

January 5, 2016



PO Box 30712 Charleston, SC 29417
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gel.com

December 28, 2015

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

Re: CHPRC SAF F15-027
Work Order: 388011
SDG: GEL388011

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on December 23, 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,

Heather Shaffer
Project Manager

Purchase Order: 303581 - 8H
Chain of Custody: F15-027-255
Enclosures



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Case Narrative

January 5, 2016

General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF F15-027
SDG: GEL388011

December 28, 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 December 23, 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
388011001	B31VW9

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 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.

January 5, 2016
Heather Shaffer

Heather Shaffer
Project Manager

Chain of Custody and Supporting Documentation

Sample Shipping Authorization Form

Project Coordinator	Project Location or Description	Survey or SAF Number	CACN	Sample Media	ASBESTOS		RADIOLOGICAL		Comments
					Friable ¹	Type ²	RSR Number	Rad Tie Sample Number	
David Todak	200-DV-1 OU Characterization of Waste Sites	F15-011	See COC form	Soil	N/A	N/A	N/A	N/A	Boreholes C9510 and C9511

Note: This form must accompany all sample deliveries to the 6269 5-Bay. Samples submitted without this form will not be accepted. Approvals are required from the Sample Shipping SME and IH PC as applicable prior to delivering samples. 1 - Yes / No 2 - e.g., white, blue, brown (if known)

Transportation / Shipping instructions: Samples associated with this project must be transported using a limited quantity radioactive material ORRSR (blue card) to on-site laboratories and shipping facilities. Please have the NCOs ensure that all of the ORRSR requirements are met prior to transport. Please also have the NCOs ensure that there is no other radioactive material on the transport. Sample shipping to offsite analytical laboratories will be conducted by authorized shippers.

Shipment authorization basis: GAMMA SPECTRUM ANALYSIS REPORT: CR15-04135

APPROVALS

Larry L. Cole 12/7/2015

Larry L. Cole N/A

Sample Shipping SME (print and sign)/Date

IH Project Coordinator (print and sign)/Date

January 5, 2016

SAMPLE RECEIPT & REVIEW FORM

Client: <u>CPEC</u>		SDG/AR/COC/Work Order: <u>388011</u>
Received By: <u>MK</u>		Date Received: <u>12-23-15</u>
Suspected Hazard Information	Yes <input checked="" type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?	<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>MR/HR = 0.6</u>
Classified Radioactive I 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#: <u>2910</u>
Samples identified as Foreign Soil?	<input checked="" type="checkbox"/>	

Sample Receipt Criteria	Yes	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<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"/>	<input checked="" 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 checked="" type="checkbox"/>	Temperature Device Serial #: <u>130462962</u> Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<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"/>	<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"/>	<input checked="" type="checkbox"/>	Sample ID's and containers affected:
7 VOA vials contain acid preservation?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	(If unknown, select No)
8 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's and containers affected:
9 Are Encore containers present?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
10 Samples received within holding time?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	ID's and tests affected:
11 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's and containers affected:
12 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's affected:
13 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's affected:
14 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
15 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
16 Carrier and tracking number.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Circle Applicable: <u>FedEx Air</u> FedEx Ground UPS Field Services Courier Other <u>7752 7301 5273</u>

Comments (Use Continuation Form if needed):

Data Review Qualifier Definitions

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

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

Project Specific Qualifier Definitions for GEL Client Code: CPRC

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

Laboratory Certifications

List of current GEL Certifications as of 28 December 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	P330-15-00283, P330-15-00253
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
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-15-10
Utah NELAP	SC000122015-19
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Metals Analysis

Case Narrative

January 5, 2016

Metals

Technical Case Narrative

CH2MHill Plateau Remediation Company (CPRC)

SDG #: GEL388011

Work Order #: 388011

Sample ID	Client ID
388011001	B31VW9
1203459944	Method Blank (MB)ICP
1203459945	Laboratory Control Sample (LCS)
1203459948	388011001(B31VW9L) Serial Dilution (SD)
1203459995	388011001(B31VW9D) Sample Duplicate (DUP)
1203459947	388011001(B31VW9S) Matrix Spike (MS)

Sample Analysis

Sample 388011 001 in this SDG was analyzed for metals on a "dry weight corrected" basis.

Method/Analysis Information

Analytical Batch:	1533758
Prep Batch :	1533757
Standard Operating Procedures:	GL-MA-E-013 REV# 24 and GL-MA-E-009 REV# 26
Analytical Method:	6010_METALS_ICP
Prep Method :	SW846 3050B

Preparation/Analytical Method Verification

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

System Configuration

The Metals analysis-ICP was performed on a PE 7300 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: 388011001 (B31VW9).

Matrix Spike (MS/MSD) Recovery Statement

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

Duplicate Relative Percent Difference (RPD) Statement

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

Sample	Analyte	Value
1203459995 (B31VW9DUP)	Chromium	22.7* (0%-20%)

Serial Dilution % Difference Statement

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

Technical Information

Holding Time Specifications

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP. Method SW-846 3050B is not a total digestion technique for most samples. It is a very strong acid digestion that will dissolve almost all elements that could become environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Sample Dilutions

The 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 (DER) was generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) 1481108 was generated for sample 1203459995 (B31VW9DUP) in this SDG/batch.

Additional Comments

Additional comments were not required for this SDG.

Certification Statement

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

January 5, 2016

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: GEL388011 GEL Work Order: 388011

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Nik-Cole Elmore

Date: 04 JAN 2016

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL388011

METHOD TYPE: SW846

SAMPLE ID: 388011001

CLIENT ID: B31VW9

CONTRACT: CPRC0F15027

MATRIX:SOIL

DATE RECEIVED 23-DEC-15

LEVEL: Low %SOLIDS: 91.3

<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	7680	ug/kg		*	P	149	1	OPTIMA5	123115-1

*Analytical Methods:

P SW846 3050B/6010C

Quality Control Summary

January 5, 2016
GEL LABORATORIES LLC

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

QC Summary

Report Date: January 4, 2016

Page 1 of 2

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 388011

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1533758										
QC1203459995	388011001	DUP									
Chromium		*	7680	*	6120	ug/kg	22.7*	(0%-20%)	JWJ	12/31/15	11:18
QC1203459945	LCS										
Chromium	42500				40500	ug/kg		95.3 (80%-120%)		12/31/15	11:11
QC1203459944	MB										
Chromium			U		ND	ug/kg				12/31/15	11:07
QC1203459947	388011001	MS									
Chromium	50700	*	7680		53600	ug/kg		90.5 (75%-125%)		12/31/15	11:21
QC1203459948	388011001	SDILT									
Chromium		*	77.2	D	15.9	ug/L	3.11	(0%-10%)		12/31/15	11:27

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

January 5, 2016

GEL LABORATORIES LLC

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

QC Summary

Workorder: 388011

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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.

Miscellaneous

DATA EXCEPTION REPORT

Mo.Day Yr. 31-DEC-15	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: ICP	Test / Method: SW846 3050B/6010C	Matrix Type: Solid	Client Code: CPRC
Batch ID: 1533758	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 388011(GEL388011)			
Application Issues: Failed RPD for DUP			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Failed RPD for DUP:</p> <p>QC 1203459995DUP</p>		<p>1. Not all the applicable analyte RPD values were within the acceptance criteria. 1203459995 (B31VW9DUP) Chromium [22.7* (0%-20%)].</p>	

Originator's Name:
Jerry Wigfall 31-DEC-15

Data Validator/Group Leader:
Lisa Tola 31-DEC-15

General Chem Analysis

Case Narrative

January 5, 2016

**General Chemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL388011
Work Order #: 388011**

Method/Analysis Information

Product: Hexavalent Chromium
Analytical Batch: 1533879 **Method:** 7196_CR6: COMMON
Prep Batch : 1533878 **Method:** SW846 3060A

Sample Analysis

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

Sample ID	Client ID
388011001	B31VW9
1203460376	Method Blank (MB)
1203460377	Laboratory Control Sample (LCS)
1203460379	388011001(B31VW9) Sample Duplicate (DUP)
1203460380	388011001(B31VW9) Matrix Spike (MS)
1203460378	Insoluble Lab Control Sample (ILCS)

Sample 388011 001 in this SDG was analyzed on a "dry weight corrected" basis.

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 388011001 (B31VW9) was selected for QC analysis.

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

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

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

Samples (See Below) were received by the laboratory outside of the method specified holding time. The data is qualified.

Sample	Analyte	Value
1203460379 (B31VW9DUP)		Received 23-DEC-15, out of holding 16-OCT-15
1203460380 (B31VW9MS)		Received 23-DEC-15, out of holding 16-OCT-15
388011001 (B31VW9)		Received 23-DEC-15, out of holding 16-OCT-15

Samples (See Below) were logged in for this analysis outside of the method specified holding time. The data is qualified.

Sample	Analyte	Value
1203460379 (B31VW9DUP)		Received 23-DEC-15, out of holding 16-OCT-15
1203460380 (B31VW9MS)		Received 23-DEC-15, out of holding 16-OCT-15
388011001 (B31VW9)		Received 23-DEC-15, out of holding 16-OCT-15

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

A data exception report (DER) 1481015 was generated for samples 388011001 (B31VW9), 1203460379 (B31VW9DUP) and 1203460380 (B31VW9MS) in this SDG/batch.

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.

January 5, 2016

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: GEL388011 GEL Work Order: 388011

The Qualifiers in this report are defined as follows:

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

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

Review/Validation

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

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

Signature: 

Name: Thomas Lewis

Date: 04 JAN 2016

Title: Data Validator

Sample Data Summary

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: January 4, 2016

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

Client Sample ID: B31VW9	Project: CPRC0F15027
Sample ID: 388011001	Client ID: CPRC001
Matrix: SOIL	
Collect Date: 16-SEP-15 13:19	
Receive Date: 23-DEC-15	
Collector: Client	
Moisture: 8.73%	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Spectrometric Analysis											
7196_CR6: COMMON "Dry Weight Corrected"											
Hexavalent Chromium	B	255	136	455	ug/Kg	1	AMB	12/31/15	0935	1533879	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3060A	SW846_7196A Hexavalent Chromium in Soil	PX01	12/30/15	1027	1533878

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	7196_CR6	

Notes:

Quality Control Summary

January 5, 2016
GEL LABORATORIES LLC

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

QC Summary

Report Date: January 4, 2016

Page 1 of 1

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

Contact: Mr. Scot Fitzgerald

Workorder: 388011

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Spectrometric Analysis											
Batch	1533879										
QC1203460379	388011001	DUP									
Hexavalent Chromium	B	255	B	406	ug/Kg	45.7 ^		(+/-442)	AMB	12/31/15	09:37
QC1203460378	ILCS										
Hexavalent Chromium	7810			8340	ug/Kg		107	(80%-120%)		12/31/15	09:34
QC1203460377	LCS										
Hexavalent Chromium	4030			4460	ug/Kg		111	(70%-130%)		12/31/15	09:33
QC1203460376	MB										
Hexavalent Chromium			U	121	ug/Kg					12/31/15	09:33
QC1203460380	388011001	MS									
Hexavalent Chromium	4370	B	255	5260	ug/Kg		114	(70%-130%)		12/31/15	09:38

Notes:

The Qualifiers in this report are defined as follows:

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

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

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

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

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

Miscellaneous

DATA EXCEPTION REPORT

Mo.Day Yr. 31-DEC-15	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: VIS SPECTROMETER	Test / Method: SW846 7196A	Matrix Type: Solid	Client Code: CPRC, OLAB
Batch ID: 1533879	Sample Numbers: See Below		

Potentially affected work order(s)(SDG): 388011(GEL388011),388124,388186(X511233-1)

Application Issues:

Sample received out of holding
Sample Logged out of Holding

**Specification and Requirements
Exception Description:**

DER Disposition:

1. Sample Logged out of Holding:
388186 001
2. Sample received out of holding:
388011 001
QC 1203460379DUP,1203460380MS

1. Sample (See Below) was logged in for this analysis outside of the method specified holding time. The data is qualified.
388186001 (X511233-01) [Logged 29-DEC-15, out of holding 20-DEC-15].
2. Samples (See Below) were received by the laboratory outside of the method specified holding time. The data is qualified.
388011001 (B31VW9) [Received 23-DEC-15, out of holding 16-OCT-15].

Originator's Name:

Alyson Boltz 31-DEC-15

Data Validator/Group Leader:

Kristen Mizzell 31-DEC-15

Radiological Analysis

January 5, 2016
Radiochemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL388011
Work Order #: 388011

Method/Analysis Information

Product: Alphaspec Am241 Solid
Analytical Method: AMCMISO_EIE_PREC_AEA
Prep Method: ASTM D 2216 (Modified)
Analytical Batch Number: 1533893
Prep Batch Number: 1533863

Sample ID	Client ID
388011001	B31VW9
1203460422	Method Blank (MB)
1203460424	Laboratory Control Sample (LCS)
1203460423	388011001(B31VW9) Sample Duplicate (DUP)

Sample 388011 001 in this SDG was analyzed on a "dry weight corrected" 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# 26.

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.

QC Information

All of the QC samples met the required acceptance limits.

January 5, 2016

Designated QC

The following sample was used for QC: 388011001 (B31VW9).

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

Sample 1203460424 (LCS) did not meet the client tracer yield requirements of 20 to 105 percent; however the GEL standard detection limits of 15 to 125 percent were met.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product:	Alphaspec Pu, Solid
Analytical Method:	PUISO_PLATE_AEA
Prep Method:	ASTM D 2216 (Modified)
Analytical Batch Number:	1533894
Prep Batch Number:	1533863

Sample ID	Client ID
388011001	B31VW9
1203460425	Method Blank (MB)
1203460427	Laboratory Control Sample (LCS)

Sample 388011 001 in this SDG was analyzed on a "dry weight corrected" 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# 26.

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.

QC Information

All of the QC samples met the required acceptance limits.

Designated QC

The following sample was used for QC: 388011001 (B31VW9).

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: Alphaspec U, Solid
Analytical Method: UIISO_IE_PRECIP_AEA
Prep Method: ASTM D 2216 (Modified)
Analytical Batch Number: 1533896
Prep Batch Number: 1533863

Sample ID	Client ID
388011001	B31VW9
1203460428	Method Blank (MB)
1203460430	Laboratory Control Sample (LCS)
1203460429	388011001(B31VW9) Sample Duplicate (DUP)

Sample 388011 001 in this SDG was analyzed on a "dry weight corrected" 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# 26.

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.

QC Information

All of the QC samples meet the required acceptance limits with the following exceptions: The U-233/234 blank

January 5, 2016

result is equal to the MDC but less than the required detection limit.

Designated QC

The following sample was used for QC: 388011001 (B31VW9).

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: Dry Weight-Percent Moisture
Analytical Method: ASTM D 2216 (Modified)
Analytical Batch Number: 1533863

Sample ID	Client ID
388011001	B31VW9
1203460340	388011001(B31VW9) Sample Duplicate (DUP)

Sample 388011 001 in this SDG was analyzed on an "as received" basis.

SOP Reference

January 5, 2016

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-020 REV# 10 and GL-RAD-A-021 REV# 20.

Calibration Information:

Quality Control (QC) Information:

Designated QC

The following sample was used for QC: 388011001 (B31VW9).

Technical Information:

Holding Time

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

Miscellaneous Information:

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: Gamma Cs137,Co60,Eu152,Eu154,E155
Analytical Method: GAMMA_GS
Prep Method: ASTM D 2216 (Modified)
Analytical Batch Number: 1534337
Prep Batch Number: 1533863

Sample ID	Client ID
388011001	B31VW9
1203461517	Method Blank (MB)
1203461519	Laboratory Control Sample (LCS)
1203461518	388011001(B31VW9) Sample Duplicate (DUP)

Sample 388011 001 in this SDG was analyzed on a "dry weight corrected" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as

January 5, 2016

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.

QC Information

All of the QC samples met the required acceptance limits.

Designated QC

The following sample was used for QC: 388011001 (B31VW9).

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 I129, Solid
Analytical Method: DOE EML HASL-300,I-01 Modified
Analytical Batch Number: 1534339

Sample ID	Client ID
388011001	B31VW9
1203461520	Method Blank (MB)
1203461523	Laboratory Control Sample (LCS)
1203461521	388011001(B31VW9) Sample Duplicate (DUP)
1203461522	388011001(B31VW9) Matrix Spike (MS)

Sample 388011 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 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.

QC Information

All of the QC samples met the required acceptance limits.

Designated QC

The following sample was used for QC: 388011001 (B31VW9).

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

Prep Method: ASTM D 2216 (Modified)

Analytical Batch Number: 1533982

Prep Batch Number: 1533863

Sample ID	Client ID
388011001	B31VW9
1203460648	Method Blank (MB)
1203460650	Laboratory Control Sample (LCS)
1203460649	388011001(B31VW9) Sample Duplicate (DUP)

Sample 388011 001 in this SDG was analyzed on a "dry weight corrected" 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

January 5, 2016

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.

QC Information

All of the QC samples met the required acceptance limits.

Designated QC

The following sample was used for QC: 388011001 (B31VW9).

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.

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

January 5, 2016

Product: Liquid Scint Te99, Solid

Analytical Method: TC99_EIE_LSC

Analytical Batch Number: 1533754

Sample ID	Client ID
388011001	B31VW9
1203459937	Method Blank (MB)
1203459939	Laboratory Control Sample (LCS)
1203459938	388011001(B31VW9) Sample Duplicate (DUP)

Sample 388011 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# 5.

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.

QC Information

All of the QC samples met the required acceptance limits.

Designated QC

The following sample was used for QC: 388011001 (B31VW9).

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: Liquid Scint C14, Solid

Analytical Method: C14_LSC

Analytical Batch Number: 1533787

Sample ID	Client ID
388011001	B31VW9
1203460054	Method Blank (MB)
1203460057	Laboratory Control Sample (LCS)
1203460055	388011001(B31VW9) Sample Duplicate (DUP)
1203460056	388011001(B31VW9) Matrix Spike (MS)

Sample 388011 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.

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.

QC Information

All of the QC samples met the required acceptance limits.

Designated QC

The following sample was used for QC: 388011001 (B31VW9).

Technical Information:

Holding Time

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

Sample Re-prep/Re-analysis

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

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

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

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: LSC, Tritium Dist, Solid
Analytical Method: TRITIUM_DIST_LSC
Analytical Batch Number: 1533834

Sample ID	Client ID
388011001	B31VW9
1203460248	Method Blank (MB)
1203460251	Laboratory Control Sample (LCS)

January 5, 2016

1203460249 388011001(B31VW9) Sample Duplicate (DUP)
1203460250 388011001(B31VW9) Matrix Spike (MS)

Sample 388011 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.

QC Information

All of the QC samples met the required acceptance limits.

Designated QC

The following sample was used for QC: 388011001 (B31VW9).

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.

January 5, 2016

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.

January 5, 2016

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: GEL388011 GEL Work Order: 388011

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: 04 JAN 2016

Title: Group Leader

Sample Data Summary

January 5, 2016

**Certificate of Analysis
Sample Summary**

SDG Number: GEL388011	Client: CPRC001	Project: CPRC0F15027
Lab Sample ID: 388011001	Date Collected: 09/16/2015 13:19	Matrix: SOIL
	Date Received: 12/23/2015 11:10	%Moisture: 8.7
Client ID: B31VW9		Prep Basis: "Dry Weight Corrected"
Batch ID: 1533893	Method: AMCMISO_EIE_PREC_AEA	SOP Ref: GL-RAD-A-011
Run Date: 12/31/2015 10:54	Analyst: HAKB	Instrument: 1089
Data File: S0388011001_AM.1A.gcnf	Aliquot: 0.105 g	Count Time: 240 min
Prep Batch: 1533893	Prep Method: DOE EML HASL-300, Am-05	Prep SOP Ref: GL-RAD-A-021
Prep Date: 12/30/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	0.208	pCi/g	+/-0.285	0.286	0.388	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	19.2	19.8	pCi/g	97.2	(20%-105%)

Comments:

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

January 5, 2016

**Certificate of Analysis
Sample Summary**

SDG Number: GEL388011	Client: CPRC001	Project: CPRC0F15027
Lab Sample ID: 388011001	Date Collected: 09/16/2015 13:19	Matrix: SOIL
	Date Received: 12/23/2015 11:10	%Moisture: 8.7
Client ID: B31VW9	Method: PUIISO_PLATE_AEA	Prep Basis: "Dry Weight Corrected"
Batch ID: 1533894	Analyst: HAKB	SOP Ref: GL-RAD-A-011
Run Date: 12/31/2015 10:38	Aliquot: 0.105 g	Instrument: 1096
Data File: S0388011001_PU.1A.gcnf	Prep Method: DOE EML HASL-300, Pu-11-	Count Time: 240 min
Prep Batch: 1533894		Prep SOP Ref: GL-RAD-A-021
Prep Date: 12/30/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	-0.0339	pCi/g	+/-0.234	0.234	0.569	1.00
OER-100-70	Plutonium-239/240	U	-0.0921	pCi/g	+/-0.175	0.175	0.539	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	13.7	18.8	pCi/g	72.7	(20%-105%)

Comments:

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

January 5, 2016

Certificate of Analysis
Sample Summary

SDG Number: GEL388011	Client: CPRC001	Project: CPRC0F15027
Lab Sample ID: 388011001	Date Collected: 09/16/2015 13:19	Matrix: SOIL
	Date Received: 12/23/2015 11:10	%Moisture: 8.7
Client ID: B31VW9	Method: UIISO_IE_PRECIP_AEA	Prep Basis: "Dry Weight Corrected"
Batch ID: 1533896	Analyst: HAKB	SOP Ref: GL-RAD-A-011
Run Date: 12/31/2015 10:38	Aliquot: 0.105 g	Instrument: 1020
Data File: S0388011001_UU.1A.gcnf	Prep Method: DOE EML HASL-300, U-02-R	Count Time: 239.9998 min
Prep Batch: 1533896		Prep SOP Ref: GL-RAD-A-021
Prep Date: 12/30/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
U-233/234 <small>13968-55-3/13966-29-5</small>	Uranium-233/234		0.658	pCi/g	+/-0.439	0.448	0.391	1.00
15117-96-1/13982-7	Uranium-235/236	U	0.237	pCi/g	+/-0.312	0.314	0.237	1.00
7440-61-1	Uranium-238		0.625	pCi/g	+/-0.418	0.427	0.307	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	18.4	20.0	pCi/g	91.8	(20%-105%)

Comments:

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

January 5, 2016

**Certificate of Analysis
Sample Summary**

SDG Number: GEL388011	Client: CPRC001	Project: CPRC0F15027
Lab Sample ID: 388011001	Date Collected: 09/16/2015 13:19	Matrix: SOIL
	Date Received: 12/23/2015 11:10	%Moisture: 8.7
Client ID: B31VW9	Method: SRTOT_SEP_PRECIP_GPC	Prep Basis: "Dry Weight Corrected"
Batch ID: 1533982	Analyst: KSD1	SOP Ref: GL-RAD-A-004
Run Date: 12/30/2015 13:37	Aliquot: 0.307 g	Instrument: PIC14A
Data File: S1533982.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1533982		Prep SOP Ref: GL-RAD-A-021
Prep Date: 12/29/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	-0.773	pCi/g	+/-0.564	0.564	1.39	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	8.80	9.34	mg	94.2	(30%-105%)

Comments:

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

January 5, 2016

**Certificate of Analysis
Sample Summary**

SDG Number: GEL388011
 Lab Sample ID: 388011001

 Client ID: B31VW9
 Batch ID: 1534337
 Run Date: 12/30/2015 16:36
 Data File: G388011001.CNF;2
 Prep Batch: 1534337
 Prep Date: 12/29/2015 00:00

Client: CPRC001
 Date Collected: 09/16/2015 13:19
 Date Received: 12/23/2015 11:10

 Method: GAMMA_GS
 Analyst: MJH1
 Aliquot: 51.656 g
 Prep Method: DOE HASL 300, 4.5.2.3/Ga-01

Project: CPRC0F15027
 Matrix: SOIL
 %Moisture: 8.7

 Prep Basis: "Dry Weight Corrected"
 SOP Ref: GL-RAD-A-013
 Instrument: GAM18
 Count Time: 500 min
 Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137	U	0.0167	pCi/g	+/-0.0154	0.0172	0.0281	0.100
10198-40-0	Cobalt-60	U	-0.025	pCi/g	+/-0.0242	0.0268	0.0353	0.050
14683-23-9	Europium-152	U	-0.0296	pCi/g	+/-0.0455	0.0475	0.0636	0.100
15585-10-1	Europium-154	U	-0.0385	pCi/g	+/-0.0555	0.0583	0.0946	0.100
14391-16-3	Europium-155	U	0.0202	pCi/g	+/-0.0396	0.0406	0.0687	0.100

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

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

January 5, 2016

**Certificate of Analysis
Sample Summary**

SDG Number: GEL388011	Client: CPRC001	Project: CPRC0F15027
Lab Sample ID: 388011001	Date Collected: 09/16/2015 13:19	Matrix: SOIL
	Date Received: 12/23/2015 11:10	%Moisture: 8.7
Client ID: B31VW9		Prep Basis: "As Received"
Batch ID: 1534339	Method: DOE EML HASL-300,I-01 Mo	SOP Ref: GL-RAD-A-006
Run Date: 01/04/2016 10:32	Analyst: MJH1	Instrument: XRAY1
Data File: I388011001.CNF;1	Aliquot: 1.093 g	Count Time: 120 min
Prep Batch: 1534339	Prep Method: DOE EML HASL-300,I-01 M	
Prep Date: 01/04/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129	U	0.232	pCi/g	+/-0.361	0.376	0.726	2.00

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

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

January 5, 2016

**Certificate of Analysis
Sample Summary**

SDG Number: GEL388011	Client: CPRC001	Project: CPRC0F15027
Lab Sample ID: 388011001	Date Collected: 09/16/2015 13:19	Matrix: SOIL
	Date Received: 12/23/2015 11:10	%Moisture: 8.7
Client ID: B31VW9		Prep Basis: "As Received"
Batch ID: 1533754	Method: TC99_EIE_LSC	SOP Ref: GL-RAD-A-059
Run Date: 01/04/2016 06:10	Analyst: MYM1	Instrument: LSCORANGE
Data File: E1533754.xls	Aliquot: 2.265 g	Count Time: 20.01237 min
Prep Batch: 1533754	Prep Method: DOE EML HASL-300, Tc-02-	
Prep Date: 12/30/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	-0.121	pCi/g	+/-0.497	0.497	0.918	1.5

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	65600	66500	CPM	98.7	(20%-105%)

Comments:

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

January 5, 2016

**Certificate of Analysis
Sample Summary**

SDG Number: GEL388011	Client: CPRC001	Project: CPRC0F15027
Lab Sample ID: 388011001	Date Collected: 09/16/2015 13:19	Matrix: SOIL
	Date Received: 12/23/2015 11:10	%Moisture: 8.7
Client ID: B31VW9		Prep Basis: "As Received"
Batch ID: 1533787	Method: C14_LSC	SOP Ref: GL-RAD-A-003
Run Date: 12/30/2015 18:40	Analyst: TXJ1	Instrument: LSCBLUE
Data File: C1533787.xls	Aliquot: 0.52 g	Count Time: 45 min
Prep Batch: 1533787	Prep Method: EPA EERF C-01 Modified	
Prep Date: 12/30/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	1.58	pCi/g	+/-2.10	2.11	3.55	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).

January 5, 2016

**Certificate of Analysis
Sample Summary**

SDG Number: GEL388011	Client: CPRC001	Project: CPRC0F15027
Lab Sample ID: 388011001	Date Collected: 09/16/2015 13:19	Matrix: SOIL
	Date Received: 12/23/2015 11:10	%Moisture: 8.7
Client ID: B31VW9		Prep Basis: "As Received"
Batch ID: 1533834	Method: TRITIUM_DIST_LSC	SOP Ref: GL-RAD-A-002
Run Date: 12/29/2015 11:14	Analyst: TXJ1	Instrument: LSCSILVER
Data File: T1533834.xls	Aliquot: 1.25 g	Count Time: 20 min
Prep Batch: 1533834	Prep Method: EPA 906.0 Modified	
Prep Date: 12/29/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium	U	6.85	pCi/g	+/-12.1	12.2	20.8	30.0

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

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

January 5, 2016

**Certificate of Analysis
Sample Summary**

SDG Number: GEL388011	Client: CPRC001	Project: CPRC0F15027
Lab Sample ID: 388011001	Date Collected: 09/16/2015 13:19	Matrix: SOIL
	Date Received: 12/23/2015 11:10	%Moisture: 8.7
Client ID: B31VW9		Prep Basis: "As Received"
Batch ID: 1533863	Method: ASTM D 2216 (Modified)	SOP Ref: GL-OA-E-020
Run Date: 12/28/2015 15:10	Analyst: CXC1	Instrument: SP-39020004
Data File:		Count Time:
Prep Batch: 1533863		
Prep Date: 12/28/2015 15:10		

CAS No.	Parmname	Qual	Result	Units	MDC	
	Moisture		8.73	percent +/-		
Surrogate/Tracer recovery		Result	Nominal	Units	Recovery%	Acceptable Limits

Comments:

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

Quality Control Data

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QC Summary

Report Date: January 4, 2016
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Client : CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Workorder: 388011

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1533893								
QC1203460422	MB								
Americium-241			U	0.0908	pCi/g			HAKB	12/31/1510:54
				Uncert: +/-0.209					
				TPU: +/-0.209					
**Americium-243 Tracer	19.8			18.6	pCi/g	REC: 94	(20%-105%)		
				Uncert: +/-2.12					
				TPU: +/-3.28					
QC1203460423	388011001	DUP							
Americium-241		U	0.208	U	0.185	pCi/g			
				Uncert: +/-0.285		RPD: 0	N/A		
				TPU: +/-0.286		RER: 0.121	(0-2)		
**Americium-243 Tracer	20.0		19.2	18.9	pCi/g	REC: 95	(20%-105%)		
				Uncert: +/-2.19					
				TPU: +/-3.37					
QC1203460424	LCS								
Americium-241				19.0	pCi/g	REC: 101	(70%-130%)		
				Uncert: +/-2.06					
				TPU: +/-3.14					
**Americium-243 Tracer	19.8			21.0	pCi/g	REC: 106*	(20%-105%)		
				Uncert: +/-2.09					
				TPU: +/-3.24					
Batch	1533894								
QC1203460425	MB								
Plutonium-238			U	0.0451	pCi/g			HAKB	12/31/1510:38
				Uncert: +/-0.169					
				TPU: +/-0.169					
Plutonium-239/240			U	0.00238	pCi/g				
				Uncert: +/-0.176					
				TPU: +/-0.176					
**Plutonium-242 Tracer	18.8			15.9	pCi/g	REC: 85	(20%-105%)		
				Uncert: +/-2.08					
				TPU: +/-3.13					
QC1203460426	388011001	DUP							
Plutonium-238		U	-0.0339	U	0.143	pCi/g			
				Uncert: +/-0.234		RPD: 0	N/A		
				TPU: +/-0.234		RER: 0.939	(0-2)		
Plutonium-239/240		U	-0.0921	U	0.0419	pCi/g			
				Uncert: +/-0.175		RPD: 0	N/A		
				TPU: +/-0.175		RER: 0.766	(0-2)		
**Plutonium-242 Tracer	19.0		13.7	13.9	pCi/g	REC: 73	(20%-105%)		
				Uncert: +/-2.38					
				TPU: +/-3.53					
QC1203460427	LCS								
Plutonium-238			U	0.00306	pCi/g				
				Uncert: +/-0.227					

~~January 5, 2019~~
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QC Summary

Workorder: **388011**

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1533894								
Plutonium-239/240	18.8	TPU:		+/-0.227					
		Uncert:		21.7	pCi/g	REC: 115	(70%-130%)		
		TPU:		+/-2.55					
		TPU:		+/-3.94					
*Plutonium-242 Tracer	18.8	TPU:		14.2	pCi/g	REC: 75	(20%-105%)		
		Uncert:		+/-2.37					
		TPU:		+/-3.51					
Batch	1533896								
QC1203460428	MB								
Uranium-233/234			U	0.189	pCi/g			HAKB	12/31/1510:38
		Uncert:		+/-0.248					
		TPU:		+/-0.250					
Uranium-235/236			U	0.215	pCi/g				
		Uncert:		+/-0.309					
		TPU:		+/-0.311					
Uranium-238			U	0.174	pCi/g				
		Uncert:		+/-0.250					
		TPU:		+/-0.251					
*Uranium-232 Tracer	20.0			17.6	pCi/g	REC: 88	(20%-105%)		
		Uncert:		+/-2.21					
		TPU:		+/-3.46					
QC1203460429	388011001	DUP							
Uranium-233/234		0.658	U	0.256	pCi/g				
		Uncert:	+/-0.439	+/-0.276		RPD: 71	(0% - 100%)		
		TPU:	+/-0.448	+/-0.278		RER: 1.5	(0-2)		
Uranium-235/236		U	0.237	U	0.0701	pCi/g			
		Uncert:	+/-0.312	+/-0.197		RPD: 12	N/A		
		TPU:	+/-0.314	+/-0.197		RER: 0.885	(0-2)		
Uranium-238		0.625		0.426	pCi/g				
		Uncert:	+/-0.418	+/-0.336		RPD: 38	(0% - 100%)		
		TPU:	+/-0.427	+/-0.341		RER: 0.713	(0-2)		
*Uranium-232 Tracer	20.2	18.4		19.2	pCi/g	REC: 95	(20%-105%)		
		Uncert:	+/-2.24	+/-2.12					
		TPU:	+/-3.50	+/-3.35					
QC1203460430	LCS								
Uranium-233/234				24.0	pCi/g				
		Uncert:		+/-2.35					
		TPU:		+/-3.93					
Uranium-235/236				1.65	pCi/g				
		Uncert:		+/-0.714					
		TPU:		+/-0.746					
Uranium-238	25.7			26.9	pCi/g	REC: 105	(70%-130%)		
		Uncert:		+/-2.49					
		TPU:		+/-4.33					
*Uranium-232 Tracer	20.0			18.4	pCi/g	REC: 92	(20%-105%)		
		Uncert:		+/-2.16					
		TPU:		+/-3.40					
Rad Gamma Spec									
Batch	1534337								

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QC Summary

Workorder: 388011

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1534337								
QC1203461517	MB								
Cesium-137			U	-0.00447	pCi/g			MJH1	12/30/1516:37
				Uncert: +/-0.0127					
				TPU: +/-0.0129					
Cobalt-60			U	0.00797	pCi/g				
				Uncert: +/-0.0141					
				TPU: +/-0.0146					
Europium-152			U	0.0123	pCi/g				
				Uncert: +/-0.036					
				TPU: +/-0.0365					
Europium-154			U	-0.0228	pCi/g				
				Uncert: +/-0.0423					
				TPU: +/-0.0435					
Europium-155			U	-0.0294	pCi/g				
				Uncert: +/-0.0396					
				TPU: +/-0.0418					
QC1203461518	388011001	DUP							
Cesium-137		U 0.0167	U	-0.000633	pCi/g				12/31/1512:29
				Uncert: +/-0.0154		RPD: 0	N/A		
				TPU: +/-0.0172		RER: 1.49	(0-2)		
Cobalt-60		U -0.025	U	0.0073	pCi/g				
				Uncert: +/-0.0242		RPD: 0	N/A		
				TPU: +/-0.0268		RER: 1.93	(0-2)		
Europium-152		U -0.0296	U	-0.0231	pCi/g				
				Uncert: +/-0.0455		RPD: 0	N/A		
				TPU: +/-0.0475		RER: 0.145	(0-2)		
Europium-154		U -0.0385	U	0.0365	pCi/g				
				Uncert: +/-0.0555		RPD: 0	N/A		
				TPU: +/-0.0583		RER: 1.64	(0-2)		
Europium-155		U 0.0202	U	-0.0391	pCi/g				
				Uncert: +/-0.0396		RPD: 0	N/A		
				TPU: +/-0.0406		RER: 1.74	(0-2)		
QC1203461519	LCS								
Americium-241	586			604	pCi/g	REC: 103	(70%-130%)		12/31/1512:29
				Uncert: +/-12.2					
				TPU: +/-49.9					
Cesium-137	194			207	pCi/g	REC: 107	(70%-130%)		
				Uncert: +/-3.31					
				TPU: +/-21.6					
Cobalt-60	131			135	pCi/g	REC: 103	(70%-130%)		
				Uncert: +/-3.37					
				TPU: +/-12.5					
Europium-152			U	-0.654	pCi/g				
				Uncert: +/-1.49					
				TPU: +/-1.52					
Europium-154			U	-0.89	pCi/g				
				Uncert: +/-1.40					
				TPU: +/-1.46					
Europium-155			U	-0.238	pCi/g				
				Uncert: +/-1.29					

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QC Summary

Workorder: 388011

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1534337								
		TPU:		+/-1.30					
Batch	1534339								
QC1203461520	MB								
Iodine-129			U	0.993	pCi/g			MJH1	01/04/1610:33
		Uncert:		+/-0.531					
		TPU:		+/-0.701					
QC1203461521	388011001	DUP							
Iodine-129		U	0.232	U	0.146	pCi/g			01/04/1610:33
		Uncert:	+/-0.361		+/-0.358		RPD: 0	N/A	
		TPU:	+/-0.376		+/-0.365		RER: 0.322	(0-2)	
QC1203461522	388011001	MS							
Iodine-129		39.9	U	0.232	33.5	pCi/g	REC: 83	(60%-140%)	01/04/1610:33
		Uncert:	+/-0.361		+/-5.82				
		TPU:	+/-0.376		+/-6.71				
QC1203461523	LCS								
Iodine-129		38.1			37.8	pCi/g	REC: 99	(70%-130%)	01/04/1612:02
		Uncert:			+/-4.71				
		TPU:			+/-6.04				
Rad Gas Flow									
Batch	1533982								
QC1203460648	MB								
Total Strontium			U	0.872	pCi/g			KSD1	12/30/1513:37
		Uncert:		+/-0.718					
		TPU:		+/-0.752					
**Strontium Carrier		9.34			7.90	mg	REC: 85	(30%-105%)	
QC1203460649	388011001	DUP							
Total Strontium		U	-0.773	U	-0.841	pCi/g			12/30/1513:37
		Uncert:	+/-0.564		+/-0.595		RPD: 0	N/A	
		TPU:	+/-0.564		+/-0.595		RER: 0.163	(0-2)	
**Strontium Carrier		9.34	8.80		8.00	mg	REC: 86	(30%-105%)	
QC1203460650	LCS								
Total Strontium		52.4			52.7	pCi/g	REC: 101	(70%-130%)	12/30/1513:37
		Uncert:			+/-3.30				
		TPU:			+/-13.8				
**Strontium Carrier		9.34			7.90	mg	REC: 85	(30%-105%)	
Rad Liquid Scintillation									
Batch	1533754								
QC1203459937	MB								
Technetium-99			U	0.104	pCi/g			MYM1	01/04/1606:32
		Uncert:		+/-0.453					
		TPU:		+/-0.453					
**Technetium-99m Tracer		66500			64100	CPM	REC: 97	(20%-105%)	
QC1203459938	388011001	DUP							
Technetium-99		U	-0.121	U	0.193	pCi/g			01/04/1606:55
		Uncert:	+/-0.497		+/-0.457		RPD: 0	N/A	
		TPU:	+/-0.497		+/-0.457		RER: 0.911	(0-2)	
**Technetium-99m Tracer		66500	65600		64300	CPM	REC: 97	(20%-105%)	
QC1203459939	LCS								
Technetium-99		33.8			28.2	pCi/g	REC: 84	(70%-130%)	01/04/1607:17

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Liquid Scintillation									
Batch	1533754								
				Uncert:					
				TPU:					
**Technetium-99m Tracer	66500			64100	CPM	REC: 97	(20%-105%)		
Batch	1533787								
QC1203460054	MB								
Carbon-14			U	0.534	pCi/g			TXJ1	12/30/1519:27
				Uncert:					
				TPU:					
QC1203460055	388011001	DUP							
Carbon-14		U	1.58	U	0.517				12/30/1520:14
				Uncert:					
				TPU:					
						RPD: 0	N/A		
						RER: 0.7	(0-2)		
QC1203460056	388011001	MS							
Carbon-14		140	U	1.58	137	pCi/g	REC: 97	(60%-140%)	12/30/1521:01
				Uncert:					
				TPU:					
QC1203460057	LCS								
Carbon-14		140			135	pCi/g	REC: 96	(70%-130%)	12/30/1521:48
				Uncert:					
				TPU:					
Batch	1533834								
QC1203460248	MB								
Tritium			U	7.22	pCi/g			TXJ1	12/29/1511:35
				Uncert:					
				TPU:					
QC1203460249	388011001	DUP							
Tritium		U	6.85	U	4.13	pCi/g			12/29/1511:57
				Uncert:					
				TPU:					
						RPD: 0	N/A		
						RER: 0.323	(0-2)		
QC1203460250	388011001	MS							
Tritium		97.3	U	6.85	106	pCi/g	REC: 109	(60%-140%)	12/29/1512:18
				Uncert:					
				TPU:					
QC1203460251	LCS								
Tritium		89.3			103	pCi/g	REC: 115	(70%-130%)	12/29/1512:40
				Uncert:					
				TPU:					

Notes:

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

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- B The associated QC sample blank has a result >= 2X the MDA and, after corrections, result is >= MDA for this sample
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.

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

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

** Indicates analyte is a surrogate compound.

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

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

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