

8/4/2016



August 03, 2016

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

Re: CHPRC SAF S16-006
Work Order: 400976
SDG: GEL400976

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on July 07, 2016. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,

B Luthman
Brielle Luthman for
Heather Shaffer
Project Manager

Purchase Order: 300071 - 7H
Chain of Custody: S16-006-261
Enclosures

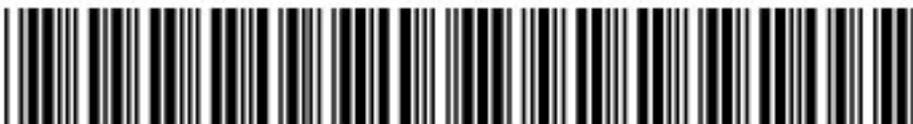


Table of Contents

Case Narrative.....	1
Chain of Custody and Supporting Documentation.....	7
Data Review Qualifier Definitions.....	10
Laboratory Certifications.....	12
FID Diesel Range Organics Analysis.....	14
Case Narrative.....	15
Sample Data Summary.....	19
Quality Control Summary.....	21
Metals Analysis.....	25
Case Narrative.....	26
Sample Data Summary.....	30
Quality Control Summary.....	35
Radiological Analysis.....	44
Case Narrative.....	45
Sample Data Summary.....	49
Quality Control Summary.....	52

Case Narrative

**General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF S16-006
SDG: GEL400976**

August 03, 2016

Laboratory Identification:

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

Summary

Sample receipt

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on July 07, 2016, for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

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

Sample Identification

The laboratory received the following samples:

Laboratory Identification	Sample Description
400976001	B35BY1
400976002	B35BX9

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, Metals and Radiochemistry.

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

8/4/2016

B. Luthman
Brielle Luthman for
Heather Shaffer
Project Manager

Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL400976
Work Order #: 400976

Diesel Range Organics

Analysis of Diesel Range Organics by Flame Ionization Detector

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

Quality Control (QC) Information

Laboratory Control Sample (LCS/LCSD) Recovery

The LCS and/or LCSD (See Below) did not meet the spike recovery acceptance limits. There was not enough aliquot of the samples available for re-extraction.

Sample	Analyte	Value
1203583412 (LCS)	Diesel Range Organics	65* (70%-130%)

Matrix Spike (MS/MSD) Recovery Statement

The MS did not meet the spike recovery acceptance limits. There was not enough aliquot of sample 400976002 available for re-extraction.

Sample	Analyte	Value
1203583413 (B35BX9MS)	Diesel Range Organics	62* (70%-130%)

Miscellaneous Information

Manual Integrations

Samples 1203583412 (LCS), 1203583413 (B35BX9MS) and 1203583414 (B35BX9MSD) required manual integration to correctly position the baseline as set in the calibration standard injections.

Metals

Determination of Metals by ICP

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

Calibration Information**CRDL/PQL Requirements**

The PQL standard recoveries for SW846 6010C or 6010D met the control limits with the exception of sodium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 400976001 (B35BY1) and 400976002 (B35BX9).

Determination of Metals by ICP-MS

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

Calibration Information**CRDL/PQL Requirements**

The CRDL standard recoveries for SW846 6020A/6020B met the advisory control limits with the exception of molybdenum. Client sample concentrations were greater than two times the PQL; therefore the data were not adversely affected. 400976001 (B35BY1).

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

The method blanks (MB) analyzed with this SDG met the exception criteria with the exception of selenium. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data. 1203580754 (MB).

Determination of Metals by ICP-MS

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

Radiochemistry**9310_ALPHABETA_GPC: COMMON**

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

Technical Information**Gross Alpha/Beta Preparation Information**

High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame

until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating.

Recounts

Sample 1203586590 (LCS) was recounted due to high recovery. The recount is reported.

Miscellaneous Information**Additional Comments**

The matrix spike and matrix spike duplicate, 1203586588 (B35BY8MS) and 1203586589 (B35BY8MSD), aliquots were reduced to conserve sample volume.

SRISO_SEP_PRECIP_GPC: COMMON

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

Technical Information**Recounts**

Sample 400976002 (B35BX9) was verified by recounting at least five days from the separation date. The recount is reported.

Certification Statement

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

Chain of Custody and Supporting Documentation

81165
400976

C.O.C.#
S16-006-261
Page 1 of 1

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

CH2M Hill Plateau Remediation Company

Collector: *Susan Agutter CH2M* Telephone No. 509-376-4650
 SAF No. S16-006 Purchase Order/Charge Code 300071
 Project Title SURV, JUNE 2016 Ice Chest No. *645-487*
 Shipped To (Lab) **GEL Laboratories, LLC** Bill of Lading/Air Bill No. *7766 8172 3129*
 Protocol SURV Priority: **30 Days** **PRIORITY** Offsite Property No. *6803*

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

SPECIAL INSTRUCTIONS: Hold Time N/A
 Total Activity Exemption: Yes No

Sample No.	Filter	* Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B35BY1	Y	JUL 05 2016	1300	1x500-mL G/P	6020_METALS_ICPMS: GW 01; 6010_METALS_ICP: GW 04	6 Months	HNO3 to pH <2
B35BX9	N	↓	↓	1x500-mL G/P	6020_METALS_ICPMS: GW 01; 6010_METALS_ICP: GW 04	6 Months	HNO3 to pH <2
B35BX9	N	↓	↓	2x1-L P	9310_ALPHABETA_GPC: COMMON	6 Months	HNO3 to pH <2
B35BX9	N	↓	↓	3x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2
B35BX9	N	JUL 05 2016	1300	3x1-L aG	WTPH_DIESEL: COMMON	14/40 Days	HCl to pH <2/Cool <=6C

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix *
<i>Susan Agutter</i>	<i>CH2M</i>		JUL 05 2016 1350	SSU-1			JUL 05 2016 1350	Soil = DS = Drum Solids Sediment = DL = Drum Liquids Solid = T = Tissue Sludge = WI = Wipe Water = L = Liquid Oil = V = Vegetation Air = X = Other
<i>Susan Agutter</i>	<i>CH2M</i>		JUL 06 2016 0900	<i>Susan Agutter</i>	<i>Jessy Wall</i>		JUL 06 2016 0900	
<i>Susan Agutter</i>	<i>CH2M</i>		JUL 06 2016 1400	<i>Susan Agutter</i>	FEDEX			
<i>Susan Agutter</i>	<i>CH2M</i>	<i>FX</i>		<i>M. Kriston</i>			7-7-16 0905	

FINAL SAMPLE DISPOSITION
 Disposal Method (e.g., Return to customer, per lab procedure, used in process) _____
 Disposed By _____ Date/Time _____

SAMPLE RECEIPT & REVIEW FORM

Client: <u>CPRC</u>		SDG/AR/COC/Work Order:	
Received By: <u>MK</u>		Date Received: <u>7-7-16</u>	
Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u>
Classified Radioactive II or III by RSO?		<input checked="" type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?		<input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		<input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		<input checked="" type="checkbox"/>	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: Ice bags Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius <u>2 C</u>
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: <u>130761911</u> Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 Do Low Level Perchlorate samples have headspace as required?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
7 VOA vials contain acid preservation?	<input checked="" type="checkbox"/>			(If unknown, select No)
8 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
9 Are Encore containers present?	<input checked="" type="checkbox"/>			(If yes, immediately deliver to Volatiles laboratory)
10 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
11 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
12 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
13 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
14 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>			
15 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
16 Carrier and tracking number.				Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other <u>7766 8172 3129 2^c</u>

Comments (Use Continuation Form if needed):

Data Review Qualifier Definitions

Project Specific Qualifier Definitions for GEL Client Code: CPRC

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

Laboratory Certifications

List of current GEL Certifications as of 03 August 2016

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

FID Diesel Range Organics Analysis

Case Narrative

**Diesel Range Organics
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL400976
Work Order #: 400976**

Product: Analysis of Diesel Range Organics by Flame Ionization Detector

Analytical Method: NWTPH-Dx

Analytical Procedure: GL-OA-E-003 REV# 26

Analytical Batch: 1581149

Preparation Method: SW846 3535A

Preparation Procedure: GL-OA-E-013 REV# 29

Preparation Batch: 1581148

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
400976002	B35BX9
1203583411	Method Blank (MB)
1203583412	Laboratory Control Sample (LCS)
1203583413	400976002(B35BX9) Matrix Spike (MS)
1203583414	400976002(B35BX9) Matrix Spike Duplicate (MSD)

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

Data Summary:

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

Quality Control (QC) Information

Laboratory Control Sample (LCS/LCSD) Recovery

The LCS and/or LCSD (See Below) did not meet the spike recovery acceptance limits. There was not enough aliquot of the samples available for re-extraction.

Sample	Analyte	Value
1203583412 (LCS)	Diesel Range Organics	65* (70%-130%)

Matrix Spike (MS/MSD) Recovery Statement

The MS did not meet the spike recovery acceptance limits. There was not enough aliquot of sample 400976002 available for re-extraction.

Sample	Analyte	Value
1203583413 (B35BX9MS)	Diesel Range Organics	62* (70%-130%)

Miscellaneous Information

Manual Integrations

Samples 1203583412 (LCS), 1203583413 (B35BX9MS) and 1203583414 (B35BX9MSD) required manual integration to correctly position the baseline as set in the calibration standard injections.

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: GEL400976 GEL Work Order: 400976

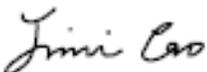
The Qualifiers in this report are defined as follows:

- 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: **Jimin Cao**

Date: **02 AUG 2016**

Title: **Data Validator**

Sample Data Summary

**FID Diesel Range Organics
Certificate of Analysis
Sample Summary**

Page 1 of 1

SDG Number: GEL400976	Date Collected: 07/05/2016 13:00	Matrix: WATER
Lab Sample ID: 400976002	Date Received: 07/07/2016 09:05	
Client ID: B35BX9	Client: CPRC001	Project: CPRC0S16006
Batch ID: 1581149	Method: NWTPH-Dx	SOP Ref: GL-OA-E-003
Run Date: 07/18/2016 21:41	Inst: FID7.I	Dilution: 1
Prep Date: 07/12/2016 17:48	Analyst: LXA1	Inj. Vol: 1 uL
Data File: 071816DRO-MO\7g1813.D	Aliquot: 1040 mL	Final Volume: 1 mL
	Column: DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
68334-30-5	Diesel Range Organics	TU	48.1	ug/L	48.1	192

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 21, 2016

Page 1 of 2

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 400976

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Diesel Range Organics											
Batch	1581149										
QC1203583412	LCS										
Diesel Range Organics	2000			1290	ug/L		65 *	(70%-130%)	LXA1	07/18/16	21:03
**o-Terphenyl	20.0			14.8	ug/L		74	(60%-140%)			
QC1203583411	MB										
Diesel Range Organics			U	50.0	ug/L					07/18/16	20:24
**o-Terphenyl	20.0			12.5	ug/L		62	(60%-140%)			
QC1203583413	400976002 MS										
Diesel Range Organics	1920	TU	48.1	T	1190	ug/L	62 *	(70%-130%)		07/18/16	22:20
**o-Terphenyl	19.2		14.2		13.1	ug/L	68	(60%-140%)			
QC1203583414	400976002 MSD										
Diesel Range Organics	1920	TU	48.1		1360	ug/L	13	71	(0%-20%)	07/18/16	22:59
**o-Terphenyl	19.2		14.2		15.3	ug/L		80	(60%-140%)		

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

GEL LABORATORIES LLC

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

QC Summary

Workorder: 400976

Page 2 of 2

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
----------	-----	--------	------	----	-------	------	------	-------	-------	------	------

- 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.

FID Diesel Range Organics
Surrogate Recovery Report

SDG Number: GEL400976

Matrix Type: LIQUID

Sample ID	Client ID	OTP %REC
1203583411	MB for batch 1581148	62
1203583412	LCS for batch 1581148	74
400976002	B35BX9	74
1203583413	B35BX9MS	68
1203583414	B35BX9MSD	80

Surrogate

OTP = o-Terphenyl

Acceptance Limits

(60%-140%)

* Recovery outside Acceptance Limits

Column to be used to flag recovery values

D Sample Diluted

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL400976
Work Order #: 400976

Product: Determination of Metals by ICP-MS
Analytical Method: 6020_METALS_ICPMS
Analytical Procedure: GL-MA-E-014 REV# 28
Analytical Batches: 1580061 and 1584542

Product: Determination of Metals by ICP
Analytical Method: 6010_METALS_ICP
Analytical Procedure: GL-MA-E-013 REV# 26
Analytical Batch: 1580083

Preparation Method: SW846 3005A
Preparation Procedure: GL-MA-E-006 REV# 13
Preparation Batches: 1580060, 1580082 and 1584541

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
400976001	B35BY1
400976002	B35BX9
1203580806	Method Blank (MB)ICP
1203580807	Laboratory Control Sample (LCS)
1203580810	400976001(B35BY1L) Serial Dilution (SD)
1203580808	400976001(B35BY1S) Matrix Spike (MS)
1203580809	400976001(B35BY1SD) Matrix Spike Duplicate (MSD)
1203580754	Method Blank (MB)ICP-MS
1203591844	Method Blank (MB)ICP-MS
1203580755	Laboratory Control Sample (LCS)
1203591845	Laboratory Control Sample (LCS)
1203580758	400976001(B35BY1L) Serial Dilution (SD)
1203591848	400976001(B35BY1L) Serial Dilution (SD)
1203580756	400976001(B35BY1S) Matrix Spike (MS)
1203591846	400976001(B35BY1S) Matrix Spike (MS)
1203580757	400976001(B35BY1SD) Matrix Spike Duplicate (MSD)
1203591847	400976001(B35BY1SD) Matrix Spike Duplicate (MSD)

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

Data Summary:

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

Calibration Information

CRDL/PQL Requirements

The PQL standard recoveries for SW846 6010C or 6010D met the control limits with the exception of sodium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 400976001 (B35BY1) and 400976002 (B35BX9)-ICP. The CRDL standard recoveries for SW846 6020A/6020B met the advisory control limits with the exception of molybdenum. Client sample concentrations were greater than two times the PQL; therefore the data were not adversely affected. 400976001 (B35BY1)-ICP-MS.

Quality Control (QC) Information

Method Blank (MB) Statement

The method blanks (MB) analyzed with this SDG met the exception criteria with the exception of selenium. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data. 1203580754 (MB)-ICP-MS.

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

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL400976 GEL Work Order: 400976

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.
- 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: 02 AUG 2016

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL400976

CONTRACT: CPRC0S16006

METHOD TYPE: SW846

SAMPLE ID: 400976001

BASIS: Filtered

DATE COLLECTED 05-JUL-16

CLIENT ID: B35BY1

LEVEL: Low

DATE RECEIVED 07-JUL-16

MATRIX: WATER

Dissolved Metals

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	15	ug/L	U	15	50	50	1	MS	SKJ	07/22/16 01:27	160721-2	1580061
7440-36-0	Antimony	1.75	ug/L	B	1	3	3	1	MS	SKJ	07/27/16 08:55	160726-12	1584542
7440-38-2	Arsenic	13.3	ug/L		1.7	5	5	1	MS	SKJ	07/22/16 01:27	160721-2	1580061
7440-39-3	Barium	20.2	ug/L		0.6	2	2	1	MS	SKJ	07/22/16 01:27	160721-2	1580061
7440-41-7	Beryllium	0.20	ug/L	U	0.2	0.5	0.5	1	MS	SKJ	07/22/16 01:27	160721-2	1580061
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	07/13/16 18:30	071316-1	1580083
7440-43-9	Cadmium	0.110	ug/L	U	0.11	1	1	1	MS	SKJ	07/22/16 01:27	160721-2	1580061
7440-70-2	Calcium	24300	ug/L		50	200	200	1	P	HSC	07/13/16 18:30	071316-1	1580083
7440-47-3	Chromium	2	ug/L	U	2	10	10	1	MS	SKJ	07/22/16 01:27	160721-2	1580061
7440-48-4	Cobalt	0.241	ug/L	B	0.1	1	1	1	MS	SKJ	07/22/16 01:27	160721-2	1580061
7440-50-8	Copper	0.911	ug/L	B	0.35	1	1	1	MS	SKJ	07/26/16 16:34	160726-5	1584542
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	07/13/16 18:30	071316-1	1580083
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	SKJ	07/22/16 01:27	160721-2	1580061
7439-95-4	Magnesium	5220	ug/L		110	300	300	1	P	HSC	07/13/16 18:30	071316-1	1580083
7439-96-5	Manganese	1	ug/L	U	1	5	5	1	MS	SKJ	07/22/16 01:27	160721-2	1580061
7439-98-7	Molybdenum	1.03	ug/L		0.165	0.5	0.5	1	MS	SKJ	07/22/16 21:38	160722-3	1580061
7440-02-0	Nickel	0.926	ug/L	B	0.5	2	2	1	MS	SKJ	07/22/16 01:27	160721-2	1580061
7440-09-7	Potassium	1950	ug/L		50	150	150	1	P	HSC	07/13/16 18:30	071316-1	1580083
7782-49-2	Selenium	4.52	ug/L	CB	1.5	5	5	1	MS	SKJ	07/22/16 21:38	160722-3	1580061
7440-22-4	Silver	0.20	ug/L	U	0.2	1	1	1	MS	SKJ	07/22/16 01:27	160721-2	1580061
7440-23-5	Sodium	70600	ug/L		100	300	300	1	P	HSC	07/13/16 18:30	071316-1	1580083
7440-24-6	Strontium	94.2	ug/L		2	10	10	1	MS	SKJ	07/22/16 01:27	160721-2	1580061
7440-28-0	Thallium	0.450	ug/L	U	0.45	2	2	1	MS	SKJ	07/22/16 01:27	160721-2	1580061
7440-29-1	Thorium	0.919	ug/L	B	0.383	2	2	1	MS	SKJ	07/22/16 21:38	160722-3	1580061
7440-31-5	Tin	1	ug/L	U	1	5	5	1	MS	SKJ	07/22/16 01:27	160721-2	1580061
7440-61-1	Uranium	0.067	ug/L	U	0.067	0.2	0.2	1	MS	SKJ	07/22/16 21:38	160722-3	1580061
7440-62-2	Vanadium	29.9	ug/L		1	5	5	1	P	HSC	07/13/16 18:30	071316-1	1580083
7440-66-6	Zinc	3.5	ug/L	U	3.5	10	10	1	MS	SKJ	07/22/16 21:38	160722-3	1580061

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1580061	1580060	SW846 3005A	50	mL	50	mL	07/07/16	JP1
1580083	1580082	SW846 3005A	50	mL	50	mL	07/07/16	JP1
1584542	1584541	SW846 3005A	25	mL	25	mL	07/25/16	JP1

METALS

-1-

INORGANICS ANALYSIS DATA PACKAGE

*Analytical Methods:

P	SW846 3005A/6010C
MS	SW846 3005A/6020A

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL400976

CONTRACT: CPRC0S16006

METHOD TYPE: SW846

SAMPLE ID: 400976002

BASIS: As Received

DATE COLLECTED 05-JUL-16

CLIENT ID: B35BX9

LEVEL: Low

DATE RECEIVED 07-JUL-16

MATRIX: WATER

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	37.1	ug/L	B	15	50	50	1	MS	SKJ	07/22/16 01:46	160721-2	1580061
7440-36-0	Antimony	1.39	ug/L	B	1	3	3	1	MS	SKJ	07/27/16 09:01	160726-12	1584542
7440-38-2	Arsenic	11.6	ug/L		1.7	5	5	1	MS	SKJ	07/22/16 01:46	160721-2	1580061
7440-39-3	Barium	25.4	ug/L		0.6	2	2	1	MS	SKJ	07/22/16 01:46	160721-2	1580061
7440-41-7	Beryllium	0.20	ug/L	U	0.2	0.5	0.5	1	MS	SKJ	07/22/16 01:46	160721-2	1580061
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	07/13/16 18:26	071316-1	1580083
7440-43-9	Cadmium	0.110	ug/L	U	0.11	1	1	1	MS	SKJ	07/22/16 01:46	160721-2	1580061
7440-70-2	Calcium	27600	ug/L		50	200	200	1	P	HSC	07/13/16 18:26	071316-1	1580083
7440-47-3	Chromium	2	ug/L	U	2	10	10	1	MS	SKJ	07/22/16 01:46	160721-2	1580061
7440-48-4	Cobalt	0.326	ug/L	B	0.1	1	1	1	MS	SKJ	07/22/16 01:46	160721-2	1580061
7440-50-8	Copper	0.885	ug/L	B	0.35	1	1	1	MS	SKJ	07/26/16 16:44	160726-5	1584542
7439-89-6	Iron	49.1	ug/L	B	30	100	100	1	P	HSC	07/13/16 18:26	071316-1	1580083
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	SKJ	07/22/16 01:46	160721-2	1580061
7439-95-4	Magnesium	5850	ug/L		110	300	300	1	P	HSC	07/13/16 18:26	071316-1	1580083
7439-96-5	Manganese	66.9	ug/L		1	5	5	1	MS	SKJ	07/22/16 01:46	160721-2	1580061
7439-98-7	Molybdenum	0.877	ug/L		0.165	0.5	0.5	1	MS	SKJ	07/25/16 13:09	160725-4	1580061
7440-02-0	Nickel	1.13	ug/L	B	0.5	2	2	1	MS	SKJ	07/22/16 01:46	160721-2	1580061
7440-09-7	Potassium	2030	ug/L		50	150	150	1	P	HSC	07/13/16 18:26	071316-1	1580083
7782-49-2	Selenium	4.34	ug/L	CB	1.5	5	5	1	MS	SKJ	07/22/16 21:58	160722-3	1580061
7440-22-4	Silver	0.20	ug/L	U	0.2	1	1	1	MS	SKJ	07/22/16 01:46	160721-2	1580061
7440-23-5	Sodium	69100	ug/L		100	300	300	1	P	HSC	07/13/16 18:26	071316-1	1580083
7440-24-6	Strontium	105	ug/L		2	10	10	1	MS	SKJ	07/22/16 01:46	160721-2	1580061
7440-28-0	Thallium	0.450	ug/L	U	0.45	2	2	1	MS	SKJ	07/22/16 01:46	160721-2	1580061
7440-29-1	Thorium	0.512	ug/L	B	0.383	2	2	1	MS	SKJ	07/22/16 21:58	160722-3	1580061
7440-31-5	Tin	1	ug/L	U	1	5	5	1	MS	SKJ	07/22/16 01:46	160721-2	1580061
7440-61-1	Uranium	0.067	ug/L	U	0.067	0.2	0.2	1	MS	SKJ	07/22/16 21:58	160722-3	1580061
7440-62-2	Vanadium	27.8	ug/L		1	5	5	1	P	HSC	07/13/16 18:26	071316-1	1580083
7440-66-6	Zinc	3.5	ug/L	U	3.5	10	10	1	MS	SKJ	07/22/16 21:58	160722-3	1580061

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1580061	1580060	SW846 3005A	50	mL	50	mL	07/07/16	JP1
1580083	1580082	SW846 3005A	50	mL	50	mL	07/07/16	JP1
1584542	1584541	SW846 3005A	25	mL	25	mL	07/25/16	JP1

METALS

-1-

INORGANICS ANALYSIS DATA PACKAGE

***Analytical Methods:**

P	SW846 3005A/6010C
MS	SW846 3005A/6020A

Quality Control Summary

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QC Summary

Report Date: August 2, 2016

Page 1 of 8

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 400976

Parmname	NOM	Sample Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS										
Batch	1580061									
QC1203580755	LCS									
Aluminum	2000		1770	ug/L		88.5	(80%-120%)	SKJ	07/22/16	01:15
Arsenic	50.0		45.4	ug/L		90.7	(80%-120%)			
Barium	50.0		42.6	ug/L		85.2	(80%-120%)			
Beryllium	50.0		49.1	ug/L		98.2	(80%-120%)			
Cadmium	50.0		43.9	ug/L		87.9	(80%-120%)			
Chromium	50.0		43.8	ug/L		87.5	(80%-120%)			
Cobalt	50.0		44.8	ug/L		89.6	(80%-120%)			
Lead	50.0		57.6	ug/L		115	(80%-120%)			
Manganese	50.0		45.1	ug/L		90.1	(80%-120%)			
Molybdenum	50.0		55.6	ug/L		111	(80%-120%)		07/22/16	21:34
Nickel	50.0		45.1	ug/L		90.1	(80%-120%)		07/22/16	01:15
Selenium	50.0		47.5	ug/L		94.9	(80%-120%)		07/22/16	21:34
Silver	50.0		56.3	ug/L		113	(80%-120%)		07/22/16	01:15
Strontium	50.0		44.4	ug/L		88.8	(80%-120%)			
Thallium	50.0		55.6	ug/L		111	(80%-120%)			
Thorium	50.0		43.2	ug/L		86.4	(80%-120%)		07/22/16	21:34
Tin	50.0		57.4	ug/L		115	(80%-120%)		07/22/16	01:15
Uranium	50.0		44.4	ug/L		88.9	(80%-120%)		07/22/16	21:34
Zinc	50.0		46.9	ug/L		93.9	(80%-120%)			

QC1203580754 MB

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QC Summary

Workorder: 400976

Page 2 of 8

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1580061										
Aluminum			U	15.0	ug/L					07/22/16	01:11
Arsenic			U	1.70	ug/L				SKJ		
Barium			U	0.600	ug/L						
Beryllium			U	0.200	ug/L						
Cadmium			U	0.110	ug/L						
Chromium			U	2.00	ug/L						
Cobalt			U	0.100	ug/L						
Lead			U	0.500	ug/L						
Manganese			U	1.00	ug/L						
Molybdenum			U	0.165	ug/L					07/22/16	21:31
Nickel			U	0.500	ug/L					07/22/16	01:11
Selenium			B	2.86	ug/L					07/22/16	21:31
Silver			U	0.200	ug/L					07/22/16	01:11
Strontium			U	2.00	ug/L						
Thallium			U	0.450	ug/L						
Thorium			U	0.383	ug/L					07/22/16	21:31
Tin			U	1.00	ug/L					07/22/16	01:11
Uranium			U	0.067	ug/L					07/22/16	21:31
Zinc			U	3.50	ug/L						
QC1203580756 400976001 MS											
Aluminum	2000	U	15.0	1670	ug/L		83.4	(75%-125%)		07/22/16	01:31
Arsenic	50.0		13.3	55.7	ug/L		84.9	(75%-125%)			
Barium	50.0		20.2	62.0	ug/L		83.6	(75%-125%)			

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QC Summary

Workorder: 400976

Page 3 of 8

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1580061										
Beryllium	50.0	U	0.200	47.6	ug/L		95	(75%-125%)	SKJ	07/22/16	01:31
Cadmium	50.0	U	0.110	44.5	ug/L		89	(75%-125%)			
Chromium	50.0	U	2.00	42.0	ug/L		83.9	(75%-125%)			
Cobalt	50.0	B	0.241	42.4	ug/L		84.2	(75%-125%)			
Lead	50.0	U	0.500	56.6	ug/L		113	(75%-125%)			
Manganese	50.0	U	1.00	43.2	ug/L		85	(75%-125%)			
Molybdenum	50.0		1.03	59.2	ug/L		116	(75%-125%)		07/22/16	21:42
Nickel	50.0	B	0.926	42.0	ug/L		82.2	(75%-125%)		07/22/16	01:31
Selenium	50.0	BC	4.52	50.1	ug/L		91.2	(75%-125%)		07/22/16	21:42
Silver	50.0	U	0.200	55.5	ug/L		111	(75%-125%)		07/22/16	01:31
Strontium	50.0		94.2	139	ug/L		89.3	(75%-125%)			
Thallium	50.0	U	0.450	54.7	ug/L		109	(75%-125%)			
Thorium	50.0	B	0.919	43.5	ug/L		85.2	(75%-125%)		07/22/16	21:42
Tin	50.0	U	1.00	59.6	ug/L		119	(75%-125%)		07/22/16	01:31
Uranium	50.0	U	0.067	44.0	ug/L		88	(75%-125%)		07/22/16	21:42
Zinc	50.0	U	3.50	47.8	ug/L		90.8	(75%-125%)			
QC1203580757 400976001 MSD											
Aluminum	2000	U	15.0	1670	ug/L	0.0892	83.3	(0%-20%)		07/22/16	01:35
Arsenic	50.0		13.3	56.5	ug/L	1.43	86.5	(0%-20%)			
Barium	50.0		20.2	61.3	ug/L	1.12	82.2	(0%-20%)			
Beryllium	50.0	U	0.200	46.9	ug/L	1.41	93.7	(0%-20%)			
Cadmium	50.0	U	0.110	44.1	ug/L	1.01	88.1	(0%-20%)			

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QC Summary

Workorder: 400976

Page 4 of 8

Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1580061										
Chromium	50.0	U	2.00	42.3	ug/L	0.693	84.5	(0%-20%)	SKJ	07/22/16	01:35
Cobalt	50.0	B	0.241	42.4	ug/L	0.182	84.4	(0%-20%)			
Lead	50.0	U	0.500	55.4	ug/L	2.16	111	(0%-20%)			
Manganese	50.0	U	1.00	42.7	ug/L	1.17	84	(0%-20%)			
Molybdenum	50.0		1.03	59.2	ug/L	0	116	(0%-20%)		07/22/16	21:46
Nickel	50.0	B	0.926	42.4	ug/L	0.94	83	(0%-20%)		07/22/16	01:35
Selenium	50.0	BC	4.52	50.0	ug/L	0.274	90.9	(0%-20%)		07/22/16	21:46
Silver	50.0	U	0.200	56.4	ug/L	1.67	113	(0%-20%)		07/22/16	01:35
Strontium	50.0		94.2	142	ug/L	2.32	95.8	(0%-20%)			
Thallium	50.0	U	0.450	54.3	ug/L	0.697	108	(0%-20%)			
Thorium	50.0	B	0.919	44.3	ug/L	1.65	86.7	(0%-20%)		07/22/16	21:46
Tin	50.0	U	1.00	60.7	ug/L	1.87	121	(0%-20%)		07/22/16	01:35
Uranium	50.0	U	0.067	44.4	ug/L	0.826	88.7	(0%-20%)		07/22/16	21:46
Zinc	50.0	U	3.50	47.0	ug/L	1.51	89.4	(0%-20%)			
QC1203580758	400976001	SDILT									
Aluminum		U	3.09	DU	75.0	ug/L	N/A	(0%-10%)		07/22/16	01:43
Arsenic			13.3	BD	2.86	ug/L	7.53	(0%-10%)			
Barium			20.2	D	4.24	ug/L	5.02	(0%-10%)			
Beryllium		U	0.038	DU	1.00	ug/L	N/A	(0%-10%)			
Cadmium		U	0.025	DU	0.550	ug/L	N/A	(0%-10%)			
Chromium		U	-0.398	DU	10.0	ug/L	N/A	(0%-10%)			
Cobalt		B	0.241	DU	0.500	ug/L	N/A	(0%-10%)			

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QC Summary

Workorder: 400976

Page 5 of 8

Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1580061										
Lead	U	0.061	DU	2.50	ug/L	N/A		(0%-10%)	SKJ	07/22/16	01:43
Manganese	U	0.686	DU	5.00	ug/L	N/A		(0%-10%)			
Molybdenum		1.03	BD	0.324	ug/L	57.6		(0%-10%)		07/22/16	21:54
Nickel	B	0.926	DU	2.50	ug/L	N/A		(0%-10%)		07/22/16	01:43
Selenium	BC	4.52	DU	7.50	ug/L	N/A		(0%-10%)		07/22/16	21:54
Silver	U	0.020	DU	1.00	ug/L	N/A		(0%-10%)		07/22/16	01:43
Strontium		94.2	D	18.5	ug/L	1.61		(0%-10%)			
Thallium	U	0.318	DU	2.25	ug/L	N/A		(0%-10%)			
Thorium	B	0.919	BD	0.828	ug/L	350		(0%-10%)		07/22/16	21:54
Tin	U	0.161	DU	5.00	ug/L	N/A		(0%-10%)		07/22/16	01:43
Uranium	U	0.019	DU	0.335	ug/L	N/A		(0%-10%)		07/22/16	21:54
Zinc	U	2.36	BD	3.72	ug/L	N/A		(0%-10%)			
Batch	1584542										
QC1203591845	LCS										
Antimony		50.0		57.6	ug/L		115	(80%-120%)	SKJ	07/27/16	08:53
Copper		50.0		47.9	ug/L		95.9	(80%-120%)		07/26/16	16:27
QC1203591844	MB										
Antimony			U	1.00	ug/L					07/27/16	08:52
Copper			U	0.350	ug/L					07/26/16	16:25
QC1203591846	400976001 MS										
Antimony		50.0	B	1.75	ug/L		113	(75%-125%)		07/27/16	08:56
Copper		50.0	B	0.911	ug/L		91.8	(75%-125%)		07/26/16	16:37
QC1203591847	400976001 MSD										
Antimony		50.0	B	1.75	ug/L	1.06	114	(0%-20%)		07/27/16	08:58

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QC Summary

Workorder: 400976

Page 6 of 8

Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1584542										
Copper	50.0	B	0.911		46.3	ug/L	1.1	90.8	(0%-20%)	07/26/16	16:39
QC1203591848	400976001	SDILT									
Antimony		B	1.75	DU	5.00	ug/L	N/A	(0%-10%)	SKJ	07/27/16	09:00
Copper		B	0.911	DU	1.75	ug/L	N/A	(0%-10%)		07/26/16	16:41
Metals Analysis-ICP											
Batch	1580083										
QC1203580807	LCS										
Boron	500				505	ug/L		101	(80%-120%)	HSC	07/13/16 18:23
Calcium	5000				5080	ug/L		102	(80%-120%)		
Iron	5000				5250	ug/L		105	(80%-120%)		
Magnesium	5000				5200	ug/L		104	(80%-120%)		
Potassium	5000				4790	ug/L		95.8	(80%-120%)		
Sodium	5000				5400	ug/L		108	(80%-120%)		
Vanadium	500				507	ug/L		101	(80%-120%)		
QC1203580806	MB										
Boron			U		15.0	ug/L					07/13/16 18:19
Calcium			U		50.0	ug/L					
Iron			U		30.0	ug/L					
Magnesium			U		110	ug/L					
Potassium			U		50.0	ug/L					
Sodium			U		100	ug/L					
Vanadium			U		1.00	ug/L					
QC1203580808	400976001	MS									
Boron	500	U	15.0		531	ug/L		104	(75%-125%)	07/13/16	18:34
Calcium	5000		24300		29400	ug/L		N/A	(75%-125%)		
Iron	5000	U	30.0		5160	ug/L		103	(75%-125%)		

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QC Summary

Workorder: 400976

Page 7 of 8

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1580083										
Magnesium	5000	5220		10100	ug/L		97.5	(75%-125%)	HSC	07/13/16	18:34
Potassium	5000	1950		7080	ug/L		103	(75%-125%)			
Sodium	5000	70600		69900	ug/L		N/A	(75%-125%)			
Vanadium	500	29.9		538	ug/L		102	(75%-125%)			
QC1203580809	400976001	MSD									
Boron	500	U	15.0	530	ug/L	0.266	103	(0%-20%)		07/13/16	18:37
Calcium	5000	24300		29400	ug/L	0.177	N/A	(0%-20%)			
Iron	5000	U	30.0	5230	ug/L	1.45	105	(0%-20%)			
Magnesium	5000	5220		10300	ug/L	1.61	101	(0%-20%)			
Potassium	5000	1950		6960	ug/L	1.75	100	(0%-20%)			
Sodium	5000	70600		74900	ug/L	7.01	N/A	(0%-20%)			
Vanadium	500	29.9		536	ug/L	0.387	101	(0%-20%)			
QC1203580810	400976001	SDILT									
Boron		U	12.5	DU	75.0	ug/L	N/A	(0%-10%)		07/13/16	18:40
Calcium			24300	D	5000	ug/L	2.77	(0%-10%)			
Iron		U	2.78	DU	150	ug/L	N/A	(0%-10%)			
Magnesium			5220	D	1100	ug/L	5.37	(0%-10%)			
Potassium			1950	D	409	ug/L	4.87	(0%-10%)			
Sodium			70600	D	13800	ug/L	2.14	(0%-10%)			
Vanadium			29.9	D	6.14	ug/L	2.78	(0%-10%)			

Notes:

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits

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QC Summary

Workorder: 400976

Page 8 of 8

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

Radiological Analysis

Case Narrative

Radiochemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL400976
Work Order #: 400976

Product: 9310_ALPHABETA_GPC: COMMON

Analytical Method: 9310_ALPHABETA_GPC

Analytical Procedure: GL-RAD-A-001 REV# 18

Analytical Batch: 1582447

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
400976002	B35BX9
1203586586	Method Blank (MB)
1203586587	400886001(B35BY8) Sample Duplicate (DUP)
1203586588	400886001(B35BY8) Matrix Spike (MS)
1203586589	400886001(B35BY8) Matrix Spike Duplicate (MSD)
1203586590	Laboratory Control Sample (LCS)

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

Data Summary:

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

Technical Information

Gross Alpha/Beta Preparation Information

High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating.

Recounts

Sample 1203586590 (LCS) was recounted due to high recovery. The recount is reported.

Miscellaneous Information

Additional Comments

The matrix spike and matrix spike duplicate, 1203586588 (B35BY8MS) and 1203586589 (B35BY8MSD), aliquots were reduced to conserve sample volume.

Product: SRISO_SEP_PRECIP_GPC: COMMON

Analytical Method: SRISO_SEP_PRECIP_GPC

Analytical Procedure: GL-RAD-A-004 REV# 17

Analytical Batch: 1582477

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
400976002	B35BX9
1203586675	Method Blank (MB)
1203586676	401516001(NonSDG) Sample Duplicate (DUP)
1203586677	Laboratory Control Sample (LCS)

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

Data Summary:

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

Technical Information

Recounts

Sample 400976002 (B35BX9) was verified by recounting at least five days from the separation date. The recount is reported.

Certification Statement

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

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL400976 GEL Work Order: 400976

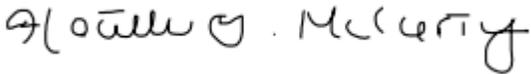
The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Heather McCarty

Date: 03 AUG 2016

Title: Analyst II

Sample Data Summary

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL400976
 Lab Sample ID: 400976002

 Client ID: B35BX9
 Batch ID: 1582447
 Run Date: 07/28/2016 06:25
 Data File: AB1582447r.xls
 Prep Batch: 1582447
 Prep Date: 07/26/2016 16:51

Client: CPRC001
 Date Collected: 07/05/2016 13:00
 Date Received: 07/07/2016 09:05

 Method: 9310_ALPHABETA_GPC
 Analyst: JXC9
 Aliquot: 150 mL
 Prep Method: EPA 900.0/SW846 9310

Project: CPRC0S16006
 Matrix: WATER

 Prep Basis: "As Received"
 SOP Ref: GL-RAD-A-001
 Instrument: LB4100B2
 Count Time: 190 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-46-1	Alpha ALPHA	U	0.232	pCi/L	+/-1.70	1.70	3.00	3.00
12587-47-2	Beta BETA		529	pCi/L	+/-8.87	86.8	2.71	4.00

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). The MDC is a sample specific MDC.

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL400976	Client: CPRC001	Project: CPRC0S16006
Lab Sample ID: 400976002	Date Collected: 07/05/2016 13:00	Matrix: WATER
	Date Received: 07/07/2016 09:05	
Client ID: B35BX9	Method: SRISO_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1582477	Analyst: KSD1	SOP Ref: GL-RAD-A-004
Run Date: 08/03/2016 12:33	Aliquot: 300 mL	Instrument: PIC1A
Data File: S1582477r.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1582477		
Prep Date: 07/28/2016 11:01		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90		221	pCi/L	+/-5.39	34.9	0.904	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	6.60	7.37	mg	89.6	(40%-110%)

Comments:

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

Quality Control Summary

8/4/2016

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QC Summary

Report Date: August 3, 2016
Page 1 of 3

Client : CH2M Hill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Workorder: 400976

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gas Flow									
Batch	1582447								
QC1203586586	MB								
Alpha			U	-0.0251	pCi/L			JXC9	07/28/1606:22
				Uncert: +/-0.906					
				TPU: +/-0.907					
Beta			U	-1.68	pCi/L				
				Uncert: +/-1.97					
				TPU: +/-1.97					
QC1203586587	400886001	DUP							
Alpha		U	-0.462	U	0.411	pCi/L			07/28/1606:36
			Uncert: +/-1.24		+/-1.52		RPD: 0	N/A	
			TPU: +/-1.24		+/-1.52		RER: 0.874	(0-2)	
Beta			11.5		12.0	pCi/L			
			Uncert: +/-1.91		+/-1.76		RPD: 4	(0% - 20%)	
			TPU: +/-2.69		+/-2.62		RER: 0.252	(0-2)	
QC1203586588	400886001	MS							
Alpha		240	U	-0.462	214	pCi/L	REC: 89	(75%-125%)	07/28/1606:18
				Uncert: +/-1.24	+/-24.8				
				TPU: +/-1.24	+/-42.9				
Beta		874		11.5	1020	pCi/L	REC: 115	(75%-125%)	
				Uncert: +/-1.91	+/-38.0				
				TPU: +/-2.69	+/-170				
QC1203586589	400886001	MSD							
Alpha		240	U	-0.462	234	pCi/L	REC: 98	(75%-125%)	07/28/1606:18
				Uncert: +/-1.24	+/-25.0		RPD: 9	(0%-20%)	
				TPU: +/-1.24	+/-45.7		RER: 0.625	(0-2)	
Beta		874		11.5	990	pCi/L	REC: 112	(75%-125%)	
				Uncert: +/-1.91	+/-36.4		RPD: 3	(0%-20%)	
				TPU: +/-2.69	+/-166		RER: 0.253	(0-2)	
QC1203586590	LCS								
Alpha		79.9			71.0	pCi/L	REC: 89	(80%-120%)	08/02/1611:17
					+/-7.54				
					+/-13.9				
Beta		291			324	pCi/L	REC: 111	(80%-120%)	
					+/-12.2				
					+/-55.1				
Batch	1582477								
QC1203586675	MB								
Strontium-90			U	-0.249	pCi/L			KSD1	07/30/1616:18
				Uncert: +/-0.431					
				TPU: +/-0.431					
**Strontium Carrier		7.37			6.60	mg	REC: 90	(40%-110%)	
QC1203586676	401516001	DUP							
Strontium-90		U	-0.666	U	-0.908	pCi/L			07/30/1616:18
			Uncert: +/-0.623		+/-0.629		RPD: 0	N/A	
			TPU: +/-0.623		+/-0.629		RER: 0.535	(0-2)	

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QC Summary

Workorder: 400976

Page 2 of 3

Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Gas Flow										
Batch	1582477									
**Strontium Carrier	7.37	7.10		6.70	mg	REC: 91	(40%-110%)			
QC1203586677	LCS									
Strontium-90	72.8			68.9	pCi/L	REC: 95	(80%-120%)		07/30/16	16:18
	Uncert:			+/-3.55						
	TPU:			+/-11.3						
**Strontium Carrier	7.37			7.00	mg	REC: 95	(40%-110%)			

Notes:

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

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- A The TIC is a suspected aldol-condensation product
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- B The analyte was detected in both the associated QC blank and in the sample.
- B The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample
- C Analyte has been confirmed by GC/MS analysis
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is \geq EQL or is > 5% of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- E Reported value is estimated due to interferences. See comment in narrative.
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated
- M Duplicate precision not met.
- N Spike Sample recovery is outside control limits.
- 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.
- 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)

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QC Summary

Workorder: 400976

Page 3 of 3

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
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N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

** Indicates analyte is a surrogate compound.

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

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

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