



November 30, 2015

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

Re: CHPRC SAF F15-011
Work Order: 385927
SDG: GEL385927

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on November 19, 2015. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,

Sarah Edwards for
Heather Shaffer
Project Manager

Purchase Order: 302632 8C
Chain of Custody: F15-011-453 and F15-011-454
Enclosures



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Case Narrative

DECEMBER 03, 2015

General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF F15-011
SDG: GEL385927

November 30, 2015

Laboratory Identification:

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

Summary

Sample receipt

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on November 19, 2015, for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

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

Sample Identification

The laboratory received the following samples:

Laboratory Identification	Sample Description
385927001	B33MD8
385927002	B33MD7

Case Narrative

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

Data Package

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

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

Sarah Edwards
DECEMBER 03, 2015

Sarah Edwards for
Heather Shaffer
Project Manager

Chain of Custody and Supporting Documentation

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F15-011-454	PAGE 1 OF 1
COLLECTOR D.L. Floyd/CHPRC	COMPANY CONTACT TODAK, D	TELEPHONE NO. 376-6427	PROJECT COORDINATOR TODAK, D	PRICE CODE 8C	DATA TURNAROUND 15 Days / 15 Days
SAMPLING LOCATION C9510, I-001	PROJECT DESIGNATION 200-DV-1 Operable Unit Characterization of Waste Sites - Soil	SAF NO. F15-011		AIR QUALITY	
ICE CHEST NO. GWS-509	FIELD LOGBOOK NO. INF-507-33 Pg 18	ACTUAL SAMPLE DEPTH 1' 4" - 6.2' FA	COA 302632	METHOD OF SHIPMENT FEDERAL EXPRESS	ORIGINAL
SHIPPED TO GEL Laboratories, LLC	OFFSITE PROPERTY NO. 6150	BILL OF LADING/AIR BILL NO. 7750 09021314			

MATRIX* A=Air DL=Drum L=Liquid S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	POSSIBLE SAMPLE HAZARDS/ REMARKS *Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1. NA	PRESERVATION Cool <=6C
	HOLDING TIME	28 Days/48 Hours
	TYPE OF CONTAINER	G/P
	NO. OF CONTAINER(S)	1
	VOLUME	60mL
	SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS
SAMPLE NO. B33MD8	MATRIX* SOIL	SAMPLE DATE 11-18-15
		SAMPLE TIME 0835

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM D.L. Floyd/CHPRC	DATE/TIME 11-18-15 0835	RECEIVED BY/STORED IN L.D. WALKER	DATE/TIME NOV 18 2015 0835	TRVL-16-018 (1) 9056_ANIONS_IC: COMMON; {Phosphorus in phosphate};	
RELINQUISHED BY/REMOVED FROM L.D. WALKER	DATE/TIME NOV 18 2015 1400	RECEIVED BY/STORED IN FEDEX	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN M. K. STONER	DATE/TIME 11-19-15 0910		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
LABORATORY SECTION	RECEIVED BY	TITLE		DATE/TIME	
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY		DATE/TIME	

DECEMBER 03, 2015

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F15-011-453	PAGE 1 OF 2
COLLECTOR	D.L. Floyd/CHPRC	COMPANY CONTACT	TODAK, D	PROJECT COORDINATOR	TODAK, D
SAMPLING LOCATION	C9510, I-001	PROJECT DESIGNATION	200-DV-1 Operable Unit Characterization of Waste Sites - Soil	SAF NO.	F15-011
ICE CHEST NO.	GWS-509	FIELD LOGBOOK NO.	MNF-N-507-33 p. 18	COA	302632
SHIPPED TO	GEL Laboratories, LLC	OFFSITE PROPERTY NO.	6150	BILL OF LADING/AIR BILL NO.	1775069821314
MATRIX*	<p>POSSIBLE SAMPLE HAZARDS/ REMARKS</p> <p>*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1. NA</p>	PRESERVATION	None	None	Cool <=6C
DL=Drum		HOLDING TIME	6 Months	6 Months	14 Days
DS=Drum		TYPE OF CONTAINER	G/P	G/P	G
L=Liquid		NO. OF CONTAINER(S)	1	1	1
O=Oil		VOLUME	60mL	250mL	60mL
S=Soil		SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	9010, CYANIDE; COMMON;
SE=Sediment		SPECIAL HANDLING AND/OR STORAGE	RADIOACTIVE TIE TO: B33MD6		
T=Tissue		SAMPLE DATE	11-18-15	SAMPLE TIME	0835
V=Vegetation		MATRIX*			
W=Water		SAMPLE NO.	B33MD7		
WI=Wipe					
X=Other					
PRICE CODE	8C	AIR QUALITY	<input type="checkbox"/>	METHOD OF SHIPMENT	FEDERAL EXPRESS
TURNAROUND	15 Days / 15 Days				
					ORIGINAL

CHAIN OF POSSESSION	SIGN/ PRINT NAMES	SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM D.L. Floyd/CHPRC	RECEIVED BY/STORED IN CHPRC/Kowalski	SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS
DATE/TIME 11-18-15 0835	DATE/TIME NOV 18 11:15 0835	
RELINQUISHED BY/REMOVED FROM L.D. Wall/Kowalski	RECEIVED BY/STORED IN FEDEX	
DATE/TIME NOV 18 2015 1400	DATE/TIME 11-19-15 0910	
RELINQUISHED BY/REMOVED FROM [Signature]	RECEIVED BY/STORED IN [Signature]	
DATE/TIME	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	
DATE/TIME	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	
DATE/TIME	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	
DATE/TIME	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	
DATE/TIME	DATE/TIME	

LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME
PRINTED ON 11/6/2015	FSR ID = FSR9255	TRVL NUM = TRVL-16-018	A-6003-618 (REV 2)

CH2MHill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F15-011-453	PAGE 2 OF 2
COLLECTOR D.L. Floyd/CHPRC	COMPANY CONTACT TODAK, D	TELEPHONE NO. 376-6427	PROJECT COORDINATOR TODAK, D	PRICE CODE 8C	DATA TURNAROUND 15 Days / 15 Days
SAMPLING LOCATION C9510, I-001	PROJECT DESIGNATION 200-DV-1 Operable Unit Characterization of Waste Sites - Soil		SAF NO. F15-011	AIR QUALITY <input type="checkbox"/>	
ICE CHEST NO. <i>GWS-509</i>	FIELD LOGBOOK NO. <i>HNF-507-33 Pg 18</i>	ACTUAL SAMPLE DEPTH <i>4'-6.2'</i>	COA 302632	METHOD OF SHIPMENT FEDERAL EXPRESS	ORIGINAL
SHIPPED TO GEL Laboratories, LLC	OFFSITE PROPERTY NO. <i>6150</i>		BILL OF LADING/AIR BILL NO. <i>7750 0982 1314</i>		
SPECIAL INSTRUCTIONS TRVL-16-018 (1) 6020_METALS_ICPMS: COMMON {Aluminum, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Molybdenum, Selenium}; 6020_METALS_ICPMS: COMMON (Add-on) {Arsenic, Manganese, Nickel, Uranium}; 6010_METALS_ICP: COMMON {Antimony, Silver}; 7471_MERCURY_CV: COMMON (SOLIDS); (2) GAMMA_GS: COMMON; AMCMISO_IE_PRECIP_AEA: COMMON; PUISO_PLATE_AEA: COMMON; Plutonium-238, Plutonium-239/240; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; C14_LSC: COMMON; H29_SEP_HEPS_GS: COMMON; N163_LSC: COMMON; NP237_IE_PRECIP_AEA: COMMON; SRTOT_SEP_PRECIP_GPC: COMMON {Total beta radiostromtium}; TC99_EIE_LSC: COMMON; TRITIUM_DIST_LSC: COMMON;					

DECEMBER 03, 2015

SAMPLE RECEIPT & REVIEW FORM

Client: <u>CPRC</u>		SDG/AR/COC/Work Order:	
Received By:		Date Received: <u>11-19-15</u>	
Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>CPM 0</u>
Classified Radioactive II or III by RSO?		<input checked="" type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?		<input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		<input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		<input checked="" type="checkbox"/>	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: Ice bags Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: <u>84092024932</u> Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?			<input checked="" type="checkbox"/>	Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 Do Low Level Perchlorate samples have headspace as required?			<input checked="" type="checkbox"/>	Sample ID's and containers affected:
7 VOA vials contain acid preservation?			<input checked="" type="checkbox"/>	(If unknown, select No)
8 VOA vials free of headspace (defined as < 6mm bubble)?			<input checked="" type="checkbox"/>	Sample ID's and containers affected:
9 Are Encore containers present?			<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
10 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
11 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
12 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
13 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
14 Are sample containers identifiable as GEL provided?			<input checked="" type="checkbox"/>	
15 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
16 Carrier and tracking number.			<input checked="" type="checkbox"/>	Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other <u>see attached sheet</u>

Comments (Use Continuation Form if needed):

SAMPLE RECEIPT & REVIEW FORM

Client: <u>P. CARH</u>		SDG/AR/COC/Work Order: <u>385927</u>
Received By: <u>P. Went</u>		Date Received: <u>11/19/15</u>
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): <u>21cpm</u>
Classified Radioactive II or III by RSO?	<input checked="" type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?	<input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?	<input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?	<input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?	<input checked="" type="checkbox"/>	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: <u>Ice bags</u> Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius <u>2c</u>
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: Secondary Temperature Device Serial # (If Applicable): <u>130462966</u>
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: <u>FedEx Air</u> FedEx Ground UPS Field Services Courier Other <u>7750 0394 6069.2c</u>

Comments (Use Continuation Form if needed):

Data Review Qualifier Definitions

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

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

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

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

Laboratory Certifications

List of current GEL Certifications as of 30 November 2015

State	Certification
Alaska	UST-110
Arkansas	88-0651
CLIA	42D0904046
California	2940 Interim
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC000122013-10
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC000122013-10
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA150001
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC000122013-10
Nebraska	NE-OS-26-13
Nevada	SC000122016-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-15-10
Utah NELAP	SC000122015-19
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL385927
Work Order #: 385927

Sample ID	Client ID
385927002	B33MD7
1203437156	Method Blank (MB)ICP
1203437157	Laboratory Control Sample (LCS)
1203437160	385927002(B33MD7L) Serial Dilution (SD)
1203437158	385927002(B33MD7D) Sample Duplicate (DUP)
1203437159	385927002(B33MD7S) Matrix Spike (MS)
1203437195	Method Blank (MB)ICP-MS
1203437196	Laboratory Control Sample (LCS)
1203437199	385927002(B33MD7L) Serial Dilution (SD)
1203437197	385927002(B33MD7D) Sample Duplicate (DUP)
1203437198	385927002(B33MD7S) Matrix Spike (MS)
1203438915	385927002(B33MD7PS) Post Spike (PS)
1203437855	Method Blank (MB)CVAA
1203437856	Laboratory Control Sample (LCS)
1203437859	385927002(B33MD7L) Serial Dilution (SD)
1203437857	385927002(B33MD7D) Sample Duplicate (DUP)
1203437858	385927002(B33MD7S) Matrix Spike (MS)

Sample Analysis

Sample 385927 002 in this SDG was analyzed on a "dry weight corrected" basis.

Method/Analysis Information

Analytical Batch:	1524782, 1524800 and 1525034
Prep Batch :	1524781, 1524799 and 1525022
Standard Operating Procedures:	GL-MA-E-013 REV# 24, GL-MA-E-009 REV# 26, GL-MA-E-014 REV# 26 and GL-MA-E-010 REV# 31
Analytical Method:	6010_METALS_ICP, 6020_METALS_ICPMS and 7471_HG_CVAA
Prep Method :	SW846 3050B and SW846 7471B Prep

Preparation/Analytical Method Verification

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

System Configuration

The Metals analysis-ICP was performed on a PE 7300 Optima radial/axial-viewing inductively coupled plasma atomic

emission spectrometer. The instrument is equipped with an ESI SC-FAST introduction, cyclonic spray chamber, and yttrium or scandium internal standard.

The Metals analysis - ICPMS was performed on a Perkin Elmer ELAN 9000 inductively coupled plasma mass spectrometer (ICP-MS). The instrument is equipped with a cross-flow nebulizer, quadrupole mass spectrometer, and dual mode electron multiplier detector. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum.

The Metals analysis-Mercury was performed on a Perkin-Elmer Flow Injection Mercury System (FIMS-100) automated mercury analyzer. The instrument consists of a cold vapor atomic absorption spectrometer set to detect mercury at a wavelength of 253.7 nm.

Calibration Information

Instrument Calibration

All initial calibration requirements have been met for this sample delivery group (SDG).

CRDL/PQL Requirements

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

ICSA/ICSAB Statement

All interference check samples (ICSA and ICSAB) associated with this SDG met the established acceptance criteria.

Continuing Calibration Blanks (CCB) Requirements

All continuing calibration blanks (CCB) bracketing this batch met the established acceptance criteria.

Continuing Calibration Verification (CCV) Requirements

All continuing calibration verifications (CCV) bracketing this SDG met the acceptance criteria.

Quality Control (QC) Information

Method Blank (MB) Statement

The method blanks (MB) analyzed with this SDG met the acceptance criteria. However, chromium was greater than the MDL. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data. 1203437195 (MB)-ICP-MS.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Sample Statement

The following samples were selected as the quality control (QC) samples for this SDG: 385927002 (B33MD7)-ICP, ICP-MS and CVAA.

Matrix Spike (MS/MSD) Recovery Statement

The percent recoveries (%R) obtained from the MS/MSD analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The MS/MSD (See Below) did not meet the recommended quality control acceptance criteria for percent recoveries for the following applicable analytes. The post spike recoveries were within the required control limits. This verifies the absence of a matrix interference in the post-spike digested sample. The recoveries may be attributed to possible sample matrix interference and/or non-homogeneity.

Sample	Analyte	Value
1203437198 (B33MD7MS)	Chromium	168* (75%-125%)
	Nickel	132* (75%-125%)

Duplicate Relative Percent Difference (RPD) Statement

The RPD obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required reporting limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control of +/-RL is used to evaluate the DUP results. The relative percent differences (RPD) between the sample and its duplicate (DUP) were within acceptable limits for all applicable analytes.

Serial Dilution % Difference Statement

The serial dilution is used to assess matrix suppression or enhancement. Raw element concentrations 25x the IDL/MDL for CVAA, 50X the IDL/MDL for ICP and 100X the IDL/MDL for ICP-MS analyses are applicable for serial dilution assessment. Not all the applicable analytes were within the established acceptance criteria. Matrix suppression may be suspected. The data has been qualified.

Sample	Analyte	Value
1203437199 (B33MD7SDILT)	Copper	18.6 *(0%-10%)
	Nickel	16.3 *(0%-10%)

Post Spike (PS) Recovery Statement

The PS met the recommended quality control acceptance criteria for percent recoveries for all applicable analytes and verifies the absence of matrix interferences in the post-digested sample.

Technical Information

Holding Time Specifications

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

Preparation/Analytical Method Verification

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

Sample Dilutions

Dilutions are performed to minimize matrix interferences resulting from elevated mineral element concentrations present in solid samples and/or to bring over range target analyte concentrations into the linear calibration range of the instrument. Sample 385927002 (B33MD7)-ICP-MS was diluted to ensure that the analyte concentration was within the linear calibration range of the instrument. The ICPMS solid samples in this SDG were diluted the standard two times. ICP-MS.

Analyte	385927
	002
Several	40X 2X 1X

Preparation Information

The samples in this SDG were not diluted and prepared according to the cited SOP.

Miscellaneous Information

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Data Exception (DER) Documentation

A Data exception report (DER) was generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) 1472103 was generated for samples 1203437198 (B33MD7MS), 1203437198 (B33MD7MS) and 1203437199 (B33MD7SDILT) in this SDG/batch.

Additional Comments

Additional comments were not required for this SDG.

Certification Statement

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

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL385927 GEL Work Order: 385927

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- D Results are reported from a diluted aliquot of sample.
- M Duplicate precision not met.
- N Spike Sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

Review/Validation

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

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

Signature:



Name: Jamie Johnson

Date: 02 DEC 2015

Title: Group Leader

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL385927

METHOD TYPE: SW846

SAMPLE ID: 385927002

CLIENT ID: B33MD7

CONTRACT: CPRC0F15011

MATRIX:SOIL

DATE RECEIVED 19-NOV-15

LEVEL: Low %SOLIDS: 95.9

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7429-90-5	Aluminum	7240000	ug/kg	D		MS	3120	2	ICPMS5	151121-2
7440-36-0	Antimony	2880	ug/kg			P	335	1	OPTIMA5	112415-1
7440-38-2	Arsenic	2620	ug/kg	D		MS	208	2	ICPMS5	151123-3
7440-39-3	Barium	77400	ug/kg	D		MS	104	2	ICPMS5	151121-2
7440-41-7	Beryllium	315	ug/kg	D		MS	20.8	2	ICPMS7	151201-4
7440-43-9	Cadmium	637	ug/kg	D		MS	20.8	2	ICPMS5	151121-2
7440-47-3	Chromium	11100	ug/kg	D	N	MS	208	2	ICPMS5	151121-2
7440-48-4	Cobalt	7620	ug/kg	D		MS	62.5	2	ICPMS5	151121-2
7440-50-8	Copper	15300	ug/kg	D	M	MS	68.7	2	ICPMS7	151201-4
7439-92-1	Lead	4530	ug/kg	D		MS	104	2	ICPMS5	151121-2
7439-96-5	Manganese	328000	ug/kg	D		MS	4160	40	ICPMS5	151123-3
7439-97-6	Mercury	6.99	ug/kg	B		AV	4.07	1	HG3	112315S5-5
7439-98-7	Molybdenum	812	ug/kg	D		MS	62.5	2	ICPMS5	151121-2
7440-02-0	Nickel	10900	ug/kg	D	MN	MS	104	2	ICPMS7	151201-4
7782-49-2	Selenium	344	ug/kg	UD		MS	344	2	ICPMS5	151123-3
7440-22-4	Silver	489	ug/kg	B		P	101	1	OPTIMA5	112415-1
7440-61-1	Uranium	808	ug/kg	D		MS	13.7	2	ICPMS7	151201-4

*Analytical Methods:

AV SW846 7471B
P SW846 3050B/6010C
MS SW846 3050B/6020A

Quality Control Summary

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QC Summary

Report Date: December 2, 2015

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 385927

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1524800										
QC1203437197 385927002 DUP											
Aluminum	D	7240000	D	7670000	ug/kg	5.84		(0%-20%)	BCD1	11/22/15	01:40
Arsenic	D	2620	D	2870	ug/kg	9.11	^	(+/-1020)		11/23/15	16:58
Barium	D	77400	D	83500	ug/kg	7.52		(0%-20%)		11/22/15	01:40
Beryllium	D	315	D	335	ug/kg	6.23	^	(+/-102)	SKJ	12/01/15	12:44
Cadmium	D	637	D	624	ug/kg	2.07	^	(+/-205)	BCD1	11/22/15	01:40
Chromium	DN	11100	D	12000	ug/kg	7.85		(0%-20%)			
Cobalt	D	7620	D	8260	ug/kg	8.14		(0%-20%)			
Copper	DM	15300	D	14500	ug/kg	5.16		(0%-20%)	SKJ	12/01/15	12:44
Lead	D	4530	D	4620	ug/kg	1.9		(0%-20%)	BCD1	11/22/15	01:40
Manganese	D	328000	D	364000	ug/kg	10.3		(0%-20%)		11/23/15	15:53
Molybdenum	D	812	D	716	ug/kg	12.5	^	(+/-205)		11/22/15	01:40
Nickel	DMN	10900	D	12400	ug/kg	12.5		(0%-20%)	SKJ	12/01/15	12:44
Selenium	DU	ND	DU	ND	ug/kg	N/A			BCD1	11/23/15	16:58
Uranium	D	808	D	964	ug/kg	17.6		(0%-20%)	SKJ	12/01/15	12:44
QC1203437196 LCS											
Aluminum		199000	D	185000	ug/kg			93 (80%-120%)	BCD1	11/22/15	01:26
Arsenic		4970	D	5020	ug/kg			101 (80%-120%)		11/23/15	15:44
Barium		4970	D	4840	ug/kg			97.4 (80%-120%)		11/22/15	01:26
Beryllium		4970	D	5550	ug/kg			112 (80%-120%)	SKJ	12/01/15	12:37
Cadmium		4970	D	4680	ug/kg			94.2 (80%-120%)	BCD1	11/22/15	01:26

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QC Summary

Workorder: 385927

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1524800										
Chromium	4970		D	5580	ug/kg		112	(80%-120%)			
Cobalt	4970		D	5610	ug/kg		113	(80%-120%)	BCD1	11/22/15	01:26
Copper	4970		D	5750	ug/kg		116	(80%-120%)	SKJ	12/01/15	12:37
Lead	4970		D	5280	ug/kg		106	(80%-120%)	BCD1	11/22/15	01:26
Manganese	4970		D	5420	ug/kg		109	(80%-120%)		11/23/15	15:44
Molybdenum	4970		D	4680	ug/kg		94.1	(80%-120%)		11/22/15	01:26
Nickel	4970		D	5760	ug/kg		116	(80%-120%)	SKJ	12/01/15	12:37
Selenium	4970		D	4540	ug/kg		91.4	(80%-120%)	BCD1	11/23/15	15:44
Uranium	4970		D	5760	ug/kg		116	(34%-166%)	SKJ	12/01/15	12:37
QC1203437195	MB										
Aluminum			DU	ND	ug/kg				BCD1	11/22/15	01:20
Arsenic			DU	ND	ug/kg					11/23/15	15:40
Barium			DU	ND	ug/kg					11/22/15	01:20
Beryllium			DU	ND	ug/kg				SKJ	12/01/15	12:35
Cadmium			DU	ND	ug/kg				BCD1	11/22/15	01:20
Chromium			BD	207	ug/kg						
Cobalt			DU	ND	ug/kg						
Copper			DU	ND	ug/kg				SKJ	12/01/15	12:35
Lead			DU	ND	ug/kg				BCD1	11/22/15	01:20
Manganese			DU	ND	ug/kg					11/23/15	15:40
Molybdenum			DU	ND	ug/kg					11/22/15	01:20
Nickel			DU	ND	ug/kg				SKJ	12/01/15	12:35
Selenium			DU	ND	ug/kg				BCD1	11/23/15	15:40

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QC Summary

Workorder: 385927

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1524800										
Uranium			DU	ND	ug/kg				SKJ	12/01/15	12:35
QC1203437198	385927002	MS									
Aluminum	206000	D	7240000	D	8310000	ug/kg	N/A	(75%-125%)	BCD1	11/22/15	01:46
Arsenic	5150	D	2620	D	7630	ug/kg	97.1	(75%-125%)		11/23/15	17:02
Barium	5150	D	77400	D	85500	ug/kg	N/A	(75%-125%)		11/22/15	01:46
Beryllium	5150	D	315	D	5900	ug/kg	108	(75%-125%)	SKJ	12/01/15	12:45
Cadmium	5150	D	637	D	5310	ug/kg	90.7	(75%-125%)	BCD1	11/22/15	01:46
Chromium	5150	DN	11100	DN	19700	ug/kg	168*	(75%-125%)			
Cobalt	5150	D	7620	D	13200	ug/kg	108	(75%-125%)			
Copper	5150	DM	15300	D	19300	ug/kg	78.2	(75%-125%)	SKJ	12/01/15	12:45
Lead	5150	D	4530	D	9650	ug/kg	99.2	(75%-125%)	BCD1	11/22/15	01:46
Manganese	5150	D	328000	D	342000	ug/kg	N/A	(75%-125%)		11/23/15	15:57
Molybdenum	5150	D	812	D	6110	ug/kg	103	(75%-125%)		11/22/15	01:46
Nickel	5150	DMN	10900	DN	17700	ug/kg	132*	(75%-125%)	SKJ	12/01/15	12:45
Selenium	5150	DU	ND	D	4410	ug/kg	85.5	(75%-125%)	BCD1	11/23/15	17:02
Uranium	5150	D	808	D	6420	ug/kg	109	(75%-125%)	SKJ	12/01/15	12:45
QC1203438915	385927002	PS									
Chromium	50.0	DN	53.1	D	100	ug/L	94.7	(80%-120%)	BCD1	11/22/15	01:53
Nickel	50.0	DMN	52.4	D	106	ug/L	107	(80%-120%)	SKJ	12/01/15	12:47
QC1203437199	385927002	SDILT									
Aluminum		D	34800	D	7640	ug/L	9.82	(0%-10%)	BCD1	11/22/15	02:00
Arsenic		D	12.6	D	2.30	ug/L	8.69	(0%-10%)		11/23/15	17:10
Barium		D	372	D	81.1	ug/L	9.08	(0%-10%)		11/22/15	02:00

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QC Summary

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Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1524800										
Beryllium	D	1.51	D	0.336	ug/L	11.2		(0%-10%)	SKJ	12/01/15	12:49
Cadmium	D	3.06	D	0.586	ug/L	4.25		(0%-10%)	BCD1	11/22/15	02:00
Chromium	DN	53.1	D	11.1	ug/L	4.62		(0%-10%)			
Cobalt	D	36.6	D	7.89	ug/L	7.78		(0%-10%)			
Copper	DM	73.5	DM	17.4	ug/L	18.6*		(0%-10%)	SKJ	12/01/15	12:49
Lead	D	21.8	D	4.56	ug/L	4.79		(0%-10%)	BCD1	11/22/15	02:00
Manganese	D	78.7	D	15.9	ug/L	1.17		(0%-10%)		11/23/15	16:05
Molybdenum	D	3.90	D	0.806	ug/L	3.36		(0%-10%)		11/22/15	02:00
Nickel	DMN	52.4	DM	12.2	ug/L	16.3*		(0%-10%)	SKJ	12/01/15	12:49
Selenium	DU	ND	DU	ND	ug/L	N/A		(0%-10%)	BCD1	11/23/15	17:10
Uranium	D	3.88	D	0.804	ug/L	3.58		(0%-10%)	SKJ	12/01/15	12:49
Metals Analysis-ICP											
Batch	1524782										
QC1203437158	385927002	DUP									
Antimony		2880		3000	ug/kg	3.9 ^		(+/-1010)	JWJ	11/24/15	18:12
Silver	B	489		575	ug/kg	16.1 ^		(+/-507)			
QC1203437157	LCS										
Antimony		47800		51900	ug/kg		109	(80%-120%)		11/24/15	18:05
Silver		47800		48800	ug/kg		102	(80%-120%)			
QC1203437156	MB										
Antimony			U	ND	ug/kg					11/24/15	18:02
Silver			U	ND	ug/kg						
QC1203437159	385927002	MS									
Antimony		51100		2880	ug/kg		98.8	(75%-125%)		11/24/15	18:16
Silver		51100	B	489	ug/kg		100	(75%-125%)			
QC1203437160	385927002	SDILT									

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QC Summary

Workorder: **385927**

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1524782										
Antimony		28.4	D	6.11	ug/L	7.54		(0%-10%)		11/24/15	18:20
Silver	B	4.82	DU	ND	ug/L	N/A		(0%-10%)	JWJ		
Metals Analysis-Mercury											
Batch	1525034										
QC1203437857	385927002	DUP									
Mercury	B	6.99	B	7.13	ug/kg	2.07 ^		(+/-12.0)	MTM1	11/23/15	16:02
QC1203437856	LCS										
Mercury	118			122	ug/kg		104	(80%-120%)		11/23/15	15:48
QC1203437855	MB										
Mercury			U	ND	ug/kg					11/23/15	15:47
QC1203437858	385927002	MS									
Mercury	118	B	6.99	122	ug/kg		96.9	(80%-120%)		11/23/15	17:25
QC1203437859	385927002	SDILT									
Mercury	B	0.115	DU	ND	ug/L	N/A		(0%-10%)		11/23/15	17:15

Notes:

The Qualifiers in this report are defined as follows:

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

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QC Summary

Workorder: 385927

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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.

Miscellaneous

DATA EXCEPTION REPORT			
Mo.Day Yr. 01-DEC-15	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: ICP/MS	Test / Method: SW846 3050B/6020A	Matrix Type: Solid	Client Code: CPRC
Batch ID: 1524800	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 385927(GEL385927)			
Application Issues: Failed Recovery for MS/MSD, or PS/PSD Failed difference for SDILT			
Specification and Requirements Exception Description:		DER Disposition:	
1. Failed Recovery for MS/MSD, or PS/PSD: QC 1203437198MS 2. Failed difference for SDILT: QC 1203437199SDILT		1. The MS/MSD (See Below) did not meet the recommended quality control acceptance criteria for percent recoveries for the following applicable analyte. The post spike recovery was within the required control limits. This verifies the absence of a matrix interference in the post-spike digested sample. The recovery may be attributed to possible sample matrix interference and/or non-homogeneity. 1203437198 (B33MD7MS) Chromium [168* (75%-125%)] and Nickel [132* (75%-125%)]. 2. Not all the applicable analytes were within the established acceptance criteria. Matrix suppression may be suspected. The data has been qualified. 1203437199 (B33MD7SDILT) Copper [18.6 *(0%-10%)] and Nickel [16.3 *(0%-10%)].	

Originator's Name:
Samantha Jacobs 01-DEC-15

Data Validator/Group Leader:
Elizabeth Janssen 01-DEC-15

General Chem Analysis

Case Narrative

**General Chemistry
Technical Case Narrative
CH2M Hill Plateau Remediation Company (CPRC)
SDG #: GEL385927
Work Order #: 385927**

Method/Analysis Information

Product: Cyanide and Total
Analytical Batch: 1524340 **Method:** 9010_CYANIDE: COMMON
Prep Batch : 1524339 **Method:** SW846 9010C Distillation

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 9012B:

Sample ID	Client ID
385927002	B33MD7
1203436091	Method Blank (MB)
1203436092	Laboratory Control Sample (LCS)
1203436094	385927002(B33MD7) Sample Duplicate (DUP)
1203436096	385927002(B33MD7) Matrix Spike (MS)

Sample 385927 002 in this SDG was analyzed on a "dry weight corrected" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-095 REV# 17.

Preparation/Analytical Method Verification

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

Calibration Information

The Flow Injection analysis was performed on a Lachat QuickChem FIA+ 8000 Series.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 385927002 (B33MD7) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

The Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample:

Analyte	Sample	Value
Cyanide, Total	1203436094 (B33MD7DUP)	112* (0.0%-30.0%)

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The following sample was diluted because target analyte concentrations exceeded the calibration range. 1203436092 (LCS).

Sample Re-analysis

Sample 1203436092 (LCS) was re-analyzed due to instrument failure. The results from the reanalysis are reported.

Miscellaneous Information

Data Exception (DER) Documentation

A data exception report (DER) 1469206 was generated for sample 1203436094 (B33MD7DUP) in this SDG/batch.

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

DECEMBER 03, 2015

always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Method/Analysis Information

Product:	Ion Chromatography		
Analytical Batch:	1525280	Method:	9056_ANIONS_IC:COMMON + (Add-on)
Prep Batch :	1525279	Method:	SW846 9056A

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 9056A:

Sample ID	Client ID
385927001	B33MD8
1203438465	Method Blank (MB)
1203438466	Laboratory Control Sample (LCS)
1203438467	385927001(B33MD8) Sample Duplicate (DUP)
1203438468	385927001(B33MD8) Matrix Spike (MS)

Sample 385927 001 in this SDG was analyzed on a "dry weight corrected" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-086 REV# 24.

Preparation/Analytical Method Verification

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

Calibration Information

The Ion Chromatography analysis was performed on a Dionex ICS-3000 Ion Chromatograph.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 385927001 (B33MD8) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Manual Integrations

Samples 1203438467 (B33MD8DUP), 1203438468 (B33MD8MS) and 385927001 (B33MD8) were manually integrated to correctly position the baseline as set in the calibration standards.

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are

present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Certification Statement

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

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL385927 GEL Work Order: 385927

The Qualifiers in this report are defined as follows:

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: Thomas Lewis

Date: 30 NOV 2015

Title: Data Validator

Sample Data Summary

Certificate of Analysis

Report Date: November 30, 2015

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F15-011

Client Sample ID: B33MD8	Project: CPRC0F15011
Sample ID: 385927001	Client ID: CPRC001
Matrix: SOIL	
Collect Date: 18-NOV-15 08:35	
Receive Date: 19-NOV-15	
Collector: Client	
Moisture: 4.47%	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
9056_ANIONS_IC:COMMON + (Add-on) "Dry Weight Corrected"											
Chloride		6480	696	2080	ug/Kg	1	MXL2	11/23/15	1907	1525280	1
Fluoride		1310	343	1040	ug/Kg	1					
Nitrate-N		2440	343	1040	ug/Kg	1					
Nitrite-N	U	343	343	1040	ug/Kg	1					
Phosphorus in phosphate	U	696	696	2080	ug/Kg	1					
Sulfate		22000	1380	4160	ug/Kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 9056A	SW846 9056A Total Anions in Soil	MXL2	11/23/15	0935	1525279

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9056A	

Notes:

Certificate of Analysis

Report Date: November 30, 2015

Company : CH2MHill Plateau Remediation Company
Address : MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Project: CHPRC SAF F15-011

Client Sample ID: B33MD7 Project: CPRC0F15011
Sample ID: 385927002 Client ID: CPRC001
Matrix: SOIL
Collect Date: 18-NOV-15 08:35
Receive Date: 19-NOV-15
Collector: Client
Moisture: 4.13%

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Flow Injection Analysis											
9010_CYANIDE: COMMON "Dry Weight Corrected"											
Cyanide, Total		1630	83.8	251	ug/kg	1	AXH3	11/20/15	1058	1524340	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 9010C Distillation	SW846 9010C Prep	AXH3	11/20/15	0933	1524339

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9012B	

Notes:

Quality Control Summary

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QC Summary

Report Date: November 30, 2015

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CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 385927

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Flow Injection Analysis											
Batch	1524340										
QC1203436094	385927002	DUP									
Cyanide, Total		1630		459	ug/kg	112*^		(+/-237)	AXH3	11/20/15	10:59
QC1203436092	LCS										
Cyanide, Total	90600		D	102000	ug/kg		113	(64%-149%)		11/20/15	10:35
QC1203436091	MB										
Cyanide, Total			U	83.5	ug/kg					11/20/15	10:30
QC1203436096	385927002	MS									
Cyanide, Total	4830	1630		5890	ug/kg		88.1	(47%-133%)		11/20/15	11:00
Ion Chromatography											
Batch	1525280										
QC1203438467	385927001	DUP									
Chloride		6480		6550	ug/Kg	1.16 ^		(+/-2080)	MXL2	11/23/15	19:40
Fluoride		1310		1310	ug/Kg	0.705 ^		(+/-1040)			
Nitrate-N		2440		2450	ug/Kg	0.504 ^		(+/-1040)			
Nitrite-N	U	343	U	344	ug/Kg	N/A					
Phosphorus in phosphate	U	696	U	698	ug/Kg	N/A					
Sulfate		22000		21700	ug/Kg	1.26		(0%-30%)			
QC1203438466	LCS										
Chloride	50000			48100	ug/Kg		96.2	(70%-130%)		11/23/15	18:34
Fluoride	25000			24800	ug/Kg		99.3	(70%-130%)			
Nitrate-N	25000			24500	ug/Kg		98.2	(70%-130%)			
Nitrite-N	25000			24500	ug/Kg		98.1	(70%-130%)			
Phosphorus in phosphate	12500			13900	ug/Kg		111	(70%-130%)			
Sulfate	100000			99200	ug/Kg		99.2	(70%-130%)			
QC1203438465	MB										

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QC Summary

Workorder: 385927

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1525280										
Chloride			U	668	ug/Kg					11/23/15	18:01
Fluoride			U	329	ug/Kg				MXL2		
Nitrate-N			U	329	ug/Kg						
Nitrite-N			U	329	ug/Kg						
Phosphorus in phosphate			U	668	ug/Kg						
Sulfate			U	1330	ug/Kg						
QC1203438468 385927001 MS											
Chloride	52100	6480		55600	ug/Kg		94.4	(48%-145%)		11/23/15	20:13
Fluoride	26000	1310		25700	ug/Kg		93.6	(30%-135%)			
Nitrate-N	26000	2440		27300	ug/Kg		95.3	(70%-125%)			
Nitrite-N	26000	U 343		25500	ug/Kg		98	(70%-120%)			
Phosphorus in phosphate	13000	U 696		10600	ug/Kg		77.9	(35%-134%)			
Sulfate	104000	22000		124000	ug/Kg		97.8	(45%-162%)			

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

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QC Summary

Workorder: 385927

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	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.

Miscellaneous

DATA EXCEPTION REPORT

Mo.Day Yr. 20-NOV-15	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: LACHAT Flow Injection Analyzer	Test / Method: SW846 9012B	Matrix Type: Solid	Client Code: CPRC
Batch ID: 1524340	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 385927(GEL385927)			
Application Issues: Failed RPD for DUP			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Failed RPD for DUP: QC 1203436094DUP</p>		<p>1. The Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample: Cyanide, Total 1203436094 (B33MD7DUP) [112* (0.0%-30.0%)].</p>	

Originator's Name:
Aubrey Kingsbury 20-NOV-15

Data Validator/Group Leader:
Kristen Mizzell 20-NOV-15

Radiological Analysis

DECEMBER 03, 2015

Radiochemistry

Technical Case Narrative

CH2MHill Plateau Remediation Company (CPRC)

SDG #: GEL385927

Work Order #: 385927

Method/Analysis Information

Product: NP237_IE_PRECIP_AEA: COMMON

Analytical Method: ASTM C 1476-00 Modified

Prep Method: Dry Soil Prep

Analytical Batch Number: 1525726

Prep Batch Number: 1524712

Sample ID	Client ID
385927002	B33MD7
1203439555	Method Blank (MB)
1203439557	Laboratory Control Sample (LCS)
1203439556	386080004(B33MH6) Sample Duplicate (DUP)

Sample 385927 002 in this SDG was analyzed on a "dry weight corrected" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-032 REV# 20.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

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

QC Information

All of the QC samples met the required acceptance limits.

Designated QC

The following sample was used for QC: 386080004 (B33MH6).

Technical Information:

Holding Time

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

Sample Re-prep/Re-analysis

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

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

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

Manual Integration

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product:	PUISO_PRECIP_AEA:COMMON
Analytical Method:	PUISO_PLATE_AEA
Prep Method:	Dry Soil Prep
Analytical Batch Number:	1525729
Prep Batch Number:	1524712

Sample ID	Client ID
385927002	B33MD7
1203439558	Method Blank (MB)
1203439560	Laboratory Control Sample (LCS)
1203439559	386080004(B33MH6) Sample Duplicate (DUP)

Sample 385927 002 in this SDG was analyzed on a "dry weight corrected" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-011 REV# 25.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

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

QC Information

All of the QC samples met the required acceptance limits.

Designated QC

The following sample was used for QC: 386080004 (B33MH6).

Technical Information:

Holding Time

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

Sample Re-prep/Re-analysis

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

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

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

Manual Integration

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: UISO_IE_PRECIP_AEA:COMMON
Analytical Method: UISO_IE_PRECIP_AEA
Prep Method: Dry Soil Prep
Analytical Batch Number: 1525730
Prep Batch Number: 1524712

Sample ID	Client ID
385927002	B33MD7
1203439561	Method Blank (MB)
1203439563	Laboratory Control Sample (LCS)
1203439562	386080004(B33MH6) Sample Duplicate (DUP)

Sample 385927 002 in this SDG was analyzed on a "dry weight corrected" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-011 REV# 25.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

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

QC Information

All of the QC samples met the required acceptance limits.

Designated QC

The following sample was used for QC: 386080004 (B33MH6).

Technical Information:

Holding Time

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

Sample Re-prep/Re-analysis

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

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

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

Manual Integration

Manual integration of alpha spectroscopy spectra 1203439562 (B33MH6DUP) was performed to fully separate counts in Regions of Interest which would have been biased.

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: AMCMISO_EIE_PRECIP_AEA: COMMON

Analytical Method: AMCMISO_EIE_PREC_AEA

Prep Method: Dry Soil Prep

Analytical Batch Number: 1527133

Prep Batch Number: 1524712

Sample ID	Client ID
385927002	B33MD7
1203443231	Method Blank (MB)
1203443233	Laboratory Control Sample (LCS)
1203443232	386080004(B33MH6) Sample Duplicate (DUP)

Sample 385927 002 in this SDG was analyzed on a "dry weight corrected" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-011 REV# 25.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

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

QC Information

All of the QC samples met the required acceptance limits.

Designated QC

The following sample was used for QC: 386080004 (B33MH6).

Technical Information:

Holding Time

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

Sample Re-prep/Re-analysis

Samples were re-prepped due to low carrier/tracer yield. The re-analysis is being reported.

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

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

Manual Integration

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: Dry Weight-Percent Moisture
Analytical Method: Dry Soil Prep
Analytical Batch Number: 1524712

Sample ID	Client ID
385927002	B33MD7
1203436992	385927002(B33MD7) Sample Duplicate (DUP)

Sample 385927 002 in this SDG was analyzed on an "as received" basis.

SOP Reference

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

Calibration Information:

Quality Control (QC) Information:

Designated QC

The following sample was used for QC: 385927002 (B33MD7).

Technical Information:

Holding Time

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

Miscellaneous Information:

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Procedure: Dry Weight-Percent Moisture

Analytical Method: ASTM D 2216 (Modified)

Analytical Batch Number: 1524933

Sample ID	Client ID
385927001	B33MD8
1203437529	385972001(GT16V0777, Bldg 102, Roof Dust composite) Sample Duplicate (DUP)

Sample 385927 001 in this SDG was analyzed on an "as received" basis.

SOP Reference

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

Calibration Information:

Quality Control (QC) Information:

Designated QC

The following sample was used for QC: 385972001 (GT16V0777, Bldg 102, Roof Dust composite).

Technical Information:

Holding Time

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

Miscellaneous Information:

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: GAMMA_GS:COMMON

Analytical Method: GAMMA_GS

Prep Method: Dry Soil Prep
Analytical Batch Number: 1524924
Prep Batch Number: 1524712

Sample ID	Client ID
385927002	B33MD7
1203437524	Method Blank (MB)
1203437526	Laboratory Control Sample (LCS)
1203437525	385927002(B33MD7) Sample Duplicate (DUP)

Sample 385927 002 in this SDG was analyzed on a "dry weight corrected" basis.

SOP Reference

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

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

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

QC Information

All of the QC samples met the required acceptance limits.

Designated QC

The following sample was used for QC: 385927002 (B33MD7).

Technical Information:

Holding Time

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

Sample Re-prep/Re-analysis

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

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

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

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: SRTOT_SEP_PRECIP_GPC: COMMON

Analytical Method: SRTOT_SEP_PRECIP_GPC

Prep Method: Dry Soil Prep

Analytical Batch Number: 1525650

Prep Batch Number: 1524712

Sample ID	Client ID
385927002	B33MD7
1203439345	Method Blank (MB)
1203439347	Laboratory Control Sample (LCS)
1203439346	386080006(B33MJ1) Sample Duplicate (DUP)

Sample 385927 002 in this SDG was analyzed on a "dry weight corrected" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-004 REV# 17.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

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

QC Information

All of the QC samples met the required acceptance limits.

Designated QC

The following sample was used for QC: 386080006 (B33MJ1).

Technical Information:

Holding Time

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

Sample Re-prep/Re-analysis

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

Chemical Recoveries

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

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

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

Manual Integration

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: NI63_LSC: COMMON

Analytical Method: NI63_LSC

Prep Method: Dry Soil Prep
Analytical Batch Number: 1525463
Prep Batch Number: 1524712

Sample ID	Client ID
385927002	B33MD7
1203438850	Method Blank (MB)
1203438852	Laboratory Control Sample (LCS)
1203438851	386080004(B33MH6) Sample Duplicate (DUP)

Sample 385927 002 in this SDG was analyzed on a "dry weight corrected" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-022 REV# 17.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

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

QC Information

All of the QC samples met the required acceptance limits.

Designated QC

The following sample was used for QC: 386080004 (B33MH6).

Technical Information:

Holding Time

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

Sample Re-prep/Re-analysis

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

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

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

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: TC99_EIE_LSC: COMMON

Analytical Method: TC99_EIE_LSC

Analytical Batch Number: 1525464

Sample ID	Client ID
385927002	B33MD7
1203438853	Method Blank (MB)
1203438855	Laboratory Control Sample (LCS)
1203438854	386080004(B33MH6) Sample Duplicate (DUP)

Sample 385927 002 in this SDG was analyzed on an "as received" basis.

SOP Reference

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

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

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

QC Information

All of the QC samples met the required acceptance limits.

Designated QC

The following sample was used for QC: 386080004 (B33MH6).

Technical Information:

Holding Time

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

Sample Re-prep/Re-analysis

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

Recounts

Samples 1203438853 (MB), 1203438855 (LCS) and 385927002 (B33MD7) were recounted due to a suspected blank false positive. The recounts are reported. Sample 1203438854 (B33MH6DUP) was recounted due to a suspected blank false positive and then recounted due to results more negative than the three sigma TPU. The third count is reported.

Miscellaneous Information:

Data Exception (DER) Documentation

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

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: TRITIUM_DIST_LSC: COMMON
Analytical Method: TRITIUM_DIST_LSC
Analytical Batch Number: 1525465

Sample ID Client ID

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385927002	B33MD7
1203438856	Method Blank (MB)
1203438859	Laboratory Control Sample (LCS)
1203438857	386080004(B33MH6) Sample Duplicate (DUP)
1203438858	386080004(B33MH6) Matrix Spike (MS)

Sample 385927 002 in this SDG was analyzed on an "as received" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-002 REV# 21.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

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

QC Information

All of the QC samples met the required acceptance limits.

Designated QC

The following sample was used for QC: 386080004 (B33MH6).

Technical Information:

Holding Time

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

Sample Re-prep/Re-analysis

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

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

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

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: C14_LSC: COMMON

Analytical Method: C14_LSC

Analytical Batch Number: 1525466

Sample ID	Client ID
385927002	B33MD7
1203438860	Method Blank (MB)
1203438863	Laboratory Control Sample (LCS)
1203438861	386080004(B33MH6) Sample Duplicate (DUP)
1203438862	386080004(B33MH6) Matrix Spike (MS)

Sample 385927 002 in this SDG was analyzed on an "as received" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-003 REV# 15.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

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

QC Information

All of the QC samples met the required acceptance limits.

Designated QC

DECEMBER 03, 2015

The following sample was used for QC: 386080004 (B33MH6).

Technical Information:

Holding Time

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

Sample Re-prep/Re-analysis

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

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

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

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

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.

DECEMBER 03, 2015

GEL LABORATORIES LLC

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

**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL385927 GEL Work Order: 385927

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Heather McCarty

Date: 03 DEC 2015

Title: Analyst II

Sample Data Summary

DECEMBER 03, 2015

Certificate of Analysis

Sample Summary

SDG Number: GEL385927
Lab Sample ID: 385927001

Client: CPRC001
Date Collected: 11/18/2015 08:35
Date Received: 11/19/2015 09:10

Project: CPRC0F15011
Matrix: SOIL
%Moisture: 4.5

DECEMBER 03, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL385927	Client: CPRC001	Project: CPRC0F15011
Lab Sample ID: 385927002	Date Collected: 11/18/2015 08:35	Matrix: SOIL
	Date Received: 11/19/2015 09:10	%Moisture: 4.1
Client ID: B33MD7		Prep Basis: "Dry Weight Corrected"
Batch ID: 1525726	Method: ASTM C 1476-00 Modified	SOP Ref: GL-RAD-A-032
Run Date: 11/25/2015 13:49	Analyst: MXS2	Instrument: 1168
Data File: S0385927002_NP.1A.gcnf	Aliquot: 0.103 g	Count Time: 240 min
Prep Batch: 1525726	Prep Method: ASTM C 1476-00 Modified	Prep SOP Ref: GL-RAD-A-021
Prep Date: 11/24/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
13994-20-2	Neptunium-237	U	-0.0839	pCi/g	+/-0.283	0.284	0.736	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	1520	1950	pCi/g	77.6	(15%-125%)

Comments:

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

DECEMBER 03, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL385927
Lab Sample ID: 385927002

Client: CPRC001
Date Collected: 11/18/2015 08:35
Date Received: 11/19/2015 09:10

Project: CPRC0F15011
Matrix: SOIL
%Moisture: 4.1

Client ID: B33MD7
Batch ID: 1525729
Run Date: 11/27/2015 09:42
Data File: S0385927002_PU.1A.gcnf
Prep Batch: 1525729
Prep Date: 11/24/2015 00:00

Method: PUIISO_PLATE_AEA
Analyst: MXS2
Aliquot: 0.107 g
Prep Method: DOE EML HASL-300, Pu-11-

Prep Basis: "Dry Weight Corrected"
SOP Ref: GL-RAD-A-011
Instrument: 1099
Count Time: 240 min
Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	0.0521	pCi/g	+/-0.233	0.234	0.457	1.00
OER-100-70	Plutonium-239/240	U	-0.013	pCi/g	+/-0.195	0.196	0.456	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	14.1	18.4	pCi/g	76.3	(15%-125%)

Comments:

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

DECEMBER 03, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL385927
Lab Sample ID: 385927002

Client: CPRC001
Date Collected: 11/18/2015 08:35
Date Received: 11/19/2015 09:10

Project: CPRC0F15011
Matrix: SOIL
%Moisture: 4.1

Client ID: B33MD7
Batch ID: 1525730
Run Date: 11/27/2015 09:42
Data File: S0385927002_UU.1A.gcnf
Prep Batch: 1525730
Prep Date: 11/24/2015 00:00

Method: UIISO_IE_PRECIP_AEA
Analyst: MXS2
Aliquot: 0.107 g
Prep Method: DOE EML HASL-300, U-02-R

Prep Basis: "Dry Weight Corrected"
SOP Ref: GL-RAD-A-011
Instrument: 1002
Count Time: 239.9998 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		0.676	pCi/g	+/-0.479	0.491	0.445	1.00
15117-96-1/13982-7	Uranium-235/236	U	-0.0432	pCi/g	+/-0.191	0.192	0.499	1.00
7440-61-1	Uranium-238		0.513	pCi/g	+/-0.435	0.443	0.480	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	16.8	19.7	pCi/g	84.9	(15%-125%)

Comments:

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

DECEMBER 03, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL385927	Client: CPRC001	Project: CPRC0F15011
Lab Sample ID: 385927002	Date Collected: 11/18/2015 08:35	Matrix: SOIL
	Date Received: 11/19/2015 09:10	%Moisture: 4.1
Client ID: B33MD7		Prep Basis: "Dry Weight Corrected"
Batch ID: 1527133	Method: AMCMISO_EIE_PREC_AEA	SOP Ref: GL-RAD-A-011
Run Date: 11/30/2015 22:21	Analyst: MXS2	Instrument: 1222
Data File: S0385927002_AM.2A.gcnf	Aliquot: 0.106 g	Count Time: 240 min
Prep Batch: 1527133	Prep Method: DOE EML HASL-300, Am-05	Prep SOP Ref: GL-RAD-A-021
Prep Date: 11/30/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	0.00557	pCi/g	+/-0.413	0.414	0.918	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	10.3	20.2	pCi/g	51.2	(15%-125%)

Comments:

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

DECEMBER 03, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL385927	Client: CPRC001	Project: CPRC0F15011
Lab Sample ID: 385927002	Date Collected: 11/18/2015 08:35	Matrix: SOIL
	Date Received: 11/19/2015 09:10	%Moisture: 4.1
Client ID: B33MD7		Prep Basis: "Dry Weight Corrected"
Batch ID: 1525650	Method: SRTOT_SEP_PRECIP_GPC	SOP Ref: GL-RAD-A-004
Run Date: 11/30/2015 17:11	Analyst: KSD1	Instrument: PIC7A
Data File: S1525650r1.xls	Aliquot: 0.326 g	Count Time: 60 min
Prep Batch: 1525650	Prep Method: EPA 905.0 Modified/DOE RP5	Prep SOP Ref: GL-RAD-A-021
Prep Date: 11/30/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	-0.0735	pCi/g	+/-0.842	0.842	1.62	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	8.20	9.34	mg	87.8	(25%-125%)

Comments:

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

DECEMBER 03, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL385927
 Lab Sample ID: 385927002

 Client ID: B33MD7
 Batch ID: 1524924
 Run Date: 11/20/2015 16:29
 Data File: G385927002.CNF;1
 Prep Batch: 1524924
 Prep Date: 11/20/2015 00:00

Client: CPRC001
 Date Collected: 11/18/2015 08:35
 Date Received: 11/19/2015 09:10

 Method: GAMMA_GS
 Analyst: RXF2
 Aliquot: 150.072 g
 Prep Method: DOE HASL 300, 4.5.2.3/Ga-01

Project: CPRC0F15011
 Matrix: SOIL
 %Moisture: 4.1

 Prep Basis: "Dry Weight Corrected"
 SOP Ref: GL-RAD-A-013
 Instrument: GAM40
 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		1.25	pCi/g	+/-0.104	0.150	0.0545	0.100
10198-40-0	Cobalt-60	U	0.0189	pCi/g	+/-0.0318	0.033	0.0587	
14683-23-9	Europium-152	U	0.00543	pCi/g	+/-0.0817	0.0817	0.134	
15585-10-1	Europium-154	U	-0.0214	pCi/g	+/-0.102	0.102	0.162	
14391-16-3	Europium-155	U	0.0354	pCi/g	+/-0.0804	0.082	0.152	

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).

DECEMBER 03, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL385927
Lab Sample ID: 385927002

Client: CPRC001
Date Collected: 11/18/2015 08:35
Date Received: 11/19/2015 09:10

Project: CPRC0F15011
Matrix: SOIL
%Moisture: 4.1

Client ID: B33MD7
Batch ID: 1525463
Run Date: 12/02/2015 16:33
Data File: N1525463.xls
Prep Batch: 1525463
Prep Date: 12/01/2015 00:00

Method: NI63_LSC
Analyst: TYJ1
Aliquot: 0.223 g
Prep Method: DOE RESL Ni-1, Modified

Prep Basis: "Dry Weight Corrected"
SOP Ref: GL-RAD-A-022
Instrument: LSCGOLD
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	4.01	pCi/g	+/-11.1	11.1	19.2	30.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Nickel Carrier	19.7	24.4	mg	80.7	(25%-125%)

Comments:

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

DECEMBER 03, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL385927	Client: CPRC001	Project: CPRC0F15011
Lab Sample ID: 385927002	Date Collected: 11/18/2015 08:35	Matrix: SOIL
	Date Received: 11/19/2015 09:10	%Moisture: 4.1
Client ID: B33MD7		Prep Basis: "As Received"
Batch ID: 1525464	Method: TC99_EIE_LSC	SOP Ref: GL-RAD-A-059
Run Date: 11/30/2015 07:26	Analyst: MYM1	Instrument: LSCRED
Data File: E1525464R2.xls	Aliquot: 0.357 g	Count Time: 25 min
Prep Batch: 1525464	Prep Method: DOE EML HASL-300, Tc-02-	
Prep Date: 11/24/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	-5.28	pCi/g	+/-5.53	5.53	9.86	15.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	45400	47300	CPM	95.9	(15%-125%)

Comments:

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

DECEMBER 03, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL385927	Client: CPRC001	Project: CPRC0F15011
Lab Sample ID: 385927002	Date Collected: 11/18/2015 08:35	Matrix: SOIL
	Date Received: 11/19/2015 09:10	%Moisture: 4.1
Client ID: B33MD7		Prep Basis: "As Received"
Batch ID: 1525465	Method: TRITIUM_DIST_LSC	SOP Ref: GL-RAD-A-002
Run Date: 11/27/2015 06:57	Analyst: TXJ1	Instrument: LSCBROWN
Data File: T1525465.xls	Aliquot: 1.25 g	Count Time: 15 min
Prep Batch: 1525465	Prep Method: EPA 906.0 Modified	
Prep Date: 11/25/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium	U	6.43	pCi/g	+/-11.3	11.4	19.7	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).

DECEMBER 03, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL385927	Client: CPRC001	Project: CPRC0F15011
Lab Sample ID: 385927002	Date Collected: 11/18/2015 08:35	Matrix: SOIL
	Date Received: 11/19/2015 09:10	%Moisture: 4.1
Client ID: B33MD7		Prep Basis: "As Received"
Batch ID: 1525466	Method: C14_LSC	SOP Ref: GL-RAD-A-003
Run Date: 11/27/2015 09:55	Analyst: TXJ1	Instrument: LSCBROWN
Data File: C1525466.xls	Aliquot: 0.5 g	Count Time: 45 min
Prep Batch: 1525466	Prep Method: EPA EERF C-01 Modified	
Prep Date: 11/25/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	0.425	pCi/g	+/-2.03	2.03	3.47	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).

DECEMBER 03, 2015

Certificate of Analysis

Sample Summary

SDG Number: GEL385927
Lab Sample ID: 385927002

Client: CPRC001
Date Collected: 11/18/2015 08:35
Date Received: 11/19/2015 09:10

Project: CPRC0F15011
Matrix: SOIL
%Moisture: 4.1

Quality Control Data

DECEMBER 03, 2015 GEL LABORATORIES LLC

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

QC Summary

Report Date: December 3, 2015

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Client : CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Workorder: 385927

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1525726								
QC1203439555	MB								
Neptunium-237			U	-0.0268	pCi/g			MXS2	11/25/1513:49
				Uncert: +/-0.185					
				TPU: +/-0.185					
**Americium-243 Tracer	1610			1580	pCi/g	REC: 99	(15%-125%)		
QC1203439556	386080004	DUP							
Neptunium-237		U	-0.0396	U	-0.0488	pCi/g			11/25/1513:49
				Uncert: +/-0.175		RPD: 0	N/A		
				TPU: +/-0.175		RER: 0.0645	(0-2)		
**Americium-243 Tracer	1730	1530		1030	pCi/g	REC: 60	(15%-125%)		
QC1203439557	LCS								
Neptunium-237	35.7			36.4	pCi/g	REC: 102	(80%-120%)		11/25/1513:49
				Uncert: +/-2.82					
				TPU: +/-4.86					
**Americium-243 Tracer	1610			1620	pCi/g	REC: 101	(15%-125%)		
Batch	1525729								
QC1203439558	MB								
Plutonium-238			U	0.029	pCi/g			MXS2	11/27/1509:42
				Uncert: +/-0.161					
				TPU: +/-0.161					
Plutonium-239/240			U	0.058	pCi/g				
				Uncert: +/-0.198					
				TPU: +/-0.198					
**Plutonium-242 Tracer	17.1			14.1	pCi/g	REC: 82	(15%-125%)		
				Uncert: +/-1.92					
				TPU: +/-2.88					
QC1203439559	386080004	DUP							
Plutonium-238		U	0.120	U	0.0345	pCi/g			11/27/1509:42
				Uncert: +/-0.315		RPD: 0	N/A		
				TPU: +/-0.316		RER: 0.451	(0-2)		
Plutonium-239/240		U	0.0399	U	0.00265	pCi/g			
				Uncert: +/-0.221		RPD: 0	N/A		
				TPU: +/-0.222		RER: 0.246	(0-2)		
**Plutonium-242 Tracer	17.1	14.4		12.9	pCi/g	REC: 75	(15%-125%)		
				Uncert: +/-2.38					
				TPU: +/-3.53					
QC1203439560	LCS								
Plutonium-238			U	0.324	pCi/g				
				Uncert: +/-0.357					
				TPU: +/-0.360					
Plutonium-239/240	17.2			17.3	pCi/g	REC: 101	(80%-120%)		
				Uncert: +/-2.34					
				TPU: +/-3.46					
**Plutonium-242 Tracer	17.1			10.2	pCi/g	REC: 60	(15%-125%)		

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1525729								
				Uncert:					
				TPU:					
Batch	1525730								
QC1203439561	MB								
Uranium-233/234			U	0.428	pCi/g			MXS2	11/27/1509:42
				Uncert:					
				TPU:					
Uranium-235/236			U	0.0376	pCi/g				
				Uncert:					
				TPU:					
Uranium-238			U	0.147	pCi/g				
				Uncert:					
				TPU:					
**Uranium-232 Tracer		18.4		16.7	pCi/g	REC:	91 (15%-125%)		
				Uncert:					
				TPU:					
QC1203439562	386080004	DUP							
Uranium-233/234				0.998	0.669	pCi/g			11/27/1509:42
				Uncert:					
				TPU:					
Uranium-235/236		U	0.0706	U	0.0612	pCi/g			
				Uncert:					
				TPU:					
Uranium-238		U	0.322	0.442	pCi/g				
				Uncert:					
				TPU:					
**Uranium-232 Tracer		18.4	18.6	17.8	pCi/g	REC:	97 (15%-125%)		
				Uncert:					
				TPU:					
QC1203439563	LCS								
Uranium-233/234				20.6	pCi/g				
				Uncert:					
				TPU:					
Uranium-235/236				0.978	pCi/g				
				Uncert:					
				TPU:					
Uranium-238		23.4		23.7	pCi/g	REC:	101 (80%-120%)		
				Uncert:					
				TPU:					
**Uranium-232 Tracer		18.4		17.3	pCi/g	REC:	94 (15%-125%)		
				Uncert:					
				TPU:					
Batch	1527133								
QC1203443231	MB								
Americium-241			U	0.0671	pCi/g			MXS2	11/30/1522:22
				Uncert:					
				TPU:					
**Americium-243 Tracer		18.9		14.1	pCi/g	REC:	74 (15%-125%)		
				Uncert:					
				TPU:					

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1527133								
QC1203443232	386080004	DUP							
Americium-241		U	-0.0194	U	-0.0703	pCi/g			11/30/1522:22
		Uncert:	+/-0.167		+/-0.212		RPD: 0	N/A	
		TPU:	+/-0.168		+/-0.213		RER: 0.368	(0-2)	
**Americium-243 Tracer	19.5	17.7			13.2	pCi/g	REC: 68	(15%-125%)	
		Uncert:	+/-2.51		+/-2.69				
		TPU:	+/-3.74		+/-3.97				
QC1203443233	LCS								
Americium-241	17.5				16.3	pCi/g	REC: 93	(80%-120%)	11/30/1522:22
		Uncert:			+/-2.38				
		TPU:			+/-3.38				
**Americium-243 Tracer	18.9				14.0	pCi/g	REC: 74	(15%-125%)	
		Uncert:			+/-2.57				
		TPU:			+/-3.79				
Rad Gamma Spec									
Batch	1524924								
QC1203437524	MB								
Cesium-137				U	0.00192	pCi/g		RXF2	11/20/1516:30
		Uncert:			+/-0.016				
		TPU:			+/-0.016				
Cobalt-60				U	-0.00772	pCi/g			
		Uncert:			+/-0.0137				
		TPU:			+/-0.0141				
Europium-152				U	0.0177	pCi/g			
		Uncert:			+/-0.0437				
		TPU:			+/-0.0445				
Europium-154				U	0.0125	pCi/g			
		Uncert:			+/-0.0566				
		TPU:			+/-0.0568				
Europium-155				U	-0.0309	pCi/g			
		Uncert:			+/-0.0385				
		TPU:			+/-0.0411				
QC1203437525	385927002	DUP							
Cesium-137		1.25			1.42	pCi/g			11/20/1518:54
		Uncert:	+/-0.104		+/-0.0943		RPD: 12	(0% - 20%)	
		TPU:	+/-0.150		+/-0.158		RER: 1.48	(0-2)	
Cobalt-60		U	0.0189	U	-0.00326	pCi/g			
		Uncert:	+/-0.0318		+/-0.0333		RPD: 0	N/A	
		TPU:	+/-0.033		+/-0.0333		RER: 0.928	(0-2)	
Europium-152		U	0.00543	U	-0.0412	pCi/g			
		Uncert:	+/-0.0817		+/-0.0992		RPD: 0	N/A	
		TPU:	+/-0.0817		+/-0.101		RER: 0.703	(0-2)	
Europium-154		U	-0.0214	U	0.037	pCi/g			
		Uncert:	+/-0.102		+/-0.100		RPD: 0	N/A	
		TPU:	+/-0.102		+/-0.102		RER: 0.793	(0-2)	
Europium-155		U	0.0354	U	0.136	pCi/g			
		Uncert:	+/-0.0804		+/-0.109		RPD: 0	N/A	
		TPU:	+/-0.082		+/-0.109		RER: 1.44	(0-2)	
QC1203437526	LCS								
Americium-241	490				549	pCi/g	REC: 112	(80%-120%)	11/20/1518:54

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1524924								
				Uncert:					
				TPU:					
Cesium-137	183			177	pCi/g	REC: 97	(80%-120%)		
				Uncert:					
				TPU:					
Cobalt-60	180			167	pCi/g	REC: 93	(80%-120%)		
				Uncert:					
				TPU:					
Europium-152			U	-1.81	pCi/g				
				Uncert:					
				TPU:					
Europium-154			U	1.16	pCi/g				
				Uncert:					
				TPU:					
Europium-155			U	0.132	pCi/g				
				Uncert:					
				TPU:					
Rad Gas Flow									
Batch	1525650								
QC1203439345	MB								
Total Strontium			U	-1.71	pCi/g			KSD1	11/30/1517:11
				Uncert:					
				TPU:					
**Strontium Carrier	9.34			7.90	mg	REC: 85	(25%-125%)		
QC1203439346	386080006	DUP							
Total Strontium		U	0.318	U	-0.865	pCi/g			11/30/1517:11
				Uncert:	+/-0.916			RPD: 0	N/A
				TPU:	+/-0.920			RER: 1.85	(0-2)
**Strontium Carrier	9.34		7.70	8.20	mg	REC: 88	(25%-125%)		
QC1203439347	LCS								
Total Strontium	62.9			66.4	pCi/g	REC: 106	(80%-120%)		11/30/1517:11
				Uncert:	+/-4.16				
				TPU:	+/-17.3				
**Strontium Carrier	9.34			7.70	mg	REC: 82	(25%-125%)		
Rad Liquid Scintillation									
Batch	1525463								
QC1203438850	MB								
Nickel-63			U	3.22	pCi/g			TYJ1	12/02/1517:38
				Uncert:	+/-9.17				
				TPU:	+/-9.19				
**Nickel Carrier	24.4			19.0	mg	REC: 78	(25%-125%)		
QC1203438851	386080004	DUP							
Nickel-63		U	5.59	U	-3.27	pCi/g			12/02/1517:54
				Uncert:	+/-11.0			RPD: 0	N/A
				TPU:	+/-11.1			RER: 1.07	(0-2)
**Nickel Carrier	24.4		19.9	19.2	mg	REC: 79	(25%-125%)		
QC1203438852	LCS								
Nickel-63	483			497	pCi/g	REC: 103	(80%-120%)		12/02/1518:10
				Uncert:	+/-24.6				

QC Summary

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Liquid Scintillation									
Batch	1525463								
		TPU:		+/-95.2					
**Nickel Carrier	24.4			19.2	mg	REC: 79	(25%-125%)		
Batch	1525464								
QC1203438853	MB								
Technetium-99			U	-3.04	pCi/g			MYM1	11/30/1509:14
		Uncert:		+/-4.64					
		TPU:		+/-4.64					
**Technetium-99m Tracer	47300			45000	CPM	REC: 95	(15%-125%)		
QC1203438854	386080004	DUP							
Technetium-99		U	-2.95	U	0.367				11/30/1512:12
		Uncert:	+/-5.50	+/-6.13		RPD: 0	N/A		
		TPU:	+/-5.50	+/-6.13		RER: 0.789	(0-2)		
**Technetium-99m Tracer	47300			45500	CPM	REC: 96	(15%-125%)		
QC1203438855	LCS								
Technetium-99				187	pCi/g	REC: 94	(80%-120%)		11/30/1510:08
		Uncert:		+/-9.04					
		TPU:		+/-23.5					
**Technetium-99m Tracer	47300			44700	CPM	REC: 94	(15%-125%)		
Batch	1525465								
QC1203438856	MB								
Tritium			U	1.14	pCi/g			TXJ1	11/27/1508:02
		Uncert:		+/-10.4					
		TPU:		+/-10.4					
QC1203438857	386080004	DUP							
Tritium		U	6.78	U	7.74				11/27/1508:19
		Uncert:	+/-11.2	+/-10.9		RPD: 0	N/A		
		TPU:	+/-11.3	+/-11.1		RER: 0.119	(0-2)		
QC1203438858	386080004	MS							
Tritium		94.1	U	6.78	90.2	pCi/g	REC: 96	(75%-125%)	11/27/1508:35
		Uncert:	+/-11.2	+/-17.4					
		TPU:	+/-11.3	+/-26.9					
QC1203438859	LCS								
Tritium		92.5		87.6	pCi/g	REC: 95	(80%-120%)		11/27/1508:51
		Uncert:		+/-17.0					
		TPU:		+/-26.2					
Batch	1525466								
QC1203438860	MB								
Carbon-14			U	0.499	pCi/g			TXJ1	11/27/1513:02
		Uncert:		+/-1.93					
		TPU:		+/-1.93					
QC1203438861	386080004	DUP							
Carbon-14		U	0.797	U	0.182	pCi/g			11/27/1513:48
		Uncert:	+/-1.98	+/-1.99		RPD: 0	N/A		
		TPU:	+/-1.98	+/-1.99		RER: 0.429	(0-2)		
QC1203438862	386080004	MS							
Carbon-14		143	U	0.797	144	pCi/g	REC: 101	(75%-125%)	11/27/1514:35
		Uncert:	+/-1.98	+/-4.23					
		TPU:	+/-1.98	+/-11.4					
QC1203438863	LCS								
Carbon-14		143		142	pCi/g	REC: 100	(80%-120%)		11/27/1515:22

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Liquid Scintillation										
Batch		1525466								
				Uncert:		+/-4.23				
				TPU:		+/-11.3				

Notes:

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

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- B The associated QC sample blank has a result $\geq 2X$ 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.