

5/11/2016



a member of **The GEL Group** INC



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May 11, 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: 395291
SDG: GEL395291

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on April 14, 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: 304043 - 8H
Chain of Custody: F16-028-005
Enclosures



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Case Narrative

**General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF F16-028
SDG: GEL395291**

May 11, 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 April 14, 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
395291001	B353C8
395291002	B354J3

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.

5/11/2016

B. Luthman
Brielle Luthman for
Heather Shaffer
Project Manager

Technical Case Narrative
CH2M Hill Plateau Remediation Company (CPRC)
SDG #: GEL395291
Work Order #: 395291

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.

Calibration Information

CRDL/PQL Requirements

The CRDL standard recoveries for SW846 6020A/6020B met the advisory control limits with the exception of uranium. Client sample concentrations were greater than two times the PQL; therefore the data were not adversely affected.

Quality Control (QC) Information

Method Blank (MB) Statement

The method blanks (MB) analyzed with this SDG met the exception criteria with the exception of thallium. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data. 1203528380 (MB).

Duplicate Relative Percent Difference (RPD) Statement

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

Sample	Analyte	Value
1203528385 (Non SDG 395298003DUP)	Uranium	414* (+/-97.8 ug/kg)

Technical Information

Sample Dilutions

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

Analyte	395291
	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
1203529441 (B354J3DUP)	pH	Received 14-APR-16, out of holding 13-APR-16
395291002 (B354J3)	pH	Received 14-APR-16, out of holding 13-APR-16

Radiochemistry

AMCMISO_EIE_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.

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

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.

THISO_IE_PLATE_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.

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.

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

The sample and the duplicate 1203529503 (B353C8DUP) and 395291001 (B353C8) did not meet the relative percent difference requirement for Ra-226; however, they do meet the relative error ratio requirement with a value of 0.1213.

Technical Information**Recounts**

Sample 1203529503 (B353C8DUP) was recounted due to high relative percent difference/relative error ratio. 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.

Quality Control (QC) Information

QC Information

The sample and the duplicate, 1203535193 (B353C8DUP) and 395291001 (B353C8) , did not meet the relative percent difference requirement; however, both results are less than the MDA.

NI63_LSC

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

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

Samples 1203530984 (MB), 1203530985 (Non SDG 395487001DUP) and 1203530986 (Non SDG 395487001MS) were recounted due to high MDCs. The recounts are reported. Sample 395291001 (B353C8) was recounted due to high MDC and then recounted to verify sample result. The third count is reported. Sample 1203530987 (LCS) was recounted due to high MDC and then recounted due to high recovery. The third count is reported.

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.

TC99_SEP_GPC

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

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

Samples were reprepared due to the quench number being outside the calibration range. The re-analysis is being reported.

Recounts

Sample 1203533804 (LCS) was recounted due to low recovery. The recount is reported.

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		F16-028-005	PAGE 1 OF 2
COLLECTOR Don Brotherton 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 #5	PROJECT DESIGNATION 200-WA-1 Opportunistic sampling - soil		SAF NO. F16-028	AIR QUALITY	
ICE CHEST NO. GWS-540	FIELD LOGBOOK NO. HNF-N-645 3.63	ACTUAL SAMPLE DEPTH 238.70	COA 8/20.3/24/16	METHOD OF SHIPMENT FEDERAL EXPRESS	ORIGINAL
SHIPPED TO GEL Laboratories, LLC	OFFSITE PROPERTY NO. 65260		304043		

7760 9531 1422

MATRIX*	PRESERVATION	HOLDING TIME	TYPE OF CONTAINER	NO. OF CONTAINER(S)	VOLUME	SAMPLE ANALYSIS	SAMPLE DATE	SAMPLE TIME	MATRIX*
A=Air DL=Drum L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	Cool <=6C	6 Months	G/P	1	250mL	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	APR 13 2016		SOIL
	None	6 Months	G/P	1	500mL	SEE ITEM (2) IN SPECIAL INSTRUCTIONS			SOIL
	None	6 Months	G/P	1	60mL	SEE ITEM (4) IN SPECIAL INSTRUCTIONS			

SPECIAL INSTRUCTIONS

SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

CHAIN OF POSSESSION	SIGN/ PRINT NAMES	DATE/TIME
RELINQUISHED BY/REMOVED FROM Don Brotherton CHPRC	Received by/STORED IN C.M. Aguilar/CHPRC	DATE/TIME 4-13-16 0830
RELINQUISHED BY/REMOVED FROM C.M. Aguilar/CHPRC	Received by/STORED IN Fedex	DATE/TIME 4-13-16
RELINQUISHED BY/REMOVED FROM Fedex	Received by/STORED IN C. Seate/Onygeorge	DATE/TIME 4-14-16 0900
RELINQUISHED BY/REMOVED FROM	Received by/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	Received by/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	Received by/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	Received by/STORED IN	DATE/TIME

CH2MHill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F15-028-005	PAGE 2 OF 2
COLLECTOR Don Brotherton 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 #5	PROJECT DESIGNATION 200-WA-1 Opportunistic sampling - soil		SAF NO. F16-028	AIR QUALITY	
ICE CHEST NO. GWS-540	FIELD LOGBOOK NO. <u>3-63</u> HNF-N-645	ACTUAL SAMPLE DEPTH 238.70 <u>473-16</u>	COA <u>AW.3/24/14</u> 300192 <u>304043</u>	METHOD OF SHIPMENT FEDERAL EXPRESS	ORIGINAL
SHIPPED TO GEL Laboratories, LLC	OFFSITE PROPERTY NO. <u>6526</u>	<u>241.20</u> <u>238.70</u>	BILL OF LADING/AIR BILL NO. <u>776095311422</u>		

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}; UISO_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>CPRC</u>		SDG/AR/COC/Work Order: <u>390291</u>	
Received By: <u>cey</u>		Date Received: <u>04/14/16</u>	
Suspected Hazard Information		*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.	
COC/Samples marked as radioactive?		Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>220cpm on soils</u>	
Classified Radioactive II or III by RSO?		If yes, Were swipes taken of sample containers < action levels?	
COC/Samples marked containing PCBs?			
Package, COC, and/or Samples marked as beryllium or asbestos containing?		If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.	
Shipped as a DOT Hazardous?		Hazard Class Shipped: _____ UN#: _____	
Samples identified as Foreign Soil?			

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
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>1304122912</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"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>B3ANR2 8210 phenolic bottle completely broken - no sample remaining in bottle</u>
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 <input checked="" type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other 7760 9581 4208 - 1.3°C 7760 9989 6431 - 1.7°C 7760 9752 3696 - 2.7°C 7760 9989 6729 - 1.4°C 7760 9752 3446 - 1.1°C 7760 9531 1000 - 3.1°C 7760 9531 0573 - 1.6°C 7760 9581 3911 - 10.3°C (none) 7760 9531 1021 - 1.8°C 7760 9531 1422 - 2.2°C
Comments (Use Continuation Form if needed):				

PM (or PMA) review: Initials DS Date 4/14/16 Page 1 of 1

Data Review Qualifier Definitions

Project Specific Qualifier Definitions for GEL Client Code: CPRC

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

Laboratory Certifications

List of current GEL Certifications as of 11 May 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 #: GEL395291
Work Order #: 395291

Product: Determination of Metals by ICP-MS**Analytical Method:** 6020_METALS_ICPMS**Analytical Procedure:** GL-MA-E-014 REV# 28**Analytical Batch:** 1559860**Preparation Method:** SW846 3050B**Preparation Procedure:** GL-MA-E-009 REV# 26**Preparation Batch:** 1559859

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
395291001	B353C8
1203528380	Method Blank (MB)ICP-MS
1203528381	Laboratory Control Sample (LCS)
1203528387	395298003(NonSDGL) Serial Dilution (SD)
1203528385	395298003(NonSDGD) Sample Duplicate (DUP)
1203528386	395298003(NonSDGS) 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.

Calibration Information**CRDL/PQL Requirements**

The CRDL standard recoveries for SW846 6020A/6020B met the advisory control limits with the exception of uranium. Client sample concentrations were greater than two times the PQL; therefore the data were not adversely affected.

Quality Control (QC) Information**Method Blank (MB) Statement**

The method blanks (MB) analyzed with this SDG met the exception criteria with the exception of thallium. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data. 1203528380 (MB).

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
1203528385 (Non SDG 395298003DUP)	Uranium	414* (+/-97.8 ug/kg)

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.

	395291
Analyte	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: GEL395291 GEL Work Order: 395291

The Qualifiers in this report are defined as follows:

* Duplicate analysis not within control limits

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

D Results are reported from a diluted aliquot of sample.

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: 09 MAY 2016

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL395291

CONTRACT: CPRC0F16028

METHOD TYPE: SW846

SAMPLE ID: 395291001

BASIS: Dry Weight

DATE COLLECTED 13-APR-16

CLIENT ID: B353C8

LEVEL: Low

DATE RECEIVED 14-APR-16

MATRIX: SOIL

%SOLIDS: 95.6

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-61-1	Uranium	992	ug/kg	D	13.1	39.6	39.6	2	MS	SKJ	04/19/16 01:32	160418-1	1559860

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1559860	1559859	SW846 3050B	0.529	g	50	mL	04/15/16	JXM5

***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: May 9, 2016

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 395291

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1559860										
QC1203528385	395298003	DUP									
Uranium		D	479 *D	893	ug/kg	60.4*^		(+/-97.8)	SKJ	04/19/16	01:48
QC1203528381	LCS										
Uranium	4880		D	5090	ug/kg		104	(34%-166%)		04/19/16	01:29
QC1203528380	MB										
Uranium			DU	13.0	ug/kg					04/19/16	01:25
QC1203528386	395298003	MS									
Uranium	12200	D	479 D	11600	ug/kg		91	(75%-125%)		04/19/16	01:52
QC1203528387	395298003	SDILT									
Uranium		D	0.953 D	0.215	ug/L	12.8		(0%-10%)		04/19/16	02:00

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

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QC Summary

Workorder: 395291

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Parmname	NOM	Sample Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
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N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ 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 #: GEL395291
Work Order #: 395291**

Product: Ion Chromatography

Analytical Method: 9056_ANIONS_IC

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

Analytical Batches: 1559997 and 1559996

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
395291001	B353C8
1203528749	Method Blank (MB)
1203528750	Laboratory Control Sample (LCS)
1203528751	395291001(B353C8) Sample Duplicate (DUP)
1203528752	395291001(B353C8) 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:** 1560235

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
395291002	B354J3
1203529440	Laboratory Control Sample (LCS)
1203529441	395291002(B354J3) 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
1203529441 (B354J3DUP)	pH	Received 14-APR-16, out of holding 13-APR-16
395291002 (B354J3)	pH	Received 14-APR-16, out of holding 13-APR-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.

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL395291 GEL Work Order: 395291

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: Kristen Mizzell

Date: 28 APR 2016

Title: Analyst I

Sample Data Summary

5/11/2016

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Certificate of Analysis

Report Date: April 28, 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: B354J3 Project: CPRC0F16028
Sample ID: 395291002 Client ID: CPRC001
Matrix: SOIL
Collect Date: 13-APR-16 07:25
Receive Date: 14-APR-16
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Titration and Ion Analysis											
9045_pH (Non-Aqueous):COMMON "As Received"											
pH at Temp 22.3C	X	8.93	0.010	0.100	SU	1	RXB5	04/15/16	1949	1560235	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9045D	

Notes:

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: April 28, 2016

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 395291

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1559997										
QC1203528751	395291001	DUP									
Chloride		2480		2480	ug/Kg	0.0845	^	(+/-2090)	MAR1	04/15/16	12:24
Fluoride	B	991	B	952	ug/Kg	3.98	^	(+/-1050)			
Nitrate-N	U	345	U	345	ug/Kg	N/A					
Nitrite-N	U	345	U	345	ug/Kg	N/A					
Phosphorus in phosphate	U	701	U	701	ug/Kg	N/A					
Sulfate		5150		4780	ug/Kg	7.38	^	(+/-4190)			
QC1203528750	LCS										
Chloride	50000			46500	ug/Kg			92.9	(80%-120%)	04/15/16	11:21
Fluoride	25000			23900	ug/Kg			95.7	(80%-120%)		
Nitrate-N	25000			24000	ug/Kg			96	(80%-120%)		
Nitrite-N	25000			24000	ug/Kg			96	(80%-120%)		
Phosphorus in phosphate	12500			11700	ug/Kg			93.9	(80%-120%)		
Sulfate	100000			96200	ug/Kg			96.2	(80%-120%)		
QC1203528749	MB										
Chloride			U	670	ug/Kg					04/15/16	10:49
Fluoride			U	330	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						
QC1203528752	395291001	MS									

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QC Summary

Workorder: 395291

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1559997										
Chloride	52200	2480		50000	ug/Kg		91.1	(48%-145%)		04/15/16	12:56
Fluoride	26100	B	991	23600	ug/Kg		86.6	(30%-135%)	MAR1		
Nitrate-N	26100	U	345	24500	ug/Kg		93.7	(70%-125%)			
Nitrite-N	26100	U	345	24900	ug/Kg		95.3	(70%-120%)			
Phosphorus in phosphate	13000	U	701	12600	ug/Kg		96.4	(35%-134%)			
Sulfate	104000		5150	106000	ug/Kg		96.3	(45%-162%)			

Titration and Ion Analysis

Batch 1560235

QC1203529441	395291002	DUP									
pH		X	8.93	X	8.92	SU	0.112	(0%-30%)	RXB5	04/15/16	19:52
QC1203529440	LCS										
pH	7.00				7.02	SU		100	(70%-130%)		04/15/16 19:21

Notes:

The Qualifiers in this report are defined as follows:

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

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

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

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

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

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

Radiological Analysis

Case Narrative

Radiochemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL395291
Work Order #: 395291

Product: AMCMISO_EIE_PRECIP_AEA: COMMON

Analytical Method: AMCMISO_EIE_PREC_AEA

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

Analytical Batch: 1560649

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1559883

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
395291001	B353C8
1203530668	Method Blank (MB)
1203530669	395291001(B353C8) Sample Duplicate (DUP)
1203530670	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: NP237_IE_PRECIP_AEA: COMMON

Analytical Method: NP237_IE_PRECIP_AEA

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

Analytical Batch: 1560650

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1559883

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
395291001	B353C8
1203530671	Method Blank (MB)
1203530672	395291001(B353C8) Sample Duplicate (DUP)

1203530673 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: PUIISO_PRECIP_AEA:COMMON

Analytical Method: PUIISO_PLATE_AEA

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

Analytical Batch: 1560651

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1559883

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
395291001	B353C8
1203530675	Method Blank (MB)
1203530676	395291001(B353C8) Sample Duplicate (DUP)
1203530677	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: THISO_IE_PLATE_AEA: COMMON

Analytical Method: THISO_IE_PLATE_AEA

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

Analytical Batch: 1560652

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1559883

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
395291001	B353C8
1203530678	Method Blank (MB)
1203530679	395291001(B353C8) Sample Duplicate (DUP)
1203530680	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: UIISO_IE_PRECIP_AEA:COMMON

Analytical Method: UIISO_IE_PRECIP_AEA

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

Analytical Batch: 1560653

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1559883

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
395291001	B353C8
1203530681	Method Blank (MB)
1203530682	395291001(B353C8) Sample Duplicate (DUP)
1203530683	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: 1559883

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
395291001	B353C8
1203528436	395291001(B353C8) 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: 1560108

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
395291001	B353C8
1203529075	Method Blank (MB)
1203529076	395291001(B353C8) Sample Duplicate (DUP)
1203529077	395291001(B353C8) Matrix Spike (MS)
1203529078	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: 1560258

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1559883

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
395291001	B353C8
1203529502	Method Blank (MB)
1203529503	395291001(B353C8) Sample Duplicate (DUP)
1203529504	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.

Quality Control (QC) Information

QC Information

All of the QC samples meet the required acceptance limits with the following exceptions: The sample and the duplicate 1203529503 (B353C8DUP) and 395291001 (B353C8) did not meet the relative percent difference requirement for Ra-226; however, they do meet the relative error ratio requirement with a value of 0.1213.

Technical Information

Recounts

Sample 1203529503 (B353C8DUP) was recounted due to high relative percent difference/relative error ratio. The recount is reported.

Qualifier Information

Qualifier	Reason	Analyte	Sample	Client Sample
X	Data rejected due to low abundance.	Radium-226	1203529503	B353C8(395291001DUP)

Product: SRTOT_SEP_PRECIP_GPC: COMMON

Analytical Method: SRTOT_SEP_PRECIP_GPC

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

Analytical Batch: 1562349

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1559883

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
395291001	B353C8

1203535192	Method Blank (MB)
1203535193	395291001(B353C8) Sample Duplicate (DUP)
1203535194	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.

Quality Control (QC) Information

QC Information

All of the QC samples meet the required acceptance limits with the following exceptions: The sample and the duplicate, 1203535193 (B353C8DUP) and 395291001 (B353C8) , did not meet the relative percent difference requirement; however, both results are less than the MDA.

Product: NI63_LSC

Analytical Method: NI63_LSC

Analytical Procedure: GL-RAD-A-022 REV# 17

Analytical Batch: 1560778

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1559883

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
395291001	B353C8
1203530962	Method Blank (MB)
1203530963	395487007(NonSDG) Sample Duplicate (DUP)
1203530964	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: TRITIUM_DIST_LSC: COMMON

Analytical Method: TRITIUM_DIST_LSC

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

Analytical Batch: 1560784

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
395291001	B353C8
1203530984	Method Blank (MB)
1203530985	395487001(NonSDG) Sample Duplicate (DUP)
1203530986	395487001(NonSDG) Matrix Spike (MS)
1203530987	Laboratory Control Sample (LCS)

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

Data Summary:

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

Technical Information

Recounts

Samples 1203530984 (MB), 1203530985 (Non SDG 395487001DUP) and 1203530986 (Non SDG 395487001MS) were recounted due to high MDCs. The recounts are reported. Sample 395291001 (B353C8) was recounted due to high MDC and then recounted to verify sample result. The third count is reported. Sample 1203530987 (LCS) was recounted due to high MDC and then recounted due to high recovery. The third count is reported.

Product: C14_LSC: COMMON

Analytical Method: C14_LSC

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

Analytical Batch: 1560785

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
395291001	B353C8
1203530988	Method Blank (MB)
1203530989	395487001(NonSDG) Sample Duplicate (DUP)
1203530990	395487001(NonSDG) Matrix Spike (MS)
1203530991	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: TC99_SEP_GPC

Analytical Method: TC99_EIE_LSC

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

Analytical Batch: 1561852

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
395291001	B353C8
1203533802	Method Blank (MB)
1203533803	395291001(B353C8) Sample Duplicate (DUP)
1203533804	Laboratory Control Sample (LCS)

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

Data Summary:

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

Technical Information

Sample Re-prep/Re-analysis

Samples were re-prepped due to the quench number being outside the calibration range. The re-analysis is being reported.

Recounts

Sample 1203533804 (LCS) was recounted due to low recovery. The recount is reported.

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

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL395291 GEL Work Order: 395291

The Qualifiers in this report are defined as follows:

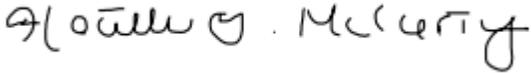
U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

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: Heather McCarty

Date: 11 MAY 2016

Title: Analyst II

Sample Data Summary

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL395291	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 395291001	Date Collected: 04/13/2016 07:25	Matrix: SOIL
	Date Received: 04/14/2016 09:00	%Moisture: 4.4
Client ID: B353C8		Prep Basis: "Dry Weight Corrected"
Batch ID: 1560649	Method: AMCMISO_EIE_PREC_AEA	SOP Ref: GL-RAD-A-011
Run Date: 04/20/2016 09:19	Analyst: MXS2	Instrument: 1103
Data File: S0395291001_AM.1A.gcnf	Aliquot: 0.116 g	Count Time: 240 min
Prep Batch: 1560649	Prep Method: DOE EML HASL-300, Am-05	Prep SOP Ref: GL-RAD-A-021
Prep Date: 04/18/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	-0.0402	pCi/g	+/-0.122	0.122	0.341	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	15.6	17.9	pCi/g	86.9	(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: GEL395291
Lab Sample ID: 395291001

Client: CPRC001
Date Collected: 04/13/2016 07:25
Date Received: 04/14/2016 09:00

Project: CPRC0F16028
Matrix: SOIL
%Moisture: 4.4

Client ID: B353C8
Batch ID: 1560650
Run Date: 04/20/2016 08:56
Data File: S0395291001_NP.1A.gcnf
Prep Batch: 1560650
Prep Date: 04/18/2016 00:00

Method: NP237_IE_PRECIP_AEA
Analyst: MXS2
Aliquot: 0.114 g
Prep Method: ASTM C 1476-00 Modified

Prep Basis: "Dry Weight Corrected"
SOP Ref: GL-RAD-A-032
Instrument: 1032
Count Time: 120 min
Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
13994-20-2	Neptunium-237	U	0.0773	pCi/g	+/-0.340	0.340	0.615	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	1730	1760	pCi/g	98.1	(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: GEL395291	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 395291001	Date Collected: 04/13/2016 07:25	Matrix: SOIL
	Date Received: 04/14/2016 09:00	%Moisture: 4.4
Client ID: B353C8		Prep Basis: "Dry Weight Corrected"
Batch ID: 1560651	Method: PUIISO_PLATE_AEA	SOP Ref: GL-RAD-A-011
Run Date: 04/20/2016 09:19	Analyst: MXS2	Instrument: 1080
Data File: S0395291001_PU.1A.gcnf	Aliquot: 0.116 g	Count Time: 239.9998 min
Prep Batch: 1560651	Prep Method: DOE EML HASL-300, Pu-11-	Prep SOP Ref: GL-RAD-A-021
Prep Date: 04/18/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	0.416	pCi/g	+/-0.369	0.374	0.429	1.00
OER-100-70	Plutonium-239/240	U	0.0474	pCi/g	+/-0.178	0.178	0.299	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-236 Tracer	15.5	20.5	pCi/g	76	(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: GEL395291
Lab Sample ID: 395291001

Client: CPRC001
Date Collected: 04/13/2016 07:25
Date Received: 04/14/2016 09:00

Project: CPRC0F16028
Matrix: SOIL
%Moisture: 4.4

Client ID: B353C8
Batch ID: 1560652
Run Date: 04/20/2016 08:56
Data File: S0395291001_TH.1A.gcnf
Prep Batch: 1560652
Prep Date: 04/18/2016 00:00

Method: THISO_IE_PLATE_AEA
Analyst: MXS2
Aliquot: 0.123 g
Prep Method: DOE EML HASL-300, Th-01-

Prep Basis: "Dry Weight Corrected"
SOP Ref: GL-RAD-A-038
Instrument: 1027
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		0.508	pCi/g	+/-0.335	0.343	0.214	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Thorium-229 Tracer	14.1	16.5	pCi/g	85.7	(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: GEL395291	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 395291001	Date Collected: 04/13/2016 07:25	Matrix: SOIL
	Date Received: 04/14/2016 09:00	%Moisture: 4.4
Client ID: B353C8		Prep Basis: "Dry Weight Corrected"
Batch ID: 1560653	Method: UIISO_IE_PRECIP_AEA	SOP Ref: GL-RAD-A-011
Run Date: 04/20/2016 08:43	Analyst: MXS2	Instrument: 1022
Data File: S0395291001_UU.1A.gcnf	Aliquot: 0.116 g	Count Time: 239.9998 min
Prep Batch: 1560653	Prep Method: DOE EML HASL-300, U-02-R	Prep SOP Ref: GL-RAD-A-021
Prep Date: 04/18/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
U-233/234 <small>13968-55-3/13966-29-5</small>	Uranium-233/234		0.690	pCi/g	+/-0.426	0.436	0.332	1.00
15117-96-1/13982-7	Uranium-235/236	U	-0.0355	pCi/g	+/-0.157	0.157	0.410	1.00
7440-61-1	Uranium-238		0.990	pCi/g	+/-0.501	0.517	0.332	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	14.8	18.0	pCi/g	82	(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: GEL395291
Lab Sample ID: 395291001

Client: CPRC001
Date Collected: 04/13/2016 07:25
Date Received: 04/14/2016 09:00

Project: CPRC0F16028
Matrix: SOIL
%Moisture: 4.4

Client ID: B353C8
Batch ID: 1562349
Run Date: 05/06/2016 12:30
Data File: S1562349.xls
Prep Batch: 1562349
Prep Date: 05/05/2016 00:00

Method: SRTOT_SEP_PRECIP_GPC
Analyst: KSD1
Aliquot: 0.487 g
Prep Method: EPA 905.0 Modified/DOE RP5

Prep Basis: "Dry Weight Corrected"
SOP Ref: GL-RAD-A-004
Instrument: PIC3B
Count Time: 60 min
Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	0.688	pCi/g	+/-0.939	0.955	1.60	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	6.40	7.77	mg	82.4	(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: GEL395291	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 395291001	Date Collected: 04/13/2016 07:25	Matrix: SOIL
	Date Received: 04/14/2016 09:00	%Moisture: 4.4
Client ID: B353C8		Prep Basis: "As Received"
Batch ID: 1560108	Method: I129_SEP_LEPS_GS	SOP Ref: GL-RAD-A-006
Run Date: 04/27/2016 07:56	Analyst: MJH1	Instrument: XRAY2
Data File: I395291001.CNF;1	Aliquot: 1.03 g	Count Time: 60 min
Prep Batch: 1560108	Prep Method: DOE EML HASL-300,I-01 M	
Prep Date: 04/20/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129	U	1.17	pCi/g	+/-0.889	1.04	1.99	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: GEL395291
 Lab Sample ID: 395291001
 Client ID: B353C8
 Batch ID: 1560258
 Run Date: 05/09/2016 06:27
 Data File: G395291001.CNF;1
 Prep Batch: 1560258
 Prep Date: 04/18/2016 00:00

Client: CPRC001
 Date Collected: 04/13/2016 07:25
 Date Received: 04/14/2016 09:00
 Method: GAMMA_GS
 Analyst: MXR1
 Aliquot: 174.68 g
 Prep Method: DOE HASL 300, 4.5.2.3/Ga-01

Project: CPRC0F16028
 Matrix: SOIL
 %Moisture: 4.4
 Prep Basis: "Dry Weight Corrected"
 SOP Ref: GL-RAD-A-013
 Instrument: GAM05
 Count Time: 120 min
 Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137	U	-0.00509	pCi/g	+/-0.0198	0.0199	0.0371	0.100
10198-40-0	Cobalt-60	U	-0.00369	pCi/g	+/-0.0209	0.021	0.0391	0.100
14683-23-9	Europium-152	U	0.038	pCi/g	+/-0.0535	0.0563	0.104	0.100
15585-10-1	Europium-154	U	0.041	pCi/g	+/-0.0624	0.0652	0.128	0.100
14391-16-3	Europium-155	U	0.0506	pCi/g	+/-0.0432	0.0492	0.0891	0.100
13982-63-3	Radium-226		0.436	pCi/g	+/-0.0962	0.103	0.0737	1.00
15262-20-1	Radium-228		0.666	pCi/g	+/-0.152	0.184	0.147	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: GEL395291
 Lab Sample ID: 395291001

 Client ID: B353C8
 Batch ID: 1560778
 Run Date: 04/21/2016 17:45
 Data File: N1560778.xls
 Prep Batch: 1560778
 Prep Date: 04/19/2016 12:11

Client: CPRC001
 Date Collected: 04/13/2016 07:25
 Date Received: 04/14/2016 09:00

 Method: NI63_LSC
 Analyst: CXS7
 Aliquot: 0.622 g
 Prep Method: DOE RESL Ni-1, Modified

Project: CPRC0F16028
 Matrix: SOIL
 %Moisture: 4.4

 Prep Basis: "Dry Weight Corrected"
 SOP Ref: GL-RAD-A-022
 Instrument: LSCBLUE
 Count Time: 30 min
 Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
NI-63	Nickel-63	U	1.72	pCi/g	+/-4.01	4.02	6.84	10.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Nickel Carrier	15.3	24.4	mg	62.7	(40%-110%)

Comments:

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL395291	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 395291001	Date Collected: 04/13/2016 07:25	Matrix: SOIL
	Date Received: 04/14/2016 09:00	%Moisture: 4.4
Client ID: B353C8		Prep Basis: "As Received"
Batch ID: 1560784	Method: TRITIUM_DIST_LSC	SOP Ref: GL-RAD-A-002
Run Date: 04/22/2016 14:54	Analyst: TXJ1	Instrument: LSCBLUE
Data File: T1560784R2.xls	Aliquot: 2.57 g	Count Time: 15 min
Prep Batch: 1560784	Prep Method: EPA 906.0 Modified	
Prep Date: 04/20/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium	U	-0.309	pCi/g	+/-12.2	12.2	22.1	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: GEL395291	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 395291001	Date Collected: 04/13/2016 07:25	Matrix: SOIL
	Date Received: 04/14/2016 09:00	%Moisture: 4.4
Client ID: B353C8		Prep Basis: "As Received"
Batch ID: 1560785	Method: C14_LSC	SOP Ref: GL-RAD-A-003
Run Date: 04/20/2016 18:37	Analyst: TXJ1	Instrument: LSCYELLOW
Data File: C1560785.xls	Aliquot: 0.51 g	Count Time: 45 min
Prep Batch: 1560785	Prep Method: EPA EERF C-01 Modified	
Prep Date: 04/20/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	0.597	pCi/g	+/-1.74	1.74	2.98	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.

Rad
Certificate of Analysis
Sample Summary

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SDG Number: GEL395291
 Lab Sample ID: 395291001

Client: CPRC001
 Date Collected: 04/13/2016 07:25
 Date Received: 04/14/2016 09:00

Project: CPRC0F16028
 Matrix: SOIL
 %Moisture: 4.4

Client ID: B353C8
 Batch ID: 1561852
 Run Date: 04/22/2016 22:56
 Data File: E1561852R.xls
 Prep Batch: 1561852
 Prep Date: 04/22/2016 00:00

Method: TC99_EIE_LSC
 Analyst: MYM1
 Aliquot: 1.081 g
 Prep Method: DOE EML HASL-300, Tc-02-

Prep Basis: "As Received"
 SOP Ref: GL-RAD-A-059
 Instrument: LSCRED
 Count Time: 120 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	0.213	pCi/g	+/-0.999	1.00	1.70	5.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	36000	43600	CPM	82.7	(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: GEL395291
Lab Sample ID: 395291001

Client: CPRC001
Date Collected: 04/13/2016 07:25
Date Received: 04/14/2016 09:00

Project: CPRC0F16028
Matrix: SOIL
%Moisture: 4.4

Quality Control Summary

5/11/2016

GEL LABORATORIES LLC

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

QC Summary

Report Date: May 11, 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: 395291

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1560649								
QC1203530668	MB								
Americium-241			U	-0.0497	pCi/g			MXS2	04/20/1609:19
				Uncert: +/-0.150					
				TPU: +/-0.151					
**Americium-243 Tracer	17.9			13.2	pCi/g	REC: 73	(30%-105%)		
				Uncert: +/-2.18					
				TPU: +/-3.31					
QC1203530669	395291001	DUP							
Americium-241		U	-0.0402	U	0.0532	pCi/g			
			Uncert: +/-0.122		+/-0.199		RPD: 0	N/A	
			TPU: +/-0.122		+/-0.200		RER: 0.783	(0-2)	
**Americium-243 Tracer	20.0	15.6		15.5	pCi/g	REC: 77	(30%-105%)		
				Uncert: +/-1.95					
				TPU: +/-3.01					
QC1203530670	LCS								
Americium-241				17.0	pCi/g	REC: 98	(80%-120%)		
				Uncert: +/-1.79					
				TPU: +/-2.72					
**Americium-243 Tracer	17.9			18.3	pCi/g	REC: 102	(30%-105%)		
				Uncert: +/-1.84					
				TPU: +/-2.86					
Batch	1560650								
QC1203530671	MB								
Neptunium-237			U	0.0671	pCi/g			MXS2	04/20/1608:56
				Uncert: +/-0.295					
				TPU: +/-0.295					
**Americium-243 Tracer	1760			1690	pCi/g	REC: 96	(30%-105%)		
QC1203530672	395291001	DUP							
Neptunium-237		U	0.0773	U	-0.16	pCi/g			
			Uncert: +/-0.340		+/-0.465		RPD: 0	N/A	
			TPU: +/-0.340		+/-0.465		RER: 0.806	(0-2)	
**Americium-243 Tracer	1910	1730		1700	pCi/g	REC: 89	(30%-105%)		
QC1203530673	LCS								
Neptunium-237				39.2	pCi/g	REC: 107	(80%-120%)		04/20/1608:56
				Uncert: +/-3.97					
				TPU: +/-6.03					
**Americium-243 Tracer	1760			1620	pCi/g	REC: 92	(30%-105%)		
Batch	1560651								
QC1203530675	MB								
Plutonium-238			U	0.401	pCi/g			MXS2	04/20/1609:19
				Uncert: +/-0.383					
				TPU: +/-0.388					
Plutonium-239/240			U	-0.0309	pCi/g				
				Uncert: +/-0.137					

5/11/2016

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QC Summary

Workorder: 395291

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1560651								
**Plutonium-236 Tracer	20.4	TPU:		+/-0.137					
		Uncert:		15.7	pCi/g	REC: 77	(30%-105%)		
		TPU:		+/-2.25					
				+/-3.41					
QC1203530676 395291001 DUP									
Plutonium-238		U	0.416	U	0.363				
		Uncert:	+/-0.369		+/-0.399	RPD: 0	N/A		
		TPU:	+/-0.374		+/-0.403	RER: 0.186	(0-2)		
Plutonium-239/240		U	0.0474	U	0.0214				
		Uncert:	+/-0.178		+/-0.223	RPD: 0	N/A		
		TPU:	+/-0.178		+/-0.224	RER: 0.178	(0-2)		
**Plutonium-236 Tracer	22.8		15.5		17.0	pCi/g	REC: 74	(30%-105%)	
		Uncert:	+/-2.22		+/-2.60				
		TPU:	+/-3.37		+/-3.92				
QC1203530677 LCS									
Plutonium-238					0.607	pCi/g			04/20/1609:19
		Uncert:			+/-0.408				
		TPU:			+/-0.416				
Plutonium-239/240	17.0				17.4	pCi/g	REC: 102	(80%-120%)	
		Uncert:			+/-1.97				
		TPU:			+/-2.87				
**Plutonium-236 Tracer	20.4				16.1	pCi/g	REC: 79	(30%-105%)	
		Uncert:			+/-2.13				
		TPU:			+/-3.25				
Batch	1560652								
QC1203530678 MB									
Thorium-232				U	0.0355	pCi/g		MXS2	04/20/1608:56
		Uncert:			+/-0.157				
		TPU:			+/-0.157				
**Thorium-229 Tracer	16.5				14.1	pCi/g	REC: 85	(30%-105%)	
		Uncert:			+/-1.88				
		TPU:			+/-3.04				
QC1203530679 395291001 DUP									
Thorium-232			0.508		0.834	pCi/g			
		Uncert:	+/-0.335		+/-0.533	RPD: 49	(0% - 100%)		
		TPU:	+/-0.343		+/-0.549	RER: 0.986	(0-2)		
**Thorium-229 Tracer	18.3		14.1		13.9	pCi/g	REC: 76	(30%-105%)	
		Uncert:	+/-1.82		+/-2.37				
		TPU:	+/-2.96		+/-3.72				
QC1203530680 LCS									
Thorium-232	16.1				18.1	pCi/g	REC: 112	(80%-120%)	
		Uncert:			+/-1.93				
		TPU:			+/-3.23				
**Thorium-229 Tracer	16.5				13.6	pCi/g	REC: 82	(30%-105%)	
		Uncert:			+/-1.86				
		TPU:			+/-3.00				
Batch	1560653								
QC1203530681 MB									
Uranium-233/234				U	0.0297	pCi/g		MXS2	04/20/1608:43
		Uncert:			+/-0.192				

5/11/2016

GEL LABORATORIES LLC

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

QC Summary

Workorder: 395291

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1560653								
Uranium-235/236		TPU:		+/-0.192					
			U	-0.0157	pCi/g				
		Uncert:		+/-0.136					
Uranium-238		TPU:		+/-0.136					
			U	-0.0763	pCi/g				
		Uncert:		+/-0.123					
**Uranium-232 Tracer	18.0	TPU:		+/-0.123					
				16.8	pCi/g	REC:	93 (30%-105%)		
		Uncert:		+/-2.04					
		TPU:		+/-3.25					
QC1203530682 395291001 DUP									
Uranium-233/234		0.690		0.642	pCi/g				04/20/1610:53
		Uncert:	+/-0.426	+/-0.545		RPD:	7 (0% - 100%)		
		TPU:	+/-0.436	+/-0.553		RER:	0.135 (0-2)		
Uranium-235/236	U	-0.0355	U	-0.027	pCi/g				
		Uncert:	+/-0.157	+/-0.233		RPD:	0 N/A		
		TPU:	+/-0.157	+/-0.234		RER:	0.0591 (0-2)		
Uranium-238		0.990		0.547	pCi/g				
		Uncert:	+/-0.501	+/-0.475		RPD:	58 (0% - 100%)		
		TPU:	+/-0.517	+/-0.481		RER:	1.23 (0-2)		
**Uranium-232 Tracer	20.1	14.8		16.1	pCi/g	REC:	80 (30%-105%)		
		Uncert:	+/-2.17	+/-2.82					
		TPU:	+/-3.41	+/-4.33					
QC1203530683 LCS									
Uranium-233/234				22.7	pCi/g				04/20/1610:53
		Uncert:		+/-2.67					
		TPU:		+/-4.24					
Uranium-235/236				1.57	pCi/g				
		Uncert:		+/-0.810					
		TPU:		+/-0.842					
Uranium-238	23.2			24.2	pCi/g	REC:	104 (80%-120%)		
		Uncert:		+/-2.75					
		TPU:		+/-4.46					
**Uranium-232 Tracer	18.0			14.2	pCi/g	REC:	79 (30%-105%)		
		Uncert:		+/-2.51					
		TPU:		+/-3.86					
Rad Gamma Spec									
Batch	1560108								
QC1203529075 MB									
Iodine-129			U	-0.446	pCi/g			MJH1	04/27/1611:32
		Uncert:		+/-0.628					
		TPU:		+/-0.661					
QC1203529076 395291001 DUP									
Iodine-129	U	1.17	U	0.251	pCi/g				04/27/1611:33
		Uncert:	+/-0.889	+/-0.564		RPD:	0 N/A		
		TPU:	+/-1.04	+/-0.576		RER:	1.51 (0-2)		
QC1203529077 395291001 MS									
Iodine-129	40.4	U	1.17	30.3	pCi/g	REC:	75 (75%-125%)		04/27/1611:33
		Uncert:	+/-0.889	+/-4.02					
		TPU:	+/-1.04	+/-5.03					

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1560108								
QC1203529078	LCS								
Iodine-129	40.4			38.9	pCi/g	REC: 96 (80%-120%)			04/27/1611:34
	Uncert:			+/-6.02					
	TPU:			+/-7.17					
Batch	1560258								
QC1203529502	MB								
Cesium-137			U	0.00257	pCi/g			MXR1	05/09/1606:28
	Uncert:			+/-0.0155					
	TPU:			+/-0.0156					
Cobalt-60			U	-0.0049	pCi/g				
	Uncert:			+/-0.0178					
	TPU:			+/-0.018					
Europium-152			U	0.0115	pCi/g				
	Uncert:			+/-0.0427					
	TPU:			+/-0.043					
Europium-154			U	0.00899	pCi/g				
	Uncert:			+/-0.0356					
	TPU:			+/-0.0359					
Europium-155			U	0.0118	pCi/g				
	Uncert:			+/-0.0343					
	TPU:			+/-0.0348					
Radium-226			U	0.00424	pCi/g				
	Uncert:			+/-0.0366					
	TPU:			+/-0.0367					
Radium-228			U	-0.0569	pCi/g				
	Uncert:			+/-0.0649					
	TPU:			+/-0.0702					
QC1203529503	395291001	DUP							
Cesium-137		U -0.00509	U	-0.00479	pCi/g				05/10/1608:54
	Uncert:	+/-0.0198		+/-0.022		RPD: 0	N/A		
	TPU:	+/-0.0199		+/-0.0221		RER: 0.0197	(0-2)		
Cobalt-60		U -0.00369	U	-0.0111	pCi/g				
	Uncert:	+/-0.0209		+/-0.025		RPD: 0	N/A		
	TPU:	+/-0.021		+/-0.0256		RER: 0.439	(0-2)		
Europium-152		U 0.038	U	0.00387	pCi/g				
	Uncert:	+/-0.0535		+/-0.0628		RPD: 0	N/A		
	TPU:	+/-0.0563		+/-0.0628		RER: 0.794	(0-2)		
Europium-154		U 0.041	U	-0.0193	pCi/g				
	Uncert:	+/-0.0624		+/-0.064		RPD: 0	N/A		
	TPU:	+/-0.0652		+/-0.0646		RER: 1.29	(0-2)		
Europium-155		U 0.0506	U	0.0963	pCi/g				
	Uncert:	+/-0.0432		+/-0.0915		RPD: 0	N/A		
	TPU:	+/-0.0492		+/-0.0919		RER: 0.861	(0-2)		
Radium-226		0.436 UX		0.00	pCi/g				
	Uncert:	+/-0.0962		+/-0.0883		RPD: 110*	(0% - 20%)		
	TPU:	+/-0.103		+/-0.212		RER: 0.121	(0-2)		
Radium-228		0.666		0.705	pCi/g				
	Uncert:	+/-0.152		+/-0.153		RPD: 6	(0% - 20%)		
	TPU:	+/-0.184		+/-0.170		RER: 0.304	(0-2)		
QC1203529504	LCS								

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1560258								
Americium-241	489			552	pCi/g	REC: 113 (80%-120%)			
	Uncert:			+/-9.46					
	TPU:			+/-44.7					
Cesium-137	181			179	pCi/g	REC: 99 (80%-120%)			
	Uncert:			+/-3.06					
	TPU:			+/-14.4					
Cobalt-60	170			161	pCi/g	REC: 94 (80%-120%)			
	Uncert:			+/-3.38					
	TPU:			+/-13.8					
Europium-152			U	-0.162	pCi/g				
	Uncert:			+/-1.61					
	TPU:			+/-1.61					
Europium-154			U	0.278	pCi/g				
	Uncert:			+/-1.10					
	TPU:			+/-1.10					
Europium-155			U	-0.394	pCi/g				
	Uncert:			+/-1.34					
	TPU:			+/-1.35					
Radium-226			U	0.406	pCi/g				
	Uncert:			+/-1.10					
	TPU:			+/-1.12					
Radium-228			U	1.12	pCi/g				
	Uncert:			+/-3.09					
	TPU:			+/-3.13					
Rad Gas Flow									
Batch	1562349								
QC1203535192	MB								
Total Strontium			U	-0.0598	pCi/g			KSD1	05/06/1612:30
	Uncert:			+/-0.493					
	TPU:			+/-0.494					
**Strontium Carrier	7.77			6.60	mg	REC: 85 (40%-110%)			
QC1203535193	395291001	DUP							
Total Strontium	U	0.688	U	-0.418	pCi/g				05/06/1612:30
	Uncert:	+/-0.939		+/-0.403		RPD: 0 N/A			
	TPU:	+/-0.955		+/-0.403		RER: 2.09 (0-2)			
**Strontium Carrier	7.77	6.40		6.00	mg	REC: 77 (40%-110%)			
QC1203535194	LCS								
Total Strontium	43.1			46.5	pCi/g	REC: 108 (80%-120%)			05/06/1612:30
	Uncert:			+/-2.78					
	TPU:			+/-12.2					
**Strontium Carrier	7.77			6.60	mg	REC: 85 (40%-110%)			
Rad Liquid Scintillation									
Batch	1560778								
QC1203530962	MB								
Nickel-63			U	1.78	pCi/g			CXS7	04/21/1622:32
	Uncert:			+/-4.46					
	TPU:			+/-4.47					
**Nickel Carrier	24.4			12.7	mg	REC: 52 (40%-110%)			
QC1203530963	395487007	DUP							

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Liquid Scintillation									
Batch	1560778								
Nickel-63		U	4.85	U	6.03	pCi/g			
		Uncert:	+/-4.29		+/-4.91		RPD: 0	N/A	
		TPU:	+/-4.38		+/-5.03		RER: 0.347	(0-2)	
**Nickel Carrier	24.4		13.9		12.2	mg	REC: 50	(40%-110%)	
QC1203530964	LCS								
Nickel-63		202			219	pCi/g	REC: 108	(80%-120%)	04/21/1623:36
		Uncert:			+/-7.76				
		TPU:			+/-41.0				
**Nickel Carrier	24.4				16.2	mg	REC: 66	(40%-110%)	
Batch	1560784								
QC1203530984	MB								
Tritium				U	4.91	pCi/g		TXJ1	04/21/1611:42
		Uncert:			+/-6.93				
		TPU:			+/-7.02				
QC1203530985	395487001	DUP							
Tritium		U	3.62	U	4.11	pCi/g			04/21/1612:00
		Uncert:	+/-6.91		+/-6.80		RPD: 0	N/A	
		TPU:	+/-6.96		+/-6.86		RER: 0.0972	(0-2)	
QC1203530986	395487001	MS							
Tritium		91.2	U	3.62	84.0	pCi/g	REC: 92	(75%-125%)	04/21/1612:17
		Uncert:	+/-6.91		+/-17.0				
		TPU:	+/-6.96		+/-25.6				
QC1203530987	LCS								
Tritium		90.8			79.9	pCi/g	REC: 88	(80%-120%)	04/22/1608:44
		Uncert:			+/-18.9				
		TPU:			+/-26.2				
Batch	1560785								
QC1203530988	MB								
Carbon-14				U	0.245	pCi/g		TXJ1	04/21/1601:34
		Uncert:			+/-1.48				
		TPU:			+/-1.48				
QC1203530989	395487001	DUP							
Carbon-14		U	1.33	U	1.54	pCi/g			04/21/1602:20
		Uncert:	+/-1.79		+/-1.73		RPD: 0	N/A	
		TPU:	+/-1.80		+/-1.73		RER: 0.165	(0-2)	
QC1203530990	395487001	MS							
Carbon-14		149	U	1.33	146	pCi/g	REC: 99	(75%-125%)	04/21/1603:07
		Uncert:	+/-1.79		+/-7.23				
		TPU:	+/-1.80		+/-13.0				
QC1203530991	LCS								
Carbon-14		128			117	pCi/g	REC: 91	(80%-120%)	04/21/1603:23
		Uncert:			+/-6.02				
		TPU:			+/-10.5				
Batch	1561852								
QC1203533802	MB								
Technetium-99				U	0.511	pCi/g		MYM1	04/23/1604:58
		Uncert:			+/-0.862				
		TPU:			+/-0.864				
**Technetium-99m Tracer	43600				38800	CPM	REC: 89	(30%-105%)	
QC1203533803	395291001	DUP							

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Liquid Scintillation										
Batch	1561852									
Technetium-99		U	0.213	U	0.585	pCi/g				
		Uncert:	+/-0.999		+/-0.884		RPD:	0	N/A	
		TPU:	+/-1.00		+/-0.886		RER:	0.546	(0-2)	
**Technetium-99m Tracer	43600		36000		40200	CPM	REC:	92	(30%-105%)	
QC1203533804	LCS									
Technetium-99	73.0				63.4	pCi/g	REC:	87	(80%-120%)	
		Uncert:			+/-4.26					04/24/1609:12
		TPU:			+/-8.45					
**Technetium-99m Tracer	43600				40700	CPM	REC:	93	(30%-105%)	

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 $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is \geq EQL or is $> 5\%$ of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.
- 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.