

July 08, 2015

July 06, 2015

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

Re: CHPRC SAF F15-028  
Work Order: 374830  
SDG: GEL374830

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 11, 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 for  
Heather Shaffer  
Project Manager

Purchase Order: 303581 - 7H  
Chain of Custody: F15-028-005  
Enclosures



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# Case Narrative

July 08, 2015

General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF F15-028  
SDG: GEL374830

July 06, 2015

**Laboratory Identification:**

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

**Summary**

**Sample receipt**

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on June 11, 2015, for analysis. The sample was 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 sample:

<b>Laboratory Identification</b>	<b>Sample Description</b>
374830001	B30RP4

**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: 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 08, 2015

Chelsea Seagle for  
Heather Shaffer  
Project Manager

# **Chain of Custody and Supporting Documentation**

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		PAGE 1 OF 1	
COLLECTOR <b>FLOYD</b>	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR TODAK, D	PRICE CODE 7H	DATA TURNAROUND 30 Days / 30 Days
SAMPLING LOCATION C8796, Interval 1-4 REQ 6/4/15	PROJECT DESIGNATION 100-KE Characterization Boreholes - Water	SAF NO. F15-028	COA 303581	AIR QUALITY	METHOD OF SHIPMENT FEDERAL EXPRESS
ICE CHEST NO. GWS-403	FIELD LOGBOOK NO. HWPN-45-3	ACTUAL SAMPLE DEPTH 70.06	BILL OF LADING/AIR BILL NO. 7737 9774 5170	<b>ORIGINAL</b>	
SHIPPED TO GEL Laboratories, LLC	OFFSITE PROPERTY NO. 5709				
MATRIX* A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SF=Sediment T=Tissue V=Vegetation W=Water WF=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 None	HNO3 to pH <2	HNO3 to pH <2	HNO3 to pH <2
		HOLDING TIME 6 Months	6 Months	6 Months	6 Months
		TYPE OF CONTAINER G/P	G/P	G/P	G/P
		NO. OF CONTAINER(S) 1	1	1	1
		VOLUME 500ml	4L	1L	500ml
		SAMPLE ANALYSIS 6010_METALS_ICP; COMMON (Chromium);	GAMMA_GS; COMMON;	AMCMISO_LEI; PRECIP_AEA; COMMON;	C14_LSC; COMMON;
	SPECIAL HANDLING AND/OR STORAGE RADIOACTIVE TIE TO: B30RP2 - JUL 6/4/15	SAMPLE DATE 6-9-15	SAMPLE TIME 1153	TRITIUUM_DIST_LSC; COMMON;	TC99_EE_LSC; COMMON;
SAMPLE NO. B30RP4	MATRIX* WATER				

July 08, 2015

374830

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS TRVL-15-037	
RELINQUISHED BY/REMOVED FROM D.L. Floyd/CHPRC	DATE/TIME MAY 09 2015 1501	RECEIVED BY/STORED IN SSU-1	DATE/TIME MAY 09 2015 1501		
RELINQUISHED BY/REMOVED FROM SSU-1	DATE/TIME JUN 10 2015 0700	RECEIVED BY/STORED IN B.E. Briggs/CHPRC	DATE/TIME JUN 10 2015 0700		
RELINQUISHED BY/REMOVED FROM B.E. Briggs/CHPRC	DATE/TIME JUN 10 2015 1400	RECEIVED BY/STORED IN FEDEX	DATE/TIME JUN 10 2015 0850		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN M. Koston/CHPRC	DATE/TIME 6-15-037		
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		
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD		DISPOSED BY		
PRINTED ON 3/17/2015			DATE/TIME		



July 08, 2015

SAMPLE RECEIPT & REVIEW FORM

Client: <b>CPRC</b>		SDG/AR/COC/Work Order: <b>374830</b>	
Received By: <b>MK</b>		Date Received: <b>6-11-15</b>	
Suspected Hazard Information		Yes	No
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Classified Radioactive II or III by RSO?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
COC/Samples marked containing PCBs?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Package, COC, and/or Samples marked as beryllium or asbestos containing?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Samples identified as Foreign Soil?		<input checked="" type="checkbox"/>	<input type="checkbox"/>

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input 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 #: <b>F5032015830</b> 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 7737 9774 5170 2c 7738 0443 6081 1c 9737 9156 2526 6c 7738 0443 5660 1c

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 06 July 2015**

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

# Metals Analysis

# Case Narrative

July 08, 2015

Metals

Technical Case Narrative

CH2MHill Plateau Remediation Company (CPRC)

SDG #: GEL374830

Work Order #: 374830

Sample ID	Client ID
374830001	B30RP4
1203335649	Method Blank (MB)ICP
1203335650	Laboratory Control Sample (LCS)
1203335653	374830001(B30RP4L) Serial Dilution (SD)
1203335651	374830001(B30RP4S) Matrix Spike (MS)
1203335652	374830001(B30RP4SD) Matrix Spike Duplicate (MSD)

**Sample Analysis**

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

**Method/Analysis Information**

<b>Analytical Batch:</b>	1485103
<b>Prep Batch :</b>	1485102
<b>Standard Operating Procedures:</b>	GL-MA-E-013 REV# 24 and GL-MA-E-006 REV# 12
<b>Analytical Method:</b>	6010_METALS_ICP
<b>Prep Method :</b>	SW846 3005A

**Preparation/Analytical Method Verification**

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

**System Configuration**

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

**Calibration Information**

**Instrument Calibration**

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

**CRDL/PQL Requirements**

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

**ICSA/ICSAB Statement**

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

criteria.

**Continuing Calibration Blanks (CCB) Requirements**

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

**Continuing Calibration Verification (CCV) Requirements**

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

**Quality Control (QC) Information**

**Method Blank (MB) Statement**

The 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: 374830001 (B30RP4).

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

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

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

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

**Serial Dilution % Difference Statement**

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

**Technical Information**

**Holding Time Specifications**

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

**Preparation/Analytical Method Verification**

All procedures were performed as stated in the SOP.

**Sample Dilutions**

The sample in this SDG did not require dilutions.

**Preparation Information**

The sample in this SDG was 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:

July 08, 2015

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

**Data Exception (DER) Documentation**

A data exception report was not required for this SDG.

**Additional Comments**

Additional comments were not required for this SDG.

**Certification Statement**

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

July 08, 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: GEL374830 GEL Work Order: 374830

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

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

**Review/Validation**

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

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

**Signature:** 

**Name:** Nik-Cole Elmore

**Date:** 08 JUL 2015

**Title:** Data Validator

# Sample Data Summary

**METALS**  
 -1-  
**INORGANICS ANALYSIS DATA PACKAGE**

**SDG No:** GEL374830

**METHOD TYPE:** SW846

**SAMPLE ID:** 374830001

**CLIENT ID:** B30RP4

**CONTRACT:** CPRC0F15028

**MATRIX:** WATER

**DATE RECEIVED** 11-JUN-15

**LEVEL:** Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-47-3	Chromium	1	ug/L	U		P	1	1	OPTIMA3	061815-1

**\*Analytical Methods:**

**P SW846 3005A/6010C**

# Quality Control Summary

July 08, 2015

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 8, 2015

Page 1 of 2

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 374830

Table with columns: Parmname, NOM, Sample, Qual, QC, Units, RPD/D%, REC%, Range, Anlst, Date, Time. Rows include Metals Analysis-ICP, Batch 1485103, and various Chromium samples with their respective QC values and dates.

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 08, 2015

# GEL LABORATORIES LLC

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

## QC Summary

Workorder: 374830

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

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

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

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

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

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

# Radiological Analysis

**July 08, 2015**  
**Radiochemistry**  
**Technical Case Narrative**  
**CH2MHill Plateau Remediation Company (CPRC)**  
**SDG #: GEL374830**  
**Work Order #: 374830**

**Method/Analysis Information**

**Product:** AMCMISO\_EIE\_PRECIP\_AEA: COMMON  
**Analytical Method:** AMCMISO\_EIE\_PREC\_AEA  
**Analytical Batch Number:** 1489314

<b>Sample ID</b>	<b>Client ID</b>
374830001	B30RP4
1203346289	Method Blank (MB)
1203346292	Laboratory Control Sample (LCS)
1203346291	375889001(B30RT1) Sample Duplicate (DUP)

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

**SOP Reference**

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

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

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

**Sample Geometry**

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

**Quality Control (QC) Information:**

**Blank Information**

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

**Designated QC**

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

**QC Information**

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

Exception Report (DER).

**Technical Information:**

**Holding Time**

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

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

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

**Recounts**

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

**Miscellaneous Information:**

**Data Exception (DER) Documentation**

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

**Manual Integration**

No manual integrations were performed on data in this batch.

**Sample-Specific MDA/MDC**

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

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

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

<b>Sample ID</b>	<b>Client ID</b>
374830001	B30RP4
1203346295	Method Blank (MB)
1203346298	Laboratory Control Sample (LCS)
1203346297	375889001(B30RT1) Sample Duplicate (DUP)

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

**SOP Reference**

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

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

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

**Sample Geometry**

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

**Quality Control (QC) Information:**

**Blank Information**

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

**Designated QC**

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

**QC Information**

All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**

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

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

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

**Recounts**

Samples 1203346295 (MB) and 374830001 (B30RP4) 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.

**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.

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**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

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

Analytical Method: UISO\_IE\_PRECIP\_AEA

Analytical Batch Number: 1489317

<b>Sample ID</b>	<b>Client ID</b>
374830001	B30RP4
1203346299	Method Blank (MB)
1203346302	Laboratory Control Sample (LCS)
1203346301	375889001(B30RT1) Sample Duplicate (DUP)

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

**SOP Reference**

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

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

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

**Sample Geometry**

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

**Quality Control (QC) Information:**

**Blank Information**

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

**Designated QC**

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

**QC Information**

All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**

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

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

Sample 374830001 (B30RP4) was re-prepped due to high MDC's. The reanalysis is being reported.

**Recounts**

None of the samples in this sample set were recounted.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**

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

**Manual Integration**

No manual integrations were performed on data in this batch.

**Sample-Specific MDA/MDC**

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

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** GAMMA\_GS:COMMON (Cs137,Co60,Eu152,Eu154,Eu155)  
**Analytical Method:** 901.1\_GAMMA\_GS  
**Analytical Batch Number:** 1483990

<b>Sample ID</b>	<b>Client ID</b>
374830001	B30RP4
1203332765	Method Blank (MB)
1203332768	Laboratory Control Sample (LCS)
1203332766	374557001(B30RP7) Sample Duplicate (DUP)
1203332767	374560001(B318R3) 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

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Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-013 REV# 25.

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

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

**Sample Geometry**

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

**Quality Control (QC) Information:**

**Blank Information**

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

**Designated QC**

The following samples were used for QC: 374557001 (B30RP7) and 374560001 (B318R3).

**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:** I129\_SEP\_LEPS\_GS: COMMON

Analytical Method: I129LL\_SEP\_LEPS\_GS

Analytical Batch Number: 1484008

<b>Sample ID</b>	<b>Client ID</b>
374830001	B30RP4
1203332811	Method Blank (MB)
1203332814	Laboratory Control Sample (LCS)
1203332812	375236031(B30R89) Sample Duplicate (DUP)
1203332813	375236031(B30R89) 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: 375236031 (B30R89).

**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:** SRTOT\_SEP\_PRECIP\_GPC  
**Analytical Batch Number:** 1486923

<b>Sample ID</b>	<b>Client ID</b>
374830001	B30RP4
1203339998	Method Blank (MB)
1203340001	Laboratory Control Sample (LCS)
1203339999	375049001(B31686) Sample Duplicate (DUP)
1203340000	375052001(B30RR0) Sample Duplicate (DUP)

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

**SOP Reference**

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

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used

before the expiration dates.

**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 samples were used for QC: 375049001 (B31686) and 375052001 (B30RR0).

**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:** TC99\_EIE\_LSC: COMMON  
**Analytical Method:** TC99\_EIE\_LSC

Analytical Batch Number: 1487386

Sample ID	Client ID
374830001	B30RP4
1203341077	Method Blank (MB)
1203341080	Laboratory Control Sample (LCS)
1203341078	375052001(B30RR0) Sample Duplicate (DUP)
1203341079	375295014(B316T5) Sample Duplicate (DUP)

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

**SOP Reference**

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

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

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

**Sample Geometry**

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

**Quality Control (QC) Information:**

**Blank Information**

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

**Designated QC**

The following samples were used for QC: 375052001 (B30RR0) and 375295014 (B316T5).

**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 1203341077 (MB), 1203341078 (B30RR0DUP), 1203341080 (LCS) and 374830001 (B30RP4) were recounted due to low recovery. The recounts are reported. Sample 1203341079 (Non SDG 375295014DUP) was recounted due to low recovery and then recounted to verify sample results. The third count 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.

**Sample-Specific MDA/MDC**

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

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** C14\_LSC: COMMON

Analytical Method: C14\_LSC

Analytical Batch Number: 1487528

Sample ID	Client ID
374830001	B30RP4
1203341502	Method Blank (MB)
1203341507	Laboratory Control Sample (LCS)
1203341503	375432001(B30RR5) Sample Duplicate (DUP)
1203341505	375432001(B30RR5) 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: 375432001 (B30RR5).

**QC Information**

All of the QC samples meet the required acceptance limits with the following exceptions: The blank, 1203341502 (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.

**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**

None of the samples in this sample set were recounted.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**

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

**Sample-Specific MDA/MDC**

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

**Additional Comments**

The matrix spike, 1203341505 (B30RR5MS), aliquot was reduced to conserve sample volume.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** TRITIUM\_DIST\_LSC: COMMON  
**Analytical Method:** TRITIUM\_DIST\_LSC  
**Analytical Batch Number:** 1488605

**Sample ID**      **Client ID**  
374830001      B30RP4

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1203344361	Method Blank (MB)
1203344366	Laboratory Control Sample (LCS)
1203344362	375706001(B30RR8) Sample Duplicate (DUP)
1203344364	375706001(B30RR8) 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: 375706001 (B30RR8).

##### **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 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. The following DER was generated for this SDG: DER 1427598 was generated due to RDL less than MDA. 1. Samples 375107001, 375228001, and 1203344361 do not meet the required detection limit. The samples were counted the maximum count time of 120 minutes to achieve the best possible results. 1. Reporting results.

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**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.

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**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: GEL374830 GEL Work Order: 374830

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

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

**Review/Validation**

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

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

**Signature:** 

**Name:** Kate Gellatly

**Date:** 08 JUL 2015

**Title:** Analyst I

**DATA EXCEPTION REPORT**

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

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

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

**DATA EXCEPTION REPORT**

<b>Mo.Day Yr.</b> 07-JUL-15	<b>Division:</b> Radiochemistry	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> LSC	<b>Test / Method:</b> EPA 906.0 Modified	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> CPRC
<b>Batch ID:</b> 1488605	<b>Sample Numbers:</b> See below		
<p><b>Potentially affected work order(s)(SDG):</b> 374830(GEL374830),374834(GEL374834),375052(GEL375052),375100(GEL375100),375107(GEL375107),375228(GEL375228)</p> <p><b>Application Issues:</b></p> <p>RDL less than MDA</p>			
<b>Specification and Requirements Exception Description:</b>		<b>DER Disposition:</b>	
<p>1. Samples 375107001, 375228001, and 1203344361 do not meet the required detection limit. The samples were counted the maximum count time of 120 minutes to achieve the best possible results.</p>		<p>1. Reporting results.</p>	

**Originator's Name:**

Lyndsey Pace      07-JUL-15

**Data Validator/Group Leader:**

Lesley Anderson      07-JUL-15

# Sample Data Summary

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**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL374830	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15028
<b>Lab Sample ID:</b> 374830001	<b>Date Collected:</b> 06/09/2015 11:53	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/11/2015 08:50	
<b>Client ID:</b> B30RP4	<b>Method:</b> AMCMISO_EIE_PREC_AEA	<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 1489314	<b>Analyst:</b> MXS2	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 07/01/2015 10:04	<b>Aliquot:</b> 0.05 L	<b>Instrument:</b> 1083
<b>Data File:</b> S0374830001_AM.2A.gcnf	<b>Prep Method:</b> DOE EML HASL-300, Am-05	<b>Count Time:</b> 239.9998 min
<b>Prep Batch:</b> 1489314		
<b>Prep Date:</b> 06/30/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	0.0756	pCi/L	+/-0.488	0.489	0.999	1.00
	Curium-243/244	U	-0.192	pCi/L	+/-0.310	0.310	0.986	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	34.1	42.8	pCi/L	79.7	(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).

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**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL374830	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15028
<b>Lab Sample ID:</b> 374830001	<b>Date Collected:</b> 06/09/2015 11:53	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/11/2015 08:50	
<b>Client ID:</b> B30RP4	<b>Method:</b> PUIISO_PLATE_AEA	<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 1489315	<b>Analyst:</b> MXS2	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 07/02/2015 15:54	<b>Aliquot:</b> 0.05 L	<b>Instrument:</b> 1067
<b>Data File:</b> S0374830001_PU.3A.gcnf	<b>Prep Method:</b> DOE EML HASL-300, Pu-11-	<b>Count Time:</b> 1000 min
<b>Prep Batch:</b> 1489315		
<b>Prep Date:</b> 06/30/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	-0.104	pCi/L	+/-0.323	0.323	0.699	1.00
OER-100-70	Plutonium-239/240	U	-0.261	pCi/L	+/-0.368	0.368	0.842	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	20.9	39.4	pCi/L	53.1	(15%-125%)

**Comments:**

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

July 08, 2015

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL374830	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15028
<b>Lab Sample ID:</b> 374830001	<b>Date Collected:</b> 06/09/2015 11:53	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/11/2015 08:50	
<b>Client ID:</b> B30RP4	<b>Method:</b> UIISO_IE_PRECIP_AEA	<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 1489317	<b>Analyst:</b> MXS2	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 07/01/2015 10:04	<b>Aliquot:</b> 0.05 L	<b>Instrument:</b> 1009
<b>Data File:</b> S0374830001_UU.2A.gcnf	<b>Prep Method:</b> DOE EML HASL-300, U-02-R	<b>Count Time:</b> 239.9998 min
<b>Prep Batch:</b> 1489317		
<b>Prep Date:</b> 06/30/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
U-233/234 <i>13968-55-3/139</i>	Uranium-233/234		1.54	pCi/L	+/-1.06	1.09	1.28	1.00
15117-96-1/13982	Uranium-235/236	U	-0.118	pCi/L	+/-0.355	0.356	0.997	1.00
7440-61-1	Uranium-238		1.69	pCi/L	+/-1.01	1.05	0.926	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	35.0	42.5	pCi/L	82.3	(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 08, 2015

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL374830	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15028
<b>Lab Sample ID:</b> 374830001	<b>Date Collected:</b> 06/09/2015 11:53	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/11/2015 08:50	
<b>Client ID:</b> B30RP4	<b>Method:</b> SRTOT_SEP_PRECIP_GPC	<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 1486923	<b>Analyst:</b> KSD1	<b>SOP Ref:</b> GL-RAD-A-004
<b>Run Date:</b> 06/30/2015 14:25	<b>Aliquot:</b> 0.3 L	<b>Instrument:</b> LB4100G2
<b>Data File:</b> S1486923.xls	<b>Prep Method:</b> EPA 905.0 Modified/DOE RP5	<b>Count Time:</b> 60 min
<b>Prep Batch:</b> 1486923		
<b>Prep Date:</b> 06/22/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium		2.84	pCi/L	+/-0.776	1.02	0.952	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	6.90	8.10	mg	85.2	(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 08, 2015

**Certificate of Analysis  
Sample Summary**

SDG Number: GEL374830  
Lab Sample ID: 374830001

Client: CPRC001  
Date Collected: 06/09/2015 11:53  
Date Received: 06/11/2015 08:50

Project: CPRC0F15028  
Matrix: WATER

Client ID: B30RP4  
Batch ID: 1483990  
Run Date: 06/23/2015 08:07  
Data File: G374830001.CNF;1  
Prep Batch: 1483990  
Prep Date: 06/20/2015 00:00

Method: 901.1\_GAMMA\_GS  
Analyst: MJH1  
Aliquot: 2 L  
Prep Method: EPA 901.1

Prep Basis: As Received  
SOP Ref: GL-RAD-A-013  
Instrument: GAM03  
Count Time: 120 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137	U	-0.289	pCi/L	+/-3.66	3.66	6.33	10.0
10198-40-0	Cobalt-60	U	0.769	pCi/L	+/-4.40	4.41	7.60	
14683-23-9	Europium-152	U	-6.61	pCi/L	+/-9.37	9.86	15.4	
15585-10-1	Europium-154	U	1.38	pCi/L	+/-9.15	9.17	18.0	
14391-16-3	Europium-155	U	15.8	pCi/L	+/-11.1	13.3	21.1	

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

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

July 08, 2015

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL374830	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15028
<b>Lab Sample ID:</b> 374830001	<b>Date Collected:</b> 06/09/2015 11:53	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/11/2015 08:50	
<b>Client ID:</b> B30RP4	<b>Method:</b> I129LL_SEP_LEPS_GS	<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 1484008	<b>Analyst:</b> MJH1	<b>SOP Ref:</b> GL-RAD-A-006
<b>Run Date:</b> 06/26/2015 12:21	<b>Aliquot:</b> 1.6 L	<b>Instrument:</b> GAM21
<b>Data File:</b> I374830001.CNF;1	<b>Prep Method:</b> DOE EML HASL-300,I-01 M	<b>Count Time:</b> 120 min
<b>Prep Batch:</b> 1484008		
<b>Prep Date:</b> 06/24/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129	U	0.388	pCi/L	+/-0.603	0.604	0.541	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 08, 2015

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL374830	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15028
<b>Lab Sample ID:</b> 374830001	<b>Date Collected:</b> 06/09/2015 11:53	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/11/2015 08:50	
<b>Client ID:</b> B30RP4	<b>Method:</b> TC99_EIE_LSC	<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 1487386	<b>Analyst:</b> MYM1	<b>SOP Ref:</b> GL-RAD-A-059
<b>Run Date:</b> 07/01/2015 12:06	<b>Aliquot:</b> 0.3 L	<b>Instrument:</b> LSCBROWN
<b>Data File:</b> E1487386R.xls	<b>Prep Method:</b> DOE EML HASL-300, Tc-02-	<b>Count Time:</b> 40 min
<b>Prep Batch:</b> 1487386		
<b>Prep Date:</b> 06/25/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99		24.2	pCi/L	+/-5.95	6.53	9.08	15.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	53700	54700	CPM	98.1	(15%-125%)

**Comments:**

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

July 08, 2015

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL374830	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15028
<b>Lab Sample ID:</b> 374830001	<b>Date Collected:</b> 06/09/2015 11:53	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/11/2015 08:50	
<b>Client ID:</b> B30RP4	<b>Method:</b> C14_LSC	<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 1487528	<b>Analyst:</b> EXK2	<b>SOP Ref:</b> GL-RAD-A-003
<b>Run Date:</b> 07/01/2015 03:13	<b>Aliquot:</b> 0.25 L	<b>Instrument:</b> LSCRED
<b>Data File:</b> C1487528.xls	<b>Prep Method:</b> EPA EERF C-01 Modified	<b>Count Time:</b> 120 min
<b>Prep Batch:</b> 1487528		
<b>Prep Date:</b> 06/30/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14		821	pCi/L	+/-8.83	153	4.12	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 08, 2015

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL374830	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15028
<b>Lab Sample ID:</b> 374830001	<b>Date Collected:</b> 06/09/2015 11:53	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/11/2015 08:50	
<b>Client ID:</b> B30RP4	<b>Method:</b> TRITIUM_DIST_LSC	<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 1488605	<b>Analyst:</b> GXR1	<b>SOP Ref:</b> GL-RAD-A-002
<b>Run Date:</b> 07/04/2015 21:02	<b>Aliquot:</b> 50 mL	<b>Instrument:</b> LSCPINK
<b>Data File:</b> T1488605.xls	<b>Prep Method:</b> EPA 906.0 Modified	<b>Count Time:</b> 120.0297 min
<b>Prep Batch:</b> 1488605		
<b>Prep Date:</b> 07/01/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		8640	pCi/L	+/-289	1700	102	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).

# Quality Control Data

# GEL LABORATORIES LLC

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## QC Summary

Report Date: July 8, 2015

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Client : CH2MHill Plateau Remediation Company  
 MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Workorder: 374830

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

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**QC Summary**

Workorder: 374830

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

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## QC Summary

Workorder: 374830

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Alpha Spec</b>									
Batch	1489317								
Uranium-238	54.3			60.9	pCi/L	REC: 112	(80%-120%)		
	Uncert:			+/-5.78					
	TPU:			+/-11.3					
*Uranium-232 Tracer	42.4			35.4	pCi/L	REC: 83	(15%-125%)		
	Uncert:			+/-4.88					
	TPU:			+/-8.34					
<b>Rad Gamma Spec</b>									
Batch	1483990								
QC1203332765	MB								
Cesium-137			U	-1.24	pCi/L			MJH1	06/23/1511:35
	Uncert:			+/-2.94					
	TPU:			+/-2.99					
Cobalt-60			U	-0.424	pCi/L				
	Uncert:			+/-3.42					
	TPU:			+/-3.43					
Europium-152			U	-5.07	pCi/L				
	Uncert:			+/-7.46					
	TPU:			+/-7.83					
Europium-154			U	8.91	pCi/L				
	Uncert:			+/-9.43					
	TPU:			+/-10.3					
Europium-155			U	1.58	pCi/L				
	Uncert:			+/-8.37					
	TPU:			+/-8.40					
QC1203332766	374557001 DUP								
Cesium-137		U	3.61	U	-2.7	pCi/L			06/23/1511:36
	Uncert:		+/-2.63		+/-2.96		RPD: 0	N/A	
	TPU:		+/-2.65		+/-3.21		RER: 2.97	(0-2)	
Cobalt-60		U	0.670	U	0.221	pCi/L			
	Uncert:		+/-2.51		+/-2.40		RPD: 0	N/A	
	TPU:		+/-2.53		+/-2.40		RER: 0.252	(0-2)	
Europium-152		U	4.55	U	0.999	pCi/L			
	Uncert:		+/-7.44		+/-8.74		RPD: 0	N/A	
	TPU:		+/-7.73		+/-8.75		RER: 0.596	(0-2)	
Europium-154		U	6.43	U	1.75	pCi/L			
	Uncert:		+/-7.21		+/-8.57		RPD: 0	N/A	
	TPU:		+/-7.79		+/-8.61		RER: 0.791	(0-2)	
Europium-155		U	-2.03	U	-0.105	pCi/L			
	Uncert:		+/-9.21		+/-11.2		RPD: 0	N/A	
	TPU:		+/-9.26		+/-11.2		RER: 0.260	(0-2)	
QC1203332767	374560001 DUP								
Cesium-137		U	2.35	U	-2.31	pCi/L			06/23/1511:50
	Uncert:		+/-3.14		+/-3.63		RPD: 0	N/A	
	TPU:		+/-3.15		+/-3.78		RER: 1.86	(0-2)	
Cobalt-60		U	1.37	U	1.59	pCi/L			
	Uncert:		+/-2.90		+/-3.00		RPD: 0	N/A	
	TPU:		+/-2.97		+/-3.08		RER: 0.100	(0-2)	
Europium-152		U	2.62	U	4.95	pCi/L			
	Uncert:		+/-7.81		+/-11.6		RPD: 0	N/A	
	TPU:		+/-7.91		+/-11.9		RER: 0.319	(0-2)	

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**QC Summary**

**Workorder: 374830**

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Gamma Spec</b>									
Batch	1483990								
Europium-154		U	-4.3	U	7.28	pCi/L			
		Uncert:	+/-7.42		+/-7.67		RPD: 0	N/A	
		TPU:	+/-7.68		+/-8.37		RER: 2.00	(0-2)	
Europium-155		U	2.32	U	-1.11	pCi/L			
		Uncert:	+/-13.0		+/-13.0		RPD: 0	N/A	
		TPU:	+/-13.0		+/-13.0		RER: 0.365	(0-2)	
QC1203332768	LCS								
Americium-241	34400				35000	pCi/L	REC: 102 (80%-120%)		06/23/1507:30
		Uncert:			+/-766				
		TPU:			+/-3390				
Cesium-137	13700				14200	pCi/L	REC: 103 (80%-120%)		
		Uncert:			+/-315				
		TPU:			+/-1180				
Cobalt-60	15400				15600	pCi/L	REC: 101 (80%-120%)		
		Uncert:			+/-356				
		TPU:			+/-1270				
Europium-152				U	108	pCi/L			
		Uncert:			+/-204				
		TPU:			+/-210				
Europium-154				U	-3.35	pCi/L			
		Uncert:			+/-122				
		TPU:			+/-122				
Europium-155				U	227	pCi/L			
		Uncert:			+/-225				
		TPU:			+/-248				
Batch	1484008								
QC1203332811	MB								
Iodine-129				U	0.165	pCi/L		MJH1	06/26/1514:38
		Uncert:			+/-0.249				
		TPU:			+/-0.260				
QC1203332812	375236031	DUP							
Iodine-129			1.76		2.00	pCi/L			06/26/1514:38
		Uncert:	+/-0.751		+/-0.608		RPD: 13 (0% - 100%)		
		TPU:	+/-0.772		+/-0.641		RER: 0.481 (0-2)		
QC1203332813	375236031	MS							
Iodine-129	26.0		1.76		21.5	pCi/L	REC: 76 (75%-125%)		06/26/1514:39
		Uncert:	+/-0.751		+/-1.99				
		TPU:	+/-0.772		+/-2.93				
QC1203332814	LCS								
Iodine-129	26.0				23.9	pCi/L	REC: 92 (80%-120%)		06/26/1514:39
		Uncert:			+/-2.21				
		TPU:			+/-3.25				
<b>Rad Gas Flow</b>									
Batch	1486923								
QC1203339998	MB								
Total Strontium				U	0.232	pCi/L		KSD1	06/30/1514:29
		Uncert:			+/-0.508				
		TPU:			+/-0.510				
**Strontium Carrier	8.10				7.50	mg	REC: 93 (25%-125%)		
QC1203339999	375049001	DUP							

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**QC Summary**

Workorder: 374830

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Gas Flow</b>									
Batch	1486923								
Total Strontium		135		113	pCi/L				
	Uncert:	+/-4.32		+/-3.61		RPD: 18	(0% - 20%)		
	TPU:	+/-31.5		+/-26.4		RER: 1.05	(0-2)		
**Strontium Carrier	8.10	6.70		7.70	mg	REC: 95	(25%-125%)		
QC1203340000	375052001	DUP							
Total Strontium		26.2		22.1	pCi/L				06/30/1514:27
	Uncert:	+/-1.84		+/-1.74		RPD: 17	(0% - 20%)		
	TPU:	+/-6.38		+/-5.48		RER: 0.953	(0-2)		
**Strontium Carrier	8.10	7.40		7.70	mg	REC: 95	(25%-125%)		
QC1203340001	LCS								
Total Strontium		72.9		61.3	pCi/L	REC: 84	(80%-120%)		06/30/1514:29
	Uncert:			+/-2.76					
	TPU:			+/-14.4					
**Strontium Carrier	8.10			7.50	mg	REC: 93	(25%-125%)		
<b>Rad Liquid Scintillation</b>									
Batch	1487386								
QC1203341077	MB								
Technetium-99			U	3.12	pCi/L			MYM1	07/01/1518:00
	Uncert:			+/-5.10					
	TPU:			+/-5.11					
**Technetium-99m Tracer	54700			55800	CPM	REC: 102	(15%-125%)		
QC1203341078	375052001	DUP							
Technetium-99		121		109	pCi/L				07/01/1518:43
	Uncert:	+/-10.8		+/-10.3		RPD: 10	(0% - 20%)		
	TPU:	+/-17.3		+/-15.9		RER: 1.00	(0-2)		
**Technetium-99m Tracer	54700	53800		54500	CPM	REC: 100	(15%-125%)		
QC1203341079	375295014	DUP							
Technetium-99		U	12.7	18.4	pCi/L				07/02/1507:56
	Uncert:	+/-8.04		+/-8.41		RPD: 37	(0% - 100%)		
	TPU:	+/-8.16		+/-8.66		RER: 0.941	(0-2)		
**Technetium-99m Tracer	54700	55300		52800	CPM	REC: 97	(15%-125%)		
QC1203341080	LCS								
Technetium-99		287		251	pCi/L	REC: 88	(80%-120%)		07/01/1520:08
	Uncert:			+/-10.0					
	TPU:			+/-29.6					
**Technetium-99m Tracer	54700			57100	CPM	REC: 104	(15%-125%)		
Batch	1487528								
QC1203341502	MB								
Carbon-14			U	0.899	pCi/L			EXK2	07/01/1509:08
	Uncert:			+/-5.21					
	TPU:			+/-5.22					
QC1203341503	375432001	DUP							
Carbon-14		261		265	pCi/L				07/01/1509:25
	Uncert:	+/-19.5		+/-19.6		RPD: 2	(0% - 20%)		
	TPU:	+/-52.2		+/-53.1		RER: 0.130	(0-2)		
QC1203341505	375432001	MS							
Carbon-14		1520	261	1840	pCi/L	REC: 104	(75%-125%)		07/01/1509:41
	Uncert:	+/-19.5		+/-84.5					
	TPU:	+/-52.2		+/-351					
QC1203341507	LCS								

**QC Summary**

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
<b>Rad Liquid Scintillation</b>										
Batch	1487528									
Carbon-14	303			311	pCi/L	REC: 102	(80%-120%)			
	Uncert:			+/-15.6						
	TPU:			+/-59.7						
Batch	1488605									
QC1203344361	MB									
Tritium			U	2.34	pCi/L			GXR1	07/06/1502:40	
	Uncert:			+/-57.3						
	TPU:			+/-57.3						
QC1203344362	375706001	DUP								
Tritium		231		268	pCi/L				07/06/1505:57	
	Uncert:	+/-74.9		+/-76.6		RPD: 15	(0% - 100%)			
	TPU:	+/-87.1		+/-92.5		RER: 0.582	(0-2)			
QC1203344364	375706001	MS								
Tritium	1830	231		1910	pCi/L	REC: 92	(75%-125%)		07/06/1508:00	
	Uncert:	+/-74.9		+/-397						
	TPU:	+/-87.1		+/-542						
QC1203344366	LCS									
Tritium	1830			1740	pCi/L	REC: 95	(80%-120%)		07/06/1508:17	
	Uncert:			+/-389						
	TPU:			+/-513						

**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.
- 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

~~JUL 08, 2015~~  
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**QC Summary**

Workorder: 374830

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	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.

\*\* 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.