

August 14, 2015



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gel.com

August 13, 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: 378431
SDG: GEL378431

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on August 01, 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,

Chelsea Seagle
Chelsea Seagle for
Heather Shaffer
Project Manager

Purchase Order: 302632 8C
Chain of Custody: F15-011-118, F15-011-119, F15-011-121 and F15-011-122
Enclosures



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Case Narrative

August 14, 2015

General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF F15-011
SDG: GEL378431

August 13, 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 August 01, 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:

<u>Laboratory Identification</u>	<u>Sample Description</u>
378431001	B320R2
378431002	B320R5
378431003	B320R4
378431004	B320R1

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.

August 14, 2015

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 Manger (or designee) and the laboratory's client services representative as verified by their signatures on this report.

Chelsea Seagle
Chelsea Seagle for
Heather Shaffer
Project Manager

Chain of Custody and Supporting Documentation

August 14, 2015

378431

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F15-011-119	PAGE 1 OF 1
COLLECTOR	D.W. Brotherton/CHPRC	COMPANY CONTACT	TELEPHONE NO.	PROJECT COORDINATOR	TODAK, D
SAMPLING LOCATION	605-48-15 7/29/15	PROJECT DESIGNATION	200-DV-1 Operable Unit Characterization of Waste Sites - Soil	SAF NO.	F15-011
ICE CHEST NO.	605-309	FIELD LOGBOOK NO.	HNFN-415-2/50	COA	302632
SHIPPED TO	GEL Laboratories, LLC	OFFSITE PROPERTY NO.	5840	BILL OF LADING/AIR BILL NO.	7741 8102 3050
MATRIX*	A=Air DL=Drum L=Liquids DS=Drum S=Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	PRESERVATION	Cool <=6C	ACTUAL SAMPLE DEPTH	64.4' - 66.4'
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.	HOLDING TIME	28 Days/48 Hours	METHOD OF SHIPMENT	FEDERAL EXPRESS
SPECIAL HANDLING AND/OR STORAGE	RADIOACTIVE TIE TO: 8320R2 DUB 7-30-15	TYPE OF CONTAINER	G/P		
		NO. OF CONTAINER(S)	1		
		VOLUME	60mL		
		SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS		
SAMPLE NO.	B320R2	SAMPLE DATE	7/30/15	SAMPLE TIME	1350

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	TRVL-15-100 ** Sample material used for GEA may be used to supplement sample mass required for other radiological tests. GEA data will be reported to CHPRC for review prior to proceeding with the remaining radiological tests. (1) 9056_ANIONS_IC: COMMON; 9056_ANIONS_IC: COMMON (Add-on) {Phosphorus in phosphate};	
D.W. Brotherton/CHPRC	JUL 30 2015 1436	SSU #1	JUL 30 2015 1436		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
SSU #1	JUL 31 2015 0710	L.D. Wall	JUL 31 2015 0710		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
L.D. Wall	JUL 31 2015 1400	CHPRC	JUL 31 2015 0710		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	FEDEX			
RELINQUISHED BY/REMOVED FROM	DATE/TIME	M. Kerslow	8-1-15 0840		
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				
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD				
PRINTED ON 7/13/2015	FSR ID = FSR1558	TRVL NUM = TRVL-15-100			
	DISPOSED BY	DATE/TIME			
		DATE/TIME			

A-6003-618 (REV 2)

August 14, 2015

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F15-011-122	PAGE 1 OF 1
COLLECTOR	R. Wall, Bethlehem/CHPRC	COMPANY CONTACT	TELEPHONE NO.	PROJECT COORDINATOR	TODAK, D
SAMPLING LOCATION	9056 ANIONS IC 7/29/15	PROJECT DESIGNATION	200-DV-1 Operable Unit Characterization of Waste Sites - Soil	SAF NO.	F15-011
ICE CHEST NO.	605-399	FIELD LOGBOOK NO.	ACTUAL SAMPLE DEPTH	COA	302632
SHIPPED TO	GEL Laboratories, LLC	OFFSITE PROPERTY NO.	5840	BILL OF LADING/AIR BILL NO.	7741 8102 3650

MATRIX*	POSSIBLE SAMPLE HAZARDS/ REMARKS	PRESERVATION	Cool <=6C
A=Air	*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.	HOLDING TIME	28 Days/48 Hours
DL=Drum		TYPE OF CONTAINER	G/P
DS=Drum		NO. OF CONTAINER(S)	1
Solids		VOLUME	60ml
L=Liquid		SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS
O=Oil		SAMPLE DATE	7/30/15
S=Soil		SAMPLE TIME	1403
SE=Sediment			
T=Tissue			
V=Vegetation			
W=Water			
WI=Wipe			
X=Other			
SPECIAL HANDLING AND/OR STORAGE	RADIOACTIVE TIE TO: B320R5-1403		
SAMPLE NO.	B320R5	MATRIX*	SOIL
			✓

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	TRVL-15-100 **	Sample material used for GE A may be used to supplement sample mass required for other radiological tests. GE A data will be reported to CHPRC for review prior to proceeding with the remaining radiological tests.
R. Wall, Bethlehem/CHPRC	JUL 30 2015 1436	SSU #1	JUL 30 2015 1436	(1) 9056_ANIONS_IC: COMMON;	9056_ANIONS_IC: COMMON (Add-on)
SSU #1	JUL 31 2015 0710	L.D. Wall	JUL 31 2015 0710	{Phosphorus in phosphate};	
L.D. Wall	JUL 31 2015 1400	CHPRC	JUL 31 2015 0710		
R. Wall, Bethlehem/CHPRC	JUL 31 2015 1400	RECEIVED BY/STORED IN	DATE/TIME		
FEDEX		RECEIVED BY/STORED IN	DATE/TIME		
M. Gaslow	8-1-15 0840	RECEIVED BY/STORED IN	DATE/TIME		
RECEIVED BY	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RECEIVED BY	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RECEIVED BY	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RECEIVED BY	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RECEIVED BY	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RECEIVED BY	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME		
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME		

August 14, 2015

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F15-011-121	PAGE 1 OF 1
COLLECTOR	D.W. Brotherton/CHPRC	COMPANY CONTACT	TELEPHONE NO.	PROJECT COORDINATOR	PRICE CODE
SAMPLING LOCATION	605-399	TODAK, D	376-6427	TODAK, D	8C
ICE CHEST NO.	605-399	PROJECT DESIGNATION	200-DV-1 Operable Unit Characterization of Waste Sites - Soil	SAF NO.	AIR QUALITY
SHIPPED TO	GEL Laboratories, LLC	FIELD LOGBOOK NO.	ACTUAL SAMPLE DEPTH	F15-011	15 Days / 15 Days
MATRIX*	POSSIBLE SAMPLE HAZARDS/ REMARKS	OFFSITE PROPERTY NO.	5840	COA	METHOD OF SHIPMENT
A=Air	*Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR/JATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.	None	None	302632	FEDERAL EXPRESS
DL=Drum		6 Months	6 Months	BILL OF LADING/AIR BILL NO.	
DS=Drum		14 Days	6 Months	774181023650	
Solids		G/P	G/P		
L=Liquid		1	1		
O=Oil		60mL	60mL		
S=Soil		SEE ITEM (1) IN SPECIAL INSTRUCTIONS	9010_CYANIDE: COMMON;		
SF=Sediment			TC99_EIE_LSC: COMMON;		
T=Tissue			UISO_PLATE_A COMMON;		
V=Vegetation					
W=Water					
WI=Wipe					
X=Other					
SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B320R4	SOIL	7/30/15	1403		

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	TRVL-15-100 ** Sample material used for GEA may be used to supplement sample mass required for other radiological tests. GEA data will be reported to CHPRC for review prior to proceeding with the remaining radiological tests.	
D.W. Brotherton/CHPRC	JUL 30 2015 1436	SSU # 61	JUL 30 2015 1436	(1) 6020_METALS_ICPMS: COMMON; 6020_METALS_ICPMS: COMMON (Add-on) {Arsenic, Manganese, Nickel, Uranium};	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	7471_MERCURY_CV: COMMON (SOLIDS);	
L.D. Wall	JUL 31 2015 0710	L.D. Wall	JUL 31 2015 0710		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
L.D. Wall	JUL 31 2015 1400	FEDEX			
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		
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	
PRINTED ON 7/13/2015	FSR ID = FSR1559	TRVL NUM = TRVL-15-100		A-6003-618 (REV 2)	

SAMPLE RECEIPT & REVIEW FORM

Client: <u>OPRC</u>		SDG/AR/COC/Work Order: <u>378431</u>	
Received By: <u>MK</u>		Date Received: <u>8-1-15</u>	
Suspected Hazard Information		Yes	No
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Classified Radioactive II or III by RSO?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
COC/Samples marked containing PCBs?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Package, COC, and/or Samples marked as beryllium or asbestos containing?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Samples identified as Foreign Soil?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.			
Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>cpm 0</u>			
If Yes, Were swipes taken of sample containers < action levels?			
If Yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.			
Hazard Class Shipped:		UN#:	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Preservation Method: <u>Ice bags</u> Blue ice Dry ice None Other (describe) <u>1c 2c</u> *all temperatures are recorded in Celsius
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>ES032015830</u> Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's, containers affected and observed pH:
6 Do Low Level Perchlorate samples (EPA 6850) have headspace as required?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If Preservation added, Lot#: Sample ID's and containers affected:
7 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
8 Are Encore containers present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
9 Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
10 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
11 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
12 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
13 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
14 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
15 Carrier and tracking number.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other <u>7741 8398 7934 2c</u> <u>7741 8102 3650 1c</u> <u>7741 8632 0157 2c</u> <u>7741 8102 3580 2c</u> <u>7741 8398 8286 1c</u>

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials EM Date 8/1/15 Page 1 of 1

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 13 August 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	P330-12-00283, P330-12-00284
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	SC000122014-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
Oklahoma	9904
Pennsylvania NELAP	68-00485
Plant Material Permit	PDEP-12-00260
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-15-10
Utah NELAP	SC000122015-17
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Metals Analysis

Case Narrative

August 14, 2015

Metals

Technical Case Narrative

CH2MHill Plateau Remediation Company (CPRC)

SDG #: GEL378431

Work Order #: 378431

Sample ID	Client ID
378431003	B320R4
378431004	B320R1
1203366091	Method Blank (MB)ICP-MS
1203366092	Laboratory Control Sample (LCS)
1203366095	378431003(B320R4L) Serial Dilution (SD)
1203366093	378431003(B320R4D) Sample Duplicate (DUP)
1203366094	378431003(B320R4S) Matrix Spike (MS)
1203371586	378431003(B320R4PS) Post Spike (PS)
1203368814	Method Blank (MB)CVAA
1203368815	Laboratory Control Sample (LCS)
1203368824	378431003(B320R4L) Serial Dilution (SD)
1203368822	378431003(B320R4D) Sample Duplicate (DUP)
1203368823	378431003(B320R4S) Matrix Spike (MS)

Sample Analysis

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

Method/Analysis Information

Analytical Batch:	1497254 and 1498313
Prep Batch :	1497253 and 1498312
Standard Operating Procedures:	GL-MA-E-014 REV# 26, GL-MA-E-009 REV# 25 and GL-MA-E-010 REV# 30
Analytical Method:	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-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.

The Metals analysis - ICPMS was performed on a PerkinElmer NexION 350X ICPMS. The instrument is equipped with a ESI PFA-ST nebulizer, quadrupole mass spectrometer, dual mode electron multiplier detector,

and Kinetic Energy Discrimination (KED) technology. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum.

Calibration Information

Instrument Calibration

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

CRDL/PQL Requirements

The CRDL/PQL standard recoveries met the referenced advisory control limits.

ICSA/ICSAB Statement

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

Continuing Calibration Blanks (CCB) Requirements

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

Continuing Calibration Verification (CCV) Requirements

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

Quality Control (QC) Information

Method Blank (MB) Statement

The method blanks (MB) analyzed with this SDG met the acceptance criteria. The analyte concentration 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. 1203366091 (MB)-ICP-MS. Zinc is flagged with a "B" flag. 1203366091 (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: 378431003 (B320R4)-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
1203366094 (B320R4MS)	Arsenic	73.7* (75%-125%)
	Nickel	44.4* (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. Not all the applicable analyte RPD values were within the acceptance criteria.

Sample	Analyte	Value
1203366093 (B320R4DUP)	Strontium	31.6* (0%-20%)
	Thorium	29.2* (0%-20%)
	Uranium	22.4* (0%-20%)
1203368822 (B320R4DUP)	Mercury	50.4* (0.0%-20.0%)

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.

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
1203366095 (B320R4SDILT)	Copper	14.6 *(0%-10%)
	Nickel	10.2 *(0%-10%)
	Zinc	15.1 *(0%-10%)

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. Samples 378431003 (B320R4) and 378431004 (B320R1)-ICP-MS were diluted to ensure that the analyte concentrations were within the linear calibration range of the instrument. The ICPMS solid samples in this SDG were diluted the standard two times. ICP-MS.

Analyte	378431	
	003	004
Several	20X 2X 1X	20X 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) 1439005 was generated for samples 1203366093 (B320R4DUP), 1203366093 (B320R4DUP), 1203366094 (B320R4MS) and 1203366095 (B320R4SDILT) in this SDG/batch. A data exception report (DER) 1436900 was generated for sample 1203368822 (B320R4DUP) 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.

August 14, 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: GEL378431 GEL Work Order: 378431

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: Nik-Cole Elmore

Date: 14 AUG 2015

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL378431

METHOD TYPE: SW846

SAMPLE ID: 378431003

CLIENT ID: B320R4

CONTRACT: CPRC0F15011

MATRIX: OTHERSOLID

DATE RECEIVED 01-AUG-15

LEVEL: Low %SOLIDS: 97.7

<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	7440000	ug/kg	D		MS	3020	2	ICPMS12	150811-6
7440-38-2	Arsenic	3280	ug/kg	D	N	MS	201	2	ICPMS12	150811-6
7440-39-3	Barium	56400	ug/kg	D		MS	101	2	ICPMS12	150811-6
7440-41-7	Beryllium	200	ug/kg	D		MS	20.1	2	ICPMS12	150811-6
7440-69-9	Bismuth	101	ug/kg	UD		MS	101	2	ICPMS12	150813-8
7440-42-8	Boron	1160	ug/kg	BD		MS	804	2	ICPMS12	150811-6
7440-43-9	Cadmium	46.6	ug/kg	BD		MS	20.1	2	ICPMS12	150811-6
7440-70-2	Calcium	7900000	ug/kg	D		MS	6630	2	ICPMS12	150811-6
7440-47-3	Chromium	14800	ug/kg	D		MS	201	2	ICPMS12	150811-6
7440-48-4	Cobalt	5230	ug/kg	D		MS	60.3	2	ICPMS12	150811-6
7440-50-8	Copper	12000	ug/kg	D	M	MS	66.3	2	ICPMS12	150811-6
7439-89-6	Iron	16500000	ug/kg	D		MS	66300	20	ICPMS12	150811-6
7439-92-1	Lead	2980	ug/kg	D		MS	101	2	ICPMS12	150811-6
7439-93-2	Lithium	8550	ug/kg	D		MS	402	2	ICPMS12	150811-6
7439-95-4	Magnesium	5000000	ug/kg	D		MS	2010	2	ICPMS12	150811-6
7439-96-5	Manganese	292000	ug/kg	D		MS	2010	20	ICPMS12	150811-6
7439-97-6	Mercury	68	ug/kg		*	AV	4.01	1	HG4	080715S1-9
7439-98-7	Molybdenum	1610	ug/kg	D		MS	60.3	2	ICPMS12	150811-6
7440-02-0	Nickel	13000	ug/kg	D	N	MS	101	2	ICPMS12	150811-6
7782-49-2	Selenium	515	ug/kg	BD		MS	332	2	ICPMS12	150811-1
7440-24-6	Strontium	32200	ug/kg	D	*	MS	402	2	ICPMS12	150811-6
7440-28-0	Thallium	98.9	ug/kg	BD		MS	60.3	2	ICPMS12	150811-6
7440-29-1	Thorium	2780	ug/kg	D	*	MS	64.3	2	ICPMS12	150811-6
7440-61-1	Uranium	464	ug/kg	D	*	MS	13.3	2	ICPMS12	150812-7
7440-66-6	Zinc	43800	ug/kg	D	M	MS	402	2	ICPMS12	150811-6

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL378431

METHOD TYPE: SW846

SAMPLE ID: 378431003

CLIENT ID: B320R4

CONTRACT: CPRC0F15011

MATRIX:OTHERSOLID

DATE RECEIVED 01-AUG-15

LEVEL: Low %SOLIDS: 97.7

<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>
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*Analytical Methods:

AV	SW846 7471B
MS	SW846 3050B/6020A

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL378431

METHOD TYPE: SW846

SAMPLE ID: 378431004

CLIENT ID: B320R1

CONTRACT: CPRC0F15011

MATRIX: OTHERSOLID

DATE RECEIVED 01-AUG-15

LEVEL: Low %SOLIDS: 96

<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	6480000	ug/kg	D		MS	2930	2	ICPMS12	150811-6
7440-38-2	Arsenic	2180	ug/kg	D	N	MS	195	2	ICPMS12	150811-6
7440-39-3	Barium	62800	ug/kg	D		MS	97.7	2	ICPMS12	150811-6
7440-41-7	Beryllium	202	ug/kg	D		MS	19.5	2	ICPMS12	150811-6
7440-69-9	Bismuth	97.7	ug/kg	UD		MS	97.7	2	ICPMS12	150813-8
7440-42-8	Boron	1750	ug/kg	BD		MS	782	2	ICPMS12	150811-6
7440-43-9	Cadmium	39.3	ug/kg	BD		MS	19.5	2	ICPMS12	150811-6
7440-70-2	Calcium	7960000	ug/kg	D		MS	6450	2	ICPMS12	150811-6
7440-47-3	Chromium	9050	ug/kg	D		MS	195	2	ICPMS12	150811-6
7440-48-4	Cobalt	5180	ug/kg	D		MS	58.6	2	ICPMS12	150811-6
7440-50-8	Copper	10600	ug/kg	D	M	MS	64.5	2	ICPMS12	150811-6
7439-89-6	Iron	18100000	ug/kg	D		MS	64500	20	ICPMS12	150811-6
7439-92-1	Lead	2650	ug/kg	D		MS	97.7	2	ICPMS12	150811-6
7439-93-2	Lithium	6990	ug/kg	D		MS	391	2	ICPMS12	150811-6
7439-95-4	Magnesium	4500000	ug/kg	D		MS	1950	2	ICPMS12	150811-6
7439-96-5	Manganese	273000	ug/kg	D		MS	1950	20	ICPMS12	150811-6
7439-97-6	Mercury	105	ug/kg		*	AV	3.8	1	HG4	080715S1-9
7439-98-7	Molybdenum	516	ug/kg	D		MS	58.6	2	ICPMS12	150811-6
7440-02-0	Nickel	9110	ug/kg	D	N	MS	97.7	2	ICPMS12	150811-6
7782-49-2	Selenium	781	ug/kg	BD		MS	322	2	ICPMS12	150811-1
7440-24-6	Strontium	25900	ug/kg	D	*	MS	391	2	ICPMS12	150811-6
7440-28-0	Thallium	58.6	ug/kg	UD		MS	58.6	2	ICPMS12	150811-6
7440-29-1	Thorium	2440	ug/kg	D	*	MS	62.5	2	ICPMS12	150811-6
7440-61-1	Uranium	1680	ug/kg	D	*	MS	12.9	2	ICPMS12	150812-7
7440-66-6	Zinc	31600	ug/kg	D	M	MS	391	2	ICPMS12	150811-6

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL378431

METHOD TYPE: SW846

SAMPLE ID: 378431004

CLIENT ID: B320R1

CONTRACT: CPRC0F15011

MATRIX:OTHERSOLID

DATE RECEIVED 01-AUG-15

LEVEL: Low %SOLIDS: 96

<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>
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*Analytical Methods:

AV	SW846 7471B
MS	SW846 3050B/6020A

Quality Control Summary

August 14, 2015
GEL LABORATORIES LLC

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QC Summary

Report Date: August 14, 2015

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 378431

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1497254										
QC1203366093 378431003 DUP											
Aluminum	D	7440000	D	7310000	ug/kg	1.71		(0%-20%)	BAJ	08/12/15	00:29
Arsenic	DN	3280	D	3010	ug/kg	8.56	^	(+/-1010)			
Barium	D	56400	D	51900	ug/kg	8.26		(0%-20%)			
Beryllium	D	200	D	206	ug/kg	2.97	^	(+/-101)			
Bismuth	DU	ND	DU	ND	ug/kg	N/A				08/13/15	13:16
Boron	BD	1160	BD	1110	ug/kg	4.54	^	(+/-3020)		08/12/15	00:29
Cadmium	BD	46.6	BD	38.2	ug/kg	19.9	^	(+/-201)			
Calcium	D	7900000	D	6920000	ug/kg	13.2		(0%-20%)			
Chromium	D	14800	D	16100	ug/kg	8.2		(0%-20%)			
Cobalt	D	5230	D	5560	ug/kg	6.18		(0%-20%)			
Copper	DM	12000	D	11900	ug/kg	0.894		(0%-20%)			
Iron	D	16500000	D	17800000	ug/kg	7.63		(0%-20%)		08/12/15	00:57
Lead	D	2980	D	3350	ug/kg	11.8		(0%-20%)		08/12/15	00:29
Lithium	D	8550	D	7980	ug/kg	6.92	^	(+/-2010)			
Magnesium	D	5000000	D	5140000	ug/kg	2.73		(0%-20%)			
Manganese	D	292000	D	295000	ug/kg	1.21		(0%-20%)		08/12/15	00:57
Molybdenum	D	1610	D	1640	ug/kg	1.79		(0%-20%)		08/12/15	00:29
Nickel	DMN	13000	D	14100	ug/kg	8.46		(0%-20%)			
Selenium	BD	515	BD	778	ug/kg	40.7	^	(+/-1010)		08/11/15	11:39
Strontium	*D	32200	*D	23400	ug/kg	31.6*		(0%-20%)		08/12/15	00:29

August 14, 2015

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QC Summary

Workorder: 378431

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1497254										
Thallium	BD	98.9	BD	60.5	ug/kg	48.2 ^		(+/-402)	BAJ	08/12/15	00:29
Thorium	*D	2780	*D	3730	ug/kg	29.2*		(0%-20%)			
Uranium	*D	464	*D	581	ug/kg	22.4*		(0%-20%)		08/13/15	07:04
Zinc	DM	43800	D	43900	ug/kg	0.099		(0%-20%)		08/12/15	00:29
QC1203366092	LCS										
Aluminum	197000		D	199000	ug/kg		101	(80%-120%)		08/12/15	00:22
Arsenic	4930		D	4290	ug/kg		87.1	(80%-120%)			
Barium	4930		D	4980	ug/kg		101	(80%-120%)			
Beryllium	4930		D	4280	ug/kg		86.9	(80%-120%)			
Bismuth	4930		D	4740	ug/kg		96.1	(80%-120%)		08/13/15	13:13
Boron	9860		D	9110	ug/kg		92.4	(80%-120%)		08/12/15	00:22
Cadmium	4930		D	4330	ug/kg		87.8	(80%-120%)			
Calcium	197000		D	205000	ug/kg		104	(80%-120%)			
Chromium	4930		D	4940	ug/kg		100	(80%-120%)			
Cobalt	4930		D	4810	ug/kg		97.5	(80%-120%)			
Copper	4930		D	4760	ug/kg		96.6	(80%-120%)			
Iron	197000		D	196000	ug/kg		99.5	(80%-120%)			
Lead	4930		D	4830	ug/kg		98	(80%-120%)			
Lithium	4930		D	4550	ug/kg		92.4	(80%-120%)			
Magnesium	197000		D	199000	ug/kg		101	(80%-120%)			
Manganese	4930		D	4850	ug/kg		98.3	(80%-120%)			
Molybdenum	4930		D	4750	ug/kg		96.3	(80%-120%)			

August 14, 2015

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QC Summary

Workorder: 378431

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1497254										
Nickel	4930		D	4700	ug/kg		95.4	(80%-120%)	BAJ	08/12/15	00:22
Selenium	4930		D	4330	ug/kg		87.7	(80%-120%)		08/11/15	11:33
Strontium	4930		D	4960	ug/kg		101	(80%-120%)		08/12/15	00:22
Thallium	4930		D	4810	ug/kg		97.5	(80%-120%)			
Thorium	4930		D	4480	ug/kg		90.9	(80%-120%)			
Uranium	4930		D	4660	ug/kg		94.5	(80%-120%)		08/13/15	07:02
Zinc	4930		D	4680	ug/kg		94.9	(80%-120%)		08/12/15	00:22
QC1203366091	MB										
Aluminum			DU	ND	ug/kg					08/12/15	00:19
Arsenic			DU	ND	ug/kg						
Barium			DU	ND	ug/kg						
Beryllium			DU	ND	ug/kg						
Bismuth			DU	ND	ug/kg					08/13/15	13:12
Boron			DU	ND	ug/kg					08/12/15	00:19
Cadmium			DU	ND	ug/kg						
Calcium			DU	ND	ug/kg						
Chromium			DU	ND	ug/kg						
Cobalt			DU	ND	ug/kg						
Copper			DU	ND	ug/kg						
Iron			DU	ND	ug/kg						
Lead			DU	ND	ug/kg						
Lithium			DU	ND	ug/kg						

August 14, 2015

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QC Summary

Workorder: 378431

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Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1497254										
Magnesium			DU	ND	ug/kg				BAJ	08/12/15	00:19
Manganese			DU	ND	ug/kg						
Molybdenum			DU	ND	ug/kg						
Nickel			DU	ND	ug/kg						
Selenium			DU	ND	ug/kg					08/11/15	11:30
Strontium			DU	ND	ug/kg					08/12/15	00:19
Thallium			DU	ND	ug/kg						
Thorium			DU	ND	ug/kg						
Uranium			DU	ND	ug/kg					08/13/15	07:00
Zinc			BD	387	ug/kg					08/12/15	00:19
QC1203366094 378431003 MS											
Aluminum	190000	D	7440000	D	7930000	ug/kg		N/A (75%-125%)		08/12/15	00:32
Arsenic	4750	DN	3280	DN	6780	ug/kg		73.7* (75%-125%)			
Barium	4750	D	56400	D	62500	ug/kg		N/A (75%-125%)			
Beryllium	4750	D	200	D	4190	ug/kg		83.8 (75%-125%)			
Bismuth	4750	DU	ND	D	4190	ug/kg		86.8 (75%-125%)		08/13/15	13:17
Boron	9510	BD	1160	D	8970	ug/kg		82.1 (75%-125%)		08/12/15	00:32
Cadmium	4750	BD	46.6	D	4170	ug/kg		86.6 (75%-125%)			
Calcium	190000	D	7900000	D	6670000	ug/kg		N/A (75%-125%)			
Chromium	4750	D	14800	D	18700	ug/kg		82.1 (75%-125%)			
Cobalt	4750	D	5230	D	9850	ug/kg		97.3 (75%-125%)			
Copper	4750	DM	12000	D	15700	ug/kg		78.9 (75%-125%)			

August 14, 2015
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QC Summary

Workorder: 378431

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1497254										
Iron	190000	D	16500000	D	16400000	ug/kg	N/A	(75%-125%)	BAJ	08/12/15	01:00
Lead	4750	D	2980	D	7340	ug/kg	91.9	(75%-125%)		08/12/15	00:32
Lithium	4750	D	8550	D	13700	ug/kg	108	(75%-125%)			
Magnesium	190000	D	5000000	D	5180000	ug/kg	N/A	(75%-125%)			
Manganese	4750	D	292000	D	280000	ug/kg	N/A	(75%-125%)		08/12/15	01:00
Molybdenum	4750	D	1610	D	6100	ug/kg	94.4	(75%-125%)		08/12/15	00:32
Nickel	4750	DMN	13000	DN	15100	ug/kg	44.4*	(75%-125%)			
Selenium	4750	BD	515	D	4670	ug/kg	87.4	(75%-125%)		08/11/15	11:42
Strontium	4750	*D	32200	D	26900	ug/kg	N/A	(75%-125%)		08/12/15	00:32
Thallium	4750	BD	98.9	D	4460	ug/kg	91.8	(75%-125%)			
Thorium	4750	*D	2780	D	7110	ug/kg	91	(75%-125%)			
Uranium	4750	*D	464	D	5020	ug/kg	95.9	(75%-125%)		08/13/15	07:06
Zinc	4750	DM	43800	D	44500	ug/kg	N/A	(75%-125%)		08/12/15	00:32
QC1203371586 378431003 PS											
Arsenic	25.0	DN	16.3	D	37.5	ug/L	84.8	(80%-120%)		08/12/15	00:35
Nickel	25.0	DMN	64.5	D	86.4	ug/L	87.6	(80%-120%)			
QC1203366095 378431003 SDILT											
Aluminum		D	37000	D	7640	ug/L	3.23	(0%-10%)		08/12/15	00:38
Arsenic		DN	16.3	D	3.35	ug/L	2.52	(0%-10%)			
Barium		D	281	D	56.9	ug/L	1.45	(0%-10%)			
Beryllium		D	0.994	D	0.242	ug/L	21.7	(0%-10%)			
Bismuth		DU	ND	DU	ND	ug/L	N/A	(0%-10%)		08/13/15	13:20
Boron		BD	5.79	DU	ND	ug/L	N/A	(0%-10%)		08/12/15	00:38

August 14, 2015

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QC Summary

Workorder: 378431

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Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1497254										
Cadmium	BD	0.232	DU	ND	ug/L	N/A		(0%-10%)	BAJ	08/12/15	00:38
Calcium	D	39300	D	8040	ug/L	2.26		(0%-10%)			
Chromium	D	73.7	D	15.4	ug/L	4.81		(0%-10%)			
Cobalt	D	26.0	D	5.59	ug/L	7.55		(0%-10%)			
Copper	DM	59.6	DM	13.7	ug/L	14.6*		(0%-10%)			
Iron	D	8220	D	1640	ug/L	.102		(0%-10%)		08/12/15	01:03
Lead	D	14.8	D	3.12	ug/L	5.5		(0%-10%)		08/12/15	00:38
Lithium	D	42.5	D	9.07	ug/L	6.57		(0%-10%)			
Magnesium	D	24900	D	5220	ug/L	4.9		(0%-10%)			
Manganese	D	145	D	28.9	ug/L	.395		(0%-10%)		08/12/15	01:03
Molybdenum	D	8.01	D	1.59	ug/L	.699		(0%-10%)		08/12/15	00:38
Nickel	DMN	64.5	DM	14.2	ug/L	10.2*		(0%-10%)			
Selenium	BD	2.56	DU	ND	ug/L	N/A		(0%-10%)		08/11/15	11:48
Strontium	*D	160	D	31.8	ug/L	.714		(0%-10%)		08/12/15	00:38
Thallium	BD	0.492	DU	ND	ug/L	N/A		(0%-10%)			
Thorium	*D	13.8	D	2.83	ug/L	2.4		(0%-10%)			
Uranium	*D	2.31	D	0.474	ug/L	2.78		(0%-10%)		08/13/15	07:08
Zinc	DM	218	DM	50.2	ug/L	15.1*		(0%-10%)		08/12/15	00:38

Metals Analysis-Mercury

Batch 1498313

QC1203368822	378431003	DUP									
Mercury	*	68.0	*	40.6	ug/kg	50.4*^		(+/-12.3)	MTM1	08/07/15	16:12

QC1203368815 LCS

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QC Summary

Workorder: 378431

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Table with columns: Parmname, NOM, Sample, Qual, QC, Units, RPD/D%, REC%, Range, Anlst, Date, Time. Rows include Metals Analysis-Mercury, Batch 1498313, and various sample results with qualifiers like U, D, and *.

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

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. 07-AUG-15	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: MERCURY	Test / Method: SW846 7471A, SW846 7471B	Matrix Type: Solid	Client Code: CARE, CPRC, HGLG
Batch ID: 1498313	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 378431(GEL378431),378524(EUI-9983)			
Application Issues: Failed Recovery for MS/MSD, or PS/PSD Failed RPD for DUP			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Failed RPD for DUP: QC 1203368822DUP</p> <p>2. Failed Recovery for MS/MSD, or PS/PSD: QC 1203368819MS</p>		<p>1. Not all the applicable analyte RPD values were within the acceptance criteria. 1203368822 (B320R4DUP) Mercury [50.4* (0.0%-20.0%)].</p> <p>2. 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. 1203368819 (9063-14-0006 M13026MS) Mercury [123* (80.0%-120.0%)].</p>	

Originator's Name:

Monifa Basdeo 07-AUG-15

Data Validator/Group Leader:

Alan Stanley 10-AUG-15

DATA EXCEPTION REPORT

Mo.Day Yr. 14-AUG-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: 1497254	Sample Numbers: See Below		

Potentially affected work order(s)(SDG): 378431(GEL378431)

Application Issues:

Failed Recovery for MS/MSD, or PS/PSD
Failed RPD for DUP
Failed difference for SDILT

**Specification and Requirements
Exception Description:**

DER Disposition:

1. Failed RPD for DUP:
QC 1203366093DUP
2. Failed Recovery for MS/MSD, or PS/PSD:
QC 1203366094MS
3. Failed difference for SDILT:
QC 1203366095SDILT

1. Not all the applicable analyte RPD values were within the acceptance criteria.
1203366093 (B320R4DUP) Strontium [31.6* (0%-20%)], Thorium [29.2* (0%-20%)] and Uranium [22.4* (0%-20%)].
2. 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.
1203366094 (B320R4MS) Arsenic [73.7* (75%-125%)] and Nickel [44.4* (75%-125%)].
3. Not all the applicable analytes were within the established acceptance criteria. Matrix suppression may be suspected. The data has been qualified.
1203366095 (B320R4SDILT) Copper [14.6 *(0%-10%)], Nickel [10.2 *(0%-10%)] and Zinc [15.1 *(0%-10%)].

Originator's Name:

Elizabeth Janssen 14-AUG-15

Data Validator/Group Leader:

Paul Boyd 14-AUG-15

General Chem Analysis

Case Narrative

General Chemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL378431
Work Order #: 378431

Method/Analysis Information

Product: Cyanide and Total
Analytical Batch: 1496816 **Method:** 9010_CYANIDE: COMMON
Prep Batch : 1496814 **Method:** SW846 9010C Distillation

Sample Analysis

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

Sample ID	Client ID
378431003	B320R4
378431004	B320R1
1203365036	Method Blank (MB)
1203365037	Laboratory Control Sample (LCS)
1203366130	378431003(B320R4) Sample Duplicate (DUP)
1203366131	378431003(B320R4) Matrix Spike (MS)

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

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 378431003 (B320R4) 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.

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	1203366130 (B320R4DUP)	37.6* (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 Preservation/Integrity

All the samples from this sample group met the preservation and integrity requirements of the method.

Sample Dilutions

The following sample was diluted because target analyte concentrations exceeded the calibration range. 1203365037 (LCS).

Sample Re-analysis

Sample1203365037 (LCS) was re-analyzed to verify the result.

Miscellaneous Information

Data Exception (DER) Documentation

A data exception report (DER) 1435509 was generated for sample 1203366130 (B320R4DUP) in this SDG/batch.

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product:	Ion Chromatography		
Analytical Batch:	1497823	Method:	9056_ANIONS_IC:COMMON + (Add-on)
Prep Batch :	1497821	Method:	SW846 9056A

Sample Analysis

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

Sample ID	Client ID
378431001	B320R2
378431002	B320R5
1203367526	Method Blank (MB)
1203367527	Laboratory Control Sample (LCS)
1203367528	378431001(B320R2) Sample Duplicate (DUP)
1203367529	378431001(B320R2) Matrix Spike (MS)

The samples in this SDG were analyzed on a "dry weight" 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 378431001 (B320R2) was selected for QC analysis.

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

The MS/PS recoveries for this sample set were within the required acceptance limits.

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 following samples were diluted because target analyte concentrations exceeded the calibration range. 1203367528 (B320R2DUP), 1203367529 (B320R2MS), 378431001 (B320R2) and 378431002 (B320R5).

Analyte	378431	
	001	002
Nitrate	1X	10X
Ortho-phosphate	2X	1X
Sulfate	1X	10X

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 1203367528 (B320R2DUP), 1203367529 (B320R2MS), 378431001 (B320R2) and 378431002 (B320R5)

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.

August 14, 2015

GEL LABORATORIES LLC

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL378431 GEL Work Order: 378431

The Qualifiers in this report are defined as follows:

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

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: 13 AUG 2015

Title: Data Validator

Sample Data Summary

GEL LABORATORIES LLC

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August 14, 2015

Certificate of Analysis

Report Date: August 13, 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: B320R2	Project: CPRC0F15011
Sample ID: 378431001	Client ID: CPRC001
Matrix: OTHERSOLID	
Collect Date: 30-JUL-15 13:50	
Receive Date: 01-AUG-15	
Collector: Client	
Moisture: 4.05%	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
9056_ANIONS_IC:COMMON + (Add-on) "Dry Weight Corrected"											
Chloride	B	1570	691	2060	ug/Kg	1	MXL2	08/04/15	2311	1497823	1
Fluoride	U	341	341	1030	ug/Kg	1					
Nitrate-N		1840	341	1030	ug/Kg	1					
Nitrite-N	U	341	341	1030	ug/Kg	1					
Sulfate		20500	1370	4130	ug/Kg	1					
Phosphorus in phosphate	D	35900	1380	4130	ug/Kg	2	MXL2	08/05/15	1657	1497823	2

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 9056A	SW846 9056A Total Anions in Soil	MXL2	08/04/15	1826	1497821

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9056A	
2	SW846 9056A	

Notes:

August 14, 2015
GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: August 13, 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: B320R5	Project: CPRC0F15011
Sample ID: 378431002	Client ID: CPRC001
Matrix: OTHERSOLID	
Collect Date: 30-JUL-15 14:03	
Receive Date: 01-AUG-15	
Collector: Client	
Moisture: 2.35%	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
9056_ANIONS_IC:COMMON + (Add-on) "Dry Weight Corrected"											
Chloride		8570	678	2020	ug/Kg	1	MXL2	08/05/15	0050	1497823	1
Fluoride	U	334	334	1010	ug/Kg	1					
Nitrite-N	B	1000	334	1010	ug/Kg	1					
Phosphorus in phosphate	B	750	678	2020	ug/Kg	1					
Nitrate-N	D	351000	3340	10100	ug/Kg	10	MXL2	08/05/15	1836	1497823	2
Sulfate	D	519000	13500	40500	ug/Kg	10					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 9056A	SW846 9056A Total Anions in Soil	MXL2	08/04/15	1826	1497821

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9056A	
2	SW846 9056A	

Notes:

Certificate of Analysis

Report Date: August 13, 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: B320R4	Project: CPRC0F15011
Sample ID: 378431003	Client ID: CPRC001
Matrix: OTHERSOLID	
Collect Date: 30-JUL-15 14:03	
Receive Date: 01-AUG-15	
Collector: Client	
Moisture: 2.27%	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Flow Injection Analysis											
9010_CYANIDE: COMMON "Dry Weight Corrected"											
Cyanide, Total		1060	76.3	228	ug/kg	1	AXH3	08/04/15	1227	1496816	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 9010C Distillation	SW846 9010C Prep	AXH3	08/04/15	1016	1496814

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9012B	

Notes:

Certificate of Analysis

Report Date: August 13, 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: B320R1	Project: CPRC0F15011
Sample ID: 378431004	Client ID: CPRC001
Matrix: OTHERSOLID	
Collect Date: 30-JUL-15 13:50	
Receive Date: 01-AUG-15	
Collector: Client	
Moisture: 3.97%	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Flow Injection Analysis											
9010_CYANIDE: COMMON "Dry Weight Corrected"											
Cyanide, Total	B	204	73.7	221	ug/kg	1	AXH3	08/04/15	1233	1496816	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 9010C Distillation	SW846 9010C Prep	AXH3	08/04/15	1016	1496814

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9012B	

Notes:

Quality Control Summary

August 14, 2015
GEL LABORATORIES LLC

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QC Summary

Report Date: August 13, 2015

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 378431

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
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Flow Injection Analysis

Batch	1496816										
QC1203366130	378431003	DUP									
Cyanide, Total		1060		1540	ug/kg	37.6*		(0%-30%)	AXH3	08/04/15	12:27
QC1203365037	LCS										
Cyanide, Total	90600		D	106000	ug/kg		117	(59%-139%)		08/04/15	12:34
QC1203365036	MB										
Cyanide, Total			U	83.5	ug/kg					08/04/15	12:17
QC1203366131	378431003	MS									
Cyanide, Total	4410	1060		6700	ug/kg		128	(47%-133%)		08/04/15	12:28

Ion Chromatography

Batch	1497823										
QC1203367528	378431001	DUP									
Chloride		B	1570	B	1780	ug/Kg	12.9 ^	(+/-2060)	MXL2	08/04/15	23:44
Fluoride		U	341	U	340	ug/Kg	N/A				
Nitrate-N			1840		1820	ug/Kg	0.866 ^	(+/-1030)			
Nitrite-N		U	341	U	340	ug/Kg	N/A				
Phosphorus in phosphate		D	35900	D	35300	ug/Kg	1.75	(0%-20%)		08/05/15	17:30
Sulfate			20500		20500	ug/Kg	0.147 ^	(+/-4120)		08/04/15	23:44
QC1203367527	LCS										
Chloride	50000				48300	ug/Kg	96.7	(90%-110%)		08/04/15	22:38
Fluoride	25000				25000	ug/Kg	100	(90%-110%)			
Nitrate-N	25000				23900	ug/Kg	95.5	(90%-110%)			
Nitrite-N	25000				24700	ug/Kg	98.7	(90%-110%)			
Phosphorus in phosphate	12500				12600	ug/Kg	101	(90%-110%)			
Sulfate	100000				97100	ug/Kg	97.1	(90%-110%)			

QC1203367526 MB

August 14, 2015

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QC Summary

Workorder: 378431

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Table with columns: Parmname, NOM, Sample, Qual, QC, Units, RPD%, REC%, Range, Anlst, Date, Time. Rows include Ion Chromatography results for Chloride, Fluoride, Nitrate-N, Nitrite-N, Phosphorus in phosphate, and Sulfate, along with QC1203367529 results for Chloride, Fluoride, Nitrate-N, Nitrite-N, Phosphorus in phosphate, and Sulfate.

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

August 14, 2015

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QC Summary

Workorder: 378431

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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. 04-AUG-15	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: LACHAT Flow Injection Analyzer	Test / Method: SW846 9012A, SW846 9012B	Matrix Type: Solid	Client Code: CPRC
Batch ID: 1496816	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 378431(GEL378431)			
Application Issues: Failed RPD for DUP			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Failed RPD for DUP:</p> <p>QC 1203366130DUP</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 1203366130 (B320R4DUP) [37.6* (0.0%-30.0%)].</p>	

Originator's Name:
Aubrey Kingsbury 04-AUG-15

Data Validator/Group Leader:
Kristen Mizzell 04-AUG-15

Radiological Analysis

August 14, 2015

Radiochemistry

Technical Case Narrative

CH2MHill Plateau Remediation Company (CPRC)

SDG #: GEL378431

Work Order #: 378431

Method/Analysis Information

Product: UISO_IE_PRECIP_AEA:COMMON

Analytical Method: UISO_IE_PRECIP_AEA

Prep Method: Dry Soil Prep

Analytical Batch Number: 1497443

Prep Batch Number: 1497226

Sample ID	Client ID
378431003	B320R4
378431004	B320R1
1203366567	Method Blank (MB)
1203366569	Laboratory Control Sample (LCS)
1203366568	378431003(B320R4) Sample Duplicate (DUP)

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

Designated QC

August 14, 2015

The following sample was used for QC: 378431003 (B320R4).

QC Information

All of the QC samples met the required acceptance limits.

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

The Method blank 1203366567 (MB) was recounted due to a suspected blank false positive. The entire batch was then recounted due to a suspected blank false positive. The recounts are being reported, with the exception of 1203366567 (MB). The second recount is being reported for sample 1203366567 (MB).

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

Procedure: Dry Weight-Percent Moisture

Analytical Method: Dry Soil Prep

Analytical Batch Number: 1497226

Sample ID	Client ID
378431003	B320R4
378431004	B320R1
1203366032	378431003(B320R4) Sample Duplicate (DUP)

August 14, 2015

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: 378422001 (X507420-01).

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: TC99_EIE_LSC: COMMON
Analytical Method: TC99_EIE_LSC
Analytical Batch Number: 1497324

Sample ID	Client ID
378431003	B320R4
378431004	B320R1
1203366332	Method Blank (MB)
1203366334	Laboratory Control Sample (LCS)
1203366333	378431003(B320R4) Sample Duplicate (DUP)

The samples in this SDG were 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.

Designated QC

The following sample was used for QC: 378431003 (B320R4).

QC Information

All of the QC samples met the required acceptance limits.

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.

Certification Statement

August 14, 2015

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.

August 14, 2015

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL378431 GEL Work Order: 378431

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: 13 AUG 2015

Title: Analyst II

Sample Data Summary

August 14, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL378431
Lab Sample ID: 378431001

Client: CPRC001
Date Collected: 07/30/2015 13:50
Date Received: 08/01/2015 08:40

Project: CPRC0F15011
Matrix: OTHERSOLID
%Moisture: 4.1

August 14, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL378431
Lab Sample ID: 378431002

Client: CPRC001
Date Collected: 07/30/2015 14:03
Date Received: 08/01/2015 08:40

Project: CPRC0F15011
Matrix: OTHERSOLID
%Moisture: 2.3

August 14, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL378431	Client: CPRC001	Project: CPRC0F15011
Lab Sample ID: 378431003	Date Collected: 07/30/2015 14:03	Matrix: OTHERSOLID
	Date Received: 08/01/2015 08:40	%Moisture: 2.3
Client ID: B320R4		Prep Basis: "Dry Weight Corrected"
Batch ID: 1497443	Method: UIISO_IE_PRECIP_AEA	SOP Ref: GL-RAD-A-011
Run Date: 08/07/2015 15:37	Analyst: HAKB	Instrument: 1152
Data File: S0378431003_UU.2A.gcnf	Aliquot: 0.102 g	Count Time: 240 min
Prep Batch: 1497443	Prep Method: DOE EML HASL-300, U-02-R	Prep SOP Ref: GL-RAD-A-021
Prep Date: 08/04/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
U-233/234 <small>13968-55-3/13966-29-5</small>	Uranium-233/234		1.45	pCi/g	+/-0.721	0.760	0.572	1.00
15117-96-1/13982-7	Uranium-235/236	U	0.484	pCi/g	+/-0.535	0.541	0.707	1.00
7440-61-1	Uranium-238		0.858	pCi/g	+/-0.557	0.576	0.452	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	18.9	20.8	pCi/g	91	(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).

August 14, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL378431	Client: CPRC001	Project: CPRC0F15011
Lab Sample ID: 378431003	Date Collected: 07/30/2015 14:03	Matrix: OTHERSOLID
	Date Received: 08/01/2015 08:40	%Moisture: 2.3
Client ID: B320R4		Prep Basis: "As Received"
Batch ID: 1497324	Method: TC99_EIE_LSC	SOP Ref: GL-RAD-A-059
Run Date: 08/11/2015 08:20	Analyst: MYM1	Instrument: LSCBLUE
Data File: E1497324.xls	Aliquot: 0.322 g	Count Time: 15 min
Prep Batch: 1497324	Prep Method: DOE EML HASL-300, Tc-02-	
Prep Date: 08/06/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99		40.6	pCi/g	+/-8.97	10.1	12.8	15.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	5.43E+05	5.67E+05	CPM	95.7	(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).

August 14, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL378431
Lab Sample ID: 378431003

Client: CPRC001
Date Collected: 07/30/2015 14:03
Date Received: 08/01/2015 08:40

Project: CPRC0F15011
Matrix: OTHERSOLID
%Moisture: 2.3

August 14, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL378431
Lab Sample ID: 378431004

Client: CPRC001
Date Collected: 07/30/2015 13:50
Date Received: 08/01/2015 08:40

Project: CPRC0F15011
Matrix: OTHERSOLID
%Moisture: 4

Client ID: B320R1
Batch ID: 1497443
Run Date: 08/07/2015 15:37
Data File: S0378431004_UU.2A.gcnf
Prep Batch: 1497443
Prep Date: 08/04/2015 00:00

Method: UIISO_IE_PRECIP_AEA
Analyst: HAKB
Aliquot: 0.103 g
Prep Method: DOE EML HASL-300, U-02-R

Prep Basis: "Dry Weight Corrected"
SOP Ref: GL-RAD-A-011
Instrument: 1155
Count Time: 240 min
Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
U-233/234 <small>13968-55-3/13966-29-5</small>	Uranium-233/234		1.93	pCi/g	+/-0.788	0.850	0.435	1.00
15117-96-1/13982-7	Uranium-235/236	U	0.462	pCi/g	+/-0.471	0.477	0.466	1.00
7440-61-1	Uranium-238		1.06	pCi/g	+/-0.600	0.625	0.435	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	18.2	20.6	pCi/g	88.3	(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).

August 14, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL378431	Client: CPRC001	Project: CPRC0F15011
Lab Sample ID: 378431004	Date Collected: 07/30/2015 13:50	Matrix: OTHERSOLID
	Date Received: 08/01/2015 08:40	%Moisture: 4
Client ID: B320R1		Prep Basis: "As Received"
Batch ID: 1497324	Method: TC99_EIE_LSC	SOP Ref: GL-RAD-A-059
Run Date: 08/11/2015 08:37	Analyst: MYM1	Instrument: LSCBLUE
Data File: E1497324.xls	Aliquot: 0.346 g	Count Time: 15 min
Prep Batch: 1497324	Prep Method: DOE EML HASL-300, Tc-02-	
Prep Date: 08/06/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	-0.84	pCi/g	+/-6.78	6.78	11.9	15.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	5.41E+05	5.67E+05	CPM	95.4	(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).

August 14, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL378431
Lab Sample ID: 378431004

Client: CPRC001
Date Collected: 07/30/2015 13:50
Date Received: 08/01/2015 08:40

Project: CPRC0F15011
Matrix: OTHERSOLID
%Moisture: 4

Quality Control Data

GEL LABORATORIES LLC

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QC Summary

Report Date: August 13, 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: 378431

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1497443								
QC1203366567	MB								
Uranium-233/234			U	0.0741	pCi/g			HAKB	08/07/1515:37
				Uncert: +/-0.253					
				TPU: +/-0.254					
Uranium-235/236			U	0.155	pCi/g				
				Uncert: +/-0.305					
				TPU: +/-0.306					
Uranium-238			U	0.322	pCi/g				
				Uncert: +/-0.347					
				TPU: +/-0.351					
**Uranium-232 Tracer	20.4			20.1	pCi/g	REC: 99	(15%-125%)		
				Uncert: +/-2.37					
				TPU: +/-4.06					
QC1203366568	378431003	DUP							
Uranium-233/234		1.45		1.19	pCi/g				08/07/1515:37
				Uncert: +/-0.721		RPD: 20	(0% - 100%)		
				TPU: +/-0.760		RER: 0.506	(0-2)		
Uranium-235/236		U 0.484		0.570	pCi/g				
				Uncert: +/-0.535		RPD: 22	(0% - 100%)		
				TPU: +/-0.541		RER: 0.228	(0-2)		
Uranium-238		0.858		0.790	pCi/g				
				Uncert: +/-0.557		RPD: 8	(0% - 100%)		
				TPU: +/-0.576		RER: 0.169	(0-2)		
**Uranium-232 Tracer	20.4	18.9		18.9	pCi/g	REC: 93	(15%-125%)		
				Uncert: +/-2.57					
				TPU: +/-4.31					
QC1203366569	LCS								
Uranium-233/234				25.0	pCi/g				08/07/1515:37
				Uncert: +/-2.71					
				TPU: +/-4.92					
Uranium-235/236				2.72	pCi/g				
				Uncert: +/-1.01					
				TPU: +/-1.10					
Uranium-238	26.1			26.2	pCi/g	REC: 100	(80%-120%)		
				Uncert: +/-2.77					
				TPU: +/-5.12					
**Uranium-232 Tracer	20.4			18.8	pCi/g	REC: 92	(15%-125%)		
				Uncert: +/-2.45					
				TPU: +/-4.15					
Rad Liquid Scintillation									
Batch	1497324								
QC1203366332	MB								
Technetium-99			U	2.23	pCi/g			MYM1	08/11/1508:54
				Uncert: +/-6.58					

QC Summary

Workorder: 378431

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Liquid Scintillation									
Batch	1497324								
TPU: +/-6.59									
**Technetium-99m Tracer	5.67E+05			5.45E+05	CPM	REC: 96	(15%-125%)		
QC1203366333 378431003 DUP									
Technetium-99		40.6		39.1	pCi/g				08/11/1509:10
Uncert: +/-8.97 +/-8.11									
TPU: +/-10.1 +/-9.29									
**Technetium-99m Tracer	5.67E+05	5.43E+05		5.48E+05	CPM	REC: 97	(15%-125%)		
QC1203366334 LCS									
Technetium-99	245			218	pCi/g	REC: 89	(80%-120%)		08/11/1509:27
Uncert: +/-13.1									
TPU: +/-28.4									
**Technetium-99m Tracer	5.67E+05			5.40E+05	CPM	REC: 95	(15%-125%)		

Notes:

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

The Qualifiers in this report are defined as follows:

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

August 14, 2015
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QC Summary

Workorder: 378431

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	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.

** 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.