

7/27/2016



July 26, 2016

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

Re: CHPRC SAF F16-037
Work Order: 401645
SDG: GEL401645

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on July 15, 2016. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,

B Luthman
Brielle Luthman for
Heather Shaffer
Project Manager

Purchase Order: 300085 - 8C
Chain of Custody: F16-037-058
Enclosures

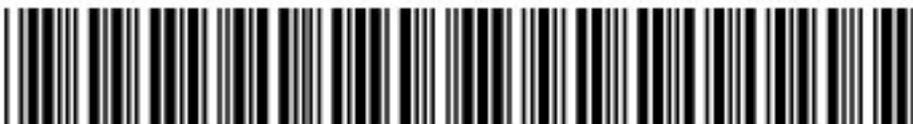


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Case Narrative

**General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF F16-037
SDG: GEL401645**

July 26, 2016

Laboratory Identification:

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

Summary

Sample receipt

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on July 15, 2016, for analysis. The sample was delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

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

Sample Identification

The laboratory received the following sample:

Laboratory Identification	Sample Description
401645001	B367R4

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: 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.

7/27/2016

B. Luthman
Brielle Luthman for
Heather Shaffer
Project Manager

**Radiochemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL401645
Work Order #: 401645**

TRITIUM_DIST_LSC: COMMON

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

Technical Information

Recounts

Samples were recounted due to low recovery. The recounts 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.

Chain of Custody and Supporting Documentation

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F16-037-058	PAGE 1 OF 1
COLLECTOR	Chris Fulton CHPRC	COMPANY CONTACT	LYNCH, SA	TELEPHONE NO.	373-5586
SAMPLING LOCATION	C9598, SAMPLE I-001 SPLIT	PROJECT DESIGNATION	100-KR-4 Long Term & Interim Action Monitoring - Soil	PROJECT COORDINATOR	TODAK, D
ICE CHEST NO.	CWS-413	FIELD LOGBOOK NO.	HNF-N-645 4-425	SAF NO.	F16-037
SHIPPED TO	GEL Laboratories, LLC	OFFSITE PROPERTY NO.	6826	COA	300085
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		PRESERVATION		METHOD OF SHIPMENT	
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.		None		FEDERAL EXPRESS	
SPECIAL HANDLING AND/OR STORAGE		HOLDING TIME		BILL OF LADING/AIR BILL NO.	
N/A		6 Months		7767 4415 3318	
NO. OF CONTAINER(S)		TYPE OF CONTAINER		4016015	
1		G			
VOLUME		NO. OF CONTAINER(S)			
125mL		1			
SAMPLE ANALYSIS		SAMPLE DATE			
TRITIUM_DIST _LSC COMMON;		JUL 13 2016 1239			
SAMPLE NO.		SAMPLE TIME			
B367R4		JUL 13 2016 1239			
MATRIX*		DATE/TIME			
SOIL		JUL 13 2016 1343			

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	N/A	
Chris Fulton CHPRC	JUL 13 2016 1343	SSU-1	JUL 13 2016 1343		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
SSU-1	JUL 14 2016 0730	Troy Bacon CHPRC	JUL 14 2016 0730		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
Troy Bacon CHPRC	JUL 14 2016 1400	FEDEX			
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
fix		Ma Gaspar 7-15-16 0900			
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
LABORATORY SECTION	RECEIVED BY	TITLE		DATE/TIME	
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY		DATE/TIME	
PRINTED ON 7/12/2016	FSR ID = FSR34077	TRVL NUM = TRVL-16-192		A-6003-618 (REV 2)	

SAMPLE RECEIPT & REVIEW FORM

Client: <u>CPR</u>		SDG/AR/COC/Work Order: <u>4011645</u>	
Received By: <u>MF</u>		Date Received: <u>7-15-16</u>	
Suspected Hazard Information		*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.	
COC/Samples marked as radioactive?		Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>CPM</u>	
Classified Radioactive II or III by RSO?		If yes, Were swipes taken of sample containers < action levels?	
COC/Samples marked containing PCBs?			
Package, COC, and/or Samples marked as beryllium or asbestos containing?		If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.	
Shipped as a DOT Hazardous?		Hazard Class Shipped: UN#:	
Samples identified as Foreign Soil?			

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	/	/		Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	/	/		Preservation Method: Ice bags Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius <u>2c</u>
2a Daily check performed and passed on IR temperature gun?	/	/		Temperature Device Serial #: <u>13046296</u> Secondary Temperature Device Serial # (if Applicable):
3 Chain of custody documents included with shipment?	/	/		
4 Sample containers intact and sealed?	/	/		Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	/	/		Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 Do Low Level Perchlorate samples have headspace as required?	/	/		Sample ID's and containers affected:
7 VOA vials contain acid preservation?	/	/		(If unknown, select No)
8 VOA vials free of headspace (defined as < 6mm bubble)?	/	/		Sample ID's and containers affected:
9 Are Encore containers present?	/	/		(If yes, immediately deliver to Volatiles laboratory)
10 Samples received within holding time?	/	/		ID's and tests affected:
11 Sample ID's on COC match ID's on bottles?	/	/		Sample ID's and containers affected:
12 Date & time on COC match date & time on bottles?	/	/		Sample ID's affected:
13 Number of containers received match number indicated on COC?	/	/		Sample ID's affected:
14 Are sample containers identifiable as GEL provided?	/	/		
15 COC form is properly signed in relinquished/received sections?	/	/		
16 Carrier and tracking number.	/	/		Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other <u>7767 8931 5299 2c</u> <u>7767 4415 3330 2c</u> <u>7767 4415 3318 2c</u>

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials DS Date 7/15/16 Page 1 of 1

Data Review Qualifier Definitions

Project Specific Qualifier Definitions for GEL Client Code: CPRC

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

Laboratory Certifications

List of current GEL Certifications as of 26 July 2016

State	Certification
Alaska	UST-0110
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA160006
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122016-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-16-11
Utah NELAP	SC000122016-20
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Radiological Analysis

Case Narrative

Radiochemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL401645
Work Order #: 401645

Product: TRITIUM_DIST_LSC: COMMON
Analytical Method: TRITIUM_DIST_LSC
Analytical Procedure: GL-RAD-A-002 REV# 21
Analytical Batch: 1582199

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
401645001	B367R4
1203586043	Method Blank (MB)
1203586044	401645001(B367R4) Sample Duplicate (DUP)
1203586045	401645001(B367R4) Matrix Spike (MS)
1203586046	Laboratory Control Sample (LCS)

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

Data Summary:

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

Technical Information

Recounts

Samples were recounted due to low recovery. The recounts 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.

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: GEL401645 GEL Work Order: 401645

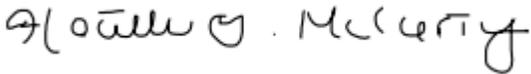
The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Heather McCarty

Date: 26 JUL 2016

Title: Analyst II

Sample Data Summary

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL401645	Client: CPRC001	Project: CPRC0F16037
Lab Sample ID: 401645001	Date Collected: 07/13/2016 12:39	Matrix: SOIL
	Date Received: 07/15/2016 09:10	
Client ID: B367R4	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1582199	Analyst: TXJ1	SOP Ref: GL-RAD-A-002
Run Date: 07/25/2016 10:32	Aliquot: 1.29 g	Instrument: LSCBLUE
Data File: T1582199R2.xls	Prep Method: EPA 906.0 Modified	Count Time: 15 min
Prep Batch: 1582199		
Prep Date: 07/20/2016 16:40		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium	U	4.04	pCi/g	+/-12.8	12.8	22.6	30.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits

Comments:

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

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 26, 2016

Page 1 of 1

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

Contact: Mr. Scot Fitzgerald

Workorder: 401645

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Liquid Scintillation									
Batch	1582199								
QC1203586043	MB								
Tritium			U	6.16	pCi/g			TXJ1	07/25/1610:49
				Uncert: +/-12.5					
				TPU: +/-12.6					
QC1203586044	401645001	DUP							
Tritium		U	4.04	U	1.13	pCi/g			07/25/1611:05
				Uncert: +/-12.8		RPD: 0	N/A		
				TPU: +/-12.8		RER: 0.32	(0-2)		
QC1203586045	401645001	MS							
Tritium	87.9	U	4.04		84.3	pCi/g	REC: 96 (75%-125%)		07/25/1611:21
				Uncert: +/-12.8					
				TPU: +/-12.8					
QC1203586046	LCS								
Tritium	87.9				72.2	pCi/g	REC: 82 (80%-120%)		07/25/1611:38
				Uncert: +/-17.5					
				TPU: +/-24.0					

Notes:

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

The Qualifiers in this report are defined as follows:

- B The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample
- 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.
- UX Gamma Spectroscopy--Uncertain identification
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

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

** Indicates analyte is a surrogate compound.

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

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

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