

October 1, 2014



PO Box 30712 Charleston, SC 29417  
2040 Savage Road Charleston, SC 29407

P 843.556.8171 F 843.766.1178

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

October 01, 2014

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

Re: CHPRC SAF X14-061  
Work Order: 356011  
SDG: GEL356011

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on September 04, 2014 and September 05, 2014. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,

Heather Shaffer  
Project Manager

Purchase Order: 300071ES20  
Chain of Custody: X14-061-090, X14-061-091 and X14-061-092  
Enclosures



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# Case Narrative

October 1, 2014

**General Narrative  
for  
Hanford MSA (51204)  
CHPRC SAF X14-061  
SDG: GEL356011**

**October 01, 2014**

**Laboratory Identification:**

GEL Laboratories LLC  
2040 Savage Road  
Charleston, South Carolina 29407  
(843) 556-8171

**Summary**

**Sample receipt**

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on September 04, 2014 and September 05, 2014, for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

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

**Sample Identification**

The laboratory received the following samples:

<b>Laboratory Identification</b>	<b>Sample Description</b>
356011001	B2XJ53
356011002	B2XJ54
356011003	B2XJ61

**Case Narrative**

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

October 1, 2014

Data Package

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

*Heather Shaffer*

Heather Shaffer  
Project Manager

# **Chain of Custody and Supporting Documentation**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

**CH2MHill Plateau Remediation Company**  
356011

Collector	S.W. King CHPRC	Contact/Requester	Karen Waters-Husted
SAF No.	X14-061	Sampling Origin	Hanford Site
Project Title	AQUIFER TUBES, SEPTEMBER 2014	Logbook No.	HNF-N-50659 / <i>let 94</i>
Shipped To (Lab)	GEL Laboratories, LLC	Method of Shipment	Commercial Carrier
Protocol	SURV	Priority:	30 Days <b>PRIORITY</b>

**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: **30 Days**    Hold Time: **30 Days**    Total Activity Exemption: Yes  No

Sample No.	Filter	* Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B2XJ53	N	SEP 02 2014	1334	1x1-L G/P	SRTOT_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2
B2XJ53	N	↓	↓	1x500-mL P	TRITIUM_DIST_LSC: COMMON	6 Months	None

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Relinquished By S.W. King CHPRC	Print <i>[Signature]</i>	Date/Time SEP 02 2014 1435	Sign
Relinquished By SSU-1	Print <i>[Signature]</i>	Date/Time SEP 02 2014 1435	Sign
Relinquished By L.D. Wall CHPRC	Print <i>[Signature]</i>	Date/Time SEP 03 2014 0930	Sign
Relinquished By Fed X	Print <i>[Signature]</i>	Date/Time SEP 03 2014 1400	Sign

Received By: *[Signature]* Sign: *[Signature]* Date/Time: SEP 02 2014 1435  
 Received By: L.D. Wall CHPRC Sign: *[Signature]* Date/Time: SEP 03 2014 0930  
 Received By: FEDEX Sign: *[Signature]* Date/Time: SEP 03 2014 1400  
 Received By: P. Valent Patricia Dent Sign: *[Signature]* Date/Time: 9/5/14 0930

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

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

**CH2MHill Plateau Remediation Company**

**Collector:** S.W. King  
**SAF No.:** X14-061  
**Project Title:** AQUIFER TUBES, SEPTEMBER 2014  
**Shipped To (Lab):** GEL Laboratories, LLC  
**Protocol:** SURV

**Contact/Requester:** Karen Waters-Husted  
**Sampling Origin:** Hanford Site  
**Logbook No.:** HNF-N-50659 94  
**Method of Shipment:** Commercial Carrier  
**Priority:** 30 Days **PRIORITY**

**Telephone No.:** 509-376-4650  
**Purchase Order/Charge Code:** 303308ES20  
**Ice Chest No.:** 609-193  
**Bill of Lading/Air Bill No.:** 7710-3444 4033  
**Offsite Property No.:** 5056

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

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

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B2XJ54	N	W	SEP 02 2014	1334	1x1-L G/P	SRTOT_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2
B2XJ54	N	W			1x500-mL P	TRITIUM_DIST_LSC: COMMON	6 Months	None

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Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix *
S.W. King			SEP 02 2014 1435				SEP 02 2014 1435	Soil DS = Drum Solids Sediment DL = Drum Liquids Solid T = Tissue Sludge SL = Sludge Water W = Water Oil O = Oil Air A = Air
Relinquished By			SEP 03 2014 0930	LD. Wall			SEP 03 2014 0930	Drum Solids DS = Drum Liquids DL = Tissue T = Wipe WI = Liquid L = Vegetation V = Other X =
Relinquished By			SEP 03 2014 1400	LD. Wall			SEP 03 2014 1400	
Relinquished By				P. Renteria			SEP 15 2014 0930	

**FINAL SAMPLE DISPOSITION**  
 Disposal Method (e.g., Return to customer, per lab procedure, used in process):  
 Disposed By: P. Renteria Date: 9/15/14 0930

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Collector	S.W. King CHPRC X14-061	Contact/Requester	Karen Waters-Husted	Telephone No.	509-376-4650
SAF No.		Sampling Origin	Hanford Site	Purchase Order/Charge Code	303308ES20
Project Title	AQUIFER TUBES, SEPTEMBER 2014	Logbook No.	HNF-N-50659 / 95	Ice Chest No.	6005-180
Shipped To (Lab)	GEL Laboratories, LLC	Method of Shipment	Commercial Carrier	Bill of Lading/Air Bill No.	7710 3444 4560
Protocol	SURV	Priority:	30 Days	Offsite Property No.	5056
<b>POSSIBLE SAMPLE HAZARDS/REMARKS</b> *** 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		<b>SPECIAL INSTRUCTIONS</b> Hold Time: Total Activity Exemption: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>			

Sample No.	Filter	* Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B2XJ61	N	SEP 03 2014	0918	1x1-L G/P	SRTOT_SEP_PRECIP_GPC; COMMON	6 Months	HNO3 to pH <2

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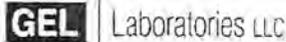
Relinquished By	S.W. King CHPRC	Print	S.W. King	Sign	[Signature]	Date/Time	SEP 03 2014 1210	Received By	L.B. Wall CHPRC	Print	L.B. Wall	Sign	[Signature]	Date/Time	SEP 03 2014 1210	Matrix #	DS = Drum Solids DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation X = Other
Relinquished By	L.B. Wall CHPRC	Print	L.B. Wall	Sign	[Signature]	Date/Time	SEP 03 2014 1400	Received By	FEDEX	Print	FEDEX	Sign	[Signature]	Date/Time			
Relinquished By	Fz Dk	Print	Fz Dk	Sign	[Signature]	Date/Time	SEP 03 2014 09:05	Received By	P. Dent Patricia Dent	Print	P. Dent Patricia Dent	Sign	[Signature]	Date/Time	9/14/14 09:05		
Relinquished By		Print		Sign		Date/Time		Received By		Print		Sign		Date/Time			
<b>FINAL SAMPLE DISPOSITION</b>	Disposal Method (e.g., Return to customer, per lab procedure, used in process)													Date/Time			

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Effective 11/7/2013  
Revision 0 Effective November 2013

Sample Receipt and Review Form

GL-CHL-SR-001 Rev 0  
Page 1 of 1



SAMPLE RECEIPT & REVIEW FORM

Client: <b>HMSA</b>		SDG/AR/COC/Work Order: <b>356019</b> <b>356011</b>	
Received By: <b>P. Nient</b>		Date Received: <b>9/24/14</b> <b>2014.20.14</b>	
Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?		X	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <b>01cpm</b>
Classified Radioactive II or III by RSO?		X	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?		X	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		X	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?		X	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		X	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	X			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	X			Preservation Method: Ice bags Blue ice Dry ice None Other (describe) <b>2c</b> *all temperatures are recorded in Celsius
2a Daily check performed and passed on IR temperature gun?	X			Temperature Device Serial #: Secondary Temperature Device Serial # (If Applicable): <b>130462966</b>
3 Chain of custody documents included with shipment?	X			
4 Sample containers intact and sealed?	X			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	X			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 VOA vials free of headspace (defined as < 6mm bubble)?		X		Sample ID's and containers affected:
7 Are Encore containers present?			X	(If yes, immediately deliver to Volatiles laboratory)
8 Samples received within holding time?	X			ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	X			Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	X			Sample ID's affected:
11 Number of containers received match number indicated on COC?				Sample ID's affected: <b>Missing Coolers</b>
12 Are sample containers identifiable as GEL provided?			X	
13 COC form is properly signed in relinquished/received sections?	X			
14 Carrier and tracking number.				Circle Applicable: <u>FedEx Air</u> FedEx Ground UPS Field Services Courier Other <b>7710 3444 4560</b>

Comments (Use Continuation Form if needed):

# **Data Review Qualifier Definitions**

## Project Specific Qualifier Definitions for GEL Client Code: **HMSA**

Code	Status	Qualifier Definition	CofA	Department	Fraction	Additional Comments
U	Programmed	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.	Y			Includes MDA, TPU, count uncert.
J	Programmed	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated	Y	Organics		Organics only
P	Programmed	Aroclor target analyte with greater than 25% difference between column analyses.	Y	Organics		PCB only
C	Manual	Analyte has been confirmed by GC/MS analysis	Y	Organics	Pesticide	IF GC/MS confirmation was attempted but unsuccessful do not qualify with C
B	Programmed	The analyte was detected in both the associated QC blank and in the sample.	Y	Organics		
E	Manual	Concentration exceeds the calibration range of the instrument	Y	Organics		Qualifier Uploaded
A	Manual	The TIC is a suspected aldol-condensation product	Y	Organics	Semi-Volatile	Uploaded with TIC
X	Programmed	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier	Y			Replaces H Hold Date In RAD replaces UI. Same usage as standard X as well.
N	Programmed	Spike Sample recovery is outside control limits.	Y			
*	Programmed	Duplicate analysis not within control limits	Y	Inorganics		
>	Programmed	Result greater than quantifiable range or greater than upper limit of the analysis range	Y	General Chemistry		
Z	Manual	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier	Y			
B	Programmed	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).	Y	Inorganics	Metals	Replaces J Estimated Value
D	Programmed	Results are reported from a diluted aliquot of sample.	Y			Dilution
E	Programmed	Reported value is estimated due to interferences. See comment in narrative.	Y	Inorganics	Metals	GEL E
M	Manual	Duplicate precision not met.	Y	Inorganics	Metals	Replaces *
o	Programmed	Analyte failed to recover within LCS limits (Organics only)	Y	Organics		
S	Manual	Reported value determined by the Method of Standard Additions (MSA)	Y	Inorganics		Not coded B/C Rarely performed
T	Programmed	Spike and/or spike duplicate sample recovery is outside control limits.	Y	Organics		GC/MS only
W	Manual	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.	Y	Inorganics		No GFAA in house.
B	Programmed	The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is $\geq$ MDA for this sample	Y	Radiological		
Y	Manual	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier	Y			
+	Manual	Correlation coefficient for Method of Standard Additions (MSA) is < 0.995	Y	Inorganics		
B	Programmed	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).	Y	General Chemistry		Replaces J Estimated Value
C	Programmed	Target analyte was detected in the sample and the associated blank. The associated blank concentration is $\geq$ EQL or is > 5% of the measured concentration and/or decision level for associated samples.	Y	Inorganics	Metals	Replaces B Blank Detection
C	Programmed	Target analyte was detected in the sample and the associated blank. The associated blank concentration is $\geq$ EQL or is > 5% of the measured concentration and/or decision level for associated samples.	Y	General Chemistry		Replaces B Blank Detection
<	Programmed	Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide	Y	General Chemistry		for Reactive CN/S

# Laboratory Certifications

**List of current GEL Certifications as of 01 October 2014**

<b>State</b>	<b>Certification</b>
Alaska	UST-110
Arkansas	88-0651
CLIA	42D0904046
California NELAP	01151CA
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC000122013-10
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-12-00283, P330-12-00284
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC000122013-10
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA130005
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC000122013-10
Nebraska	NE-OS-26-13
Nevada	SC000122014-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
Oklahoma	9904
Pennsylvania NELAP	68-00485
Plant Material Permit	PDEP-12-00260
South Carolina Chemistry	10120001
South Carolina GVL	23611001
South Carolina Radiochemi	10120002
Tennessee	TN 02934
Texas NELAP	T104704235-14-9
Utah NELAP	SC000122014-14
Vermont	VT87156
Virginia NELAP	460202
Washington	C780-12
Wisconsin	999887790

# Radiological Analysis

**October 1, 2014**  
**Radiochemistry Case Narrative**  
**Hanford MSA (HMSA)**  
**SDG GEL356011**  
**Work Order 356011**

**Method/Analysis Information**

**Product:** SRTOT\_SEP\_PRECIP\_GPC: COMMON

Analytical Method: SRTOT\_SEP\_PRECIP\_GPC

Analytical Batch Number: 1419083

<b>Sample ID</b>	<b>Client ID</b>
356011001	B2XJ53
356011002	B2XJ54
356011003	B2XJ61
1203167476	MB for batch 1419083
1203167478	Laboratory Control Sample (LCS)
1203167477	356062003(B2XJ67) Sample Duplicate (DUP)

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

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-004 REV# 17.

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

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

**Sample Geometry**

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

**Quality Control (QC) Information:**

**Blank Information**

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

**Designated QC**

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

**QC Information**

October 1, 2014

All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**

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

**Sample Re-prep/Re-analysis**

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

**Chemical Recoveries**

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

**Recounts**

None of the samples in this sample set were recounted.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**

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

**Sample-Specific MDA/MDC**

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

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** TRITIUM\_DIST\_LSC: COMMON  
**Analytical Method:** TRITIUM\_DIST\_LSC  
**Analytical Batch Number:** 1418820

<b>Sample ID</b>	<b>Client ID</b>
356011001	B2XJ53
356011002	B2XJ54
1203166815	MB for batch 1418820
1203166818	Laboratory Control Sample (LCS)
1203166816	356403002(B2X7N8) Sample Duplicate (DUP)
1203166817	356403002(B2X7N8) Matrix Spike (MS)

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

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-002 REV# 21.

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

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

**Sample Geometry**

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

**Quality Control (QC) Information:**

**Blank Information**

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

**Designated QC**

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

**QC Information**

All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**

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

**Sample Re-prep/Re-analysis**

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

**Recounts**

Samples 1203166816 (B2X7N8), 1203166817 (B2X7N8), 1203166818 (LCS), 356011001 (B2XJ53) and 356011002 (B2XJ54) were recounted due to low recovery. The recounts are reported. Sample 1203166815 (MB) was recounted due to low recovery and then recounted due to high MDC. The third count is reported.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**

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

**Sample-Specific MDA/MDC**

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

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Certification Statement**

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

October 1, 2014

**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: GEL356011 GEL Work Order: 356011

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

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

**Review/Validation**

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

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

**Signature:** 

**Name:** Kate Gellatly

**Date:** 01 OCT 2014

**Title:** Analyst I

# Sample Data Summary

~~October 1, 2014~~  
**GEL LABORATORIES LLC**

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

**Certificate of Analysis**

Company : CH2MHill Plateau Remediation  
Address : Company  
MSIN R3-50 CHPRC  
PO Box 1600  
Richland, Washington 99352  
Contact: Mr. Scot Fitzgerald  
Project: CHPRC SAF X14-061

Report Date: October 1, 2014

Client Sample ID: B2XJ53  
Sample ID: 356011001  
Matrix: WATER  
Collect Date: 02-SEP-14  
Receive Date: 05-SEP-14  
Collector: Client

Project: HMSA00198  
Client ID: HMSA001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gas Flow Proportional Counting</b>													
<i>SRTOT_SEP_PRECIP_GPC: COMMON "As Received"</i>													
Total Strontium		1.98	+/-1.10	1.49	+/-1.20	2.00	pCi/L		KSD1	09/25/14	1139	1419083	1
<b>Rad Liquid Scintillation Analysis</b>													
<i>TRITIUM_DIST_LSC: COMMON "As Received"</i>													
Tritium		10100	+/-372	147	+/-1990	100	pCi/L		BYS1	09/25/14	1459	1418820	2

**The following Analytical Methods were performed**

Method	Description
1	EPA 905.0 Modified
2	EPA 906.0 Modified

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

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

# GEL LABORATORIES LLC

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

## Certificate of Analysis

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

Report Date: October 1, 2014

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

Client Sample ID: B2XJ54  
 Sample ID: 356011002  
 Matrix: WATER  
 Collect Date: 02-SEP-14  
 Receive Date: 05-SEP-14  
 Collector: Client

Project: HMSA00198  
 Client ID: HMSA001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gas Flow Proportional Counting</b>													
<i>SRTOT_SEP_PRECIP_GPC: COMMON "As Received"</i>													
Total Strontium	U	0.559	+/-1.11	1.98	+/-1.12	2.00	pCi/L		KSD1	09/25/14	1136	1419083	1
<b>Rad Liquid Scintillation Analysis</b>													
<i>TRITIUM_DIST_LSC: COMMON "As Received"</i>													
Tritium		9130	+/-347	142	+/-1800	100	pCi/L		BYS1	09/25/14	1632	1418820	2

**The following Analytical Methods were performed**

Method	Description
1	EPA 905.0 Modified
2	EPA 906.0 Modified

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

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

~~October 1, 2014~~  
**GEL LABORATORIES LLC**

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

**Certificate of Analysis**

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

Report Date: October 1, 2014

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

Client Sample ID: B2XJ61  
Sample ID: 356011003  
Matrix: WATER  
Collect Date: 03-SEP-14  
Receive Date: 04-SEP-14  
Collector: Client

Project: HMSA00198  
Client ID: HMSA001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
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**Rad Gas Flow Proportional Counting**

*SRTOT\_SEP\_PRECIP\_GPC: COMMON "As Received"*

Total Strontium	U	0.0668	+/-0.950	1.83	+/-0.950	2.00	pCi/L		KSD1	09/25/14	1136	1419083	1
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**The following Analytical Methods were performed**

Method	Description
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1	EPA 905.0 Modified
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Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Strontium Carrier	SRTOT_SEP_PRECIP_GPC: COMMON "As Received"	1419083	86.3	(25%-125%)

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

# Quality Control Data

# GEL LABORATORIES LLC

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## QC Summary

Report Date: October 1, 2014  
Page 1 of 2

**Client :** CH2M Hill Plateau Remediation Company  
**MSIN R3-50 CHPRC**  
**PO Box 1600**  
**Richland, Washington 99352**  
**Contact:** Mr. Scot Fitzgerald  
**Workorder:** 356011

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

**Notes:**

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

The Qualifiers in this report are defined as follows:

- B The associated QC sample blank has a result  $\geq 2X$  the MDA and, after corrections, result is  $\geq$  MDA for this sample
- 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

~~October 1, 2014~~  
**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 356011

Page 2 of 2

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

\*\* Indicates analyte is a surrogate compound.

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

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

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