



August 12, 2014

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

Re: CHPRC SAF W14-005
Work Order: 348882
SDG: GEL348882

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on May 16, 2014. This revised data report has been prepared and reviewed in accordance with GEL's standard operating procedures. This data package was revised per P&D: Samples B2WB68 and B2WB74 need to have 8270 compound Diphenylamine reported as Diphenylamine + N-Nitrosodiphenylamine.

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: W14-005-040, W14-005-041, W14-005-114 and W14-005-115
Enclosures



Table of Contents

Case Narrative.....1

Chain of Custody and Supporting Documentation.....4

Problem and Discrepancy Report.....11

Sample Issue Resolution.....13

Data Review Qualifier Definitions.....15

Laboratory Certifications.....17

Semi-Volatile Analysis.....19

 Case Narrative.....20

 Sample Data Summary.....26

 Quality Control Summary.....35

Metals Analysis.....45

 Case Narrative.....46

 Sample Data Summary.....51

 Quality Control Summary.....57

General Chem Analysis.....64

 Case Narrative.....65

 Sample Data Summary.....81

 Quality Control Summary.....87

Case Narrative

August 19, 2014

Rev. 1

This data package was revised per P&D: Samples B2WB68 and B2WB74 need to have 8270 compound Diphenylamine reported as Diphenylamine + N-Nitrosodiphenylamine.

**General Narrative
for
Hanford MSA (51204)
CHPRC SAF W14-005
SDG: GEL348882**

August 12, 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 16, 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. Please see the enclosed SIR.

Items of Note All samples were received and analyzed within hold time.

Sample Identification

The laboratory received the following samples:

<u>Laboratory Identification</u>	<u>Sample Description</u>
348882001	B2WB69
348882002	B2WB68
348882003	B2WB74
348882004	B2WB75
348882005	B2WFK1
348882006	B2WFK2
348882007	FILTER BLANK

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.

August 19, 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 Semivolatile, General Chemistry and Metals. 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

348882

CH2M Hill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. #

W14-005-040

Page 1 of 1

Collector: MA White
 CHPRC
 SAF No.: W14-005
 Project Title: RCRA, MAY 2014
 Shipped To (Lab): GEL Laboratories, LLC
 Protocol: RCRA

Contact/Requester: Karen Waters-Husted
 Telephone No.: 509-376-4650
 Sampling Origin: Hanford Site
 Purchase Order/Charge Code: 300071ES20
 Logbook No.: HNF-N-506 64/35
 Ice Chest No.: 6205-192
 Method of Shipment: Commercial Carrier
 Bill of Lading/Air Bill No.: 7988 7691 4808
 Priority: 30 Days
 Offsite Property No.: 4800

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
B2WB69	Y	5-15-14	0854	1x500-mL G/P	6010_METALS_ICP: COMMON	6 Months	HNO3 to pH <2
B2WB69 *	Y			1x500-mL G	7470_MERCURY_CV: COMMON (AQUEOUS)	28 Days	HNO3 to pH <2
B2WB68	N			1x250-mL G/P	2320_ALKALINITY: GW 01	14 Days	Cool <=6C
B2WB68	N			1x500-mL G/P	350.1_AMMONIA: COMMON	28 Days	H2SO4 to pH <2/Cool <=6C
B2WB68	N			1x500-mL G/P	6010_METALS_ICP: COMMON	6 Months	HNO3 to pH <2
B2WB68	N			1x500-mL G	7470_MERCURY_CV: COMMON (AQUEOUS)	28 Days	HNO3 to pH <2
B2WB68	N			4x1-L aG	8270_SVOA_GCMS_IX: COMMON REV 1	7/40 Days	Cool <=6C
B2WB68	N			1x250-mL G/P	9012_CYANIDE: COMMON	14 Days	NaOH to pH >=12/Cool <=6C
B2WB68	N	5-15-14	0854	1x250-mL aG	9060_TOC: COMMON	28 Days	HCl or H2SO4 to pH <2/Cool <=6C
B2WB68	N			1x20-mL P	Activity Scan	6 Months	None

* Sample not filtered

Relinquished By: MA White	Print	Sign	Date/Time	Received By: Fulton	Print	Sign	Date/Time
CHPRC			MAY 15 2014 1145	Fulton			MAY 15 2014 1145
Relinquished By: Fulton	Print	Sign	Date/Time	Received By: Fulton	Print	Sign	Date/Time
			1400	Fulton			
Relinquished By: FedEx	Print	Sign	Date/Time	Received By: P. Went	Print	Sign	Date/Time
			5-15-14	P. Went			16-14 0900
Relinquished By:	Print	Sign	Date/Time	Received By:	Print	Sign	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process)			Disposed By:			
PRINTED O 4/21/2014				A-6004-842 (REV 2)			

August 19, 2014

Rev. 1

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # **W14-005-041**

Page 1 of 1

Collector: **MA White CHPRC**

SAF No.: **W14-005**

Project Title: **RCRA, MAY 2014**

Shipped To (Lab): **GEL Laboratories, LLC**

Protocol: **RCRA**

Contact/Requester: **Karen Waters-Husted**

Telephone No.: **509-376-4650**

Sampling Origin: **Hanford Site**

Purchase Order/Charge Code: **300071ES20**

Logbook No.: **HNF-N-506 641 35**

Ice Chest No.: **7ws-192**

Method of Shipment: **Commercial Carrier**

Bill of Lading/Air Bill No.: **79887691 4808**

Priority: **30 Days PRIORITY**

Offsite Property No.: **4800**

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
B2WB74	N	W	5-15-14	1101	1x250-mL G/P	2320_ALKALINITY: GW 01	14 Days	Cool <=6C
B2WB74	N	W			1x500-mL G/P	350.1_AMMONIA: COMMON	28 Days	H2SO4 to pH <2/Cool <=6C
B2WB74	N	W			1x500-mL G/P	6010_METALS_JCP: COMMON	6 Months	HNO3 to pH <2
B2WB74	N	W			1x500-mL G	7470_MERCURY_CV: COMMON (AQUEOUS)	28 Days	HNO3 to pH <2
B2WB74	N	W			4x1-L aG	8270_SVOA_GCMS_IX: COMMON REV 1	7/40 Days	Cool <=6C
B2WB74	N	W			1x250-mL G/P	9012_CYANIDE: COMMON	14 Days	NaOH to pH >=12/Cool <=6C
B2WB74	N	W			1x250-mL aG	9060_TOC: COMMON	28 Days	HCl or H2SO4 to pH <2/Cool <=6C
B2WB74	N	W			1x20-mL P	Activity Scan	6 Months	None
B2WB75	Y	W	5-15-14	1101	1x500-mL G/P	6010_METALS_JCP: COMMON	6 Months	HNO3 to pH <2
B2WB75	Y	W	5-15-14	1101	1x500-mL G	7470_MERCURY_CV: COMMON (AQUEOUS)	28 Days	HNO3 to pH <2

Relinquished By: **MA White CHPRC** Date/Time: **MAY 15 2014 1145** Sign: *[Signature]* Print: *[Signature]*

Received By: **Patricia Bent** Date/Time: **MAY 15 2014 1145** Sign: *[Signature]* Print: *[Signature]*

Relinquished By: **MA White CHPRC** Date/Time: **5-15-14** Sign: *[Signature]* Print: *[Signature]*

Received By: **Patricia Bent** Date/Time: **5-16-14 0900** Sign: *[Signature]* Print: *[Signature]*

Relinquished By: **FedEx** Date/Time: **5-15-14** Sign: *[Signature]* Print: *[Signature]*

Received By: **Patricia Bent** Date/Time: **5-16-14 0900** Sign: *[Signature]* Print: *[Signature]*

FINAL SAMPLE DISPOSITION

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

Disposed By: _____ Date/Time: _____

PRINTED ON 4/21/2014

Page 6 of 91

A-5004-842 (REV 2)

85 165

CH2M Hill Plateau Remediation Company

C.O.C. # **W14-005-114**
Page 1 of 1

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Contact/Requester: Karen Waters-Husted Telephone No. 509-376-4650
 Sampling Origin: Hanford Site Purchase Order/Charge Code: 30007IES20
 Logbook No. HNF-N-506 64135 Ice Chest No. GWS-192
 Method of Shipment: Commercial Carrier Bill of Lading/Air Bill No. 79887691 4808
 Priority: 30 Days Hold Time: 4800

SPECIAL INSTRUCTIONS Hold Time: Total Activity Exemption: Yes No

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

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B2WFK1	N	W	5-15-14	0854	1x250-mL G/P	9056_ANIONS_IC: COMMON	28 Days/48 Hours	Cool <=6C
B2WFK1	N	W	KS 5/13/14		1x20-ml-P	Activity Scan	6 Months	None

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix *
M. White	<i>M. White</i>	<i>[Signature]</i>	MAY 15 2014 1145	[Signature]	<i>[Signature]</i>		MAY 15 2014 1145	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
[Signature]	<i>[Signature]</i>	<i>[Signature]</i>	5-15-14 1400	FED EX	<i>[Signature]</i>			
[Signature]	<i>[Signature]</i>	<i>[Signature]</i>		[Signature]	<i>[Signature]</i>			
[Signature]	<i>[Signature]</i>	<i>[Signature]</i>		[Signature]	<i>[Signature]</i>			

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

Disposed By: _____ Date/Time: _____

PRINTED ON 4/21/2014

A-6004-842 (REV 2)

CH2M Hill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # **W14-005-115**
Page 1 of 1

Collector: **MA White CHPRC**
SAF No.: **W14-005**
Project Title: **RCRA, MAY 2014**
Shipped To (Lab): **GEL Laboratories, LLC**
Protocol: **RCRA**

Contact/Requester: **Karen Waters-Husted**
Telephone No.: **509-376-4650**
Sampling Origin: **Hanford Site**
Purchase Order/Charge Code: **300071ES20**
Logbook No.: **HNF-N-506 64135**
Ice Chest No.: **625-192**
Method of Shipment: **Commercial Carrier**
Bill of Lading/Air Bill No.: **798876914808**
Priority: **30 Days**
Offsite Property No.: **4800**

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: **PRIORITY**
Hold Time: **28 Days/48 Hours**
Total Activity Exemption: Yes No

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B2WFK2	N	W	5-15-14	1101	1x250-mL G/P	9056_ANIONS_IC: COMMON	28 Days/48 Hours	Cool <=6C
B2WFK2	N	W	KS 5/13/14		1x20-mL P	Activity Scan	6 Months	None

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix *
MA White	MA White	[Signature]	MAY 15 2014 1145	CHPRC	[Signature]	[Signature]	MAY 15 2014 1145	S = Soil, SE = Sediment, SO = Solid, SL = Sludge, W = Water, O = Oil, A = Air, DS = Drum Solids, DL = Drum Liquids, T = Tissue, WI = Wipe, L = Liquid, V = Vegetation, X = Other
Relinquished By	[Signature]	[Signature]	5-15-14 1460	FedEx	[Signature]	[Signature]	5-16-14 0900	
Relinquished By	FedEx	[Signature]		Received By				
FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process)			Disposed By		Date/Time		

PRINTED ON 4/21/2014

A-6004-842 (REV 2)

August 19, 2014

Client: HMSA		SDG/AR/COC/Work Order: 348873 348882	
Received By: P. Rent		Date Received: 5-16-14	
Suspected Hazard Information		Yes	No
COC/Samples marked as radioactive?			<input checked="" type="checkbox"/>
Classified Radioactive II or III by RSO?			<input checked="" type="checkbox"/>
COC/Samples marked containing PCBs?			<input checked="" type="checkbox"/>
Package, COC, and/or Samples marked as beryllium or asbestos containing?			<input checked="" type="checkbox"/>
Shipped as a DOT Hazardous?			<input checked="" type="checkbox"/>
Samples identified as Foreign Soil?			<input checked="" type="checkbox"/>

*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.

Maximum Net Counts Observed* (Observed Counts - Area Background Counts): **0CPM**

If yes, Were swipes taken of sample containers < action levels?

If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.

Hazard Class Shipped: UN#:

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: <u>Ice bags</u> Blue ice Dry ice None Other (describe) Ice *all temperatures are recorded in Celsius
2a	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: Secondary Temperature Device Serial # (If Applicable): 130462966
3	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4	Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	VOA vials free of headspace (defined as < 6mm bubble)?		<input checked="" type="checkbox"/>		Sample ID's and containers affected:
7	Are Encore containers present?			<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
11	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
12	Are sample containers identifiable as GEL provided?		<input checked="" type="checkbox"/>		clients
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 (circled) FedEx Ground UPS Field Services Courier Other 7988 7691 4808 7988 7704 5697

Comments (Use Continuation Form if needed):

August 19, 2014

Rev. 1

Subject: W14-005-040**From:** "Waters-husted, Karen S" <Karen_S_Waters-husted@rl.gov>**Date:** 5/15/2014 6:20 PM**To:** "Heather Shaffer (heather.shaffer@gel.com)" <heather.shaffer@gel.com>**CC:** "Puckett, Susan" <Susan_Puckett@rl.gov>

Heather,

Sample number B2EB69 on chain of custody W14-005-040 was supposed to be filtered in the field. (Metals) The samplers forgot to filter it. When you get it, can you please filter it prior to running it?

When it comes in, please fill out a SIR for it and we will approve the direction to filter it.

Please call if you have any questions.

Thank you.

Karen Waters-Husted

CH2MHill Plateau Remediation Company

Sample Management and Reporting

Groundwater Project Coordinator

200 East / MO-277 / 108

509-376-4650

Karen_S_Waters-husted@rl.gov

Problem and Discrepancy Report

August 19, 2014

Rev. 1

Problem and Discrepancy Report**GEL****SDG GEL348882****8/5/2014**

1. The data package has the following issues:

Samples B2WB68 and B2WB74 need to have 8270 compound Diphenylamine reported as "Diphenylamine + N-Nitrosodiphenylamine". The CAS # also needs to be corrected to the pseudo –CAS DPA+NNDPA in the EDD. Please revise the hardcopy report and EDD.

Resolution: *Provide correction.*

Lab Response:

The lab will reissue the report with the corrected compound name as listed above. A revised EDD will be submitted.

Provide a resolution to each issue noted on the report

Page 1 of 1

Sample Issue Resolution

August 19, 2014

Rev. 1

SAMPLE ISSUE RESOLUTION

SIR NUM SDR14-171
REV NUM 0
DATE INITIATED 5/16/2014

SAMPLE EVENT INFORMATION

SAF NUM(S) W14-005
OPERABLE UNIT(S) NONE
PROJECT(S) RCRA14
SAMPLE EVENT TITLE(S) RCRA14
LABORATORY GEL Laboratories, LLC

SAMPLING INFORMATION

NUMBER OF SAMPLES 1
SAMPLE NUMBERS B2WB69
SAMPLE MATRIX WATER
COLLECTION DATE -
SDG NUM

ISSUE BACKGROUND

CLASS Field Sampling Issue
TYPE Incorrect Sample Preservation
DESCRIPTION The Hg container for sample ID B2WB69 was not filtered in the field.

DISPOSITION

DESCRIPTION PROPOSED DISPOSITION: GEL will filter the sample prior to analysis.
JUSTIFICATION ACCEPTED DISPOSITION: Accept the proposed resolution.

SUBMITTED BY: Heather Shaffer/GEL Date: 5/16/14
ACCEPTED BY: Karen Waters-Husted/CHPRC 5/16/14

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, and the sample concentration was ≤ 5 times the blank concentration.	Y	Inorganics	Metals	Replaces B Blank Detection
C	Programmed	Target analyte was detected in the sample and the associated blank, and the sample concentration was ≤ 5 times the blank concentration.	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

August 19, 2014

Rev. 1

List of current GEL Certifications as of 12 August 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

Semi-Volatile Analysis

Case Narrative

August 19, 2014
Semi-Volatile Case Narrative
Hanford MSA (HMSA)
SDG GEL348882

Rev. 1

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: 1389407

Prep Batch Number: 1389404

Sample Analysis

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

Sample ID	Client ID
348882002	B2WB68
348882003	B2WB74
1203092255	Method Blank (MB)
1203092256	Laboratory Control Sample (LCS)
1203092257	348967002(B2WB95) Matrix Spike (MS)
1203092258	348967002(B2WB95) 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

August 19, 2014

Rev. 1

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 Calibration Verification Standards (CCV) did not meet the acceptance criteria as outlined in Method 8270D. However, the method allows for a designated number of outliers dependent on the requested analyte list. This SDG satisfied the 8270D outlier acceptance criteria. Detected concentrations of these analytes should be considered as estimated.

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 348967002 (B2WB95) 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

August 19, 2014

Rev. 1

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

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.

Manual Integrations

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

TIC Comment

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

Additional Comments

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

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

Electronic Package Comment

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

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

System Configuration

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

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

August 19, 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.

August 19, 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: GEL348882 GEL Work Order: 348882

The Qualifiers in this report are defined as follows:

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

DL Indicates that sample is diluted.

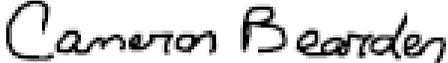
RA Indicates that sample is re-analyzed without re-extraction.

RE Indicates that sample is re-extracted.

Review/Validation

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

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

Signature: 

Name: Cameron Bearden

Date: 14 AUG 2014

Title: Group Leader

Sample Data Summary

~~August 19, 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 SAF W14-005**

Report Date: August 14, 2014

Client Sample ID: B2WB68
 Lab Sample ID: 348882002
 Matrix: WATER
 Collect Date: 15-MAY-14 08:54
 Receive Date: 16-MAY-14
 Collector: Client

Project: HMSA00148
 Client ID: HMSA001
 Client SDG: GEL348882

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatile-GC/MS												
<i>8270_SVOA_GCMS_IX:COMMON "As Received"</i>												
1,2,4,5-Tetrachlorobenzene	U	ND	3.00	10.0	10.0	ug/L	1	JLD1	05/21/14	18:32	1389407	1
1,2,4-Trichlorobenzene	U	ND	3.00	10.0	10.0	ug/L	1					
1,2-Dichlorobenzene	U	ND	3.00	10.0	10.0	ug/L	1					
1,3,5-Trinitrobenzene	U	ND	3.00	10.0	10.0	ug/L	1					
1,3-Dichlorobenzene	U	ND	3.00	10.0	10.0	ug/L	1					
1,4-Dichlorobenzene	U	ND	3.00	10.0	10.0	ug/L	1					
1,4-Dioxane	U	ND	3.00	10.0	10.0	ug/L	1					
1,4-Naphthoquinone	U	ND	3.00	10.0	10.0	ug/L	1					
1-Naphthylamine	U	ND	3.00	10.0	10.0	ug/L	1					
2,3,4,6-Tetrachlorophenol	U	ND	3.00	10.0	10.0	ug/L	1					
2,4,5-Trichlorophenol	U	ND	3.00	10.0	10.0	ug/L	1					
2,4,6-Trichlorophenol	U	ND	3.00	10.0	10.0	ug/L	1					
2,4-Dichlorophenol	U	ND	3.00	10.0	10.0	ug/L	1					
2,4-Dimethylphenol	U	ND	3.00	10.0	10.0	ug/L	1					
2,4-Dinitrophenol	U	ND	5.00	20.0	20.0	ug/L	1					
2,4-Dinitrotoluene	U	ND	3.00	10.0	10.0	ug/L	1					
2,6-Dichlorophenol	U	ND	3.00	10.0	10.0	ug/L	1					
2,6-Dinitrotoluene	U	ND	3.00	10.0	10.0	ug/L	1					
2-Acetylaminofluorene	U	ND	3.00	10.0	10.0	ug/L	1					
2-Chloronaphthalene	U	ND	0.410	1.00	1.00	ug/L	1					
2-Chlorophenol	U	ND	3.00	10.0	10.0	ug/L	1					
2-Methylnaphthalene	U	ND	0.300	1.00	1.00	ug/L	1					
2-Naphthylamine	U	ND	3.00	10.0	10.0	ug/L	1					
2-Nitrophenol	U	ND	3.00	10.0	10.0	ug/L	1					
2-Picoline	U	ND	3.00	10.0	10.0	ug/L	1					
3,3'-Dichlorobenzidine	U	ND	3.00	10.0	10.0	ug/L	1					
3,3'-Dimethylbenzidine	U	ND	3.30	10.0	10.0	ug/L	1					
3-Methylcholanthrene	U	ND	3.00	10.0	10.0	ug/L	1					
4-Aminobiphenyl	U	ND	3.00	10.0	10.0	ug/L	1					
4-Bromophenylphenylether	U	ND	3.00	10.0	10.0	ug/L	1					
4-Chloro-3-methylphenol	U	ND	3.00	10.0	10.0	ug/L	1					
4-Chloroaniline	U	ND	3.30	10.0	10.0	ug/L	1					
4-Chlorophenylphenylether	U	ND	3.00	10.0	10.0	ug/L	1					
4-Nitrophenol	U	ND	3.00	10.0	10.0	ug/L	1					
5-Nitro-o-toluidine	U	ND	3.00	10.0	10.0	ug/L	1					

~~August 19, 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 SAF W14-005**

Report Date: August 14, 2014

Client Sample ID: B2WB68
 Lab Sample ID: 348882002

Project: HMSA00148
 Client ID: HMSA001
 Client SDG: GEL348882

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatile-GC/MS												
<i>8270_SVOA_GCMS_IX:COMMON "As Received"</i>												
7,12-Dimethylbenz(a)anthracene	U	ND	3.00	10.0	10.0	ug/L	1					
Acenaphthene	U	ND	0.300	1.00	1.00	ug/L	1					
Acenaphthylene	U	ND	0.300	1.00	1.00	ug/L	1					
Acetophenone	U	ND	3.00	10.0	10.0	ug/L	1					
Aniline	U	ND	4.20	10.0	10.0	ug/L	1					
Anthracene	U	ND	0.300	1.00	1.00	ug/L	1					
Aramite	U	ND	3.70	10.0	10.0	ug/L	1					
Benzo(a)anthracene	U	ND	0.300	1.00	1.00	ug/L	1					
Benzo(a)pyrene	U	ND	0.300	1.00	1.00	ug/L	1					
Benzo(b)fluoranthene	U	ND	0.300	1.00	1.00	ug/L	1					
Benzo(ghi)perylene	U	ND	0.300	1.00	1.00	ug/L	1					
Benzo(k)fluoranthene	U	ND	0.300	1.00	1.00	ug/L	1					
Benzyl alcohol	U	ND	3.00	10.0	10.0	ug/L	1					
Butylbenzylphthalate	U	ND	3.00	10.0	10.0	ug/L	1					
Carbazole	U	ND	0.300	1.00	1.00	ug/L	1					
Chlorobenzilate	U	ND	3.00	10.0	10.0	ug/L	1					
Chrysene	U	ND	0.300	1.00	1.00	ug/L	1					
Di-n-butylphthalate	U	ND	3.00	10.0	10.0	ug/L	1					
Di-n-octylphthalate	U	ND	3.00	10.0	10.0	ug/L	1					
Diallate	U	ND	3.00	10.0	10.0	ug/L	1					
Dibenzo(a,h)anthracene	U	ND	0.300	1.00	1.00	ug/L	1					
Dibenzofuran	U	ND	3.00	10.0	10.0	ug/L	1					
Diethylphthalate	U	ND	3.00	10.0	10.0	ug/L	1					
Dimethoate	U	ND	3.00	10.0	10.0	ug/L	1					
Dimethylphthalate	U	ND	3.00	10.0	10.0	ug/L	1					
Dinoseb	U	ND	3.00	10.0	10.0	ug/L	1					
diphenylamine+N-nitrosodiphenylamine	U	ND	3.00	10.0	10.0	ug/L	1					
Disulfoton	U	ND	3.00	10.0	10.0	ug/L	1					
Ethyl Methanesulfonate	U	ND	3.00	10.0	10.0	ug/L	1					
Famphur	U	ND	5.00	10.0	10.0	ug/L	1					
Fluoranthene	U	ND	0.300	1.00	1.00	ug/L	1					
Fluorene	U	ND	0.300	1.00	1.00	ug/L	1					
Hexachlorobenzene	U	ND	3.00	10.0	10.0	ug/L	1					
Hexachlorobutadiene	U	ND	3.00	10.0	10.0	ug/L	1					
Hexachlorocyclopentadiene	U	ND	3.00	10.0	10.0	ug/L	1					
Hexachloroethane	U	ND	3.00	10.0	10.0	ug/L	1					
Hexachlorophene	U	ND	167	500	500	ug/L	1					

August 19, 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 SAF W14-005**

Report Date: August 14, 2014

Client Sample ID: B2WB68
 Lab Sample ID: 348882002

Project: HMSA00148
 Client ID: HMSA001

Client SDG: GEL348882

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatile-GC/MS												
<i>8270_SVOA_GCMS_IX:COMMON "As Received"</i>												
Hexachloropropene	U	ND	3.00	10.0	10.0	ug/L	1					
Indeno(1,2,3-cd)pyrene	U	ND	0.300	1.00	1.00	ug/L	1					
Isodrin	U	ND	3.00	10.0	10.0	ug/L	1					
Isophorone	U	ND	3.50	10.0	10.0	ug/L	1					
Isosafrole	U	ND	3.00	10.0	10.0	ug/L	1					
Kepone	U	ND	3.00	10.0	10.0	ug/L	1					
Methapyrilene	U	ND	3.00	10.0	10.0	ug/L	1					
Methyl methanesulfonate	U	ND	3.00	10.0	10.0	ug/L	1					
Methyl parathion	U	ND	3.00	10.0	10.0	ug/L	1					
N-Methyl-N-nitrosomethylamine	U	ND	3.00	10.0	10.0	ug/L	1					
N-Nitrosodi-n-butylamine	U	ND	3.00	10.0	10.0	ug/L	1					
N-Nitrosodiethylamine	U	ND	3.00	10.0	10.0	ug/L	1					
N-Nitrosodipropylamine	U	ND	3.00	10.0	10.0	ug/L	1					
N-Nitrosomethylethylamine	U	ND	3.00	10.0	10.0	ug/L	1					
N-Nitrosomorpholine	U	ND	3.00	10.0	10.0	ug/L	1					
N-Nitrosopiperidine	U	ND	3.00	10.0	10.0	ug/L	1					
Naphthalene	U	ND	0.300	1.00	1.00	ug/L	1					
Nitrobenzene	U	ND	3.00	10.0	10.0	ug/L	1					
Parathion	U	ND	3.00	10.0	10.0	ug/L	1					
Pentachlorobenzene	U	ND	3.00	10.0	10.0	ug/L	1					
Pentachloronitrobenzene	U	ND	3.40	10.0	10.0	ug/L	1					
Pentachlorophenol	U	ND	3.00	10.0	10.0	ug/L	1					
Phenacetin	U	ND	3.00	10.0	10.0	ug/L	1					
Phenanthrene	U	ND	0.300	1.00	1.00	ug/L	1					
Phenol	U	ND	3.00	10.0	10.0	ug/L	1					
Phorate	U	ND	3.00	10.0	10.0	ug/L	1					
Pronamide	U	ND	3.00	10.0	10.0	ug/L	1					
Pyrene	U	ND	0.300	1.00	1.00	ug/L	1					
Pyridine	U	ND	3.00	10.0	10.0	ug/L	1					
Safrole	U	ND	3.00	10.0	10.0	ug/L	1					
Sulfotepp	U	ND	3.00	10.0	10.0	ug/L	1					
Triethylphosphorothioate	U	ND	3.00	10.0	10.0	ug/L	1					
a,a-Dimethylphenethylamine	U	ND	5.40	10.0	10.0	ug/L	1					
bis(2-Chloroethoxy)methane	U	ND	3.00	10.0	10.0	ug/L	1					
bis(2-Chloroethyl) ether	U	ND	3.00	10.0	10.0	ug/L	1					
bis(2-Ethylhexyl)phthalate	U	ND	3.00	10.0	10.0	ug/L	1					
m,p-Cresols	U	ND	3.70	10.0	10.0	ug/L	1					
m-Dinitrobenzene	U	ND	3.00	10.0	10.0	ug/L	1					

August 19, 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 SAF W14-005**

Report Date: August 14, 2014

Client Sample ID: B2WB68
 Lab Sample ID: 348882002

Project: HMSA00148
 Client ID: HMSA001
 Client SDG: GEL348882

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatile-GC/MS												
<i>8270_SVOA_GCMS_IX:COMMON "As Received"</i>												
o-Cresol	U	ND	3.00	10.0	10.0	ug/L	1					
o-Toluidine	U	ND	3.00	10.0	10.0	ug/L	1					
p-(Dimethylamino)azobenzene	U	ND	3.00	10.0	10.0	ug/L	1					
p-Phenylenediamine	U	ND	100	500	500	ug/L	1					

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3510C	3510C BNA Liq. Prep-8270 Analysis	DXF4	05/21/14	0530	1389404

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 3510C/8270D	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
2,4,6-Tribromophenol	8270_SVOA_GCMS_IX:COMMON "As Received"	75.3 ug/L	100	75.3	(26%-129%)
2-Fluorophenol	8270_SVOA_GCMS_IX:COMMON "As Received"	40.0 ug/L	100	40.0	(10%-78%)
Phenol-d5	8270_SVOA_GCMS_IX:COMMON "As Received"	26.3 ug/L	100	26.3	(10%-104%)
2-Fluorobiphenyl	8270_SVOA_GCMS_IX:COMMON "As Received"	39.2 ug/L	50.0	78.4	(32%-102%)
Nitrobenzene-d5	8270_SVOA_GCMS_IX:COMMON "As Received"	42.7 ug/L	50.0	85.4	(36%-125%)
p-Terphenyl-d14	8270_SVOA_GCMS_IX:COMMON "As Received"	19.3 ug/L	50.0	38.5	(34%-135%)

August 19, 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 SAF W14-005**

Report Date: August 14, 2014

Client Sample ID: B2WB74
 Lab Sample ID: 348882003
 Matrix: WATER
 Collect Date: 15-MAY-14 11:01
 Receive Date: 16-MAY-14
 Collector: Client

Project: HMSA00148
 Client ID: HMSA001
 Client SDG: GEL348882

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatile-GC/MS												
<i>8270_SVOA_GCMS_IX:COMMON "As Received"</i>												
1,2,4,5-Tetrachlorobenzene	U	ND	2.88	9.62	9.62	ug/L	1	JLD1	05/21/14	19:01	1389407	1
1,2,4-Trichlorobenzene	U	ND	2.88	9.62	9.62	ug/L	1					
1,2-Dichlorobenzene	U	ND	2.88	9.62	9.62	ug/L	1					
1,3,5-Trinitrobenzene	U	ND	2.88	9.62	9.62	ug/L	1					
1,3-Dichlorobenzene	U	ND	2.88	9.62	9.62	ug/L	1					
1,4-Dichlorobenzene	U	ND	2.88	9.62	9.62	ug/L	1					
1,4-Dioxane	U	ND	2.88	9.62	9.62	ug/L	1					
1,4-Naphthoquinone	U	ND	2.88	9.62	9.62	ug/L	1					
1-Naphthylamine	U	ND	2.88	9.62	9.62	ug/L	1					
2,3,4,6-Tetrachlorophenol	U	ND	2.88	9.62	9.62	ug/L	1					
2,4,5-Trichlorophenol	U	ND	2.88	9.62	9.62	ug/L	1					
2,4,6-Trichlorophenol	U	ND	2.88	9.62	9.62	ug/L	1					
2,4-Dichlorophenol	U	ND	2.88	9.62	9.62	ug/L	1					
2,4-Dimethylphenol	U	ND	2.88	9.62	9.62	ug/L	1					
2,4-Dinitrophenol	U	ND	4.81	19.2	19.2	ug/L	1					
2,4-Dinitrotoluene	U	ND	2.88	9.62	9.62	ug/L	1					
2,6-Dichlorophenol	U	ND	2.88	9.62	9.62	ug/L	1					
2,6-Dinitrotoluene	U	ND	2.88	9.62	9.62	ug/L	1					
2-Acetylaminofluorene	U	ND	2.88	9.62	9.62	ug/L	1					
2-Chloronaphthalene	U	ND	0.394	0.962	0.962	ug/L	1					
2-Chlorophenol	U	ND	2.88	9.62	9.62	ug/L	1					
2-Methylnaphthalene	U	ND	0.288	0.962	0.962	ug/L	1					
2-Naphthylamine	U	ND	2.88	9.62	9.62	ug/L	1					
2-Nitrophenol	U	ND	2.88	9.62	9.62	ug/L	1					
2-Picoline	U	ND	2.88	9.62	9.62	ug/L	1					
3,3'-Dichlorobenzidine	U	ND	2.88	9.62	9.62	ug/L	1					
3,3'-Dimethylbenzidine	U	ND	3.17	9.62	9.62	ug/L	1					
3-Methylcholanthrene	U	ND	2.88	9.62	9.62	ug/L	1					
4-Aminobiphenyl	U	ND	2.88	9.62	9.62	ug/L	1					
4-Bromophenylphenylether	U	ND	2.88	9.62	9.62	ug/L	1					
4-Chloro-3-methylphenol	U	ND	2.88	9.62	9.62	ug/L	1					
4-Chloroaniline	U	ND	3.17	9.62	9.62	ug/L	1					
4-Chlorophenylphenylether	U	ND	2.88	9.62	9.62	ug/L	1					
4-Nitrophenol	U	ND	2.88	9.62	9.62	ug/L	1					
5-Nitro-o-toluidine	U	ND	2.88	9.62	9.62	ug/L	1					

August 19, 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 SAF W14-005**

Report Date: August 14, 2014

Client Sample ID: B2WB74
 Lab Sample ID: 348882003

Project: HMSA00148
 Client ID: HMSA001
 Client SDG: GEL348882

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatile-GC/MS												
<i>8270_SVOA_GCMS_IX:COMMON "As Received"</i>												
7,12-Dimethylbenz(a)anthracene	U	ND	2.88	9.62	9.62	ug/L	1					
Acenaphthene	U	ND	0.288	0.962	0.962	ug/L	1					
Acenaphthylene	U	ND	0.288	0.962	0.962	ug/L	1					
Acetophenone	U	ND	2.88	9.62	9.62	ug/L	1					
Aniline	U	ND	4.04	9.62	9.62	ug/L	1					
Anthracene	U	ND	0.288	0.962	0.962	ug/L	1					
Aramite	U	ND	3.56	9.62	9.62	ug/L	1					
Benzo(a)anthracene	U	ND	0.288	0.962	0.962	ug/L	1					
Benzo(a)pyrene	U	ND	0.288	0.962	0.962	ug/L	1					
Benzo(b)fluoranthene	U	ND	0.288	0.962	0.962	ug/L	1					
Benzo(ghi)perylene	U	ND	0.288	0.962	0.962	ug/L	1					
Benzo(k)fluoranthene	U	ND	0.288	0.962	0.962	ug/L	1					
Benzyl alcohol	U	ND	2.88	9.62	9.62	ug/L	1					
Butylbenzylphthalate	U	ND	2.88	9.62	9.62	ug/L	1					
Carbazole	U	ND	0.288	0.962	0.962	ug/L	1					
Chlorobenzilate	U	ND	2.88	9.62	9.62	ug/L	1					
Chrysene	U	ND	0.288	0.962	0.962	ug/L	1					
Di-n-butylphthalate	U	ND	2.88	9.62	9.62	ug/L	1					
Di-n-octylphthalate	U	ND	2.88	9.62	9.62	ug/L	1					
Diallate	U	ND	2.88	9.62	9.62	ug/L	1					
Dibenzo(a,h)anthracene	U	ND	0.288	0.962	0.962	ug/L	1					
Dibenzofuran	U	ND	2.88	9.62	9.62	ug/L	1					
Diethylphthalate	U	ND	2.88	9.62	9.62	ug/L	1					
Dimethoate	U	ND	2.88	9.62	9.62	ug/L	1					
Dimethylphthalate	U	ND	2.88	9.62	9.62	ug/L	1					
Dinoseb	U	ND	2.88	9.62	9.62	ug/L	1					
diphenylamine+N-nitrosodiphenylamine	U	ND	2.88	9.62	9.62	ug/L	1					
Disulfoton	U	ND	2.88	9.62	9.62	ug/L	1					
Ethyl Methanesulfonate	U	ND	2.88	9.62	9.62	ug/L	1					
Famphur	U	ND	4.81	9.62	9.62	ug/L	1					
Fluoranthene	U	ND	0.288	0.962	0.962	ug/L	1					
Fluorene	U	ND	0.288	0.962	0.962	ug/L	1					
Hexachlorobenzene	U	ND	2.88	9.62	9.62	ug/L	1					
Hexachlorobutadiene	U	ND	2.88	9.62	9.62	ug/L	1					
Hexachlorocyclopentadiene	U	ND	2.88	9.62	9.62	ug/L	1					
Hexachloroethane	U	ND	2.88	9.62	9.62	ug/L	1					
Hexachlorophene	U	ND	161	481	481	ug/L	1					

August 19, 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 SAF W14-005**

Report Date: August 14, 2014

Client Sample ID: B2WB74
 Lab Sample ID: 348882003

Project: HMSA00148
 Client ID: HMSA001

Client SDG: GEL348882

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatile-GC/MS												
<i>8270_SVOA_GCMS_IX:COMMON "As Received"</i>												
Hexachloropropene	U	ND	2.88	9.62	9.62	ug/L	1					
Indeno(1,2,3-cd)pyrene	U	ND	0.288	0.962	0.962	ug/L	1					
Isodrin	U	ND	2.88	9.62	9.62	ug/L	1					
Isophorone	U	ND	3.37	9.62	9.62	ug/L	1					
Isosafrole	U	ND	2.88	9.62	9.62	ug/L	1					
Kepone	U	ND	2.88	9.62	9.62	ug/L	1					
Methapyrilene	U	ND	2.88	9.62	9.62	ug/L	1					
Methyl methanesulfonate	U	ND	2.88	9.62	9.62	ug/L	1					
Methyl parathion	U	ND	2.88	9.62	9.62	ug/L	1					
N-Methyl-N-nitrosomethylamine	U	ND	2.88	9.62	9.62	ug/L	1					
N-Nitrosodi-n-butylamine	U	ND	2.88	9.62	9.62	ug/L	1					
N-Nitrosodiethylamine	U	ND	2.88	9.62	9.62	ug/L	1					
N-Nitrosodipropylamine	U	ND	2.88	9.62	9.62	ug/L	1					
N-Nitrosomethylethylamine	U	ND	2.88	9.62	9.62	ug/L	1					
N-Nitrosomorpholine	U	ND	2.88	9.62	9.62	ug/L	1					
N-Nitrosopiperidine	U	ND	2.88	9.62	9.62	ug/L	1					
Naphthalene	U	ND	0.288	0.962	0.962	ug/L	1					
Nitrobenzene	U	ND	2.88	9.62	9.62	ug/L	1					
Parathion	U	ND	2.88	9.62	9.62	ug/L	1					
Pentachlorobenzene	U	ND	2.88	9.62	9.62	ug/L	1					
Pentachloronitrobenzene	U	ND	3.27	9.62	9.62	ug/L	1					
Pentachlorophenol	U	ND	2.88	9.62	9.62	ug/L	1					
Phenacetin	U	ND	2.88	9.62	9.62	ug/L	1					
Phenanthrene	U	ND	0.288	0.962	0.962	ug/L	1					
Phenol	U	ND	2.88	9.62	9.62	ug/L	1					
Phorate	U	ND	2.88	9.62	9.62	ug/L	1					
Pronamide	U	ND	2.88	9.62	9.62	ug/L	1					
Pyrene	U	ND	0.288	0.962	0.962	ug/L	1					
Pyridine	U	ND	2.88	9.62	9.62	ug/L	1					
Safrole	U	ND	2.88	9.62	9.62	ug/L	1					
Sulfotepp	U	ND	2.88	9.62	9.62	ug/L	1					
Triethylphosphorothioate	U	ND	2.88	9.62	9.62	ug/L	1					
a,a-Dimethylphenethylamine	U	ND	5.19	9.62	9.62	ug/L	1					
bis(2-Chloroethoxy)methane	U	ND	2.88	9.62	9.62	ug/L	1					
bis(2-Chloroethyl) ether	U	ND	2.88	9.62	9.62	ug/L	1					
bis(2-Ethylhexyl)phthalate	U	ND	2.88	9.62	9.62	ug/L	1					
m,p-Cresols	U	ND	3.56	9.62	9.62	ug/L	1					
m-Dinitrobenzene	U	ND	2.88	9.62	9.62	ug/L	1					

August 19, 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 SAF W14-005**

Report Date: August 14, 2014

Client Sample ID: B2WB74
 Lab Sample ID: 348882003

Project: HMSA00148
 Client ID: HMSA001
 Client SDG: GEL348882

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatile-GC/MS												
<i>8270_SVOA_GCMS_IX:COMMON "As Received"</i>												
o-Cresol	U	ND	2.88	9.62	9.62	ug/L	1					
o-Toluidine	U	ND	2.88	9.62	9.62	ug/L	1					
p-(Dimethylamino)azobenzene	U	ND	2.88	9.62	9.62	ug/L	1					
p-Phenylenediamine	U	ND	96.2	481	481	ug/L	1					

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3510C	3510C BNA Liq. Prep-8270 Analysis	DXF4	05/21/14	0530	1389404

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_IX:COMMON "As Received"	40.2 ug/L	48.1	83.6	(32%-102%)
Nitrobenzene-d5	8270_SVOA_GCMS_IX:COMMON "As Received"	43.1 ug/L	48.1	89.7	(36%-125%)
p-Terphenyl-d14	8270_SVOA_GCMS_IX:COMMON "As Received"	40.5 ug/L	48.1	84.3	(34%-135%)
2,4,6-Tribromophenol	8270_SVOA_GCMS_IX:COMMON "As Received"	63.1 ug/L	96.2	65.6	(26%-129%)
2-Fluorophenol	8270_SVOA_GCMS_IX:COMMON "As Received"	43.5 ug/L	96.2	45.2	(10%-78%)
Phenol-d5	8270_SVOA_GCMS_IX:COMMON "As Received"	27.1 ug/L	96.2	28.2	(10%-104%)

Quality Control Summary

August 19, 2014

Rev. 1

GEL LABORATORIES LLC

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

QC Summary

Report Date: August 14, 2014

Page 1 of 9

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 348882

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1389407										
QC1203092256	LCS										
1,2,4-Trichlorobenzene	50.0			35.1	ug/L		70.3	(26%-92%)	JLD1	05/21/14	18:04
1,4-Dichlorobenzene	50.0			36.0	ug/L		72	(24%-88%)			
2,4-Dinitrotoluene	50.0			54.0	ug/L		108	(45%-124%)			
2-Chlorophenol	50.0			39.8	ug/L		79.6	(39%-99%)			
4-Chloro-3-methylphenol	50.0			42.3	ug/L		84.7	(46%-111%)			
4-Nitrophenol	50.0			10.5	ug/L		21.1	(16%-77%)			
Acenaphthene	50.0			41.9	ug/L		83.8	(40%-104%)			
N-Nitrosodipropylamine	50.0			45.5	ug/L		90.9	(39%-113%)			
Pentachlorophenol	50.0			35.9	ug/L		71.7	(27%-102%)			
Phenol	50.0			18.1	ug/L		36.1	(13%-77%)			
Pyrene	50.0			51.9	ug/L		104	(38%-127%)			
**2,4,6-Tribromophenol	100			92.7	ug/L		92.7	(26%-129%)			
**2-Fluorobiphenyl	50.0			42.7	ug/L		85.4	(32%-102%)			
**2-Fluorophenol	100			51.2	ug/L		51.2	(10%-78%)			
**Nitrobenzene-d5	50.0			47.0	ug/L		94	(36%-125%)			
**Phenol-d5	100			33.7	ug/L		33.7	(10%-104%)			
**p-Terphenyl-d14	50.0			49.8	ug/L		99.5	(34%-135%)			
QC1203092255	MB										
1,2,4,5-Tetrachlorobenzene			U	ND	ug/L					05/21/14	17:35
1,2,4-Trichlorobenzene			U	ND	ug/L						

August 19, 2014

Rev. 1

GEL LABORATORIES LLC

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

QC Summary

Workorder: 348882

Page 2 of 9

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1389407										
1,2-Dichlorobenzene			U	ND	ug/L						
1,3,5-Trinitrobenzene			U	ND	ug/L				JLD1	05/21/14	17:35
1,3-Dichlorobenzene			U	ND	ug/L						
1,4-Dichlorobenzene			U	ND	ug/L						
1,4-Dioxane			U	ND	ug/L						
1,4-Naphthoquinone			U	ND	ug/L						
1-Naphthylamine			U	ND	ug/L						
2,3,4,6-Tetrachlorophenol			U	ND	ug/L						
2,4,5-Trichlorophenol			U	ND	ug/L						
2,4,6-Trichlorophenol			U	ND	ug/L						
2,4-Dichlorophenol			U	ND	ug/L						
2,4-Dimethylphenol			U	ND	ug/L						
2,4-Dinitrophenol			U	ND	ug/L						
2,4-Dinitrotoluene			U	ND	ug/L						
2,6-Dichlorophenol			U	ND	ug/L						
2,6-Dinitrotoluene			U	ND	ug/L						
2-Acetylaminofluorene			U	ND	ug/L						
2-Chloronaphthalene			U	ND	ug/L						
2-Chlorophenol			U	ND	ug/L						
2-Methylnaphthalene			U	ND	ug/L						
2-Naphthylamine			U	ND	ug/L						
2-Nitrophenol			U	ND	ug/L						

August 19, 2014

Rev. 1

GEL LABORATORIES LLC

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

QC Summary

Workorder: 348882

Page 3 of 9

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1389407										
2-Picoline			U	ND	ug/L						
3,3'-Dichlorobenzidine			U	ND	ug/L				JLD1	05/21/14	17:35
3,3'-Dimethylbenzidine			U	ND	ug/L						
3-Methylcholanthrene			U	ND	ug/L						
4-Aminobiphenyl			U	ND	ug/L						
4-Bromophenylphenylether			U	ND	ug/L						
4-Chloro-3-methylphenol			U	ND	ug/L						
4-Chloroaniline			U	ND	ug/L						
4-Chlorophenylphenylether			U	ND	ug/L						
4-Nitrophenol			U	ND	ug/L						
5-Nitro-o-toluidine			U	ND	ug/L						
7,12-Dimethylbenz(a)anthracene			U	ND	ug/L						
Acenaphthene			U	ND	ug/L						
Acenaphthylene			U	ND	ug/L						
Acetophenone			U	ND	ug/L						
Aniline			U	ND	ug/L						
Anthracene			U	ND	ug/L						
Aramite			U	ND	ug/L						
Benzo(a)anthracene			U	ND	ug/L						
Benzo(a)pyrene			U	ND	ug/L						
Benzo(b)fluoranthene			U	ND	ug/L						
Benzo(ghi)perylene			U	ND	ug/L						

August 19, 2014

Rev. 1

GEL LABORATORIES LLC

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

QC Summary

Workorder: 348882

Page 4 of 9

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1389407										
Benzo(k)fluoranthene			U	ND	ug/L						
Benzyl alcohol			U	ND	ug/L				JLD1	05/21/14	17:35
Butylbenzylphthalate			U	ND	ug/L						
Carbazole			U	ND	ug/L						
Chlorobenzilate			U	ND	ug/L						
Chrysene			U	ND	ug/L						
Di-n-butylphthalate			U	ND	ug/L						
Di-n-octylphthalate			U	ND	ug/L						
Diallate			U	ND	ug/L						
Dibenzo(a,h)anthracene			U	ND	ug/L						
Dibenzofuran			U	ND	ug/L						
Diethylphthalate			U	ND	ug/L						
Dimethoate			U	ND	ug/L						
Dimethylphthalate			U	ND	ug/L						
Dinoseb			U	ND	ug/L						
Disulfoton			U	ND	ug/L						
Ethyl Methanesulfonate			U	ND	ug/L						
Famphur			U	ND	ug/L						
Fluoranthene			U	ND	ug/L						
Fluorene			U	ND	ug/L						
Hexachlorobenzene			U	ND	ug/L						
Hexachlorobutadiene			U	ND	ug/L						

August 19, 2014

Rev. 1

GEL LABORATORIES LLC

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

QC Summary

Workorder: 348882

Page 5 of 9

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1389407										
Hexachlorocyclopentadiene			U	ND	ug/L						
Hexachloroethane			U	ND	ug/L				JLD1	05/21/14	17:35
Hexachlorophene			U	ND	ug/L						
Hexachloropropene			U	ND	ug/L						
Indeno(1,2,3-cd)pyrene			U	ND	ug/L						
Isodrin			U	ND	ug/L						
Isophorone			U	ND	ug/L						
Isosafrole			U	ND	ug/L						
Kepone			U	ND	ug/L						
Methapyrilene			U	ND	ug/L						
Methyl methanesulfonate			U	ND	ug/L						
Methyl parathion			U	ND	ug/L						
N-Methyl-N-nitrosomethylamine			U	ND	ug/L						
N-Nitrosodi-n-butylamine			U	ND	ug/L						
N-Nitrosodiethylamine			U	ND	ug/L						
N-Nitrosodipropylamine			U	ND	ug/L						
N-Nitrosomethylethylamine			U	ND	ug/L						
N-Nitrosomorpholine			U	ND	ug/L						
N-Nitrosopiperidine			U	ND	ug/L						
Naphthalene			U	ND	ug/L						
Nitrobenzene			U	ND	ug/L						
Parathion			U	ND	ug/L						

August 19, 2014

Rev. 1

GEL LABORATORIES LLC

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

QC Summary

Workorder: 348882

Page 6 of 9

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1389407										
Pentachlorobenzene			U	ND	ug/L						
Pentachloronitrobenzene			U	ND	ug/L				JLD1	05/21/14	17:35
Pentachlorophenol			U	ND	ug/L						
Phenacetin			U	ND	ug/L						
Phenanthrene			U	ND	ug/L						
Phenol			U	ND	ug/L						
Phorate			U	ND	ug/L						
Pronamide			U	ND	ug/L						
Pyrene			U	ND	ug/L						
Pyridine			U	ND	ug/L						
Safrole			U	ND	ug/L						
Sulfotepp			U	ND	ug/L						
Triethylphosphorothioate			U	ND	ug/L						
a,a-Dimethylphenethylamine			U	ND	ug/L						
bis(2-Chloroethoxy)methane			U	ND	ug/L						
bis(2-Chloroethyl) ether			U	ND	ug/L						
bis(2-Ethylhexyl)phthalate			U	ND	ug/L						
diphenylamine+N-nitrosodiphenylamine			U	ND	ug/L						
m,p-Cresols			U	ND	ug/L						
m-Dinitrobenzene			U	ND	ug/L						
o-Cresol			U	ND	ug/L						
o-Toluidine			U	ND	ug/L						

August 19, 2014

Rev. 1

GEL LABORATORIES LLC

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

QC Summary

Workorder: 348882

Page 7 of 9

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1389407										
p-(Dimethylamino)azobenzene			U	ND	ug/L						
p-Phenylenediamine			U	ND	ug/L				JLD1	05/21/14	17:35
**2,4,6-Tribromophenol	100			88.4	ug/L		88.4	(26%-129%)			
**2-Fluorobiphenyl	50.0			48.7	ug/L		97.5	(32%-102%)			
**2-Fluorophenol	100			59.5	ug/L		59.5	(10%-78%)			
**Nitrobenzene-d5	50.0			55.1	ug/L		110	(36%-125%)			
**Phenol-d5	100			38.5	ug/L		38.5	(10%-104%)			
**p-Terphenyl-d14	50.0			59.3	ug/L		119	(34%-135%)			
QC1203092257 348967002 MS											
1,2,4-Trichlorobenzene	100	U	ND	57.8	ug/L		57.8	(20%-90%)		05/21/14	19:59
1,4-Dichlorobenzene	100	U	ND	60.4	ug/L		60.4	(20%-86%)			
2,4-Dinitrotoluene	100	U	ND	83.4	ug/L		83.4	(34%-126%)			
2-Chlorophenol	100	U	ND	66.0	ug/L		66	(31%-103%)			
4-Chloro-3-methylphenol	100	U	ND	67.3	ug/L		67.3	(31%-119%)			
4-Nitrophenol	100	U	ND	26.9	ug/L		26.9	(16%-71%)			
Acenaphthene	100	U	ND	67.1	ug/L		67.1	(31%-103%)			
N-Nitrosodipropylamine	100	U	ND	69.8	ug/L		69.8	(29%-116%)			
Pentachlorophenol	100	U	ND	55.1	ug/L		55.1	(19%-112%)			
Phenol	100	U	ND	41.2	ug/L		41.2	(10%-88%)			
Pyrene	100	U	ND	78.4	ug/L		78.4	(27%-126%)			
**2,4,6-Tribromophenol	200		60.2	137	ug/L		68.5	(26%-129%)			
**2-Fluorobiphenyl	100		37.7	66.1	ug/L		66.1	(32%-102%)			
**2-Fluorophenol	200		35.0	102	ug/L		51.2	(10%-78%)			

August 19, 2014

Rev. 1

GEL LABORATORIES LLC

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

QC Summary

Workorder: 348882

Page 8 of 9

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1389407										
**Nitrobenzene-d5	100	40.0		73.7	ug/L		73.7	(36%-125%)	JLD1	05/21/14	19:59
**Phenol-d5	200	22.6		77.2	ug/L		38.6	(10%-104%)			
**p-Terphenyl-d14	100	20.2		78.6	ug/L		78.6	(34%-135%)			
QC1203092258 348967002 MSD											
1,2,4-Trichlorobenzene	100	U	ND	61.2	ug/L	5.75	61.2	(0%-30%)		05/21/14	20:28
1,4-Dichlorobenzene	100	U	ND	61.8	ug/L	2.32	61.8	(0%-30%)			
2,4-Dinitrotoluene	100	U	ND	91.3	ug/L	9.11	91.3	(0%-30%)			
2-Chlorophenol	100	U	ND	69.6	ug/L	5.31	69.6	(0%-30%)			
4-Chloro-3-methylphenol	100	U	ND	72.3	ug/L	7.10	72.3	(0%-30%)			
4-Nitrophenol	100	U	ND	30.2	ug/L	11.5	30.2	(0%-30%)			
Acenaphthene	100	U	ND	73.2	ug/L	8.58	73.2	(0%-30%)			
N-Nitrosodipropylamine	100	U	ND	72.8	ug/L	4.24	72.8	(0%-30%)			
Pentachlorophenol	100	U	ND	63.9	ug/L	14.8	63.9	(0%-30%)			
Phenol	100	U	ND	43.4	ug/L	5.24	43.4	(0%-30%)			
Pyrene	100	U	ND	82.3	ug/L	4.75	82.3	(0%-30%)			
**2,4,6-Tribromophenol	200	60.2		150	ug/L		75.2	(26%-129%)			
**2-Fluorobiphenyl	100	37.7		72.7	ug/L		72.7	(32%-102%)			
**2-Fluorophenol	200	35.0		109	ug/L		54.6	(10%-78%)			
**Nitrobenzene-d5	100	40.0		79.6	ug/L		79.6	(36%-125%)			
**Phenol-d5	200	22.6		82.0	ug/L		41	(10%-104%)			
**p-Terphenyl-d14	100	20.2		80.6	ug/L		80.6	(34%-135%)			

Notes:

August 19, 2014

Rev. 1

GEL LABORATORIES LLC

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

QC Summary

Workorder: 348882

Page 9 of 9

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

The Qualifiers in this report are defined as follows:

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

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

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

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

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

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

Metals Analysis

Case Narrative

August 19, 2014

Rev. 1

**Metals Fractional Narrative
Hanford MSA (HMSA)
SDG GEL348882**

Sample Analysis

Sample ID	Client ID
348882001	B2WB69
348882002	B2WB68
348882003	B2WB74
348882004	B2WB75
1203090615	Method Blank (MB) ICP
1203090616	Laboratory Control Sample (LCS)
1203090619	348882002(B2WB68L) Serial Dilution (SD)
1203090617	348882002(B2WB68S) Matrix Spike (MS)
1203090618	348882002(B2WB68SD) Matrix Spike Duplicate (MSD)
1203101860	Method Blank (MB) CVAA
1203101861	Laboratory Control Sample (LCS)
1203101867	348882001(B2WB69L) Serial Dilution (SD)
1203101865	348882001(B2WB69D) Sample Duplicate (DUP)
1203101866	348882001(B2WB69S) Matrix Spike (MS)
348882007	Filtration Blank (FLTB)

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

Method/Analysis Information

Analytical Batch:	1388763 and 1393140
Prep Batch :	1388762 and 1393137
Prep Batch :	1388924
Standard Operating Procedures:	GL-MA-E-013 REV# 22, GL-MA-E-006 REV# 10, GL-LB-E-034 REV# 1 and GL-MA-E-010 REV# 27
Analytical Method:	6010_METALS_ICP and 7470_HG_CVAA
Prep Method :	SW846 3005A and SW846 7470A Prep
Prep Method :	EPA 160

August 19, 2014

Rev. 1

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-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**Instrument Calibration**

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

CRDL/PQL Requirements

The initial and closing 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 MBs analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

August 19, 2014

Rev. 1

Quality Control (QC) Sample Statement

The following samples were selected as the quality control (QC) samples for this SDG: 348882002 (B2WB68)-ICP and 348882001 (B2WB69)-CVAA.

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.

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 elements 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 between qualifying elements results in the MS and MSD were within the acceptance limits of 20%.

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.

August 19, 2014

Rev. 1

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 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.

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: *Al Stull* Date: *06/11/2014*

Sample Data Summary

August 19, 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: GEL348882 GEL Work Order: 348882

The Qualifiers in this report are defined as follows:

* Duplicate analysis not within control limits

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

D Results are reported from a diluted aliquot of sample.

N Spike Sample recovery is outside control limits.

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

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

Bob Stull 06/11/2014

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 SAF W14-005**

Report Date: June 10, 2014

Client Sample ID: B2WB69
Lab Sample ID: 348882001
Matrix: WATER
Collect Date: 15-MAY-14 08:54
Receive Date: 16-MAY-14
Collector: Client

Project: HMSA00148
Client ID: HMSA001
Client SDG: GEL348882

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	ND	0.067	0.200	0.200	ug/L	1	NOR1	06/05/14	10:58	1393140	1
Metals Analysis-ICP												
<i>6010_METALS_ICP: COMMON "As Received"</i>												
Antimony	U	ND	3.50	10.0	60.0	ug/L	1	HSC	06/03/14	18:22	1388763	2
Arsenic	U	ND	5.00	30.0	100	ug/L	1					
Barium		215	1.00	5.00	20.0	ug/L	1					
Cadmium	U	ND	1.00	5.00	5.00	ug/L	1					
Calcium		222000	50.0	200	1000	ug/L	1					
Chromium		43.0	1.00	5.00	10.0	ug/L	1					
Cobalt	U	ND	1.00	5.00	20.0	ug/L	1					
Copper	U	ND	3.00	10.0	10.0	ug/L	1					
Iron		205	30.0	100	50.0	ug/L	1					
Magnesium		63400	110	300	750	ug/L	1					
Manganese		88.1	2.00	10.0	5.00	ug/L	1					
Nickel	U	ND	1.50	5.00	40.0	ug/L	1					
Potassium		16600	50.0	150	4000	ug/L	1					
Silver	U	ND	1.00	5.00	10.0	ug/L	1					
Vanadium	B	6.91	1.00	5.00	25.0	ug/L	1					
Zinc		537	3.30	10.0	10.0	ug/L	1					
Sodium		177000	100	300	500	ug/L	1	HSC	06/04/14	15:32	1388763	3

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 160	EPA 160 Laboratory Filtration (Metals Only)	EXF1	05/21/14	0830	1388924
SW846 3005A	SW846 3005A for 6010C	KXP3	05/28/14	0900	1388762
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	AXS5	06/04/14	1523	1393137

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	7470_HG_CVAA	
2	6010_METALS_ICP	
3	6010_METALS_ICP	

~~August 19, 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 SAF W14-005**

Report Date: June 10, 2014

Client Sample ID: B2WB68
 Lab Sample ID: 348882002
 Matrix: WATER
 Collect Date: 15-MAY-14 08:54
 Receive Date: 16-MAY-14
 Collector: Client

Project: HMSA00148
 Client ID: HMSA001
 Client SDG: GEL348882

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	ND	0.067	0.200	0.200	ug/L	1	NOR1	06/05/14	11:07	1393140	1
Metals Analysis-ICP												
<i>6010_METALS_ICP: COMMON "As Received"</i>												
Antimony	B	6.16	3.50	10.0	60.0	ug/L	1	HSC	06/03/14	18:33	1388763	2
Arsenic	B	12.6	5.00	30.0	100	ug/L	1					
Barium		215	1.00	5.00	20.0	ug/L	1					
Cadmium	U	ND	1.00	5.00	5.00	ug/L	1					
Calcium		226000	50.0	200	1000	ug/L	1					
Chromium		45.4	1.00	5.00	10.0	ug/L	1					
Cobalt	U	ND	1.00	5.00	20.0	ug/L	1					
Copper	U	ND	3.00	10.0	10.0	ug/L	1					
Iron		261	30.0	100	50.0	ug/L	1					
Magnesium		63400	110	300	750	ug/L	1					
Manganese		90.2	2.00	10.0	5.00	ug/L	1					
Nickel	U	ND	1.50	5.00	40.0	ug/L	1					
Potassium		16400	50.0	150	4000	ug/L	1					
Silver	U	ND	1.00	5.00	10.0	ug/L	1					
Vanadium	B	7.24	1.00	5.00	25.0	ug/L	1					
Zinc		564	3.30	10.0	10.0	ug/L	1					
Sodium		172000	100	300	500	ug/L	1	HSC	06/04/14	15:35	1388763	3

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	SW846 3005A for 6010C	KXP3	05/28/14	0900	1388762
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	AXS5	06/04/14	1523	1393137

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	7470_HG_CVAA	
2	6010_METALS_ICP	
3	6010_METALS_ICP	

August 19, 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 SAF W14-005**

Report Date: June 10, 2014

Client Sample ID: B2WB74
 Lab Sample ID: 348882003
 Matrix: WATER
 Collect Date: 15-MAY-14 11:01
 Receive Date: 16-MAY-14
 Collector: Client

Project: HMSA00148
 Client ID: HMSA001
 Client SDG: GEL348882

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	ND	0.067	0.200	0.200	ug/L	1	NOR1	06/05/14	11:08	1393140	1
Metals Analysis-ICP												
<i>6010_METALS_ICP: COMMON "As Received"</i>												
Antimony	U	ND	3.50	10.0	60.0	ug/L	1	HSC	06/03/14	18:47	1388763	2
Arsenic	B	5.27	5.00	30.0	100	ug/L	1					
Barium		86.4	1.00	5.00	20.0	ug/L	1					
Cadmium	U	ND	1.00	5.00	5.00	ug/L	1					
Calcium		85300	50.0	200	1000	ug/L	1					
Chromium		10.6	1.00	5.00	10.0	ug/L	1					
Cobalt	U	ND	1.00	5.00	20.0	ug/L	1					
Copper	U	ND	3.00	10.0	10.0	ug/L	1					
Iron		90.3	30.0	100	50.0	ug/L	1					
Magnesium		24300	110	300	750	ug/L	1					
Manganese	U	ND	2.00	10.0	5.00	ug/L	1					
Nickel	B	4.90	1.50	5.00	40.0	ug/L	1					
Potassium		8760	50.0	150	4000	ug/L	1					
Silver	U	ND	1.00	5.00	10.0	ug/L	1					
Vanadium	B	16.8	1.00	5.00	25.0	ug/L	1					
Zinc	U	ND	3.30	10.0	10.0	ug/L	1					
Sodium		41900	100	300	500	ug/L	1	HSC	06/04/14	15:49	1388763	3

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	SW846 3005A for 6010C	KXP3	05/28/14	0900	1388762
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	AXS5	06/04/14	1523	1393137

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	7470_HG_CVAA	
2	6010_METALS_ICP	
3	6010_METALS_ICP	

~~August 19, 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 SAF W14-005**

Report Date: June 10, 2014

Client Sample ID: B2WB75
 Lab Sample ID: 348882004
 Matrix: WATER
 Collect Date: 15-MAY-14 11:01
 Receive Date: 16-MAY-14
 Collector: Client

Project: HMSA00148
 Client ID: HMSA001
 Client SDG: GEL348882

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	ND	0.067	0.200	0.200	ug/L	1	NOR1	06/05/14	11:13	1393140	1
Metals Analysis-ICP												
<i>6010_METALS_ICP: COMMON "As Received"</i>												
Antimony	U	ND	3.50	10.0	60.0	ug/L	1	HSC	06/03/14	18:50	1388763	2
Arsenic	B	11.6	5.00	30.0	100	ug/L	1					
Barium		83.3	1.00	5.00	20.0	ug/L	1					
Cadmium	U	ND	1.00	5.00	5.00	ug/L	1					
Calcium		81800	50.0	200	1000	ug/L	1					
Chromium	B	6.40	1.00	5.00	10.0	ug/L	1					
Cobalt	U	ND	1.00	5.00	20.0	ug/L	1					
Copper	U	ND	3.00	10.0	10.0	ug/L	1					
Iron		85.7	30.0	100	50.0	ug/L	1					
Magnesium		23300	110	300	750	ug/L	1					
Manganese	U	ND	2.00	10.0	5.00	ug/L	1					
Nickel	B	4.52	1.50	5.00	40.0	ug/L	1					
Potassium		8440	50.0	150	4000	ug/L	1					
Silver	U	ND	1.00	5.00	10.0	ug/L	1					
Vanadium	B	16.1	1.00	5.00	25.0	ug/L	1					
Zinc	U	ND	3.30	10.0	10.0	ug/L	1					
Sodium		40700	100	300	500	ug/L	1	HSC	06/04/14	15:52	1388763	3

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	SW846 3005A for 6010C	KXP3	05/28/14	0900	1388762
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	AXS5	06/04/14	1523	1393137

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	7470_HG_CVAA	
2	6010_METALS_ICP	
3	6010_METALS_ICP	

Quality Control Summary

August 19, 2014

Rev. 1

GEL LABORATORIES LLC

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

QC Summary

Report Date: June 10, 2014

Page 1 of 6

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 348882

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1388763										
QC1203090616	LCS										
Antimony	500			509	ug/L		102	(80%-120%)	HSC	06/03/14	18:07
Arsenic	500			515	ug/L		103	(80%-120%)			
Barium	500			522	ug/L		104	(80%-120%)			
Cadmium	500			523	ug/L		105	(80%-120%)			
Calcium	5000			5230	ug/L		105	(80%-120%)			
Chromium	500			526	ug/L		105	(80%-120%)			
Cobalt	500			520	ug/L		104	(80%-120%)			
Copper	500			519	ug/L		104	(80%-120%)			
Iron	5000			5360	ug/L		107	(80%-120%)			
Magnesium	5000			5320	ug/L		106	(80%-120%)			
Manganese	500			522	ug/L		104	(80%-120%)			
Nickel	500			522	ug/L		104	(80%-120%)			
Potassium	5000			5230	ug/L		105	(80%-120%)			
Silver	500			521	ug/L		104	(80%-120%)			
Sodium	5000			5280	ug/L		106	(80%-120%)		06/04/14	15:09
Vanadium	500			546	ug/L		109	(80%-120%)		06/03/14	18:07
Zinc	500			529	ug/L		106	(80%-120%)			
QC1203090615	MB										
Antimony			U	ND	ug/L					06/03/14	18:03
Arsenic			U	ND	ug/L						

August 19, 2014

Rev. 1

GEL LABORATORIES LLC

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

QC Summary

Workorder: 348882

Page 2 of 6

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1388763										
Barium			U	ND	ug/L						
Cadmium			U	ND	ug/L				HSC	06/03/14	18:03
Calcium			U	ND	ug/L						
Chromium			U	ND	ug/L						
Cobalt			U	ND	ug/L						
Copper			U	ND	ug/L						
Iron			U	ND	ug/L						
Magnesium			U	ND	ug/L						
Manganese			U	ND	ug/L						
Nickel			U	ND	ug/L						
Potassium			U	ND	ug/L						
Silver			U	ND	ug/L						
Sodium			U	ND	ug/L					06/04/14	15:05
Vanadium			U	ND	ug/L					06/03/14	18:03
Zinc			U	ND	ug/L						
QC1203090617 348882002 MS											
Antimony	500	B	6.16	531	ug/L		105	(75%-125%)		06/03/14	18:36
Arsenic	500	B	12.6	552	ug/L		108	(75%-125%)			
Barium	500		215	721	ug/L		101	(75%-125%)			
Cadmium	500	U	ND	495	ug/L		99	(75%-125%)			
Calcium	5000		226000	230000	ug/L		N/A	(75%-125%)			
Chromium	500		45.4	554	ug/L		102	(75%-125%)			
Cobalt	500	U	ND	473	ug/L		94.6	(75%-125%)			

August 19, 2014

Rev. 1

GEL LABORATORIES LLC

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

QC Summary

Workorder: 348882

Page 3 of 6

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1388763										
Copper	500	U	ND	539	ug/L		108	(75%-125%)	HSC	06/03/14	18:36
Iron	5000		261	5390	ug/L		102	(75%-125%)			
Magnesium	5000		63400	68600	ug/L		N/A	(75%-125%)			
Manganese	500		90.2	593	ug/L		101	(75%-125%)			
Nickel	500	U	ND	473	ug/L		94.3	(75%-125%)			
Potassium	5000		16400	21100	ug/L		95.4	(75%-125%)			
Silver	500	U	ND	521	ug/L		104	(75%-125%)			
Sodium	5000		172000	178000	ug/L		N/A	(75%-125%)		06/04/14	15:38
Vanadium	500	B	7.24	554	ug/L		109	(75%-125%)		06/03/14	18:36
Zinc	500		564	1070	ug/L		101	(75%-125%)			
QC1203090618	348882002	MSD									
Antimony	500	B	6.16	539	ug/L	1.53	107	(0%-20%)		06/03/14	18:40
Arsenic	500	B	12.6	566	ug/L	2.49	111	(0%-20%)			
Barium	500		215	739	ug/L	2.39	105	(0%-20%)			
Cadmium	500	U	ND	510	ug/L	2.97	102	(0%-20%)			
Calcium	5000		226000	232000	ug/L	1.03	N/A	(0%-20%)			
Chromium	500		45.4	568	ug/L	2.52	104	(0%-20%)			
Cobalt	500	U	ND	497	ug/L	4.91	99.4	(0%-20%)			
Copper	500	U	ND	552	ug/L	2.35	110	(0%-20%)			
Iron	5000		261	5530	ug/L	2.72	105	(0%-20%)			
Magnesium	5000		63400	69100	ug/L	0.799	N/A	(0%-20%)			
Manganese	500		90.2	609	ug/L	2.64	104	(0%-20%)			

August 19, 2014

Rev. 1

GEL LABORATORIES LLC

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

QC Summary

Workorder: 348882

Page 4 of 6

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1388763										
Nickel	500	U	ND	483	ug/L	2.19	96.4	(0%-20%)	HSC	06/03/14	18:40
Potassium	5000		16400	21200	ug/L	0.420	97.1	(0%-20%)			
Silver	500	U	ND	534	ug/L	2.34	107	(0%-20%)			
Sodium	5000		172000	181000	ug/L	1.68	N/A	(0%-20%)		06/04/14	15:42
Vanadium	500	B	7.24	570	ug/L	2.86	113	(0%-20%)		06/03/14	18:40
Zinc	500		564	1090	ug/L	1.73	105	(0%-20%)			
QC1203090619 348882002 SDILT											
Antimony		B	6.16 DU	ND	ug/L	N/A		(0%-10%)		06/03/14	18:43
Arsenic		B	12.6 DU	ND	ug/L	N/A		(0%-10%)			
Barium			215 D	43.0	ug/L	.121		(0%-10%)			
Cadmium		U	ND DU	ND	ug/L	N/A		(0%-10%)			
Calcium			226000 D	44800	ug/L	.791		(0%-10%)			
Chromium			45.4 D	9.55	ug/L	5.13		(0%-10%)			
Cobalt		U	ND DU	ND	ug/L	N/A		(0%-10%)			
Copper		U	ND DU	ND	ug/L	N/A		(0%-10%)			
Iron			261 D	56.7	ug/L	8.55		(0%-10%)			
Magnesium			63400 D	12900	ug/L	2.11		(0%-10%)			
Manganese			90.2 D	18.5	ug/L	2.73		(0%-10%)			
Nickel		U	ND DU	ND	ug/L	N/A		(0%-10%)			
Potassium			16400 D	3300	ug/L	.932		(0%-10%)			
Silver		U	ND DU	ND	ug/L	N/A		(0%-10%)			
Sodium			172000 D	36300	ug/L	5.77		(0%-10%)		06/04/14	15:45

August 19, 2014

Rev. 1

GEL LABORATORIES LLC

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

QC Summary

Workorder: 348882

Page 5 of 6

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1388763										
Vanadium	B	7.24	D	1.71	ug/L	17.8		(0%-10%)	HSC	06/03/14	18:43
Zinc		564	D	111	ug/L	2.04		(0%-10%)			
Metals Analysis-Mercury											
Batch	1393140										
QC1203101865	348882001	DUP									
Mercury	U	ND	U	ND	ug/L	N/A			NOR1	06/05/14	11:00
QC348882007	FLTB										
Mercury			U	ND	ug/L					06/05/14	11:15
QC1203101861	LCS										
Mercury	2.00			1.99	ug/L		99.3	(80%-120%)		06/05/14	10:56
QC1203101860	MB										
Mercury			U	ND	ug/L					06/05/14	10:55
QC1203101866	348882001	MS									
Mercury	2.00	U	ND	2.07	ug/L		103	(75%-125%)		06/05/14	11:01
QC1203101867	348882001	SDILT									
Mercury	U	ND	DU	ND	ug/L	N/A		(0%-10%)		06/05/14	11:03

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

August 19, 2014

Rev. 1

GEL LABORATORIES LLC

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

QC Summary

Workorder: 348882

Page 6 of 6

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

August 19, 2014

Rev. 1

**General Chemistry Narrative
Hanford MSA (HMSA)
SDG GEL348882**

Method/Analysis Information

Product: Carbon and Total Organic

Analytical Batch: 1389159

Method: 9060_TOC: COMMON

Sample Analysis

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

Sample ID	Client ID
348882002	B2WB68
348882003	B2WB74
1203091537	Method Blank (MB)
1203091539	348882003(B2WB74) Sample Duplicate (DUP)
1203091541	348882003(B2WB74) Post Spike (PS)
1203091542	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-GC-E-093 REV# 12.

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

August 19, 2014

Rev. 1

Calibration Verification Information (CCV)

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 348882003 (B2WB74).

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

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

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages

August 19, 2014

Rev. 1

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.

August 19, 2014

Rev. 1

Method/Analysis Information

Product: Cyanide and Total
Analytical Batch: 1388571 **Method:** 9012_CYANIDE: COMMON
Prep Batch : 1388569 **Method:** SW846 9010C Distillation

Sample Analysis

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

Sample ID	Client ID
348882002	B2WB68
348882003	B2WB74
1203090112	Method Blank (MB)
1203090115	Laboratory Control Sample (LCS)
1203091471	348882002(B2WB68) Sample Duplicate (DUP)
1203091472	348882002(B2WB68) 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

August 19, 2014

Rev. 1

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: 348882002 (B2WB68).

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

The MS/PS recoveries for this sample set were within the required acceptance limits.

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The following samples in this sample group were diluted due to high concentration: 1203091471 (B2WB68), 1203091472 (B2WB68) and 348882002 (B2WB68).

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

August 19, 2014

Rev. 1

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.

August 19, 2014

Rev. 1

Method/Analysis Information**Product:** Ion Chromatography**Analytical Batch:** 1388861**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
348882005	B2WFK1
348882006	B2WFK2
1203090815	Method Blank (MB)
1203090816	348873005(B2WFN3) Sample Duplicate (DUP)
1203090818	348873005(B2WFN3) Post Spike (PS)
1203090820	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-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.

Calibration Verification Information (CCV)

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

August 19, 2014

Rev. 1

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: 348873005 (B2WFN3).

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

The MS/PS recoveries for this sample set were within the required acceptance limits.

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The following samples in this sample group were diluted due to high concentration: 1203090816 (B2WFN3), 1203090818 (B2WFN3), 348882005 (B2WFK1) and 348882006 (B2WFK2).

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.

Manual Integrations

Manual integrations were not required for the samples in 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

August 19, 2014

Rev. 1

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.

August 19, 2014

Rev. 1

Method/Analysis Information

Product: Ammonia Nitrogen

Analytical Batch: 1389710 **Method:** 350.1_AMMONIA: COMMON

Prep Batch : 1389709 **Method:** EPA 350.2 Prep

Sample Analysis

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

Sample ID	Client ID
348882002	B2WB68
348882003	B2WB74
1203092947	Method Blank (MB)
1203092949	348882002(B2WB68) Sample Duplicate (DUP)
1203092951	348882002(B2WB68) Matrix Spike (MS)
1203092952	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-GC-E-106 REV# 9.

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information

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

Continuing Calibration Blanks

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

August 19, 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 sample was selected for QC analysis: 348882002 (B2WB68).

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

The MS/PS recoveries for this sample set were within the required acceptance limits.

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

The following samples were re-analyzed due to instrument failure. The results from the reanalysis are reported. 1203092951 (B2WB68) and 348882003 (B2WB74).

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.

Additional Comments

Additional comments were not required for this SDG.

August 19, 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.

August 19, 2014

Rev. 1

Method/Analysis Information

Product: Alkalinity
Analytical Batch: 1391265 **Method:** 2320_ALKALINITY: GW 01

Sample Analysis

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

Sample ID	Client ID
348882002	B2WB68
348882003	B2WB74
1203097313	Method Blank (MB)
1203097321	Laboratory Control Sample (LCS)
1203097334	348873002(B2WDP4) Sample Duplicate (DUP)
1203097335	348873002(B2WDP4) Matrix Spike (MS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-033 REV# 11.

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Standardization

The titrant was properly standardized

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

August 19, 2014

Rev. 1

Quality Control (QC) Designation

The following sample was selected for QC analysis: 348873002 (B2WDP4).

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

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

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

Additional Comments

Less sample was used because limited volume was provided by the client. 1203097334 (B2WDP4) and 1203097335 (B2WDP4).

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.

August 19, 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: 12Jun14

Sample Data Summary

August 19, 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: GEL348882 GEL Work Order: 348882

The Qualifiers in this report are defined as follows:

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

D Results are reported from a diluted aliquot of sample.

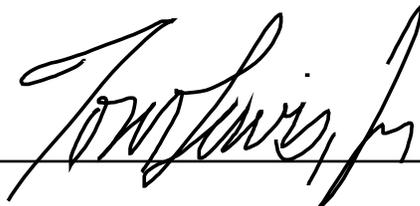
U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

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

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

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

Reviewed by



August 19, 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 SAF W14-005**

Report Date: June 12, 2014

Client Sample ID: B2WB68
 Lab Sample ID: 348882002
 Matrix: WATER
 Collect Date: 15-MAY-14 08:54
 Receive Date: 16-MAY-14
 Collector: Client

Project: HMSA00148
 Client ID: HMSA001
 Client SDG: GEL348882

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
<i>9060_TOC: COMMON "As Received"</i>												
Total Organic Carbon #1	B	557	330	1000	1000	ug/L	1	TSM	05/21/14	22:18	1389159	1
Total Organic Carbon #2	B	589	330	1000	1000	ug/L	1					
Total Organic Carbon #3	B	497	330	1000	1000	ug/L	1					
Total Organic Carbon #4	B	499	330	1000	1000	ug/L	1					
Total Organic Carbon Average	B	536	330	1000	1000	ug/L	1					
Flow Injection Analysis												
<i>9012_CYANIDE: COMMON "As Received"</i>												
Cyanide, Total	D	248	3.34	10.0	5.00	ug/L	2	AXH3	05/20/14	11:01	1388571	2
Nutrient Analysis												
<i>350.1_AMMONIA: COMMON "As Received"</i>												
Nitrogen, Ammonia		1.05	0.017	0.050	0.050	mg/L	1	KLP1	05/29/14	14:01	1389710	3
Titration and Ion Analysis												
<i>2320_ALKALINITY: GW 01 "As Received"</i>												
Alkalinity, Total as CaCO3		89500	725	1000	1000	ug/L		LXA1	05/28/14	17:05	1391265	4
Bicarbonate alkalinity (CaCO3)		89500	725	1000	1000	ug/L						
Carbonate alkalinity (CaCO3)	U	ND	725	1000	1000	ug/L						
Hydroxide alkalinity as CaCO3	U	ND	725	1000	1000	ug/L						

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.2 Prep	EPA 350.1 Ammonia Nitrogen Prep	KLP1	05/28/14	1500	1389709
SW846 9010C Distillation	SW846 9010C Prep	AXH3	05/20/14	0926	1388569

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 9060A	
2	SW846 9012B	
3	EPA 350.1	
4	2320_ALKALINITY	

August 19, 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 SAF W14-005**

Report Date: June 12, 2014

Client Sample ID: B2WB74
 Lab Sample ID: 348882003
 Matrix: WATER
 Collect Date: 15-MAY-14 11:01
 Receive Date: 16-MAY-14
 Collector: Client

Project: HMSA00148
 Client ID: HMSA001
 Client SDG: GEL348882

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
<i>9060_TOC: COMMON "As Received"</i>												
Total Organic Carbon #1	U	ND	330	1000	1000	ug/L	1	TSM	05/21/14	22:52	1389159	1
Total Organic Carbon #2	U	ND	330	1000	1000	ug/L	1					
Total Organic Carbon #3	U	ND	330	1000	1000	ug/L	1					
Total Organic Carbon #4	U	ND	330	1000	1000	ug/L	1					
Total Organic Carbon Average	U	ND	330	1000	1000	ug/L	1					
Flow Injection Analysis												
<i>9012_CYANIDE: COMMON "As Received"</i>												
Cyanide, Total		108	1.67	5.00	5.00	ug/L	1	AXH3	05/20/14	10:48	1388571	2
Nutrient Analysis												
<i>350.1_AMMONIA: COMMON "As Received"</i>												
Nitrogen, Ammonia		0.0764	0.017	0.050	0.050	mg/L	1	KLP1	05/29/14	14:16	1389710	3
Titration and Ion Analysis												
<i>2320_ALKALINITY: GW 01 "As Received"</i>												
Alkalinity, Total as CaCO3		106000	725	1000	1000	ug/L		LXA1	05/28/14	17:08	1391265	4
Bicarbonate alkalinity (CaCO3)		106000	725	1000	1000	ug/L						
Carbonate alkalinity (CaCO3)	U	ND	725	1000	1000	ug/L						
Hydroxide alkalinity as CaCO3	U	ND	725	1000	1000	ug/L						

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.2 Prep	EPA 350.1 Ammonia Nitrogen Prep	KLP1	05/28/14	1500	1389709
SW846 9010C Distillation	SW846 9010C Prep	AXH3	05/20/14	0926	1388569

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 9060A	
2	SW846 9012B	
3	EPA 350.1	
4	2320_ALKALINITY	

August 19, 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 SAF W14-005**

Report Date: June 12, 2014

Client Sample ID: B2WFK1
 Lab Sample ID: 348882005
 Matrix: WATER
 Collect Date: 15-MAY-14 08:54
 Receive Date: 16-MAY-14
 Collector: Client

Project: HMSA00148
 Client ID: HMSA001
 Client SDG: GEL348882

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
<i>9056_ANIONS_IC:COMMON "As Received"</i>												
Fluoride	B	369	33.0	100	500	ug/L	1	MAR105/16/14	21:22	1388861	1	
Nitrite-N	U	ND	38.0	100	250	ug/L	1					
Chloride	D	44400	6700	20000	200	ug/L	100	MAR105/17/14	10:54	1388861	2	
Nitrate-N	D	224000	3300	10000	250	ug/L	100					
Sulfate	D	226000	13300	40000	500	ug/L	100					

The following Analytical Methods were performed

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

August 19, 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 SAF W14-005**

Report Date: June 12, 2014

Client Sample ID: B2WFK2
 Lab Sample ID: 348882006
 Matrix: WATER
 Collect Date: 15-MAY-14 11:01
 Receive Date: 16-MAY-14
 Collector: Client

Project: HMSA00148
 Client ID: HMSA001
 Client SDG: GEL348882

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
<i>9056_ANIONS_IC:COMMON "As Received"</i>												
Fluoride	B	376	33.0	100	500	ug/L	1	MAR105/16/14	21:52	1388861	1	
Nitrite-N	U	ND	38.0	100	250	ug/L	1					
Chloride	D	19300	1340	4000	200	ug/L	20	MAR105/17/14	13:23	1388861	2	
Nitrate-N	D	41200	660	2000	250	ug/L	20					
Sulfate	D	106000	2660	8000	500	ug/L	20					

The following Analytical Methods were performed

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

Quality Control Summary

August 19, 2014

Rev. 1

GEL LABORATORIES LLC

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

QC Summary

Report Date: June 12, 2014

Page 1 of 4

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 348882

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Carbon Analysis											
Batch	1389159										
QC1203091539	348882003	DUP									
Total Organic Carbon Average		U	ND	U	ND	ug/L	N/A		TSM	05/21/14	23:26
QC1203091542	LCS										
Total Organic Carbon Average	10000				9610	ug/L	96.1	(85%-115%)		05/21/14	18:02
QC1203091537	MB										
Total Organic Carbon Average			U		ND	ug/L				05/21/14	17:53
QC1203091541	348882003	PS									
Total Organic Carbon Average	10.0	U	ND		10.7	mg/L	104	(65%-120%)		05/21/14	23:45
Flow Injection Analysis											
Batch	1388571										
QC1203091471	348882002	DUP									
Cyanide, Total		D	248	D	230	ug/L	7.53	(0%-32%)	AXH3	05/20/14	11:02
QC1203090115	LCS										
Cyanide, Total	50.0				51.3	ug/L	103	(90%-110%)		05/20/14	10:18
QC1203090112	MB										
Cyanide, Total			U		ND	ug/L				05/20/14	10:18
QC1203091472	348882002	MS									
Cyanide, Total	100	D	248	D	324	ug/L	76	(60%-124%)		05/20/14	11:02
Ion Chromatography											
Batch	1388861										
QC1203090816	348873005	DUP									
Chloride		D	16800	D	16700	ug/L	0.477	(0%-20%)	MAR1	05/17/14	11:53
Fluoride		B	127	B	137	ug/L	7.73 ^	(+/-500)		05/16/14	19:53
Nitrate-N		D	7170	D	7340	ug/L	2.31	(0%-20%)		05/17/14	11:53
Nitrite-N		U	ND	U	ND	ug/L	N/A			05/16/14	19:53
Sulfate		D	163000	D	162000	ug/L	0.846	(0%-20%)		05/17/14	11:53
QC1203090820	LCS										
Chloride	5000				4870	ug/L	97.5	(90%-110%)		05/16/14	18:53

August 19, 2014

Rev. 1

GEL LABORATORIES LLC

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

QC Summary

Workorder: 348882

Page 2 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1388861										
Fluoride	2500			2500	ug/L		100	(90%-110%)			
Nitrate-N	2500			2460	ug/L		98.4	(90%-110%)	MAR1	05/16/14	18:53
Nitrite-N	2500			2490	ug/L		99.8	(90%-110%)			
Sulfate	10000			10000	ug/L		100	(90%-110%)			
QC1203090815	MB										
Chloride			U	ND	ug/L					05/16/14	18:23
Fluoride			U	ND	ug/L						
Nitrate-N			U	ND	ug/L						
Nitrite-N			U	ND	ug/L						
Sulfate			U	ND	ug/L						
QC1203090818	348873005 PS										
Chloride	5.00	D	0.840	D	5.79	mg/L	99.1	(90%-110%)		05/17/14	12:23
Fluoride	2.50	B	0.127		2.74	mg/L	105	(90%-110%)		05/16/14	20:23
Nitrate-N	2.50	D	0.359	D	2.87	mg/L	100	(90%-110%)		05/17/14	12:23
Nitrite-N	2.50	U	ND		2.50	mg/L	99.8	(90%-110%)		05/16/14	20:23
Sulfate	10.0	D	8.17	D	18.9	mg/L	107	(90%-110%)		05/17/14	12:23
Nutrient Analysis											
Batch	1389710										
QC1203092949	348882002 DUP										
Nitrogen, Ammonia			1.05		1.13	mg/L	7.34	(0%-20%)	KLP1	05/29/14	14:02
QC1203092952	LCS										
Nitrogen, Ammonia	1.00				1.04	mg/L	104	(90%-110%)		05/29/14	13:55
QC1203092947	MB										
Nitrogen, Ammonia			U		ND	mg/L				05/29/14	13:54
QC1203092951	348882002 MS										
Nitrogen, Ammonia	1.00		1.05		2.09	mg/L	104	(90%-110%)		05/29/14	14:15
Titration and Ion Analysis											
Batch	1391265										

August 19, 2014

Rev. 1

GEL LABORATORIES LLC

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

QC Summary

Workorder: 348882

Page 3 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
Batch	1391265										
QC1203097334	348873002	DUP									
Alkalinity, Total as CaCO3		90000		90000	ug/L	0.00		(0%-20%)	LXA1	05/28/14	16:57
Bicarbonate alkalinity (CaCO3)		90000		90000	ug/L	0.00		(0%-20%)			
Carbonate alkalinity (CaCO3)	U	ND	U	ND	ug/L	N/A					
Hydroxide alkalinity as CaCO3	U	ND	U	ND	ug/L	N/A					
QC1203097321	LCS										
Alkalinity, Total as CaCO3	50000			50100	ug/L		100	(90%-110%)		05/28/14	10:53
QC1203097313	MB										
Alkalinity, Total as CaCO3			U	ND	ug/L					05/28/14	10:53
Bicarbonate alkalinity (CaCO3)			U	ND	ug/L						
Carbonate alkalinity (CaCO3)			U	ND	ug/L						
Hydroxide alkalinity as CaCO3			U	ND	ug/L						
QC1203097335	348873002	MS									
Alkalinity, Total as CaCO3	100000	90000		190000	ug/L		100	(80%-120%)		05/28/14	17:01

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

August 19, 2014

Rev. 1

GEL LABORATORIES LLC

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

QC Summary

Workorder: 348882

Page 4 of 4

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

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

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

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

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

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