

February 23, 2015



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February 18, 2015

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

Re: CHPRC SAF S15-001
Work Order: 365858
SDG: GEL365858

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on January 27, 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,

Heather Shaffer
Project Manager

Purchase Order: 300071
Chain of Custody: S15-001-175, S15-001-182 and S15-001-330
Enclosures



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Case Narrative

February 23, 2015

General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF S15-001
SDG: GEL365858

February 18, 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 January 27, 2015, for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

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

Sample Identification

The laboratory received the following samples:

<u>Laboratory Identification</u>	<u>Sample Description</u>
365858001	B30141
365858002	B30176
365858003	B30174
365858004	B30178
365858005	B30181

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.

February 23, 2015

Data Package

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: 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 Manger (or designee) and the laboratory's client services representative as verified by their signatures on this report.



Heather Shaffer
Project Manager

Chain of Custody and Supporting Documentation

CH2M Hill Plateau Remediation Company **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** C.O.C.# **S15-001-175**
 Page 1 of 1

365858

Collector: **K.C. Patterson** Contact/Requester: **Karen Waters-Husted** Telephone No. **509-376-4650**
 CHPRC Hanford Site

SAF No. **S15-001** Sampling Origin: **Hanford Site** Purchase Order/Charge Code **300071**

Project Title: **SURV, JANUARY 2015** Logbook No. **HNF-N-50674 134** Ice Chest No. **6005-150**

Shipped To (Lab): **GEL Laboratories, LLC** Method of Shipment: **Commercial Carrier** Bill of Lading/Air Bill No. **772708944951**

Protocol: **SURV** Priority: **30 Days** Offsite Property No. **53664**

POSSIBLE SAMPLE HAZARDS/REMARKS SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption: Yes No

*** 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

Sample No.	Filter	* Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B30141	N	W JAN 23 2015	0926	1x500-mL P 1x500-mL P	9310_ALPHA_BETA_GPC: COMMON TRITIUM_DIST_LSC: COMMON	6 Months	HNO3 to pH <2
B30141	N	W	↓	1x500-mL P	TRITIUM_DIST_LSC: COMMON	6 Months	None

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix *
K.C. Patterson CHPRC	<i>[Signature]</i>	<i>[Signature]</i>	JAN 23 2015 1435	SSU-1			JAN 23 2015 1435	S = Soil, SE = Sediment, SO = Solid, SL = Sludge, W = Water, O = Oil, A = Air, DS = Drum Solids, DL = Drum Liquids, T = Tissue, WI = Wipe, L = Liquid, V = Vegetation, X = Other
Relinquished By			JAN 26 2015 1210	L.D. Wall CHPRC	<i>[Signature]</i>		JAN 26 2015 1210	
Relinquished By			JAN 26 2015 1400	FEDEX				
Relinquished By			1.27.15/0915	<i>[Signature]</i>	<i>[Signature]</i>		1.27.15/0915	
FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process)							Date/Time

77165

February 23, 2015

CH2MHill Plateau Remediation Company
 C.O.C.# S15-001-330
 Page 1 of 1

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Contact/Requester: Karen Waters-Husted
 Telephone No. 509-376-4650
 Sampling Origin: Hanford Site
 Purchase Order/Charge Code: 300071
 Logbook No. HNF-N-506 7154
 Ice Chest No. 6WS-307
 Method of Shipment: Commercial Carrier
 Bill of Lading/Air Bill No. 17270894 4723
 Priority: 30 Days
 Offsite Property No. 5364

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

Sample No.	Filter	* Date	Date	Time	No./Type Container	Sample Analysis	Holding Time	Preservative
B30176	Y		JAN 23 2015	1210	1x500-mL G/P	6010_METALS_ICP: COMMON; 6020_METALS_ICPMS: Antimony (1); 6020_METALS_ICPMS: Arsenic (1)	6 Months	HNO3 to pH <2
B30174	N				1x500-mL G/P	350.1_AMMONIA: COMMON	28 Days	H2SO4 to pH <2/Cool <=6C
B30174	N				1x500-mL G/P	410.4_COD: COMMON	28 Days	H2SO4 to pH <2/Cool <=6C
B30174	N				1x500-mL G/P	6010_METALS_ICP: COMMON; 6020_METALS_ICPMS: Antimony (1); 6020_METALS_ICPMS: Arsenic (1)	6 Months	HNO3 to pH <2
B30174	N				4x40-mL aGs*	8260_VOA_GCMS: COMMON; 8260_VOA_GCMS: GW 01	14 Days	HCl or H2SO4 to pH <2/Cool <=6C
B30174	N		JAN 23 2015	1710	3x1-L aG	8270_SVOA_GCMS: 1,4 Dioxane (1)	7/40 Days	Cool <=6C
B30174	N				1x250-mL aG	9060_TOC: COMMON	28 Days	HCl or H2SO4 to pH <2/Cool <=6C

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption: Yes No

Received By: **SSU-1** Date/Time: **JAN 23 2015 1405** Sign: _____ Print: _____

Received By: **L.D. Well** Date/Time: **JAN 26 2015 0910** Sign: *L.D. Well* Print: **CHPEC**

Received By: **FEDEX** Date/Time: _____ Sign: _____ Print: _____

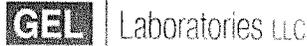
Received By: **FEDEX** Date/Time: **1.27.15/0915** Sign: *Janet Schwabher* Print: **Sachal Talwar**

Disposed By: _____ Date/Time: _____

FINAL SAMPLE DISPOSITION Disposal Method (e.g., Return to customer, per lab procedure, used in process)

PRINTED ON 12/3/2014 A-6004-842 (REV 2)

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SAMPLE RECEIPT & REVIEW FORM

Client: <u>CPRC</u>		SDG/AR/COC/Work Order: <u>305858</u>
Received By: <u>SE</u>		Date Received: <u>1.27.15</u>
Suspected Hazard Information	Yes <input type="checkbox"/>	No <input type="checkbox"/>
*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.		
COC/Samples marked as radioactive?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Classified Radioactive II or III by RSO?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0cpm</u>		
COC/Samples marked containing PCBs?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Package, COC, and/or Samples marked as beryllium or asbestos containing?	<input type="checkbox"/>	<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 type="checkbox"/>	<input checked="" type="checkbox"/>
Hazard Class Shipped:		UN#:
Samples identified as Foreign Soil?	<input type="checkbox"/>	<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: <u>ice bags</u> Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius <u>3.8 & 3.3</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>130532792</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#:
6 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
7 Are Encore containers present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
8 Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
12 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
14 Carrier and tracking number.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: <u>FedEx Air</u> FedEx Ground UPS Field Services Courier Other <u>7727 0894 4723 3.8</u> <u>77270894 4951 3.3</u>

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 18 February 2015

State	Certification
Alaska	UST-110
Arkansas	88-0651
CLIA	42D0904046
California	2940 Interim
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC000122013-10
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-12-00283, P330-12-00284
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC000122013-10
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA150001
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC000122013-10
Nebraska	NE-OS-26-13
Nevada	SC000122014-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
Oklahoma	9904
Pennsylvania NELAP	68-00485
Plant Material Permit	PDEP-12-00260
South Carolina Chemistry	10120001
South Carolina GVL	23611001
South Carolina Radiochemi	10120002
Tennessee	TN 02934
Texas NELAP	T104704235-15-10
Utah NELAP	SC000122014-16
Vermont	VT87156
Virginia NELAP	460202
Washington	C780-12

Volatile Analysis

Case Narrative

February 23, 2015
GC/MS Volatile
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL365858
Work Order #: 365858

Method/Analysis Information

Procedure: Volatile Organic Compounds (VOC) by Gas Chromatograph/Mass Spectrometer

Analytical Method: SW846 8260C

Analytical Batch Number: 1454155

Sample Analysis

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

Sample ID	Client ID
365858003	B30174
365858004	B30178
1203254811	Method Blank (MB)
1203254812	Laboratory Control Sample (LCS)
1203254813	Laboratory Control Sample (LCS)
1203254814	365992007(B30195) Post Spike (PS)
1203254815	365992007(B30195) Post Spike Duplicate (PSD)
1203254816	365992007(B30195) Post Spike (PS)
1203254817	365992007(B30195) 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

February 23, 2015

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 all client and quality control samples were within the acceptance limits.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 365992007 (B30195) was designated for spike analysis.

Matrix Spike/Matrix Spike Duplicate Recovery Statement

The spike and/or spike duplicate 1203254814 (B30195PS) and 1203254815 (B30195PSD) recoveries were not all within the acceptance limits.

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

Re-analyses were not required for samples in this SDG.

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

February 23, 2015

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

The following DER was generated for this SDG: 1379261.

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.

Residual Chlorine

Residual Chlorine was not detected in any of the samples in this SDG.

System Configuration

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

Instrument ID	Instrument	System Configuration	Column ID	Column Description	P & T Trap
VOA2.I	Agilent 7890/5975 GC/MS w/ OI Eclipse/Archon Autosampler	HP7890N/HP5975C	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.

February 23, 2015

GEL LABORATORIES LLC

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

**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL365858 GEL Work Order: 365858

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.

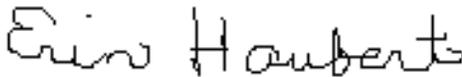
RA Indicates that sample is re-analyzed without re-extraction.

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.

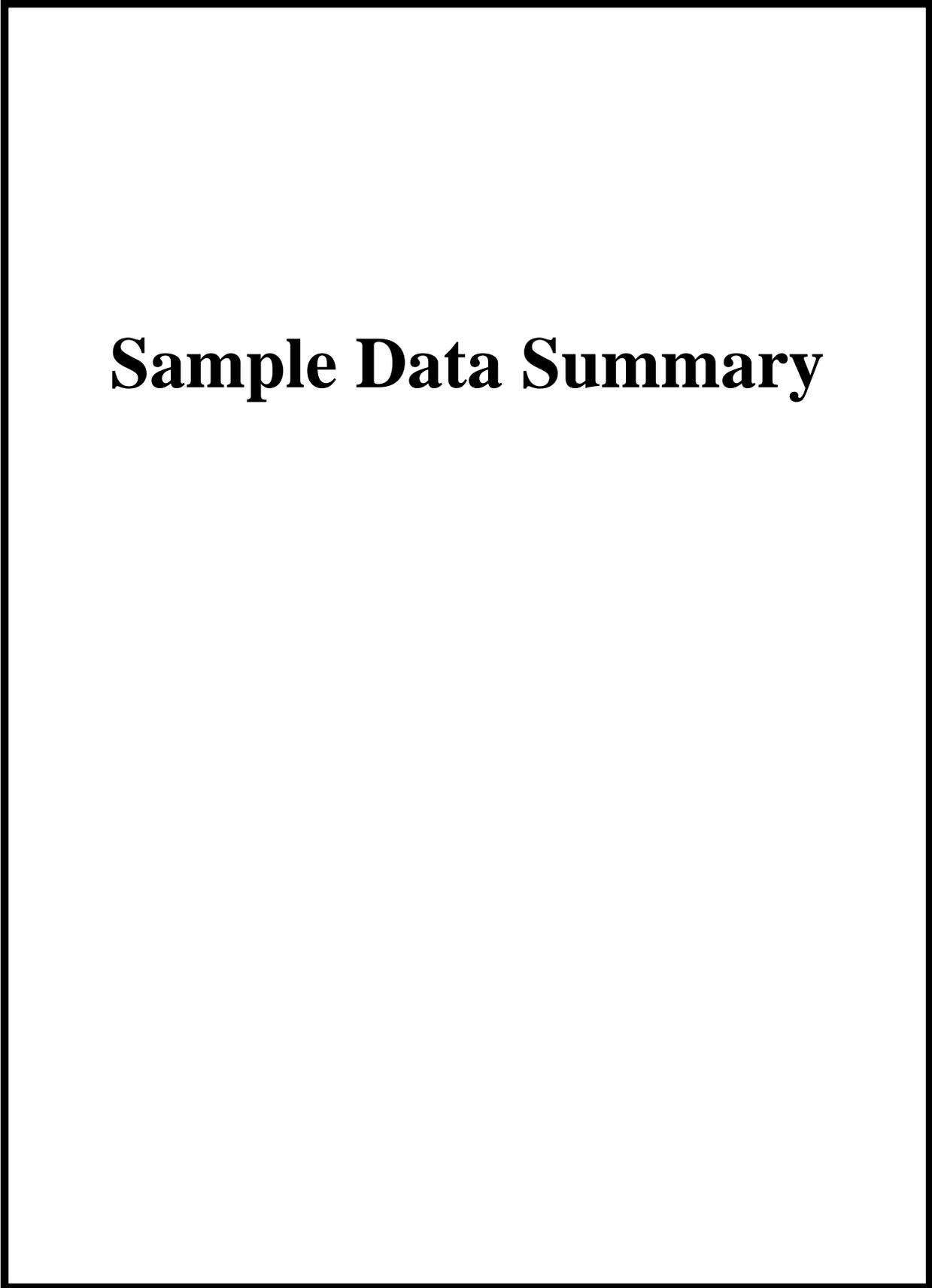
The following data validator verified the information presented in this data report:

Signature: 

Name: Erin Haubert

Date: 20 FEB 2015

Title: Data Validator



Sample Data Summary

Certificate of Analysis

Company : CH2MHill Plateau Remediation
 Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S15-001**

Report Date: February 18, 2015

Client Sample ID:	B30174	Project:	CPRC0S15001
Sample ID:	365858003	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	23-JAN-15 12:10		
Receive Date:	27-JAN-15		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Volatile Organics											
<i>8260VOA_GCMS: COMMON + GW 01 "As Received"</i>											
1,1,1-Trichloroethane 71-55-6	U	0.00	0.300	5.00	ug/L	1	CDS1	01/30/15	1239	1454155	1
1,1,2-Trichloroethane 79-00-5	U	0.00	0.300	5.00	ug/L	1					
1,1-Dichloroethane 75-34-3	U	0.00	0.300	10.0	ug/L	1					
1,1-Dichloroethylene 75-35-4	U	0.00	0.300	10.0	ug/L	1					
1,2-Dichloroethane 107-06-2	U	0.00	0.300	5.00	ug/L	1					
1,4-Dichlorobenzene 106-46-7	U	0.00	0.300	5.00	ug/L	1					
2-Butanone 78-93-3	TU	0.00	3.00	10.0	ug/L	1					
4-Methyl-2-pentanone 108-10-1	U	0.00	3.00	10.0	ug/L	1					
Acetone 67-64-1	TU	0.00	3.00	20.0	ug/L	1					
Benzene 71-43-2	U	0.00	0.300	5.00	ug/L	1					
Carbon disulfide 75-15-0	U	0.00	1.60	10.0	ug/L	1					
Carbon tetrachloride 56-23-5	U	0.00	0.300	5.00	ug/L	1					
Chlorobenzene 108-90-7	U	0.00	0.300	5.00	ug/L	1					
Chloroform 67-66-3	U	0.00	0.300	5.00	ug/L	1					
Ethylbenzene 100-41-4	U	0.00	0.300	5.00	ug/L	1					
Methylene chloride 75-09-2	U	0.00	1.60	5.00	ug/L	1					
Propionitrile 107-12-0	U	0.00	3.00	10.0	ug/L	1					
Tetrachloroethylene 127-18-4	J	0.520	0.300	5.00	ug/L	1					

Certificate of Analysis

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S15-001**

Report Date: February 18, 2015

Client Sample ID: B30174 Project: CPRC0S15001
 Sample ID: 365858003 Client ID: CPRC001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Volatile Organics											
<i>8260VOA_GCMS: COMMON + GW 01 "As Received"</i>											
Tetrahydrofuran	U	0.00	1.50	50.0	ug/L	1					
109-99-9											
Toluene	U	0.00	0.300	5.00	ug/L	1					
108-88-3											
Trichloroethylene	U	0.00	0.300	5.00	ug/L	1					
79-01-6											
Vinyl chloride	U	0.00	0.300	10.0	ug/L	1					
75-01-4											
Xylenes (total)	U	0.00	0.300	10.0	ug/L	1					
1330-20-7											
cis-1,2-Dichloroethylene	U	0.00	0.300	5.00	ug/L	1					
156-59-2											
n-Butyl alcohol	U	0.00	83.3	250	ug/L	1					
71-36-3											
trans-1,2-Dichloroethylene	U	0.00	0.300	5.00	ug/L	1					
156-60-5											

The following Analytical Methods were performed

Method	Description	Analyst	Comments
1	SW846 8260C		

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	8260VOA_GCMS: COMMON + GW 01 "As Received"	49.5 ug/L	50.0	99.0	(77%-123%)
Bromofluorobenzene	8260VOA_GCMS: COMMON + GW 01 "As Received"	54.3 ug/L	50.0	109	(80%-120%)
Toluene-d8	8260VOA_GCMS: COMMON + GW 01 "As Received"	48.0 ug/L	50.0	96.0	(80%-120%)

Certificate of Analysis

Company : CH2MHill Plateau Remediation
 Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S15-001**

Report Date: February 18, 2015

Client Sample ID:	B30178	Project:	CPRC0S15001
Sample ID:	365858004	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	23-JAN-15 12:45		
Receive Date:	27-JAN-15		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Volatile Organics											
<i>8260VOA_GCMS: COMMON + GW 01 "As Received"</i>											
1,1,1-Trichloroethane 71-55-6	U	0.00	0.300	5.00	ug/L	1	CDS1	01/30/15	1309	1454155	1
1,1,2-Trichloroethane 79-00-5	U	0.00	0.300	5.00	ug/L	1					
1,1-Dichloroethane 75-34-3	U	0.00	0.300	10.0	ug/L	1					
1,1-Dichloroethylene 75-35-4	U	0.00	0.300	10.0	ug/L	1					
1,2-Dichloroethane 107-06-2	U	0.00	0.300	5.00	ug/L	1					
1,4-Dichlorobenzene 106-46-7	U	0.00	0.300	5.00	ug/L	1					
2-Butanone 78-93-3	TU	0.00	3.00	10.0	ug/L	1					
4-Methyl-2-pentanone 108-10-1	U	0.00	3.00	10.0	ug/L	1					
Acetone 67-64-1	TU	0.00	3.00	20.0	ug/L	1					
Benzene 71-43-2	U	0.00	0.300	5.00	ug/L	1					
Carbon disulfide 75-15-0	U	0.00	1.60	10.0	ug/L	1					
Carbon tetrachloride 56-23-5	U	0.00	0.300	5.00	ug/L	1					
Chlorobenzene 108-90-7	U	0.00	0.300	5.00	ug/L	1					
Chloroform 67-66-3	U	0.00	0.300	5.00	ug/L	1					
Ethylbenzene 100-41-4	U	0.00	0.300	5.00	ug/L	1					
Methylene chloride 75-09-2	U	0.00	1.60	5.00	ug/L	1					
Propionitrile 107-12-0	U	0.00	3.00	10.0	ug/L	1					
Tetrachloroethylene 127-18-4	U	0.00	0.300	5.00	ug/L	1					

Certificate of Analysis

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S15-001**

Report Date: February 18, 2015

Client Sample ID: B30178 Project: CPRC0S15001
 Sample ID: 365858004 Client ID: CPRC001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Volatile Organics											
<i>8260VOA_GCMS: COMMON + GW 01 "As Received"</i>											
Tetrahydrofuran	U	0.00	1.50	50.0	ug/L	1					
109-99-9											
Toluene	U	0.00	0.300	5.00	ug/L	1					
108-88-3											
Trichloroethylene	U	0.00	0.300	5.00	ug/L	1					
79-01-6											
Vinyl chloride	U	0.00	0.300	10.0	ug/L	1					
75-01-4											
Xylenes (total)	U	0.00	0.300	10.0	ug/L	1					
1330-20-7											
cis-1,2-Dichloroethylene	U	0.00	0.300	5.00	ug/L	1					
156-59-2											
n-Butyl alcohol	U	0.00	83.3	250	ug/L	1					
71-36-3											
trans-1,2-Dichloroethylene	U	0.00	0.300	5.00	ug/L	1					
156-60-5											

The following Analytical Methods were performed

Method	Description	Analyst	Comments
1	SW846 8260C		

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	8260VOA_GCMS: COMMON + GW 01 "As Received"	50.0 ug/L	50.0	100	(77%-123%)
Bromofluorobenzene	8260VOA_GCMS: COMMON + GW 01 "As Received"	53.4 ug/L	50.0	107	(80%-120%)
Toluene-d8	8260VOA_GCMS: COMMON + GW 01 "As Received"	48.3 ug/L	50.0	96.7	(80%-120%)

Quality Control Summary

February 23, 2015
GEL LABORATORIES LLC

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QC Summary

Report Date: February 18, 2015

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CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 365858

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1454155										
QC1203254812	LCS										
1,1,1-Trichloroethane	50.0			52.4	ug/L		105	(70%-130%)	CDS1	01/30/15	07:03
1,1,2-Trichloroethane	50.0			48.8	ug/L		97.5	(70%-130%)			
1,1-Dichloroethane	50.0			50.2	ug/L		100	(70%-130%)			
1,1-Dichloroethylene	50.0			50.5	ug/L		101	(70%-130%)			
1,2-Dichloroethane	50.0			47.4	ug/L		94.7	(70%-130%)			
1,4-Dichlorobenzene	50.0			48.9	ug/L		97.7	(70%-130%)			
2-Butanone	250			283	ug/L		113	(70%-130%)			
4-Methyl-2-pentanone	250			270	ug/L		108	(70%-130%)			
Acetone	250			290	ug/L		116	(70%-130%)			
Benzene	50.0			49.8	ug/L		99.5	(70%-130%)			
Carbon disulfide	250			263	ug/L		105	(70%-130%)			
Carbon tetrachloride	50.0			52.1	ug/L		104	(70%-130%)			
Chlorobenzene	50.0			49.0	ug/L		98	(70%-130%)			
Chloroform	50.0			48.8	ug/L		97.5	(70%-130%)			
Ethylbenzene	50.0			51.7	ug/L		103	(70%-130%)			
Methylene chloride	50.0			45.1	ug/L		90.2	(70%-130%)			
Tetrachloroethylene	50.0			50.3	ug/L		101	(70%-130%)			
Toluene	50.0			48.8	ug/L		97.7	(70%-130%)			
Trichloroethylene	50.0			49.5	ug/L		98.9	(70%-130%)			
Vinyl chloride	50.0			43.2	ug/L		86.5	(70%-130%)			

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QC Summary

Workorder: 365858

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1454155										
Xylenes (total)	150			154	ug/L		103	(70%-130%)	CDS1	01/30/15	07:03
cis-1,2-Dichloroethylene	50.0			50.6	ug/L		101	(70%-130%)			
n-Butyl alcohol	5000			5420	ug/L		108	(70%-130%)			
trans-1,2-Dichloroethylene	50.0			50.2	ug/L		100	(70%-130%)			
**1,2-Dichloroethane-d4	50.0			52.2	ug/L		104	(77%-123%)			
**Bromofluorobenzene	50.0			49.7	ug/L		99.5	(80%-120%)			
**Toluene-d8	50.0			49.2	ug/L		98.4	(80%-120%)			
QC1203254813	LCS										
Propionitrile	250			220	ug/L		87.9	(70%-130%)		01/30/15	08:38
Tetrahydrofuran	250			221	ug/L		88.3	(70%-130%)			
**1,2-Dichloroethane-d4	50.0			49.4	ug/L		98.8	(77%-123%)			
**Bromofluorobenzene	50.0			51.7	ug/L		103	(80%-120%)			
**Toluene-d8	50.0			46.7	ug/L		93.3	(80%-120%)			
QC1203254811	MB										
1,1,1-Trichloroethane			U	0.300	ug/L					01/30/15	10:08
1,1,2-Trichloroethane			U	0.300	ug/L						
1,1-Dichloroethane			U	0.300	ug/L						
1,1-Dichloroethylene			U	0.300	ug/L						
1,2-Dichloroethane			U	0.300	ug/L						
1,4-Dichlorobenzene			U	0.300	ug/L						
2-Butanone			U	3.00	ug/L						
4-Methyl-2-pentanone			U	3.00	ug/L						
Acetone			U	3.00	ug/L						

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QC Summary

Workorder: 365858

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1454155										
Benzene			U	0.300	ug/L				CDS1	01/30/15	10:08
Carbon disulfide			U	1.60	ug/L						
Carbon tetrachloride			U	0.300	ug/L						
Chlorobenzene			U	0.300	ug/L						
Chloroform			U	0.300	ug/L						
Ethylbenzene			U	0.300	ug/L						
Methylene chloride			U	1.60	ug/L						
Propionitrile			U	3.00	ug/L						
Tetrachloroethylene			U	0.300	ug/L						
Tetrahydrofuran			U	1.50	ug/L						
Toluene			U	0.300	ug/L						
Trichloroethylene			U	0.300	ug/L						
Vinyl chloride			U	0.300	ug/L						
Xylenes (total)			U	0.300	ug/L						
cis-1,2-Dichloroethylene			U	0.300	ug/L						
n-Butyl alcohol			U	83.3	ug/L						
trans-1,2-Dichloroethylene			U	0.300	ug/L						
**1,2-Dichloroethane-d4	50.0			50.7	ug/L		101	(77%-123%)			
**Bromofluorobenzene	50.0			51.3	ug/L		103	(80%-120%)			
**Toluene-d8	50.0			46.5	ug/L		93.1	(80%-120%)			
QC1203254814 365992007 PS											
1,1,1-Trichloroethane	50.0	U	0.00	55.3	ug/L		111	(70%-130%)		01/30/15	16:42

February 23, 2015
GEL LABORATORIES LLC

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1454155										
1,1,2-Trichloroethane	50.0	U	0.00	52.8	ug/L		106	(70%-130%)	CDS1	01/30/15	16:42
1,1-Dichloroethane	50.0	U	0.00	54.5	ug/L		109	(70%-130%)			
1,1-Dichloroethylene	50.0	U	0.00	54.0	ug/L		108	(70%-130%)			
1,2-Dichloroethane	50.0	U	0.00	53.3	ug/L		107	(70%-130%)			
1,4-Dichlorobenzene	50.0	U	0.00	50.9	ug/L		102	(70%-130%)			
2-Butanone	250	TU	0.00	176	ug/L		70.6	(70%-130%)			
4-Methyl-2-pentanone	250	U	0.00	261	ug/L		105	(70%-130%)			
Acetone	250	TU	0.00	T 125	ug/L		50.2*	(70%-130%)			
Benzene	50.0	U	0.00	53.2	ug/L		106	(70%-130%)			
Carbon disulfide	250	U	0.00	284	ug/L		114	(70%-130%)			
Carbon tetrachloride	50.0	U	0.00	55.8	ug/L		112	(70%-130%)			
Chlorobenzene	50.0	U	0.00	52.7	ug/L		105	(70%-130%)			
Chloroform	50.0	U	0.00	53.9	ug/L		108	(70%-130%)			
Ethylbenzene	50.0	U	0.00	54.8	ug/L		110	(70%-130%)			
Methylene chloride	50.0	U	0.00	49.1	ug/L		98.2	(70%-130%)			
Tetrachloroethylene	50.0	U	0.00	51.0	ug/L		102	(70%-130%)			
Toluene	50.0	U	0.00	50.4	ug/L		101	(70%-130%)			
Trichloroethylene	50.0	U	0.00	53.5	ug/L		107	(70%-130%)			
Vinyl chloride	50.0	U	0.00	54.5	ug/L		109	(70%-130%)			
Xylenes (total)	150	U	0.00	164	ug/L		109	(70%-130%)			
cis-1,2-Dichloroethylene	50.0	U	0.00	55.5	ug/L		111	(70%-130%)			

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QC Summary

Workorder: 365858

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1454155										
n-Butyl alcohol	5000	U	0.00	6070	ug/L		121	(70%-130%)			
trans-1,2-Dichloroethylene	50.0	U	0.00	54.9	ug/L		110	(70%-130%)	CDS1	01/30/15	16:42
**1,2-Dichloroethane-d4	50.0		50.5	50.5	ug/L		101	(77%-123%)			
**Bromofluorobenzene	50.0		52.8	49.8	ug/L		99.7	(80%-120%)			
**Toluene-d8	50.0		45.8	47.6	ug/L		95.3	(80%-120%)			
QC1203254816 365992007 PS											
Propionitrile	250	U	0.00	236	ug/L		94.5	(70%-130%)		01/30/15	17:42
Tetrahydrofuran	250	U	0.00	230	ug/L		92	(70%-130%)			
**1,2-Dichloroethane-d4	50.0		50.5	50.5	ug/L		101	(77%-123%)			
**Bromofluorobenzene	50.0		52.8	53.9	ug/L		108	(80%-120%)			
**Toluene-d8	50.0		45.8	47.7	ug/L		95.3	(80%-120%)			
QC1203254815 365992007 PSD											
1,1,1-Trichloroethane	50.0	U	0.00	55.6	ug/L	0.631	111	(0%-20%)		01/30/15	17:12
1,1,2-Trichloroethane	50.0	U	0.00	50.8	ug/L	4.00	102	(0%-20%)			
1,1-Dichloroethane	50.0	U	0.00	53.4	ug/L	2.00	107	(0%-20%)			
1,1-Dichloroethylene	50.0	U	0.00	53.7	ug/L	0.427	107	(0%-20%)			
1,2-Dichloroethane	50.0	U	0.00	53.1	ug/L	0.226	106	(0%-20%)			
1,4-Dichlorobenzene	50.0	U	0.00	50.6	ug/L	0.690	101	(0%-20%)			
2-Butanone	250	TU	0.00	T 163	ug/L	7.98	65.1 *	(0%-20%)			
4-Methyl-2-pentanone	250	U	0.00	249	ug/L	5.03	99.5	(0%-20%)			
Acetone	250	TU	0.00	T 120	ug/L	4.78	47.8 *	(0%-20%)			
Benzene	50.0	U	0.00	52.0	ug/L	2.19	104	(0%-20%)			
Carbon disulfide	250	U	0.00	272	ug/L	4.30	109	(0%-20%)			
Carbon tetrachloride	50.0	U	0.00	56.0	ug/L	0.465	112	(0%-20%)			

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1454155										
Chlorobenzene	50.0	U	0.00	51.5	ug/L	2.42	103	(0%-20%)	CDS1	01/30/15	17:12
Chloroform	50.0	U	0.00	53.4	ug/L	0.802	107	(0%-20%)			
Ethylbenzene	50.0	U	0.00	53.1	ug/L	3.13	106	(0%-20%)			
Methylene chloride	50.0	U	0.00	48.4	ug/L	1.37	96.9	(0%-20%)			
Tetrachloroethylene	50.0	U	0.00	49.9	ug/L	2.14	99.9	(0%-20%)			
Toluene	50.0	U	0.00	49.6	ug/L	1.70	99.1	(0%-20%)			
Trichloroethylene	50.0	U	0.00	52.5	ug/L	1.98	105	(0%-20%)			
Vinyl chloride	50.0	U	0.00	54.8	ug/L	0.677	110	(0%-20%)			
Xylenes (total)	150	U	0.00	158	ug/L	3.85	105	(0%-20%)			
cis-1,2-Dichloroethylene	50.0	U	0.00	54.0	ug/L	2.87	108	(0%-20%)			
n-Butyl alcohol	5000	U	0.00	5630	ug/L	7.61	113	(0%-20%)			
trans-1,2-Dichloroethylene	50.0	U	0.00	53.3	ug/L	2.88	107	(0%-20%)			
**1,2-Dichloroethane-d4	50.0		50.5	50.5	ug/L		101	(77%-123%)			
**Bromofluorobenzene	50.0		52.8	50.1	ug/L		100	(80%-120%)			
**Toluene-d8	50.0		45.8	47.7	ug/L		95.4	(80%-120%)			
QC1203254817 365992007 PSD											
Propionitrile	250	U	0.00	244	ug/L	3.41	97.8	(0%-20%)		01/30/15	18:12
Tetrahydrofuran	250	U	0.00	239	ug/L	3.76	95.5	(0%-20%)			
**1,2-Dichloroethane-d4	50.0		50.5	50.8	ug/L		102	(77%-123%)			
**Bromofluorobenzene	50.0		52.8	53.5	ug/L		107	(80%-120%)			
**Toluene-d8	50.0		45.8	47.3	ug/L		94.6	(80%-120%)			

Notes:

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QC Summary

Workorder: 365858

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

Mo.Day Yr. 05-FEB-15	Division: Federal	Quality Criteria: SOP	Type: Process
Instrument Type: VOA GC/MS	Test / Method: 8260C	Matrix Type: Liquid	Client Code: CPRC001
Batch ID: 1454155	Sample Numbers: See Below		

Potentially affected work order(s)(SDG): 365758(GEL365758),365858(GEL365858),365860(GEL365860),365992(GEL365992),366005(GEL366005)

Application Issues:

Failed Recovery for MS/MSD, or PS/PSD

Failed Recovery for PS/PSD

**Specification and Requirements
Exception Description:**

DER Disposition:

1. The recovery for Acetone was outside of acceptance limits in the MS and in the MSD performed on sample 365992007.
2. The recovery for 2-Butanone was outside of acceptance limits in the MSD performed on sample 365992007. The recovery was within limits in the MS but near the lower control limit.

1,2. Narrate and report data. The calculated relative percent differences between the MS and MSD were within acceptance limits for all client requested compounds.

Originator's Name:

Crystal Stacey 05-FEB-15

Data Validator/Group Leader:

Kelle Bellamy 18-FEB-15

Semi-Volatile Analysis

Case Narrative

February 23, 2015
GC/MS Semivolatile
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL365858
Work Order #: 365858

Method/Analysis Information

Procedure: Analysis of Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry

Analytical Method: SW846 3510C/8270D

Prep Method: SW846 3510C

Analytical Batch Number: 1453437

Prep Batch Number: 1453436

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 3510C/8270D:

Sample ID	Client ID
365858003	B30174
365858004	B30178
1203252923	MB for batch 1453436
1203252924	Laboratory Control Sample (LCS)
1203252927	365858004(B30178) Matrix Spike (MS)
1203252928	365858004(B30178) Matrix Spike Duplicate (MSD)

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

February 23, 2015

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 365858004 (B30178) was selected for analysis as the matrix spike and matrix spike duplicate.

Spike Recovery Statement

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

MS/MSD Relative Percent Difference (RPD) Statement

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

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. GEL assigns holding times based on the associated methodology that 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.

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

February 23, 2015

Re-extractions or re-analyses were not required in this SDG in this analytical batch unless confirmations or dilutions were required.

Miscellaneous Information:

Data Exception (DER) Documentation

A data exception report (DER) was not generated for sample(s) in this SDG in this batch. A data exception report (DER) was not generated for this SDG.

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

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 following additional comments were required:

Due to rounding differences in the calculation, the data reported in the Surrogate Recovery Report may differ slightly from the raw data. Due to software issue, the raw data may not correctly display the updated SPC limits. Please see Sample Data Summary Report and Surrogate Recovery Report for the correct surrogate acceptance limits.

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:

Instrument ID	Instrument	System Configuration	Column ID	Column Description
MSD5.I	Agilent 6890/5973 GC/MS w/ 7683 Autosampler	HP6890/HP5973	DB-5MS	25m x 0.2mm, 0.33um (5% Phenylmethylpolysiloxane)

Certification Statement

February 23, 2015

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

February 23, 2015

GEL LABORATORIES LLC

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL365858 GEL Work Order: 365858

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: **Barbara Bailey**

Date: **20 FEB 2015**

Title: **Data Validator**

Sample Data Summary

Certificate of Analysis

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S15-001**

Report Date: February 2, 2015

Client Sample ID:	B30174	Project:	CPRC0S15001
Sample ID:	365858003	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	23-JAN-15 12:10		
Receive Date:	27-JAN-15		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatile-GC/MS											
<i>8270_SVOA_GCMS: 1,4 Dioxane (1) "As Received"</i>											
1,4-Dioxane	U	0.00	2.83	9.43	ug/L	1	RMB	01/30/15	1548	1453437	1
123-91-1											

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3510C	3510C BNA Liq. Prep-8270 Analysis	JXS7	01/29/15	1645	1453436

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 3510C/8270D	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
2-Fluorobiphenyl	8270_SVOA_GCMS: 1,4 Dioxane (1) "As Received"	33.1 ug/L	47.2	70.2	(35%-102%)
Nitrobenzene-d5	8270_SVOA_GCMS: 1,4 Dioxane (1) "As Received"	35.7 ug/L	47.2	75.6	(38%-113%)
p-Terphenyl-d14	8270_SVOA_GCMS: 1,4 Dioxane (1) "As Received"	35.7 ug/L	47.2	75.6	(38%-123%)
2,4,6-Tribromophenol	8270_SVOA_GCMS: 1,4 Dioxane (1) "As Received"	50.1 ug/L	94.3	53.1	(33%-126%)
2-Fluorophenol	8270_SVOA_GCMS: 1,4 Dioxane (1) "As Received"	40.3 ug/L	94.3	42.7	(18%-84%)
Phenol-d5	8270_SVOA_GCMS: 1,4 Dioxane (1) "As Received"	27.7 ug/L	94.3	29.3	(10%-110%)

Certificate of Analysis

Company : CH2MHill Plateau Remediation
 Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S15-001**

Report Date: February 2, 2015

Client Sample ID:	B30178	Project:	CPRC0S15001
Sample ID:	365858004	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	23-JAN-15 12:45		
Receive Date:	27-JAN-15		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatile-GC/MS											
<i>8270_SVOA_GCMS: 1,4 Dioxane (1) "As Received"</i>											
1,4-Dioxane	U	0.00	3.00	10.0	ug/L	1	RMB	01/30/15	1619	1453437	1
123-91-1											

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3510C	3510C BNA Liq. Prep-8270 Analysis	JXS7	01/29/15	1645	1453436

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 3510C/8270D	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
2,4,6-Tribromophenol	8270_SVOA_GCMS: 1,4 Dioxane (1) "As Received"	50.6 ug/L	100	50.6	(33%-126%)
2-Fluorophenol	8270_SVOA_GCMS: 1,4 Dioxane (1) "As Received"	40.0 ug/L	100	40.0	(18%-84%)
Phenol-d5	8270_SVOA_GCMS: 1,4 Dioxane (1) "As Received"	26.8 ug/L	100	26.8	(10%-110%)
2-Fluorobiphenyl	8270_SVOA_GCMS: 1,4 Dioxane (1) "As Received"	30.9 ug/L	50.0	61.7	(35%-102%)
Nitrobenzene-d5	8270_SVOA_GCMS: 1,4 Dioxane (1) "As Received"	33.7 ug/L	50.0	67.3	(38%-113%)
p-Terphenyl-d14	8270_SVOA_GCMS: 1,4 Dioxane (1) "As Received"	35.6 ug/L	50.0	71.1	(38%-123%)

Quality Control Summary

February 23, 2015
GEL LABORATORIES LLC

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QC Summary

Report Date: February 2, 2015

Page 1 of 3

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 365858

<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>
Semi-Volatile-GC/MS											
Batch	1453437										
QC1203252924	LCS										
1,4-Dioxane	50.0			31.9	ug/L		63.8	(29%-74%)	RMB	01/30/15	08:57
**2,4,6-Tribromophenol	100			70.7	ug/L		70.7	(33%-126%)			
**2-Fluorobiphenyl	50.0			35.3	ug/L		70.5	(35%-102%)			
**2-Fluorophenol	100			51.0	ug/L		51	(18%-84%)			
**Nitrobenzene-d5	50.0			36.5	ug/L		72.9	(38%-113%)			
**Phenol-d5	100			33.9	ug/L		33.9	(10%-110%)			
**p-Terphenyl-d14	50.0			45.5	ug/L		90.9	(38%-123%)			
QC1203252923	MB										
1,4-Dioxane			U	3.00	ug/L					01/30/15	08:25
**2,4,6-Tribromophenol	100			57.3	ug/L		57.3	(33%-126%)			
**2-Fluorobiphenyl	50.0			34.7	ug/L		69.3	(35%-102%)			
**2-Fluorophenol	100			49.5	ug/L		49.5	(18%-84%)			
**Nitrobenzene-d5	50.0			36.6	ug/L		73.3	(38%-113%)			
**Phenol-d5	100			33.8	ug/L		33.8	(10%-110%)			
**p-Terphenyl-d14	50.0			44.8	ug/L		89.6	(38%-123%)			
QC1203252927	365858004 MS										
1,4-Dioxane	100	U	3.00	87.0	ug/L		87	(27%-94%)		01/30/15	16:51
**2,4,6-Tribromophenol	200		50.6	156	ug/L		77.8	(33%-126%)			
**2-Fluorobiphenyl	100		30.9	79.7	ug/L		79.7	(35%-102%)			
**2-Fluorophenol	200		40.0	149	ug/L		74.6	(18%-84%)			
**Nitrobenzene-d5	100		33.7	84.7	ug/L		84.7	(38%-113%)			

February 23, 2015
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QC Summary

Workorder: 365858

Page 2 of 3

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1453437										
**Phenol-d5	200	26.8		120	ug/L		60	(10%-110%)	RMB	01/30/15	16:51
**p-Terphenyl-d14	100	35.6		94.6	ug/L		94.6	(38%-123%)			
QC1203252928 365858004 MSD											
1,4-Dioxane	100	U	3.00	81.6	ug/L	6.31	81.6	(0%-30%)		01/30/15	17:22
**2,4,6-Tribromophenol	200	50.6		149	ug/L		74.5	(33%-126%)			
**2-Fluorobiphenyl	100	30.9		75.0	ug/L		75	(35%-102%)			
**2-Fluorophenol	200	40.0		140	ug/L		69.8	(18%-84%)			
**Nitrobenzene-d5	100	33.7		81.4	ug/L		81.4	(38%-113%)			
**Phenol-d5	200	26.8		113	ug/L		56.6	(10%-110%)			
**p-Terphenyl-d14	100	35.6		83.2	ug/L		83.2	(38%-123%)			

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)

February 23, 2015
GEL LABORATORIES LLC

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QC Summary

Workorder: 365858

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

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.

Metals Analysis

Case Narrative

February 23, 2015

Metals

Technical Case Narrative

CH2MHill Plateau Remediation Company (CPRC)

SDG #: GEL365858

Work Order #: 365858

Sample ID	Client ID
365858002	B30176
365858003	B30174
365858004	B30178
365858005	B30181
1203252659	Method Blank (MB)ICP
1203252660	Laboratory Control Sample (LCS)
1203252663	365860001(B2YWK0L) Serial Dilution (SD)
1203252661	365860001(B2YWK0S) Matrix Spike (MS)
1203252662	365860001(B2YWK0SD) Matrix Spike Duplicate (MSD)
1203252675	Method Blank (MB)ICP-MS
1203253443	Method Blank (MB)ICP-MS
1203252676	Laboratory Control Sample (LCS)
1203253444	Laboratory Control Sample (LCS)
1203252679	365858002(B30176L) Serial Dilution (SD)
1203253447	365929003(B303L5L) Serial Dilution (SD)
1203252677	365858002(B30176S) Matrix Spike (MS)
1203253445	365929003(B303L5S) Matrix Spike (MS)
1203252678	365858002(B30176SD) Matrix Spike Duplicate (MSD)
1203253446	365929003(B303L5SD) Matrix Spike Duplicate (MSD)

Sample Analysis

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

Method/Analysis Information

Analytical Batch:	1453349, 1453355 and 1453626
Prep Batch :	1453348, 1453354 and 1453625
Standard Operating Procedures:	GL-MA-E-013 REV# 23, GL-MA-E-006 REV# 11 and GL-MA-E-014 REV# 25
Analytical Method:	SW846 3005A/6010C and SW846 3005A/6020A
Prep Method :	SW846 3005A

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

Calibration Information

Instrument Calibration

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

CRDL/PQL Requirements

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

ICSA/ICSAB Statement

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

Continuing Calibration Blanks (CCB) Requirements

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

Continuing Calibration Verification (CCV) Requirements

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

Quality Control (QC) Information

Method Blank (MB) Statement

The method blanks (MB) analyzed with this SDG met the acceptance criteria. The antimony and/or uranium concentration was greater than the MDL in blank . In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data. 1203253443 (MB)-ICP-MS.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Sample Statement

The following samples were selected as the quality control (QC) samples for this SDG: 365860001 (B2YWK0)-ICP, 365858002 (B30176) and 365929003 (B303L5)-ICP-MS.

Matrix Spike (MS/MSD) Recovery Statement

The percent recoveries (%R) obtained from the MS 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.

MS/MSD Relative Percent Difference (RPD) Statement

The relative percent difference (RPD) obtained from the designated matrix spike duplicate (MSD) is evaluated based on acceptance criteria of 20%. The RPD values between qualifying analyte results in the MS and MSD

were within the acceptance limits.

Serial Dilution % Difference Statement

All applicable analytes in the serial dilution (SDILT) demonstrated acceptable correlation to its associated sample and met the established acceptance percent difference criteria.

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.

Sample Dilutions

The samples in this SDG did not require dilutions.

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 was not required for this SDG.

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.

February 23, 2015

GEL LABORATORIES LLC

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL365858 GEL Work Order: 365858

The Qualifiers in this report are defined as follows:

* Duplicate analysis not within control limits

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

D Results are reported from a diluted aliquot of sample.

N Spike Sample recovery is outside control limits.

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

Review/Validation

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

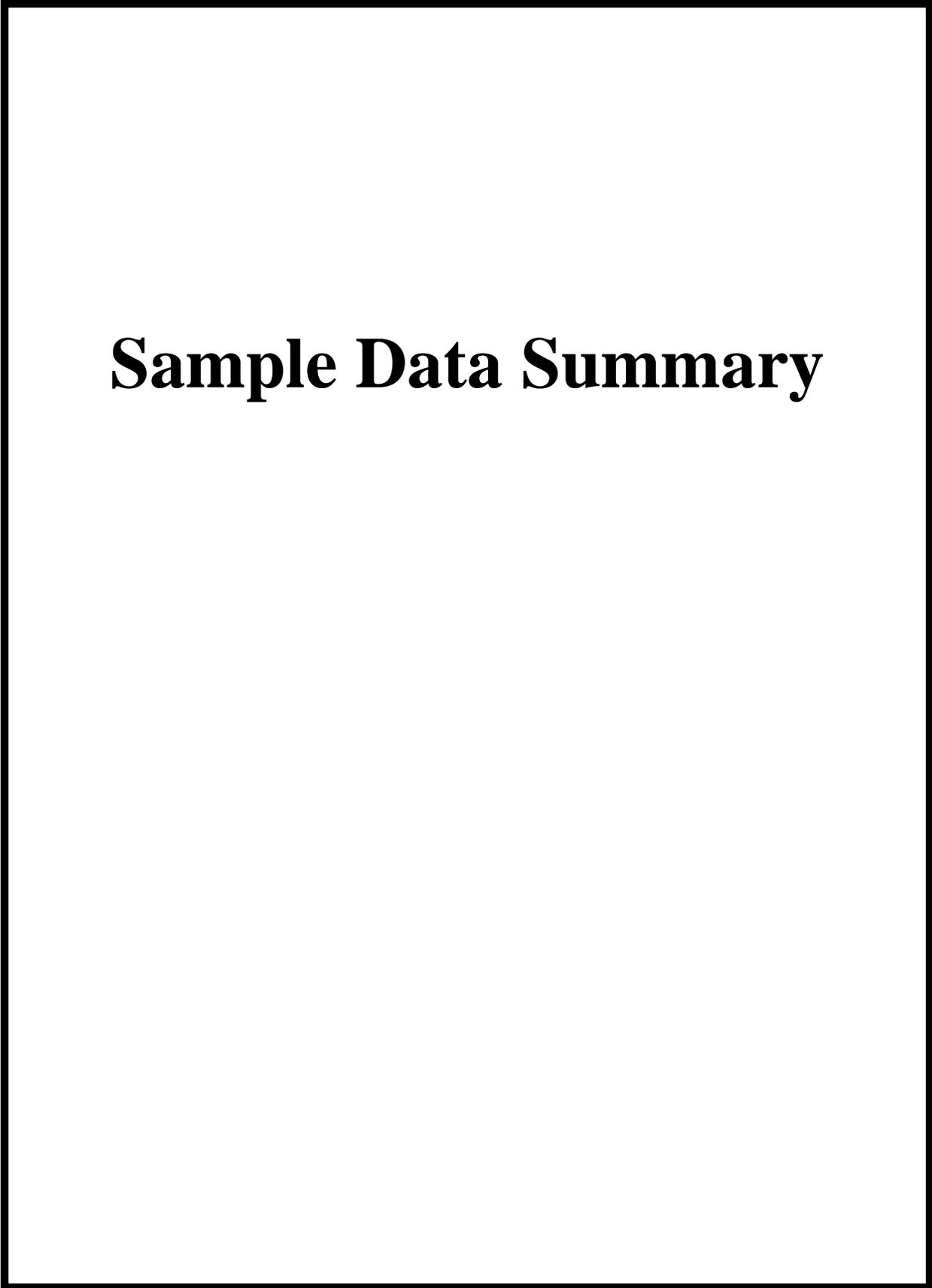
The following data validator verified the information presented in this data report:

Signature: 

Name: Nik-Cole Elmore

Date: 23 FEB 2015

Title: Data Validator



Sample Data Summary

~~February 23, 2015~~
GEL LABORATORIES LLC

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Certificate of Analysis

Company : CH2MHill Plateau Remediation
 Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S15-001**

Report Date: February 23, 2015

Client Sample ID:	B30176	Project:	CPRC0S15001
Sample ID:	365858002	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	23-JAN-15 12:10		
Receive Date:	27-JAN-15		
Collector:	Client		

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP												
<i>6010_METALS_ICP: COMMON "As Received"</i>												
Antimony 7440-36-0	U	-1.83	+/-1.22	3.50	10.0	ug/L	1	HSC	02/09/15	1950	1453349	1
Arsenic 7440-38-2	U	0.684	+/-1.67	5.00	30.0	ug/L	1					
Barium 7440-39-3		74.4	+/-14.9	1.00	5.00	ug/L	1					
Cadmium 7440-43-9	U	0.270	+/-0.338	1.00	5.00	ug/L	1					
Calcium 7440-70-2		71400	+/-14300	50.0	200	ug/L	1					
Chromium 7440-47-3	B	3.50	+/-0.776	1.00	5.00	ug/L	1					
Cobalt 7440-48-4	U	0.369	+/-0.341	1.00	5.00	ug/L	1					
Copper 7440-50-8	U	-0.869	+/-1.01	3.00	10.0	ug/L	1					
Iron 7439-89-6	U	13.3	+/-10.3	30.0	100	ug/L	1					
Manganese 7439-96-5	U	0.748	+/-0.683	2.00	10.0	ug/L	1					
Nickel 7440-02-0		16.8	+/-3.39	1.50	5.00	ug/L	1					
Potassium 7440-09-7		7400	+/-1480	50.0	150	ug/L	1					
Silver 7440-22-4	U	0.165	+/-0.335	1.00	5.00	ug/L	1					
Sodium 7440-23-5		23600	+/-4710	100	300	ug/L	1					
Vanadium 7440-62-2		11.8	+/-2.38	1.00	5.00	ug/L	1					
Zinc 7440-66-6		14.5	+/-3.10	3.30	10.0	ug/L	1					
Magnesium 7439-95-4		15500	+/-3090	110	300	ug/L	1	HSC	02/12/15	1522	1453349	2

Metals Analysis-ICP-MS

Certificate of Analysis

Company : CH2MHill Plateau Remediation
 Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S15-001**

Report Date: February 23, 2015

Client Sample ID: B30176 Project: CPRC0S15001
 Sample ID: 365858002 Client ID: CPRC001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method	
Metals Analysis-ICP-MS												
<i>6020_METALS_ICPMS: Antimony + Arsenic(1) "As Received"</i>												
Antimony 7440-36-0	U	0.297	+/-0.339	1.00	3.00	ug/L	1	BAJ	01/30/15	2046	1453355	3
Arsenic 7440-38-2	B	2.81	+/-0.798	1.70	5.00	ug/L	1					

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	JXM5	01/28/15	0800	1453354
SW846 3005A	SW846 3005A for 6010C	JXM5	01/28/15	0800	1453348

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 3005A/6010C	
2	SW846 3005A/6010C	
3	SW846 3005A/6020A	

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Certificate of Analysis

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S15-001**

Report Date: February 23, 2015

Client Sample ID:	B30174	Project:	CPRC0S15001
Sample ID:	365858003	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	23-JAN-15 12:10		
Receive Date:	27-JAN-15		
Collector:	Client		

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP												
<i>6010_METALS_ICP: COMMON "As Received"</i>												
Antimony 7440-36-0	U	-0.934	+/-1.18	3.50	10.0	ug/L	1	HSC	02/09/15	1953	1453349	1
Arsenic 7440-38-2	U	-0.538	+/-1.67	5.00	30.0	ug/L	1					
Barium 7440-39-3		75.2	+/-15.0	1.00	5.00	ug/L	1					
Cadmium 7440-43-9	U	0.245	+/-0.337	1.00	5.00	ug/L	1					
Calcium 7440-70-2		71900	+/-14400	50.0	200	ug/L	1					
Chromium 7440-47-3		22.7	+/-4.56	1.00	5.00	ug/L	1					
Cobalt 7440-48-4	U	0.396	+/-0.343	1.00	5.00	ug/L	1					
Copper 7440-50-8	U	2.64	+/-1.13	3.00	10.0	ug/L	1					
Iron 7439-89-6		105	+/-23.3	30.0	100	ug/L	1					
Manganese 7439-96-5	B	2.02	+/-0.779	2.00	10.0	ug/L	1					
Nickel 7440-02-0		24.4	+/-4.90	1.50	5.00	ug/L	1					
Potassium 7440-09-7		7480	+/-1500	50.0	150	ug/L	1					
Silver 7440-22-4	U	0.0275	+/-0.333	1.00	5.00	ug/L	1					
Sodium 7440-23-5		23300	+/-4660	100	300	ug/L	1					
Vanadium 7440-62-2		12.4	+/-2.50	1.00	5.00	ug/L	1					
Zinc 7440-66-6		16.3	+/-3.44	3.30	10.0	ug/L	1					
Magnesium 7439-95-4		15600	+/-3120	110	300	ug/L	1	HSC	02/12/15	1525	1453349	2

Metals Analysis-ICP-MS

Certificate of Analysis

Company : CH2MHill Plateau Remediation
 Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S15-001**

Report Date: February 23, 2015

Client Sample ID: B30174 Project: CPRC0S15001
 Sample ID: 365858003 Client ID: CPRC001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method	
Metals Analysis-ICP-MS												
<i>6020_METALS_ICPMS: Antimony + Arsenic(1) "As Received"</i>												
Antimony 7440-36-0	U	0.839	+/-0.373	1.00	3.00	ug/L	1	BAJ	02/20/15	1405	1453626	3
Arsenic 7440-38-2	B	3.58	+/-0.913	1.70	5.00	ug/L	1					

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	JXM5	01/29/15	0800	1453625
SW846 3005A	SW846 3005A for 6010C	JXM5	01/28/15	0800	1453348

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 3005A/6010C	
2	SW846 3005A/6010C	
3	SW846 3005A/6020A	

Certificate of Analysis

Company : CH2MHill Plateau Remediation
 Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S15-001**

Report Date: February 23, 2015

Client Sample ID:	B30178	Project:	CPRC0S15001
Sample ID:	365858004	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	23-JAN-15 12:45		
Receive Date:	27-JAN-15		
Collector:	Client		

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP												
<i>6010_METALS_ICP: COMMON "As Received"</i>												
Antimony 7440-36-0	U	-3.83	+/-1.40	3.50	10.0	ug/L	1	HSC	02/09/15	1956	1453349	1
Arsenic 7440-38-2	U	1.56	+/-1.70	5.00	30.0	ug/L	1					
Barium 7440-39-3		54.5	+/-10.9	1.00	5.00	ug/L	1					
Cadmium 7440-43-9	U	0.0808	+/-0.334	1.00	5.00	ug/L	1					
Calcium 7440-70-2		52300	+/-10500	50.0	200	ug/L	1					
Chromium 7440-47-3	B	2.85	+/-0.661	1.00	5.00	ug/L	1					
Cobalt 7440-48-4	U	-0.0354	+/-0.333	1.00	5.00	ug/L	1					
Copper 7440-50-8	U	-0.826	+/-1.01	3.00	10.0	ug/L	1					
Iron 7439-89-6	U	7.82	+/-10.1	30.0	100	ug/L	1					
Manganese 7439-96-5	U	1.53	+/-0.734	2.00	10.0	ug/L	1					
Nickel 7440-02-0	U	0.911	+/-0.532	1.50	5.00	ug/L	1					
Potassium 7440-09-7		7070	+/-1410	50.0	150	ug/L	1					
Silver 7440-22-4	U	0.519	+/-0.349	1.00	5.00	ug/L	1					
Sodium 7440-23-5		22500	+/-4500	100	300	ug/L	1					
Vanadium 7440-62-2		13.0	+/-2.62	1.00	5.00	ug/L	1					
Zinc 7440-66-6	U	2.23	+/-1.19	3.30	10.0	ug/L	1					
Magnesium 7439-95-4		13900	+/-2770	110	300	ug/L	1	HSC	02/12/15	1528	1453349	2

Metals Analysis-ICP-MS

Certificate of Analysis

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S15-001**

Report Date: February 23, 2015

Client Sample ID:	B30181	Project:	CPRC0S15001
Sample ID:	365858005	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	23-JAN-15 12:45		
Receive Date:	27-JAN-15		
Collector:	Client		

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP												
<i>6010_METALS_ICP: COMMON "As Received"</i>												
Antimony 7440-36-0	U	-1.46	+/-1.20	3.50	10.0	ug/L	1	HSC	02/09/15	2006	1453349	1
Arsenic 7440-38-2	U	-0.151	+/-1.67	5.00	30.0	ug/L	1					
Barium 7440-39-3		56.3	+/-11.3	1.00	5.00	ug/L	1					
Cadmium 7440-43-9	U	-0.0082	+/-0.333	1.00	5.00	ug/L	1					
Calcium 7440-70-2		54000	+/-10800	50.0	200	ug/L	1					
Chromium 7440-47-3	B	3.10	+/-0.704	1.00	5.00	ug/L	1					
Cobalt 7440-48-4	U	0.0607	+/-0.334	1.00	5.00	ug/L	1					
Copper 7440-50-8	U	-1.08	+/-1.02	3.00	10.0	ug/L	1					
Iron 7439-89-6	U	5.75	+/-10.1	30.0	100	ug/L	1					
Manganese 7439-96-5	U	0.289	+/-0.669	2.00	10.0	ug/L	1					
Nickel 7440-02-0	U	0.327	+/-0.504	1.50	5.00	ug/L	1					
Potassium 7440-09-7		7230	+/-1450	50.0	150	ug/L	1					
Silver 7440-22-4	U	0.259	+/-0.337	1.00	5.00	ug/L	1					
Sodium 7440-23-5		23500	+/-4700	100	300	ug/L	1					
Vanadium 7440-62-2		13.4	+/-2.69	1.00	5.00	ug/L	1					
Zinc 7440-66-6	U	-0.275	+/-1.10	3.30	10.0	ug/L	1					
Magnesium 7439-95-4		14100	+/-2820	110	300	ug/L	1	HSC	02/12/15	1537	1453349	2

Metals Analysis-ICP-MS

Certificate of Analysis

Company : CH2MHill Plateau Remediation
 Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S15-001**

Report Date: February 23, 2015

Client Sample ID: B30181 Project: CPRC0S15001
 Sample ID: 365858005 Client ID: CPRC001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS											
<i>6020_METALS_ICPMS: Antimony + Arsenic(1) "As Received"</i>											
Antimony 7440-36-0	U	0.329	+/-0.340	1.00	3.00	ug/L	1	BAJ	01/30/15	2055	1453355 3
Arsenic 7440-38-2	B	3.49	+/-0.898	1.70	5.00	ug/L	1				

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	JXM5	01/28/15	0800	1453354
SW846 3005A	SW846 3005A for 6010C	JXM5	01/28/15	0800	1453348

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 3005A/6010C	
2	SW846 3005A/6010C	
3	SW846 3005A/6020A	

Quality Control Summary

February 23, 2015
GEL LABORATORIES LLC

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QC Summary

Report Date: February 23, 2015

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

Contact: Mr. Scot Fitzgerald

Workorder: 365858

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1453355										
QC1203252676	LCS										
Antimony	50.0			48.6	ug/L		97.2	(80%-120%)	BAJ	01/30/15	20:43
Arsenic	50.0			41.1	ug/L		82.3	(80%-120%)			
QC1203252675	MB										
Antimony			U	ND	ug/L					01/30/15	20:41
Arsenic			U	ND	ug/L						
QC1203252677	365858002	MS									
Antimony	50.0	U	ND	50.0	ug/L		99.5	(75%-125%)		01/30/15	20:48
Arsenic	50.0	B	2.81	43.5	ug/L		81.4	(75%-125%)			
QC1203252678	365858002	MSD									
Antimony	50.0	U	ND	50.7	ug/L	1.33	101	(0%-20%)		01/30/15	20:50
Arsenic	50.0	B	2.81	45.3	ug/L	4.12	85.1	(0%-20%)			
QC1203252679	365858002	SDILT									
Antimony		U	ND DU	ND	ug/L	N/A		(0%-10%)		01/30/15	20:53
Arsenic		B	2.81 DU	ND	ug/L	N/A		(0%-10%)			
Batch	1453626										
QC1203253444	LCS										
Antimony	50.0			52.7	ug/L		105	(80%-120%)	BAJ	02/20/15	14:02
Arsenic	50.0			44.5	ug/L		89.1	(80%-120%)			
QC1203253443	MB										
Antimony			B	1.76	ug/L					02/20/15	14:00
Arsenic			U	ND	ug/L						
QC1203253445	365929003	MS									
Antimony	50.0	U	ND	53.4	ug/L		105	(75%-125%)		02/20/15	14:12
Arsenic	50.0		2.15	47.3	ug/L		90.3	(75%-125%)			
QC1203253446	365929003	MSD									

February 23, 2015
GEL LABORATORIES LLC

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QC Summary

Workorder: 365858

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1453626										
Antimony	50.0	U	ND	53.6	ug/L	0.366	106	(0%-20%)		02/20/15	14:14
Arsenic	50.0		2.15	48.9	ug/L	3.34	93.5	(0%-20%)	BAJ		
QC1203253447 365929003 SDILT											
Antimony		U	ND DU	ND	ug/L	N/A		(0%-10%)		02/20/15	14:19
Arsenic			2.15 DU	ND	ug/L	N/A		(0%-10%)			
Metals Analysis-ICP											
Batch	1453349										
QC1203252660 LCS											
Antimony	500			499	ug/L		99.7	(80%-120%)	HSC	02/09/15	19:34
Arsenic	500			516	ug/L		103	(80%-120%)			
Barium	500			513	ug/L		103	(80%-120%)			
Cadmium	500			515	ug/L		103	(80%-120%)			
Calcium	5000			5250	ug/L		105	(80%-120%)			
Chromium	500			518	ug/L		104	(80%-120%)			
Cobalt	500			532	ug/L		106	(80%-120%)			
Copper	500			509	ug/L		102	(80%-120%)			
Iron	5000			5020	ug/L		100	(80%-120%)			
Magnesium	5000			5180	ug/L		104	(80%-120%)		02/12/15	15:06
Manganese	500			510	ug/L		102	(80%-120%)		02/09/15	19:34
Nickel	500			512	ug/L		102	(80%-120%)			
Potassium	5000			5270	ug/L		105	(80%-120%)			
Silver	500			499	ug/L		99.7	(80%-120%)			
Sodium	5000			5030	ug/L		101	(80%-120%)			
Vanadium	500			528	ug/L		106	(80%-120%)			

February 23, 2015
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QC Summary

Workorder: 365858

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1453349										
Zinc	500			501	ug/L		100	(80%-120%)			
QC1203252659	MB										
Antimony			U	ND	ug/L				HSC	02/09/15	19:31
Arsenic			U	ND	ug/L						
Barium			U	ND	ug/L						
Cadmium			U	ND	ug/L						
Calcium			U	ND	ug/L						
Chromium			U	ND	ug/L						
Cobalt			U	ND	ug/L						
Copper			U	ND	ug/L						
Iron			U	ND	ug/L						
Magnesium			U	ND	ug/L					02/12/15	15:03
Manganese			U	ND	ug/L					02/09/15	19:31
Nickel			U	ND	ug/L						
Potassium			U	ND	ug/L						
Silver			U	ND	ug/L						
Sodium			U	ND	ug/L						
Vanadium			U	ND	ug/L						
Zinc			U	ND	ug/L						
QC1203252661	365860001 MS										
Antimony	500	U	ND	512	ug/L		102	(75%-125%)		02/09/15	19:41
Arsenic	500	U	ND	524	ug/L		105	(75%-125%)			
Barium	500	U	ND	522	ug/L		104	(75%-125%)			
Cadmium	500	U	ND	522	ug/L		104	(75%-125%)			

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1453349										
Calcium	5000	U	ND	5310	ug/L		106	(75%-125%)	HSC	02/09/15	19:41
Chromium	500	U	ND	530	ug/L		106	(75%-125%)			
Cobalt	500	U	ND	541	ug/L		108	(75%-125%)			
Copper	500	U	ND	520	ug/L		104	(75%-125%)			
Iron	5000	U	ND	5180	ug/L		104	(75%-125%)			
Magnesium	5000	U	ND	5550	ug/L		111	(75%-125%)		02/12/15	15:12
Manganese	500	U	ND	520	ug/L		104	(75%-125%)		02/09/15	19:41
Nickel	500	U	ND	522	ug/L		104	(75%-125%)			
Potassium	5000	U	ND	5310	ug/L		106	(75%-125%)			
Silver	500	U	ND	507	ug/L		101	(75%-125%)			
Sodium	5000	U	ND	4970	ug/L		99.2	(75%-125%)			
Vanadium	500	U	ND	539	ug/L		108	(75%-125%)			
Zinc	500	U	ND	510	ug/L		102	(75%-125%)			
QC1203252662 365860001 MSD											
Antimony	500	U	ND	509	ug/L	0.450	102	(0%-20%)		02/09/15	19:44
Arsenic	500	U	ND	527	ug/L	0.529	105	(0%-20%)			
Barium	500	U	ND	521	ug/L	0.0614	104	(0%-20%)			
Cadmium	500	U	ND	522	ug/L	0.00766	104	(0%-20%)			
Calcium	5000	U	ND	5310	ug/L	0.0226	106	(0%-20%)			
Chromium	500	U	ND	530	ug/L	0.00	106	(0%-20%)			
Cobalt	500	U	ND	541	ug/L	0.0499	108	(0%-20%)			
Copper	500	U	ND	520	ug/L	0.0442	104	(0%-20%)			

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1453349										
Iron	5000	U	ND	5180	ug/L	0.124	104	(0%-20%)	HSC	02/09/15	19:44
Magnesium	5000	U	ND	5420	ug/L	2.38	108	(0%-20%)		02/12/15	15:15
Manganese	500	U	ND	520	ug/L	0.106	104	(0%-20%)		02/09/15	19:44
Nickel	500	U	ND	523	ug/L	0.0517	104	(0%-20%)			
Potassium	5000	U	ND	5360	ug/L	0.836	107	(0%-20%)			
Silver	500	U	ND	507	ug/L	0.0651	101	(0%-20%)			
Sodium	5000	U	ND	4940	ug/L	0.594	98.6	(0%-20%)			
Vanadium	500	U	ND	539	ug/L	0.0353	108	(0%-20%)			
Zinc	500	U	ND	510	ug/L	0.0471	102	(0%-20%)			
QC1203252663 365860001 SDILT											
Antimony		U	ND DU	ND	ug/L	N/A		(0%-10%)		02/09/15	19:47
Arsenic		U	ND DU	ND	ug/L	N/A		(0%-10%)			
Barium		U	ND DU	ND	ug/L	N/A		(0%-10%)			
Cadmium		U	ND DU	ND	ug/L	N/A		(0%-10%)			
Calcium		U	ND DU	ND	ug/L	N/A		(0%-10%)			
Chromium		U	ND DU	ND	ug/L	N/A		(0%-10%)			
Cobalt		U	ND DU	ND	ug/L	N/A		(0%-10%)			
Copper		U	ND DU	ND	ug/L	N/A		(0%-10%)			
Iron		U	ND DU	ND	ug/L	N/A		(0%-10%)			
Magnesium		U	ND DU	ND	ug/L	N/A		(0%-10%)		02/12/15	15:18
Manganese		U	ND DU	ND	ug/L	N/A		(0%-10%)		02/09/15	19:47
Nickel		U	ND DU	ND	ug/L	N/A		(0%-10%)			

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QC Summary

Workorder: 365858

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1453349										
Potassium	U	ND	DU	ND	ug/L	N/A		(0%-10%)	HSC	02/09/15	19:47
Silver	U	ND	DU	ND	ug/L	N/A		(0%-10%)			
Sodium	U	ND	DU	ND	ug/L	N/A		(0%-10%)			
Vanadium	U	ND	DU	ND	ug/L	N/A		(0%-10%)			
Zinc	U	ND	D	4.12	ug/L	N/A		(0%-10%)			

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.

General Chem Analysis

Case Narrative

**General Chemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL365858
Work Order #: 365858**

Method/Analysis Information

Product: Carbon and Total Organic

Analytical Batch: 1453607

Method: 9060_TOC: COMMON

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 9060A:

Sample ID	Client ID
365858003	B30174
365858004	B30178
1203253389	Method Blank (MB)
1203253390	Laboratory Control Sample (LCS)
1203253392	365858004(B30178) Sample Duplicate (DUP)
1203253394	365858004(B30178) Post Spike (PS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-093 REV# 12.

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 Carbon analysis was performed on a O-I Analytical Model 1010 Total Organic Carbon Analyzer.

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.

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

Sample365858004 (B30178) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

The 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

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:

February 23, 2015

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

Method/Analysis Information

Product: Ammonia Nitrogen
Analytical Batch: 1452820 **Method:** 350.1_AMMONIA: COMMON
Prep Batch : 1452819 **Method:** EPA 350.2 Prep

Sample Analysis

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

Sample ID	Client ID
365858003	B30174
365858004	B30178
1203251177	Method Blank (MB)
1203251178	Laboratory Control Sample (LCS)
1203251183	365755001(B30168) Sample Duplicate (DUP)
1203251184	365755001(B30168) Matrix Spike (MS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-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 1203251177 (MB) analyzed with this SDG met the acceptance criteria. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample365755001 (B30168) was selected for QC analysis.

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

The matrix spike recovered outside of the established acceptance limits due to matrix interference. 1203251184 (B30168MS).

Duplicate Relative Percent Difference (RPD) Statement

The values for the sample and duplicate are less than the Practical Quantitation Limit (PQL); therefore, the RPD is not applicable. 1203251183 (B30168DUP).

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

The following DER was generated for this SDG: 1378032. 1203251184 (B30168MS).

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: COD
Analytical Batch: 1453379 **Method:** 410.4_COD: COMMON

Sample Analysis

The following samples were analyzed using the analytical protocol as established in EPA 410.4:

Sample ID	Client ID
365858003	B30174
365858004	B30178
1203252746	Method Blank (MB)
1203252747	Laboratory Control Sample (LCS)
1203252750	365858003(B30174) Sample Duplicate (DUP)
1203252751	365858003(B30174) Matrix Spike (MS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-061 REV# 18.

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

Sample365858003 (B30174) was selected for QC analysis.

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

The matrix spike recovered outside of the established acceptance limits due to matrix interference. 1203252751 (B30174MS).

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

The following DER was generated for this SDG: 1376910. 1203252751 (B30174MS).

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.

February 23, 2015

GEL LABORATORIES LLC

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

**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL365858 GEL Work Order: 365858

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.
- 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 FEB 2015

Title: Data Validator

Sample Data Summary

Certificate of Analysis

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S15-001**

Report Date: February 23, 2015

Client Sample ID:	B30174	Project:	CPRC0S15001
Sample ID:	365858003	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	23-JAN-15 12:10		
Receive Date:	27-JAN-15		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis											
<i>9060_TOC: COMMON "As Received"</i>											
Total Organic Carbon #1	B	471	330	1000	ug/L	1	TSM	01/30/15	1539	1453607	1
Total Organic Carbon #2	B	597	330	1000	ug/L	1					
Total Organic Carbon #3	B	609	330	1000	ug/L	1					
Total Organic Carbon #4	B	463	330	1000	ug/L	1					
Total Organic Carbon Average	B	535	330	1000	ug/L	1					
Nutrient Analysis											
<i>350.1_AMMONIA: COMMON "As Received"</i>											
Nitrogen, Ammonia 7664-41-7	BC	21.8	+/-5.71	17.0	50.0	ug/L	1	KLP1	02/02/15	1220	1452820 2
Spectrometric Analysis											
<i>410.4_COD: COMMON "As Received"</i>											
COD		97500	6670	20000	ug/L	1	SXC5	01/28/15	1508	1453379	3

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.2 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	02/02/15	1125	1452819

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 9060A	
2	EPA 350.1	
3	EPA 410.4	

Certificate of Analysis

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S15-001**

Report Date: February 23, 2015

Client Sample ID:	B30178	Project:	CPRC0S15001
Sample ID:	365858004	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	23-JAN-15 12:45		
Receive Date:	27-JAN-15		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis											
<i>9060_TOC: COMMON "As Received"</i>											
Total Organic Carbon #1	B	602	330	1000	ug/L	1	TSM	01/30/15	1612	1453607	1
Total Organic Carbon #2	B	601	330	1000	ug/L	1					
Total Organic Carbon #3	B	621	330	1000	ug/L	1					
Total Organic Carbon #4	B	579	330	1000	ug/L	1					
Total Organic Carbon Average	B	601	330	1000	ug/L	1					
Nutrient Analysis											
<i>350.1_AMMONIA: COMMON "As Received"</i>											
Nitrogen, Ammonia 7664-41-7	BC	48.7	+/-5.89	17.0	50.0	ug/L	1	KLP1	02/02/15	1221	1452820 2
Spectrometric Analysis											
<i>410.4_COD: COMMON "As Received"</i>											
COD	U	-2470	6670	20000	ug/L	1	SXC5	01/28/15	1510	1453379	3

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.2 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	02/02/15	1125	1452819

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 9060A	
2	EPA 350.1	
3	EPA 410.4	

Quality Control Summary

February 23, 2015
GEL LABORATORIES LLC

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

QC Summary

Report Date: February 23, 2015

Page 1 of 2

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 365858

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Carbon Analysis											
Batch	1453607										
QC1203253392	365858004	DUP									
Total Organic Carbon Average		B	601	B	599	ug/L	0.333 ^	(+/-1000)	TSM	01/30/15	16:46
QC1203253390	LCS										
Total Organic Carbon Average	10000				9830	ug/L		98.3 (85%-115%)		01/30/15	15:30
QC1203253389	MB										
Total Organic Carbon Average				U	330	ug/L				01/30/15	15:21
QC1203253394	365858004	PS									
Total Organic Carbon Average	10.0	B	0.601		10.4	mg/L		98.4 (65%-120%)		01/30/15	17:06
Nutrient Analysis											
Batch	1452820										
QC1203251183	365755001	DUP									
Nitrogen, Ammonia		NU	17.0	U	17.0	ug/L	N/A		KLP1	02/02/15	12:18
QC1203251178	LCS										
Nitrogen, Ammonia	1000				1060	ug/L		106 (90%-110%)		02/02/15	12:06
QC1203251177	MB										
Nitrogen, Ammonia				B	33.5	ug/L				02/02/15	12:06
QC1203251184	365755001	MS									
Nitrogen, Ammonia	1000	NU	17.0	N	1260	ug/L		125* (90%-110%)		02/02/15	12:19
Spectrometric Analysis											
Batch	1453379										
QC1203252750	365858003	DUP									
COD			97500		100000	ug/L	2.66 ^	(+/-20000)	SXC5	01/28/15	15:09
QC1203252747	LCS										
COD	500000				505000	ug/L		101 (90%-110%)		01/28/15	15:04
QC1203252746	MB										
COD				U	6670	ug/L				01/28/15	15:04
QC1203252751	365858003	MS									
COD	500000		97500		521000	ug/L		84.7* (90%-110%)		01/28/15	15:09

Notes:

February 23, 2015
GEL LABORATORIES LLC

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

QC Summary

Workorder: 365858

Page 2 of 2

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

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

Mo.Day Yr. 28-JAN-15	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: VIS SPEC HIGH	Test / Method: EPA 410.4, HACH 8000	Matrix Type: Liquid	Client Code: CBMW, CPRC, HASS, LATA,
Batch ID: 1453379	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 365668(GEL365668),365755(GEL365755),365858(GEL365858)			
Application Issues: Failed Recovery for MS/MSD, or PS/PSD			
Specification and Requirements Exception Description:		DER Disposition:	
1. Failed Recovery for MS: QC 1203252751MS		1. The spike recovery falls outside of the established acceptance limits due to matrix interference.	

Originator's Name:

Sarah Carson 28-JAN-15

Data Validator/Group Leader:

Elzbieta Szulc 29-JAN-15

DATA EXCEPTION REPORT

Mo.Day Yr. 02-FEB-15	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: LACHAT Flow Injection Analyzer	Test / Method: EPA 350.1, EPA 350.1 SC	Matrix Type: Liquid	Client Code: ALBR, CPRC, ESHL, GRSD,
Batch ID: 1452820	Sample Numbers: See Below		
<p>Potentially affected work order(s)(SDG): 365668(GEL365668),365746(2015-698),365755(GEL365755),365858(GEL365858),365874,365982,366001,366038(V4025),366061,366091</p> <p>Application Issues:</p> <p>Failed Recovery for MS/MSD, or PS/PSD</p>			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Failed Recovery for MS/PS:</p> <p>QC 1203251182MS,1203251184MS</p>		<p>1. The spike recovery falls outside of the established acceptance limits due to matrix interference.</p>	

Originator's Name:
Kristen Parson 02-FEB-15

Data Validator/Group Leader:
Aubrey Kingsbury 02-FEB-15

Radiological Analysis

February 23, 2015

Radiochemistry

Technical Case Narrative

CH2MHill Plateau Remediation Company (CPRC)

SDG #: GEL365858

Work Order #: 365858

"
"
"

Method/Analysis Information

"

Product: 9310_ALPHABETA_GPC: COMMON

Cpcnf \decn'O gjf qf <" GRC"; 22ØIU Y : 68"; 532

Cpcnf \decn'Dcvej 'P wo dgt<" 3676878

"

Sample ID "" Client ID

587: 7: 223" " D52363

34254799: 8"" O D'hqt'dcvej '3676878

34254799: 2"" Ncdqtcvqt { 'Eqpvtqnl'Uco r ng'*NEU+

34254799: 9"" 587; ; 4229*D523; 7+'Uco r ng'F wr rkecvg'*F WR+

34254799: : "" 587; ; 4229*D523; 7+'O cvtkz 'Ur knq'*O U+

34254799: ; "" 587; ; 4229*D523; 7+'O cvtkz 'Ur knq'F wr rkecvg'*O UF +

"

Vj g'ucor rgu'lp'vj ku'UF I 'y gtg'cpcnf| gf "qp'cp"\$cu'tgegkxgf '\$'dcuku0"

"

SOP Reference"

Rtqegf wtg'hqt'r tgr ctcvkqp."cpcnf uku'cpf 'tgr qt vki 'qh'cpcnf \decn'f cvc'ctg'eqpvtqmgf 'd { 'I GN'Ncdqtcvqt lgu'NNE'cu Ucpf ctf 'Qr gtcvki 'Rtqegf wtg'*UQR+ØVj g'f cvc'f kuewugf 'lp'vj ku'pcttcvkxg'j cu'dggp'cpcnf| gf 'lp'ceeqtfcpeg'y kj I N/TCF/C/223'TGX%3: 0"

Calibration Information:

"

Calibration Information"

Cml'pklcni'cpf "eqp'vkwpi "ecrkdtevkp'tgs vktgo gpw'j cxg'dggp'o gv0"

"

Standards Information"

Ucpf ctf "uq'vkwpu'hqt'vj gug'cpcnf uku'ctg'P KUV'tcegcdrg'qt'xgt'kkgf 'y kj "c'P KUV'tcegcdrg'ucpf ctf 'cpf'wugf dghqt'vj g'gzr ktcvkp'f cvgu0"

"

Sample Geometry"

Cml'eqwvki "uq'wtegu'y gtg'r tgr ctgf 'lp'vj g'ucor g'f gqo gvt { 'cu'vj g'ecrkdtevkp'ucpf ctf u0"

Quality Control (QC) Information:

"

Blank Information"

Vj g'drcp'vkwpi g'ku'tgr tggp'vkwg'qh'vj g'ucor r ng'xq'vkw g'lp'vj ku'dcvej 0"

"

Designated QC"

Vj g'hq'vki 'ucor r ng'y cu'wugf 'hqt'S E<587; ; 4229*D523; 7+0"

"

QC Information"

Cml'qh'v'j g'S E'uco r ngu'o gv'y'j g'tgs wkt gf 'ceegr vcepg'hko ku0"

Technical Information:"

"

Holding Time"

Cml'uco r ng'r tqegf wt gu'hqt'vj ku'uco r ng'ugv'y gt g'r gthqto gf 'y kj kp'vj g'tgs wkt gf 'j qrf kpi 'vko g0"

"

Sample Re-prep/Re-analysis"

P qpg'qh'vj g'uco r ngu'lp'vj ku'uco r ng'ugv'tgs wkt gf 'tgr tgr 'qt'tgcpncf uku0"

"

Chemical Recoveries"

Cml'ej go lecn'tgeqxtgku'o ggv'y'j g'tgs wkt gf 'ceegr vcepg'hko ku'hqt'vj ku'uco r ng'ugv0"

"

Gross Alpha/Beta Preparation Information"

J ki j 'j { i tqeqr le'ucn'eqpv'p'lp'g'xcr qtcv'gf 'uco r ngu'ecp'ecwug'vj g'uco r ng'o cuu'vq'hmwewcvg'f'wg'vq'o qkuwtg
cduqtr vqp0'Vq'o kpo k' g'vj ku'lp'v'gthgt'gpeg.'vj g'ucnu'ctg'eqpxgtv'gf 'vq'qz'kf'gu'd'{'j gcv'kpi 'vj g'uco r ng'v'pf'gt'c'h'ro g
wp'k'c'f'wnt'gf 'eqm't'ku'qdv'cl'p'gf'0'Vj g'eqpxgt'uk'p'v'q'qz'kf'gu'ucd'k'k'gu'vj g'uco r ng'y'g'ki j v'c'pf 'g'puwt'gu'vj cv'r tqr gt
c'r j c'ldgc'g'h'le'k'p'el'gu'ct'g'cu'ki p'gf 'hqt'g'cej 'uco r ng'0'X'q'nc'v'k'g't'cf'k'q'ku'q'qr'gu'q'h'ect'd'qp.'j { f't'qi'gp.'v'gej'p'g'k'wo .
r'q'p'k'wo 'c'pf 'eguk'wo 'o c'{'d'g'h'qu'v'f'wt'k'pi 'uco r ng'j' gcv'kpi 0"

"

Recounts"

Uco r ngu'34254799: : *D523; 70 U+'cpf '34254799: ; *D523; 70 UF +'y gt g'tgeqwpv'gf 'f'wg'vq'j' ki j 'tgeqxtg {0'Vj g
tgeqwpw'ctg'tgr qt'v'gf 0"

Miscellaneous Information:"

"

Data Exception (DER) Documentation"

F'cvc'g'ze'gr v'k'p't'gr q'tu'ct'g'i' g'p'gt'cv'gf 'vq'f'q'ewo g'p'v'c'p'{'r' tqegf wt'c'rl'c'p'q'o c'r'ku'v'j cv'o c'{'f' g'x'k'v'g'h't'q'o 't'g'h't'g'p'eg'f
UQR'qt'eq'p't'ce'w'cn'f'q'ewo g'p'w'0'c'f'cvc'g'ze'gr v'k'p't'gr q't'v'F'GT +'y cu'p'q'v'i' g'p'gt'cv'gf 'hqt'vj ku'UF I 0"

"

"

Sample-Specific MDA/MDC"

Vj g'O F C I O F E 'tgr qt'v'gf 'qp'vj g'egt'v'k'ec'v'g'q'h'c'p'nc'f' uku'ku'c'uco r ng'ur'ge'k'he'O F C I O F E 0"

"

Additional Comments"

Vj g'o cv't'k'z'ur'kng'c'p'f' 'o cv't'k'z'ur'kng'f'w'r'k'ec'v'g.'34254799: : *D523; 70 U+'cpf '34254799: ; *D523; 70 UF +
c'rk'v'q'u'y'gt'g't'gf'w'eg'f'v'q'eq'pu'gt'x'g'uco r ng'x'q'n'wo g0"

Qualifier Information"

"

O'c'p'w'cn's'w'c'h'k'g't'u'y'gt'g'p'q'v't'gs'w'k't'gf 0"

"

"

"

Method/Analysis Information"

"

Product: TRITIUM_DIST_LSC: COMMON

C'p'nc'f'v'k'ec'ri'O'g'v'j'q'f'<' GRC'; 280'O'q'f'k'k'g'f

C'p'nc'f'v'k'ec'ri'D'c'v'ej'P'w'o'd'gt'<' 3676464

"

Sample ID "" Client ID

587: 7: 223"" D52363
3425477269"" O D'hqt'dcvej '3676464
3425477272"" Ncdqtcvqt { 'Eqpvtqnl'Uco r ig'*NEU+
342547726: "" 587; ; 4229*D523; 7+'Uco r ig'F wr rkecvg'*F WR+
342547726; "" 587; ; 4229*D523; 7+'O cxtkz'Ur knq'*O U+

"

Vj g'uco r rgu'lp'y ku'UF I 'y gtg'cpcn{ | gf 'qp'cp'\$cu'tgeglxgf '\$dcuku0"

"

SOP Reference""

Rtqegf wtg'hqt'r tgr ctv'kq. 'cpcn{ uku'cpf 'tgr qt v'kpi 'qh'cpcn{ v'ecrnf cvc'ctg'eqpvtqmgf 'd{ 'I GN'Ncdqtcvqt'kgu'NNE'cu
Ucpcf ctf 'Qr gtcv'kpi 'Rtqegf wtg'*UQR+0'Vj g'f cvc'f k'uewungf 'lp'y'j ku'pcttcv'kxg'j' cu'dggp'cpcn{ | gf 'lp'cee'qtf cpeg'y'kj
I N/TCF/C/224'TGX%430"

Calibration Information:"

"

Calibration Information""

Cml'p'k'k'c'c'p'f 'eqp'v'k'p'k'p' 'ecr'k'c'v'k'p' 'tgs' w'k't'go' gpw'j' cxg'dggp'o' g'0"

"

Standards Information""

Ucpcf ctf 'uq'rw'k'p'u'hqt'y'j' g'ug'c'p'c'n{ uku'ctg'P'KUV't'cegcdng'qt'xgt'k'h'gf'y'kj' 'c'P'KUV't'cegcdng'uc'p'f'ctf' 'c'p'f' 'w'ug'f
d'gh'q't'g'y'j' g'z'r'k'c'v'k'p'f'c'v'g'u'0"

"

Sample Geometry""

Cml'eq'w'p'v'k'p' 'uq'w'eg'u'y'j' g't'g'r' t'g'r' c't'g'f' 'lp'y'j' g'uco' g'i' g'q'o' g'v' { 'cu'y'j' g'ecr'k'c'v'k'p' 'uc'p'f'ctf' u'0"

Quality Control (QC) Information:"

"

Blank Information""

Vj g'd'r'c'p'n'x'q'n'w'o' g'ku't'g'r' t'g'ug'p'v'c'k'x'g'q'h'y'j' g'uco' r' r'g'x'q'n'w'o' g'lp'y'j' ku'dcvej' 0"

"

Designated QC""

Vj g'h'q'm'y' k'p'i' 'uco' r' r'g'y' cu'w'ug'f' 'hqt'S' E-<587; ; 4229*D523; 7+0"

"

QC Information""

Cml'q'h'y'j' g'S' E'uco' r' r'gu'o' g'v'y'j' g't'gs' w'k't'gf' 'ce'eg'r' v'c'p'eg' 'r'ko' ku'0"

Technical Information:"

"

Holding Time""

Cml'uco' r' r'g'r' t'q'eg'f' w't'gu'hqt'y'j' ku'uco' r' r'g'ug'v'y'j' g't'g'r' g't'h'q't'o' g'f' 'y'kj' k'p'y'j' g't'gs' w'k't'gf' 'j' q'f' k'p'i' 'v'ko' g'0"

"

Sample Re-prep/Re-analysis""

P'q'p'g'q'h'y'j' g'uco' r' r'gu'lp'y'j' ku'uco' r' r'g'ug'v't'gs' w'k't'gf' 't'g'r' t'g'r' 'q't' 't'g'c'p'c'n{ uku'0"

"

Recounts""

Uco' r' r'g'587: 7: 223*D52363+'y' cu't'ge'q'w'p'v'g'f' 'v'q'x'g't'k'h'f' 'uco' r' r'g't'g'u'w'n'0'Vj' g't'ge'q'w'p'v't'g'u'w'n'ku'uko' k'r'c't' 'v'q'y'j' g'
q't'k'i' k'p'c'n't'g'u'w'n'0'Q't'k'i' k'p'c'n't'g'u'w'n'ku't'g'r' q't'v'g'f' 0"

Miscellaneous Information:"

"

Data Exception (DER) Documentation""

F'c'v'c'z'g'e'z'r' v'k'p' 't'g'r' q't'u'c't'g'i' g'p'g't'c'v'g'f' 'v'q'f' q'ew'o' g'p'v'c'p' { 'r' t'q'eg'f' w't'c'n'l'c'p'q'o' c'r'k'g'u'y'j' c'v'o' c' { 'f' g'x'k'c'v'g' 'h'q'o' 't'g'h't'g'p'eg'f

February 23, 2015

UQR'qt'eqptcewcnf qewo gpw0C'f cvc"gzegr vkp'tgr qt v*F GT +y cu'pqvi gpgtcvgf 'hqt'y ku'UF I 0"

"

"

Sample-Specific MDA/MDC"

Vj g'O F C I O F E'tgr qt vgf "qp'y g'egt vhecvg"qh'cpcn{ uku'ku'c'uco r ng/ur gekhe'O F C I O F E0"

"

Additional Comments"

Cffk kqpcn'eqo o gpw'y gtg'pqv'tgs wktgf 'hqt'y ku'uco r ng'ug0"

Qualifier Information"

"

O cpwcn's wcn'htu'y gtg'pqv'tgs wktgf 0"

"

"

"

Certification Statement"

"

Y j gtg'y g'cpcn{ vlcen'o gj qf 'j cu'dggp'r gthqto gf 'wvf gt 'P GNC R'egt vhecvkq. 'yj g'cpcn{ uku'j cu'o gv'cm'qh'y g tgs wktgo gpw'qh'y g'P GNCE'ucpf ctf "wprguu'qyj gty kug'pqv'gf 'lp'y g'cpcn{ vlcen'ecug'pcttcvkg0"

February 23, 2015

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**Qualifier Definition Report
for**

ERTE223'EJ 4O J km'Rrcvcw'Tgo gf kvcqp'Ego r cp{
ErkpvUF I <I GN587: 7: "I GN"Y qtm'Qtf gt<587: 7:

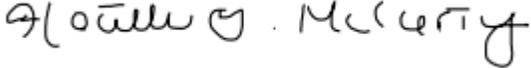
The Qualifiers in this report are defined as follows:

W""Cpcn{ | gf 'hqt'dw'pqv'f gvev'f'cdq'xg'ho k'kpi "etkgt'k'k'pen'f'gu'OFN.'OFC.'RS N.'| gtq.'eqwp'kpi "gttqt.'cpf'vqcn
cpcn{ v'ecr'gttqt0

Review/Validation

I GN'tgs w'k'gu'cm'cpcn{ v'ecr'f'cvc'q'dg'xgt'k'k'f' "d{ "c's w'k'k'f' "f'cvc'tgx'k'gy'gt0" k'p'c'f'f'k'k'p.'cm'ENR'k'k'ng'f'gr'k'x'g'cd'ng'u
t'geg'k'g'c'v'j'k'f' "g'x'gn't'g'x'k'gy' "q'h'v'j'g' "t'c'v'k'p'c'n'f'cvc'r'c'c'c'i'g0"

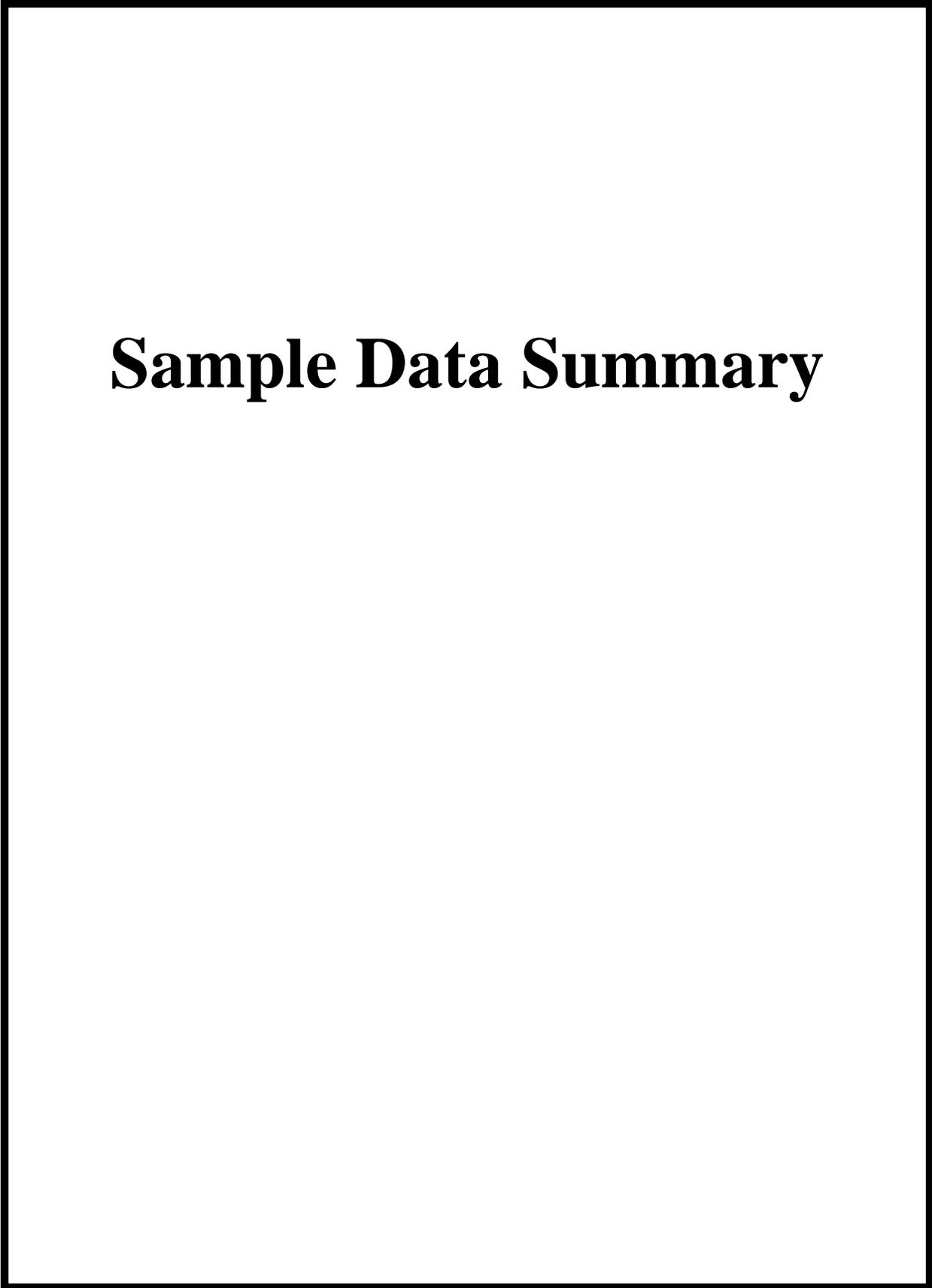
Vj'g'hq'm'y'k'p'i "f'cvc'x'c'r'f'c'v'q't'x'g't'k'k'f' "v'j'g' "k'p'q'to'c'v'k'p'r't'g'g'p'v'g'f' "k'p'v'j'k'u'f'cvc't'g'r'q't'v'

Signature: 

Name: Heather McCarty

Date: 13 FEB 2015

Title: Analyst II



Sample Data Summary

Certificate of Analysis

Eqo rcp{ "< EJ 40J kmRrcvrgwTgo gf kcvkp
 Eqo rcp{
 Cfftguu{ "< O UKP 'T5/72'EJ RTE
 RQ'Dqz'3822
 Tlej rcpf. "Y cuj lpi vqp"; ; 574
 Eqpvcev< O t0UeqvHksj i gtrcf
 Rtqlgev< EJ RTE'UCHU37/223

Tgr qtvF cvg< Hgdtwct{ "35.'4237

ErkpvUco r rg'KF <	D52363	Rtqlgev<	ERTE2U37223
Uco r rg'KF <	587: 7: 223	Erkpv'KF <	ERTE223
O ctkz<	Y CVGT		
EqmgevF cvg<	45/ICP/37		
T gegkxg'F cvg<	49/ICP/37		
Eqmgevqt<	Erkpv		

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time Batch	Mtd.
-----------	-----------	--------	-------------	-----	-----	----	-------	----	---------	------	------------	------

Rad Gas Flow Proportional Counting

9310_ALPHABETA_GPC: COMMON "As Received"

Cn j c		; 054	- 1/405	40 ;	- 1/505	502	r EkN		CZL3	2412;	B7 3532	3676878	3
347: 9/68/3													
Dgc		4804	- 1/4074	407:	- 1/606	602	r EkN						
347: 9/69/4													

Rad Liquid Scintillation Analysis

TRITIUM_DIST_LSC: COMMON "As Received"

Vtkkwo		: 09G- 27	- 1/38; 22	85:	- 1/302G- 27	322	r EkN		D[U3	24129B7	3937	3676464	4
3224: /39/:													

The following Analytical Methods were performed

Method	Description
3	GRC"; 220IUY : 68"; 532
4	GRC"; 280'O qf Hgf

P qvku<

VRW'cpf "Eqwv'kpi "Wpegtv'kpv' "ctg'ecrww'v'gf "cv'j g"; 7' "eqph'k' gpeg'rgxgn"30 8'uki o c-0
 "Vj g'S wcn'kgu'lp' "j ku'tgr qtv'ctg'f'gh'p'gf "cu'hqmy u"<

D""Vj g'cuqekcv'gf "S E'uco r rg'dnc'pnl'j cu'c't'guwn'@ "4Z "j g'O F C'cpf. "chgt'eqttge'v'kpu.'t'guwn'ku'@ "O F C'hqt' "j ku'uco r rg"
 F ""T'guwn'ctg'tgr qtv'gf "t'qo "c'f'kw'gf "c'ks wq'v'qh'uco r rg0
 P ""U'kn'g'Uco r rg'tgeq'xgt { "ku'q'w'kf g'eq'p't'q'nl'ko ku0
 W ""C'pcn' | gf "hqt'dw'p'q'v'f'g'v'gf "cdq'xg'iko k'kpi "et'k'gt'k'0'k'pen'f'gu'O F N.'O F C.'RS N.' | gtq.'eqw'v'kpi "gttqt."cpf "v'q'cn'c'pcn' v'ecn'gttqt0
 WZ ""I co o c'U' gest'queqr { //Wpegtv'kpv'kf'gp'v'k'ec'v'kpv"
 Z ""Eqpuwn'Ecug'P cttc'v'xg.'F cv'U'wo o ct { 'r'ceni g.'qt'Rtqlgev'O cpci gt'eqpegt'p'kpi "j ku's wcn'kgu'
 [""Eqpuwn'Ecug'P cttc'v'xg.'F cv'U'wo o ct { 'r'ceni g.'qt'Rtqlgev'O cpci gt'eqpegt'p'kpi "j ku's wcn'kgu'
 \ ""Eqpuwn'Ecug'P cttc'v'xg.'F cv'U'wo o ct { 'r'ceni g.'qt'Rtqlgev'O cpci gt'eqpegt'p'kpi "j ku's wcn'kgu'
 "Vj g'cdq'xg'uco r rg'ku'tgr qtv'gf "qp'cp' \$cu't'gegk'xg'f '\$'dcuk0

Quality Control Data

GEL LABORATORIES LLC

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QC Summary

Report Date: February 13, 2015

Page 1 of 3

Client : CH2MHill Plateau Remediation Company
 MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Workorder: 365858

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gas Flow									
Batch	1454656								
QC1203257786	MB								
Alpha			U	-0.00461	pCi/L			AXJ1	02/09/1513:32
				Uncert: +/-1.01					
				TPU: +/-1.01					
Beta			U	-1.5	pCi/L				
				Uncert: +/-1.30					
				TPU: +/-1.30					
QC1203257787	365992007	DUP							
Alpha		U	-0.62	U	-0.269	pCi/L			02/09/1513:32
			Uncert: +/-1.43		+/-1.27		RPD: 0	N/A	
			TPU: +/-1.43		+/-1.27		RER: 0.360	(0-2)	
Beta			5.08		5.08	pCi/L			
			Uncert: +/-1.59		+/-1.55		RPD: 0	(0% - 100%)	
			TPU: +/-1.80		+/-1.77		RER: 0.00368	(0-2)	
QC1203257788	365992007	MS							
Alpha		243	U	-0.62	301	pCi/L	REC: 124	(75%-125%)	02/10/1515:06
			Uncert: +/-1.43		+/-30.7				
			TPU: +/-1.43		+/-60.6				
Beta		949		5.08	1180	pCi/L	REC: 123	(75%-125%)	
			Uncert: +/-1.59		+/-40.0				
			TPU: +/-1.80		+/-204				
QC1203257789	365992007	MSD							
Alpha		243	U	-0.62	275	pCi/L	REC: 113	(75%-125%)	02/10/1511:46
			Uncert: +/-1.43		+/-28.6		RPD: 9	(0%-20%)	
			TPU: +/-1.43		+/-55.5		RER: 0.615	(0-2)	
Beta		949		5.08	1150	pCi/L	REC: 121	(75%-125%)	
			Uncert: +/-1.59		+/-39.3		RPD: 2	(0%-20%)	
			TPU: +/-1.80		+/-192		RER: 0.180	(0-2)	
QC1203257790	LCS								
Alpha		81.1			97.0	pCi/L	REC: 120	(80%-120%)	02/09/1513:11
			Uncert: +/-8.51						
			TPU: +/-18.0						
Beta		316			360	pCi/L	REC: 114	(80%-120%)	
			Uncert: +/-12.6						
			TPU: +/-59.9						
Rad Liquid Scintillation									
Batch	1454242								
QC1203255047	MB								
Tritium			U	-18	pCi/L			BYS1	02/07/1521:24
				Uncert: +/-42.0					
				TPU: +/-42.0					
QC1203255048	365992007	DUP							
Tritium		U	28.5	U	-15	pCi/L			02/07/1523:27
			Uncert: +/-45.0		+/-42.0		RPD: 0	N/A	
			TPU: +/-45.3		+/-42.0		RER: 1.38	(0-2)	

QC Summary

Workorder: 365858

Page 2 of 3

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Liquid Scintillation									
Batch	1454242								
QC1203255049	365992007	MS							
Tritium	1870	U	28.5	1780	pCi/L	REC: 95	(75%-125%)		02/08/1501:29
	Uncert:		+/-45.0	+/-306					
	TPU:		+/-45.3	+/-460					
QC1203255050	LCS								
Tritium	1870			1760	pCi/L	REC: 95	(80%-120%)		02/08/1501:47
	Uncert:			+/-301					
	TPU:			+/-455					

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.
- 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)

February 21, 2015
GEL LABORATORIES LLC

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QC Summary

Workorder: 365858

Page 3 of 3

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
-----------------	------------	---------------	-------------	-----------	--------------	--------------------	--------------	----------------	-------------	-------------

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.