

October 7, 2015



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October 02, 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: 380928
SDG: GEL380928

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on September 10, 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,

Sarah Edwards for
Heather Shaffer
Project Manager

Purchase Order: 303581 - 7H
Chain of Custody: F15-028-030
Enclosures



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Case Narrative

October 7, 2015

General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF F15-028
SDG: GEL380928

October 02, 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 September 10, 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:

Laboratory Identification	Sample Description
380928001	B31T35

Case Narrative

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

Data Package

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

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

Sarah M. Edwards
October 7, 2015

Sarah Edwards for
Heather Shaffer
Project Manager

Chain of Custody and Supporting Documentation

October 7, 2015

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F15-028-030	PAGE 2 OF 2
COLLECTOR <i>L WALL</i>	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR TODAK, D	PRICE CODE 7H	DATA TURNAROUND 30 Days / 30 Days
SAMPLING LOCATION C8796, Post Development	PROJECT DESIGNATION 100-KE Characterization Boreholes - Water	ACTUAL SAMPLE DEPTH <i>69'</i>	SAF NO. F15-028	AIR QUALITY	
ICE CHEST NO. <i>6WOS-404</i>	FIELD LOGBOOK NO. <i>HNF-N-645 3-21</i>		COA 303581	METHOD OF SHIPMENT FEDERAL EXPRESS	ORIGINAL
SHIPPED TO GEL Laboratories, LLC	OFFSITE PROPERTY NO. <i>5948</i>		BILL OF LADING/AIR BILL NO. <i>77447103 2721</i>		

MATRIX*	NO. OF CONTAINER(S)	NO. OF CONTAINER(S)	NO. OF CONTAINER(S)
A=Air	1	1	1
DL=Drum	IL	IL	IL
Liquids			
DS=Drum			
Solids			
L=Liquid			
O=Oil			
S=Soil			
SE=Sediment			
T=Tissue			
V=Vegetation			
W=Water			
WI=Wipe			
X=Other			

SPECIAL HANDLING AND/OR STORAGE	SAMPLE ANALYSIS	UISO_PLATE_A EAK COMMON;
	PRESERVATION	HNO3 to pH <2
SPECIAL HANDLING AND/OR STORAGE	HOLDING TIME	6 Months
	TYPE OF CONTAINER	G/P
SPECIAL HANDLING AND/OR STORAGE	SAMPLE DATE	SEP 09 2015
	SAMPLE TIME	0952
SPECIAL HANDLING AND/OR STORAGE	MATRIX*	WATER
	SAMPLE NO.	B31T35

SPECIAL INSTRUCTIONS
TRVL-15-037

CHAIN OF POSSESSION	SIGN/ PRINT NAMES	DATE/TIME
RELINQUISHED BY/REMOVED FROM <i>L WALL</i>	RECEIVED BY/STORED IN <i>KW 9/19/15</i>	DATE/TIME <i>SEP 09 2015</i>
RELINQUISHED BY/REMOVED FROM <i>FELIX</i>	RECEIVED BY/STORED IN <i>CHASE SEAGL</i>	DATE/TIME <i>09/10/15 0910</i>
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	DATE/TIME
LABORATORY SECTION	RECEIVED BY	TITLE
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DATE/TIME

October 7, 2015

SAMPLE RECEIPT & REVIEW FORM

Client: <u>CPRC</u>		SDG/AR/COC/Work Order:
Received By: <u>CAS</u>		Date Received: <u>09/16/15</u>
Suspected Hazard Information	Yes <input type="checkbox"/> No <input type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?	<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0cpm</u>
Classified Radioactive II or III by RSO?	<input checked="" type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?	<input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?	<input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?	<input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?	<input checked="" type="checkbox"/>	

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: <u>Ice bags</u> Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius <u>1.3°C, 1.8°C</u>
2a	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: <u>E40920240132</u> Secondary Temperature Device Serial # (If Applicable):
3	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4	Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	Do Low Level Perchlorate samples have headspace as required?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
7	VOA vials contain acid preservation?	<input checked="" type="checkbox"/>			(If unknown, select No)
8	VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
9	Are Encore containers present?	<input checked="" type="checkbox"/>			(If yes, immediately deliver to Volatiles laboratory)
10	Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
11	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
12	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
13	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
14	Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>			
15	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
16	Carrier and tracking number.	<input checked="" type="checkbox"/>			Circle Applicable: <u>FedEx Air</u> FedEx Ground UPS Field Services Courier Other <u>7144 7103 2853 - 1.3°C</u> <u>2721 - 1.8°C</u>

Comments (Use Continuation Form if needed):

Data Review Qualifier Definitions

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

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

October 7, 2015

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 02 October 2015

State	Certification
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	SC000122016-1
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	SC000122015-18
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Metals Analysis

Case Narrative

October 7, 2015

Metals

Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL380928
Work Order #: 380928

Sample ID	Client ID
380928001	B31T35
1203391011	Method Blank (MB)ICP
1203391012	Laboratory Control Sample (LCS)
1203391015	380924001(B32823L) Serial Dilution (SD)
1203391018	380928001(B31T35L) Serial Dilution (SD)
1203391013	380924001(B32823S) Matrix Spike (MS)
1203391016	380928001(B31T35S) Matrix Spike (MS)
1203391014	380924001(B32823SD) Matrix Spike Duplicate (MSD)
1203391017	380928001(B31T35SD) Matrix Spike Duplicate (MSD)

Sample Analysis

Sample 380928 001 in this SDG was analyzed for metals on an "as received" basis.

Method/Analysis Information

Analytical Batch:	1506808
Prep Batch :	1506807
Standard Operating Procedures:	GL-MA-E-013 REV# 24 and GL-MA-E-006 REV# 12
Analytical Method:	6010_METALS_ICP
Prep Method :	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 samples were selected as the quality control (QC) samples for this SDG: 380924001 (B32823) and 380928001 (B31T35).

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:

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.

October 7, 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: GEL380928 GEL Work Order: 380928

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: 07 OCT 2015

Title: Data Validator

Sample Data Summary

METALS
 -1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL380928

METHOD TYPE: SW846

SAMPLE ID: 380928001

CLIENT ID: B31T35

CONTRACT: CPRC0F15028

MATRIX: WATER

DATE RECEIVED 10-SEP-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	10.6	ug/L			P	1	1	OPTIMA3	091115-1

***Analytical Methods:**

P SW846 3005A/6010C

Quality Control Summary

October 7, 2015
GEL LABORATORIES LLC

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

QC Summary

Report Date: October 7, 2015

Page 1 of 2

CH2M Hill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 380928

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1506808										
QC1203391012	LCS										
Chromium	500			497	ug/L		99.5	(80%-120%)	HSC	09/11/15	14:44
QC1203391011	MB										
Chromium			U	ND	ug/L					09/11/15	14:41
QC1203391013	380924001	MS									
Chromium	500	B	3.83	486	ug/L		96.5	(75%-125%)		09/11/15	14:51
QC1203391016	380928001	MS									
Chromium	500		10.6	494	ug/L		96.7	(75%-125%)		09/11/15	15:19
QC1203391014	380924001	MSD									
Chromium	500	B	3.83	490	ug/L	0.776	97.3	(0%-20%)		09/11/15	14:54
QC1203391017	380928001	MSD									
Chromium	500		10.6	493	ug/L	0.115	96.5	(0%-20%)		09/11/15	15:22
QC1203391015	380924001	SDILT									
Chromium		B	3.83	DU	ND	ug/L	N/A	(0%-10%)		09/11/15	14:57
QC1203391018	380928001	SDILT									
Chromium			10.6	D	2.05	ug/L	3.28	(0%-10%)		09/11/15	15:26

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.

October 7, 2015

GEL LABORATORIES LLC

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

QC Summary

Workorder: 380928

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
W	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

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

General Chem Analysis

Case Narrative

October 7, 2015

**General Chemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL380928
Work Order #: 380928**

Method/Analysis Information

Product: Alkalinity
Analytical Batch: 1506960 **Method:** 2320_ALKALINITY: COMMON + (ADD ON)

Sample Analysis

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

Sample ID	Client ID
380928001	B31T35
1203391416	Method Blank (MB)
1203391417	Laboratory Control Sample (LCS)
1203391420	380928001(B31T35) Sample Duplicate (DUP)
1203391421	380893004(B32CM9) Sample Duplicate (DUP)

Sample 380928 001 in this SDG was analyzed on an "as received" basis.

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Samples 380893004 (B32CM9) and 380928001 (B31T35) were selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted: Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Certification Statement

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

October 7, 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: GEL380928 GEL Work Order: 380928

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Thomas Lewis

Date: 06 OCT 2015

Title: Data Validator

Sample Data Summary

~~October 7, 2015~~
GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: October 6, 2015

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

Client Sample ID:	B31T35	Project:	CPRC0F15028
Sample ID:	380928001	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	09-SEP-15 12:00		
Receive Date:	10-SEP-15		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Titration and Ion Analysis											
2320_ALKALINITY: COMMON + (ADD ON) "As Received"											
Alkalinity, Total as CaCO3		107000	725	1000	ug/L		AMB	09/16/15	1824	1506960	1
Bicarbonate alkalinity (CaCO3)		107000	725	1000	ug/L						
Carbonate alkalinity (CaCO3)	U	725	725	1000	ug/L						
Hydroxide alkalinity as CaCO3	U	725	725	1000	ug/L						

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	2320_ALKALINITY	

Notes:

Quality Control Summary

October 7, 2015
GEL LABORATORIES LLC

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

QC Summary

Report Date: October 6, 2015

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CH2M Hill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 380928

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
Batch	1506960										
QC1203391420	380928001	DUP									
Alkalinity, Total as CaCO3		107000		108000	ug/L	0.995		(0%-20%)	AMB	09/16/15	18:27
Bicarbonate alkalinity (CaCO3)		107000		108000	ug/L	0.995		(0%-20%)			
Carbonate alkalinity (CaCO3)	U	725	U	725	ug/L	N/A					
Hydroxide alkalinity as CaCO3	U	725	U	725	ug/L	N/A					
QC1203391421	380893004	DUP									
Alkalinity, Total as CaCO3		126000		126000	ug/L	0.425		(0%-20%)		09/16/15	18:16
Bicarbonate alkalinity (CaCO3)		126000		126000	ug/L	0.425		(0%-20%)			
Carbonate alkalinity (CaCO3)	U	725	U	725	ug/L	N/A					
Hydroxide alkalinity as CaCO3	U	725	U	725	ug/L	N/A					
QC1203391417	LCS										
Alkalinity, Total as CaCO3	50000			55200	ug/L		110	(90%-110%)		09/16/15	16:26
QC1203391416	MB										
Alkalinity, Total as CaCO3			U	725	ug/L					09/16/15	16:19
Bicarbonate alkalinity (CaCO3)			U	725	ug/L						
Carbonate alkalinity (CaCO3)			U	725	ug/L						
Hydroxide alkalinity as CaCO3			U	725	ug/L						

Notes:

The Qualifiers in this report are defined as follows:

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

October 7, 2015

GEL LABORATORIES LLC

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QC Summary

Workorder: 380928

Page 2 of 2

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

October 7, 2015
Radiochemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL380928
Work Order #: 380928

Method/Analysis Information

Product: AMCMISO_EIE_PRECIP_AEA: COMMON

Analytical Method: AMCMISO_EIE_PREC_AEA

Analytical Batch Number: 1508171

Sample ID	Client ID
380928001	B31T35
1203394646	Method Blank (MB)
1203394648	Laboratory Control Sample (LCS)
1203394647	380994002(B31TY6) Sample Duplicate (DUP)

Sample 380928 001 in this SDG was 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: 380994002 (B31TY6).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

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

Sample Re-prep/Re-analysis

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

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

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

Manual Integration

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: PUIISO_PLATE_AEA:COMMON
Analytical Method: PUIISO_PLATE_AEA
Analytical Batch Number: 1508174

Sample ID	Client ID
380928001	B31T35
1203394674	Method Blank (MB)
1203394677	Laboratory Control Sample (LCS)
1203394675	380994002(B31TY6) Sample Duplicate (DUP)

Sample 380928 001 in this SDG was 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.

October 7, 2015

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: 380994002 (B31TY6).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

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

Sample Re-prep/Re-analysis

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

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

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

Manual Integration

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: UISO_PLATE_AEA:COMMON
Analytical Method: UISO_IE_PRECIP_AEA
Analytical Batch Number: 1508184

Sample ID	Client ID
380928001	B31T35
1203394694	Method Blank (MB)
1203394696	Laboratory Control Sample (LCS)
1203394695	380994002(B31TY6) Sample Duplicate (DUP)

Sample 380928 001 in this SDG was 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: 380994002 (B31TY6).

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

October 7, 2015

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

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

Manual Integration

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: I129_SEP_LEPS_GS: COMMON
Analytical Method: DOE EML HASL-300,I-01 Modified
Analytical Batch Number: 1507474

Sample ID	Client ID
380928001	B31T35
1203392829	Method Blank (MB)
1203392832	Laboratory Control Sample (LCS)
1203392830	380994002(B31TY6) Sample Duplicate (DUP)
1203392831	380994002(B31TY6) Matrix Spike (MS)

Sample 380928 001 in this SDG was 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

October 7, 2015

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: 380994002 (B31TY6).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

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

Sample Re-prep/Re-analysis

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

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

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

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product:	GAMMA_GS:COMMON (Cs137,Co60,Eu152,Eu154,Eu155)
Analytical Method:	901.1_GAMMA_GS
Analytical Batch Number:	1507497

October 7, 2015

Sample ID	Client ID
380928001	B31T35
1203392907	Method Blank (MB)
1203392910	Laboratory Control Sample (LCS)
1203392908	380994002(B31TY6) Sample Duplicate (DUP)

Sample 380928 001 in this SDG was analyzed on an "as received" basis.

SOP Reference

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

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

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

Designated QC

The following sample was used for QC: 380994002 (B31TY6).

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.

October 7, 2015

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: 1509161

Sample ID	Client ID
380928001	B31T35
1203397222	Method Blank (MB)
1203397224	Laboratory Control Sample (LCS)
1203397223	380994002(B31TY6) Sample Duplicate (DUP)

Sample 380928 001 in this SDG was 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 sample was used for QC: 380994002 (B31TY6).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

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

Sample Re-prep/Re-analysis

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

Chemical Recoveries

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

Recounts

Sample 380928001 (B31T35) was recounted due to a suspected false positive. The recount is reported.

Miscellaneous Information:

Data Exception (DER) Documentation

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

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: TRITIUM_DIST_LSC: COMMON
Analytical Method: TRITIUM_DIST_LSC
Analytical Batch Number: 1507565

Sample ID	Client ID
380928001	B31T35
1203393075	Method Blank (MB)
1203393080	Laboratory Control Sample (LCS)
1203393076	380994002(B31TY6) Sample Duplicate (DUP)
1203393078	380994002(B31TY6) Matrix Spike (MS)

October 7, 2015

Sample 380928 001 in this SDG was 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: 380994002 (B31TY6).

QC Information

All of the QC samples meet the required acceptance limits with the following exceptions: The blank, 1203393075 (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 reprep or reanalysis.

Recounts

Samples were recounted due to low recovery. The recounts are reported.

Miscellaneous Information:

Data Exception (DER) Documentation

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

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: TC99_EIE_LSC: COMMON
Analytical Method: TC99_EIE_LSC
Analytical Batch Number: 1507940

Sample ID	Client ID
380928001	B31T35
1203394068	Method Blank (MB)
1203394071	Laboratory Control Sample (LCS)
1203394069	381168001(B32CM0) Sample Duplicate (DUP)

Sample 380928 001 in this SDG was analyzed on an "as received" basis.

SOP Reference

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

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

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

Designated QC

The following sample was used for QC: 381168001 (B32CM0).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

October 7, 2015

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

Sample 1203394071 (LCS) was recounted due to low recovery. The recount is reported. Sample 380928001 (B31T35) was recounted to verify sample result. The recount result is similar to the original result. Recount is reported.

Miscellaneous Information:

Data Exception (DER) Documentation

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

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: 1508952

Sample ID	Client ID
380928001	B31T35
1203396559	Method Blank (MB)
1203396562	Laboratory Control Sample (LCS)
1203396560	380994002(B31TY6) Sample Duplicate (DUP)
1203396561	380994002(B31TY6) Matrix Spike (MS)

Sample 380928 001 in this SDG was 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.

October 7, 2015

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: 380994002 (B31TY6).

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

Sample 380928001 (B31T35) was recounted to verify sample result. The recount result is similar to the original result. Original result 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.

Certification Statement

October 7, 2015

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.

October 7, 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: GEL380928 GEL Work Order: 380928

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: 06 OCT 2015

Title: Group Leader

Sample Data Summary

October 7, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL380928	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 380928001	Date Collected: 09/09/2015 12:00	Matrix: WATER
	Date Received: 09/10/2015 09:10	
Client ID: B31T35	Method: AMCMISO_EIE_PREC_AEA	Prep Basis: "As Received"
Batch ID: 1508171	Analyst: MXS2	SOP Ref: GL-RAD-A-011
Run Date: 09/23/2015 09:27	Aliquot: 0.1 L	Instrument: 1068
Data File: S0380928001_AM.1A.gcnf	Prep Method: DOE EML HASL-300, Am-05	Count Time: 239.9998 min
Prep Batch: 1508171		
Prep Date: 09/22/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	-0.0795	pCi/L	+/-0.184	0.185	0.546	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	17.6	21.4	pCi/L	82.5	(15%-125%)

Comments:

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

October 7, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL380928	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 380928001	Date Collected: 09/09/2015 12:00	Matrix: WATER
	Date Received: 09/10/2015 09:10	
Client ID: B31T35	Method: PUIISO_PLATE_AEA	Prep Basis: "As Received"
Batch ID: 1508174	Analyst: MXS2	SOP Ref: GL-RAD-A-011
Run Date: 09/23/2015 09:27	Aliquot: 0.1 L	Instrument: 1075
Data File: S0380928001_PU.1A.gcnf	Prep Method: DOE EML HASL-300, Pu-11-	Count Time: 240 min
Prep Batch: 1508174		
Prep Date: 09/22/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	-0.0167	pCi/L	+/-0.251	0.251	0.585	1.00
OER-100-70	Plutonium-239/240	U	-0.157	pCi/L	+/-0.271	0.271	0.769	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	13.7	19.8	pCi/L	69.3	(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).

October 7, 2015

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL380928	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 380928001	Date Collected: 09/09/2015 12:00	Matrix: WATER
	Date Received: 09/10/2015 09:10	
Client ID: B31T35	Method: UIISO_IE_PRECIP_AEA	Prep Basis: "As Received"
Batch ID: 1508184	Analyst: MXS2	SOP Ref: GL-RAD-A-011
Run Date: 09/23/2015 09:26	Aliquot: 0.1 L	Instrument: 1004
Data File: S0380928001_UU.1A.gcnf	Prep Method: DOE EML HASL-300, U-02-R	Count Time: 240 min
Prep Batch: 1508184		
Prep Date: 09/22/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
U-233/234 <small>13968-55-3/13966-29-5</small>	Uranium-233/234		3.29	pCi/L	+/-1.01	1.14	0.559	1.00
15117-96-1/13982-7	Uranium-235/236		0.538	pCi/L	+/-0.488	0.496	0.448	1.00
7440-61-1	Uranium-238		2.12	pCi/L	+/-0.815	0.884	0.498	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	20.2	21.2	pCi/L	95.5	(15%-125%)

Comments:

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

October 7, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL380928	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 380928001	Date Collected: 09/09/2015 12:00	Matrix: WATER
	Date Received: 09/10/2015 09:10	
Client ID: B31T35	Method: SRTOT_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1509161	Analyst: KSD1	SOP Ref: GL-RAD-A-004
Run Date: 09/30/2015 16:13	Aliquot: 300 mL	Instrument: PIC1D
Data File: S1509161r1.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1509161		
Prep Date: 09/29/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	1.21	pCi/L	+/-1.17	1.20	1.93	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	7.60	8.10	mg	93.8	(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).

October 7, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL380928	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 380928001	Date Collected: 09/09/2015 12:00	Matrix: WATER
	Date Received: 09/10/2015 09:10	
Client ID: B31T35	Method: DOE EML HASL-300,I-01 Mo	Prep Basis: "As Received"
Batch ID: 1507474	Analyst: MJH1	SOP Ref: GL-RAD-A-006
Run Date: 09/22/2015 07:38	Aliquot: 0.3 L	Instrument: XRAY5
Data File: I380928001.CNF;1	Prep Method: DOE EML HASL-300,I-01 M	Count Time: 120 min
Prep Batch: 1507474		
Prep Date: 09/18/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129	U	0.730	pCi/L	+/-1.84	1.87	3.84	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).

October 7, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL380928
 Lab Sample ID: 380928001

 Client ID: B31T35
 Batch ID: 1507497
 Run Date: 09/18/2015 06:05
 Data File: G380928001.CNF;1
 Prep Batch: 1507497
 Prep Date: 09/17/2015 00:00

Client: CPRC001
 Date Collected: 09/09/2015 12:00
 Date Received: 09/10/2015 09:10

 Method: 901.1_GAMMA_GS
 Analyst: MJH1
 Aliquot: 2 L
 Prep Method: EPA 901.1

Project: CPRC0F15028
 Matrix: WATER

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

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137	U	-1.27	pCi/L	+/-3.13	3.19	5.46	10.0
10198-40-0	Cobalt-60	U	0.885	pCi/L	+/-3.73	3.76	7.35	
14683-23-9	Europium-152	U	7.60	pCi/L	+/-9.52	10.2	17.9	
15585-10-1	Europium-154	U	-5.13	pCi/L	+/-10.5	10.8	18.5	
14391-16-3	Europium-155	U	-3.15	pCi/L	+/-12.5	12.6	21.9	

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).

October 7, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL380928	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 380928001	Date Collected: 09/09/2015 12:00	Matrix: WATER
	Date Received: 09/10/2015 09:10	
Client ID: B31T35	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1507565	Analyst: GXR1	SOP Ref: GL-RAD-A-002
Run Date: 09/22/2015 05:16	Aliquot: 50 mL	Instrument: LSCPINK
Data File: T1507565R.xls	Prep Method: EPA 906.0 Modified	Count Time: 120.0297 min
Prep Batch: 1507565		
Prep Date: 09/17/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		14400	pCi/L	+/-388	2810	110	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).

October 7, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL380928	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 380928001	Date Collected: 09/09/2015 12:00	Matrix: WATER
	Date Received: 09/10/2015 09:10	
Client ID: B31T35	Method: TC99_EIE_LSC	Prep Basis: "As Received"
Batch ID: 1507940	Analyst: MYM1	SOP Ref: GL-RAD-A-059
Run Date: 09/30/2015 13:07	Aliquot: 300 mL	Instrument: LSCBLUE
Data File: E1507940R.xls	Prep Method: DOE EML HASL-300, Tc-02-	Count Time: 20 min
Prep Batch: 1507940		
Prep Date: 09/24/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99		27.3	pCi/L	+/-7.59	8.18	11.6	15.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	39000	38300	CPM	102	(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).

October 7, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL380928	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 380928001	Date Collected: 09/09/2015 12:00	Matrix: WATER
	Date Received: 09/10/2015 09:10	
Client ID: B31T35	Method: C14_LSC	Prep Basis: "As Received"
Batch ID: 1508952	Analyst: TXJ1	SOP Ref: GL-RAD-A-003
Run Date: 09/30/2015 17:21	Aliquot: 300 mL	Instrument: LSCGOLD
Data File: C1508952.xls	Prep Method: EPA EERF C-01 Modified	Count Time: 18.6499996185303 min
Prep Batch: 1508952		
Prep Date: 09/30/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14		1130	pCi/L	+/-22.9	211	7.37	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).

Quality Control Data

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QC Summary

Report Date: October 2, 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: 380928

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1508171								
QC1203394646	MB								
Americium-241			U	-0.0846	pCi/L			MXS2	09/23/1509:27
				Uncert: +/-0.196					
				TPU: +/-0.196					
**Americium-243 Tracer	21.4			14.6	pCi/L	REC: 68	(15%-125%)		
				Uncert: +/-2.69					
				TPU: +/-3.98					
QC1203394647	380994002	DUP							
Americium-241		U	0.0318	U	-0.0476	pCi/L			
				Uncert: +/-0.362		RPD: 0	N/A		
				TPU: +/-0.363		RER: 0.399	(0-2)		
**Americium-243 Tracer	21.4		12.3	17.6	pCi/L	REC: 83	(15%-125%)		
				Uncert: +/-2.85					
				TPU: +/-4.20					
QC1203394648	LCS								
Americium-241				19.7	pCi/L	REC: 89	(80%-120%)		09/23/1509:27
				Uncert: +/-2.18					
				TPU: +/-3.09					
**Americium-243 Tracer	21.4			18.4	pCi/L	REC: 86	(15%-125%)		
				Uncert: +/-2.39					
				TPU: +/-3.58					
Batch	1508174								
QC1203394674	MB								
Plutonium-238			U	0.0713	pCi/L			MXS2	09/23/1509:27
				Uncert: +/-0.320					
				TPU: +/-0.320					
Plutonium-239/240			U	-0.0606	pCi/L				
				Uncert: +/-0.274					
				TPU: +/-0.274					
**Plutonium-242 Tracer	19.8			12.3	pCi/L	REC: 62	(15%-125%)		
				Uncert: +/-2.63					
				TPU: +/-3.87					
QC1203394675	380994002	DUP							
Plutonium-238		U	0.0292	U	0.0436	pCi/L			09/23/1509:26
				Uncert: +/-0.305		RPD: 0	N/A		
				TPU: +/-0.306		RER: 0.0723	(0-2)		
Plutonium-239/240		U	0.684	U	0.0872	pCi/L			
				Uncert: +/-0.627		RPD: 0	N/A		
				TPU: +/-0.635		RER: 1.67	(0-2)		
**Plutonium-242 Tracer	19.8		11.5	13.4	pCi/L	REC: 68	(15%-125%)		
				Uncert: +/-2.87					
				TPU: +/-4.20					
QC1203394677	LCS								
Plutonium-238			U	0.107	pCi/L				
				Uncert: +/-0.246					

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QC Summary

Workorder: 380928

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1508174								
Plutonium-239/240	19.7	TPU:		+/-0.246					
		Uncert:		18.5	pCi/L	REC: 94	(80%-120%)		
		TPU:		+/-2.24					
**Plutonium-242 Tracer	19.8	TPU:		+/-3.28					
		Uncert:		15.4	pCi/L	REC: 78	(15%-125%)		
		TPU:		+/-2.32					
		TPU:		+/-3.46					
Batch	1508184								
QC1203394694	MB								
Uranium-233/234			U	0.0804	pCi/L			MXS2	09/23/1509:26
		Uncert:		+/-0.221					
		TPU:		+/-0.222					
Uranium-235/236			U	0.118	pCi/L				
		Uncert:		+/-0.271					
		TPU:		+/-0.272					
Uranium-238			U	0.0477	pCi/L				
		Uncert:		+/-0.179					
		TPU:		+/-0.179					
**Uranium-232 Tracer	21.2			20.3	pCi/L	REC: 96	(15%-125%)		
		Uncert:		+/-2.28					
		TPU:		+/-3.98					
QC1203394695	380994002	DUP							
Uranium-233/234		0.366		0.414	pCi/L				09/23/1509:26
		Uncert:	+/-0.333	+/-0.351		RPD: 12	(0% - 100%)		
		TPU:	+/-0.337	+/-0.357		RER: 0.189	(0-2)		
Uranium-235/236		U	-0.0157	0.456	pCi/L				
		Uncert:	+/-0.236	+/-0.409		RPD: 19	(0% - 100%)		
		TPU:	+/-0.236	+/-0.414		RER: 1.94	(0-2)		
Uranium-238		U	0.176	U 0.148	pCi/L				
		Uncert:	+/-0.253	+/-0.235		RPD: 0	N/A		
		TPU:	+/-0.254	+/-0.236		RER: 0.155	(0-2)		
**Uranium-232 Tracer	21.2	18.6		20.7	pCi/L	REC: 98	(15%-125%)		
		Uncert:	+/-2.30	+/-2.21					
		TPU:	+/-4.00	+/-3.91					
QC1203394696	LCS								
Uranium-233/234				26.1	pCi/L				
		Uncert:		+/-2.45					
		TPU:		+/-4.68					
Uranium-235/236				1.53	pCi/L				
		Uncert:		+/-0.681					
		TPU:		+/-0.720					
Uranium-238	27.2			24.2	pCi/L	REC: 89	(80%-120%)		
		Uncert:		+/-2.36					
		TPU:		+/-4.38					
**Uranium-232 Tracer	21.2			19.5	pCi/L	REC: 92	(15%-125%)		
		Uncert:		+/-2.23					
		TPU:		+/-3.93					
Rad Gamma Spec									
Batch	1507474								

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QC Summary

Workorder: 380928

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1507474								
QC1203392829	MB								
Iodine-129			U	-1.8	pCi/L			MJH1	09/22/1511:38
				Uncert: +/-1.75					
				TPU: +/-1.94					
QC1203392830	380994002	DUP							
Iodine-129		U	0.692	U	-0.861	pCi/L			09/22/1513:46
				Uncert: +/-1.92	+/-1.98	RPD: 0	N/A		
				TPU: +/-1.95	+/-2.02	RER: 1.09	(0-2)		
QC1203392831	380994002	MS							
Iodine-129		139	U	0.692	135	pCi/L	REC: 97 (75%-125%)		09/22/1513:47
				Uncert: +/-1.92	+/-12.6				
				TPU: +/-1.95	+/-18.6				
QC1203392832	LCS								
Iodine-129		139			157	pCi/L	REC: 113 (80%-120%)		09/22/1513:48
				Uncert: +/-18.9					
				TPU: +/-24.8					
Batch	1507497								
QC1203392907	MB								
Cesium-137			U	3.25	pCi/L			MJH1	09/18/1506:32
				Uncert: +/-2.40					
				TPU: +/-2.82					
Cobalt-60			U	2.28	pCi/L				
				Uncert: +/-2.54					
				TPU: +/-2.75					
Europium-152			U	1.95	pCi/L				
				Uncert: +/-6.75					
				TPU: +/-6.81					
Europium-154			U	-0.577	pCi/L				
				Uncert: +/-6.21					
				TPU: +/-6.21					
Europium-155			U	-1.88	pCi/L				
				Uncert: +/-7.80					
				TPU: +/-7.85					
QC1203392908	380994002	DUP							
Cesium-137		U	2.88	U	3.09	pCi/L			09/18/1508:07
				Uncert: +/-2.84	+/-3.41	RPD: 0	N/A		
				TPU: +/-2.85	+/-3.70	RER: 0.089	(0-2)		
Cobalt-60		U	0.719	U	-0.913	pCi/L			
				Uncert: +/-2.56	+/-3.59	RPD: 0	N/A		
				TPU: +/-2.58	+/-3.61	RER: 0.721	(0-2)		
Europium-152		U	5.72	U	7.15	pCi/L			
				Uncert: +/-7.35	+/-9.32	RPD: 0	N/A		
				TPU: +/-7.80	+/-9.89	RER: 0.223	(0-2)		
Europium-154		U	-1.08	U	8.24	pCi/L			
				Uncert: +/-6.94	+/-8.31	RPD: 0	N/A		
				TPU: +/-6.96	+/-9.12	RER: 1.59	(0-2)		
Europium-155		U	-2.7	U	1.49	pCi/L			
				Uncert: +/-9.22	+/-12.7	RPD: 0	N/A		
				TPU: +/-9.31	+/-12.7	RER: 0.521	(0-2)		
QC1203392910	LCS								

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QC Summary

Workorder: 380928

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1507497								
Americium-241	34400			35100	pCi/L	REC: 102	(80%-120%)		
	Uncert:			+/-1010					
	TPU:			+/-2840					
Cesium-137	13700			13700	pCi/L	REC: 100	(80%-120%)		
	Uncert:			+/-331					
	TPU:			+/-1140					
Cobalt-60	14900			15200	pCi/L	REC: 102	(80%-120%)		
	Uncert:			+/-382					
	TPU:			+/-1290					
Europium-152			U	34.7	pCi/L				
	Uncert:			+/-251					
	TPU:			+/-252					
Europium-154			U	-67.1	pCi/L				
	Uncert:			+/-165					
	TPU:			+/-168					
Europium-155			U	55.7	pCi/L				
	Uncert:			+/-237					
	TPU:			+/-238					
Rad Gas Flow									
Batch	1509161								
QC1203397222	MB								
Total Strontium			U	-0.0391	pCi/L			KSD1	09/30/1514:08
	Uncert:			+/-0.674					
	TPU:			+/-0.674					
**Strontium Carrier	8.10			6.60	mg	REC: 82	(25%-125%)		
QC1203397223	380994002	DUP							
Total Strontium			28.6	25.4	pCi/L				09/30/1514:08
	Uncert:		+/-2.83	+/-2.73		RPD: 12	(0% - 20%)		
	TPU:		+/-7.20	+/-6.46		RER: 0.661	(0-2)		
**Strontium Carrier	8.10		7.20	7.10	mg	REC: 88	(25%-125%)		
QC1203397224	LCS								
Total Strontium			72.4	73.3	pCi/L	REC: 101	(80%-120%)		09/30/1514:08
	Uncert:			+/-4.55					
	TPU:			+/-17.5					
**Strontium Carrier	8.10			7.30	mg	REC: 90	(25%-125%)		
Rad Liquid Scintillation									
Batch	1507565								
QC1203393075	MB								
Tritium			U	23.8	pCi/L			GXR1	09/22/1509:21
	Uncert:			+/-62.3					
	TPU:			+/-62.5					
QC1203393076	380994002	DUP							
Tritium			133	164	pCi/L				09/22/1511:24
	Uncert:		+/-70.3	+/-73.0		RPD: 21	(0% - 100%)		
	TPU:		+/-74.8	+/-79.6		RER: 0.563	(0-2)		
QC1203393078	380994002	MS							
Tritium			1810	133	pCi/L	REC: 76	(75%-125%)		09/21/1509:03
	Uncert:		+/-70.3	+/-360					
	TPU:		+/-74.8	+/-463					

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QC Summary

Workorder: 380928

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Liquid Scintillation									
Batch	1507565								
QC1203393080	LCS								
Tritium	1800			1630	pCi/L	REC: 90 (80%-120%)			09/21/1509:20
	Uncert:			+/-376					
	TPU:			+/-491					
Batch	1507940								
QC1203394068	MB								
Technetium-99			U	-5.18	pCi/L			MYM1	09/29/1519:49
	Uncert:			+/-4.44					
	TPU:			+/-4.44					
**Technetium-99m Tracer	38300			37400	CPM	REC: 98 (15%-125%)			
QC1203394069	381168001	DUP							
Technetium-99		U	-3.26	U	-4.16	pCi/L			09/29/1520:37
	Uncert:		+/-6.65		+/-7.16	RPD: 0	N/A		
	TPU:		+/-6.65		+/-7.16	RER: 0.182	(0-2)		
**Technetium-99m Tracer	38300	38500		35400	CPM	REC: 92 (15%-125%)			
QC1203394071	LCS								
Technetium-99	287			247	pCi/L	REC: 86 (80%-120%)			09/30/1509:43
	Uncert:			+/-12.9					
	TPU:			+/-30.3					
**Technetium-99m Tracer	38300			38600	CPM	REC: 101 (15%-125%)			
Batch	1508952								
QC1203396559	MB								
Carbon-14			U	-3.2	pCi/L			TXJ1	09/30/1519:45
	Uncert:			+/-2.10					
	TPU:			+/-2.10					
QC1203396560	380994002	DUP							
Carbon-14			61.4	64.0	pCi/L				09/30/1521:47
	Uncert:		+/-2.98	+/-3.01	RPD: 4	(0% - 20%)			
	TPU:		+/-11.8	+/-12.3	RER: 0.293	(0-2)			
QC1203396561	380994002	MS							
Carbon-14	252	61.4		321	pCi/L	REC: 103 (75%-125%)			10/01/1500:59
	Uncert:		+/-2.98	+/-14.1					
	TPU:		+/-11.8	+/-61.2					
QC1203396562	LCS								
Carbon-14	252			253	pCi/L	REC: 100 (80%-120%)			10/01/1501:16
	Uncert:			+/-12.6					
	TPU:			+/-48.7					

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
- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- B The associated QC sample blank has a result >= 2X the MDA and, after corrections, result is >= MDA for this sample

QC Summary

Workorder: 380928

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

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

** Indicates analyte is a surrogate compound.

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