

June 14, 2016



gel.com

June 13, 2016

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

Re: CHPRC SAF F16-028
Work Order: 397606
SDG: GEL397606

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on May 18, 2016. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,

B Luthman
Brielle Luthman for
Heather Shaffer
Project Manager

Purchase Order: 300192 - 8H
Chain of Custody: F16-028-007
Enclosures



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Case Narrative

General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF F16-028
SDG: GEL397606

June 13, 2016

Laboratory Identification:

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

Summary

Sample receipt

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on May 18, 2016, for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Items of Note All efforts were made by the lab to meet any short hold times. Samples that were analyzed outside of the initial hold time but still within 2X hold time will be noted in the lab case narrative and DER.

Sample Identification

The laboratory received the following samples:

Laboratory Identification	Sample Description
397606001	B353D0
397606002	B354J5

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.

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

June 14, 2016

B. Luthman
Brielle Luthman for
Heather Shaffer
Project Manager

Technical Case Narrative
CH2M Hill Plateau Remediation Company (CPRC)
SDG #: GEL397606
Work Order #: 397606

Metals

Determination of Metals by ICP-MS

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

Quality Control (QC) Information

Duplicate Relative Percent Difference (RPD) Statement

Not all the applicable analyte RPD values were within the acceptance criteria.

Sample	Analyte	Value
1203551838 (B353D0DUP)	Uranium	108* (0%-20%)

Technical Information

Sample Dilutions

The ICPMS solid samples in this SDG were diluted the standard two times.

Analyte	397606
	001
Uranium	2X

General Chemistry

Ion Chromatography

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

pH

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

applicable, with the following exceptions.

Technical Information

Holding Times

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

Sample	Analyte	Value
1203555083 (B354J5DUP)	pH	Received 18-MAY-16, out of holding 17-MAY-16
397606002 (B354J5)	pH	Received 18-MAY-16, out of holding 17-MAY-16

Radiochemistry

AMCMISO_EIE_PRECIP_AEA: COMMON

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

Quality Control (QC) Information

QC Information

Refer to Data Exception Report (DER).

Miscellaneous Information

NP237_IE_PRECIP_AEA: COMMON

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

PUISO_PRECIP_AEA:COMMON

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

Technical Information

Recounts

Sample 1203551723 (MB) was recounted due to poor resolution. The recount is reported.

THISO_IE_PLATE_AEA: COMMON

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

Technical Information

Recounts

Sample 397606001 (B353D0) was recounted due to a peak shift. The recount is reported.

UIISO_IE_PRECIP_AEA:COMMON

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

Dry Weight

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

I129_SEP_LEPS_GS

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

GAMMA_GS:COMMON + (Add-on)

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

Technical Information

Recounts

Sample 397606001 (B353D0) was recounted due to high MDC. The recount is reported.

SRTOT_SEP_PRECIP_GPC: COMMON

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

Technical Information

Recounts

Sample 1203558180 (B353C9DUP) was recounted due to results more negative than the three sigma TPU. The second count is reported.

NI63_LSC

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

Technical Information

Recounts

Sample 1203553502 (LCS) was recounted due to low recovery. The recount is reported.

TC99_SEP_GPC

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

TRITIUM_DIST_LSC: COMMON

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

C14_LSC: COMMON

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

Certification Statement

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

Chain of Custody and Supporting Documentation

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F16-028-007	PAGE 2 OF 2
COLLECTOR J.R. Aguilera/CHPRC	COMPANY CONTACT TODAK, D	TELEPHONE NO. 376-6427	PROJECT COORDINATOR TODAK, D	PRICE CODE 8H	DATA TURNAROUND 30 Days / 30 Days
SAMPLING LOCATION C9414, 200-WA-1 #7	PROJECT DESIGNATION 200-WA-1 Opportunistic sampling - soil		SAF NO. F16-028	AIR QUALITY <input type="checkbox"/>	
ICE CHEST NO. GWS-415	FIELD LOGBOOK NO. ANF-N-645-3/72	ACTUAL SAMPLE DEPTH 260.3 - 262.8	COA 300192	METHOD OF SHIPMENT FEDERAL EXPRESS	ORIGINAL
SHIPPED TO GEL Laboratories, LLC	OFFSITE PROPERTY NO.		BILL OF LADING/AIR BILL NO.		

SPECIAL INSTRUCTIONS

(1) 6020_METALS_ICPMS: COMMON (Add-on) {Uranium}; 9056_ANIONS_IC: COMMON {Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Sulfate}; 9056_ANIONS_IC: COMMON (Add-on) {Phosphorus in phosphate};
 (2) GAMMA_GS: COMMON; GAMMA_GS: COMMON (Add-on) {Radium-226, Radium-228};
 (3) AMCMISO_IE_PRECIP_AEA: COMMON {Americium-241}; C14_LSC: COMMON; I129_SEP_LEPS_GS: COMMON; NI63_LSC: COMMON; PUISO_PLATE_AEA: COMMON; SRTOT_SEP_PRECIP_GPC: COMMON; TC99_EIE_LSC: COMMON; THISO_IE_PLATE_AEA: COMMON {Thorium-232}; UIISO_IE_PRECIP_AEA: COMMON; NP237_IE_PRECIP_AEA: COMMON; TRITIUM_DIST_LSC: COMMON;
 (4) 9045_pH (Non-Aqueous): COMMON {pH Measurement};

SAMPLE RECEIPT & REVIEW FORM

Client: <u>OPPC</u>		SDG/AR/COC/Work Order: <u>3970010</u>	
Received By: <u>mjk</u>		Date Received: <u>5-18-16</u>	
Suspected Hazard Information		Yes	No
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Classified Radioactive II or III by RSO?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
COC/Samples marked containing PCBs?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Package, COC, and/or Samples marked as beryllium or asbestos containing?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Samples identified as Foreign Soil?		<input checked="" type="checkbox"/>	<input type="checkbox"/>

*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
 Maximum Net Counts Observed* (Observed Counts - Area Background Counts): CPD
 If yes, Were swipes taken of sample containers < action levels?
 If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
 Hazard Class Shipped: UN#:

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Preservation Method: Ice bags Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius <u>2C</u>
2a	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input 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 type="checkbox"/>	<input type="checkbox"/>	
4	Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	Do Low Level Perchlorate samples have headspace as required?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
7	VOA vials contain acid preservation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(If unknown, select No)
8	VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
9	Are Encore containers present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
10	Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
11	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
12	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
13	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
14	Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
15	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
16	Carrier and tracking number.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other <u>7831 0562 7415</u>

Comments (Use Continuation Form if needed):

Data Review Qualifier Definitions

Project Specific Qualifier Definitions for GEL Client Code: CPRC

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

Laboratory Certifications

List of current GEL Certifications as of 13 June 2016

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

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL397606
Work Order #: 397606

Product: Determination of Metals by ICP-MS
Analytical Method: 6020_METALS_ICPMS
Analytical Procedure: GL-MA-E-014 REV# 28
Analytical Batch: 1568482

Preparation Method: SW846 3050B
Preparation Procedure: GL-MA-E-009 REV# 26
Preparation Batch: 1568481

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
397606001	B353D0
1203551836	Method Blank (MB)ICP-MS
1203551837	Laboratory Control Sample (LCS)
1203551840	397606001(B353D0L) Serial Dilution (SD)
1203551838	397606001(B353D0D) Sample Duplicate (DUP)
1203551839	397606001(B353D0S) Matrix Spike (MS)

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

Data Summary:

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

Quality Control (QC) Information

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
1203551838 (B353D0DUP)	Uranium	108* (0%-20%)

Technical Information

Preparation/Analytical Method Verification

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

Dilutions are performed to minimize matrix interferences resulting from elevated mineral element concentrations present in solid samples and/or to bring over range target analyte concentrations into the linear calibration range of the instrument. The ICPMS solid samples in this SDG were diluted the standard two times.

Analyte	397606
	001
Uranium	2X

Certification Statement

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

GEL LABORATORIES LLC

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

**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL397606 GEL Work Order: 397606

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: 13 JUN 2016

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL397606

CONTRACT: CPRC0F16028

METHOD TYPE: SW846

SAMPLE ID:397606001

BASIS: Dry Weight

DATE COLLECTED 17-MAY-16

CLIENT ID: B353D0

LEVEL: Low

DATE RECEIVED 18-MAY-16

MATRIX: SOIL

%SOLIDS: 96.2

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-61-1	Uranium	466	ug/kg	D*	13.5	41	41	2	MS	SKJ	05/25/16 21:02	160525-1	1568482

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1568482	1568481	SW846 3050B	0.507	g	50	mL	05/18/16	SXW1

***Analytical Methods:**

MS SW846 3050B/6020A

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: June 13, 2016

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 397606

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1568482										
QC1203551838	397606001	DUP									
Uranium		*D	466	*D	1550	ug/kg	108*	(0%-20%)	SKJ	05/25/16	21:06
QC1203551837	LCS										
Uranium	4810			D	4850	ug/kg	101	(34%-166%)		05/25/16	20:58
QC1203551836	MB										
Uranium				DU	13.1	ug/kg				05/25/16	20:54
QC1203551839	397606001	MS									
Uranium	4970	*D	466	D	6340	ug/kg	118	(75%-125%)		05/25/16	21:10
QC1203551840	397606001	SDILT									
Uranium		*D	2.27	D	0.432	ug/L	4.89	(0%-10%)		05/25/16	21:18

Notes:

The Qualifiers in this report are defined as follows:

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

GEL LABORATORIES LLC

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

QC Summary

Workorder: 397606

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.

General Chem Analysis

Case Narrative

General Chemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL397606
Work Order #: 397606

Product: Ion Chromatography

Analytical Method: 9056_ANIONS_IC

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

Analytical Batches: 1569023 and 1569022

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
397606001	B353D0
1203553167	Method Blank (MB)
1203553168	Laboratory Control Sample (LCS)
1203553169	397606001(B353D0) Sample Duplicate (DUP)
1203553170	397606001(B353D0) Matrix Spike (MS)

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

Data Summary:

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

Product: pH

Analytical Method: SW846 9045D

Analytical Procedure: GL-GC-E-008 REV# 21

Analytical Batch: 1569812

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
397606002	B354J5
1203555080	Laboratory Control Sample (LCS)
1203555083	397606002(B354J5) Sample Duplicate (DUP)

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

Data Summary:

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

Technical Information

Holding Times

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

Sample	Analyte	Value
1203555083 (B354J5DUP)	pH	Received 18-MAY-16, out of holding 17-MAY-16
397606002 (B354J5)	pH	Received 18-MAY-16, out of holding 17-MAY-16

Certification Statement

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

GEL LABORATORIES LLC

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

**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL397606 GEL Work Order: 397606

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).

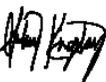
U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

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: **Aubrey Kingsbury**

Date: **06 JUN 2016**

Title: **Analyst I**

Sample Data Summary

June 14, 2016

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: June 6, 2016

Company : CH2MHill Plateau Remediation Company
Address : MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Project: CHPRC SAF F16-028

Client Sample ID: B353D0 Project: CPRC0F16028
Sample ID: 397606001 Client ID: CPRC001
Matrix: SOIL
Collect Date: 17-MAY-16 08:25
Receive Date: 18-MAY-16
Collector: Client
Moisture: 3.78%

Table with 11 columns: Parameter, Qualifier, Result, DL, RL, Units, DF, Analyst, Date, Time, Batch, Method. Rows include Ion Chromatography and 9056_ANIONS_IC:COMMON + (Add-on) "Dry Weight Corrected" with various chemical results.

The following Prep Methods were performed:

Table with 6 columns: Method, Description, Analyst, Date, Time, Prep Batch. Row: SW846 9056A, SW846 9056A Total Anions in Soil, MXL2, 05/23/16, 1315, 1569022

The following Analytical Methods were performed:

Table with 3 columns: Method, Description, Analyst Comments. Row: 1, 9056_ANIONS_IC

Notes:

June 14, 2016

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: June 6, 2016

Company : CH2MHill Plateau Remediation Company
Address : MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Project: CHPRC SAF F16-028

Client Sample ID: B354J5
Sample ID: 397606002
Matrix: SOIL
Collect Date: 17-MAY-16 08:25
Receive Date: 18-MAY-16
Collector: Client
Project: CPRC0F16028
Client ID: CPRC001

Table with 11 columns: Parameter, Qualifier, Result, DL, RL, Units, DF, Analyst, Date, Time Batch, Method. Row 1: 9045_pH (Non-Aqueous):COMMON "As Received", X, 8.84, 0.010, 0.100, SU, 1, AMB, 05/25/16 0949, 1569812, 1.

The following Analytical Methods were performed:

Table with 3 columns: Method, Description, Analyst Comments. Row 1: 1, SW846 9045D, (empty).

Notes:

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: June 6, 2016

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 397606

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1569023										
QC1203553169	397606001	DUP									
Chloride		3780		3580	ug/Kg	5.34	^	(+/-2080)	MAR1	05/24/16	01:53
Fluoride		1040	B	1030	ug/Kg	1.1	^	(+/-1040)			
Nitrate-N	U	343	U	343	ug/Kg	N/A					
Nitrite-N	U	343	U	343	ug/Kg	N/A					
Phosphorus in phosphate	U	696	U	696	ug/Kg	N/A					
Sulfate		8730		7910	ug/Kg	9.78	^	(+/-4160)			
QC1203553168	LCS										
Chloride	50000			49600	ug/Kg			99.3	(80%-120%)		05/24/16 00:47
Fluoride	25000			27100	ug/Kg			108	(80%-120%)		
Nitrate-N	25000			24900	ug/Kg			99.7	(80%-120%)		
Nitrite-N	25000			25400	ug/Kg			102	(80%-120%)		
Phosphorus in phosphate	12500			13300	ug/Kg			106	(80%-120%)		
Sulfate	100000			103000	ug/Kg			103	(80%-120%)		
QC1203553167	MB										
Chloride			U	720	ug/Kg						05/24/16 00:14
Fluoride			U	340	ug/Kg						
Nitrate-N			U	330	ug/Kg						
Nitrite-N			U	330	ug/Kg						
Phosphorus in phosphate			U	670	ug/Kg						
Sulfate			U	1330	ug/Kg						
QC1203553170	397606001	MS									

GEL LABORATORIES LLC

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

QC Summary

Workorder: 397606

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1569023										
Chloride	52000	3780		56900	ug/Kg		102	(48%-145%)		05/24/16	02:26
Fluoride	26000	1040		25400	ug/Kg		93.8	(30%-135%)	MAR1		
Nitrate-N	26000	U	343	25600	ug/Kg		98.6	(70%-125%)			
Nitrite-N	26000	U	343	27000	ug/Kg		104	(70%-120%)			
Phosphorus in phosphate	13000	U	696	12500	ug/Kg		95.9	(35%-134%)			
Sulfate	104000	8730		114000	ug/Kg		101	(45%-162%)			

Titration and Ion Analysis

Batch	1569812										
QC1203555083	397606002	DUP									
pH		X	8.84	X	6.91	SU	24.5	(0%-30%)	AMB	05/25/16	09:55
QC1203555080	LCS										
pH	7.00				7.02	SU		100	(70%-130%)		05/25/16 09:43

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.
- N Spike Sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

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

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

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

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

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

Radiological Analysis

Case Narrative

Radiochemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL397606
Work Order #: 397606

Product: AMCMISO_EIE_PRECIP_AEA: COMMON

Analytical Method: AMCMISO_EIE_PREC_AEA

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

Analytical Batch: 1568440

Preparation Method: Dry Soil Prep

Preparation Procedure: GL-RAD-A-021 REV# 20

Preparation Batch: 1568331

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
397606001	B353D0
1203551713	Method Blank (MB)
1203551714	397606001(B353D0) Sample Duplicate (DUP)
1203551715	Laboratory Control Sample (LCS)

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

Data Summary:

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

Miscellaneous Information

1. The Am-243 tracer for Duplicate 1203551714 is greater than 50 keV from the expected energy of 5269 keV.
1. The tracer peak is within the Am-243 ROI and the tracer recovery does meet the client acceptance criteria. Reporting results.

Product: NP237_IE_PRECIP_AEA: COMMON

Analytical Method: NP237_IE_PRECIP_AEA

Analytical Procedure: GL-RAD-A-032 REV# 20

Analytical Batch: 1568441

Preparation Method: Dry Soil Prep

Preparation Procedure: GL-RAD-A-021 REV# 20

Preparation Batch: 1568331

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
397606001	B353D0
1203551716	Method Blank (MB)
1203551717	397606001(B353D0) Sample Duplicate (DUP)
1203551718	Laboratory Control Sample (LCS)

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

Data Summary:

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

Product: PUISO_PRECIP_AEA:COMMON
Analytical Method: PUISO_PRECIP_AEA
Analytical Procedure: GL-RAD-A-011 REV# 26
Analytical Batch: 1568443

Preparation Method: Dry Soil Prep
Preparation Procedure: GL-RAD-A-021 REV# 20
Preparation Batch: 1568331

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
397606001	B353D0
1203551723	Method Blank (MB)
1203551724	397606001(B353D0) Sample Duplicate (DUP)
1203551725	Laboratory Control Sample (LCS)

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

Data Summary:

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

Technical Information

Recounts

Sample 1203551723 (MB) was recounted due to poor resolution. The recount is reported.

Product: THISO_IE_PLATE_AEA: COMMON

Analytical Method: THISO_IE_PRECIP_AEA

Analytical Procedure: GL-RAD-A-038 REV# 17

Analytical Batch: 1568444

Preparation Method: Dry Soil Prep

Preparation Procedure: GL-RAD-A-021 REV# 20

Preparation Batch: 1568331

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
397606001	B353D0
1203551726	Method Blank (MB)
1203551727	397606001(B353D0) Sample Duplicate (DUP)
1203551728	Laboratory Control Sample (LCS)

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

Data Summary:

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

Technical Information

Recounts

Sample 397606001 (B353D0) was recounted due to a peak shift. The recount is reported.

Product: UISO_IE_PRECIP_AEA:COMMON

Analytical Method: UISO_IE_PRECIP_AEA

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

Analytical Batch: 1568446

Preparation Method: Dry Soil Prep

Preparation Procedure: GL-RAD-A-021 REV# 20

Preparation Batch: 1568331

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
397606001	B353D0
1203551734	Method Blank (MB)
1203551735	397606001(B353D0) Sample Duplicate (DUP)
1203551736	Laboratory Control Sample (LCS)

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

Data Summary:

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

Product: Dry Weight

Preparation Method: Dry Soil Prep

Preparation Procedure: GL-RAD-A-021 REV# 20

Preparation Batch: 1568331

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
397606001	B353D0
1203551394	397606001(B353D0) Sample Duplicate (DUP)

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

Data Summary:

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

Product: I129_SEP_LEPS_GS

Analytical Method: I129_SEP_LEPS_GS

Analytical Procedure: GL-RAD-A-006 REV# 21

Analytical Batch: 1567423

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
397606001	B353D0
1203549122	Method Blank (MB)
1203549123	397347001(B353C9) Sample Duplicate (DUP)
1203549124	397347001(B353C9) Matrix Spike (MS)
1203549125	Laboratory Control Sample (LCS)

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

Data Summary:

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

Product: GAMMA_GS:COMMON + (Add-on)

Analytical Method: GAMMA_GS

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

Analytical Batch: 1568717

Preparation Method: Dry Soil Prep

Preparation Procedure: GL-RAD-A-021 REV# 20

Preparation Batch: 1568331

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
397606001	B353D0
1203552385	Method Blank (MB)
1203552386	397606001(B353D0) Sample Duplicate (DUP)
1203552387	Laboratory Control Sample (LCS)

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

Data Summary:

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

Technical Information

Recounts

Sample 397606001 (B353D0) was recounted due to high MDC. The recount is reported.

Product: SRTOT_SEP_PRECIP_GPC: COMMON

Analytical Method: SRTOT_SEP_PRECIP_GPC

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

Analytical Batch: 1570989

Preparation Method: Dry Soil Prep

Preparation Procedure: GL-RAD-A-021 REV# 20

Preparation Batch: 1568331

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
397606001	B353D0

1203558179	Method Blank (MB)
1203558180	397347001(B353C9) Sample Duplicate (DUP)
1203558181	Laboratory Control Sample (LCS)

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

Data Summary:

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

Technical Information

Recounts

Sample 1203558180 (B353C9DUP) was recounted due to results more negative than the three sigma TPU. The second count is reported.

Product: NI63_LSC

Analytical Method: NI63_LSC

Analytical Procedure: GL-RAD-A-022 REV# 18

Analytical Batch: 1569163

Preparation Method: Dry Soil Prep

Preparation Procedure: GL-RAD-A-021 REV# 20

Preparation Batch: 1568331

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
397606001	B353D0
1203553500	Method Blank (MB)
1203553501	397347001(B353C9) Sample Duplicate (DUP)
1203553502	Laboratory Control Sample (LCS)

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

Data Summary:

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

Technical Information

Recounts

Sample 1203553502 (LCS) was recounted due to low recovery. The recount is reported.

Product: TC99_SEP_GPC

Analytical Method: TC99_EIE_LSC

Analytical Procedure: GL-RAD-A-059 REV# 4

Analytical Batch: 1569183

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
397606001	B353D0
1203553565	Method Blank (MB)
1203553566	397347001(B353C9) Sample Duplicate (DUP)
1203553567	Laboratory Control Sample (LCS)

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

Data Summary:

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

Product: TRITIUM_DIST_LSC: COMMON

Analytical Method: TRITIUM_DIST_LSC

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

Analytical Batch: 1569869

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
397606001	B353D0
1203555247	Method Blank (MB)
1203555248	397347001(B353C9) Sample Duplicate (DUP)
1203555249	397347001(B353C9) Matrix Spike (MS)
1203555250	Laboratory Control Sample (LCS)

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

Data Summary:

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

Product: C14_LSC: COMMON

Analytical Method: C14_LSC

Analytical Procedure: GL-RAD-A-003 REV# 15

Analytical Batch: 1570119

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
397606001	B353D0
1203555879	Method Blank (MB)
1203555880	397347001(B353C9) Sample Duplicate (DUP)
1203555881	397347001(B353C9) Matrix Spike (MS)
1203555882	Laboratory Control Sample (LCS)

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

Data Summary:

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

Certification Statement

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

GEL LABORATORIES LLC

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

**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL397606 GEL Work Order: 397606

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: 13 JUN 2016

Title: Group Leader

Sample Data Summary

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL397606	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 397606001	Date Collected: 05/17/2016 08:25	Matrix: SOIL
	Date Received: 05/18/2016 09:00	%Moisture: 3.8
Client ID: B353D0	Method: AMCMISO_EIE_PREC_AEA	Prep Basis: "Dry Weight Corrected"
Batch ID: 1568440	Analyst: HAKB	SOP Ref: GL-RAD-A-011
Run Date: 06/01/2016 09:35	Aliquot: 0.111 g	Instrument: 1089
Data File: S0397606001_AM.1A.gcnf	Prep Method: DOE EML HASL-300, Am-05	Count Time: 240 min
Prep Batch: 1568440		Prep SOP Ref: GL-RAD-A-021
Prep Date: 05/27/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	0.0774	pCi/g	+/-0.299	0.299	0.579	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	15.3	18.7	pCi/g	81.7	(30%-105%)

Comments:

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL397606
Lab Sample ID: 397606001

Client: CPRC001
Date Collected: 05/17/2016 08:25
Date Received: 05/18/2016 09:00

Project: CPRC0F16028
Matrix: SOIL
%Moisture: 3.8

Client ID: B353D0
Batch ID: 1568441
Run Date: 06/02/2016 12:12
Data File: S0397606001_NP.1A.gcnf
Prep Batch: 1568441
Prep Date: 05/27/2016 00:00

Method: NP237_IE_PRECIP_AEA
Analyst: HAKB
Aliquot: 0.11 g
Prep Method: ASTM C 1476-00 Modified

Prep Basis: "Dry Weight Corrected"
SOP Ref: GL-RAD-A-032
Instrument: 1066
Count Time: 239.9998 min
Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
13994-20-2	Neptunium-237	U	0.0321	pCi/g	+/-0.226	0.226	0.464	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	1900	1830	pCi/g	104	(30%-105%)

Comments:

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL397606
Lab Sample ID: 397606001

Client: CPRC001
Date Collected: 05/17/2016 08:25
Date Received: 05/18/2016 09:00

Project: CPRC0F16028
Matrix: SOIL
%Moisture: 3.8

Client ID: B353D0
Batch ID: 1568443
Run Date: 06/01/2016 09:35
Data File: S0397606001_PU.1A.gcnf
Prep Batch: 1568443
Prep Date: 05/27/2016 00:00

Method: PUIISO_PRECIP_AEA
Analyst: HAKB
Aliquot: 0.111 g
Prep Method: DOE EML HASL-300, Pu-11-

Prep Basis: "Dry Weight Corrected"
SOP Ref: GL-RAD-A-011
Instrument: 1103
Count Time: 240 min
Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	0.00252	pCi/g	+/-0.187	0.187	0.415	1.00
OER-100-70	Plutonium-239/240	U	0.0479	pCi/g	+/-0.180	0.180	0.302	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	14.3	17.8	pCi/g	80.4	(30%-105%)

Comments:

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL397606
Lab Sample ID: 397606001

Client: CPRC001
Date Collected: 05/17/2016 08:25
Date Received: 05/18/2016 09:00

Project: CPRC0F16028
Matrix: SOIL
%Moisture: 3.8

Client ID: B353D0
Batch ID: 1568444
Run Date: 06/01/2016 13:43
Data File: S0397606001_TH.1C.gcnf
Prep Batch: 1568444
Prep Date: 05/27/2016 00:00

Method: THISO_IE_PRECIP_AEA
Analyst: HAKB
Aliquot: 0.115 g
Prep Method: DOE EML HASL-300, Th-01-

Prep Basis: "Dry Weight Corrected"
SOP Ref: GL-RAD-A-038
Instrument: 1177
Count Time: 240 min
Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
TH-232 <small>7440-29-1</small>	Thorium-232		0.785	pCi/g	+/-0.516	0.532	0.315	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Thorium-229 Tracer	13.4	17.7	pCi/g	75.9	(30%-105%)

Comments:

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL397606
Lab Sample ID: 397606001

Client: CPRC001
Date Collected: 05/17/2016 08:25
Date Received: 05/18/2016 09:00

Project: CPRC0F16028
Matrix: SOIL
%Moisture: 3.8

Client ID: B353D0
Batch ID: 1568446
Run Date: 06/01/2016 09:09
Data File: S0397606001_UU.1A.gcnf
Prep Batch: 1568446
Prep Date: 05/27/2016 00:00

Method: UIISO_IE_PRECIP_AEA
Analyst: HAKB
Aliquot: 0.111 g
Prep Method: DOE EML HASL-300, U-02-R

Prep Basis: "Dry Weight Corrected"
SOP Ref: GL-RAD-A-011
Instrument: 1139
Count Time: 240 min
Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
U-233/234 <small>13968-55-3/13966-29-5</small>	Uranium-233/234	U	0.320	pCi/g	+/-0.397	0.400	0.574	1.00
15117-96-1/13982-7	Uranium-235/236	U	0.231	pCi/g	+/-0.367	0.368	0.508	1.00
7440-61-1	Uranium-238		0.688	pCi/g	+/-0.487	0.497	0.453	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	17.2	18.8	pCi/g	91.5	(30%-105%)

Comments:

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL397606	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 397606001	Date Collected: 05/17/2016 08:25	Matrix: SOIL
	Date Received: 05/18/2016 09:00	%Moisture: 3.8
Client ID: B353D0		Prep Basis: "Dry Weight Corrected"
Batch ID: 1570989	Method: SRTOT_SEP_PRECIP_GPC	SOP Ref: GL-RAD-A-004
Run Date: 06/06/2016 17:21	Analyst: KSD1	Instrument: PIC5B
Data File: S1570989r1.xls	Aliquot: 0.47 g	Count Time: 60 min
Prep Batch: 1570989	Prep Method: EPA 905.0 Modified/DOE RP5	Prep SOP Ref: GL-RAD-A-021
Prep Date: 06/03/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	-0.176	pCi/g	+/-0.433	0.433	0.907	2.00

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

Comments:

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

Rad
Certificate of Analysis
Sample Summary

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SDG Number: GEL397606
 Lab Sample ID: 397606001

Client: CPRC001
 Date Collected: 05/17/2016 08:25
 Date Received: 05/18/2016 09:00

Project: CPRC0F16028
 Matrix: SOIL
 %Moisture: 3.8

Client ID: B353D0
 Batch ID: 1567423
 Run Date: 06/02/2016 14:09
 Data File: I397606001.CNF;1
 Prep Batch: 1567423
 Prep Date: 05/25/2016 00:00

Method: I129_SEP_LEPS_GS
 Analyst: MJH1
 Aliquot: 1.05 g
 Prep Method: DOE EML HASL-300,I-01 M

Prep Basis: "As Received"
 SOP Ref: GL-RAD-A-006
 Instrument: XRAY6
 Count Time: 60 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129	U	0.159	pCi/g	+/-0.491	0.496	1.31	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits

Comments:

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

Rad
Certificate of Analysis
Sample Summary

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SDG Number: GEL397606
 Lab Sample ID: 397606001
 Client ID: B353D0
 Batch ID: 1568717
 Run Date: 06/10/2016 11:02
 Data File: G397606001.CNF;4
 Prep Batch: 1568717
 Prep Date: 05/19/2016 00:00

Client: CPRC001
 Date Collected: 05/17/2016 08:25
 Date Received: 05/18/2016 09:00
 Method: GAMMA_GS
 Analyst: MXR1
 Aliquot: 152.841 g
 Prep Method: DOE HASL 300, 4.5.2.3/Ga-01

Project: CPRC0F16028
 Matrix: SOIL
 %Moisture: 3.8
 Prep Basis: "Dry Weight Corrected"
 SOP Ref: GL-RAD-A-013
 Instrument: GAM01
 Count Time: 251 min
 Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137	U	0.00261	pCi/g	+/-0.0184	0.0184	0.0345	0.100
10198-40-0	Cobalt-60	U	0.00367	pCi/g	+/-0.0189	0.019	0.0363	0.100
14683-23-9	Europium-152	U	0.0283	pCi/g	+/-0.0508	0.0524	0.0845	0.100
15585-10-1	Europium-154	U	0.0178	pCi/g	+/-0.0556	0.0562	0.107	0.100
14391-16-3	Europium-155	U	0.0228	pCi/g	+/-0.056	0.057	0.102	0.100
13982-63-3	Radium-226		0.353	pCi/g	+/-0.0782	0.0835	0.066	1.00
15262-20-1	Radium-228		0.746	pCi/g	+/-0.142	0.169	0.119	3.00

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).
 The MDC is a sample specific MDC.

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL397606
Lab Sample ID: 397606001

Client: CPRC001
Date Collected: 05/17/2016 08:25
Date Received: 05/18/2016 09:00

Project: CPRC0F16028
Matrix: SOIL
%Moisture: 3.8

Client ID: B353D0
Batch ID: 1569163
Run Date: 06/07/2016 17:32
Data File: N1569163.xls
Prep Batch: 1569163
Prep Date: 06/06/2016 15:10

Method: NI63_LSC
Analyst: CXS7
Aliquot: 0.728 g
Prep Method: DOE RESL Ni-1, Modified

Prep Basis: "Dry Weight Corrected"
SOP Ref: GL-RAD-A-022
Instrument: LSCYELLOW
Count Time: 20 min
Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
NI-63	Nickel-63	U	1.40	pCi/g	+/-3.44	3.45	5.92	10.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Nickel Carrier	16.1	24.4	mg	65.9	(40%-110%)

Comments:

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL397606
Lab Sample ID: 397606001

Client ID: B353D0
Batch ID: 1569183
Run Date: 06/05/2016 17:51
Data File: E1569183.xls
Prep Batch: 1569183
Prep Date: 05/31/2016 00:00

Client: CPRC001
Date Collected: 05/17/2016 08:25
Date Received: 05/18/2016 09:00

Method: TC99_EIE_LSC
Analyst: MYM1
Aliquot: 1.231 g
Prep Method: DOE EML HASL-300, Tc-02-

Project: CPRC0F16028
Matrix: SOIL
%Moisture: 3.8

Prep Basis: "As Received"
SOP Ref: GL-RAD-A-059
Instrument: LSCGOLD
Count Time: 20 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	-0.0303	pCi/g	+/-1.73	1.73	3.01	5.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	27000	28400	CPM	94.9	(30%-105%)

Comments:

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL397606	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 397606001	Date Collected: 05/17/2016 08:25	Matrix: SOIL
	Date Received: 05/18/2016 09:00	%Moisture: 3.8
Client ID: B353D0		Prep Basis: "As Received"
Batch ID: 1569869	Method: TRITIUM_DIST_LSC	SOP Ref: GL-RAD-A-002
Run Date: 06/03/2016 03:57	Analyst: TXJ1	Instrument: LSCSILVER
Data File: T1569869.xls	Aliquot: 1.26 g	Count Time: 45 min
Prep Batch: 1569869	Prep Method: EPA 906.0 Modified	
Prep Date: 06/01/2016 12:29		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium	U	3.87	pCi/g	+/-6.57	6.63	11.3	30.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits

Comments:

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL397606	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 397606001	Date Collected: 05/17/2016 08:25	Matrix: SOIL
	Date Received: 05/18/2016 09:00	%Moisture: 3.8
Client ID: B353D0		Prep Basis: "As Received"
Batch ID: 1570119	Method: C14_LSC	SOP Ref: GL-RAD-A-003
Run Date: 06/08/2016 20:44	Analyst: TXJ1	Instrument: LSCRED
Data File: C1570119.xls	Aliquot: 0.5 g	Count Time: 45 min
Prep Batch: 1570119	Prep Method: EPA EERF C-01 Modified	
Prep Date: 06/01/2016 16:06		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	-0.358	pCi/g	+/-1.87	1.87	3.25	5.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits

Comments:

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

Quality Control Summary

June 14, 2016

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QC Summary

Report Date: June 13, 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: 397606

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1568440								
QC1203551713	MB								
Americium-241			U	-0.0291	pCi/g			HAKB	06/01/1609:35
				Uncert: +/-0.129					
				TPU: +/-0.129					
**Americium-243 Tracer	18.7			15.7	pCi/g	REC: 84	(30%-105%)		
				Uncert: +/-2.08					
				TPU: +/-3.19					
QC1203551714	397606001	DUP							
Americium-241		U	0.0774	U	0.235	pCi/g			
				Uncert: +/-0.299		RPD: 0	N/A		
				TPU: +/-0.299		RER: 0.561	(0-2)		
**Americium-243 Tracer	20.6		15.3	8.59	pCi/g	REC: 42	(30%-105%)		
				Uncert: +/-2.27					
				TPU: +/-3.45					
QC1203551715	LCS								
Americium-241				17.8	pCi/g	REC: 93	(80%-120%)		
				Uncert: +/-1.86					
				TPU: +/-2.77					
**Americium-243 Tracer	18.7			19.6	pCi/g	REC: 105	(30%-105%)		
				Uncert: +/-1.97					
				TPU: +/-3.06					
Batch	1568441								
QC1203551716	MB								
Neptunium-237			U	-0.0874	pCi/g			HAKB	06/02/1612:12
				Uncert: +/-0.123					
				TPU: +/-0.123					
**Americium-243 Tracer	1830			1880	pCi/g	REC: 103	(30%-105%)		
QC1203551717	397606001	DUP							
Neptunium-237		U	0.0321	U	0.0827	pCi/g			
				Uncert: +/-0.226		RPD: 0	N/A		
				TPU: +/-0.226		RER: 0.309	(0-2)		
**Americium-243 Tracer	1910		1900	1940	pCi/g	REC: 101	(30%-105%)		
QC1203551718	LCS								
Neptunium-237				40.6	pCi/g	REC: 105	(80%-120%)		
				Uncert: +/-2.83					
				TPU: +/-5.45					
**Americium-243 Tracer	1830			1880	pCi/g	REC: 103	(30%-105%)		
Batch	1568443								
QC1203551723	MB								
Plutonium-238			U	-0.0559	pCi/g			HAKB	06/06/1611:34
				Uncert: +/-0.169					
				TPU: +/-0.169					
Plutonium-239/240			U	0.0807	pCi/g				
				Uncert: +/-0.276					

June 14, 2016

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QC Summary

Workorder: 397606

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1568443								
**Plutonium-242 Tracer	TPU:			+/-0.276					
	17.8			12.5	pCi/g	REC: 70	(30%-105%)		
	Uncert:			+/-2.31					
	TPU:			+/-3.42					
QC1203551724 397606001 DUP									
Plutonium-238		U	0.00252	U	0.0189				06/01/1609:35
	Uncert:		+/-0.187		+/-0.197	RPD: 0	N/A		
	TPU:		+/-0.187		+/-0.197	RER: 0.118	(0-2)		
Plutonium-239/240		U	0.0479	U	0.0512				
	Uncert:		+/-0.180		+/-0.192	RPD: 0	N/A		
	TPU:		+/-0.180		+/-0.192	RER: 0.0245	(0-2)		
**Plutonium-242 Tracer	19.5		14.3		16.0	pCi/g	REC: 82	(30%-105%)	
	Uncert:		+/-2.08		+/-2.25				
	TPU:		+/-3.11		+/-3.38				
QC1203551725 LCS									
Plutonium-238				U	0.0715				
	Uncert:				+/-0.244				
	TPU:				+/-0.245				
Plutonium-239/240	17.8				19.8	pCi/g	REC: 111	(80%-120%)	
	Uncert:				+/-2.29				
	TPU:				+/-3.52				
**Plutonium-242 Tracer	17.8				13.3	pCi/g	REC: 75	(30%-105%)	
	Uncert:				+/-2.18				
	TPU:				+/-3.24				
Batch	1568444								
QC1203551726 MB									
Thorium-232				U	0.070			HAKB	06/01/1609:01
	Uncert:				+/-0.177				
	TPU:				+/-0.177				
**Thorium-229 Tracer	17.7				16.1	pCi/g	REC: 91	(30%-105%)	
	Uncert:				+/-1.87				
	TPU:				+/-3.07				
QC1203551727 397606001 DUP									
Thorium-232			0.785		1.24				
	Uncert:		+/-0.516		+/-0.735	RPD: 45	(0% - 100%)		
	TPU:		+/-0.532		+/-0.767	RER: 0.951	(0-2)		
**Thorium-229 Tracer	17.8		13.4		7.85	pCi/g	REC: 44	(30%-105%)	
	Uncert:		+/-2.33		+/-2.69				
	TPU:		+/-3.65		+/-4.12				
QC1203551728 LCS									
Thorium-232	17.3				19.0	pCi/g	REC: 110	(80%-120%)	
	Uncert:				+/-2.25				
	TPU:				+/-3.66				
**Thorium-229 Tracer	17.7				12.7	pCi/g	REC: 72	(30%-105%)	
	Uncert:				+/-2.18				
	TPU:				+/-3.45				
Batch	1568446								
QC1203551734 MB									
Uranium-233/234				U	0.162			HAKB	06/01/1609:10
	Uncert:				+/-0.319				

June 14, 2016

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QC Summary

Workorder: 397606

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Alpha Spec										
Batch	1568446									
Uranium-235/236		TPU:		+/-0.320						
			U	-0.0273	pCi/g					
		Uncert:		+/-0.236						
Uranium-238		TPU:		+/-0.236						
			U	0.0258	pCi/g					
		Uncert:		+/-0.270						
**Uranium-232 Tracer	18.8	TPU:		+/-0.270						
				13.3	pCi/g	REC:	71	(30%-105%)		
		Uncert:		+/-2.60						
		TPU:		+/-3.93						
QC1203551735 397606001 DUP										
Uranium-233/234		U	0.320	0.914	pCi/g					06/01/1609:10
		Uncert:	+/-0.397	+/-0.565		RPD:	46	(0% - 100%)		
		TPU:	+/-0.400	+/-0.579		RER:	1.65	(0-2)		
Uranium-235/236		U	0.231	0.196	pCi/g					
		Uncert:	+/-0.367	+/-0.336		RPD:	0	N/A		
		TPU:	+/-0.368	+/-0.337		RER:	0.136	(0-2)		
Uranium-238			0.688	1.09	pCi/g					
		Uncert:	+/-0.487	+/-0.605		RPD:	45	(0% - 100%)		
		TPU:	+/-0.497	+/-0.625		RER:	0.992	(0-2)		
**Uranium-232 Tracer	20.7		17.2	18.8	pCi/g	REC:	91	(30%-105%)		
		Uncert:	+/-2.32	+/-2.52						
		TPU:	+/-3.57	+/-3.88						
QC1203551736 LCS										
Uranium-233/234				21.7	pCi/g					06/01/1609:10
		Uncert:		+/-2.50						
		TPU:		+/-4.01						
Uranium-235/236				1.29	pCi/g					
		Uncert:		+/-0.698						
		TPU:		+/-0.723						
Uranium-238	24.3			24.0	pCi/g	REC:	99	(80%-120%)		
		Uncert:		+/-2.62						
		TPU:		+/-4.36						
**Uranium-232 Tracer	18.8			18.6	pCi/g	REC:	99	(30%-105%)		
		Uncert:		+/-2.33						
		TPU:		+/-3.58						
Rad Gamma Spec										
Batch	1567423									
QC1203549122 MB										
Iodine-129			U	-0.302	pCi/g				MJH1	06/02/1614:14
		Uncert:		+/-0.418						
		TPU:		+/-0.441						
QC1203549123 397347001 DUP										
Iodine-129		U	-0.107	0.275	pCi/g					06/02/1614:31
		Uncert:	+/-0.520	+/-0.583		RPD:	0	N/A		
		TPU:	+/-0.523	+/-0.597		RER:	0.941	(0-2)		
QC1203549124 397347001 MS										
Iodine-129	39.3	U	-0.107	33.4	pCi/g	REC:	85	(75%-125%)		06/02/1614:31
		Uncert:	+/-0.520	+/-4.92						
		TPU:	+/-0.523	+/-5.93						

June 14, 2016

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QC Summary

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Table with columns: Parmname, NOM, Sample, Qual, QC, Units, QC Criteria, Range, Analyst, Date Time. Rows include Rad Gamma Spec, Iodine-129, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226, Radium-228, and various QC1203552385 and QC1203552386 entries.

June 14, 2016

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QC Summary

Workorder: 397606

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1568717								
Americium-241	489			538	pCi/g	REC: 110	(80%-120%)		
	Uncert:			+/-9.23					
	TPU:			+/-47.6					
Cesium-137	181			179	pCi/g	REC: 99	(80%-120%)		
	Uncert:			+/-2.62					
	TPU:			+/-14.7					
Cobalt-60	169			159	pCi/g	REC: 94	(80%-120%)		
	Uncert:			+/-2.82					
	TPU:			+/-13.0					
Europium-152			U	0.171	pCi/g				
	Uncert:			+/-1.42					
	TPU:			+/-1.42					
Europium-154			U	0.877	pCi/g				
	Uncert:			+/-1.06					
	TPU:			+/-1.13					
Europium-155			U	0.244	pCi/g				
	Uncert:			+/-1.29					
	TPU:			+/-1.29					
Radium-226			U	-0.139	pCi/g				
	Uncert:			+/-0.987					
	TPU:			+/-0.990					
Radium-228			U	0.786	pCi/g				
	Uncert:			+/-2.77					
	TPU:			+/-2.79					
Rad Gas Flow									
Batch	1570989								
QC1203558179	MB								
Total Strontium			U	-0.134	pCi/g			KSD1	06/06/1617:23
	Uncert:			+/-0.484					
	TPU:			+/-0.484					
**Strontium Carrier	7.77			6.90	mg	REC: 89	(40%-110%)		
QC1203558180	397347001	DUP							
Total Strontium	U	-0.243	U	-0.279	pCi/g				06/07/1609:35
	Uncert:	+/-0.636		+/-0.443		RPD: 0	N/A		
	TPU:	+/-0.636		+/-0.443		RER: 0.0928	(0-2)		
**Strontium Carrier	7.77	6.60		7.10	mg	REC: 91	(40%-110%)		
QC1203558181	LCS								
Total Strontium	46.7			49.2	pCi/g	REC: 105	(80%-120%)		06/06/1617:23
	Uncert:			+/-2.98					
	TPU:			+/-12.8					
**Strontium Carrier	7.77			6.20	mg	REC: 80	(40%-110%)		
Rad Liquid Scintillation									
Batch	1569163								
QC1203553500	MB								
Nickel-63			U	-0.349	pCi/g			CXS7	06/07/1617:53
	Uncert:			+/-2.92					
	TPU:			+/-2.92					
**Nickel Carrier	24.4			16.6	mg	REC: 68	(40%-110%)		
QC1203553501	397347001	DUP							

June 14, 2016

GEL LABORATORIES LLC

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

QC Summary

Workorder: 397606

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Liquid Scintillation									
Batch	1569163								
Nickel-63		U	0.269	U	-3.05	pCi/g			
		Uncert:	+/-2.97		+/-3.15		RPD: 0	N/A	
		TPU:	+/-2.97		+/-3.15		RER: 1.5	(0-2)	
**Nickel Carrier	24.4		16.4		16.5	mg	REC: 68	(40%-110%)	
QC1203553502	LCS								
Nickel-63	165				133	pCi/g	REC: 80	(80%-120%)	06/08/1610:52
		Uncert:			+/-6.59				
		TPU:			+/-25.3				
**Nickel Carrier	24.4				17.2	mg	REC: 70	(40%-110%)	
Batch	1569183								
QC1203553565	MB								
Technetium-99				U	-0.0384	pCi/g		MYM1	06/05/1618:12
		Uncert:			+/-1.58				
		TPU:			+/-1.58				
**Technetium-99m Tracer	28400				27700	CPM	REC: 97	(30%-105%)	
QC1203553566	397347001	DUP							
Technetium-99		U	0.253	U	0.278	pCi/g			06/05/1618:34
		Uncert:	+/-1.66		+/-1.74		RPD: 0	N/A	
		TPU:	+/-1.66		+/-1.74		RER: 0.0198	(0-2)	
**Technetium-99m Tracer	28400		26800		26600	CPM	REC: 94	(30%-105%)	
QC1203553567	LCS								
Technetium-99	66.8				61.4	pCi/g	REC: 92	(80%-120%)	06/05/1618:56
		Uncert:			+/-3.13				
		TPU:			+/-7.72				
**Technetium-99m Tracer	28400				28500	CPM	REC: 100	(30%-105%)	
Batch	1569869								
QC1203555247	MB								
Tritium				U	0.354	pCi/g		TXJ1	06/02/1623:52
		Uncert:			+/-0.301				
		TPU:			+/-0.311				
QC1203555248	397347001	DUP							
Tritium		U	-0.424	U	2.88	pCi/g			06/03/1605:31
		Uncert:	+/-5.95		+/-6.28		RPD: 0	N/A	
		TPU:	+/-5.95		+/-6.31		RER: 0.747	(0-2)	
QC1203555249	397347001	MS							
Tritium	91.6	U	-0.424		91.6	pCi/g	REC: 100	(75%-125%)	06/03/1606:18
		Uncert:	+/-5.95		+/-10.7				
		TPU:	+/-5.95		+/-23.4				
QC1203555250	LCS								
Tritium	5.78				6.10	pCi/g	REC: 106	(80%-120%)	06/03/1607:05
		Uncert:			+/-0.690				
		TPU:			+/-1.55				
Batch	1570119								
QC1203555879	MB								
Carbon-14				U	1.87	pCi/g		TXJ1	06/08/1621:31
		Uncert:			+/-1.80				
		TPU:			+/-1.81				
QC1203555880	397347001	DUP							
Carbon-14		U	0.253	U	1.48	pCi/g			06/08/1622:17

QC Summary

Workorder: 397606

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Liquid Scintillation										
Batch	1570119									
		Uncert:	+/-1.82	+/-1.79						
		TPU:	+/-1.82	+/-1.79		RPD: 0	N/A			
						RER: 0.944	(0-2)			
QC1203555881	397347001	MS								
Carbon-14	146	U	0.253	148	pCi/g	REC: 101	(75%-125%)		06/08/1623:04	
		Uncert:	+/-1.82	+/-4.47						
		TPU:	+/-1.82	+/-11.8						
QC1203555882	LCS									
Carbon-14	140			142	pCi/g	REC: 101	(80%-120%)		06/08/1623:50	
		Uncert:		+/-4.30						
		TPU:		+/-11.3						

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
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQC 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 +/- 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.