1579827

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
400883002	B362W6
400883003	B362W7
400883004	B362W8
1203580211	Method Blank (MB)
1203580212	400883002(B362W6) Sample Duplicate (DUP)
1203580213	Laboratory Control Sample (LCS)

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

**Data Summary:**

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

**Miscellaneous Information**

1. Sample 400883004 does not meet the Pu-238 detection limit due to the small sample aliquots used. The blank, 1203580211, does not meet the Pu-238 and Pu-239/240 detection limits due to keeping the volume consistent with the other sample aliquots. 1. The sample aliquots were reduced due to the high activity of other isotopes and in attempt to minimize interferences. Reporting results.

**Product:** UISO\_PLATE\_AEA:COMMON (HIGH RAD)

**Analytical Method:** UISO\_IE\_PRECIP\_AEA

**Analytical Procedure:** GL-RAD-A-011 REV# 26

**Analytical Batch:** 1579829

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
400883002	B362W6
400883003	B362W7
400883004	B362W8
1203580218	Method Blank (MB)
1203580219	400883002(B362W6) Sample Duplicate (DUP)
1203580220	Laboratory Control Sample (LCS)

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

**Data Summary:**

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

**Technical Information**

**Recounts**

Sample 400883003 (B362W7) was recounted due to a suspected false positive. The recount is reported. Sample 400883002 (B362W6) was recounted to verify the result. The recount is reported.

**Miscellaneous Information**

1. Sample 400883002 did not meet the U-233/234 and U-235/236 detection limits and samples 400883003, 400883004, and 1203580219 did not meet the U-233/234, U-235/236, and U-238 detection limits due to the small sample aliquots used. The blank, 1203580218, did not meet the U-233/234, U-235/236, and U-238 detection limits due to keeping the volume consistent with the other sample aliquots. 1. The sample aliquots were reduced due to the high activity of other isotopes and in attempt to minimize interferences. Reporting results.

**Product: AMCMISO\_EIE\_PLATE\_AEA: (HIGH RAD)**

**Analytical Method:** AMCMISO\_EIE\_PREC\_AEA

**Analytical Procedure:** GL-RAD-A-011 REV# 26

**Analytical Batch:** 1582213

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
400883002	B362W6
400883003	B362W7
400883004	B362W8
1203586083	Method Blank (MB)
1203586084	400883002(B362W6) Sample Duplicate (DUP)
1203586085	Laboratory Control Sample (LCS)

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

**Data Summary:**

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

**Technical Information**

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

Samples were re-prepped due to high blank activity. The re-analysis is being reported.

**Recounts**

Sample 400883002 (B362W6) was recounted due to high carrier/tracer yield. The recount is reported. Samples

1203586084 (B362W6DUP) and 400883003 (B362W7) were recounted twice due to high tracer yields. The third counts are reported. Sample 1203586085 (LCS) was recounted due to a detector error. The recount is reported.

### Miscellaneous Information

#### **Manual Integration**

Manual integrations of alpha spectroscopy spectra 1203586084 (B362W6DUP) and 400883003 (B362W7) were performed to fully separate counts in Regions of Interest which would have been biased.

1. The duplicate, 1203586084, did not meet the client's tracer yield requirement of 30 to 105 percent. 2. Samples 400883002, 400883003, 400883004, and 1203586084 did not meet the Cm-243/244 detection limit due to the small sample aliquots used. The blank, 1203586083, did not meet the Am-241 and Cm-243/244 detection limits due to keeping the volume consistent with the other sample aliquots. 3. Sample 400883002 does not meet the resolution requirement of having a full width half maximum of 100 keV or less for the Am-243 tracer. 1. The QC sample does meet the client's tracer yield requirement and the duplicate and QC sample meet all duplication requirements. Client granted relief to send. Reporting results. 2. The sample aliquots were reduced due to the high activity of other isotopes and in attempt to minimize interferences. Reporting results. 3. The sample does meet the tracer yield requirement and its tracer peak is within the Am-243 region of interest. Reporting results.

#### **Product: GAMMA\_GS:COMMON (Cs137) HIGH RAD**

**Analytical Method:** 901.1\_GAMMA\_GS

**Analytical Procedure:** GL-RAD-A-013 REV# 25

**Analytical Batch:** 1579822

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
400883002	B362W6
400883003	B362W7
400883004	B362W8
1203580201	Method Blank (MB)
1203580202	400883002(B362W6) Sample Duplicate (DUP)
1203580203	Laboratory Control Sample (LCS)

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

#### **Data Summary:**

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

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

##### **QC Information**

All of the QC samples meet the required acceptance limits with the following exceptions: The blank, 1203580201 (MB), did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots. All other samples met the detection limits.

**Product:** SRTOT\_SEP\_PRECIP\_GPC: COMMON (HIGH RAD)

**Analytical Method:** SRTOT\_SEP\_PRECIP\_GPC

**Analytical Procedure:** GL-RAD-A-004 REV# 17

**Analytical Batch:** 1579831

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
400883002	B362W6
400883003	B362W7
400883004	B362W8
1203580221	Method Blank (MB)
1203580222	400883002(B362W6) Sample Duplicate (DUP)
1203580223	Laboratory Control Sample (LCS)

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

**Data Summary:**

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

**Quality Control (QC) Information**

**QC Information**

All of the QC samples meet the required acceptance limits with the following exceptions: The blank, 1203580221 (MB), did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots. All other samples met the detection limits. The blank, 1203580221 (MB), result is greater than the required detection limit but less than the MDC.

**Product:** TRITIUM\_DIST\_LSC: COMMON (HIGH RAD)

**Analytical Method:** TRITIUM\_DIST\_LSC

**Analytical Procedure:** GL-RAD-A-002 REV# 21

**Analytical Batch:** 1579832

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
400883001	B362W5
400883003	B362W7
400883004	B362W8
1203580224	Method Blank (MB)
1203580225	400883001(B362W5) Sample Duplicate (DUP)
1203580226	400883001(B362W5) Matrix Spike (MS)
1203580227	Laboratory Control Sample (LCS)

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

**Data Summary:**

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

**Quality Control (QC) Information****QC Information**

All of the QC samples meet the required acceptance limits with the following exceptions: The blank, 1203580224 (MB), did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots. All other samples met the detection limits.

**Product:** Laboratory Comp for preserved & unpres analysis

**Composite Preparation Method:** GL-RAD-A-026

**Composite Preparation Procedure:** GL-RAD-A-026 REV# 15

**Composite Preparation Batch:** 1579424

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
400883003	B362W7
400883004	B362W8

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

**Data Summary:**

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

**Certification Statement**

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

**GEL LABORATORIES LLC**

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

**Qualifier Definition Report  
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL400883 GEL Work Order: 400883

**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:** Theresa Austin

**Date:** 22 JUL 2016

**Title:** Group Leader

# Sample Data Summary

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

SDG Number: GEL400883	Client: CPRC001	Project: CPRC0F14021
Lab Sample ID: 400883001	Date Collected: 07/05/2016 08:30	Matrix: WATER
	Date Received: 07/06/2016 09:10	
Client ID: B362W5	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1579832	Analyst: JXC5	SOP Ref: GL-RAD-A-002
Run Date: 07/07/2016 21:04	Aliquot: 1 mL	Instrument: LSCSILVER
Data File: T1579832.xls	Prep Method: EPA 906.0 Modified	Count Time: 112.849998474121 min
Prep Batch: 1579832		
Prep Date: 07/07/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		8.93E+05	pCi/L	+/-18600	1.74E+05	9350	100

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits

**Comments:**

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

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

SDG Number: GEL400883  
 Lab Sample ID: 400883002  
  
 Client ID: B362W6  
 Batch ID: 1579822  
 Run Date: 07/07/2016 10:23  
 Data File: G400883002.CNF;1  
 Prep Batch: 1579822  
 Prep Date: 07/07/2016 00:00

Client: CPRC001  
 Date Collected: 07/05/2016 08:30  
 Date Received: 07/06/2016 09:10  
  
 Method: 901.1\_GAMMA\_GS  
 Analyst: JXC5  
 Aliquot: 0.2 L  
 Prep Method: EPA 901.1

Project: CPRC0F14021  
 Matrix: WATER  
  
 Prep Basis: "As Received"  
 SOP Ref: GL-RAD-A-013  
 Instrument: WELL  
 Count Time: 120 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137		5.22E+05	pCi/L	+/-2200	48400	401	15.0

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

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

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

SDG Number: GEL400883	Client: CPRC001	Project: CPRC0F14021
Lab Sample ID: 400883002	Date Collected: 07/05/2016 08:30	Matrix: WATER
	Date Received: 07/06/2016 09:10	
Client ID: B362W6	Method: PUIISO_PRECIP_AEA	Prep Basis: "As Received"
Batch ID: 1579827	Analyst: JXC5	SOP Ref: GL-RAD-A-011
Run Date: 07/08/2016 09:54	Aliquot: 0.001 L	Instrument: 1095
Data File: S0400883002_PU.1B.gcnf	Prep Method: DOE EML HASL-300, Pu-11-	Count Time: 239.9998 min
Prep Batch: 1579827		
Prep Date: 07/07/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238		839	pCi/L	+/-158	192	51.6	1.00
OER-100-70	Plutonium-239/240		6370	pCi/L	+/-431	923	22.7	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-236 Tracer	1800	2250	pCi/L	80.3	(30%-105%)

**Comments:**

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

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

<b>SDG Number:</b> GEL400883	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F14021
<b>Lab Sample ID:</b> 400883002	<b>Date Collected:</b> 07/05/2016 08:30	<b>Matrix:</b> WATER
	<b>Date Received:</b> 07/06/2016 09:10	
<b>Client ID:</b> B362W6	<b>Method:</b> UIISO_IE_PRECIP_AEA	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1579829	<b>Analyst:</b> JXC5	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 07/14/2016 15:27	<b>Aliquot:</b> 0.001 L	<b>Instrument:</b> 1113
<b>Data File:</b> S0400883002_UU.2A.gcnf	<b>Prep Method:</b> DOE EML HASL-300, U-02-R	<b>Count Time:</b> 240 min
<b>Prep Batch:</b> 1579829		
<b>Prep Date:</b> 07/07/2016 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	21.8	pCi/L	+/-38.8	38.9	63.0	1.00
15117-96-1/13982-7	Uranium-235/236	U	8.01	pCi/L	+/-30.0	30.1	50.5	1.00
7440-61-1	Uranium-238		66.5	pCi/L	+/-53.7	54.5	59.8	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	1860	2080	pCi/L	89.4	(30%-105%)

**Comments:**

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

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

SDG Number: GEL400883	Client: CPRC001	Project: CPRC0F14021
Lab Sample ID: 400883002	Date Collected: 07/05/2016 08:30	Matrix: WATER
	Date Received: 07/06/2016 09:10	
Client ID: B362W6	Method: SRTOT_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1579831	Analyst: JXC5	SOP Ref: GL-RAD-A-004
Run Date: 07/07/2016 14:23	Aliquot: 10 mL	Instrument: LB4100I1
Data File: S1579831.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1579831		
Prep Date: 07/07/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium		2.03E+05	pCi/L	+/-1260	47000	57.6	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	6.50	7.77	mg	83.7	(40%-110%)

**Comments:**

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

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

SDG Number: GEL400883	Client: CPRC001	Project: CPRC0F14021
Lab Sample ID: 400883002	Date Collected: 07/05/2016 08:30	Matrix: WATER
	Date Received: 07/06/2016 09:10	
Client ID: B362W6	Method: AMCMISO_EIE_PREC_AEA	Prep Basis: "As Received"
Batch ID: 1582213	Analyst: JXC5	SOP Ref: GL-RAD-A-011
Run Date: 07/19/2016 12:52	Aliquot: 0.001 L	Instrument: 1234
Data File: S0400883002_AM.3A.gcnf	Prep Method: DOE EML HASL-300, Am-05	Count Time: 60 min
Prep Batch: 1582213		
Prep Date: 07/18/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241		12600	pCi/L	+/-1220	3370	128	1.00
	Curium-243/244	U	0.00	pCi/L	+/-59.6	60.1	91.1	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	2060	2080	pCi/L	99.2	(30%-105%)

**Comments:**

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

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

**SDG Number:** GEL400883  
**Lab Sample ID:** 400883003  
  
**Client ID:** B362W7  
**Batch ID:** 1579822  
**Run Date:** 07/07/2016 15:33  
**Data File:** G400883003.CNF;1  
**Prep Batch:** 1579822  
**Prep Date:** 07/07/2016 00:00

**Client:** CPRC001  
**Date Collected:** 07/05/2016 08:30  
**Date Received:** 07/06/2016 09:10  
  
**Method:** 901.1\_GAMMA\_GS  
**Analyst:** JXC5  
**Aliquot:** 0.2 L  
**Prep Method:** EPA 901.1

**Project:** CPRC0F14021  
**Matrix:** WATER  
  
**Prep Basis:** "As Received"  
**SOP Ref:** GL-RAD-A-013  
**Instrument:** WELL  
**Count Time:** 120 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137		4.95E+05	pCi/L	+/-2170	45900	381	15.0

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

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

**Rad  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL400883	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F14021
<b>Lab Sample ID:</b> 400883003	<b>Date Collected:</b> 07/05/2016 08:30	<b>Matrix:</b> WATER
	<b>Date Received:</b> 07/06/2016 09:10	
<b>Client ID:</b> B362W7	<b>Method:</b> PUIISO_PRECIP_AEA	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1579827	<b>Analyst:</b> JXC5	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 07/08/2016 09:54	<b>Aliquot:</b> 0.001 L	<b>Instrument:</b> 1096
<b>Data File:</b> S0400883003_PU.1B.gcnf	<b>Prep Method:</b> DOE EML HASL-300, Pu-11-	<b>Count Time:</b> 239.9998 min
<b>Prep Batch:</b> 1579827		
<b>Prep Date:</b> 07/07/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238		900	pCi/L	+/-158	194	53.9	1.00
OER-100-70	Plutonium-239/240		7170	pCi/L	+/-440	996	21.1	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-236 Tracer	1840	2250	pCi/L	81.7	(30%-105%)

**Comments:**

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

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

<b>SDG Number:</b> GEL400883	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F14021
<b>Lab Sample ID:</b> 400883003	<b>Date Collected:</b> 07/05/2016 08:30	<b>Matrix:</b> WATER
	<b>Date Received:</b> 07/06/2016 09:10	
<b>Client ID:</b> B362W7	<b>Method:</b> UIISO_IE_PRECIP_AEA	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1579829	<b>Analyst:</b> JXC5	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 07/14/2016 15:27	<b>Aliquot:</b> 0.001 L	<b>Instrument:</b> 1132
<b>Data File:</b> S0400883003_UU.2A.gcnf	<b>Prep Method:</b> DOE EML HASL-300, U-02-R	<b>Count Time:</b> 240 min
<b>Prep Batch:</b> 1579829		
<b>Prep Date:</b> 07/07/2016 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	12.2	pCi/L	+/-35.5	35.5	66.1	1.00
15117-96-1/13982-7	Uranium-235/236	U	21.5	pCi/L	+/-38.0	38.1	57.6	1.00
7440-61-1	Uranium-238	U	8.54	pCi/L	+/-35.8	35.8	70.3	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	1980	2080	pCi/L	94.8	(30%-105%)

**Comments:**

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

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

SDG Number: GEL400883	Client: CPRC001	Project: CPRC0F14021
Lab Sample ID: 400883003	Date Collected: 07/05/2016 08:30	Matrix: WATER
	Date Received: 07/06/2016 09:10	
Client ID: B362W7		Prep Basis: "As Received"
Batch ID: 1579831	Method: SRTOT_SEP_PRECIP_GPC	SOP Ref: GL-RAD-A-004
Run Date: 07/07/2016 14:23	Analyst: JXC5	Instrument: LB4100I2
Data File: S1579831.xls	Aliquot: 10 mL	Count Time: 60 min
Prep Batch: 1579831	Prep Method: EPA 905.0 Modified/DOE RP5	
Prep Date: 07/07/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium		1.81E+05	pCi/L	+/-1220	41800	81.8	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	6.00	7.77	mg	77.3	(40%-110%)

**Comments:**

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

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

SDG Number: GEL400883  
 Lab Sample ID: 400883003

Client: CPRC001  
 Date Collected: 07/05/2016 08:30  
 Date Received: 07/06/2016 09:10

Project: CPRC0F14021  
 Matrix: WATER

Client ID: B362W7  
 Batch ID: 1579832  
 Run Date: 07/07/2016 23:01  
 Data File: T1579832.xls  
 Prep Batch: 1579832  
 Prep Date: 07/07/2016 00:00

Method: TRITIUM\_DIST\_LSC  
 Analyst: JXC5  
 Aliquot: 1 mL  
 Prep Method: EPA 906.0 Modified

Prep Basis: "As Received"  
 SOP Ref: GL-RAD-A-002  
 Instrument: LSCSILVER  
 Count Time: 113.650001525879 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		8.72E+05	pCi/L	+/-18200	1.70E+05	9190	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).  
 The MDC is a sample specific MDC.

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

Page 1 of 1

SDG Number: GEL400883  
 Lab Sample ID: 400883003

Client: CPRC001  
 Date Collected: 07/05/2016 08:30  
 Date Received: 07/06/2016 09:10

Project: CPRC0F14021  
 Matrix: WATER

Client ID: B362W7  
 Batch ID: 1582213  
 Run Date: 07/20/2016 13:02  
 Data File: S0400883003\_AM.4B  
 Prep Batch: 1582213  
 Prep Date: 07/18/2016 00:00

Method: AMCMISO\_EIE\_PREC\_AEA  
 Analyst: JXC5  
 Aliquot: 0.001 L  
 Prep Method: DOE EML HASL-300, Am-05

Prep Basis: "As Received"  
 SOP Ref: GL-RAD-A-011  
 Instrument: 1245  
 Count Time: 30 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241		13700	pCi/L	+/-1790	5040	181	1.00
	Curium-243/244	U	-1.78	pCi/L	+/-117	118	213	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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Americium-243 Tracer	2060	2080	pCi/L	98.9	(30%-105%)
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**Comments:**

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

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

The MDC is a sample specific MDC.

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

SDG Number: GEL400883	Client: CPRC001	Project: CPRC0F14021
Lab Sample ID: 400883004	Date Collected: 07/05/2016 08:30	Matrix: WATER
	Date Received: 07/06/2016 09:10	
Client ID: B362W8	Method: 901.1_GAMMA_GS	Prep Basis: "As Received"
Batch ID: 1579822	Analyst: JXC5	SOP Ref: GL-RAD-A-013
Run Date: 07/08/2016 08:51	Aliquot: 0.2 L	Instrument: WELL
Data File: G400883004.CNF;1	Prep Method: EPA 901.1	Count Time: 120 min
Prep Batch: 1579822		
Prep Date: 07/07/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137		213	pCi/L	+/-77.3	79.8	59.6	15.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits

**Comments:**

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

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

SDG Number: GEL400883	Client: CPRC001	Project: CPRC0F14021
Lab Sample ID: 400883004	Date Collected: 07/05/2016 08:30	Matrix: WATER
	Date Received: 07/06/2016 09:10	
Client ID: B362W8	Method: PUIISO_PRECIP_AEA	Prep Basis: "As Received"
Batch ID: 1579827	Analyst: JXC5	SOP Ref: GL-RAD-A-011
Run Date: 07/08/2016 09:54	Aliquot: 0.001 L	Instrument: 1097
Data File: S0400883004_PU.1B.gcnf	Prep Method: DOE EML HASL-300, Pu-11-	Count Time: 239.9998 min
Prep Batch: 1579827		
Prep Date: 07/07/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	24.4	pCi/L	+/-33.9	34.2	52.1	1.00
OER-100-70	Plutonium-239/240		59.5	pCi/L	+/-42.1	42.7	39.2	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-236 Tracer	1860	2250	pCi/L	83	(30%-105%)

**Comments:**

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

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

The MDC is a sample specific MDC.

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

SDG Number: GEL400883	Client: CPRC001	Project: CPRC0F14021
Lab Sample ID: 400883004	Date Collected: 07/05/2016 08:30	Matrix: WATER
	Date Received: 07/06/2016 09:10	
Client ID: B362W8	Method: UIISO_IE_PRECIP_AEA	Prep Basis: "As Received"
Batch ID: 1579829	Analyst: JXC5	SOP Ref: GL-RAD-A-011
Run Date: 07/07/2016 15:05	Aliquot: 0.001 L	Instrument: 1157
Data File: S0400883004_UU.1A.gcnf	Prep Method: DOE EML HASL-300, U-02-R	Count Time: 240 min
Prep Batch: 1579829		
Prep Date: 07/07/2016 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/L	+/-26.4	26.5	58.7	1.00
15117-96-1/13982-7	Uranium-235/236	U	22.0	pCi/L	+/-37.8	37.9	33.1	1.00
7440-61-1	Uranium-238	U	11.4	pCi/L	+/-31.4	31.4	54.4	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	1690	2080	pCi/L	81	(30%-105%)

**Comments:**

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

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

SDG Number: GEL400883	Client: CPRC001	Project: CPRC0F14021
Lab Sample ID: 400883004	Date Collected: 07/05/2016 08:30	Matrix: WATER
	Date Received: 07/06/2016 09:10	
Client ID: B362W8	Method: SRTOT_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1579831	Analyst: JXC5	SOP Ref: GL-RAD-A-004
Run Date: 07/07/2016 14:23	Aliquot: 10 mL	Instrument: LB410014
Data File: S1579831.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1579831		
Prep Date: 07/07/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium		552	pCi/L	+/-74.4	148	59.2	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	5.90	7.77	mg	76	(40%-110%)

**Comments:**

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

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

SDG Number: GEL400883  
 Lab Sample ID: 400883004

Client: CPRC001  
 Date Collected: 07/05/2016 08:30  
 Date Received: 07/06/2016 09:10

Project: CPRC0F14021  
 Matrix: WATER

Client ID: B362W8  
 Batch ID: 1579832  
 Run Date: 07/08/2016 00:58  
 Data File: T1579832.xls  
 Prep Batch: 1579832  
 Prep Date: 07/07/2016 00:00

Method: TRITIUM\_DIST\_LSC  
 Analyst: JXC5  
 Aliquot: 1 mL  
 Prep Method: EPA 906.0 Modified

Prep Basis: "As Received"  
 SOP Ref: GL-RAD-A-002  
 Instrument: LSCSILVER  
 Count Time: 110.949996948242 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		8.95E+05	pCi/L	+/-18600	1.74E+05	9250	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).  
 The MDC is a sample specific MDC.

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

SDG Number: GEL400883	Client: CPRC001	Project: CPRC0F14021
Lab Sample ID: 400883004	Date Collected: 07/05/2016 08:30	Matrix: WATER
	Date Received: 07/06/2016 09:10	
Client ID: B362W8	Method: AMCMISO_EIE_PREC_AEA	Prep Basis: "As Received"
Batch ID: 1582213	Analyst: JXC5	SOP Ref: GL-RAD-A-011
Run Date: 07/18/2016 16:34	Aliquot: 0.001 L	Instrument: 1085
Data File: S0400883004_AM.2A.gcnf	Prep Method: DOE EML HASL-300, Am-05	Count Time: 240 min
Prep Batch: 1582213		
Prep Date: 07/18/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241		119	pCi/L	+/-58.4	60.5	37.7	1.00
	Curium-243/244	U	11.8	pCi/L	+/-23.2	23.3	32.2	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	1770	2080	pCi/L	85.3	(30%-105%)

**Comments:**

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

# Quality Control Summary

**GEL LABORATORIES LLC**

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

**QC Summary**

Report Date: July 22, 2016

Page 1 of 4

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

Contact: Mr. Scot Fitzgerald

Workorder: 400883

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>High Rad Testing</b>									
Batch	1579822								
QC1203580201	MB								
Cesium-137			U	-5.79	pCi/L			JXC5	07/08/1610:54
				Uncert: +/-43.6					
				TPU: +/-43.7					
QC1203580202	400883002	DUP							
Cesium-137		5.22E+05		5.21E+05	pCi/L				07/07/1612:26
				Uncert: +/-2200		RPD: 0	(0% - 20%)		
				TPU: +/-48400		RER: 0.0143	(0-2)		
QC1203580203	LCS								
Americium-241	3.00E+05			3.12E+05	pCi/L	REC: 104	(80%-120%)		07/08/1612:56
				Uncert: +/-7170					
				TPU: +/-32400					
Cobalt-60	62900			68400	pCi/L	REC: 109	(80%-120%)		
				Uncert: +/-2800					
				TPU: +/-6830					
Cesium-137	98400			1.04E+05	pCi/L	REC: 106	(80%-120%)		
				Uncert: +/-2940					
				TPU: +/-10100					
Batch	1579827								
QC1203580211	MB								
Plutonium-238			U	30.7	pCi/L			JXC5	07/08/1609:54
				Uncert: +/-42.0					
				TPU: +/-42.3					
Plutonium-239/240			U	-9.94	pCi/L				
				Uncert: +/-16.0					
				TPU: +/-16.0					
**Plutonium-236 Tracer	2240			1750	pCi/L	REC: 78	(30%-105%)		
				Uncert: +/-245					
				TPU: +/-370					
QC1203580212	400883002	DUP							
Plutonium-238		839		962	pCi/L				
				Uncert: +/-158		RPD: 14	(0% - 20%)		
				TPU: +/-192		RER: 0.875	(0-2)		
Plutonium-239/240		6370		6360	pCi/L				
				Uncert: +/-431		RPD: 0	(0% - 20%)		
				TPU: +/-923		RER: 0.0133	(0-2)		
**Plutonium-236 Tracer	2250	1800		2060	pCi/L	REC: 92	(30%-105%)		
				Uncert: +/-256					
				TPU: +/-386					
QC1203580213	LCS								
Plutonium-238			U	40.8	pCi/L				07/08/1609:54
				Uncert: +/-48.6					
				TPU: +/-49.1					
Plutonium-239/240	1970			1960	pCi/L	REC: 100	(80%-120%)		
				Uncert: +/-264					

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>High Rad Testing</b>									
Batch		1579827							
**Plutonium-236 Tracer		TPU: 2240		+/-381 1720	pCi/L	REC: 77	(30%-105%)		
		Uncert: TPU:		+/-284 +/-423					
Batch		1579829							
QC1203580218	MB								
Uranium-233/234			U	2.59	pCi/L			JXC5	07/07/1615:05
		Uncert: TPU:		+/-27.1 +/-27.1					
Uranium-235/236			U	11.4	pCi/L				
		Uncert: TPU:		+/-32.2 +/-32.2					
Uranium-238			U	16.3	pCi/L				
		Uncert: TPU:		+/-32.0 +/-32.1					
**Uranium-232 Tracer		2080		1670	pCi/L	REC: 80	(30%-105%)		
		Uncert: TPU:		+/-290 +/-444					
QC1203580219	400883002	DUP							
Uranium-233/234		U	21.8	U	36.4	pCi/L			07/07/1615:05
		Uncert: TPU:	+/-38.8 +/-38.9		+/-39.2 +/-39.5		RPD: 0 RER: 0.514	N/A (0-2)	
Uranium-235/236		U	8.01	U	9.95	pCi/L			
		Uncert: TPU:	+/-30.0 +/-30.1		+/-28.0 +/-28.0		RPD: 0 RER: 0.0926	N/A (0-2)	
Uranium-238			66.5	U	30.3	pCi/L			
		Uncert: TPU:	+/-53.7 +/-54.5		+/-35.7 +/-35.9		RPD: 53 RER: 1.09	(0% - 100%) (0-2)	
**Uranium-232 Tracer		2080	1860		1880	pCi/L	REC: 90	(30%-105%)	
		Uncert: TPU:	+/-278 +/-428		+/-270 +/-419				
QC1203580220	LCS								
Uranium-233/234				2730	pCi/L				07/07/1615:05
		Uncert: TPU:		+/-288 +/-469					
Uranium-235/236				141	pCi/L				
		Uncert: TPU:		+/-76.7 +/-79.0					
Uranium-238		2690		2480	pCi/L	REC: 92	(80%-120%)		
		Uncert: TPU:		+/-274 +/-434					
**Uranium-232 Tracer		2080		1960	pCi/L	REC: 94	(30%-105%)		
		Uncert: TPU:		+/-267 +/-415					
Batch		1579831							
QC1203580221	MB								
Total Strontium			U	35.9	pCi/L			JXC5	07/07/1614:23
		Uncert: TPU:		+/-37.5 +/-38.5					
						REC:			

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>High Rad Testing</b>									
Batch	1579831								
**Strontium Carrier	7.77			5.90	mg	76	(40%-110%)		
QC1203580222	400883002	DUP							
Total Strontium		2.03E+05		1.99E+05	pCi/L				07/07/1614:23
		Uncert:	+/-1260	+/-1300		RPD:	2	(0% - 20%)	
		TPU:	+/-47000	+/-46000		RER:	0.128	(0-2)	
**Strontium Carrier	7.77	6.50		6.00	mg	REC:	77	(40%-110%)	
QC1203580223	LCS								
Total Strontium	10900			11400	pCi/L	REC:	104	(80%-120%)	07/07/1614:23
		Uncert:		+/-302					
		TPU:		+/-2660					
**Strontium Carrier	7.77			6.30	mg	REC:	81	(40%-110%)	
Batch	1579832								
QC1203580224	MB								
Tritium			U	-525	pCi/L			JXC5	07/08/1604:08
		Uncert:		+/-5180					
		TPU:		+/-5180					
QC1203580225	400883001	DUP							
Tritium		8.93E+05		8.74E+05	pCi/L				07/08/1606:11
		Uncert:	+/-18600	+/-21700		RPD:	2	(0% - 20%)	
		TPU:	+/-1.74E+05	+/-1.70E+05		RER:	0.149	(0-2)	
QC1203580226	400883001	MS							
Tritium	1.16E+05	8.93E+05		1.01E+06	pCi/L	REC:	103	(75%-125%)	07/08/1607:34
		Uncert:	+/-18600	+/-53600					
		TPU:	+/-1.74E+05	+/-2.03E+05					
QC1203580227	LCS								
Tritium	1.16E+05			1.06E+05	pCi/L	REC:	92	(80%-120%)	07/08/1607:51
		Uncert:		+/-20400					
		TPU:		+/-29000					
Batch	1582213								
QC1203586083	MB								
Americium-241			U	-2.83	pCi/L			JXC5	07/18/1616:34
		Uncert:		+/-19.5					
		TPU:		+/-19.5					
Curium-243/244			U	11.1	pCi/L				
		Uncert:		+/-21.9					
		TPU:		+/-21.9					
**Americium-243 Tracer	2080			2010	pCi/L	REC:	97	(30%-105%)	
		Uncert:		+/-226					
		TPU:		+/-347					
QC1203586084	400883002	DUP							
Americium-241		12600		10700	pCi/L				07/20/1613:02
		Uncert:	+/-1220	+/-1500		RPD:	16	(0% - 20%)	
		TPU:	+/-3370	+/-3810		RER:	0.731	(0-2)	
Curium-243/244	U	0.00	U	0.00	pCi/L				
		Uncert:	+/-59.6	+/-105		RPD:	0	N/A	
		TPU:	+/-60.1	+/-106		RER:	0	(0-2)	
**Americium-243 Tracer	2080	2060		2300	pCi/L	REC:	111*	(30%-105%)	
		Uncert:	+/-497	+/-663					
		TPU:	+/-717	+/-948					
QC1203586085	LCS								

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
<b>High Rad Testing</b>										
Batch	1582213									
Americium-241	1970			2070	pCi/L	REC: 105	(80%-120%)			
	Uncert:			+/-247						
	TPU:			+/-374						
Curium-243/244	2620			2470	pCi/L	REC: 94	(80%-120%)			
	Uncert:			+/-268						
	TPU:			+/-428						
**Americium-243 Tracer	2080			2050	pCi/L	REC: 99	(30%-105%)			
	Uncert:			+/-246						
	TPU:			+/-374						

**Notes:**

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

The Qualifiers in this report are defined as follows:

- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- B The associated QC sample blank has a result  $\geq 2X$  the MDA and, after corrections, result is  $\geq$  MDA for this sample
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is  $\geq$  EQL or is  $> 5\%$  of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.
- N Spike Sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- UX Gamma Spectroscopy--Uncertain identification
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

\*\* Indicates analyte is a surrogate compound.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

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