

OCTOBER 2, 2014



a member of **The GEL Group** INC



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October 02, 2014

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

Re: CHPRC SAF I14-039
Work Order: 356061
SDG: GEL356061

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on September 05, 2014. 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,

A handwritten signature in cursive script that reads "Heather Shaffer".

Heather Shaffer
Project Manager

Purchase Order: 300071ES20
Chain of Custody: I14-039-031 and I14-039-032
Enclosures



Table of Contents

Case Narrative.....	1
Chain of Custody and Supporting Documentation.....	4
Data Review Qualifier Definitions.....	8
Laboratory Certifications.....	10
Metals Analysis.....	12
Case Narrative.....	13
Sample Data Summary.....	17
Quality Control Summary.....	21
General Chem Analysis.....	28
Case Narrative.....	29
Sample Data Summary.....	36
Quality Control Summary.....	40
Radiological Analysis.....	45
Sample Data Summary.....	54
Quality Control Data.....	57

Case Narrative

**General Narrative
for
Hanford MSA (51204)
CHPRC SAF I14-039
SDG: GEL356061**

October 02, 2014

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 September 05, 2014, 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>
356061001	B2XFY9
356061002	B2XH00
356061003	B2XFY8

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.

OCTOBER 2, 2014

Data Package

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: General Chemistry, Metals and Radiochemistry. This package, to the best of my knowledge, is in compliance with technical and administrative requirements.

Heather Shaffer

Heather Shaffer
Project Manager

Chain of Custody and Supporting Documentation

2260601

CH2MHill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		C.O.C. # I14-039-032	
Telephone No. 509-376-4650		Purchase Order/Charge Code 30007IES20		Page 1 of 1	
Contact/Requester Karen Waters-Husted		Ice Chest No. 6005-092		Bill of Lading/Air Bill No. 1710 4868 0375	
Sampling Origin Hanford Site		Logbook No. HNF-N-506 67113		Offsite Property No. 5060	
Method of Shipment Commercial Carrier		Priority: 30 Days		Hold Time	
SPECIAL INSTRUCTIONS		Hold Time		Total Activity Exemption: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
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	Time	No/Type Container
B2XFY9	N	W	9-3-14	1349	1x250-mL G/P
Sample Analysis			Holding Time		Preservative
9056_ANIONS_IC: COMMON; 9056_ANIONS_IC: GW 01			28 Days/48 Hours		Cool <=6C

Relinquished By W.A. White CHPRC	Sign <i>W.A. White</i>	Print W.A. White	Date/Time SEP 03 2014 1425	Received By SSU-1	Sign [Signature]	Print [Signature]	Date/Time SEP 03 2014 1425	Matrix * S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air
Relinquished By SSU-1	Sign [Signature]	Print SSU-1	Date/Time SEP 03 2014 1425	Received By L.D. Wall CHPRC	Sign [Signature]	Print L.D. Wall	Date/Time SEP 04 2014 1045	Matrix * DS = Drum Solids DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation X = Other
Relinquished By L.D. Wall CHPRC	Sign [Signature]	Print L.D. Wall	Date/Time SEP 04 2014 1045	Received By FEDEX	Sign [Signature]	Print FEDEX	Date/Time SEP 04 2014 1400	
Relinquished By [Signature]	Sign [Signature]	Print [Signature]	Date/Time SEP 04 2014 1400	Received By P. M. Dent	Sign [Signature]	Print P. M. Dent	Date/Time 9/5/14 09:30	
FINAL SAMPLE DISPOSITION			Disposal Method (e.g., Return to customer, per lab procedure, used in process)					Date/Time

CH2M Hill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C.#
I14-039-031
Page 1 of 1

Collector: **M.A. White**
 CHPRC
 Telephone No. 509-376-4650
 Contact/Requester: **Karen Waters-Husted**
 Purchase Order/Charge Code: 300071ES20
 SAF No. I14-039
 Sampling Origin: **Hanford Site**
 Project Title: 100NR2, SEPTEMBER 2014
 Logbook No. **HNF-N-506 62113**
 Ice Chest No. **605-092**
 Method of Shipment: **Commercial Carrier**
 Shipped To (Lab): **GEL Laboratories, LLC**
 Bill of Lading/Air Bill No. **771048680375**
 Protocol: **CERCLA**
 Priority: **30 Days**
 Offsite Property No. **5060**

POSSIBLE SAMPLE HAZARDS/REMARKS
 *** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1

SPECIAL INSTRUCTIONS Hold Time: Yes No
 Total Activity Exemption: Yes No No

Sample No.	Filter	*	Date	Time	No./Type Container	Sample Analysis	Holding Time	Preservative
B2XH00	Y	W	9-3-14	1349	1x500-mL G/P	6010_METALS_ICP: COMMON; 6010_METALS_ICP: GW 03	6 Months	HNO3 to pH <2
B2XFY8	N	W			1x250-mL G/P	2320_ALKALINITY: GW 01	14 Days	Cool <=6C
B2XFY8	N	W			1x500-mL G/P	6010_METALS_ICP: COMMON; 6010_METALS_ICP: GW 03	6 Months	HNO3 to pH <2
B2XFY8	N	W			1x2-L P	9310_ALPHABETA_GPC: COMMON	6 Months	HNO3 to pH <2
B2XFY8	N	W			1x4-L G/P	GAMMA_GS: COMMON	6 Months	HNO3 to pH <2
B2XFY8	N	W			1x1-L G/P	SRTOT_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2
B2XFY8	N	W	9-3-14	1349	1x500-mL P	TRITIUM_DIST_LSC: COMMON	6 Months	None

Relinquished By: M.A. White CHPRC	Print: <i>M.A. White</i>	Sign: <i>M.A. White</i>	Date/Time: SEP 03 2014 1425	Received By: SSU-1	Print: <i>SSU-1</i>	Sign: <i>SSU-1</i>	Date/Time: SEP 03 2014 1425	Matrix * S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air
Relinquished By: SSU-1	Print: <i>SSU-1</i>	Sign: <i>SSU-1</i>	Date/Time: SEP 04 2014 1045	Received By: L.D. Wall CHPRC	Print: <i>L.D. Wall</i>	Sign: <i>L.D. Wall</i>	Date/Time: SEP 04 2014 1045	DS = Drum Solids DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation X = Other
Relinquished By: L.D. Wall CHPRC	Print: <i>L.D. Wall</i>	Sign: <i>L.D. Wall</i>	Date/Time: SEP 04 2014 1400	Received By: FEDEX	Print: <i>FEDEX</i>	Sign: <i>FEDEX</i>	Date/Time: SEP 04 2014 1400	
Relinquished By: FEDEX	Print: <i>FEDEX</i>	Sign: <i>FEDEX</i>	Date/Time: SEP 04 2014 1400	Received By: R. Dent Paterica Dent	Print: <i>R. Dent Paterica</i>	Sign: <i>R. Dent Paterica</i>	Date/Time: 9/5/14 09:30	

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



SAMPLE RECEIPT & REVIEW FORM

Client: <u>HUSA</u>		SDG/AR/COC/Work Order: <u>356061</u>
Received By: <u>P. West</u>		Date Received: <u>9/5/14</u>
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?	<input type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0/cpm</u>
Classified Radioactive II or III by RSO?	<input checked="" type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?	<input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?	<input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?	<input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?	<input checked="" type="checkbox"/>	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: <u>Ice bags</u> Blue ice Dry ice None Other (describe) <u>2c</u> *all temperatures are recorded in Celsius
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: Secondary Temperature Device Serial # (If Applicable): <u>130462966</u>
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 VOA vials free of headspace (defined as < 6mm bubble)?		<input checked="" type="checkbox"/>		Sample ID's and containers affected:
7 Are Encore containers present?			<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
8 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
12 Are sample containers identifiable as GEL provided?			<input checked="" type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
14 Carrier and tracking number.	<input checked="" type="checkbox"/>			Circle Applicable: <u>FedEx Air</u> FedEx Ground UPS Field Services Courier Other <u>7710 4868 0375</u>

Comments (Use Continuation Form if needed):

Data Review Qualifier Definitions

Project Specific Qualifier Definitions for GEL Client Code: HMSA

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

Laboratory Certifications

List of current GEL Certifications as of 02 October 2014

State	Certification
Alaska	UST-110
Arkansas	88-0651
CLIA	42D0904046
California NELAP	01151CA
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	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA130005
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	T104704235-14-9
Utah NELAP	SC000122014-14
Vermont	VT87156
Virginia NELAP	460202
Washington	C780-12
Wisconsin	999887790

Metals Analysis

Case Narrative

**Metals Fractional Narrative
Hanford MSA (HMSA)
SDG GEL356061**

Sample Analysis

Sample ID	Client ID
356061002	B2XH00
356061003	B2XFY8
1203162015	Method Blank (MB) ICP
1203162016	Laboratory Control Sample (LCS)
1203162019	356062004(B2XJ80L) Serial Dilution (SD)
1203162017	356062004(B2XJ80S) Matrix Spike (MS)
1203162018	356062004(B2XJ80SD) Matrix Spike Duplicate (MSD)

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

Method/Analysis Information

Analytical Batch:	1416987
Prep Batch :	1416986
Standard Operating Procedures:	GL-MA-E-013 REV# 22 and GL-MA-E-006 REV# 11
Analytical Method:	6010_METALS_ICP
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. Operating conditions for the ICP are set at a power level of 1500 watts. The instrument has a peristaltic pump flow rate of 0.4L/min, argon gas flows of 13 L/min and 0.2 L/min for the torch and auxiliary gases, and a flow setting of 0.65L/min for the nebulizer.

Calibration Information

Instrument Calibration

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

CRDL/PQL Requirements

The PQL standard recoveries for SW846 6010C met the control limits except for potassium in file 091514-2 at 14:10. Potassium recovered high in the closing PQL standard; however the analyte concentrations in the associated client samples were greater than two times the PQL. Therefore, the data were not adversely affected.

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 MB 1203162015 (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 recoveries met the acceptance limits.

Quality Control (QC) Sample Statement

The following sample was selected as the quality control (QC) sample for this SDG: 356062004 (B2XJ80).

Matrix Spike (MS) 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. All applicable analytes met the acceptance criteria.

Matrix Spike Duplicate (MSD) Recovery Statement

The percent recovery (%R) obtained from the MSD analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. All applicable analytes met the acceptance criteria.

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

The serial dilution is used to assess matrix suppression or enhancement. Raw element concentrations 25x the IDL/MDL for CVAA, 50X the IDL/MDL for ICP and 100X the IDL/MDL for ICP-MS analyses are applicable for serial dilution assessment. All applicable analytes met the established acceptance percent difference criteria.

Technical Information

Holding Time Specifications

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

the specified holding time.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

Dilutions are performed to minimize matrix interferences resulting from elevated mineral element concentrations present in solid samples and/or to bring over range target analyte concentrations into the linear calibration range of the instrument. The samples in this SDG did not require dilutions.

Preparation Information

The samples in this SDG were prepared exactly 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

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. Data exception reports were included behind the Case Narrative or in the Miscellaneous Data section of this data package. 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.

Review Validation:

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

The following data validator verified the information presented in this case narrative:

Reviewer: Pat Stealy Date: 10/02/2014

Sample Data Summary

GEL LABORATORIES LLC

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

**Qualifier Definition Report
for**

HMSA001 Hanford MSA (51204)

Client SDG: GEL356061 GEL Work Order: 356061

The Qualifiers in this report are defined as follows:

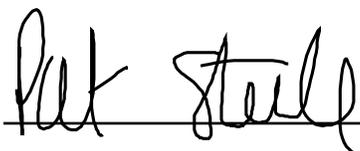
- * Duplicate analysis not within control limits
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is \geq EQL or is $> 5\%$ of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.
- N Spike Sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

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 Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Heather Shaffer.

Reviewed by

 10/02/2014

GEL LABORATORIES LLC

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

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 I14-039**

Report Date: October 2, 2014

Client Sample ID: B2XH00
 Lab Sample ID: 356061002
 Matrix: WATER
 Collect Date: 03-SEP-14 13:49
 Receive Date: 05-SEP-14
 Collector: Client
 Project: HMSA0114039
 Client ID: HMSA001
 Client SDG: GEL356061

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP												
<i>6010_METALS_ICP: COMMON +GW 03 "As Received"</i>												
Antimony	U	3.50	3.50	10.0	10.0	ug/L	1	HSC	09/12/14	15:48	1416987	1
Arsenic	B	6.44	5.00	30.0	30.0	ug/L	1					
Barium		37.8	1.00	5.00	5.00	ug/L	1					
Beryllium	U	1.00	1.00	5.00	5.00	ug/L	1					
Cadmium	U	1.00	1.00	5.00	5.00	ug/L	1					
Calcium		48400	50.0	200	200	ug/L	1					
Chromium	B	3.82	1.00	5.00	5.00	ug/L	1					
Cobalt	U	1.00	1.00	5.00	5.00	ug/L	1					
Copper	U	3.00	3.00	10.0	10.0	ug/L	1					
Iron	U	30.0	30.0	100	100	ug/L	1					
Magnesium		15000	110	300	300	ug/L	1					
Manganese	U	2.00	2.00	10.0	10.0	ug/L	1					
Nickel	U	1.50	1.50	5.00	5.00	ug/L	1					
Silver	U	1.00	1.00	5.00	5.00	ug/L	1					
Vanadium		7.29	1.00	5.00	5.00	ug/L	1					
Zinc	U	3.30	3.30	10.0	10.0	ug/L	1					
Potassium		3540	50.0	150	150	ug/L	1	HSC	09/15/14	13:51	1416987	2
Sodium		7290	100	300	300	ug/L	1					
Strontium		365	1.00	5.00	5.00	ug/L	1					

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	SW846 3005A for 6010C	KXP3	09/09/14	0815	1416986

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	6010_METALS_ICP	
2	6010_METALS_ICP	

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 I14-039**

Report Date: October 2, 2014

Client Sample ID: B2XFY8
 Lab Sample ID: 356061003
 Matrix: WATER
 Collect Date: 03-SEP-14 13:49
 Receive Date: 05-SEP-14
 Collector: Client
 Project: HMSA0114039
 Client ID: HMSA001
 Client SDG: GEL356061

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP												
<i>6010_METALS_ICP: COMMON +GW 03 "As Received"</i>												
Antimony	BC	6.85	3.50	10.0	10.0	ug/L	1	HSC	09/12/14	15:51	1416987	1
Arsenic	U	5.00	5.00	30.0	30.0	ug/L	1					
Barium		37.0	1.00	5.00	5.00	ug/L	1					
Beryllium	U	1.00	1.00	5.00	5.00	ug/L	1					
Cadmium	U	1.00	1.00	5.00	5.00	ug/L	1					
Calcium		47900	50.0	200	200	ug/L	1					
Chromium	B	3.41	1.00	5.00	5.00	ug/L	1					
Cobalt	U	1.00	1.00	5.00	5.00	ug/L	1					
Copper	U	3.00	3.00	10.0	10.0	ug/L	1					
Iron	U	30.0	30.0	100	100	ug/L	1					
Magnesium		14700	110	300	300	ug/L	1					
Manganese	U	2.00	2.00	10.0	10.0	ug/L	1					
Nickel	U	1.50	1.50	5.00	5.00	ug/L	1					
Silver	U	1.00	1.00	5.00	5.00	ug/L	1					
Vanadium		6.55	1.00	5.00	5.00	ug/L	1					
Zinc	U	3.30	3.30	10.0	10.0	ug/L	1					
Potassium		3430	50.0	150	150	ug/L	1	HSC	09/15/14	13:54	1416987	2
Sodium		7090	100	300	300	ug/L	1					
Strontium		357	1.00	5.00	5.00	ug/L	1					

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	SW846 3005A for 6010C	KXP3	09/09/14	0815	1416986

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	6010_METALS_ICP	
2	6010_METALS_ICP	

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: October 2, 2014

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 356061

Parmname	NOM	Sample Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP										
Batch	1416987									
QC1203162016	LCS									
Antimony	500		499	ug/L		99.8	(80%-120%)	HSC	09/12/14	15:26
Arsenic	500		486	ug/L		97.1	(80%-120%)			
Barium	500		500	ug/L		100	(80%-120%)			
Beryllium	500		495	ug/L		99	(80%-120%)			
Cadmium	500		476	ug/L		95.2	(80%-120%)			
Calcium	5000		5110	ug/L		102	(80%-120%)			
Chromium	500		484	ug/L		96.7	(80%-120%)			
Cobalt	500		498	ug/L		99.5	(80%-120%)			
Copper	500		502	ug/L		100	(80%-120%)			
Iron	5000		5220	ug/L		104	(80%-120%)			
Magnesium	5000		5400	ug/L		108	(80%-120%)			
Manganese	500		507	ug/L		101	(80%-120%)			
Nickel	500		505	ug/L		101	(80%-120%)			
Potassium	5000		5210	ug/L		104	(80%-120%)		09/15/14	13:29
Silver	500		478	ug/L		95.7	(80%-120%)		09/12/14	15:26
Sodium	5000		5230	ug/L		105	(80%-120%)		09/15/14	13:29
Strontium	500		525	ug/L		105	(80%-120%)			
Vanadium	500		513	ug/L		103	(80%-120%)		09/12/14	15:26
Zinc	500		494	ug/L		98.8	(80%-120%)			

QC1203162015 MB

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QC Summary

Workorder: 356061

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1416987										
Antimony			B	5.61	ug/L					09/12/14	15:23
Arsenic			U	ND	ug/L				HSC		
Barium			U	ND	ug/L						
Beryllium			U	ND	ug/L						
Cadmium			U	ND	ug/L						
Calcium			U	ND	ug/L						
Chromium			U	ND	ug/L						
Cobalt			B	1.15	ug/L						
Copper			U	ND	ug/L						
Iron			U	ND	ug/L						
Magnesium			U	ND	ug/L						
Manganese			U	ND	ug/L						
Nickel			U	ND	ug/L						
Potassium			U	ND	ug/L					09/15/14	13:25
Silver			U	ND	ug/L					09/12/14	15:23
Sodium			U	ND	ug/L					09/15/14	13:25
Strontium			U	ND	ug/L						
Vanadium			U	ND	ug/L					09/12/14	15:23
Zinc			U	ND	ug/L						
QC1203162017 356062004 MS											
Antimony	500	U	ND	510	ug/L		102	(75%-125%)		09/12/14	15:32
Arsenic	500	U	ND	512	ug/L		102	(75%-125%)			
Barium	500		53.8	556	ug/L		100	(75%-125%)			

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QC Summary

Workorder: 356061

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1416987										
Beryllium	500	U	ND	511	ug/L		102	(75%-125%)	HSC	09/12/14	15:32
Cadmium	500	U	ND	475	ug/L		95	(75%-125%)			
Calcium	5000		51700	56500	ug/L		N/A	(75%-125%)			
Chromium	500	B	4.77	482	ug/L		95.4	(75%-125%)			
Cobalt	500	U	ND	492	ug/L		98.2	(75%-125%)			
Copper	500	U	ND	539	ug/L		108	(75%-125%)			
Iron	5000	U	ND	5160	ug/L		103	(75%-125%)			
Magnesium	5000		11100	16200	ug/L		101	(75%-125%)			
Manganese	500	U	ND	497	ug/L		99.4	(75%-125%)			
Nickel	500	U	ND	496	ug/L		99.1	(75%-125%)			
Potassium	5000		5100	10100	ug/L		101	(75%-125%)		09/15/14	13:35
Silver	500	U	ND	500	ug/L		100	(75%-125%)		09/12/14	15:32
Sodium	5000		86800	92800	ug/L		N/A	(75%-125%)		09/15/14	13:35
Strontium	500		301	821	ug/L		104	(75%-125%)			
Vanadium	500		8.48	538	ug/L		106	(75%-125%)		09/12/14	15:32
Zinc	500	U	ND	498	ug/L		99.5	(75%-125%)			
QC1203162018 356062004 MSD											
Antimony	500	U	ND	508	ug/L	0.324	101	(0%-20%)		09/12/14	15:35
Arsenic	500	U	ND	503	ug/L	1.72	101	(0%-20%)			
Barium	500		53.8	545	ug/L	1.98	98.3	(0%-20%)			
Beryllium	500	U	ND	499	ug/L	2.30	99.8	(0%-20%)			
Cadmium	500	U	ND	466	ug/L	2.00	93.1	(0%-20%)			

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QC Summary

Workorder: 356061

Page 4 of 6

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1416987										
Calcium	5000	51700		56100	ug/L	0.674	N/A	(0%-20%)	HSC	09/12/14	15:35
Chromium	500	B	4.77	476	ug/L	1.17	94.3	(0%-20%)			
Cobalt	500	U	ND	481	ug/L	2.23	96	(0%-20%)			
Copper	500	U	ND	532	ug/L	1.41	106	(0%-20%)			
Iron	5000	U	ND	5040	ug/L	2.24	101	(0%-20%)			
Magnesium	5000		11100	16100	ug/L	0.781	98.7	(0%-20%)			
Manganese	500	U	ND	490	ug/L	1.34	98.1	(0%-20%)			
Nickel	500	U	ND	491	ug/L	1.02	98	(0%-20%)			
Potassium	5000		5100	10100	ug/L	0.852	99	(0%-20%)		09/15/14	13:38
Silver	500	U	ND	488	ug/L	2.45	97.6	(0%-20%)		09/12/14	15:35
Sodium	5000		86800	90400	ug/L	2.70	N/A	(0%-20%)		09/15/14	13:38
Strontium	500		301	806	ug/L	1.76	101	(0%-20%)			
Vanadium	500		8.48	532	ug/L	1.05	105	(0%-20%)		09/12/14	15:35
Zinc	500	U	ND	492	ug/L	1.23	98.3	(0%-20%)			
QC1203162019 356062004 SDILT											
Antimony		U	ND DU	ND	ug/L	N/A		(0%-10%)		09/12/14	15:38
Arsenic		U	ND DU	ND	ug/L	N/A		(0%-10%)			
Barium			53.8 D	11.0	ug/L	2.52		(0%-10%)			
Beryllium		U	ND DU	ND	ug/L	N/A		(0%-10%)			
Cadmium		U	ND DU	ND	ug/L	N/A		(0%-10%)			
Calcium			51700 D	10400	ug/L	.926		(0%-10%)			
Chromium		B	4.77 DU	ND	ug/L	N/A		(0%-10%)			

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QC Summary

Workorder: 356061

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1416987										
Cobalt	U	ND DU		ND	ug/L	N/A		(0%-10%)	HSC	09/12/14	15:38
Copper	U	ND DU		ND	ug/L	N/A		(0%-10%)			
Iron	U	ND DU		ND	ug/L	N/A		(0%-10%)			
Magnesium		11100 D		2290	ug/L	2.99		(0%-10%)			
Manganese	U	ND DU		ND	ug/L	N/A		(0%-10%)			
Nickel	U	ND DU		ND	ug/L	N/A		(0%-10%)			
Potassium		5100 D		1040	ug/L	1.99		(0%-10%)		09/15/14	13:41
Silver	U	ND DU		ND	ug/L	N/A		(0%-10%)		09/12/14	15:38
Sodium		86800 D		17800	ug/L	2.37		(0%-10%)		09/15/14	13:41
Strontium		301 D		61.0	ug/L	1.32		(0%-10%)			
Vanadium		8.48 D		2.65	ug/L	56.3		(0%-10%)		09/12/14	15:38
Zinc	U	ND DU		ND	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.

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QC Summary

Workorder: 356061

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
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 Narrative
Hanford MSA (HMSA)
SDG GEL356061**

Method/Analysis Information

Product: Ion Chromatography

Analytical Batch: 1416896 **Method:** 9056_ANIONS_IC: COMMON + GW 01

Sample Analysis

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

Sample ID	Client ID
356061001	B2XFY9
1203161806	MB for batch 1416896
1203161807	Laboratory Control Sample (LCS)
1203161808	356063002(B2XD11) Sample Duplicate (DUP)
1203161809	356063003(B2XD12) Sample Duplicate (DUP)
1203161810	356063002(B2XD11) Post Spike (PS)
1203161811	356063003(B2XD12) 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-086 REV# 23.

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following samples were selected for QC analysis: 356063002 (B2XD11) and 356063003 (B2XD12).

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

The spike recovery falls outside of the established acceptance limits due to matrix interference: 1203161811 (B2XD12). The spike recovery falls outside of the GEL acceptance limits but within the client specified limits. 1203161811 (B2XD12).

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The following sample in this sample group was diluted due to high concentration: 356061001 (B2XFY9). The following samples were diluted based on historical data: 356061001 (B2XFY9). All samples diluted at a 2X per client request. 1203161808 (B2XD11), 1203161809 (B2XD12), 1203161810 (B2XD11), 1203161811 (B2XD12) and 356061001 (B2XFY9).

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.

Manual Integrations

The following samples from this sample group had to be manually integrated due to errors in the instrument software peak integration: 1203161809 (B2XD12), 1203161811 (B2XD12) and 356061001 (B2XFY9).

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:** Alkalinity**Analytical Batch:** 1416871 **Method:** 2320_ALKALINITY: GW 01**Sample Analysis**

The following samples were analyzed using the analytical protocol as established in 2320_ALKALINITY:

Sample ID	Client ID
356061003	B2XFY8
1203161709	MB for batch 1416871
1203161711	Laboratory Control Sample (LCS)
1203161713	Laboratory Control Sample Duplicate (LCSD)
1203161715	355867006(B2XH20) Sample Duplicate (DUP)
1203161717	355867006(B2XH20) 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-033 REV# 11.

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 Titration and Ion analysis was performed on a manually operated buret.

Initial Standardization

The titrant was properly standardized

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.

Laboratory Control Sample Duplicate (LCSD) Recovery

The LCSD spike recovery met the acceptance limits.

LCS/LCSD Relative Percent Difference (RPD) Statement

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

Quality Control (QC) Designation

The following sample was selected for QC analysis: 355867006 (B2XH20).

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 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

Less sample was used because limited volume was provided by the client. 1203161715 (B2XH20) and 1203161717 (B2XH20).

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.

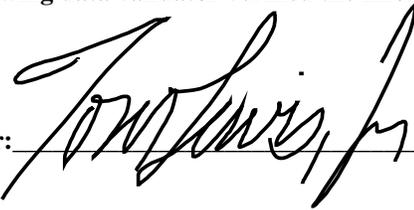
Certification Statement

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.

Review Validation:

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

The following data validator verified the information presented in this case narrative:

Reviewer:  Date: 02Oct14

Sample Data Summary

GEL LABORATORIES LLC

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**Certificate of Analysis Report
for**

HMSA001 Hanford MSA (51204)

Client SDG: GEL356061 GEL Work Order: 356061

The Qualifiers in this report are defined as follows:

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

D Results are reported from a diluted aliquot of sample.

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

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 Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Heather Shaffer.

Reviewed by _____

A handwritten signature in black ink, appearing to read "Tom Lewis, Jr.", is written over a horizontal line.

GEL LABORATORIES LLC

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

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 I14-039**

Report Date: September 29, 2014

Client Sample ID: B2XFY9
 Lab Sample ID: 356061001
 Matrix: WATER
 Collect Date: 03-SEP-14 13:49
 Receive Date: 05-SEP-14
 Collector: Client

Project: HMSA0I14039
 Client ID: HMSA001
 Client SDG: GEL356061

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
<i>9056_ANIONS_IC: COMMON + GW 01 "As Received"</i>												
Chloride	D	14800	134	400	200	ug/L	2	RXB5	09/05/14	14:35	1416896	1
Fluoride	BD	89.6	66.0	200	500	ug/L	2					
Nitrate-N	D	9790	66.0	200	250	ug/L	2					
Nitrite-N	DU	76.0	76.0	200	250	ug/L	2					
Phosphorus in phosphate	DU	134	134	400	500	ug/L	2					
Sulfate	D	73700	665	2000	500	ug/L	5	RXB5	09/05/14	16:39	1416896	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 9056A	
2	SW846 9056A	

GEL LABORATORIES LLC

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

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 I14-039**

Report Date: September 29, 2014

Client Sample ID: B2XFY8
 Lab Sample ID: 356061003
 Matrix: WATER
 Collect Date: 03-SEP-14 13:49
 Receive Date: 05-SEP-14
 Collector: Client

Project: HMSA0114039
 Client ID: HMSA001
 Client SDG: GEL356061

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Titration and Ion Analysis												
<i>2320_ALKALINITY: GW 01 "As Received"</i>												
Alkalinity, Total as CaCO3		59000	725	1000	1000	ug/L	PX01	09/05/14	18:32	1416871	1	
Bicarbonate alkalinity (CaCO3)		59000	725	1000	1000	ug/L						
Carbonate alkalinity (CaCO3)	U	725	725	1000	1000	ug/L						
Hydroxide alkalinity as CaCO3	U	725	725	1000	1000	ug/L						

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	2320_ALKALINITY	

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: September 29, 2014

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 356061

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1416896										
QC1203161808	356063002	DUP									
Chloride	DU	ND	DU	ND	ug/L	N/A			RXB5	09/05/14	21:19
Fluoride	DU	ND	DU	ND	ug/L	N/A					
Nitrate-N	DU	ND	DU	ND	ug/L	N/A					
Nitrite-N	DU	ND	DU	ND	ug/L	N/A					
Phosphorus in phosphate	DU	ND	DU	ND	ug/L	N/A					
Sulfate	DU	ND	DU	ND	ug/L	N/A					
QC1203161809	356063003	DUP									
Chloride	D	16500	D	16500	ug/L	0.302		(0%-20%)		09/05/14	22:51
Fluoride	BD	112	BD	115	ug/L	2.46	^	(+/-500)			
Nitrate-N	D	6200	D	6210	ug/L	0.139		(0%-20%)			
Nitrite-N	DU	ND	DU	ND	ug/L	N/A					
Phosphorus in phosphate	DU	ND	DU	ND	ug/L	N/A					
Sulfate	D	165000	D	163000	ug/L	1.21		(0%-20%)		09/06/14	20:11
QC1203161807	LCS										
Chloride	5000			4710	ug/L		94.3	(90%-110%)		09/06/14	05:34
Fluoride	2500			2460	ug/L		98.3	(90%-110%)			
Nitrate-N	2500			2350	ug/L		94.2	(90%-110%)			
Nitrite-N	2500			2340	ug/L		93.7	(90%-110%)			
Phosphorus in phosphate	1250			1330	ug/L		107	(90%-110%)			
Sulfate	10000			9730	ug/L		97.3	(90%-110%)			
QC1203161806	MB										

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QC Summary

Workorder: 356061

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1416896										
Chloride			U	ND	ug/L					09/06/14	05:03
Fluoride			U	ND	ug/L				RXB5		
Nitrate-N			U	ND	ug/L						
Nitrite-N			U	ND	ug/L						
Phosphorus in phosphate			U	ND	ug/L						
Sulfate			U	ND	ug/L						
QC1203161810 356063002 PS											
Chloride	5.00	DU	ND	D	4.69	mg/L	93.8	(90%-110%)		09/05/14	21:49
Fluoride	2.50	DU	ND	D	2.42	mg/L	96.8	(90%-110%)			
Nitrate-N	2.50	DU	ND	D	2.38	mg/L	95.1	(90%-110%)			
Nitrite-N	2.50	DU	ND	D	2.35	mg/L	93.8	(90%-110%)			
Phosphorus in phosphate	1.25	DU	ND	D	1.25	mg/L	99.9	(90%-110%)			
Sulfate	10.0	DU	ND	D	9.69	mg/L	96.9	(90%-110%)			
QC1203161811 356063003 PS											
Chloride	5.00	D	8.23	D	13.9	mg/L	113*	(90%-110%)		09/05/14	23:22
Fluoride	2.50	BD	0.0561	D	2.46	mg/L	96.1	(90%-110%)			
Nitrate-N	2.50	D	3.10	D	5.78	mg/L	107	(90%-110%)			
Nitrite-N	2.50	DU	ND	D	2.39	mg/L	95.7	(90%-110%)			
Phosphorus in phosphate	1.25	DU	ND	D	1.21	mg/L	96.8	(90%-110%)			
Sulfate	10.0	D	8.27	D	18.4	mg/L	101	(90%-110%)		09/06/14	20:42
Titration and Ion Analysis											
Batch	1416871										
QC1203161715 355867006 DUP											
Alkalinity, Total as CaCO3			67700		67700	ug/L	0.00	(0%-20%)	PXO1	09/05/14	15:46
Bicarbonate alkalinity (CaCO3)			67700		67700	ug/L	0.00	(0%-20%)			

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QC Summary

Workorder: 356061

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
Batch	1416871										
Carbonate alkalinity (CaCO3)		U	ND	U	ND	ug/L	N/A				
Hydroxide alkalinity as CaCO3		U	ND	U	ND	ug/L	N/A		PX01	09/05/14	15:46
QC1203161711 LCS											
Alkalinity, Total as CaCO3	50000				49800	ug/L	99.5	(90%-110%)		09/05/14	15:25
QC1203161713 LCSD											
Alkalinity, Total as CaCO3	50000				49800	ug/L	0.00	99.5	(0%-20%)	09/05/14	15:25
QC1203161709 MB											
Alkalinity, Total as CaCO3			U		ND	ug/L				09/05/14	15:25
Bicarbonate alkalinity (CaCO3)			U		ND	ug/L					
Carbonate alkalinity (CaCO3)			U		ND	ug/L					
Hydroxide alkalinity as CaCO3			U		ND	ug/L					
QC1203161717 355867006 MS											
Alkalinity, Total as CaCO3	100000	67700			166000	ug/L	98.5	(80%-120%)		09/05/14	15:48

Notes:

The Qualifiers in this report are defined as follows:

- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= 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

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QC Summary

Workorder: 356061

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
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N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

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

Radiological Analysis

**Radiochemistry Case Narrative
Hanford MSA (HMSA)
SDG GEL356061
Work Order 356061**

Method/Analysis Information

Product: GAMMA_GS:COMMON (Cs137,Co60,Eu152,Eu154,Eu155)

Analytical Method: 901.1_GAMMA_GS

Analytical Batch Number: 1416335

Sample ID	Client ID
356061003	B2XFY8
1203160340	MB for batch 1416335
1203160342	Laboratory Control Sample (LCS)
1203160341	355867006(B2XH20) Sample Duplicate (DUP)

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-RAD-A-013 REV# 25.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

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

Designated QC

The following sample was used for QC: 355867006 (B2XH20).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:**Holding Time**

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

Sample Re-prep/Re-analysis

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

Recounts

None of the samples in this sample set were recounted.

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

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

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: 9310_ALPHABETA_GPC: COMMON
Analytical Method: BETA_GPC
Analytical Batch Number: 1419068

Sample ID	Client ID
356061003	B2XFY8
1203167438	MB for batch 1419068
1203167442	Laboratory Control Sample (LCS)
1203167439	356431004(B2XH59) Sample Duplicate (DUP)
1203167440	356431004(B2XH59) Matrix Spike (MS)
1203167441	356431004(B2XH59) Matrix Spike Duplicate (MSD)

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-RAD-A-001 REV# 17.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

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

Designated QC

The following sample was used for QC: 356431004 (B2XH59).

QC Information

All of the QC samples meet the required acceptance limits with the following exceptions: The Matrix Spike and Matrix Spike Duplicate 1203167440 (B2XH59) and 1203167441 (B2XH59) did not meet beta recovery requirements due to the sample activity being greater than five times the spiked nominal concentration.

Technical Information:

Holding Time

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

Sample Re-prep/Re-analysis

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

Chemical Recoveries

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

Gross Alpha/Beta Preparation Information

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

Recounts

Sample 356061003 (B2XFY8) was recounted due to results more negative than the three sigma TPU. The second count is reported.

Miscellaneous Information:

Data Exception (DER) Documentation

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

Sample-Specific MDA/MDC

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

Additional Comments

The matrix spike and matrix spike duplicate, 1203167440 (B2XH59) and 1203167441 (B2XH59), aliquots were reduced to conserve sample volume. Sample 356061003 (B2XFY8) was processed without beta spill over correction.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: SRTOT_SEP_PRECIP_GPC: COMMON

Analytical Method: SRTOT_SEP_PRECIP_GPC

Analytical Batch Number: 1419083

Sample ID	Client ID
356061003	B2XFY8
1203167476	MB for batch 1419083
1203167478	Laboratory Control Sample (LCS)
1203167477	356062003(B2XJ67) Sample Duplicate (DUP)

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-RAD-A-004 REV# 17.

Calibration Information:**Calibration Information**

All initial and continuing calibration requirements have been met.

Standards Information

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

Sample Geometry

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

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

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

Designated QC

The following sample was used for QC: 356062003 (B2XJ67).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

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

Sample Re-prep/Re-analysis

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

Chemical Recoveries

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

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

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

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: TRITIUM_DIST_LSC: COMMON
Analytical Method: TRITIUM_DIST_LSC
Analytical Batch Number: 1418820

Sample ID	Client ID
356061003	B2XFY8
1203166815	MB for batch 1418820
1203166818	Laboratory Control Sample (LCS)
1203166816	356403002(B2X7N8) Sample Duplicate (DUP)
1203166817	356403002(B2X7N8) 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-RAD-A-002 REV# 21.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

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

Designated QC

The following sample was used for QC: 356403002 (B2X7N8).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

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

Sample Re-prep/Re-analysis

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

Recounts

Samples 1203166816 (B2X7N8), 1203166817 (B2X7N8), 1203166818 (LCS) and 356061003 (B2XFY8) were recounted due to low recovery. The recounts are reported. Sample 1203166815 (MB) was recounted due to low recovery and then recounted due to high MDC. The third count is reported.

Miscellaneous Information:

Data Exception (DER) Documentation

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

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Certification Statement

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

GEL LABORATORIES LLC

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**Qualifier Definition Report
for**

HMSA001 Hanford MSA (51204)

Client SDG: GEL356061 GEL Work Order: 356061

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Kate Gellatly

Date: 01 OCT 2014

Title: Analyst I

Sample Data Summary

GEL LABORATORIES LLC

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

Certificate of Analysis

Company : CH2MHill Plateau Remediation
 Address : Company
 MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF I14-039

Report Date: October 1, 2014

Client Sample ID: B2XFY8
 Sample ID: 356061003
 Matrix: WATER
 Collect Date: 03-SEP-14
 Receive Date: 05-SEP-14
 Collector: Client
 Project: HMSA0114039
 Client ID: HMSA001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis													
<i>GAMMA_GS: COMMON (Cs137,Co60,Eu152,Eu154,Eu155) "As Received"</i>													
Cesium-137	U	0.128	+/-3.06	5.64	+/-3.06	10.0	pCi/L		MJH1	09/15/14	1025	1416335	1
Cobalt-60	U	1.00	+/-2.88	6.02	+/-2.92		pCi/L						
Europium-152	U	6.93	+/-8.39	16.0	+/-8.97		pCi/L						
Europium-154	U	1.55	+/-7.93	16.2	+/-7.96		pCi/L						
Europium-155	U	6.55	+/-10.7	19.0	+/-11.1		pCi/L						
Rad Gas Flow Proportional Counting													
<i>9310_ALPHABETA_GPC: COMMON "As Received"</i>													
Alpha	U	-0.685	+/-1.12	2.08	+/-1.12	3.00	pCi/L		JXH3	09/24/14	1554	1419068	2
Beta		4440	+/-15.8	1.81	+/-728	4.00	pCi/L						
<i>SRTOT_SEP_PRECIP_GPC: COMMON "As Received"</i>													
Total Strontium		2240	+/-22.9	1.89	+/-517	2.00	pCi/L		KSD1	09/25/14	1137	1419083	3
Rad Liquid Scintillation Analysis													
<i>TRITIUM_DIST_LSC: COMMON "As Received"</i>													
Tritium		10500	+/-373	143	+/-2070	100	pCi/L		BYS1	09/26/14	0147	1418820	4

The following Analytical Methods were performed

Method	Description
1	EPA 901.1
2	EPA 900.0/SW846 9310
3	EPA 905.0 Modified
4	EPA 906.0 Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Strontium Carrier	SRTOT_SEP_PRECIP_GPC: COMMON "As Received"	1419083	90.2	(25%-125%)

OCTOBER 2, 2014

GEL LABORATORIES LLC

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Certificate of Analysis

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

Report Date: October 1, 2014

Contact: Mr. Scot Fitzgerald

Project: CHPRC SAF I14-039

Client Sample ID: B2XFY8
Sample ID: 356061003

Project: HMSA0I14039
Client ID: HMSA001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer	Recovery	Test					Batch ID	Recovery%	Acceptable Limits				

Notes:

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

Quality Control Data

GEL LABORATORIES LLC

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

QC Summary

Report Date: October 1, 2014

Page 1 of 4

Client : CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Workorder: 356061

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1416335								
QC1203160340	MB								
Cesium-137			U	3.16	pCi/L			MJH1	09/15/1410:26
				Uncert: +/-6.44					
				TPU: +/-6.45					
Cobalt-60			U	0.709	pCi/L				
				Uncert: +/-2.58					
				TPU: +/-2.61					
Europium-152			U	1.89	pCi/L				
				Uncert: +/-7.11					
				TPU: +/-7.17					
Europium-154			U	-1.01	pCi/L				
				Uncert: +/-7.87					
				TPU: +/-7.88					
Europium-155			U	-6.43	pCi/L				
				Uncert: +/-11.2					
				TPU: +/-11.6					
QC1203160341	355867006	DUP							
Cesium-137		U	1.25	U	0.418	pCi/L			09/15/1410:27
				Uncert: +/-2.99		RPD: 0	N/A		
				TPU: +/-3.04		RER: 0.400	(0-2)		
Cobalt-60		U	-0.269	U	-0.224	pCi/L			
				Uncert: +/-2.84		RPD: 0	N/A		
				TPU: +/-2.85		RER: 0.0249	(0-2)		
Europium-152		U	-4.45	U	-2.5	pCi/L			
				Uncert: +/-8.15		RPD: 0	N/A		
				TPU: +/-8.41		RER: 0.332	(0-2)		
Europium-154		U	-7.51	U	4.48	pCi/L			
				Uncert: +/-8.91		RPD: 0	N/A		
				TPU: +/-9.55		RER: 2.03	(0-2)		
Europium-155		U	5.34	U	-2.19	pCi/L			
				Uncert: +/-13.2		RPD: 0	N/A		
				TPU: +/-13.4		RER: 0.868	(0-2)		
QC1203160342	LCS								
Americium-241	34500			38200	pCi/L	REC: 111	(80%-120%)		09/15/1410:27
				Uncert: +/-1090					
				TPU: +/-2830					
Cesium-137	14000			14300	pCi/L	REC: 102	(80%-120%)		
				Uncert: +/-312					
				TPU: +/-1200					
Cobalt-60	17100			17400	pCi/L	REC: 102	(80%-120%)		
				Uncert: +/-380					
				TPU: +/-1460					
Europium-152			U	-45.2	pCi/L				
				Uncert: +/-235					
				TPU: +/-236					

GEL LABORATORIES LLC

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QC Summary

Workorder: 356061

Page 2 of 4

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1416335								
Europium-154			U	66.4	pCi/L				
				Uncert: +/-123					
				TPU: +/-126					
Europium-155			U	-25.1	pCi/L				
				Uncert: +/-257					
				TPU: +/-257					
Rad Gas Flow									
Batch	1419068								
QC1203167438	MB								
Alpha			U	0.262	pCi/L			JXH3	09/24/1411:54
				Uncert: +/-0.711					
				TPU: +/-0.712					
Beta			U	-8.73	pCi/L				
				Uncert: +/-1.18					
				TPU: +/-1.18					
QC1203167439	356431004	DUP							
Alpha		2.74	U	2.03	pCi/L				09/24/1411:54
				Uncert: +/-1.16		RPD: 30 (0% - 100%)			
				TPU: +/-1.24		RER: 0.592 (0-2)			
Beta		23900		24000	pCi/L				
				Uncert: +/-37.2		RPD: 1 (0% - 20%)			
				TPU: +/-3910		RER: 0.052 (0-2)			
QC1203167440	356431004	MS							
Alpha		411		2.74	pCi/L	REC: 110 (75%-125%)			09/24/1411:54
				Uncert: +/-1.16					
				TPU: +/-1.24					
Beta		1600		23900	pCi/L	REC: N/A			
				Uncert: +/-37.2					
				TPU: +/-3910					
QC1203167441	356431004	MSD							
Alpha		411		2.74	pCi/L	REC: 113 (75%-125%)			09/24/1411:54
				Uncert: +/-1.16		RPD: 3 (0%-20%)			
				TPU: +/-1.24		RER: 0.222 (0-2)			
Beta		1600		23900	pCi/L	REC: N/A			
				Uncert: +/-37.2		RPD: 6 (0%-20%)			
				TPU: +/-3910		RER: 0.518 (0-2)			
QC1203167442	LCS								
Alpha		82.3			pCi/L	REC: 108 (80%-120%)			09/24/1411:54
				Uncert: +/-8.51					
				TPU: +/-17.3					
Beta		319			pCi/L	REC: 113 (80%-120%)			
				Uncert: +/-12.5					
				TPU: +/-61.2					
Batch	1419083								
QC1203167476	MB								
Total Strontium			U	0.804	pCi/L			KSD1	09/25/1411:37
				Uncert: +/-1.09					
				TPU: +/-1.10					
QC1203167477	356062003	DUP							
Total Strontium		U	0.764	U	1.72	pCi/L			09/25/1411:40

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QC Summary

Workorder: 356061

Page 3 of 4

Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gas Flow									
Batch		1419083							
				Uncert:	+/-1.11				
				TPU:	+/-1.12				
						RPD:	0	N/A	
						RER:	1.08	(0-2)	
QC1203167478	LCS								
Total Strontium		112			108	REC:	96	(80%-120%)	09/25/1411:34
				Uncert:	+/-5.78				
				TPU:	+/-25.5				
Rad Liquid Scintillation									
Batch		1418820							
QC1203166815	MB								
Tritium			U		49.4			BYS1	09/30/1405:19
				Uncert:	+/-50.4				
				TPU:	+/-51.3				
QC1203166816	356403002	DUP							
Tritium		1160			1050				09/26/1420:40
				Uncert:	+/-144	RPD:	10	(0% - 20%)	
				TPU:	+/-266	RER:	0.593	(0-2)	
QC1203166817	356403002	MS							
Tritium		1910	1160		2800	REC:	86	(75%-125%)	09/26/1422:13
				Uncert:	+/-144				
				TPU:	+/-266				
QC1203166818	LCS								
Tritium		1910			1750	REC:	92	(80%-120%)	09/26/1422:45
				Uncert:	+/-268				
				TPU:	+/-432				

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
- 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 associated QC sample blank has a result >= 2X the MDA and, after corrections, result is >= MDA for this sample
- 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

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QC Summary

Workorder: 356061

Page 4 of 4

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier									

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

** Indicates analyte is a surrogate compound.

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

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

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