

July 30, 2014

Rev. 1



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2040 Savage Road Charleston, SC 29407

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[www.gel.com](http://www.gel.com)

July 28, 2014

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

Re: CHPRC F14-003  
Work Order: 348682  
SDG: GEL348682

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on May 14, 2014. This revised data report has been prepared and reviewed in accordance with GEL's standard operating procedures. This data package was revised per enclosed P&D: The EDD will be revised to report VOAs at the MDL.

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

Sincerely,

Heather Shaffer  
Project Manager

Purchase Order: 300071ES20  
Chain of Custody: F14-003-140, F14-003-142 and F14-003-225  
Enclosures



## Table of Contents

Case Narrative.....	1
Chain of Custody and Supporting Documentation.....	4
Problem and Discrepancy Report.....	9
Data Review Qualifier Definitions.....	11
Laboratory Certifications.....	13
Volatile Analysis.....	15
Case Narrative.....	16
Sample Data Summary.....	21
Quality Control Summary.....	26
Miscellaneous.....	35
Metals Analysis.....	37
Case Narrative.....	38
Sample Data Summary.....	43
Quality Control Summary.....	46
General Chem Analysis.....	49
Case Narrative.....	50
Sample Data Summary.....	55
Quality Control Summary.....	58
Miscellaneous.....	60
Radiological Analysis.....	62

Sample Data Summary.....67

Quality Control Data.....69

July 30, 2014

Rev. 1

# Case Narrative

July 30, 2014

Rev. 1

This data package was revised per enclosed P&D: The EDD will be revised to report VOAs at the MDL.

**General Narrative  
for  
Hanford MSA (51204)  
CHPRC F14-003  
SDG: GEL348682**

**July 28, 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 May 14, 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**

**Sample Identification**

The laboratory received the following samples:

<b>Laboratory Identification</b>	<b>Sample Description</b>
348682001	B2W2V5
348682002	B2W2V3
348682003	B2WK84

**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.

July 30, 2014

Rev. 1

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 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**





CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY / SAMPLE ANALYSIS REQUEST		F14-003-225	PAGE 1 OF 1	
COLLECTOR Don Brotherton	COMPANY CONTACT TODAK, D	TELEPHONE NO. 376-6427	PROJECT COORDINATOR TODAK, D	PRICE CODE 7H	DATA TURNAROUND 30 Days / 30 Days	
SAMPLING LOCATION C8716, FXR-11	PROJECT DESIGNATION FY2014 200-ZP-1 Remedial Action Wells Sampling and Analysis - Water	FIELD LOGBOOK NO. HNF-N-507-28 p. 23	SAF NO. F14-003	AIR QUALITY <input type="checkbox"/>	METHOD OF SHIPMENT FEDERAL EXPRESS	
ICE CHEST NO. 605-060	OFFSITE PROPERTY NO. SEE PPR 20.5/13/14 4793	ACTUAL SAMPLE DEPTH 520 ft	COA 302938ES10	BILL OF LADING / AIR BILL NO. SEE PPR 20.5/13/14 7988 4596 7890		
SHIPPED TO GEL Laboratories, LLC						
MATRIX* A=Air DL=Drum L=Liquid S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	POSSIBLE SAMPLE HAZARDS / REMARKS *Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.	PRESERVATION HCl or H2SO4 to pH <2 / Cool 14 Days	HOLDING TIME	TYPE OF CONTAINER aGs*	NO. OF CONTAINER(S) 4	VOLUME 40mL
SPECIAL HANDLING AND/OR STORAGE		SAMPLE ANALYSIS 8260_VOA_GCM S: COMMON 8260_VOA_GCM S: CR 01;				
SAMPLE NO. B2WK84	MATRIX* WATER	SAMPLE DATE MAY 12 2014	SAMPLE TIME 1426			

CHAIN OF POSSESSION		SIGN / PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY / REMOVED FROM	DATE / TIME	RECEIVED BY / STORED IN	DATE / TIME	** The CACN for all analytical work at WSCF laboratory is 403857. ** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF. ** VOA analysis will be conducted with a 24 hour turnaround time on preliminary data. The VOA samples will be placed on a separate COC. ** Cr VI holding times MUST BE MET. Sample Management Project Coordinator must be contacted immediately if there is a problem. ** The laboratory is to report all TICs for Method 8260. TRVL-14-059	
Don Brotherton	MAY 12 2014 1525	SSW #1	MAY 12 2014 1525		
SSW #1	MAY 13 2014 1148	LD. WELLS	MAY 13 2014 1148		
LD. WELLS	MAY 13 2014 1400	CHPRC	MAY 13 2014 1400		
CHPRC		FEDEX			
FEDEX		OP Jen Pellegrini	5-14-14 0915		
OP Jen Pellegrini					
RECEIVED BY	DATE / TIME	RECEIVED BY / STORED IN	DATE / TIME		
DISPOSAL METHOD	DATE / TIME	DISPOSED BY	DATE / TIME		

July 30, 2014

Client: <u>HMSA</u>		SDG/AR/COC/Work Order: <u>348656 / 348657 / 348658 / 348682</u>	
Received By: <u>JP</u>		Date Received: <u>5-14-14</u>	
<b>Suspected Hazard Information</b>		Yes	No
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Classified Radioactive II or III by RSO?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
COC/Samples marked containing PCBs?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Package, COC, and/or Samples marked as beryllium or asbestos containing?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Samples identified as Foreign Soil?		<input checked="" type="checkbox"/>	<input type="checkbox"/>

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Preservation Method: <u>Ice bags</u> Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>130442961</u> Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
7 Are Encore containers present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
8 Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
12 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
14 Carrier and tracking number.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: <u>FedEx Air</u> FedEx Ground UPS Field Services Courier Other  <u>7988 4596 7890</u>

Comments (Use Continuation Form if needed):

# **Problem and Discrepancy Report**

July 30, 2014

Rev. 1

**Problem and Discrepancy Report****SDGs**

GEL349221 GEL348559 GEL349334 GEL349571 GEL348657 GEL348682  
GEL349473 GEL349208 GEL349574 GEL348302 GEL349214 GEL348658

**7/16/2014**

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**1. The data package has the following issues:**

- a) The listed SDGs need to have the VOAs re-reported as MDL not PQL.

**Resolution:** *Provide correction.*

**Lab Response:**

The lab will submit a revised EDD and send a revised data package to narrate the revision.

Provide a resolution to each issue noted on the report

Page 1 of 1

# **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 h flags. 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
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
C	Programmed	Target analyte was detected in the sample and the associated blank, and the sample concentration was $\leq 5$ times the blank concentration.	Y	Inorganics	Metals	Replaces B
C	Programmed	Target analyte was detected in the sample and the associated blank, and the sample concentration was $\leq 5$ times the blank concentration.	Y	General Chemistry		Replaces B
<	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

July 30, 2014

Rev. 1

**List of current GEL Certifications as of 28 July 2014**

<b>State</b>	<b>Certification</b>
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	SC000122014-13
Vermont	VT87156
Virginia NELAP	460202
Washington	C780-12
Wisconsin	999887790

# **Volatile Analysis**

# Case Narrative

**July 30, 2014**  
**ChemStation Case Narrative**  
**Hanford MSA (HMSA)**  
**SDG GEL348682**

Rev. 1

**Method/Analysis Information**

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

Analytical Method: SW846 8260C

Analytical Batch Number: 1387956

**Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
348682002	B2W2V3
348682003	B2WK84
1203088526	Method Blank (MB)
1203088529	Laboratory Control Sample (LCS)
1203088531	348558001(B2WD49) Post Spike (PS)
1203088532	348558001(B2WD49) Post Spike Duplicate (PSD)

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

The 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-038 REV# 21.

Raw data reports are processed and reviewed by the analyst using the Chemstation software package. False positives have been removed from the quantitation reports per standard operating procedures (SOP) section 19.1.2. False positive analytes are designated on the quantitation report with a 'd' qualifier.

**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

July 30, 2014

Rev. 1

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.

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

The blank analyzed with this SDG met the acceptance criteria.

**Surrogate Recoveries**

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

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

**QC Sample Designation**

Sample 348558001 (B2WD49) was designated for spike analysis.

**Matrix Spike (PS) Recovery Statement**

The spike 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 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**

Preservation was indicated on the vials, however the sample pH values were above 2. All samples were pH 3 at the time of analysis. The samples were analyzed within 7 days from collection.

**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.

July 30, 2014

Rev. 1

**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: 1293696.

**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 requested for this sample delivery group/work order. Please note that non-requested target analytes that are reported on the quantitation reports will be present on the Form I. These detected analytes are included in the calibrated method and as a result will be reported on the Sample Data Summary (Form I) or Certificate of Analysis (C of A). TIC data are included on the Sample Data Summary (Form I). 348682002 (B2W2V3) and 348682003 (B2WK84).

**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:

<b>Instrument ID</b>	<b>Instrument</b>	<b>System Configuration</b>	<b>Column ID</b>	<b>Column Description</b>	<b>P &amp; T Trap</b>
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.

July 30, 2014

Rev. 1

**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: GEL348682 GEL Work Order: 348682

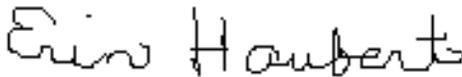
**The Qualifiers in this report are defined as follows:**

- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

**Review/Validation**

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

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

Signature: 

Name: Erin Haubert

Date: 06 JUN 2014

Title: Data Validator

# Sample Data Summary

~~JULY 30, 2014~~  
**GEL LABORATORIES LLC**

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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 F14-003**

Report Date: June 6, 2014

Client Sample ID:	B2W2V3	Project:	HMSA00152
Sample ID:	348682002	Client ID:	HMSA001
Matrix:	WATER		
Collect Date:	12-MAY-14 14:26		
Receive Date:	14-MAY-14		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
<b>Volatile Organics</b>										
<i>8260VOA_GCMS: COMMON + CH 01 "As Received"</i>										
1,1,1-Trichloroethane	U	ND	0.300	5.00	ug/L	1	CDS1 05/14/14	1716	1387956	1
1,1,1,2-Tetrachloroethane	U	ND	0.300	5.00	ug/L	1				
1,1,2-Trichloroethane	U	ND	0.300	5.00	ug/L	1				
1,1-Dichloroethane	U	ND	0.300	10.0	ug/L	1				
1,1-Dichloroethylene	U	ND	0.300	10.0	ug/L	1				
1,2-Dichloroethane	U	ND	0.300	5.00	ug/L	1				
1,2-Dichloroethylene (total)	U	ND	0.300	10.0	ug/L	1				
1,2-Dichloropropane	U	ND	0.300	5.00	ug/L	1				
2-Butanone	TU	ND	3.00	10.0	ug/L	1				
2-Hexanone	U	ND	3.00	20.0	ug/L	1				
4-Methyl-2-pentanone	U	ND	3.00	10.0	ug/L	1				
Acetone	TU	ND	3.00	20.0	ug/L	1				
Benzene	U	ND	0.300	5.00	ug/L	1				
Bromodichloromethane	U	ND	0.300	5.00	ug/L	1				
Bromoform	U	ND	0.300	5.00	ug/L	1				
Bromomethane	U	ND	0.300	10.0	ug/L	1				
Carbon disulfide	U	ND	1.60	10.0	ug/L	1				
Carbon tetrachloride	U	ND	0.300	5.00	ug/L	1				
Chlorobenzene	U	ND	0.300	5.00	ug/L	1				
Chloroethane	U	ND	0.300	10.0	ug/L	1				
Chloroform	U	ND	0.300	5.00	ug/L	1				
Chloromethane	U	ND	0.300	10.0	ug/L	1				
Dibromochloromethane	U	ND	0.300	5.00	ug/L	1				
Ethylbenzene	U	ND	0.300	5.00	ug/L	1				
Methylene chloride	U	ND	1.60	5.00	ug/L	1				
Styrene	U	ND	0.300	5.00	ug/L	1				
Tetrachloroethylene	U	ND	0.300	5.00	ug/L	1				
Toluene	U	ND	0.300	5.00	ug/L	1				
Trichloroethene	U	ND	0.300	5.00	ug/L	1				
Vinyl chloride	U	ND	0.300	10.0	ug/L	1				
Xylenes (total)	U	ND	0.300	10.0	ug/L	1				
cis-1,3-Dichloropropylene	U	ND	0.300	5.00	ug/L	1				
trans-1,3-Dichloropropylene	U	ND	0.300	5.00	ug/L	1				

~~JUL 30, 2014~~  
**GEL LABORATORIES LLC**

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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 F14-003**

Report Date: June 6, 2014

Client Sample ID: B2W2V3  
 Sample ID: 348682002

Project: HMSA00152  
 Client ID: HMSA001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
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**Volatile Organics**

8260VOA\_GCMS: COMMON + CH 01 "As Received"

<i>Surrogate/Tracer recovery</i>	<i>Result</i>	<i>Nominal</i>	<i>Recovery%</i>	<i>Acceptable Limits</i>	<i>Date Time:</i>	<i>05/14/14 17 16</i>
1,2-Dichloroethane-d4	47.8 ug/L	50.0	95.5	(78%-124%)		
Toluene-d8	47.8 ug/L	50.0	95.6	(80%-120%)		
Bromofluorobenzene	53.5 ug/L	50.0	107	(80%-120%)		

<i>Tentatively Identified Compound (TIC)</i>	<i>CAS No.</i>	<i>RT</i>	<i>Est. Concentration</i>	<i>Fit</i>	<i>Qual</i>	<i>Date Time:</i>	<i>05/14/14 17 16</i>
unknown		3.593	27.2 ug/L	0	J		

**The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	SW846 8260C	

~~JULY 30, 2014~~  
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## Certificate of Analysis

Company : CH2MHill Plateau Remediation  
 Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: **CHPRC F14-003**

Report Date: June 6, 2014

Client Sample ID:	B2WK84	Project:	HMSA00152
Sample ID:	348682003	Client ID:	HMSA001
Matrix:	WATER		
Collect Date:	12-MAY-14 14:26		
Receive Date:	14-MAY-14		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
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### Volatile Organics

8260VOA\_GCMS: COMMON + CH 01 "As Received"

1,1,1-Trichloroethane	U	ND	0.300	5.00	ug/L	1	CDS1 05/14/14	1746	1387956	1
1,1,1,2-Tetrachloroethane	U	ND	0.300	5.00	ug/L	1				
1,1,2-Trichloroethane	U	ND	0.300	5.00	ug/L	1				
1,1-Dichloroethane	U	ND	0.300	10.0	ug/L	1				
1,1-Dichloroethylene	U	ND	0.300	10.0	ug/L	1				
1,2-Dichloroethane	U	ND	0.300	5.00	ug/L	1				
1,2-Dichloroethylene (total)	U	ND	0.300	10.0	ug/L	1				
1,2-Dichloropropane	U	ND	0.300	5.00	ug/L	1				
2-Butanone	TU	ND	3.00	10.0	ug/L	1				
2-Hexanone	U	ND	3.00	20.0	ug/L	1				
4-Methyl-2-pentanone	U	ND	3.00	10.0	ug/L	1				
Acetone	TU	ND	3.00	20.0	ug/L	1				
Benzene	U	ND	0.300	5.00	ug/L	1				
Bromodichloromethane	U	ND	0.300	5.00	ug/L	1				
Bromoform	U	ND	0.300	5.00	ug/L	1				
Bromomethane	U	ND	0.300	10.0	ug/L	1				
Carbon disulfide	U	ND	1.60	10.0	ug/L	1				
Carbon tetrachloride	U	ND	0.300	5.00	ug/L	1				
Chlorobenzene	U	ND	0.300	5.00	ug/L	1				
Chloroethane	U	ND	0.300	10.0	ug/L	1				
Chloroform	U	ND	0.300	5.00	ug/L	1				
Chloromethane	U	ND	0.300	10.0	ug/L	1				
Dibromochloromethane	U	ND	0.300	5.00	ug/L	1				
Ethylbenzene	U	ND	0.300	5.00	ug/L	1				
Methylene chloride	J	2.55	1.60	5.00	ug/L	1				
Styrene	U	ND	0.300	5.00	ug/L	1				
Tetrachloroethylene	U	ND	0.300	5.00	ug/L	1				
Toluene	U	ND	0.300	5.00	ug/L	1				
Trichloroethene	U	ND	0.300	5.00	ug/L	1				
Vinyl chloride	U	ND	0.300	10.0	ug/L	1				
Xylenes (total)	U	ND	0.300	10.0	ug/L	1				
cis-1,3-Dichloropropylene	U	ND	0.300	5.00	ug/L	1				
trans-1,3-Dichloropropylene	U	ND	0.300	5.00	ug/L	1				



# Quality Control Summary

July 30, 2014

Rev. 1

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**QC Summary**

Report Date: June 6, 2014

Page 1 of 8

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 348682

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Volatile-GC/MS</b>											
Batch	1387956										
QC1203088529	LCS										
1,1,1-Trichloroethane	50.0			51.1	ug/L		102	(70%-130%)	CDS1	05/14/14	07:50
1,1,2,2-Tetrachloroethane	50.0			48.7	ug/L		97.3	(70%-130%)			
1,1,2-Trichloroethane	50.0			47.0	ug/L		93.9	(70%-130%)			
1,1-Dichloroethane	50.0			44.3	ug/L		88.6	(70%-130%)			
1,1-Dichloroethylene	50.0			45.6	ug/L		91.2	(70%-130%)			
1,2-Dichloroethane	50.0			47.7	ug/L		95.4	(70%-130%)			
1,2-Dichloroethylene (total)	100			88.4	ug/L		88.4	(70%-130%)			
1,2-Dichloropropane	50.0			47.0	ug/L		93.9	(70%-130%)			
2-Butanone	250			260	ug/L		104	(70%-130%)			
2-Hexanone	250			298	ug/L		119	(70%-130%)			
4-Methyl-2-pentanone	250			221	ug/L		88.6	(70%-130%)			
Acetone	250			233	ug/L		93.3	(70%-130%)			
Benzene	50.0			45.3	ug/L		90.7	(70%-130%)			
Bromodichloromethane	50.0			53.3	ug/L		107	(70%-130%)			
Bromoform	50.0			60.4	ug/L		121	(70%-130%)			
Bromomethane	50.0			39.8	ug/L		79.6	(70%-130%)			
Carbon disulfide	250			233	ug/L		93.3	(70%-130%)			
Carbon tetrachloride	50.0			52.2	ug/L		104	(70%-130%)			
Chlorobenzene	50.0			47.3	ug/L		94.5	(70%-130%)			
Chloroethane	50.0			45.2	ug/L		90.3	(70%-130%)			

July 30, 2014

Rev. 1

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

**QC Summary**

Workorder: 348682

Page 2 of 8

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Volatile-GC/MS</b>											
Batch	1387956										
Chloroform	50.0			47.0	ug/L		94	(70%-130%)	CDS1	05/14/14	07:50
Chloromethane	50.0			41.1	ug/L		82.1	(70%-130%)			
Dibromochloromethane	50.0			52.3	ug/L		105	(70%-130%)			
Ethylbenzene	50.0			47.3	ug/L		94.5	(70%-130%)			
Methylene chloride	50.0			40.5	ug/L		81	(70%-130%)			
Styrene	50.0			50.4	ug/L		101	(70%-130%)			
Tetrachloroethylene	50.0			48.6	ug/L		97.2	(70%-130%)			
Toluene	50.0			45.3	ug/L		90.7	(70%-130%)			
Trichloroethene	50.0			49.5	ug/L		98.9	(70%-130%)			
Vinyl chloride	50.0			42.4	ug/L		84.8	(70%-130%)			
Xylenes (total)	150			140	ug/L		93	(70%-130%)			
cis-1,3-Dichloropropylene	50.0			53.2	ug/L		106	(70%-130%)			
trans-1,3-Dichloropropylene	50.0			50.2	ug/L		100	(70%-130%)			
**1,2-Dichloroethane-d4	50.0			47.4	ug/L		94.7	(78%-124%)			
**Bromofluorobenzene	50.0			53.2	ug/L		106	(80%-120%)			
**Toluene-d8	50.0			47.4	ug/L		94.8	(80%-120%)			
QC1203088526 MB											
1,1,1-Trichloroethane			U	ND	ug/L					05/14/14	09:50
1,1,2,2-Tetrachloroethane			U	ND	ug/L						
1,1,2-Trichloroethane			U	ND	ug/L						
1,1-Dichloroethane			U	ND	ug/L						
1,1-Dichloroethylene			U	ND	ug/L						

July 30, 2014

Rev. 1

**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 348682

Page 3 of 8

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Volatile-GC/MS</b>											
Batch	1387956										
1,2-Dichloroethane			U	ND	ug/L				CDS1	05/14/14	09:50
1,2-Dichloroethylene (total)			U	ND	ug/L						
1,2-Dichloropropane			U	ND	ug/L						
2-Butanone			U	ND	ug/L						
2-Hexanone			U	ND	ug/L						
4-Methyl-2-pentanone			U	ND	ug/L						
Acetone			U	ND	ug/L						
Benzene			U	ND	ug/L						
Bromodichloromethane			U	ND	ug/L						
Bromoform			U	ND	ug/L						
Bromomethane			U	ND	ug/L						
Carbon disulfide			U	ND	ug/L						
Carbon tetrachloride			U	ND	ug/L						
Chlorobenzene			U	ND	ug/L						
Chloroethane			U	ND	ug/L						
Chloroform			U	ND	ug/L						
Chloromethane			U	ND	ug/L						
Dibromochloromethane			U	ND	ug/L						
Ethylbenzene			U	ND	ug/L						
Methylene chloride			U	ND	ug/L						
Styrene			U	ND	ug/L						

July 30, 2014

Rev. 1

**GEL LABORATORIES LLC**

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

**QC Summary**

Workorder: 348682

Page 4 of 8

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Volatile-GC/MS</b>											
Batch	1387956										
Tetrachloroethylene			U	ND	ug/L						
Toluene			U	ND	ug/L				CDS1	05/14/14	09:50
Trichloroethene			U	ND	ug/L						
Vinyl chloride			U	ND	ug/L						
Xylenes (total)			U	ND	ug/L						
cis-1,3-Dichloropropylene			U	ND	ug/L						
trans-1,3-Dichloropropylene			U	ND	ug/L						
**1,2-Dichloroethane-d4	50.0			48.7	ug/L		97.3	(78%-124%)			
**Bromofluorobenzene	50.0			52.3	ug/L		105	(80%-120%)			
**Toluene-d8	50.0			47.4	ug/L		94.8	(80%-120%)			
QC1203088531 348558001 PS											
1,1,1-Trichloroethane	50.0	U	ND	51.7	ug/L		103	(70%-130%)		05/14/14	14:16
1,1,2,2-Tetrachloroethane	50.0	U	ND	45.9	ug/L		91.7	(70%-130%)			
1,1,2-Trichloroethane	50.0	U	ND	46.7	ug/L		93.4	(70%-130%)			
1,1-Dichloroethane	50.0	U	ND	45.7	ug/L		91.4	(70%-130%)			
1,1-Dichloroethylene	50.0	U	ND	47.4	ug/L		94.8	(70%-130%)			
1,2-Dichloroethane	50.0	U	ND	46.5	ug/L		92.9	(70%-130%)			
1,2-Dichloroethylene (total)	100			92.6	ug/L		92.6	(70%-130%)			
1,2-Dichloropropane	50.0	U	ND	47.1	ug/L		94.2	(70%-130%)			
2-Butanone	250	TU	ND T	168	ug/L		67.2*	(70%-130%)			
2-Hexanone	250	U	ND	199	ug/L		79.5	(70%-130%)			
4-Methyl-2-pentanone	250	U	ND	214	ug/L		85.5	(70%-130%)			
Acetone	250	TU	ND T	127	ug/L		50.7*	(70%-130%)			

July 30, 2014

Rev. 1

**GEL LABORATORIES LLC**

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

**QC Summary**

Workorder: 348682

Page 5 of 8

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Volatile-GC/MS</b>											
Batch	1387956										
Benzene	50.0	U	ND	47.1	ug/L	94.1	(70%-130%)	CDS1	05/14/14	14:16	
Bromodichloromethane	50.0	U	ND	51.5	ug/L	103	(70%-130%)				
Bromoform	50.0	U	ND	54.8	ug/L	110	(70%-130%)				
Bromomethane	50.0	U	ND	50.7	ug/L	101	(70%-130%)				
Carbon disulfide	250	U	ND	248	ug/L	99.2	(70%-130%)				
Carbon tetrachloride	50.0		16.2	68.6	ug/L	105	(70%-130%)				
Chlorobenzene	50.0	U	ND	48.7	ug/L	97.4	(70%-130%)				
Chloroethane	50.0	U	ND	48.5	ug/L	97	(70%-130%)				
Chloroform	50.0	J	2.17	49.5	ug/L	94.6	(70%-130%)				
Chloromethane	50.0	U	ND	43.2	ug/L	86.3	(70%-130%)				
Dibromochloromethane	50.0	U	ND	51.0	ug/L	102	(70%-130%)				
Ethylbenzene	50.0	U	ND	49.8	ug/L	99.7	(70%-130%)				
Methylene chloride	50.0	U	ND	41.9	ug/L	83.9	(70%-130%)				
Styrene	50.0	U	ND	52.0	ug/L	104	(70%-130%)				
Tetrachloroethylene	50.0	U	ND	51.1	ug/L	102	(70%-130%)				
Toluene	50.0	U	ND	48.4	ug/L	96.8	(70%-130%)				
Trichloroethene	50.0	J	4.00	54.3	ug/L	101	(70%-130%)				
Vinyl chloride	50.0	U	ND	45.8	ug/L	91.5	(70%-130%)				
Xylenes (total)	150	U	ND	149	ug/L	99	(70%-130%)				
cis-1,3-Dichloropropylene	50.0	U	ND	49.3	ug/L	98.6	(70%-130%)				
trans-1,3-Dichloropropylene	50.0	U	ND	48.7	ug/L	97.5	(70%-130%)				

July 30, 2014

Rev. 1

**GEL LABORATORIES LLC**

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

**QC Summary**

Workorder: 348682

Page 6 of 8

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Volatile-GC/MS</b>											
Batch	1387956										
**1,2-Dichloroethane-d4	50.0	47.6		46.9	ug/L		93.7	(78%-124%)			
**Bromofluorobenzene	50.0	54.9		51.1	ug/L		102	(80%-120%)	CDS1	05/14/14	14:16
**Toluene-d8	50.0	48.6		48.8	ug/L		97.5	(80%-120%)			
QC1203088532 348558001 PSD											
1,1,1-Trichloroethane	50.0	U	ND	54.3	ug/L	5.02	109	(0%-20%)		05/14/14	14:46
1,1,2,2-Tetrachloroethane	50.0	U	ND	50.9	ug/L	10.4	102	(0%-20%)			
1,1,2-Trichloroethane	50.0	U	ND	49.8	ug/L	6.39	99.5	(0%-20%)			
1,1-Dichloroethane	50.0	U	ND	47.6	ug/L	4.05	95.2	(0%-20%)			
1,1-Dichloroethylene	50.0	U	ND	49.3	ug/L	3.81	98.5	(0%-20%)			
1,2-Dichloroethane	50.0	U	ND	49.6	ug/L	6.62	99.3	(0%-20%)			
1,2-Dichloroethylene (total)	100			95.8	ug/L	3.38	95.8	(0%-20%)			
1,2-Dichloropropane	50.0	U	ND	50.1	ug/L	6.19	100	(0%-20%)			
2-Butanone	250	TU	ND	178	ug/L	5.76	71.2	(0%-20%)			
2-Hexanone	250	U	ND	212	ug/L	6.40	84.7	(0%-20%)			
4-Methyl-2-pentanone	250	U	ND	223	ug/L	4.20	89.1	(0%-20%)			
Acetone	250	TU	ND T	135	ug/L	6.66	54.2*	(0%-20%)			
Benzene	50.0	U	ND	48.3	ug/L	2.52	96.5	(0%-20%)			
Bromodichloromethane	50.0	U	ND	55.6	ug/L	7.58	111	(0%-20%)			
Bromoform	50.0	U	ND	61.6	ug/L	11.7	123	(0%-20%)			
Bromomethane	50.0	U	ND	47.7	ug/L	6.14	95.3	(0%-20%)			
Carbon disulfide	250	U	ND	251	ug/L	1.09	100	(0%-20%)			
Carbon tetrachloride	50.0		16.2	70.3	ug/L	2.48	108	(0%-20%)			
Chlorobenzene	50.0	U	ND	50.9	ug/L	4.42	102	(0%-20%)			

July 30, 2014

Rev. 1

**GEL LABORATORIES LLC**

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

**QC Summary**

Workorder: 348682

Page 7 of 8

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Volatile-GC/MS</b>											
Batch	1387956										
Chloroethane	50.0	U	ND	47.1	ug/L	3.06	94.1	(0%-20%)	CDS1	05/14/14	14:46
Chloroform	50.0	J	2.17	51.7	ug/L	4.47	99.1	(0%-20%)			
Chloromethane	50.0	U	ND	43.2	ug/L	0.162	86.5	(0%-20%)			
Dibromochloromethane	50.0	U	ND	54.6	ug/L	6.74	109	(0%-20%)			
Ethylbenzene	50.0	U	ND	51.4	ug/L	3.10	103	(0%-20%)			
Methylene chloride	50.0	U	ND	43.7	ug/L	4.18	87.5	(0%-20%)			
Styrene	50.0	U	ND	53.9	ug/L	3.49	108	(0%-20%)			
Tetrachloroethylene	50.0	U	ND	52.7	ug/L	3.08	105	(0%-20%)			
Toluene	50.0	U	ND	49.7	ug/L	2.61	99.4	(0%-20%)			
Trichloroethene	50.0	J	4.00	56.7	ug/L	4.42	105	(0%-20%)			
Vinyl chloride	50.0	U	ND	45.1	ug/L	1.50	90.2	(0%-20%)			
Xylenes (total)	150	U	ND	151	ug/L	1.76	101	(0%-20%)			
cis-1,3-Dichloropropylene	50.0	U	ND	54.4	ug/L	9.85	109	(0%-20%)			
trans-1,3-Dichloropropylene	50.0	U	ND	53.0	ug/L	8.45	106	(0%-20%)			
**1,2-Dichloroethane-d4	50.0		47.6	47.3	ug/L		94.7	(78%-124%)			
**Bromofluorobenzene	50.0		54.9	52.5	ug/L		105	(80%-120%)			
**Toluene-d8	50.0		48.6	48.1	ug/L		96.2	(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

July 30, 2014

Rev. 1

**GEL LABORATORIES LLC**

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

**QC Summary**

Workorder: 348682

Page 8 of 8

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
D	Results are reported from a diluted aliquot of sample.										
E	Concentration exceeds the calibration range of the instrument										
J	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated										
N	Spike Sample recovery is outside control limits.										
P	Aroclor target analyte with greater than 25% difference between column analyses.										
T	Spike and/or spike duplicate sample recovery is outside control limits.										
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
o	Analyte failed to recover within LCS limits (Organics only)										

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

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

\* Indicates that a Quality Control parameter was not within specifications.

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

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

# Miscellaneous

July 30, 2014

Rev. 1  
DER Report No.: 1293696  
Revision No.: 1

## DATA EXCEPTION REPORT

<b>Mo.Day Yr.</b> 16-MAY-14	<b>Division:</b> Federal	<b>Quality Criteria:</b> SOP	<b>Type:</b> Process
<b>Instrument Type:</b> VOA GC/MS	<b>Test / Method:</b> 8260C	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> HMSA001
<b>Batch ID:</b> 1387956	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG):</b> 348313,348558(GEL348558),348559(GEL348559),348657(GEL348657),348658(GEL348658),348682(GEL348682)			
<b>Application Issues:</b>  Failed Recovery for MS/PS Other Failed Recovery for LCS/LCSD Failed Recovery for MSD/PSD			
<b>Specification and Requirements Exception Description:</b>		<b>DER Disposition:</b>	
<p>1. The percent drifts for Dichlorodifluoromethane and 2-Chloro-1,3-butadiene were above the acceptance limits in the initial calibration verification samples both with high bias. The effected SDGs are 348558 and 348658.</p> <p>2. The percent drifts for Dichlorodifluoromethane, Bromoform and 2-Chloro-1,3-butadiene were above the acceptance limits in the calibration verification sample analyzed on 05/14/14 and 05/15/14. The effected SDGs are 348558 and 348658 and 348682(Bromoform only).</p> <p>3. The recovery for 2-Chloro-1,3-butadiene was above the acceptance limits in LCS 1203089347. The effected SDGs is 348558.</p> <p>4. The recovery for 2-Chloro-1,3-butadiene was above the acceptance limits in MS and in the MSD performed on sample 348558001. The recovery for Acetone was below the acceptance limits in the MS and in the MSD performed on this sample. The recovery for 2-Butanone was below the acceptance limits in the MS performed on this sample. The calculated relative percent differences between the MS and MSD were all within acceptance limits.</p>		<p>1,2. Narrate and report data. Dichlorodifluoromethane and 2-Chloro-1,3-butadiene were not detected in any of the associated samples.</p> <p>3,4. Narrate and report data.</p>	

**Originator's Name:**

Crystal Stacey 16-MAY-14

**Data Validator/Group Leader:**

Erin Haubert 16-MAY-14

# Metals Analysis

# Case Narrative

July 30, 2014

Rev. 1

**Metals Fractional Narrative  
Hanford MSA (HMSA)  
SDG GEL348682**

**Sample Analysis**

<b>Sample ID</b>	<b>Client ID</b>
348682001	B2W2V5
1203100081	Method Blank (MB) CVAA
1203100082	Laboratory Control Sample (LCS)
1203100091	348682001(B2W2V5L) Serial Dilution (SD)
1203100089	348682001(B2W2V5D) Sample Duplicate (DUP)
1203100090	348682001(B2W2V5S) Matrix Spike (MS)

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

**Method/Analysis Information**

<b>Analytical Batch:</b>	1392500
<b>Prep Batch :</b>	1392498
<b>Standard Operating Procedures:</b>	GL-MA-E-010 REV# 27
<b>Analytical Method:</b>	7470_HG_CVAA
<b>Prep Method :</b>	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-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.

**Calibration Information**

July 30, 2014

Rev. 1

**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.

**Continuing Calibration Blanks (CCB) Requirements**

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

**Continuing Calibration Verification (CCV) Requirements**

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

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

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

**Quality Control (QC) Sample Statement**

The following sample was selected as the quality control (QC) sample for this SDG: 348682001 (B2W2V5).

**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 elements met the acceptance 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.

**Serial Dilution % Difference Statement**

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

**Technical Information****Holding Time Specifications**

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

**Preparation/Analytical Method Verification**

All procedures were performed as stated in the SOP.

**Sample Dilutions**

Dilutions are performed to minimize matrix interferences resulting from elevated mineral element concentrations present in solid samples and/or to bring over range target analyte concentrations into the linear calibration range of the

July 30, 2014

Rev. 1

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

**Preparation Information**

The sample 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 are included in the Miscellaneous Data section of the package. A data exception report was not required for this SDG.

**Additional Comments**

Additional comments were not required for this SDG.

July 30, 2014

Rev. 1

**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:** 6/9/14

# Sample Data Summary

July 30, 2014

Rev. 1

**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: GEL348682 GEL Work Order: 348682

**The Qualifiers in this report are defined as follows:**

\* Duplicate analysis not within control limits

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

D Results are reported from a diluted aliquot of sample.

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



6/9/14

~~JUL 30 2014~~  
**GEL LABORATORIES LLC**

Rev. 1

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 F14-003**

Report Date: June 5, 2014

Client Sample ID: B2W2V5  
 Lab Sample ID: 348682001  
 Matrix: WATER  
 Collect Date: 12-MAY-14 14:26  
 Receive Date: 14-MAY-14  
 Collector: Client

Project: HMSA00152  
 Client ID: HMSA001  
 Client SDG: GEL348682

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Mercury Analysis-CVAA</b>												
<i>7470_MERCURY_CV: COMMON "As Received"</i>												
Mercury	U	ND	0.067	0.200	0.200	ug/L	1	NOR1	06/03/14	12:22	1392500	1

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	AXS5	06/02/14	1517	1392498

**The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	7470_HG_CVAA	

# Quality Control Summary

July 30, 2014

Rev. 1

**GEL LABORATORIES LLC**

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

**QC Summary**

Report Date: June 5, 2014

Page 1 of 2

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 348682

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-Mercury</b>											
Batch	1392500										
QC1203100089	348682001	DUP									
Mercury		U	ND	U	ND	ug/L	N/A		NOR1	06/03/14	12:23
QC1203100082	LCS										
Mercury	2.00				2.24	ug/L	112	(80%-120%)		06/03/14	11:58
QC1203100081	MB										
Mercury			U		ND	ug/L				06/03/14	11:56
QC1203100090	348682001	MS									
Mercury	2.00	U	ND		2.03	ug/L	101	(75%-125%)		06/03/14	12:25
QC1203100091	348682001	SDILT									
Mercury		U	ND	DU	ND	ug/L	N/A	(0%-10%)		06/03/14	12:30

**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, and the sample concentration was <= 5 times the blank concentration.
- 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

July 30, 2014

Rev. 1

**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 348682

Page 2 of 2

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

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

\* Indicates that a Quality Control parameter was not within specifications.

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

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

July 30, 2014

Rev. 1

# General Chem Analysis

# Case Narrative

July 30, 2014

Rev. 1

**General Chemistry Narrative  
Hanford MSA (HMSA)  
SDG GEL348682**

**Method/Analysis Information**

**Product:** Ion Chromatography

**Analytical Batch:** 1387959      **Method:** 9056\_ANIONS\_IC: COMMON (nitrate only)

**Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
348682001	B2W2V5
1203088539	Method Blank (MB)
1203088540	348656002(B2WFM8) Sample Duplicate (DUP)
1203088541	348656002(B2WFM8) Post Spike (PS)
1203088542	Laboratory Control Sample (LCS)
1203088652	348682001(B2W2V5) Sample Duplicate (DUP)
1203088653	348682001(B2W2V5) 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# 22.

**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.

July 30, 2014

Rev. 1

**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: 348656002 (B2WFM8) and 348682001 (B2W2V5).

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

The spike recovery falls outside of the established acceptance limits due to matrix interference: 1203088541 (B2WFM8).

**Duplicate Relative Percent Difference (RPD) Statement**

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

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

The following DER was generated for this SDG: 1293148 1203088653 (B2W2V5).

**Manual Integrations**

Manual integrations were not required for the samples in this SDG.

**Additional Comments**

Additional comments were not required for this SDG.

July 30, 2014

Rev. 1

**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.

July 30, 2014

Rev. 1

**Certification Statement**

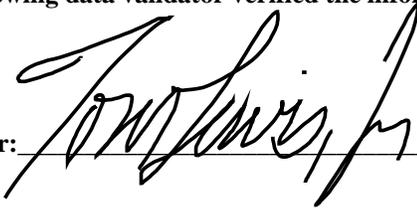
Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

**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:

09Jun14

# Sample Data Summary

July 30, 2014

Rev. 1

**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: GEL348682 GEL Work Order: 348682

**The Qualifiers in this report are defined as follows:**

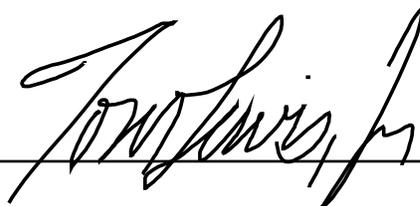
U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

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



---

~~JUL 30 2014~~  
**GEL LABORATORIES LLC**

Rev. 1

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## Certificate of Analysis

Company : CH2MHill Plateau Remediation  
 Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: **CHPRC F14-003**

Report Date: June 9, 2014

Client Sample ID: B2W2V5  
 Lab Sample ID: 348682001  
 Matrix: WATER  
 Collect Date: 12-MAY-14 14:26  
 Receive Date: 14-MAY-14  
 Collector: Client

Project: HMSA00152  
 Client ID: HMSA001  
 Client SDG: GEL348682

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Ion Chromatography</b>												
<i>9056_ANIONS_IC: COMMON (nitrate only) "As Received"</i>												
Nitrate-N	U	ND	33.0	100	250	ug/L	1	MAR105/14/14	15:49	1387959	1	

**The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	SW846 9056A	

# Quality Control Summary

July 30, 2014

Rev. 1

**GEL LABORATORIES LLC**

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

**QC Summary**

Report Date: June 9, 2014

Page 1 of 1

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 348682

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1387959										
QC1203088540	348656002	DUP									
Nitrate-N		U	ND	U	ND	ug/L	N/A		MAR1	05/14/14	14:49
QC1203088652	348682001	DUP									
Nitrate-N		U	ND	U	ND	ug/L	N/A			05/14/14	16:18
QC1203088542	LCS										
Nitrate-N	2500				2470	ug/L	98.7	(90%-110%)		05/14/14	17:48
QC1203088539	MB										
Nitrate-N			U		ND	ug/L				05/14/14	17:18
QC1203088541	348656002	PS									
Nitrate-N	2.50	U	ND		2.37	mg/L	95	(90%-110%)		05/14/14	15:19
QC1203088653	348682001	PS									
Nitrate-N	2.50	U	ND		2.43	mg/L	97.3	(90%-110%)		05/14/14	16:48

**Notes:**

The Qualifiers in this report are defined as follows:

- > Result greater than quantifiable range or greater than upper limit of the analysis range
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank, and the sample concentration was <= 5 times the blank concentration.
- 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

July 30, 2014

DER Report No.: 1293148  
Rev. 1

Revision No.: 1

## DATA EXCEPTION REPORT

<b>Mo.Day Yr.</b> 15-MAY-14	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> IC	<b>Test / Method:</b> SW846 9056A	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> HMSA
<b>Batch ID:</b> 1387959	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 348656(GEL348656),348682(GEL348682)</b>			
<b>Application Issues:</b> Failed Recovery for MS/PS			
<b>Specification and Requirements Exception Description:</b>		<b>DER Disposition:</b>	
1. Failed Recovery for MS/PS:  QC 1203088653PS		1. The MS/PS mixture contains seven anions of interest. Of those, all requested anions except sulfate met normal acceptance criteria for recovery (90 - 110%). This failure is attributed to the matrix of the sample because the successful recovery of the other compounds indicate that the laboratory process was in control. This variance is judged to have no negative impact on the data. The deviation is noted in the Case Narrative and DER, and the data has been reported.	

**Originator's Name:**

Dustin Miller 15-MAY-14

**Data Validator/Group Leader:**

Thomas Lewis 09-JUN-14

# Radiological Analysis

**July 30, 2014**  
**Radiochemistry Case Narrative**  
**Hanford MSA (HMSA)**  
**SDG GEL348682**  
**Work Order 348682**

Rev. 1

**Method/Analysis Information****Product:** TC99\_EIE\_LSC: COMMON

Analytical Method: TC99\_EIE\_LSC

Analytical Batch Number: 1386708

<b>Sample ID</b>	<b>Client ID</b>
348682001	B2W2V5
1203085101	Method Blank (MB)
1203085102	348070004(B2WF26) Sample Duplicate (DUP)
1203085103	Laboratory Control Sample (LCS)

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# 2.

**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: 348070004 (B2WF26).

**QC Information**

All of the QC samples met the required acceptance limits.

July 30, 2014

Rev. 1

**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 batch were recounted.

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

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

**Sample-Specific MDA/MDC**

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

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** TRITIUM\_DIST\_LSC: COMMON  
**Analytical Method:** TRITIUM\_DIST\_LSC  
**Analytical Batch Number:** 1388201

<b>Sample ID</b>	<b>Client ID</b>
348682001	B2W2V5
1203089095	Method Blank (MB)
1203089096	348682001(B2W2V5) Sample Duplicate (DUP)
1203089097	348682001(B2W2V5) Matrix Spike (MS)
1203089098	Laboratory Control Sample (LCS)

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.

July 30, 2014

Rev. 1

**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: 348682001 (B2W2V5).

**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 low 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.

**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.

July 30, 2014

Rev. 1

**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: GEL348682 GEL Work Order: 348682

**The Qualifiers in this report are defined as follows:**

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

**Review/Validation**

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

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

**Signature:****Name: Kate Gellatly****Date: 06 JUN 2014****Title: Analyst I**

# Sample Data Summary

~~JUL 30, 2014~~  
**GEL LABORATORIES LLC**

Rev. 1

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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 F14-003

Report Date: June 6, 2014

Client Sample ID: B2W2V5  
 Sample ID: 348682001  
 Matrix: WATER  
 Collect Date: 12-MAY-14  
 Receive Date: 14-MAY-14  
 Collector: Client

Project: HMSA00152  
 Client ID: HMSA001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Liquid Scintillation Analysis</b>													
<i>TC99_EIE_LSC: COMMON "As Received"</i>													
Technetium-99	U	4.35	+/-3.46	5.72	+/-3.50	15.0	pCi/L		MYM	05/25/14	1708	1386708	1
<i>TRITIUM_DIST_LSC: COMMON "As Received"</i>													
Tritium	U	17.1	+/-48.2	84.6	+/-48.3	100	pCi/L		BYS1	05/22/14	1212	1388201	2

### The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Tc-02-RC Modified
2	EPA 906.0 Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Technetium-99m Tracer	TC99_EIE_LSC: COMMON "As Received"	1386708	96.3	(15%-125%)

### Notes:

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

# Quality Control Data

~~JUL 30, 2014~~  
**GEL LABORATORIES LLC**

Rev. 1

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

**QC Summary**

**Client :** CH2M Hill Plateau Remediation Company  
 MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352

**Contact:** Mr. Scot Fitzgerald

**Workorder:** 348682

**Report Date:** June 6, 2014  
 Page 1 of 2

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Liquid Scintillation</b>									
Batch	1386708								
QC1203085101	MB								
Technetium-99			U	-0.598	pCi/L			MYM1	05/25/1418:04
				Uncert: +/-3.13					
				TPU: +/-3.13					
QC1203085102	348070004	DUP							
Technetium-99		U	-0.659	U	2.57				05/25/1418:35
				Uncert: +/-3.37		RPD: 0	N/A		
				TPU: +/-3.37		RER: 1.28	(0-2)		
QC1203085103	LCS								
Technetium-99		290		274	pCi/L	REC: 95	(80%-120%)		05/25/1419:06
				Uncert: +/-9.58					
				TPU: +/-31.9					
Batch	1388201								
QC1203089095	MB								
Tritium			U	-5.65	pCi/L			BYS1	05/22/1413:45
				Uncert: +/-45.6					
				TPU: +/-45.6					
QC1203089096	348682001	DUP							
Tritium		U	17.1	U	-0.236				05/22/1415:17
				Uncert: +/-48.2		RPD: 0	N/A		
				TPU: +/-48.3		RER: 0.509	(0-2)		
QC1203089097	348682001	MS							
Tritium		1790	U	17.1	1620	pCi/L	REC: 90	(75%-125%)	05/22/1416:50
				Uncert: +/-48.2					
				TPU: +/-48.3					
QC1203089098	LCS								
Tritium		1790		1440	pCi/L	REC: 81	(80%-120%)		05/22/1417:07
				Uncert: +/-265					
				TPU: +/-385					

**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
- > 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  $\geq 2X$  the MDA and, after corrections, result is  $\geq$  MDA for this sample
- C Analyte has been confirmed by GC/MS analysis
- C Target analyte was detected in the sample and the associated blank, and the sample concentration was  $\leq 5$  times the blank concentration.

QC Summary

Workorder: 348682

Page 2 of 2

Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
D						Results are reported from a diluted aliquot of sample.				
E						Concentration exceeds the calibration range of the instrument				
E						Reported value is estimated due to interferences. See comment in narrative.				
J						The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated				
M						Duplicate precision not met.				
N						Spike Sample recovery is outside control limits.				
P						Aroclor target analyte with greater than 25% difference between column analyses.				
S						Reported value determined by the Method of Standard Additions (MSA)				
T						Spike and/or spike duplicate sample recovery is outside control limits.				
U						Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.				
W						Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.				
X						Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier				
Y						Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier				
Z						Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier				
o						Analyte failed to recover within LCS limits (Organics only)				

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

\*\* Indicates analyte is a surrogate compound.

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

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

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