

November 16, 2015

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

Re: CHPRC SAF F15-011  
Work Order: 385355  
SDG: GEL385355

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on November 12, 2015. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,



Sarah Edwards for  
Heather Shaffer  
Project Manager

Purchase Order: 302632 8C  
Chain of Custody: F16-011-437, F16-011-438, F16-011-440, F16-011-441, F16-011-443, F16-011-444,  
F16-011-445 and F16-011-450  
Enclosures



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# Case Narrative

General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF F15-011  
SDG: GEL385355

November 16, 2015

**Laboratory Identification:**

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

**Summary**

**Sample receipt**

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on November 12, 2015, for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

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

**Sample Identification**

The laboratory received the following samples:

<b>Laboratory Identification</b>	<b>Sample Description</b>
385355001	B33M90
385355002	B33M93
385355003	B33M97
385355004	B33M89
385355005	B33M92
385355006	B33M95
385355007	B33MB2
385355008	B33M96

**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: Diesel Range Organics, GC Semivolatile PCB, GC/MS Semivolatile, GC/MS Volatile, General Chemistry, Metals and Radiochemistry.

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



Sarah Edwards for  
Heather Shaffer  
Project Manager

# **Chain of Custody and Supporting Documentation**

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST <b>385355</b>		F15-011-450	PAGE 1 OF 1
COLLECTOR <i>W's h t</i>	COMPANY CONTACT TODAK, D	TELEPHONE NO. 376-6427	PROJECT COORDINATOR TODAK, D	PRICE CODE 8C	DATA TURNAROUND 15 Days / 15 Days
SAMPLING LOCATION FXR-1	PROJECT DESIGNATION 200-DV-1 Operable Unit Characterization of Waste Sites - Soil	FIELD LOGBOOK NO. <i>HNF-N-645-2/92</i>	ACTUAL SAMPLE DEPTH <i>(NA)</i>	AIR QUALITY <input type="checkbox"/>	METHOD OF SHIPMENT FEDERAL EXPRESS
ICE CHEST NO. <i>GWS-505</i>	OFFSITE PROPERTY NO. <i>6125</i>	BILL OF LADING/AIR BILL NO. <i>7749 5211 7056</i>			

MATRIX*	POSSIBLE SAMPLE HAZARDS/ REMARKS	PRESERVATION	NO. OF CONTAINER(S)	VOLUME	SAMPLE ANALYSIS
A=Air DL=Drum L=Liquid DS=Drum S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	*Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR/TATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1. NA	Frozen/Cool <-7C and > 20C 14 Days aGs	5	40mL	5035/8260_VOA : LOW LEVEL: COMMON;
SPECIAL HANDLING AND/OR STORAGE					
SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B33MB2	SOIL	<i>11-10-15</i>	<i>1305</i>	<i>✓</i>	

CHAIN OF POSSESSION	SIGN/ PRINT NAMES	RECEIVED BY/STORED IN	DATE/TIME	SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM <i>W's h t, CH2M</i>	RECEIVED BY/STORED IN <i>SSU-1</i>	DATE/TIME <i>11-10-15 1420</i>	DATE/TIME <i>11-10-15 1420</i>	** All VOA samples will be collected using EPA Method 5035A and will include 5 bottles for low level analysis.** The laboratory is to use one of the low level VOA bottles for moisture content determination.** VOA bottles will be labeled with an appended suffix of K, L, M, N, or P. These suffixes are for the purpose of providing bottle weights to the laboratories. These suffixes should not be included as part of the sample ID reported in the final data packages. TRVL-16-017
RELINQUISHED BY/REMOVED FROM <i>SSU-1</i>	RECEIVED BY/STORED IN <i>CH2M/1000</i>	DATE/TIME <i>NOV 11 2015 0900</i>	DATE/TIME <i>NOV 11 2015 0900</i>	
RELINQUISHED BY/REMOVED FROM <i>CH2M/1000</i>	RECEIVED BY/STORED IN <i>FEDEX</i>	DATE/TIME <i>NOV 11 2015 1400</i>	DATE/TIME <i>NOV 11 2015 1400</i>	
RELINQUISHED BY/REMOVED FROM <i>CH2M/1000</i>	RECEIVED BY/STORED IN <i>W's h t</i>	DATE/TIME <i>NOV 11 2015 1400</i>	DATE/TIME <i>NOV 11 2015 1400</i>	
RELINQUISHED BY/REMOVED FROM <i>CH2M/1000</i>	RECEIVED BY/STORED IN <i>CH2M/1000</i>	DATE/TIME <i>NOV 11 2015 1400</i>	DATE/TIME <i>NOV 11 2015 1400</i>	
RELINQUISHED BY/REMOVED FROM <i>CH2M/1000</i>	RECEIVED BY/STORED IN <i>CH2M/1000</i>	DATE/TIME <i>NOV 11 2015 1400</i>	DATE/TIME <i>NOV 11 2015 1400</i>	
LABORATORY SECTION	RECEIVED BY	TITLE		DATE/TIME
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY		DATE/TIME

## SAMPLE RECORD SHEET FOR VOC SAMPLE COLLECTION

Location:

C9492

F15-011-450

Sampler Initials and Date:

D. Wight 11-10-15

Sample Number <sup>1</sup>	Sample Suffix	Initial Weight <sup>2</sup> (grams)	Total Weight <sup>3</sup> (grams)	Soil Weight <sup>4</sup> (grams)
B33MB2	K	29.11	35.32	6.21
B33MB2	L	28.71	36.23	7.52
B33MB2	M	29.33	34.66	5.33
B33MB2	N	29.15	36.49	7.34
B33MB2	P	29.45	39.91	8.46

<sup>1</sup> Enter sample number associated with the sampling event.

<sup>2</sup> Initial weight is to include all labels, stickers, bags, spin bars (for samples with suffix K, L, M, N and P) and anything else that will be associated with the bottle when it is weighed with the sample.

<sup>3</sup> Ensure that everything weighed for the empty bottle and no additional items (besides the sample) is weighed.

<sup>4</sup> Soil weight is the vial with sample minus Initial Weight.

A-6005-526 (REV 0)

CH2M HILL Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F15-011-443	PAGE 1 OF 1
COLLECTOR <i>W. S. H. T.</i>	COMPANY CONTACT TODAK, D	TELEPHONE NO. 376-6427	PROJECT COORDINATOR TODAK, D	PRICE CODE 8C	DATA TURNAROUND 15 Days / 15 Days
SAMPLING LOCATION C9492, I-003	PROJECT DESIGNATION 200-DV-1 Operable Unit Characterization of Waste Sites - Soil	FIELD LOGBOOK NO. <i>HNF-N-45-2/92</i>	SAF NO. F15-011	AIR QUALITY <input type="checkbox"/>	METHOD OF SHIPMENT FEDERAL EXPRESS
ICE CHEST NO. <i>GWS-505</i>	ACTUAL SAMPLE DEPTH <i>9.0-11.0</i>	OFFSITE PROPERTY NO. <i>6125</i>	COA 302632	BILL OF LADING/AIR BILL NO. <i>7749 52117056</i>	
GEL Laboratories, LLC					

MATRIX* A=Air DL=Drum L=Liquid S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	PRESERVATION Frozen/Cool <-7C and >- 20C 14 Days	HOLDING TIME	TYPE OF CONTAINER aGS	NO. OF CONTAINER(S) 5	VOLUME 40mL	SAMPLE ANALYSIS 3035/8260 VOA : LOW LEVEL COMMON;
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. NA	SPECIAL HANDLING AND/OR STORAGE RADIOACTIVE TIE TO: B33M94 <i>W/HA 90 11-10-15</i>					
SAMPLE NO. B33M95	MATRIX* SOIL	SAMPLE DATE <i>11-10-15</i>	SAMPLE TIME <i>1330</i>	CHECKED <i>11-10-15 1420</i>		

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM <i>W. S. H. T. CHREC</i>	DATE/TIME <i>11-10-15 1420</i>	RECEIVED BY/STORED IN SSU-1	DATE/TIME <i>11-10-15 1420</i>	** All VOA samples will be collected using EPA Method 5035A and will include 5 bottles for low level analysis. ** The laboratory is to use one of the low level VOA bottles for moisture content determination. ** VOA bottles will be labeled with an appended suffix of K, L, M, N, or P. These suffixes are for the purpose of providing bottle weights to the laboratories. These suffixes should not be included as part of the sample ID reported in the final data packages. TRVL-16-017	
RELINQUISHED BY/REMOVED FROM SSU-1	DATE/TIME NOV 11 2015 0900	RECEIVED BY/STORED IN CHREC/DOAK	DATE/TIME NOV 11 2015 0900		
RELINQUISHED BY/REMOVED FROM CHREC/DOAK	DATE/TIME NOV 11 2015 1400	RECEIVED BY/STORED IN FEDEX	DATE/TIME		
RELINQUISHED BY/REMOVED FROM <i>CHREC</i>	DATE/TIME	RECEIVED BY/STORED IN <i>M. Genslow</i>	DATE/TIME <i>11-10-15 0905</i>		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	TITLE	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	DISPOSED BY	
LABORATORY SECTION 0 of 29	RECEIVED BY	TITLE			
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DATE/TIME			
PRINTED ON 11/2/2015	TRVL NUM = TRVL-16-017	DATE/TIME			
	FSR ID = FSR8932	DATE/TIME			
		A-6003-618 (REV 2)			

## SAMPLE RECORD SHEET FOR VOC SAMPLE COLLECTION

Location:

C9492

FIS-011-443

Sampler Initials and Date: D. Wight 11-10-15

Sample Number <sup>1</sup>	Sample Suffix	Initial Weight <sup>2</sup> (grams)	Total Weight <sup>3</sup> (grams)	Soil Weight <sup>4</sup> (grams)
B33m95	K	28.96	35.19	6.23
B33m95	L	28.94	35.86	6.92
B33 m95	M	28.91	35.07	6.16
B33 m95	N	28.94	36.24	7.3
B33 m95	P	29.57	36.65	7.08

<sup>1</sup> Enter sample number associated with the sampling event.

<sup>2</sup> Initial weight is to include all labels, stickers, bags, spin bars (for samples with suffix K, L, M, N and P) and anything else that will be associated with the bottle when it is weighed with the sample.

<sup>3</sup> Ensure that everything weighed for the empty bottle and no additional items (besides the sample) is weighed.

<sup>4</sup> Soil weight is the vial with sample minus Initial Weight.

A-6005-526 (REV 0)

**CH2M Hill Plateau Remediation Company**

**COLLECTOR**  
W. J. A. T.

**SAMPLING LOCATION**  
C9492, I-001

**ICE CHEST NO.**  
GWS-505

**SHIPPED TO**  
GEL Laboratories, LLC

**CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**  
F15-011-438

**PROJECT COORDINATOR**  
TODAK, D

**TELEPHONE NO.**  
376-6427

**PROJECT DESIGNATION**  
200-DV-1 Operable Unit Characterization of Waste Sites - Soil

**FIELD LOGBOOK NO.**  
HNF-N-645-2/92

**ACTUAL SAMPLE DEPTH**  
3.0 - 5.0

**OFFSITE PROPERTY NO.**  
0125

**BILL OF LADING/AIR BILL NO.**  
7749 5211 7050

**PRICE CODE**  
8C

**AIR QUALITY**

**METHOD OF SHIPMENT**  
FEDERAL EXPRESS

**PAGE 1 OF 1**

**DATA TURNAROUND**  
15 Days / 15 Days

**ORIGINAL**

<b>MATRIX*</b> A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WT=Wipe X=Other	<b>PRESERVATION</b> Cool <=6C
<b>HOLDING TIME</b>	28 Days/48 Hours
<b>TYPE OF CONTAINER</b>	G/P
<b>NO. OF CONTAINER(S)</b>	1
<b>VOLUME</b>	60ml
<b>SAMPLE ANALYSIS</b>	SEE ITEM (1) IN SPECIAL INSTRUCTIONS
<b>SAMPLE DATE</b> NOV 10 2015	<b>SAMPLE TIME</b> 1227
<b>SAMPLE NO.</b> B33M90	<b>MATRIX*</b> SOIL

**CHAIN OF POSSESSION**

<b>RELINQUISHED BY/REMOVED FROM</b> W. J. A. T. CH2M	<b>RECEIVED BY/STORED IN</b> SSU-1	<b>DATE/TIME</b> NOV 10 2015 1426
<b>RELINQUISHED BY/REMOVED FROM</b> SSU-1	<b>RECEIVED BY/STORED IN</b> CH2M	<b>DATE/TIME</b> NOV 11 2015 0800
<b>RELINQUISHED BY/REMOVED FROM</b> CH2M	<b>RECEIVED BY/STORED IN</b> FEDEX	<b>DATE/TIME</b> NOV 11 2015 1400
<b>RELINQUISHED BY/REMOVED FROM</b> FEDEX	<b>RECEIVED BY/STORED IN</b> M. Kinslow	<b>DATE/TIME</b> 11-15-2015
<b>RELINQUISHED BY/REMOVED FROM</b>	<b>RECEIVED BY/STORED IN</b>	<b>DATE/TIME</b>
<b>RELINQUISHED BY/REMOVED FROM</b>	<b>RECEIVED BY/STORED IN</b>	<b>DATE/TIME</b>
<b>RELINQUISHED BY/REMOVED FROM</b>	<b>RECEIVED BY/STORED IN</b>	<b>DATE/TIME</b>
<b>RELINQUISHED BY/REMOVED FROM</b>	<b>RECEIVED BY/STORED IN</b>	<b>DATE/TIME</b>

**SPECIAL INSTRUCTIONS**  
TRVL-16-017  
(1) 9056\_ANIONS\_IC: COMMON; 9056\_ANIONS\_IC: COMMON (Add-on)  
{Phosphorus in phosphate};

**LABORATORY SECTION**  
RECEIVED BY

**FINAL SAMPLE DISPOSITION**  
DISPOSAL METHOD

**TITLE**

**DISPOSED BY**

**DATE/TIME**

**DATE/TIME**

**FRS ID = FSR8930**

**TRVL NUM = TRVL-16-017**

**PRINTED ON 11/2/2015**

**A-6003-618 (REV 2)**

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F15-011-445	PAGE 1 OF 1
COLLECTOR <i>Wright</i>	COMPANY CONTACT TODAK, D	TELEPHONE NO. 376-6427	PROJECT COORDINATOR TODAK, D	PRICE CODE 8C	DATA TURNAROUND 15 Days / 15 Days
SAMPLING LOCATION C9492, I-003	PROJECT DESIGNATION 200-DV-1 Operable Unit Characterization of Waste Sites - Soil		SAF NO. F15-011	AIR QUALITY <input type="checkbox"/>	
ICE CHEST NO. GWS-505	FIELD LOGBOOK NO. HNF-N	ACTUAL SAMPLE DEPTH 9.0 - 11.0 FT	COA 302632	METHOD OF SHIPMENT FEDERAL EXPRESS	ORIGINAL
SHIPPED TO GEL Laboratories, LLC	OFFSITE PROPERTY NO. 6125	BILL OF LADING/AIR BILL NO. 7749 5211 7056			
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 be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1. NA	PRESERVATION Cool <=6C	HOLDING TIME 28 Days/48 Hours	TYPE OF CONTAINER G/P	NO. OF CONTAINER(S) 1
		VOLUME 60mL			
	SPECIAL HANDLING AND/OR STORAGE RADIOACTIVE TIE TO: B33M94 N/A 00 880 11-10-15	SAMPLE ANALYSIS SEE ITEM (1) IN SPECIAL INSTRUCTIONS			
B33M97	SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
	SOIL		11-10-15	1330	✓

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	TRVL-16-017	
<i>Wright, CHRIS</i>	11-10-15 1420	SSU-1	11-20-15 1420	(1) 9056_ANIONS_IC: COMMON;	
<i>CHRIS</i>	NOV 11 2015 0800	RECEIVED BY/STORED IN L.D. WILSON CHRC	NOV 11 2015 0800	{Phosphorus in phosphate};	
SSU-1	NOV 11 2015 0800	RECEIVED BY/STORED IN FEDEX			
L.D. WILSON	NOV 11 2015 1420	RECEIVED BY/STORED IN <i>M. Kashy</i>	11-15-15 0905		
CHRC		RECEIVED BY/STORED IN			
		RECEIVED BY/STORED IN			
		RECEIVED BY/STORED IN			
		RECEIVED BY/STORED IN			
		RECEIVED BY/STORED IN			
		RECEIVED BY/STORED IN			
LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME		
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME		



**CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**

**COLLECTOR:** WISH +  
**SAMPLING LOCATION:** C9492, I-001  
**ICE CHEST NO.:** GWS-505  
**SHIPPED TO:** GEL Laboratories, LLC

**COMPANY CONTACT:** TODAYK, D  
**TELEPHONE NO.:** 376-6427  
**PROJECT COORDINATOR:** TODAYK, D

**PROJECT DESIGNATION:** 200-DV-1 Operable Unit Characterization of Waste Sites - Soil  
**FIELD LOGBOOK NO.:** HNF-N-445-2/92  
**ACTUAL SAMPLE DEPTH:** 3.0-5.0  
**OFFSITE PROPERTY NO.:** 6125  
**BILL OF LADING/AIR BILL NO.:** 77495a117056

**F15-011-437**      **PRICE CODE** 8C      **AIR QUALITY**       **METHOD OF SHIPMENT** FEDERAL EXPRESS  
**PAGE 1 OF 2**      **DATA TURNAROUND** 15 Days / 15 Days      **ORIGINAL**

MATRIX*	POSSIBLE SAMPLE HAZARDS/REMARKS	PRESERVATION	HOLDING TIME	TYPE OF CONTAINER	NO. OF CONTAINER(S)	VOLUME	SAMPLE ANALYSIS	SAMPLE DATE	SAMPLE TIME	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	*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. NA	None	6 Months	G/P	1	60mL	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	NOV 10 2015	1227	SOIL
		None	6 Months	G/P	1	250mL	SEE ITEM (2) IN SPECIAL INSTRUCTIONS			
		Cool <=6C	14 Days	G	1	60mL	9010, CYANIDE, COMMON,			

**CHAIN OF POSSESSION**

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Wish +, CAPREC	NOV 10 2015 1420	SSU-1	NOV 10 2015 1420
SSU-1	NOV 11 2015 0800	CHPRC/KOLOKO	NOV 11 2015 0800
CHPRC/KOLOKO	NOV 11 2015 1400	FEDEX	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

**SPECIAL INSTRUCTIONS:** SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

**LABORATORY SECTION:** RECEIVED BY

**FINAL SAMPLE DISPOSITION:** DISPOSAL METHOD

**PRINTED ON:** 11/2/2015

**FRS ID = FSR8930**      **TRVL NUM = TRVL-16-017**      **A-6003-618 (REV 2)**

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F15-011-437	PAGE 2 OF 2
COLLECTOR <i>Wisa</i> C9492, I-001	COMPANY CONTACT TODAK, D	TELEPHONE NO. 376-6427	PROJECT COORDINATOR TODAK, D	PRICE CODE 8C	DATA TURNAROUND 15 Days / 15 Days
SAMPLING LOCATION C9492, I-001	PROJECT DESIGNATION 200-DV-1 Operable Unit Characterization of Waste Sites - Soil	ACTUAL SAMPLE DEPTH <i>3.0-5.0</i>	SAF NO. F15-011	AIR QUALITY <input type="checkbox"/>	METHOD OF SHIPMENT FEDERAL EXPRESS
ICE CHEST NO. <i>6WS-505</i>	FIELD LOGBOOK NO. <i>HNF-N-645-2/92</i>	OFFSITE PROPERTY NO. <i>6125</i>	COA 302632	<b>ORIGINAL</b>	
SHIPPED TO GEL Laboratories, LLC	BILL OF LADING/AIR BILL NO. <i>7749 5211 7056</i>				
<b>SPECIAL INSTRUCTIONS</b> TRVL-16-017 (1) 6020_METALS_ICPMS: COMMON {Aluminum, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Molybdenum, Selenium}; 6020_METALS_ICPMS: COMMON (Add-on) {Arsenic, Manganese, Nickel, Uranium}; 6010_METALS_ICP: COMMON {Antimony, Silver}; 7471_MERCURY_CV: COMMON (SOLIDS); (2) GAMMA_GS: COMMON; AMCMISO_IE_PRECIP_AEA: COMMON; PUIISO_PLATE_AEA: COMMON; PUIISO_PLATE_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO_PLATE_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; C14_LSC: COMMON; #29_SEP_HEPS_GS: COMMON; NI63_LSC: COMMON; NP237_IE_PRECIP_AEA: COMMON; SRTOT_SEP_PRECIP_GPC: COMMON {Total beta radiostrontium}; TC99_TTE_LSC: COMMON; TRITIUM_DIST_LSC: COMMON; TC99_TTE_LSC: COMMON;					

A-6003-618 (REV 2)

TRVL NUM = TRVL-16-017

FSR ID = FSR8930

PRINTED ON 11/2/2015



CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F15-011-440	PAGE 2 OF 2
COLLECTOR <i>W. S. Hart</i>	COMPANY CONTACT TODAK, D	TELEPHONE NO. 376-6427	PROJECT COORDINATOR TODAK, D	PRICE CODE 8C	DATA TURNAROUND 15 Days / 15 Days
SAMPLING LOCATION C9492, I-002	PROJECT DESIGNATION 200-DV-1 Operable Unit Characterization of Waste Sites - Soil	SAF NO. F15-011	METHOD OF SHIPMENT FEDERAL EXPRESS	AIR QUALITY <input type="checkbox"/>	<b>ORIGINAL</b>
ICE CHEST NO. <i>6WS-505</i>	FIELD LOGBOOK NO. <i>HNF-N-645-2/172</i>	ACTUAL SAMPLE DEPTH <i>7.1-9.1 FT</i>	COA 302632	BILL OF LADING/AIR BILL NO. <i>7749 52117050</i>	
SHIPPED TO GEL Laboratories, LLC	OFFSITE PROPERTY NO. <i>6125</i>				

**SPECIAL INSTRUCTIONS**  
 TRVL-16-017  
 (1) 6020\_METALS\_ICPMS: COMMON {Aluminum, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Molybdenum, Selenium}; 6020\_METALS\_ICPMS: COMMON (Add-on) {Arsenic, Manganese, Nickel, Uranium}; 6010\_METALS\_ICP: COMMON {Antimony, Silver}; 7471\_MERCURY\_CV: COMMON (SOLIDS);  
 (2) GAMMA\_GS: COMMON; AMCMISO\_IE\_PRECIP\_AEA: COMMON; PUISO\_PLATE\_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UIISO\_PLATE\_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; C14\_LSC: COMMON; ~~I129\_SEP\_LEPS\_GS: COMMON~~; NI63\_LSC: COMMON; NP237\_IE\_PRECIP\_AEA: COMMON; SRTOT\_SEP\_PRECIP\_GPC: COMMON {Total beta radiostromtium}; TC99\_EIE\_LSC: COMMON; TRITIUM\_DIST\_LSC: COMMON;

*AD 11-5-15*

**CHAIN OF CUSTODY / SAMPLE ANALYSIS REQUEST**

COLLECTOR: *Wish +* COMPANY CONTACT: TODAYAK, D TELEPHONE NO.: 376-6427 PROJECT COORDINATOR: TODAYAK, D

SAMPLING LOCATION: C9492, I-003 PROJECT DESIGNATION: 200-DV-1 Operable Unit Characterization of Waste Sites - Soil SAF NO.: F15-011

ICE CHEST NO.: GWS-505 FIELD LOGBOOK NO.: HNF-N-645-2/92 ACTUAL SAMPLE DEPTH: 9.0-11.0 COA: 302632

SHIPPED TO: GEL Laboratories, LLC OFFSITE PROPERTY NO.: 6125 BILL OF LADING/AIR BILL NO.: 774952117056

F15-011-444 PRICE CODE: 8C AIR QUALITY:  DATA TURNAROUND: 15 Days / 15 Days

METHOD OF SHIPMENT: FEDERAL EXPRESS ORIGINAL

MATRIX*	PRESERVATION	Cool <=6C			None
		Cool <=6C	Cool <=6C	Cool <=6C	
<b>POSSIBLE SAMPLE HAZARDS/ REMARKS</b> *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. NA	<b>HOLDING TIME</b>	14/40 Days	14/40 Days	1 yr/1 yr	6 Months
<b>SPECIAL HANDLING AND/OR STORAGE</b> RADIOACTIVE TIE TO: B33M96 <i>N/A</i>	<b>TYPE OF CONTAINER</b>	aG	aG	aG	G/P
	<b>NO. OF CONTAINER(S)</b>	1	1	1	1
	<b>VOLUME</b>	60mL	60mL	60mL	250mL
	<b>SAMPLE ANALYSIS</b>	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	WTPH_KEROSE NE; COMMON; WTPH-DIESEL; COMMON;	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS
	<b>SAMPLE DATE</b>	11-10-15	1330		
<b>SAMPLE NO.</b>	<b>MATRIX*</b>	B33M96	SOIL		

**CHAIN OF POSSESSION**

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
<i>Wish +</i>	11-10-15 1400	SSU-1	11-10-15 1400
SSU-1	NOV 11 2015 0800	L.B. Wall	NOV 11 2015 0800
CHPRGNOWall	NOV 11 2015 1400	FEDEX	
		<i>M. Kasby</i>	11-17-15 0905

**SPECIAL INSTRUCTIONS**  
SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS

**LABORATORY SECTION** RECEIVED BY: TITLE: DATE/TIME:

**FINAL SAMPLE DISPOSITION** DISPOSAL METHOD: DATE/TIME:

PRINTED ON 11/2/2015

FRS ID = FSR8932 TRVL NUM = TRVL-16-017 A-6003-618 (REV 2)

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F15-011-444	PAGE 2 OF 2
COLLECTOR <i>Wright</i>	COMPANY CONTACT TODAK, D	TELEPHONE NO. 376-6427	PROJECT COORDINATOR TODAK, D	PRICE CODE 8C	DATA TURNAROUND 15 Days / 15 Days
SAMPLING LOCATION C9492, I-003	PROJECT DESIGNATION 200-DV-1 Operable Unit Characterization of Waste Sites - Soil	SAF NO. F15-011	COA 302632	AIR QUALITY <input type="checkbox"/>	METHOD OF SHIPMENT FEDERAL EXPRESS
ICE CHEST NO. <i>605-505</i>	FIELD LOGBOOK NO. <i>HNF-N-645-219a</i>	ACTUAL SAMPLE DEPTH <i>9.0-11.0 Ft</i>	BILL OF LADING/AIR BILL NO. <i>774952117056</i>	ORIGINAL	
SHIPPED TO GEL Laboratories, LLC	OFFSITE PROPERTY NO. <i>6125</i>				

**SPECIAL INSTRUCTIONS**  
 TRVL-16-017  
 (1) 8270\_SVOA\_GCMS: COMMON; 8270\_SVOA\_GCMS: CH 01; 8270\_SVOA\_GCMS: COMMON (Add-on) {Tributyl phosphate};  
 (2) 8082\_PCB\_GC: COMMON; 8082\_PCB\_GC: COMMON (Add-on) {Aroclor-1262, Aroclor-1268};  
 (3) 6020\_METALS\_ICPMS: COMMON {Aluminum, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Molybdenum, Selenium}; 6020\_METALS\_ICPMS: COMMON (Add-on) {Arsenic, Manganese, Nickel, Uranium}; 6010\_METALS\_ICP: COMMON {Antimony, Silver}; 7471\_MERCURY\_CV: COMMON (SOLIDS);  
 (4) 7196\_CR6: COMMON; 350.1\_AMMONIA: COMMON; 9010\_CYANIDE: COMMON;  
 (5) GAMMA\_GS: COMMON; AMCMISO\_IE\_PRECIP\_AEA: COMMON; PUISO\_PLATE\_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UISO\_PLATE\_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238}; C14\_LSC: COMMON; I129\_SEP\_LEPS\_GS: COMMON; NI63\_LSC: COMMON; NP237\_IE\_PRECIP\_AEA: COMMON; SRTOT\_SEP\_PRECIP\_GPC: COMMON {Total beta radiostrontium}; TC99\_EIE\_LSC: COMMON; TRITIUM\_DIST\_LSC: COMMON;



**SAMPLE RECEIPT & REVIEW FORM**

Client: <u>OPRS</u>		SDG/AR/COC/Work Order:
Received By: <u>[Signature]</u>		Date Received: <u>11-17-15</u>
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u>
Classified Radioactive II or III by RSO?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Preservation Method: 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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>EV092024932</u> Secondary Temperature Device Serial # (if Applicable):
3	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4	Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's, containers affected and observed pH: If Preservation added, Lot#: Sample ID's and containers affected:
6	Do Low Level Perchlorate samples have headspace as required?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(If unknown, select No)
7	VOA vials contain acid preservation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
8	VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
9	Are Encore containers present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
10	Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
11	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
12	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
13	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
14	Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
15	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
16	Carrier and tracking number.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other  7749 5211 7056 2C 7749 5660 2247 2C 7749 5413 8572 2C

Comments (Use Continuation Form if needed):

# **Data Review Qualifier Definitions**

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

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

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

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

# Laboratory Certifications

**List of current GEL Certifications as of 16 November 2015**

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

# **Volatile Analysis**

# Case Narrative

**GC/MS Volatile  
Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL385355  
Work Order #: 385355**

**Method/Analysis Information**

<b>Procedure:</b>	<b>Volatile Organic Compounds (VOC) by Gas Chromatograph/Mass Spectrometer</b>
Analytical Method:	SW846 5035/8260C
Prep Method:	SW846 5035
Analytical Batch Number:	1524349
Prep Batch Number:	1524347

**Sample Analysis**

The following client and quality control samples were analyzed to complete this SDG using the methods referenced in the Analysis Information section:

<b>Sample ID</b>	<b>Client ID</b>
385355006	B33M95
385355007	B33MB2
1203436104	Method Blank (MB)
1203436105	Laboratory Control Sample (LCS)
1203436106	385355006(B33M95) Post Spike (PS)
1203436107	385355006(B33M95) Post Spike Duplicate (PSD)

NOTE: For volatile organic analyses the matrix spike designations may be indicated as "PS" or "PSD". The "PS" designation (post spike) indicates that the matrix was fortified prior to analysis but after applying any prep factors, such as a dilution. The laboratory considers the MS/MSD and PS/PSD designations interchangeable.

The data results reported met all SOP and method criteria, unless otherwise discussed below.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-038 REV# 21.

**Calibration Information**

A complete list of the initial calibration data files with the correct dates and times of analysis are shown in the Calibration History report located in the Standard Data section of the data package. The surrogate compounds were calibrated using a minimum five-point calibration curve. The surrogates were added by the auto sampler at a concentration of 50 ug/L or 20 ug/L for low level analyses. GEL Laboratories LLC will not have surrogate recoveries reported for Dibromofluoromethane. This is due to increased regulations for this analyte and an industry shortage.

**Initial Calibration**

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

**Continuing Calibration Verification Requirements**

All associated calibration verification standard(s) (CCV) met the acceptance criteria.

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

The blank analyzed with this SDG met the acceptance criteria.

**Surrogate Recoveries**

Surrogate recoveries, in sample (See Below) was outside the acceptance limits. Sample re-analysis confirmed matrix interference. The initial results are reported.

Sample	Analyte	Value
385355006 (B33M95)	1,2-Dichloroethane-d4	129* (81%-124%)

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

**QC Sample Designation**

Sample 385355006 (B33M95) was designated for spike analysis.

**Matrix Spike/Matrix Spike Duplicate Recovery Statement**

The spike and/or spike duplicate (See Below) recoveries were not all within the acceptance limits. The recoveries were similar. It is believed possible matrix interference has been demonstrated.

Sample	Analyte	Value
1203436107 (B33M95PSD)	Chlorobenzene, Styrene and Xylenes (total)	68* (70%-130%)

**Relative Percent Difference (RPD) Statement**

The RPDs between the matrix spike pair met the acceptance limits.

**Internal Standard (ISTD) Acceptance**

The internal standard responses in all client and quality control samples met the required acceptance criteria.

**Technical Information****Holding Time Specifications**

All samples in this SDG met the specified holding time. GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection or sample receipt. Those holding times expressed in hours are calculated in the ALPHALIMS system. Those holding times expressed as days expire at midnight on the day of expiration.

**Sample Preservation and Integrity**

All samples met the sample preservation and integrity requirements.

**Sample Dilutions/Methanol Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-extraction/Re-analysis**

Samples 385355006 (B33M95) and 385355007 (B33MB2) were re-analyzed due to unacceptable surrogate or internal standard recoveries in the initial analysis. The re-analyses confirmed/and or passed and were reported.

### Miscellaneous Information

#### **Data Exception (DER) Documentation**

A data exception report (DER) 1469295 was generated for samples 385355006 (B33M95) and 1203436107 (B33M95PSD) in this SDG/batch.

#### **Manual Integrations**

Data files associated with the initial calibration, continuing calibration check, and samples did not require manual integrations.

#### **TIC Comment**

Tentatively identified compounds (TIC) were not required for this SDG.

#### **Additional Comments**

Additional comments were not required for this SDG.

### System Configuration

The Volatile-GC/MS analysis was performed on the following instrument configuration:

<b>Instrument ID</b>	<b>Instrument</b>	<b>System Configuration</b>	<b>Column ID</b>	<b>Column Description</b>	<b>P &amp; T Trap</b>
VOA3.I	Agilent 6890/5973 GC/MS w/ OI 4560/Archon Autosampler	HP6890/HP5973	DB-624	J&W, 60m x 0.25mm x 1.4um	Trap 10

### 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: GEL385355 GEL Work Order: 385355

**The Qualifiers in this report are defined as follows:**

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

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.

DL Indicates that sample is diluted.

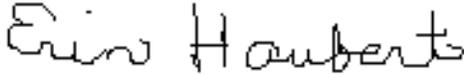
RA Indicates that sample is re-analyzed without re-extraction.

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:** Erin Haubert

**Date:** 23 NOV 2015

**Title:** Data Validator

# Sample Data Summary

November 25, 2015

Page 1 of 1

Certificate of Analysis  
Sample Summary

<b>SDG Number:</b> GEL385355	<b>Date Collected:</b> 11/10/2015 13:30	<b>Matrix:</b> SOIL
<b>Lab Sample ID:</b> 385355006	<b>Date Received:</b> 11/12/2015 09:05	<b>%Moisture:</b> 5.7
<b>Client ID:</b> B33M95	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15011
<b>Batch ID:</b> 1524349	<b>Method:</b> SW846 5035/8260C	<b>SOP Ref:</b> GL-OA-E-038
<b>Run Date:</b> 11/18/2015 13:46	<b>Inst:</b> VOA3.I	<b>Dilution:</b> 1
<b>Prep Date:</b> 11/10/2015 13:30	<b>Analyst:</b> CDS1	<b>Purge Vol:</b> 5 mL
<b>Data File:</b> 111815V3\3J310.D	<b>Aliquot:</b> 6.9 g	<b>Final Volume:</b> 5 mL
	<b>Column:</b> DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
71-55-6	1,1,1-Trichloroethane	U	0.231	ug/kg	0.231	1.54
79-34-5	1,1,2,2-Tetrachloroethane	U	0.231	ug/kg	0.231	1.54
79-00-5	1,1,2-Trichloroethane	U	0.231	ug/kg	0.231	1.54
75-34-3	1,1-Dichloroethane	U	0.231	ug/kg	0.231	1.54
75-35-4	1,1-Dichloroethylene	U	0.231	ug/kg	0.231	1.54
107-06-2	1,2-Dichloroethane	U	0.231	ug/kg	0.231	1.54
540-59-0	1,2-Dichloroethylene (total)	U	0.231	ug/kg	0.231	3.07
78-87-5	1,2-Dichloropropane	U	0.231	ug/kg	0.231	1.54
78-93-3	2-Butanone	U	2.31	ug/kg	2.31	7.69
591-78-6	2-Hexanone	U	2.31	ug/kg	2.31	7.69
108-10-1	4-Methyl-2-pentanone	U	2.31	ug/kg	2.31	7.69
67-64-1	Acetone	J	5.08	ug/kg	2.31	7.69
71-43-2	Benzene	U	0.231	ug/kg	0.231	1.54
75-27-4	Bromodichloromethane	U	0.231	ug/kg	0.231	1.54
75-25-2	Bromoform	U	0.231	ug/kg	0.231	1.54
74-83-9	Bromomethane	U	0.231	ug/kg	0.231	1.54
75-15-0	Carbon disulfide	U	1.23	ug/kg	1.23	7.69
56-23-5	Carbon tetrachloride	U	0.231	ug/kg	0.231	1.54
108-90-7	Chlorobenzene	TU	0.231	ug/kg	0.231	1.54
75-00-3	Chloroethane	U	0.231	ug/kg	0.231	1.54
67-66-3	Chloroform	U	0.231	ug/kg	0.231	1.54
74-87-3	Chloromethane	U	0.231	ug/kg	0.231	1.54
124-48-1	Dibromochloromethane	U	0.231	ug/kg	0.231	1.54
100-41-4	Ethylbenzene	U	0.231	ug/kg	0.231	1.54
75-09-2	Methylene chloride	U	1.23	ug/kg	1.23	3.84
100-42-5	Styrene	TU	0.231	ug/kg	0.231	1.54
127-18-4	Tetrachloroethylene	U	0.231	ug/kg	0.231	1.54
108-88-3	Toluene	J	0.477	ug/kg	0.231	1.54
79-01-6	Trichloroethylene	U	0.231	ug/kg	0.231	1.54
75-01-4	Vinyl chloride	U	0.231	ug/kg	0.231	1.54
1330-20-7	Xylenes (total)	JT	0.284	ug/kg	0.231	4.61
10061-01-5	cis-1,3-Dichloropropylene	U	0.231	ug/kg	0.231	1.54
10061-02-6	trans-1,3-Dichloropropylene	U	0.231	ug/kg	0.231	1.54

November 25, 2015

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Certificate of Analysis  
Sample Summary

<b>SDG Number:</b> GEL385355	<b>Date Collected:</b> 11/10/2015 13:05	<b>Matrix:</b> SOIL
<b>Lab Sample ID:</b> 385355007	<b>Date Received:</b> 11/12/2015 09:05	<b>%Moisture:</b> 0
<b>Client ID:</b> B33MB2	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15011
<b>Batch ID:</b> 1524349	<b>Method:</b> SW846 5035/8260C	<b>SOP Ref:</b> GL-OA-E-038
<b>Run Date:</b> 11/18/2015 15:16	<b>Inst:</b> VOA3.I	<b>Dilution:</b> 1
<b>Prep Date:</b> 11/10/2015 13:05	<b>Analyst:</b> CDS1	<b>Purge Vol:</b> 5 mL
<b>Data File:</b> 111815V3\3J313.D	<b>Aliquot:</b> 6.2 g	<b>Final Volume:</b> 5 mL
	<b>Column:</b> DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
71-55-6	1,1,1-Trichloroethane	U	0.242	ug/kg	0.242	1.61
79-34-5	1,1,2,2-Tetrachloroethane	U	0.242	ug/kg	0.242	1.61
79-00-5	1,1,2-Trichloroethane	U	0.242	ug/kg	0.242	1.61
75-34-3	1,1-Dichloroethane	U	0.242	ug/kg	0.242	1.61
75-35-4	1,1-Dichloroethylene	U	0.242	ug/kg	0.242	1.61
107-06-2	1,2-Dichloroethane	U	0.242	ug/kg	0.242	1.61
540-59-0	1,2-Dichloroethylene (total)	U	0.242	ug/kg	0.242	3.23
78-87-5	1,2-Dichloropropane	U	0.242	ug/kg	0.242	1.61
78-93-3	2-Butanone	U	2.42	ug/kg	2.42	8.06
591-78-6	2-Hexanone	U	2.42	ug/kg	2.42	8.06
108-10-1	4-Methyl-2-pentanone	U	2.42	ug/kg	2.42	8.06
67-64-1	Acetone	U	2.42	ug/kg	2.42	8.06
71-43-2	Benzene	U	0.242	ug/kg	0.242	1.61
75-27-4	Bromodichloromethane	U	0.242	ug/kg	0.242	1.61
75-25-2	Bromoform	U	0.242	ug/kg	0.242	1.61
74-83-9	Bromomethane	U	0.242	ug/kg	0.242	1.61
75-15-0	Carbon disulfide	U	1.29	ug/kg	1.29	8.06
56-23-5	Carbon tetrachloride	U	0.242	ug/kg	0.242	1.61
108-90-7	Chlorobenzene	TU	0.242	ug/kg	0.242	1.61
75-00-3	Chloroethane	U	0.242	ug/kg	0.242	1.61
67-66-3	Chloroform	U	0.242	ug/kg	0.242	1.61
74-87-3	Chloromethane	U	0.242	ug/kg	0.242	1.61
124-48-1	Dibromochloromethane	U	0.242	ug/kg	0.242	1.61
100-41-4	Ethylbenzene	U	0.242	ug/kg	0.242	1.61
75-09-2	Methylene chloride	U	1.29	ug/kg	1.29	4.03
100-42-5	Styrene	TU	0.242	ug/kg	0.242	1.61
127-18-4	Tetrachloroethylene	U	0.242	ug/kg	0.242	1.61
108-88-3	Toluene	U	0.242	ug/kg	0.242	1.61
79-01-6	Trichloroethylene	U	0.242	ug/kg	0.242	1.61
75-01-4	Vinyl chloride	U	0.242	ug/kg	0.242	1.61
1330-20-7	Xylenes (total)	TU	0.242	ug/kg	0.242	4.84
10061-01-5	cis-1,3-Dichloropropylene	U	0.242	ug/kg	0.242	1.61
10061-02-6	trans-1,3-Dichloropropylene	U	0.242	ug/kg	0.242	1.61

# Quality Control Summary

**November 25, 2015**  
**GEL LABORATORIES LLC**

**REV 1**

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

**QC Summary**

Report Date: November 23, 2015

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**CH2M Hill Plateau Remediation Company**

**MSIN R3-50 CHPRC**

**PO Box 1600**

**Richland, Washington**

**Contact: Mr. Scot Fitzgerald**

**Workorder: 385355**

<b>Parmname</b>	<b>NOM</b>	<b>Sample Qual</b>	<b>QC</b>	<b>Units</b>	<b>RPD%</b>	<b>REC%</b>	<b>Range</b>	<b>Anlst</b>	<b>Date</b>	<b>Time</b>
<b>Volatile-GC/MS</b>										
Batch	1524349									
QC1203436105	LCS									
1,1,1-Trichloroethane	50.0		58.3	ug/kg		117	(70%-130%)	CDS1	11/18/15	12:15
1,1,2,2-Tetrachloroethane	50.0		49.2	ug/kg		98	(70%-130%)			
1,1,2-Trichloroethane	50.0		46.5	ug/kg		93	(70%-130%)			
1,1-Dichloroethane	50.0		52.0	ug/kg		104	(70%-130%)			
1,1-Dichloroethylene	50.0		56.4	ug/kg		113	(70%-130%)			
1,2-Dichloroethane	50.0		46.5	ug/kg		93	(70%-130%)			
1,2-Dichloroethylene (total)	100		101	ug/kg		101	(70%-130%)			
1,2-Dichloropropane	50.0		48.7	ug/kg		97	(70%-130%)			
2-Butanone	250		221	ug/kg		89	(70%-130%)			
2-Hexanone	250		233	ug/kg		93	(70%-130%)			
4-Methyl-2-pentanone	250		215	ug/kg		86	(70%-130%)			
Acetone	250		215	ug/kg		86	(70%-130%)			
Benzene	50.0		50.0	ug/kg		100	(70%-130%)			
Bromodichloromethane	50.0		50.8	ug/kg		102	(70%-130%)			
Bromoform	50.0		53.6	ug/kg		107	(70%-130%)			
Bromomethane	50.0		55.4	ug/kg		111	(70%-130%)			
Carbon disulfide	250		275	ug/kg		110	(70%-130%)			
Carbon tetrachloride	50.0		56.6	ug/kg		113	(70%-130%)			
Chlorobenzene	50.0		50.0	ug/kg		100	(70%-130%)			
Chloroethane	50.0		55.0	ug/kg		110	(70%-130%)			

## QC Summary

Workorder: 385355

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Volatile-GC/MS</b>											
Batch	1524349										
Chloroform	50.0			50.1	ug/kg		100	(70%-130%)	CDS1	11/18/15	12:15
Chloromethane	50.0			50.0	ug/kg		100	(70%-130%)			
Dibromochloromethane	50.0			50.0	ug/kg		100	(70%-130%)			
Ethylbenzene	50.0			51.7	ug/kg		103	(70%-130%)			
Methylene chloride	50.0			47.7	ug/kg		95	(70%-130%)			
Styrene	50.0			50.3	ug/kg		101	(70%-130%)			
Tetrachloroethylene	50.0			52.6	ug/kg		105	(70%-130%)			
Toluene	50.0			47.7	ug/kg		95	(70%-130%)			
Trichloroethylene	50.0			51.5	ug/kg		103	(70%-130%)			
Vinyl chloride	50.0			51.0	ug/kg		102	(70%-130%)			
Xylenes (total)	150			150	ug/kg		100	(70%-130%)			
cis-1,3-Dichloropropylene	50.0			51.9	ug/kg		104	(70%-130%)			
trans-1,3-Dichloropropylene	50.0			49.2	ug/kg		98	(70%-130%)			
**1,2-Dichloroethane-d4	50.0			50.4	ug/L		101	(81%-124%)			
**Bromofluorobenzene	50.0			52.0	ug/L		104	(70%-130%)			
**Toluene-d8	50.0			48.2	ug/L		96	(81%-120%)			
QC1203436104 MB											
1,1,1-Trichloroethane			U	0.300	ug/kg					11/18/15	13:15
1,1,2,2-Tetrachloroethane			U	0.300	ug/kg						
1,1,2-Trichloroethane			U	0.300	ug/kg						
1,1-Dichloroethane			U	0.300	ug/kg						
1,1-Dichloroethylene			U	0.300	ug/kg						

**QC Summary**

Workorder: 385355

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Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Volatile-GC/MS</b>											
Batch	1524349										
1,2-Dichloroethane			U	0.300	ug/kg				CDS1	11/18/15	13:15
1,2-Dichloroethylene (total)			U	0.300	ug/kg						
1,2-Dichloropropane			U	0.300	ug/kg						
2-Butanone			U	3.00	ug/kg						
2-Hexanone			U	3.00	ug/kg						
4-Methyl-2-pentanone			U	3.00	ug/kg						
Acetone			U	3.00	ug/kg						
Benzene			U	0.300	ug/kg						
Bromodichloromethane			U	0.300	ug/kg						
Bromoform			U	0.300	ug/kg						
Bromomethane			U	0.300	ug/kg						
Carbon disulfide			U	1.60	ug/kg						
Carbon tetrachloride			U	0.300	ug/kg						
Chlorobenzene			U	0.300	ug/kg						
Chloroethane			U	0.300	ug/kg						
Chloroform			U	0.300	ug/kg						
Chloromethane			U	0.300	ug/kg						
Dibromochloromethane			U	0.300	ug/kg						
Ethylbenzene			U	0.300	ug/kg						
Methylene chloride			U	1.60	ug/kg						
Styrene			U	0.300	ug/kg						

### QC Summary

Workorder: 385355

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Volatile-GC/MS</b>											
Batch	1524349										
Tetrachloroethylene			U	0.300	ug/kg						
Toluene			U	0.300	ug/kg				CDS1	11/18/15	13:15
Trichloroethylene			U	0.300	ug/kg						
Vinyl chloride			U	0.300	ug/kg						
Xylenes (total)			U	0.300	ug/kg						
cis-1,3-Dichloropropylene			U	0.300	ug/kg						
trans-1,3-Dichloropropylene			U	0.300	ug/kg						
**1,2-Dichloroethane-d4	50.0			56.6	ug/L		113	(81%-124%)			
**Bromofluorobenzene	50.0			49.0	ug/L		98	(70%-130%)			
**Toluene-d8	50.0			50.4	ug/L		101	(81%-120%)			
QC1203436106 385355006 PS											
1,1,1-Trichloroethane	50.0	U	0.00	51.8	ug/L		104	(70%-130%)		11/18/15	20:49
1,1,2,2-Tetrachloroethane	50.0	U	0.00	46.1	ug/L		92	(70%-130%)			
1,1,2-Trichloroethane	50.0	U	0.00	45.5	ug/L		91	(70%-130%)			
1,1-Dichloroethane	50.0	U	0.00	51.5	ug/L		103	(70%-130%)			
1,1-Dichloroethylene	50.0	U	0.00	50.3	ug/L		101	(70%-130%)			
1,2-Dichloroethane	50.0	U	0.00	45.9	ug/L		92	(70%-130%)			
1,2-Dichloroethylene (total)	100	U	0.00	90.8	ug/L		91	(70%-130%)			
1,2-Dichloropropane	50.0	U	0.00	46.0	ug/L		92	(70%-130%)			
2-Butanone	250	U	0.00	265	ug/L		106	(70%-130%)			
2-Hexanone	250	U	0.00	263	ug/L		105	(70%-130%)			
4-Methyl-2-pentanone	250	U	0.00	252	ug/L		101	(70%-130%)			
Acetone	250	J	6.61	271	ug/L		106	(70%-130%)			

### QC Summary

Workorder: 385355

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Volatile-GC/MS</b>											
Batch	1524349										
Benzene	50.0	U	0.00	45.5	ug/L		91	(70%-130%)	CDS1	11/18/15	20:49
Bromodichloromethane	50.0	U	0.00	44.5	ug/L		89	(70%-130%)			
Bromoform	50.0	U	0.00	46.8	ug/L		94	(70%-130%)			
Bromomethane	50.0	U	0.00	41.8	ug/L		84	(70%-130%)			
Carbon disulfide	250	U	0.00	257	ug/L		103	(70%-130%)			
Carbon tetrachloride	50.0	U	0.00	48.2	ug/L		96	(70%-130%)			
Chlorobenzene	50.0	TU	0.00	36.4	ug/L		73	(70%-130%)			
Chloroethane	50.0	U	0.00	44.7	ug/L		89	(70%-130%)			
Chloroform	50.0	U	0.00	46.8	ug/L		94	(70%-130%)			
Chloromethane	50.0	U	0.00	44.8	ug/L		90	(70%-130%)			
Dibromochloromethane	50.0	U	0.00	43.2	ug/L		86	(70%-130%)			
Ethylbenzene	50.0	U	0.00	36.8	ug/L		74	(70%-130%)			
Methylene chloride	50.0	U	0.00	48.1	ug/L		96	(70%-130%)			
Styrene	50.0	TU	0.00	34.9	ug/L		70	(70%-130%)			
Tetrachloroethylene	50.0	U	0.00	38.2	ug/L		76	(70%-130%)			
Toluene	50.0	J	0.620	40.7	ug/L		80	(70%-130%)			
Trichloroethylene	50.0	U	0.00	44.6	ug/L		89	(70%-130%)			
Vinyl chloride	50.0	U	0.00	39.9	ug/L		80	(70%-130%)			
Xylenes (total)	150	JT	0.370	109	ug/L		72	(70%-130%)			
cis-1,3-Dichloropropylene	50.0	U	0.00	42.3	ug/L		85	(70%-130%)			
trans-1,3-Dichloropropylene	50.0	U	0.00	43.3	ug/L		87	(70%-130%)			

### QC Summary

Workorder: 385355

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Volatile-GC/MS</b>											
Batch	1524349										
**1,2-Dichloroethane-d4	50.0	64.6		50.0	ug/L		100	(81%-124%)			
**Bromofluorobenzene	50.0	57.9		50.0	ug/L		100	(70%-130%)	CDS1	11/18/15	20:49
**Toluene-d8	50.0	60.2		49.8	ug/L		100	(81%-120%)			
QC1203436107 385355006 PSD											
1,1,1-Trichloroethane	50.0	U	0.00	48.9	ug/L	6	98	(0%-20%)		11/18/15	21:20
1,1,2,2-Tetrachloroethane	50.0	U	0.00	41.5	ug/L	11	83	(0%-20%)			
1,1,2-Trichloroethane	50.0	U	0.00	42.1	ug/L	8	84	(0%-20%)			
1,1-Dichloroethane	50.0	U	0.00	48.6	ug/L	6	97	(0%-20%)			
1,1-Dichloroethylene	50.0	U	0.00	47.2	ug/L	6	94	(0%-20%)			
1,2-Dichloroethane	50.0	U	0.00	43.2	ug/L	6	86	(0%-20%)			
1,2-Dichloroethylene (total)	100	U	0.00	85.9	ug/L	6	86	(0%-20%)			
1,2-Dichloropropane	50.0	U	0.00	42.6	ug/L	8	85	(0%-20%)			
2-Butanone	250	U	0.00	239	ug/L	10	96	(0%-20%)			
2-Hexanone	250	U	0.00	243	ug/L	8	97	(0%-20%)			
4-Methyl-2-pentanone	250	U	0.00	233	ug/L	8	93	(0%-20%)			
Acetone	250	J	6.61	240	ug/L	12	93	(0%-20%)			
Benzene	50.0	U	0.00	42.4	ug/L	7	85	(0%-20%)			
Bromodichloromethane	50.0	U	0.00	43.0	ug/L	3	86	(0%-20%)			
Bromoform	50.0	U	0.00	44.2	ug/L	6	88	(0%-20%)			
Bromomethane	50.0	U	0.00	43.3	ug/L	3	87	(0%-20%)			
Carbon disulfide	250	U	0.00	239	ug/L	8	95	(0%-20%)			
Carbon tetrachloride	50.0	U	0.00	45.1	ug/L	7	90	(0%-20%)			
Chlorobenzene	50.0	TU	0.00	T	33.8	ug/L	7	68*	(0%-20%)		

### QC Summary

Workorder: 385355

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Volatile-GC/MS</b>											
Batch	1524349										
Chloroethane	50.0	U	0.00		43.5	ug/L	3	87	(0%-20%)	CDS1	11/18/15 21:20
Chloroform	50.0	U	0.00		44.3	ug/L	5	89	(0%-20%)		
Chloromethane	50.0	U	0.00		41.2	ug/L	8	82	(0%-20%)		
Dibromochloromethane	50.0	U	0.00		41.9	ug/L	3	84	(0%-20%)		
Ethylbenzene	50.0	U	0.00		34.9	ug/L	5	70	(0%-20%)		
Methylene chloride	50.0	U	0.00		45.9	ug/L	5	92	(0%-20%)		
Styrene	50.0	TU	0.00	T	34.2	ug/L	2	68*	(0%-20%)		
Tetrachloroethylene	50.0	U	0.00		35.2	ug/L	8	70	(0%-20%)		
Toluene	50.0	J	0.620		39.4	ug/L	3	77	(0%-20%)		
Trichloroethylene	50.0	U	0.00		42.3	ug/L	5	85	(0%-20%)		
Vinyl chloride	50.0	U	0.00		38.3	ug/L	4	77	(0%-20%)		
Xylenes (total)	150	JT	0.370	T	102	ug/L	7	68*	(0%-20%)		
cis-1,3-Dichloropropylene	50.0	U	0.00		40.3	ug/L	5	81	(0%-20%)		
trans-1,3-Dichloropropylene	50.0	U	0.00		42.3	ug/L	2	85	(0%-20%)		
**1,2-Dichloroethane-d4	50.0		64.6		49.3	ug/L		99	(81%-124%)		
**Bromofluorobenzene	50.0		57.9		49.6	ug/L		99	(70%-130%)		
**Toluene-d8	50.0		60.2		50.2	ug/L		100	(81%-120%)		

**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

## QC Summary

Workorder: 385355

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
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 25, 2015  
 Surrogate Recovery Report

SDG Number: GEL385355

Matrix Type: SOLID

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203436105	LCS for batch 1524347	101	96	104
1203436104	MB for batch 1524347	113	101	98
385355006	B33M95	129 *	120	116
385355007	B33MB2	93	117	105
1203436106	B33M95PS	100	100	100
1203436107	B33M95PSD	99	100	99

**Surrogate****Acceptance Limits**

DCED4 = 1,2-Dichloroethane-d4

(81%-124%)

TOL = Toluene-d8

(81%-120%)

BFB = Bromofluorobenzene

(70%-130%)

\* Recovery outside Acceptance Limits

# Column to be used to flag recovery values

D Sample Diluted

# Miscellaneous

<b>DATA EXCEPTION REPORT</b>			
<b>Mo.Day Yr.</b> 20-NOV-15	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> VOA GC/MS	<b>Test / Method:</b> SW846 5035/8260C	<b>Matrix Type:</b> Solid	<b>Client Code:</b> CPRC
<b>Batch ID:</b> 1524349	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 385355(GEL385355),385608(GEL385608)</b>			
<b>Application Issues:</b> Failed Recovery for MS/MSD, or PS/PSD Failed Yield for Surrogates			
<b>Specification and Requirements Exception Description:</b>		<b>DER Disposition:</b>	
<p>1. Failed Recovery for MS/MSD, or PS/PSD:  QC 1203436107PSD</p> <p>2. Failed Yield for Surrogates:  385355 006  385608 002</p>		<p>1. The spike and/or spike duplicate (See Below) recoveries were not all within the acceptance limits. The recoveries were similar. It is believed possible matrix interference has been demonstrated. 1203436107 (B33M95PSD) Chlorobenzene [68* (70%-130%)], Styrene [68* (70%-130%)] and Xylenes (total) [68* (70%-130%)].</p> <p>2. Surrogate recoveries, in sample (See Below) was outside the acceptance limits. Sample re-analysis confirmed matrix interference. The initial results are reported. 385355006 (B33M95) 1,2-Dichloroethane-d4 [129* (81%-124%)].</p> <p>Surrogate recoveries, in sample (See Below) was outside the acceptance limits. Sample re-analysis confirmed matrix interference. The re-analysis results are reported. 385608002 (B32J15) 1,2-Dichloroethane-d4 [125* (81%-124%)].</p>	

**Originator's Name:**  
Crystal Stacey      20-NOV-15

**Data Validator/Group Leader:**  
Kelle Bellamy      23-NOV-15

# **Semi-Volatile Analysis**

# Case Narrative

GC/MS Semivolatile  
Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL385355  
Work Order #: 385355

**Method/Analysis Information**

**Procedure:** Analysis of Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry  
**Analytical Method:** 8270\_SVOA\_GCMS  
**Prep Method:** SW846 3541  
**Analytical Batch Number:** 1522624  
**Prep Batch Number:** 1522623

**Sample Analysis**

The following samples were analyzed using the analytical protocol as established in 8270\_SVOA\_GCMS:

Sample ID	Client ID
385355008	B33M96
1203431784	Method Blank (MB)
1203431785	Laboratory Control Sample (LCS)
1203433760	385355008(B33M96) Matrix Spike (MS)
1203433761	385355008(B33M96) Matrix Spike Duplicate (MSD)

Sample 385355 008 in this SDG was analyzed on a "dry weight corrected" basis.

**Preparation/Analytical Method Verification**

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-009 REV# 35.

Raw data reports are processed and reviewed by the analyst using the data analysis software package. False positives have been removed from the quantitation reports per standard operating procedures (SOP).

**Calibration Information**

A complete list of the initial calibration data files are shown in the Calibration History report located in the Standard Data section of the data package. The various calibration mixes may not be calibrated using all of the calibration levels. In addition, not all of the mixes are calibrated using the same levels.

Diphenylamine has now superseded N-Nitroso-diphenylamine on Quantitation Reports, Initial Calibration Reports, Calibration Check Standard Reports, etc. Previous versions of EPA Methodologies referenced N-Nitroso-diphenylamine. However, as stated in EPA Methodology, "N-Nitroso-diphenylamine decomposes in the gas chromatographic inlet and cannot be separated from Diphenylamine." Studies of these two compounds at GEL, both independent of each other and together, showed that they not only co-elute, but also have similar mass spectra. N-Nitroso-diphenylamine and Diphenylamine will be reported as Diphenylamine on all reports and forms.

#### **Initial Calibration**

All initial calibration requirements have been met for this sample delivery group (SDG) in this batch. A second source initial calibration verification (ICV) was included in the standard section directly behind the initial calibration.

#### **CCV Requirements**

All associated calibration verification standard(s) (ICV or CCV) met the acceptance criteria.

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

##### **Method Blank (MB) Statement**

The MB analyzed with this SDG in this batch met the acceptance criteria.

##### **Surrogate Recoveries**

All the surrogate recoveries were within the established acceptance criteria for this SDG in this batch.

##### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

##### **QC Sample Designation**

Sample 385355008 (B33M96) was selected for analysis as the matrix spike and matrix spike duplicate.

##### **Spike Recovery Statement**

The MS or MSD (See Below) spike recoveries were not within the acceptance limits. The associated MS or MSD passed recoveries, as did the LCS. It appears that the low spike recoveries were isolated to the MS or MSD only and were the result of a poor extraction.

Sample	Analyte	Value
1203433760 (B33M96MS)	bis(2-Ethylhexyl)phthalate	803* (27%-131%)

The MS or MSD (See Below) recovered spiked analytes outside of the established acceptance limits. Because the recoveries were biased high and the target analytes were not detected in the associated samples above the reporting limit, the data were reported.

Sample	Analyte	Value
1203433760 (B33M96MS)	Isophorone	133* (29%-107%)

##### **MS/MSD Relative Percent Difference (RPD) Statement**

The relative percent difference (RPD) between the MS and MSD (See Below) did not meet acceptance limits. As the individual MS and MSD recoveries were within the acceptance limits, the failures had no adverse impact on the reported sample data.

Sample	Analyte	Value
--------	---------	-------

1203433760MS and 1203433761MSD (B33M96)	Several	See applicable report
---	---------	-----------------------

The RPD values between the MS and MSD, (See Below), were not within the acceptance limits due to the large difference between the individual recoveries in each MS and MSD analyte pair. The failures may be attributed to an error in the extraction process.

Sample	Analyte	Value
1203433760MS and 1203433761MSD (B33M96)	Several	See applicable report

#### **Internal Standard (ISTD) Acceptance**

The internal standard responses used to quantitate the requested target analytes were within the required acceptance criteria for the SDG associated samples in this batch.

#### **Technical Information:**

##### **Holding Time Specifications**

All samples in this SDG in this batch met the specified holding time.

##### **Preparation/Analytical Method Verification**

All procedures were performed as stated in the SOP. All reported compound mass spectra met the detection specifications in the method.

##### **Sample Dilutions**

The samples in this SDG in this batch did not require dilutions.

##### **Sample Re-extraction/Re-analysis**

Sample 1203433761 (B33M96MSD) failed ISTD acceptance criteria. The sample was re-analyzed and passed ISTD acceptance criteria. The re-analysis data were reported.

#### **Miscellaneous Information:**

##### **Data Exception (DER) Documentation**

A data exception report (DER) 1467489 was generated for samples 1203433760 (B33M96MS) and 1203433761 (B33M96MSD) in this SDG/batch.

##### **Manual Integrations**

Some initial calibration standards, continuing calibration standards, and/or samples may require manual integrations due to software limitations. Manual integrations, if any, are included with the raw data.

##### **TIC Comment**

Tentatively identified compounds (TIC) were not required for the samples in this SDG for this batch.

##### **Additional Comments**

Additional comments were not required for the SDG associated samples in this batch.

##### **Electronic Package Comment**

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

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

### **System Configuration**

The Semi-Volatile-GC/MS analysis was performed on the following instrument configuration:

<b>Instrument ID</b>	<b>Instrument</b>	<b>System Configuration</b>	<b>Column ID</b>	<b>Column Description</b>
MSD4.I	Agilent 7890A/5975C GC/MS w/ 7683 Autosampler	HP6890/HP5973	DB-5MS	25m x 0.2mm, 0.33um (5% Phenylmethylpolysiloxane)

### **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: GEL385355 GEL Work Order: 385355

**The Qualifiers in this report are defined as follows:**

- E Concentration exceeds the calibration range of the instrument
- 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.
- 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: **19 NOV 2015**

Title: **Data Validator**

# Sample Data Summary

November 25, 2015

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Semi-Volatile  
**Certificate of Analysis**  
**Sample Summary**

<b>SDG Number:</b> GEL385355	<b>Date Collected:</b> 11/10/2015 13:30	<b>Matrix:</b> SOIL
<b>Lab Sample ID:</b> 385355008	<b>Date Received:</b> 11/12/2015 09:05	<b>%Moisture:</b> 8.3
<b>Client ID:</b> B33M96	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15011
<b>Batch ID:</b> 1522624	<b>Method:</b> 8270_SVOA_GCMS	<b>SOP Ref:</b> GL-OA-E-009
<b>Run Date:</b> 11/15/2015 16:38	<b>Inst:</b> MSD4.I	<b>Dilution:</b> 1
<b>Prep Date:</b> 11/13/2015 13:00	<b>Analyst:</b> JMB3	<b>Inj. Vol:</b> 1 uL
<b>Data File:</b> s111515.B\s4k1516.D	<b>Aliquot:</b> 30.03 g	<b>Final Volume:</b> 1 mL
	<b>Column:</b> DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
120-82-1	1,2,4-Trichlorobenzene	U	109	ug/kg	109	363
95-50-1	1,2-Dichlorobenzene	U	109	ug/kg	109	363
541-73-1	1,3-Dichlorobenzene	U	109	ug/kg	109	363
106-46-7	1,4-Dichlorobenzene	U	109	ug/kg	109	363
95-95-4	2,4,5-Trichlorophenol	U	109	ug/kg	109	363
120-83-2	2,4-Dichlorophenol	U	109	ug/kg	109	363
105-67-9	2,4-Dimethylphenol	U	109	ug/kg	109	363
51-28-5	2,4-Dinitrophenol	U	109	ug/kg	109	726
121-14-2	2,4-Dinitrotoluene	U	109	ug/kg	109	363
606-20-2	2,6-Dinitrotoluene	U	109	ug/kg	109	363
91-58-7	2-Chloronaphthalene	U	10.9	ug/kg	10.9	36.3
95-57-8	2-Chlorophenol	U	109	ug/kg	109	363
534-52-1	2-Methyl-4,6-dinitrophenol	U	109	ug/kg	109	363
91-57-6	2-Methylnaphthalene	U	10.9	ug/kg	10.9	36.3
88-75-5	2-Nitrophenol	U	109	ug/kg	109	363
91-94-1	3,3'-Dichlorobenzidine	U	109	ug/kg	109	363
101-55-3	4-Bromophenylphenylether	U	109	ug/kg	109	363
59-50-7	4-Chloro-3-methylphenol	U	145	ug/kg	145	363
106-47-8	4-Chloroaniline	U	109	ug/kg	109	363
7005-72-3	4-Chlorophenylphenylether	U	109	ug/kg	109	363
100-02-7	4-Nitrophenol	U	109	ug/kg	109	363
83-32-9	Acenaphthene	U	10.9	ug/kg	10.9	36.3
208-96-8	Acenaphthylene	U	10.9	ug/kg	10.9	36.3
120-12-7	Anthracene	U	10.9	ug/kg	10.9	36.3
56-55-3	Benzo(a)anthracene	U	10.9	ug/kg	10.9	36.3
50-32-8	Benzo(a)pyrene	U	10.9	ug/kg	10.9	36.3
205-99-2	Benzo(b)fluoranthene	U	10.9	ug/kg	10.9	36.3
191-24-2	Benzo(ghi)perylene	U	10.9	ug/kg	10.9	36.3
207-08-9	Benzo(k)fluoranthene	U	10.9	ug/kg	10.9	36.3
85-68-7	Butylbenzylphthalate	U	109	ug/kg	109	363
86-74-8	Carbazole	U	10.9	ug/kg	10.9	36.3
218-01-9	Chrysene	U	10.9	ug/kg	10.9	36.3
84-74-2	Di-n-butylphthalate	U	109	ug/kg	109	363
117-84-0	Di-n-octylphthalate	U	109	ug/kg	109	363
53-70-3	Dibenzo(a,h)anthracene	U	10.9	ug/kg	10.9	36.3
132-64-9	Dibenzofuran	U	109	ug/kg	109	363
84-66-2	Diethylphthalate	U	109	ug/kg	109	363
131-11-3	Dimethylphthalate	U	109	ug/kg	109	363

November 25, 2015

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Semi-Volatile  
**Certificate of Analysis**  
**Sample Summary**

<b>SDG Number:</b> GEL385355	<b>Date Collected:</b> 11/10/2015 13:30	<b>Matrix:</b> SOIL
<b>Lab Sample ID:</b> 385355008	<b>Date Received:</b> 11/12/2015 09:05	<b>%Moisture:</b> 8.3
<b>Client ID:</b> B33M96	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15011
<b>Batch ID:</b> 1522624	<b>Method:</b> 8270_SVOA_GCMS	<b>SOP Ref:</b> GL-OA-E-009
<b>Run Date:</b> 11/15/2015 16:38	<b>Inst:</b> MSD4.I	<b>Dilution:</b> 1
<b>Prep Date:</b> 11/13/2015 13:00	<b>Analyst:</b> JMB3	<b>Inj. Vol:</b> 1 uL
<b>Data File:</b> s111515.B\s4k1516.D	<b>Aliquot:</b> 30.03 g	<b>Final Volume:</b> 1 mL
	<b>Column:</b> DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
206-44-0	Fluoranthene	U	10.9	ug/kg	10.9	36.3
86-73-7	Fluorene	U	10.9	ug/kg	10.9	36.3
118-74-1	Hexachlorobenzene	U	109	ug/kg	109	363
87-68-3	Hexachlorobutadiene	U	109	ug/kg	109	363
77-47-4	Hexachlorocyclopentadiene	U	109	ug/kg	109	363
67-72-1	Hexachloroethane	U	109	ug/kg	109	363
193-39-5	Indeno(1,2,3-cd)pyrene	U	10.9	ug/kg	10.9	36.3
78-59-1	Isophorone	TU	109	ug/kg	109	363
621-64-7	N-Nitrosodipropylamine	U	109	ug/kg	109	363
91-20-3	Naphthalene	U	10.9	ug/kg	10.9	36.3
98-95-3	Nitrobenzene	U	109	ug/kg	109	363
87-86-5	Pentachlorophenol	U	109	ug/kg	109	363
85-01-8	Phenanthrene	U	10.9	ug/kg	10.9	36.3
108-95-2	Phenol	U	109	ug/kg	109	363
129-00-0	Pyrene	U	10.9	ug/kg	10.9	36.3
126-73-8	Tributylphosphate	U	109	ug/kg	109	363
108-60-1	bis(2-Chloro-1-methylethyl)ether	U	109	ug/kg	109	363
111-91-1	bis(2-Chloroethoxy)methane	U	109	ug/kg	109	363
111-44-4	bis(2-Chloroethyl) ether	U	109	ug/kg	109	363
117-81-7	bis(2-Ethylhexyl)phthalate	T	1370	ug/kg	109	363
99-09-2	m-Nitroaniline	U	109	ug/kg	109	363
95-48-7	o-Cresol	U	109	ug/kg	109	363
88-74-4	o-Nitroaniline	U	120	ug/kg	120	363
100-01-6	p-Nitroaniline	U	109	ug/kg	109	363

# Quality Control Summary

**November 25, 2015**  
**GEL LABORATORIES LLC**

**REV 1**

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

**QC Summary**

Report Date: November 19, 2015

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**CH2MHill Plateau Remediation Company**

**MSIN R3-50 CHPRC**

**PO Box 1600**

**Richland, Washington**

**Contact: Mr. Scot Fitzgerald**

**Workorder: 385355**

<b>Parmname</b>	<b>NOM</b>	<b>Sample Qual</b>	<b>QC</b>	<b>Units</b>	<b>RPD%</b>	<b>REC%</b>	<b>Range</b>	<b>Anlst</b>	<b>Date</b>	<b>Time</b>
<b>Semi-Volatile-GC/MS</b>										
Batch	1522624									
QC1203431785	LCS									
1,2,4-Trichlorobenzene	1670		1260	ug/kg		76	(42%-102%)	JMB3	11/15/15	15:13
1,2-Dichlorobenzene	1670		1220	ug/kg		73	(39%-100%)			
1,3-Dichlorobenzene	1670		1190	ug/kg		72	(39%-95%)			
1,4-Dichlorobenzene	1670		1220	ug/kg		73	(39%-98%)			
2,4,5-Trichlorophenol	1670		1270	ug/kg		76	(45%-111%)			
2,4-Dichlorophenol	1670		1240	ug/kg		75	(44%-108%)			
2,4-Dimethylphenol	1670		1190	ug/kg		71	(41%-106%)			
2,4-Dinitrophenol	1670		871	ug/kg		52	(26%-90%)			
2,4-Dinitrotoluene	1670		1400	ug/kg		84	(46%-115%)			
2,6-Dinitrotoluene	1670		1340	ug/kg		80	(46%-112%)			
2-Chloronaphthalene	1670		1270	ug/kg		76	(44%-102%)			
2-Chlorophenol	1670		1280	ug/kg		77	(41%-110%)			
2-Methyl-4,6-dinitrophenol	1670		1230	ug/kg		74	(31%-100%)			
2-Methylnaphthalene	1670		1270	ug/kg		76	(42%-103%)			
2-Nitrophenol	1670		1270	ug/kg		77	(42%-112%)			
3,3'-Dichlorobenzidine	1670		1230	ug/kg		74	(39%-104%)			
4-Bromophenylphenylether	1670		1430	ug/kg		86	(46%-112%)			
4-Chloro-3-methylphenol	1670		1330	ug/kg		80	(42%-116%)			
4-Chloroaniline	1670		1110	ug/kg		66	(37%-113%)			
4-Chlorophenylphenylether	1670		1460	ug/kg		88	(48%-113%)			

**QC Summary**

Workorder: 385355

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Semi-Volatile-GC/MS</b>											
Batch	1522624										
4-Nitrophenol	1670			1050	ug/kg		63	(27%-125%)	JMB3	11/15/15	15:13
Acenaphthene	1670			1380	ug/kg		83	(45%-103%)			
Acenaphthylene	1670			1360	ug/kg		82	(46%-107%)			
Anthracene	1670			1330	ug/kg		80	(47%-104%)			
Benzo(a)anthracene	1670			1440	ug/kg		87	(47%-107%)			
Benzo(a)pyrene	1670			1430	ug/kg		86	(46%-110%)			
Benzo(b)fluoranthene	1670			1410	ug/kg		85	(47%-112%)			
Benzo(ghi)perylene	1670			1370	ug/kg		82	(33%-125%)			
Benzo(k)fluoranthene	1670			1460	ug/kg		88	(46%-115%)			
Butylbenzylphthalate	1670			1620	ug/kg		97	(42%-120%)			
Carbazole	1670			1380	ug/kg		83	(46%-112%)			
Chrysene	1670			1520	ug/kg		91	(45%-109%)			
Di-n-butylphthalate	1670			1520	ug/kg		91	(47%-115%)			
Di-n-octylphthalate	1670			1510	ug/kg		91	(41%-128%)			
Dibenzo(a,h)anthracene	1670			1390	ug/kg		83	(34%-137%)			
Dibenzofuran	1670			1350	ug/kg		81	(48%-112%)			
Diethylphthalate	1670			1360	ug/kg		81	(45%-113%)			
Dimethylphthalate	1670			1410	ug/kg		84	(47%-110%)			
Fluoranthene	1670			1350	ug/kg		81	(44%-112%)			
Fluorene	1670			1330	ug/kg		80	(45%-107%)			
Hexachlorobenzene	1670			1260	ug/kg		76	(44%-108%)			

**QC Summary**

Workorder: 385355

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Semi-Volatile-GC/MS</b>											
Batch	1522624										
Hexachlorobutadiene	1670			1240	ug/kg		74	(40%-110%)			
Hexachlorocyclopentadiene	1670			683	ug/kg		41	(27%-84%)	JMB3	11/15/15	15:13
Hexachloroethane	1670			1230	ug/kg		74	(38%-103%)			
Indeno(1,2,3-cd)pyrene	1670			1320	ug/kg		79	(38%-131%)			
Isophorone	1670			1330	ug/kg		80	(42%-107%)			
N-Nitrosodipropylamine	1670			1310	ug/kg		79	(36%-109%)			
Naphthalene	1670			1290	ug/kg		78	(43%-103%)			
Nitrobenzene	1670			1310	ug/kg		78	(41%-109%)			
Pentachlorophenol	1670			1180	ug/kg		71	(30%-106%)			
Phenanthrene	1670			1330	ug/kg		80	(47%-103%)			
Phenol	1670			1270	ug/kg		76	(38%-111%)			
Pyrene	1670			1500	ug/kg		90	(38%-111%)			
Tributylphosphate	1670			1680	ug/kg		101	(43%-123%)			
bis(2-Chloro-1-methylethyl)ether	1670			1440	ug/kg		87	(35%-114%)			
bis(2-Chloroethoxy)methane	1670			1360	ug/kg		82	(45%-110%)			
bis(2-Chloroethyl) ether	1670			1390	ug/kg		83	(41%-110%)			
bis(2-Ethylhexyl)phthalate	1670			1560	ug/kg		94	(42%-120%)			
m-Nitroaniline	1670			1190	ug/kg		72	(35%-131%)			
o-Cresol	1670			1280	ug/kg		77	(40%-111%)			
o-Nitroaniline	1670			1340	ug/kg		81	(39%-119%)			
p-Nitroaniline	1670			1280	ug/kg		77	(34%-138%)			
**2,4,6-Tribromophenol	3330			2420	ug/kg		73	(12%-129%)			

**QC Summary**

Workorder: 385355

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Semi-Volatile-GC/MS</b>											
Batch	1522624										
**2-Fluorobiphenyl	1670			1160	ug/kg		70	(15%-110%)			
**2-Fluorophenol	3330			2410	ug/kg		72	(10%-115%)	JMB3	11/15/15	15:13
**Nitrobenzene-d5	1670			1180	ug/kg		71	(13%-112%)			
**Phenol-d5	3330			2570	ug/kg		77	(15%-117%)			
**p-Terphenyl-d14	1670			1500	ug/kg		90	(24%-141%)			
QC1203431784 MB											
1,2,4-Trichlorobenzene			U	100	ug/kg					11/15/15	14:41
1,2-Dichlorobenzene			U	100	ug/kg						
1,3-Dichlorobenzene			U	100	ug/kg						
1,4-Dichlorobenzene			U	100	ug/kg						
2,4,5-Trichlorophenol			U	100	ug/kg						
2,4-Dichlorophenol			U	100	ug/kg						
2,4-Dimethylphenol			U	100	ug/kg						
2,4-Dinitrophenol			U	100	ug/kg						
2,4-Dinitrotoluene			U	100	ug/kg						
2,6-Dinitrotoluene			U	100	ug/kg						
2-Chloronaphthalene			U	10.0	ug/kg						
2-Chlorophenol			U	100	ug/kg						
2-Methyl-4,6-dinitrophenol			U	100	ug/kg						
2-Methylnaphthalene			U	10.0	ug/kg						
2-Nitrophenol			U	100	ug/kg						
3,3'-Dichlorobenzidine			U	100	ug/kg						
4-Bromophenylphenylether			U	100	ug/kg						

**QC Summary**

Workorder: 385355

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Semi-Volatile-GC/MS</b>											
Batch	1522624										
4-Chloro-3-methylphenol			U	133	ug/kg				JMB3	11/15/15	14:41
4-Chloroaniline			U	100	ug/kg						
4-Chlorophenylphenylether			U	100	ug/kg						
4-Nitrophenol			U	100	ug/kg						
Acenaphthene			U	10.0	ug/kg						
Acenaphthylene			U	10.0	ug/kg						
Anthracene			U	10.0	ug/kg						
Benzo(a)anthracene			U	10.0	ug/kg						
Benzo(a)pyrene			U	10.0	ug/kg						
Benzo(b)fluoranthene			U	10.0	ug/kg						
Benzo(ghi)perylene			U	10.0	ug/kg						
Benzo(k)fluoranthene			U	10.0	ug/kg						
Butylbenzylphthalate			U	100	ug/kg						
Carbazole			U	10.0	ug/kg						
Chrysene			U	10.0	ug/kg						
Di-n-butylphthalate			U	100	ug/kg						
Di-n-octylphthalate			U	100	ug/kg						
Dibenzo(a,h)anthracene			U	10.0	ug/kg						
Dibenzofuran			U	100	ug/kg						
Diethylphthalate			U	100	ug/kg						
Dimethylphthalate			U	100	ug/kg						

**QC Summary**

Workorder: 385355

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Semi-Volatile-GC/MS</b>											
Batch	1522624										
Fluoranthene			U	10.0	ug/kg						
Fluorene			U	10.0	ug/kg				JMB3	11/15/15	14:41
Hexachlorobenzene			U	100	ug/kg						
Hexachlorobutadiene			U	100	ug/kg						
Hexachlorocyclopentadiene			U	100	ug/kg						
Hexachloroethane			U	100	ug/kg						
Indeno(1,2,3-cd)pyrene			U	10.0	ug/kg						
Isophorone			U	100	ug/kg						
N-Nitrosodipropylamine			U	100	ug/kg						
Naphthalene			U	10.0	ug/kg						
Nitrobenzene			U	100	ug/kg						
Pentachlorophenol			U	100	ug/kg						
Phenanthrene			U	10.0	ug/kg						
Phenol			U	100	ug/kg						
Pyrene			U	10.0	ug/kg						
Tributylphosphate			U	100	ug/kg						
bis(2-Chloro-1-methylethyl)ether			U	100	ug/kg						
bis(2-Chloroethoxy)methane			U	100	ug/kg						
bis(2-Chloroethyl) ether			U	100	ug/kg						
bis(2-Ethylhexyl)phthalate			U	100	ug/kg						
m-Nitroaniline			U	100	ug/kg						
o-Cresol			U	100	ug/kg						

### QC Summary

Workorder: 385355

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Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Semi-Volatile-GC/MS</b>											
Batch	1522624										
o-Nitroaniline			U	110	ug/kg						
p-Nitroaniline			U	100	ug/kg				JMB3	11/15/15	14:41
**2,4,6-Tribromophenol	3330			2290	ug/kg		69	(12%-129%)			
**2-Fluorobiphenyl	1670			1200	ug/kg		72	(15%-110%)			
**2-Fluorophenol	3330			2280	ug/kg		68	(10%-115%)			
**Nitrobenzene-d5	1670			1200	ug/kg		72	(13%-112%)			
**Phenol-d5	3330			2490	ug/kg		75	(15%-117%)			
**p-Terphenyl-d14	1670			1570	ug/kg		94	(24%-141%)			
QC1203433760 385355008 MS											
1,2,4-Trichlorobenzene	1820	U	109	1200	ug/kg		66	(26%-104%)		11/15/15	17:07
1,2-Dichlorobenzene	1820	U	109	1110	ug/kg		61	(26%-98%)			
1,3-Dichlorobenzene	1820	U	109	1050	ug/kg		58	(27%-92%)			
1,4-Dichlorobenzene	1820	U	109	1090	ug/kg		60	(27%-95%)			
2,4,5-Trichlorophenol	1820	U	109	1390	ug/kg		76	(26%-120%)			
2,4-Dichlorophenol	1820	U	109	1280	ug/kg		71	(21%-119%)			
2,4-Dimethylphenol	1820	U	109	1240	ug/kg		68	(27%-111%)			
2,4-Dinitrophenol	1820	U	109	1040	ug/kg		57	(12%-112%)			
2,4-Dinitrotoluene	1820	U	109	1540	ug/kg		85	(32%-118%)			
2,6-Dinitrotoluene	1820	U	109	1490	ug/kg		82	(32%-114%)			
2-Chloronaphthalene	1820	U	10.9	1290	ug/kg		71	(25%-111%)			
2-Chlorophenol	1820	U	109	1200	ug/kg		66	(20%-114%)			
2-Methyl-4,6-dinitrophenol	1820	U	109	1390	ug/kg		77	(17%-115%)			
2-Methylnaphthalene	1820	U	10.9	1260	ug/kg		69	(25%-112%)			

**QC Summary**

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Semi-Volatile-GC/MS</b>											
Batch	1522624										
2-Nitrophenol	1820	U	109	1210	ug/kg		67	(23%-115%)	JMB3	11/15/15	17:07
3,3'-Dichlorobenzidine	1820	U	109	1600	ug/kg		88	(21%-107%)			
4-Bromophenylphenylether	1820	U	109	1590	ug/kg		88	(29%-121%)			
4-Chloro-3-methylphenol	1820	U	145	1440	ug/kg		79	(29%-119%)			
4-Chloroaniline	1820	U	109	1330	ug/kg		73	(22%-120%)			
4-Chlorophenylphenylether	1820	U	109	1560	ug/kg		86	(29%-119%)			
4-Nitrophenol	1820	U	109	853	ug/kg		47	(20%-120%)			
Acenaphthene	1820	U	10.9	1420	ug/kg		78	(27%-111%)			
Acenaphthylene	1820	U	10.9	1430	ug/kg		79	(26%-117%)			
Anthracene	1820	U	10.9	1510	ug/kg		83	(29%-118%)			
Benzo(a)anthracene	1820	U	10.9	1600	ug/kg		88	(25%-126%)			
Benzo(a)pyrene	1820	U	10.9	1610	ug/kg		89	(28%-122%)			
Benzo(b)fluoranthene	1820	U	10.9	1550	ug/kg		86	(28%-127%)			
Benzo(ghi)perylene	1820	U	10.9	1670	ug/kg		92	(22%-113%)			
Benzo(k)fluoranthene	1820	U	10.9	1570	ug/kg		86	(28%-131%)			
Butylbenzylphthalate	1820	U	109	1780	ug/kg		98	(26%-133%)			
Carbazole	1820	U	10.9	1560	ug/kg		86	(27%-123%)			
Chrysene	1820	U	10.9	1700	ug/kg		94	(26%-122%)			
Di-n-butylphthalate	1820	U	109	1670	ug/kg		89	(26%-126%)			
Di-n-octylphthalate	1820	U	109	1640	ug/kg		90	(29%-130%)			
Dibenzo(a,h)anthracene	1820	U	10.9	1710	ug/kg		94	(19%-133%)			

**QC Summary**

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Semi-Volatile-GC/MS</b>											
Batch	1522624										
Dibenzofuran	1820	U	109	1420	ug/kg		78	(30%-119%)			
Diethylphthalate	1820	U	109	1520	ug/kg		84	(26%-124%)	JMB3	11/15/15	17:07
Dimethylphthalate	1820	U	109	1540	ug/kg		85	(27%-120%)			
Fluoranthene	1820	U	10.9	1530	ug/kg		84	(24%-123%)			
Fluorene	1820	U	10.9	1440	ug/kg		79	(27%-117%)			
Hexachlorobenzene	1820	U	109	1410	ug/kg		77	(30%-113%)			
Hexachlorobutadiene	1820	U	109	1140	ug/kg		63	(25%-109%)			
Hexachlorocyclopentadiene	1820	U	109	576	ug/kg		32	(10%-100%)			
Hexachloroethane	1820	U	109	1070	ug/kg		59	(23%-98%)			
Indeno(1,2,3-cd)pyrene	1820	U	10.9	1600	ug/kg		88	(21%-126%)			
Isophorone	1820	TU	109 T	2410	ug/kg		133 *	(29%-107%)			
N-Nitrosodipropylamine	1820	U	109	1270	ug/kg		70	(25%-113%)			
Naphthalene	1820	U	10.9	1240	ug/kg		68	(23%-111%)			
Nitrobenzene	1820	U	109	1260	ug/kg		69	(26%-109%)			
Pentachlorophenol	1820	U	109	1390	ug/kg		77	(17%-119%)			
Phenanthrene	1820	U	10.9	1510	ug/kg		83	(26%-121%)			
Phenol	1820	U	109	1210	ug/kg		67	(28%-111%)			
Pyrene	1820	U	10.9	1820	ug/kg		100	(23%-127%)			
Tributylphosphate	1820	U	109	1870	ug/kg		103	(25%-131%)			
bis(2-Chloro-1-methylethyl)ether	1820	U	109	1380	ug/kg		76	(21%-116%)			
bis(2-Chloroethoxy)methane	1820	U	109	1320	ug/kg		73	(30%-111%)			
bis(2-Chloroethyl) ether	1820	U	109	1290	ug/kg		71	(27%-110%)			

### QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Semi-Volatile-GC/MS</b>											
Batch	1522624										
bis(2-Ethylhexyl)phthalate	1820	T	1370	ET	16000	ug/kg	803*	(27%-131%)			
m-Nitroaniline	1820	U	109		1460	ug/kg	80	(24%-137%)	JMB3	11/15/15	17:07
o-Cresol	1820	U	109		1260	ug/kg	69	(28%-114%)			
o-Nitroaniline	1820	U	120		1480	ug/kg	82	(27%-120%)			
p-Nitroaniline	1820	U	109		1450	ug/kg	80	(19%-140%)			
**2,4,6-Tribromophenol	3630		2710		2590	ug/kg	71	(12%-129%)			
**2-Fluorobiphenyl	1820		1410		1160	ug/kg	64	(15%-110%)			
**2-Fluorophenol	3630		2710		2230	ug/kg	61	(10%-115%)			
**Nitrobenzene-d5	1820		1480		1140	ug/kg	63	(13%-112%)			
**Phenol-d5	3630		3020		2420	ug/kg	67	(15%-117%)			
**p-Terphenyl-d14	1820		1750		1720	ug/kg	95	(24%-141%)			
QC1203433761 385355008 MSD											
1,2,4-Trichlorobenzene	1820	U	109		899	ug/kg	28	49	(0%-30%)		11/16/15 17:27
1,2-Dichlorobenzene	1820	U	109		818	ug/kg	31*	45	(0%-30%)		
1,3-Dichlorobenzene	1820	U	109		769	ug/kg	31*	42	(0%-30%)		
1,4-Dichlorobenzene	1820	U	109		788	ug/kg	32*	43	(0%-30%)		
2,4,5-Trichlorophenol	1820	U	109		1240	ug/kg	11	68	(0%-30%)		
2,4-Dichlorophenol	1820	U	109		971	ug/kg	27	54	(0%-30%)		
2,4-Dimethylphenol	1820	U	109		942	ug/kg	27	52	(0%-30%)		
2,4-Dinitrophenol	1820	U	109		1170	ug/kg	12	64	(0%-30%)		
2,4-Dinitrotoluene	1820	U	109		1530	ug/kg	0	84	(0%-30%)		
2,6-Dinitrotoluene	1820	U	109		1320	ug/kg	12	73	(0%-30%)		
2-Chloronaphthalene	1820	U	10.9		1030	ug/kg	22	57	(0%-30%)		

**QC Summary**

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Semi-Volatile-GC/MS</b>											
Batch	1522624										
2-Chlorophenol	1820	U	109	864	ug/kg	33*	48	(0%-30%)	JMB3	11/16/15	17:27
2-Methyl-4,6-dinitrophenol	1820	U	109	1480	ug/kg	6	81	(0%-30%)			
2-Methylnaphthalene	1820	U	10.9	953	ug/kg	28	52	(0%-30%)			
2-Nitrophenol	1820	U	109	913	ug/kg	28	50	(0%-30%)			
3,3'-Dichlorobenzidine	1820	U	109	1610	ug/kg	1	89	(0%-30%)			
4-Bromophenylphenylether	1820	U	109	1500	ug/kg	6	83	(0%-30%)			
4-Chloro-3-methylphenol	1820	U	145	1180	ug/kg	20	65	(0%-30%)			
4-Chloroaniline	1820	U	109	1030	ug/kg	25	57	(0%-30%)			
4-Chlorophenylphenylether	1820	U	109	1360	ug/kg	13	75	(0%-30%)			
4-Nitrophenol	1820	U	109	1300	ug/kg	42*	72	(0%-30%)			
Acenaphthene	1820	U	10.9	1180	ug/kg	19	65	(0%-30%)			
Acenaphthylene	1820	U	10.9	1180	ug/kg	19	65	(0%-30%)			
Anthracene	1820	U	10.9	1510	ug/kg	0	83	(0%-30%)			
Benzo(a)anthracene	1820	U	10.9	1710	ug/kg	7	94	(0%-30%)			
Benzo(a)pyrene	1820	U	10.9	1710	ug/kg	6	94	(0%-30%)			
Benzo(b)fluoranthene	1820	U	10.9	1660	ug/kg	7	91	(0%-30%)			
Benzo(ghi)perylene	1820	U	10.9	1620	ug/kg	3	89	(0%-30%)			
Benzo(k)fluoranthene	1820	U	10.9	1700	ug/kg	8	94	(0%-30%)			
Butylbenzylphthalate	1820	U	109	1930	ug/kg	8	106	(0%-30%)			
Carbazole	1820	U	10.9	1630	ug/kg	4	90	(0%-30%)			
Chrysene	1820	U	10.9	1800	ug/kg	6	99	(0%-30%)			

**November 25, 2015**  
**GEL LABORATORIES LLC**

**REV 1**

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

**QC Summary**

**Workorder: 385355**

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<b>Parmname</b>	<b>NOM</b>	<b>Sample</b>	<b>Qual</b>	<b>QC</b>	<b>Units</b>	<b>RPD%</b>	<b>REC%</b>	<b>Range</b>	<b>Anlst</b>	<b>Date</b>	<b>Time</b>
<b>Semi-Volatile-GC/MS</b>											
Batch	1522624										
Di-n-butylphthalate	1820	U	109	1770	ug/kg	6	95	(0%-30%)			
Di-n-octylphthalate	1820	U	109	1680	ug/kg	2	92	(0%-30%)	JMB3	11/16/15	17:27
Dibenzo(a,h)anthracene	1820	U	10.9	1600	ug/kg	6	88	(0%-30%)			
Dibenzofuran	1820	U	109	1210	ug/kg	16	67	(0%-30%)			
Diethylphthalate	1820	U	109	1450	ug/kg	4	80	(0%-30%)			
Dimethylphthalate	1820	U	109	1370	ug/kg	12	76	(0%-30%)			
Fluoranthene	1820	U	10.9	1600	ug/kg	4	88	(0%-30%)			
Fluorene	1820	U	10.9	1260	ug/kg	13	69	(0%-30%)			
Hexachlorobenzene	1820	U	109	1410	ug/kg	0	77	(0%-30%)			
Hexachlorobutadiene	1820	U	109	871	ug/kg	27	48	(0%-30%)			
Hexachlorocyclopentadiene	1820	U	109	446	ug/kg	25	25	(0%-30%)			
Hexachloroethane	1820	U	109	757	ug/kg	35*	42	(0%-30%)			
Indeno(1,2,3-cd)pyrene	1820	U	10.9	1570	ug/kg	2	86	(0%-30%)			
Isophorone	1820	TU	109	969	ug/kg	85*	53	(0%-30%)			
N-Nitrosodipropylamine	1820	U	109	920	ug/kg	32*	51	(0%-30%)			
Naphthalene	1820	U	10.9	937	ug/kg	28	52	(0%-30%)			
Nitrobenzene	1820	U	109	911	ug/kg	32*	50	(0%-30%)			
Pentachlorophenol	1820	U	109	1540	ug/kg	10	85	(0%-30%)			
Phenanthrene	1820	U	10.9	1480	ug/kg	1	82	(0%-30%)			
Phenol	1820	U	109	889	ug/kg	30	49	(0%-30%)			
Pyrene	1820	U	10.9	1950	ug/kg	7	107	(0%-30%)			
Tributylphosphate	1820	U	109	1970	ug/kg	5	108	(0%-30%)			

### QC Summary

Workorder: 385355

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Semi-Volatile-GC/MS</b>											
Batch	1522624										
bis(2-Chloro-1-methylethyl)ether	1820	U	109	922	ug/kg	40*	51	(0%-30%)			
bis(2-Chloroethoxy)methane	1820	U	109	977	ug/kg	30	54	(0%-30%)	JMB3	11/16/15	17:27
bis(2-Chloroethyl) ether	1820	U	109	932	ug/kg	32*	51	(0%-30%)			
bis(2-Ethylhexyl)phthalate	1820	T	1370	2820	ug/kg	140*	80	(0%-30%)			
m-Nitroaniline	1820	U	109	1380	ug/kg	6	76	(0%-30%)			
o-Cresol	1820	U	109	934	ug/kg	30	51	(0%-30%)			
o-Nitroaniline	1820	U	120	1230	ug/kg	18	68	(0%-30%)			
p-Nitroaniline	1820	U	109	1480	ug/kg	2	82	(0%-30%)			
**2,4,6-Tribromophenol	3630		2710	2640	ug/kg		73	(12%-129%)			
**2-Fluorobiphenyl	1820		1410	935	ug/kg		51	(15%-110%)			
**2-Fluorophenol	3630		2710	1650	ug/kg		45	(10%-115%)			
**Nitrobenzene-d5	1820		1480	846	ug/kg		47	(13%-112%)			
**Phenol-d5	3630		3020	1780	ug/kg		49	(15%-117%)			
**p-Terphenyl-d14	1820		1750	1850	ug/kg		102	(24%-141%)			

**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.

## QC Summary

Workorder: 385355

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
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 25, 2015

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## Surrogate Recovery Report

SDG Number: GEL385355

Matrix Type: SOLID

Sample ID	Client ID	2FP %REC	PHL %REC	NBZ %REC	FBP %REC	TBP %REC	TPH %REC
1203431784	MB for batch 1522623	68	75	72	72	69	94
1203431785	LCS for batch 1522623	72	77	71	70	73	90
385355008	B33M96	75	83	82	77	75	96
1203433760	B33M96MS	61	67	63	64	71	95
1203433761	B33M96MSD	45	49	47	51	73	102

## Surrogate

## Acceptance Limits

2FP	= 2-Fluorophenol	(10%-115%)
PHL	= Phenol-d5	(15%-117%)
NBZ	= Nitrobenzene-d5	(13%-112%)
FBP	= 2-Fluorobiphenyl	(15%-110%)
TBP	= 2,4,6-Tribromophenol	(12%-129%)
TPH	= p-Terphenyl-d14	(24%-141%)

\* Recovery outside Acceptance Limits

# Column to be used to flag recovery values

D Sample Diluted

# Miscellaneous

**DATA EXCEPTION REPORT**

<b>Mo.Day Yr.</b> 17-NOV-15	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> SEMIOVA GC/MS	<b>Test / Method:</b> SW846 3541/8270D	<b>Matrix Type:</b> Solid	<b>Client Code:</b> BRKL, CARE, CPRC, ENRG
<b>Batch ID:</b> 1522624	<b>Sample Numbers:</b> See Below		

**Potentially affected work order(s)(SDG): 384742(GEL384742),385041,385223(37053),385255(37055),385279(EUI-10068),385355(GEL385355)**

**Application Issues:**

- Failed Recovery for MS/MSD, or PS/PSD
- Failed RPD for MS/MSD, or PS/PSD
- Failed Yield for Surrogates

<b>Specification and Requirements Exception Description:</b>	<b>DER Disposition:</b>
<p>1. Samples 385041012 and 385041014 failed surrogate recovery.</p> <p>2. The 1203433760MS and 1203433761MSD failed spike recovery.</p> <p>3. The RPD values between the 1203433760MS and 1203433761MSD were not within the acceptance limits.</p>	<p>1. 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. 385041012 (WS-04-SB) 2,4,6-Tribromophenol [0* (12%-129%)], 2-Fluorophenol [7* (10%-115%)] and Phenol-d5 [14* (15%-117%)].</p> <p>Sample (See Below) was re-extracted due to surrogate failure. The surrogate failures were confirmed by re-extraction and analysis. The original extraction results have been reported. 385041014 (WS-04-SC) 2,4,6-Tribromophenol [1* (12%-129%)], 2-Fluorobiphenyl [1* (15%-110%)], 2-Fluorophenol [0* (10%-115%)], Nitrobenzene-d5 [0* (13%-112%)], Phenol-d5 [1* (15%-117%)] and p-Terphenyl-d14 [3* (24%-141%)].</p> <p>2. The MS or MSD (See Below) spike recoveries were not within the acceptance limits. The associated MS or MSD passed recoveries, as did the LCS. It appears that the low spike recoveries were isolated to the MS or MSD only and were the result of a poor extraction. 1203433760 (B33M96MS) bis(2-Ethylhexyl)phthalate [803* (27%-131%)]. 1203433761 (B33M96MSD) Pyridine [27* (30%-64%)].</p> <p>The MS or MSD (See Below) recovered spiked analytes outside of the established acceptance limits. Because the recoveries were biased high and the target analytes were not detected in the associated samples above the reporting limit, the data were reported. 1203433760 (B33M96MS) Isophorone [133* (29%-107%)].</p> <p>3. The relative percent difference (RPD) between the MS and MSD (See Below) did not meet acceptance limits. As the individual MS and MSD recoveries were within the acceptance limits, the failures had no adverse impact on the reported sample data. 1203433760MS and 1203433761MSD (B33M96) Several [See applicable report].</p> <p>The RPD values between the MS and MSD, (See Below), were not within the acceptance limits due to the large difference between the individual recoveries in each MS and MSD analyte pair. The failures may be attributed to an error in the extraction process. 1203433760MS and 1203433761MSD (B33M96) Several [See applicable report].</p>

**Originator's Name:**

Josh Brooks 17-NOV-15

**Data Validator/Group Leader:**

Josh Brooks 17-NOV-15

# **FID Diesel Range Organics Analysis**

# Case Narrative

**Diesel Range Organics  
Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL385355  
Work Order #: 385355**

**Method/Analysis Information**

**Procedure:** Analysis of Diesel Range Organics by Flame Ionization Detector  
Analytical Method: NWTPH-Dx in Soil  
Prep Method: SW846 3541  
Analytical Batch Number: 1523066  
Prep Batch Number: 1523065

**Sample Analysis**

The following samples were analyzed using the analytical protocol as established in NWTPH-Dx in Soil:

<b>Sample ID</b>	<b>Client ID</b>
385355008	B33M96
1203432802	Method Blank (MB)
1203432803	Laboratory Control Sample (LCS)
1203432806	Laboratory Control Sample (LCS)
1203432807	Laboratory Control Sample Duplicate (LCSD)
1203432804	385355008(B33M96) Matrix Spike (MS)
1203432805	385355008(B33M96) Matrix Spike Duplicate (MSD)

Sample 385355 008 in this SDG was analyzed on a "dry weight corrected" basis.

**Preparation/Analytical Method Verification**

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-003 REV# 25.

Raw data reports are processed and reviewed by the analyst using the Chemstation software package. False positives have been removed from the quantitation reports per standard operating procedures (SOP).

**Calibration Information**

**Initial Calibration**

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

**Continuing Calibration Verification (CCV) Requirements**

All associated calibration verification standards (ICV or CCV) met the acceptance criteria for the target analytes. Analyte peaks eluted within the established retention time windows for this method.

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

The MB analyzed with this SDG met the acceptance criteria.

**Surrogate Recoveries**

All surrogate recoveries were within the established acceptance criteria for this SDG.

**Laboratory Control Sample (LCS/LCSD) Recovery**

The LCS/LCSD spike recoveries met the acceptance limits.

**LCS/LCSD Relative Percent Difference (RPD) Statement**

The RPD between the LCS and LCSD met the acceptance limits.

**QC Sample Designation**

Sample 385355008 (B33M96) was selected for the MS and MSD analyses.

**Matrix Spike (MS/MSD) Recovery Statement**

The MS/MSD recovery was within the established acceptance limits.

**MS/MSD Relative Percent Difference (RPD) Statement**

The RPD between the MS and MSD met the acceptance limits.

**Technical Information****Holding Time Specifications**

GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection of sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

**Preparation/Analytical Method Verification**

All procedures were performed as stated in the SOP. Analyte peaks eluted within the established retention time windows for this method.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-extraction/Re-analysis**

Re-extractions or re-analyses were not required in this SDG.

**Miscellaneous Information****Electronic Package Comment**

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

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative.

**Data Exception (DER) Documentation**

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

**Manual Integrations**

Certain standards and samples may have required manual integration to correctly position the baseline as set in the calibration standard injections. If manual integration was performed, copies of all manual integration peak profiles are included in the raw data section of this fraction.

**Additional Comments**

The additional comments field is used to address special issues associated with each analysis, clarify method/contractual issues pertaining to the analysis, and to list any report documents generated as a result of sample analysis or review. The additional comments were not required.

**System Configuration**

The Diesel Range Organics analysis was performed on the following instrument configuration:

<b>Instrument ID</b>	<b>Instrument</b>	<b>System Configuration</b>	<b>Column ID</b>	<b>Column Description</b>
FID7.I	Agilent Gas Chromatograph	Agilent 6890N GC/FID	DB-5MS	30m x 0.25mm, 0.25um(J&W)

**Certification Statement**

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

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**Qualifier Definition Report  
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL385355 GEL Work Order: 385355

**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.

DL Indicates that sample is diluted.

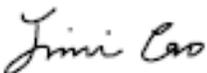
RA Indicates that sample is re-analyzed without re-extraction.

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: Jimin Cao

Date: 20 NOV 2015

Title: Data Validator

# Sample Data Summary

November 25, 2015  
FD Volatile Range OrganicsPage 1 of 1  
REV 1

## Certificate of Analysis

## Sample Summary

SDG Number:	GEL385355	Date Collected:	11/10/2015 13:30	Matrix:	SOIL
Lab Sample ID:	385355008	Date Received:	11/12/2015 09:05	%Moisture:	8.3
Client ID:	B33M96	Client:	CPRC001	Project:	CPRC0F15011
Batch ID:	1523066	Method:	NWTPH-Dx in Soil	SOP Ref:	GL-OA-E-003
Run Date:	11/16/2015 14:25	Inst:	FID7.I	Dilution:	1
Prep Date:	11/13/2015 10:58	Analyst:	LXA1	Inj. Vol:	1 uL
Data File:	111615kero\7k1611.D	Aliquot:	30.03 g	Final Volume:	1 mL
		Column:	DB-5ms		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
8008-20-6	Kerosene	U	1210	ug/Kg	1210	7260

November 25, 2015  
~~NO Diesel Range Organics~~

Page 1 of 1  
 REV 1

**Certificate of Analysis  
 Sample Summary**

<b>SDG Number:</b> GEL385355	<b>Date Collected:</b> 11/10/2015 13:30	<b>Matrix:</b> SOIL
<b>Lab Sample ID:</b> 385355008	<b>Date Received:</b> 11/12/2015 09:05	<b>%Moisture:</b> 8.3
<b>Client ID:</b> B33M96RA	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15011
<b>Batch ID:</b> 1523066	<b>Method:</b> NWTPH-Dx in Soil	<b>SOP Ref:</b> GL-OA-E-003
<b>Run Date:</b> 11/17/2015 15:58	<b>Inst:</b> FID7.I	<b>Dilution:</b> 1
<b>Prep Date:</b> 11/13/2015 10:58	<b>Analyst:</b> LXA1	<b>Inj. Vol:</b> 1 uL
<b>Data File:</b> 111715MO\fk1710.D	<b>Aliquot:</b> 30.03 g	<b>Final Volume:</b> 1 mL
	<b>Column:</b> DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
68334-30-5	Diesel Range Organics	U	2360	ug/Kg	2360	7260

# Quality Control Summary

**November 25, 2015**  
**GEL LABORATORIES LLC**

**REV 1**

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

**QC Summary**

Report Date: November 18, 2015

Page 1 of 2

**CH2M Hill Plateau Remediation Company**  
**MSIN R3-50 CHPRC**  
**PO Box 1600**  
**Richland, Washington**

**Contact: Mr. Scot Fitzgerald**

**Workorder: 385355**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Diesel Range Organics</b>											
Batch	1523066										
QC1203432803	LCS										
Diesel Range Organics	66600			57100	ug/Kg		86	(70%-130%)	LXA1	11/17/15	13:19
**o-Terphenyl	666			509	ug/Kg		77	(50%-150%)			
QC1203432806	LCS										
Kerosene	33300			31400	ug/Kg		94	(70%-130%)		11/16/15	11:08
**o-Terphenyl	667			577	ug/Kg		86	(50%-150%)			
QC1203432807	LCSD										
Kerosene	33300			29500	ug/Kg	6	89	(0%-20%)		11/16/15	11:47
**o-Terphenyl	666			562	ug/Kg		84	(50%-150%)			
QC1203432802	MB										
Diesel Range Organics			U	2160	ug/Kg					11/17/15	12:39
Kerosene			U	1110	ug/Kg					11/16/15	10:28
**o-Terphenyl	666			399	ug/Kg		60	(50%-150%)		11/17/15	12:39
QC1203432804	385355008 MS										
Diesel Range Organics	72700	U	2360	63900	ug/Kg		88	(70%-130%)		11/17/15	16:37
**o-Terphenyl	727		476	620	ug/Kg		85	(50%-150%)			
QC1203432805	385355008 MSD										
Diesel Range Organics	72700	U	2360	63300	ug/Kg	1	87	(0%-20%)		11/17/15	17:17
**o-Terphenyl	727		476	607	ug/Kg		83	(50%-150%)			

**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.

## QC Summary

Workorder: 385355

Page 2 of 2

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
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 25, 2015  
 Pesticide Range Organics  
 Surrogate Recovery Report

SDG Number: GEL385355

Matrix Type: SOLID

Sample ID	Client ID	OTP %REC
1203432802	MB for batch 1523065	75
1203432806	LCS for batch 1523065	86
1203432807	LCSD for batch 1523065	84
385355008	B33M96	67
1203432802	MB for batch 1523065RA	60
1203432803	LCS for batch 1523065	77
385355008	B33M96RA	66
1203432804	B33M96RAMS	85
1203432805	B33M96RAMSD	83

**Surrogate**

OTP = o-Terphenyl

**Acceptance Limits**

(50%-150%)

\* Recovery outside Acceptance Limits

# Column to be used to flag recovery values

D Sample Diluted

# PCB Analysis

# Case Narrative

**GC Semivolatile PCB  
Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL385355  
Work Order #: 385355**

**Method/Analysis Information**

**Procedure:** Analysis of Polychlorinated Biphenyls by ECD

Analytical Method: SW846 3541/8082A

Prep Method: SW846 3541

Analytical Batch Number: 1523419

Prep Batch Number: 1523417

**Sample Analysis**

The following samples were analyzed using the analytical protocol as established in SW846 3541/8082A:

<b>Sample ID</b>	<b>Client ID</b>
385355008	B33M96
1203433740	Method Blank (MB)
1203433741	Laboratory Control Sample (LCS)
1203433744	385355008(B33M96) Matrix Spike (MS)
1203433745	385355008(B33M96) Matrix Spike Duplicate (MSD)

Sample 385355 008 in this SDG was analyzed on a "dry weight corrected" basis.

**Preparation/Analytical Method Verification****SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-040 REV# 20.

Raw data reports are processed and reviewed by the analyst using the Chemstation software package. False positives have been removed from the quantitation reports per standard operating procedures (SOP).

**Calibration Information**

A complete list of the initial calibration data files are shown in the Calibration History report located in the Standard Data section of the data package.

**Initial Calibration**

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

**Continuing Calibration Verification (CCV) Requirements**

All associated calibration verification standards (ICV or CCV) met the acceptance criteria. All analytes were

within the established retention time windows for this method.

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

#### **Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

#### **Surrogate Recoveries**

Samples (See Below) failed to meet acceptance criteria for surrogate recovery. Since the the sample and the associated MS/MSD displayed similar surrogate recovery, the failures were attributed to sample matrix interference.

Sample	Analyte	Value
1203433744 (B33M96MS)	Decachlorobiphenyl	22* (32%-139%)
	Decachlorobiphenyl	23* (32%-139%)
1203433745 (B33M96MSD)	Decachlorobiphenyl	22* (32%-139%)
	Decachlorobiphenyl	24* (32%-139%)
385355008 (B33M96)	Decachlorobiphenyl	21* (32%-139%)

#### **Laboratory Control Sample (LCS/LCSD) Recovery**

The LCS/LCSD spike recoveries met the acceptance limits.

#### **QC Sample Designation**

Sample 385355008 (B33M96) was selected for the matrix spike and matrix spike duplicate analysis.

#### **Matrix Spike (MS/MSD) Recovery Statement**

The MS/MSD recoveries were within the established acceptance limits.

#### **MS/MSD Relative Percent Difference (RPD) Statement**

The RPD between the MS and MSD met the acceptance limits.

### **Technical Information**

#### **Holding Time Specifications**

GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection of sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

#### **Preparation/Analytical Method Verification**

All samples and QC in this batch were cleaned using alumina in order to remove oil and other high molecular weight interferences. All samples and QC in this batch were cleaned with activated copper in order to remove sulfur. All reported analyte detections in client and quality control samples were within the established retention time windows. Reported analyte concentrations were confirmed on dissimilar columns.

#### **Sample Dilutions**

The samples in this SDG in this batch did not require dilutions.

#### **Sample Re-extraction/Re-analysis**

Re-extractions or re-analyses were not required in this SDG in this batch.

**Miscellaneous Information****Electronic Package Comment**

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

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

**Data Exception (DER) Documentation**

A data exception report (DER) 1467846 was generated for samples 385355008 (B33M96), 1203433744 (B33M96MS) and 1203433745 (B33M96MSD) in this SDG/batch.

**Manual Integrations**

Certain standards and samples may have required manual integration to correctly position the baseline as set in the calibration standard injections. If manual integration was performed, copies of all manual integration peak profiles are included in the raw data section of this PCB fraction.

**Additional Comments**

The lower results from either column have been chosen and reported in the data package for the client samples, MB and LCS. The data reported for the MS and MSD are from the same analytical column as the parent sample.

Due to software issue, the surrogate recovery range was not indicated or possibly indicated incorrectly in Quantitation Report. Please see Surrogate Recovery Report for correct surrogate acceptance limits.

Aroclors quantitated on the raw data report by ChemStation data system do not necessarily represent positive Aroclor identification. In order for positive identification to be made, the Aroclor must match in pattern and retention time; as well as quantitate relatively close between the primary and confirmation columns, as specified in SW846 method 8000. When these conditions are not met, the Aroclor is reported as a non-detect on the data report.

**System Configuration**

The Semi-Volatiles-PCB analysis was performed on the following instrument configuration:

<b>Instrument ID</b>	<b>Instrument</b>	<b>System Configuration</b>	<b>Column ID</b>	<b>Column Description</b>
ECD8A.I_1	Agilent 6890 Gas Chromatograph/Dual ECD w/ 7683 Autosampler	HP6890 Series ECD	Rtx-CLP I	30m x 0.25mm, 0.25um (Rtx-CLPesticide I)
ECD8A.I_2	Agilent 6890 Gas Chromatograph/Dual ECD w/ 7683 Autosampler	HP6890 Series ECD	Rtx-CLP II	30m x 0.25mm, 0.20um (Rtx-CLPesticide II)

**Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the

requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

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**Qualifier Definition Report  
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL385355 GEL Work Order: 385355

**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.

DL Indicates that sample is diluted.

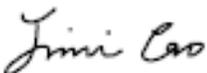
RA Indicates that sample is re-analyzed without re-extraction.

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: Jimin Cao

Date: 23 NOV 2015

Title: Data Validator

# Sample Data Summary

November 25, 2015

Page 1 of 1 REV 1

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL385355	<b>Date Collected:</b> 11/10/2015 13:30	<b>Matrix:</b> SOIL
<b>Lab Sample ID:</b> 385355008	<b>Date Received:</b> 11/12/2015 09:05	<b>%Moisture:</b> 8.3
<b>Client ID:</b> B33M96	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15011
<b>Batch ID:</b> 1523419	<b>Method:</b> SW846 3541/8082A	<b>SOP Ref:</b> GL-OA-E-040
<b>Run Date:</b> 11/17/2015 12:54	<b>Inst:</b> ECD8A.I	<b>Dilution:</b> 1
<b>Prep Date:</b> 11/16/2015 09:10	<b>Analyst:</b> JXM	<b>Inj. Vol:</b> 1 uL
<b>Data File:</b> 111715.B\8k1733.D	<b>Aliquot:</b> 10 g	<b>Final Volume:</b> 1 mL
111715.B\8k1733.D	<b>Column:</b> 1 RTX-CLPEST1	
	2 RTX-CLPEST2	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	Column
12674-11-2	Aroclor-1016	U	3.63	ug/kg	3.63	10.9	1
11104-28-2	Aroclor-1221	U	3.63	ug/kg	3.63	10.9	1
11141-16-5	Aroclor-1232	U	3.63	ug/kg	3.63	10.9	1
53469-21-9	Aroclor-1242	U	3.63	ug/kg	3.63	10.9	1
12672-29-6	Aroclor-1248	U	3.63	ug/kg	3.63	10.9	1
11097-69-1	Aroclor-1254	U	3.63	ug/kg	3.63	10.9	1
11096-82-5	Aroclor-1260	U	3.63	ug/kg	3.63	10.9	1
37324-23-5	Aroclor-1262	U	3.63	ug/kg	3.63	10.9	1
11100-14-4	Aroclor-1268	U	3.63	ug/kg	3.63	10.9	1

# Quality Control Summary

November 25, 2015  
 Surrogate Recovery Report

SDG Number: GEL385355

Matrix Type: SOLID

Sample ID	Client ID	4CMX 1 %REC #	4CMX 2 %REC #	DCB 1 %REC #	DCB 2 %REC #
1203433740	MB for batch 1523417	67	73	72	79
1203433741	LCS for batch 1523417	71	79	85	92
385355008	B33M96	66	71	21 *	21 *
1203433744	B33M96MS	64	70	22 *	23 *
1203433745	B33M96MSD	63	70	22 *	24 *

**Surrogate**

4CMX = 4cmx

DCB = Decachlorobiphenyl

**Acceptance Limits**

(30%-120%)

(32%-139%)

\* Recovery outside Acceptance Limits

# Column to be used to flag recovery values

D Sample Diluted

**November 25, 2015**  
**GEL LABORATORIES LLC**

**REV 1**

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

**QC Summary**

Report Date: November 19, 2015

Page 1 of 2

**CH2MHill Plateau Remediation Company**

**MSIN R3-50 CHPRC**

**PO Box 1600**

**Richland, Washington**

**Contact: Mr. Scot Fitzgerald**

**Workorder: 385355**

<u>Parmname</u>	<u>NOM</u>	<u>Sample</u>	<u>Qual</u>	<u>QC</u>	<u>Units</u>	<u>RPD%</u>	<u>REC%</u>	<u>Range</u>	<u>Anlst</u>	<u>Date</u>	<u>Time</u>
<b>Semi-Volatiles-PCB</b>											
Batch	1523419										
QC1203433741	LCS										
Aroclor-1016	99.8			78.3	ug/kg		78	(48%-93%)	JXM	11/17/15	12:25
Aroclor-1260	99.8			78.3	ug/kg		78	(58%-117%)			
**4cmx	20.0			14.1	ug/kg		71	(30%-120%)			
**Decachlorobiphenyl	20.0			17.0	ug/kg		85	(32%-139%)			
QC1203433740	MB										
Aroclor-1016			U	3.32	ug/kg					11/17/15	12:12
Aroclor-1221			U	3.32	ug/kg						
Aroclor-1232			U	3.32	ug/kg						
Aroclor-1242			U	3.32	ug/kg						
Aroclor-1248			U	3.32	ug/kg						
Aroclor-1254			U	3.32	ug/kg						
Aroclor-1260			U	3.32	ug/kg						
Aroclor-1262			U	3.32	ug/kg						
Aroclor-1268			U	3.32	ug/kg						
**4cmx	19.9			13.3	ug/kg		67	(30%-120%)			
**Decachlorobiphenyl	19.9			14.3	ug/kg		72	(32%-139%)			
QC1203433744	385355008 MS										
Aroclor-1016	109	U	3.63	69.1	ug/kg		63	(23%-121%)		11/17/15	13:08
Aroclor-1260	109	U	3.63	46.5	ug/kg		43	(35%-135%)			
**4cmx	21.8		14.3	14.0	ug/kg		64	(30%-120%)			
**Decachlorobiphenyl	21.8		4.51	4.97	ug/kg		23 *	(32%-139%)			

**QC Summary**

Workorder: 385355

Page 2 of 2

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Semi-Volatiles-PCB</b>											
Batch	1523419										
QC1203433745	385355008	MSD									
Aroclor-1016	109	U	3.63	74.6	ug/kg	8	69	(0%-29%)	JXM	11/17/15	13:23
Aroclor-1260	109	U	3.63	50.0	ug/kg	7	46	(0%-33%)			
**4cmx	21.7		14.3	13.7	ug/kg		63	(30%-120%)			
**Decachlorobiphenyl	21.7		4.51	5.12	ug/kg		24*	(32%-139%)			

**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.

# Miscellaneous

**DATA EXCEPTION REPORT**

<b>Mo.Day Yr.</b> 18-NOV-15	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> GC/ECD	<b>Test / Method:</b> SW846 3541/8082A	<b>Matrix Type:</b> Solid	<b>Client Code:</b> CARE, CPRC
<b>Batch ID:</b> 1523419	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 385279(EUI-10068),385355(GEL385355)</b>			
<b>Application Issues:</b> Failed Yield for Surrogates			
<b>Specification and Requirements Exception Description:</b>		<b>DER Disposition:</b>	
<p>1. Failed Yield for Surrogates:</p> <p>385279 001</p> <p>385355 008</p> <p>QC 1203433744MS,1203433745MSD</p>		<p>1. Sample (See Below) did not meet acceptance criteria for surrogate recovery due to dilution. 385279001 (ECW-19 Composite ES01481,-64) 4cmx [0* (30%-120%)] and Decachlorobiphenyl [0* (32%-139%)].</p> <p>Samples (See Below) failed to meet acceptance criteria for surrogate recovery. Since the the sample and the associated MS/MSD displayed similar surrogate recovery, the failures were attributed to sample matrix interference.</p> <p>1203433744 (B33M96MS) Decachlorobiphenyl [22* (32%-139%)], Decachlorobiphenyl [23* (32%-139%)]. 1203433745 (B33M96MSD) Decachlorobiphenyl [22* (32%-139%)] and Decachlorobiphenyl [24* (32%-139%)]. 385355008 (B33M96) Decachlorobiphenyl [21* (32%-139%)].</p>	

**Originator's Name:**  
James Maestas 18-NOV-15

**Data Validator/Group Leader:**  
Cameron Bearden 19-NOV-15

# Metals Analysis

# Case Narrative

**Metals****Technical Case Narrative****CH2MHill Plateau Remediation Company (CPRC)****SDG #: GEL385355****Work Order #: 385355**

<b>Sample ID</b>	<b>Client ID</b>
385355004	B33M89
385355005	B33M92
385355008	B33M96
1203432560	Method Blank (MB)ICP
1203432561	Laboratory Control Sample (LCS)
1203432564	385355004(B33M89L) Serial Dilution (SD)
1203432562	385355004(B33M89D) Sample Duplicate (DUP)
1203432563	385355004(B33M89S) Matrix Spike (MS)
1203432537	Method Blank (MB)ICP-MS
1203432538	Laboratory Control Sample (LCS)
1203432541	385355004(B33M89L) Serial Dilution (SD)
1203432539	385355004(B33M89D) Sample Duplicate (DUP)
1203432540	385355004(B33M89S) Matrix Spike (MS)
1203433121	Method Blank (MB)CVAA
1203433122	Laboratory Control Sample (LCS)
1203433125	385355004(B33M89L) Serial Dilution (SD)
1203433123	385355004(B33M89D) Sample Duplicate (DUP)
1203433124	385355004(B33M89S) Matrix Spike (MS)

**Sample Analysis**

Samples 385355 004, 005 and 008 in this SDG were analyzed on a "dry weight corrected" basis.

**Method/Analysis Information**

<b>Analytical Batch:</b>	1522952, 1522944 and 1523179
<b>Prep Batch :</b>	1522951, 1522943 and 1523174
<b>Standard Operating Procedures:</b>	GL-MA-E-013 REV# 24, GL-MA-E-009 REV# 26, GL-MA-E-014 REV# 26 and GL-MA-E-010 REV# 31
<b>Analytical Method:</b>	6010_METALS_ICP, 6020_METALS_ICPMS and 7471_HG_CVAA
<b>Prep Method :</b>	SW846 3050B and SW846 7471B Prep

**Preparation/Analytical Method Verification**

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

**System Configuration**

The Metals analysis-ICP was performed on a P E 5300 Optima radial/axial-viewing inductively coupled plasma

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

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

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

The Metals analysis - ICPMS was performed on a PerkinElmer NexION 350X ICPMS. The instrument is equipped with a ESI PFA-ST nebulizer, quadrupole mass spectrometer, dual mode electron multiplier detector, and Kinetic Energy Discrimination (KED) technology. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum.

### **Calibration Information**

#### **Instrument Calibration**

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

#### **CRDL/PQL Requirements**

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

#### **ICSA/ICSAB Statement**

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

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

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

#### **Continuing Calibration Verification (CCV) Requirements**

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

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

#### **Method Blank (MB) Statement**

The method blanks (MB) analyzed with this SDG met the acceptance criteria. However, molybdenum was greater than the MDL. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data. 1203432537 (MB)-ICP-MS. The method blank contained analytes greater than the client RDL, yet were less than GEL's RDL. 1203433121 (MB)-CVAA.

#### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

#### **Quality Control (QC) Sample Statement**

The following samples were selected as the quality control (QC) samples for this SDG: 385355004 (B33M89)-ICP, ICP-MS and CVAA.

#### **Matrix Spike (MS/MSD) Recovery Statement**

The percent recoveries (%R) obtained from the MS/MSD analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The matrix spike met the recommended quality control acceptance criteria for percent recoveries for all applicable analytes.

**Duplicate Relative Percent Difference (RPD) Statement**

The RPD obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required reporting limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control of +/-RL is used to evaluate the DUP results. Not all the applicable analyte RPD values were within the acceptance criteria.

Sample	Analyte	Value
1203432539 (B33M89DUP)	Uranium	22.3* (0%-20%)

**Serial Dilution % Difference Statement**

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

Sample	Analyte	Value
1203432541 (B33M89SDILT)	Barium	11.3 *(0%-10%)
	Copper	10.9 *(0%-10%)

**Technical Information****Holding Time Specifications**

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

**Preparation/Analytical Method Verification**

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

**Sample Dilutions**

Dilutions are performed to minimize matrix interferences resulting from elevated mineral element concentrations present in solid samples and/or to bring over range target analyte concentrations into the linear calibration range of the instrument. Samples were diluted for titanium in order to bring raw values within the linear range of the instrument, and for the analytes interfered with, in order to ensure that the inter-element correction factors were valid for antimony. 385355004 (B33M89), 385355005 (B33M92) and 385355008 (B33M96)-ICP. Samples 385355004 (B33M89), 385355005 (B33M92) and 385355008 (B33M96)-ICP-MS were diluted to ensure that the analyte concentrations were within the linear calibration range of the instrument. The ICPMS solid samples in this SDG were diluted the standard two times. ICP-MS.

Analyte	385355		
	004	005	008
Several	5X 40X 2X 1X	5X 40X 2X 1X	5X 40X 2X 10X 1X

**Preparation Information**

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

**Miscellaneous Information****Electronic Packaging Comment**

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

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

**Data Exception (DER) Documentation**

A Data exception report (DER) was generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) 1469770 was generated for samples 1203432539 (B33M89DUP) and 1203432541 (B33M89SDILT) in this SDG/batch. A data exception report (DER) 1467213 was generated for sample 1203433121 (MB) in this SDG/batch.

**Additional Comments**

Additional comments were not required for this SDG.

**Certification Statement**

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

**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: GEL385355 GEL Work Order: 385355

**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).
- 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.
- M Duplicate precision not met.
- N Spike Sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

**Review/Validation**

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

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

**Signature:****Name: Nik-Cole Elmore****Date: 23 NOV 2015****Title: Data Validator**

# Sample Data Summary

**METALS**  
-1-  
**INORGANICS ANALYSIS DATA PACKAGE**

SDG No: GEL385355

METHOD TYPE: SW846

SAMPLE ID: 385355004

CLIENT ID: B33M89

CONTRACT: CPRC0F15011

MATRIX:SOIL

DATE RECEIVED 12-NOV-15

LEVEL: Low %SOLIDS: 95.8

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7429-90-5	Aluminum	7410000	ug/kg	D		MS	3130	2	ICPMS5	151119-4
7440-36-0	Antimony	1700	ug/kg	UD		P	1700	5	OPTIMA3	111615A-2
7440-38-2	Arsenic	2740	ug/kg	D		MS	209	2	ICPMS5	151119-4
7440-39-3	Barium	84700	ug/kg	D	M	MS	104	2	ICPMS5	151119-4
7440-41-7	Beryllium	279	ug/kg	D		MS	20.9	2	ICPMS7	151120-12
7440-43-9	Cadmium	573	ug/kg	D		MS	20.9	2	ICPMS5	151119-4
7440-47-3	Chromium	7840	ug/kg	D		MS	209	2	ICPMS5	151119-4
7440-48-4	Cobalt	8370	ug/kg	D		MS	62.6	2	ICPMS5	151119-4
7440-50-8	Copper	14000	ug/kg	D	M	MS	68.9	2	ICPMS5	151119-4
7439-92-1	Lead	4580	ug/kg	D		MS	104	2	ICPMS5	151119-4
7439-96-5	Manganese	378000	ug/kg	D		MS	4170	40	ICPMS12	151122-3
7439-97-6	Mercury	12.3	ug/kg	B		AV	4.15	1	HG3	111615S1-13
7439-98-7	Molybdenum	271	ug/kg	CD		MS	62.6	2	ICPMS5	151119-4
7440-02-0	Nickel	9810	ug/kg	D		MS	104	2	ICPMS5	151119-4
7782-49-2	Selenium	344	ug/kg	UD		MS	344	2	ICPMS7	151120-5
7440-22-4	Silver	139	ug/kg	CB		P	103	1	OPTIMA3	111615A-1
7440-61-1	Uranium	473	ug/kg	D	*	MS	13.8	2	ICPMS7	151120-5

## \*Analytical Methods:

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

**METALS**  
-1-  
**INORGANICS ANALYSIS DATA PACKAGE**

SDG No: GEL385355

METHOD TYPE: SW846

SAMPLE ID: 385355005

CLIENT ID: B33M92

CONTRACT: CPRC0F15011

MATRIX:SOIL

DATE RECEIVED 12-NOV-15

LEVEL: Low %SOLIDS: 85

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7429-90-5	Aluminum	7380000	ug/kg	D		MS	3360	2	ICPMS5	151119-4
7440-36-0	Antimony	1820	ug/kg	UD		P	1820	5	OPTIMA3	111615A-2
7440-38-2	Arsenic	3180	ug/kg	D		MS	224	2	ICPMS5	151119-4
7440-39-3	Barium	85300	ug/kg	D	M	MS	112	2	ICPMS5	151119-4
7440-41-7	Beryllium	294	ug/kg	D		MS	22.4	2	ICPMS7	151120-12
7440-43-9	Cadmium	441	ug/kg	D		MS	22.4	2	ICPMS5	151119-4
7440-47-3	Chromium	10900	ug/kg	D		MS	224	2	ICPMS5	151119-4
7440-48-4	Cobalt	7330	ug/kg	D		MS	67.2	2	ICPMS5	151119-4
7440-50-8	Copper	15500	ug/kg	D	M	MS	73.9	2	ICPMS5	151119-4
7439-92-1	Lead	5200	ug/kg	D		MS	112	2	ICPMS5	151119-4
7439-96-5	Manganese	326000	ug/kg	D		MS	4480	40	ICPMS12	151122-3
7439-97-6	Mercury	5.79	ug/kg	B		AV	4.31	1	HG3	111615S1-13
7439-98-7	Molybdenum	501	ug/kg	CD		MS	67.2	2	ICPMS5	151119-4
7440-02-0	Nickel	12300	ug/kg	D		MS	112	2	ICPMS5	151119-4
7782-49-2	Selenium	370	ug/kg	UD		MS	370	2	ICPMS7	151120-5
7440-22-4	Silver	278	ug/kg	CB		P	110	1	OPTIMA3	111615A-1
7440-61-1	Uranium	547	ug/kg	D	*	MS	14.8	2	ICPMS7	151120-5

## \*Analytical Methods:

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

**METALS**  
-1-  
**INORGANICS ANALYSIS DATA PACKAGE**

SDG No: GEL385355

METHOD TYPE: SW846

SAMPLE ID: 385355008

CLIENT ID: B33M96

CONTRACT: CPRC0F15011

MATRIX:SOIL

DATE RECEIVED 12-NOV-15

LEVEL: Low %SOLIDS: 92.6

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7429-90-5	Aluminum	6830000	ug/kg	D		MS	3150	2	ICPMS5	151119-4
7440-36-0	Antimony	1770	ug/kg	UD		P	1770	5	OPTIMA3	111615A-2
7440-38-2	Arsenic	3420	ug/kg	D		MS	210	2	ICPMS5	151119-4
7440-39-3	Barium	78300	ug/kg	D	M	MS	105	2	ICPMS5	151119-4
7440-41-7	Beryllium	232	ug/kg	BD		MS	105	10	ICPMS7	151120-12
7440-43-9	Cadmium	538	ug/kg	D		MS	21	2	ICPMS5	151119-4
7440-47-3	Chromium	11400	ug/kg	D		MS	210	2	ICPMS5	151119-4
7440-48-4	Cobalt	7630	ug/kg	D		MS	63	2	ICPMS5	151119-4
7440-50-8	Copper	15600	ug/kg	D	M	MS	69.3	2	ICPMS5	151119-4
7439-92-1	Lead	4510	ug/kg	D		MS	105	2	ICPMS5	151119-4
7439-96-5	Manganese	350000	ug/kg	D		MS	4200	40	ICPMS12	151122-3
7439-97-6	Mercury	7.08	ug/kg	B		AV	4.16	1	HG3	111615S1-13
7439-98-7	Molybdenum	399	ug/kg	CD		MS	63	2	ICPMS5	151119-4
7440-02-0	Nickel	11600	ug/kg	D		MS	105	2	ICPMS5	151119-4
7782-49-2	Selenium	347	ug/kg	UD		MS	347	2	ICPMS7	151120-5
7440-22-4	Silver	329	ug/kg	CB		P	107	1	OPTIMA3	111615A-1
7440-61-1	Uranium	536	ug/kg	D	*	MS	13.9	2	ICPMS7	151120-5

## \*Analytical Methods:

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

# Quality Control Summary

**November 25, 2015**  
**GEL LABORATORIES LLC**

**REV 1**

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

**QC Summary**

Report Date: November 23, 2015

Page 1 of 5

**CH2M Hill Plateau Remediation Company**

**MSIN R3-50 CHPRC**

**PO Box 1600**

**Richland, Washington**

**Contact: Mr. Scot Fitzgerald**

**Workorder: 385355**

<b>Parmname</b>	<b>NOM</b>	<b>Sample</b>	<b>Qual</b>	<b>QC</b>	<b>Units</b>	<b>RPD/D%</b>	<b>REC%</b>	<b>Range</b>	<b>Anlst</b>	<b>Date</b>	<b>Time</b>
<b>Metals Analysis - ICPMS</b>											
Batch	1522944										
QC1203432539 385355004 DUP											
Aluminum	D	7410000	D	7320000	ug/kg	1.11		(0%-20%)	BCD1	11/19/15	19:43
Arsenic	D	2740	D	2590	ug/kg	5.39	^	(+/-996)			
Barium	DM	84700	D	89100	ug/kg	5.09		(0%-20%)			
Beryllium	D	279	D	304	ug/kg	8.44	^	(+/-99.6)	SKJ	11/21/15	07:39
Cadmium	D	573	D	605	ug/kg	5.42	^	(+/-199)	BCD1	11/19/15	19:43
Chromium	D	7840	D	8390	ug/kg	6.84		(0%-20%)			
Cobalt	D	8370	D	8210	ug/kg	1.97		(0%-20%)			
Copper	DM	14000	D	14100	ug/kg	0.514		(0%-20%)			
Lead	D	4580	D	4700	ug/kg	2.64		(0%-20%)			
Manganese	D	378000	D	364000	ug/kg	3.99		(0%-20%)	BAJ	11/23/15	09:42
Molybdenum	CD	271	D	280	ug/kg	3.45	^	(+/-199)	BCD1	11/19/15	19:43
Nickel	D	9810	D	10100	ug/kg	2.46		(0%-20%)			
Selenium	DU	ND	DU	ND	ug/kg	N/A			SKJ	11/20/15	16:16
Uranium	*D	473	*D	591	ug/kg	22.3*		(0%-20%)			
QC1203432538 LCS											
Aluminum		190000	D	204000	ug/kg			107 (80%-120%)	BCD1	11/19/15	19:30
Arsenic		4760	D	4630	ug/kg			97.3 (80%-120%)			
Barium		4760	D	4980	ug/kg			105 (80%-120%)			
Beryllium		4760	D	4950	ug/kg			104 (80%-120%)	SKJ	11/21/15	07:34
Cadmium		4760	D	4590	ug/kg			96.5 (80%-120%)	BCD1	11/19/15	19:30

**QC Summary**

Workorder: 385355

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Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1522944										
Chromium	4760		D	5130	ug/kg		108	(80%-120%)			
Cobalt	4760		D	5100	ug/kg		107	(80%-120%)	BCD1	11/19/15	19:30
Copper	4760		D	5060	ug/kg		106	(80%-120%)			
Lead	4760		D	5050	ug/kg		106	(80%-120%)			
Manganese	4760		D	4750	ug/kg		99.8	(80%-120%)	BAJ	11/23/15	09:40
Molybdenum	4760		D	4910	ug/kg		103	(80%-120%)	BCD1	11/19/15	19:30
Nickel	4760		D	5110	ug/kg		107	(80%-120%)			
Selenium	4760		D	4620	ug/kg		97	(80%-120%)	SKJ	11/20/15	16:09
Uranium	4760		D	5130	ug/kg		108	(34%-166%)			
QC1203432537	MB										
Aluminum			DU	ND	ug/kg				BCD1	11/19/15	19:23
Arsenic			DU	ND	ug/kg						
Barium			DU	ND	ug/kg						
Beryllium			DU	ND	ug/kg				SKJ	11/21/15	07:32
Cadmium			DU	ND	ug/kg				BCD1	11/19/15	19:23
Chromium			DU	ND	ug/kg						
Cobalt			DU	ND	ug/kg						
Copper			DU	ND	ug/kg						
Lead			DU	ND	ug/kg						
Manganese			DU	ND	ug/kg				BAJ	11/23/15	09:39
Molybdenum			BD	69.8	ug/kg				BCD1	11/19/15	19:23
Nickel			DU	ND	ug/kg						
Selenium			DU	ND	ug/kg				SKJ	11/20/15	16:07

**QC Summary**

Workorder: 385355

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1522944										
Uranium			DU	ND	ug/kg				SKJ	11/20/15	16:07
QC1203432540	385355004	MS									
Aluminum	206000	D	7410000	D	7380000	ug/kg	N/A	(75%-125%)	BCD1	11/19/15	19:50
Arsenic	5150	D	2740	D	7330	ug/kg	89.1	(75%-125%)			
Barium	5150	DM	84700	D	98100	ug/kg	N/A	(75%-125%)			
Beryllium	5150	D	279	D	5350	ug/kg	98.4	(75%-125%)	SKJ	11/21/15	07:40
Cadmium	5150	D	573	D	5430	ug/kg	94.2	(75%-125%)	BCD1	11/19/15	19:50
Chromium	5150	D	7840	D	12500	ug/kg	90.5	(75%-125%)			
Cobalt	5150	D	8370	D	12600	ug/kg	82.8	(75%-125%)			
Copper	5150	DM	14000	D	19200	ug/kg	101	(75%-125%)			
Lead	5150	D	4580	D	9930	ug/kg	104	(75%-125%)			
Manganese	5150	D	378000	D	347000	ug/kg	N/A	(75%-125%)	BAJ	11/23/15	09:43
Molybdenum	5150	CD	271	D	5290	ug/kg	97.5	(75%-125%)	BCD1	11/19/15	19:50
Nickel	5150	D	9810	D	14300	ug/kg	86.2	(75%-125%)			
Selenium	5150	DU	ND	D	4510	ug/kg	87.4	(75%-125%)	SKJ	11/20/15	16:17
Uranium	5150	*D	473	D	5860	ug/kg	105	(75%-125%)			
QC1203432541	385355004	SDILT									
Aluminum		D	35500	D	7730	ug/L	8.96	(0%-10%)	BCD1	11/19/15	20:03
Arsenic		D	13.1	D	2.69	ug/L	2.65	(0%-10%)			
Barium		DM	406	DM	90.3	ug/L	11.3*	(0%-10%)			
Beryllium		D	1.34	D	0.252	ug/L	5.9	(0%-10%)	SKJ	11/21/15	07:51
Cadmium		D	2.75	D	0.506	ug/L	7.87	(0%-10%)	BCD1	11/19/15	20:03
Chromium		D	37.6	D	8.16	ug/L	8.62	(0%-10%)			

**November 25, 2015**  
**GEL LABORATORIES LLC**

**REV 1**

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

**QC Summary**

**Workorder: 385355**

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<b>Parname</b>	<b>NOM</b>	<b>Sample</b>	<b>Qual</b>	<b>QC</b>	<b>Units</b>	<b>RPD/D%</b>	<b>REC%</b>	<b>Range</b>	<b>Anlst</b>	<b>Date</b>	<b>Time</b>
<b>Metals Analysis - ICPMS</b>											
Batch	1522944										
Cobalt	D	40.1	D	8.62	ug/L	7.36		(0%-10%)	BCD1	11/19/15	20:03
Copper	DM	67.1	DM	14.9	ug/L	10.9*		(0%-10%)			
Lead	D	22.0	D	4.64	ug/L	5.56		(0%-10%)			
Manganese	D	90.6	D	16.9	ug/L	6.94		(0%-10%)	BAJ	11/23/15	09:47
Molybdenum	CD	1.30	DU	ND	ug/L	N/A		(0%-10%)	BCD1	11/19/15	20:03
Nickel	D	47.0	D	10.2	ug/L	8.28		(0%-10%)			
Selenium	DU	ND	DU	ND	ug/L	N/A		(0%-10%)	SKJ	11/20/15	16:35
Uranium	*D	2.27	D	0.430	ug/L	5.08		(0%-10%)			
<b>Metals Analysis-ICP</b>											
Batch	1522952										
QC1203432562	385355004 DUP										
Antimony	DU	ND	DU	ND	ug/kg	N/A			HSC	11/16/15	13:34
Silver	BC	139	B	202	ug/kg	36.4 ^		(+/-515)		11/16/15	09:21
QC1203432561	LCS										
Antimony		48700		46400	ug/kg		95.1	(80%-120%)		11/16/15	13:21
Silver		48700		50500	ug/kg		104	(80%-120%)		11/16/15	09:07
QC1203432560	MB										
Antimony			U	ND	ug/kg					11/16/15	13:18
Silver			B	98.5	ug/kg					11/16/15	09:04
QC1203432563	385355004 MS										
Antimony	51300	DU	ND	D	45400	ug/kg		85.9	(75%-125%)	11/16/15	13:37
Silver	51300	BC	139		52300	ug/kg		102	(75%-125%)	11/16/15	09:24
QC1203432564	385355004 SDILT										
Antimony	DU	ND	DU	ND	ug/L	N/A		(0%-10%)		11/16/15	13:43
Silver	BC	1.35	DU	ND	ug/L	N/A		(0%-10%)		11/16/15	09:28

**QC Summary**

Workorder: 385355

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Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-Mercury</b>											
Batch	1523179										
QC1203433123	385355004	DUP									
Mercury		B	12.3	B	8.50	ug/kg	36.4 ^	(+/-12.5)	MTM1	11/16/15	12:23
QC1203433122	LCS										
Mercury	118				118	ug/kg		(80%-120%)		11/16/15	12:02
QC1203433121	MB										
Mercury				U	ND	ug/kg				11/16/15	12:01
QC1203433124	385355004	MS									
Mercury	123	B	12.3		134	ug/kg		(80%-120%)		11/16/15	12:24
QC1203433125	385355004	SDILT									
Mercury		B	0.198	DU	ND	ug/L	N/A	(0%-10%)		11/16/15	12:26

**Notes:**

The Qualifiers in this report are defined as follows:

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

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.  
 ^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

\* Indicates that a Quality Control parameter was not within specifications.  
 For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

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

# Miscellaneous

**DATA EXCEPTION REPORT**

<b>Mo.Day Yr.</b> 16-NOV-15	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> MERCURY	<b>Test / Method:</b> SW846 7471A, SW846 7471B	<b>Matrix Type:</b> Solid	<b>Client Code:</b> BRKL, CPRC, LLNL
<b>Batch ID:</b> 1523179	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 385223(37053),385255(37055),385336,385339,385355(GEL385355),385369</b>			
<b>Application Issues:</b> Method Blank contamination			
<b>Specification and Requirements Exception Description:</b>		<b>DER Disposition:</b>	
1. Method Blank contamination:  QC 1203433121MB		1. The method blank contained analytes greater than the client RDL, yet were less than GEL's RDL.	

**Originator's Name:**  
Monifa Basdeo 16-NOV-15

**Data Validator/Group Leader:**  
Alan Stanley 16-NOV-15

**DATA EXCEPTION REPORT**

<b>Mo.Day Yr.</b> 23-NOV-15	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> ICP/MS	<b>Test / Method:</b> SW846 3050B/6020A	<b>Matrix Type:</b> Solid	<b>Client Code:</b> CPRC
<b>Batch ID:</b> 1522944	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 385355(GEL385355)</b>			
<b>Application Issues:</b> Failed RPD for DUP Failed difference for SDILT			
<b>Specification and Requirements Exception Description:</b>		<b>DER Disposition:</b>	
<p>1. Failed RPD for DUP: QC 1203432539DUP</p> <p>2. Failed difference for SDILT: QC 1203432541SDILT</p>		<p>1. Not all the applicable analyte RPD values were within the acceptance criteria. 1203432539 (B33M89DUP) Uranium [22.3* (0%-20%)].</p> <p>2. Not all the applicable analytes were within the established acceptance criteria. Matrix suppression may be suspected. The data has been qualified. 1203432541 (B33M89SDILT) Barium [11.3 *(0%-10%)] and Copper [10.9 *(0%-10%)].</p>	

**Originator's Name:**  
Samantha Jacobs 23-NOV-15

**Data Validator/Group Leader:**  
Paul Boyd 23-NOV-15

# General Chem Analysis

# Case Narrative

**General Chemistry  
Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL385355  
Work Order #: 385355**

**Method/Analysis Information**

<b>Product:</b>	<b>Cyanide and Total</b>		
<b>Analytical Batch:</b>	1522931	<b>Method:</b>	9010_CYANIDE: COMMON
<b>Prep Batch :</b>	1522926	<b>Method:</b>	SW846 9010C Distillation

**Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
385355004	B33M89
385355005	B33M92
385355008	B33M96
1203432505	Method Blank (MB)
1203432506	Laboratory Control Sample (LCS)
1203432508	385355004(B33M89) Sample Duplicate (DUP)
1203432510	385355004(B33M89) Matrix Spike (MS)

Samples 385355 004, 005 and 008 in this SDG were analyzed on a "dry weight corrected" basis.

**SOP Reference**

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

**Preparation/Analytical Method Verification**

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

**Calibration Information**

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

**Initial Calibration**

All initial calibration requirements have been met for this SDG.

**Y Intercept Rule**

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

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

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 385355004 (B33M89) was selected for QC analysis.

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

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

**Duplicate Relative Percent Difference (RPD) Statement**

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The following sample was diluted because target analyte concentrations exceeded the calibration range. 1203432506 (LCS).

**Sample Re-analysis**

Sample 1203432510 (B33M89MS) was re-analyzed due to instrument failure. The results from the reanalysis are reported.

**Miscellaneous Information****Data Exception (DER) Documentation**

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

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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

**Method/Analysis Information**

<b>Product:</b>	<b>Ion Chromatography</b>		
<b>Analytical Batch:</b>	1523089	<b>Method:</b>	9056_ANIONS_IC:COMMON + (Add-on)
<b>Prep Batch :</b>	1523088	<b>Method:</b>	SW846 9056A

**Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
385355001	B33M90
385355002	B33M93
385355003	B33M97
1203432870	Method Blank (MB)
1203432871	Laboratory Control Sample (LCS)
1203432872	385355001(B33M90) Sample Duplicate (DUP)
1203432875	385355001(B33M90) Matrix Spike (MS)

Samples 385355 001, 002 and 003 in this SDG were analyzed on a "dry weight corrected" basis.

**SOP Reference**

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

**Preparation/Analytical Method Verification**

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

**Calibration Information**

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

**Initial Calibration**

All initial calibration requirements have been met for this SDG.

**Continuing Calibration Blanks**

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

**Calibration Verification Information (CCV)**

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

**Y Intercept Rule**

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

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

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 385355001 (B33M90) was selected for QC analysis.

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

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

**Duplicate Relative Percent Difference (RPD) Statement**

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

**Miscellaneous Information****Data Exception (DER) Documentation**

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

**Manual Integrations**

Samples 385355002 (B33M93) and 385355003 (B33M97) were manually integrated to correctly position the baseline as set in the calibration standards.

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages

electronically. The following change from traditional packages should be noted:

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

**Method/Analysis Information**

<b>Product:</b>	<b>Ammonia Nitrogen</b>		
<b>Analytical Batch:</b>	1523634	<b>Method:</b>	350.1_AMMONIA: COMMON
<b>Prep Batch :</b>	1523633	<b>Method:</b>	EPA 350.2 Modified Prep

**Sample Analysis**

The following samples were analyzed using the analytical protocol as established in EPA 350.1 Modified:

<b>Sample ID</b>	<b>Client ID</b>
385355008	B33M96
1203434287	Method Blank (MB)
1203434288	Laboratory Control Sample (LCS)
1203434289	385355008(B33M96) Sample Duplicate (DUP)
1203434290	385355008(B33M96) Matrix Spike (MS)

Sample 385355 008 in this SDG was analyzed on a "dry weight corrected" basis.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-106 REV# 9.

**Preparation/Analytical Method Verification**

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

**Calibration Information**

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

**Initial Calibration**

All initial calibration requirements have been met for this SDG.

**Calibration Verification Information**

All associated calibration verification standard(s) (ICV or CCV) met the acceptance criteria.

**Continuing Calibration Blanks**

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

**Calibration Verification Information (CCV)**

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

**Y Intercept Rule**

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

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

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 385355008 (B33M96) was selected for QC analysis.

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

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

Analyte	Sample	Value
Nitrogen, Ammonia	1203434290 (B33M96MS)	113* (90%-110%)

**Duplicate Relative Percent Difference (RPD) Statement**

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

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

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

**Miscellaneous Information****Data Exception (DER) Documentation**

A data exception report (DER) 1468688 was generated for sample 1203434290 (B33M96MS) in this SDG/batch.

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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

**Method/Analysis Information**

<b>Product:</b>	<b>Hexavalent Chromium</b>		
<b>Analytical Batch:</b>	1524055	<b>Method:</b>	7196_CR6: COMMON
<b>Prep Batch :</b>	1524053	<b>Method:</b>	SW846 3060A

**Sample Analysis**

The following samples were analyzed using the analytical protocol as established in 7196\_CR6 :

<b>Sample ID</b>	<b>Client ID</b>
385355008	B33M96
1203435362	Method Blank (MB)
1203435363	Laboratory Control Sample (LCS)
1203435365	385355008(B33M96) Sample Duplicate (DUP)
1203435367	385355008(B33M96) Matrix Spike (MS)
1203435369	385355008(B33M96) Matrix Spike Duplicate (MSD)
1203435364	Insoluble Lab Control Sample (ILCS)

Sample 385355 008 in this SDG was analyzed on a "dry weight corrected" basis.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-044 REV# 21.

**Preparation/Analytical Method Verification**

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

**Calibration Information**

The Spectrometric analysis was performed on a Spectronic 20D+ Digital Spectrophotometer.

**Initial Calibration**

All initial calibration requirements have been met for this SDG.

**Continuing Calibration Blanks**

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

**Calibration Verification Information (CCV)**

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

**Y Intercept Rule**

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

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

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 385355008 (B33M96) was selected for QC analysis.

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

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

**MS/MSD Relative Percent Difference (RPD) Statement**

The RPD between the spike and spike duplicate met the acceptance limits.

**Duplicate Relative Percent Difference (RPD) Statement**

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

**Miscellaneous Information****Data Exception (DER) Documentation**

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

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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

**Certification Statement**

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

**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: GEL385355 GEL Work Order: 385355

**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).
- 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.

**Review/Validation**

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

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

**Signature:** 

**Name:** Thomas Lewis

**Date:** 23 NOV 2015

**Title:** Data Validator

# Sample Data Summary

## Certificate of Analysis

Report Date: November 23, 2015

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

Client Sample ID: B33M90	Project: CPRC0F15011
Sample ID: 385355001	Client ID: CPRC001
Matrix: SOIL	
Collect Date: 10-NOV-15 12:27	
Receive Date: 12-NOV-15	
Collector: Client	
Moisture: 3.56%	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Ion Chromatography</b>											
<b>9056_ANIONS_IC:COMMON + (Add-on) "Dry Weight Corrected"</b>											
Chloride		3910	690	2060	ug/Kg	1	MXL2	11/13/15	1116	1523089	1
Fluoride		1070	340	1030	ug/Kg	1					
Nitrate-N		3180	340	1030	ug/Kg	1					
Nitrite-N	U	340	340	1030	ug/Kg	1					
Phosphorus in phosphate	B	991	690	2060	ug/Kg	1					
Sulfate		4980	1370	4120	ug/Kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 9056A	SW846 9056A Total Anions in Soil	MXL2	11/12/15	1943	1523088

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9056A	

**Notes:**

## Certificate of Analysis

Report Date: November 23, 2015

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

Client Sample ID: B33M93	Project: CPRC0F15011
Sample ID: 385355002	Client ID: CPRC001
Matrix: SOIL	
Collect Date: 10-NOV-15 12:45	
Receive Date: 12-NOV-15	
Collector: Client	
Moisture: 15.1%	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Ion Chromatography</b>											
<b>9056_ANIONS_IC:COMMON + (Add-on) "Dry Weight Corrected"</b>											
Chloride		3170	777	2320	ug/Kg	1	MXL2	11/13/15	1255	1523089	1
Fluoride		1410	383	1160	ug/Kg	1					
Nitrate-N		5450	383	1160	ug/Kg	1					
Nitrite-N	U	383	383	1160	ug/Kg	1					
Phosphorus in phosphate	U	777	777	2320	ug/Kg	1					
Sulfate		7010	1540	4640	ug/Kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 9056A	SW846 9056A Total Anions in Soil	MXL2	11/12/15	1943	1523088

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9056A	

**Notes:**

## Certificate of Analysis

Report Date: November 23, 2015

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

Client Sample ID: B33M97	Project: CPRC0F15011
Sample ID: 385355003	Client ID: CPRC001
Matrix: SOIL	
Collect Date: 10-NOV-15 13:30	
Receive Date: 12-NOV-15	
Collector: Client	
Moisture: 3.77%	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Ion Chromatography</b>											
<b>9056_ANIONS_IC:COMMON + (Add-on) "Dry Weight Corrected"</b>											
Chloride	B	1220	686	2050	ug/Kg	1	MXL2	11/13/15	1327	1523089	1
Fluoride		1260	338	1020	ug/Kg	1					
Nitrate-N		1140	338	1020	ug/Kg	1					
Nitrite-N	U	338	338	1020	ug/Kg	1					
Phosphorus in phosphate	U	686	686	2050	ug/Kg	1					
Sulfate	B	3720	1360	4100	ug/Kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 9056A	SW846 9056A Total Anions in Soil	MXL2	11/12/15	1943	1523088

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9056A	

**Notes:**

## Certificate of Analysis

Report Date: November 23, 2015

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

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Client Sample ID: B33M89	Project: CPRC0F15011
Sample ID: 385355004	Client ID: CPRC001
Matrix: SOIL	
Collect Date: 10-NOV-15 12:27	
Receive Date: 12-NOV-15	
Collector: Client	
Moisture: 4.15%	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Flow Injection Analysis											
9010_CYANIDE: COMMON "Dry Weight Corrected"											
Cyanide, Total	U	54.4	54.4	163	ug/kg	1	AXH3	11/18/15	1050	1522931	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 9010C Distillation	SW846 9010C Prep	AXH3	11/17/15	1246	1522926

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9012B	

**Notes:**

## Certificate of Analysis

Report Date: November 23, 2015

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

---

Client Sample ID: B33M92	Project: CPRC0F15011
Sample ID: 385355005	Client ID: CPRC001
Matrix: SOIL	
Collect Date: 10-NOV-15 12:45	
Receive Date: 12-NOV-15	
Collector: Client	
Moisture: 13%	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Flow Injection Analysis											
9010_CYANIDE: COMMON "Dry Weight Corrected"											
Cyanide, Total	U	90.5	90.5	271	ug/kg	1	AXH3	11/18/15	1053	1522931	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 9010C Distillation	SW846 9010C Prep	AXH3	11/17/15	1246	1522926

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9012B	

**Notes:**

## Certificate of Analysis

Report Date: November 23, 2015

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

Client Sample ID: B33M96	Project: CPRC0F15011
Sample ID: 385355008	Client ID: CPRC001
Matrix: SOIL	
Collect Date: 10-NOV-15 13:30	
Receive Date: 12-NOV-15	
Collector: Client	
Moisture: 8.31%	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Flow Injection Analysis</b>											
9010_CYANIDE: COMMON "Dry Weight Corrected"											
Cyanide, Total	U	91.1	91.1	273	ug/kg	1	AXH3	11/18/15	1054	1522931	1
<b>Nutrient Analysis</b>											
350.1_AMMONIA: COMMON "Dry Weight Corrected"											
Nitrogen, Ammonia	CN	6400	891	2620	ug/Kg	1	KLP1	11/19/15	1255	1523634	2
<b>Spectrometric Analysis</b>											
7196_CR6: COMMON "Dry Weight Corrected"											
Hexavalent Chromium	B	149	130	432	ug/Kg	1	SXC5	11/19/15	1352	1524055	3

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	11/19/15	1105	1523633
SW846 3060A	SW846_7196A Hexavalent Chromium in Soil	SXC5	11/18/15	1109	1524053
SW846 9010C Distillation	SW846 9010C Prep	AXH3	11/17/15	1246	1522926

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	SW846 9012B		
2	EPA 350.1 Modified		
3	7196_CR6		

**Notes:**

# Quality Control Summary

**November 25, 2015**  
**GEL LABORATORIES LLC**

**REV 1**

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

**QC Summary**

Report Date: November 23, 2015

Page 1 of 3

**CH2MHill Plateau Remediation Company**

**MSIN R3-50 CHPRC**

**PO Box 1600**

**Richland, Washington**

**Contact: Mr. Scot Fitzgerald**

**Workorder: 385355**

<u>Parmname</u>	<u>NOM</u>	<u>Sample</u>	<u>Qual</u>	<u>QC</u>	<u>Units</u>	<u>RPD%</u>	<u>REC%</u>	<u>Range</u>	<u>Anlst</u>	<u>Date</u>	<u>Time</u>
<b>Flow Injection Analysis</b>											
Batch	1522931										
QC1203432508	385355004	DUP									
Cyanide, Total		U	54.4	U	83.8	ug/kg	N/A		AXH3	11/18/15	10:51
QC1203432506	LCS										
Cyanide, Total	90600			D	87900	ug/kg	97	(64%-149%)		11/18/15	10:24
QC1203432505	MB										
Cyanide, Total				U	83.5	ug/kg				11/18/15	10:23
QC1203432510	385355004	MS									
Cyanide, Total	4420	U	54.4		4950	ug/kg	112	(47%-133%)		11/18/15	11:02
<b>Ion Chromatography</b>											
Batch	1523089										
QC1203432872	385355001	DUP									
Chloride			3910		3930	ug/Kg	0.301	^	(+/-2060)	MXL2	11/13/15 11:49
Fluoride			1070		1070	ug/Kg	0.232	^	(+/-1030)		
Nitrate-N			3180		3210	ug/Kg	0.829	^	(+/-1030)		
Nitrite-N		U	340	U	340	ug/Kg	N/A				
Phosphorus in phosphate		B	991	B	872	ug/Kg	12.8	^	(+/-2060)		
Sulfate			4980		4980	ug/Kg	0.0618	^	(+/-4130)		
QC1203432871	LCS										
Chloride	50000				46000	ug/Kg	92	(70%-130%)		11/13/15	10:43
Fluoride	25000				23600	ug/Kg	94.3	(70%-130%)			
Nitrate-N	25000				23300	ug/Kg	93.1	(70%-130%)			
Nitrite-N	25000				23300	ug/Kg	93.3	(70%-130%)			
Phosphorus in phosphate	12500				12600	ug/Kg	101	(70%-130%)			
Sulfate	100000				94400	ug/Kg	94.4	(70%-130%)			
QC1203432870	MB										

**QC Summary**

Workorder: 385355

Page 2 of 3

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1523089										
Chloride			U	670	ug/Kg					11/13/15	10:10
Fluoride			U	330	ug/Kg				MXL2		
Nitrate-N			U	330	ug/Kg						
Nitrite-N			U	330	ug/Kg						
Phosphorus in phosphate			U	670	ug/Kg						
Sulfate			U	1330	ug/Kg						
QC1203432875 385355001 MS											
Chloride	51700	3910		53000	ug/Kg		94.9	(48%-145%)		11/13/15	12:22
Fluoride	25900	1070		25100	ug/Kg		93.1	(30%-135%)			
Nitrate-N	25900	3180		28000	ug/Kg		95.9	(70%-125%)			
Nitrite-N	25900	U 340		25300	ug/Kg		97.9	(70%-120%)			
Phosphorus in phosphate	12900	B 991		12000	ug/Kg		84.9	(35%-134%)			
Sulfate	103000	4980		106000	ug/Kg		98	(45%-162%)			
<b>Nutrient Analysis</b>											
Batch	1523634										
QC1203434289 385355008 DUP											
Nitrogen, Ammonia		CN 6400		8450	ug/Kg	27.7 ^		(+/-2730)	KLP1	11/19/15	12:56
QC1203434288 LCS											
Nitrogen, Ammonia	50000			54000	ug/Kg		108	(90%-110%)		11/19/15	12:55
QC1203434287 MB											
Nitrogen, Ammonia			B	1730	ug/Kg					11/19/15	12:54
QC1203434290 385355008 MS											
Nitrogen, Ammonia	54500	CN 6400	N	68200	ug/Kg		113 *	(90%-110%)		11/19/15	12:57
<b>Spectrometric Analysis</b>											
Batch	1524055										
QC1203435365 385355008 DUP											
Hexavalent Chromium		B 149	U	131	ug/Kg	44.6 ^		(+/-435)	SXC5	11/19/15	13:53
QC1203435364 ILCS											
Hexavalent Chromium	7940			6660	ug/Kg		83.9	(80%-120%)		11/19/15	13:49

**QC Summary**

Workorder: 385355

Page 3 of 3

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Spectrometric Analysis</b>											
Batch	1524055										
QC1203435363	LCS										
Hexavalent Chromium	3980			4040	ug/Kg		102	(80%-120%)	SXC5	11/19/15	13:49
QC1203435362	MB										
Hexavalent Chromium			U	120	ug/Kg					11/19/15	13:49
QC1203435367	385355008	MS									
Hexavalent Chromium	4320	B	149	4880	ug/Kg		110	(75%-125%)		11/19/15	13:54
QC1203435369	385355008	MSD									
Hexavalent Chromium	4360	B	149	4880	ug/Kg	0.109	108	(0%-30%)		11/19/15	13:55

**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.

# Miscellaneous

**DATA EXCEPTION REPORT**

<b>Mo.Day Yr.</b> 19-NOV-15	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> LACHAT Flow Injection Analyzer	<b>Test / Method:</b> EPA 350.1 Modified	<b>Matrix Type:</b> Solid	<b>Client Code:</b> CPRC
<b>Batch ID:</b> 1523634	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 385355(GEL385355)</b>			
<b>Application Issues:</b> Failed Recovery for MS/MSD, or PS/PSD			
<b>Specification and Requirements Exception Description:</b>		<b>DER Disposition:</b>	
<p>1. Failed Recovery for MS/MSD, or PS/PSD:</p> <p>QC 1203434290MS</p>		<p>1. The matrix spike recovered outside of the established acceptance limits due to matrix interference and/or non-homogeneity. Nitrogen, Ammonia 1203434290 (B33M96MS) [113* (90%-110%)].</p>	

**Originator's Name:**  
Kristen Mizzell 19-NOV-15

**Data Validator/Group Leader:**  
Aubrey Kingsbury 19-NOV-15

# Radiological Analysis

Radiochemistry  
Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL385355  
Work Order #: 385355

**Method/Analysis Information**

**Product:** AMCMISO\_EIE\_PRECIP\_AEA: COMMON  
Analytical Method: AMCMISO\_EIE\_PREC\_AEA  
Prep Method: Dry Soil Prep  
Analytical Batch Number: 1523268  
Prep Batch Number: 1522900

Sample ID	Client ID
385355004	B33M89
385355005	B33M92
385355008	B33M96
1203433375	Method Blank (MB)
1203433377	Laboratory Control Sample (LCS)
1203433376	385355004(B33M89) Sample Duplicate (DUP)

Samples 385355 004, 005 and 008 in this SDG were analyzed on a "dry weight corrected" basis.

**SOP Reference**

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

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

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

**Sample Geometry**

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

**Quality Control (QC) Information:**

**Blank Information**

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

**QC Information**

All of the QC samples met the required acceptance limits.

**Designated QC**

The following sample was used for QC: 385355004 (B33M89).

**Technical Information:**

**Holding Time**

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

**Sample Re-prep/Re-analysis**

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

**Recounts**

The laboratory control sample, 1203433377 (LCS), was recounted due to a low spiked recovery and then again due to a peak shift. The third count is reported.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**

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

**Manual Integration**

No manual integrations were performed on data in this batch.

**Sample-Specific MDA/MDC**

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

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

<b>Product:</b>	<b>NP237_IE_PRECIP_AEA: COMMON</b>
Analytical Method:	ASTM C 1476-00 Modified
Prep Method:	Dry Soil Prep
Analytical Batch Number:	1523269
Prep Batch Number:	1522900

<b>Sample ID</b>	<b>Client ID</b>
385355004	B33M89

385355005	B33M92
385355008	B33M96
1203433378	Method Blank (MB)
1203433380	Laboratory Control Sample (LCS)
1203433379	385355004(B33M89) Sample Duplicate (DUP)

Samples 385355 004, 005 and 008 in this SDG were analyzed on a "dry weight corrected" basis.

#### **SOP Reference**

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

#### **Calibration Information:**

##### **Calibration Information**

All initial and continuing calibration requirements have been met.

##### **Standards Information**

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

##### **Sample Geometry**

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

#### **Quality Control (QC) Information:**

##### **Blank Information**

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

##### **QC Information**

All of the QC samples met the required acceptance limits.

##### **Designated QC**

The following sample was used for QC: 385355004 (B33M89).

#### **Technical Information:**

##### **Holding Time**

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

##### **Sample Re-prep/Re-analysis**

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

##### **Recounts**

None of the samples in this sample set were recounted.

#### **Miscellaneous Information:**

##### **Data Exception (DER) Documentation**

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

##### **Manual Integration**

No manual integrations were performed on data in this batch.

**Sample-Specific MDA/MDC**

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

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** PUIISO\_PRECIP\_AEA:COMMON  
**Analytical Method:** PUIISO\_PLATE\_AEA  
**Prep Method:** Dry Soil Prep  
**Analytical Batch Number:** 1523270  
**Prep Batch Number:** 1522900

<b>Sample ID</b>	<b>Client ID</b>
385355004	B33M89
385355005	B33M92
385355008	B33M96
1203433381	Method Blank (MB)
1203433383	Laboratory Control Sample (LCS)
1203433382	385355004(B33M89) Sample Duplicate (DUP)

Samples 385355 004, 005 and 008 in this SDG were analyzed on a "dry weight corrected" basis.

**SOP Reference**

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

**Calibration Information:****Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

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

**Sample Geometry**

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

**Quality Control (QC) Information:****Blank Information**

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

**QC Information**

All of the QC samples met the required acceptance limits.

**Designated QC**

The following sample was used for QC: 385355004 (B33M89).

**Technical Information:****Holding Time**

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

**Sample Re-prep/Re-analysis**

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

**Recounts**

None of the samples in this sample set were recounted.

**Miscellaneous Information:****Data Exception (DER) Documentation**

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

**Manual Integration**

No manual integrations were performed on data in this batch.

**Sample-Specific MDA/MDC**

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

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

<b>Product:</b>	<b>UIISO_IE_PRECIP_AEA:COMMON</b>
Analytical Method:	UIISO_IE_PRECIP_AEA
Prep Method:	Dry Soil Prep
Analytical Batch Number:	1523271
Prep Batch Number:	1522900

<b>Sample ID</b>	<b>Client ID</b>
385355004	B33M89
385355005	B33M92
385355008	B33M96
1203433384	Method Blank (MB)
1203433386	Laboratory Control Sample (LCS)
1203433385	385355004(B33M89) Sample Duplicate (DUP)

Samples 385355 004, 005 and 008 in this SDG were analyzed on a "dry weight corrected" basis.

#### **SOP Reference**

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

#### **Calibration Information:**

##### **Calibration Information**

All initial and continuing calibration requirements have been met.

##### **Standards Information**

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

##### **Sample Geometry**

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

#### **Quality Control (QC) Information:**

##### **Blank Information**

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

##### **QC Information**

All of the QC samples met the required acceptance limits.

##### **Designated QC**

The following sample was used for QC: 385355004 (B33M89).

#### **Technical Information:**

##### **Holding Time**

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

##### **Sample Re-prep/Re-analysis**

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

##### **Recounts**

None of the samples in this sample set were recounted.

#### **Miscellaneous Information:**

##### **Data Exception (DER) Documentation**

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

**Manual Integration**

No manual integrations were performed on data in this batch.

**Sample-Specific MDA/MDC**

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

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** Dry Weight-Percent Moisture

Analytical Method: Dry Soil Prep

Analytical Batch Number: 1522900

<b>Sample ID</b>	<b>Client ID</b>
385355004	B33M89
385355005	B33M92
385355008	B33M96
1203432453	385355004(B33M89) Sample Duplicate (DUP)

Samples 385355 004, 005 and 008 in this SDG were analyzed on an "as received" basis.

**SOP Reference**

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

**Calibration Information:****Quality Control (QC) Information:****Designated QC**

The following sample was used for QC: 385355004 (B33M89).

**Technical Information:****Holding Time**

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

**Miscellaneous Information:****Data Exception (DER) Documentation**

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

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Procedure: Dry Weight-Percent Moisture**

Analytical Method: ASTM D 2216 (Modified)

Analytical Batch Number: 1522945

<b>Sample ID</b>	<b>Client ID</b>
385355001	B33M90
385355002	B33M93
385355003	B33M97
385355005	B33M92
385355006	B33M95
385355007	B33MB2
385355008	B33M96
1203432570	385355001(B33M90) Sample Duplicate (DUP)

Samples 385355 001, 002, 003, 005, 006, 007 and 008 in this SDG were analyzed on an "as received" basis.

**SOP Reference**

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

**Calibration Information:**

**Quality Control (QC) Information:**

**Designated QC**

The following sample was used for QC: 385355001 (B33M90).

**Technical Information:**

**Holding Time**

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

**Miscellaneous Information:**

**Data Exception (DER) Documentation**

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

#### **Additional Comments**

Additional comments were not required for this sample set.

#### **Qualifier Information**

Manual qualifiers were not required.

#### **Method/Analysis Information**

**Product:** GAMMA\_GS:COMMON  
**Analytical Method:** GAMMA\_GS  
**Prep Method:** Dry Soil Prep  
**Analytical Batch Number:** 1523127  
**Prep Batch Number:** 1522900

<b>Sample ID</b>	<b>Client ID</b>
385355004	B33M89
385355005	B33M92
385355008	B33M96
1203432969	Method Blank (MB)
1203432971	Laboratory Control Sample (LCS)
1203432970	385355004(B33M89) Sample Duplicate (DUP)

Samples 385355 004, 005 and 008 in this SDG were analyzed on a "dry weight corrected" basis.

#### **SOP Reference**

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

#### **Calibration Information:**

##### **Calibration Information**

All initial and continuing calibration requirements have been met.

##### **Standards Information**

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

##### **Sample Geometry**

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

**Quality Control (QC) Information:****Blank Information**

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

**QC Information**

All of the QC samples met the required acceptance limits.

**Designated QC**

The following sample was used for QC: 385355004 (B33M89).

**Technical Information:****Holding Time**

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

**Sample Re-prep/Re-analysis**

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

**Recounts**

None of the samples in this sample set were recounted.

**Miscellaneous Information:****Data Exception (DER) Documentation**

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

**Sample-Specific MDA/MDC**

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

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Qualifier	Reason	Analyte	Sample	Client Sample
X	Data rejected due to interference.	Europium-155	385355008	B33M96

**Method/Analysis Information**

**Product:** I129\_SEP\_LEPS\_GS: COMMON  
**Analytical Method:** DOE EML HASL-300,I-01 Modified  
**Analytical Batch Number:** 1523652

<b>Sample ID</b>	<b>Client ID</b>
385355008	B33M96
1203434362	Method Blank (MB)
1203434365	Laboratory Control Sample (LCS)
1203434363	385355008(B33M96) Sample Duplicate (DUP)
1203434364	385355008(B33M96) Matrix Spike (MS)

Sample 385355 008 in this SDG was analyzed on an "as received" basis.

#### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-006 REV# 21.

#### **Calibration Information:**

##### **Calibration Information**

All initial and continuing calibration requirements have been met.

##### **Standards Information**

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

##### **Sample Geometry**

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

#### **Quality Control (QC) Information:**

##### **Blank Information**

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

##### **QC Information**

All of the QC samples met the required acceptance limits.

##### **Designated QC**

The following sample was used for QC: 385355008 (B33M96).

#### **Technical Information:**

##### **Holding Time**

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

##### **Sample Re-prep/Re-analysis**

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

##### **Recounts**

None of the samples in this sample set were recounted.

#### **Miscellaneous Information:**

##### **Data Exception (DER) Documentation**

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

**Sample-Specific MDA/MDC**

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

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Qualifier	Reason	Analyte	Sample	Client Sample
X	Data rejected due to no valid peak.	Iodine-129	1203434362	MB for batch 1523652

**Method/Analysis Information**

<b>Product:</b>	<b>SRTOT_SEP_PRECIP_GPC: COMMON</b>
Analytical Method:	SRTOT_SEP_PRECIP_GPC
Prep Method:	Dry Soil Prep
Analytical Batch Number:	1523540
Prep Batch Number:	1522900

Sample ID	Client ID
385355004	B33M89
385355005	B33M92
385355008	B33M96
1203433976	Method Blank (MB)
1203433978	Laboratory Control Sample (LCS)
1203433977	385355008(B33M96) Sample Duplicate (DUP)

Samples 385355 004, 005 and 008 in this SDG were analyzed on a "dry weight corrected" basis.

**SOP Reference**

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

**Calibration Information:****Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

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

**Sample Geometry**

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

**Quality Control (QC) Information:****Blank Information**

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

**QC Information**

All of the QC samples meet the required acceptance limits with the following exceptions: The sample and the duplicate, 1203433977 (B33M96DUP) and 385355008 (B33M96), have a relative error ratio greater than 2; however there is no activity being reported in either sample.

**Designated QC**

The following sample was used for QC: 385355008 (B33M96).

**Technical Information:****Holding Time**

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

**Sample Re-prep/Re-analysis**

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

**Chemical Recoveries**

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

**Recounts**

Sample 385355005 (B33M92) was recounted due to results more negative than the three sigma TPU. The second count is reported. Sample 385355004 (B33M89) was recounted to confirm the results. The recount is reported.

**Miscellaneous Information:****Data Exception (DER) Documentation**

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

**Sample-Specific MDA/MDC**

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

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** TC99\_EIE\_LSC: COMMON

Analytical Method: TC99\_EIE\_LSC

Analytical Batch Number: 1522832

<b>Sample ID</b>	<b>Client ID</b>
385355004	B33M89
385355005	B33M92
385355008	B33M96
1203432302	Method Blank (MB)
1203432304	Laboratory Control Sample (LCS)
1203432303	385355004(B33M89) Sample Duplicate (DUP)

Samples 385355 004, 005 and 008 in this SDG were analyzed on an "as received" basis.

#### **SOP Reference**

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

#### **Calibration Information:**

##### **Calibration Information**

All initial and continuing calibration requirements have been met.

##### **Standards Information**

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

##### **Sample Geometry**

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

#### **Quality Control (QC) Information:**

##### **Blank Information**

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

##### **QC Information**

All of the QC samples met the required acceptance limits.

##### **Designated QC**

The following sample was used for QC: 385355004 (B33M89).

#### **Technical Information:**

##### **Holding Time**

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

##### **Sample Re-prep/Re-analysis**

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

##### **Recounts**

None of the samples in this sample set were recounted.

**Miscellaneous Information:****Data Exception (DER) Documentation**

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

**Sample-Specific MDA/MDC**

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

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** C14\_LSC: COMMON

Analytical Method: C14\_LSC

Analytical Batch Number: 1522834

<b>Sample ID</b>	<b>Client ID</b>
385355004	B33M89
385355005	B33M92
385355008	B33M96
1203432305	Method Blank (MB)
1203432308	Laboratory Control Sample (LCS)
1203432306	385355004(B33M89) Sample Duplicate (DUP)
1203432307	385355004(B33M89) Matrix Spike (MS)

Samples 385355 004, 005 and 008 in this SDG were analyzed on an "as received" basis.

**SOP Reference**

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

**Calibration Information:****Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

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

**Sample Geometry**

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

**Quality Control (QC) Information:**

**Blank Information**

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

**QC Information**

All of the QC samples met the required acceptance limits.

**Designated QC**

The following sample was used for QC: 385355004 (B33M89).

**Technical Information:**

**Holding Time**

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

**Sample Re-prep/Re-analysis**

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

**Recounts**

None of the samples in this sample set were recounted.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**

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

**Sample-Specific MDA/MDC**

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

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** TRITIUM\_DIST\_LSC: COMMON

Analytical Method: TRITIUM\_DIST\_LSC

Analytical Batch Number: 1522835

**Sample ID**    **Client ID**  
385355004    B33M89

385355005	B33M92
385355008	B33M96
1203432309	Method Blank (MB)
1203432312	Laboratory Control Sample (LCS)
1203432310	385355004(B33M89) Sample Duplicate (DUP)
1203432311	385355004(B33M89) Matrix Spike (MS)

Samples 385355 004, 005 and 008 in this SDG were analyzed on an "as received" basis.

#### **SOP Reference**

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

#### **Calibration Information:**

##### **Calibration Information**

All initial and continuing calibration requirements have been met.

##### **Standards Information**

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

##### **Sample Geometry**

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

#### **Quality Control (QC) Information:**

##### **Blank Information**

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

##### **QC Information**

All of the QC samples met the required acceptance limits.

##### **Designated QC**

The following sample was used for QC: 385355004 (B33M89).

#### **Technical Information:**

##### **Holding Time**

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

##### **Sample Re-prep/Re-analysis**

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

##### **Recounts**

Samples were recounted due to low recovery. The recounts are reported.

#### **Miscellaneous Information:**

##### **Data Exception (DER) Documentation**

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

##### **Sample-Specific MDA/MDC**

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

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** NI63\_LSC: COMMON

Analytical Method: NI63\_LSC

Prep Method: Dry Soil Prep

Analytical Batch Number: 1525666

Prep Batch Number: 1522900

<b>Sample ID</b>	<b>Client ID</b>
385355004	B33M89
385355005	B33M92
385355008	B33M96
1203439399	Method Blank (MB)
1203439401	Laboratory Control Sample (LCS)
1203439400	385355008(B33M96) Sample Duplicate (DUP)

Samples 385355 004, 005 and 008 in this SDG were analyzed on a "dry weight corrected" basis.

**SOP Reference**

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

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

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

**Sample Geometry**

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

**Quality Control (QC) Information:**

**Blank Information**

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

**QC Information**

All of the QC samples met the required acceptance limits.

**Designated QC**

The following sample was used for QC: 385355008 (B33M96).

**Technical Information:****Holding Time**

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

**Sample Re-prep/Re-analysis**

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

**Recounts**

None of the samples in this sample set were recounted.

**Miscellaneous Information:****Data Exception (DER) Documentation**

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

**Sample-Specific MDA/MDC**

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

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Certification Statement**

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

**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: GEL385355 GEL Work Order: 385355

**The Qualifiers in this report are defined as follows:**

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

X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

**Review/Validation**

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

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

**Signature:**



**Name: Theresa Austin**

**Date: 25 NOV 2015**

**Title: Group Leader**

# Sample Data Summary

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**Certificate of Analysis**

**Sample Summary**

**SDG Number:** GEL385355  
**Lab Sample ID:** 385355001

**Client:** CPRC001  
**Date Collected:** 11/10/2015 12:27  
**Date Received:** 11/12/2015 09:05

**Project:** CPRC0F15011  
**Matrix:** SOIL  
**%Moisture:** 3.6

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**Certificate of Analysis**

**Sample Summary**

**SDG Number:** GEL385355  
**Lab Sample ID:** 385355002

**Client:** CPRC001  
**Date Collected:** 11/10/2015 12:45  
**Date Received:** 11/12/2015 09:05

**Project:** CPRC0F15011  
**Matrix:** SOIL  
**%Moisture:** 15.1

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**Certificate of Analysis  
Sample Summary**

**SDG Number:** GEL385355  
**Lab Sample ID:** 385355003

**Client:** CPRC001  
**Date Collected:** 11/10/2015 13:30  
**Date Received:** 11/12/2015 09:05

**Project:** CPRC0F15011  
**Matrix:** SOIL  
**%Moisture:** 3.8

November 25, 2015

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**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL385355	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15011
<b>Lab Sample ID:</b> 385355004	<b>Date Collected:</b> 11/10/2015 12:27	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 11/12/2015 09:05	<b>%Moisture:</b> 4.2
<b>Client ID:</b> B33M89		<b>Prep Basis:</b> "Dry Weight Corrected"
<b>Batch ID:</b> 1523268	<b>Method:</b> AMCMISO_EIE_PREC_AEA	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 11/18/2015 17:43	<b>Analyst:</b> MXS2	<b>Instrument:</b> 1223
<b>Data File:</b> S0385355004_AM.1A.gcnf	<b>Aliquot:</b> 0.122 g	<b>Count Time:</b> 240 min
<b>Prep Batch:</b> 1523268	<b>Prep Method:</b> DOE EML HASL-300, Am-05	<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 11/17/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	0.0449	pCi/g	+/-0.250	0.250	0.478	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	12.3	17.5	pCi/g	70.1	(15%-125%)

**Comments:**

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

November 25, 2015

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**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL385355	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15011
<b>Lab Sample ID:</b> 385355004	<b>Date Collected:</b> 11/10/2015 12:27	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 11/12/2015 09:05	<b>%Moisture:</b> 4.2
<b>Client ID:</b> B33M89		<b>Prep Basis:</b> "Dry Weight Corrected"
<b>Batch ID:</b> 1523269	<b>Method:</b> ASTM C 1476-00 Modified	<b>SOP Ref:</b> GL-RAD-A-032
<b>Run Date:</b> 11/18/2015 11:06	<b>Analyst:</b> MXS2	<b>Instrument:</b> 1233
<b>Data File:</b> S0385355004_NP.1A.gcnf	<b>Aliquot:</b> 0.111 g	<b>Count Time:</b> 240 min
<b>Prep Batch:</b> 1523269	<b>Prep Method:</b> ASTM C 1476-00 Modified	<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 11/17/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
13994-20-2	Neptunium-237	U	0.0373	pCi/g	+/-0.241	0.241	0.493	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	1750	1760	pCi/g	99.6	(15%-125%)

**Comments:**

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

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**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL385355	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15011
<b>Lab Sample ID:</b> 385355004	<b>Date Collected:</b> 11/10/2015 12:27	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 11/12/2015 09:05	<b>%Moisture:</b> 4.2
<b>Client ID:</b> B33M89		<b>Prep Basis:</b> "Dry Weight Corrected"
<b>Batch ID:</b> 1523270	<b>Method:</b> PUIISO_PLATE_AEA	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 11/19/2015 09:26	<b>Analyst:</b> MXS2	<b>Instrument:</b> 1067
<b>Data File:</b> S0385355004_PU.1A.gcnf	<b>Aliquot:</b> 0.122 g	<b>Count Time:</b> 239.9998 min
<b>Prep Batch:</b> 1523270	<b>Prep Method:</b> DOE EML HASL-300, Pu-11-	<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 11/17/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	0.136	pCi/g	+/-0.266	0.267	0.369	1.00
OER-100-70	Plutonium-239/240	U	0.00308	pCi/g	+/-0.228	0.229	0.508	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	9.95	16.1	pCi/g	61.6	(15%-125%)

**Comments:**

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

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**Certificate of Analysis  
Sample Summary**

SDG Number: GEL385355  
Lab Sample ID: 385355004

Client: CPRC001  
Date Collected: 11/10/2015 12:27  
Date Received: 11/12/2015 09:05

Project: CPRC0F15011  
Matrix: SOIL  
%Moisture: 4.2

Client ID: B33M89  
Batch ID: 1523271  
Run Date: 11/19/2015 09:26  
Data File: S0385355004\_UU.1A.gcnf  
Prep Batch: 1523271  
Prep Date: 11/17/2015 00:00

Method: UIISO\_IE\_PRECIP\_AEA  
Analyst: MXS2  
Aliquot: 0.122 g  
Prep Method: DOE EML HASL-300, U-02-R

Prep Basis: "Dry Weight Corrected"  
SOP Ref: GL-RAD-A-011  
Instrument: 1017  
Count Time: 239.9998 min  
Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
U-233/234 <small>13968-55-3/13966-29-5</small>	Uranium-233/234		1.01	pCi/g	+/-0.513	0.539	0.340	1.00
15117-96-1/13982-7	Uranium-235/236		0.379	pCi/g	+/-0.366	0.371	0.228	1.00
7440-61-1	Uranium-238		0.494	pCi/g	+/-0.386	0.394	0.405	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	13.5	17.3	pCi/g	78.2	(15%-125%)

**Comments:**

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

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**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL385355	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15011
<b>Lab Sample ID:</b> 385355004	<b>Date Collected:</b> 11/10/2015 12:27	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 11/12/2015 09:05	<b>%Moisture:</b> 4.2
<b>Client ID:</b> B33M89		<b>Prep Basis:</b> "Dry Weight Corrected"
<b>Batch ID:</b> 1523540	<b>Method:</b> SRTOT_SEP_PRECIP_GPC	<b>SOP Ref:</b> GL-RAD-A-004
<b>Run Date:</b> 11/19/2015 12:12	<b>Analyst:</b> KSD1	<b>Instrument:</b> PIC3B
<b>Data File:</b> S1523540r1.xls	<b>Aliquot:</b> 0.335 g	<b>Count Time:</b> 60 min
<b>Prep Batch:</b> 1523540	<b>Prep Method:</b> EPA 905.0 Modified/DOE RP5	<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 11/17/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium		2.63	pCi/g	+/-1.07	1.26	1.53	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	8.00	8.10	mg	98.8	(25%-125%)

**Comments:**

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

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Sample Summary**

SDG Number: GEL385355  
 Lab Sample ID: 385355004  
  
 Client ID: B33M89  
 Batch ID: 1523127  
 Run Date: 11/14/2015 08:16  
 Data File: G385355004.CNF;1  
 Prep Batch: 1523127  
 Prep Date: 11/13/2015 00:00

Client: CPRC001  
 Date Collected: 11/10/2015 12:27  
 Date Received: 11/12/2015 09:05  
  
 Method: GAMMA\_GS  
 Analyst: RXF2  
 Aliquot: 159.46 g  
 Prep Method: DOE HASL 300, 4.5.2.3/Ga-01

Project: CPRC0F15011  
 Matrix: SOIL  
 %Moisture: 4.2  
  
 Prep Basis: "Dry Weight Corrected"  
 SOP Ref: GL-RAD-A-013  
 Instrument: GAM15  
 Count Time: 60 min  
 Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137		0.212	pCi/g	+/-0.0866	0.0887	0.0744	0.100
10198-40-0	Cobalt-60	U	0.00833	pCi/g	+/-0.0306	0.0309	0.068	
14683-23-9	Europium-152	U	-0.0506	pCi/g	+/-0.112	0.115	0.198	
15585-10-1	Europium-154	U	0.0511	pCi/g	+/-0.123	0.125	0.259	
14391-16-3	Europium-155	U	0.0419	pCi/g	+/-0.118	0.120	0.230	

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

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

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**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL385355	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15011
<b>Lab Sample ID:</b> 385355004	<b>Date Collected:</b> 11/10/2015 12:27	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 11/12/2015 09:05	<b>%Moisture:</b> 4.2
<b>Client ID:</b> B33M89		<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1522832	<b>Method:</b> TC99_EIE_LSC	<b>SOP Ref:</b> GL-RAD-A-059
<b>Run Date:</b> 11/22/2015 09:28	<b>Analyst:</b> MYM1	<b>Instrument:</b> LSCGOLD
<b>Data File:</b> E1522832.xls	<b>Aliquot:</b> 1.132 g	<b>Count Time:</b> 15 min
<b>Prep Batch:</b> 1522832	<b>Prep Method:</b> DOE EML HASL-300, Tc-02-	
<b>Prep Date:</b> 11/17/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	2.37	pCi/g	+/-2.19	2.21	3.66	15.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	24900	25400	CPM	98.1	(15%-125%)

**Comments:**

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

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Sample Summary**

<b>SDG Number:</b> GEL385355	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15011
<b>Lab Sample ID:</b> 385355004	<b>Date Collected:</b> 11/10/2015 12:27	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 11/12/2015 09:05	<b>%Moisture:</b> 4.2
<b>Client ID:</b> B33M89		<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1522834	<b>Method:</b> C14_LSC	<b>SOP Ref:</b> GL-RAD-A-003
<b>Run Date:</b> 11/20/2015 14:04	<b>Analyst:</b> TXJ1	<b>Instrument:</b> LSCBROWN
<b>Data File:</b> C1522834.xls	<b>Aliquot:</b> 0.5 g	<b>Count Time:</b> 45 min
<b>Prep Batch:</b> 1522834	<b>Prep Method:</b> EPA EERF C-01 Modified	
<b>Prep Date:</b> 11/19/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	-0.207	pCi/g	+/-2.00	2.00	3.45	5.00

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

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

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**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL385355	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15011
<b>Lab Sample ID:</b> 385355004	<b>Date Collected:</b> 11/10/2015 12:27	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 11/12/2015 09:05	<b>%Moisture:</b> 4.2
<b>Client ID:</b> B33M89		<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1522835	<b>Method:</b> TRITIUM_DIST_LSC	<b>SOP Ref:</b> GL-RAD-A-002
<b>Run Date:</b> 11/23/2015 07:40	<b>Analyst:</b> TXJ1	<b>Instrument:</b> LSCYELLOW
<b>Data File:</b> T1522835R3.xls	<b>Aliquot:</b> 1.25 g	<b>Count Time:</b> 15 min
<b>Prep Batch:</b> 1522835	<b>Prep Method:</b> EPA 906.0 Modified	
<b>Prep Date:</b> 11/19/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium	U	-4.9	pCi/g	+/-10.4	10.4	20.4	30.0

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

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

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**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL385355	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15011
<b>Lab Sample ID:</b> 385355004	<b>Date Collected:</b> 11/10/2015 12:27	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 11/12/2015 09:05	<b>%Moisture:</b> 4.2
<b>Client ID:</b> B33M89		<b>Prep Basis:</b> "Dry Weight Corrected"
<b>Batch ID:</b> 1525666	<b>Method:</b> NI63_LSC	<b>SOP Ref:</b> GL-RAD-A-022
<b>Run Date:</b> 11/24/2015 19:30	<b>Analyst:</b> AEA	<b>Instrument:</b> LSCBLUE
<b>Data File:</b> N1525666.xls	<b>Aliquot:</b> 0.282 g	<b>Count Time:</b> 30 min
<b>Prep Batch:</b> 1525666	<b>Prep Method:</b> DOE RESL Ni-1, Modified	<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 11/23/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
NI-63	Nickel-63	U	-0.71	pCi/g	+/-8.86	8.86	15.3	30.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Nickel Carrier	16.7	26.6	mg	62.8	(25%-125%)

**Comments:**

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

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**Certificate of Analysis**

**Sample Summary**

**SDG Number:** GEL385355  
**Lab Sample ID:** 385355004

**Client:** CPRC001  
**Date Collected:** 11/10/2015 12:27  
**Date Received:** 11/12/2015 09:05

**Project:** CPRC0F15011  
**Matrix:** SOIL  
**%Moisture:** 4.2

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**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL385355	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15011
<b>Lab Sample ID:</b> 385355005	<b>Date Collected:</b> 11/10/2015 12:45	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 11/12/2015 09:05	<b>%Moisture:</b> 13
<b>Client ID:</b> B33M92		<b>Prep Basis:</b> "Dry Weight Corrected"
<b>Batch ID:</b> 1523268	<b>Method:</b> AMCMISO_EIE_PREC_AEA	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 11/18/2015 17:43	<b>Analyst:</b> MXS2	<b>Instrument:</b> 1225
<b>Data File:</b> S0385355005_AM.1A.gcnf	<b>Aliquot:</b> 0.116 g	<b>Count Time:</b> 240 min
<b>Prep Batch:</b> 1523268	<b>Prep Method:</b> DOE EML HASL-300, Am-05	<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 11/17/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	-0.0144	pCi/g	+/-0.215	0.216	0.503	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	16.0	18.4	pCi/g	86.9	(15%-125%)

**Comments:**

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

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**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL385355	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15011
<b>Lab Sample ID:</b> 385355005	<b>Date Collected:</b> 11/10/2015 12:45	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 11/12/2015 09:05	<b>%Moisture:</b> 13
<b>Client ID:</b> B33M92		<b>Prep Basis:</b> "Dry Weight Corrected"
<b>Batch ID:</b> 1523269	<b>Method:</b> ASTM C 1476-00 Modified	<b>SOP Ref:</b> GL-RAD-A-032
<b>Run Date:</b> 11/18/2015 11:06	<b>Analyst:</b> MXS2	<b>Instrument:</b> 1234
<b>Data File:</b> S0385355005_NP.1A.gcnf	<b>Aliquot:</b> 0.107 g	<b>Count Time:</b> 240 min
<b>Prep Batch:</b> 1523269	<b>Prep Method:</b> ASTM C 1476-00 Modified	<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 11/17/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
13994-20-2	Neptunium-237	U	0.173	pCi/g	+/-0.275	0.276	0.380	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	1870	1830	pCi/g	102	(15%-125%)

**Comments:**

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

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**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL385355	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15011
<b>Lab Sample ID:</b> 385355005	<b>Date Collected:</b> 11/10/2015 12:45	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 11/12/2015 09:05	<b>%Moisture:</b> 13
<b>Client ID:</b> B33M92		<b>Prep Basis:</b> "Dry Weight Corrected"
<b>Batch ID:</b> 1523270	<b>Method:</b> PUIISO_PLATE_AEA	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 11/19/2015 09:26	<b>Analyst:</b> MXS2	<b>Instrument:</b> 1068
<b>Data File:</b> S0385355005_PU.1A.gcnf	<b>Aliquot:</b> 0.116 g	<b>Count Time:</b> 239.9998 min
<b>Prep Batch:</b> 1523270	<b>Prep Method:</b> DOE EML HASL-300, Pu-11-	<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 11/17/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	0.112	pCi/g	+/-0.296	0.296	0.531	1.00
OER-100-70	Plutonium-239/240	U	0.181	pCi/g	+/-0.288	0.289	0.398	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	13.9	17.0	pCi/g	81.7	(15%-125%)

**Comments:**

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

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**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL385355	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15011
<b>Lab Sample ID:</b> 385355005	<b>Date Collected:</b> 11/10/2015 12:45	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 11/12/2015 09:05	<b>%Moisture:</b> 13
<b>Client ID:</b> B33M92		<b>Prep Basis:</b> "Dry Weight Corrected"
<b>Batch ID:</b> 1523271	<b>Method:</b> UIISO_IE_PRECIP_AEA	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 11/19/2015 09:26	<b>Analyst:</b> MXS2	<b>Instrument:</b> 1020
<b>Data File:</b> S0385355005_UU.1A.gcnf	<b>Aliquot:</b> 0.116 g	<b>Count Time:</b> 239.9998 min
<b>Prep Batch:</b> 1523271	<b>Prep Method:</b> DOE EML HASL-300, U-02-R	<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 11/17/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
U-233/234 <small>13968-55-3/13966-29-5</small>	Uranium-233/234		0.811	pCi/g	+/-0.486	0.504	0.444	1.00
15117-96-1/13982-7	Uranium-235/236	U	0.197	pCi/g	+/-0.314	0.315	0.434	1.00
7440-61-1	Uranium-238		0.603	pCi/g	+/-0.415	0.426	0.351	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	15.1	18.2	pCi/g	82.7	(15%-125%)

**Comments:**

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

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**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL385355	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15011
<b>Lab Sample ID:</b> 385355005	<b>Date Collected:</b> 11/10/2015 12:45	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 11/12/2015 09:05	<b>%Moisture:</b> 13
<b>Client ID:</b> B33M92		<b>Prep Basis:</b> "Dry Weight Corrected"
<b>Batch ID:</b> 1523540	<b>Method:</b> SRTOT_SEP_PRECIP_GPC	<b>SOP Ref:</b> GL-RAD-A-004
<b>Run Date:</b> 11/19/2015 12:12	<b>Analyst:</b> KSD1	<b>Instrument:</b> PIC3D
<b>Data File:</b> S1523540r1.xls	<b>Aliquot:</b> 0.306 g	<b>Count Time:</b> 60 min
<b>Prep Batch:</b> 1523540	<b>Prep Method:</b> EPA 905.0 Modified/DOE RP5	<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 11/17/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	-0.37	pCi/g	+/-0.478	0.478	1.07	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	7.70	8.10	mg	95.1	(25%-125%)

**Comments:**

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

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**Certificate of Analysis  
Sample Summary**

SDG Number: GEL385355  
 Lab Sample ID: 385355005  
  
 Client ID: B33M92  
 Batch ID: 1523127  
 Run Date: 11/14/2015 08:17  
 Data File: G385355005.CNF;1  
 Prep Batch: 1523127  
 Prep Date: 11/13/2015 00:00

Client: CPRC001  
 Date Collected: 11/10/2015 12:45  
 Date Received: 11/12/2015 09:05  
  
 Method: GAMMA\_GS  
 Analyst: RXF2  
 Aliquot: 158.9 g  
 Prep Method: DOE HASL 300, 4.5.2.3/Ga-01

Project: CPRC0F15011  
 Matrix: SOIL  
 %Moisture: 13  
  
 Prep Basis: "Dry Weight Corrected"  
 SOP Ref: GL-RAD-A-013  
 Instrument: GAM16  
 Count Time: 60 min  
 Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137	U	0.0445	pCi/g	+/-0.0467	0.0468	0.0664	0.100
10198-40-0	Cobalt-60	U	-0.00745	pCi/g	+/-0.0404	0.0405	0.0761	
14683-23-9	Europium-152	U	-0.0398	pCi/g	+/-0.0945	0.0963	0.150	
15585-10-1	Europium-154	U	0.0433	pCi/g	+/-0.122	0.123	0.221	
14391-16-3	Europium-155	U	0.0569	pCi/g	+/-0.0934	0.097	0.187	

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

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**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL385355	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15011
<b>Lab Sample ID:</b> 385355005	<b>Date Collected:</b> 11/10/2015 12:45	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 11/12/2015 09:05	<b>%Moisture:</b> 13
<b>Client ID:</b> B33M92		<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1522832	<b>Method:</b> TC99_EIE_LSC	<b>SOP Ref:</b> GL-RAD-A-059
<b>Run Date:</b> 11/22/2015 09:45	<b>Analyst:</b> MYM1	<b>Instrument:</b> LSCGOLD
<b>Data File:</b> E1522832.xls	<b>Aliquot:</b> 1.017 g	<b>Count Time:</b> 15 min
<b>Prep Batch:</b> 1522832	<b>Prep Method:</b> DOE EML HASL-300, Tc-02-	
<b>Prep Date:</b> 11/17/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	-0.988	pCi/g	+/-2.30	2.30	4.11	15.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	24100	25400	CPM	95	(15%-125%)

**Comments:**

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**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL385355	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15011
<b>Lab Sample ID:</b> 385355005	<b>Date Collected:</b> 11/10/2015 12:45	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 11/12/2015 09:05	<b>%Moisture:</b> 13
<b>Client ID:</b> B33M92		<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1522834	<b>Method:</b> C14_LSC	<b>SOP Ref:</b> GL-RAD-A-003
<b>Run Date:</b> 11/20/2015 14:51	<b>Analyst:</b> TXJ1	<b>Instrument:</b> LSCBROWN
<b>Data File:</b> C1522834.xls	<b>Aliquot:</b> 0.5 g	<b>Count Time:</b> 45 min
<b>Prep Batch:</b> 1522834	<b>Prep Method:</b> EPA EERF C-01 Modified	
<b>Prep Date:</b> 11/19/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	0.400	pCi/g	+/-2.05	2.05	3.51	5.00

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

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**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL385355	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15011
<b>Lab Sample ID:</b> 385355005	<b>Date Collected:</b> 11/10/2015 12:45	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 11/12/2015 09:05	<b>%Moisture:</b> 13
<b>Client ID:</b> B33M92		<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1522835	<b>Method:</b> TRITIUM_DIST_LSC	<b>SOP Ref:</b> GL-RAD-A-002
<b>Run Date:</b> 11/23/2015 07:56	<b>Analyst:</b> TXJ1	<b>Instrument:</b> LSCYELLOW
<b>Data File:</b> T1522835R3.xls	<b>Aliquot:</b> 1.26 g	<b>Count Time:</b> 15 min
<b>Prep Batch:</b> 1522835	<b>Prep Method:</b> EPA 906.0 Modified	
<b>Prep Date:</b> 11/19/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium	U	-5.54	pCi/g	+/-10.4	10.4	20.7	30.0

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

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

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**Certificate of Analysis  
Sample Summary**

SDG Number: GEL385355  
Lab Sample ID: 385355005

Client: CPRC001  
Date Collected: 11/10/2015 12:45  
Date Received: 11/12/2015 09:05

Project: CPRC0F15011  
Matrix: SOIL  
%Moisture: 13

Client ID: B33M92  
Batch ID: 1525666  
Run Date: 11/24/2015 20:02  
Data File: N1525666.xls  
Prep Batch: 1525666  
Prep Date: 11/23/2015 00:00

Method: NI63\_LSC  
Analyst: AEA  
Aliquot: 0.208 g  
Prep Method: DOE RESL Ni-1, Modified

Prep Basis: "Dry Weight Corrected"  
SOP Ref: GL-RAD-A-022  
Instrument: LSCBLUE  
Count Time: 30 min  
Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
NI-63	Nickel-63	U	-15.7	pCi/g	+/-15.2	15.2	27.0	30.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Nickel Carrier	12.9	26.6	mg	48.5	(25%-125%)

**Comments:**

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**Certificate of Analysis**

**Sample Summary**

SDG Number: GEL385355  
Lab Sample ID: 385355005

Client: CPRC001  
Date Collected: 11/10/2015 12:45  
Date Received: 11/12/2015 09:05

Project: CPRC0F15011  
Matrix: SOIL  
%Moisture: 13

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**Certificate of Analysis**

**Sample Summary**

SDG Number: GEL385355  
Lab Sample ID: 385355006

Client: CPRC001  
Date Collected: 11/10/2015 13:30  
Date Received: 11/12/2015 09:05

Project: CPRC0F15011  
Matrix: SOIL  
%Moisture: 5.7

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**Certificate of Analysis**

**Sample Summary**

SDG Number: GEL385355  
Lab Sample ID: 385355007

Client: CPRC001  
Date Collected: 11/10/2015 13:05  
Date Received: 11/12/2015 09:05

Project: CPRC0F15011  
Matrix: SOIL  
%Moisture: 0

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**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL385355	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15011
<b>Lab Sample ID:</b> 385355008	<b>Date Collected:</b> 11/10/2015 13:30	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 11/12/2015 09:05	<b>%Moisture:</b> 8.3
<b>Client ID:</b> B33M96		<b>Prep Basis:</b> "Dry Weight Corrected"
<b>Batch ID:</b> 1523268	<b>Method:</b> AMCMISO_EIE_PREC_AEA	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 11/18/2015 17:43	<b>Analyst:</b> MXS2	<b>Instrument:</b> 1227
<b>Data File:</b> S0385355008_AM.1A.gcnf	<b>Aliquot:</b> 0.111 g	<b>Count Time:</b> 240 min
<b>Prep Batch:</b> 1523268	<b>Prep Method:</b> DOE EML HASL-300, Am-05	<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 11/17/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	-0.0514	pCi/g	+/-0.155	0.156	0.436	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	17.9	19.3	pCi/g	92.7	(15%-125%)

**Comments:**

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**Certificate of Analysis  
Sample Summary**

SDG Number: GEL385355  
Lab Sample ID: 385355008

Client: CPRC001  
Date Collected: 11/10/2015 13:30  
Date Received: 11/12/2015 09:05

Project: CPRC0F15011  
Matrix: SOIL  
%Moisture: 8.3

Client ID: B33M96  
Batch ID: 1523269  
Run Date: 11/18/2015 11:06  
Data File: S0385355008\_NP.1A.gcnf  
Prep Batch: 1523269  
Prep Date: 11/17/2015 00:00

Method: ASTM C 1476-00 Modified  
Analyst: MXS2  
Aliquot: 0.113 g  
Prep Method: ASTM C 1476-00 Modified

Prep Basis: "Dry Weight Corrected"  
SOP Ref: GL-RAD-A-032  
Instrument: 1235  
Count Time: 240 min  
Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
13994-20-2	Neptunium-237	U	-0.0663	pCi/g	+/-0.154	0.154	0.455	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	1670	1730	pCi/g	96.4	(15%-125%)

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**Certificate of Analysis  
Sample Summary**

SDG Number: GEL385355  
Lab Sample ID: 385355008

Client: CPRC001  
Date Collected: 11/10/2015 13:30  
Date Received: 11/12/2015 09:05

Project: CPRC0F15011  
Matrix: SOIL  
%Moisture: 8.3

Client ID: B33M96  
Batch ID: 1523270  
Run Date: 11/19/2015 09:26  
Data File: S0385355008\_PU.1A.gcnf  
Prep Batch: 1523270  
Prep Date: 11/17/2015 00:00

Method: PUIISO\_PLATE\_AEA  
Analyst: MXS2  
Aliquot: 0.111 g  
Prep Method: DOE EML HASL-300, Pu-11-

Prep Basis: "Dry Weight Corrected"  
SOP Ref: GL-RAD-A-011  
Instrument: 1069  
Count Time: 239.9998 min  
Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	0.00	pCi/g	+/-0.132	0.132	0.196	1.00
OER-100-70	Plutonium-239/240	U	0.00262	pCi/g	+/-0.194	0.194	0.431	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	14.1	17.7	pCi/g	79.5	(15%-125%)

**Comments:**

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**Certificate of Analysis  
Sample Summary**

SDG Number: GEL385355  
Lab Sample ID: 385355008

Client: CPRC001  
Date Collected: 11/10/2015 13:30  
Date Received: 11/12/2015 09:05

Project: CPRC0F15011  
Matrix: SOIL  
%Moisture: 8.3

Client ID: B33M96  
Batch ID: 1523271  
Run Date: 11/19/2015 09:26  
Data File: S0385355008\_UU.1A.gcnf  
Prep Batch: 1523271  
Prep Date: 11/17/2015 00:00

Method: UIISO\_IE\_PRECIP\_AEA  
Analyst: MXS2  
Aliquot: 0.111 g  
Prep Method: DOE EML HASL-300, U-02-R

Prep Basis: "Dry Weight Corrected"  
SOP Ref: GL-RAD-A-011  
Instrument: 1021  
Count Time: 239.9998 min  
Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
U-233/234 <small>13968-55-3/13966-29-5</small>	Uranium-233/234		0.702	pCi/g	+/-0.424	0.438	0.286	1.00
15117-96-1/13982-7	Uranium-235/236	U	0.130	pCi/g	+/-0.255	0.256	0.354	1.00
7440-61-1	Uranium-238		0.972	pCi/g	+/-0.500	0.522	0.365	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	16.9	19.0	pCi/g	88.6	(15%-125%)

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**Certificate of Analysis  
Sample Summary**

SDG Number: GEL385355  
Lab Sample ID: 385355008

Client: CPRC001  
Date Collected: 11/10/2015 13:30  
Date Received: 11/12/2015 09:05

Project: CPRC0F15011  
Matrix: SOIL  
%Moisture: 8.3

Client ID: B33M96  
Batch ID: 1523540  
Run Date: 11/18/2015 12:23  
Data File: S1523540r1.xls  
Prep Batch: 1523540  
Prep Date: 11/17/2015 00:00

Method: SRTOT\_SEP\_PRECIP\_GPC  
Analyst: KSD1  
Aliquot: 0.308 g  
Prep Method: EPA 905.0 Modified/DOE RP5

Prep Basis: "Dry Weight Corrected"  
SOP Ref: GL-RAD-A-004  
Instrument: PIC7D  
Count Time: 60 min  
Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	-0.823	pCi/g	+/-0.698	0.699	1.57	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	7.90	8.10	mg	97.5	(25%-125%)

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**Certificate of Analysis  
Sample Summary**

SDG Number: GEL385355  
 Lab Sample ID: 385355008  
  
 Client ID: B33M96  
 Batch ID: 1523127  
 Run Date: 11/14/2015 08:17  
 Data File: G385355008.CNF;1  
 Prep Batch: 1523127  
 Prep Date: 11/13/2015 00:00

Client: CPRC001  
 Date Collected: 11/10/2015 13:30  
 Date Received: 11/12/2015 09:05  
  
 Method: GAMMA\_GS  
 Analyst: RXF2  
 Aliquot: 159.04 g  
 Prep Method: DOE HASL 300, 4.5.2.3/Ga-01

Project: CPRC0F15011  
 Matrix: SOIL  
 %Moisture: 8.3  
  
 Prep Basis: "Dry Weight Corrected"  
 SOP Ref: GL-RAD-A-013  
 Instrument: GAM23  
 Count Time: 60 min  
 Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137		0.135	pCi/g	+/-0.0696	0.0705	0.0771	0.100
10198-40-0	Cobalt-60	U	0.00998	pCi/g	+/-0.0464	0.0466	0.0931	
14683-23-9	Europium-152	U	0.0357	pCi/g	+/-0.0946	0.096	0.179	
15585-10-1	Europium-154	U	-0.0444	pCi/g	+/-0.136	0.137	0.249	
14391-16-3	Europium-155	UX	0.00	pCi/g	+/-0.189	0.191	0.181	

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL385355	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15011
<b>Lab Sample ID:</b> 385355008	<b>Date Collected:</b> 11/10/2015 13:30	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 11/12/2015 09:05	<b>%Moisture:</b> 8.3
<b>Client ID:</b> B33M96		<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1523652	<b>Method:</b> DOE EML HASL-300,I-01 Mo	<b>SOP Ref:</b> GL-RAD-A-006
<b>Run Date:</b> 11/17/2015 18:17	<b>Analyst:</b> MJH1	<b>Instrument:</b> XRAY1
<b>Data File:</b> I385355008.CNF;1	<b>Aliquot:</b> 1.157 g	<b>Count Time:</b> 240 min
<b>Prep Batch:</b> 1523652	<b>Prep Method:</b> DOE EML HASL-300,I-01 M	
<b>Prep Date:</b> 11/17/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129	U	0.0067	pCi/g	+/-0.333	0.333	0.583	2.00

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

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  - X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
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**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL385355	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15011
<b>Lab Sample ID:</b> 385355008	<b>Date Collected:</b> 11/10/2015 13:30	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 11/12/2015 09:05	<b>%Moisture:</b> 8.3
<b>Client ID:</b> B33M96		<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1522832	<b>Method:</b> TC99_EIE_LSC	<b>SOP Ref:</b> GL-RAD-A-059
<b>Run Date:</b> 11/22/2015 10:01	<b>Analyst:</b> MYM1	<b>Instrument:</b> LSCGOLD
<b>Data File:</b> E1522832.xls	<b>Aliquot:</b> 1.107 g	<b>Count Time:</b> 15 min
<b>Prep Batch:</b> 1522832	<b>Prep Method:</b> DOE EML HASL-300, Tc-02-	
<b>Prep Date:</b> 11/17/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	1.29	pCi/g	+/-2.14	2.15	3.64	15.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	24900	25400	CPM	98.1	(15%-125%)

**Comments:**

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**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL385355	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15011
<b>Lab Sample ID:</b> 385355008	<b>Date Collected:</b> 11/10/2015 13:30	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 11/12/2015 09:05	<b>%Moisture:</b> 8.3
<b>Client ID:</b> B33M96		<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1522834	<b>Method:</b> C14_LSC	<b>SOP Ref:</b> GL-RAD-A-003
<b>Run Date:</b> 11/20/2015 15:37	<b>Analyst:</b> TXJ1	<b>Instrument:</b> LSCBROWN
<b>Data File:</b> C1522834.xls	<b>Aliquot:</b> 0.5 g	<b>Count Time:</b> 45 min
<b>Prep Batch:</b> 1522834	<b>Prep Method:</b> EPA EERF C-01 Modified	
<b>Prep Date:</b> 11/19/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	0.926	pCi/g	+/-2.05	2.05	3.49	5.00

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

- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
  - X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

November 25, 2015

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**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL385355	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F15011
<b>Lab Sample ID:</b> 385355008	<b>Date Collected:</b> 11/10/2015 13:30	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 11/12/2015 09:05	<b>%Moisture:</b> 8.3
<b>Client ID:</b> B33M96		<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1522835	<b>Method:</b> TRITIUM_DIST_LSC	<b>SOP Ref:</b> GL-RAD-A-002
<b>Run Date:</b> 11/23/2015 08:12	<b>Analyst:</b> TXJ1	<b>Instrument:</b> LSCYELLOW
<b>Data File:</b> T1522835R3.xls	<b>Aliquot:</b> 1.27 g	<b>Count Time:</b> 15 min
<b>Prep Batch:</b> 1522835	<b>Prep Method:</b> EPA 906.0 Modified	
<b>Prep Date:</b> 11/19/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium	U	-2.0	pCi/g	+/-11.0	11.0	21.0	30.0

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

- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
  - X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

November 25, 2015

Page 1 of 1 REV 1

**Certificate of Analysis  
Sample Summary**

SDG Number: GEL385355  
Lab Sample ID: 385355008

Client: CPRC001  
Date Collected: 11/10/2015 13:30  
Date Received: 11/12/2015 09:05

Project: CPRC0F15011  
Matrix: SOIL  
%Moisture: 8.3

Client ID: B33M96  
Batch ID: 1525666  
Run Date: 11/24/2015 20:33  
Data File: N1525666.xls  
Prep Batch: 1525666  
Prep Date: 11/23/2015 00:00

Method: NI63\_LSC  
Analyst: AEA  
Aliquot: 0.269 g  
Prep Method: DOE RESL Ni-1, Modified

Prep Basis: "Dry Weight Corrected"  
SOP Ref: GL-RAD-A-022  
Instrument: LSCBLUE  
Count Time: 30 min  
Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
NI-63	Nickel-63	U	-10.3	pCi/g	+/-10.4	10.4	18.5	30.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Nickel Carrier	14.5	26.6	mg	54.5	(25%-125%)

**Comments:**

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

November 25, 2015

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REV 1

**Certificate of Analysis**

**Sample Summary**

**SDG Number:** GEL385355  
**Lab Sample ID:** 385355008

**Client:** CPRC001  
**Date Collected:** 11/10/2015 13:30  
**Date Received:** 11/12/2015 09:05

**Project:** CPRC0F15011  
**Matrix:** SOIL  
**%Moisture:** 8.3

# Quality Control Data

**QC Summary**

Report Date: November 25, 2015  
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**Client :** CH2MHill Plateau Remediation Company  
 MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352

**Contact:** Mr. Scot Fitzgerald

**Workorder:** 385355

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Alpha Spec</b>									
Batch	1523268								
QC1203433375	MB								
Americium-241			U	-0.0418	pCi/g			MXS2	11/18/1517:43
				Uncert: +/-0.185					
				TPU: +/-0.185					
**Americium-243 Tracer	17.5			12.3	pCi/g	REC: 70	(15%-125%)		
				Uncert: +/-2.42					
				TPU: +/-3.57					
QC1203433376	385355004	DUP							
Americium-241		U	0.0449	U	0.0541	pCi/g			11/18/1517:43
				Uncert: +/-0.250	+/-0.203	RPD: 0	N/A		
				TPU: +/-0.250	+/-0.203	RER: 0.0557	(0-2)		
**Americium-243 Tracer	20.0		12.3	19.1	pCi/g	REC: 96	(15%-125%)		
				Uncert: +/-2.41	+/-2.33				
				TPU: +/-3.55	+/-3.49				
QC1203433377	LCS								
Americium-241				15.1	pCi/g	REC: 94	(80%-120%)		11/20/1508:12
				Uncert: +/-1.93					
				TPU: +/-2.76					
**Americium-243 Tracer	17.5			16.6	pCi/g	REC: 95	(15%-125%)		
				Uncert: +/-2.06					
				TPU: +/-3.08					
Batch	1523269								
QC1203433378	MB								
Neptunium-237			U	-0.0329	pCi/g			MXS2	11/18/1511:06
				Uncert: +/-0.227					
				TPU: +/-0.227					
**Americium-243 Tracer	1730			1480	pCi/g	REC: 86	(15%-125%)		
QC1203433379	385355004	DUP							
Neptunium-237		U	0.0373	U	0.0812	pCi/g			11/18/1511:06
				Uncert: +/-0.241	+/-0.228	RPD: 0	N/A		
				TPU: +/-0.241	+/-0.229	RER: 0.259	(0-2)		
**Americium-243 Tracer	1760		1750	1460	pCi/g	REC: 83	(15%-125%)		
QC1203433380	LCS								
Neptunium-237				39.1	pCi/g	REC: 99	(80%-120%)		11/18/1511:06
				Uncert: +/-3.16					
				TPU: +/-5.30					
**Americium-243 Tracer	1730			1670	pCi/g	REC: 97	(15%-125%)		
Batch	1523270								
QC1203433381	MB								
Plutonium-238			U	-0.0181	pCi/g			MXS2	11/19/1509:26
				Uncert: +/-0.156					
				TPU: +/-0.157					
Plutonium-239/240			U	0.284	pCi/g				
				Uncert: +/-0.335					

**QC Summary**

**Workorder: 385355**

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Alpha Spec</b>									
Batch	1523270								
**Plutonium-242 Tracer	16.1	TPU:		+/-0.337					
		Uncert:		11.9	pCi/g	REC: 73	(15%-125%)		
		TPU:		+/-2.17					
				+/-3.21					
QC1203433382 385355004 DUP									
Plutonium-238		U	0.136	U	0.0809				
		Uncert:	+/-0.266		+/-0.223	RPD: 0	N/A		
		TPU:	+/-0.267		+/-0.223	RER: 0.308	(0-2)		
Plutonium-239/240		U	0.00308	U	-0.0758				
		Uncert:	+/-0.228		+/-0.144	RPD: 0	N/A		
		TPU:	+/-0.229		+/-0.144	RER: 0.572	(0-2)		
**Plutonium-242 Tracer	18.4		9.95		15.1	pCi/g	REC: 82	(15%-125%)	
		Uncert:	+/-2.20		+/-2.12				
		TPU:	+/-3.25		+/-3.18				
QC1203433383 LCS									
Plutonium-238				U	-0.0847				11/19/1509:26
		Uncert:			+/-0.137				
		TPU:			+/-0.137				
Plutonium-239/240	16.2				15.3	pCi/g	REC: 95	(80%-120%)	
		Uncert:			+/-1.87				
		TPU:			+/-2.75				
**Plutonium-242 Tracer	16.1				12.4	pCi/g	REC: 77	(15%-125%)	
		Uncert:			+/-1.92				
		TPU:			+/-2.87				
Batch	1523271								
QC1203433384 MB									
Uranium-233/234				U	0.233	pCi/g		MXS2	11/19/1509:26
		Uncert:			+/-0.284				
		TPU:			+/-0.286				
Uranium-235/236				U	0.377	pCi/g			
		Uncert:			+/-0.376				
		TPU:			+/-0.381				
Uranium-238				U	0.261	pCi/g			
		Uncert:			+/-0.281				
		TPU:			+/-0.284				
**Uranium-232 Tracer	17.3				14.7	pCi/g	REC: 85	(15%-125%)	
		Uncert:			+/-1.99				
		TPU:			+/-3.41				
QC1203433385 385355004 DUP									
Uranium-233/234			1.01		0.899	pCi/g			11/19/1509:26
		Uncert:	+/-0.513		+/-0.470	RPD: 12	(0% - 100%)		
		TPU:	+/-0.539		+/-0.490	RER: 0.31	(0-2)		
Uranium-235/236			0.379	U	0.191	pCi/g			
		Uncert:	+/-0.366		+/-0.275	RPD: 13	(0% - 100%)		
		TPU:	+/-0.371		+/-0.277	RER: 0.796	(0-2)		
Uranium-238			0.494		0.646	pCi/g			
		Uncert:	+/-0.386		+/-0.399	RPD: 27	(0% - 100%)		
		TPU:	+/-0.394		+/-0.411	RER: 0.524	(0-2)		
**Uranium-232 Tracer	19.8		13.5		18.5	pCi/g	REC: 94	(15%-125%)	
		Uncert:	+/-2.04		+/-2.07				

### QC Summary

Workorder: 385355

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Alpha Spec</b>									
Batch	1523271								
		TPU:	+/-3.47	+/-3.67					
QC1203433386	LCS								
Uranium-233/234				20.9	pCi/g				
		Uncert:	+/-2.07						
		TPU:	+/-3.86						
Uranium-235/236				1.28	pCi/g				
		Uncert:	+/-0.591						
		TPU:	+/-0.623						
Uranium-238	22.1			21.9	pCi/g	REC:	99	(80%-120%)	
		Uncert:	+/-2.12						
		TPU:	+/-4.02						
**Uranium-232 Tracer	17.3			15.3	pCi/g	REC:	88	(15%-125%)	
		Uncert:	+/-1.89						
		TPU:	+/-3.30						
<b>Rad Gamma Spec</b>									
Batch	1523127								
QC1203432969	MB								
Cesium-137			U	-0.00051	pCi/g			RXF2	11/14/1509:29
		Uncert:	+/-0.0205						
		TPU:	+/-0.0205						
Cobalt-60			U	-0.0048	pCi/g				
		Uncert:	+/-0.024						
		TPU:	+/-0.0241						
Europium-152			U	0.00538	pCi/g				
		Uncert:	+/-0.0601						
		TPU:	+/-0.0601						
Europium-154			U	0.0462	pCi/g				
		Uncert:	+/-0.0675						
		TPU:	+/-0.0707						
Europium-155			U	-0.00913	pCi/g				
		Uncert:	+/-0.0493						
		TPU:	+/-0.0495						
QC1203432970	385355004	DUP							
Cesium-137		0.212		0.136	pCi/g				11/14/1509:29
		Uncert:	+/-0.0866	+/-0.0887		RPD:	43	(0% - 100%)	
		TPU:	+/-0.0887	+/-0.0894		RER:	1.18	(0-2)	
Cobalt-60		U	0.00833	U	-0.0279	pCi/g			
		Uncert:	+/-0.0306	+/-0.0523		RPD:	0	N/A	
		TPU:	+/-0.0309	+/-0.0538		RER:	1.14	(0-2)	
Europium-152		U	-0.0506	U	0.0562	pCi/g			
		Uncert:	+/-0.112	+/-0.118		RPD:	0	N/A	
		TPU:	+/-0.115	+/-0.120		RER:	1.26	(0-2)	
Europium-154		U	0.0511	U	-0.0972	pCi/g			
		Uncert:	+/-0.123	+/-0.148		RPD:	0	N/A	
		TPU:	+/-0.125	+/-0.155		RER:	1.46	(0-2)	
Europium-155		U	0.0419	U	0.0625	pCi/g			
		Uncert:	+/-0.118	+/-0.0718		RPD:	0	N/A	
		TPU:	+/-0.120	+/-0.0774		RER:	0.283	(0-2)	
QC1203432971	LCS								
Americium-241	490			551	pCi/g	REC:	112	(80%-120%)	11/14/1509:30

**QC Summary**

**Workorder: 385355**

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Gamma Spec</b>									
Batch	1523127								
				Uncert:					
				TPU:					
Cesium-137	183			183	pCi/g	REC: 100 (80%-120%)			
				Uncert:					
				TPU:					
Cobalt-60	180			173	pCi/g	REC: 96 (80%-120%)			
				Uncert:					
				TPU:					
Europium-152			U	-1.68	pCi/g				
				Uncert:					
				TPU:					
Europium-154			U	-0.0538	pCi/g				
				Uncert:					
				TPU:					
Europium-155			U	-0.217	pCi/g				
				Uncert:					
				TPU:					
Batch	1523652								
QC1203434362	MB								
Iodine-129			UX	0.00	pCi/g			MJH1	11/17/1518:18
				Uncert:					
				TPU:					
QC1203434363	385355008	DUP							
Iodine-129		U	0.0067	U	0.135	pCi/g			11/17/1518:18
			Uncert:	+/-0.333	+/-0.255	RPD: 0	N/A		
			TPU:	+/-0.333	+/-0.262	RER: 0.591	(0-2)		
QC1203434364	385355008	MS							
Iodine-129		U	0.0067		35.7	pCi/g	REC: 96 (75%-125%)		11/17/1518:19
			Uncert:	+/-0.333	+/-4.84				
			TPU:	+/-0.333	+/-6.02				
QC1203434365	LCS								
Iodine-129					35.3	pCi/g	REC: 98 (80%-120%)		11/18/1506:51
				Uncert:	+/-3.85				
				TPU:	+/-5.22				
<b>Rad Gas Flow</b>									
Batch	1523540								
QC1203433976	MB								
Total Strontium			U	-0.49	pCi/g			KSD1	11/18/1512:23
				Uncert:	+/-0.415				
				TPU:	+/-0.416				
**Strontium Carrier		8.10			8.00	mg	REC: 99 (25%-125%)		
QC1203433977	385355008	DUP							
Total Strontium		U	-0.823	U	0.372	pCi/g			11/18/1512:23
			Uncert:	+/-0.698	+/-0.786	RPD: 0	N/A		
			TPU:	+/-0.699	+/-0.791	RER: 2.22	(0-2)		
**Strontium Carrier		8.10	7.90		7.80	mg	REC: 96 (25%-125%)		
QC1203433978	LCS								
Total Strontium					65.7	pCi/g	REC: 102 (80%-120%)		11/18/1512:23
				Uncert:	+/-3.91				
				TPU:	+/-17.1				

## QC Summary

Workorder: **385355**

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Gas Flow</b>									
Batch	1523540								
**Strontium Carrier	8.10			7.90	mg	REC:	98	(25%-125%)	
<b>Rad Liquid Scintillation</b>									
Batch	1522832								
QC1203432302									
Technetium-99			U	0.337	pCi/g			MYM1	11/22/1510:18
				Uncert:					
				TPU:					
**Technetium-99m Tracer	25400			24900	CPM	REC:	98	(15%-125%)	
QC1203432303									
385355004									
DUP									
Technetium-99		U	2.37	U	1.78				11/22/1510:35
				Uncert:	+/-2.19	+/-2.03	RPD:	0	N/A
				TPU:	+/-2.21	+/-2.04	RER:	0.384	(0-2)
**Technetium-99m Tracer	25400			24900	CPM	REC:	98	(15%-125%)	
QC1203432304									
LCS									
Technetium-99	72.0			66.1	pCi/g	REC:	92	(80%-120%)	
				Uncert:	+/-3.93				
				TPU:	+/-8.56				
**Technetium-99m Tracer	25400			24900	CPM	REC:	98	(15%-125%)	
Batch	1522834								
QC1203432305									
MB									
Carbon-14			U	0.168	pCi/g			TXJ1	11/20/1516:24
				Uncert:	+/-2.02				
				TPU:	+/-2.02				
QC1203432306									
385355004									
DUP									
Carbon-14		U	-0.207	U	-0.237				11/20/1517:11
				Uncert:	+/-2.00	+/-2.00	RPD:	0	N/A
				TPU:	+/-2.00	+/-2.00	RER:	0.0206	(0-2)
QC1203432307									
385355004									
MS									
Carbon-14	151	U	-0.207		144				11/20/1517:57
				Uncert:	+/-2.00	+/-4.39			
				TPU:	+/-2.00	+/-11.5			
QC1203432308									
LCS									
Carbon-14	149				149				11/20/1518:44
				Uncert:	+/-4.41				
				TPU:	+/-11.9				
Batch	1522835								
QC1203432309									
MB									
Tritium			U	-2.69	pCi/g			TXJ1	11/23/1508:29
				Uncert:	+/-10.5				
				TPU:	+/-10.5				
QC1203432310									
385355004									
DUP									
Tritium		U	-4.9	U	-3.44				11/23/1508:45
				Uncert:	+/-10.4	+/-10.2	RPD:	0	N/A
				TPU:	+/-10.4	+/-10.2	RER:	0.196	(0-2)
QC1203432311									
385355004									
MS									
Tritium	94.2	U	-4.9		82.5				11/23/1506:51
				Uncert:	+/-10.4	+/-17.8			
				TPU:	+/-10.4	+/-25.8			
QC1203432312									
LCS									
						REC:			

## QC Summary

**Workorder: 385355**

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Liquid Scintillation</b>									
Batch	1522835								
Tritium	92.6			76.9	pCi/g	83	(80%-120%)		
	Uncert:			+/-18.6					
	TPU:			+/-25.5					
Batch	1525666								
QC1203439399	MB								
Nickel-63			U	-7.3	pCi/g			AEA	11/24/1521:05
	Uncert:			+/-9.12					
	TPU:			+/-9.12					
**Nickel Carrier	26.6			15.9	mg	REC:	60	(25%-125%)	
QC1203439400	385355008	DUP							
Nickel-63		U	-10.3	U	-9.26	pCi/g			11/24/1521:37
	Uncert:		+/-10.4		+/-9.25	RPD:	0	N/A	
	TPU:		+/-10.4		+/-9.25	RER:	0.15	(0-2)	
**Nickel Carrier	26.6		14.5		17.0	mg	REC:	64	(25%-125%)
QC1203439401	LCS								
Nickel-63	481			570	pCi/g	REC:	119	(80%-120%)	11/24/1522:09
	Uncert:			+/-19.4					
	TPU:			+/-108					
**Nickel Carrier	26.6			17.1	mg	REC:	64	(25%-125%)	

**Notes:**

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

The Qualifiers in this report are defined as follows:

- \* Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- 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 >= 2X the MDA and, after corrections, result is >= 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 >= 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.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- S Reported value determined by the Method of Standard Additions (MSA)
- 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.

### QC Summary

Workorder: 385355

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
UX	Gamma Spectroscopy--Uncertain identification									
W	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.									
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier									
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier									
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier									
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.

\*\* 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.