

July 21, 2014

REVISION 1



PO Box 30712 Charleston, SC 29417
2040 Savage Road Charleston, SC 29407
P 843.556.8171 F 843.766.1178

www.gel.com

July 02, 2014

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

Re: CHPRC SAF S14-006
Work Order: 350586
SDG: GEL350586

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 13, 2014. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,

A handwritten signature in cursive script that reads "Heather Shaffer".

Heather Shaffer
Project Manager

Purchase Order: 300071ES20
Chain of Custody: S14-006-134, S14-006-139, S14-006-140, S14-006-141, S14-006-142, S14-006-143,
S14-006-144, S14-006-180, S14-006-181 and S14-006-184
Enclosures



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Case Narrative

**General Narrative
for
Hanford MSA (51204)
CHPRC SAF S14-006
SDG: GEL350586**

July 02, 2014

Laboratory Identification:

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

Summary

Sample receipt

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on June 13, 2014, for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Items of Note All efforts were made by the lab to meet any short hold times. Samples that were analyzed outside of the initial hold time but still within 2X hold time will be noted in the lab case narrative and DER.

Sample Identification

The laboratory received the following samples:

Laboratory Identification	Sample Description
350586001	B2WRF8
350586002	B2WP90
350586003	B2WPL0
350586004	B2WPL6
350586005	B2WPK9
350586006	B2WPL5
350586007	B2WPK0
350586008	B2WPK4
350586009	B2WPJ9
350586010	B2WPK3
350586011	B2WRD4
350586012	B2WPL1
350586013	B2WPL2
350586014	B2WRD5

Case Narrative

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

Data Package

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



Heather Shaffer
Project Manager

SAMPLE ISSUE RESOLUTION

SIR NUM SDR14-263
REV NUM 0
DATE INITIATED 7/15/2014

SAMPLE EVENT INFORMATION

SAF NUM(S) S14-006
OPERABLE UNIT(S) NONE
PROJECT(S) SURV14
SAMPLE EVENT TITLE(S) SURV14
LABORATORY GEL Laboratories, LLC

SAMPLING INFORMATION

NUMBER OF SAMPLES 6
SAMPLE NUMBERS B2WPK9, B2WPL0, B2WPL1, B2WPL2, B2WPL5, B2WPL6
SAMPLE MATRIX WATER
COLLECTION DATE 6/12/2014 - 6/12/2014
SDG NUM GEL350586

ISSUE BACKGROUND

CLASS Chain of Custody Issue (Field)
TYPE No/Illegible Relinquisher/Receiver Listed on COC
DESCRIPTION There are 2 signatures missing on each of the following pages: 7, 8, 12, 13. Samples: B2WPK9, B2WPL5, B2WPL0, B2WPL6, B2WPL1, B2WPL2. C.O.C.#: S14-006-143, S14-006-141, S14-006-142, S14-006-144

DISPOSITION

DESCRIPTION PROPOSED DISPOSITION: Document the excursion, insert the SIR into the data package and close the SIR.

JUSTIFICATION ACCEPTED DISPOSITION: Accept proposed resolution.

SUBMITTED BY: Kira Murray/CHPRC DATE: 7/15/14
 ACCEPTED BY: Susan Puckett/CHPRC DATE: 7/16/14

Chain of Custody and Supporting Documentation

350580

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # **S14-006-184**
Page 1 of 1

CH2M Hill Plateau Remediation Company

Collector: **D.L. Floyd CHPRC**
 SAF No.: **S14-006**
 Project Title: **SURV, JUNE 2014**
 Shipped To (Lab): **GEL Laboratories, LLC**
 Protocol: **SURV**

Contact/Requester: **Karen Waters-Husted**
 Telephone No.: **509-376-4650**
 Sampling Origin: **Hanford Site**
 Purchase Order/Charge Code: **300071ES20**
 Logbook No.: **HNF-N-506 65161**
 Ice Chest No.: **6W5-120**
 Method of Shipment: **Commercial Carrier**
 Bill of Lading/Air Bill No.: **770285874736**
 Priority: **30 Days**
 Offsite Property No.: **4860**

PRIORITY

SPECIAL INSTRUCTIONS Hold Time: **6 Months**
 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.: **B2WRF8**
 Filter: **N**
 Date: **JUN 11 2014**
 Time: **12:13**
 No./Type Container: **1x500-mL GIP**
 Sample Analysis: **KPA_UTOT: COMMON**
 Holding Time: **6 Months**
 Preservative: **HNO3 to pH <2**

Relinquished By D.L. Floyd CHPRC	Print 	Sign	Date/Time JUN 11 2014 / 1418	Received By SSU #1	Print	Sign 6-11-14 / 1418	Date/Time 6-11-14 / 1418	Matrix *
Relinquished By SSU-1 K.M. Campbell CHPRC	Print 	Sign	Date/Time JUN 12 2014	Received By K.M. Campbell CHPRC	Print K.M. Campbell	Sign CHPRC	Date/Time JUN 12 2014 0800	S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air
Relinquished By SSU-1 K.M. Campbell CHPRC	Print 	Sign	Date/Time JUN 12 2014	Received By FEDEX	Print FEDEX	Sign	Date/Time JUN 12 2014	DS = Drum Solids DL = Drum Liquids T = Tissue WI = Wine L = Liquid V = Vegetation X = Other
FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process)		Date/Time	Received By H. Taylor	Print 	Sign 061314 0910	Date/Time 061314 0910	

CH2M Hill Plateau Remediation Company		C.O.C. #	
E.L. Kauer CHPRC		S14-006-134	
S14-006		Page 1 of 1	
Project Title	Collecting	Telephone No.	509-376-4650
Shipped To (Lab)	Requester	Purchase Order/Charge Code	303309ES20
GEL Laboratories, LLC	Karen Waters-Husted	Ice Chest No.	6WS-347
SURV	Sampling Origin	Bill of Lading/Air Bill No.	7702 6608 3619
	Hanford Site	Offsite Property No.	4856
	Logbook No.	SPECIAL INSTRUCTIONS	
	HNF-N-506 64/56	Hold Time	
	Method of Shipment	Total Activity Exemption: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
	Priority: 30 Days	Hold Time	
POSSIBLE SAMPLE HAZARDS/REMARKS		Hold Time	
*** 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 Analysis	
Sample No.	Filler	No/Type Container	Holding Time
B2WP90	N	1x500-mL P	6 Months
	Date	TRITIUM_DIST_LSC: COMMON	Preservative
	Time		None
	6-16-14		
	12/6		

Relinquished By	Print	Sign	Received By	Print	Sign	Date/Time	Matrix *
E.L. Kauer	<i>E.L. Kauer</i>	6-16-14	SSU-1	SSU-1	<i>L.D. Wall</i>	6-10-14	S = Soil
CHPRC					CHPRC		SE = Sediment
SSU-1							SO = Solid
L.D. Wall	<i>L.D. Wall</i>	JUN 11 2014 0910				JUN 11 2014 0810	SL = Sludge
CHPRC							W = Water
							O = Oil
							A = Air
							DS = Drum Solids
							DL = Drum Liquids
							T = Tissue
							WI = Wipe
							L = Liquid
							V = Vegetation
							X = Other
FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process)		Received By		Date/Time		
	Fedex		<i>H. Taylor</i>		JUN 11 2014 0910		
PRINTED ON 5/9/2014			Disposed By		Date/Time		

A-6004-842 (REV 2)

CH2M Hill Plateau Remediation Company		C.O.C. # S14-006-143	
E.L. Kauer CHPRC		Page 1 of 1	
Collector	E.L. Kauer CHPRC	Contact/Requester	Karen Waters-Husted
SAF No.	S14-006	Telephone No.	509-376-4650
Project Title	SURV, JUNE 2014	Sampling Origin	Hanford Site
Shipped To (Lab)	GEL Laboratories, LLC	Logbook No.	HNF-N-506-44 / 58
Protocol	SURV	Method of Shipment	Commercial Carrier
POSSIBLE SAMPLE HAZARDS/REMARKS *** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1		Priority:	30 Days
SPECIAL INSTRUCTIONS		Hold Time	4860
Total Activity Exemption: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>			

Sample No.	Filter	* W	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B2WPL0	N	W	6-12-14	0855	1x250-mL G/P	2320_ALKALINITY: GW 01	14 Days	Cool <=6C
B2WPL0	N	W			1x500-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: GW 01	6 Months	HNO3 to pH <2
B2WPL6	Y	W			1x500-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: GW 01	6 Months	HNO3 to pH <2

Relinquished By E.L. Kauer CHPRC	Date/Time 1000	Received By CHPRC	Date/Time 6-12-14	Print CHPRC	Sign E.L. Kauer	Date/Time 1000	Matrix *
Relinquished By K.M. Campbell CHPRC	Date/Time 1135	Received By K.M. Campbell CHPRC	Date/Time 6-12-14	Print CHPRC	Sign K.M. Campbell	Date/Time 1135	Matrix *
Relinquished By K.M. Campbell CHPRC	Date/Time 1400	Received By FEDEX	Date/Time JUN 12 2014	Print FEDEX	Sign FEDEX	Date/Time 1400	Matrix *
Relinquished By H. Taylor	Date/Time Fedex	Received By H. Taylor	Date/Time JUN 12 2014	Print H. Taylor	Sign H. Taylor	Date/Time 061314 0910	Matrix *
FINAL SAMPLE DISPOSITION Disposal Method (e.g., Return to customer, per lab procedure, used in process)		Disposed By					

A-6004-842 (REV 2)

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C.O.C. # **S14-006-141**
Page 1 of 1

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

CH2M Hill Plateau Remediation Company

Collector: E.L. Kauer
CHPRC

SAF No.: S14-006

Project Title: SURV, JUNE 2014

Shipped To (Lab): GEL Laboratories, LLC

Protocol: SURV

Contact/Requester: Karen Waters-Husted

Sampling Origin: Hanford Site

Logbook No.: HNF-N-506 64/58

Method of Shipment: Commercial Carrier

Priority: 30 Days **PRIORITY**

Telephone No.: 509-376-4650

Purchase Order/Charge Code: 300071ES20

Ice Chest No.: 605-350

Bill of Lading/Air Bill No.: 17702 85875386

Offsite Property No.: 4860

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
B2WPK9	N	W	6-12-14	0730	1x250-mL G/P	2320_ALKALINITY: GW 01	14 Days	Cool <=6C
B2WPK9	N	W	6-12-14	0730	1x500-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_CPMS: GW 01	6 Months	HNO3 to pH <2
B2WPL5	Y	W	6-12-14	0730	1x500-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_CPMS: GW 01	6 Months	HNO3 to pH <2

Relinquished By: E.L. Kauer CHPRC	Date/Time: 1000	Received By: CHPRC BE Briggs	Date/Time: 1000	Sign: <i>6-12-14</i>	Print: <i>6-12-14</i>	Matrix * S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air
Relinquished By: BE Briggs	Date/Time: 1135	Received By: K.M. Campbell CHPRC	Date/Time: 1135	Sign: <i>6-12-14</i>	Print: <i>6-12-14</i>	Matrix * DS = Drum Solids DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation X = Other
Relinquished By: K.M. Campbell CHPRC	Date/Time: 1400	Received By: FEDEX	Date/Time: 1400	Sign: <i>JUN 12 2014</i>	Print: <i>JUN 12 2014</i>	
Relinquished By: FEDEX	Date/Time: 0910	Received By: H. Taylor	Date/Time: 0910	Sign: <i>6-13-14</i>	Print: <i>6-13-14</i>	

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

Disposed By: *H. Taylor*

A-6004-842 (REV 2)

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CH2MHill Plateau Remediation Company		C.O.C. # S14-006-140	
Page 1 of 1			
Collector	Brotherton HPRC	Contact/Requester	Karen Waters-Husted
SAF No.	S14-006	Sampling Origin	Hanford Site
Project Title	SURV, JUNE 2014	Logbook No.	HNF-N-506 <u>46131</u>
Shipped To (Lab)	GEL Laboratories, LLC	Method of Shipment	Commercial Carrier
Protocol	SURV	Priority:	30 Days PRIORITY
POSSIBLE SAMPLE HAZARDS/REMARKS *** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1		SPECIAL INSTRUCTIONS Hold Time <input type="checkbox"/> 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
B2WPK0	N	W JUN 12 2014	0901	1x250-mL G/P	2320_ALKALINITY: GW 01	14 Days	Cool <=6C
B2WPK0	N	W		1x500-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: GW 01	6 Months	HNO3 to pH <2
B2WPK4	Y	W		1x500-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: GW 01	6 Months	HNO3 to pH <2

Relinquished By	D.W. Brotherton	Print	<i>DWB</i>	Sign		Date/Time	JUN 12 2014 1220
Relinquished By	CHPRC	Print		Sign	<i>L.D. Wall</i>	Date/Time	JUN 12 2014 1220
Relinquished By	L.D. Wall	Print	<i>L.D. Wall</i>	Sign	<i>L.D. Wall</i>	Date/Time	JUN 12 2014 1220
Relinquished By	CHPRC	Print		Sign	<i>FEDEX</i>	Date/Time	
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Relinquished By		Print	<i>FEDEX</i>	Sign	<i>FEDEX</i>	Date/Time	

Received By	L.D. Wall	Print	<i>L.D. Wall</i>	Sign	<i>L.D. Wall</i>	Date/Time	JUN 12 2014 1220
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CH2M Hill Plateau Remediation Company		C.O.C. # S14-006-139	
Collector <i>Don Beatherton</i>		Telephone No.	509-376-4650
SAF No.	S14-006	Purchase Order/Charge Code	300071ES20
Project Title	SURV, JUNE 2014	Ice Chest No.	6WS-350
Shipped To (Lab)	GEL Laboratories, LLC	Bill of Lading/Air Bill No.	7702 85875386
Protocol	SURV	Offsite Property No.	4860
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 <input type="checkbox"/> No <input checked="" type="checkbox"/>	Priority: 30 Days PRIORITY

Sample No.	Filter	* Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B2WPJ9	N	JUN 12 2014	0820	1x250-mL G/P	2320_ALKALINITY: GW 01	14 Days	Cool <=6C
B2WPJ9	N	W	/	1x500-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: GW 01	6 Months	HNO3 to pH <2
B2WPK3	Y	W	/	1x500-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: GW 01	6 Months	HNO3 to pH <2

Relinquished By	<i>Don Beatherton</i>	Print	<i>Don Beatherton</i>	Sign	<i>Don Beatherton</i>	Date/Time	JUN 12 2014 1220
Relinquished By	L.D. Wall	Print	L.D. Wall	Sign	<i>L.D. Wall</i>	Date/Time	JUN 12 2014 1220
Relinquished By	CHPRC	Print	CHPRC	Sign	CHPRC	Date/Time	JUN 12 2014 1400
Relinquished By	Fedex	Print	Fedex	Sign	<i>Fedex</i>	Date/Time	JUN 12 2014 0910

Received By	L.D. Wall	Print	L.D. Wall	Sign	<i>L.D. Wall</i>	Date/Time	JUN 12 2014 1220
Received By	FEDEX	Print	FEDEX	Sign	FEDEX	Date/Time	JUN 12 2014 0910
Received By	H. Taylor	Print	H. Taylor	Sign	<i>H. Taylor</i>	Date/Time	JUN 12 2014 0910
Received By	CHPRC	Print	CHPRC	Sign	CHPRC	Date/Time	JUN 12 2014 0910

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

FINAL SAMPLE DISPOSITION	
PRINTED ON	5/9/2014

A-6004-842 (REV 2)

CH2M Hill Plateau Remediation Company		C.O.C. # S14-006-180	
Collector: F.M. Hall CHPRC		Contact/Requester: Karen Waters-Husted	Telephone No. 509-376-4650
SAF No. S14-006		Sampling Origin: Hanford Site	Purchase Order/Charge Code: 300071ES20
Project Title: SURV, JUNE 2014		Logbook No. HNF-N-506 66137	Ice Chest No. GWS-120
Shipped To (Lab): GEL Laboratories, LLC		Method of Shipment: Commercial Carrier	Bill of Lading/Air Bill No. 770285874736
Protocol: SURV		Priority: 30 Days	Offsite Property No. 4860
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: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Total Activity Exemption: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B2WRD4	N	W	JUN 11 2014	1210	1x250-mL GIP	2320_ALKALINITY: GW 01	14 Days	Cool <=6C
B2WRD4	N	W			1x500-mL GIP	6010_METALS_ICP: COMMON; 6010_METALS_ICP: GW 03	6 Months	HNO3 to pH <2
B2WRD4	N	W			4x40-mL aGs*	8260_VOA_GCMS: COMMON; 8260_VOA_GCMS: GW 01	14 Days	HCl or H2SO4 to pH <2/Cool <=6C
B2WRD4	N	W			1x500-mL GIP	ALPHA_GPC.DISCRETE: COMMON; BETA_GPC: COMMON	6 Months	HNO3 to pH <2
B2WRD4	N	W	JUN 11 2014	1210	1x500-mL GIP	KPA_UTOT: COMMON	6 Months	HNO3 to pH <2

Relinquished By: F.M. Hall CHPRC	Print:	Sign:	Date/Time: JUN 11 2014 1530	Received By: SSU-1	Print:	Sign:	Date/Time: JUN 11 2014 1530	Matrix * S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air
Relinquished By: SSU-1	Print:	Sign:	Date/Time: JUN 12 2014	Received By: K.M. Campbell CHPRC	Print:	Sign: K.M. Campbell	Date/Time: JUN 12 2014	Matrix * DS = Drum Solids DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation X = Other
Relinquished By: K.M. Campbell CHPRC	Print:	Sign: K.M. Campbell	Date/Time: JUN 12 2014	Received By: FEDEX	Print:	Sign: FEDEX	Date/Time: JUN 12 2014	
Relinquished By: CHPRC	Print:	Sign: CHPRC	Date/Time: JUN 12 2014	Received By: H. Taylor	Print:	Sign: H. Taylor	Date/Time: JUN 12 2014	

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

Disposed By:

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		C.O.C. # S14-006-142
Collector E.L. Kauer CHPRC	Contact/Requester Karen Waters-Husted	Telephone No. 509-376-4650	Page 1 of 1	
SAF No. S14-006	Sampling Origin Hanford Site	Purchase Order/Charge Code 300071ES20		
Project Title SURV, JUNE 2014	Logbook No. HNF-N-506 64 / 58	Ice Chest No. 6WS-350		
Shipped To (Lab) GEL Laboratories, LLC	Method of Shipment Commercial Carrier	Bill of Lading/Air Bill No. 7702 85875386		
Protocol SURV	Priority: 30 Days	Offsite Property No. 4860	Total Activity Exemption: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
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. B2WPL1	Filter N	Date 6-12-14	Time 0730	No/Type Container 1x250-mL GIP
				Sample Analysis 9056_ANIONS_IC: COMMON; 9056_ANIONS_IC: GW 02
				Holding Time 28 Days/48 Hours
				Preservative Cool <=6C

Relinquished By E.L. Kauer CHPRC	Print <i>[Signature]</i>	Sign 6-12-14	Date/Time 1000	Received By CHPRC	Print <i>[Signature]</i>	Sign 6-12-14	Date/Time 1000	Matrix *
Relinquished By BeBriggs	Print <i>[Signature]</i>	Sign 6/12/14	Date/Time 1135	Received By K.M. Campbell CHPRC	Print <i>[Signature]</i>	Sign JUN 12 2014	Date/Time 1135	S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air
Relinquished By K.M. Campbell CHPRC	Print <i>[Signature]</i>	Sign JUN 12 2014	Date/Time 1400	Received By FEDEX	Print <i>[Signature]</i>	Sign JUN 12 2014	Date/Time 061314 0910	DS = Drum Solids DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation X = Other
Relinquished By FEDEX	Print <i>[Signature]</i>	Sign FEDEX	Date/Time 061314 0910	Received By H. Taylor	Print <i>[Signature]</i>	Sign 061314 0910	Date/Time 061314 0910	
FINAL SAMPLE DISPOSITION Disposal Method (e.g., Return to customer, per lab procedure, used in process)								Date/Time
PRINTED ON 5/9/2014								A-6004-842 (REV 2)

CH2M Hill Plateau Remediation Company		C.O.C. # S14-006-144	
E.L. Kauer CHPRC		Page 1 of 1	
Collector	S14-006	Telephone No.	509-376-4650
SAF No.	SURV, JUNE 2014	Purchase Order/Charge Code	300071ES20
Project Title	GEL Laboratories, LLC	Ice Chest No.	6WS-350
Shipped To (Lab)	SURV	Bill of Lading/Air Bill No.	770285875386
Protocol	SURV	Offsite Property No.	4860
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 <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Sample No.	B2WPL2	Filter	N
*	W	Date	6-12-14 0855
Time	1x250-mL G/P	No/Type Container	9056_ANIONS_IC: COMMON; 9056_ANIONS_IC: GW 02
Sample Analysis	9056_ANIONS_IC: COMMON; 9056_ANIONS_IC: GW 02	Holding Time	28 Days/48 Hours
Preservative			Cool <=6C

Relinquished By	E.L. Kauer	Print	Sign	Date/Time	1000
Relinquished By	BE Briggs	Print	Sign	Date/Time	6-12-14 1000
Relinquished By	K.M. Campbell	Print	Sign	Date/Time	1135
Relinquished By	K.M. Campbell	Print	Sign	Date/Time	1400
Relinquished By	Fidel	Print	Sign	Date/Time	06/13/14 0910
FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process)				
PRINTED ON	5/9/2014	A-6004-842 (REV 2)			

CH2MHill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		C.O.C. # S14-006-181
		Page 1 of 1		
Collector F.M. Hall CHPRC	Contact/Requester Karen Waters-Husted	Telephone No. 509-376-4650		
SAF No. S14-006	Sampling Origin Hanford Site	Purchase Order/Charge Code 30007IES20		
Project Title SURV, JUNE 2014	Logbook No. HNF-N-506 66137	Ice Chest No. 625-126		
Shipped To (Lab) GEL Laboratories, LLC	Method of Shipment Commercial Carrier	Bill of Lading/Air Bill No. 77028587473e		
Protocol SURV	Priority: 30 Days	Offsite Property No. 4860		
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 <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Sample No. B2WRD5	Filter N	No/Type Container 1x250-mL G/P	Sample Analysis 9056_ANIONS_IC: COMMON; 9056_ANIONS_C: GW 02	Preservative Cool <=6C
	Date JUN 11 2014 1210	Time 1210	Holding Time 28 Days/48 Hours	

Relinquished By F.M. Hall CHPRC	Print 	Sign [Signature]	Date/Time JUN 11 2014 1530	Received By SSU-1	Print [Signature]	Sign [Signature]	Date/Time JUN 11 2014 1530	Matrix * 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 K.M. Campbell CHPRC	Print 	Sign [Signature]	Date/Time JUN 12 2014 0800	Received By K.M. Campbell CHPRC	Print [Signature]	Sign [Signature]	Date/Time JUN 12 2014 0800	
Relinquished By K.M. Campbell CHPRC	Print 	Sign [Signature]	Date/Time JUN 12 2014 1400	Received By FEDEX	Print [Signature]	Sign [Signature]	Date/Time JUN 12 2014 0910	
Relinquished By [Signature]	Print 	Sign [Signature]	Date/Time [Signature]	Received By [Signature]	Print [Signature]	Sign [Signature]	Date/Time [Signature]	
FINAL SAMPLE DISPOSITION		Disposal Method (e.g., Return to customer, per lab procedure, used in process)		Disposed By [Signature]		Date/Time [Signature]		

SAMPLE RECEIPT & REVIEW FORM

Client: <u>HMSA</u>		SDG/AR/COC/Work Order: <u>35058 p</u>
Received By: <u>H. Taylor</u>		Date Received: <u>06/3/14</u>
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?	<input type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts):
Classified Radioactive II or III by RSO?	<input type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels? <u>0cpm</u>
COC/Samples marked containing PCBs?	<input type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?	<input type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?	<input type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?	<input type="checkbox"/>	

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Preservation Method: <u>Ice bags</u> Blue ice Dry ice None Other (describe) *All temperatures are recorded in Celsius
2a	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>130462961</u> Secondary Temperature Device Serial # (if Applicable):
3	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4	Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
7	Are Encore containers present?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
11	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
12	Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
13	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
14	Carrier and tracking number.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other <u>7702 8587 5559 7702 8587 5386</u> <u>✓ ✓ 4736 7702 6608 3619</u> <u>5114</u> <u>5412</u>

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials HT Date 06/3/14 Page 1 of 1

Data Review Qualifier Definitions

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 (843) 556-8171

Report Date: 02-JUL-14

Project Specific Qualifier Definitions for GEL Client Code: HMSA

Code	Status	Qualifier Definition	CofA	Department	Fraction	Additional Comments
U	Programmed	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.	Y			Includes MDA, TPU, count uncert.
J	Programmed	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated	Y	Organics		Organics only
P	Programmed	Aroclor target analyte with greater than 25% difference between column analyses.	Y	Organics		PCB only
C	Manual	Analyte has been confirmed by GC/MS analysis	Y	Organics	Pesticide	IF GC/MS confirmation was attempted but unsuccessful do not qualify with C
B	Programmed	The analyte was detected in both the associated QC blank and in the sample.	Y	Organics		
E	Manual	Concentration exceeds the calibration range of the instrument	Y	Organics		Qualifier Uploaded
A	Manual	The TIC is a suspected aldol-condensation product	Y	Organics	Semi-Volatile	Uploaded with TIC
X	Programmed	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier	Y			Replaces H h flags. In RAD replaces UI. Same usage as standard X as well.
N	Programmed	Spike Sample recovery is outside control limits.	Y			
*	Programmed	Duplicate analysis not within control limits	Y	Inorganics		
>	Programmed	Result greater than quantifiable range or greater than upper limit of the analysis range	Y	General Chemistry		
Z	Manual	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier	Y			
B	Programmed	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).	Y	Inorganics	Metals	Replaces J
D	Programmed	Results are reported from a diluted aliquot of sample.	Y			Dilution
E	Programmed	Reported value is estimated due to interferences. See comment in narrative.	Y	Inorganics	Metals	GEL E
M	Manual	Duplicate precision not met.	Y	Inorganics	Metals	Replaces *
o	Programmed	Analyte failed to recover within LCS limits (Organics only)	Y	Organics		
S	Manual	Reported value determined by the Method of Standard Additions (MSA)	Y	Inorganics		Not coded B/C Rarely preformed
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 >= 2X the MDA and, after corrections, result is >= MDA for this sample	Y	Radiological		
Y	Manual	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier	Y			
+	Manual	Correlation coefficient for Method of Standard Additions (MSA) is < 0.995	Y	Inorganics		
B	Programmed	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).	Y	General Chemistry		Replaces J
C	Programmed	Target analyte was detected in the sample and the associated blank, and the sample concentration was <= 5 times the blank concentration.	Y	Inorganics	Metals	Replaces B
C	Programmed	Target analyte was detected in the sample and the associated blank, and the sample concentration was <= 5 times the blank concentration.	Y	General Chemistry		Replaces B
<	Programmed	Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide	Y	General Chemistry		for Reactive CN/S

Laboratory Certifications

List of current GEL Certifications as of 02 July 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 (A133904)
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	SC000122014-12
Vermont	VT87156
Virginia NELAP	460202
Washington	C780-12
Wisconsin	999887790

Volatile Analysis

Case Narrative

**ChemStation Case Narrative
Hanford MSA (HMSA)
SDG GEL350586**

Method/Analysis Information

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

Analytical Method: SW846 8260C

Analytical Batch Number: 1396079

Sample Analysis

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

Sample ID	Client ID
350586011	B2WRD4
1203109578	Method Blank (MB)
1203109579	350688001(B2WNF9) Post Spike (PS)
1203109580	350688001(B2WNF9) Post Spike Duplicate (PSD)
1203109581	Laboratory Control Sample (LCS)
1203109582	Laboratory Control Sample (LCS)
1203109584	350688001(B2WNF9) Post Spike (PS)
1203109585	350688001(B2WNF9) Post Spike Duplicate (PSD)
1203116618	Method Blank (MB)
1203116619	Laboratory Control Sample (LCS)
1203116620	Laboratory Control Sample (LCS)

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

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

Preparation/Analytical Method Verification

SOP Reference

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

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

Calibration Information

A complete list of the initial calibration data files with the correct dates and times of analysis are shown in the Calibration History report located in the Standard Data section of the data package.

The surrogate compounds were calibrated using a minimum five-point calibration curve. The surrogates were added by the auto sampler at a concentration of 50 ug/L or 20 ug/L for low level analyses. GEL Laboratories LLC will not have surrogate recoveries reported for Dibromofluoromethane. This is due to increased regulations for this analyte and an industry shortage.

Initial Calibration

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

Continuing Calibration Verification Requirements

The calibration verification standard requirements were not all met. Please see the Data Exception Report in the miscellaneous section of the deliverable.

Quality Control (QC) Information

Blank (MB) Statement

Target analytes were detected in the blank 1203109578 (MB) below the reporting limit.

Surrogate Recoveries

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

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 350688001 (B2WNF9) was designated for spike analysis.

Matrix Spike (PS) Recovery Statement

The spike 1203109579 (B2WNF9) recoveries were not all within the acceptance limits. See the Data Exception Report in the miscellaneous section of the data package.

Matrix Spike Duplicate (PSD) Recovery Statement

The spike duplicate 1203109580 (B2WNF9) recoveries were not all within the acceptance limits. See the Data Exception Report in the miscellaneous section of the data package.

Relative Percent Difference (RPD) Statement

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

Internal Standard (ISTD) Acceptance

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

Technical Information

Holding Time Specifications

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

Sample Preservation and Integrity

Preservation for the sample 350586011 (B2WRD4) was indicated on the vial, however the sample pH values were above 2 at the time of analysis. The samples were analyzed within 7 days from collection. Preservation for the samples 1203109579 (B2WNF9), 1203109580 (B2WNF9), 1203109584 (B2WNF9) and 1203109585 (B2WNF9) was indicated on the vials, however the sample pH value was above 2 at the time of analysis. The

samples were analyzed beyond the 7th day from collection.

Sample Dilutions/Methanol Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

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

Miscellaneous Information

Electronic Packaging Comment

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

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Data Exception (DER) Documentation

The following DER was generated for this SDG: 1308903.

Manual Integrations

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

TIC Comment

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

Additional Comments

Additional comments were not required for this SDG.

Residual Chlorine

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

System Configuration

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

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

Instrument ID	Instrument	System Configuration	Column ID	Column Description	P & T Trap
VOA3.I	Agilent 6890/5973 GC/MS w/ OI 4560/Archon Autosampler	HP6890/HP5973	DB-624	J&W, 60m x 0.25mm x 1.4um	Trap 10

VOA2.I	Agilent 7890/5975 GC/MS w/ OI Eclipse/Archon Autosampler	HP7890N/HP5975C	DB-624	J&W, 60m x 0.25mm x 1.4um	Trap 10
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Certification Statement

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

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**Qualifier Definition Report
for**

HMSA001 Hanford MSA (51204)

Client SDG: GEL350586 GEL Work Order: 350586

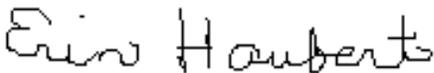
The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Erin Haubert

Date: 30 JUN 2014

Title: Data Validator

Sample Data Summary

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Certificate of Analysis

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S14-006**

Report Date: June 27, 2014

Client Sample ID: B2WRD4
 Lab Sample ID: 350586011
 Matrix: WATER
 Collect Date: 11-JUN-14 12:10
 Receive Date: 13-JUN-14
 Collector: Client

Project: HMSA00158
 Client ID: HMSA001
 Client SDG: GEL350586

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
<i>8260VOA_GCMS: COMMON + GW 01 "As Received"</i>												
1,1,1-Trichloroethane	U	ND	0.300	2.00	5.00	ug/L	1	CDS1	06/16/14	11:28	1396079	1
1,1,2-Trichloroethane	U	ND	0.300	2.00	5.00	ug/L	1					
1,1-Dichloroethane	U	ND	0.300	2.00	10.0	ug/L	1					
1,1-Dichloroethylene	U	ND	0.300	2.00	10.0	ug/L	1					
1,2-Dichloroethane	U	ND	0.300	2.00	5.00	ug/L	1					
1,4-Dichlorobenzene	U	ND	0.300	2.00	5.00	ug/L	1					
2-Butanone	TU	ND	3.00	10.0	10.0	ug/L	1					
4-Methyl-2-pentanone	U	ND	3.00	10.0	10.0	ug/L	1					
Acetone	TU	ND	3.00	10.0	20.0	ug/L	1					
Benzene	U	ND	0.300	2.00	5.00	ug/L	1					
Carbon disulfide	U	ND	1.60	10.0	5.00	ug/L	1					
Carbon tetrachloride	TU	ND	0.300	2.00	5.00	ug/L	1					
Chlorobenzene	U	ND	0.300	2.00	5.00	ug/L	1					
Chloroform	U	ND	0.300	2.00	5.00	ug/L	1					
Ethylbenzene	U	ND	0.300	2.00	5.00	ug/L	1					
Methylene chloride	BJ	2.37	1.60	5.00	5.00	ug/L	1					
Propionitrile	U	ND	3.00	10.0	10.0	ug/L	1					
Tetrachloroethylene	U	ND	0.300	2.00	5.00	ug/L	1					
Tetrahydrofuran	U	ND	1.50	10.0	50.0	ug/L	1					
Toluene	U	ND	0.300	2.00	5.00	ug/L	1					
Trichloroethene		5.80	0.300	2.00	5.00	ug/L	1					
Vinyl chloride	U	ND	0.300	2.00	10.0	ug/L	1					
Xylenes (total)	U	ND	0.300	6.00	10.0	ug/L	1					
cis-1,2-Dichloroethylene	J	0.750	0.300	2.00	5.00	ug/L	1					
n-Butyl alcohol	U	ND	83.3	250	100	ug/L	1					
trans-1,2-Dichloroethylene	U	ND	0.300	2.00	5.00	ug/L	1					

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 8260C	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	8260VOA_GCMS: COMMON + GW 01 "As	53.5 ug/L	50.0	107	(78%-124%)

July 21, 2014

REVISION 1

GEL LABORATORIES LLC

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Certificate of Analysis

Company : CH2MHill Plateau Remediation Company
Address : MSIN R3-50 CHPRC PO Box 1600 Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Project: CHPRC SAF S14-006

Report Date: June 27, 2014

Client Sample ID: B2WRD4
Lab Sample ID: 350586011

Project: HMSA00158
Client ID: HMSA001

Client SDG: GEL350586

Table with columns: Parameter, Qualifier, Result, MDL, RL, CRDL, Units, DF, Analyst, Date, Time, Batch, Method. Rows include Surrogate/Tracer recovery, Bromofluorobenzene, and Toluene-d8.

Quality Control Summary

GEL LABORATORIES LLC

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QC Summary

Report Date: June 27, 2014

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

Contact: Mr. Scot Fitzgerald

Workorder: 350586

Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS										
Batch	1396079									
QC1203109581	LCS									
1,1,1-Trichloroethane	50.0		54.9	ug/L		110	(70%-130%)	CDS1	06/16/14	08:01
1,1,2-Trichloroethane	50.0		49.4	ug/L		98.9	(70%-130%)			
1,1-Dichloroethane	50.0		53.4	ug/L		107	(70%-130%)			
1,1-Dichloroethylene	50.0		52.4	ug/L		105	(70%-130%)			
1,2-Dichloroethane	50.0		52.3	ug/L		105	(70%-130%)			
1,4-Dichlorobenzene	50.0		51.7	ug/L		103	(70%-130%)			
2-Butanone	250		275	ug/L		110	(70%-130%)			
4-Methyl-2-pentanone	250		246	ug/L		98.5	(70%-130%)			
Acetone	250		280	ug/L		112	(70%-130%)			
Benzene	50.0		52.0	ug/L		104	(70%-130%)			
Carbon disulfide	250		274	ug/L		110	(70%-130%)			
Carbon tetrachloride	50.0		55.4	ug/L		111	(70%-130%)			
Chlorobenzene	50.0		51.0	ug/L		102	(70%-130%)			
Chloroform	50.0		54.1	ug/L		108	(70%-130%)			
Ethylbenzene	50.0		52.3	ug/L		105	(70%-130%)			
Methylene chloride	50.0	B	49.2	ug/L		98.4	(70%-130%)			
Tetrachloroethylene	50.0		51.6	ug/L		103	(70%-130%)			
Toluene	50.0		50.2	ug/L		100	(70%-130%)			
Trichloroethene	50.0		54.4	ug/L		109	(70%-130%)			
Vinyl chloride	50.0		42.6	ug/L		85.1	(70%-130%)			

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QC Summary

Workorder: 350586

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1396079										
Xylenes (total)	150			159	ug/L		106	(70%-130%)	CDS1	06/16/14	08:01
cis-1,2-Dichloroethylene	50.0			52.4	ug/L		105	(70%-130%)			
n-Butyl alcohol	5000			5740	ug/L		115	(70%-130%)			
trans-1,2-Dichloroethylene	50.0			53.2	ug/L		106	(70%-130%)			
**1,2-Dichloroethane-d4	50.0			51.6	ug/L		103	(78%-124%)			
**Bromofluorobenzene	50.0			49.9	ug/L		99.8	(80%-120%)			
**Toluene-d8	50.0			47.2	ug/L		94.5	(80%-120%)			
QC1203109582	LCS										
Propionitrile	250			254	ug/L		101	(70%-130%)		06/16/14	09:01
Tetrahydrofuran	250			251	ug/L		100	(70%-130%)			
**1,2-Dichloroethane-d4	50.0			50.5	ug/L		101	(78%-124%)			
**Bromofluorobenzene	50.0			49.4	ug/L		98.8	(80%-120%)			
**Toluene-d8	50.0			48.3	ug/L		96.5	(80%-120%)			
QC1203116619	LCS										
Propionitrile	250			227	ug/L		90.8	(70%-130%)		06/24/14	09:41
Tetrahydrofuran	250			225	ug/L		90.1	(70%-130%)			
**1,2-Dichloroethane-d4	50.0			47.4	ug/L		94.9	(78%-124%)			
**Bromofluorobenzene	50.0			40.6	ug/L		81.3	(80%-120%)			
**Toluene-d8	50.0			49.2	ug/L		98.3	(80%-120%)			
QC1203116620	LCS										
1,1,1-Trichloroethane	50.0			58.6	ug/L		117	(70%-130%)		06/24/14	08:40
1,1,2-Trichloroethane	50.0			50.3	ug/L		101	(70%-130%)			
1,1-Dichloroethane	50.0			52.1	ug/L		104	(70%-130%)			

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QC Summary

Workorder: 350586

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1396079										
1,1-Dichloroethylene	50.0			56.0	ug/L		112	(70%-130%)			
1,2-Dichloroethane	50.0			52.2	ug/L		104	(70%-130%)	CDS1	06/24/14	08:40
1,4-Dichlorobenzene	50.0			53.4	ug/L		107	(70%-130%)			
2-Butanone	250			267	ug/L		107	(70%-130%)			
4-Methyl-2-pentanone	250			236	ug/L		94.6	(70%-130%)			
Acetone	250			282	ug/L		113	(70%-130%)			
Benzene	50.0			52.8	ug/L		106	(70%-130%)			
Carbon disulfide	250			278	ug/L		111	(70%-130%)			
Carbon tetrachloride	50.0			56.2	ug/L		112	(70%-130%)			
Chlorobenzene	50.0			51.3	ug/L		103	(70%-130%)			
Chloroform	50.0			52.8	ug/L		106	(70%-130%)			
Ethylbenzene	50.0			50.2	ug/L		100	(70%-130%)			
Methylene chloride	50.0			49.0	ug/L		97.9	(70%-130%)			
Tetrachloroethylene	50.0			48.4	ug/L		96.8	(70%-130%)			
Toluene	50.0			50.0	ug/L		100	(70%-130%)			
Trichloroethene	50.0			54.6	ug/L		109	(70%-130%)			
Vinyl chloride	50.0			48.3	ug/L		96.6	(70%-130%)			
Xylenes (total)	150			149	ug/L		99.3	(70%-130%)			
cis-1,2-Dichloroethylene	50.0			50.7	ug/L		101	(70%-130%)			
n-Butyl alcohol	5000			5440	ug/L		109	(70%-130%)			
trans-1,2-Dichloroethylene	50.0			53.0	ug/L		106	(70%-130%)			
**1,2-Dichloroethane-d4	50.0			49.3	ug/L		98.5	(78%-124%)			

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QC Summary

Workorder: 350586

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1396079										
**Bromofluorobenzene	50.0			49.7	ug/L		99.5	(80%-120%)			
**Toluene-d8	50.0			47.1	ug/L		94.2	(80%-120%)	CDS1	06/24/14	08:40
QC1203109578											
1,1,1-Trichloroethane			U	ND	ug/L					06/16/14	09:31
1,1,2-Trichloroethane			U	ND	ug/L						
1,1-Dichloroethane			U	ND	ug/L						
1,1-Dichloroethylene			U	ND	ug/L						
1,2-Dichloroethane			U	ND	ug/L						
1,4-Dichlorobenzene			U	ND	ug/L						
2-Butanone			U	ND	ug/L						
4-Methyl-2-pentanone			U	ND	ug/L						
Acetone			U	ND	ug/L						
Benzene			U	ND	ug/L						
Carbon disulfide			U	ND	ug/L						
Carbon tetrachloride			U	ND	ug/L						
Chlorobenzene			U	ND	ug/L						
Chloroform			U	ND	ug/L						
Ethylbenzene			U	ND	ug/L						
Methylene chloride			J	1.74	ug/L						
Propionitrile			U	ND	ug/L						
Tetrachloroethylene			U	ND	ug/L						
Tetrahydrofuran			U	ND	ug/L						
Toluene			U	ND	ug/L						

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QC Summary

Workorder: 350586

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1396079										
Trichloroethene			U	ND	ug/L				CDS1	06/16/14	09:31
Vinyl chloride			U	ND	ug/L						
Xylenes (total)			U	ND	ug/L						
cis-1,2-Dichloroethylene			U	ND	ug/L						
n-Butyl alcohol			U	ND	ug/L						
trans-1,2-Dichloroethylene			U	ND	ug/L						
**1,2-Dichloroethane-d4	50.0			51.6	ug/L		103	(78%-124%)			
**Bromofluorobenzene	50.0			49.6	ug/L		99.1	(80%-120%)			
**Toluene-d8	50.0			49.1	ug/L		98.3	(80%-120%)			
QC1203116618 MB											
1,1,1-Trichloroethane			U	ND	ug/L					06/24/14	10:12
1,1,2-Trichloroethane			U	ND	ug/L						
1,1-Dichloroethane			U	ND	ug/L						
1,1-Dichloroethylene			U	ND	ug/L						
1,2-Dichloroethane			U	ND	ug/L						
1,4-Dichlorobenzene			U	ND	ug/L						
2-Butanone			U	ND	ug/L						
4-Methyl-2-pentanone			U	ND	ug/L						
Acetone			U	ND	ug/L						
Benzene			U	ND	ug/L						
Carbon disulfide			U	ND	ug/L						
Carbon tetrachloride			U	ND	ug/L						

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QC Summary

Workorder: 350586

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1396079										
Chlorobenzene			U	ND	ug/L				CDS1	06/24/14	10:12
Chloroform			U	ND	ug/L						
Ethylbenzene			U	ND	ug/L						
Methylene chloride			U	ND	ug/L						
Propionitrile			U	ND	ug/L						
Tetrachloroethylene			U	ND	ug/L						
Tetrahydrofuran			U	ND	ug/L						
Toluene			U	ND	ug/L						
Trichloroethene			U	ND	ug/L						
Vinyl chloride			U	ND	ug/L						
Xylenes (total)			U	ND	ug/L						
cis-1,2-Dichloroethylene			U	ND	ug/L						
n-Butyl alcohol			U	ND	ug/L						
trans-1,2-Dichloroethylene			U	ND	ug/L						
**1,2-Dichloroethane-d4	50.0			52.5	ug/L		105	(78%-124%)			
**Bromofluorobenzene	50.0			48.5	ug/L		97	(80%-120%)			
**Toluene-d8	50.0			49.6	ug/L		99.1	(80%-120%)			
QC1203109579 350688001 PS											
1,1,1-Trichloroethane	50.0	U	ND	57.0	ug/L		114	(70%-130%)		06/24/14	17:14
1,1,2-Trichloroethane	50.0	U	ND	50.9	ug/L		102	(70%-130%)			
1,1-Dichloroethane	50.0	U	ND	51.3	ug/L		103	(70%-130%)			
1,1-Dichloroethylene	50.0	U	ND	53.1	ug/L		106	(70%-130%)			

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QC Summary

Workorder: 350586

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1396079										
1,2-Dichloroethane	50.0	U	ND	50.9	ug/L		102	(70%-130%)	CDS1	06/24/14	17:14
1,4-Dichlorobenzene	50.0	U	ND	51.2	ug/L		102	(70%-130%)			
2-Butanone	250	TU	ND T	145	ug/L		57.9*	(70%-130%)			
4-Methyl-2-pentanone	250	U	ND	219	ug/L		87.6	(70%-130%)			
Acetone	250	TU	ND T	106	ug/L		42.4*	(70%-130%)			
Benzene	50.0	U	ND	51.1	ug/L		102	(70%-130%)			
Carbon disulfide	250	U	ND	257	ug/L		103	(70%-130%)			
Carbon tetrachloride	50.0	ET	110 ET	136	ug/L		51.3*	(70%-130%)			
Chlorobenzene	50.0	U	ND	50.7	ug/L		101	(70%-130%)			
Chloroform	50.0		2.98	52.7	ug/L		99.4	(70%-130%)			
Ethylbenzene	50.0	U	ND	51.5	ug/L		103	(70%-130%)			
Methylene chloride	50.0	U	ND	46.9	ug/L		91.4	(70%-130%)			
Tetrachloroethylene	50.0	U	ND	50.2	ug/L		100	(70%-130%)			
Toluene	50.0	U	ND	51.2	ug/L		102	(70%-130%)			
Trichloroethene	50.0	U	ND	52.8	ug/L		106	(70%-130%)			
Vinyl chloride	50.0	U	ND	48.6	ug/L		97.2	(70%-130%)			
Xylenes (total)	150	U	ND	150	ug/L		100	(70%-130%)			
cis-1,2-Dichloroethylene	50.0	U	ND	51.0	ug/L		102	(70%-130%)			
n-Butyl alcohol	5000	U	ND	4970	ug/L		99.4	(70%-130%)			
trans-1,2-Dichloroethylene	50.0	U	ND	50.6	ug/L		101	(70%-130%)			
**1,2-Dichloroethane-d4	50.0		49.4	49.4	ug/L		98.9	(78%-124%)			

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QC Summary

Workorder: 350586

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1396079										
**Bromofluorobenzene	50.0	47.3		50.5	ug/L		101	(80%-120%)			
**Toluene-d8	50.0	49.4		49.2	ug/L		98.5	(80%-120%)	CDS1	06/24/14	17:14
QC1203109584 350688001 PS											
Propionitrile	250	U	ND	234	ug/L		93.8	(70%-130%)		06/24/14	18:15
Tetrahydrofuran	250	U	ND	234	ug/L		93.5	(70%-130%)			
**1,2-Dichloroethane-d4	50.0	49.4		47.1	ug/L		94.2	(78%-124%)			
**Bromofluorobenzene	50.0	47.3		44.0	ug/L		88.1	(80%-120%)			
**Toluene-d8	50.0	49.4		49.3	ug/L		98.6	(80%-120%)			
QC1203109580 350688001 PSD											
1,1,1-Trichloroethane	50.0	U	ND	57.3	ug/L	0.455	115	(0%-20%)		06/24/14	17:45
1,1,2-Trichloroethane	50.0	U	ND	48.6	ug/L	4.64	97.2	(0%-20%)			
1,1-Dichloroethane	50.0	U	ND	54.2	ug/L	5.52	108	(0%-20%)			
1,1-Dichloroethylene	50.0	U	ND	53.6	ug/L	0.787	107	(0%-20%)			
1,2-Dichloroethane	50.0	U	ND	52.7	ug/L	3.34	105	(0%-20%)			
1,4-Dichlorobenzene	50.0	U	ND	50.6	ug/L	1.12	101	(0%-20%)			
2-Butanone	250	TU	ND T	150	ug/L	3.85	60.2*	(0%-20%)			
4-Methyl-2-pentanone	250	U	ND	215	ug/L	1.64	86.1	(0%-20%)			
Acetone	250	TU	ND T	110	ug/L	4.12	44.1*	(0%-20%)			
Benzene	50.0	U	ND	52.6	ug/L	2.99	105	(0%-20%)			
Carbon disulfide	250	U	ND	267	ug/L	3.87	107	(0%-20%)			
Carbon tetrachloride	50.0	ET	110 ET	134	ug/L	1.40	47.6*	(0%-20%)			
Chlorobenzene	50.0	U	ND	51.4	ug/L	1.39	103	(0%-20%)			
Chloroform	50.0		2.98	56.6	ug/L	7.14	107	(0%-20%)			
Ethylbenzene	50.0	U	ND	49.9	ug/L	3.19	99.8	(0%-20%)			

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QC Summary

Workorder: 350586

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1396079										
Methylene chloride	50.0	U	ND	48.7	ug/L	3.62	94.8	(0%-20%)	CDS1	06/24/14	17:45
Tetrachloroethylene	50.0	U	ND	49.5	ug/L	1.36	99	(0%-20%)			
Toluene	50.0	U	ND	49.0	ug/L	4.39	97.9	(0%-20%)			
Trichloroethene	50.0	U	ND	54.3	ug/L	2.88	109	(0%-20%)			
Vinyl chloride	50.0	U	ND	50.9	ug/L	4.60	102	(0%-20%)			
Xylenes (total)	150	U	ND	148	ug/L	1.28	98.8	(0%-20%)			
cis-1,2-Dichloroethylene	50.0	U	ND	53.8	ug/L	5.28	108	(0%-20%)			
n-Butyl alcohol	5000	U	ND	5100	ug/L	2.70	102	(0%-20%)			
trans-1,2-Dichloroethylene	50.0	U	ND	52.9	ug/L	4.52	106	(0%-20%)			
**1,2-Dichloroethane-d4	50.0		49.4	49.5	ug/L		98.9	(78%-124%)			
**Bromofluorobenzene	50.0		47.3	50.1	ug/L		100	(80%-120%)			
**Toluene-d8	50.0		49.4	47.2	ug/L		94.5	(80%-120%)			
QC1203109585 350688001 PSD											
Propionitrile	250	U	ND	252	ug/L	7.17	101	(0%-20%)		06/24/14	18:45
Tetrahydrofuran	250	U	ND	252	ug/L	7.60	101	(0%-20%)			
**1,2-Dichloroethane-d4	50.0		49.4	47.8	ug/L		95.5	(78%-124%)			
**Bromofluorobenzene	50.0		47.3	43.4	ug/L		86.8	(80%-120%)			
**Toluene-d8	50.0		49.4	47.0	ug/L		94	(80%-120%)			

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis

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QC Summary

Workorder: 350586

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

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

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

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

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

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

Miscellaneous

DATA EXCEPTION REPORT			
Mo.Day Yr. 26-JUN-14	Division: Federal	Quality Criteria: Specifications	Type: Process
Instrument Type: VOA GC/MS	Test / Method: 8260C	Matrix Type: Liquid	Client Code: HMSA001
Batch ID: 1396079	Sample Numbers: See Below		
<p>Potentially affected work order(s)(SDG): 350586(GEL350586),350687(GEL350687),350688(GEL350688)</p> <p>Application Issues: Failed Recovery for MS/PS Other Failed Recovery for LCS/LCSD Failed Recovery for MSD/PSD</p>			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. The recovery for Acrolein was outside of acceptance limits in LCS 1203116619. The effected sample was 350688001. Acrolein recovered at 142%. The limits are 70%-130%.</p> <p>2. The recoveries for several compounds were outside of acceptance limits in the MS and MSD performed on sample 350688001. The calculated relative percent differences between the MS and MSD for all monitored compounds were within acceptance limits.</p> <p>3. The percent drifts for Acetone and Acrolein were outside of acceptance limits in the calibration verification samples both with high bias. Neither compound was detected in the associated sample 350688001.</p> <p>4. The percent drifts for Acetone and 2-Butanone were outside of acceptance limits in the calibration verification samples both with high bias. Neither compound was detected in the associated samples 350586001, 350687001.</p>		<p>1. Narrate and report data. The number of compounds with unacceptable recoveries was less than five percent of the total number of client requested compounds. The client's acceptance criteria was satisfied.</p> <p>2-4. Narrate and report data.</p>	

Originator's Name:
Crystal Stacey 27-JUN-14

Data Validator/Group Leader:
Kelle Bellamy 27-JUN-14

Metals Analysis

Case Narrative

**Metals Fractional Narrative
Hanford MSA (HMSA)
SDG GEL350586**

Sample Analysis

Sample ID	Client ID
350586003	B2WPL0
350586004	B2WPL6
350586005	B2WPK9
350586006	B2WPL5
350586007	B2WPK0
350586008	B2WPK4
350586009	B2WPJ9
350586010	B2WPK3
350586011	B2WRD4
1203108746	Method Blank (MB) ICP
1203108747	Laboratory Control Sample (LCS)
1203108750	350586003(B2WPL0L) Serial Dilution (SD)
1203108748	350586003(B2WPL0S) Matrix Spike (MS)
1203108749	350586003(B2WPL0SD) Matrix Spike Duplicate (MSD)
1203108726	Method Blank (MB) ICP-MS
1203108727	Laboratory Control Sample (LCS)
1203108730	350586003(B2WPL0L) Serial Dilution (SD)
1203108728	350586003(B2WPL0S) Matrix Spike (MS)
1203108729	350586003(B2WPL0SD) Matrix Spike Duplicate (MSD)

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

Method/Analysis Information

Analytical Batch:	1395761 and 1395753
Prep Batch :	1395760 and 1395752
Standard Operating Procedures:	GL-MA-E-013 REV# 22, GL-MA-E-006 REV# 10 and GL-MA-E-014 REV# 25
Analytical Method:	6010_METALS_ICP and 6020_METALS_ICPMS
Prep Method :	SW846 3005A

Preparation/Analytical Method Verification

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

System Configuration

The Metals analysis-ICP was performed on a P E 5300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with an ESI SC-FAST introduction, cyclonic spray chamber, and yttrium or scandium internal standard. Operating conditions for the ICP are set at a power level of 1500 watts. The instrument has a peristaltic pump flow rate of 0.4L/min, argon gas flows of 13 L/min and 0.2 L/min for the torch and auxiliary gases, and a flow setting of 0.65L/min for the nebulizer.

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

Calibration Information

Instrument Calibration

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

CRDL/PQL Requirements

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

ICSA/ICSAB Statement

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

Continuing Calibration Blanks (CCB) Requirements

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

Continuing Calibration Verification (CCV) Requirements

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MBs analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Sample Statement

The following samples were selected as the quality control (QC) samples for this SDG: 350586003 (B2WPL0)-ICP and ICP-MS.

Matrix Spike (MS) Recovery Statement

The percent recoveries (%R) obtained from the MS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. All applicable analytes met the acceptance criteria.

Matrix Spike Duplicate (MSD) Recovery Statement

The percent recovery (%R) obtained from the MSD analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. All applicable analytes met the acceptance criteria.

MS/MSD Relative Percent Difference (RPD) Statement

The relative percent difference (RPD) obtained from the designated matrix spike duplicate (MSD) is evaluated based on acceptance criteria of 20%. The RPD values between qualifying analyte results in the MS and MSD were within the acceptance limits.

Serial Dilution % Difference Statement

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

Technical Information**Holding Time Specifications**

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

Dilutions are performed to minimize matrix interferences resulting from elevated mineral element concentrations present in solid samples and/or to bring over range target analyte concentrations into the linear calibration range of the instrument. The samples in this SDG did not require dilutions.

Preparation Information

The samples in this SDG were prepared exactly according to the cited SOP.

Miscellaneous Information**Electronic Packaging Comment**

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

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also

includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. Data exception reports were included behind the Case Narrative or in the Miscellaneous Data section of this data package. A data exception report was not required for this SDG.

Additional Comments

Additional comments were not required for this SDG.

Certification Statement

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

Review Validation:

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

The following data validator verified the information presented in this case narrative:

Reviewer: Nik-Cole A. Elmer Date: 7-10-14

Sample Data Summary

GEL LABORATORIES LLC

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**Qualifier Definition Report
for**

HMSA001 Hanford MSA (51204)

Client SDG: GEL350586 GEL Work Order: 350586

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

Nik-Cole A. Elmore 7-10-14

GEL LABORATORIES LLC

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

Certificate of Analysis

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S14-006**

Report Date: July 10, 2014

Client Sample ID: B2WPL0
 Lab Sample ID: 350586003
 Matrix: WATER
 Collect Date: 12-JUN-14 08:55
 Receive Date: 13-JUN-14
 Collector: Client
 Project: HMSA00158
 Client ID: HMSA001
 Client SDG: GEL350586

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP												
<i>6010_METALS_ICP:GW 04 "As Received"</i>												
Calcium		73500	50.0	200	200	ug/L	1	HSC	07/03/14	13:42	1395761	1
Iron	U	ND	30.0	100	100	ug/L	1					
Magnesium		20400	110	300	300	ug/L	1					
Potassium		4570	50.0	150	150	ug/L	1					
Sodium		9830	100	300	300	ug/L	1					
Vanadium		8.46	1.00	5.00	5.00	ug/L	1					
Metals Analysis-ICP-MS												
<i>6020_METALS_ICPMS: GW 01 "As Received"</i>												
Antimony	U	ND	1.00	3.00	5.00	ug/L	1	BAJ	06/30/14	04:58	1395753	2
Cadmium	U	ND	0.110	1.00	2.00	ug/L	1					
Lead	U	ND	0.500	2.00	2.00	ug/L	1					
Molybdenum	B	1.64	0.165	0.500	20.0	ug/L	1					
Silver	U	ND	0.200	1.00	2.00	ug/L	1					
Strontium		480	2.00	10.0	10.0	ug/L	1					
Thallium	U	ND	0.450	2.00	2.00	ug/L	1					
Thorium	U	ND	0.383	2.00	2.00	ug/L	1					
Tin	U	ND	1.00	5.00	5.00	ug/L	1					
Arsenic	U	ND	1.70	5.00	2.00	ug/L	1	BAJ	06/30/14	14:54	1395753	3
Selenium	B	1.79	1.50	5.00	4.00	ug/L	1					
Uranium		2.86	0.067	0.200	0.200	ug/L	1					
Zinc	U	ND	3.50	10.0	10.0	ug/L	1					
Boron	B	13.5	4.00	15.0	15.0	ug/L	1	BAJ	07/01/14	13:54	1395753	4
Aluminum	U	ND	15.0	50.0	20.0	ug/L	1	BAJ	06/30/14	16:47	1395753	5
Beryllium	U	ND	0.200	0.500	2.00	ug/L	1					
Chromium		20.9	2.00	10.0	2.00	ug/L	1					
Cobalt	B	0.366	0.100	1.00	4.00	ug/L	1					
Copper	B	0.819	0.350	1.00	8.00	ug/L	1					
Manganese	U	ND	1.00	5.00	5.00	ug/L	1					
Nickel		3.40	0.500	2.00	2.00	ug/L	1					
Barium		72.8	0.600	2.00	5.00	ug/L	1	BAJ	07/03/14	16:37	1395753	6

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	JXO1	06/17/14	1000	1395752

July 21, 2014

REVISION 1

GEL LABORATORIES LLC

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Certificate of Analysis

Company : CH2MHill Plateau Remediation
Company
Address : MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Project: **CHPRC SAF S14-006**

Report Date: July 10, 2014

Client Sample ID: B2WPL0
Lab Sample ID: 350586003

Project: HMSA00158
Client ID: HMSA001

Client SDG: GEL350586

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
SW846 3005A	SW846 3005A for 6010C			JX01	06/17/14		1030	1395760				

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	6010_METALS_ICP	
2	6020_METALS_ICPMS	
3	6020_METALS_ICPMS	
4	6020_METALS_ICPMS	
5	6020_METALS_ICPMS	
6	6020_METALS_ICPMS	

GEL LABORATORIES LLC

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Certificate of Analysis

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S14-006**

Report Date: July 10, 2014

Client Sample ID: B2WPL6
 Lab Sample ID: 350586004
 Matrix: WATER
 Collect Date: 12-JUN-14 08:55
 Receive Date: 13-JUN-14
 Collector: Client

Project: HMSA00158
 Client ID: HMSA001
 Client SDG: GEL350586

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP												
<i>6010_METALS_ICP:GW 04 "As Received"</i>												
Calcium		73700	50.0	200	200	ug/L	1	HSC	07/03/14	14:03	1395761	1
Iron	U	ND	30.0	100	100	ug/L	1					
Magnesium		20500	110	300	300	ug/L	1					
Potassium		4560	50.0	150	150	ug/L	1					
Sodium		9720	100	300	300	ug/L	1					
Vanadium		8.14	1.00	5.00	5.00	ug/L	1					
Metals Analysis-ICP-MS												
<i>6020_METALS_ICPMS: GW 01 "As Received"</i>												
Antimony	U	ND	1.00	3.00	5.00	ug/L	1	BAJ	06/30/14	05:32	1395753	2
Cadmium	U	ND	0.110	1.00	2.00	ug/L	1					
Lead	U	ND	0.500	2.00	2.00	ug/L	1					
Molybdenum	B	1.56	0.165	0.500	20.0	ug/L	1					
Silver	U	ND	0.200	1.00	2.00	ug/L	1					
Strontium		475	2.00	10.0	10.0	ug/L	1					
Thallium	U	ND	0.450	2.00	2.00	ug/L	1					
Thorium	U	ND	0.383	2.00	2.00	ug/L	1					
Tin	U	ND	1.00	5.00	5.00	ug/L	1					
Arsenic	U	ND	1.70	5.00	2.00	ug/L	1	BAJ	06/30/14	15:25	1395753	3
Selenium	B	1.77	1.50	5.00	4.00	ug/L	1					
Uranium		2.73	0.067	0.200	0.200	ug/L	1					
Zinc	U	ND	3.50	10.0	10.0	ug/L	1					
Boron	B	13.0	4.00	15.0	15.0	ug/L	1	BAJ	07/01/14	14:05	1395753	4
Aluminum	U	ND	15.0	50.0	20.0	ug/L	1	BAJ	06/30/14	17:08	1395753	5
Beryllium	U	ND	0.200	0.500	2.00	ug/L	1					
Chromium		21.7	2.00	10.0	2.00	ug/L	1					
Cobalt	B	0.574	0.100	1.00	4.00	ug/L	1					
Copper	B	0.874	0.350	1.00	8.00	ug/L	1					
Manganese	U	ND	1.00	5.00	5.00	ug/L	1					
Nickel		3.56	0.500	2.00	2.00	ug/L	1					
Barium		71.9	0.600	2.00	5.00	ug/L	1	BAJ	07/03/14	17:03	1395753	6

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	JXO1	06/17/14	1000	1395752

July 21, 2014

REVISION 1

GEL LABORATORIES LLC

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

Certificate of Analysis

Company : CH2MHill Plateau Remediation
Company
Address : MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Project: **CHPRC SAF S14-006**

Report Date: July 10, 2014

Client Sample ID: B2WPL6
Lab Sample ID: 350586004

Project: HMSA00158
Client ID: HMSA001

Client SDG: GEL350586

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
SW846 3005A	SW846 3005A for 6010C			JX01	06/17/14		1030	1395760				

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	6010_METALS_ICP	
2	6020_METALS_ICPMS	
3	6020_METALS_ICPMS	
4	6020_METALS_ICPMS	
5	6020_METALS_ICPMS	
6	6020_METALS_ICPMS	

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Certificate of Analysis

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S14-006**

Report Date: July 10, 2014

Client Sample ID: B2WPK9
 Lab Sample ID: 350586005
 Matrix: WATER
 Collect Date: 12-JUN-14 07:30
 Receive Date: 13-JUN-14
 Collector: Client

Project: HMSA00158
 Client ID: HMSA001
 Client SDG: GEL350586

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP												
<i>6010_METALS_ICP:GW 04 "As Received"</i>												
Calcium	U	ND	50.0	200	200	ug/L	1	HSC	07/03/14	14:06	1395761	1
Iron	U	ND	30.0	100	100	ug/L	1					
Magnesium	U	ND	110	300	300	ug/L	1					
Potassium	U	ND	50.0	150	150	ug/L	1					
Sodium	U	ND	100	300	300	ug/L	1					
Vanadium	U	ND	1.00	5.00	5.00	ug/L	1					
Metals Analysis-ICP-MS												
<i>6020_METALS_ICPMS: GW 01 "As Received"</i>												
Antimony	U	ND	1.00	3.00	5.00	ug/L	1	BAJ	06/30/14	05:58	1395753	2
Cadmium	U	ND	0.110	1.00	2.00	ug/L	1					
Lead	U	ND	0.500	2.00	2.00	ug/L	1					
Molybdenum	U	ND	0.165	0.500	20.0	ug/L	1					
Silver	U	ND	0.200	1.00	2.00	ug/L	1					
Strontium	U	ND	2.00	10.0	10.0	ug/L	1					
Thallium	U	ND	0.450	2.00	2.00	ug/L	1					
Thorium	U	ND	0.383	2.00	2.00	ug/L	1					
Tin	U	ND	1.00	5.00	5.00	ug/L	1					
Arsenic	U	ND	1.70	5.00	2.00	ug/L	1	BAJ	06/30/14	15:29	1395753	3
Selenium	U	ND	1.50	5.00	4.00	ug/L	1					
Uranium	U	ND	0.067	0.200	0.200	ug/L	1					
Zinc	U	ND	3.50	10.0	10.0	ug/L	1					
Boron	U	ND	4.00	15.0	15.0	ug/L	1	BAJ	07/01/14	14:15	1395753	4
Aluminum	U	ND	15.0	50.0	20.0	ug/L	1	BAJ	06/30/14	17:11	1395753	5
Beryllium	U	ND	0.200	0.500	2.00	ug/L	1					
Chromium	U	ND	2.00	10.0	2.00	ug/L	1					
Cobalt	U	ND	0.100	1.00	4.00	ug/L	1					
Copper	U	ND	0.350	1.00	8.00	ug/L	1					
Manganese	U	ND	1.00	5.00	5.00	ug/L	1					
Nickel	U	ND	0.500	2.00	2.00	ug/L	1					
Barium	U	ND	0.600	2.00	5.00	ug/L	1	BAJ	07/03/14	17:06	1395753	6

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	JXO1	06/17/14	1000	1395752

July 21, 2014

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Certificate of Analysis

Company : CH2MHill Plateau Remediation
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Address : MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Project: **CHPRC SAF S14-006**

Report Date: July 10, 2014

Client Sample ID: B2WPK9
Lab Sample ID: 350586005

Project: HMSA00158
Client ID: HMSA001

Client SDG: GEL350586

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
SW846 3005A	SW846 3005A for 6010C			JX01	06/17/14		1030	1395760				

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	6010_METALS_ICP	
2	6020_METALS_ICPMS	
3	6020_METALS_ICPMS	
4	6020_METALS_ICPMS	
5	6020_METALS_ICPMS	
6	6020_METALS_ICPMS	

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 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S14-006**

Report Date: July 10, 2014

Client Sample ID: B2WPL5
 Lab Sample ID: 350586006
 Matrix: WATER
 Collect Date: 12-JUN-14 07:30
 Receive Date: 13-JUN-14
 Collector: Client

Project: HMSA00158
 Client ID: HMSA001
 Client SDG: GEL350586

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP												
<i>6010_METALS_ICP:GW 04 "As Received"</i>												
Calcium	U	ND	50.0	200	200	ug/L	1	HSC	07/03/14	14:10	1395761	1
Iron	U	ND	30.0	100	100	ug/L	1					
Magnesium	U	ND	110	300	300	ug/L	1					
Potassium	U	ND	50.0	150	150	ug/L	1					
Sodium	U	ND	100	300	300	ug/L	1					
Vanadium	U	ND	1.00	5.00	5.00	ug/L	1					
Metals Analysis-ICP-MS												
<i>6020_METALS_ICPMS: GW 01 "As Received"</i>												
Antimony	U	ND	1.00	3.00	5.00	ug/L	1	BAJ	06/30/14	06:05	1395753	2
Cadmium	U	ND	0.110	1.00	2.00	ug/L	1					
Lead	U	ND	0.500	2.00	2.00	ug/L	1					
Molybdenum	U	ND	0.165	0.500	20.0	ug/L	1					
Silver	U	ND	0.200	1.00	2.00	ug/L	1					
Strontium	U	ND	2.00	10.0	10.0	ug/L	1					
Thallium	U	ND	0.450	2.00	2.00	ug/L	1					
Thorium	U	ND	0.383	2.00	2.00	ug/L	1					
Tin	U	ND	1.00	5.00	5.00	ug/L	1					
Arsenic	U	ND	1.70	5.00	2.00	ug/L	1	BAJ	06/30/14	15:32	1395753	3
Selenium	U	ND	1.50	5.00	4.00	ug/L	1					
Uranium	U	ND	0.067	0.200	0.200	ug/L	1					
Zinc	U	ND	3.50	10.0	10.0	ug/L	1					
Boron	U	ND	4.00	15.0	15.0	ug/L	1	BAJ	07/01/14	14:18	1395753	4
Aluminum	U	ND	15.0	50.0	20.0	ug/L	1	BAJ	06/30/14	17:14	1395753	5
Beryllium	U	ND	0.200	0.500	2.00	ug/L	1					
Chromium	U	ND	2.00	10.0	2.00	ug/L	1					
Cobalt	U	ND	0.100	1.00	4.00	ug/L	1					
Copper	U	ND	0.350	1.00	8.00	ug/L	1					
Manganese	U	ND	1.00	5.00	5.00	ug/L	1					
Nickel	U	ND	0.500	2.00	2.00	ug/L	1					
Barium	U	ND	0.600	2.00	5.00	ug/L	1	BAJ	07/03/14	17:09	1395753	6

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	JXO1	06/17/14	1000	1395752

July 21, 2014

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Certificate of Analysis

Company : CH2MHill Plateau Remediation
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Address : MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Project: **CHPRC SAF S14-006**

Report Date: July 10, 2014

Client Sample ID: B2WPL5
Lab Sample ID: 350586006

Project: HMSA00158
Client ID: HMSA001

Client SDG: GEL350586

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
SW846 3005A	SW846 3005A for 6010C			JX01	06/17/14		1030	1395760				

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	6010_METALS_ICP	
2	6020_METALS_ICPMS	
3	6020_METALS_ICPMS	
4	6020_METALS_ICPMS	
5	6020_METALS_ICPMS	
6	6020_METALS_ICPMS	

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 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S14-006**

Report Date: July 10, 2014

Client Sample ID: B2WPK0
 Lab Sample ID: 350586007
 Matrix: WATER
 Collect Date: 12-JUN-14 09:01
 Receive Date: 13-JUN-14
 Collector: Client

Project: HMSA00158
 Client ID: HMSA001
 Client SDG: GEL350586

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP												
<i>6010_METALS_ICP:GW 04 "As Received"</i>												
Calcium		70900	50.0	200	200	ug/L	1	HSC	07/03/14	14:14	1395761	1
Iron	U	ND	30.0	100	100	ug/L	1					
Magnesium		17500	110	300	300	ug/L	1					
Potassium		4080	50.0	150	150	ug/L	1					
Sodium		7920	100	300	300	ug/L	1					
Vanadium		6.73	1.00	5.00	5.00	ug/L	1					
Metals Analysis-ICP-MS												
<i>6020_METALS_ICPMS: GW 01 "As Received"</i>												
Antimony	U	ND	1.00	3.00	5.00	ug/L	1	BAJ	06/30/14	06:11	1395753	2
Cadmium	U	ND	0.110	1.00	2.00	ug/L	1					
Lead	U	ND	0.500	2.00	2.00	ug/L	1					
Molybdenum	B	0.798	0.165	0.500	20.0	ug/L	1					
Silver	U	ND	0.200	1.00	2.00	ug/L	1					
Strontium		429	2.00	10.0	10.0	ug/L	1					
Thallium	U	ND	0.450	2.00	2.00	ug/L	1					
Thorium	U	ND	0.383	2.00	2.00	ug/L	1					
Tin	U	ND	1.00	5.00	5.00	ug/L	1					
Arsenic	U	ND	1.70	5.00	2.00	ug/L	1	BAJ	06/30/14	15:36	1395753	3
Selenium	B	2.10	1.50	5.00	4.00	ug/L	1					
Uranium		2.39	0.067	0.200	0.200	ug/L	1					
Zinc	U	ND	3.50	10.0	10.0	ug/L	1					
Boron	B	13.1	4.00	15.0	15.0	ug/L	1	BAJ	07/01/14	14:21	1395753	4
Aluminum	U	ND	15.0	50.0	20.0	ug/L	1	BAJ	06/30/14	17:17	1395753	5
Beryllium	U	ND	0.200	0.500	2.00	ug/L	1					
Chromium		121	2.00	10.0	2.00	ug/L	1					
Cobalt	B	0.173	0.100	1.00	4.00	ug/L	1					
Copper	B	1.05	0.350	1.00	8.00	ug/L	1					
Manganese	U	ND	1.00	5.00	5.00	ug/L	1					
Nickel		2.30	0.500	2.00	2.00	ug/L	1					
Barium		65.7	0.600	2.00	5.00	ug/L	1	BAJ	07/03/14	17:12	1395753	6

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	JXO1	06/17/14	1000	1395752

July 21, 2014

REVISION 1

GEL LABORATORIES LLC

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

Certificate of Analysis

Company : CH2MHill Plateau Remediation
Company
Address : MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Project: **CHPRC SAF S14-006**

Report Date: July 10, 2014

Client Sample ID: B2WPK0
Lab Sample ID: 350586007

Project: HMSA00158
Client ID: HMSA001

Client SDG: GEL350586

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
SW846 3005A	SW846 3005A for 6010C			JX01	06/17/14		1030	1395760				

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	6010_METALS_ICP	
2	6020_METALS_ICPMS	
3	6020_METALS_ICPMS	
4	6020_METALS_ICPMS	
5	6020_METALS_ICPMS	
6	6020_METALS_ICPMS	

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Certificate of Analysis

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S14-006**

Report Date: July 10, 2014

Client Sample ID: B2WPK4
 Lab Sample ID: 350586008
 Matrix: WATER
 Collect Date: 12-JUN-14 09:01
 Receive Date: 13-JUN-14
 Collector: Client

Project: HMSA00158
 Client ID: HMSA001
 Client SDG: GEL350586

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP												
<i>6010_METALS_ICP:GW 04 "As Received"</i>												
Calcium		68500	50.0	200	200	ug/L	1	HSC	07/03/14	14:17	1395761	1
Iron	U	ND	30.0	100	100	ug/L	1					
Magnesium		16700	110	300	300	ug/L	1					
Potassium		3940	50.0	150	150	ug/L	1					
Sodium		7670	100	300	300	ug/L	1					
Vanadium		6.51	1.00	5.00	5.00	ug/L	1					
Metals Analysis-ICP-MS												
<i>6020_METALS_ICPMS: GW 01 "As Received"</i>												
Antimony	U	ND	1.00	3.00	5.00	ug/L	1	BAJ	06/30/14	06:18	1395753	2
Cadmium	U	ND	0.110	1.00	2.00	ug/L	1					
Lead	U	ND	0.500	2.00	2.00	ug/L	1					
Molybdenum	B	0.829	0.165	0.500	20.0	ug/L	1					
Silver	U	ND	0.200	1.00	2.00	ug/L	1					
Strontium		437	2.00	10.0	10.0	ug/L	1					
Thallium	U	ND	0.450	2.00	2.00	ug/L	1					
Thorium	U	ND	0.383	2.00	2.00	ug/L	1					
Tin	U	ND	1.00	5.00	5.00	ug/L	1					
Arsenic	U	ND	1.70	5.00	2.00	ug/L	1	BAJ	06/30/14	15:40	1395753	3
Selenium	B	1.90	1.50	5.00	4.00	ug/L	1					
Uranium		2.37	0.067	0.200	0.200	ug/L	1					
Zinc	B	5.16	3.50	10.0	10.0	ug/L	1					
Boron	B	12.3	4.00	15.0	15.0	ug/L	1	BAJ	07/01/14	14:24	1395753	4
Aluminum	U	ND	15.0	50.0	20.0	ug/L	1	BAJ	06/30/14	17:20	1395753	5
Beryllium	U	ND	0.200	0.500	2.00	ug/L	1					
Chromium		119	2.00	10.0	2.00	ug/L	1					
Cobalt	B	2.06	0.100	1.00	4.00	ug/L	1					
Copper	B	3.87	0.350	1.00	8.00	ug/L	1					
Manganese	B	2.78	1.00	5.00	5.00	ug/L	1					
Nickel		2.56	0.500	2.00	2.00	ug/L	1					
Barium		61.3	0.600	2.00	5.00	ug/L	1	BAJ	07/03/14	17:15	1395753	6

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	JXO1	06/17/14	1000	1395752

July 21, 2014

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GEL LABORATORIES LLC

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Certificate of Analysis

Company : CH2MHill Plateau Remediation
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Address : MSIN R3-50 CHPRC
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Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Project: **CHPRC SAF S14-006**

Report Date: July 10, 2014

Client Sample ID: B2WPK4
Lab Sample ID: 350586008

Project: HMSA00158
Client ID: HMSA001

Client SDG: GEL350586

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
SW846 3005A	SW846 3005A for 6010C			JX01	06/17/14		1030	1395760				

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	6010_METALS_ICP	
2	6020_METALS_ICPMS	
3	6020_METALS_ICPMS	
4	6020_METALS_ICPMS	
5	6020_METALS_ICPMS	
6	6020_METALS_ICPMS	

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Company : CH2MHill Plateau Remediation Company
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 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S14-006**

Report Date: July 10, 2014

Client Sample ID: B2WPJ9
 Lab Sample ID: 350586009
 Matrix: WATER
 Collect Date: 12-JUN-14 08:20
 Receive Date: 13-JUN-14
 Collector: Client

Project: HMSA00158
 Client ID: HMSA001
 Client SDG: GEL350586

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP												
<i>6010_METALS_ICP:GW 04 "As Received"</i>												
Calcium	U	ND	50.0	200	200	ug/L	1	HSC	07/03/14	14:20	1395761	1
Iron	U	ND	30.0	100	100	ug/L	1					
Magnesium	U	ND	110	300	300	ug/L	1					
Potassium	U	ND	50.0	150	150	ug/L	1					
Sodium	U	ND	100	300	300	ug/L	1					
Vanadium	U	ND	1.00	5.00	5.00	ug/L	1					
Metals Analysis-ICP-MS												
<i>6020_METALS_ICPMS: GW 01 "As Received"</i>												
Antimony	U	ND	1.00	3.00	5.00	ug/L	1	BAJ	06/30/14	06:25	1395753	2
Cadmium	U	ND	0.110	1.00	2.00	ug/L	1					
Lead	U	ND	0.500	2.00	2.00	ug/L	1					
Molybdenum	U	ND	0.165	0.500	20.0	ug/L	1					
Silver	U	ND	0.200	1.00	2.00	ug/L	1					
Strontium	U	ND	2.00	10.0	10.0	ug/L	1					
Thallium	U	ND	0.450	2.00	2.00	ug/L	1					
Thorium	U	ND	0.383	2.00	2.00	ug/L	1					
Tin	U	ND	1.00	5.00	5.00	ug/L	1					
Arsenic	U	ND	1.70	5.00	2.00	ug/L	1	BAJ	06/30/14	15:44	1395753	3
Selenium	U	ND	1.50	5.00	4.00	ug/L	1					
Uranium	U	ND	0.067	0.200	0.200	ug/L	1					
Zinc	U	ND	3.50	10.0	10.0	ug/L	1					
Boron	U	ND	4.00	15.0	15.0	ug/L	1	BAJ	07/01/14	14:26	1395753	4
Aluminum	U	ND	15.0	50.0	20.0	ug/L	1	BAJ	06/30/14	17:23	1395753	5
Beryllium	U	ND	0.200	0.500	2.00	ug/L	1					
Chromium	U	ND	2.00	10.0	2.00	ug/L	1					
Cobalt	U	ND	0.100	1.00	4.00	ug/L	1					
Copper	U	ND	0.350	1.00	8.00	ug/L	1					
Manganese	U	ND	1.00	5.00	5.00	ug/L	1					
Nickel	U	ND	0.500	2.00	2.00	ug/L	1					
Barium	U	ND	0.600	2.00	5.00	ug/L	1	BAJ	07/03/14	17:18	1395753	6

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	JXO1	06/17/14	1000	1395752

July 21, 2014

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GEL LABORATORIES LLC

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Certificate of Analysis

Company : CH2MHill Plateau Remediation
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Address : MSIN R3-50 CHPRC
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Contact: Mr. Scot Fitzgerald
Project: **CHPRC SAF S14-006**

Report Date: July 10, 2014

Client Sample ID: B2WPJ9
Lab Sample ID: 350586009

Project: HMSA00158
Client ID: HMSA001

Client SDG: GEL350586

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
SW846 3005A	SW846 3005A for 6010C			JX01	06/17/14		1030	1395760				

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	6010_METALS_ICP	
2	6020_METALS_ICPMS	
3	6020_METALS_ICPMS	
4	6020_METALS_ICPMS	
5	6020_METALS_ICPMS	
6	6020_METALS_ICPMS	

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Certificate of Analysis

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S14-006**

Report Date: July 10, 2014

Client Sample ID: B2WPK3
 Lab Sample ID: 350586010
 Matrix: WATER
 Collect Date: 12-JUN-14 08:20
 Receive Date: 13-JUN-14
 Collector: Client

Project: HMSA00158
 Client ID: HMSA001
 Client SDG: GEL350586

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP												
<i>6010_METALS_ICP:GW 04 "As Received"</i>												
Calcium	U	ND	50.0	200	200	ug/L	1	HSC	07/03/14	14:24	1395761	1
Iron	U	ND	30.0	100	100	ug/L	1					
Magnesium	U	ND	110	300	300	ug/L	1					
Potassium	U	ND	50.0	150	150	ug/L	1					
Sodium	U	ND	100	300	300	ug/L	1					
Vanadium	U	ND	1.00	5.00	5.00	ug/L	1					
Metals Analysis-ICP-MS												
<i>6020_METALS_ICPMS: GW 01 "As Received"</i>												
Antimony	U	ND	1.00	3.00	5.00	ug/L	1	BAJ	06/30/14	06:31	1395753	2
Cadmium	U	ND	0.110	1.00	2.00	ug/L	1					
Lead	U	ND	0.500	2.00	2.00	ug/L	1					
Molybdenum	U	ND	0.165	0.500	20.0	ug/L	1					
Silver	U	ND	0.200	1.00	2.00	ug/L	1					
Strontium	U	ND	2.00	10.0	10.0	ug/L	1					
Thallium	U	ND	0.450	2.00	2.00	ug/L	1					
Thorium	U	ND	0.383	2.00	2.00	ug/L	1					
Tin	U	ND	1.00	5.00	5.00	ug/L	1					
Arsenic	U	ND	1.70	5.00	2.00	ug/L	1	BAJ	06/30/14	15:48	1395753	3
Selenium	U	ND	1.50	5.00	4.00	ug/L	1					
Uranium	U	ND	0.067	0.200	0.200	ug/L	1					
Zinc	U	ND	3.50	10.0	10.0	ug/L	1					
Boron	U	ND	4.00	15.0	15.0	ug/L	1	BAJ	07/01/14	14:29	1395753	4
Aluminum	U	ND	15.0	50.0	20.0	ug/L	1	BAJ	06/30/14	17:26	1395753	5
Beryllium	U	ND	0.200	0.500	2.00	ug/L	1					
Chromium	U	ND	2.00	10.0	2.00	ug/L	1					
Cobalt	U	ND	0.100	1.00	4.00	ug/L	1					
Copper	U	ND	0.350	1.00	8.00	ug/L	1					
Manganese	U	ND	1.00	5.00	5.00	ug/L	1					
Nickel	U	ND	0.500	2.00	2.00	ug/L	1					
Barium	U	ND	0.600	2.00	5.00	ug/L	1	BAJ	07/03/14	17:21	1395753	6

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	JXO1	06/17/14	1000	1395752

July 21, 2014

REVISION 1

GEL LABORATORIES LLC

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Certificate of Analysis

Company : CH2MHill Plateau Remediation
Company
Address : MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Project: **CHPRC SAF S14-006**

Report Date: July 10, 2014

Client Sample ID: B2WPK3
Lab Sample ID: 350586010

Project: HMSA00158
Client ID: HMSA001

Client SDG: GEL350586

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
SW846 3005A	SW846 3005A for 6010C			JX01	06/17/14		1030	1395760				

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	6010_METALS_ICP	
2	6020_METALS_ICPMS	
3	6020_METALS_ICPMS	
4	6020_METALS_ICPMS	
5	6020_METALS_ICPMS	
6	6020_METALS_ICPMS	

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Certificate of Analysis

Company : CH2MHill Plateau Remediation
 Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S14-006**

Report Date: July 10, 2014

Client Sample ID: B2WRD4
 Lab Sample ID: 350586011
 Matrix: WATER
 Collect Date: 11-JUN-14 12:10
 Receive Date: 13-JUN-14
 Collector: Client

Project: HMSA00158
 Client ID: HMSA001
 Client SDG: GEL350586

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP												
<i>6010_METALS_ICP: COMMON +GW 03 "As Received"</i>												
Antimony	U	ND	3.50	10.0	10.0	ug/L	1	HSC	07/03/14	14:28	1395761	1
Arsenic	B	8.57	5.00	30.0	30.0	ug/L	1					
Barium		44.3	1.00	5.00	5.00	ug/L	1					
Beryllium	U	ND	1.00	5.00	5.00	ug/L	1					
Cadmium	U	ND	1.00	5.00	5.00	ug/L	1					
Calcium		45600	50.0	200	200	ug/L	1					
Chromium	B	4.80	1.00	5.00	5.00	ug/L	1					
Cobalt	U	ND	1.00	5.00	5.00	ug/L	1					
Copper	U	ND	3.00	10.0	10.0	ug/L	1					
Iron	U	ND	30.0	100	100	ug/L	1					
Magnesium		10800	110	300	300	ug/L	1					
Manganese	U	ND	2.00	10.0	10.0	ug/L	1					
Nickel	U	ND	1.50	5.00	5.00	ug/L	1					
Potassium		4120	50.0	150	150	ug/L	1					
Silver	U	ND	1.00	5.00	5.00	ug/L	1					
Sodium		21800	100	300	300	ug/L	1					
Strontium		218	1.00	5.00	5.00	ug/L	1					
Vanadium		7.49	1.00	5.00	5.00	ug/L	1					
Zinc	U	ND	3.30	10.0	10.0	ug/L	1					

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	SW846 3005A for 6010C	JXO1	06/17/14	1030	1395760

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	6010_METALS_ICP	

Quality Control Summary

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QC Summary

Report Date: July 10, 2014

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

Contact: Mr. Scot Fitzgerald

Workorder: 350586

Parmname	NOM	Sample Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS										
Batch	1395753									
QC1203108727	LCS									
Aluminum	2000		1760	ug/L		88.1	(80%-120%)	BAJ	06/30/14	16:44
Antimony	50.0		49.3	ug/L		98.5	(80%-120%)		06/30/14	04:38
Arsenic	50.0		44.0	ug/L		88.1	(80%-120%)		06/30/14	14:50
Barium	50.0		43.8	ug/L		87.7	(80%-120%)		07/03/14	16:34
Beryllium	50.0		46.2	ug/L		92.5	(80%-120%)		06/30/14	16:44
Boron	100		92.8	ug/L		92.8	(80%-120%)		07/01/14	13:51
Cadmium	50.0		45.7	ug/L		91.5	(80%-120%)		06/30/14	04:38
Chromium	50.0		45.2	ug/L		90.5	(80%-120%)		06/30/14	16:44
Cobalt	50.0		44.9	ug/L		89.7	(80%-120%)			
Copper	50.0		47.9	ug/L		95.8	(80%-120%)			
Lead	50.0		50.3	ug/L		101	(80%-120%)		06/30/14	04:38
Manganese	50.0		46.0	ug/L		92	(80%-120%)		06/30/14	16:44
Molybdenum	50.0		47.3	ug/L		94.6	(80%-120%)		06/30/14	04:38
Nickel	50.0		45.6	ug/L		91.3	(80%-120%)		06/30/14	16:44
Selenium	50.0		45.5	ug/L		91	(80%-120%)		06/30/14	14:50
Silver	50.0		50.5	ug/L		101	(80%-120%)		06/30/14	04:38
Strontium	50.0		46.0	ug/L		92	(80%-120%)			
Thallium	50.0		48.1	ug/L		96.2	(80%-120%)			
Thorium	50.0		47.6	ug/L		95.3	(80%-120%)			
Tin	50.0		50.5	ug/L		101	(80%-120%)			

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QC Summary

Workorder: 350586

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1395753										
Uranium	50.0			47.0	ug/L		93.9	(80%-120%)	BAJ	06/30/14	14:50
Zinc	50.0			46.7	ug/L		93.5	(80%-120%)			
QC1203108726	MB										
Aluminum			U	ND	ug/L					06/30/14	16:41
Antimony			U	ND	ug/L					06/30/14	04:32
Arsenic			U	ND	ug/L					06/30/14	14:46
Barium			U	ND	ug/L					07/03/14	16:31
Beryllium			U	ND	ug/L					06/30/14	16:41
Boron			U	ND	ug/L					07/01/14	13:49
Cadmium			U	ND	ug/L					06/30/14	04:32
Chromium			U	ND	ug/L					06/30/14	16:41
Cobalt			U	ND	ug/L						
Copper			U	ND	ug/L						
Lead			U	ND	ug/L					06/30/14	04:32
Manganese			U	ND	ug/L					06/30/14	16:41
Molybdenum			U	ND	ug/L					06/30/14	04:32
Nickel			U	ND	ug/L					06/30/14	16:41
Selenium			U	ND	ug/L					06/30/14	14:46
Silver			U	ND	ug/L					06/30/14	04:32
Strontium			U	ND	ug/L						
Thallium			U	ND	ug/L						
Thorium			U	ND	ug/L						

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QC Summary

Workorder: 350586

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1395753										
Tin			U	ND	ug/L				BAJ	06/30/14	04:32
Uranium			U	ND	ug/L					06/30/14	14:46
Zinc			U	ND	ug/L						
QC1203108728 350586003 MS											
Aluminum	2000	U	ND	1640	ug/L		81.9	(75%-125%)		06/30/14	16:50
Antimony	50.0	U	ND	48.5	ug/L		96.6	(75%-125%)		06/30/14	05:05
Arsenic	50.0	U	ND	43.6	ug/L		85.1	(75%-125%)		06/30/14	14:58
Barium	50.0		72.8	113	ug/L		80	(75%-125%)		07/03/14	16:41
Beryllium	50.0	U	ND	42.1	ug/L		84.1	(75%-125%)		06/30/14	16:50
Boron	100	B	13.5	104	ug/L		90.7	(75%-125%)		07/01/14	13:57
Cadmium	50.0	U	ND	43.1	ug/L		86.2	(75%-125%)		06/30/14	05:05
Chromium	50.0		20.9	64.3	ug/L		86.8	(75%-125%)		06/30/14	16:50
Cobalt	50.0	B	0.366	44.8	ug/L		88.9	(75%-125%)			
Copper	50.0	B	0.819	47.9	ug/L		94.1	(75%-125%)			
Lead	50.0	U	ND	48.9	ug/L		97.8	(75%-125%)		06/30/14	05:05
Manganese	50.0	U	ND	45.1	ug/L		89.5	(75%-125%)		06/30/14	16:50
Molybdenum	50.0	B	1.64	47.2	ug/L		91	(75%-125%)		06/30/14	05:05
Nickel	50.0		3.40	48.1	ug/L		89.5	(75%-125%)		06/30/14	16:50
Selenium	50.0	B	1.79	44.2	ug/L		84.9	(75%-125%)		06/30/14	14:58
Silver	50.0	U	ND	47.0	ug/L		93.9	(75%-125%)		06/30/14	05:05
Strontium	50.0		480	521	ug/L		N/A	(75%-125%)			
Thallium	50.0	U	ND	46.3	ug/L		92.6	(75%-125%)			

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QC Summary

Workorder: 350586

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1395753										
Thorium	50.0	U	ND	46.9	ug/L		93.7	(75%-125%)	BAJ	06/30/14	05:05
Tin	50.0	U	ND	49.4	ug/L		98.7	(75%-125%)			
Uranium	50.0		2.86	48.4	ug/L		91.1	(75%-125%)		06/30/14	14:58
Zinc	50.0	U	ND	43.1	ug/L		83.3	(75%-125%)			
QC1203108729 350586003 MSD											
Aluminum	2000	U	ND	1680	ug/L	2.15	83.7	(0%-20%)		06/30/14	16:53
Antimony	50.0	U	ND	49.9	ug/L	2.94	99.4	(0%-20%)		06/30/14	05:12
Arsenic	50.0	U	ND	43.6	ug/L	0.0688	85.2	(0%-20%)		06/30/14	15:02
Barium	50.0		72.8	116	ug/L	2.91	86.7	(0%-20%)		07/03/14	16:44
Beryllium	50.0	U	ND	43.0	ug/L	2.11	85.9	(0%-20%)		06/30/14	16:53
Boron	100	B	13.5	106	ug/L	1.71	92.5	(0%-20%)		07/01/14	13:59
Cadmium	50.0	U	ND	43.6	ug/L	1.19	87.3	(0%-20%)		06/30/14	05:12
Chromium	50.0		20.9	67.2	ug/L	4.41	92.6	(0%-20%)		06/30/14	16:53
Cobalt	50.0	B	0.366	44.8	ug/L	0.0804	88.8	(0%-20%)			
Copper	50.0	B	0.819	47.7	ug/L	0.412	93.7	(0%-20%)			
Lead	50.0	U	ND	50.7	ug/L	3.51	101	(0%-20%)		06/30/14	05:12
Manganese	50.0	U	ND	45.7	ug/L	1.28	90.6	(0%-20%)		06/30/14	16:53
Molybdenum	50.0	B	1.64	48.7	ug/L	3.31	94.2	(0%-20%)		06/30/14	05:12
Nickel	50.0		3.40	48.5	ug/L	0.658	90.1	(0%-20%)		06/30/14	16:53
Selenium	50.0	B	1.79	44.1	ug/L	0.249	84.7	(0%-20%)		06/30/14	15:02
Silver	50.0	U	ND	48.6	ug/L	3.45	97.2	(0%-20%)		06/30/14	05:12
Strontium	50.0		480	523	ug/L	0.341	N/A	(0%-20%)			

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QC Summary

Workorder: 350586

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1395753										
Thallium	50.0	U	ND	48.6	ug/L	4.83	97.2	(0%-20%)	BAJ	06/30/14	05:12
Thorium	50.0	U	ND	47.8	ug/L	1.94	95.5	(0%-20%)			
Tin	50.0	U	ND	50.9	ug/L	2.99	102	(0%-20%)			
Uranium	50.0		2.86	48.1	ug/L	0.566	90.5	(0%-20%)		06/30/14	15:02
Zinc	50.0	U	ND	43.2	ug/L	0.273	83.5	(0%-20%)			
QC1203108730 350586003 SDILT											
Aluminum		U	ND DU	ND	ug/L	N/A		(0%-10%)		06/30/14	16:57
Antimony		U	ND DU	ND	ug/L	N/A		(0%-10%)		06/30/14	05:25
Arsenic		U	ND DU	ND	ug/L	N/A		(0%-10%)		06/30/14	15:09
Barium			72.8 D	15.7	ug/L	7.89		(0%-10%)		07/03/14	16:50
Beryllium		U	ND DU	ND	ug/L	N/A		(0%-10%)		06/30/14	16:57
Boron		B	13.5 DU	ND	ug/L	N/A		(0%-10%)		07/01/14	14:02
Cadmium		U	ND DU	ND	ug/L	N/A		(0%-10%)		06/30/14	05:25
Chromium			20.9 D	4.37	ug/L	4.5		(0%-10%)		06/30/14	16:57
Cobalt		B	0.366 DU	ND	ug/L	N/A		(0%-10%)			
Copper		B	0.819 DU	ND	ug/L	N/A		(0%-10%)			
Lead		U	ND DU	ND	ug/L	N/A		(0%-10%)		06/30/14	05:25
Manganese		U	ND DU	ND	ug/L	N/A		(0%-10%)		06/30/14	16:57
Molybdenum		B	1.64 D	0.344	ug/L	5.01		(0%-10%)		06/30/14	05:25
Nickel			3.40 D	0.718	ug/L	5.59		(0%-10%)		06/30/14	16:57
Selenium		B	1.79 DU	ND	ug/L	N/A		(0%-10%)		06/30/14	15:09
Silver		U	ND DU	ND	ug/L	N/A		(0%-10%)		06/30/14	05:25

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QC Summary

Workorder: 350586

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1395753										
Strontium		480	D	104	ug/L	8.71		(0%-10%)	BAJ	06/30/14	05:25
Thallium	U	ND	DU	ND	ug/L	N/A		(0%-10%)			
Thorium	U	ND	DU	ND	ug/L	N/A		(0%-10%)			
Tin	U	ND	DU	ND	ug/L	N/A		(0%-10%)			
Uranium		2.86	D	0.567	ug/L	.805		(0%-10%)		06/30/14	15:09
Zinc	U	ND	DU	ND	ug/L	N/A		(0%-10%)			

Metals Analysis-ICP

Batch 1395761

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
QC1203108747 LCS											
Antimony	500			451	ug/L		90.1	(80%-120%)	HSC	07/03/14	13:38
Arsenic	500			457	ug/L		91.4	(80%-120%)			
Barium	500			476	ug/L		95.1	(80%-120%)			
Beryllium	500			473	ug/L		94.6	(80%-120%)			
Cadmium	500			459	ug/L		91.8	(80%-120%)			
Calcium	5000			4640	ug/L		92.9	(80%-120%)			
Chromium	500			453	ug/L		90.5	(80%-120%)			
Cobalt	500			467	ug/L		93.4	(80%-120%)			
Copper	500			463	ug/L		92.6	(80%-120%)			
Iron	5000			4810	ug/L		96.1	(80%-120%)			
Magnesium	5000			4920	ug/L		98.3	(80%-120%)			
Manganese	500			454	ug/L		90.7	(80%-120%)			
Nickel	500			439	ug/L		87.8	(80%-120%)			
Potassium	5000			4910	ug/L		98.1	(80%-120%)			

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QC Summary

Workorder: 350586

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1395761										
Silver	500			495	ug/L		99	(80%-120%)	HSC	07/03/14	13:38
Sodium	5000			4780	ug/L		95.7	(80%-120%)			
Strontium	500			481	ug/L		96.1	(80%-120%)			
Vanadium	500			474	ug/L		94.9	(80%-120%)			
Zinc	500			448	ug/L		89.6	(80%-120%)			
QC1203108746 MB											
Antimony			U	ND	ug/L					07/03/14	13:34
Arsenic			U	ND	ug/L						
Barium			U	ND	ug/L						
Beryllium			U	ND	ug/L						
Cadmium			U	ND	ug/L						
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						

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QC Summary

Workorder: 350586

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1395761										
Strontium			U	ND	ug/L				HSC	07/03/14	13:34
Vanadium			U	ND	ug/L						
Zinc			U	ND	ug/L						
QC1203108748 350586003 MS											
Antimony	500	U	ND	470	ug/L		93.5	(75%-125%)		07/03/14	13:45
Arsenic	500	B	6.17	476	ug/L		93.9	(75%-125%)			
Barium	500		70.8	546	ug/L		95	(75%-125%)			
Beryllium	500	U	ND	473	ug/L		94.5	(75%-125%)			
Cadmium	500	U	ND	455	ug/L		91	(75%-125%)			
Calcium	5000		73500	79400	ug/L		N/A	(75%-125%)			
Chromium	500		20.0	471	ug/L		90.3	(75%-125%)			
Cobalt	500	U	ND	444	ug/L		88.8	(75%-125%)			
Copper	500	U	ND	473	ug/L		94.6	(75%-125%)			
Iron	5000	U	ND	4800	ug/L		95.7	(75%-125%)			
Magnesium	5000		20400	25400	ug/L		N/A	(75%-125%)			
Manganese	500	U	ND	452	ug/L		90.4	(75%-125%)			
Nickel	500	B	1.90	423	ug/L		84.3	(75%-125%)			
Potassium	5000		4570	9280	ug/L		94.2	(75%-125%)			
Silver	500	U	ND	496	ug/L		99.1	(75%-125%)			
Sodium	5000		9830	14500	ug/L		94.1	(75%-125%)			
Strontium	500		485	963	ug/L		95.5	(75%-125%)			
Vanadium	500		8.46	497	ug/L		97.7	(75%-125%)			

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QC Summary

Workorder: 350586

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1395761										
Zinc	500	U	ND	449	ug/L		89.8	(75%-125%)	HSC	07/03/14	13:45
QC1203108749 350586003 MSD											
Antimony	500	U	ND	475	ug/L	1.11	94.5	(0%-20%)		07/03/14	13:48
Arsenic	500	B	6.17	492	ug/L	3.27	97.1	(0%-20%)			
Barium	500		70.8	554	ug/L	1.49	96.7	(0%-20%)			
Beryllium	500	U	ND	481	ug/L	1.83	96.3	(0%-20%)			
Cadmium	500	U	ND	462	ug/L	1.57	92.4	(0%-20%)			
Calcium	5000		73500	79600	ug/L	0.192	N/A	(0%-20%)			
Chromium	500		20.0	475	ug/L	0.767	91	(0%-20%)			
Cobalt	500	U	ND	452	ug/L	1.86	90.5	(0%-20%)			
Copper	500	U	ND	478	ug/L	0.986	95.5	(0%-20%)			
Iron	5000	U	ND	4910	ug/L	2.35	98	(0%-20%)			
Magnesium	5000		20400	25500	ug/L	0.173	N/A	(0%-20%)			
Manganese	500	U	ND	456	ug/L	0.769	91.1	(0%-20%)			
Nickel	500	B	1.90	426	ug/L	0.659	84.9	(0%-20%)			
Potassium	5000		4570	9400	ug/L	1.29	96.6	(0%-20%)			
Silver	500	U	ND	506	ug/L	2.06	101	(0%-20%)			
Sodium	5000		9830	14700	ug/L	0.952	96.9	(0%-20%)			
Strontium	500		485	970	ug/L	0.695	96.9	(0%-20%)			
Vanadium	500		8.46	500	ug/L	0.646	98.4	(0%-20%)			
Zinc	500	U	ND	452	ug/L	0.699	90.4	(0%-20%)			
QC1203108750 350586003 SDILT											
Antimony		U	ND D	3.64	ug/L	N/A		(0%-10%)		07/03/14	13:51

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QC Summary

Workorder: 350586

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1395761										
Arsenic	B	6.17	DU	ND	ug/L	N/A		(0%-10%)	HSC	07/03/14	13:51
Barium		70.8	D	13.9	ug/L	1.96		(0%-10%)			
Beryllium	U	ND	DU	ND	ug/L	N/A		(0%-10%)			
Cadmium	U	ND	DU	ND	ug/L	N/A		(0%-10%)			
Calcium		73500	D	15000	ug/L	1.86		(0%-10%)			
Chromium		20.0	D	4.07	ug/L	1.76		(0%-10%)			
Cobalt	U	ND	DU	ND	ug/L	N/A		(0%-10%)			
Copper	U	ND	DU	ND	ug/L	N/A		(0%-10%)			
Iron	U	ND	DU	ND	ug/L	N/A		(0%-10%)			
Magnesium		20400	D	4130	ug/L	.927		(0%-10%)			
Manganese	U	ND	DU	ND	ug/L	N/A		(0%-10%)			
Nickel	B	1.90	DU	ND	ug/L	N/A		(0%-10%)			
Potassium		4570	D	939	ug/L	2.86		(0%-10%)			
Silver	U	ND	DU	ND	ug/L	N/A		(0%-10%)			
Sodium		9830	D	1980	ug/L	.722		(0%-10%)			
Strontium		485	D	97.4	ug/L	.373		(0%-10%)			
Vanadium		8.46	D	1.64	ug/L	3.18		(0%-10%)			
Zinc	U	ND	DU	ND	ug/L	N/A		(0%-10%)			

Notes:

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995

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QC Summary

Workorder: 350586

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
B	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).										
C	Target analyte was detected in the sample and the associated blank, and the sample concentration was <= 5 times the blank concentration.										
D	Results are reported from a diluted aliquot of sample.										
E	Reported value is estimated due to interferences. See comment in narrative.										
M	Duplicate precision not met.										
N	Spike Sample recovery is outside control limits.										
S	Reported value determined by the Method of Standard Additions (MSA)										
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.										
W	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										

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

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

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

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

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

General Chem Analysis

Case Narrative

**General Chemistry Narrative
Hanford MSA (HMSA)
SDG GEL350586**

Method/Analysis Information

Product: Ion Chromatography
Analytical Batch: 1395672 **Method:** 9056_ANIONS_IC:COMMON + GW 02

Sample Analysis

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

Sample ID	Client ID
350586012	B2WPL1
350586013	B2WPL2
350586014	B2WRD5
1203108520	Method Blank (MB)
1203108521	350586013(B2WPL2) Sample Duplicate (DUP)
1203108522	350586013(B2WPL2) Post Spike (PS)
1203108523	Laboratory Control Sample (LCS)
1203108576	350593015(B2WTM1) Sample Duplicate (DUP)
1203108577	350593015(B2WTM1) Post Spike (PS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-086 REV# 22.

Preparation/Analytical Method Verification

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

Calibration Information

The Ion Chromatography analysis was performed on a Dionex ICS-3000 Ion Chromatograph.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

The absolute value of the intercept is less than 3 times the MDL.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following samples were selected for QC analysis: 350586013 (B2WPL2) and 350593015 (B2WTM1).

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: 1203108521 (B2WPL2), 1203108522 (B2WPL2), 1203108576 (B2WTM1), 1203108577 (B2WTM1), 350586013 (B2WPL2) and 350586014 (B2WRD5).

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

The following DER was generated for this SDG: 1309885. 1203108521 (B2WPL2), 1203108522 (B2WPL2), 1203108577 (B2WTM1) and 350586013 (B2WPL2).

Manual Integrations

The following samples from this sample group had to be manually integrated due to errors in the instrument software

peak integration: 1203108523 (LCS), 1203108576 (B2WTM1) and 350586012 (B2WPL1).

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Alkalinity
Analytical Batch: 1397897 **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
350586003	B2WPL0
350586005	B2WPK9
350586007	B2WPK0
350586009	B2WPJ9
350586011	B2WRD4
1203114086	Method Blank (MB)
1203114090	350586003(B2WPL0) Sample Duplicate (DUP)
1203114093	350586003(B2WPL0) Matrix Spike (MS)
1203114094	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-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.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 350586003 (B2WPL0).

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

50 ml of sample was used due to limited sample quantity . 1203114090 (B2WPL0), 1203114093 (B2WPL0) and 350586003 (B2WPL0).

Electronic Packaging Comment

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

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

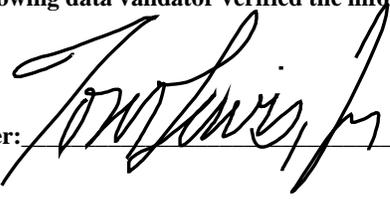
Certification Statement

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

Review Validation:

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

The following data validator verified the information presented in this case narrative:

Reviewer:  Date: 10 July 14

Sample Data Summary

GEL LABORATORIES LLC

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**Certificate of Analysis Report
for**

HMSA001 Hanford MSA (51204)

Client SDG: GEL350586 GEL Work Order: 350586

The Qualifiers in this report are defined as follows:

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

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

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

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

Reviewed by _____



GEL LABORATORIES LLC

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Certificate of Analysis

Company : CH2MHill Plateau Remediation
 Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S14-006**

Report Date: July 10, 2014

Client Sample ID: B2WPL0
 Lab Sample ID: 350586003
 Matrix: WATER
 Collect Date: 12-JUN-14 08:55
 Receive Date: 13-JUN-14
 Collector: Client

Project: HMSA00158
 Client ID: HMSA001
 Client SDG: GEL350586

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Titration and Ion Analysis												
<i>2320_ALKALINITY: GW 01 "As Received"</i>												
Alkalinity, Total as CaCO3		94500	1450	2000	2000	ug/L		PX01	06/24/14	15:44	1397897	1
Bicarbonate alkalinity (CaCO3)		94500	1450	2000	2000	ug/L						
Carbonate alkalinity (CaCO3)	U	ND	1450	2000	2000	ug/L						
Hydroxide alkalinity as CaCO3	U	ND	1450	2000	2000	ug/L						

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	2320_ALKALINITY	

GEL LABORATORIES LLC

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Certificate of Analysis

Company : CH2MHill Plateau Remediation
 Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S14-006**

Report Date: July 10, 2014

Client Sample ID: B2WPK9
 Lab Sample ID: 350586005
 Matrix: WATER
 Collect Date: 12-JUN-14 07:30
 Receive Date: 13-JUN-14
 Collector: Client

Project: HMSA00158
 Client ID: HMSA001
 Client SDG: GEL350586

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Titration and Ion Analysis												
<i>2320_ALKALINITY: GW 01 "As Received"</i>												
Alkalinity, Total as CaCO3	U	ND	725	1000	1000	ug/L		PX01	06/24/14	15:52	1397897	1
Bicarbonate alkalinity (CaCO3)	U	ND	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 Analytical Methods were performed

Method	Description	Analyst Comments
1	2320_ALKALINITY	

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Certificate of Analysis

Company : CH2MHill Plateau Remediation
 Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S14-006**

Report Date: July 10, 2014

Client Sample ID: B2WPK0
 Lab Sample ID: 350586007
 Matrix: WATER
 Collect Date: 12-JUN-14 09:01
 Receive Date: 13-JUN-14
 Collector: Client

Project: HMSA00158
 Client ID: HMSA001
 Client SDG: GEL350586

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Titration and Ion Analysis												
<i>2320_ALKALINITY: GW 01 "As Received"</i>												
Alkalinity, Total as CaCO3		92000	725	1000	1000	ug/L		PX01	06/24/14	16:00	1397897	1
Bicarbonate alkalinity (CaCO3)		92000	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 Analytical Methods were performed

Method	Description	Analyst Comments
1	2320_ALKALINITY	

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Certificate of Analysis

Company : CH2MHill Plateau Remediation
 Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S14-006**

Report Date: July 10, 2014

Client Sample ID: B2WPJ9
 Lab Sample ID: 350586009
 Matrix: WATER
 Collect Date: 12-JUN-14 08:20
 Receive Date: 13-JUN-14
 Collector: Client

Project: HMSA00158
 Client ID: HMSA001
 Client SDG: GEL350586

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Titration and Ion Analysis												
<i>2320_ALKALINITY: GW 01 "As Received"</i>												
Alkalinity, Total as CaCO3	U	ND	725	1000	1000	ug/L		PX01	06/24/14	16:10	1397897	1
Bicarbonate alkalinity (CaCO3)	U	ND	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 Analytical Methods were performed

Method	Description	Analyst Comments
1	2320_ALKALINITY	

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Certificate of Analysis

Company : CH2MHill Plateau Remediation
 Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S14-006**

Report Date: July 10, 2014

Client Sample ID: B2WRD4
 Lab Sample ID: 350586011
 Matrix: WATER
 Collect Date: 11-JUN-14 12:10
 Receive Date: 13-JUN-14
 Collector: Client

Project: HMSA00158
 Client ID: HMSA001
 Client SDG: GEL350586

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Titration and Ion Analysis												
<i>2320_ALKALINITY: GW 01 "As Received"</i>												
Alkalinity, Total as CaCO3		125000	725	1000	1000	ug/L		PX01	06/24/14	16:14	1397897	1
Bicarbonate alkalinity (CaCO3)		125000	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 Analytical Methods were performed

Method	Description	Analyst Comments
1	2320_ALKALINITY	

GEL LABORATORIES LLC

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Certificate of Analysis

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S14-006**

Report Date: July 10, 2014

Client Sample ID: B2WPL1
 Lab Sample ID: 350586012
 Matrix: WATER
 Collect Date: 12-JUN-14 07:30
 Receive Date: 13-JUN-14
 Collector: Client

Project: HMSA00158
 Client ID: HMSA001
 Client SDG: GEL350586

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
<i>9056_ANIONS_IC:COMMON + GW 02 "As Received"</i>												
Bromide	U	ND	67.0	200	250	ug/L	1	MAR106	13/14	15:33	1395672	1
Chloride	B	92.4	67.0	200	200	ug/L	1					
Fluoride	U	ND	33.0	100	500	ug/L	1					
Nitrate-N	B	39.5	33.0	100	250	ug/L	1					
Nitrite-N	U	ND	38.0	100	250	ug/L	1					
Phosphorus in phosphate	U	ND	67.0	200	500	ug/L	1					
Sulfate	B	146	133	400	500	ug/L	1					

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 9056A	

GEL LABORATORIES LLC

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

Certificate of Analysis

Company : CH2MHill Plateau Remediation
 Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S14-006**

Report Date: July 10, 2014

Client Sample ID: B2WPL2
 Lab Sample ID: 350586013
 Matrix: WATER
 Collect Date: 12-JUN-14 08:55
 Receive Date: 13-JUN-14
 Collector: Client

Project: HMSA00158
 Client ID: HMSA001
 Client SDG: GEL350586

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
<i>9056_ANIONS_IC:COMMON + GW 02 "As Received"</i>												
Bromide	B	173	67.0	200	250	ug/L	1	MAR106	13/14	17:45	1395672	1
Fluoride	B	175	33.0	100	500	ug/L	1					
Nitrite-N	U	ND	38.0	100	250	ug/L	1					
Phosphorus in phosphate	U	ND	67.0	200	500	ug/L	1					
Chloride	D	15200	335	1000	200	ug/L	5	MAR106	13/14	19:23	1395672	2
Nitrate-N	D	5780	165	500	250	ug/L	5					
Sulfate	D	222000	3330	10000	500	ug/L	25	MAR106	15/14	03:46	1395672	3

The following Analytical Methods were performed

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

GEL LABORATORIES LLC

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

Certificate of Analysis

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S14-006**

Report Date: July 10, 2014

Client Sample ID: B2WRD5
 Lab Sample ID: 350586014
 Matrix: WATER
 Collect Date: 11-JUN-14 12:10
 Receive Date: 13-JUN-14
 Collector: Client

Project: HMSA00158
 Client ID: HMSA001
 Client SDG: GEL350586

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
<i>9056_ANIONS_IC:COMMON + GW 02 "As Received"</i>												
Bromide	B	143	67.0	200	250	ug/L	1	MAR106	13/14	12:15	1395672	1
Fluoride	B	372	33.0	100	500	ug/L	1					
Nitrite-N	U	ND	38.0	100	250	ug/L	1					
Phosphorus in phosphate	B	273	67.0	200	500	ug/L	1					
Chloride	D	15200	335	1000	200	ug/L	5	MAR106	13/14	12:48	1395672	2
Nitrate-N	D	4800	165	500	250	ug/L	5					
Sulfate	D	49500	665	2000	500	ug/L	5					

The following Analytical Methods were performed

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

Quality Control Summary

GEL LABORATORIES LLC

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QC Summary

Report Date: July 10, 2014

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

Contact: Mr. Scot Fitzgerald

Workorder: 350586

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1395672										
QC1203108521 350586013 DUP											
Bromide	B	173	B	168	ug/L	3.04	^	(+/-250)	MAR1	06/13/14	18:17
Chloride	D	15200	D	15400	ug/L	0.987		(0%-20%)		06/13/14	19:56
Fluoride	B	175	B	171	ug/L	2.54	^	(+/-500)		06/13/14	18:17
Nitrate-N	D	5780	D	5840	ug/L	1.03		(0%-20%)		06/13/14	19:56
Nitrite-N	U	ND	U	ND	ug/L	N/A				06/13/14	18:17
Phosphorus in phosphate	U	ND	U	ND	ug/L	N/A					
Sulfate	D	222000	D	221000	ug/L	0.454		(0%-20%)		06/15/14	04:19
QC1203108576 350593015 DUP											
Chloride		1120		1110	ug/L	0.566		(0%-20%)		06/14/14	00:52
Fluoride	B	77.1	B	76.6	ug/L	0.651	^	(+/-500)			
Nitrate-N	U	ND	U	ND	ug/L	N/A					
Nitrite-N	U	ND	U	ND	ug/L	N/A					
Phosphorus in phosphate	D	6940	D	6910	ug/L	0.347		(0%-20%)		06/14/14	02:31
Sulfate		1780		1800	ug/L	0.893	^	(+/-500)		06/14/14	00:52
QC1203108523 LCS											
Bromide		1250		1220	ug/L			97.7 (90%-110%)		06/13/14	11:43
Chloride		5000		4620	ug/L			92.5 (90%-110%)			
Fluoride		2500		2340	ug/L			93.7 (90%-110%)			
Nitrate-N		2500		2390	ug/L			95.5 (90%-110%)			
Nitrite-N		2500		2380	ug/L			95.1 (90%-110%)			
Phosphorus in phosphate		1250		1200	ug/L			95.8 (90%-110%)			

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QC Summary

Workorder: 350586

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1395672										
Sulfate	10000			9730	ug/L		97.3	(90%-110%)	MAR1	06/13/14	11:43
QC1203108520 MB											
Bromide			U	ND	ug/L					06/13/14	11:10
Chloride			U	ND	ug/L						
Fluoride			U	ND	ug/L						
Nitrate-N			U	ND	ug/L						
Nitrite-N			U	ND	ug/L						
Phosphorus in phosphate			U	ND	ug/L						
Sulfate			U	ND	ug/L						
QC1203108522 350586013 PS											
Bromide	1.25	B	0.173	1.40	mg/L		98.3	(90%-110%)		06/13/14	18:50
Chloride	5.00	D	3.04 D	8.24	mg/L		104	(90%-110%)		06/13/14	20:29
Fluoride	2.50	B	0.175	2.55	mg/L		95.1	(90%-110%)		06/13/14	18:50
Nitrate-N	2.50	D	1.16 D	3.71	mg/L		102	(90%-110%)		06/13/14	20:29
Nitrite-N	2.50	U	ND	2.40	mg/L		96	(90%-110%)		06/13/14	18:50
Phosphorus in phosphate	1.25	U	ND	1.24	mg/L		99.1	(90%-110%)			
Sulfate	10.0	D	8.89 D	19.9	mg/L		110	(90%-110%)		06/15/14	04:52
QC1203108577 350593015 PS											
Chloride	5.00		1.12	6.02	mg/L		98.1	(90%-110%)		06/14/14	01:25
Fluoride	2.50	B	0.0771	2.60	mg/L		101	(90%-110%)			
Nitrate-N	2.50	U	ND	2.42	mg/L		96.9	(90%-110%)			
Nitrite-N	2.50	U	ND	2.45	mg/L		97.9	(90%-110%)			
Phosphorus in phosphate	1.25	D	1.39 D	2.63	mg/L		99.2	(90%-110%)		06/14/14	03:04

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QC Summary

Workorder: 350586

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1395672										
Sulfate	10.0	1.78		11.7	mg/L		99.2	(90%-110%)		06/14/14	01:25
Titration and Ion Analysis											
Batch	1397897										
QC1203114090	350586003	DUP									
Alkalinity, Total as CaCO3		94500		92500	ug/L	2.20		(0%-20%)	PX01	06/24/14	15:47
Bicarbonate alkalinity (CaCO3)		94500		92500	ug/L	2.20		(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				
QC1203114094	LCS										
Alkalinity, Total as CaCO3	50000			50300	ug/L		101	(90%-110%)		06/24/14	14:40
QC1203114086	MB										
Alkalinity, Total as CaCO3		U		ND	ug/L					06/24/14	14:29
Bicarbonate alkalinity (CaCO3)		U		ND	ug/L						
Carbonate alkalinity (CaCO3)		U		ND	ug/L						
Hydroxide alkalinity as CaCO3		U		ND	ug/L						
QC1203114093	350586003	MS									
Alkalinity, Total as CaCO3	100000	94500		193000	ug/L		98.6	(80%-120%)		06/24/14	15:50

Notes:

The Qualifiers in this report are defined as follows:

- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- 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

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QC Summary

Workorder: 350586

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<u>Parmname</u>	<u>NOM</u>	<u>Sample</u>	<u>Qual</u>	<u>QC</u>	<u>Units</u>	<u>RPD%</u>	<u>REC%</u>	<u>Range</u>	<u>Anlst</u>	<u>Date</u>	<u>Time</u>
-----------------	------------	---------------	-------------	-----------	--------------	-------------	-------------	--------------	--------------	-------------	-------------

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

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

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

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

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

Miscellaneous

DATA EXCEPTION REPORT			
Mo.Day Yr. 30-JUN-14	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: IC	Test / Method: SW846 9056A	Matrix Type: Liquid	Client Code: HMSA
Batch ID: 1395672	Sample Numbers: See Below		
<p>Potentially affected work order(s)(SDG): 350586(GEL350586),350593(GEL350593),350598(GEL350598)</p> <p>Application Issues: Failed Recovery for MS/PS Sample Analyzed out of Holding Sample received out of holding</p>			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Sample Analyzed out of Holding:</p> <p style="padding-left: 40px;">350593 014</p> <p style="padding-left: 40px;">350598 019,020</p> <p>2. Sample received out of holding:</p> <p style="padding-left: 40px;">350598 018</p>		<p>1. Samples was received with insufficient time to prep and/or analyze within the remaining method-specified holding time. The samples was analyzed as soon as possible by the analyst.</p> <p>2. Sample received out of holding (Contact PM for Comments)</p>	

Originator's Name:
Mary Sherwood 30-JUN-14

Data Validator/Group Leader:
Thomas Lewis 10-JUL-14

Radiological Analysis

**Radiochemistry Case Narrative
Hanford MSA (HMSA)
SDG GEL350586
Work Order 350586**

Method/Analysis Information

Product: 9310_ALPHABETA_GPC: COMMON
Analytical Method: BETA_GPC
Analytical Batch Number: 1396252

Sample ID	Client ID
350586011	B2WRD4
1203110021	Method Blank (MB)
1203110022	350493003(B2WRB6) Sample Duplicate (DUP)
1203110023	350493003(B2WRB6) Matrix Spike (MS)
1203110024	350493003(B2WRB6) Matrix Spike Duplicate (MSD)
1203110025	Laboratory Control Sample (LCS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-001 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: 350493003 (B2WRB6).

QC Information

All of the QC samples meet the required acceptance limits with the following exceptions: The sample and the duplicate, 1203110022 (B2WRB6), did not meet the alpha or beta relative percent difference requirements; however, they do meet the relative error ratio requirements with value of 1.13 for alpha and 1.38 for beta.

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.

Gross Alpha/Beta Preparation Information

High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating.

Recounts

Sample 1203110023 (B2WRB6) was recounted due to high recovery. The recount is reported.

Miscellaneous Information:

Data Exception (DER) Documentation

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

Sample-Specific MDA/MDC

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

Additional Comments

The matrix spike and matrix spike duplicate, 1203110023 (B2WRB6) and 1203110024 (B2WRB6), aliquots were reduced to conserve sample volume.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product:	KPA_UTOT: COMMON
Analytical Method:	UTOT_KPA
Analytical Batch Number:	1395913

Sample ID Client ID

350586001	B2WRF8
350586011	B2WRD4
1203109085	Method Blank (MB)
1203109086	350686005(B2WML8) Sample Duplicate (DUP)
1203109087	350686005(B2WML8) Matrix Spike (MS)
1203109088	Laboratory Control Sample (LCS)
1203109089	Laboratory Control Sample (LCS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-023 REV# 19.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met. The calibration for Total Uranium is performed prior to each analysis and is located in the raw data section.

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: 350686005 (B2WML8).

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

Samples 350586001 (B2WRF8) and 350586011 (B2WRD4) initial concentrations were greater than the required detection limit. The samples were diluted 1:10 and reanalyzed. The initial results were verified. The diluted samples were then treated with a post-spike due to contractual requirements and reanalyzed to test for quenching. No evidence of quenching was found. The post-spikes verified the diluted results, so the diluted results are reported. "D" qualifiers have been assigned.

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

MB 1203109085 (MB) failed R2 and/or lifetime. This was due to insufficient uranium in the sample for measurement. The results are reported.

Qualifier Information

Qualifier	Reason	Analyte	Sample	Client Sample
D	Results are reported from a diluted aliquot of sample.	Total Uranium	350586001	B2WRF8
			350586011	B2WRD4

Method/Analysis Information

Product: TRITIUM_DIST_LSC: COMMON
Analytical Method: TRITIUM_DIST_LSC
Analytical Batch Number: 1396338

Sample ID	Client ID
350586002	B2WP90
1203110236	Method Blank (MB)
1203110237	350686005(B2WML8) Sample Duplicate (DUP)
1203110238	350686005(B2WML8) Matrix Spike (MS)
1203110239	Laboratory Control Sample (LCS)

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

SOP Reference

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

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: 350686005 (B2WML8).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:**Holding Time**

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

Sample Re-prep/Re-analysis

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

Recounts

Sample 350586002 (B2WP90) was recounted to verify sample results. The recount result is similar to the original result. Original result is reported.

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

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

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the

requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

GEL LABORATORIES LLC

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

**Qualifier Definition Report
for**

HMSA001 Hanford MSA (51204)

Client SDG: GEL350586 GEL Work Order: 350586

The Qualifiers in this report are defined as follows:

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.

Review/Validation

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

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

Signature: 

Name: Heather McCarty

Date: 08 JUL 2014

Title: Analyst II

Sample Data Summary

July 21, 2014

REVISION 1

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 S14-006

Report Date: July 8, 2014

Client Sample ID: B2WRF8
Sample ID: 350586001
Matrix: WATER
Collect Date: 11-JUN-14
Receive Date: 13-JUN-14
Collector: Client

Project: HMSA00158
Client ID: HMSA001

Table with 13 columns: Parameter, Qualifier, Result, Uncertainty, MDC, TPU, RL, Units, DF, Analyst, Date, Time, Batch, Mtd. Row 1: Rad Total Uranium, KPA_UTOT: COMMON "As Received", Total Uranium, D, 41.6, +/-1.03, 2.05, +/-4.34, 1.00, ug/L, 10 JAOC, 07/01/14, 1247, 1395913, 1

The following Analytical Methods were performed

Table with 2 columns: Method, Description. Row 1: 1, ASTM D 5174

Table with 4 columns: Surrogate/Tracer Recovery, Test, Batch ID, Recovery%, Acceptable Limits

Notes:

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

July 21, 2014

REVISION 1

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 S14-006

Report Date: July 8, 2014

Client Sample ID: B2WP90
Sample ID: 350586002
Matrix: WATER
Collect Date: 10-JUN-14
Receive Date: 13-JUN-14
Collector: Client

Project: HMSA00158
Client ID: HMSA001

Table with 14 columns: Parameter, Qualifier, Result, Uncertainty, MDC, TPU, RL, Units, DF, Analyst, Date, Time, Batch, Mtd. Row 1: Tritium, 3050, +/-192, 101, +/-621, 100, pCi/L, BYS1, 06/20/14, 2355, 1396338, 1

The following Analytical Methods were performed

Table with 2 columns: Method, Description. Row 1: 1, EPA 906.0 Modified

Table with 4 columns: Surrogate/Tracer Recovery, Test, Batch ID, Recovery%, Acceptable Limits

Notes:

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

July 21, 2014

REVISION 1

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 S14-006

Report Date: July 8, 2014

Client Sample ID: B2WRD4
 Sample ID: 350586011
 Matrix: WATER
 Collect Date: 11-JUN-14
 Receive Date: 13-JUN-14
 Collector: Client

Project: HMSA00158
 Client ID: HMSA001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gas Flow Proportional Counting													
<i>9310_ALPHABETA_GPC: COMMON "As Received"</i>													
Alpha		76.8	+/-7.36	2.87	+/-14.7	3.00	pCi/L		BXF1	06/30/14	1103	1396252	1
Beta		43.1	+/-3.53	2.99	+/-7.93	4.00	pCi/L						
Rad Total Uranium													
<i>KPA_UTOT: COMMON "As Received"</i>													
Total Uranium	D	106	+/-2.61	2.05	+/-11.0	1.00	ug/L	10	JAOC	07/01/14	1249	1395913	2

The following Analytical Methods were performed

Method	Description
1	EPA 900.0/SW846 9310
2	ASTM D 5174

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
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Notes:

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

Quality Control Data

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 8, 2014

Page 1 of 3

Client : CH2M Hill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Workorder: 350586

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Gas Flow										
Batch	1396252									
QC1203110021	MB									
Alpha			U	0.114	pCi/L			BXF1	06/30/1411:29	
				Uncert: +/-0.949						
				TPU: +/-0.950						
Beta			U	-1.13	pCi/L					
				Uncert: +/-1.27						
				TPU: +/-1.27						
QC1203110022	350493003	DUP								
Alpha		21.4		17.0	pCi/L				06/30/1411:28	
				Uncert: +/-4.27		RPD: 23*	(0% - 20%)			
				TPU: +/-5.58		RER: 1.13	(0-2)			
Beta		24.2		19.6	pCi/L					
				Uncert: +/-2.78		RPD: 21*	(0% - 20%)			
				TPU: +/-4.82		RER: 1.38	(0-2)			
QC1203110023	350493003	MS								
Alpha		206	21.4	232	pCi/L	REC: 102	(75%-125%)		07/01/1416:49	
				Uncert: +/-4.27						
				TPU: +/-5.58						
Beta		753	24.2	881	pCi/L	REC: 114	(75%-125%)			
				Uncert: +/-2.78						
				TPU: +/-4.82						
QC1203110024	350493003	MSD								
Alpha		206	21.4	272	pCi/L	REC: 122	(75%-125%)		06/30/1411:28	
				Uncert: +/-4.27		RPD: 16	(0%-20%)			
				TPU: +/-5.58		RER: 1.12	(0-2)			
Beta		753	24.2	943	pCi/L	REC: 122	(75%-125%)			
				Uncert: +/-2.78		RPD: 7	(0%-20%)			
				TPU: +/-4.82		RER: 0.565	(0-2)			
QC1203110025	LCS									
Alpha		82.3		93.3	pCi/L	REC: 113	(80%-120%)		06/30/1411:28	
				Uncert: +/-8.84						
				TPU: +/-17.8						
Beta		301		333	pCi/L	REC: 111	(80%-120%)			
				Uncert: +/-12.0						
				TPU: +/-55.8						
Rad Liquid Scintillation										
Batch	1396338									
QC1203110236	MB									
Tritium			U	14.7	pCi/L			BYS1	06/21/1407:56	
				Uncert: +/-54.6						
				TPU: +/-54.7						
QC1203110237	350686005	DUP								
Tritium		570		518	pCi/L				06/21/1408:58	
				Uncert: +/-96.9		RPD: 10	(0% - 20%)			
				TPU: +/-147		RER: 0.511	(0-2)			

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Liquid Scintillation										
Batch	1396338									
QC1203110238	350686005	MS								
Tritium	1780	570		2410	pCi/L	REC: 103	(75%-125%)		06/21/1410:01	
	Uncert:	+/-96.9		+/-334						
	TPU:	+/-147		+/-573						
QC1203110239	LCS									
Tritium	1780			1510	pCi/L	REC: 85	(80%-120%)		06/21/1410:18	
	Uncert:			+/-268						
	TPU:			+/-396						
Rad Total U										
Batch	1395913									
QC1203109085	MB									
Total Uranium			U	-0.0278	ug/L			JAOC	07/01/1411:49	
	Uncert:			+/-0.000682						
	TPU:			+/-0.00239						
QC1203109086	350686005	DUP								
Total Uranium		4.20		4.47	ug/L				07/01/1411:52	
	Uncert:	+/-0.107		+/-0.112		RPD: 6	(0% - 20%)			
	TPU:	+/-0.363		+/-0.386		RER: 1.01	(0-2)			
QC1203109087	350686005	MS								
Total Uranium	50.0	4.20		53.5	ug/L	REC: 99	(75%-125%)		07/01/1411:55	
	Uncert:	+/-0.107		+/-3.27						
	TPU:	+/-0.363		+/-5.49						
QC1203109088	LCS									
Total Uranium	50.0			51.5	ug/L	REC: 103	(80%-120%)		07/01/1411:57	
	Uncert:			+/-3.19						
	TPU:			+/-5.32						
QC1203109089	LCS									
Total Uranium	5.00			4.90	ug/L	REC: 98	(80%-120%)		07/01/1412:00	
	Uncert:			+/-0.123						
	TPU:			+/-0.422						

Notes:

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

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- A The TIC is a suspected aldol-condensation product
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- B The analyte was detected in both the associated QC blank and in the sample.
- B The associated QC sample blank has a result >= 2X the MDA and, after corrections, result is >= MDA for this sample
- C Analyte has been confirmed by GC/MS analysis
- C Target analyte was detected in the sample and the associated blank, and the sample concentration was <= 5 times the blank concentration.
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- E Reported value is estimated due to interferences. See comment in narrative.

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

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

** Indicates analyte is a surrogate compound.

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

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

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