



January 09, 2017

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

Re: CHPRC SAF F16-028
Work Order: 412594
SDG: GEL412594

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on December 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: 300192 - 8H
Chain of Custody: F16-028-052 and F16-028-054
Enclosures



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Case Narrative

**General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF F16-028
SDG: GEL412594**

January 09, 2017

Laboratory Identification:

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

Summary

Sample receipt

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on December 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.

Sample Identification

The laboratory received the following samples:

Laboratory Identification	Sample Description
412594001	B35XX0
412594002	B35XX2

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.

01/10/2017

REV.0

B. Luthman
Brielle Luthman for
Heather Shaffer
Project Manager

Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL412594
Work Order #: 412594

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.

Technical Information

Sample Dilutions

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

Analyte	412594	
	001	002
Uranium	2X	2X

General Chemistry

Ion Chromatography

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

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

The matrix spike recovered outside of the established acceptance limits due to matrix interference and/or non-homogeneity.

Analyte	Sample	Value
Chloride	1203691514 (Non SDG 412139002MS)	147* (48%-145%)
Nitrate	1203691514 (Non SDG 412139002MS)	244* (70%-125%)
Nitrite	1203691514 (Non SDG 412139002MS)	10.3* (70%-120%)
Ortho-phosphate	1203691514 (Non SDG 412139002MS)	19.5* (35%-134%)
Sulfate	1203691514 (Non SDG 412139002MS)	41.3* (45%-162%)

Miscellaneous Information**Manual Integrations**

Samples 1203691514 (Non SDG 412139002MS) and 412594001 (B35XX0) were manually integrated to correctly position the baseline as set in the calibration standards.

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
1203702219 (B35XX0DUP)	pH	Received 14-DEC-16, out of holding 12-DEC-16
412594001 (B35XX0)	pH	Received 14-DEC-16, out of holding 12-DEC-16
412594002 (B35XX2)	pH	Received 14-DEC-16, out of holding 12-DEC-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.

Technical Information**Recounts**

Sample 1203691139 (LCS) was recounted due to a peak shift. The recount is reported.

NP237_IE_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 1203691147 (LCS) was recounted due to a peak shift. The recount is reported.

Miscellaneous Information**Manual Integration**

Manual integration of alpha spectroscopy spectra 1203691147 (LCS) was performed to fully separate counts in Regions of Interest which would have been biased.

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.

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

Refer to Miscellaneous Information section.

Miscellaneous Information**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)

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.

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 1203696349 (LCS) was recounted due to high recovery. The recount is reported. Sample 412594001 (B35XX0) was recounted due to a suspected false positive. 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.

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.

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

Sample 412594001 (B35XX0) was recounted to verify sample result and then recounted due to high MDC. The third 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

Sample Re-prep/Re-analysis

Samples were reprepared due to low recovery. The re-analysis is being 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

CHAIN OF CUSTODY / SAMPLE ANALYSIS REQUEST

CH2MHill Plateau Remediation Company

COLLECTOR: Ed Kauer, CHPRC

SAMPLING LOCATION: C9594, I-005

ICE CHEST NO.: GWS-512

GEL Laboratories, LLC

COMPANY CONTACT: TODAY, D (376-6427)

PROJECT DESIGNATION: 200-WA-1 Opportunistic sampling - soil

FIELD LOGBOOK NO.: HNF-N-645 4-58

ACTUAL SAMPLE DEPTH: 244.3

OFFSITE PROPERTY NO.: 7375

TELEPHONE NO.: 376-6427

PROJECT COORDINATOR: TODAY, D

SAF NO.: F16-028

COA: 300192

PRICE CODE: 8H

AIR QUALITY:

METHOD OF SHIPMENT: FEDERAL EXPRESS

F16-028-052

PAGE 1 OF 2

DATA TURNAROUND: 30 Days / 30 Days

ORIGINAL

7779 3853 5680

412594

MATRIX*	PRESERVATION	None	None	None	None
A=Air	None	None	None	None	None
DL=Drum	6 Months	6 Months	6 Months	6 Months	ASAP
Liquids	G/P	G/P	G/P	G/P	G/P
DS=Drum	1	1	1	1	1
Solids	250mL	250mL	500mL	60mL	
L=Liquid					
O=Oil					
S=Soil					
SE=Sediment					
T=Tissue					
V=Vegetation					
W=Water					
WI=Wipe					
X=Other					

COOL <=6C

MOISTURE RESISTANT CONTAINER

SPECIAL HANDLING AND/OR STORAGE: NA

SAMPLE NO.: B35XX0

MATRIX*: SOIL

SAMPLE DATE: DEC 17 2016

SAMPLE TIME: 0831

CHAIN OF POSSESSION

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS
SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Ed Kauer, CHPRC	DEC 12 2016	SSU-1	DEC 12 2016
Troy Bacon, CHPRC	DEC 13 2016	Troy Bacon, CHPRC	DEC 13 2016
Troy Bacon, CHPRC	DEC 13 2016	FEDEX	DEC 13 2016
Troy Bacon, CHPRC	DEC 13 2016	Patricia Poteris, Dent 1ak/116 0910	DEC 13 2016
FED EX			

LABORATORY SECTION: RECEIVED BY

FINAL SAMPLE DISPOSITION: DISPOSAL METHOD

PRINTED ON 8/11/2016

FSR ID = FSR33073

TRVL NUM = TRVL-16-167

A-6003-618 (REV 2)

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F16-028-052	PAGE 2 OF 2
COLLECTOR Ed Kauer CHPRC	COMPANY CONTACT TODAK, D	TELEPHONE NO. 376-6427	PROJECT COORDINATOR TODAK, D	PRICE CODE 8H	DATA TURNAROUND 30 Days / 30 Days
SAMPLING LOCATION C9594, I-005	PROJECT DESIGNATION 200-WA-1 Opportunistic sampling - soil		SAF NO. F16-028	AIR QUALITY <input type="checkbox"/>	
ICE CHEST NO. GWS-512	FIELD LOGBOOK NO. HNF-N-645 4 - 58	ACTUAL SAMPLE DEPTH 244.3	COA 300192	METHOD OF SHIPMENT FEDERAL EXPRESS	
SHIPPED TO GEL Laboratories, LLC	OFFSITE PROPERTY NO. 937B		BILL OF LADING/AIR BILL NO. 7779 5853 5680		
SPECIAL INSTRUCTIONS					
<p>(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};</p> <p>(2) GAMMA_GS: COMMON; GAMMA_GS: COMMON (Add-on) {Radium-226, Radium-228};</p> <p>(3) AMCMISO_IE_PRECIP_AEA: COMMON {Americium-241}; C14_LSC: COMMON; I129_SEP_LEPS_GS: COMMON; NI63_LSC: COMMON; PUIISO_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;</p> <p>(4) Moisture Content - D2216 {Percent moisture (wet sample)};</p> <p>(5) 9045_pH (Non-Aqueous): COMMON {pH Measurement};</p>					

A-6003-618 (REV 2)

TRVL NUM = TRVL-16-167

FSR ID = FSR33073

PRINTED ON 8/11/2016

CH2M Hill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

COLLECTOR: Ed Kauert
CHPRC

SAMPLING LOCATION: C9594, I-006

ICE CHEST NO.: GWS-512

COMPANY CONTACT: TODAY, D 376-6427

PROJECT DESIGNATION: 200-WA-1 Opportunistic sampling - soil

FIELD LOGBOOK NO.: HNF-N-645 4-58

ACTUAL SAMPLE DEPTH: 254 FT

OFFSITE PROPERTY NO.: 7375

PROJECT COORDINATOR: TODAY, D

SAF NO.: F16-028

COA: 300192

PRICE CODE: 8H

AIR QUALITY:

METHOD OF SHIPMENT: FEDERAL EXPRESS

F16-028-054

PAGE 1 OF 2

DATA TURNAROUND: 30 Days / 30 Days

ORIGINAL

MATRIX*	PRESERVATION	HOLDING TIME	TYPE OF CONTAINER	NO. OF CONTAINER(S)	VOLUME	SAMPLE ANALYSIS	SAMPLE DATE	SAMPLE TIME	BILL OF LADING/AIR BILL NO.		
									None	None	None
A=Air DL=Drum L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	None	6 Months	G/P	1	250mL	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	DEC 17 2016	1259	None	None	None
POSSIBLE SAMPLE HAZARDS/ REMARKS *Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR/JATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.	None	6 Months	G/P	1	250mL	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	DEC 17 2016	1259	None	None	None
SPECIAL HANDLING AND/OR STORAGE NA	None	6 Months	G/P	1	250mL	SEE ITEM (3) IN SPECIAL INSTRUCTIONS	DEC 17 2016	1259	None	None	None
SAMPLE NO. B35XX2	None	6 Months	G/P	1	250mL	SEE ITEM (4) IN SPECIAL INSTRUCTIONS	DEC 17 2016	1259	None	None	None
	None	6 Months	G/P	1	250mL	SEE ITEM (5) IN SPECIAL INSTRUCTIONS	DEC 17 2016	1259	None	None	None

412594

779938535680

CHAIN OF POSSESSION

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS
SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS
40% Recovery NO Moisture
tin taken

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Ed Kauert CHPRC	DEC 12 2016 1343	SSU-1	DEC 17 2016 1343
Troy Bacon CHPRC	DEC 13 2016 0100	Troy Bacon CHPRC	DEC 13 2016 0100
Troy L. Bacon CHPRC	DEC 13 2016 1400	FEDEX	DEC 13 2016 0100
Troy L. Bacon CHPRC	DEC 13 2016 1400	P. Dent Patrice Dent	DEC 13 2016 0100
FEDEX	EX	Patrice Dent	DEC 13 2016 0100

LABORATORY SECTION
RECEIVED BY

FINAL SAMPLE DISPOSITION
DISPOSAL METHOD

TITLE
DISPOSED BY

DATE/TIME
12/14/16 09:10

DATE/TIME

FRS ID = FSR33074

TRVL NUM = TRVL-16-167

PRINTED ON 8/11/2016

A-6003-618 (REV 2)

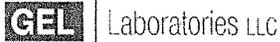
CH2MHill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F16-028-054	PAGE 2 OF 2
COLLECTOR Ed Kauer CHPRC	COMPANY CONTACT TODAK, D	TELEPHONE NO. 376-6427	PROJECT COORDINATOR TODAK, D	PRICE CODE 8H	DATA TURNAROUND 30 Days / 30 Days
SAMPLING LOCATION C9594, I-006	PROJECT DESIGNATION 200-WA-1 Opportunistic sampling - soil		SAF NO. F16-028	AIR QUALITY <input type="checkbox"/>	
ICE CHEST NO. GWS-512	FIELD LOGBOOK NO. HNF-N-645 H-58	ACTUAL SAMPLE DEPTH 254 FT	COA 300192	METHOD OF SHIPMENT FEDERAL EXPRESS ORIGINAL	
SHIPPED TO GEL Laboratories, LLC	OFFSITE PROPERTY NO. 7375	BILL OF LADING/AIR BILL NO. 7779 3883 5680			
SPECIAL INSTRUCTIONS					
<p>(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};</p> <p>(2) GAMMA_GS: COMMON; GAMMA_GS: COMMON (Add-on) {Radium-226, Radium-228};</p> <p>(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;</p> <p>(4) Moisture Content - D2216 {Percent moisture (wet sample)};</p> <p>(5) 9045_pH (Non-Aqueous): COMMON {pH Measurement};</p>					

A-6003-618 (REV 2)

TRVL NUM = TRVL-16-167

FSR ID = FSR33074

PRINTED ON 8/11/2016



SAMPLE RECEIPT & REVIEW FORM

Client: CPBC		SDG/AR/COC/Work Order: 412594	
Received By: <i>[Signature]</i>		Date Received: 12/14/16	
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.	
COC/Samples marked as radioactive?	<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0/cpm	
Classified Radioactive II or III by RSO?	<input checked="" type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?	
COC/Samples marked containing PCBs?	<input checked="" type="checkbox"/>		
Package, COC, and/or Samples marked as beryllium or asbestos containing?	<input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.	
Shipped as a DOT Hazardous?	<input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:	
Samples identified as Foreign Soil?	<input checked="" type="checkbox"/>		

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: Ice bags Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius Ice
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: Secondary Temperature Device Serial # (If Applicable): 201404436
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 Do Low Level Perchlorate samples have headspace as required?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
7 VOA vials contain acid preservation?	<input checked="" type="checkbox"/>			(If unknown, select No)
8 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
9 Are Encore containers present?	<input checked="" type="checkbox"/>			(If yes, immediately deliver to Volatiles laboratory)
10 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
11 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
12 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
13 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
14 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>			
15 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			

16 Carrier and tracking number.	Circle Applicable:				
	FedEx Air	FedEx Ground	UPS	Field Services	Courier Other
	7779	3451	9921		
	7779	3853	5680		
	7779	3451	9200		
	7779	3451	9678		

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials *[Signature]* Date **12/15/16** Page **1** of **1**

Data Review Qualifier Definitions

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 (843) 556-8171

Report Date: 09-JAN-17

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 09 January 2017

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	LA170010
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	SC000122016-21
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL412594
Work Order #: 412594

Product: Determination of Metals by ICP-MS**Analytical Method:** SW846 3050B/6020B**Analytical Procedure:** GL-MA-E-014 REV# 28**Analytical Batch:** 1624660**Preparation Method:** SW846 3050B**Preparation Procedure:** GL-MA-E-009 REV# 26**Preparation Batch:** 1624659

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
412594001	B35XX0
412594002	B35XX2
1203691285	Method Blank (MB)ICP-MS
1203691286	Laboratory Control Sample (LCS)
1203691289	412594001(B35XX0L) Serial Dilution (SD)
1203691287	412594001(B35XX0D) Sample Duplicate (DUP)
1203691288	412594001(B35XX0S) 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.

Technical Information**Sample Dilutions**

Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range. The ICPMS solid samples in this SDG were diluted the standard two times.

Analyte	412594	
	001	002
Uranium	2X	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

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL412594 GEL Work Order: 412594

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: 09 JAN 2017****Title: Data Validator**

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL412594

CONTRACT: CPRC0F16028

METHOD TYPE: SW846

SAMPLE ID:412594001

BASIS: Dry Weight

DATE COLLECTED 12-DEC-16

CLIENT ID: B35XX0

LEVEL: Low

DATE RECEIVED 14-DEC-16

MATRIX: SOIL

%SOLIDS: 94.5

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-61-1	Uranium	431	ug/kg	D	13	39.4	39.4	2	MS	SKJ	12/27/16 13:00	161227-1	1624660

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1624660	1624659	SW846 3050B	0.537	g	50	mL	12/15/16	SXW1

***Analytical Methods:**

MS SW846 3050B/6020B

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL412594

CONTRACT: CPRC0F16028

METHOD TYPE: SW846

SAMPLE ID:412594002

BASIS: Dry Weight

DATE COLLECTED 12-DEC-16

CLIENT ID: B35XX2

LEVEL: Low

DATE RECEIVED 14-DEC-16

MATRIX: SOIL

%SOLIDS: 90.6

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-61-1	Uranium	525	ug/kg	D	13.5	41	41	2	MS	SKJ	12/27/16 13:16	161227-1	1624660

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1624660	1624659	SW846 3050B	0.539	g	50	mL	12/15/16	SXW1

***Analytical Methods:**

MS SW846 3050B/6020B

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: January 9, 2017

Page 1 of 2

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 412594

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1624660										
QC1203691287	412594001	DUP									
Uranium		D	431	D	484	ug/kg	11.6	(0%-20%)	SKJ	12/27/16	13:04
QC1203691286	LCS										
Uranium	4830			D	5060	ug/kg		(80%-120%)		12/27/16	12:56
QC1203691285	MB										
Uranium				DU	12.9	ug/kg				12/27/16	12:52
QC1203691288	412594001	MS									
Uranium	5040	D	431	D	5510	ug/kg		(75%-125%)		12/27/16	13:08
QC1203691289	412594001	SDILT									
Uranium		D	2.18	D	0.440	ug/L	.733	(0%-20%)		12/27/16	13:12

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

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QC Summary

Workorder: 412594

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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 #: GEL412594
Work Order #: 412594**

Product: Ion Chromatography**Analytical Method:** 9056_ANIONS_IC**Analytical Procedure:** GL-GC-E-086 REV# 25**Analytical Batches:** 1624725 and 1624724

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
412594001	B35XX0
412594002	B35XX2
1203691511	Method Blank (MB)
1203691512	Laboratory Control Sample (LCS)
1203691513	412139002(NonSDG) Sample Duplicate (DUP)
1203691514	412139002(NonSDG) 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**Matrix Spike (MS)/Post Spike (PS) Recovery Statement**

The percent recoveries (%R) obtained from the spike analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The matrix spike recovered outside of the established acceptance limits due to matrix interference and/or non-homogeneity.

Analyte	Sample	Value
Chloride	1203691514 (Non SDG 412139002MS)	147* (48%-145%)
Nitrate	1203691514 (Non SDG 412139002MS)	244* (70%-125%)
Nitrite	1203691514 (Non SDG 412139002MS)	10.3* (70%-120%)
Ortho-phosphate	1203691514 (Non SDG 412139002MS)	19.5* (35%-134%)
Sulfate	1203691514 (Non SDG 412139002MS)	41.3* (45%-162%)

Miscellaneous Information**Manual Integrations**

Samples 1203691514 (Non SDG 412139002MS) and 412594001 (B35XX0) were manually integrated to correctly position the baseline as set in the calibration standards.

Product: pH**Analytical Method:** SW846 9045D**Analytical Procedure:** GL-GC-E-008 REV# 22**Analytical Batch:** 1629015

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
412594001	B35XX0
412594002	B35XX2
1203702218	Laboratory Control Sample (LCS)
1203702219	412594001(B35XX0) 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
1203702219 (B35XX0DUP)	pH	Received 14-DEC-16, out of holding 12-DEC-16
412594001 (B35XX0)	pH	Received 14-DEC-16, out of holding 12-DEC-16
412594002 (B35XX2)	pH	Received 14-DEC-16, out of holding 12-DEC-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: GEL412594 GEL Work Order: 412594

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).

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

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: 05 JAN 2017****Title: Analyst I**

Sample Data Summary

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: January 5, 2017

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: B35XXO Project: CPRC0F16028
 Sample ID: 412594001 Client ID: CPRC001
 Matrix: SOIL
 Collect Date: 12-DEC-16 08:31
 Receive Date: 14-DEC-16
 Collector: Client
 Moisture: 5.54%

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
9056_ANIONS_IC:COMMON + (Add-on) "Dry Weight Corrected"												
Chloride		2700	755	2100	ug/Kg	9.90	1	MXL2	12/16/16	1657	1624725	1
Fluoride	U	356	356	1050	ug/Kg	9.90	1					
Nitrate-N		2070	346	1050	ug/Kg	9.90	1					
Nitrite-N	U	346	346	1050	ug/Kg	9.90	1					
Phosphorus in phosphate	U	702	702	2100	ug/Kg	9.90	1					
Sulfate		6610	1390	4190	ug/Kg	9.90	1					

Titration and Ion Analysis

9045_pH (Non-Aqueous):COMMON "As Received"

pH at Temp 21.3C	X	8.33	0.010	0.100	SU		1	RXB5	01/04/17	1338	1629015	2
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The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 9056A	SW846 9056A Total Anions in Soil	MAR1	12/16/16	1058	1624724

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	9056_ANIONS_IC	
2	SW846 9045D	

Notes:

Column headers are defined as follows:

DF: Dilution Factor Lc/LC: Critical Level
 DL: Detection Limit PF: Prep Factor
 MDA: Minimum Detectable Activity RL: Reporting Limit
 MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: January 5, 2017

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: B35XX2 Project: CPRC0F16028
 Sample ID: 412594002 Client ID: CPRC001
 Matrix: SOIL
 Collect Date: 12-DEC-16 12:59
 Receive Date: 14-DEC-16
 Collector: Client
 Moisture: 9.39%

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
9056_ANIONS_IC:COMMON + (Add-on) "Dry Weight Corrected"												
Chloride		4990	793	2200	ug/Kg	9.98	1	MXL2	12/16/16	1726	1624725	1
Fluoride	B	1030	374	1100	ug/Kg	9.98	1					
Nitrate-N		1910	363	1100	ug/Kg	9.98	1					
Nitrite-N	U	363	363	1100	ug/Kg	9.98	1					
Phosphorus in phosphate	U	738	738	2200	ug/Kg	9.98	1					
Sulfate		9190	1460	4400	ug/Kg	9.98	1					

Titration and Ion Analysis

9045_pH (Non-Aqueous):COMMON "As Received"

pH at Temp 21.1C	X	8.96	0.010	0.100	SU		1	RXB5	01/04/17	1348	1629015	2
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The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 9056A	SW846 9056A Total Anions in Soil	MAR1	12/16/16	1058	1624724

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	9056_ANIONS_IC	
2	SW846 9045D	

Notes:

Column headers are defined as follows:

DF: Dilution Factor Lc/LC: Critical Level
 DL: Detection Limit PF: Prep Factor
 MDA: Minimum Detectable Activity RL: Reporting Limit
 MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: January 5, 2017

Page 1 of 2

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 412594

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1624725										
QC1203691513	412139002	DUP									
Chloride	N	21200		21100	ug/Kg	0.479		(0%-35%)	MXL2	12/16/16	15:59
Fluoride	U	340	U	340	ug/Kg	N/A					
Nitrate-N	N	15900		15900	ug/Kg	0.365		(0%-35%)			
Nitrite-N	NU	330	U	330	ug/Kg	N/A					
Phosphorus in phosphate	NU	670	U	670	ug/Kg	N/A					
Sulfate	BN	3670	B	2770	ug/Kg	28 ^		(+/-4000)			
QC1203691512	LCS										
Chloride	50000			48400	ug/Kg		96.8	(80%-120%)		12/16/16	15:01
Fluoride	25000			25300	ug/Kg		101	(80%-120%)			
Nitrate-N	25000			24300	ug/Kg		97	(80%-120%)			
Nitrite-N	25000			24500	ug/Kg		97.9	(80%-120%)			
Phosphorus in phosphate	12500			12800	ug/Kg		102	(80%-120%)			
Sulfate	100000			98700	ug/Kg		98.7	(80%-120%)			
QC1203691511	MB										
Chloride			U	720	ug/Kg					12/16/16	14:32
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						
QC1203691514	412139002 MS										

GEL LABORATORIES LLC

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QC Summary

Workorder: 412594

Page 2 of 2

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1624725										
Chloride	50000	N	21200	N	94500	ug/Kg	147*	(48%-145%)		12/16/16	16:28
Fluoride	25000	U	340		18400	ug/Kg	73.8	(30%-135%)	MXL2		
Nitrate-N	25000	N	15900	N	76800	ug/Kg	244*	(70%-125%)			
Nitrite-N	25000	NU	330	N	2580	ug/Kg	10.3*	(70%-120%)			
Phosphorus in phosphate	12500	NU	670	N	2440	ug/Kg	19.5*	(35%-134%)			
Sulfate	100000	BN	3670	N	44900	ug/Kg	41.3*	(45%-162%)			

Titration and Ion Analysis

Batch	1629015										
QC1203702219	412594001	DUP									
pH		X	8.33	X	8.42	SU	1.07		(0%-30%)	RXB5	01/04/17 13:42
QC1203702218	LCS										
pH	7.00				6.99	SU	99.9		(70%-130%)		01/04/17 13:38

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 #: GEL412594
Work Order #: 412594

Product: AMCMISO_EIE_PRECIP_AEA: COMMON
Analytical Method: AMCMISO_EIE_PREC_AEA
Analytical Procedure: GL-RAD-A-011 REV# 26
Analytical Batch: 1624570

Preparation Method: ASTM D 2216 (Modified)
Preparation Procedure: GL-RAD-A-021 REV# 20
Preparation Batch: 1624405

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
412594001	B35XX0
412594002	B35XX2
1203691137	Method Blank (MB)
1203691138	412594001(B35XX0) Sample Duplicate (DUP)
1203691139	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 1203691139 (LCS) was recounted due to a peak shift. The recount is reported.

Product: NP237_IE_PRECIP_AEA: COMMON
Analytical Method: ASTM C 1475-00 Modified
Analytical Procedure: GL-RAD-A-032 REV# 21
Analytical Batch: 1624572

Preparation Method: ASTM D 2216 (Modified)
Preparation Procedure: GL-RAD-A-021 REV# 20
Preparation Batch: 1624405

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
412594001	B35XX0
412594002	B35XX2
1203691145	Method Blank (MB)
1203691146	412594001(B35XX0) Sample Duplicate (DUP)
1203691147	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 1203691147 (LCS) was recounted due to a peak shift. The recount is reported.

Miscellaneous Information

Manual Integration

Manual integration of alpha spectroscopy spectra 1203691147 (LCS) was performed to fully separate counts in Regions of Interest which would have been biased.

Product: PUIISO_PRECIP_AEA:COMMON

Analytical Method: PUIISO_PRECIP_AEA

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

Analytical Batch: 1624573

Preparation Method: ASTM D 2216 (Modified)

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

Preparation Batch: 1624405

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
412594001	B35XX0
412594002	B35XX2
1203691148	Method Blank (MB)
1203691149	412594001(B35XX0) Sample Duplicate (DUP)
1203691150	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: Refer to Miscellaneous Information section.

Miscellaneous Information

1. The Pu-242 tracer for samples 412594001, 412594002, 1203691148, 1203691149, and 1203691150 does not meet the resolution requirements of having a full width half maximum of 100 keV or less. 1. The tracer peaks are within the Pu-242 ROI and the tracer yield recoveries do meet the client acceptance criteria. Reporting results.

Product: THISO_IE_PLATE_AEA: COMMON

Analytical Method: THISO_IE_PRECIP_AEA

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

Analytical Batch: 1624575

Preparation Method: ASTM D 2216 (Modified)

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

Preparation Batch: 1624405

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
412594001	B35XX0
412594002	B35XX2
1203691153	Method Blank (MB)
1203691154	412594001(B35XX0) Sample Duplicate (DUP)
1203691155	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: 1624576

Preparation Method: ASTM D 2216 (Modified)

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

Preparation Batch: 1624405

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
412594001	B35XX0
412594002	B35XX2
1203691156	Method Blank (MB)
1203691157	412594001(B35XX0) Sample Duplicate (DUP)
1203691158	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: ASTM D 2216 (Modified)

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

Preparation Batch: 1624405

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
412594001	B35XX0
412594002	B35XX2
1203690698	412594001(B35XX0) 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: 1624452

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
412594001	B35XX0
412594002	B35XX2
1203690836	Method Blank (MB)
1203690837	412594001(B35XX0) Sample Duplicate (DUP)
1203690838	412594001(B35XX0) Matrix Spike (MS)
1203690839	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: 1624548

Preparation Method: ASTM D 2216 (Modified)

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

Preparation Batch: 1624405

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
412594001	B35XX0
412594002	B35XX2
1203691079	Method Blank (MB)
1203691080	412594001(B35XX0) Sample Duplicate (DUP)
1203691081	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, 1203691080 (B35XX0DUP) and 412594001 (B35XX0), did not meet the relative error ratio requirement for Eu-152 however there is no activity being reported in either sample.

Qualifier Information

Qualifier	Reason	Analyte	Sample	Client Sample
X	Data rejected due to high peak-width.	Cesium-137	1203691079	MB for batch 1624548

Product: SRTOT_SEP_PRECIP_GPC: COMMON

Analytical Method: SRTOT_SEP_PRECIP_GPC

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

Analytical Batch: 1626581

Preparation Method: ASTM D 2216 (Modified)

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

Preparation Batch: 1624405

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
412594001	B35XX0
412594002	B35XX2
1203696347	Method Blank (MB)
1203696348	412594002(B35XX2) Sample Duplicate (DUP)
1203696349	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 1203696349 (LCS) was recounted due to high recovery. The recount is reported. Sample 412594001 (B35XX0) was recounted due to a suspected false positive. The recount is reported.

Product: TC99_SEP_GPC

Analytical Method: TC99_EIE_LSC

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

Analytical Batch: 1626509

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
412594001	B35XX0
412594002	B35XX2
1203696126	Method Blank (MB)
1203696127	412594002(B35XX2) Sample Duplicate (DUP)
1203696128	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: 1626510

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
412594001	B35XX0
412594002	B35XX2
1203696129	Method Blank (MB)
1203696130	412594002(B35XX2) Sample Duplicate (DUP)
1203696131	412594002(B35XX2) Matrix Spike (MS)
1203696132	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: 1626511

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
412594001	B35XX0
412594002	B35XX2
1203696133	Method Blank (MB)
1203696134	412594002(B35XX2) Sample Duplicate (DUP)
1203696135	412594002(B35XX2) Matrix Spike (MS)
1203696136	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

Sample 412594001 (B35XX0) was recounted to verify sample result and then recounted due to high MDC. The third count is reported.

Product: NI63_LSC

Analytical Method: NI63_LSC

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

Analytical Batch: 1627544

Preparation Method: ASTM D 2216 (Modified)

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

Preparation Batch: 1624405

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
412594001	B35XX0
412594002	B35XX2
1203698399	Method Blank (MB)
1203698400	412594001(B35XX0) Sample Duplicate (DUP)
1203698401	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

Sample Re-prep/Re-analysis

Samples were reprepared due to low recovery. The re-analysis is being 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

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

**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL412594 GEL Work Order: 412594

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: Kate Gellatly****Date: 10 JAN 2017****Title: Analyst I**

Sample Data Summary

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL412594	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 412594001	Date Collected: 12/12/2016 08:31	Matrix: SOIL
	Date Received: 12/14/2016 09:15	%Moisture: 5.5
Client ID: B35XX0		Prep Basis: "Dry Weight Corrected"
Batch ID: 1624570	Method: AMCMISO_EIE_PREC_AEA	SOP Ref: GL-RAD-A-011
Run Date: 12/29/2016 10:36	Analyst: KXB2	Instrument: 1066
Data File: S0412594001_AM.1A.gcnf	Aliquot: 0.109 g	Count Time: 239.9998 min
Prep Batch: 1624570	Prep Method: DOE EML HASL-300, Am-05	Prep SOP Ref: GL-RAD-A-021
Prep Date: 12/22/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	-0.0507	pCi/g	+/-0.153	0.154	0.431	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	19.1	19.6	pCi/g	97.4	(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: GEL412594	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 412594001	Date Collected: 12/12/2016 08:31	Matrix: SOIL
	Date Received: 12/14/2016 09:15	%Moisture: 5.5
Client ID: B35XX0		Prep Basis: "Dry Weight Corrected"
Batch ID: 1624572	Method: ASTM C 1475-00 Modified	SOP Ref: GL-RAD-A-032
Run Date: 12/28/2016 08:56	Analyst: KXB2	Instrument: 1107
Data File: S0412594001_NP.1A.gcnf	Aliquot: 0.108 g	Count Time: 240 min
Prep Batch: 1624572	Prep Method: ASTM C 1475-00 Modified	Prep SOP Ref: GL-RAD-A-021
Prep Date: 12/22/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
13994-20-2	Neptunium-237	U	-0.0244	pCi/g	+/-0.168	0.168	0.410	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	2020	1980	pCi/g	102	(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: GEL412594
Lab Sample ID: 412594001

Client: CPRC001
Date Collected: 12/12/2016 08:31
Date Received: 12/14/2016 09:15

Project: CPRC0F16028
Matrix: SOIL
%Moisture: 5.5

Client ID: B35XX0
Batch ID: 1624573
Run Date: 12/29/2016 10:36
Data File: S0412594001_PU.1A.gcnf
Prep Batch: 1624573
Prep Date: 12/22/2016 00:00

Method: PUIISO_PRECIP_AEA
Analyst: KXB2
Aliquot: 0.109 g
Prep Method: DOE EML HASL-300, Pu-11-

Prep Basis: "Dry Weight Corrected"
SOP Ref: GL-RAD-A-011
Instrument: 1089
Count Time: 239.9998 min
Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	0.0922	pCi/g	+/-0.289	0.289	0.541	1.00
OER-100-70	Plutonium-239/240	U	-0.0112	pCi/g	+/-0.259	0.259	0.585	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	15.2	18.1	pCi/g	84.1	(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: GEL412594	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 412594001	Date Collected: 12/12/2016 08:31	Matrix: SOIL
	Date Received: 12/14/2016 09:15	%Moisture: 5.5
Client ID: B35XX0		Prep Basis: "Dry Weight Corrected"
Batch ID: 1624575	Method: THISO_IE_PRECIP_AEA	SOP Ref: GL-RAD-A-038
Run Date: 12/28/2016 08:41	Analyst: KXB2	Instrument: 1040
Data File: S0412594001_TH.1A.gcnf	Aliquot: 0.108 g	Count Time: 239.9998 min
Prep Batch: 1624575	Prep Method: DOE EML HASL-300, Th-01-	Prep SOP Ref: GL-RAD-A-021
Prep Date: 12/22/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
TH-232 <small>7440-29-1</small>	Thorium-232		0.924	pCi/g	+/-0.464	0.481	0.287	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Thorium-229 Tracer	18.2	19.2	pCi/g	95	(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: GEL412594
Lab Sample ID: 412594001

Client: CPRC001
Date Collected: 12/12/2016 08:31
Date Received: 12/14/2016 09:15

Project: CPRC0F16028
Matrix: SOIL
%Moisture: 5.5

Client ID: B35XX0
Batch ID: 1624576
Run Date: 12/27/2016 09:16
Data File: S0412594001_UU.1A.gcnf
Prep Batch: 1624576
Prep Date: 12/22/2016 00:00

Method: UIISO_IE_PRECIP_AEA
Analyst: KXB2
Aliquot: 0.109 g
Prep Method: DOE EML HASL-300, U-02-R

Prep Basis: "Dry Weight Corrected"
SOP Ref: GL-RAD-A-011
Instrument: 1007
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	0.271	pCi/g	+/-0.390	0.392	0.470	1.00
15117-96-1/13982-7	Uranium-235/236	U	-0.0291	pCi/g	+/-0.251	0.252	0.581	1.00
7440-61-1	Uranium-238	U	0.177	pCi/g	+/-0.401	0.402	0.688	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	12.6	19.2	pCi/g	65.7	(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: GEL412594
Lab Sample ID: 412594001

Client: CPRC001
Date Collected: 12/12/2016 08:31
Date Received: 12/14/2016 09:15

Project: CPRC0F16028
Matrix: SOIL
%Moisture: 5.5

Client ID: B35XX0
Batch ID: 1626581
Run Date: 01/07/2017 17:10
Data File: S1626581r2.xls
Prep Batch: 1626581
Prep Date: 01/04/2017 09:30

Method: SRTOT_SEP_PRECIP_GPC
Analyst: BXF1
Aliquot: 0.301 g
Prep Method: EPA 905.0 Modified/DOE RP5

Prep Basis: "Dry Weight Corrected"
SOP Ref: GL-RAD-A-004
Instrument: PIC5A
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	0.357	pCi/g	+/-0.749	0.755	1.32	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	7.00	7.75	mg	90.3	(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: GEL412594	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 412594001	Date Collected: 12/12/2016 08:31	Matrix: SOIL
	Date Received: 12/14/2016 09:15	%Moisture: 5.5
Client ID: B35XX0		Prep Basis: "As Received"
Batch ID: 1624452	Method: I129_SEP_LEPS_GS	SOP Ref: GL-RAD-A-006
Run Date: 12/27/2016 11:45	Analyst: MJH1	Instrument: XRAY3
Data File: I412594001.CNF;1	Aliquot: 1.005 g	Count Time: 60 min
Prep Batch: 1624452	Prep Method: DOE EML HASL-300,I-01 M	
Prep Date: 12/23/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129	U	0.336	pCi/g	+/-0.652	0.653	0.947	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

SDG Number: GEL412594	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 412594001	Date Collected: 12/12/2016 08:31	Matrix: SOIL
	Date Received: 12/14/2016 09:15	%Moisture: 5.5
Client ID: B35XX0		Prep Basis: "Dry Weight Corrected"
Batch ID: 1624548	Method: GAMMA_GS	SOP Ref: GL-RAD-A-013
Run Date: 01/05/2017 06:01	Analyst: MXR1	Instrument: GAM05
Data File: G412594001.CNF;1	Aliquot: 133.857 g	Count Time: 120 min
Prep Batch: 1624548	Prep Method: DOE HASL 300, 4.5.2.3/Ga-01	Prep SOP Ref: GL-RAD-A-021
Prep Date: 12/15/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137	U	-0.00265	pCi/g	+/-0.0222	0.0223	0.0408	0.100
10198-40-0	Cobalt-60	U	0.0138	pCi/g	+/-0.0225	0.0234	0.0476	0.100
14683-23-9	Europium-152	U	-0.0331	pCi/g	+/-0.0501	0.0523	0.0923	0.100
15585-10-1	Europium-154	U	-0.0266	pCi/g	+/-0.0753	0.0763	0.137	0.100
14391-16-3	Europium-155	U	0.0711	pCi/g	+/-0.102	0.102	0.0881	0.100
13982-63-3	Radium-226		0.529	pCi/g	+/-0.119	0.121	0.0857	1.00
15262-20-1	Radium-228		0.944	pCi/g	+/-0.237	0.241	0.162	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: GEL412594	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 412594001	Date Collected: 12/12/2016 08:31	Matrix: SOIL
	Date Received: 12/14/2016 09:15	%Moisture: 5.5
Client ID: B35XX0		Prep Basis: "As Received"
Batch ID: 1626509	Method: TC99_EIE_LSC	SOP Ref: GL-RAD-A-059
Run Date: 01/02/2017 11:21	Analyst: LXT2	Instrument: LSCGOLD
Data File: E1626509.xls	Aliquot: 1.509 g	Count Time: 20 min
Prep Batch: 1626509	Prep Method: DOE EML HASL-300, Tc-02-	
Prep Date: 12/27/2016 13:05		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	-0.342	pCi/g	+/-1.49	1.49	2.61	5.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	52700	58600	CPM	89.9	(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: GEL412594	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 412594001	Date Collected: 12/12/2016 08:31	Matrix: SOIL
	Date Received: 12/14/2016 09:15	%Moisture: 5.5
Client ID: B35XX0		Prep Basis: "As Received"
Batch ID: 1626510	Method: C14_LSC	SOP Ref: GL-RAD-A-003
Run Date: 01/06/2017 04:15	Analyst: TXJ1	Instrument: LSCBROWN
Data File: C1626510.xls	Aliquot: 0.546 g	Count Time: 45 min
Prep Batch: 1626510	Prep Method: EPA EERF C-01 Modified	
Prep Date: 01/05/2017 15:54		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	-0.429	pCi/g	+/-2.15	2.15	3.69	5.00

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

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL412594	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 412594001	Date Collected: 12/12/2016 08:31	Matrix: SOIL
	Date Received: 12/14/2016 09:15	%Moisture: 5.5
Client ID: B35XX0		Prep Basis: "As Received"
Batch ID: 1626511	Method: TRITIUM_DIST_LSC	SOP Ref: GL-RAD-A-002
Run Date: 01/08/2017 15:52	Analyst: TXJ1	Instrument: LSCGREEN
Data File: T1626511R2.xls	Aliquot: 1.26 g	Count Time: 40 min
Prep Batch: 1626511	Prep Method: EPA 906.0 Modified	
Prep Date: 01/05/2017 15:44		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium	U	-9.13	pCi/g	+/-12.1	12.1	22.5	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: GEL412594
 Lab Sample ID: 412594001

Client: CPRC001
 Date Collected: 12/12/2016 08:31
 Date Received: 12/14/2016 09:15

Project: CPRC0F16028
 Matrix: SOIL
 %Moisture: 5.5

Client ID: B35XX0
 Batch ID: 1627544
 Run Date: 12/28/2016 17:05
 Data File: N1627544.xls
 Prep Batch: 1627544
 Prep Date: 12/27/2016 13:15

Method: NI63_LSC
 Analyst: MYM1
 Aliquot: 0.724 g
 Prep Method: DOE RESL Ni-1, Modified

Prep Basis: "Dry Weight Corrected"
 SOP Ref: GL-RAD-A-022
 Instrument: LSCBLUE
 Count Time: 15 min
 Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
NI-63	Nickel-63	U	-0.238	pCi/g	+/-3.23	3.23	5.73	10.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Nickel Carrier	19.6	24.6	mg	79.7	(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: GEL412594	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 412594001	Date Collected: 12/12/2016 08:31	Matrix: SOIL
	Date Received: 12/14/2016 09:15	%Moisture: 5.5
Client ID: B35XX0		Prep Basis: "As Received"
Batch ID: 1624405	Method: ASTM D 2216 (Modified)	SOP Ref: GL-OA-E-020
Run Date: 12/14/2016 13:31	Analyst: CXC1	Instrument: SP-39020004
Data File:		Count Time:
Prep Batch: 1624405		
Prep Date: 12/14/2016 13:31		

CAS No.	Parmname	Qual	Result	Units	MDC	
%MOISTURE	Moisture		5.54	percent +/-		
Surrogate/Tracer recovery		Result	Nominal	Units	Recovery%	Acceptable Limits

Comments:

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL412594	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 412594002	Date Collected: 12/12/2016 12:59	Matrix: SOIL
	Date Received: 12/14/2016 09:15	%Moisture: 9.4
Client ID: B35XX2	Method: AMCMISO_EIE_PREC_AEA	Prep Basis: "Dry Weight Corrected"
Batch ID: 1624570	Analyst: KXB2	SOP Ref: GL-RAD-A-011
Run Date: 12/29/2016 10:36	Aliquot: 0.102 g	Instrument: 1067
Data File: S0412594002_AM.1A.gcnf	Prep Method: DOE EML HASL-300, Am-05	Count Time: 239.9998 min
Prep Batch: 1624570		Prep SOP Ref: GL-RAD-A-021
Prep Date: 12/22/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	0.254	pCi/g	+/-0.483	0.485	0.836	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	15.5	20.9	pCi/g	74.2	(30%-105%)

Comments:

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL412594	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 412594002	Date Collected: 12/12/2016 12:59	Matrix: SOIL
	Date Received: 12/14/2016 09:15	%Moisture: 9.4
Client ID: B35XX2		Prep Basis: "Dry Weight Corrected"
Batch ID: 1624572	Method: ASTM C 1475-00 Modified	SOP Ref: GL-RAD-A-032
Run Date: 12/28/2016 08:56	Analyst: KXB2	Instrument: 1108
Data File: S0412594002_NP.1A.gcnf	Aliquot: 0.107 g	Count Time: 240 min
Prep Batch: 1624572	Prep Method: ASTM C 1475-00 Modified	Prep SOP Ref: GL-RAD-A-021
Prep Date: 12/22/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
13994-20-2	Neptunium-237	U	0.0695	pCi/g	+/-0.191	0.191	0.332	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	1890	2000	pCi/g	94.3	(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: GEL412594	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 412594002	Date Collected: 12/12/2016 12:59	Matrix: SOIL
	Date Received: 12/14/2016 09:15	%Moisture: 9.4
Client ID: B35XX2		Prep Basis: "Dry Weight Corrected"
Batch ID: 1624573	Method: PUIISO_PRECIP_AEA	SOP Ref: GL-RAD-A-011
Run Date: 12/29/2016 10:36	Analyst: KXB2	Instrument: 1090
Data File: S0412594002_PU.1A.gcnf	Aliquot: 0.102 g	Count Time: 239.9998 min
Prep Batch: 1624573	Prep Method: DOE EML HASL-300, Pu-11-	Prep SOP Ref: GL-RAD-A-021
Prep Date: 12/22/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	0.139	pCi/g	+/-0.239	0.240	0.209	1.00
OER-100-70	Plutonium-239/240	U	0.0195	pCi/g	+/-0.204	0.204	0.426	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	15.8	19.3	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: GEL412594	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 412594002	Date Collected: 12/12/2016 12:59	Matrix: SOIL
	Date Received: 12/14/2016 09:15	%Moisture: 9.4
Client ID: B35XX2		Prep Basis: "Dry Weight Corrected"
Batch ID: 1624575	Method: THISO_IE_PRECIP_AEA	SOP Ref: GL-RAD-A-038
Run Date: 12/28/2016 08:41	Analyst: KXB2	Instrument: 1041
Data File: S0412594002_TH.1A.gcnf	Aliquot: 0.105 g	Count Time: 239.9998 min
Prep Batch: 1624575	Prep Method: DOE EML HASL-300, Th-01-	Prep SOP Ref: GL-RAD-A-021
Prep Date: 12/22/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
TH-232 <small>7440-29-1</small>	Thorium-232		1.46	pCi/g	+/-0.594	0.628	0.305	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Thorium-229 Tracer	17.7	19.7	pCi/g	89.6	(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: GEL412594	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 412594002	Date Collected: 12/12/2016 12:59	Matrix: SOIL
	Date Received: 12/14/2016 09:15	%Moisture: 9.4
Client ID: B35XX2		Prep Basis: "Dry Weight Corrected"
Batch ID: 1624576	Method: UIISO_IE_PRECIP_AEA	SOP Ref: GL-RAD-A-011
Run Date: 12/27/2016 09:16	Analyst: KXB2	Instrument: 1008
Data File: S0412594002_UU.1A.gcnf	Aliquot: 0.102 g	Count Time: 240 min
Prep Batch: 1624576	Prep Method: DOE EML HASL-300, U-02-R	Prep SOP Ref: GL-RAD-A-021
Prep Date: 12/22/2016 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		0.575	pCi/g	+/-0.384	0.391	0.342	1.00
15117-96-1/13982-7	Uranium-235/236	U	0.122	pCi/g	+/-0.239	0.240	0.332	1.00
7440-61-1	Uranium-238		0.562	pCi/g	+/-0.384	0.391	0.369	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	20.9	20.6	pCi/g	101	(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: GEL412594	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 412594002	Date Collected: 12/12/2016 12:59	Matrix: SOIL
	Date Received: 12/14/2016 09:15	%Moisture: 9.4
Client ID: B35XX2		Prep Basis: "Dry Weight Corrected"
Batch ID: 1626581	Method: SRTOT_SEP_PRECIP_GPC	SOP Ref: GL-RAD-A-004
Run Date: 01/05/2017 16:29	Analyst: BXF1	Instrument: PIC1D
Data File: S1626581r2.xls	Aliquot: 0.308 g	Count Time: 70 min
Prep Batch: 1626581	Prep Method: EPA 905.0 Modified/DOE RP5	Prep SOP Ref: GL-RAD-A-021
Prep Date: 01/04/2017 09:30		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	-0.594	pCi/g	+/-0.974	0.974	1.88	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	7.10	7.75	mg	91.6	(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: GEL412594	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 412594002	Date Collected: 12/12/2016 12:59	Matrix: SOIL
	Date Received: 12/14/2016 09:15	%Moisture: 9.4
Client ID: B35XX2		Prep Basis: "As Received"
Batch ID: 1624452	Method: I129_SEP_LEPS_GS	SOP Ref: GL-RAD-A-006
Run Date: 12/27/2016 12:09	Analyst: MJH1	Instrument: XRAY4
Data File: I412594002.CNF;1	Aliquot: 1.007 g	Count Time: 60 min
Prep Batch: 1624452	Prep Method: DOE EML HASL-300,I-01 M	
Prep Date: 12/23/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129	U	0.380	pCi/g	+/-0.604	0.629	1.42	2.00

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

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL412594
 Lab Sample ID: 412594002

 Client ID: B35XX2
 Batch ID: 1624548
 Run Date: 01/05/2017 06:01
 Data File: G412594002.CNF;1
 Prep Batch: 1624548
 Prep Date: 12/15/2016 00:00

Client: CPRC001
 Date Collected: 12/12/2016 12:59
 Date Received: 12/14/2016 09:15

 Method: GAMMA_GS
 Analyst: MXR1
 Aliquot: 153.698 g
 Prep Method: DOE HASL 300, 4.5.2.3/Ga-01

Project: CPRC0F16028
 Matrix: SOIL
 %Moisture: 9.4

 Prep Basis: "Dry Weight Corrected"
 SOP Ref: GL-RAD-A-013
 Instrument: GAM16
 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	-0.00477	pCi/g	+/-0.0223	0.0224	0.0357	0.100
10198-40-0	Cobalt-60	U	0.00658	pCi/g	+/-0.0252	0.0254	0.0445	0.100
14683-23-9	Europium-152	U	-0.00125	pCi/g	+/-0.0507	0.0507	0.0976	0.100
15585-10-1	Europium-154	U	-0.0279	pCi/g	+/-0.0696	0.0707	0.125	0.100
14391-16-3	Europium-155	U	0.0492	pCi/g	+/-0.0591	0.0633	0.116	0.100
13982-63-3	Radium-226		0.446	pCi/g	+/-0.100	0.102	0.0827	1.00
15262-20-1	Radium-228		0.915	pCi/g	+/-0.191	0.197	0.139	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: GEL412594	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 412594002	Date Collected: 12/12/2016 12:59	Matrix: SOIL
	Date Received: 12/14/2016 09:15	%Moisture: 9.4
Client ID: B35XX2		Prep Basis: "As Received"
Batch ID: 1626509	Method: TC99_EIE_LSC	SOP Ref: GL-RAD-A-059
Run Date: 01/02/2017 11:42	Analyst: LXT2	Instrument: LSCGOLD
Data File: E1626509.xls	Aliquot: 1.504 g	Count Time: 20 min
Prep Batch: 1626509	Prep Method: DOE EML HASL-300, Tc-02-	
Prep Date: 12/27/2016 13:05		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	-0.882	pCi/g	+/-1.42	1.42	2.52	5.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	55200	58600	CPM	94.2	(30%-105%)

Comments:

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL412594	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 412594002	Date Collected: 12/12/2016 12:59	Matrix: SOIL
	Date Received: 12/14/2016 09:15	%Moisture: 9.4
Client ID: B35XX2		Prep Basis: "As Received"
Batch ID: 1626510	Method: C14_LSC	SOP Ref: GL-RAD-A-003
Run Date: 01/06/2017 05:02	Analyst: TXJ1	Instrument: LSCBROWN
Data File: C1626510.xls	Aliquot: 0.554 g	Count Time: 45 min
Prep Batch: 1626510	Prep Method: EPA EERF C-01 Modified	
Prep Date: 01/05/2017 15:54		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	0.504	pCi/g	+/-2.14	2.14	3.65	5.00

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

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

**Rad
Certificate of Analysis
Sample Summary**

SDG Number: GEL412594	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 412594002	Date Collected: 12/12/2016 12:59	Matrix: SOIL
	Date Received: 12/14/2016 09:15	%Moisture: 9.4
Client ID: B35XX2		Prep Basis: "As Received"
Batch ID: 1626511	Method: TRITIUM_DIST_LSC	SOP Ref: GL-RAD-A-002
Run Date: 01/06/2017 17:38	Analyst: TXJ1	Instrument: LSCGREEN
Data File: T1626511.xls	Aliquot: 1.267 g	Count Time: 15 min
Prep Batch: 1626511	Prep Method: EPA 906.0 Modified	
Prep Date: 01/05/2017 15:44		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium	U	-1.74	pCi/g	+/-12.4	12.4	22.9	30.0

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

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL412594
Lab Sample ID: 412594002

Client: CPRC001
Date Collected: 12/12/2016 12:59
Date Received: 12/14/2016 09:15

Project: CPRC0F16028
Matrix: SOIL
%Moisture: 9.4

Client ID: B35XX2
Batch ID: 1627544
Run Date: 12/28/2016 17:21
Data File: N1627544.xls
Prep Batch: 1627544
Prep Date: 12/27/2016 13:15

Method: NI63_LSC
Analyst: MYM1
Aliquot: 0.764 g
Prep Method: DOE RESL Ni-1, Modified

Prep Basis: "Dry Weight Corrected"
SOP Ref: GL-RAD-A-022
Instrument: LSCBLUE
Count Time: 15 min
Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
NI-63	Nickel-63	U	-1.93	pCi/g	+/-3.02	3.02	5.53	10.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Nickel Carrier	19.2	24.6	mg	78.1	(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.

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: January 10, 2017

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Client : CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Workorder: 412594

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1624570								
QC1203691137	MB								
Americium-241			U	0.123	pCi/g			KXB2	12/29/1610:36
				Uncert: +/-0.280					
				TPU: +/-0.280					
**Americium-243 Tracer	19.6			15.2	pCi/g	REC: 78	(30%-105%)		
				Uncert: +/-2.27					
				TPU: +/-3.47					
QC1203691138	412594001	DUP							
Americium-241		U	-0.0507	U	0.00	pCi/g			
			Uncert: +/-0.153		+/-0.145		RPD: 0	N/A	
			TPU: +/-0.154		+/-0.145		RER: 0.471	(0-2)	
**Americium-243 Tracer	20.4	19.1		15.9	pCi/g	REC: 78	(30%-105%)		
			Uncert: +/-2.29		+/-2.36				
			TPU: +/-3.51		+/-3.61				
QC1203691139	LCS								
Americium-241				18.1	pCi/g	REC: 88	(80%-120%)		01/05/1713:27
				Uncert: +/-1.82					
				TPU: +/-2.67					
**Americium-243 Tracer	19.6			19.1	pCi/g	REC: 98	(30%-105%)		
				Uncert: +/-2.00					
				TPU: +/-3.13					
Batch	1624572								
QC1203691145	MB								
Neptunium-237			U	0.134	pCi/g			KXB2	12/28/1608:56
				Uncert: +/-0.217					
				TPU: +/-0.218					
**Americium-243 Tracer	1980			2000	pCi/g	REC: 101	(30%-105%)		
QC1203691146	412594001	DUP							
Neptunium-237		U	-0.0244	U	0.031	pCi/g			
			Uncert: +/-0.168		+/-0.172		RPD: 0	N/A	
			TPU: +/-0.168		+/-0.172		RER: 0.45	(0-2)	
**Americium-243 Tracer	2140	2020		2070	pCi/g	REC: 97	(30%-105%)		
QC1203691147	LCS								
Neptunium-237				41.3	pCi/g	REC: 114	(80%-120%)		01/05/1714:02
				Uncert: +/-3.46					
				TPU: +/-6.22					
**Americium-243 Tracer	1980			2050	pCi/g	REC: 104	(30%-105%)		
Batch	1624573								
QC1203691148	MB								
Plutonium-238			U	-0.10	pCi/g			KXB2	12/29/1610:36
				Uncert: +/-0.142					
				TPU: +/-0.142					
Plutonium-239/240			U	0.0478	pCi/g				
				Uncert: +/-0.214					

GEL LABORATORIES LLC

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QC Summary

Workorder: 412594

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1624573								
**Plutonium-242 Tracer		TPU:		+/-0.214					
	18.1			15.0	pCi/g	REC: 83	(30%-105%)		
		Uncert:		+/-2.05					
		TPU:		+/-3.08					
QC1203691149 412594001 DUP									
Plutonium-238		U	0.0922	U	0.00256				
		Uncert:	+/-0.289	+/-0.190		RPD: 0	N/A		
		TPU:	+/-0.289	+/-0.190		RER: 0.507	(0-2)		
Plutonium-239/240		U	-0.0112	U	0.00256				
		Uncert:	+/-0.259	+/-0.190		RPD: 0	N/A		
		TPU:	+/-0.259	+/-0.190		RER: 0.0838	(0-2)		
**Plutonium-242 Tracer		18.8	15.2	17.8	pCi/g	REC: 95	(30%-105%)		
		Uncert:	+/-2.24	+/-2.16					
		TPU:	+/-3.33	+/-3.24					
QC1203691150 LCS									
Plutonium-238				U	0.0855				
		Uncert:		+/-0.294					
		TPU:		+/-0.294					
Plutonium-239/240		18.1		19.1	pCi/g	REC: 105	(80%-120%)		
		Uncert:		+/-2.15					
		TPU:		+/-3.27					
**Plutonium-242 Tracer		18.1		15.0	pCi/g	REC: 83	(30%-105%)		
		Uncert:		+/-2.10					
		TPU:		+/-3.14					
Batch	1624575								
QC1203691153 MB									
Thorium-232				U	0.010			KXB2	12/28/1608:41
		Uncert:		+/-0.183					
		TPU:		+/-0.183					
**Thorium-229 Tracer		19.2		15.8	pCi/g	REC: 82	(30%-105%)		
		Uncert:		+/-2.16					
		TPU:		+/-3.50					
QC1203691154 412594001 DUP									
Thorium-232			0.924		0.921				12/28/1608:41
		Uncert:	+/-0.464	+/-0.455		RPD: 0	(0% - 100%)		
		TPU:	+/-0.481	+/-0.472		RER: 0.0102	(0-2)		
**Thorium-229 Tracer		20.1	18.2	20.4	pCi/g	REC: 102	(30%-105%)		
		Uncert:	+/-2.03	+/-2.07					
		TPU:	+/-3.35	+/-3.43					
QC1203691155 LCS									
Thorium-232		18.4		18.0	pCi/g	REC: 98	(80%-120%)		
		Uncert:		+/-2.04					
		TPU:		+/-3.26					
**Thorium-229 Tracer		19.2		18.9	pCi/g	REC: 99	(30%-105%)		
		Uncert:		+/-2.11					
		TPU:		+/-3.43					
Batch	1624576								
QC1203691156 MB									
Uranium-233/234				U	0.0767			KXB2	12/27/1620:24
		Uncert:		+/-0.288					

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1624576								
Uranium-235/236		TPU:		+/-0.288					
			U	-0.0299	pCi/g				
		Uncert:		+/-0.258					
Uranium-238		TPU:		+/-0.259					
			U	0.0767	pCi/g				
		Uncert:		+/-0.288					
**Uranium-232 Tracer	19.2	TPU:		+/-0.288					
				13.3	pCi/g	REC:	69 (30%-105%)		
		Uncert:		+/-2.74					
		TPU:		+/-4.14					
QC1203691157 412594001 DUP									
Uranium-233/234		U	0.271	0.738	pCi/g				12/27/1609:16
		Uncert:	+/-0.390	+/-0.417		RPD:	44 (0% - 100%)		
		TPU:	+/-0.392	+/-0.428		RER:	1.58 (0-2)		
Uranium-235/236		U	-0.0291	0.211	pCi/g				
		Uncert:	+/-0.251	+/-0.277		RPD:	94 N/A		
		TPU:	+/-0.252	+/-0.278		RER:	1.25 (0-2)		
Uranium-238		U	0.177	0.697	pCi/g				
		Uncert:	+/-0.401	+/-0.420		RPD:	1 (0% - 100%)		
		TPU:	+/-0.402	+/-0.429		RER:	1.74 (0-2)		
**Uranium-232 Tracer	20.0	12.6		19.7	pCi/g	REC:	99 (30%-105%)		
		Uncert:	+/-2.71	+/-2.10					
		TPU:	+/-4.09	+/-3.32					
QC1203691158 LCS									
Uranium-233/234				26.9	pCi/g				
		Uncert:		+/-3.01					
		TPU:		+/-5.12					
Uranium-235/236				1.21	pCi/g				
		Uncert:		+/-0.764					
		TPU:		+/-0.787					
Uranium-238	24.7			27.6	pCi/g	REC:	112 (80%-120%)		
		Uncert:		+/-3.05					
		TPU:		+/-5.23					
**Uranium-232 Tracer	19.2			12.3	pCi/g	REC:	64 (30%-105%)		
		Uncert:		+/-2.60					
		TPU:		+/-3.95					
Rad Gamma Spec									
Batch	1624452								
QC1203690836 MB									
Iodine-129			U	0.106	pCi/g			MJH1	12/27/1612:10
		Uncert:		+/-0.238					
		TPU:		+/-0.243					
QC1203690837 412594001 DUP									
Iodine-129		U	0.336	-0.0619	pCi/g				12/27/1612:19
		Uncert:	+/-0.652	+/-0.452		RPD:	0 N/A		
		TPU:	+/-0.653	+/-0.453		RER:	0.982 (0-2)		
QC1203690838 412594001 MS									
Iodine-129	41.4	U	0.336	38.2	pCi/g	REC:	92 (75%-125%)		12/27/1612:19
		Uncert:	+/-0.652	+/-4.43					
		TPU:	+/-0.653	+/-5.80					

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1624452								
QC1203690839	LCS								
Iodine-129	41.2			33.7	pCi/g	REC: 82 (80%-120%)			12/28/1606:05
	Uncert:			+/-4.83					
	TPU:			+/-5.87					
Batch	1624548								
QC1203691079	MB								
Cesium-137			UX	0.00	pCi/g			MXR1	01/05/1706:02
	Uncert:			+/-0.0167					
	TPU:			+/-0.0168					
Cobalt-60			U	-0.00194	pCi/g				
	Uncert:			+/-0.0115					
	TPU:			+/-0.0115					
Europium-152			U	-0.00703	pCi/g				
	Uncert:			+/-0.0313					
	TPU:			+/-0.0314					
Europium-154			U	-0.0213	pCi/g				
	Uncert:			+/-0.0381					
	TPU:			+/-0.0393					
Europium-155			U	0.00674	pCi/g				
	Uncert:			+/-0.0294					
	TPU:			+/-0.0296					
Radium-226			U	0.0475	pCi/g				
	Uncert:			+/-0.0716					
	TPU:			+/-0.0748					
Radium-228			U	-0.0359	pCi/g				
	Uncert:			+/-0.061					
	TPU:			+/-0.0632					
QC1203691080	412594001	DUP							
Cesium-137		U -0.00265	U	-0.00256	pCi/g				01/05/1706:02
	Uncert:	+/-0.0222		+/-0.0268		RPD: 0	N/A		
	TPU:	+/-0.0223		+/-0.0268		RER: 0.00489	(0-2)		
Cobalt-60		U 0.0138	U	-0.0117	pCi/g				
	Uncert:	+/-0.0225		+/-0.0222		RPD: 0	N/A		
	TPU:	+/-0.0234		+/-0.0228		RER: 1.53	(0-2)		
Europium-152		U -0.0331	U	0.0493	pCi/g				
	Uncert:	+/-0.0501		+/-0.0565		RPD: 0	N/A		
	TPU:	+/-0.0523		+/-0.0608		RER: 2.01	(0-2)		
Europium-154		U -0.0266	U	0.0217	pCi/g				
	Uncert:	+/-0.0753		+/-0.0702		RPD: 0	N/A		
	TPU:	+/-0.0763		+/-0.0708		RER: 0.908	(0-2)		
Europium-155		U 0.0711	U	0.0406	pCi/g				
	Uncert:	+/-0.102		+/-0.0662		RPD: 0	N/A		
	TPU:	+/-0.102		+/-0.0688		RER: 0.487	(0-2)		
Radium-226		0.529		0.473	pCi/g				
	Uncert:	+/-0.119		+/-0.112		RPD: 11	(0% - 20%)		
	TPU:	+/-0.121		+/-0.114		RER: 0.656	(0-2)		
Radium-228		0.944		0.867	pCi/g				
	Uncert:	+/-0.237		+/-0.247		RPD: 8	(0% - 20%)		
	TPU:	+/-0.241		+/-0.251		RER: 0.432	(0-2)		
QC1203691081	LCS								

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Gamma Spec										
Batch	1624548									
Americium-241	489			543	pCi/g	REC: 111	(80%-120%)			
	Uncert:			+/-8.95						
	TPU:			+/-40.7						
Cesium-137	178			186	pCi/g	REC: 104	(80%-120%)			
	Uncert:			+/-3.25						
	TPU:			+/-8.62						
Cobalt-60	156			150	pCi/g	REC: 96	(80%-120%)			
	Uncert:			+/-3.32						
	TPU:			+/-6.44						
Europium-152			U	0.594	pCi/g					
	Uncert:			+/-1.28						
	TPU:			+/-1.31						
Europium-154			U	-0.0526	pCi/g					
	Uncert:			+/-0.844						
	TPU:			+/-0.844						
Europium-155			U	0.172	pCi/g					
	Uncert:			+/-1.26						
	TPU:			+/-1.26						
Radium-226			U	-0.40	pCi/g					
	Uncert:			+/-1.10						
	TPU:			+/-1.11						
Radium-228			U	0.763	pCi/g					
	Uncert:			+/-2.68						
	TPU:			+/-2.70						
Rad Gas Flow										
Batch	1626581									
QC1203696347	MB									
Total Strontium			U	0.151	pCi/g			BXF1	01/05/1716:31	
	Uncert:			+/-0.611						
	TPU:			+/-0.613						
**Strontium Carrier	7.75			7.40	mg	REC: 96	(40%-110%)			
QC1203696348	412594002	DUP								
Total Strontium		U	-0.594	U	0.478	pCi/g			01/05/1716:31	
	Uncert:		+/-0.974		+/-0.757		RPD: 0	N/A		
	TPU:		+/-0.974		+/-0.767		RER: 1.7	(0-2)		
**Strontium Carrier	7.75		7.10	7.10	mg	REC: 92	(40%-110%)			
QC1203696349	LCS									
Total Strontium	70.2			71.6	pCi/g	REC: 102	(80%-120%)		01/06/1713:24	
	Uncert:			+/-3.62						
	TPU:			+/-18.9						
**Strontium Carrier	7.75			7.50	mg	REC: 97	(40%-110%)			
Rad Liquid Scintillation										
Batch	1626509									
QC1203696126	MB									
Technetium-99			U	-0.0362	pCi/g			LXT2	01/02/1712:25	
	Uncert:			+/-1.30						
	TPU:			+/-1.30						
**Technetium-99m Tracer	58600			57800	CPM	REC: 99	(30%-105%)			
QC1203696127	412594002	DUP								

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Liquid Scintillation									
Batch	1626509								
Technetium-99		U	-0.882	U	0.438	pCi/g			
		Uncert:	+/-1.42		+/-1.41		RPD: 0	N/A	
		TPU:	+/-1.42		+/-1.41		RER: 1.29	(0-2)	
**Technetium-99m Tracer	58600		55200		57200	CPM	REC: 98	(30%-105%)	
QC1203696128	LCS								
Technetium-99		54.4			50.5	pCi/g	REC: 93	(80%-120%)	01/02/1713:09
		Uncert:			+/-2.59				
		TPU:			+/-6.35				
**Technetium-99m Tracer	58600				57900	CPM	REC: 99	(30%-105%)	
Batch	1626510								
QC1203696129	MB								
Carbon-14				U	-1.25	pCi/g		TXJ1	01/06/1706:36
		Uncert:			+/-2.10				
		TPU:			+/-2.10				
QC1203696130	412594002	DUP							
Carbon-14		U	0.504	U	-1.53	pCi/g			01/06/1707:23
		Uncert:	+/-2.14		+/-2.11		RPD: 0	N/A	
		TPU:	+/-2.14		+/-2.11		RER: 1.33	(0-2)	
QC1203696131	412594002	MS							
Carbon-14		137	U	0.504	132	pCi/g	REC: 96	(75%-125%)	01/06/1708:10
		Uncert:	+/-2.14		+/-6.76				
		TPU:	+/-2.14		+/-11.9				
QC1203696132	LCS								
Carbon-14		136			132	pCi/g	REC: 97	(80%-120%)	01/06/1708:26
		Uncert:			+/-6.73				
		TPU:			+/-11.8				
Batch	1626511								
QC1203696133	MB								
Tritium				U	-4.75	pCi/g		TXJ1	01/06/1718:11
		Uncert:			+/-12.3				
		TPU:			+/-12.3				
QC1203696134	412594002	DUP							
Tritium		U	-1.74	U	4.58	pCi/g			01/06/1718:27
		Uncert:	+/-12.4		+/-12.6		RPD: 0	N/A	
		TPU:	+/-12.4		+/-12.7		RER: 0.699	(0-2)	
QC1203696135	412594002	MS							
Tritium		92.1	U	-1.74	74.1	pCi/g	REC: 80	(75%-125%)	01/06/1718:43
		Uncert:	+/-12.4		+/-18.3				
		TPU:	+/-12.4		+/-24.8				
QC1203696136	LCS								
Tritium		90.3			78.8	pCi/g	REC: 87	(80%-120%)	01/06/1719:00
		Uncert:			+/-18.3				
		TPU:			+/-25.6				
Batch	1627544								
QC1203698399	MB								
Nickel-63				U	-3.53	pCi/g		MYM1	12/28/1617:38
		Uncert:			+/-2.93				
		TPU:			+/-2.93				
**Nickel Carrier	24.6				19.2	mg	REC: 78	(40%-110%)	
QC1203698400	412594001	DUP							

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Liquid Scintillation										
Batch	1627544									
Nickel-63		U	-0.238	U	-4.22	pCi/g				
		Uncert:	+/-3.23		+/-2.88		RPD:	0	N/A	
		TPU:	+/-3.23		+/-2.88		RER:	1.81	(0-2)	
**Nickel Carrier	24.6		19.6		19.8	mg	REC:	81	(40%-110%)	
QC1203698401	LCS									
Nickel-63	176				162	pCi/g	REC:	92	(80%-120%) 12/28/1618:11	
		Uncert:			+/-8.18					
		TPU:			+/-31.0					
**Nickel Carrier	24.6				19.9	mg	REC:	81	(40%-110%)	

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.