

OCTOBER 3, 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 X14-061
Work Order: 356062
SDG: GEL356062

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 black ink that reads "Heather Shaffer".

Heather Shaffer
Project Manager

Purchase Order: 300071ES20
Chain of Custody: X14-061-093, X14-061-094, X14-061-095, X14-061-096 and X14-061-097
Enclosures



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Case Narrative

**General Narrative
for
Hanford MSA (51204)
CHPRC SAF X14-061
SDG: GEL356062**

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>
356062001	B2XJ72
356062002	B2XJ79
356062003	B2XJ67
356062004	B2XJ80
356062005	B2XJ78
356062006	B2XJ71
356062007	B2XJ73

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 3, 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: Diesel Range Organics, 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

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		C.O.C. # X14-061-097
Collector R.J. Crow CHPRC		Contact/Requester Karen Waters-Husted	Telephone No. 509-376-4650	Page 1 of 1
SAF No. X14-061	Sampling Origin Hanford Site	Logbook No. HNF-N-506 5911	Purchase Order/Charge Code 303064ES20	
Project Title AQUIFER TUBES, SEPTEMBER 2014	Method of Shipment Commercial Carrier	Ice Chest No. GWS-092	Bill of Lading/Air Bill No. 971049680375	
Shipped To (Lab) GEL Laboratories, LLC	Priority: 30 Days	Offsite Property No. 5060		
Protocol SURV	PRIORITY			
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. B2XJ79	Filter N	Date 9-4-14	No/Type Container 1x250-mL G/P	Sample Analysis 9056_ANIONS_IC: COMMON; 9056_ANIONS_IC: GW 01
		Time 1142	Holding Time 28 Days/48 Hours	Preservative Cool <=6C

Relinquished By R.J. Crow CHPRC	Print 	Sign 	Received By K.C. Patterson CHPRC	Print 	Sign 	Date/Time SEP 04 2014 1220	Date/Time SEP 04 2014 1220	Matrix * = Soil DS = Sediment DL = Solid T = Sludge WI = Water L = Oil V = Air X
Relinquished By R.J. Crow CHPRC	Print 	Sign 	Received By FEDEX	Print 	Sign 	Date/Time SEP 04 2014 1400	Date/Time SEP 04 2014 1400	
Relinquished By FED X	Print 	Sign 	Received By P. Valent Patrice Dent	Print 	Sign 	Date/Time 9/5/14 0930	Date/Time 9/5/14 0930	
Relinquished By	Print	Sign	Received By	Print	Sign	Date/Time	Date/Time	
FINAL SAMPLE DISPOSITION			Disposal Method (e.g., Return to customer, per lab procedure, used in process)			Date/Time		

CH2M Hill Plateau Remediation Company		C.O.C. # X14-061-093	
R.J. Crow CHPRC		Page 1 of 1	
Collector	R.J. Crow CHPRC	Contact/Requester	Karen Waters-Husted
SAF No.	X14-061	Telephone No.	509-376-4650
Project Title	AQUIFER TUBES, SEPTEMBER 2014	Sampling Origin	Hanford Site
Shipped To (Lab)	GEL Laboratories, LLC	Logbook No.	HNF-N-506 5911
Protocol	SURV	Method of Shipment	Commercial Carrier
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		Priority:	30 Days
SPECIAL INSTRUCTIONS		Hold Time	PRIORITY
Total Activity Exemption: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Offsite Property No.	5060
Sample No.	B2XJ67	No/Type Container	1X1-L G/P
Filter	N	Sample Analysis	SRTOT_SEP_PRECIP_GPC: COMMON
Date	9-4-14	Holding Time	6 Months
Time	0916	Preservative	HNO3 to pH <2

Relinquished By	R.J. Crow CHPRC	Print	R Crow	Sign		Received By	L.D. Wall CHPRC	Print	L.D. Wall	Sign		Date/Time	SEP 04 2014 1100
Relinquished By	L.D. Wall CHPRC	Print	L.D. Wall	Sign		Received By	FEDEX	Print		Sign		Date/Time	
Relinquished By		Print		Sign		Received By	P. Hunt Patricia Dent	Print		Sign		Date/Time	9/15/14 0930
Relinquished By		Print		Sign		Received By		Print		Sign		Date/Time	
FINAL SAMPLE DISPOSITION		Disposal Method (e.g., Return to customer, per lab procedure, used in process)		Disposed By		Date/Time		Date/Time		Date/Time		Date/Time	

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CH2M Hill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. #

X14-061-096

Page 1 of 1

Collector	R.J. Crow CHPRC	Contact/Requester	Karen Waters-Husted	Telephone No.	509-376-4650
SAF No.	X14-061	Sampling Origin	Hanford Site	Purchase Order/Charge Code	303064ES20
Project Title	AQUIFER TUBES, SEPTEMBER 2014	Logbook No.	HNF-N-506 <i>59/1</i>	Ice Chest No.	<i>GWS-092</i>
Shipped To (Lab)	GEL Laboratories, LLC	Method of Shipment	Commercial Carrier	Bill of Lading/Air Bill No.	<i>7710 4868 0375</i>
Protocol	SURV	Priority:	30 Days	Offsite Property No.	<i>5060</i>

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

Total Activity Exemption: Yes No

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B2X-J80	Y	W	<i>9-4-14</i>	<i>1142</i>	1x500-mL G/P	6010_METALS_ICP: COMMON	6 Months	HNO3 to pH <2
B2X-J78	N	W			1x500-mL G/P	6010_METALS_ICP: COMMON	6 Months	HNO3 to pH <2
B2X-J78	N	W			1x1-L G/P	SRTOT_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2
B2X-J78	N	W			1x500-mL P	TRITIUM_DIST_LSC: COMMON	6 Months	None
B2X-J78	N	W			3x1-L aG	WTPH_DIESEL: COMMON	14/40 Days	HCl to pH <2/Cool <=6C

Relinquished By	R.J. Crow CHPRC	Print	<i>R. Crow</i>	Sign	<i>[Signature]</i>	Received By	K.C. Patterson CHPRC	Print	<i>[Signature]</i>	Sign	<i>[Signature]</i>	Date/Time	SEP 04 2014 1220
Relinquished By	K.C. Patterson CHPRC	Print	<i>[Signature]</i>	Sign	<i>[Signature]</i>	Received By	FEDEX	Print	CHPRC	Sign	<i>[Signature]</i>	Date/Time	SEP 04 2014 1400
Relinquished By	FED X	Print	<i>[Signature]</i>	Sign	<i>[Signature]</i>	Received By	P. Dent Patent	Print	<i>[Signature]</i>	Sign	<i>[Signature]</i>	Date/Time	SEP 15 2014 09:30

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FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process)	Disposed By	Date/Time
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CH2MHill Plateau Remediation Company
CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST
 C.O.C. # **X14-061-094**
 Page 1 of 1

Collector: R.J. Crow
CHPRC
SAF No.: X14-061
Contact/Requester: Karen Waters-Husted
Telephone No.: 509-376-4650
Sampling Origin: Hanford Site
Purchase Order/Charge Code: 303064ES20
Project Title: AQUIFER TUBES, SEPTEMBER 2014
Logbook No.: HNF-N-506 5911
Ice Chest No.: GW 5-092
Method of Shipment: Commercial Carrier
Bill of Lading/Air Bill No.: 7710 4868 0375
Shipped To (Lab): GEL Laboratories, LLC
Offsite Property No.: 5000
Protocol: SURV
Priority: 30 Days
PRIORITY

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 **Hold Time** Total Activity Exemption: Yes No

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B2XJ71	N	W	9-4-14	0943	1x500-mL G/P	6010_METALS_ICP: COMMON	6 Months	HNO3 to pH <2
B2XJ71	N	W			1x1-L G/P	SRTOT_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2
B2XJ71	N	W			1x500-mL P	TRITIUM_DIST_LSC: COMMON	6 Months	None
B2XJ71	N	W			3x1-L aG	WTPH_DIESEL: COMMON	14/40 Days	HCl to pH <2/Cool <=6C
B2XJ73	Y	W			1x500-mL G/P	6010_METALS_ICP: COMMON	6 Months	HNO3 to pH <2

Relinquished By: **R.J. Crow** Print **R. Crow** Sign **[Signature]** Date/Time **SEP 04 2014** 12:00
 Received By: **K.C. Patterson** CHPRC Sign **[Signature]** Date/Time **SEP 04 2014**
 Relinquished By: **K.C. Patterson** CHPRC Sign **[Signature]** Date/Time **SEP 04 2014** 14:00
 Received By: **FEDEX** Sign **[Signature]** Date/Time **SEP 04 2014**
 Relinquished By: **FED X** Sign **[Signature]** Date/Time **SEP 04 2014** 09:30
 Received By: **F. Dent Patena Dent** Sign **[Signature]** Date/Time **9/5/14** 09:30

Matrix *
 S = Soil DS = Drum Solids
 SE = Sediment DL = Drum Liquids
 SO = Solid T = Tissue
 SL = Sludge WI = Wipe
 W = Water L = Liquid
 O = Oil V = Vegetation
 A = Air X = Other

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

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 A-6004-842 (REV 2)
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SAMPLE RECEIPT & REVIEW FORM

Client: HUSA		SDG/AR/COC/Work Order: 356062	
Received By: P. Dent		Date Received: 9/5/14	
Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0/cpm
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 ≤ deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: Ice bags Blue ice Dry ice None Other (describe) ice *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): 130462966
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 7710 4868 0375

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

FID Diesel Range Organics Analysis

Case Narrative

**FID Diesel Range Organics
Hanford MSA (HMSA)
SDG GEL356062**

Method/Analysis Information

Procedure: Analysis of Diesel Range Organics by Flame Ionization Detector

Analytical Method: NWTPH-Dx

Prep Method: SW846 3535A

Analytical Batch Number: 1417390

Prep Batch Number: 1417388

Sample Analysis

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

Sample ID	Client ID
356062005	B2XJ78
356062006	B2XJ71
1203163049	MB for batch 1417388
1203163050	Laboratory Control Sample (LCS)
1203163051	356062005(B2XJ78) Matrix Spike (MS)
1203163052	356062005(B2XJ78) 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-003 REV# 24.

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

Calibration Information**Initial Calibration**

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

Continuing Calibration Verification (CCV) Requirements

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

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

The MB analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

Sample 356062006 (B2XJ71) recovered below the acceptance limits for the surrogate, and was re-extracted. The re-extracted sample met surrogate recovery acceptance criteria. Both sets of the data were reported.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 356062005 (B2XJ78) was selected for the matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The MS recovery was not within the established acceptance limits possibly due to poor extraction and due to sample matrix interference.

Matrix Spike Duplicate (MSD) Recovery Statement

The MSD recovery was not within the established acceptance limits possibly due to sample matrix interference.

MS/MSD Relative Percent Difference (RPD) Statement

The RPD between the MS and MSD did not meet the acceptance limits due to very low spike recovery in the MS.

Technical Information**Holding Time Specifications**

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

Preparation/Analytical Method Verification

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

Sample 356062006 (B2XJ71) was re-extracted because the results showed low surrogate recovery and possible false results due to incorrect spiking.

Miscellaneous Information**Electronic Package Comment**

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

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

Data Exception (DER) Documentation

Data exception report (DER) is generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. DER #1334645 was generated for this SDG.

Manual Integrations

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

Additional Comments

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

System Configuration

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

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

Method/Analysis Information

Procedure:	Analysis of Diesel Range Organics by Flame Ionization Detector
Analytical Method:	NWTPH-Dx
Prep Method:	SW846 3535A
Analytical Batch Number:	1419500
Prep Batch Number:	1419487

Sample Analysis

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

Sample ID	Client ID
356062006	B2XJ71
1203168485	MB for batch 1419487
1203168486	Laboratory Control Sample (LCS)
1203168487	356784005(B2XHP9) Matrix Spike (MS)
1203168488	356784005(B2XHP9) 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-003 REV# 24.

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

Calibration Information

Initial Calibration

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

Continuing Calibration Verification (CCV) Requirements

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

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

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

HMSA sample 356784005 (B2XHP9) was selected for the matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The MS recovery was within the established acceptance limits.

Matrix Spike Duplicate (MSD) Recovery Statement

The MSD recovery was not within the established acceptance limits possibly due to isolated poor extraction.

MS/MSD Relative Percent Difference (RPD) Statement

The RPD between the MS and MSD did not meet the acceptance limits due to low spike recovery in the MSD.

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. Sample 356062006 (B2XJ71) was re-extracted out of holding.

Preparation/Analytical Method Verification

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

Sample 356062006 (B2XJ71) was extracted and analyzed twice due to low surrogate recovery and possibly inaccurate results in the first analysis. Both analyses were reported in this data package.

Miscellaneous Information**Electronic Package Comment**

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

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

Data Exception (DER) Documentation

Data exception report (DER) is generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. DER #1336011 was generated for this SDG.

Manual Integrations

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

Additional Comments

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

System Configuration

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

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

Certification Statement

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

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: GEL356062 GEL Work Order: 356062

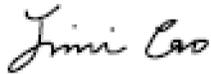
The Qualifiers in this report are defined as follows:

- 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.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

Review/Validation

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

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

Signature: 

Name: Jimin Cao

Date: 22 SEP 2014

Title: Data Validator

Sample Data Summary

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: September 22, 2014

Page 1 of 1

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

Workorder: 356062

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Diesel Range Organics											
Batch	1417390										
QC1203163050	LCS										
TPH Diesel	1000			737	ug/L		73.7	(47%–112%)	BYT1	09/16/14	11
**o–Terphenyl	20.0			15.4	ug/L		77.1	(32%–125%)			
QC1203163049	MB										
TPH Diesel			U	ND	ug/L					09/16/14	10
**o–Terphenyl	20.0			12.2	ug/L		61.2	(32%–125%)			
QC1203163051	356062005	MS									
TPH Diesel	962	JT	128	JT	154	ug/L	2.7*	(70%–130%)		09/16/14	13
**o–Terphenyl	19.2		12.6		13.0	ug/L	67.8	(50%–150%)			
QC1203163052	356062005	MSD									
TPH Diesel	962	JT	128	T	612	ug/L	120*	50.3*	(0%–20%)	09/16/14	13
**o–Terphenyl	19.2		12.6		11.4	ug/L	59.5	(50%–150%)			
Batch	1419500										
QC1203168486	LCS										
TPH Diesel	1000			706	ug/L		70.6	(70%–130%)	BYT1	09/19/14	05
**o–Terphenyl	20.0			15.2	ug/L		75.8	(50%–150%)			
QC1203168485	MB										
TPH Diesel			U	ND	ug/L					09/19/14	04
**o–Terphenyl	20.0			13.6	ug/L		68.2	(50%–150%)			

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol–condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument

GEL LABORATORIES LLC

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QC Summary

Workorder: 356062

Page 2 of 2

Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
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. 17-SEP-14	Division: Federal	Quality Criteria: Specifications	Type: Process
Instrument Type: GC/FID	Test / Method: NWTPH-Dx, SW846 3535A/8015C	Matrix Type: Liquid	Client Code: HMSA, XCEL
Batch ID: 1417390	Sample Numbers: See Below		
<p>Potentially affected work order(s)(SDG): 356058,356062(GEL356062)</p> <p>Application Issues: Failed Recovery for MS/PS Failed RPD for MS/MSD, or PS/PSD Failed Recovery for MSD/PSD Failed Yield for Surrogates</p>			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Sample 356062006 recovered o-Terphenyl at 32%(SPC Limit: 50%-150%).</p> <p>2. The MS(1203163051) and MSD(1203163052) recovered diesel range organics at 2% and 50% respectively(SPC Limit: 70%-130).</p> <p>3. The MS/MSD RPD value was 120%(SPC Limit: 20%).</p>		<p>1, 2 & 3. The failures were possibly due to extraction or spiking error of the MS and sample 356062006. Sample 356062006 was re-extracted.</p>	

Originator's Name:
Benjamin Taft 17-SEP-14

Data Validator/Group Leader:
Jimin Cao 17-SEP-14

DATA EXCEPTION REPORT			
Mo.Day Yr. 21-SEP-14	Division: Federal	Quality Criteria: Specifications	Type: Process
Instrument Type: GC/FID	Test / Method: NWTPH-Dx	Matrix Type: Liquid	Client Code: HMSA
Batch ID: 1419500	Sample Numbers: See Below		
<p>Potentially affected work order(s)(SDG): 356062(GEL356062),356637(GEL356637),356640(GEL356640),356736(GEL356736),356777(GEL356777),356784(GEL356784)</p> <p>Application Issues:</p> <p>Failed RPD for MS/MSD, or PS/PSD Failed Recovery for MSD/PSD Sample Prepped out of Holding</p>			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Sample 356062006 was re-extracted out of holding.</p> <p>2. The MSD(1203168488) recovered diesel range organics at 25%(SPC Limit: 70%-130%).</p> <p>3. The MS/MSD RPD value for diesel range organics and o-Terphenyl was 61% and 53% respectively(SPC Limit: 20%)</p>		<p>1. Sample was re-extracted due to low surrogate recovery in the first extraction. Re-extracted sample met surrogate recovery acceptance criteria but was re-extracted out of holding. Both sets of data were reported.</p> <p>2 & 3. The failures were possibly due to isolated poor extraction efficiency of the MSD as the MSD recovered low for the spiked analytes and recovered relatively lower for the surrogate as well. The data were reported.</p>	

Originator's Name:
Benjamin Taft 21-SEP-14

Data Validator/Group Leader:
Jimin Cao 22-SEP-14

Metals Analysis

Case Narrative

**Metals Fractional Narrative
Hanford MSA (HMSA)
SDG GEL356062**

Sample Analysis

Sample ID	Client ID
356062004	B2XJ80
356062005	B2XJ78
356062006	B2XJ71
356062007	B2XJ73
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 Steele Date: 10/03/2014

Sample Data Summary

GEL LABORATORIES LLC

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**Qualifier Definition Report
for**

HMSA001 Hanford MSA (51204)

Client SDG: GEL356062 GEL Work Order: 356062

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

 10/03/2014

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 X14-061**

Report Date: October 3, 2014

Client Sample ID: B2XJ80
 Lab Sample ID: 356062004
 Matrix: WATER
 Collect Date: 04-SEP-14 11:42
 Receive Date: 05-SEP-14
 Collector: Client

Project: HMSA00198
 Client ID: HMSA001
 Client SDG: GEL356062

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP												
<i>6010_METALS_ICP: COMMON "As Received"</i>												
Antimony	U	3.50	3.50	10.0	10.0	ug/L	1	HSC	09/12/14	15:29	1416987	1
Arsenic	U	5.00	5.00	30.0	30.0	ug/L	1					
Barium		53.8	1.00	5.00	5.00	ug/L	1					
Cadmium	U	1.00	1.00	5.00	5.00	ug/L	1					
Calcium		51700	50.0	200	200	ug/L	1					
Chromium	B	4.77	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		11100	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		8.48	1.00	5.00	5.00	ug/L	1					
Zinc	U	3.30	3.30	10.0	10.0	ug/L	1					
Potassium		5100	50.0	150	150	ug/L	1	HSC	09/15/14	13:32	1416987	2
Sodium		86800	100	300	300	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

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 X14-061**

Report Date: October 3, 2014

Client Sample ID: B2XJ78
Lab Sample ID: 356062005
Matrix: WATER
Collect Date: 04-SEP-14 11:42
Receive Date: 05-SEP-14
Collector: Client

Project: HMSA00198
Client ID: HMSA001
Client SDG: GEL356062

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP												
<i>6010_METALS_ICP: COMMON "As Received"</i>												
Antimony	U	3.50	3.50	10.0	10.0	ug/L	1	HSC	09/12/14	15:54	1416987	1
Arsenic	B	8.57	5.00	30.0	30.0	ug/L	1					
Barium		59.4	1.00	5.00	5.00	ug/L	1					
Cadmium	U	1.00	1.00	5.00	5.00	ug/L	1					
Calcium		52300	50.0	200	200	ug/L	1					
Chromium		5.94	1.00	5.00	5.00	ug/L	1					
Cobalt	BC	1.31	1.00	5.00	5.00	ug/L	1					
Copper	U	3.00	3.00	10.0	10.0	ug/L	1					
Iron		650	30.0	100	100	ug/L	1					
Magnesium		11400	110	300	300	ug/L	1					
Manganese		33.0	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		8.62	1.00	5.00	5.00	ug/L	1					
Zinc	B	8.41	3.30	10.0	10.0	ug/L	1					
Potassium		5170	50.0	150	150	ug/L	1	HSC	09/15/14	13:57	1416987	2
Sodium		88900	100	300	300	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

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 X14-061**

Report Date: October 3, 2014

Client Sample ID: B2XJ71
 Lab Sample ID: 356062006
 Matrix: WATER
 Collect Date: 04-SEP-14 09:43
 Receive Date: 05-SEP-14
 Collector: Client
 Project: HMSA00198
 Client ID: HMSA001
 Client SDG: GEL356062

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP												
<i>6010_METALS_ICP: COMMON "As Received"</i>												
Antimony	BC	5.40	3.50	10.0	10.0	ug/L	1	HSC	09/12/14	15:57	1416987	1
Arsenic	U	5.00	5.00	30.0	30.0	ug/L	1					
Barium		28.0	1.00	5.00	5.00	ug/L	1					
Cadmium	U	1.00	1.00	5.00	5.00	ug/L	1					
Calcium		37200	50.0	200	200	ug/L	1					
Chromium		5.16	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	B	77.4	30.0	100	100	ug/L	1					
Magnesium		11500	110	300	300	ug/L	1					
Manganese	B	3.55	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		16.7	1.00	5.00	5.00	ug/L	1					
Zinc	U	3.30	3.30	10.0	10.0	ug/L	1					
Potassium		5390	50.0	150	150	ug/L	1	HSC	09/15/14	14:00	1416987	2
Sodium		103000	100	300	300	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

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 X14-061**

Report Date: October 3, 2014

Client Sample ID: B2XJ73
 Lab Sample ID: 356062007
 Matrix: WATER
 Collect Date: 04-SEP-14 09:43
 Receive Date: 05-SEP-14
 Collector: Client

Project: HMSA00198
 Client ID: HMSA001
 Client SDG: GEL356062

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP												
<i>6010_METALS_ICP: COMMON "As Received"</i>												
Antimony	BC	8.32	3.50	10.0	10.0	ug/L	1	HSC	09/12/14	16:00	1416987	1
Arsenic	U	5.00	5.00	30.0	30.0	ug/L	1					
Barium		27.0	1.00	5.00	5.00	ug/L	1					
Cadmium	U	1.00	1.00	5.00	5.00	ug/L	1					
Calcium		37000	50.0	200	200	ug/L	1					
Chromium	B	4.18	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		11400	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		17.3	1.00	5.00	5.00	ug/L	1					
Zinc	U	3.30	3.30	10.0	10.0	ug/L	1					
Potassium		5410	50.0	150	150	ug/L	1	HSC	09/15/14	14:03	1416987	2
Sodium		104000	100	300	300	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 3, 2014

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 356062

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%)			
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
Vanadium	500			513	ug/L		103	(80%-120%)		09/12/14	15:26
Zinc	500			494	ug/L		98.8	(80%-120%)			
QC1203162015	MB										
Antimony			B	5.61	ug/L					09/12/14	15:23
Arsenic			U	ND	ug/L						

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QC Summary

Workorder: 356062

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1416987										
Barium			U	ND	ug/L						
Cadmium			U	ND	ug/L				HSC	09/12/14	15:23
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
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%)			
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%)			

GEL LABORATORIES LLC

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QC Summary

Workorder: 356062

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1416987										
Copper	500	U	ND	539	ug/L		108	(75%-125%)	HSC	09/12/14	15:32
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
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%)			
Cadmium	500	U	ND	466	ug/L	2.00	93.1	(0%-20%)			
Calcium	5000		51700	56100	ug/L	0.674	N/A	(0%-20%)			
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%)			

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QC Summary

Workorder: 356062

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1416987										
Nickel	500	U	ND	491	ug/L	1.02	98	(0%-20%)	HSC	09/12/14	15:35
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
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%)			
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%)			
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			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

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QC Summary

Workorder: 356062

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1416987										
Vanadium		8.48	D	2.65	ug/L	56.3		(0%-10%)	HSC	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.
- 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 GEL356062**

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
356062001	B2XJ72
356062002	B2XJ79
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 samples in this sample group were diluted due to high concentration: 356062001 (B2XJ72) and 356062002 (B2XJ79). The following samples were diluted based on historical data: 356062001 (B2XJ72). All samples diluted at a 2X per client request. 1203161808 (B2XD11), 1203161809 (B2XD12), 1203161810 (B2XD11), 1203161811 (B2XD12), 356062001 (B2XJ72) and 356062002 (B2XJ79).

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), 356062001 (B2XJ72) and 356062002 (B2XJ79).

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.

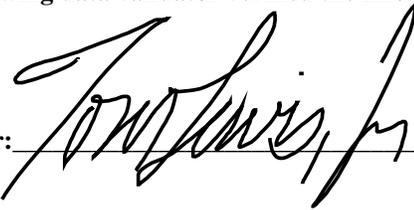
Certification Statement

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.

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

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

**Certificate of Analysis Report
for**

HMSA001 Hanford MSA (51204)

Client SDG: GEL356062 GEL Work Order: 356062

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



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 X14-061**

Report Date: September 29, 2014

Client Sample ID: B2XJ72
 Lab Sample ID: 356062001
 Matrix: WATER
 Collect Date: 04-SEP-14 09:43
 Receive Date: 05-SEP-14
 Collector: Client

Project: HMSA00198
 Client ID: HMSA001
 Client SDG: GEL356062

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>												
Fluoride	BD	284	66.0	200	500	ug/L	2	RXB5	09/05/14	17:11	1416896	1
Nitrate-N	D	7960	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					
Chloride	D	40000	335	1000	200	ug/L	5	RXB5	09/05/14	17:42	1416896	2
Sulfate	D	141000	1330	4000	500	ug/L	10	RXB5	09/06/14	04:32	1416896	3

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 9056A	
2	SW846 9056A	
3	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 X14-061**

Report Date: September 29, 2014

Client Sample ID: B2XJ79
 Lab Sample ID: 356062002
 Matrix: WATER
 Collect Date: 04-SEP-14 11:42
 Receive Date: 05-SEP-14
 Collector: Client

Project: HMSA00198
 Client ID: HMSA001
 Client SDG: GEL356062

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>												
Fluoride	BD	229	66.0	200	500	ug/L	2	RXB5	09/05/14	19:15	1416896	1
Nitrate-N	D	9390	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					
Chloride	D	38000	335	1000	200	ug/L	5	RXB5	09/05/14	19:46	1416896	2
Sulfate	D	113000	1330	4000	500	ug/L	10	RXB5	09/06/14	18:38	1416896	3

The following Analytical Methods were performed

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

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: 356062

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										

GEL LABORATORIES LLC

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

QC Summary

Workorder: 356062

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

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

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QC Summary

Workorder: 356062

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

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 GEL356062
Work Order 356062**

Method/Analysis Information

Product: SRTOT_SEP_PRECIP_GPC: COMMON

Analytical Method: SRTOT_SEP_PRECIP_GPC

Analytical Batch Number: 1419083

Sample ID	Client ID
356062003	B2XJ67
356062005	B2XJ78
356062006	B2XJ71
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
356062005	B2XJ78
356062006	B2XJ71
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), 356062005 (B2XJ78) and 356062006 (B2XJ71) 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.

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**Qualifier Definition Report
for**

HMSA001 Hanford MSA (51204)

Client SDG: GEL356062 GEL Work Order: 356062

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Heather McCarty

Date: 01 OCT 2014

Title: Analyst II

Sample Data Summary

OCTOBER 3, 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
Contact: Mr. Scot Fitzgerald
Project: CHPRC SAF X14-061

Report Date: October 1, 2014

Client Sample ID: B2XJ67
Sample ID: 356062003
Matrix: WATER
Collect Date: 04-SEP-14
Receive Date: 05-SEP-14
Collector: Client

Project: HMSA00198
Client ID: HMSA001

Table with 13 columns: Parameter, Qualifier, Result, Uncertainty, MDC, TPU, RL, Units, DF, Analyst, Date, Time, Batch, Mtd. Row 1: Rad Gas Flow Proportional Counting, SRTOT_SEP_PRECIP_GPC: COMMON "As Received". Row 2: Total Strontium, U, 0.764, +/-1.11, 1.91, +/-1.12, 2.00, pCi/L, KSD1, 09/25/14, 1134, 1419083, 1

The following Analytical Methods were performed

Table with 2 columns: Method, Description. Row 1: 1, EPA 905.0 Modified

Table with 5 columns: Surrogate/Tracer Recovery, Test, Batch ID, Recovery%, Acceptable Limits. Row 1: Strontium Carrier, SRTOT_SEP_PRECIP_GPC: COMMON "As Received", 1419083, 86.3, (25%-125%)

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

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 X14-061

Client Sample ID: B2XJ78
 Sample ID: 356062005
 Matrix: WATER
 Collect Date: 04-SEP-14
 Receive Date: 05-SEP-14
 Collector: Client

Project: HMSA00198
 Client ID: HMSA001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gas Flow Proportional Counting													
<i>SRTOT_SEP_PRECIP_GPC: COMMON "As Received"</i>													
Total Strontium		2.16	+/-1.26	1.83	+/-1.36	2.00	pCi/L		KSD1	09/25/14	1140	1419083	1
Rad Liquid Scintillation Analysis													
<i>TRITIUM_DIST_LSC: COMMON "As Received"</i>													
Tritium		1810	+/-173	146	+/-390	100	pCi/L		BYS1	09/26/14	0319	1418820	2

The following Analytical Methods were performed

Method	Description
1	EPA 905.0 Modified
2	EPA 906.0 Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Strontium Carrier	SRTOT_SEP_PRECIP_GPC: COMMON "As Received"	1419083	83.7	(25%-125%)

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

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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 X14-061

Client Sample ID: B2XJ71
 Sample ID: 356062006
 Matrix: WATER
 Collect Date: 04-SEP-14
 Receive Date: 05-SEP-14
 Collector: Client

Project: HMSA00198
 Client ID: HMSA001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gas Flow Proportional Counting													
<i>SRTOT_SEP_PRECIP_GPC: COMMON "As Received"</i>													
Total Strontium	U	0.914	+/-1.12	1.89	+/-1.14	2.00	pCi/L		KSD1	09/25/14	1137	1419083	1
Rad Liquid Scintillation Analysis													
<i>TRITIUM_DIST_LSC: COMMON "As Received"</i>													
Tritium		925	+/-133	142	+/-223	100	pCi/L		BYS1	09/26/14	0453	1418820	2

The following Analytical Methods were performed

Method	Description
1	EPA 905.0 Modified
2	EPA 906.0 Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Strontium Carrier	SRTOT_SEP_PRECIP_GPC: COMMON "As Received"	1419083	92.8	(25%-125%)

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

Quality Control Data

GEL LABORATORIES LLC

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QC Summary

Report Date: October 1, 2014

Page 1 of 2

Client : CH2M Hill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Workorder: 356062

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gas Flow									
Batch	1419083								
QC1203167476	MB								
Total Strontium			U	0.804	pCi/L			KSD1	09/25/1411:37
				Uncert:					
				TPU:					
QC1203167477	356062003	DUP							
Total Strontium		U	0.764	U	1.72				09/25/1411:40
				Uncert:		RPD: 0	N/A		
				TPU:		RER: 1.08	(0-2)		
QC1203167478	LCS								
Total Strontium	112			108	pCi/L	REC: 96	(80%-120%)		09/25/1411:34
				Uncert:					
				TPU:					
Rad Liquid Scintillation									
Batch	1418820								
QC1203166815	MB								
Tritium			U	49.4	pCi/L			BYS1	09/30/1405:19
				Uncert:					
				TPU:					
QC1203166816	356403002	DUP							
Tritium	1160			1050	pCi/L				09/26/1420:40
				Uncert:		RPD: 10	(0% - 20%)		
				TPU:		RER: 0.593	(0-2)		
QC1203166817	356403002	MS							
Tritium	1910	1160		2800	pCi/L	REC: 86	(75%-125%)		09/26/1422:13
				Uncert:					
				TPU:					
QC1203166818	LCS								
Tritium	1910			1750	pCi/L	REC: 92	(80%-120%)		09/26/1422:45
				Uncert:					
				TPU:					

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

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QC Summary

Workorder: 356062

Page 2 of 2

Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
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.				
W						Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.				
X						Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier				
Y						Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier				
Z						Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier				
o						Analyte failed to recover within LCS limits (Organics only)				

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

** Indicates analyte is a surrogate compound.

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

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

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