

OCTOBER 1, 2014



a member of **The GEL Group** INC



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October 01, 2014

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

Re: CHPRC SAF S14-007
Work Order: 356016
SDG: GEL356016

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on September 04, 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 that reads "Heather Shaffer".

Heather Shaffer
Project Manager

Purchase Order: 300071ES20
Chain of Custody: S14-007-105 and S14-007-106
Enclosures



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Case Narrative

**General Narrative
for
Hanford MSA (51204)
CHPRC SAF S14-007
SDG: GEL356016**

October 01, 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 04, 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:

Laboratory Identification	Sample Description
356016001	B2X174
356016002	B2X172

Case Narrative

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

Data Package

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



Heather Shaffer
Project Manager

Chain of Custody and Supporting Documentation

356016

CH2M Hill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # S14-007-105
Page 1 of 1

Collector: CHRIS FULTON CHPRC
SAF No.: S14-007
Project Title: SURV, JULY 2014
Shipped To (Lab): GEL Laboratories, LLC
Protocol: CERCLA

Contact/Requester: Karen Waters-Husted
Sampling Origin: Hanford Site
Logbook No.: HNF-N-506 6A12
Method of Shipment: Commercial Carrier
Priority: 30 Days **PRIORITY**

Telephone No.: 509-376-4650
Purchase Order/Charge Code: 30007IES20
Ice Chest No.: 6WS-307
Bill of Lading/Air Bill No.: 77163444 4630
Offsite Property No.: 5056

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: Total Activity Exemption: Yes No

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B2X172	N	W	SEP 03 2014	0837	1x500-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: GW 01; 7470_MERCURY_CV: COMMON (AQUEOUS)	6 Months	HNO3 to pH <2
B2X172	N	W			4x40-mL aGs*	8260_VOA_GCMS: COMMON	14 Days	HCl or H2SO4 to pH <2/Cool <=6C
B2X172	N	W			4x1-L aG	8270_SVOA_GCMS: COMMON	7/40 Days	Cool <=6C
B2X172	N	W			1x250-mL G/P	9012_CYANIDE: COMMON	14 Days	NaOH to pH >=12/Cool <=6C
B2X172	N	W			1x1-L G/P	AMCMISO_EIE_PLATE_AEA: COMMON	6 Months	HNO3 to pH <2
B2X172	N	W			1x4-L G/P	GAMMA_GS: COMMON; GAMMA_GS: GW 01	6 Months	HNO3 to pH <2
B2X172	N	W			1x1-L G/P	NP237_IE_PRECIP_AEA: COMMON	180 Days	HNO3 to pH <2
B2X172	N	W			1x1-L G/P	PUISO_PLATE_AEA: COMMON	6 Months	HNO3 to pH <2
B2X172	N	W			1x1-L G/P	SRTOT_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2
B2X172	N	W			1x500-mL G/P	TC99_EIE_LSC: COMMON	6 Months	HNO3 to pH <2
B2X172	N	W			1x1-L G/P	THISO_IE_PLATE_AEA: COMMON	6 Months	HNO3 to pH <2
B2X172	N	W			1x500-mL P	TRITIUM_DIST_LSC: COMMON	6 Months	None

Requisitioned By: CHRIS FULTON CHPRC Date/Time: SEP 03 2014 0900 Sign:	Received By: F.M. Hall CHPRC Date/Time: SEP 03 2014 0900 Sign:	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
Requisitioned By: F.M. Hall CHPRC Date/Time: SEP 03 2014 1400 Sign:	Received By: FEDEX Date/Time: SEP 03 2014 Sign:	
Requisitioned By: F.M. Hall CHPRC Date/Time: SEP 03 2014 Sign:	Received By: R. Kent Patrius Dent Date/Time: 9/4/14 09:05 Sign:	
Requisitioned By: F.M. Hall CHPRC Date/Time: SEP 03 2014 Sign:	Received By:	
FINAL SAMPLE DISPOSITION Disposal Method (e.g., Return to customer, per lab procedure, used in process)	Disposed By:	Date/Time:

87105

CH2M Hill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. #

S14-007-106

Page 1 of 1

Collector	CHRIS FULTON CHPRC	Contact/Requester	Karen Waters-Husted	Telephone No.	509-376-4650
SAF No.	S14-007	Sampling Origin	Hanford Site	Purchase Order/Charge Code	30007IES20
Project Title	SURV, JULY 2014	Logbook No.	HNF-N-506	Ice Chest No.	605-307
Shipped To (Lab)	GEL Laboratories, LLC	Method of Shipment	Commercial Carrier	Bill of Lading/Air Bill No.	71034444630
Protocol	CERCLA	Priority:	30 Days	Offsite Property No.	5056

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 Total Activity Exemption: Yes No

Sample No.	Filter	* Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B2X174	N	W\$SEP 03 2014	0837	1x250-mL G/P	9056_ANIONS_IC: COMMON	28 Days/48 Hours	Cool <=6C

Relinquished By	CHRIS FULTON CHPRC	Print		Sign		Date/Time	SEP 03 2014 0900
Received By	P.M. Hall CHPRC	Print		Sign		Date/Time	SEP 03 2014 0900
Relinquished By	CHRIS FULTON CHPRC	Print		Sign		Date/Time	SEP 03 2014 0900
Received By	P. H. Dent FEDX	Print		Sign		Date/Time	SEP 03 2014 0905

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



SAMPLE RECEIPT & REVIEW FORM

Client: HMSA		SDG/AR/COC/Work Order: 356016
Received By: P. Went		Date Received: 9/5/14
Suspected Hazard Information	Yes <input type="checkbox"/> No <input type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0/cpm
Classified Radioactive II or III by RSO?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Package, COC, and/or Samples marked as beryllium or asbestos containing?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Hazard Class Shipped: _____ UN#: _____
Samples identified as Foreign Soil?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: Ice bags Blue ice Dry ice None Other (describe) DC 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"/>			Chain Rec'd 9/4/14 Samples rec'd 9/5/14
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: Missing COOLERS RECEIVED. All Samples accounted for.
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: FedEx Air FedEx Ground UPS Field Services Courier Other 7710 3444 4630 } DC 11 11 4033 }

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 01 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

Volatile Analysis

Case Narrative

**ChemStation Case Narrative
Hanford MSA (HMSA)
SDG GEL356016**

Method/Analysis Information

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

Analytical Method: SW846 8260C

Analytical Batch Number: 1416794

Sample Analysis

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

Sample ID	Client ID
356016002	B2X172
1203161478	Method Blank (MB)
1203161479	Laboratory Control Sample (LCS)
1203161480	355853001(B2TXT0) Post Spike (PS)
1203161481	355853001(B2TXT0) Post Spike Duplicate (PSD)
1203164353	Method Blank (MB)
1203164354	Laboratory Control Sample (LCS)

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

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

SOP Reference

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

Calibration Information

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

Initial Calibration

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

Continuing Calibration Verification Requirements

The calibration verification standard requirements were not all met. Please see the Data Exception Report in the miscellaneous section of the deliverable. The percent drifts for a few compounds were outside the acceptance limits with high bias in the continuing calibration verification sample analyzed 09/05. The compounds were not detected in the associated samples.

Quality Control (QC) Information

Blank (MB) Statement

The blanks analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

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

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 355853001 (B2TXT0) was designated for spike analysis.

Matrix Spike (PS) Recovery Statement

The spike 1203161480 (B2TXT0) recoveries were not all within the acceptance limits. See the Data Exception Report in the miscellaneous section of the data package.

Matrix Spike Duplicate (PSD) Recovery Statement

The spike duplicate 1203161481 (B2TXT0) recoveries were not all within the acceptance limits. See the Data Exception Report in the miscellaneous section of the data package.

Relative Percent Difference (RPD) Statement

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

Internal Standard (ISTD) Acceptance

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

Technical Information

Holding Time Specifications

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

Sample Preservation and Integrity

The following samples were pH3 at the time of analysis: 356016002 (B2X172).

Sample Dilutions/Methanol Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

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

Holding Times

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

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

The following DER was generated for this SDG: 1333811.

Manual Integrations

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

TIC Comment

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

Additional Comments

Additional comments were not required for this SDG.

Residual Chlorine

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

System Configuration

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

Instrument ID	Instrument	System Configuration	Column ID	Column Description	P & T Trap
VOA2.I	Agilent 7890/5975 GC/MS w/ OI Eclipse/Archon Autosampler	HP7890N/HP5975C	DB-624	J&W, 60m x 0.25mm x 1.4um	Trap 10

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all 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: GEL356016 GEL Work Order: 356016

The Qualifiers in this report are defined as follows:

T Spike and/or spike duplicate sample recovery is outside control limits.

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

DL Indicates that sample is diluted.

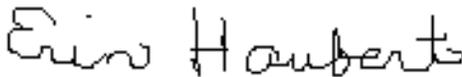
RA Indicates that sample is re-analyzed without re-extraction.

RE Indicates that sample is re-extracted.

Review/Validation

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

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

Signature: 

Name: Erin Haubert

Date: 30 SEP 2014

Title: Data Validator

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 Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S14-007**

Report Date: September 23, 2014

Client Sample ID: B2X172
 Lab Sample ID: 356016002
 Matrix: WATER
 Collect Date: 03-SEP-14 08:37
 Receive Date: 04-SEP-14
 Collector: Client
 Project: HMSA00177
 Client ID: HMSA001
 Client SDG: GEL356016

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
<i>8260VOA_GCMS: COMMON "As Received"</i>												
1,1,1-Trichloroethane	U	0.300	0.300	2.00	5.00	ug/L	1	CDS1	09/09/14	16:42	1416794	1
1,1,2-Trichloroethane	U	0.300	0.300	2.00	5.00	ug/L	1					
1,1-Dichloroethane	U	0.300	0.300	2.00	10.0	ug/L	1					
1,1-Dichloroethylene	U	0.300	0.300	2.00	10.0	ug/L	1					
1,2-Dichloroethane	U	0.300	0.300	2.00	5.00	ug/L	1					
2-Butanone	TU	3.00	3.00	10.0	10.0	ug/L	1					
4-Methyl-2-pentanone	U	3.00	3.00	10.0	10.0	ug/L	1					
Acetone	TU	3.00	3.00	10.0	20.0	ug/L	1					
Benzene	U	0.300	0.300	2.00	5.00	ug/L	1					
Carbon disulfide	U	1.60	1.60	10.0	5.00	ug/L	1					
Carbon tetrachloride	U	0.300	0.300	2.00	5.00	ug/L	1					
Chlorobenzene	U	0.300	0.300	2.00	5.00	ug/L	1					
Chloroform	U	0.300	0.300	2.00	5.00	ug/L	1					
Ethylbenzene	U	0.300	0.300	2.00	5.00	ug/L	1					
Methylene chloride	U	1.60	1.60	5.00	5.00	ug/L	1					
Tetrachloroethylene	U	0.300	0.300	2.00	5.00	ug/L	1					
Toluene	U	0.300	0.300	2.00	5.00	ug/L	1					
Trichloroethene	U	0.300	0.300	2.00	5.00	ug/L	1					
Vinyl chloride	U	0.300	0.300	2.00	10.0	ug/L	1					
Xylenes (total)	U	0.300	0.300	6.00	10.0	ug/L	1					

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 8260C	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	8260VOA_GCMS: COMMON "As Received"	49.9 ug/L	50.0	99.8	(78%-124%)
Bromofluorobenzene	8260VOA_GCMS: COMMON "As Received"	50.0 ug/L	50.0	100	(80%-120%)
Toluene-d8	8260VOA_GCMS: COMMON "As Received"	49.6 ug/L	50.0	99.2	(80%-120%)

Quality Control Summary

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QC Summary

Report Date: September 23, 2014

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 356016

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1416794										
QC1203161479	LCS										
1,1,1-Trichloroethane	50.0			49.3	ug/L		98.6	(70%-130%)	CDS1	09/05/14	07:38
1,1,2-Trichloroethane	50.0			45.7	ug/L		91.4	(70%-130%)			
1,1-Dichloroethane	50.0			49.2	ug/L		98.3	(70%-130%)			
1,1-Dichloroethylene	50.0			47.4	ug/L		94.8	(70%-130%)			
1,2-Dichloroethane	50.0			46.8	ug/L		93.6	(70%-130%)			
2-Butanone	250			265	ug/L		106	(70%-130%)			
4-Methyl-2-pentanone	250			233	ug/L		93.2	(70%-130%)			
Acetone	250			302	ug/L		121	(70%-130%)			
Benzene	50.0			47.9	ug/L		95.7	(70%-130%)			
Carbon disulfide	250			245	ug/L		98.1	(70%-130%)			
Carbon tetrachloride	50.0			49.0	ug/L		97.9	(70%-130%)			
Chlorobenzene	50.0			46.0	ug/L		92	(70%-130%)			
Chloroform	50.0			48.2	ug/L		96.3	(70%-130%)			
Ethylbenzene	50.0			46.9	ug/L		93.8	(70%-130%)			
Methylene chloride	50.0			47.0	ug/L		94	(70%-130%)			
Tetrachloroethylene	50.0			44.2	ug/L		88.5	(70%-130%)			
Toluene	50.0			46.1	ug/L		92.2	(70%-130%)			
Trichloroethene	50.0			47.1	ug/L		94.1	(70%-130%)			
Vinyl chloride	50.0			55.1	ug/L		110	(70%-130%)			
Xylenes (total)	150			142	ug/L		94.6	(70%-130%)			

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QC Summary

Workorder: 356016

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1416794										
**1,2-Dichloroethane-d4	50.0			50.8	ug/L		102	(78%-124%)	CDS1	09/05/14	07:38
**Bromofluorobenzene	50.0			47.2	ug/L		94.4	(80%-120%)			
**Toluene-d8	50.0			48.6	ug/L		97.1	(80%-120%)			
QC1203164354 LCS											
1,1,1-Trichloroethane	50.0			50.5	ug/L		101	(70%-130%)		09/09/14	08:42
1,1,2-Trichloroethane	50.0			50.4	ug/L		101	(70%-130%)			
1,1-Dichloroethane	50.0			51.1	ug/L		102	(70%-130%)			
1,1-Dichloroethylene	50.0			49.9	ug/L		99.9	(70%-130%)			
1,2-Dichloroethane	50.0			50.5	ug/L		101	(70%-130%)			
2-Butanone	250			284	ug/L		114	(70%-130%)			
4-Methyl-2-pentanone	250			267	ug/L		107	(70%-130%)			
Acetone	250			310	ug/L		124	(70%-130%)			
Benzene	50.0			50.3	ug/L		101	(70%-130%)			
Carbon disulfide	250			261	ug/L		104	(70%-130%)			
Carbon tetrachloride	50.0			50.7	ug/L		101	(70%-130%)			
Chlorobenzene	50.0			48.2	ug/L		96.4	(70%-130%)			
Chloroform	50.0			50.7	ug/L		101	(70%-130%)			
Ethylbenzene	50.0			49.9	ug/L		99.8	(70%-130%)			
Methylene chloride	50.0			48.8	ug/L		97.5	(70%-130%)			
Tetrachloroethylene	50.0			46.8	ug/L		93.6	(70%-130%)			
Toluene	50.0			50.5	ug/L		101	(70%-130%)			
Trichloroethene	50.0			50.8	ug/L		102	(70%-130%)			

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QC Summary

Workorder: 356016

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1416794										
Vinyl chloride	50.0			57.0	ug/L		114	(70%-130%)	CDS1	09/09/14	08:42
Xylenes (total)	150			149	ug/L		99.5	(70%-130%)			
**1,2-Dichloroethane-d4	50.0			50.5	ug/L		101	(78%-124%)			
**Bromofluorobenzene	50.0			49.2	ug/L		98.5	(80%-120%)			
**Toluene-d8	50.0			51.3	ug/L		103	(80%-120%)			
QC1203161478	MB										
1,1,1-Trichloroethane			U	ND	ug/L					09/05/14	09:54
1,1,2-Trichloroethane			U	ND	ug/L						
1,1-Dichloroethane			U	ND	ug/L						
1,1-Dichloroethylene			U	ND	ug/L						
1,2-Dichloroethane			U	ND	ug/L						
2-Butanone			U	ND	ug/L						
4-Methyl-2-pentanone			U	ND	ug/L						
Acetone			U	ND	ug/L						
Benzene			U	ND	ug/L						
Carbon disulfide			U	ND	ug/L						
Carbon tetrachloride			U	ND	ug/L						
Chlorobenzene			U	ND	ug/L						
Chloroform			U	ND	ug/L						
Ethylbenzene			U	ND	ug/L						
Methylene chloride			U	ND	ug/L						
Tetrachloroethylene			U	ND	ug/L						

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QC Summary

Workorder: 356016

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1416794										
Toluene			U	ND	ug/L				CDS1	09/05/14	09:54
Trichloroethene			U	ND	ug/L						
Vinyl chloride			U	ND	ug/L						
Xylenes (total)			U	ND	ug/L						
**1,2-Dichloroethane-d4	50.0			50.8	ug/L		102	(78%-124%)			
**Bromofluorobenzene	50.0			49.9	ug/L		99.8	(80%-120%)			
**Toluene-d8	50.0			49.3	ug/L		98.6	(80%-120%)			
QC1203164353 MB											
1,1,1-Trichloroethane			U	ND	ug/L					09/09/14	09:42
1,1,2-Trichloroethane			U	ND	ug/L						
1,1-Dichloroethane			U	ND	ug/L						
1,1-Dichloroethylene			U	ND	ug/L						
1,2-Dichloroethane			U	ND	ug/L						
2-Butanone			U	ND	ug/L						
4-Methyl-2-pentanone			U	ND	ug/L						
Acetone			U	ND	ug/L						
Benzene			U	ND	ug/L						
Carbon disulfide			U	ND	ug/L						
Carbon tetrachloride			U	ND	ug/L						
Chlorobenzene			U	ND	ug/L						
Chloroform			U	ND	ug/L						
Ethylbenzene			U	ND	ug/L						

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QC Summary

Workorder: 356016

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1416794										
Methylene chloride			U	ND	ug/L				CDS1	09/09/14	09:42
Tetrachloroethylene			U	ND	ug/L						
Toluene			U	ND	ug/L						
Trichloroethene			U	ND	ug/L						
Vinyl chloride			U	ND	ug/L						
Xylenes (total)			U	ND	ug/L						
**1,2-Dichloroethane-d4	50.0			49.8	ug/L		99.6	(78%-124%)			
**Bromofluorobenzene	50.0			49.6	ug/L		99.1	(80%-120%)			
**Toluene-d8	50.0			49.9	ug/L		99.8	(80%-120%)			
QC1203161480 355853001 PS											
1,1,1-Trichloroethane	50.0	U	ND	46.4	ug/L		92.7	(70%-130%)		09/05/14	15:48
1,1,2-Trichloroethane	50.0	U	ND	48.1	ug/L		96.1	(70%-130%)			
1,1-Dichloroethane	50.0	U	ND	48.0	ug/L		95.9	(70%-130%)			
1,1-Dichloroethylene	50.0	U	ND	46.1	ug/L		92.3	(70%-130%)			
1,2-Dichloroethane	50.0	U	ND	47.3	ug/L		94.6	(70%-130%)			
2-Butanone	250	TU	ND T	170	ug/L		67.9 *	(70%-130%)			
4-Methyl-2-pentanone	250	U	ND	241	ug/L		96.2	(70%-130%)			
Acetone	250	TU	ND T	140	ug/L		56.1 *	(70%-130%)			
Benzene	50.0	U	ND	47.5	ug/L		95.1	(70%-130%)			
Carbon disulfide	250	U	ND	244	ug/L		97.6	(70%-130%)			
Carbon tetrachloride	50.0	U	ND	46.5	ug/L		93	(70%-130%)			
Chlorobenzene	50.0	U	ND	46.3	ug/L		92.6	(70%-130%)			

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1416794										
Chloroform	50.0	U	ND	47.5	ug/L		95	(70%-130%)	CDS1	09/05/14	15:48
Ethylbenzene	50.0	U	ND	47.3	ug/L		94.6	(70%-130%)			
Methylene chloride	50.0	U	ND	46.6	ug/L		90.7	(70%-130%)			
Tetrachloroethylene	50.0	U	ND	43.2	ug/L		86.3	(70%-130%)			
Toluene	50.0	U	ND	47.2	ug/L		94.4	(70%-130%)			
Trichloroethene	50.0	U	ND	47.3	ug/L		94.5	(70%-130%)			
Vinyl chloride	50.0	U	ND	61.5	ug/L		123	(70%-130%)			
Xylenes (total)	150	U	ND	142	ug/L		94.5	(70%-130%)			
**1,2-Dichloroethane-d4	50.0		49.2	50.4	ug/L		101	(78%-124%)			
**Bromofluorobenzene	50.0		51.2	48.8	ug/L		97.6	(80%-120%)			
**Toluene-d8	50.0		49.4	49.8	ug/L		99.5	(80%-120%)			
QC1203161481 355853001 PSD											
1,1,1-Trichloroethane	50.0	U	ND	45.3	ug/L	2.20	90.7	(0%-20%)		09/05/14	16:18
1,1,2-Trichloroethane	50.0	U	ND	45.9	ug/L	4.60	91.8	(0%-20%)			
1,1-Dichloroethane	50.0	U	ND	47.4	ug/L	1.28	94.7	(0%-20%)			
1,1-Dichloroethylene	50.0	U	ND	45.3	ug/L	1.84	90.6	(0%-20%)			
1,2-Dichloroethane	50.0	U	ND	46.1	ug/L	2.64	92.1	(0%-20%)			
2-Butanone	250	TU	ND T	157	ug/L	7.78	62.8*	(0%-20%)			
4-Methyl-2-pentanone	250	U	ND	222	ug/L	8.25	88.6	(0%-20%)			
Acetone	250	TU	ND T	134	ug/L	4.88	53.4*	(0%-20%)			
Benzene	50.0	U	ND	46.2	ug/L	2.75	92.5	(0%-20%)			
Carbon disulfide	250	U	ND	237	ug/L	2.73	95	(0%-20%)			

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QC Summary

Workorder: 356016

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1416794										
Carbon tetrachloride	50.0	U	ND	45.6	ug/L	1.98	91.2	(0%-20%)	CDS1	09/05/14	16:18
Chlorobenzene	50.0	U	ND	44.9	ug/L	3.07	89.8	(0%-20%)			
Chloroform	50.0	U	ND	46.5	ug/L	2.15	92.9	(0%-20%)			
Ethylbenzene	50.0	U	ND	45.5	ug/L	3.79	91.1	(0%-20%)			
Methylene chloride	50.0	U	ND	46.2	ug/L	1.03	89.8	(0%-20%)			
Tetrachloroethylene	50.0	U	ND	41.3	ug/L	4.36	82.7	(0%-20%)			
Toluene	50.0	U	ND	45.0	ug/L	4.75	90	(0%-20%)			
Trichloroethene	50.0	U	ND	45.6	ug/L	3.66	91.1	(0%-20%)			
Vinyl chloride	50.0	U	ND	63.5	ug/L	3.18	127	(0%-20%)			
Xylenes (total)	150	U	ND	136	ug/L	3.80	91	(0%-20%)			
**1,2-Dichloroethane-d4	50.0		49.2	50.7	ug/L		101	(78%-124%)			
**Bromofluorobenzene	50.0		51.2	50.4	ug/L		101	(80%-120%)			
**Toluene-d8	50.0		49.4	49.7	ug/L		99.4	(80%-120%)			

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.

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QC Summary

Workorder: 356016

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
o	Analyte failed to recover within LCS limits (Organics only)										

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

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

Miscellaneous

DATA EXCEPTION REPORT			
Mo.Day Yr. 15-SEP-14	Division: Federal	Quality Criteria: Specifications	Type: Process
Instrument Type: VOA GC/MS	Test / Method: 8260C	Matrix Type: Liquid	Client Code: HMSA001
Batch ID: 1416794	Sample Numbers: See Below		
<p>Potentially affected work order(s)(SDG): 355615(GEL355615),355627(GEL355627),355853(GEL355853),355854(GEL355854),356010(GEL356010),356016(GEL356016)</p> <p>Application Issues:</p> <p>Failed Recovery for MS/PS Other Failed Recovery for MSD/PSD</p>			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. The percent drifts for a few compounds were outside the acceptance limits with high bias in the continuing calibration verification sample analyzed 09/05. The compounds were not detected in the associated samples. The effected SDG's are GEL355615, GEL355627, GEL355853, GEL355854.</p> <p>2. he percent drifts for a few compounds were outside the acceptance limits with high bias in the continuing calibration verification sample analyzed 09/09. The compounds were not detected in the associated samples. The effected SDG's are GEL356010, GEL356016.</p> <p>3. The recoveries for Acetone and 2-Butanone were outside of acetpance limits in the MS and in the MSD performed on sample 355853001. The calculated relative percent differences for all requested compounds between the MS and MSD were within acetpance limits.</p>		<p>1-3. Narrate and report data.</p>	

Originator's Name:
Crystal Stacey 15-SEP-14

Data Validator/Group Leader:
Kelle Bellamy 23-SEP-14

Semi-Volatile Analysis

Case Narrative

**Semi-Volatile Case Narrative
Hanford MSA (HMSA)
SDG GEL356016**

Method/Analysis Information

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

Analytical Method: SW846 3510C/8270D

Prep Method: SW846 3510C

Analytical Batch Number: 1416934

Prep Batch Number: 1416932

Sample Analysis

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

Sample ID	Client ID
356016002	B2X172
1203161891	MB for batch 1416932
1203161892	Laboratory Control Sample (LCS)
1203161897	356016002(B2X172) Matrix Spike (MS)
1203161898	356016002(B2X172) Matrix Spike Duplicate (MSD)

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

Preparation/Analytical Method Verification**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-009 REV# 32.

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

Calibration Information

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

Diphenylamine has now superseded N-Nitroso-diphenylamine on Quantitation Reports, Initial Calibration Reports, Calibration Check Standard Reports, etc. Previous versions of EPA Methodologies referenced N-Nitroso-diphenylamine. However, as stated in EPA Methodology, "N-Nitroso-diphenylamine decomposes in the gas chromatographic inlet and cannot be separated from Diphenylamine." Studies of these two compounds at

GEL, both independent of each other and together, showed that they not only co-elute, but also have similar mass spectra. N-Nitroso-diphenylamine and Diphenylamine will be reported as Diphenylamine on all reports and forms.

Initial Calibration

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

CCV Requirements

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

Quality Control (QC) Information

Method Blank (MB) Statement

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

Surrogate Recoveries

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

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 356016002 (B2X172) was selected for analysis as the matrix spike and matrix spike duplicate.

Matrix Spike (MS) Recovery Statement

The MS recoveries were within the established acceptance limits.

Matrix Spike Duplicate (MSD) Recovery Statement

The MSD recoveries were within the established acceptance limits.

MS/MSD Relative Percent Difference (RPD) Statement

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

Internal Standard (ISTD) Acceptance

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

Technical Information:

Holding Time Specifications

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

Preparation/Analytical Method Verification

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

Sample Dilutions

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

Sample Re-extraction/Re-analysis

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

dilutions were required.

Miscellaneous Information:

Data Exception (DER) Documentation

A DER was not required for sample 356016002 (B2X172) and associated QC samples in this batch for this SDG.

Manual Integrations

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

TIC Comment

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

Additional Comments

The additional comments field is used to address special issues associated with each analysis, clarify method/contractual issues pertaining to the analysis, and to list any report documents generated as a result of sample analysis or review. The following additional comments were required:

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

Electronic Package Comment

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

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

System Configuration

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

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

Instrument ID	Instrument	System Configuration	Column ID	Column Description
MSD3.I	Agilent 7890A/5975C GC/MS w/ 7683 Autosampler	HP7890A/HP5975C	DB-5MS	25m x 0.2mm, 0.33um (5% Phenylmethylpolysiloxane)

MSD2.I	Agilent 7890A/5975C GC/MS w/7683 Autosampler	HP7890A/HP5975C	DB-5MS	25m x 0.2mm, 0.33um (5% Phenylmethylpolysiloxane)
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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: GEL356016 GEL Work Order: 356016

The Qualifiers in this report are defined as follows:

- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

Review/Validation

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

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

Signature: 

Name: **Barbara Bailey**

Date: **30 SEP 2014**

Title: **Data Validator**

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
Company
Address : MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Project: CHPRC SAF S14-007

Report Date: September 30, 2014

Client Sample ID: B2X172
Lab Sample ID: 356016002
Matrix: WATER
Collect Date: 03-SEP-14 08:37
Receive Date: 04-SEP-14
Collector: Client

Project: HMSA00177
Client ID: HMSA001
Client SDG: GEL356016

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatile-GC/MS												
<i>8270_SVOA_GCMS: COMMON "As Received"</i>												
2,4-Dichlorophenol	U	2.78	2.78	9.26	9.26	ug/L	1	AGS1	09/09/14	01:46	1416934	1
2-Nitrophenol	U	2.78	2.78	9.26	9.26	ug/L	1					
Naphthalene	U	0.278	0.278	0.926	0.926	ug/L	1					
Pentachlorophenol	U	2.78	2.78	9.26	9.26	ug/L	1					
Phenol	U	2.78	2.78	9.26	9.26	ug/L	1					
bis(2-Ethylhexyl)phthalate	U	2.78	2.78	9.26	9.26	ug/L	1					
o-Cresol	U	2.78	2.78	9.26	9.26	ug/L	1					

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3510C	3510C BNA Liq. Prep-8270 Analysis	SJW1	09/08/14	1150	1416932

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 3510C/8270D	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
2-Fluorobiphenyl	8270_SVOA_GCMS: COMMON "As Received"	26.7 ug/L	46.3	57.7	(32%-102%)
Nitrobenzene-d5	8270_SVOA_GCMS: COMMON "As Received"	25.9 ug/L	46.3	56.0	(36%-125%)
p-Terphenyl-d14	8270_SVOA_GCMS: COMMON "As Received"	30.7 ug/L	46.3	66.4	(34%-135%)
2,4,6-Tribromophenol	8270_SVOA_GCMS: COMMON "As Received"	58.4 ug/L	92.6	63.1	(26%-129%)
2-Fluorophenol	8270_SVOA_GCMS: COMMON "As Received"	35.7 ug/L	92.6	38.6	(10%-78%)
Phenol-d5	8270_SVOA_GCMS: COMMON "As Received"	21.7 ug/L	92.6	23.5	(10%-104%)

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: September 30, 2014

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 356016

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1416934										
QC1203161892	LCS										
2,4-Dichlorophenol	50.0			37.0	ug/L		74.1	(45%-106%)	AGS1	09/08/14	23:21
2-Nitrophenol	50.0			37.0	ug/L		73.9	(42%-111%)			
Naphthalene	50.0			25.9	ug/L		51.7	(31%-98%)			
Pentachlorophenol	50.0			36.8	ug/L		73.6	(27%-102%)			
Phenol	50.0			16.8	ug/L		33.6	(13%-77%)			
bis(2-Ethylhexyl)phthalate	50.0			40.0	ug/L		80	(37%-124%)			
o-Cresol	50.0			34.0	ug/L		67.9	(32%-90%)			
**2,4,6-Tribromophenol	100			80.3	ug/L		80.3	(26%-129%)			
**2-Fluorobiphenyl	50.0			35.9	ug/L		71.8	(32%-102%)			
**2-Fluorophenol	100			48.9	ug/L		48.9	(10%-78%)			
**Nitrobenzene-d5	50.0			32.8	ug/L		65.5	(36%-125%)			
**Phenol-d5	100			30.9	ug/L		30.9	(10%-104%)			
**p-Terphenyl-d14	50.0			39.9	ug/L		79.8	(34%-135%)			
QC1203161891	MB										
2,4-Dichlorophenol			U	ND	ug/L					09/08/14	22:53
2-Nitrophenol			U	ND	ug/L						
Naphthalene			U	ND	ug/L						
Pentachlorophenol			U	ND	ug/L						
Phenol			U	ND	ug/L						
bis(2-Ethylhexyl)phthalate			U	ND	ug/L						

GEL LABORATORIES LLC

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QC Summary

Workorder: 356016

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1416934										
o-Cresol			U	ND	ug/L						
**2,4,6-Tribromophenol	100			71.1	ug/L		71.1	(26%-129%)	AGS1	09/08/14	22:53
**2-Fluorobiphenyl	50.0			36.2	ug/L		72.5	(32%-102%)			
**2-Fluorophenol	100			50.1	ug/L		50.1	(10%-78%)			
**Nitrobenzene-d5	50.0			33.7	ug/L		67.5	(36%-125%)			
**Phenol-d5	100			31.2	ug/L		31.2	(10%-104%)			
**p-Terphenyl-d14	50.0			39.0	ug/L		78	(34%-135%)			
QC1203161897 356016002 MS											
2,4-Dichlorophenol	100	U	ND	70.4	ug/L		70.4	(34%-111%)		09/09/14	02:15
2-Nitrophenol	100	U	ND	73.2	ug/L		73.2	(29%-117%)			
Naphthalene	100	U	ND	53.4	ug/L		53.4	(25%-100%)			
Pentachlorophenol	100	U	ND	74.9	ug/L		74.9	(19%-112%)			
Phenol	100	U	ND	48.1	ug/L		48.1	(10%-88%)			
bis(2-Ethylhexyl)phthalate	100	U	ND	80.8	ug/L		80.8	(29%-120%)			
o-Cresol	100	U	ND	69.8	ug/L		69.8	(26%-97%)			
**2,4,6-Tribromophenol	200		58.4	159	ug/L		79.3	(26%-129%)			
**2-Fluorobiphenyl	100		26.7	70.8	ug/L		70.8	(32%-102%)			
**2-Fluorophenol	200		35.7	111	ug/L		55.4	(10%-78%)			
**Nitrobenzene-d5	100		25.9	62.5	ug/L		62.5	(36%-125%)			
**Phenol-d5	200		21.7	87.5	ug/L		43.8	(10%-104%)			
**p-Terphenyl-d14	100		30.7	78.5	ug/L		78.5	(34%-135%)			
QC1203161898 356016002 MSD											
2,4-Dichlorophenol	100	U	ND	77.5	ug/L	9.52	77.5	(0%-30%)		09/09/14	02:44
2-Nitrophenol	100	U	ND	79.0	ug/L	7.59	79	(0%-30%)			

GEL LABORATORIES LLC

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

QC Summary

Workorder: 356016

Page 3 of 4

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1416934										
Naphthalene	100	U	ND	55.0	ug/L	2.95	55	(0%-30%)	AGS1	09/09/14	02:44
Pentachlorophenol	100	U	ND	72.7	ug/L	2.93	72.7	(0%-30%)			
Phenol	100	U	ND	55.5	ug/L	14.4	55.5	(0%-30%)			
bis(2-Ethylhexyl)phthalate	100	U	ND	74.6	ug/L	8.03	74.6	(0%-30%)			
o-Cresol	100	U	ND	81.4	ug/L	15.3	81.4	(0%-30%)			
**2,4,6-Tribromophenol	200		58.4	157	ug/L		78.4	(26%-129%)			
**2-Fluorobiphenyl	100		26.7	75.6	ug/L		75.6	(32%-102%)			
**2-Fluorophenol	200		35.7	129	ug/L		64.7	(10%-78%)			
**Nitrobenzene-d5	100		25.9	68.5	ug/L		68.5	(36%-125%)			
**Phenol-d5	200		21.7	101	ug/L		50.5	(10%-104%)			
**p-Terphenyl-d14	100		30.7	74.1	ug/L		74.1	(34%-135%)			

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

GEL LABORATORIES LLC

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

QC Summary

Workorder: 356016

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

- o Analyte failed to recover within LCS limits (Organics only)

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

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

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

Metals Analysis

Case Narrative

**Metals Fractional Narrative
Hanford MSA (HMSA)
SDG GEL356016**

Sample Analysis

Sample ID	Client ID
356016002	B2X172
1203161194	Method Blank (MB) ICP
1203161195	Laboratory Control Sample (LCS)
1203161198	356019010(B2XHJ4L) Serial Dilution (SD)
1203161196	356019010(B2XHJ4S) Matrix Spike (MS)
1203161197	356019010(B2XHJ4SD) Matrix Spike Duplicate (MSD)
1203161210	Method Blank (MB) ICP-MS
1203161211	Laboratory Control Sample (LCS)
1203161214	356016002(B2X172L) Serial Dilution (SD)
1203161212	356016002(B2X172S) Matrix Spike (MS)
1203161213	356016002(B2X172SD) Matrix Spike Duplicate (MSD)
1203166255	Method Blank (MB) CVAA
1203166256	Laboratory Control Sample (LCS)
1203166259	356016002(B2X172L) Serial Dilution (SD)
1203166257	356016002(B2X172D) Sample Duplicate (DUP)
1203166258	356016002(B2X172S) Matrix Spike (MS)

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

Method/Analysis Information

Analytical Batch:	1416668, 1416673 and 1418606
Prep Batch :	1416666, 1416672 and 1418601
Standard Operating Procedures:	GL-MA-E-013 REV# 22, GL-MA-E-006 REV# 11, GL-MA-E-014 REV# 25 and GL-MA-E-010 REV# 28
Analytical Method:	6010_METALS_ICP, 6020_METALS_ICPMS and 7470_HG_CVAA
Prep Method :	SW846 3005A and SW846 7470A Prep

Preparation/Analytical Method Verification

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

System Configuration

The Metals analysis-ICP was performed on a P E 5300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with an ESI SC-FAST introduction, cyclonic spray chamber, and yttrium or scandium internal standard. 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.

The Metals analysis - ICPMS was performed on a Perkin Elmer ELAN 9000 inductively coupled plasma mass spectrometer (ICP-MS). The instrument is equipped with a cross-flow nebulizer, quadrupole mass spectrometer, and dual mode electron multiplier detector. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum. Operating conditions are set at 1400W power and combined argon pressures of 360+/-7 kPa for the plasma and auxiliary gases, and 0.85 L/min carrier gas flow, and an initial lens voltage of 5.2.

The Metals analysis-Mercury was performed on a Perkin-Elmer Flow Injection Mercury System (FIMS-100) automated mercury analyzer. The instrument consists of a cold vapor atomic absorption spectrometer set to detect mercury at a wavelength of 253.7 nm. Sample introduction through the flow injection system is performed via a peristaltic pump at 9 mL/min and nitrogen carrier gas rate of 80 mL/min.

The Metals analysis - ICPMS was performed on a PerkinElmer NexION 300X ICPMS. The instrument is equipped with a ESI PFA-ST nebulizer, quadrupole mass spectrometer, and dual mode electron multiplier detector. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum. Operating conditions are set at 1600W power, 16 L/m for the plasma, and 1.2 L/m auxiliary gases, and 1.12 L/min carrier gas flow.

Calibration Information

Instrument Calibration

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

CRDL/PQL Requirements

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

ICSA/ICSAB Statement

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

Continuing Calibration Blanks (CCB) Requirements

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

Continuing Calibration Verification (CCV) Requirements

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

Quality Control (QC) Information

Method Blank (MB) Statement

The samples in this SDG contained uranium at concentrations more than ten times the amount present in the method blank (MB), therefore the data was not adversely affected. ICP-MS.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Sample Statement

The following samples were selected as the quality control (QC) samples for this SDG: 356019010 (B2XHJ4)-ICP and 356016002 (B2X172)-CVAA and ICP-MS.

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.

Duplicate Relative Percent Difference (RPD) Statement

The RPD obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required reporting limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control of +/-RL is used to evaluate the DUP results. All applicable analytes met these requirements.

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: Nikhil A. Elmore Date: 10.1.14

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: GEL356016 GEL Work Order: 356016

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



10-1-14

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 S14-007**

Report Date: October 1, 2014

Client Sample ID: B2X172
 Lab Sample ID: 356016002
 Matrix: WATER
 Collect Date: 03-SEP-14 08:37
 Receive Date: 04-SEP-14
 Collector: Client

Project: HMSA00177
 Client ID: HMSA001
 Client SDG: GEL356016

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA												
<i>7470_MERCURY_CV: COMMON "As Received"</i>												
Mercury	U	0.067	0.067	0.200	0.200	ug/L	1	MTM	09/15/14	11:48	1418606	1
Metals Analysis-ICP												
<i>6010_METALS_ICP:GW 04 (6 metals) "As Received"</i>												
Calcium		83500	50.0	200	200	ug/L	1	HSC	10/01/14	10:09	1416668	2
Iron	U	30.0	30.0	100	100	ug/L	1					
Magnesium		24800	110	300	300	ug/L	1					
Potassium		8100	50.0	150	150	ug/L	1					
Sodium		30200	100	300	300	ug/L	1					
Vanadium		12.6	1.00	5.00	5.00	ug/L	1					
Metals Analysis-ICP-MS												
<i>6020_METALS_ICPMS: GW 01 "As Received"</i>												
Aluminum	B	16.9	15.0	50.0	50.0	ug/L	1	PRB	09/24/14	18:13	1416673	3
Antimony	U	1.00	1.00	3.00	3.00	ug/L	1					
Arsenic	B	3.67	1.70	5.00	5.00	ug/L	1					
Barium		74.6	0.600	2.00	2.00	ug/L	1					
Cadmium	U	0.110	0.110	1.00	1.00	ug/L	1					
Chromium	B	2.64	2.00	10.0	10.0	ug/L	1					
Cobalt	U	0.100	0.100	1.00	1.00	ug/L	1					
Copper		1.69	0.350	1.00	1.00	ug/L	1					
Lead	U	0.500	0.500	2.00	2.00	ug/L	1					
Manganese	U	1.00	1.00	5.00	5.00	ug/L	1					
Molybdenum		7.11	0.165	0.500	0.500	ug/L	1					
Nickel	U	0.500	0.500	2.00	2.00	ug/L	1					
Selenium		6.56	1.50	5.00	5.00	ug/L	1					
Silver	U	0.200	0.200	1.00	1.00	ug/L	1					
Strontium		418	2.00	10.0	10.0	ug/L	1					
Thallium	U	0.450	0.450	2.00	2.00	ug/L	1					
Zinc	U	3.50	3.50	10.0	10.0	ug/L	1					
Thorium	U	0.383	0.383	2.00	2.00	ug/L	1	PRB	09/25/14	15:33	1416673	4
Uranium	C	49.7	0.067	0.200	0.200	ug/L	1					
Tin	U	1.00	1.00	5.00	5.00	ug/L	1	BAJ	09/27/14	00:14	1416673	5
Beryllium	U	0.200	0.200	0.500	0.500	ug/L	1	BAJ	09/29/14	17:01	1416673	6
Boron		33.3	4.00	15.0	15.0	ug/L	1	BAJ	09/30/14	02:43	1416673	7

OCTOBER 1, 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 S14-007

Report Date: October 1, 2014

Client Sample ID: B2X172
Lab Sample ID: 356016002

Project: HMSA00177
Client ID: HMSA001

Client SDG: GEL356016

Parameter Qualifier Result MDL RL CRDL Units DF Analyst Date Time Batch Method

The following Prep Methods were performed

Table with 7 columns: Method, Description, Analyst, Date, Time, Prep Batch. Rows include SW846 3005A (ICP-MS 3005A PREP), SW846 3005A (SW846 3005A for 6010C), and SW846 7470A Prep (EPA 7470A Mercury Prep Liquid).

The following Analytical Methods were performed

Table with 3 columns: Method, Description, Analyst Comments. Rows 1-7 list analytical methods such as 7470_HG_CVAA, 6010_METALS_ICP, and 6020_METALS_ICPMS.

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: October 1, 2014

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 356016

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1416673										
QC1203161211	LCS										
Aluminum	2000			2150	ug/L		107	(80%-120%)	PRB	09/24/14	18:05
Antimony	50.0			48.6	ug/L		97.2	(80%-120%)			
Arsenic	50.0			56.5	ug/L		113	(80%-120%)			
Barium	50.0			53.0	ug/L		106	(80%-120%)			
Beryllium	50.0			52.0	ug/L		104	(80%-120%)	BAJ	09/29/14	16:57
Boron	100			109	ug/L		109	(80%-120%)		09/30/14	02:40
Cadmium	50.0			50.4	ug/L		101	(80%-120%)	PRB	09/24/14	18:05
Chromium	50.0			48.5	ug/L		97.1	(80%-120%)			
Cobalt	50.0			49.6	ug/L		99.3	(80%-120%)			
Copper	50.0			49.6	ug/L		99.2	(80%-120%)			
Lead	50.0			50.1	ug/L		100	(80%-120%)			
Manganese	50.0			48.6	ug/L		97.2	(80%-120%)			
Molybdenum	50.0			50.3	ug/L		101	(80%-120%)			
Nickel	50.0			49.0	ug/L		98	(80%-120%)			
Selenium	50.0			54.8	ug/L		110	(80%-120%)			
Silver	50.0			52.4	ug/L		105	(80%-120%)			
Strontium	50.0			50.7	ug/L		101	(80%-120%)			
Thallium	50.0			47.3	ug/L		94.6	(80%-120%)			
Thorium	50.0			45.4	ug/L		90.9	(80%-120%)		09/25/14	15:29
Tin	50.0			51.8	ug/L		104	(80%-120%)	BAJ	09/26/14	23:51

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QC Summary

Workorder: 356016

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1416673										
Uranium	50.0			44.4	ug/L		88.9	(80%-120%)	PRB	09/25/14	15:29
Zinc	50.0			54.2	ug/L		108	(80%-120%)		09/24/14	18:05
QC1203161210	MB										
Aluminum			U	ND	ug/L					09/24/14	18:02
Antimony			U	ND	ug/L						
Arsenic			U	ND	ug/L						
Barium			U	ND	ug/L						
Beryllium			U	ND	ug/L				BAJ	09/29/14	16:53
Boron			U	ND	ug/L					09/30/14	02:36
Cadmium			U	ND	ug/L				PRB	09/24/14	18:02
Chromium			U	ND	ug/L						
Cobalt			U	ND	ug/L						
Copper			U	ND	ug/L						
Lead			U	ND	ug/L						
Manganese			U	ND	ug/L						
Molybdenum			U	ND	ug/L						
Nickel			U	ND	ug/L						
Selenium			U	ND	ug/L						
Silver			U	ND	ug/L						
Strontium			U	ND	ug/L						
Thallium			U	ND	ug/L						
Thorium			U	ND	ug/L					09/25/14	15:28

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QC Summary

Workorder: 356016

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1416673										
Tin			U	ND	ug/L				BAJ	09/26/14	23:43
Uranium				0.396	ug/L				PRB	09/25/14	15:28
Zinc			U	ND	ug/L					09/24/14	18:02
QC1203161212 356016002 MS											
Aluminum	2000	B	16.9	2030	ug/L		100	(75%-125%)		09/24/14	18:15
Antimony	50.0	U	ND	50.0	ug/L		99.4	(75%-125%)			
Arsenic	50.0	B	3.67	57.9	ug/L		109	(75%-125%)			
Barium	50.0		74.6	133	ug/L		117	(75%-125%)			
Beryllium	50.0	U	ND	55.2	ug/L		110	(75%-125%)	BAJ	09/29/14	17:04
Boron	100		33.3	138	ug/L		105	(75%-125%)		09/30/14	02:47
Cadmium	50.0	U	ND	50.9	ug/L		102	(75%-125%)	PRB	09/24/14	18:15
Chromium	50.0	B	2.64	50.2	ug/L		95.1	(75%-125%)			
Cobalt	50.0	U	ND	49.8	ug/L		99.5	(75%-125%)			
Copper	50.0		1.69	48.1	ug/L		92.8	(75%-125%)			
Lead	50.0	U	ND	47.8	ug/L		95.4	(75%-125%)			
Manganese	50.0	U	ND	47.8	ug/L		95.1	(75%-125%)			
Molybdenum	50.0		7.11	58.3	ug/L		102	(75%-125%)			
Nickel	50.0	U	ND	47.9	ug/L		95	(75%-125%)			
Selenium	50.0		6.56	62.9	ug/L		113	(75%-125%)			
Silver	50.0	U	ND	53.0	ug/L		106	(75%-125%)			
Strontium	50.0		418	454	ug/L		N/A	(75%-125%)			
Thallium	50.0	U	ND	45.3	ug/L		90.6	(75%-125%)			

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QC Summary

Workorder: 356016

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1416673										
Thorium	50.0	U	ND	50.4	ug/L		101	(75%-125%)	PRB	09/25/14	15:34
Tin	50.0	U	ND	53.0	ug/L		106	(75%-125%)	BAJ	09/27/14	00:22
Uranium	50.0	C	49.7	95.9	ug/L		92.5	(75%-125%)	PRB	09/25/14	15:34
Zinc	50.0	U	ND	51.4	ug/L		99.9	(75%-125%)		09/24/14	18:15
QC1203161213 356016002 MSD											
Aluminum	2000	B	16.9	2180	ug/L	7.13	108	(0%-20%)		09/24/14	18:18
Antimony	50.0	U	ND	52.5	ug/L	4.70	104	(0%-20%)			
Arsenic	50.0	B	3.67	56.7	ug/L	2.07	106	(0%-20%)			
Barium	50.0		74.6	129	ug/L	3.08	109	(0%-20%)			
Beryllium	50.0	U	ND	54.7	ug/L	0.954	109	(0%-20%)	BAJ	09/29/14	17:08
Boron	100		33.3	139	ug/L	0.723	106	(0%-20%)		09/30/14	02:51
Cadmium	50.0	U	ND	53.4	ug/L	4.84	107	(0%-20%)	PRB	09/24/14	18:18
Chromium	50.0	B	2.64	51.4	ug/L	2.50	97.6	(0%-20%)			
Cobalt	50.0	U	ND	52.1	ug/L	4.48	104	(0%-20%)			
Copper	50.0		1.69	48.5	ug/L	0.834	93.7	(0%-20%)			
Lead	50.0	U	ND	46.0	ug/L	3.75	91.9	(0%-20%)			
Manganese	50.0	U	ND	49.4	ug/L	3.29	98.3	(0%-20%)			
Molybdenum	50.0		7.11	58.3	ug/L	0.00857	102	(0%-20%)			
Nickel	50.0	U	ND	52.2	ug/L	8.62	104	(0%-20%)			
Selenium	50.0		6.56	60.3	ug/L	4.23	107	(0%-20%)			
Silver	50.0	U	ND	55.3	ug/L	4.12	111	(0%-20%)			
Strontium	50.0		418	483	ug/L	6.24	N/A	(0%-20%)			

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QC Summary

Workorder: 356016

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1416673										
Thallium	50.0	U	ND	45.0	ug/L	0.780	89.9	(0%-20%)	PRB	09/24/14	18:18
Thorium	50.0	U	ND	51.5	ug/L	2.25	103	(0%-20%)		09/25/14	15:36
Tin	50.0	U	ND	51.1	ug/L	3.70	102	(0%-20%)	BAJ	09/27/14	00:29
Uranium	50.0	C	49.7	95.8	ug/L	0.118	92.3	(0%-20%)	PRB	09/25/14	15:36
Zinc	50.0	U	ND	50.8	ug/L	1.20	98.7	(0%-20%)		09/24/14	18:18
QC1203161214 356016002 SDILT											
Aluminum		B	16.9 DU	ND	ug/L	N/A		(0%-10%)		09/24/14	18:23
Antimony		U	ND DU	ND	ug/L	N/A		(0%-10%)			
Arsenic		B	3.67 DU	ND	ug/L	N/A		(0%-10%)			
Barium			74.6 D	14.6	ug/L	2.35		(0%-10%)			
Beryllium		U	ND DU	ND	ug/L	N/A		(0%-10%)	BAJ	09/29/14	17:11
Boron			33.3 D	7.93	ug/L	19		(0%-10%)		09/30/14	02:54
Cadmium		U	ND DU	ND	ug/L	N/A		(0%-10%)	PRB	09/24/14	18:23
Chromium		B	2.64 DU	ND	ug/L	N/A		(0%-10%)			
Cobalt		U	ND DU	ND	ug/L	N/A		(0%-10%)			
Copper			1.69 DU	ND	ug/L	N/A		(0%-10%)			
Lead		U	ND DU	ND	ug/L	N/A		(0%-10%)			
Manganese		U	ND DU	ND	ug/L	N/A		(0%-10%)			
Molybdenum			7.11 D	1.34	ug/L	5.56		(0%-10%)			
Nickel		U	ND DU	ND	ug/L	N/A		(0%-10%)			
Selenium			6.56 DU	ND	ug/L	N/A		(0%-10%)			
Silver		U	ND DU	ND	ug/L	N/A		(0%-10%)			

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QC Summary

Workorder: 356016

Paramname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1416673										
Strontium		418	D	78.5	ug/L	6.23		(0%-10%)	PRB	09/24/14	18:23
Thallium	U	ND	DU	ND	ug/L	N/A		(0%-10%)			
Thorium	U	ND	DU	ND	ug/L	N/A		(0%-10%)		09/25/14	15:38
Tin	U	ND	DU	ND	ug/L	N/A		(0%-10%)	BAJ	09/27/14	00:37
Uranium	C	49.7	D	9.18	ug/L	7.57		(0%-10%)	PRB	09/25/14	15:38
Zinc	U	ND	DU	ND	ug/L	N/A		(0%-10%)		09/24/14	18:23

Metals Analysis-ICP

Batch 1416668

QC1203161195	LCS										
Calcium		5000		5070	ug/L		101	(80%-120%)	HSC	10/01/14	09:50
Iron		5000		5160	ug/L		103	(80%-120%)			
Magnesium		5000		5220	ug/L		104	(80%-120%)			
Potassium		5000		5020	ug/L		100	(80%-120%)			
Sodium		5000		5220	ug/L		104	(80%-120%)			
Vanadium		500		528	ug/L		106	(80%-120%)			

QC1203161194	MB										
Calcium			U	ND	ug/L					10/01/14	09:47
Iron			U	ND	ug/L						
Magnesium			U	ND	ug/L						
Potassium			U	ND	ug/L						
Sodium			U	ND	ug/L						
Vanadium			U	ND	ug/L						

QC1203161196	356019010	MS									
Calcium		5000	66000	73200	ug/L		N/A	(75%-125%)		10/01/14	09:56

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QC Summary

Workorder: 356016

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1416668										
Iron	5000	U	ND	5170	ug/L		103	(75%-125%)			
Magnesium	5000		11400	16900	ug/L		111	(75%-125%)	HSC	10/01/14	09:56
Potassium	5000		2260	7400	ug/L		103	(75%-125%)			
Sodium	5000		4930	10100	ug/L		103	(75%-125%)			
Vanadium	500	B	2.64	538	ug/L		107	(75%-125%)			
QC1203161197 356019010 MSD											
Calcium	5000		66000	71900	ug/L	1.87	N/A	(0%-20%)		10/01/14	09:58
Iron	5000	U	ND	5150	ug/L	0.519	103	(0%-20%)			
Magnesium	5000		11400	16700	ug/L	1.34	106	(0%-20%)			
Potassium	5000		2260	7320	ug/L	0.992	101	(0%-20%)			
Sodium	5000		4930	9950	ug/L	1.36	100	(0%-20%)			
Vanadium	500	B	2.64	537	ug/L	0.128	107	(0%-20%)			
QC1203161198 356019010 SDILT											
Calcium			66000	D	13000	ug/L	1.61	(0%-10%)		10/01/14	10:00
Iron		U	ND	DU	ND	ug/L	N/A	(0%-10%)			
Magnesium			11400	D	2320	ug/L	2.17	(0%-10%)			
Potassium			2260	D	504	ug/L	11.2	(0%-10%)			
Sodium			4930	D	980	ug/L	.713	(0%-10%)			
Vanadium		B	2.64	DU	ND	ug/L	N/A	(0%-10%)			
Metals Analysis-Mercury											
Batch	1418606										
QC1203166257 356016002 DUP											
Mercury		U	ND	U	ND	ug/L	N/A		MTM1	09/15/14	11:50
QC1203166256 LCS											
Mercury	2.00				2.05	ug/L		102	(80%-120%)		09/15/14 11:46
QC1203166255 MB											

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QC Summary

Workorder: 356016

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-Mercury											
Batch	1418606										
Mercury			U	ND	ug/L					09/15/14	11:44
QC1203166258	356016002	MS									
Mercury	2.00	U	ND	2.03	ug/L		100	(75%-125%)	MTM1	09/15/14	11:51
QC1203166259	356016002	SDILT									
Mercury		U	ND DU	ND	ug/L	N/A		(0%-10%)		09/15/14	11:53

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 GEL356016**

Method/Analysis Information

Product: Cyanide and Total

Analytical Batch: 1416793 **Method:** 9012_CYANIDE: COMMON

Prep Batch : 1416792 **Method:** SW846 9010C Distillation

Sample Analysis

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

Sample ID	Client ID
356016002	B2X172
1203161470	MB for batch 1416792
1203161471	Laboratory Control Sample (LCS)
1203161474	356016002(B2X172) Sample Duplicate (DUP)
1203161477	356016002(B2X172) 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-095 REV# 17.

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

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 sample was selected for QC analysis: 356016002 (B2X172).

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 values for the sample and duplicate are less than the Practical Quantitation Limit (PQL); therefore, the RPD is not applicable. 1203161474 (B2X172).

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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:** Ion Chromatography**Analytical Batch:** 1416896**Method:** 9056_ANIONS_IC:COMMON**Sample Analysis**

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

Sample ID	Client ID
356016001	B2X174
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

The following sample was received with insufficient time to prep and/or analyze within the remaining method-specified holding time. The sample was analyzed as soon as possible by the analyst. 356016001 (B2X174).

Sample Dilutions

The following sample in this sample group was diluted due to high concentration: 356016001 (B2X174). All samples diluted at a 2X per client request. 1203161808 (B2XD11), 1203161809 (B2XD12), 1203161810 (B2XD11), 1203161811 (B2XD12) and 356016001 (B2X174).

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

The following DER was generated for this SDG: 1332561. 356016001 (B2X174).

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 356016001 (B2X174).

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.

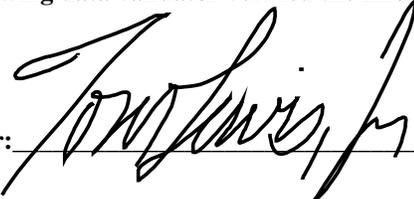
Certification Statement

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: 30Sep14

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: GEL356016 GEL Work Order: 356016

The Qualifiers in this report are defined as follows:

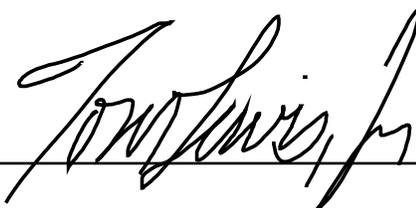
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- D Results are reported from a diluted aliquot of sample.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

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 _____



OCTOBER 1, 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 S14-007

Report Date: September 26, 2014

Client Sample ID: B2X174
Lab Sample ID: 356016001
Matrix: WATER
Collect Date: 03-SEP-14 08:37
Receive Date: 04-SEP-14
Collector: Client

Project: HMSA00177
Client ID: HMSA001
Client SDG: GEL356016

Table with 12 columns: Parameter, Qualifier, Result, MDL, RL, CRDL, Units, DF, Analyst, Date, Time, Batch, Method. Rows include Ion Chromatography and 9056_ANIONS_IC:COMMON 'As Received' with data for Fluoride, Nitrite-N, Chloride, Nitrate-N, and Sulfate.

The following Analytical Methods were performed

Table with 3 columns: Method, Description, Analyst Comments. Rows 1 and 2 describe SW846 9056A.

OCTOBER 1, 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 S14-007

Report Date: September 26, 2014

Client Sample ID: B2X172
Lab Sample ID: 356016002
Matrix: WATER
Collect Date: 03-SEP-14 08:37
Receive Date: 04-SEP-14
Collector: Client
Project: HMSA00177
Client ID: HMSA001
Client SDG: GEL356016

Table with 12 columns: Parameter, Qualifier, Result, MDL, RL, CRDL, Units, DF, Analyst, Date, Time, Batch Method. Row 1: Flow Injection Analysis. Row 2: 9012_CYANIDE: COMMON "As Received". Row 3: Cyanide, Total B 1.92 1.67 5.00 5.00 ug/L 1 AXH3 09/08/14 10:03 1416793 1

The following Prep Methods were performed

Table with 6 columns: Method, Description, Analyst, Date, Time, Prep Batch. Row 1: SW846 9010C Distillation SW846 9010C Prep AXH3 09/08/14 0940 1416792

The following Analytical Methods were performed

Table with 3 columns: Method, Description, Analyst Comments. Row 1: 1 SW846 9012B

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: September 26, 2014

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 356016

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

Flow Injection Analysis

Batch	1416793										
QC1203161474	356016002	DUP									
Cyanide, Total	B	1.92	B	3.70	ug/L	63.3	^	(+/-5.00)	AXH3	09/08/14	10:03
QC1203161471	LCS										
Cyanide, Total	50.0			50.3	ug/L			(90%-110%)		09/08/14	09:56
QC1203161470	MB										
Cyanide, Total			U	ND	ug/L					09/08/14	09:56
QC1203161477	356016002	MS									
Cyanide, Total	100	B	1.92	114	ug/L			(60%-124%)		09/08/14	10:08

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					
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					
Sulfate	D	165000	D	163000	ug/L	1.21		(0%-20%)		09/06/14	20:11
QC1203161807	LCS										
Chloride	5000			4710	ug/L			(90%-110%)		09/06/14	05:34
Fluoride	2500			2460	ug/L			(90%-110%)			

GEL LABORATORIES LLC

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

QC Summary

Workorder: 356016

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1416896										
Nitrate-N	2500			2350	ug/L		94.2	(90%-110%)			
Nitrite-N	2500			2340	ug/L		93.7	(90%-110%)	RXB5	09/06/14	05:34
Sulfate	10000			9730	ug/L		97.3	(90%-110%)			
QC1203161806 MB											
Chloride			U	ND	ug/L					09/06/14	05:03
Fluoride			U	ND	ug/L						
Nitrate-N			U	ND	ug/L						
Nitrite-N			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%)			
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%)			
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

GEL LABORATORIES LLC

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

QC Summary

Workorder: 356016

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.

Miscellaneous

DATA EXCEPTION REPORT			
Mo.Day Yr. 10-SEP-14	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: IC	Test / Method: SW846 9056A	Matrix Type: Liquid	Client Code: HMSA
Batch ID: 1416896	Sample Numbers: See Below		
<p>Potentially affected work order(s)(SDG): 355867(GEL355867),356016(GEL356016),356018(GEL356018),356019(GEL356019),356061(GEL356061),356062(GEL356062),356063(GEL356063)</p> <p>Application Issues:</p> <p>Sample Analyzed out of Holding Sample received out of holding</p>			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Sample Received out of holding:</p> <p>355867 013</p> <p>356018 001</p> <p>2. Sample Analyzed out of Holding:</p> <p>356016 001</p> <p>356019 001,004,005,006,007</p>		<p>1. Samples received out of method specified hold time. See PM comments.</p> <p>2. The following samples (356016001, 356019001, 356019004) were received with insufficient time to prep and/or analyze within the remaining method-specified holding time. The samples were analyzed as soon as possible by the analyst. The following samples (356019005, 356019006, 356019007) were initially analyzed within holding; however, the holding times had expired prior to reanalysis of diluted samples.</p>	

Originator's Name:

Rachael Bell 10-SEP-14

Data Validator/Group Leader:

Thomas Lewis 26-SEP-14

Radiological Analysis

**Radiochemistry Case Narrative
Hanford MSA (HMSA)
SDG GEL356016
Work Order 356016**

Method/Analysis Information

Product: AMCMISO_EIE_PLATE_AEA:

Analytical Method: AMCMISO_EIE_PREC_AEA

Analytical Batch Number: 1416610

Sample ID	Client ID
356016002	B2X172
1203161065	MB for batch 1416610
1203161067	Laboratory Control Sample (LCS)
1203161066	356016002(B2X172) 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-011 REV# 25.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

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

Designated QC

The following sample was used for QC: 356016002 (B2X172).

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

Sample 356016002 (B2X172) was recounted due to a peak shift. The recount is reported.

Miscellaneous Information:

Data Exception (DER) Documentation

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

Manual Integration

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: NP237_IE_PRECIP_AEA: COMMON

Analytical Method: ASTM C 1476-00 Modified

Analytical Batch Number: 1416611

Sample ID	Client ID
356016002	B2X172
1203161071	MB for batch 1416611
1203161073	Laboratory Control Sample (LCS)
1203161072	356016002(B2X172) 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-032 REV# 19.

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: 356016002 (B2X172).

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.

Manual Integration

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: PUIISO_PLATE_AEA:COMMON

Analytical Method: PUIISO_PLATE_AEA

Analytical Batch Number: 1416614

Sample ID	Client ID
356016002	B2X172
1203161074	MB for batch 1416614
1203161076	Laboratory Control Sample (LCS)
1203161075	356016002(B2X172) 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-011 REV# 25.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

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

Designated QC

The following sample was used for QC: 356016002 (B2X172).

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

Sample 1203161076 (LCS) was recounted due to a peak shift. The recount is reported. Sample 1203161075 (B2X172) was recounted due to a negative result causing a high RER value. The recount is being reported.

Miscellaneous Information:

Data Exception (DER) Documentation

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

Manual Integration

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: THISO_IE_PLATE_AEA: COMMON
Analytical Method: THISO_IE_PLATE_AEA
Analytical Batch Number: 1416616

Sample ID	Client ID
356016002	B2X172
1203161077	MB for batch 1416616
1203161079	Laboratory Control Sample (LCS)
1203161078	356016002(B2X172) 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-038 REV# 16.

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 volumes in this batch.

Designated QC

The following sample was used for QC: 356016002 (B2X172).

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 were recounted due to high recovery. The recounts are reported.

Miscellaneous Information:

Data Exception (DER) Documentation

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

Manual Integration

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product:	GAMMA_GS:COMMON + GW 01
Analytical Method:	901.1_GAMMA_GS
Analytical Batch Number:	1416335

Sample ID	Client ID
356016002	B2X172
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: SRTOT_SEP_PRECIP_GPC: COMMON

Analytical Method: SRTOT_SEP_PRECIP_GPC

Analytical Batch Number: 1419083

Sample ID	Client ID
356016002	B2X172
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: TC99_EIE_LSC: COMMON
Analytical Method: TC99_EIE_LSC
Analytical Batch Number: 1418507

Sample ID	Client ID
356016002	B2X172
1203165939	MB for batch 1418507
1203165941	Laboratory Control Sample (LCS)
1203165940	356431004(B2XH59) 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-059 REV# 3.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

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

Designated QC

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

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 1203165939 (MB), 1203165941 (LCS) and 356016002 (B2X172) were recounted to verify sample results. Recounts are reported. Samples 1203165940 (B2XH59) were recounted to verify sample results and due to high MDCs. Recounts are reported.

Miscellaneous Information:

Data Exception (DER) Documentation

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

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

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

Sample ID	Client ID
356016002	B2X172
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 356016002 (B2X172) 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: GEL356016 GEL Work Order: 356016

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

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 S14-007

Report Date: October 1, 2014

Client Sample ID: B2X172
 Sample ID: 356016002
 Matrix: WATER
 Collect Date: 03-SEP-14
 Receive Date: 04-SEP-14
 Collector: Client

Project: HMSA00177
 Client ID: HMSA001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
<i>AMCMISO_EIE_PLATE_AEA: "As Received"</i>													
Americium-241	U	0.0472	+/-0.177	0.298	+/-0.177	1.00	pCi/L		MXS2	09/22/14	0939	1416610	1
<i>NP237_IE_PRECIP_AEA: COMMON "As Received"</i>													
Neptunium-237	U	-0.089	+/-0.202	0.552	+/-0.202	1.00	pCi/L		MXS2	09/19/14	1016	1416611	2
<i>PUIISO_PLATE_AEA:COMMON "As Received"</i>													
Plutonium-238	U	-0.0636	+/-0.192	0.539	+/-0.192	1.00	pCi/L		MXS2	09/19/14	1018	1416614	3
Plutonium-239/240	U	0.134	+/-0.308	0.489	+/-0.309	1.00	pCi/L						
<i>THISO_IE_PLATE_AEA: COMMON "As Received"</i>													
Thorium-228	U	0.116	+/-0.269	0.430	+/-0.270	1.00	pCi/L		MXS2	09/23/14	1032	1416616	4
Thorium-230	U	0.0825	+/-0.408	0.807	+/-0.411	1.00	pCi/L						
Thorium-232	U	-0.044	+/-0.160	0.434	+/-0.161	1.00	pCi/L						
Rad Gamma Spec Analysis													
<i>GAMMA_GS:COMMON + GW 01 "As Received"</i>													
Antimony-125	U	7.15	+/-7.89	14.1	+/-8.55		pCi/L		MJH1	09/12/14	1247	1416335	5
Cesium-134	U	-1.14	+/-3.09	5.63	+/-3.13		pCi/L						
Cesium-137	U	-0.594	+/-2.84	5.11	+/-2.86	10.0	pCi/L						
Cobalt-60	U	0.892	+/-2.74	5.76	+/-2.77		pCi/L						
Europium-152	U	9.68	+/-10.8	16.2	+/-11.7		pCi/L						
Europium-154	U	0.997	+/-8.64	17.3	+/-8.65		pCi/L						
Europium-155	U	0.789	+/-10.7	16.6	+/-10.7		pCi/L						
Potassium-40	U	43.3	+/-38.8	85.8	+/-43.6		pCi/L						
Rad Gas Flow Proportional Counting													
<i>SRTOT_SEP_PRECIP_GPC: COMMON "As Received"</i>													
Total Strontium	U	1.76	+/-1.24	1.91	+/-1.31	2.00	pCi/L		KSD1	09/25/14	1136	1419083	6
Rad Liquid Scintillation Analysis													
<i>TC99_EIE_LSC: COMMON "As Received"</i>													
Technetium-99		52.9	+/-7.59	10.4	+/-9.59	15.0	pCi/L		MYM	09/30/14	1313	1418507	7
<i>TRITIUM_DIST_LSC: COMMON "As Received"</i>													
Tritium		3050	+/-214	145	+/-627	100	pCi/L		BYS1	09/25/14	1804	1418820	8

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Am-05-RC Modified
2	ASTM C 1476-00 Modified
3	DOE EML HASL-300, Pu-11-RC Modified
4	DOE EML HASL-300, Th-01-RC Modified
5	EPA 901.1

OCTOBER 1, 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 S14-007

Client Sample ID: B2X172
Sample ID: 356016002

Project: HMSA00177
Client ID: HMSA001

Table with 13 columns: Parameter, Qualifier, Result, Uncertainty, MDC, TPU, RL, Units, DF, Analyst, Date, Time, Batch, Mtd. Rows 6-8 show EPA modified methods.

Table with 6 columns: Surrogate/Tracer Recovery, Test, Batch ID, Recovery%, Acceptable Limits. Lists various tracers and their recovery percentages.

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

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Client : CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Workorder: 356016

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1416610								
QC1203161065	MB								
Americium-241			U	-0.0415	pCi/L			MXS2	09/19/1410:19
				Uncert: +/-0.287					
				TPU: +/-0.287					
QC1203161066	356016002	DUP							
Americium-241		U	0.0472	U	0.119				09/19/1410:19
				Uncert: +/-0.177		RPD: 0	N/A		
				TPU: +/-0.177		RER: 0.371	(0-2)		
QC1203161067	LCS								
Americium-241		14.1		15.0	pCi/L	REC: 107	(80%-120%)		09/19/1410:19
				Uncert: +/-2.91					
				TPU: +/-3.89					
Batch	1416611								
QC1203161071	MB								
Neptunium-237			U	-0.00692	pCi/L			MXS2	09/19/1410:16
				Uncert: +/-0.248					
				TPU: +/-0.248					
QC1203161072	356016002	DUP							
Neptunium-237		U	-0.089	U	0.0361				
				Uncert: +/-0.202		RPD: 0	N/A		
				TPU: +/-0.202		RER: 0.755	(0-2)		
QC1203161073	LCS								
Neptunium-237		43.1		44.5	pCi/L	REC: 103	(80%-120%)		
				Uncert: +/-3.26					
				TPU: +/-6.38					
Batch	1416614								
QC1203161074	MB								
Plutonium-238			U	0.00	pCi/L			MXS2	09/19/1410:18
				Uncert: +/-0.173					
				TPU: +/-0.174					
Plutonium-239/240			U	-0.0619	pCi/L				
				Uncert: +/-0.187					
				TPU: +/-0.187					
QC1203161075	356016002	DUP							
Plutonium-238		U	-0.0636	U	-0.022				09/24/1411:00
				Uncert: +/-0.192		RPD: 0	N/A		
				TPU: +/-0.192		RER: 0.301	(0-2)		
Plutonium-239/240		U	0.134	U	0.183				
				Uncert: +/-0.308		RPD: 0	N/A		
				TPU: +/-0.309		RER: 0.218	(0-2)		
QC1203161076	LCS								
Plutonium-238			U	0.214	pCi/L				09/23/1412:40
				Uncert: +/-0.379					
				TPU: +/-0.380					
						REC:			

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QC Summary

Workorder: 356016

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1416614								
Plutonium-239/240	19.7			22.4	pCi/L	114	(80%-120%)		
	Uncert:			+/-2.86					
	TPU:			+/-4.36					
Batch	1416616								
QC1203161077	MB								
Thorium-228			U	0.147	pCi/L			MXS2	09/23/1410:32
	Uncert:			+/-0.292					
	TPU:			+/-0.292					
Thorium-230			U	-0.0168	pCi/L				
	Uncert:			+/-0.338					
	TPU:			+/-0.340					
Thorium-232			U	0.139	pCi/L				
	Uncert:			+/-0.289					
	TPU:			+/-0.290					
QC1203161078	356016002	DUP							
Thorium-228		U	0.116	U	0.00459	pCi/L			
	Uncert:	+/-0.269		+/-0.277		RPD: 0	N/A		
	TPU:	+/-0.270		+/-0.277		RER: 0.563	(0-2)		
Thorium-230		U	0.0825	U	0.0403	pCi/L			
	Uncert:	+/-0.408		+/-0.402		RPD: 0	N/A		
	TPU:	+/-0.411		+/-0.404		RER: 0.144	(0-2)		
Thorium-232		U	-0.044	U	-0.00482	pCi/L			
	Uncert:	+/-0.160		+/-0.219		RPD: 0	N/A		
	TPU:	+/-0.161		+/-0.219		RER: 0.283	(0-2)		
QC1203161079	LCS								
Thorium-228			U	-0.0684	pCi/L				
	Uncert:			+/-0.300					
	TPU:			+/-0.300					
Thorium-230	21.4			24.8	pCi/L	REC: 116	(80%-120%)		
	Uncert:			+/-2.79					
	TPU:			+/-4.75					
Thorium-232			U	-0.0572	pCi/L				
	Uncert:			+/-0.241					
	TPU:			+/-0.241					
Rad Gamma Spec									
Batch	1416335								
QC1203160340	MB								
Antimony-125			U	4.33	pCi/L			MJH1	09/15/1410:26
	Uncert:			+/-8.21					
	TPU:			+/-8.45					
Cesium-134			U	1.53	pCi/L				
	Uncert:			+/-3.42					
	TPU:			+/-3.49					
Cesium-137			U	3.16	pCi/L				
	Uncert:			+/-6.44					
	TPU:			+/-6.45					
Cobalt-60			U	0.709	pCi/L				
	Uncert:			+/-2.58					
	TPU:			+/-2.61					

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QC Summary

Workorder: 356016

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1416335								
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					
Potassium-40			U	-1.68	pCi/L				
				Uncert: +/-32.9					
				TPU: +/-33.0					
QC1203160341 355867006 DUP									
Antimony-125		U -3.53	U	-5.01	pCi/L				09/15/1410:27
				Uncert: +/-7.76		RPD: 0	N/A		
				TPU: +/-7.93		RER: 0.274	(0-2)		
Cesium-134		U 1.69	U	-1.34	pCi/L				
				Uncert: +/-3.28		RPD: 0	N/A		
				TPU: +/-3.37		RER: 1.49	(0-2)		
Cesium-137		U 1.25	U	0.418	pCi/L				
				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)		
Potassium-40		U 11.1	U	14.1	pCi/L				
				Uncert: +/-52.5		RPD: 0	N/A		
				TPU: +/-52.5		RER: 0.0891	(0-2)		
QC1203160342 LCS									
Americium-241	34500			38200	pCi/L	REC: 111	(80%-120%)		09/15/1410:27
				Uncert: +/-1090					
				TPU: +/-2830					
Antimony-125			U	48.0	pCi/L				
				Uncert: +/-208					
				TPU: +/-209					
Cesium-134			U	-20.5	pCi/L				
				Uncert: +/-84.4					
				TPU: +/-85.0					
Cesium-137	14000			14300	pCi/L	REC: 102	(80%-120%)		
				Uncert: +/-312					
				TPU: +/-1200					

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QC Summary

Workorder: 356016

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1416335								
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					
Europium-154			U	66.4	pCi/L				
	Uncert:			+/-123					
	TPU:			+/-126					
Europium-155			U	-25.1	pCi/L				
	Uncert:			+/-257					
	TPU:			+/-257					
Potassium-40			U	-58.6	pCi/L				
	Uncert:			+/-290					
	TPU:			+/-291					
Rad Gas Flow									
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
	Uncert:		+/-1.11		+/-1.25		RPD: 0	N/A	
	TPU:		+/-1.12		+/-1.31		RER: 1.08	(0-2)	
QC1203167478	LCS								
Total Strontium			112		108	pCi/L	REC: 96	(80%-120%)	09/25/1411:34
	Uncert:				+/-5.78				
	TPU:				+/-25.5				
Rad Liquid Scintillation									
Batch	1418507								
QC1203165939	MB								
Technetium-99			U	9.04	pCi/L			MYM1	09/30/1415:31
	Uncert:			+/-6.55					
	TPU:			+/-6.62					
QC1203165940	356431004	DUP							
Technetium-99		U	6.69	U	10.8	pCi/L			10/01/1410:23
	Uncert:		+/-8.54		+/-7.98		RPD: 0	N/A	
	TPU:		+/-8.57		+/-8.07		RER: 0.686	(0-2)	
QC1203165941	LCS								
Technetium-99			290		259	pCi/L	REC: 89	(80%-120%)	09/30/1416:27
	Uncert:				+/-12.2				
	TPU:				+/-31.2				
Batch	1418820								
QC1203166815	MB								
Tritium			U	49.4	pCi/L			BYS1	09/30/1405:19
	Uncert:			+/-50.4					
	TPU:			+/-51.3					
QC1203166816	356403002	DUP							

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QC Summary

Workorder: 356016

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Liquid Scintillation										
Batch	1418820									
Tritium		1160		1050	pCi/L					
		Uncert:	+/-144	+/-140		RPD:	10	(0% - 20%)		
		TPU:	+/-266	+/-247		RER:	0.593	(0-2)		
QC1203166817	356403002	MS								
Tritium	1910	1160		2800	pCi/L	REC:	86	(75%-125%)	09/26/1422:13	
		Uncert:	+/-144	+/-340						
		TPU:	+/-266	+/-639						
QC1203166818	LCS									
Tritium	1910			1750	pCi/L	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
- A The TIC is a suspected aldol-condensation product
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- B The analyte was detected in both the associated QC blank and in the sample.
- B The associated QC sample blank has a result >= 2X the MDA and, after corrections, result is >= MDA for this sample
- C Analyte has been confirmed by GC/MS analysis
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- E Reported value is estimated due to interferences. See comment in narrative.
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated
- M Duplicate precision not met.
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- S Reported value determined by the Method of Standard Additions (MSA)
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- 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)

OCTOBER 1, 2014

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QC Summary

Workorder: 356016

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

** Indicates analyte is a surrogate compound.

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

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

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