

November 09, 2017

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

Re: CHPRC SAF F17-065
Work Order: 434421
SDG: GEL434421

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on October 05, 2017. This revised data report has been prepared and reviewed in accordance with GEL's standard operating procedures. Client NCR

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,



Heather Shaffer
Project Manager

Purchase Order: 304614 - C05
Chain of Custody: F17-065-002 and F17-065-022
Enclosures



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Problem and Discrepancy Report

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PROBLEM AND DISCREPANCY (P&D) REPORT		P&D Number: PD18-0015
		Rev. Number: 0
		Laboratory: GEL
		SDG Number: GEL434421
		Date Initiated: 10/18/2017
<u>SAMPLE EVENT INFORMATION</u>		
SAF NUM(S):	F17-065	
<u>SAMPLING INFORMATION</u>		
NUMBER OF SAMPLES:	2	
SAMPLE MATRIX:	OTHER SOLID	
<u>ISSUE BACKGROUND</u>		
CLASS:	Data Issues	
TYPE:	Other	
DESCRIPTION:	The metals (6010, 6020 and mercury) results are reported "as received" for B3F958. The project requires these results to be reported based on the dry weight.	
<u>RESOLUTION</u>		
PROPOSED RESOLUTION:	Please correct the issue and resubmit the hard copy and electronic copy data packages	
FINAL RESOLUTION:	Accept resolution	
SUBMITTED BY:		
FITZGERALD, SL		10/18/2017
_____		_____

Sample Issue Resolution

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SAMPLE ISSUE RESOLUTION (SIR) REPORT

SIR Number: SIR18-0019
Rev. Number: 0
Date Initiated: 10/12/2017

SAMPLE EVENT INFORMATION

SAF NUM(S): F17-065
LABORATORY: GEL

SAMPLING INFORMATION

NUMBER OF SAMPLES: 2
SAMPLE NUMBERS: B3F947, B3F976
SAMPLE MATRIX: OTHER SOLID
SDG NUM(S): GEL434421

ISSUE BACKGROUND

CLASS: General Laboratory Direction
TYPE: Analysis Turnaround Time Modification
DESCRIPTION: GEL could not complete all requested analysis with the sample volume shipped to them. Supplemental volume has been shipped to GEL but this will result in a delay in data reporting.

RESOLUTION

PROPOSED RESOLUTION: Modify due date to October 17. Gell has sent preliminary data in the interim.

FINAL RESOLUTION: Accept due date modification

SUBMITTED BY:

FITZGERALD, SL

10/12/2017

ACCEPTED BY:

SHAFFER, H

10/12/2017

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REV.2

SAMPLE ISSUE RESOLUTION (SIR) REPORT

SIR Number: SIR18-0014
Rev. Number: 0
Date Initiated: 10/10/2017

SAMPLE EVENT INFORMATION

SAF NUM(S): F17-065
LABORATORY: GEL

SAMPLING INFORMATION

NUMBER OF SAMPLES: 2
SAMPLE NUMBERS: B3F947, B3F976
SAMPLE MATRIX: OTHER SOLID
SDG NUM(S): GEL434421

ISSUE BACKGROUND

CLASS: General Sample Management Direction
TYPE: Other General Sample Management Direction (Specify
DESCRIPTION: Sub-sample of B3F981 and B3F987 are being shipped from TestAmerica Richland to GEL. Upon receipt of these samples GEL is instructed to add the volume from B3F981 to B3F947 and the volume from B3F987 to B3F976. This is supplement the sample volumes so that all the requested analysis can be completed. All results will be reported under sample number the original GEL sample numbers (B3F947 and B3F976).

RESOLUTION

PROPOSED RESOLUTION: Combine the samples as described above.

FINAL RESOLUTION: Accept proposed resolution

SUBMITTED BY:

FITZGERALD, SL

10/10/2017

ACCEPTED BY:

SHAFFER, H

10/10/2017

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SAMPLE ISSUE RESOLUTION (SIR) REPORT

SIR Number: SIR18-0033
Rev. Number: 0
Date Initiated: 10/23/2017

SAMPLE EVENT INFORMATION

SAF NUM(S): F17-065
LABORATORY: GEL

SAMPLING INFORMATION

NUMBER OF SAMPLES: 1
SAMPLE NUMBERS: B3F947
SAMPLE MATRIX: OTHER SOLID
SDG NUM(S): GEL434421

ISSUE BACKGROUND

CLASS: General Laboratory Direction
TYPE: Other General Laboratory Direction (Specify)
DESCRIPTION: The project requests that all tentatively identified SVOA compounds be reported for the sample above.

RESOLUTION

PROPOSED RESOLUTION: Add TICs to the data report as above.

FINAL RESOLUTION: Accept proposed resolution

SUBMITTED BY:

FITZGERALD, SL

10/23/2017

ACCEPTED BY:

SHAFFER, H

10/23/2017

Case Narrative

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Client NCR

**General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF F17-065
SDG: GEL434421**

November 09, 2017

Laboratory Identification:

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

Summary**Sample receipt**

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on October 05, 2017, 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. Please see the enclosed SIRs for further details on all issues..

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

Sample Identification

The laboratory received the following samples:

Laboratory Identification	Sample Description
434421001	B3F947
434421002	B3F976

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: GC/MS Semivolatile, General Chemistry, Metals and Radiochemistry.

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

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Heather Shaffer

Heather Shaffer
Project Manager

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Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL434421
Work Order #: 434421

GC/MS Semivolatile

Analysis of Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry

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

Quality Control (QC) Information

Surrogate Recoveries

Sample (See Below) did not meet surrogate recovery acceptance criteria. The sample was analyzed at a dilution. As a result, one or more surrogates were diluted out of the acceptance limits.

Sample	Analyte	Value
434421001 (B3F947)	p-Terphenyl-d14	126* (45%-119%)

Sample (See Below) did not meet surrogate recovery acceptance criteria. Since there is insufficient sample remaining to perform a re-extraction, the results from this extraction are reported.

Sample	Analyte	Value
434421002 (B3F976)	2,4,6-Tribromophenol	25* (39%-115%)
	2-Fluorobiphenyl	22* (35%-107%)
	2-Fluorophenol	26* (36%-104%)
	Nitrobenzene-d5	21* (34%-109%)
	Phenol-d5	28* (39%-106%)
	p-Terphenyl-d14	38* (45%-119%)

Internal Standard (ISTD) Acceptance

The internal standard response for Perylene-d12 was outside of the acceptance criteria for sample 434421001 (B3F947). Since Perylene-d12 was not used to quantitate the requested target analytes or surrogates for this batch, the data were not adversely impacted by the failure. The results are reported.

Technical Information

Sample Dilutions

Sample 434421001 (B3F947) was diluted due to the presence of non-target analytes. The data from the dilution are reported.

Metals

Determination of Metals by ICP

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

Calibration Information**CRDL/PQL Requirements**

The PQL standard recoveries for SW846 6010C or 6010D met the control limits with the exception of potassium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected.

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

The method blanks (MB) analyzed with this SDG met the acceptance criteria. However, where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data.

Sample	Analyte	Value
1203893168 (MB)	Sodium	8570 between (6540 - 11700)

Technical Information**Sample Dilutions**

434421001 diluted due to highly over range zinc, which will contaminate the instrument. 434421002 diluted due to over range sodium. 434421001 (B3F947) and 434421002 (B3F976).

Analyte	434421	
	001	002
Several	500X 200X 10X	10X 1X

Determination of Metals by ICP-MS

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

Calibration Information**Continuing Calibration Blanks (CCB) Requirements**

The continuing calibration blank (CCB) bracketing the sample in this SDG did not meet the acceptance criteria. The samples bracketed by this CCB, however, contained molybdenum less than the RDL. This indicates that any contribution to the concentration of molybdenum in the samples from potential laboratory contamination would be minimal.

Technical Information**Sample Dilutions**

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

	434421	
Analyte	001	002
Uranium	2X	2X

Mercury Analysis Using the Perkin Elmer Automated Mercury Analyzer

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

Quality Control (QC) Information**Laboratory Control Sample Duplicate (LCSD)**

An LCSD was used in place of matrix QC due to limited sample volume.

Mercury Analysis Using the Perkin Elmer Automated Mercury Analyzer

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

General Chemistry**Carbon, Total Organic**

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

Quality Control (QC) Information**Laboratory Control Sample Duplicate (LCSD)**

An LCSD was used in place of matrix QC due to limited sample volume.

Technical Information**Sample Dilutions**

Sample 434421002 (B3F976) was diluted at the prep step due to high concentration.

Miscellaneous Information**Additional Comments**

The following prep procedure was performed prior to analysis: A few drops of 5% Phosphoric acid (lot# 2559247 exp date:12/13/17) were added to all of the samples to check for the presence of inorganic carbon, which is indicated by a fizzing reaction. The following samples reacted requiring additional solution. 434421002 (B3F976).

Carbon, Total

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

Quality Control (QC) Information**Laboratory Control Sample Duplicate (LCSD)**

An LCSD was used in place of matrix QC due to limited sample volume.

Technical Information**Sample Dilutions**

Sample 434421002 (B3F976) was diluted at the prep step due to high concentration.

Carbon, Inorganic Carbon Calculation

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

Ion Chromatography

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

Technical Information**Sample Dilutions**

The following samples 434421001 (B3F947) and 434421002 (B3F976) were diluted because target analyte concentrations exceeded the calibration range. The following samples 434421001 (B3F947) and 434421002 (B3F976) in this sample group were diluted due to matrix interference.

	434421	
Analyte	001	002

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Several	200X 1000X 10X	100X 10X
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Miscellaneous Information**Manual Integrations**

Samples 1203892787 (Non SDG 434442001DUP), 1203892788 (Non SDG 434442015DUP), 434421001 (B3F947) and 434421002 (B3F976) were manually integrated to correctly position the baseline as set in the calibration standards.

Ammonia Nitrogen

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

Technical Information**Sample Dilutions**

The following samples 1203897277 (B3F947DUP), 1203897278 (B3F947MS) and 434421001 (B3F947) were diluted because target analyte concentrations exceeded the calibration range.

Analyte	434421
	001
Nitrogen, Ammonia	50X

Sample Re-analysis

Sample 434421001 (B3F947) was re-analyzed due to instrument failure. The results from the reanalysis are reported.

pH

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

Technical Information**Holding Times**

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

Sample	Analyte	Value
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1203891103 (Non SDG 434442014DUP)	pH	Received 06-OCT-17, out of holding 05-OCT-17
434421001 (B3F947)	pH	Received 05-OCT-17, out of holding 03-OCT-17
434421002 (B3F976)	pH	Received 05-OCT-17, out of holding 03-OCT-17

Miscellaneous Information**Additional Comments**

10g used due to limited sample volume. 434421001 (B3F947). 4g used due to limited sample volume. 434421002 (B3F976).

Radiochemistry**AMCMISO_EIE_PRECIP_AEA: COMMON**

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

Technical Information**Recounts**

Sample 1203891904 (MB) was recounted due to high carrier/tracer yield. The recount is reported. Sample 434421001 (B3F947) was recounted due to detector error. The recount is reported.

PUISO_PRECIP_AEA:COMMON

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

Technical Information**Recounts**

Sample 434421001 (B3F947) was recounted due to detector error. The recount is reported.

Dry Weight

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

Miscellaneous Information**Additional Comments**

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% Moisture analysis was added after the dry prep was complete. Due to limited volume remaining, data was transferred from Batch# 1707468.

Dry Weight

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

GAMMA_GS:COMMON

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

Quality Control (QC) Information

Duplication Criteria between QC Sample and Duplicate Sample

The precision requirements for Cs-137 were not met, however, GEL's internal precision requirements were met (RPD of 0% to 100% when both results are less than 5*MDC).

Sample	Analyte	Value
1203891875 (B3F947DUP)	Cesium-137	RPD 35.7* (0%-30%) RER 2.5* (0-2)

RDL Met

Samples did not meet the detection limits due to limited sample volume.

Sample	Analyte	Value
1203891874 (MB)	Cesium-137	Result 0.11 < MDA 0.313 > RDL 0.1 pCi/g
	Cobalt-60	Result -0.171 < MDA 0.421 > RDL 0.1 pCi/g
	Europium-152	Result 0.402 < MDA 0.87 > RDL 0.1 pCi/g
	Europium-154	Result 0.0903 < MDA 1.23 > RDL 0.1 pCi/g
	Europium-155	Result 0.12 < MDA 0.76 > RDL 0.1 pCi/g
1203891875 (B3F947DUP)	Cobalt-60	Result 0.0692 < MDA 0.504 > RDL 0.1 pCi/g
	Europium-152	Result -0.219 < MDA 1.1 > RDL 0.1 pCi/g
	Europium-154	Result -0.371 < MDA 1.36 > RDL 0.1 pCi/g
	Europium-155	Result -0.115 < MDA 0.779 > RDL 0.1 pCi/g
434421001 (B3F947)	Cesium-137	Result 0.286 < MDA 0.743 > RDL 0.1 pCi/g
	Cobalt-60	Result -0.0667 < MDA 0.617 > RDL 0.1 pCi/g
	Europium-152	Result -0.364 < MDA 0.828 > RDL 0.1 pCi/g
	Europium-154	Result -0.25 < MDA 1.76 > RDL 0.1 pCi/g

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	Europium-155	Result 0.0457 < MDA 0.895 > RDL 0.1 pCi/g
434421002 (B3F976)	Cesium-137	Result 0.487 < MDA 0.731 > RDL 0.1 pCi/g
	Cobalt-60	Result -0.157 < MDA 0.498 > RDL 0.1 pCi/g
	Europium-152	Result -0.0784 < MDA 1.18 > RDL 0.1 pCi/g
	Europium-154	Result 0.502 < MDA 2.32 > RDL 0.1 pCi/g
	Europium-155	Result 0.146 < MDA 1.01 > RDL 0.1 pCi/g

SRTOT_SEP_PRECIP_GPC: COMMON

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

Quality Control (QC) Information**RDL Met**

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1203894073 (MB)	Total Strontium	Result 0.537 < MDA 2.29 > RDL 2 pCi/g

Samples (See Below) did not meet the detection limits due to limited sample volume. Samples were counted the maximum count time in order to achieve the lowest MDAs possible.

Sample	Analyte	Value
434421001 (B3F947)	Total Strontium	Result 1.78 < MDA 2.46 > RDL 2 pCi/g
434421002 (B3F976)	Total Strontium	Result 1.85 < MDA 2.86 > RDL 2 pCi/g

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

Samples were re-prepped due to high blank activity. The re-analysis is being reported.

TC99_SEP_GPC

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

Quality Control (QC) Information

Laboratory Control Sample (LCS) Recovery

The Laboratory Control Duplicate, 1203891340 (LCSD), does not meet the client specific recovery requirement; however, the sample does meet GEL standard requirement.

Technical Information**Recounts**

Samples 1203891339 (LCS) and 1203891340 (LCSD) were recounted due to high recovery. The recounts are reported.

C14_LSC: COMMON

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

NI63_LSC

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

Certification Statement

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

Chain of Custody and Supporting Documentation

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CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 42421

CH2MHill Plateau Remediation Company **PROJECT COORDINATOR** SUMNER, LC

COLLECTOR CHRIS FULTON CHPRC **TELEPHONE NO.** 376-3922

SAMPLING LOCATION PUREX White Rm Cmp 1 **PROJECT DESIGNATION** PUREX Special Sampling - Other Solid

ICE CHEST NO. GWS-589 **FIELD LOGBOOK NO.** HNF-N-507 27 **ACTUAL SAMPLE DEPTH** (N/A)

SHIPPED TO GEL Laboratories, LLC **OFFSITE PROPERTY NO.** 8534

PRICE CODE C05 **AIR QUALITY** **METHOD OF SHIPMENT** FEDERAL EXPRESS

PAGE 1 OF 2

DATA TURNAROUND 7 Days / 7 Days

ORIGINAL

BILL OF LADING/AIR BILL NO. 7704 2084 3674

MATRIX*	PRESERVATION	None
A=Air	HOLDING TIME	ASAP
DL=Drum	TYPE OF CONTAINER	ag
Liquids	NO. OF CONTAINER(S)	1
DS=Drum	VOLUME	18g
Solids	SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS
L=Liquid	SAMPLE DATE	OCT 03 2017
O=Oil	SAMPLE TIME	1255
S=Soil	OTHER SOLID	✓
SE=Sediment		
T=Tissue		
V=Vegetation		
W=Water		
WI=Wipe		
X=Other		

CHAIN OF POSSESSION

SIGN/PRINT NAMES

SPECIAL INSTRUCTIONS
SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

RELINQUISHED BY/REMOVED FROM CHRIS FULTON	DATE/TIME OCT 03 2017 1300	RECEIVED BY/STORED IN SSU-1	DATE/TIME OCT 03 2017 1600
RELINQUISHED BY/REMOVED FROM SSU-1	DATE/TIME OCT 04 2017 0654	RECEIVED BY/STORED IN Troy Bacon CHPRC	DATE/TIME OCT 04 2017 0654
RELINQUISHED BY/REMOVED FROM Troy Bacon CHPRC	DATE/TIME OCT 04 2017 1400	RECEIVED BY/STORED IN FEDEX	DATE/TIME OCT 04 2017 1400
RELINQUISHED BY/REMOVED FROM Troy Bacon CHPRC	DATE/TIME OCT 04 2017 1400	RECEIVED BY/STORED IN Chris Gane	DATE/TIME OCT 04 2017 1400
RELINQUISHED BY/REMOVED FROM Chris Gane	DATE/TIME OCT 04 2017 1400	RECEIVED BY/STORED IN Chris Gane	DATE/TIME OCT 04 2017 1400
RELINQUISHED BY/REMOVED FROM Chris Gane	DATE/TIME OCT 04 2017 1400	RECEIVED BY/STORED IN Chris Gane	DATE/TIME OCT 04 2017 1400
RELINQUISHED BY/REMOVED FROM Chris Gane	DATE/TIME OCT 04 2017 1400	RECEIVED BY/STORED IN Chris Gane	DATE/TIME OCT 04 2017 1400

LABORATORY SECTION RECEIVED BY

FINAL SAMPLE DISPOSITION DISPOSAL METHOD

TITLE

DATE/TIME

DISPOSED BY

DATE/TIME

FSR ID = FSR51250

TRVL NUM = TRVL-17-233

PRINTED ON 9/25/2017

A-6003-618 (REV 2)

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CH2MHill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		PAGE 2 OF 2	
COLLECTOR CHRIS FULTON	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	PRICE CODE C05	DATA TURNAROUND 7 Days / 7 Days
SAMPLING LOCATION PUREX White Rm Cmp 1	PROJECT DESIGNATION PUREX Special Sampling - Other Solid	FIELD LOGBOOK NO. HNF-N-50727	SAF NO. F17-065	AIR QUALITY <input type="checkbox"/>	METHOD OF SHIPMENT FEDERAL EXPRESS
ICE CHEST NO. AWS-589	ACTUAL SAMPLE DEPTH (N/A)	COA 304614	BILL OF LADING/AIR BILL NO. 17704 2084 3674		
SHIPPED TO GEL Laboratories, LLC	SPECIAL INSTRUCTIONS TRVL-17-233 (1) 9045_pH (Non-Aqueous): COMMON {pH Measurement}; 7471_MERCURY_CV: COMMON (SOLIDS) {Mercury}; 6010_METALS_ICP: COMMON {Antimony, Arsenic, Barium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Magnesium, Manganese, Nickel, Potassium, Silver, Sodium, Vanadium, Zinc}; 6010_METALS_ICP: COMMON (Add-on) {Aluminum, Beryllium, Lead, Selenium}; 300.0_ANIONS_IC: COMMON {Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Sulfate}; 300.0_ANIONS_IC: COMMON (Add-on) {Bromide, Phosphorus in phosphate}; 350.1_AMMONIA: COMMON {Ammonia}; 6020_METALS_ICPMS: COMMON (Add-on) {Uranium}; 8270_SVOA_GCMS: COMMON (Add-on) {Tributyl phosphate}; 9060_TOC: COMMON {Total organic carbon}; 9060_TIC: COMMON {Total Inorganic Carbon}; GAMMA_GS: COMMON {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; AMCMISO_IE_PRECIP_AEA: COMMON {Americium-241}; PUJISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; SRTOT_SEP_PRECIP_GPC: COMMON {Total beta radiostrontium}; TC99_EIE_LSC: COMMON {Technetium-99}; C14_LSC: COMMON {Carbon-14}; NI63_LSC: COMMON {Nickel-63};				

A-6003-618 (REV 2)

TRVL NUM = TRVL-17-233

FSR ID = FSR51250

PRINTED ON 9/25/2017

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CH2MHill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 434421		F17-065-022	PAGE 1 OF 2
COLLECTOR CHRIS FULTON CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	PRICE CODE C05	DATA TURNAROUND 7 Days / 7 Days
SAMPLING LOCATION PUREX P and O Cmp 1	PROJECT DESIGNATION PUREX Special Sampling - Other Solid	FIELD LOGBOOK NO. HNF-N-507 27	SAF NO. F17-065	AIR QUALITY <input type="checkbox"/>	METHOD OF SHIPMENT FEDERAL EXPRESS
ICE CHEST NO. GWS-589	FIELD LOGBOOK NO. HNF-N-507 27	ACTUAL SAMPLE DEPTH (N/A)	COA 304614	ORIGINAL	
SHIPPED TO GEL Laboratories, LLC	OFFSITE PROPERTY NO. 8534	BILL OF LADING/AIR BILL NO. 77704 2084 3674			

MATRIX* A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil 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 regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.	PRESERVATION None	HOLDING TIME ASAP	TYPE OF CONTAINER ag	NO. OF CONTAINER(S) 1	VOLUME 18g	SAMPLE ANALYSIS SEE ITEM (1) IN SPECIAL INSTRUCTIONS
SPECIAL HANDLING AND/OR STORAGE							
SAMPLE NO. B3F976	MATRIX* OTHER SOLID	SAMPLE DATE OCT 03 2017	SAMPLE TIME 1326				

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM CHRIS FULTON	DATE/TIME OCT 03 2017 1500	RECEIVED BY/STORED IN SSU-1	DATE/TIME OCT 03 2017 1500	SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM SSU-1	DATE/TIME OCT 04 2017 0654	RECEIVED BY/STORED IN Troy Bacon CHPRC	DATE/TIME OCT 04 2017 0654		
RELINQUISHED BY/REMOVED FROM Troy Bacon CHPRC	DATE/TIME OCT 04 2017 1400	RECEIVED BY/STORED IN FEDEX	DATE/TIME OCT 04 2017 1400		
RELINQUISHED BY/REMOVED FROM	DATE/TIME FEDEX	RECEIVED BY/STORED IN Chris Gurne Chuska Gurne	DATE/TIME OCT 06 2017 8:50		

LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

NOVEMBER 9, 2017

REV.2

CH2MHill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F17-065-022	PAGE 2 OF 2
COLLECTOR CHRIS FULTON CFPC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	PRICE CODE C05	DATA TURNAROUND 7 Days / 7 Days	
SAMPLING LOCATION PUREX P and O Cmp 1	PROJECT DESIGNATION PUREX Special Sampling - Other Solid		SAF NO. F17-065	AIR QUALITY <input type="checkbox"/>		
ICE CHEST NO. 6WS-689	FIELD LOGBOOK NO. HNF-N-507 27	ACTUAL SAMPLE DEPTH (N/A)	COA 304614	METHOD OF SHIPMENT FEDERAL EXPRESS		ORIGINAL
SHIPPED TO GEL Laboratories, LLC	OFFSITE PROPERTY NO. 8834		BILL OF LADING/AIR BILL NO. 9704			2084 3676
<p>SPECIAL INSTRUCTIONS</p> <p>TRVL-17-233</p> <p>(1) 9045_pH (Non-Aqueous): COMMON {pH Measurement}; 7471_MERCURY_CV: COMMON (SOLIDS) {Mercury}; 6010_METALS_ICP: COMMON {Antimony, Arsenic, Barium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Magnesium, Manganese, Nickel, Potassium, Silver, Sodium, Vanadium, Zinc}; 6010_METALS_ICP: COMMON (Add-on) {Aluminum, Beryllium, Lead, Selenium}; 300.0_ANIONS_IC: COMMON {Chloride, Fluoride, Nitrogen in Nitrate, Nitrite, Sulfate}; 300.0_ANIONS_IC: COMMON (Add-on) {Bromide, Phosphorus in phosphate}; 350.1_AMMONIA: COMMON {Ammonia}; 6020_METALS_ICPMS: COMMON (Add-on) {Uranium}; 8270_SVOA_GCMS: COMMON (Add-on) {Tributyl phosphate}; 9060_TOC: COMMON {Total organic carbon}; 9060_TIC: COMMON {Total inorganic carbon}; GAMMA_GS: COMMON {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; AMCMISO_IE_PRECIP_AEA: COMMON {Americium-241}; PUISO_IE_PRECIP_AEA: COMMON {Plutonium-238, Plutonium-239/240}; SRTOT_SEP_PRECIP_GPC: COMMON {Total beta radiostrontium}; TC99_EIE_LSC: COMMON {Technetium-99}; C14_LSC: COMMON {Carbon-14}; NI63_LSC: COMMON {Nickel-63};</p>						

A-6003-618 (REV 2)

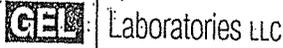
TRVL NUM = TRVL-17-233

FSR ID = FSR51255

PRINTED ON 9/25/2017

NOVEMBER 9, 2017

REV.2



SAMPLE RECEIPT & REVIEW FORM

Client: <u>OPRC</u>		SDG/AR/COC/Work Order: <u>434421</u>
Received By: <u>Christelle Garves</u>		Date Received: <u>October 5, 2017</u>
Carrier and Tracking Number		Circle Applicable: <input checked="" type="checkbox"/> FedEx Express <input type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other <u>7704 2084 3952 → 2°C</u> <u>7704 2084 3676 → 2°C RAD7 SOIL IN IT</u>
Suspected Hazard Information	Yes <input type="checkbox"/> No <input type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
Shipped as a DOT Hazardous?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Hazard Class Shipped: _____ UN#: _____
COC/Samples marked or classified as radioactive?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> <input checked="" type="checkbox"/> CPM mR/Hr Classified as: <input checked="" type="checkbox"/> Rad 1 <input type="checkbox"/> Rad 2 <input type="checkbox"/> Rad 3
Is package, COC, and/or Samples marked HAZ?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other: _____

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	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: <input checked="" type="checkbox"/> Wet Ice <input type="checkbox"/> Ice Packs <input type="checkbox"/> Dry ice <input type="checkbox"/> None <input type="checkbox"/> Other *all temperatures are recorded in Celsius TEMP: <u>SEE ABOVE</u>
4	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: <u>JR1-17</u> Secondary Temperature Device Serial # (If Applicable): _____
5	Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's and Containers Affected: _____ If Preservation added, Lot#: _____
7	Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>			If Yes, Are Encores or Soil Kits present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A (If unknown, select No) VOA vials free of headspace? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A Sample ID's and containers affected: _____
8	Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected: _____
9	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected: _____
10	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected: _____
11	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected: _____
12	Are sample containers identifiable as GEL provided?			<input checked="" type="checkbox"/>	
13	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			

Comments (Use Continuation Form if needed):

NOVEMBER 9, 2017

REV.2

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F17-065-004	PAGE 1 OF 1
COLLECTOR	CHRIS FULTON CHPRC	COMPANY CONTACT	HEY, BE	PROJECT COORDINATOR	SUMNER, LC
SAMPLING LOCATION	PUREX White Rm Cmp 1	PROJECT DESIGNATION	PUREX Special Sampling - Other Solid	SAF NO.	F17-065
ICE CHEST NO.	N/A	FIELD LOGBOOK NO.	HNF-N-507 27	COA	304614
SHIPPED TO	TestAmerica Incorporated, Richland, GEL	OFFSITE PROPERTY NO.	N/A	BILL OF LADING/AIR BILL NO.	N/A

MATRIX*	A=Air DL=Drum L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	PRELIMINARY	None
POSSIBLE SAMPLE HAZARDS/REMARKS	*Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.	HOLDING TIME	6 Months
SPECIAL HANDLING AND/OR STORAGE		TYPE OF CONTAINER	6615 3.17 64
		NO. OF CONTAINER(S)	1
		VOLUME	1g
		SAMPLE ANALYSIS	Generic Testing (No CAS)
SAMPLE NO.	B3F981	MATRIX*	OTHER SOLID
		SAMPLE DATE	OCT 03 2017
		SAMPLE TIME	1255

GEL 434421

JNS040408
EMAD911
NAB59



CHAIN OF POSSESSION		SIGN / PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	TRVL-17-233 ** TARL GENERIC TESTING BOTTLE - is for PLM analyses	
CHRIS FULTON CHPRC	OCT 03 2017 1800	SSU-1	OCT 03 2017 1900		
SSU-1	OCT 04 2017 0654	Troy Bacon CHPRC	OCT 04 2017 0654		
Troy Bacon CHPRC	OCT 04 2017 1600	Bank, TARL	OCT 04 2017 1600		
Wally Johnson	10.10.17 1530	STACY BOONE	10/13/17 9:00		
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		

NOVEMBER 9, 2017

REV.2

CH2MHill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F17-065-024	PAGE 1 OF 1
COLLECTOR	CHRIS FULLTON CHPRC	COMPANY CONTACT	HEY, BE	TELEPHONE NO.	373-7787
SAMPLING LOCATION	PUREX P and O Cmp 1	PROJECT DESIGNATION	PUREX Special Sampling - Other Solid	PROJECT COORDINATOR	SUMNER, LC
ICE CHEST NO.	N/A	FIELD LOGBOOK NO.	HNF-N-507 27	SAF NO.	F17-065
SHIPPED TO	10.10.17 TestAmerica Incorporated, Richland, GEL	ACTUAL SAMPLE DEPTH	(N/A)	COA	304614
MATRIX*	A=Air DL=Drum L=Liquid S=Soil T=Tissue V=Vegetation W=Water WT=Wipe X=Other	PRESERVATION	None	BILL OF LADING/AIR BILL NO.	N/A
POSSIBLE SAMPLE HAZARDS/ REMARKS	*Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.	HOLDING TIME	6 Months bb 10.3.17 ag	METHOD OF SHIPMENT	GOVERNMENT VEHICLE
SPECIAL HANDLING AND/OR STORAGE		TYPE OF CONTAINER			ORIGINAL
		NO. OF CONTAINER(S)	1		
		VOLUME	1g		
		SAMPLE ANALYSIS	Generic Testing (Ho CAS)		
SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3F987	OTHER SOLID	OCT 0 3 2017	1326		

GEL 434421

J7J040408
NABLA
cmr0911

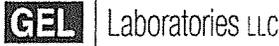


CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	TRVL-17-233 ** TARL GENERIC TESTING BOTTLE - is for PLM analyses	
CHRIS FULLTON	OCT 0 3 2017 1500	SSU-1	OCT 0 3 2017 1500		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
SSU-1	OCT 0 4 2017 0654	Troy Bacca CHPRC	OCT 0 4 2017 0654		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
Troy Bacca CHPRC	OCT 0 4 2017 1500	J. Bock, TARL	OCT 0 4 2017 1500		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
10.10.17 1530	10.10.17 1530	STACY DOWNE	10/13/17 9:00		
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 9/25/2017	FSR ID = FSR51255	TRVL NUM = TRVL-17-233	A-6003-618 (REV 2)		

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SAMPLE RECEIPT & REVIEW FORM

Client: CPRC		SDG/AR/COC/Work Order: 434421		
Received By: STACY BOONE		Date Received: OCT 13, 2017		
Carrier and Tracking Number		Circle Applicable: <input checked="" type="checkbox"/> FedEx Express <input type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other 7704 7057 2830		
Suspected Hazard Information	Yes <input type="checkbox"/> No <input type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.		
Shipped as a DOT Hazardous?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____		
COC/Samples marked or classified as radioactive?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> CPM / mR/Hr Classified as: <u>Rad 1</u> Rad 2 Rad 3		
Is package, COC, and/or Samples marked HAZ?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other: _____		
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 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3 Samples requiring cold preservation within (0 ≤ deg. C)?*	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Preservation Method: Wet Ice Ice Packs Dry ice None Other: _____ *all temperatures are recorded in Celsius TEMP: <u>2ic</u>
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>IR3-17</u> Secondary Temperature Device Serial # (If Applicable): _____
5 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)
6 Samples requiring chemical preservation at proper pH?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's and Containers Affected: _____ If Preservation added, Lot#: _____
7 Do any samples require Volatile Analysis?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	If Yes, Are Encores or Soil Kits present? Yes ___ No ___ (if yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes ___ No ___ N/A (if unknown, select No) VOA vials free of headspace? Yes ___ No ___ N/A Sample ID's and containers affected: _____
8 Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected: _____
9 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: _____
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected: _____
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected: _____
12 Are sample containers identifiable as GEL provided?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Comments (Use Continuation Form if needed): Extra volume received from TA.				

PM (or PMA) review: Initials DS Date 10/14/17 Page 1 of 1

Data Review Qualifier Definitions

Project Specific Qualifier Definitions for GEL Client Code: CPRC

Revision #2 09-NOV-2017

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

Laboratory Certifications

List of current GEL Certifications as of 09 November 2017

State	Certification
Alaska	UST-0110
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA170010
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122018-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-17-12
Utah NELAP	SC000122017-24
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Semi-Volatile Analysis

Case Narrative

NOVEMBER 9, 2017**REV.2**

**GC/MS Semivolatile
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL434421
Work Order #: 434421**

Product: Analysis of Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry
Analytical Method: 8270_SVOA_GCMS
Analytical Procedure: GL-OA-E-009 REV# 39
Analytical Batch: 1707313

Preparation Method: SW846 3541
Preparation Procedure: GL-OA-E-066 REV# 8
Preparation Batch: 1707311

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
434421001	B3F947
434421002	B3F976
1203890764	Method Blank (MB)
1203890765	Laboratory Control Sample (LCS)
1203890766	434439001(NonSDG) Matrix Spike (MS)
1203890767	434439001(NonSDG) Matrix Spike Duplicate (MSD)

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

Data Summary:

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

Quality Control (QC) Information

Surrogate Recoveries

Sample (See Below) did not meet surrogate recovery acceptance criteria. The sample was analyzed at a dilution. As a result, one or more surrogates were diluted out of the acceptance limits.

Sample	Analyte	Value
434421001 (B3F947)	p-Terphenyl-d14	126* (45%-119%)

Sample (See Below) did not meet surrogate recovery acceptance criteria. Since there is insufficient sample remaining to perform a re-extraction, the results from this extraction are reported.

Sample	Analyte	Value
434421002 (B3F976)	2,4,6-Tribromophenol	25* (39%-115%)
	2-Fluorobiphenyl	22* (35%-107%)

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	2-Fluorophenol	26* (36%-104%)
	Nitrobenzene-d5	21* (34%-109%)
	Phenol-d5	28* (39%-106%)
	p-Terphenyl-d14	38* (45%-119%)

Technical Information**Sample Dilutions**

Sample 434421001 (B3F947) was diluted due to the presence of non-target analytes. The data from the dilution are reported.

Certification Statement

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

NOVEMBER 9, 2017

REV.2

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: GEL434421 GEL Work Order: 434421

The Qualifiers in this report are defined as follows:

D Results are reported from a diluted aliquot of sample.

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

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

DL Indicates that sample is diluted.

RA Indicates that sample is re-analyzed without re-extraction.

RE Indicates that sample is re-extracted.

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: **Barbara Bailey**Date: **10 OCT 2017**Title: **Data Validator**

Sample Data Summary

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Semi Volatile

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL434421	Date Collected: 10/03/2017 12:55	Matrix: OTHER SOLID
Lab Sample ID: 434421001	Date Received: 10/05/2017 08:50	%Moisture: 7
Client Sample: TA ID B3F981	Client: CPRC001	Project: CPRC0F17065
Client ID: B3F947	Method: 8270_SVOA_GCMS	SOP Ref: GL-OA-E-009
Batch ID: 1707313	Inst: MSD3.I	Dilution: 5
Run Date: 10/09/2017 20:18	Analyst: JLD1	Inj. Vol: 1 uL
Prep Date: 10/09/2017 10:10	Aliquot: 1.02 g	Final Volume: 1 mL
Data File: s100917a.s\sj0925.D	Column: DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
126-73-8	Tributylphosphate	DJ	21900	ug/kg	15800	52700

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
000067-66-3	Trichloromethane	2.179	58200	ug/kg	93	NJ
	Unknown Aldol Condensate	3.97	58700	ug/kg		AJ

NOVEMBER 9, 2017

Semi Volatile

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REV 2

Certificate of Analysis
Sample Summary

SDG Number: GEL434421	Date Collected: 10/03/2017 13:26	Matrix: OTHER SOLID
Lab Sample ID: 434421002	Date Received: 10/05/2017 08:50	%Moisture: 27.4
Client ID: B3F976	Client: CPRC001	Project: CPRC0F17065
Batch ID: 1707313	Method: 8270_SVOA_GCMS	SOP Ref: GL-OA-E-009
Run Date: 10/09/2017 16:51	Inst: MSD3.I	Dilution: 1
Prep Date: 10/09/2017 10:10	Analyst: JLD1	Inj. Vol: 1 uL
Data File: s100917a.s\s3j0918.D	Aliquot: .5 g	Final Volume: .5 mL
	Column: DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
126-73-8	Tributylphosphate	U	3000	ug/kg	3000	10000

Quality Control Summary

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GEL LABORATORIES LLC

REV.2

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

QC Summary

Report Date: October 10, 2017

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 434421

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1707313										
QC1203890765	LCS										
Tributylphosphate	1660			1620	ug/kg		97	(70%-130%)	JLD1	10/09/17	15:23
**2,4,6-Tribromophenol	3330			2380	ug/kg		71	(39%-115%)			
**2-Fluorobiphenyl	1660			939	ug/kg		56	(35%-107%)			
**2-Fluorophenol	3330			2300	ug/kg		69	(36%-104%)			
**Nitrobenzene-d5	1660			909	ug/kg		55	(34%-109%)			
**Phenol-d5	3330			2320	ug/kg		70	(39%-106%)			
**p-Terphenyl-d14	1660			1050	ug/kg		63	(45%-119%)			
QC1203890764	MB										
Tributylphosphate			U	99.9	ug/kg					10/09/17	14:53
**2,4,6-Tribromophenol	3330			2810	ug/kg		84	(39%-115%)			
**2-Fluorobiphenyl	1660			1200	ug/kg		72	(35%-107%)			
**2-Fluorophenol	3330			2800	ug/kg		84	(36%-104%)			
**Nitrobenzene-d5	1660			1220	ug/kg		73	(34%-109%)			
**Phenol-d5	3330			2900	ug/kg		87	(39%-106%)			

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QC Summary

Workorder: 434421

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1707313										
**p-Terphenyl-d14	1660			1300	ug/kg		78	(45%-119%)	JLD1	10/09/17	14:53
QC1203890766 434439001 MS											
Tributylphosphate	1660	U	99.7	1600	ug/kg		96	(25%-131%)		10/09/17	17:51
**2,4,6-Tribromophenol	3320		1950	2400	ug/kg		72	(39%-115%)			
**2-Fluorobiphenyl	1660		1010	967	ug/kg		58	(35%-107%)			
**2-Fluorophenol	3320		2220	2340	ug/kg		70	(36%-104%)			
**Nitrobenzene-d5	1660		1040	982	ug/kg		59	(34%-109%)			
**Phenol-d5	3320		2330	2330	ug/kg		70	(39%-106%)			
**p-Terphenyl-d14	1660		1200	1050	ug/kg		63	(45%-119%)			
QC1203890767 434439001 MSD											
Tributylphosphate	1660	U	99.7	1670	ug/kg	5	101	(0%-30%)		10/09/17	18:20
**2,4,6-Tribromophenol	3320		1950	2150	ug/kg		65	(39%-115%)			
**2-Fluorobiphenyl	1660		1010	820	ug/kg		49	(35%-107%)			
**2-Fluorophenol	3320		2220	2020	ug/kg		61	(36%-104%)			
**Nitrobenzene-d5	1660		1040	789	ug/kg		47	(34%-109%)			
**Phenol-d5	3320		2330	2120	ug/kg		64	(39%-106%)			

QC Summary

Workorder: 434421

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Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch 1707313											
**p-Terphenyl-d14	1660	1200		1020	ug/kg		61	(45%-119%)	JLD1	10/09/17	18:20

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate 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
 - o Analyte failed to recover within LCS limits (Organics only)

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.

NOVEMBER 9, 2017

Semi-Volatile

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REV.2

Surrogate Recovery Report

SDG Number: GEL434421

Matrix Type: SOLID

Sample ID	Client ID	2FP %REC	PHL %REC	NBZ %REC	FBP %REC	TBP %REC	TPH %REC
1203890764	MB for batch 1707311	84	87	73	72	84	78
1203890765	LCS for batch 1707311	69	70	55	56	71	63
434421002	B3F976	26 *	28 *	21 *	22 *	25 *	38 *
1203890766	B3BN67MS	70	70	59	58	72	63
1203890767	B3BN67MSD	61	64	47	49	65	61
434421001	B3F947	59 D	53 D	58 D	65 D	43 D	126 * D

Surrogate

Acceptance Limits

2FP	= 2-Fluorophenol	(36%-104%)
PHL	= Phenol-d5	(39%-106%)
NBZ	= Nitrobenzene-d5	(34%-109%)
FBP	= 2-Fluorobiphenyl	(35%-107%)
TBP	= 2,4,6-Tribromophenol	(39%-115%)
TPH	= p-Terphenyl-d14	(45%-119%)

* Recovery outside Acceptance Limits

Column to be used to flag recovery values

D Sample Diluted

Metals Analysis

Case Narrative

NOVEMBER 9, 2017**REV.2****Metals****Technical Case Narrative****CH2MHill Plateau Remediation Company (CPRC)****SDG #: GEL434421****Work Order #: 434421****Product: Determination of Metals by ICP****Analytical Method:** SW846 3050B/6010D**Analytical Procedure:** GL-MA-E-013 REV# 30**Analytical Batch:** 1707943**Product: Determination of Metals by ICP-MS****Analytical Method:** SW846 3050B/6020B**Analytical Procedure:** GL-MA-E-014 REV# 31**Analytical Batch:** 1707409**Product: Mercury Analysis Using the Perkin Elmer Automated Mercury Analyzer****Analytical Method:** 7471_HG_CVAA**Analytical Procedure:** GL-MA-E-010 REV# 36**Analytical Batches:** 1708406 and 1709410**Preparation Method:** SW846 3050B**Preparation Procedure:** GL-MA-E-009 REV# 26**Preparation Batches:** 1707408 and 1707941**Preparation Method:** SW846 7471B Prep**Preparation Procedure:** GL-MA-E-010 REV# 35**Preparation Batches:** 1708405 and 1709406

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
434421001	B3F947
434421002	B3F976
1203893168	Method Blank (MB) ICP
1203893169	Laboratory Control Sample (LCS)
1203893173	Laboratory Control Sample Duplicate (LCSD)
1203893172	434421001(B3F947L) Serial Dilution (SD)
1203891024	Method Blank (MB) ICP-MS
1203891025	Laboratory Control Sample (LCS)
1203891028	434439001(NonSDGL) Serial Dilution (SD)
1203891026	434439001(NonSDGD) Sample Duplicate (DUP)
1203891027	434439001(NonSDGS) Matrix Spike (MS)
1203893545	Method Blank (MB) CVAA
1203896099	Method Blank (MB) CVAA
1203893546	Laboratory Control Sample (LCS)
1203896100	Laboratory Control Sample (LCS)
1203893547	Laboratory Control Sample Duplicate (LCSD)
1203896171	Laboratory Control Sample Duplicate (LCSD)
1203893548	434421001(B3F947L) Serial Dilution (SD)
1203896103	434378001(NonSDGL) Serial Dilution (SD)

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

Data Summary:

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

Calibration Information

CRDL/PQL Requirements

The PQL standard recoveries for SW846 6010C or 6010D met the control limits with the exception of potassium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. ICP.

ICSA/ICSAB Statement

For the ICP-MS analysis, the ICSA solution contains analyte concentrations which are verified trace impurities indigenous to the purchased standard.

Continuing Calibration Blanks (CCB) Requirements

The continuing calibration blank (CCB) bracketing the sample in this SDG did not meet the acceptance criteria. The samples bracketed by this CCB, however, contained molybdenum less than the RDL. This indicates that any contribution to the concentration of molybdenum in the samples from potential laboratory contamination would be minimal. ICP-MS.

Quality Control (QC) Information

Method Blank (MB) Statement

The method blanks (MB) analyzed with this SDG met the acceptance criteria. However, where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data.

Sample	Analyte	Value
1203893168 (MB)	Sodium	8570 between (6540 - 11700)

Laboratory Control Sample Duplicate (LCSD)

An LCSD was used in place of matrix QC due to limited sample volume. CVAA.

Technical Information

Preparation/Analytical Method Verification

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

Sample Dilutions

Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range. 434421001 diluted due to highly over range zinc, which will contaminate the instrument. 434421002 diluted due to over range sodium. 434421001 (B3F947) and 434421002 (B3F976)-ICP. The ICPMS solid samples in this SDG were diluted the standard two times. ICP-MS.

Analyte	434421	
	001	002

NOVEMBER 9, 2017

REV.2

Several	500X 200X 2X 10X 1X	2X 10X 1X
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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.

NOVEMBER 9, 2017

REV.2

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: GEL434421 GEL Work Order: 434421

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.
- 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: 20 OCT 2017****Title: Data Validator**

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL434421

CONTRACT: CPRC0F17065

METHOD TYPE: SW846

SAMPLE ID: 434421001

BASIS: Dry Weight

DATE COLLECTED 03-OCT-17

CLIENT ID: B3F947

LEVEL: Low

DATE RECEIVED 05-OCT-17

MATRIX: OTHER SOLID

%SOLIDS: 93

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	586000	ug/kg	D	69600	205000	205000	10	P	TXT1	10/11/17 13:05	101117-2	1707943
7440-36-0	Antimony	46800	ug/kg	D	3380	10200	10200	10	P	TXT1	10/11/17 13:05	101117-2	1707943
7440-38-2	Arsenic	6680	ug/kg	BD	5120	30700	30700	10	P	TXT1	10/11/17 13:05	101117-2	1707943
7440-39-3	Barium	37800	ug/kg	D	1020	5120	5120	10	P	TXT1	10/11/17 13:05	101117-2	1707943
7440-41-7	Beryllium	1020	ug/kg	UD	1020	5120	5120	10	P	TXT1	10/11/17 13:05	101117-2	1707943
7440-43-9	Cadmium	1050000	ug/kg	D	1020	5120	5120	10	P	TXT1	10/11/17 13:05	101117-2	1707943
7440-70-2	Calcium	1960000	ug/kg	D	81900	256000	256000	10	P	TXT1	10/11/17 13:05	101117-2	1707943
7440-47-3	Chromium	169000	ug/kg	D	1540	5120	5120	10	P	TXT1	10/11/17 13:05	101117-2	1707943
7440-48-4	Cobalt	10400	ug/kg	D	1540	5120	5120	10	P	TXT1	10/11/17 13:05	101117-2	1707943
7440-50-8	Copper	1040000	ug/kg	D	3070	10200	10200	10	P	TXT1	10/11/17 13:05	101117-2	1707943
7439-89-6	Iron	85300000	ug/kg	D	81900	256000	256000	10	P	TXT1	10/11/17 13:05	101117-2	1707943
7439-92-1	Lead	2090000	ug/kg	D	3380	10200	10200	10	P	TXT1	10/11/17 13:05	101117-2	1707943
7439-95-4	Magnesium	323000	ug/kg	D	87000	307000	307000	10	P	TXT1	10/11/17 13:05	101117-2	1707943
7439-96-5	Manganese	327000	ug/kg	D	2050	10200	10200	10	P	TXT1	10/11/17 13:05	101117-2	1707943
7439-97-6	Mercury	598	ug/kg		4.22	12.6	12.6	1	AV	MTM1	10/11/17 11:33	101117S1-10	1708406
7440-02-0	Nickel	52500	ug/kg	D	1540	5120	5120	10	P	TXT1	10/11/17 13:05	101117-2	1707943
7440-09-7	Potassium	1310000	ug/kg	UD	1310000	5120000	5120000	200	P	HSC	10/11/17 14:01	101117C-1	1707943
7782-49-2	Selenium	5120	ug/kg	UD	5120	30700	30700	10	P	TXT1	10/11/17 13:05	101117-2	1707943
7440-22-4	Silver	1020	ug/kg	UD	1020	5120	5120	10	P	TXT1	10/11/17 13:05	101117-2	1707943
7440-23-5	Sodium	1430000	ug/kg	UD	1430000	5120000	5120000	200	P	HSC	10/11/17 14:01	101117C-1	1707943
7440-61-1	Uranium	59.7	ug/kg	D	13.3	40.2	40.2	2	MS	PRB	10/10/17 09:29	171009-8	1707409
7440-62-2	Vanadium	2180	ug/kg	BD	1020	5120	5120	10	P	TXT1	10/11/17 13:05	101117-2	1707943
7440-66-6	Zinc	348000000	ug/kg	D	205000	512000	512000	500	P	TXT1	10/11/17 13:30	101117-2	1707943

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1707409	1707408	SW846 3050B	0.535	g	50	mL	10/06/17	JXM8
1707943	1707941	SW846 3050B	0.525	g	50	mL	10/10/17	JXM8
1708406	1708405	SW846 7471B Prep	0.512	g	30	mL	10/10/17	AXS5

***Analytical Methods:**

AV SW846 7471B
P SW846 3050B/6010D
MS SW846 3050B/6020B

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL434421

CONTRACT: CPRC0F17065

METHOD TYPE: SW846

SAMPLE ID: 434421002

BASIS: Dry Weight

DATE COLLECTED 03-OCT-17

CLIENT ID: B3F976

LEVEL: Low

DATE RECEIVED 05-OCT-17

MATRIX: OTHER SOLID

%SOLIDS: 73

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	184000	ug/kg		9770	28700	28700	1	P	TXT1	10/11/17 13:11	101117-2	1707943
7440-36-0	Antimony	1530	ug/kg		474	1440	1440	1	P	TXT1	10/11/17 13:11	101117-2	1707943
7440-38-2	Arsenic	718	ug/kg	U	718	4310	4310	1	P	TXT1	10/11/17 13:11	101117-2	1707943
7440-39-3	Barium	9010	ug/kg		144	718	718	1	P	TXT1	10/11/17 13:11	101117-2	1707943
7440-41-7	Beryllium	144	ug/kg	U	144	718	718	1	P	TXT1	10/11/17 13:11	101117-2	1707943
7440-43-9	Cadmium	741	ug/kg		144	718	718	1	P	TXT1	10/11/17 13:11	101117-2	1707943
7440-70-2	Calcium	136000	ug/kg		11500	35900	35900	1	P	TXT1	10/11/17 13:11	101117-2	1707943
7440-47-3	Chromium	116000	ug/kg		216	718	718	1	P	TXT1	10/11/17 13:11	101117-2	1707943
7440-48-4	Cobalt	367	ug/kg	B	216	718	718	1	P	TXT1	10/11/17 13:11	101117-2	1707943
7440-50-8	Copper	342000	ug/kg		431	1440	1440	1	P	TXT1	10/11/17 13:11	101117-2	1707943
7439-89-6	Iron	295000	ug/kg		11500	35900	35900	1	P	TXT1	10/11/17 13:11	101117-2	1707943
7439-92-1	Lead	25300	ug/kg		474	1440	1440	1	P	TXT1	10/11/17 13:11	101117-2	1707943
7439-95-4	Magnesium	122000	ug/kg		12200	43100	43100	1	P	TXT1	10/11/17 13:11	101117-2	1707943
7439-96-5	Manganese	2850	ug/kg		287	1440	1440	1	P	TXT1	10/11/17 13:11	101117-2	1707943
7439-97-6	Mercury	12.1	ug/kg	B	5.51	16.5	16.5	1	AV	MTM1	10/16/17 11:24	101617S1-11	1709410
7440-02-0	Nickel	5830	ug/kg		216	718	718	1	P	TXT1	10/11/17 13:11	101117-2	1707943
7440-09-7	Potassium	10500000	ug/kg	D	92000	359000	359000	10	P	HSC	10/11/17 14:07	101117C-1	1707943
7782-49-2	Selenium	718	ug/kg	U	718	4310	4310	1	P	TXT1	10/11/17 13:11	101117-2	1707943
7440-22-4	Silver	144	ug/kg	U	144	718	718	1	P	TXT1	10/11/17 13:11	101117-2	1707943
7440-23-5	Sodium	37500000	ug/kg	D	101000	359000	359000	10	P	HSC	10/11/17 14:07	101117C-1	1707943
7440-61-1	Uranium	41.3	ug/kg	BD	16.6	50.4	50.4	2	MS	PRB	10/10/17 09:31	171009-8	1707409
7440-62-2	Vanadium	750	ug/kg		144	718	718	1	P	TXT1	10/11/17 13:11	101117-2	1707943
7440-66-6	Zinc	148000	ug/kg		575	1440	1440	1	P	TXT1	10/11/17 13:11	101117-2	1707943

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1707409	1707408	SW846 3050B	0.546	g	50	mL	10/06/17	JXM8
1707943	1707941	SW846 3050B	0.479	g	50	mL	10/10/17	JXM8
1709410	1709406	SW846 7471B Prep	0.502	g	30	mL	10/13/17	AXS5

***Analytical Methods:**

AV SW846 7471B
P SW846 3050B/6010D
MS SW846 3050B/6020B

Quality Control Summary

NOVEMBER 9, 2017

GEL LABORATORIES LLC

REV.2

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

QC Summary

Report Date: November 9, 2017

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 434421

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1707409										
QC1203891026	434439001	DUP									
Uranium		D	90.4	D	72.0	ug/kg	^	(+/-40.0)	PRB	10/10/17	09:34
QC1203891025	LCS										
Uranium	4660			D	4430	ug/kg		(80%-120%)		10/10/17	09:27
QC1203891024	MB										
Uranium				DU	12.2	ug/kg				10/10/17	09:26
QC1203891027	434439001	MS									
Uranium	4800	D	90.4	D	4670	ug/kg		(75%-125%)		10/10/17	09:36
QC1203891028	434439001	SDILT									
Uranium		D	0.454	BD	0.093	ug/L		(0%-10%)		10/10/17	09:39
Metals Analysis-ICP											
Batch	1707943										
QC1203893169	LCS										
Aluminum	466000				472000	ug/kg		101 (80%-120%)	TXT1	10/11/17	13:01
Antimony	46600				44300	ug/kg		95.2 (80%-120%)			
Arsenic	46600				46400	ug/kg		99.8 (80%-120%)			
Barium	46600				45700	ug/kg		98.1 (80%-120%)			
Beryllium	46600				47300	ug/kg		102 (80%-120%)			
Cadmium	46600				45800	ug/kg		98.4 (80%-120%)			

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QC Summary

Workorder: 434421

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1707943										
Calcium	466000			470000	ug/kg		101	(80%-120%)	TXT1	10/11/17	13:01
Chromium	46600			45300	ug/kg		97.3	(80%-120%)			
Cobalt	46600			46700	ug/kg		100	(80%-120%)			
Copper	46600			45900	ug/kg		98.6	(80%-120%)			
Iron	466000			461000	ug/kg		99	(80%-120%)			
Lead	46600			46000	ug/kg		98.8	(80%-120%)			
Magnesium	466000			462000	ug/kg		99.3	(80%-120%)			
Manganese	46600			46100	ug/kg		99.1	(80%-120%)			
Nickel	46600			44900	ug/kg		96.5	(80%-120%)			
Potassium	466000			450000	ug/kg		96.6	(80%-120%)	HSC	10/11/17	13:55
Selenium	46600			47700	ug/kg		102	(80%-120%)	TXT1	10/11/17	13:01
Silver	46600			44300	ug/kg		95.1	(80%-120%)			
Sodium	466000			502000	ug/kg		108	(80%-120%)	HSC	10/11/17	13:55
Vanadium	46600			45000	ug/kg		96.7	(80%-120%)	TXT1	10/11/17	13:01
Zinc	46600			45800	ug/kg		98.4	(80%-120%)			

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1707943										
	QC1203893173	LCSD									
Aluminum	456000			449000	ug/kg	4.92	98.4	(0%-35%)	TXT1	10/11/17	13:03
Antimony	45600			42100	ug/kg	5.02	92.4	(0%-35%)			
Arsenic	45600			44000	ug/kg	5.4	96.4	(0%-35%)			
Barium	45600			43800	ug/kg	4.21	95.9	(0%-35%)			
Beryllium	45600			45100	ug/kg	4.68	98.9	(0%-35%)			
Cadmium	45600			43900	ug/kg	4.31	96.2	(0%-35%)			
Calcium	456000			449000	ug/kg	4.64	98.4	(0%-35%)			
Chromium	45600			43200	ug/kg	4.82	94.6	(0%-35%)			
Cobalt	45600			44700	ug/kg	4.33	98	(0%-35%)			
Copper	45600			43600	ug/kg	5.01	95.7	(0%-35%)			
Iron	456000			440000	ug/kg	4.58	96.5	(0%-35%)			
Lead	45600			44100	ug/kg	4.28	96.6	(0%-35%)			
Magnesium	456000			442000	ug/kg	4.35	97	(0%-35%)			
Manganese	45600			43900	ug/kg	4.91	96.3	(0%-35%)			
Nickel	45600			42600	ug/kg	5.26	93.4	(0%-35%)			

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1707943										
Potassium	456000			428000	ug/kg	4.84	93.9	(0%-35%)	HSC	10/11/17	13:58
Selenium	45600			44400	ug/kg	7.03	97.4	(0%-35%)	TXT1	10/11/17	13:03
Silver	45600			42400	ug/kg	4.43	92.8	(0%-35%)			
Sodium	456000			454000	ug/kg	10	99.5	(0%-35%)	HSC	10/11/17	13:58
Vanadium	45600			42900	ug/kg	4.77	94.1	(0%-35%)	TXT1	10/11/17	13:03
Zinc	45600			51800	ug/kg	12.2	113	(0%-35%)			
QC1203893168	MB										
Aluminum			U	6360	ug/kg					10/11/17	12:58
Antimony			U	308	ug/kg						
Arsenic			U	467	ug/kg						
Barium			U	93.5	ug/kg						
Beryllium			U	93.5	ug/kg						
Cadmium			U	93.5	ug/kg						
Calcium			U	7480	ug/kg						
Chromium			U	140	ug/kg						
Cobalt			U	140	ug/kg						

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1707943										
Copper			U	280	ug/kg				TXT1	10/11/17	12:58
Iron			U	7480	ug/kg						
Lead			U	308	ug/kg						
Magnesium			U	7940	ug/kg						
Manganese			U	187	ug/kg						
Nickel			U	140	ug/kg						
Potassium			U	5980	ug/kg				HSC	10/11/17	13:52
Selenium			U	467	ug/kg				TXT1	10/11/17	12:58
Silver			U	93.5	ug/kg						
Sodium			B	8570	ug/kg				HSC	10/11/17	13:52
Vanadium			U	93.5	ug/kg				TXT1	10/11/17	12:58
Zinc			U	374	ug/kg						
QC1203893172 434421001 SDILT											
Aluminum	D	573	BD	112	ug/L	2.09		(0%-10%)		10/11/17	13:08
Antimony	D	45.7	D	10.2	ug/L	11.1		(0%-10%)			
Arsenic	BD	6.53	DU	25600	ug/L	N/A		(0%-10%)			

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1707943										
Barium	D	36.9	D	7.45	ug/L	.793		(0%-10%)	TXT1	10/11/17	13:08
Beryllium	DU	0.300	DU	5120	ug/L	N/A		(0%-10%)			
Cadmium	D	1030	D	209	ug/L	2.05		(0%-10%)			
Calcium	D	1910	D	391	ug/L	2.18		(0%-10%)			
Chromium	D	165	D	33.2	ug/L	.832		(0%-10%)			
Cobalt	D	10.1	BD	2.03	ug/L	.168		(0%-10%)			
Copper	D	1010	D	199	ug/L	2.12		(0%-10%)			
Iron	D	83300	D	16800	ug/L	.917		(0%-10%)			
Lead	D	2040	D	412	ug/L	.975		(0%-10%)			
Magnesium	D	316	DU	435000	ug/L	N/A		(0%-10%)			
Manganese	D	320	D	65.4	ug/L	2.26		(0%-10%)			
Nickel	D	51.3	D	11.1	ug/L	8.48		(0%-10%)			
Potassium	DU	44.1	DU	6550000	ug/L	N/A		(0%-10%)	HSC	10/11/17	14:04
Selenium	DU	0.466	BD	5.66	ug/L	N/A		(0%-10%)	TXT1	10/11/17	13:08
Silver	DU	-0.724	DU	5120	ug/L	N/A		(0%-10%)			

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1707943										
Sodium	DU	14.2	BD	161	ug/L	N/A		(0%-10%)	HSC	10/11/17	14:04
Vanadium	BD	2.13	DU	5120	ug/L	N/A		(0%-10%)	TXT1	10/11/17	13:08
Zinc	D	6810	D	1550	ug/L	13.6		(0%-10%)		10/11/17	13:33
Metals Analysis-Mercury											
Batch	1708406										
QC1203893546	LCS										
Mercury	118			113	ug/kg		95.3	(80%-120%)	MTM1	10/11/17	11:30
QC1203893547	LCSD										
Mercury	117			111	ug/kg	1.35	94.9	(0%-35%)		10/11/17	11:32
QC1203893545	MB										
Mercury			U	3.68	ug/kg					10/11/17	11:28
QC1203893548	434421001	SDILT									
Mercury		9.49	D	2.04	ug/L	7.38		(0%-10%)		10/11/17	11:35
Batch	1709410										
QC1203896100	LCS										
Mercury	112			108	ug/kg		96.8	(80%-120%)	MTM1	10/16/17	10:24
QC1203896171	LCSD										
Mercury	119			114	ug/kg	5.29	96.3	(0%-35%)		10/16/17	10:26
QC1203896099	MB										
Mercury			U	3.96	ug/kg					10/16/17	10:23
QC1203896103	434378001	SDILT									
Mercury		2.66	D	0.563	ug/L	6.03		(0%-10%)		10/16/17	11:02

Notes:

QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
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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 \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.
- 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.

General Chem Analysis

Case Narrative

NOVEMBER 9, 2017**REV.2**

**General Chemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL434421
Work Order #: 434421**

Product: Carbon, Total Organic**Analytical Method: SW846 9060A Modified****Analytical Procedure: GL-GC-E-093 REV# 15****Analytical Batch: 1707558****Preparation Method: SW846 9060A Modified Prep****Preparation Procedure: GL-GC-E-093 REV# 15****Preparation Batch: 1707557**

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
434421001	B3F947
434421002	B3F976
1203891412	Method Blank (MB)
1203891413	Laboratory Control Sample (LCS)
1203892176	Laboratory Control Sample Duplicate (LCSD)

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

Data Summary:

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

Quality Control (QC) Information**Laboratory Control Sample Duplicate (LCSD)**

An LCSD was used in place of matrix QC due to limited sample volume.

Technical Information**Sample Dilutions**

Sample 434421002 (B3F976) was diluted at the prep step due to high concentration. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

Miscellaneous Information**Additional Comments**

The following prep procedure was performed prior to analysis: A few drops of 5% Phosphoric acid (lot# 2559247 exp date:12/13/17) were added to all of the samples to check for the presence of inorganic carbon, which is indicated by a fizzing reaction. The following samples reacted requiring additional solution. 434421002 (B3F976).

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REV.2

Product: Carbon, Total**Analytical Method:** SW846 9060A Modified**Analytical Procedure:** GL-GC-E-093 REV# 15**Analytical Batch:** 1707619**Preparation Method:** SW846 9060A Modified Prep**Preparation Procedure:** GL-GC-E-093 REV# 15**Preparation Batch:** 1707618

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
434421001	B3F947
434421002	B3F976
1203891565	Method Blank (MB)
1203891566	Laboratory Control Sample (LCS)
1203892187	Laboratory Control Sample Duplicate (LCSD)

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

Data Summary:

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

Quality Control (QC) Information**Laboratory Control Sample Duplicate (LCSD)**

An LCSD was used in place of matrix QC due to limited sample volume.

Technical Information**Sample Dilutions**

Sample 434421002 (B3F976) was diluted at the prep step due to high concentration. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

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REV.2

Product: Carbon, Inorganic Carbon Calculation

Analytical Method: SW846 9060A Modified

Analytical Procedure: GL-GC-E-062 REV# 18

Analytical Batch: 1707622

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
434421001	B3F947
434421002	B3F976

Data Summary:

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

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REV.2

Product: Ion Chromatography**Analytical Method:** 9056_ANIONS_IC**Analytical Procedure:** GL-GC-E-086 REV# 25**Analytical Batches:** 1708095 and 1708094

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
434421001	B3F947
434421002	B3F976
1203892785	Method Blank (MB)
1203892786	Laboratory Control Sample (LCS)
1203892787	434442001(NonSDG) Sample Duplicate (DUP)
1203892788	434442015(NonSDG) Sample Duplicate (DUP)
1203892789	434442001(NonSDG) Matrix Spike (MS)
1203892790	434442015(NonSDG) Matrix Spike (MS)

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

Data Summary:

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

Technical Information**Sample Dilutions**

The following samples 434421001 (B3F947) and 434421002 (B3F976) were diluted because target analyte concentrations exceeded the calibration range. The following samples 434421001 (B3F947) and 434421002 (B3F976) in this sample group were diluted due to matrix interference. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

Analyte	434421	
	001	002
Several	200X 1000X 10X	100X 10X

Miscellaneous Information**Manual Integrations**

Samples 1203892787 (Non SDG 434442001DUP), 1203892788 (Non SDG 434442015DUP), 434421001 (B3F947) and 434421002 (B3F976) were manually integrated to correctly position the baseline as set in the calibration standards.

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REV.2

Product: Ammonia Nitrogen**Preparation Method:** 350.1_AMMONIA**Preparation Procedure:** GL-GC-E-106 REV# 9**Preparation Batch:** 1709851**Preparation Method:** EPA 350.2 Modified Prep**Preparation Procedure:** GL-GC-E-072 REV# 17**Preparation Batch:** 1709850

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
434421001	B3F947
434421002	B3F976
1203897275	Method Blank (MB)
1203897276	Laboratory Control Sample (LCS)
1203897277	434421001(B3F947) Sample Duplicate (DUP)
1203897278	434421001(B3F947) Matrix Spike (MS)

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

Data Summary:

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

Technical Information**Sample Dilutions**

The following samples 1203897277 (B3F947DUP), 1203897278 (B3F947MS) and 434421001 (B3F947) were diluted because target analyte concentrations exceeded the calibration range. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

Analyte	434421
	001
Nitrogen, Ammonia	50X

Sample Re-analysis

Sample 434421001 (B3F947) was re-analyzed due to instrument failure. The results from the reanalysis are reported.

NOVEMBER 9, 2017

REV.2

Product: pH**Analytical Method:** SW846 9045D**Analytical Procedure:** GL-GC-E-008 REV# 22**Analytical Batch:** 1707434

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
434421001	B3F947
434421002	B3F976
1203891102	Laboratory Control Sample (LCS)
1203891103	434442014(NonSDG) Sample Duplicate (DUP)

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

Data Summary:

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

Technical Information**Holding Times**

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

Sample	Analyte	Value
1203891103 (Non SDG 434442014DUP)	pH	Received 06-OCT-17, out of holding 05-OCT-17
434421001 (B3F947)	pH	Received 05-OCT-17, out of holding 03-OCT-17
434421002 (B3F976)	pH	Received 05-OCT-17, out of holding 03-OCT-17

Miscellaneous Information**Additional Comments**

10g used due to limited sample volume. 434421001 (B3F947). 4g used due to limited sample volume. 434421002 (B3F976).

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.

NOVEMBER 9, 2017

REV.2

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: GEL434421 GEL Work Order: 434421

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

Review/Validation

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

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

Signature: 

Name: Kristen Mizzell

Date: 16 OCT 2017

Title: Analyst I

Sample Data Summary

Certificate of Analysis

Report Date: October 20, 2017

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F17-065

Client Sample ID: B3F947 Project: CPRC0F17065
 Sample ID: 434421001 Client ID: CPRC001
 Matrix: OTHER SOLID
 Collect Date: 03-OCT-17 12:55
 Receive Date: 05-OCT-17
 Collector: Client
 Moisture: 6.97%

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
9060_TOC: COMMON "As Received"												
Total Organic Carbon #1		18700000	200000	500000	ug/Kg	1.00	1	TSM	10/09/17	1432	1707558	1
Total Organic Carbon #2		18400000	200000	500000	ug/Kg	1.00	1					
Total Organic Carbon #3		18400000	200000	500000	ug/Kg	1.00	1					
Total Organic Carbon #4		18300000	200000	500000	ug/Kg	1.00	1					
Total Organic Carbon Average		18500000	200000	500000	ug/Kg	1.00	1					
SW 9060A Total Carbon "As Received"												
Total Carbon Average		31000000	200000	500000	ug/kg	1.00	1	TSM	10/10/17	1333	1707619	2
9060_TIC: COMMON "See Parent Products"												
Total Inorganic Carbon Average		12600000	200000	500000	ug/kg		1	TSM	10/10/17	1532	1707622	3
Ion Chromatography												
9056_ANIONS_IC:COMMON + (Add-on) "Dry Weight Corrected"												
Bromide	DU	6890	6890	20600	ug/Kg	9.57	10	MXL2	10/11/17	1157	1708095	4
Fluoride	DU	3500	3500	10300	ug/Kg	9.57	10					
Nitrite-N	DU	3390	3390	10300	ug/Kg	9.57	10					
Phosphorus in phosphate	BD	10500	6890	20600	ug/Kg	9.57	10					
Sulfate	D	228000	13700	41100	ug/Kg	9.57	10					
Chloride	D	1020000	148000	411000	ug/Kg	9.57	200	MXL2	10/11/17	1355	1708095	5
Nitrate-N	D	25000000	339000	1030000	ug/Kg	9.57	1000	MXL2	10/11/17	1441	1708095	6
Nutrient Analysis												
350.1_AMMONIA: COMMON "Dry Weight Corrected"												
Nitrogen in Ammonia	D	1090000	42400	118000	ug/Kg	43.9	50	KLP1	10/16/17	1002	1709851	7
Titration and Ion Analysis												
9045_pH (Non-Aqueous):COMMON "As Received"												
pH at Temp 21.1C	X	5.89	0.010	0.100	SU		1	RXB5	10/07/17	1714	1707434	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.2 Modified Prep	EPA 350.1 Mod. Ammonia Nitrogen Prep	AXH3	10/16/17	0651	1709850
SW846 9056A	SW846 9056A Total Anions in Soil	MXL2	10/10/17	1123	1708094
SW846 9060A Modified Prep	SW846 9060A Modified Total Organic Carbon	TSM	10/06/17	1705	1707557
SW846 9060A Modified Prep	SW846-9060A Modified Total Carbon Prep	TSM	10/06/17	1715	1707618

Certificate of Analysis

Report Date: October 20, 2017

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F17-065

Client Sample ID: B3F976 Project: CPRC0F17065
 Sample ID: 434421002 Client ID: CPRC001
 Matrix: OTHER SOLID
 Collect Date: 03-OCT-17 13:26
 Receive Date: 05-OCT-17
 Collector: Client
 Moisture: 27.4%

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
9060_TOC: COMMON "As Received"												
Total Organic Carbon #1		52600000	1090000	2720000	ug/Kg	5.43	1	TSM	10/09/17	1543	1707558	1
Total Organic Carbon #2		51800000	1090000	2720000	ug/Kg	5.43	1					
Total Organic Carbon #3		51400000	1090000	2720000	ug/Kg	5.43	1					
Total Organic Carbon #4		51300000	1090000	2720000	ug/Kg	5.43	1					
Total Organic Carbon Average		51800000	1090000	2720000	ug/Kg	5.43	1					
SW 9060A Total Carbon "As Received"												
Total Carbon Average		127000000	1090000	2730000	ug/kg	5.47	1	TSM	10/10/17	1438	1707619	2
9060_TIC: COMMON "See Parent Products"												
Total Inorganic Carbon Average		75300000	1090000	2730000	ug/kg		1	TSM	10/10/17	1532	1707622	3
Ion Chromatography												
9056_ANIONS_IC:COMMON + (Add-on) "Dry Weight Corrected"												
Chloride	D	535000	99100	275000	ug/Kg	10.0	100	MXL2	10/10/17	1719	1708095	4
Nitrate-N	D	1460000	45400	138000	ug/Kg	10.0	100					
Bromide	DU	9220	9220	27500	ug/Kg	10.0	10	MXL2	10/11/17	0703	1708095	5
Fluoride	D	20300	4680	13800	ug/Kg	10.0	10					
Nitrite-N	DU	4540	4540	13800	ug/Kg	10.0	10					
Phosphorus in phosphate	DU	9220	9220	27500	ug/Kg	10.0	10					
Sulfate	D	527000	18300	55100	ug/Kg	10.0	10					
Nutrient Analysis												
350.1_AMMONIA: COMMON "Dry Weight Corrected"												
Nitrogen in Ammonia		13600	1190	3310	ug/Kg	48.1	1	KLP1	10/16/17	0959	1709851	6
Titration and Ion Analysis												
9045_pH (Non-Aqueous):COMMON "As Received"												
pH at Temp 21.5C	X	9.69	0.010	0.100	SU		1	RXB5	10/07/17	1715	1707434	7

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.2 Modified Prep	EPA 350.1 Mod. Ammonia Nitrogen Prep	AXH3	10/16/17	0651	1709850
SW846 9056A	SW846 9056A Total Anions in Soil	MXL2	10/10/17	1123	1708094
SW846 9060A Modified Prep	SW846 9060A Modified Total Organic Carbon	TSM	10/06/17	1705	1707557
SW846 9060A Modified Prep	SW846-9060A Modified Total Carbon Prep	TSM	10/06/17	1715	1707618

Certificate of Analysis

Report Date: October 20, 2017

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F17-065

Client Sample ID: B3F976 Project: CPRC0F17065
 Sample ID: 434421002 Client ID: CPRC001

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
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The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	SW846 9060A Modified		
2	SW846 9060A Modified		
3	SW846 9060A Modified		
4	9056_ANIONS_IC		
5	9056_ANIONS_IC		
6	350.1_AMMONIA		
7	SW846 9045D		

Notes:Column headers are defined as follows:

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

Quality Control Summary

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GEL LABORATORIES LLC

REV.2

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

QC Summary

Report Date: October 20, 2017

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 434421

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Carbon Analysis											
Batch	1707558										
QC1203891413	LCS										
Total Organic Carbon Average	6030000			5520000	ug/Kg		91.5	(80%-120%)	TSM	10/09/17	11:59
QC1203892176	LCSD										
Total Organic Carbon Average	6030000			5880000	ug/Kg	6.32	97.5	(0%-35%)		10/09/17	12:24
QC1203891412	MB										
Total Organic Carbon Average			U	200000	ug/Kg					10/09/17	11:35
Batch	1707619										
QC1203891566	LCS										
Total Carbon Average	6030000			5440000	ug/kg		90.2	(80%-120%)	TSM	10/10/17	12:13
QC1203892187	LCSD										
Total Carbon Average	6030000			6690000	ug/kg	20.6	111	(0%-35%)		10/10/17	12:38
QC1203891565	MB										
Total Carbon Average			U	200000	ug/kg					10/10/17	11:48
Ion Chromatography											
Batch	1708095										
QC1203892787	434442001	DUP									
Bromide		U	647	U	649	ug/Kg	N/A		MXL2	10/10/17	18:18
Chloride		B	1890	B	1880	ug/Kg	0.0194 ^	(+/-1940)			
Fluoride		U	328	U	329	ug/Kg	N/A				
Nitrate-N		B	488	B	498	ug/Kg	2 ^	(+/-968)			

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QC Summary

Workorder: 434421

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1708095										
Nitrite-N	U	319	U	320	ug/Kg	N/A			MXL2	10/10/17	18:18
Phosphorus in phosphate	U	647	U	649	ug/Kg	N/A					
Sulfate	B	3180	B	2730	ug/Kg	15.2 ^		(+/-3870)			
QC1203892788	434442015 DUP										
Bromide	U	666	U	666	ug/Kg	N/A				10/11/17	04:06
Chloride		43500		43500	ug/Kg	0.00686		(0%-35%)			
Fluoride	U	338	U	338	ug/Kg	N/A					
Nitrate-N	B	451	B	425	ug/Kg	5.9 ^		(+/-994)			
Nitrite-N	U	328	U	328	ug/Kg	N/A					
Phosphorus in phosphate	U	666	U	666	ug/Kg	N/A					
Sulfate	B	3830	B	3470	ug/Kg	9.61 ^		(+/-3980)			
QC1203892786	LCS										
Bromide		12400		12300	ug/Kg		99.1	(80%-120%)		10/11/17	05:34
Chloride		49800		44000	ug/Kg		88.4	(80%-120%)			
Fluoride		24900		24400	ug/Kg		98	(80%-120%)			
Nitrate-N		24900		22800	ug/Kg		91.8	(80%-120%)			
Nitrite-N		24900		23000	ug/Kg		92.6	(80%-120%)			

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1708095										
Phosphorus in phosphate	12400			12600	ug/Kg		101	(80%-120%)	MXL2	10/11/17	05:34
Sulfate	99500			92100	ug/Kg		92.6	(80%-120%)			
QC1203892785	MB										
Bromide			U	667	ug/Kg					10/11/17	05:05
Chloride			U	716	ug/Kg						
Fluoride			U	338	ug/Kg						
Nitrate-N			U	328	ug/Kg						
Nitrite-N			U	328	ug/Kg						
Phosphorus in phosphate			U	667	ug/Kg						
Sulfate			U	1320	ug/Kg						
QC1203892789	434442001 MS										
Bromide	12100	U	647	11600	ug/Kg		96.2	(75%-125%)		10/10/17	18:47
Chloride	48400	B	1890	44300	ug/Kg		87.7	(75%-125%)			
Fluoride	24200	U	328	23400	ug/Kg		96.5	(75%-125%)			
Nitrate-N	24200	B	488	22800	ug/Kg		92.1	(75%-125%)			
Nitrite-N	24200	U	319	22800	ug/Kg		94.1	(75%-125%)			
Phosphorus in phosphate	12100	U	647	12000	ug/Kg		99.3	(75%-125%)			

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QC Summary

Workorder: 434421

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1708095										
Sulfate	96800	B	3180	94100	ug/Kg		93.9	(75%-125%)	MXL2	10/10/17	18:47
QC1203892790	434442015	MS									
Bromide	12400	U	666	12300	ug/Kg		99.1	(75%-125%)		10/11/17	04:36
Chloride	49700		43500	94600	ug/Kg		103	(75%-125%)			
Fluoride	24800	U	338	24200	ug/Kg		97.3	(75%-125%)			
Nitrate-N	24800	B	451	23300	ug/Kg		91.8	(75%-125%)			
Nitrite-N	24800	U	328	23200	ug/Kg		93.4	(75%-125%)			
Phosphorus in phosphate	12400	U	666	12600	ug/Kg		101	(75%-125%)			
Sulfate	99400	B	3830	97100	ug/Kg		93.8	(75%-125%)			
Nutrient Analysis											
Batch	1709851										
QC1203897277	434421001	DUP									
Nitrogen in Ammonia		D	1090000	D	999000	ug/Kg	8.61	(0%-35%)	KLP1	10/16/17	10:00
QC1203897276	LCS										
Nitrogen in Ammonia	50000				50500	ug/Kg		101	(80%-120%)		10/16/17 09:55
QC1203897275	MB										
Nitrogen in Ammonia				U	900	ug/Kg					10/16/17 09:55
QC1203897278	434421001	MS									
Nitrogen in Ammonia	52700	D	1090000	D	1160000	ug/Kg		N/A	(75%-125%)	10/16/17	10:01

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QC Summary

Workorder: 434421

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
Batch	1707434										
QC1203891103	434442014	DUP									
pH	X	9.33	X	9.32	SU	0.107		(0%-30%)	RXB5	10/07/17	17:28
QC1203891102	LCS										
pH	7.00			7.00	SU		100	(70%-130%)		10/07/17	15:04

Notes:

The Qualifiers in this report are defined as follows:

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

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

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

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

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

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

Radiological Analysis

Case Narrative

NOVEMBER 9, 2017**REV.2**

**Radiochemistry
 Technical Case Narrative
 CH2M Hill Plateau Remediation Company (CPRC)
 SDG #: GEL434421
 Work Order #: 434421**

Product: AMCMISO_EIE_PRECIP_AEA: COMMON
Analytical Method: AMCMISO_EIE_PREC_AEA
Analytical Procedure: GL-RAD-A-011 REV# 26
Analytical Batch: 1707744

Preparation Method: Dry Soil Prep
Preparation Procedure: GL-RAD-A-021 REV# 21
Preparation Batch: 1707468

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
434421001	B3F947
434421002	B3F976
1203891904	Method Blank (MB)
1203891905	434421001(B3F947) Sample Duplicate (DUP)
1203891906	Laboratory Control Sample (LCS)

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

Data Summary:

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

Technical Information

Recounts

Sample 1203891904 (MB) was recounted due to high carrier/tracer yield. The recount is reported. Sample 434421001 (B3F947) was recounted due to detector error. The recount is reported.

Product: PUIISO_PRECIP_AEA:COMMON
Analytical Method: PUIISO_PRECIP_AEA
Analytical Procedure: GL-RAD-A-011 REV# 26
Analytical Batch: 1707748

Preparation Method: Dry Soil Prep
Preparation Procedure: GL-RAD-A-021 REV# 21
Preparation Batch: 1707468

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
434421001	B3F947
434421002	B3F976
1203891907	Method Blank (MB)
1203891908	434421001(B3F947) Sample Duplicate (DUP)
1203891909	Laboratory Control Sample (LCS)

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

Data Summary:

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

Technical Information

Recounts

Sample 434421001 (B3F947) was recounted due to detector error. The recount is reported.

Product: Dry Weight

Preparation Method: Dry Soil Prep

Preparation Procedure: GL-RAD-A-021 REV# 21

Preparation Batch: 1707468

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
434421001	B3F947
434421002	B3F976

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

Data Summary:

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

Product: GAMMA_GS:COMMON

Analytical Method: GAMMA_GS

Analytical Procedure: GL-RAD-A-013 REV# 27

Analytical Batch: 1707735

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Preparation Method: Dry Soil Prep**Preparation Procedure:** GL-RAD-A-021 REV# 21**Preparation Batch:** 1707468

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

GEL Sample ID#	Client Sample Identification
434421001	B3F947
434421002	B3F976
1203891874	Method Blank (MB)
1203891875	434421001(B3F947) Sample Duplicate (DUP)
1203891876	Laboratory Control Sample (LCS)

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

Data Summary:

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

Quality Control (QC) Information**Duplication Criteria between QC Sample and Duplicate Sample**

The precision requirements for Cs-137 were not met, however, GEL's internal precision requirements were met (RPD of 0% to 100% when both results are less than 5*MDC).

Sample	Analyte	Value
1203891875 (B3F947DUP)	Cesium-137	RPD 35.7* (0%-30%) RER 2.5* (0-2)

RDL Met

Samples did not meet the detection limits due to limited sample volume.

Sample	Analyte	Value
1203891874 (MB)	Cesium-137	Result 0.11 < MDA 0.313 > RDL 0.1 pCi/g
	Cobalt-60	Result -0.171 < MDA 0.421 > RDL 0.1 pCi/g
	Europium-152	Result 0.402 < MDA 0.87 > RDL 0.1 pCi/g
	Europium-154	Result 0.0903 < MDA 1.23 > RDL 0.1 pCi/g
	Europium-155	Result 0.12 < MDA 0.76 > RDL 0.1 pCi/g
1203891875 (B3F947DUP)	Cobalt-60	Result 0.0692 < MDA 0.504 > RDL 0.1 pCi/g
	Europium-152	Result -0.219 < MDA 1.1 > RDL 0.1 pCi/g
	Europium-154	Result -0.371 < MDA 1.36 > RDL 0.1 pCi/g
	Europium-155	Result -0.115 < MDA 0.779 > RDL 0.1 pCi/g
434421001 (B3F947)	Cesium-137	Result 0.286 < MDA 0.743 > RDL 0.1 pCi/g
	Cobalt-60	Result -0.0667 < MDA 0.617 > RDL 0.1 pCi/g
	Europium-152	Result -0.364 < MDA 0.828 > RDL 0.1 pCi/g
	Europium-154	Result -0.25 < MDA 1.76 > RDL 0.1 pCi/g

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	Europium-155	Result 0.0457 < MDA 0.895 > RDL 0.1 pCi/g
434421002 (B3F976)	Cesium-137	Result 0.487 < MDA 0.731 > RDL 0.1 pCi/g
	Cobalt-60	Result -0.157 < MDA 0.498 > RDL 0.1 pCi/g
	Europium-152	Result -0.0784 < MDA 1.18 > RDL 0.1 pCi/g
	Europium-154	Result 0.502 < MDA 2.32 > RDL 0.1 pCi/g
	Europium-155	Result 0.146 < MDA 1.01 > RDL 0.1 pCi/g

Product: SRTOT_SEP_PRECIP_GPC: COMMON

Analytical Method: SRTOT_SEP_PRECIP_GPC

Analytical Procedure: GL-RAD-A-004 REV# 18

Analytical Batch: 1708611

Preparation Method: Dry Soil Prep

Preparation Procedure: GL-RAD-A-021 REV# 21

Preparation Batch: 1707468

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
434421001	B3F947
434421002	B3F976
1203894073	Method Blank (MB)
1203894074	Laboratory Control Sample (LCS)
1203894075	Laboratory Control Sample Duplicate (LCSD)

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

Data Summary:

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

Quality Control (QC) Information

RDL Met

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1203894073 (MB)	Total Strontium	Result 0.537 < MDA 2.29 > RDL 2 pCi/g

Samples (See Below) did not meet the detection limits due to limited sample volume. Samples were counted the

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maximum count time in order to achieve the lowest MDAs possible.

Sample	Analyte	Value
434421001 (B3F947)	Total Strontium	Result 1.78 < MDA 2.46 > RDL 2 pCi/g
434421002 (B3F976)	Total Strontium	Result 1.85 < MDA 2.86 > RDL 2 pCi/g

Technical Information

Sample Re-prep/Re-analysis

Samples were reprepared due to high blank activity. The re-analysis is being reported.

Product: TC99_SEP_GPC

Analytical Method: TC99_EIE_LSC

Analytical Procedure: GL-RAD-A-059 REV# 5

Analytical Batch: 1707536

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
434421001	B3F947
434421002	B3F976
1203891338	Method Blank (MB)
1203891339	Laboratory Control Sample (LCS)
1203891340	Laboratory Control Sample Duplicate (LCSD)

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

Data Summary:

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

Quality Control (QC) Information

Laboratory Control Sample (LCS) Recovery

The Laboratory Control Duplicate, 1203891340 (LCSD), does not meet the client specific recovery requirement; however, the sample does meet GEL standard requirement.

Technical Information

Recounts

Samples 1203891339 (LCS) and 1203891340 (LCSD) were recounted due to high recovery. The recounts are reported.

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Product: C14_LSC: COMMON**Analytical Method:** C14_LSC**Analytical Procedure:** GL-RAD-A-003 REV# 15**Analytical Batch:** 1707554

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
434421001	B3F947
434421002	B3F976
1203891405	Method Blank (MB)
1203891406	Laboratory Control Sample (LCS)
1203891407	Laboratory Control Sample Duplicate (LCSD)

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

Data Summary:

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

Product: NI63_LSC**Analytical Method:** NI63_LSC**Analytical Procedure:** GL-RAD-A-022 REV# 18**Analytical Batch:** 1707572**Preparation Method:** Dry Soil Prep**Preparation Procedure:** GL-RAD-A-021 REV# 21**Preparation Batch:** 1707468

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
434421001	B3F947
434421002	B3F976
1203891460	Method Blank (MB)
1203891461	Laboratory Control Sample (LCS)
1203891462	Laboratory Control Sample Duplicate (LCSD)

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

Data Summary:

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

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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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: GEL434421 GEL Work Order: 434421

The Qualifiers in this report are defined as follows:

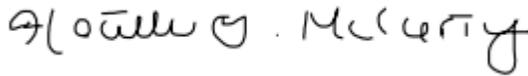
N Spike Sample recovery is outside control limits.

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: Heather McCarty****Date: 13 OCT 2017****Title: Analyst II**

Sample Data Summary

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**Certificate of Analysis
 Sample Summary**

SDG Number: GEL434421	Client: CPRC001	Project: CPRC0F17065
Lab Sample ID: 434421001	Date Collected: 10/03/2017 12:55	Matrix: OTHER SOLID
Client Sample: TA ID B3F981	Date Received: 10/05/2017 08:50	%Moisture: 7
Client ID: B3F947		Prep Basis: "Dry Weight Corrected"
Batch ID: 1707744	Method: AMCMISO_EIE_PREC_AEA	SOP Ref: GL-RAD-A-011
Run Date: 10/11/2017 09:13	Analyst: BXA4	Instrument: 1090
Data File: S0434421001_AM.2A.gcnf	Aliquot: 0.102 g	Count Time: 239.9998 min
Prep Batch: 1707744	Prep Method: DOE EML HASL-300, Am-05	Prep SOP Ref: GL-RAD-A-021
Prep Date: 10/09/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241		3.23	pCi/g	+/-0.945	1.04	0.211	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	16.5	20.6	pCi/g	80.5	(30%-105%)

Comments:

- 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.
- TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
 The MDC is a sample specific MDC.

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**Certificate of Analysis
 Sample Summary**

SDG Number: GEL434421	Client: CPRC001	Project: CPRC0F17065
Lab Sample ID: 434421001	Date Collected: 10/03/2017 12:55	Matrix: OTHER SOLID
Client Sample: TA ID B3F981	Date Received: 10/05/2017 08:50	%Moisture: 7
Client ID: B3F947		Prep Basis: "Dry Weight Corrected"
Batch ID: 1707748	Method: PUIISO_PRECIP_AEA	SOP Ref: GL-RAD-A-011
Run Date: 10/11/2017 09:13	Analyst: BXA4	Instrument: 1091
Data File: S0434421001_PU.2A.gcnf	Aliquot: 0.102 g	Count Time: 239.9998 min
Prep Batch: 1707748	Prep Method: DOE EML HASL-300, Pu-11-	Prep SOP Ref: GL-RAD-A-021
Prep Date: 10/09/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	0.275	pCi/g	+/-0.322	0.324	0.446	1.00
OER-100-70	Plutonium-239/240		10.3	pCi/g	+/-1.56	2.13	0.506	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	17.4	19.3	pCi/g	89.9	(30%-105%)

Comments:

- N Spike Sample recovery is outside control limits.**
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**Certificate of Analysis
 Sample Summary**

SDG Number: GEL434421	Client: CPRC001	Project: CPRC0F17065
Lab Sample ID: 434421001	Date Collected: 10/03/2017 12:55	Matrix: OTHER SOLID
Client Sample: TA ID B3F981	Date Received: 10/05/2017 08:50	%Moisture: 7
Client ID: B3F947		Prep Basis: "Dry Weight Corrected"
Batch ID: 1708611	Method: SRTOT_SEP_PRECIP_GPC	SOP Ref: GL-RAD-A-004
Run Date: 10/11/2017 17:59	Analyst: BXF1	Instrument: LB4100E1
Data File: S1708611.xls	Aliquot: 0.111 g	Count Time: 500 min
Prep Batch: 1708611	Prep Method: EPA 905.0 Modified/DOE RP5	Prep SOP Ref: GL-RAD-A-021
Prep Date: 10/11/2017 10:21		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	1.78	pCi/g	+/-1.48	1.55	2.46	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	6.60	7.85	mg	84.1	(40%-110%)

Comments:

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**Certificate of Analysis
 Sample Summary**

SDG Number: GEL434421	Client: CPRC001	Project: CPRC0F17065
Lab Sample ID: 434421001	Date Collected: 10/03/2017 12:55	Matrix: OTHER SOLID
Client Sample: TA ID B3F981	Date Received: 10/05/2017 08:50	%Moisture: 7
Client ID: B3F947		Prep Basis: "Dry Weight Corrected"
Batch ID: 1707735	Method: GAMMA_GS	SOP Ref: GL-RAD-A-013
Run Date: 10/10/2017 06:29	Analyst: MXR1	Instrument: GAM36
Data File: G434421001.CNF;1	Aliquot: 5.991 g	Count Time: 120 min
Prep Batch: 1707735	Prep Method: DOE HASL 300, 4.5.2.3/Ga-01	Prep SOP Ref: GL-RAD-A-021
Prep Date: 10/09/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137	U	0.286	pCi/g	+/-0.349	0.373	0.743	0.100
10198-40-0	Cobalt-60	U	-0.0667	pCi/g	+/-0.302	0.303	0.617	0.100
14683-23-9	Europium-152	U	-0.364	pCi/g	+/-0.527	0.553	0.828	0.100
15585-10-1	Europium-154	U	-0.25	pCi/g	+/-0.881	0.889	1.76	0.100
14391-16-3	Europium-155	U	0.0457	pCi/g	+/-0.470	0.471	0.895	0.100

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

- 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.
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**Certificate of Analysis
 Sample Summary**

SDG Number: GEL434421	Client: CPRC001	Project: CPRC0F17065
Lab Sample ID: 434421001	Date Collected: 10/03/2017 12:55	Matrix: OTHER SOLID
Client Sample: TA ID B3F981	Date Received: 10/05/2017 08:50	%Moisture: 7
Client ID: B3F947		Prep Basis: "As Received"
Batch ID: 1707536	Method: TC99_EIE_LSC	SOP Ref: GL-RAD-A-059
Run Date: 10/10/2017 16:54	Analyst: CXS7	Instrument: LSCGREEN
Data File: E1707536.xls	Aliquot: 0.621 g	Count Time: 45 min
Prep Batch: 1707536	Prep Method: DOE EML HASL-300, Tc-02-	
Prep Date: 10/10/2017 10:10		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	NU	1.34	pCi/g	+/-2.59	2.60	4.39	5.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	3.64E+05	4.30E+05	CPM	84.6	(30%-105%)

Comments:

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 The MDC is a sample specific MDC.

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Certificate of Analysis
 Sample Summary

SDG Number: GEL434421	Client: CPRC001	Project: CPRC0F17065
Lab Sample ID: 434421001	Date Collected: 10/03/2017 12:55	Matrix: OTHER SOLID
Client Sample: TA ID B3F981	Date Received: 10/05/2017 08:50	%Moisture: 7
Client ID: B3F947		Prep Basis: "As Received"
Batch ID: 1707554	Method: C14_LSC	SOP Ref: GL-RAD-A-003
Run Date: 10/10/2017 19:18	Analyst: BXM4	Instrument: LSCBLUE
Data File: C1707554.xls	Aliquot: 0.511 g	Count Time: 40 min
Prep Batch: 1707554	Prep Method: EPA EERF C-01 Modified	
Prep Date: 10/09/2017 11:19		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	-1.17	pCi/g	+/-2.28	2.28	3.98	5.00

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

- 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.
- TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
 The MDC is a sample specific MDC.

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**Certificate of Analysis
 Sample Summary**

SDG Number: GEL434421	Client: CPRC001	Project: CPRC0F17065
Lab Sample ID: 434421001	Date Collected: 10/03/2017 12:55	Matrix: OTHER SOLID
Client Sample: TA ID B3F981	Date Received: 10/05/2017 08:50	%Moisture: 7
Client ID: B3F947		Prep Basis: "Dry Weight Corrected"
Batch ID: 1707572	Method: NI63_LSC	SOP Ref: GL-RAD-A-022
Run Date: 10/11/2017 00:03	Analyst: CXS7	Instrument: LSCBLUE
Data File: N1707572.xls	Aliquot: 0.2196 g	Count Time: 120 min
Prep Batch: 1707572	Prep Method: DOE RESL Ni-1, Modified	Prep SOP Ref: GL-RAD-A-021
Prep Date: 10/09/2017 12:13		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
NI-63	Nickel-63	U	6.38	pCi/g	+/-5.56	5.69	9.30	10.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Nickel Carrier	16.3	25.2	mg	64.7	(40%-110%)

Comments:

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 The MDC is a sample specific MDC.

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL434421	Client: CPRC001	Project: CPRC0F17065
Lab Sample ID: 434421002	Date Collected: 10/03/2017 13:26	Matrix: OTHER SOLID
Client Sample: TA ID B3F987	Date Received: 10/05/2017 08:50	%Moisture: 27.4
Client ID: B3F976	Method: AMCMISO_EIE_PREC_AEA	Prep Basis: "Dry Weight Corrected"
Batch ID: 1707744	Analyst: BXA4	SOP Ref: GL-RAD-A-011
Run Date: 10/10/2017 09:08	Aliquot: 0.108 g	Instrument: 1230
Data File: S0434421002_AM.1A.gcnf	Prep Method: DOE EML HASL-300, Am-05	Count Time: 240 min
Prep Batch: 1707744		Prep SOP Ref: GL-RAD-A-021
Prep Date: 10/09/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	0.00	pCi/g	+/-0.184	0.184	0.273	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	15.1	19.4	pCi/g	77.9	(30%-105%)

Comments:

- N Spike Sample recovery is outside control limits.
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The MDC is a sample specific MDC.

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**Certificate of Analysis
 Sample Summary**

SDG Number: GEL434421	Client: CPRC001	Project: CPRC0F17065
Lab Sample ID: 434421002	Date Collected: 10/03/2017 13:26	Matrix: OTHER SOLID
Client Sample: TA ID B3F987	Date Received: 10/05/2017 08:50	%Moisture: 27.4
Client ID: B3F976		Prep Basis: "Dry Weight Corrected"
Batch ID: 1707748	Method: PUIISO_PRECIP_AEA	SOP Ref: GL-RAD-A-011
Run Date: 10/10/2017 09:08	Analyst: BXA4	Instrument: 1239
Data File: S0434421002_PU.1A.gcnf	Aliquot: 0.108 g	Count Time: 240 min
Prep Batch: 1707748	Prep Method: DOE EML HASL-300, Pu-11-	Prep SOP Ref: GL-RAD-A-021
Prep Date: 10/09/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	0.258	pCi/g	+/-0.327	0.329	0.406	1.00
OER-100-70	Plutonium-239/240	U	0.188	pCi/g	+/-0.334	0.335	0.542	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	18.4	18.3	pCi/g	101	(30%-105%)

Comments:

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 The MDC is a sample specific MDC.

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**Certificate of Analysis
 Sample Summary**

SDG Number: GEL434421	Client: CPRC001	Project: CPRC0F17065
Lab Sample ID: 434421002	Date Collected: 10/03/2017 13:26	Matrix: OTHER SOLID
Client Sample: TA ID B3F987	Date Received: 10/05/2017 08:50	%Moisture: 27.4
Client ID: B3F976	Method: SRTOT_SEP_PRECIP_GPC	Prep Basis: "Dry Weight Corrected"
Batch ID: 1708611	Analyst: BXF1	SOP Ref: GL-RAD-A-004
Run Date: 10/11/2017 17:59	Aliquot: 0.104 g	Instrument: LB4100E2
Data File: S1708611.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 500 min
Prep Batch: 1708611	Prep SOP Ref: GL-RAD-A-021	
Prep Date: 10/11/2017 10:21		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	1.85	pCi/g	+/-1.71	1.78	2.86	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	6.20	7.85	mg	79	(40%-110%)

Comments:

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 The MDC is a sample specific MDC.

NOVEMBER 9, 2017

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REV 2

**Certificate of Analysis
Sample Summary**

SDG Number: GEL434421	Client: CPRC001	Project: CPRC0F17065
Lab Sample ID: 434421002	Date Collected: 10/03/2017 13:26	Matrix: OTHER SOLID
Client Sample: TA ID B3F987	Date Received: 10/05/2017 08:50	%Moisture: 27.4
Client ID: B3F976		Prep Basis: "Dry Weight Corrected"
Batch ID: 1707735	Method: GAMMA_GS	SOP Ref: GL-RAD-A-013
Run Date: 10/10/2017 06:29	Analyst: MXR1	Instrument: GAM23
Data File: G434421002.CNF;1	Aliquot: 4.973 g	Count Time: 120 min
Prep Batch: 1707735	Prep Method: DOE HASL 300, 4.5.2.3/Ga-01	Prep SOP Ref: GL-RAD-A-021
Prep Date: 10/09/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137	U	0.487	pCi/g	+/-0.326	0.395	0.731	0.100
10198-40-0	Cobalt-60	U	-0.157	pCi/g	+/-0.284	0.293	0.498	0.100
14683-23-9	Europium-152	U	-0.0784	pCi/g	+/-0.685	0.686	1.18	0.100
15585-10-1	Europium-154	U	0.502	pCi/g	+/-1.08	1.10	2.32	0.100
14391-16-3	Europium-155	U	0.146	pCi/g	+/-0.518	0.522	1.01	0.100

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

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NOVEMBER 9, 2017

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REV 2

**Certificate of Analysis
 Sample Summary**

SDG Number: GEL434421	Client: CPRC001	Project: CPRC0F17065
Lab Sample ID: 434421002	Date Collected: 10/03/2017 13:26	Matrix: OTHER SOLID
Client Sample: TA ID B3F987	Date Received: 10/05/2017 08:50	%Moisture: 27.4
Client ID: B3F976		Prep Basis: "As Received"
Batch ID: 1707536	Method: TC99_EIE_LSC	SOP Ref: GL-RAD-A-059
Run Date: 10/10/2017 17:42	Analyst: CXS7	Instrument: LSCGREEN
Data File: E1707536.xls	Aliquot: 0.681 g	Count Time: 45 min
Prep Batch: 1707536	Prep Method: DOE EML HASL-300, Tc-02-	
Prep Date: 10/10/2017 10:10		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	NU	2.90	pCi/g	+/-2.17	2.19	3.60	5.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	3.94E+05	4.30E+05	CPM	91.7	(30%-105%)

Comments:

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NOVEMBER 9, 2017

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REV 2

**Certificate of Analysis
 Sample Summary**

SDG Number: GEL434421	Client: CPRC001	Project: CPRC0F17065
Lab Sample ID: 434421002	Date Collected: 10/03/2017 13:26	Matrix: OTHER SOLID
Client Sample: TA ID B3F987	Date Received: 10/05/2017 08:50	%Moisture: 27.4
Client ID: B3F976		Prep Basis: "As Received"
Batch ID: 1707554	Method: C14_LSC	SOP Ref: GL-RAD-A-003
Run Date: 10/10/2017 20:01	Analyst: BXM4	Instrument: LSCBLUE
Data File: C1707554.xls	Aliquot: 0.505 g	Count Time: 40 min
Prep Batch: 1707554	Prep Method: EPA EERF C-01 Modified	
Prep Date: 10/09/2017 11:19		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	-0.722	pCi/g	+/-2.33	2.33	4.04	5.00

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

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- TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
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NOVEMBER 9, 2017

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**Certificate of Analysis
 Sample Summary**

SDG Number: GEL434421	Client: CPRC001	Project: CPRC0F17065
Lab Sample ID: 434421002	Date Collected: 10/03/2017 13:26	Matrix: OTHER SOLID
Client Sample: TA ID B3F987	Date Received: 10/05/2017 08:50	%Moisture: 27.4
Client ID: B3F976		Prep Basis: "Dry Weight Corrected"
Batch ID: 1707572	Method: NI63_LSC	SOP Ref: GL-RAD-A-022
Run Date: 10/11/2017 03:18	Analyst: CXS7	Instrument: LSCBLUE
Data File: N1707572.xls	Aliquot: 0.2329 g	Count Time: 120 min
Prep Batch: 1707572	Prep Method: DOE RESL Ni-1, Modified	Prep SOP Ref: GL-RAD-A-021
Prep Date: 10/09/2017 12:13		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
NI-63	Nickel-63	U	1.73	pCi/g	+/-4.09	4.10	6.91	10.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Nickel Carrier	20.7	25.2	mg	82.1	(40%-110%)

Comments:

- 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.
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Quality Control Summary

QC Summary

Report Date: October 13, 2017

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Client : CH2MHill Plateau Remediation Company
 MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352

Contact: Mr. Scot Fitzgerald

Workorder: 434421

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1707744								
QC1203891904	MB								
Americium-241			U	-0.0705	pCi/g			BXA4	10/11/1709:13
				Uncert: +/-0.134					
				TPU: +/-0.134					
**Americium-243 Tracer	19.1			18.8	pCi/g	REC: 99	(30%-105%)		
				Uncert: +/-2.07					
				TPU: +/-3.20					
QC1203891905	434421001	DUP							
Americium-241		3.23		4.10	pCi/g				10/10/1709:09
				Uncert: +/-0.945		RPD: 24	(0%-30%)		
				TPU: +/-1.04		RER: 1.04	(0-2)		
**Americium-243 Tracer	19.1	16.5		17.0	pCi/g	REC: 89	(30%-105%)		
				Uncert: +/-2.35					
				TPU: +/-3.60					
QC1203891906	LCS								
Americium-241		17.9		14.7	pCi/g	REC: 82	(80%-120%)		10/10/1709:09
				Uncert: +/-1.99					
				TPU: +/-2.82					
**Americium-243 Tracer	19.1			18.6	pCi/g	REC: 98	(30%-105%)		
				Uncert: +/-2.26					
				TPU: +/-3.45					
Batch	1707748								
QC1203891907	MB								
Plutonium-238			U	-0.0204	pCi/g			BXA4	10/10/1709:08
				Uncert: +/-0.176					
				TPU: +/-0.176					
Plutonium-239/240			U	-0.0408	pCi/g				
				Uncert: +/-0.180					
				TPU: +/-0.181					
**Plutonium-242 Tracer	17.9			14.6	pCi/g	REC: 81	(30%-105%)		
				Uncert: +/-2.43					
				TPU: +/-3.78					
QC1203891908	434421001	DUP							
Plutonium-238		U	0.275	U	0.210	pCi/g			10/10/1709:08
				Uncert: +/-0.322		RPD: 0	N/A		
				TPU: +/-0.324		RER: 0.261	(0-2)		
Plutonium-239/240		10.3		10.9	pCi/g				
				Uncert: +/-1.56		RPD: 5	(0%-30%)		
				TPU: +/-2.13		RER: 0.321	(0-2)		
**Plutonium-242 Tracer	17.9	17.4		11.4	pCi/g	REC: 63	(30%-105%)		
				Uncert: +/-2.13					
				TPU: +/-3.45					
QC1203891909	LCS								
Plutonium-238			U	0.0734	pCi/g				10/10/1709:04
				Uncert: +/-0.251					

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Alpha Spec										
Batch	1707748									
Plutonium-239/240	18.0	TPU:		+/-0.251						
		Uncert:		17.1	pCi/g	REC:	95 (80%-120%)			
		TPU:		+/-2.16						
**Plutonium-242 Tracer	17.9	TPU:		+/-3.37						
		Uncert:		16.2	pCi/g	REC:	90 (30%-105%)			
		TPU:		+/-2.22						
		TPU:		+/-3.51						
Rad Gamma Spec										
Batch	1707735									
QC1203891874	MB									
Cesium-137			U	0.110	pCi/g			MXR1	10/10/1706:42	
		Uncert:		+/-0.139						
		TPU:		+/-0.148						
Cobalt-60			U	-0.171	pCi/g					
		Uncert:		+/-0.245						
		TPU:		+/-0.258						
Europium-152			U	0.402	pCi/g					
		Uncert:		+/-0.417						
		TPU:		+/-0.456						
Europium-154			U	0.0903	pCi/g					
		Uncert:		+/-0.583						
		TPU:		+/-0.585						
Europium-155			U	0.120	pCi/g					
		Uncert:		+/-0.433						
		TPU:		+/-0.436						
QC1203891875	434421001	DUP								
Cesium-137		U	0.286	1.07	pCi/g				10/10/1708:33	
		Uncert:	+/-0.349	+/-0.475		RPD:	36 (0% - 100%)			
		TPU:	+/-0.373	+/-0.484		RER:	2.5* (0-2)			
Cobalt-60		U	-0.0667	0.0692	pCi/g					
		Uncert:	+/-0.302	+/-0.218		RPD:	0 N/A			
		TPU:	+/-0.303	+/-0.221		RER:	0.711 (0-2)			
Europium-152		U	-0.364	-0.219	pCi/g					
		Uncert:	+/-0.527	+/-0.598		RPD:	0 N/A			
		TPU:	+/-0.553	+/-0.606		RER:	0.345 (0-2)			
Europium-154		U	-0.25	-0.371	pCi/g					
		Uncert:	+/-0.881	+/-0.759		RPD:	0 N/A			
		TPU:	+/-0.889	+/-0.778		RER:	0.202 (0-2)			
Europium-155		U	0.0457	-0.115	pCi/g					
		Uncert:	+/-0.470	+/-0.425		RPD:	0 N/A			
		TPU:	+/-0.471	+/-0.428		RER:	0.496 (0-2)			
QC1203891876	LCS									
Americium-241	4470			4840	pCi/g	REC:	108 (80%-120%)		10/10/1708:34	
		Uncert:		+/-86.5						
		TPU:		+/-371						
Cesium-137	1760			1930	pCi/g	REC:	110 (80%-120%)			
		Uncert:		+/-46.0						
		TPU:		+/-180						
Cobalt-60	1660			1840	pCi/g	REC:	111 (80%-120%)			
		Uncert:		+/-56.6						

QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Gamma Spec										
Batch	1707735									
Europium-152		TPU:		+/-158						
			U	1.65	pCi/g					
		Uncert:		+/-18.1						
Europium-154		TPU:		+/-18.1						
			U	3.99	pCi/g					
		Uncert:		+/-13.6						
Europium-155		TPU:		+/-13.7						
			U	-11.8	pCi/g					
		Uncert:		+/-11.7						
		TPU:		+/-12.9						
Rad Gas Flow										
Batch	1708611									
QC1203894073	MB									
Total Strontium			U	0.537	pCi/g			BXF1	10/11/1717:59	
		Uncert:		+/-1.35						
		TPU:		+/-1.35						
**Strontium Carrier		7.85		5.90	mg	REC:	75 (40%-110%)			
QC1203894074	LCS									
Total Strontium		214		215	pCi/g	REC:	100 (80%-120%)		10/11/1716:34	
		Uncert:		+/-12.6						
		TPU:		+/-58.5						
**Strontium Carrier		7.85		6.60	mg	REC:	84 (40%-110%)			
QC1203894075	LCSD									
Total Strontium		214		204	pCi/g	REC:	95 (80%-120%)		10/11/1716:34	
		Uncert:		+/-12.1		RPD:	5 (0%-30%)			
		TPU:		+/-54.3		RER:	0.27 (0-2)			
**Strontium Carrier		7.85		6.70	mg	REC:	85 (40%-110%)			
Rad Liquid Scintillation										
Batch	1707536									
QC1203891338	MB									
Technetium-99			U	2.45	pCi/g			CXS7	10/10/1718:30	
		Uncert:		+/-2.21						
		TPU:		+/-2.23						
**Technetium-99m Tracer		4.30E+05		3.82E+05	CPM	REC:	89 (30%-105%)			
QC1203891339	LCS									
Technetium-99		130	N	154	pCi/g	REC:	118 (80%-120%)		10/11/1704:59	
		Uncert:		+/-8.10						
		TPU:		+/-19.5						
**Technetium-99m Tracer		4.30E+05		3.78E+05	CPM	REC:	88 (30%-105%)			
QC1203891340	LCSD									
Technetium-99		130	N	158	pCi/g	REC:	121* (80%-120%)		10/11/1705:15	
		Uncert:		+/-8.50		RPD:	2 (0%-30%)			
		TPU:		+/-20.0		RER:	0.236 (0-2)			
**Technetium-99m Tracer		4.30E+05		3.58E+05	CPM	REC:	83 (30%-105%)			
Batch	1707554									
QC1203891405	MB									
Carbon-14			U	-0.265	pCi/g			BXM4	10/10/1720:42	
		Uncert:		+/-2.31						
		TPU:		+/-2.31						

QC Summary

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Liquid Scintillation										
Batch	1707554									
QC1203891406	LCS									
Carbon-14		147		127	pCi/g	REC: 86	(80%-120%)		10/10/1721:24	
		Uncert:		+/-7.20						
		TPU:		+/-11.8						
QC1203891407	LCSD									
Carbon-14		147		130	pCi/g	REC: 89	(80%-120%)		10/10/1721:40	
		Uncert:		+/-7.28		RPD: 3	(0%-30%)			
		TPU:		+/-12.1		RER: 0.431	(0-2)			
Batch	1707572									
QC1203891460	MB									
Nickel-63			U	3.28	pCi/g			CXS7	10/11/1705:22	
		Uncert:		+/-4.34						
		TPU:		+/-4.38						
**Nickel Carrier		25.2		19.6	mg	REC: 78	(40%-110%)			
QC1203891461	LCS									
Nickel-63		575		634	pCi/g	REC: 110	(80%-120%)		10/11/1707:24	
		Uncert:		+/-26.9						
		TPU:		+/-121						
**Nickel Carrier		25.2		20.6	mg	REC: 82	(40%-110%)			
QC1203891462	LCSD									
Nickel-63		575		625	pCi/g	REC: 109	(80%-120%)		10/11/1707:40	
		Uncert:		+/-30.4		RPD: 1	(0%-30%)			
		TPU:		+/-120		RER: 0.106	(0-2)			
**Nickel Carrier		25.2		16.1	mg	REC: 64	(40%-110%)			

Notes:

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

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- A The TIC is a suspected aldol-condensation product
- 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 analyte was detected in both the associated QC blank and in the sample.
- B The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample
- C Analyte has been confirmed by GC/MS analysis
- 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 Concentration exceeds the calibration range of the instrument
- E Reported value is estimated due to interferences. See comment in narrative.
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated
- M Duplicate precision not met.
- N Spike Sample recovery is outside control limits.

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
P										
S										
T										
U										
UX										
W										
X										
Y										
Z										
o										

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.