



Tuesday, October 15, 2019

Karen Waters-Husted
CH2M HILL Plateau Remediation Company
825 Jadwin Avenue
Richland, WA 99352

Re: ALS Workorder: 1909241
Project Name: AQUIFER TUBES, OCTOBER 2019
Project Number: X20-001

Dear Ms. Waters-Husted:

Fifteen water samples were received from CH2M HILL Plateau Remediation Company, on 9/13/2019. The samples were scheduled for the following analyses:

- GC/MS Volatiles
- Inorganics
- Metals
- Strontium-90
- Technetium-99
- Tritium

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. O'Brien
Project Manager

We certify that this data package is in compliance with the SOW, both technically and for completeness, including a full description of, explanation of, and corrective actions for, any and all deviations, from either the analyses requested or the case narrative requested. Release of the data contained in this hard copy data package has been authorized by the Laboratory Analytical Manager (or designee) and the laboratory's client services representative as verified by their signatures on this report.

SAMPLE ISSUE RESOLUTION (SIR) REPORT		SIR Number: SIR19-0851
		Rev. Number: 0
		Date Initiated: 09/17/2019
<u>SAMPLE EVENT INFORMATION</u>		
SAF NUM(S):	X20-001	
LABORATORY:	ALS	
<u>SAMPLING INFORMATION</u>		
NUMBER OF SAMPLES:	5	
SAMPLE NUMBERS:	B3RR23, B3RR62, B3RR66, B3RR67, B3RR72	
SAMPLE MATRIX:	WATER	
SDG NUM(S):	ALS1909241	
<u>ISSUE BACKGROUND</u>		
CLASS:	Chain of Custody Issue (Field)	
TYPE:	Sample Date/time is missing/incorrect/illegible	
DESCRIPTION:	Upon chain of custody data entry for SDG ALS1909241, COCs X20-001-004 (Sample #B3RR62), X20-001-005 (Sample #B3RR72), X20-001-456 (Sample #B3RR66), X20-001-457 (Sample #B3RR67), and X20-001-462 (Sample #B3RR23), the Sample date (month) is incorrect.	
<u>RESOLUTION</u>		
PROPOSED RESOLUTION:	Sample Date should be recorded as: Sept. 12, 2019.	
FINAL RESOLUTION:	Sample Date should be recorded as: Sept. 12, 2019.	
SUBMITTED BY:		
GIBSON, GG	09/17/2019	
_____	_____	
ACCEPTED BY:		
HEY, BE	09/17/2019	
_____	_____	

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1909241

Client Name: CH2M HILL Plateau Remediation Company

Client Project Name: AQUIFER TUBES, OCTOBER 2019

Client Project Number: X20-001

Client PO Number: BOA 54854

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
B3RNR7	1909241-1		WATER	11-Sep-19	9:41
B3RP44	1909241-2		WATER	11-Sep-19	10:31
B3RPW2	1909241-3		WATER	11-Sep-19	9:08
B3RNR3	1909241-4		WATER	11-Sep-19	9:08
B3RP32	1909241-5		WATER	11-Sep-19	10:52
B3RP41	1909241-6		WATER	11-Sep-19	10:52
B3RNR4	1909241-7		WATER	11-Sep-19	9:08
B3RPW3	1909241-8		WATER	11-Sep-19	9:08
B3RP40	1909241-9		WATER	11-Sep-19	6:30
B3RP31	1909241-10		WATER	11-Sep-19	6:30
B3RR23	1909241-11		WATER	12-Sep-19	8:27
B3RR66	1909241-12		WATER	12-Sep-19	10:11
B3RR67	1909241-13		WATER	12-Sep-19	10:11
B3RR72	1909241-14		WATER	12-Sep-19	11:08
B3RR62	1909241-15		WATER	12-Sep-19	10:11

CH2MHill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		C.O.C.# X20-001-040
		Telephone No.: 509-376-4650		Page 1 of 1
Collector: Juan Aguilar CHPRC		Contact/Requester: Karen Waters-Husted		
SAF No.: X20-001		Sampling Origin: Hanford Site		
Project Title: AQUIFER TUBES, OCTOBER 2019		Logbook No.: HNF-N-506-103/40		
Shipped To (Lab): ALS Environmental Ft. Collins		Method of Shipment Commercial Carrier		
Protocol: SURV		Priority: 30 Days		
POSSIBLE SAMPLE HAZARDS/REMARK		SPECIAL INSTRUCTIONS		
** ** 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		N/A		
Sample No.	Filter	* Date	Time	No/Type Container
B3RNR7	N	9-11-19	0941	5x40-mL aGs*
B3RNR7	N	9-11-19	0941	1x250-mL P
		Sample Analysis		Holding Time
		8260_VOA_GCMS: COMMON		14 Days
		TRITIUM_DIST_LSC: COMMON		6 Months
		Preservative		
		HCl or H2SO4 to pH <2 / Cool <=6C		None

Relinquished By		Received By	
Print First and Last Name	Signature	Print First and Last Name	Signature
Juan Aguilar CHPRC		Janelle Zunker CHPRC	
Janelle Zunker CHPRC		SSU-1	
SSU-1		Janelle Zunker CHPRC	
Janelle Zunker CHPRC		FEDEX	
FEDEX		EMILY LYONS	

Print First and Last Name	Signature	Date/Time	Date/Time
Juan Aguilar CHPRC		SEP 11 2019 1118	SEP 11 2019 1118
Janelle Zunker CHPRC		SEP 11 2019 1300	SEP 11 2019 1300
SSU-1		SEP 12 2019 0630	SEP 12 2019 0630
Janelle Zunker CHPRC		SEP 12 2019 1400	SEP 12 2019 1400
FEDEX		SEP 12 2019 1400	SEP 12 2019 1400
EMILY LYONS		SEP 13 2019 0958	SEP 13 2019 0958

FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process):	Disposed By:	Date/Time:
Printed On 8/26/2019			

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 1909241		C.O.C. # X20-001-028 Page 1 of 1
Collector: Juan Aguilar CHPRC	Contact/Requester: Karen Waters-Husted	Telephone No.: 509-376-4650	Purchase Order/Charge Code: 303064	
SAF No.: X20-001	Sampling Origin: Hanford Site	Logbook No.: HNF-N-506 - 103/40	Ice Chest No.: 605-061	Bill of Lading/Air Bill No.: 776222389187
Project Title: AQUIFER TUBES, OCTOBER 2019	Method of Shipment: Commercial Carrier	Priority: 30 Days	Offsite Property No.: 11583	
Shipped To (Lab): ALS Environmental Ft. Collins	SPECIAL INSTRUCTIONS N/A			
Protocol: SURV	POSSIBLE SAMPLE HAZARDS/REMARK ** ** 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. B3RP44 Filter N * W Time 9-11-19 1031 Date 9-11-19 1031	No/Type Container 5x40-mL aGs* 2x1-L G/P	Sample Analysis 8260_VOA_GCMS: COMMON SRISO_SEP_PRECIP_GPC: COMMON	Holding Time 14 Days 6 Months	Preservative HCl or H2SO4 to pH <2 / COOL <=6C HNO3 to pH <2

Relinquished By		Received By	
Print First and Last (Name)	Signature	Print First and Last Name	Signature
Juan Aguilar CHPRC	<i>[Signature]</i>	Janelle Zunker CHPRC	<i>[Signature]</i>
Janelle Zunker CHPRC	<i>[Signature]</i>	SSU-1	SEP 11 2019 1130
SSU-1	<i>[Signature]</i>	Janelle Zunker CHPRC	SEP 12 2019 0630
Janelle Zunker CHPRC	<i>[Signature]</i>	FEDEX	SEP 12 2019 1430
FEDEX	<i>[Signature]</i>	FEDEX	SEP 12 2019 1430
		EMILY AYONS Emily Ayons	09-13-19 0952

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

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

CH2M Hill Plateau Remediation Company

C.O.C.#
X20-001-038
Page 1 of 1

Collector: Juan Aguilar CHPRC
SAF No.: X20-001
Project Title: AQUIFER TUBES, OCTOBER 2019
Shipped To (Lab): ALS Environmental Ft. Collins
Protocol: SURV
Contact/Requester: Karen Waters-Husted
Sampling Origin: Hanford Site
Logbook No.: HNF-N-506-103/kO
Method of Shipment: Commercial Carrier
Priority: 30 Days
Telephone No.: 509-376-4650
Purchase Order/Charge Code: 303064
Ice Chest No.: GWS-06
Bill of Lading/Air Bill No.: 776222389187
Offsite Property No.: 11583

SPECIAL INSTRUCTIONS
N/A

POSSIBLE SAMPLE HAZARDS/REMARK
 ** ** 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
B3RPW2	S	N	9-11-19	0908	1x500-mL G/P	6020_METALS_ICPMS: Chromium (1)	6 Months	HNO3 to pH <2
B3RPW2	↓	N	9-11-19	0908	2x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2
B3RRR3	✓	Y	9-11-19	0908	1x500-mL G/P	6020_METALS_ICPMS: Chromium (1)	6 Months	HNO3 to pH <2

Relinquished By		Received By	
Print First and Last Name	Signature	Print First and Last Name	Signature
Juan Aguilar CHPRC		Janelle Zunker CHPRC	
Janelle Zunker CHPRC		Janelle Zunker CHPRC	
SSU-1		SSU-1	
Janelle Zunker CHPRC		FEDEX	
FEDEX		EMILY LYONS	

Print First and Last Name	Signature	Date/Time	Matrix *
Juan Aguilar CHPRC		SEP 11 2019 1118	S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air
Janelle Zunker CHPRC		SEP 11 2019 1130	DS = Drum Solids DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation X = Other
SSU-1		SEP 12 2019 1400	
Janelle Zunker CHPRC		SEP 12 2019 1400	
FEDEX		SEP 17 2019 0952	

FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process):	Disposed By:	Date/Time:
Printed On 8/26/2019			

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		C.O.C.# X20-001-027				
Juan Aguilar JCHPRC Telephone No.: 509-376-4650 Page 1 of 1		1909241 Purchase Order/Charge Code: 303064 Ice Chest No.: <u>92917114</u> Bill of Lading/Air Bill No.: <u>1716222389187</u> Offsite Property No.: <u>11583</u>						
Contact/Requester: Karen Waters-Husted Sampling Origin: Hanford Site Logbook No.: HNF-N-506-103160 Method of Shipment: Commercial Carrier Priority: 30 Days	SPECIAL INSTRUCTIONS N/A							
POSSIBLE SAMPLE HAZARDS/REMARK ** ** 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								
B3RP32	N	W	9-11-19	1052	1x500-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: GW 01	6 Months	HNO3 to pH <2
B3RP32	N	W	9-11-19	1052	2x1-L G/P	SRISO_SEP_PRECIP_GFC: COMMON	6 Months	HNO3 to pH <2
B3RP41	Y	W	9-11-19	1052	1x500-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: GW 01	6 Months	HNO3 to pH <2

Relinquished By		Received By	
Print First and Last Name	Signature	Print First and Last Name	Signature
Juan Aguilar JCHPRC		Janelle Zunker CHPRC	
Janelle Zunker CHPRC		SSU-1 Janelle Zunker CHPRC	
SSU-1 Janelle Zunker CHPRC		FEDEX	
		EMILY LYONS	

Date/Time: SEP 11 2019 11:18 Date/Time: SEP 11 2019 11:30 Date/Time: SEP 12 2019 11:30 Date/Time: SEP 12 2019 14:00	Date/Time: SEP 11 2019 11:18 Date/Time: SEP 11 2019 11:30 Date/Time: SEP 12 2019 11:30 Date/Time: SEP 12 2019 14:00
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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	Disposed By: Emily Lyons 09.13.19.0952 Date/Time:
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FINAL SAMPLE DISPOSITION Disposal Method (e.g., Return to customer, per lab procedure, used in process):

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

**CH2MHill Plateau
Remediation Company**

C.O.C.#
X20-001-039
Page 1 of 1

1909241

Collector: Juan Aguilar CH2MRC	Contact/Requester: Karen Waters-Husted	Telephone No.: 509-376-4650
SAF No.: X20-001	Sampling Origin: Hanford Site	Purchase Order/Charge Code: 303064
Project Title: AQUIFER TUBES, OCTOBER 2019	Logbook No.: HNF-N-506-103160	Ice Chest No.: 6205-061
Shipped To (Lab): ALS Environmental Ft. Collins	Method of Shipment: Commercial Carrier	Bill of Lading/Air Bill No.: 7106222389187
Protocol: SURV	Priority: 30 Days	Offsite Property No.: 11583

SPECIAL INSTRUCTIONS
N/A

POSSIBLE SAMPLE HAZARDS/REMARK
** ** 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
B3RNR4	7	W	9-11-19	0908	1x500-mL G/P	6020_METALS_ICPMS: Chromium (1)	6 Months	HNO3 to pH <2
B3RPW3	8	W	9-11-19	0908	1x500-mL G/P	6020_METALS_ICPMS: Chromium (1)	6 Months	HNO3 to pH <2
B3RPW3	9	W	9-11-19	0908	2x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2

Relinquished By		Received By		Matrix *	
Print First and Last Name	Signature	Date/Time	Signature	Date/Time	S = Soil
Juan Aguilar CH2MRC		SEP 11 2019 1118	Janelle Zunker CH2MRC	SEP 11 2019 1118	SE = Sediment
Janelle Zunker CH2MRC		SEP 11 2019 1130	SSU-1	SEP 11 2019 1130	SO = Solid
SSU-1		SEP 12 2019 0830	Janelle Zunker CH2MRC	SEP 12 2019 0830	SL = Sludge
Janelle Zunker CH2MRC		SEP 12 2019 1440	FEDEX	SEP 12 2019 0953	W = Water
			FEDEX	SEP 12 2019 0953	WI = Wipe
			EMILY LYONS	09-13-19 0953	L = Liquid
					V = Vegetation
					X = Other

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

Disposed By:

Date/Time:

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		C.O.C.# X20-001-026	
Collector: Juan Aguilar /CHPRC		Contact/Requester: Karen Waters-Husted		Page 1 of 1	
SAF No.: X20-001		Sampling Origin: Hanford Site		Telephone No.: 509-376-4650	
Project Title: AQUIFER TUBES, OCTOBER 2019		Logbook No.: HNF-N-506-103/60		Purchase Order/Charge Code: 303064	
Shipped To (Lab): ALS Environmental Ft. Collins		Method of Shipment: Commercial Carrier		Ice Chest No.: 6WS-061	
Protocol: SURV		Priority: 30 Days		Bill of Lading/Air Bill No.: 177622389187	
POSSIBLE SAMPLE HAZARDS/REMARK		SPECIAL INSTRUCTIONS		Offsite Property No.: 11583	
** ** 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		N/A			

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3RP40	Y	W	9-11-19	0630	1x500-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: GW 01	6 Months	HNO3 to pH <2
B3RP31	N	W	9-11-19	0630	1x500-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: GW 01	6 Months	HNO3 to pH <2
B3RP31	N	W	9-11-19	0630	2x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2

Relinquished By		Received By	
Print First and Last Name	Signature	Print First and Last Name	Signature
Juan Aguilar /CHPRC	<i>[Signature]</i>	Janelle Zunker /CHPRC	<i>[Signature]</i>
Janelle Zunker /CHPRC	<i>[Signature]</i>	SSU-1	<i>[Signature]</i>
SSU-1	<i>[Signature]</i>	Janelle Zunker /CHPRC	<i>[Signature]</i>
Janelle Zunker /CHPRC	<i>[Signature]</i>	FEDEX	<i>[Signature]</i>
		EMILY LYONS	<i>[Signature]</i>

Date/Time	Date/Time
SEP 11 2019 1118	SEP 11 2019 1118
SEP 11 2019 1400	SEP 11 2019 1400
SEP 12 2019 0600	SEP 12 2019 0600
SEP 12 2019 1400	SEP 12 2019 1400

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

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

Printed On: 8/26/2019 FSR ID = FSR83652 A-6004-842 (REV 3)

CH2MHill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST <i>1909241</i>		C.O.C.# X20-001-462 Page 1 of 1
Collector: Mike Esperza /CHPRC	SAF No.: X20-001	Contact/Requester: Karen Waters-Husted	Telephone No.: 509-376-4650	
Project Title: AQUIFER TUBES, OCTOBER 2019	Shipped To (Lab): ALS Environmental Ft. Collins	Sampling Origin: Hanford Site	Purchase Order/Charge Code: 303064	
Protocol: SURV	Method of Shipment: Commercial Carrier	Logbook No.: HNF-N-506/03/61	Ice Chest No.: <i>6WS-384</i>	Bill of Lading/Air Bill No.: <i>7776228517468</i>
POSSIBLE SAMPLE HAZARDS/REMARK ** ** 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	Offsite Property No.: <i>11590</i>	
SPECIAL INSTRUCTIONS N/A				
Sample No. B3RR23	Filter N	Date AUG 17 2019	No/Type Container 1x125-mL P	Sample Analysis 300.0_ANIONS_IC: COMMON
		Time	Holding Time 48 Hours	Preservative Cool <=6C

Relinquished By		Received By	
Print First and Last Name Mike Esperza /CHPRC	Signature <i>Mike Esperza</i>	Print First and Last Name Jeff Lucas /CHPRC	Signature <i>Jeff Lucas</i>
Date AUG 17 2019	Date/Time AUG 17 2019 1400	Date/Time AUG 17 2019	Date/Time AUG 17 2019
Disposal Method (e.g., Return to customer, per lab procedure, used in process):	Disposal Method (e.g., Return to customer, per lab procedure, used in process):	Disposal Method (e.g., Return to customer, per lab procedure, used in process):	Disposal Method (e.g., Return to customer, per lab procedure, used in process):
DATE SEP 17 2019	DATE SEP 17 2019	DATE SEP 17 2019	DATE SEP 17 2019
TIME 1400	TIME 1400	TIME 0913	TIME 0952
Matrix *		Matrix *	
S = Soil	DS = Drum Solids	S = Soil	DS = Drum Solids
SE = Sediment	DL = Drum Liquids	SE = Sediment	DL = Drum Liquids
SO = Solid	T = Tissue	SO = Solid	T = Tissue
SL = Sludge	WI = Wipe	SL = Sludge	WI = Wipe
W = Water	L = Liquid	W = Water	L = Liquid
O = Oil	V = Vegetation	O = Oil	V = Vegetation
A = Air	X = Other	A = Air	X = Other
Date/Time:		Date/Time:	

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 1909241		C.O.C.# X20-001-004 Page 1 of 1
Collector: Mike Esparza /CHPRC	Contact/Requester: Karen Waters-Husted	Telephone No.: 509-376-4650	Purchase Order/Charge Code: 303064	
SAF No.: X20-001	Sampling Origin: Hanford Site	Logbook No.: HNF-N-506 / 03/61	Ice Chest No.: 205-380	Bill of Lading/Air Bill No.: 7762 2851 7468
Project Title: AQUIFER TUBES, OCTOBER 2019	Method of Shipment: Commercial Carrier	Priority: 30 Days	Offsite Property No.: 11590	
Shipped To (Lab): ALS Environmental Ft. Collins	SPECIAL INSTRUCTIONS N/A			
Protocol: SURV	POSSIBLE SAMPLE HAZARDS/REMARK ** ** 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	No/Type Container	Sample Analysis
B3RR62	N	AUG 12 2019 / 011	5x40-mL aGs*	8260_VOA_GCMS: COMMON; 8260_VOA_GCMS: GW 01
B3RR62	N	AUG 12 2019 / 011	2x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON
B3RR62	N	AUG 12 2019 / 011	1x500-mL G/P	TC99_SEP_LSC: COMMON
				Holding Time: 14 Days Preservative: HCl or H2SO4 to pH <2 / COOL <=6C 6 Months HNO3 to pH <2 6 Months HNO3 to pH <2

Relinquished By		Received By	
Print First and Last Name Mike Esparza /CHPRC	Signature [Signature]	Print First and Last Name Jeff Lucas /CHPRC FEDEX	Signature [Signature]
Date/Time SEP 12 2019 12:00	Date/Time SEP 12 2019 1400	Date/Time SEP 12 2019 0952	
FINAL SAMPLE DISPOSITION		Disposal Method (e.g., Return to customer, per lab procedure, used in process):	
Disposed By:		Date/Time:	



ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: CHPRC
Project Manager: KMO

Workorder No: 1509241 LA09241
Initials: TEM Date: 9/13/19

1. Are airbills / shipping documents present and/or removable?		DROP OFF	<u>YES</u>	NO			
2. Are custody seals on shipping containers intact?		NONE	<u>YES</u>	NO *			
3. Are custody seals on sample containers intact?		NONE	<u>YES</u>	NO *			
4. Is there a COC (chain-of-custody) present?			<u>YES</u>	NO *			
5. Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)			<u>YES</u>	NO *			
6. Are short-hold samples present?			YES	<u>NO</u>			
7. Are all samples within holding times for the requested analyses?			<u>YES</u>	NO *			
8. Were all sample containers received intact? (not broken or leaking)			<u>YES</u>	NO *			
9. Is there sufficient sample for the requested analyses?			<u>YES</u>	NO *			
10. Are all samples in the proper containers for the requested analyses?			<u>YES</u>	NO *			
11. Are all aqueous samples preserved correctly, if required? (excluding volatiles)		N/A	<u>YES</u>	NO *			
12. Are all aqueous non-preserved samples pH 4-9?		N/A	<u>YES</u>	NO *			
13. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)		N/A	<u>YES</u>	NO			
14. Were the samples shipped on ice?			<u>YES</u>	NO			
15. Were cooler temperatures measured at 0.1-6.0°C?	IR gun used*:	#1	<u>#3</u>	#4	RAD ONLY	<u>YES</u>	NO
Cooler #:		<u>11583</u>	<u>11590</u>				
Temperature (°C):		<u>4.7</u>	<u>0.3</u>				
No. of custody seals on cooler:		<u>2</u>	<u>2</u>				
External µR/hr reading:		<u>13</u>	<u>13</u>				
Background µR/hr reading:		<u>13</u>					
Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)							

* Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.

All client bottle ID's vs ALS lab ID's double-checked by: TEM

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____
Project Manager Signature / Date: [Signature] 9/14/19

(909241)

ORIGIN ID: PSCA (509) 531-0450
TROY BAACON
CH2M
6287 LATI AH ST.
RICHLAND, WA 98352
UNITED STATES US

SHIP DATE: 19SEP18
ACT WT: 89.00 LB
CAD: 107086051/NET14100
BILL THIRD PARTY

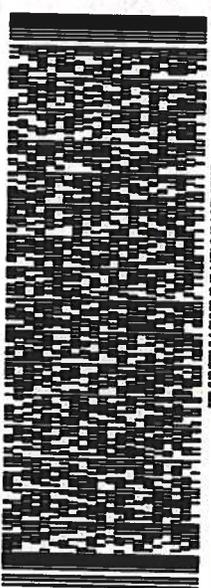
TO JULIE ELLINGSON
ALS GLOBAL-FORT COLLINS
225 COMMERCE DR

13-2

FORT COLLINS CO 80524
REF: PTT#11893

4.2

DEPT: 11583

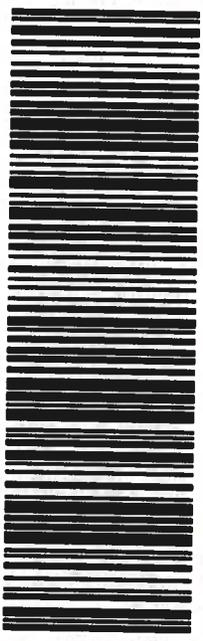


TRK# 7762 2238 9187
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DSR

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12092241

1909241

ORIGIN: D-PSCA (509) 531-0450
TROY BRACON
CH2M
6287 LATAH ST.
RICHLAND, WA 99352
UNITED STATES US

SHIP DATE: 12SEP19
ACT WGT: 72.00 LB
CAD: 107068951IN/ET4160

BILL THIRD PARTY 11590

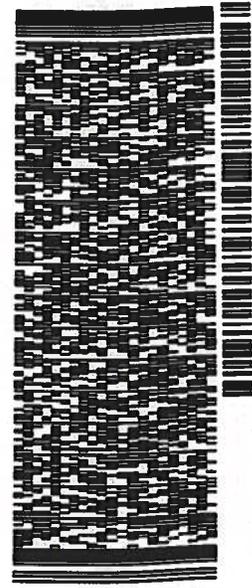
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0.3

PO DEPT



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GC/MS Volatiles Case Narrative

CH2M HILL Plateau Remediation Company AQUIFER TUBES, OCTOBER 2019 – X20-001

Work Order Number: 1909241

1. These samples were prepared according to SW-846, 3rd Edition procedures. Specifically, the water samples were prepared using purge and trap procedures based on Method 5030C.
2. The samples were analyzed using GC/MS with an RTX-624, RTX-VMS, or equivalent capillary column according to the current revision of SOP 525 based on SW-846 Method 8260. All positive results were quantitated against the initial calibration standards using the internal standard technique. The identification of positive results was achieved by a comparison of the retention time and mass spectrum of the sample versus the daily calibration standard.
3. All initial calibration criteria were met.
4. All initial calibrations are verified by comparing a second source standard calibration verification (ICV) against the calibration curve. All criteria for initial calibration verification were met.
5. Per the guidance in methods 8000 and 8260, all compounds in each of the daily (continuing) calibration verifications had sufficient response to support accurate quantitation of the data included in this report.
6. Methylene chloride, acetone and 2-butanone are common laboratory contaminants. In order to minimize the levels of these compounds detected in the gc/ms analysis, ALS has designated its volatile laboratory as a restricted access area. In addition, the laboratory has been equipped with a dedicated, air intake and exhaust system that operates under positive pressure in order to minimize cross contamination of these compounds. Due to fluctuations in ambient laboratory conditions, reported sample values for common laboratory contaminants may be due to lab contamination even if the compound in question is not detected in the associated method blank.

All method blank criteria were met.

7. All laboratory control sample and laboratory control sample duplicate recoveries and RPDs were within the acceptance criteria.

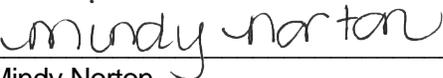


8. Sample 1909241-1 was designated as the quality control sample for this analysis. Similarity of matrix and therefore relevance of the QC results should not be automatically inferred for any sample other than the native sample selected for QC.

All matrix spike and matrix spike duplicate recoveries and RPDs were within acceptance criteria.

9. The samples were analyzed within the established holding time.
10. All surrogate recoveries were within acceptance criteria.
11. All internal standard recoveries were within acceptance criteria.
12. Manual integrations are performed when needed to provide consistent and defensible data following the guidelines in the current revision of SOP 939.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.



Mindy Norton
Organics Primary Data Reviewer

10/7/19
Date



Kath M. O.
Organics Final Data Reviewer

10/15/19
Date

ALS
Data Qualifier Flags
Organics

- U or ND:** This flag indicates that the compound was analyzed for but not detected.
- J:** This flag indicates an estimated value. This flag is used as follows : (1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; (2) when the mass spectral and retention time data indicate the presence of a compound that meets the volatile and semivolatile GC/MS identification criteria, and the result is less than the reporting limit (RL) but greater than the method detection limit (MDL); (3) when the retention time data indicate the presence of a compound that meets the GC identification criteria, and the result is less than the RL but greater than the MDL; and (4) the reported value is estimated.
- B:** This flag is used when the analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user. This flag shall be used for a tentatively identified compound (TIC) as well as for a positively identified target compound.
- E:** This flag identifies compounds whose concentration exceeds the upper level of the calibration range.
- A:** This flag indicates that a tentatively identified compound is a suspected aldol-condensation product.
- X:** This flag indicates that the analyte was diluted below an accurate quantitation level.
- *:** This flag indicates that a spike recovery is equal to or outside the control criteria used.
- +:** This flag indicates that the relative percent difference (RPD) equals or exceeds the control criteria.

GC/MS Volatiles**Method SW8260_25C****Method Blank****Lab Name:** ALS -- Fort Collins**Work Order Number:** 1909241**Client Name:** CH2M HILL Plateau Remediation Company**ClientProject ID:** AQUIFER TUBES, OCTOBER 2019 X20-001**Lab ID:** VL190918-4MB**Sample Matrix:** WATER**% Moisture:** N/A**Date Collected:** N/A**Date Extracted:** 18-Sep-19**Date Analyzed:** 18-Sep-19**Prep Batch:** VL190918-4**QCBatchID:** VL190918-4-2**Run ID:** VL190918-4A**Cleanup:** NONE**Basis:** N/A**File Name:** D73370**Sample Aliquot:** 10 ml**Final Volume:** 10 ml**Result Units:** UG/L**Clean DF:** 1

CASNO	Target Analyte	DF	Result	Result Qualifier	Reporting Limit	MDL
75-01-4	VINYL CHLORIDE	1	0.15	U	1	0.15
75-35-4	1,1-DICHLOROETHENE	1	0.3	U	1	0.3
67-64-1	ACETONE	1	3	U	10	3
75-15-0	CARBON DISULFIDE	1	0.3	U	1	0.3
75-09-2	METHYLENE CHLORIDE	1	0.34	U	1	0.34
75-34-3	1,1-DICHLOROETHANE	1	0.3	U	1	0.3
78-93-3	2-BUTANONE	1	3	U	10	3
67-66-3	CHLOROFORM	1	0.3	U	1	0.3
71-55-6	1,1,1-TRICHLOROETHANE	1	0.3	U	1	0.3
56-23-5	CARBON TETRACHLORIDE	1	0.15	U	1	0.15
107-06-2	1,2-DICHLOROETHANE	1	0.15	U	1	0.15
71-43-2	BENZENE	1	0.3	U	1	0.3
79-01-6	TRICHLOROETHENE	1	0.5	U	1	0.5
108-10-1	4-METHYL-2-PENTANONE	1	3	U	10	3
108-88-3	TOLUENE	1	0.3	U	1	0.3
79-00-5	1,1,2-TRICHLOROETHANE	1	0.3	U	1	0.3
127-18-4	TETRACHLOROETHENE	1	0.3	U	1	0.3
108-90-7	CHLOROBENZENE	1	0.3	U	1	0.3
100-41-4	ETHYLBENZENE	1	0.3	U	1	0.3
1330-20-7	TOTAL XYLENES	1	1	U	1	

Data Package ID: VL1909241-1**Date Printed:** Monday, October 07, 2019**ALS -- Fort Collins**

Page 1 of 2

LIMS Version: 6.912

GC/MS Volatiles

Method SW8260_25C

Method Blank

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Lab ID: VL190918-4MB

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 18-Sep-19

Date Analyzed: 18-Sep-19

Prep Batch: VL190918-4

QCBatchID: VL190918-4-2

Run ID: VL190918-4A

Cleanup: NONE

Basis: N/A

File Name: D73370

Sample Aliquot: 1 ml

Final Volume: 1 ml

Result Units: UG/L

Clean DF: 1

CASNO	Target Analyte	DF	Result	Result Qualifier	Reporting Limit	MDL
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Surrogate Recovery

CASNO	Surrogate Analyte	Result	Flag	Spike Amount	Percent Recovery	Control Limits
460-00-4	4-BROMOFLUOROBENZENE	25.4		25	102	85 - 115
1868-53-7	DIBROMOFLUOROMETHANE	25.5		25	102	84 - 118
2037-26-5	TOLUENE-D8	25		25	100	85 - 115

Data Package ID: VL1909241-1

GC/MS Volatiles**Method SW8260_25C****Sample Results****Lab Name:** ALS -- Fort Collins**Work Order Number:** 1909241**Client Name:** CH2M HILL Plateau Remediation Company**ClientProject ID:** AQUIFER TUBES, OCTOBER 2019 X20-001**Field ID:** B3RNR7**Lab ID:** 1909241-1**Sample Matrix:** WATER**% Moisture:** N/A**Date Collected:** 11-Sep-19**Date Extracted:** 18-Sep-19**Date Analyzed:** 18-Sep-19**Prep Method:** SW5030 Rev C**Prep Batch:** VL190918-4**QC Batch ID:** VL190918-4-2**Run ID:** VL190918-4A**Cleanup:** NONE**Basis:** As Received**File Name:** D73377**Analyst:** Cory C. Lewis**Sample Aliquot:** 10 ml**Final Volume:** 10 ml**Result Units:** UG/L**Clean DF:** 1**Analysis ReqCode:** 8260_VOA_GCM

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
75-01-4	VINYL CHLORIDE	1	0.15	U	1	0.15
75-35-4	1,1-DICHLOROETHENE	1	0.3	U	1	0.3
67-64-1	ACETONE	1	3	U	10	3
75-15-0	CARBON DISULFIDE	1	0.3	U	1	0.3
75-09-2	METHYLENE CHLORIDE	1	0.34	U	1	0.34
75-34-3	1,1-DICHLOROETHANE	1	0.3	U	1	0.3
78-93-3	2-BUTANONE	1	3	U	10	3
67-66-3	CHLOROFORM	1	0.3	U	1	0.3
71-55-6	1,1,1-TRICHLOROETHANE	1	0.3	U	1	0.3
56-23-5	CARBON TETRACHLORIDE	1	0.15	U	1	0.15
107-06-2	1,2-DICHLOROETHANE	1	0.15	U	1	0.15
71-43-2	BENZENE	1	0.3	U	1	0.3
79-01-6	TRICHLOROETHENE	1	2.1		1	0.5
108-10-1	4-METHYL-2-PENTANONE	1	3	U	10	3
108-88-3	TOLUENE	1	0.3	U	1	0.3
79-00-5	1,1,2-TRICHLOROETHANE	1	0.3	U	1	0.3
127-18-4	TETRACHLOROETHENE	1	0.3	U	1	0.3
108-90-7	CHLOROBENZENE	1	0.3	U	1	0.3
100-41-4	ETHYLBENZENE	1	0.3	U	1	0.3
1330-20-7	TOTAL XYLENES	1	1	U	1	

Data Package ID: VL1909241-1**Date Printed:** Monday, October 07, 2019**ALS -- Fort Collins**

Page 1 of 6

LIMS Version: 6.912

GC/MS Volatiles

Method SW8260_25C

Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: B3RNR7	Sample Matrix: WATER	Prep Batch: VL190918-4	Analyst: Cory C. Lewis
Lab ID: 1909241-1	% Moisture: N/A	QCBatchID: VL190918-4-2	Sample Aliquot: 1 ml
Analysis ReqCode: 8260_VOA_GCM	Date Collected: 11-Sep-19	Run ID: VL190918-4A	Final Volume: 1 ml
	Date Extracted: 18-Sep-19	Cleanup: NONE	Result Units: UG/L
	Date Analyzed: 18-Sep-19	Basis: As Received	Clean DF: 1
	Prep Method: SW5030 Rev C	File Name: D73377	

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
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Surrogate Recovery

CASNO	Surrogate Analyte	Result	Flag	Spike Amount	Percent Recovery	Control Limits
460-00-4	4-BROMOFLUOROBENZENE	25.5		25	102	85 - 115
1868-53-7	DIBROMOFLUOROMETHANE	25		25	100	84 - 118
2037-26-5	TOLUENE-D8	25.1		25	100	85 - 115

Data Package ID: VL1909241-1

GC/MS Volatiles**Method SW8260_25C****Sample Results****Lab Name:** ALS -- Fort Collins**Work Order Number:** 1909241**Client Name:** CH2M HILL Plateau Remediation Company**ClientProject ID:** AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	B3RP44
Lab ID:	1909241-2

Sample Matrix: WATER**% Moisture:** N/A**Date Collected:** 11-Sep-19**Date Extracted:** 18-Sep-19**Date Analyzed:** 18-Sep-19**Prep Method:** SW5030 Rev C**Prep Batch:** VL190918-4**QC Batch ID:** VL190918-4-2**Run ID:** VL190918-4A**Cleanup:** NONE**Basis:** As Received**File Name:** D73378**Analyst:** Cory C. Lewis**Sample Aliquot:** 10 ml**Final Volume:** 10 ml**Result Units:** UG/L**Clean DF:** 1**Analysis ReqCode:** 8260_VOA_GCM

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
75-01-4	VINYL CHLORIDE	1	0.15	U	1	0.15
75-35-4	1,1-DICHLOROETHENE	1	0.3	U	1	0.3
67-64-1	ACETONE	1	3	U	10	3
75-15-0	CARBON DISULFIDE	1	0.3	U	1	0.3
75-09-2	METHYLENE CHLORIDE	1	0.34	U	1	0.34
75-34-3	1,1-DICHLOROETHANE	1	0.3	U	1	0.3
78-93-3	2-BUTANONE	1	3	U	10	3
67-66-3	CHLOROFORM	1	0.3	U	1	0.3
71-55-6	1,1,1-TRICHLOROETHANE	1	0.3	U	1	0.3
56-23-5	CARBON TETRACHLORIDE	1	0.15	U	1	0.15
107-06-2	1,2-DICHLOROETHANE	1	0.15	U	1	0.15
71-43-2	BENZENE	1	0.3	U	1	0.3
79-01-6	TRICHLOROETHENE	1	0.5	U	1	0.5
108-10-1	4-METHYL-2-PENTANONE	1	3	U	10	3
108-88-3	TOLUENE	1	0.3	U	1	0.3
79-00-5	1,1,2-TRICHLOROETHANE	1	0.3	U	1	0.3
127-18-4	TETRACHLOROETHENE	1	0.3	U	1	0.3
108-90-7	CHLOROBENZENE	1	0.3	U	1	0.3
100-41-4	ETHYLBENZENE	1	0.3	U	1	0.3
1330-20-7	TOTAL XYLENES	1	1	U	1	

Data Package ID: VL1909241-1**Date Printed:** Monday, October 07, 2019**ALS -- Fort Collins**

Page 3 of 6

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GC/MS Volatiles

Method SW8260_25C

Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: B3RP44	Sample Matrix: WATER	Prep Batch: VL190918-4	Analyst: Cory C. Lewis
Lab ID: 1909241-2	% Moisture: N/A	QCBatchID: VL190918-4-2	Sample Aliquot: 1 ml
Analysis ReqCode: 8260_VOA_GCM	Date Collected: 11-Sep-19	Run ID: VL190918-4A	Final Volume: 1 ml
	Date Extracted: 18-Sep-19	Cleanup: NONE	Result Units: UG/L
	Date Analyzed: 18-Sep-19	Basis: As Received	Clean DF: 1
	Prep Method: SW5030 Rev C	File Name: D73378	

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
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Surrogate Recovery

CASNO	Surrogate Analyte	Result	Flag	Spike Amount	Percent Recovery	Control Limits
460-00-4	4-BROMOFLUOROBENZENE	25.5		25	102	85 - 115
1868-53-7	DIBROMOFLUOROMETHANE	24.9		25	100	84 - 118
2037-26-5	TOLUENE-D8	24.8		25	99	85 - 115

Data Package ID: VL1909241-1

GC/MS Volatiles

Method SW8260_25C

Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	B3RR62
Lab ID:	1909241-15

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 12-Sep-19

Date Extracted: 18-Sep-19

Date Analyzed: 18-Sep-19

Prep Method: SW5030 Rev C

Prep Batch: VL190918-4

QCBatchID: VL190918-4-4

Run ID: VL190918-4A

Cleanup: NONE

Basis: As Received

File Name: D73379

Analyst: Cory C. Lewis

Sample Aliquot: 10 ml

Final Volume: 10 ml

Result Units: UG/L

Clean DF: 1

Analysis ReqCode: 8260_VOA_GCM

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
71-36-3	N-BUTANOL	1	30	U	100	30
75-01-4	VINYL CHLORIDE	1	0.15	U	1	0.15
75-35-4	1,1-DICHLOROETHENE	1	0.3	U	1	0.3
67-64-1	ACETONE	1	3	U	10	3
75-15-0	CARBON DISULFIDE	1	0.3	U	1	0.3
75-09-2	METHYLENE CHLORIDE	1	0.34	U	1	0.34
156-60-5	TRANS-1,2-DICHLOROETHENE	1	0.3	U	1	0.3
75-34-3	1,1-DICHLOROETHANE	1	0.3	U	1	0.3
156-59-2	CIS-1,2-DICHLOROETHENE	1	0.3	U	1	0.3
78-93-3	2-BUTANONE	1	3	U	10	3
67-66-3	CHLOROFORM	1	0.3	U	1	0.3
71-55-6	1,1,1-TRICHLOROETHANE	1	0.3	U	1	0.3
56-23-5	CARBON TETRACHLORIDE	1	0.15	U	1	0.15
107-06-2	1,2-DICHLOROETHANE	1	0.15	U	1	0.15
71-43-2	BENZENE	1	0.3	U	1	0.3
79-01-6	TRICHLOROETHENE	1	1.3		1	0.5
108-10-1	4-METHYL-2-PENTANONE	1	3	U	10	3
108-88-3	TOLUENE	1	0.3	U	1	0.3
79-00-5	1,1,2-TRICHLOROETHANE	1	0.3	U	1	0.3
107-12-0	PROPIONITRILE	1	3	U	10	3
127-18-4	TETRACHLOROETHENE	1	0.3	U	1	0.3
108-90-7	CHLOROBENZENE	1	0.3	U	1	0.3
100-41-4	ETHYLBENZENE	1	0.3	U	1	0.3
106-46-7	1,4-DICHLOROBENZENE	1	0.3	U	1	0.3
1330-20-7	TOTAL XYLENES	1	1	U	1	

Data Package ID: VL1909241-1

Date Printed: Monday, October 07, 2019

ALS -- Fort Collins

Page 5 of 6

LIMS Version: 6.912

GC/MS Volatiles

Method SW8260_25C

Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: B3RR62	Sample Matrix: WATER	Prep Batch: VL190918-4	Analyst: Cory C. Lewis
Lab ID: 1909241-15	% Moisture: N/A	QCBatchID: VL190918-4-2	Sample Aliquot: 1 ml
Analysis ReqCode: 8260_VOA_GCM	Date Collected: 12-Sep-19	Run ID: VL190918-4A	Final Volume: 1 ml
	Date Extracted: 18-Sep-19	Cleanup: NONE	Result Units: UG/L
	Date Analyzed: 18-Sep-19	Basis: As Received	Clean DF: 1
	Prep Method: SW5030 Rev C	File Name: D73379	

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
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Surrogate Recovery

CASNO	Surrogate Analyte	Result	Flag	Spike Amount	Percent Recovery	Control Limits
460-00-4	4-BROMOFLUOROBENZENE	25.5		25	102	85 - 115
1868-53-7	DIBROMOFLUOROMETHANE	24.9		25	100	84 - 118
2037-26-5	TOLUENE-D8	25.2		25	101	85 - 115

Data Package ID: VL1909241-1

GC/MS Volatiles

Method SW8260_25C

Laboratory Control Sample and Laboratory Control Sample Duplicate

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Lab ID: VL190918-4LCS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 09/18/2019

Date Analyzed: 09/18/2019

Prep Method: SW5030C

Prep Batch: VL190918-4

QCBatchID: VL190918-4-2

Run ID: VL190918-4A

Cleanup: NONE

Basis: N/A

File Name: D73366

Sample Aliquot: 10 ml

Final Volume: 10 ml

Result Units: UG/L

Clean DF: 1

CASNO	Target Analyte	Spike Added	LCS Result	Reporting Limit	Result Qualifier	LCS % Rec.	Control Limits
75-01-4	VINYL CHLORIDE	10	10.4	1		104	72 - 123%
75-35-4	1,1-DICHLOROETHENE	10	8.58	1		86	77 - 119%
67-64-1	ACETONE	40	34.2	10		85	62 - 142%
75-15-0	CARBON DISULFIDE	10	8.83	1		88	76 - 121%
75-09-2	METHYLENE CHLORIDE	10	8.59	1		86	71 - 130%
75-34-3	1,1-DICHLOROETHANE	10	9.01	1		90	83 - 119%
78-93-3	2-BUTANONE	40	33.4	10		84	70 - 135%
67-66-3	CHLOROFORM	10	8.89	1		89	82 - 119%
71-55-6	1,1,1-TRICHLOROETHANE	10	9.06	1		91	80 - 120%
56-23-5	CARBON TETRACHLORIDE	10	9.54	1		95	77 - 122%
107-06-2	1,2-DICHLOROETHANE	10	8.66	1		87	74 - 128%
71-43-2	BENZENE	10	8.97	1		90	83 - 117%
79-01-6	TRICHLOROETHENE	10	9.02	1		90	83 - 117%
108-10-1	4-METHYL-2-PENTANONE	40	35.4	10		88	73 - 125%
108-88-3	TOLUENE	10	9.06	1		91	82 - 113%
79-00-5	1,1,2-TRICHLOROETHANE	10	8.88	1		89	78 - 116%
127-18-4	TETRACHLOROETHENE	10	9.28	1		93	84 - 117%
108-90-7	CHLOROBENZENE	10	8.89	1		89	81 - 113%
100-41-4	ETHYLBENZENE	10	9.11	1		91	81 - 113%
179601-23-	M+P-XYLENE	20	18	1		90	82 - 115%
95-47-6	O-XYLENE	10	8.81	1		88	81 - 115%

Data Package ID: VL1909241-1

Date Printed: Monday, October 07, 2019

ALS -- Fort Collins

Page 1 of 3

LIMS Version: 6.912

GC/MS Volatiles**Method SW8260_25C****Laboratory Control Sample and Laboratory Control Sample Duplicate**

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Lab ID: VL190918-4LCSD

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 09/18/2019

Date Analyzed: 09/18/2019

Prep Method: SW5030C

Prep Batch: VL190918-4

QC Batch ID: VL190918-4-2

Run ID: VL190918-4A

Cleanup: NONE

Basis: N/A

File Name: D73367

Sample Aliquot: 10 ml

Final Volume: 10 ml

Result Units: UG/L

Clean DF: 1

CASNO	Target Analyte	Spike Added	LCSD Result	Reporting Limit	Result Qualifier	LCSD % Rec.	RPD Limit	RPD
75-01-4	VINYL CHLORIDE	10	10.3	1		103	20	1
75-35-4	1,1-DICHLOROETHENE	10	8.71	1		87	20	2
67-64-1	ACETONE	40	36.9	10		92	30	8
75-15-0	CARBON DISULFIDE	10	8.95	1		89	20	1
75-09-2	METHYLENE CHLORIDE	10	8.88	1		89	20	3
75-34-3	1,1-DICHLOROETHANE	10	9.22	1		92	20	2
78-93-3	2-BUTANONE	40	34.6	10		87	30	4
67-66-3	CHLOROFORM	10	8.93	1		89	20	1
71-55-6	1,1,1-TRICHLOROETHANE	10	9.24	1		92	20	2
56-23-5	CARBON TETRACHLORIDE	10	9.43	1		94	20	1
107-06-2	1,2-DICHLOROETHANE	10	8.93	1		89	20	3
71-43-2	BENZENE	10	9.17	1		92	20	2
79-01-6	TRICHLOROETHENE	10	9.07	1		91	20	1
108-10-1	4-METHYL-2-PENTANONE	40	37.1	10		93	30	5
108-88-3	TOLUENE	10	8.9	1		89	20	2
79-00-5	1,1,2-TRICHLOROETHANE	10	9.15	1		92	20	3
127-18-4	TETRACHLOROETHENE	10	9.02	1		90	20	3
108-90-7	CHLOROBENZENE	10	9.11	1		91	20	2
100-41-4	ETHYLBENZENE	10	9.21	1		92	20	1
179601-23-	M+P-XYLENE	20	18.2	1		91	20	1
95-47-6	O-XYLENE	10	8.98	1		90	20	2

Data Package ID: VL1909241-1

Date Printed: Monday, October 07, 2019

ALS -- Fort Collins

Page 2 of 3

LIMS Version: 6.912

GC/MS Volatiles

Method SW8260_25C

Laboratory Control Sample and Laboratory Control Sample Duplicate

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Surrogate Recovery LCS/LCSD

CASNO	Target Analyte	Spike Added	LCS % Rec.	LCS Flag	LCSD % Rec.	LCSD Flag	Control Limits
460-00-4	4-BROMOFLUOROBENZENE	25	100		103		85 - 115
1868-53-7	DIBROMOFLUOROMETHANE	25	103		103		84 - 118
2037-26-5	TOLUENE-D8	25	101		100		85 - 115

Data Package ID: VL1909241-1

GC/MS Volatiles

Method SW8260_25C

Matrix Spike And Matrix Spike Duplicate

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: B3RNR7

LabID: 1909241-1MS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 11-Sep-19

Date Extracted: 18-Sep-19

Date Analyzed: 18-Sep-19

Prep Method: SW5030 Rev C

Prep Batch: VL190918-4

QCBatchID: VL190918-4-2

Run ID: VL190918-4A

Cleanup: NONE

Basis: As Received

Sample Aliquot: 10 ml

Final Volume: 10 ml

Result Units: UG/L

File Name: D73385

CASNO	Target Analyte	Sample Result	Samp Qual	MS Result	MS Qual	Reporting Limit	Spike Added	MS % Rec.	Control Limits
75-01-4	VINYL CHLORIDE	0.15	U	11.2		1	10	112	72 - 123%
75-35-4	1,1-DICHLOROETHENE	0.3	U	9.07		1	10	91	77 - 119%
67-64-1	ACETONE	3	U	37.7		10	40	94	62 - 142%
75-15-0	CARBON DISULFIDE	0.3	U	9.13		1	10	91	76 - 121%
75-09-2	METHYLENE CHLORIDE	0.34	U	9.02		1	10	90	71 - 130%
75-34-3	1,1-DICHLOROETHANE	0.3	U	9.42		1	10	94	83 - 119%
78-93-3	2-BUTANONE	3	U	34.2		10	40	85	70 - 135%
67-66-3	CHLOROFORM	0.3	U	9.52		1	10	95	82 - 119%
71-55-6	1,1,1-TRICHLOROETHANE	0.3	U	9.42		1	10	94	80 - 120%
56-23-5	CARBON TETRACHLORIDE	0.15	U	9.67		1	10	97	77 - 122%
107-06-2	1,2-DICHLOROETHANE	0.15	U	9.07		1	10	91	74 - 128%
71-43-2	BENZENE	0.3	U	9.49		1	10	95	83 - 117%
79-01-6	TRICHLOROETHENE	2.1		11.4		1	10	93	83 - 117%
108-10-1	4-METHYL-2-PENTANONE	3	U	35.1		10	40	88	73 - 125%
108-88-3	TOLUENE	0.3	U	9.29		1	10	93	82 - 113%
79-00-5	1,1,2-TRICHLOROETHANE	0.3	U	9.3		1	10	93	78 - 116%
127-18-4	TETRACHLOROETHENE	0.3	U	9.37		1	10	94	84 - 117%
108-90-7	CHLOROBENZENE	0.3	U	9.31		1	10	93	81 - 113%
100-41-4	ETHYLBENZENE	0.3	U	9.42		1	10	94	81 - 113%

Data Package ID: VL1909241-1

Date Printed: Monday, October 07, 2019

ALS -- Fort Collins

Page 1 of 3

LIMS Version: 6.912

GC/MS Volatiles

Method SW8260_25C

Matrix Spike And Matrix Spike Duplicate

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: B3RNR7
LabID: 1909241-1MSD

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 11-Sep-19

Date Extracted: 18-Sep-19

Date Analyzed: 18-Sep-19

Prep Method: SW5030 Rev C

Prep Batch: VL190918-4

QCBatchID: VL190918-4-2

Run ID: VL190918-4A

Cleanup: NONE

Basis: As Received

Sample Aliquot: 10 ml

Final Volume: 10 ml

Result Units: UG/L

File Name: D73386

CASNO	Target Analyte	MSD Result	MSD Qual	Spike Added	MSD % Rec.	Reporting Limit	RPD Limit	RPD
75-01-4	VINYL CHLORIDE	10.3		10	103	1	20	8
75-35-4	1,1-DICHLOROETHENE	8.43		10	84	1	20	7
67-64-1	ACETONE	37.9		40	95	10	30	0
75-15-0	CARBON DISULFIDE	8.66		10	87	1	20	5
75-09-2	METHYLENE CHLORIDE	8.68		10	87	1	20	4
75-34-3	1,1-DICHLOROETHANE	9.19		10	92	1	20	2
78-93-3	2-BUTANONE	35.1		40	88	10	30	3
67-66-3	CHLOROFORM	9.07		10	91	1	20	5
71-55-6	1,1,1-TRICHLOROETHANE	8.91		10	89	1	20	6
56-23-5	CARBON TETRACHLORIDE	9.08		10	91	1	20	6
107-06-2	1,2-DICHLOROETHANE	8.99		10	90	1	20	1
71-43-2	BENZENE	9.11		10	91	1	20	4
79-01-6	TRICHLOROETHENE	10.8		10	87	1	20	5
108-10-1	4-METHYL-2-PENTANONE	36.5		40	91	10	30	4
108-88-3	TOLUENE	9.08		10	91	1	20	2
79-00-5	1,1,2-TRICHLOROETHANE	9.28		10	93	1	20	0
127-18-4	TETRACHLOROETHENE	9.43		10	94	1	20	1
108-90-7	CHLOROBENZENE	8.94		10	89	1	20	4
100-41-4	ETHYLBENZENE	8.89		10	89	1	20	6

Data Package ID: VL1909241-1

Date Printed: Monday, October 07, 2019

ALS -- Fort Collins

Page 2 of 3

LIMS Version: 6.912

GC/MS Volatiles

Method SW8260_25C

Matrix Spike And Matrix Spike Duplicate

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Surrogate Recovery MS/MSD

CASNO	Target Analyte	Spike Added	MS % Rec.	MS Flag	MSD % Rec.	MSD Flag	Control Limits
460-00-4	4-BROMOFLUOROBENZENE	25	101		100		85 - 115
1868-53-7	DIBROMOFLUOROMETHANE	25	103		102		84 - 118
2037-26-5	TOLUENE-D8	25	99		100		85 - 115

Data Package ID: VL1909241-1

Prep Batch ID: VL190918-4

Start Date: 09/18/19	End Date: 09/18/19	Concentration Method: NONE	Batch Created By: CCL
Start Time: 9:48	End Time: 19:32	Extract Method: SW5030C	Date Created: 09/18/19
Prep Analyst: Cory C. Lewis		Initial Volume Units: ml	Time Created: 11:31
Comments:		Final Volume Units: ml	Validated By: CCL
			Date Validated: 09/19/19
			Time Validated: 8:17

QC Batch ID: VL190918-4-2

Lab ID	QC Type	Field ID	Matrix	Date Collected	Initial Wt/Vol	Final Wt/Vol	Cleanup Method	Cleanup DF	Order Number
VL190918-4	MB	XXXXXX	WATER	XXXXXX	10	10	NONE	1	1909241
VL190918-4	LCS	XXXXXX	WATER	XXXXXX	10	10	NONE	1	1909241
VL190918-4	LCSD	XXXXXX	WATER	XXXXXX	10	10	NONE	1	1909241
1909241-1	MS	B3RNR7	WATER	9/11/2019	10	10	NONE	1	1909241
1909241-1	MSD	B3RNR7	WATER	9/11/2019	10	10	NONE	1	1909241
1909241-1	SMP	B3RNR7	WATER	9/11/2019	10	10	NONE	1	1909241
1909241-15	SMP	B3RR62	WATER	9/12/2019	10	10	NONE	1	1909241
1909241-2	SMP	B3RP44	WATER	9/11/2019	10	10	NONE	1	1909241
1909244-1	SMP	XXXXXX	WATER	XXXXXX	10	10	NONE	1	1909244
1909244-2	SMP	XXXXXX	WATER	XXXXXX	10	10	NONE	1	1909244
1909305-2	SMP	XXXXXX	WATER	XXXXXX	10	10	NONE	1	1909305
1909305-4	SMP	XXXXXX	WATER	XXXXXX	10	10	NONE	1	1909305
1909305-5	SMP	XXXXXX	WATER	XXXXXX	10	10	NONE	1	1909305

QC Types

CAR	Carrier reference sample	DLS	Detection Limit Standard
DUP	Laboratory Duplicate	LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicat	LODV	Limit of Detection Verification
LOQV	Limit of Quantitation Verification	MB	Method Blank
MS	Laboratory Matrix Spike	MSD	Laboratory Matrix Spike Duplicate
REP	Sample replicate	RVS	Reporting Level Verification Standar
SMP	Field Sample	SYS	Sample Yield Spike

Prep Batch ID: VL190918-4

Start Date: 09/18/19	End Date: 09/18/19	Concentration Method: NONE	Batch Created By: CCL
Start Time: 9:48	End Time: 19:32	Extract Method: SW5030C	Date Created: 09/18/19
Prep Analyst: Cory C. Lewis		Initial Volume Units: ml	Time Created: 11:31
Comments:		Final Volume Units: ml	Validated By: CCL
			Date Validated: 09/19/19
			Time Validated: 8:17

QC Batch ID: VL190918-4-4

Lab ID	QC Type	Field ID	Matrix	Date Collected	Initial Wt/Vol	Final Wt/Vol	Cleanup Method	Cleanup DF	Order Number
VL190918-4	MB	XXXXXX	WATER	XXXXXX	10	10	NONE	1	1909241
VL190918-4	LCS	XXXXXX	WATER	XXXXXX	10	10	NONE	1	1909241
VL190918-4	LCSD	XXXXXX	WATER	XXXXXX	10	10	NONE	1	1909241
1909241-15	SMP	B3RR62	WATER	9/12/2019	10	10	NONE	1	1909241
1909305-2	SMP	XXXXXX	WATER	XXXXXX	10	10	NONE	1	1909305

QC Types

CAR	Carrier reference sample	DLS	Detection Limit Standard
DUP	Laboratory Duplicate	LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicat	LODV	Limit of Detection Verification
LOQV	Limit of Quantitation Verification	MB	Method Blank
MS	Laboratory Matrix Spike	MSD	Laboratory Matrix Spike Duplicate
REP	Sample replicate	RVS	Reporting Level Verification Standar
SMP	Field Sample	SYS	Sample Yield Spike



Inorganics

Case Narrative

CH2M HILL Plateau Remediation Company

AQUIFER TUBES, OCTOBER 2019 -- X20-001

Work Order Number: 1909241

1. The samples were prepared for analysis based on Environmental Monitoring Systems Laboratory (EMSL) Rev 2.1 procedures.
2. The samples were analyzed following EMSL procedures for the current revisions of the following SOPs and methods:

<u>Analyte</u>	<u>Method</u>	<u>SOP #</u>
Chloride	300.0 Revision 2.1	1113
Fluoride	300.0 Revision 2.1	1113
Nitrate as N	300.0 Revision 2.1	1113
Nitrite as N	300.0 Revision 2.1	1113
Sulfate	300.0 Revision 2.1	1113

3. All standards and solutions were used within their recommended shelf life.
4. The samples were prepared and analyzed within the established hold time for this analysis.

All in house quality control procedures were followed, as described below.

5. General quality control procedures.
 - A preparation (method) blank, laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) were prepared and analyzed with the samples in this preparation batch.
 - The method blank associated with this batch was below the reporting limit for the requested analytes. Sample results have been compared to the blank results and are flagged as appropriate. Chloride, nitrite as N, and sulfate were detected above the MDL.
 - All laboratory control sample criteria were met.



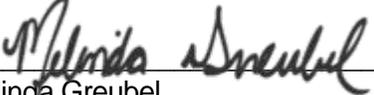
- All initial and continuing calibration blanks were below the reporting limit for the requested analytes.
 - All initial and continuing calibration verifications were within the acceptance criteria for the requested analytes.
6. Matrix specific quality control procedures.

Sample 1909241-11 was designated as the quality control sample for this analysis.

Similarity of matrix and therefore relevance of the QC results should not be automatically inferred for any sample other than the native sample selected for QC.

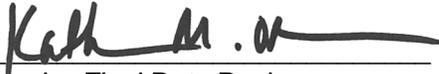
- A matrix spike (MS) was prepared and analyzed with this batch. All guidance criteria for precision and accuracy were met.
7. It is a standard practice that samples for CHPRC on the ion chromatograph are analyzed at a dilution. The 2X factor can be considered an artifact of the prep and does not indicate a secondary dilution and is therefore not flagged as a dilution.
8. Manual integrations are performed when needed to provide consistent and defensible data following the guidelines in the current revision of SOP 939.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.



Melinda Greubel
Inorganics Primary Data Reviewer

10/9/19
Date



Inorganics Final Data Reviewer

10/15/19
Date



Inorganic Data Reporting Qualifiers

The following qualifiers are used as needed by the laboratory when reporting results of inorganic analyses.

- Concentration qualifier -- A "B" is entered if the reported value was obtained from a reading that was less than the Reporting Limit but greater than or equal to ALS's Method Detection Limit. If the analyte was analyzed for but not detected a "U" is entered.
- QC qualifier -- Specified entries and their meanings are as follows:
 - E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.
 - M - Duplicate injection precision was not met.
 - N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.
 - Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.
 - * - Duplicate analysis (relative percent difference) not within control limits.
 - S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.
 - C - The analyte was detected in both the sample and the associated QC blank, and the sample concentration was $\leq 20X$ the blank concentration.
 - D - Analyte was reported at a secondary dilution factor, typically $DF > 1$ (i.e., the primary preparation required dilution to either bring the analyte within the calibration range or to minimize interference). Required for organics/wetchem if the sample was diluted.

Ion Chromatography

Method EPA300.0 Revision 2.1

Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	B3RR23
Lab ID:	1909241-11

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 12-Sep-19

Date Extracted: 13-Sep-19

Date Analyzed: 13-Sep-19

Prep Method: NONE

Prep Batch: IC190913-2

QCBatchID: IC190913-2-1

Run ID: IC190913-1A3

Cleanup: NONE

Basis: As Received

File Name: 190913IC3LIMS

Analyst: Lainey M. Lloyd

Sample Aliquot: 5 ml

Final Volume: 5 ml

Result Units: MG/L

Clean DF: 1

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
16984-48-8	FLUORIDE AnalysisTime: 23:07	2	0.085	B	0.2	0.06
16887-00-6	CHLORIDE AnalysisTime: 23:07	2	0.67	C	0.4	0.12
14797-65-0	NITRITE AS N AnalysisTime: 23:07	2	0.06	U	0.2	0.06
14797-55-8	NITRATE AS N AnalysisTime: 23:07	2	0.12	U	0.4	0.12
14808-79-8	SULFATE AnalysisTime: 23:07	2	11		2	0.6

Data Package ID: IC1909241-1

Ion Chromatography

Method EPA300.0 Revision 2.1

Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	B3RR66
Lab ID:	1909241-12

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 12-Sep-19

Date Extracted: 13-Sep-19

Date Analyzed: 13-Sep-19

Prep Method: NONE

Prep Batch: IC190913-2

QCBatchID: IC190913-2-1

Run ID: IC190913-1A3

Cleanup: NONE

Basis: As Received

File Name: 190913IC3LIMS

Analyst: Lainey M. Lloyd

Sample Aliquot: 5 ml

Final Volume: 5 ml

Result Units: MG/L

Clean DF: 1

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
16984-48-8	FLUORIDE AnalysisTime: 23:33	2	0.17	B	0.2	0.06
16887-00-6	CHLORIDE AnalysisTime: 23:33	2	9.7		0.4	0.12
14797-65-0	NITRITE AS N AnalysisTime: 23:33	2	0.21	C	0.2	0.06
14797-55-8	NITRATE AS N AnalysisTime: 23:33	2	7.7		0.4	0.12
14808-79-8	SULFATE AnalysisTime: 23:33	2	29		2	0.6

Data Package ID: IC1909241-1

Ion Chromatography

Method EPA300.0 Revision 2.1

Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	B3RR67
Lab ID:	1909241-13

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 12-Sep-19

Date Extracted: 13-Sep-19

Date Analyzed: 13-Sep-19

Prep Method: NONE

Prep Batch: IC190913-2

QCBatchID: IC190913-2-1

Run ID: IC190913-1A3

Cleanup: NONE

Basis: As Received

File Name: 190913IC3LIMS

Analyst: Lainey M. Lloyd

Sample Aliquot: 5 ml

Final Volume: 5 ml

Result Units: MG/L

Clean DF: 1

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
16984-48-8	FLUORIDE AnalysisTime: 23:46	2	0.16	B	0.2	0.06
16887-00-6	CHLORIDE AnalysisTime: 23:46	2	9.7		0.4	0.12
14797-65-0	NITRITE AS N AnalysisTime: 23:46	2	0.2	C	0.2	0.06
14797-55-8	NITRATE AS N AnalysisTime: 23:46	2	7.8		0.4	0.12
14808-79-8	SULFATE AnalysisTime: 23:46	2	29		2	0.6

Data Package ID: IC1909241-1

Ion Chromatography

Method EPA300.0 Revision 2.1

Method Blank

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Lab ID: IC190913-2MB

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 13-Sep-19

Date Analyzed: 13-Sep-19

Prep Batch: IC190913-2

QCBatchID: IC190913-2-1

Run ID: IC190913-1A3

Cleanup: NONE

Basis: N/A

File Name: 190913IC3LIMS

Sample Aliquot: 5 ml

Final Volume: 5 ml

Result Units: MG/L

Clean DF: 1

CASNO	Target Analyte	DF	Result	Result Qualifier	Reporting Limit	MDL
16984-48-8	FLUORIDE	1	0.03	U	0.1	0.03
16887-00-6	CHLORIDE	1	0.16	B	0.2	0.06
14797-65-0	NITRITE AS N	1	0.063	B	0.1	0.03
14797-55-8	NITRATE AS N	1	0.06	U	0.2	0.06
14808-79-8	SULFATE	1	0.32	B	1	0.3

Data Package ID: IC1909241-1

Ion Chromatography

Method EPA300.0 Revision 2.1

Laboratory Control Sample and Laboratory Control Sample Duplicate

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Lab ID: IC190913-2LCS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 09/13/2019

Date Analyzed: 09/13/2019

Prep Method: NONE

Prep Batch: IC190913-2

QCBatchID: IC190913-2-1

Run ID: IC190913-1A3

Cleanup: NONE

Basis: N/A

File Name: 190913IC3LIMS

Sample Aliquot: 5 ml

Final Volume: 5 ml

Result Units: MG/L

Clean DF: 1

CASNO	Target Analyte	Spike Added	LCS Result	Reporting Limit	Result Qualifier	LCS % Rec.	Control Limits
16984-48-8	FLUORIDE	5	4.57	0.1		91	90 - 110%
16887-00-6	CHLORIDE	10	9.27	0.2		93	90 - 110%
14797-65-0	NITRITE AS N	5	5.02	0.1		100	90 - 110%
14797-55-8	NITRATE AS N	10	9.03	0.2		90	90 - 110%
14808-79-8	SULFATE	50	45.8	1		92	90 - 110%

Lab ID: IC190913-2LCSD

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 09/13/2019

Date Analyzed: 09/14/2019

Prep Method: NONE

Prep Batch: IC190913-2

QCBatchID: IC190913-2-1

Run ID: IC190913-1A3

Cleanup: NONE

Basis: N/A

File Name: 190913IC3LIMS

Sample Aliquot: 5 ml

Final Volume: 5 ml

Result Units: MG/L

Clean DF: 1

CASNO	Target Analyte	Spike Added	LCSD Result	Reporting Limit	Result Qualifier	LCSD % Rec.	RPD Limit	RPD
16984-48-8	FLUORIDE	5	4.82	0.1		96	15	5
16887-00-6	CHLORIDE	10	9.61	0.2		96	15	4
14797-65-0	NITRITE AS N	5	5.24	0.1		105	15	4
14797-55-8	NITRATE AS N	10	9.54	0.2		95	15	6
14808-79-8	SULFATE	50	48.1	1		96	15	5

Data Package ID: IC1909241-1

Ion Chromatography

Method EPA300.0 Revision 2.1

Matrix Spike

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	B3RR23
LabID:	1909241-11MS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 12-Sep-19

Date Extracted: 13-Sep-19

Date Analyzed: 13-Sep-19

Prep Batch: IC190913-2

QCBatchID: IC190913-2-1

Run ID: IC190913-1A3

Cleanup: NONE

Basis: As Received

Sample Aliquot: 5 ml

Final Volume: 5 ml

Result Units: MG/L

File Name: 190913IC3LIMS

CASNO	Target Analyte	Sample Result	Samp Qual	MS Result	MS Qual	Reporting Limit	Spike Added	MS % Rec.	Control Limits
16984-48-8	FLUORIDE	0.085	B	4.25		0.2	4	104	85 - 115%
16887-00-6	CHLORIDE	0.67	C	10.7		0.4	10	100	85 - 115%
14797-65-0	NITRITE AS N	0.2	U	4.46		0.2	4	111	85 - 115%
14797-55-8	NITRATE AS N	0.4	U	10.5		0.4	10	105	85 - 115%
14808-79-8	SULFATE	11		49		2	40	94	85 - 115%

Data Package ID: IC1909241-1

Prep Batch ID: IC190913-2

Start Date: 09/13/19	End Date: 09/13/19	Concentration Method: NONE	Batch Created By: kjs
Start Time: 14:50	End Time: 15:00	Extract Method: NONE	Date Created: 09/13/19
Prep Analyst: Keli J. Smith		Initial Volume Units: ml	Time Created: 14:51
Comments:		Final Volume Units: ml	Validated By: lml
			Date Validated: 09/17/19
			Time Validated: 9:24

QC Batch ID: IC190913-2-1

Lab ID	QC Type	Field ID	Matrix	Date Collected	Initial Wt/Vol	Final Wt/Vol	Cleanup Method	Cleanup DF	Order Number
IC190913-2	MB	XXXXXX	WATER	XXXXXX	5	5	NONE	1	1909241
IC190913-2	LCS	XXXXXX	WATER	XXXXXX	5	5	NONE	1	1909241
IC190913-2	LCSD	XXXXXX	WATER	XXXXXX	5	5	NONE	1	1909241
1909241-11	MS	B3RR23	WATER	9/12/2019	5	5	NONE	1	1909241
1909241-11	SMP	B3RR23	WATER	9/12/2019	5	5	NONE	1	1909241
1909241-12	SMP	B3RR66	WATER	9/12/2019	5	5	NONE	1	1909241
1909241-13	SMP	B3RR67	WATER	9/12/2019	5	5	NONE	1	1909241
1909242-4	SMP	XXXXXX	WATER	XXXXXX	5	5	NONE	1	1909242
1909242-8	SMP	XXXXXX	WATER	XXXXXX	5	5	NONE	1	1909242

QC Types

CAR	Carrier reference sample	DLS	Detection Limit Standard
DUP	Laboratory Duplicate	LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicat	LODV	Limit of Detection Verification
LOQV	Limit of Quantitation Verification	MB	Method Blank
MS	Laboratory Matrix Spike	MSD	Laboratory Matrix Spike Duplicate
REP	Sample replicate	RVS	Reporting Level Verification Standar
SMP	Field Sample	SYS	Sample Yield Spike



Metals

Case Narrative

CH2M HILL Plateau Remediation Company

AQUIFER TUBES, OCTOBER 2019 -- X20-001

Work Order Number: 1909241

1. The samples were prepared and analyzed based on SW-846, 3rd Edition procedures.

For analysis by Trace ICP and ICP-MS, the samples were digested following method 3005A and the current revision of SOP 806.

2. Analysis by ICP-MS followed method 6020B and the current revision of SOP 827.

Analysis by Trace ICP followed method 6010D and the current revision of SOP 834.

3. All standards and solutions are NIST traceable and were used within their recommended shelf life.
4. The samples were prepared and analyzed within the established hold time.

All in house quality control procedures were followed, as described below.

5. General quality control procedures.
 - A preparation (method) blank and laboratory control sample were digested and analyzed with the samples in this digestion batch.
 - The preparation (method) blank associated with this digestion batch was below the reporting limit for the requested analytes. Sample results have been compared to the blank results and are flagged as appropriate. Potassium, sodium, aluminum, tin and zinc were detected above the MDL.
 - All laboratory control sample criteria were met.
 - All initial and continuing calibration blanks were below the reporting limit for the requested analytes.
 - All initial and continuing calibration verifications were within the acceptance criteria for the requested analytes.



- The interference check samples and high standard read-backs associated with Method 6010D were within acceptance criteria.
- The interference check samples associated with Method 6020B were analyzed.

6. Matrix specific quality control procedures.

Sample 1909217-2 was designated as the quality control sample for each analysis. Results for the shared quality control samples are included at the client's request.

Similarity of matrix and therefore relevance of the QC results should not be automatically inferred for any sample other than the native sample selected for QC.

- A matrix spike and matrix spike duplicate were digested and analyzed with each batch. All acceptance criteria for accuracy and precision were met.
- A serial dilution was analyzed with each batch. All acceptance criteria were met.

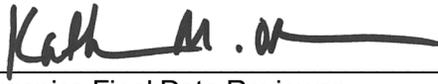
7. It is a standard practice that samples for ICP-MS are analyzed at a dilution. The 10X factor can be considered an artifact of the prep and does not indicate a secondary dilution and is therefore not flagged as a dilution.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.



Megan Johnstone
Inorganics Primary Data Reviewer

10/10/19
Date



Kath M. W.
Inorganics Final Data Reviewer

10/15/19
Date



Inorganic Data Reporting Qualifiers

The following qualifiers are used as needed by the laboratory when reporting results of inorganic analyses.

- Result qualifier -- A "B" is entered if the reported value was obtained from a reading that was less than the Reporting Limit but greater than or equal to the Method Detection Limit (MDL). If the analyte was analyzed for but not detected a "U" is entered. For samples, negative values are reported as non-detects ("U" flagged). For blanks, if the absolute value of the negative value is above the MDL and below the reporting limit, then the result is "B" flagged.
- QC qualifier -- Specified entries and their meanings are as follows:
 - E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.
 - M - Duplicate injection precision was not met.
 - N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.
 - Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.
 - * - Duplicate analysis (relative percent difference) not within control limits.
 - S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.
 - C - The analyte was detected in both the sample and the associated QC blank, and the sample concentration was $\leq 20X$ the blank concentration.
 - D - Analyte was reported at a secondary dilution factor, typically $DF > 1$ (i.e., the primary preparation required dilution to either bring the analyte within the calibration range or to minimize interference). Required for organics/wetchem if the sample was diluted.

Total Recoverable ICP Metals

Method SW6010D

Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	B3RP32
Lab ID:	1909241-5

Sample Matrix: WATER
 % Moisture: N/A
 Date Collected: 11-Sep-19
 Date Extracted: 02-Oct-19
 Date Analyzed: 03-Oct-19
 Prep Method: SW3005 Rev A

Prep Batch: IP191002-2
 QCBatchID: IP191002-2-2
 Run ID: IT191003-1A2
 Cleanup: NONE
 Basis: As Received
 File Name: 191003A.

Analyst: Steve Workman
 Sample Aliquot: 50 ml
 Final Volume: 50 ml
 Result Units: UG/L
 Clean DF: 1

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
7440-42-8	BORON	1	36	U	50	36
7440-70-2	CALCIUM	1	39000		1000	210
7439-89-6	IRON	1	160		50	30
7439-95-4	MAGNESIUM	1	8400		750	89
7440-09-7	POTASSIUM	1	2900	C	1000	130
7440-23-5	SODIUM	1	8000		500	38
7440-62-2	VANADIUM	1	5.8	B	10	0.43

Data Package ID: *it1909241-1*

Date Printed: Thursday, October 10, 2019

ALS -- Fort Collins

Page 1 of 4

LIMS Version: 6.912

Dissolved ICP Metals

Method SW6010D

Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	B3RP41
Lab ID:	1909241-6

Sample Matrix: WATER
 % Moisture: N/A
 Date Collected: 11-Sep-19
 Date Extracted: 02-Oct-19
 Date Analyzed: 03-Oct-19
 Prep Method: SW3005 Rev A

Prep Batch: IP191002-2
 QCBatchID: IP191002-2-2
 Run ID: IT191003-1A2
 Cleanup: NONE
 Basis: As Received
 File Name: 191003A.

Analyst: Steve Workman
 Sample Aliquot: 50 ml
 Final Volume: 50 ml
 Result Units: UG/L
 Clean DF: 1

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
7440-42-8	BORON	1	36	U	50	36
7440-70-2	CALCIUM	1	39000		1000	210
7439-89-6	IRON	1	30	U	50	30
7439-95-4	MAGNESIUM	1	8300		750	89
7440-09-7	POTASSIUM	1	2900	C	1000	130
7440-23-5	SODIUM	1	7900		500	38
7440-62-2	VANADIUM	1	6	B	10	0.43

Data Package ID: *it1909241-1*

Dissolved ICP Metals

Method SW6010D

Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	B3RP40
Lab ID:	1909241-9

Sample Matrix: WATER
 % Moisture: N/A
 Date Collected: 11-Sep-19
 Date Extracted: 02-Oct-19
 Date Analyzed: 03-Oct-19
 Prep Method: SW3005 Rev A

Prep Batch: IP191002-2
 QCBatchID: IP191002-2-2
 Run ID: IT191003-1A2
 Cleanup: NONE
 Basis: As Received
 File Name: 191003A.

Analyst: Steve Workman
 Sample Aliquot: 50 ml
 Final Volume: 50 ml
 Result Units: UG/L
 Clean DF: 1

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
7440-42-8	BORON	1	36	U	50	36
7440-70-2	CALCIUM	1	210	U	1000	210
7439-89-6	IRON	1	30	U	50	30
7439-95-4	MAGNESIUM	1	89	U	750	89
7440-09-7	POTASSIUM	1	130	U	1000	130
7440-23-5	SODIUM	1	130	BC	500	38
7440-62-2	VANADIUM	1	0.43	U	10	0.43

Data Package ID: *it1909241-1*

Total Recoverable ICP Metals

Method SW6010D

Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	B3RP31
Lab ID:	1909241-10

Sample Matrix: WATER
 % Moisture: N/A
 Date Collected: 11-Sep-19
 Date Extracted: 02-Oct-19
 Date Analyzed: 03-Oct-19
 Prep Method: SW3005 Rev A

Prep Batch: IP191002-2
 QCBatchID: IP191002-2-2
 Run ID: IT191003-1A2
 Cleanup: NONE
 Basis: As Received
 File Name: 191003A.

Analyst: Steve Workman
 Sample Aliquot: 50 ml
 Final Volume: 50 ml
 Result Units: UG/L
 Clean DF: 1

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
7440-42-8	BORON	1	36	U	50	36
7440-70-2	CALCIUM	1	210	U	1000	210
7439-89-6	IRON	1	30	U	50	30
7439-95-4	MAGNESIUM	1	89	U	750	89
7440-09-7	POTASSIUM	1	170	BC	1000	130
7440-23-5	SODIUM	1	120	BC	500	38
7440-62-2	VANADIUM	1	0.43	U	10	0.43

Data Package ID: *it1909241-1*

Total Recoverable ICPMS Metals

Method SW6020B

Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: B3RPW2	Sample Matrix: WATER	Prep Batch: IP191002-2	Analyst: Nicole C. Chirban
Lab ID: 1909241-3	% Moisture: N/A	QCBatchID: IP191002-2-3	Sample Aliquot: 50 ml
Analysis ReqCode: 6020_METALS_I	Date Collected: 11-Sep-19	Run ID: IM191009-20A2	Final Volume: 50 ml
	Date Extracted: 02-Oct-19	Cleanup: NONE	Result Units: UG/L
	Date Analyzed: 09-Oct-19	Basis: As Received	Clean DF: 1
	Prep Method: SW3005 Rev A	File Name: 151SMPL_	

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
7440-47-3	CHROMIUM	10	6.2	B	10	0.46

Data Package ID: *IM1909241-1*

Dissolved ICPMS Metals

Method SW6020B

Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: B3RNR3 Lab ID: 1909241-4	Sample Matrix: WATER % Moisture: N/A Date Collected: 11-Sep-19 Date Extracted: 02-Oct-19 Date Analyzed: 09-Oct-19 Prep Method: SW3005 Rev A	Prep Batch: IP191002-2 QCBatchID: IP191002-2-3 Run ID: IM191009-20A2 Cleanup: NONE Basis: As Received File Name: 152SMPL_	Analyst: Nicole C. Chirban Sample Aliquot: 50 ml Final Volume: 50 ml Result Units: UG/L Clean DF: 1
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Analysis ReqCode: 6020_METALS_I

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
7440-47-3	CHROMIUM	10	5.6	B	10	0.46

Data Package ID: *IM1909241-1*

Total Recoverable ICPMS Metals

Method SW6020B

Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: B3RP32

Lab ID: 1909241-5

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 11-Sep-19

Date Extracted: 02-Oct-19

Date Analyzed: 09-Oct-19

Prep Method: SW3005 Rev A

Prep Batch: IP191002-2

QCBatchID: IP191002-2-1

Run ID: IM191009-20A2

Cleanup: NONE

Basis: As Received

File Name: 153SMPL_

Analyst: Nicole C. Chirban

Sample Aliquot: 50 ml

Final Volume: 50 ml

Result Units: UG/L

Clean DF: 1

Analysis ReqCode: 6020_METALS_I

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
7429-90-5	ALUMINUM	10	120	C	100	10
7440-36-0	ANTIMONY	10	0.18	B	1	0.12
7440-38-2	ARSENIC	10	0.75	B	2	0.39
7440-39-3	BARIUM	10	35		5	0.56
7440-41-7	BERYLLIUM	10	0.054	U	0.5	0.054
7440-43-9	CADMIUM	10	0.083	U	2	0.083
7440-47-3	CHROMIUM	10	1.5	B	10	0.46
7440-48-4	COBALT	10	0.2	B	5	0.11
7440-50-8	COPPER	10	0.92	B	8	0.32
7439-92-1	LEAD	10	0.079	U	2	0.079
7439-96-5	MANGANESE	10	4.9	B	5	0.36
7439-98-7	MOLYBDENUM	10	0.44	B	2	0.079
7440-02-0	NICKEL	10	0.92	U	20	0.92
7782-49-2	SELENIUM	10	0.65	U	10	0.65
7440-22-4	SILVER	10	0.029	U	0.5	0.029
7440-24-6	STRONTIUM	10	160		5	0.32
7440-28-0	THALLIUM	10	0.0041	U	0.1	0.0041
7440-29-1	THORIUM	10	0.02	B	0.2	0.016
7440-31-5	TIN	10	1.8	BC	10	0.12
7440-61-1	URANIUM	10	1.8		0.1	0.0049
7440-66-6	ZINC	10	1.6	BC	100	1.4

Data Package ID: IM1909241-1

Dissolved ICPMS Metals

Method SW6020B

Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: B3RP41
Lab ID: 1909241-6

Sample Matrix: WATER
% Moisture: N/A
Date Collected: 11-Sep-19
Date Extracted: 02-Oct-19
Date Analyzed: 09-Oct-19
Prep Method: SW3005 Rev A

Prep Batch: IP191002-2
QCBatchID: IP191002-2-1
Run ID: IM191009-20A2
Cleanup: NONE
Basis: As Received
File Name: 154SMPL_

Analyst: Nicole C. Chirban
Sample Aliquot: 50 ml
Final Volume: 50 ml
Result Units: UG/L
Clean DF: 1

Analysis ReqCode: 6020_METALS_I

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
7429-90-5	ALUMINUM	10	10	U	100	10
7440-36-0	ANTIMONY	10	0.22	B	1	0.12
7440-38-2	ARSENIC	10	0.88	B	2	0.39
7440-39-3	BARIUM	10	35		5	0.56
7440-41-7	BERYLLIUM	10	0.054	U	0.5	0.054
7440-43-9	CADMIUM	10	0.083	U	2	0.083
7440-47-3	CHROMIUM	10	1.2	B	10	0.46
7440-48-4	COBALT	10	0.15	B	5	0.11
7440-50-8	COPPER	10	0.51	B	8	0.32
7439-92-1	LEAD	10	0.079	U	2	0.079
7439-96-5	MANGANESE	10	0.36	U	5	0.36
7439-98-7	MOLYBDENUM	10	0.43	B	2	0.079
7440-02-0	NICKEL	10	0.92	U	20	0.92
7782-49-2	SELENIUM	10	0.65	U	10	0.65
7440-22-4	SILVER	10	0.029	U	0.5	0.029
7440-24-6	STRONTIUM	10	170		5	0.32
7440-28-0	THALLIUM	10	0.0041	U	0.1	0.0041
7440-29-1	THORIUM	10	0.016	U	0.2	0.016
7440-31-5	TIN	10	0.26	BC	10	0.12
7440-61-1	URANIUM	10	1.8		0.1	0.0049
7440-66-6	ZINC	10	1.4	U	100	1.4

Data Package ID: IM1909241-1

Dissolved ICPMS Metals

Method SW6020B

Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: B3RNR4	Sample Matrix: WATER	Prep Batch: IP191002-2	Analyst: Nicole C. Chirban
Lab ID: 1909241-7	% Moisture: N/A	QCBatchID: IP191002-2-3	Sample Aliquot: 50 ml
	Date Collected: 11-Sep-19	Run ID: IM191009-20A2	Final Volume: 50 ml
	Date Extracted: 02-Oct-19	Cleanup: NONE	Result Units: UG/L
Analysis ReqCode: 6020_METALS_I	Date Analyzed: 09-Oct-19	Basis: As Received	Clean DF: 1
	Prep Method: SW3005 Rev A	File Name: 157SMPL_	

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
7440-47-3	CHROMIUM	10	5.5	B	10	0.46

Data Package ID: *IM1909241-1*

Total Recoverable ICPMS Metals

Method SW6020B

Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: B3RPW3	Sample Matrix: WATER	Prep Batch: IP191002-2	Analyst: Nicole C. Chirban
Lab ID: 1909241-8	% Moisture: N/A	QCBatchID: IP191002-2-3	Sample Aliquot: 50 ml
Analysis ReqCode: 6020_METALS_I	Date Collected: 11-Sep-19	Run ID: IM191009-20A2	Final Volume: 50 ml
	Date Extracted: 02-Oct-19	Cleanup: NONE	Result Units: UG/L
	Date Analyzed: 09-Oct-19	Basis: As Received	Clean DF: 1
	Prep Method: SW3005 Rev A	File Name: 158SMPL_	

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
7440-47-3	CHROMIUM	10	5.9	B	10	0.46

Data Package ID: IM1909241-1

Dissolved ICPMS Metals

Method SW6020B

Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: B3RP40
Lab ID: 1909241-9

Sample Matrix: WATER
% Moisture: N/A
Date Collected: 11-Sep-19
Date Extracted: 02-Oct-19
Date Analyzed: 09-Oct-19
Prep Method: SW3005 Rev A

Prep Batch: IP191002-2
QCBatchID: IP191002-2-1
Run ID: IM191009-20A2
Cleanup: NONE
Basis: As Received
File Name: 159SMPL_

Analyst: Nicole C. Chirban
Sample Aliquot: 50 ml
Final Volume: 50 ml
Result Units: UG/L
Clean DF: 1

Analysis ReqCode: 6020_METALS_I

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
7429-90-5	ALUMINUM	10	10	U	100	10
7440-36-0	ANTIMONY	10	0.12	U	1	0.12
7440-38-2	ARSENIC	10	0.39	U	2	0.39
7440-39-3	BARIIUM	10	0.56	U	5	0.56
7440-41-7	BERYLLIUM	10	0.054	U	0.5	0.054
7440-43-9	CADMIUM	10	0.083	U	2	0.083
7440-47-3	CHROMIUM	10	0.46	U	10	0.46
7440-48-4	COBALT	10	0.11	U	5	0.11
7440-50-8	COPPER	10	0.32	U	8	0.32
7439-92-1	LEAD	10	0.079	U	2	0.079
7439-96-5	MANGANESE	10	0.36	U	5	0.36
7439-98-7	MOLYBDENUM	10	0.079	U	2	0.079
7440-02-0	NICKEL	10	0.92	U	20	0.92
7782-49-2	SELENIUM	10	0.65	U	10	0.65
7440-22-4	SILVER	10	0.029	U	0.5	0.029
7440-24-6	STRONTIUM	10	0.32	U	5	0.32
7440-28-0	THALLIUM	10	0.0041	U	0.1	0.0041
7440-29-1	THORIUM	10	0.016	U	0.2	0.016
7440-31-5	TIN	10	0.3	BC	10	0.12
7440-61-1	URANIUM	10	0.0049	U	0.1	0.0049
7440-66-6	ZINC	10	1.4	U	100	1.4

Data Package ID: IM1909241-1

Total Recoverable ICPMS Metals

Method SW6020B

Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: B3RP31
Lab ID: 1909241-10

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 11-Sep-19

Date Extracted: 02-Oct-19

Date Analyzed: 09-Oct-19

Prep Method: SW3005 Rev A

Prep Batch: IP191002-2

QCBatchID: IP191002-2-1

Run ID: IM191009-20A2

Cleanup: NONE

Basis: As Received

File Name: 160SMPL_

Analyst: Nicole C. Chirban

Sample Aliquot: 50 ml

Final Volume: 50 ml

Result Units: UG/L

Clean DF: 1

Analysis ReqCode: 6020_METALS_I

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
7429-90-5	ALUMINUM	10	19	BC	100	10
7440-36-0	ANTIMONY	10	0.12	U	1	0.12
7440-38-2	ARSENIC	10	0.39	U	2	0.39
7440-39-3	BARIUM	10	0.56	U	5	0.56
7440-41-7	BERYLLIUM	10	0.054	U	0.5	0.054
7440-43-9	CADMIUM	10	0.083	U	2	0.083
7440-47-3	CHROMIUM	10	0.46	U	10	0.46
7440-48-4	COBALT	10	0.11	U	5	0.11
7440-50-8	COPPER	10	0.48	B	8	0.32
7439-92-1	LEAD	10	0.079	U	2	0.079
7439-96-5	MANGANESE	10	0.36	U	5	0.36
7439-98-7	MOLYBDENUM	10	0.079	U	2	0.079
7440-02-0	NICKEL	10	0.92	U	20	0.92
7782-49-2	SELENIUM	10	0.65	U	10	0.65
7440-22-4	SILVER	10	0.029	U	0.5	0.029
7440-24-6	STRONTIUM	10	0.32	U	5	0.32
7440-28-0	THALLIUM	10	0.0041	U	0.1	0.0041
7440-29-1	THORIUM	10	0.016	U	0.2	0.016
7440-31-5	TIN	10	0.32	BC	10	0.12
7440-61-1	URANIUM	10	0.0049	U	0.1	0.0049
7440-66-6	ZINC	10	1.4	U	100	1.4

Data Package ID: IM1909241-1

ICP Metals

Method SW6010D

Method Blank

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Lab ID: IP191002-2MB

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 02-Oct-19

Date Analyzed: 03-Oct-19

Prep Batch: IP191002-2

QCBatchID: IP191002-2-2

Run ID: IT191003-1A2

Cleanup: NONE

Basis: N/A

File Name: 191003A.

Sample Aliquot: 50 ml

Final Volume: 50 ml

Result Units: UG/L

Clean DF: 1

CASNO	Target Analyte	DF	Result	Result Qualifier	Reporting Limit	MDL
7440-42-8	BORON	1	36	U	50	36
7440-70-2	CALCIUM	1	210	U	1000	210
7439-89-6	IRON	1	30	U	50	30
7439-95-4	MAGNESIUM	1	89	U	750	89
7440-09-7	POTASSIUM	1	180	B	1000	130
7440-23-5	SODIUM	1	210	B	500	38
7440-62-2	VANADIUM	1	0.43	U	10	0.43

Data Package ID: *it1909241-1*

ICP Metals

Method SW6010D

Laboratory Control Sample

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Lab ID: IP191002-2LCS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 10/02/2019

Date Analyzed: 10/03/2019

Prep Method: SW3005A

Prep Batch: IP191002-2

QCBatchID: IP191002-2-2

Run ID: IT191003-1A2

Cleanup: NONE

Basis: N/A

File Name: 191003A.

Sample Aliquot: 50 ml

Final Volume: 50 ml

Result Units: UG/L

Clean DF: 1

CASNO	Target Analyte	Spike Added	LCS Result	Reporting Limit	Result Qualifier	LCS % Rec.	Control Limits
7440-42-8	BORON	1000	997	50		100	80 - 120%
7440-70-2	CALCIUM	40000	39600	1000		99	80 - 120%
7439-89-6	IRON	1000	964	50		96	80 - 120%
7439-95-4	MAGNESIUM	40000	40800	750		102	80 - 120%
7440-09-7	POTASSIUM	40000	39400	1000		98	80 - 120%
7440-23-5	SODIUM	40000	42100	500		105	80 - 120%
7440-62-2	VANADIUM	500	482	10		96	80 - 120%

Data Package ID: *it1909241-1*

ICP Metals

Method SW6010D

Matrix Spike And Matrix Spike Duplicate

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: SHARED QC LabID: 1909217-2MS	Sample Matrix: WATER % Moisture: N/A Date Collected: 09-Sep-19 Date Extracted: 02-Oct-19 Date Analyzed: 03-Oct-19 Prep Method: SW3005 Rev A	Prep Batch: IP191002-2 QCBatchID: IP191002-2-2 Run ID: IT191003-1A2 Cleanup: NONE Basis: As Received	Sample Aliquot: 50 ml Final Volume: 50 ml Result Units: UG/L File Name: 191003A.
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CASNO	Target Analyte	Sample Result	Samp Qual	MS Result	MS Qual	Reporting Limit	Spike Added	MS % Rec.	Control Limits
7440-42-8	BORON	36	U	1020		50	1000	102	80 - 120%
7440-70-2	CALCIUM	38000		78400		1000	40000	100	80 - 120%
7439-89-6	IRON	100		1060		50	1000	95	80 - 120%
7439-95-4	MAGNESIUM	13000		54000		750	40000	103	80 - 120%
7440-09-7	POTASSIUM	4700		45600		1000	40000	102	80 - 120%
7440-23-5	SODIUM	31000		68700		500	40000	94	80 - 120%
7440-62-2	VANADIUM	25		505		10	500	96	80 - 120%

Field ID: SHARED QC LabID: 1909217-2MSD	Sample Matrix: WATER % Moisture: N/A Date Collected: 09-Sep-19 Date Extracted: 02-Oct-19 Date Analyzed: 03-Oct-19 Prep Method: SW3005 Rev A	Prep Batch: IP191002-2 QCBatchID: IP191002-2-2 Run ID: IT191003-1A2 Cleanup: NONE Basis: As Received	Sample Aliquot: 50 ml Final Volume: 50 ml Result Units: UG/L File Name: 191003A.
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CASNO	Target Analyte	MSD Result	MSD Qual	Spike Added	MSD % Rec.	Reporting Limit	RPD Limit	RPD
7440-42-8	BORON	1020		1000	102	50	20	0
7440-70-2	CALCIUM	77800		40000	99	1000	20	1
7439-89-6	IRON	1050		1000	95	50	20	0
7439-95-4	MAGNESIUM	53700		40000	102	750	20	1
7440-09-7	POTASSIUM	45600		40000	102	1000	20	0
7440-23-5	SODIUM	68300		40000	92	500	20	1
7440-62-2	VANADIUM	502		500	95	10	20	1

Data Package ID: *it1909241-1*

Prep Batch ID: IP191002-2

Start Date: 10/02/19	End Date: 10/02/19	Concentration Method: NONE	Batch Created By: jml
Start Time: 11:12	End Time: 18:00	Extract Method: SW3005A	Date Created: 10/02/19
Prep Analyst: Jill M. Latelle		Initial Volume Units: ml	Time Created: 11:12
<u>Comments:</u>		Final Volume Units: ml	Validated By: jml
			Date Validated: 10/02/19
			Time Validated: 11:41

QC Batch ID: IP191002-2-2

Lab ID	QC Type	Field ID	Matrix	Date Collected	Initial Wt/Vol	Final Wt/Vol	Cleanup Method	Cleanup DF	Order Number
IP191002-2	MB	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909217
IP191002-2	LCS	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909217
1909217-2	MS	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909217
1909217-2	MSD	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909217
1909217-2	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909217
1909217-3	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909217
1909217-6	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909217
1909217-7	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909217
1909217-8	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909217
1909217-9	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909217
1909232-1	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909232
1909232-2	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909232
1909232-3	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909232
1909232-4	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909232
1909241-10	SMP	B3RP31	WATER	9/11/2019	50	50	NONE	1	1909241
1909241-5	SMP	B3RP32	WATER	9/11/2019	50	50	NONE	1	1909241
1909241-6	SMP	B3RP41	WATER	9/11/2019	50	50	NONE	1	1909241
1909241-9	SMP	B3RP40	WATER	9/11/2019	50	50	NONE	1	1909241
1909438-5	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909438
1909438-6	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909438

Prep Batch ID: IP191002-2

Start Date: 10/02/19	End Date: 10/02/19	Concentration Method: NONE	Batch Created By: jml
Start Time: 11:12	End Time: 18:00	Extract Method: SW3005A	Date Created: 10/02/19
Prep Analyst: Jill M. Latelle		Initial Volume Units: ml	Time Created: 11:12
Comments:		Final Volume Units: ml	Validated By: jml
			Date Validated: 10/02/19
			Time Validated: 11:41

QC Types

CAR	Carrier reference sample		DLS	Detection Limit Standard	
DUP	Laboratory Duplicate		LCS	Laboratory Control Sample	
LCSD	Laboratory Control Sample Duplicat		LODV	Limit of Detection Verification	
LOQV	Limit of Quantitation Verification		MB	Method Blank	
MS	Laboratory Matrix Spike		MSD	Laboratory Matrix Spike Duplicate	
REP	Sample replicate		RVS	Reporting Level Verification Standar	
SMP	Field Sample		SYS	Sample Yield Spike	

ICPMS Metals

Method SW6020B

Method Blank

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Lab ID: IP191002-2MB

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 02-Oct-19

Date Analyzed: 09-Oct-19

Prep Batch: IP191002-2

QCBatchID: IP191002-2-1

Run ID: IM191009-20A2

Cleanup: NONE

Basis: N/A

File Name: 133SMPL_

Sample Aliquot: 50 ml

Final Volume: 50 ml

Result Units: UG/L

Clean DF: 1

CASNO	Target Analyte	DF	Result	Result Qualifier	Reporting Limit	MDL
7429-90-5	ALUMINUM	10	10	B	100	10
7440-36-0	ANTIMONY	10	0.12	U	1	0.12
7440-38-2	ARSENIC	10	0.39	U	2	0.39
7440-39-3	BARIUM	10	0.56	U	5	0.56
7440-41-7	BERYLLIUM	10	0.054	U	0.5	0.054
7440-43-9	CADMIUM	10	0.083	U	2	0.083
7440-47-3	CHROMIUM	10	0.46	U	10	0.46
7440-48-4	COBALT	10	0.11	U	5	0.11
7440-50-8	COPPER	10	0.32	U	8	0.32
7439-92-1	LEAD	10	0.079	U	2	0.079
7439-96-5	MANGANESE	10	0.36	U	5	0.36
7439-98-7	MOLYBDENUM	10	0.079	U	2	0.079
7440-02-0	NICKEL	10	0.92	U	20	0.92
7782-49-2	SELENIUM	10	0.65	U	10	0.65
7440-22-4	SILVER	10	0.029	U	0.5	0.029
7440-24-6	STRONTIUM	10	0.32	U	5	0.32
7440-28-0	THALLIUM	10	0.0041	U	0.1	0.0041
7440-29-1	THORIUM	10	0.016	U	0.2	0.016
7440-31-5	TIN	10	0.85	B	10	0.12
7440-61-1	URANIUM	10	0.0049	U	0.1	0.0049
7440-66-6	ZINC	10	2.7	B	100	1.4

Data Package ID: IM1909241-1

Date Printed: Thursday, October 10, 2019

ALS -- Fort Collins

Page 1 of 1

LIMS Version: 6.912

ICPMS Metals

Method SW6020B

Laboratory Control Sample

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Lab ID: IM191002-2LCS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 10/02/2019

Date Analyzed: 10/09/2019

Prep Method: SW3005A

Prep Batch: IP191002-2

QCBatchID: IP191002-2-1

Run ID: IM191009-20A2

Cleanup: NONE

Basis: N/A

File Name: 134SMPL_

Sample Aliquot: 50 ml

Final Volume: 50 ml

Result Units: UG/L

Clean DF: 1

CASNO	Target Analyte	Spike Added	LCS Result	Reporting Limit	Result Qualifier	LCS % Rec.	Control Limits
7429-90-5	ALUMINUM	5000	4570	100		91	80 - 120%
7440-36-0	ANTIMONY	30	29.4	1		98	80 - 120%
7440-38-2	ARSENIC	100	95	2		95	80 - 120%
7440-39-3	BARIUM	100	97.1	5		97	80 - 120%
7440-41-7	BERYLLIUM	50	48.4	0.5		97	80 - 120%
7440-43-9	CADMIUM	30	30.6	2		102	80 - 120%
7440-47-3	CHROMIUM	500	491	10		98	80 - 120%
7440-48-4	COBALT	100	98.1	5		98	80 - 120%
7440-50-8	COPPER	1000	974	8		97	80 - 120%
7439-92-1	LEAD	50	47.2	2		94	80 - 120%
7439-96-5	MANGANESE	100	97	5		97	80 - 120%
7439-98-7	MOLYBDENUM	100	99.1	2		99	80 - 120%
7440-02-0	NICKEL	500	501	20		100	80 - 120%
7782-49-2	SELENIUM	100	100	10		100	80 - 120%
7440-22-4	SILVER	10	10.3	0.5		103	80 - 120%
7440-24-6	STRONTIUM	100	98.6	5		99	80 - 120%
7440-28-0	THALLIUM	2	1.83	0.1		92	80 - 120%
7440-29-1	THORIUM	10	9.37	0.2		94	80 - 120%
7440-31-5	TIN	500	493	10		99	80 - 120%
7440-61-1	URANIUM	10	8.9	0.1		89	80 - 120%
7440-66-6	ZINC	2000	1790	100		89	80 - 120%

Data Package ID: IM1909241-1

Date Printed: Thursday, October 10, 2019

ALS -- Fort Collins

Page 1 of 1

LIMS Version: 6.912

ICPMS Metals

Method SW6020B

Matrix Spike And Matrix Spike Duplicate

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: SHARED QC

LabID: 1909217-2MS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 09-Sep-19

Date Extracted: 02-Oct-19

Date Analyzed: 09-Oct-19

Prep Method: SW3005 Rev A

Prep Batch: IP191002-2

QCBatchID: IP191002-2-1

Run ID: IM191009-20A2

Cleanup: NONE

Basis: As Received

Sample Aliquot: 50 ml

Final Volume: 50 ml

Result Units: UG/L

File Name: 137SMPL_

CASNO	Target Analyte	Sample Result	Samp Qual	MS Result	MS Qual	Reporting Limit	Spike Added	MS % Rec.	Control Limits
7429-90-5	ALUMINUM	37	BC	4570		100	5000	91	75 - 125%
7440-36-0	ANTIMONY	0.12	U	30		1	30	100	75 - 125%
7440-38-2	ARSENIC	1.8	B	97.3		2	100	96	75 - 125%
7440-39-3	BARIUM	43		143		5	100	100	75 - 125%
7440-41-7	BERYLLIUM	0.054	U	48.1		0.5	50	96	75 - 125%
7440-43-9	CADMIUM	0.083	U	30.6		2	30	102	75 - 125%
7440-47-3	CHROMIUM	3.3	B	491		10	500	98	75 - 125%
7440-48-4	COBALT	0.15	B	97.5		5	100	97	75 - 125%
7440-50-8	COPPER	1.7	B	969		8	1000	97	75 - 125%
7439-92-1	LEAD	0.18	B	47.7		2	50	95	75 - 125%
7439-96-5	MANGANESE	6.3		103		5	100	97	75 - 125%
7439-98-7	MOLYBDENUM	8.2		108		2	100	100	75 - 125%
7440-02-0	NICKEL	0.92	U	498		20	500	100	75 - 125%
7782-49-2	SELENIUM	15		113		10	100	98	75 - 125%
7440-22-4	SILVER	0.05	B	10.2		0.5	10	102	75 - 125%
7440-24-6	STRONTIUM	150		255		5	100	100	75 - 125%
7440-28-0	THALLIUM	0.0041	U	1.88		0.1	2	94	75 - 125%
7440-29-1	THORIUM	0.03	B	9.59		0.2	10	96	75 - 125%
7440-31-5	TIN	0.66	BC	493		10	500	99	75 - 125%
7440-61-1	URANIUM	2.2		11.4		0.1	10	91	75 - 125%
7440-66-6	ZINC	2.8	BC	1790		100	2000	90	75 - 125%

Data Package ID: IM1909241-1

ICPMS Metals

Method SW6020B

Matrix Spike And Matrix Spike Duplicate

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: SHARED QC

LabID: 1909217-2MSD

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 09-Sep-19

Date Extracted: 02-Oct-19

Date Analyzed: 09-Oct-19

Prep Method: SW3005 Rev A

Prep Batch: IP191002-2

QCBatchID: IP191002-2-1

Run ID: IM191009-20A2

Cleanup: NONE

Basis: As Received

Sample Aliquot: 50 ml

Final Volume: 50 ml

Result Units: UG/L

File Name: 138SMPL_

CASNO	Target Analyte	MSD Result	MSD Qual	Spike Added	MSD % Rec.	Reporting Limit	RPD Limit	RPD
7429-90-5	ALUMINUM	4460		5000	88	100	20	2
7440-36-0	ANTIMONY	30		30	100	1	20	0
7440-38-2	ARSENIC	95.8		100	94	2	20	2
7440-39-3	BARIUM	143		100	100	5	20	0
7440-41-7	BERYLLIUM	48		50	96	0.5	20	0
7440-43-9	CADMIUM	30.3		30	101	2	20	1
7440-47-3	CHROMIUM	488		500	97	10	20	1
7440-48-4	COBALT	96.6		100	96	5	20	1
7440-50-8	COPPER	970		1000	97	8	20	0
7439-92-1	LEAD	47.1		50	94	2	20	1
7439-96-5	MANGANESE	102		100	96	5	20	1
7439-98-7	MOLYBDENUM	107		100	99	2	20	1
7440-02-0	NICKEL	493		500	99	20	20	1
7782-49-2	SELENIUM	113		100	99	10	20	1
7440-22-4	SILVER	10.1		10	101	0.5	20	1
7440-24-6	STRONTIUM	250		100	95	5	20	2
7440-28-0	THALLIUM	1.89		2	94	0.1	20	1
7440-29-1	THORIUM	9.78		10	98	0.2	20	2
7440-31-5	TIN	501		500	100	10	20	2
7440-61-1	URANIUM	11.3		10	90	0.1	20	1
7440-66-6	ZINC	1770		2000	88	100	20	1

Data Package ID: IM1909241-1

Prep Batch ID: IP191002-2

Start Date: 10/02/19	End Date: 10/02/19	Concentration Method: NONE	Batch Created By: jml
Start Time: 11:12	End Time: 18:00	Extract Method: SW3005A	Date Created: 10/02/19
Prep Analyst: Jill M. Latelle		Initial Volume Units: ml	Time Created: 11:12
Comments:		Final Volume Units: ml	Validated By: jml
<div style="border: 1px solid black; height: 30px; width: 100%;"></div>			Date Validated: 10/02/19
			Time Validated: 11:41

QC Batch ID: IP191002-2-1

Lab ID	QC Type	Field ID	Matrix	Date Collected	Initial Wt/Vol	Final Wt/Vol	Cleanup Method	Cleanup DF	Order Number
IP191002-2	MB	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909217
IM191002-2	LCS	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909217
1909217-2	MS	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909217
1909217-2	MSD	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909217
1909217-2	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909217
1909217-3	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909217
1909217-6	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909217
1909217-7	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909217
1909217-8	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909217
1909217-9	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909217
1909232-1	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909232
1909232-2	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909232
1909232-3	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909232
1909232-4	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909232
1909241-10	SMP	B3RP31	WATER	9/11/2019	50	50	NONE	1	1909241
1909241-5	SMP	B3RP32	WATER	9/11/2019	50	50	NONE	1	1909241
1909241-6	SMP	B3RP41	WATER	9/11/2019	50	50	NONE	1	1909241
1909241-9	SMP	B3RP40	WATER	9/11/2019	50	50	NONE	1	1909241
1909438-5	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909438
1909438-6	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909438

Prep Batch ID: IP191002-2

Start Date: 10/02/19	End Date: 10/02/19	Concentration Method: NONE	Batch Created By: jml
Start Time: 11:12	End Time: 18:00	Extract Method: SW3005A	Date Created: 10/02/19
Prep Analyst: Jill M. Latelle		Initial Volume Units: ml	Time Created: 11:12
Comments:		Final Volume Units: ml	Validated By: jml
<div style="border: 1px solid black; height: 30px; width: 100%;"></div>			Date Validated: 10/02/19
			Time Validated: 11:41

QC Types

CAR	Carrier reference sample		DLS	Detection Limit Standard
DUP	Laboratory Duplicate		LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicat		LODV	Limit of Detection Verification
LOQV	Limit of Quantitation Verification		MB	Method Blank
MS	Laboratory Matrix Spike		MSD	Laboratory Matrix Spike Duplicate
REP	Sample replicate		RVS	Reporting Level Verification Standar
SMP	Field Sample		SYS	Sample Yield Spike

Prep Batch ID: IP191002-2

Start Date: 10/02/19	End Date: 10/02/19	Concentration Method: NONE	Batch Created By: jml
Start Time: 11:12	End Time: 18:00	Extract Method: SW3005A	Date Created: 10/02/19
Prep Analyst: Jill M. Latelle		Initial Volume Units: ml	Time Created: 11:12
Comments:		Final Volume Units: ml	Validated By: jml
<div style="border: 1px solid black; height: 30px; width: 100%;"></div>			Date Validated: 10/02/19
			Time Validated: 11:41

QC Batch ID: IP191002-2-3

Lab ID	QC Type	Field ID	Matrix	Date Collected	Initial Wt/Vol	Final Wt/Vol	Cleanup Method	Cleanup DF	Order Number
IP191002-2	MB	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909217
IM191002-2	LCS	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909217
1909217-2	MS	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909217
1909217-2	MSD	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909217
1909217-2	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909217
1909241-3	SMP	B3RPW2	WATER	9/11/2019	50	50	NONE	1	1909241
1909241-4	SMP	B3RNR3	WATER	9/11/2019	50	50	NONE	1	1909241
1909241-7	SMP	B3RNR4	WATER	9/11/2019	50	50	NONE	1	1909241
1909241-8	SMP	B3RPW3	WATER	9/11/2019	50	50	NONE	1	1909241

QC Types

CAR	Carrier reference sample	DLS	Detection Limit Standard
DUP	Laboratory Duplicate	LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicat	LODV	Limit of Detection Verification
LOQV	Limit of Quantitation Verification	MB	Method Blank
MS	Laboratory Matrix Spike	MSD	Laboratory Matrix Spike Duplicate
REP	Sample replicate	RVS	Reporting Level Verification Standar
SMP	Field Sample	SYS	Sample Yield Spike



Strontium-90

Case Narrative

CH2M HILL Plateau Remediation Company

AQUIFER TUBES, OCTOBER 2019 – X20-001

Work Order Number: 1909241

1. The samples were prepared according to the current revision of SOP 707.
2. The samples were analyzed for the presence of ⁹⁰Sr according to the current revision of SOP 724. The analyses were completed on 10/13/2019.
3. Total radio-strontium is reported as ⁹⁰Sr. The presence of other radioisotopes of strontium may cause positive bias in the measured strontium concentration.
4. The analysis results for these samples are reported in units of pCi/L. The samples were not filtered prior to analysis.
5. Sample volume was insufficient to allow preparation of a duplicate. A laboratory control sample duplicate (LCSD) was prepared in lieu of a client sample duplicate.
6. In accordance with project specific instructions, the evaluation threshold for Relative Percent Difference (RPD) has been set at 20%. RPD is defined as:

$$RPD = \frac{|S - D|}{(S + D)/2} * 100$$

Where: S = sample activity result and D = duplicate activity result.

7. No anomalous situations were encountered during the preparation and analysis of these samples. All quality control criteria were met.



The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Pik Yee Yuen
Pik Yee Yuen
Radiochemistry Primary Data Reviewer

10/14/19
Date

Kath M. W.
Radiochemistry Final Data Reviewer

10/15/19
Date

Strontium-90 by GFPC

PAI 724 Rev 13

Method Blank Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Lab ID: SR191008-2MB

Sample Matrix: WATER
 Prep SOP: PAI 707 Rev 15
 Date Collected: 08-Oct-19
 Date Prepared: 08-Oct-19
 Date Analyzed: 13-Oct-19

Prep Batch: SR191008-2
 QCBatchID: SR191008-2-1
 Run ID: SR191008-2A
 Count Time: 90 minutes

Final Aliquot: 994 ml
 Result Units: pCi/l
 File Name: SRC1013B

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10098-97-2	Sr-90	1.75E-02 +/- 2.47E-01	5.72E-01	1.00E+00	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
STRONTIUM	1.030E+03	9.32E+02	ug	90.5	40 - 110 %	

Comments:**Qualifiers/Flags:**

U - Result is less than the sample specific MDC.
 Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
 Y2 - Chemical Yield outside default limits.

Abbreviations:

TPU - Total Propagated Uncertainty
 MDC - Sample specific Minimum Detectable Concentration
 BDL - Below Detection Limit

M - Requested MDC not met.
 B - Analyte concentration greater than MDC.
 B3 - Analyte concentration greater than MDC but less than Requested MDC.
 DL - Decision Level

Data Package ID: SR1909241-1

Strontium-90 by GFPC

PAI 724 Rev 13

Laboratory Control Sample(s)**Lab Name:** ALS -- Fort Collins**Work Order Number:** 1909241**Client Name:** CH2M HILL Plateau Remediation Company**ClientProject ID:** AQUIFER TUBES, OCTOBER 2019 X20-001**Lab ID:** SR191008-2LCS**Sample Matrix:** WATER**Prep Batch:** SR191008-2**Final Aliquot:** 994 ml**Prep SOP:** PAI 707 Rev 15**QCBatchID:** SR191008-2-1**Result Units:** pCi/l**Date Collected:** 08-Oct-19**Run ID:** SR191008-2A**File Name:** SRC1013**Date Prepared:** 08-Oct-19**Count Time:** 30 minutes**Date Analyzed:** 13-Oct-19

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
10098-97-2	Sr-90	1.26E+01 +/- 3.24E+00	1.02E+00	1.150E+01	110	75 - 125	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
STRONTIUM	1.030E+03	9.20E+02	ug	89.4	40 - 110 %	

Comments:**Qualifiers/Flags:**

U - Result is less than the sample specific MDC.
 Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
 Y2 - Chemical Yield outside default limits.
 L - LCS Recovery below lower control limit.
 H - LCS Recovery above upper control limit.
 P - LCS Recovery within control limits.
 M - The requested MDC was not met.
 M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
 MDC - Minimum Detectable Concentration

Data Package ID: SR1909241-1

Strontium-90 by GFPC

PAI 724 Rev 13

Laboratory Control Sample(s)**Lab Name:** ALS -- Fort Collins**Work Order Number:** 1909241**Client Name:** CH2M HILL Plateau Remediation Company**ClientProject ID:** AQUIFER TUBES, OCTOBER 2019 X20-001**Lab ID:** SR191008-2LCSD

Sample Matrix: WATER
Prep SOP: PAI 707 Rev 15
Date Collected: 08-Oct-19
Date Prepared: 08-Oct-19
Date Analyzed: 13-Oct-19

Prep Batch: SR191008-2
QCBatchID: SR191008-2-1
Run ID: SR191008-2A
Count Time: 30 minutes

Final Aliquot: 994 ml
Result Units: pCi/l
File Name: SRC1013

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
10098-97-2	Sr-90	1.11E+01 +/- 2.85E+00	9.53E-01	1.150E+01	95.9	75 - 125	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
STRONTIUM	1.030E+03	9.41E+02	ug	91.4	40 - 110 %	

Comments:**Qualifiers/Flags:**

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: SR1909241-1

Strontium-90 by GFPC

PAI 724 Rev 13

Duplicate Sample Results (DER)**Lab Name:** ALS -- Fort Collins**Work Order Number:** 1909241**Client Name:** CH2M HILL Plateau Remediation Company**ClientProject ID:** AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	
Lab ID:	SR191008-2LCSD

Sample Matrix: WATER**Prep SOP:** PAI 707 Rev 15**Date Collected:** 08-Oct-19**Date Prepared:** 08-Oct-19**Date Analyzed:** 13-Oct-19**Prep Batch:** SR191008-2**QCBatchID:** SR191008-2-1**Run ID:** SR191008-2A**Count Time:** 30 minutes**Final Aliquot:** 994 ml**Prep Basis:** Unfiltered**Moisture(%):** NA**Result Units:** pCi/l**File Name:** SRC1013

CASNO	Analyte	Sample				Duplicate				DER	DER Lim
		Result +/-	2 s TPU	MDC	Flags	Result +/-	2 s TPU	MDC	Flags		
10098-97-2	Sr-90	1.26E+01 +/-	3.24E+00	1.02E+00		1.11E+01 +/-	2.85E+00	9.53E-01		0.73	3

Comments:**Duplicate Qualifiers/Flags:**

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

D - DER is greater than Control Limit of 3

LT - Result is less than Request MDC, greater than sample specific MDC

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

Abbreviations:

TPU - Total Propagated Uncertainty

DER - Duplicate Error Ratio

BDL - Below Detection Limit

NR - Not Reported

Data Package ID: SR1909241-1

Strontium-90 by GFPC

PAI 724 Rev 13

Duplicate Sample Results (RPD)**Lab Name:** ALS -- Fort Collins**Work Order Number:** 1909241**Client Name:** CH2M HILL Plateau Remediation Company**ClientProject ID:** AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	
Lab ID:	SR191008-2LCSD

Sample Matrix: WATER**Prep SOP:** PAI 707 Rev 15**Date Collected:** 08-Oct-19**Date Prepared:** 08-Oct-19**Date Analyzed:** 13-Oct-19**Prep Batch:** SR191008-2**QCBatchID:** SR191008-2-1**Run ID:** SR191008-2A**Count Time:** 30 minutes**Final Aliquot:** 994 ml**Prep Basis:** Unfiltered**Moisture(%):** NA**Result Units:** pCi/l**File Name:** SRC1013

CASNO	Analyte	Sample				Duplicate				RPD	RPD Lim
		Result +/-	2 s TPU	MDC	Flags	Result +/-	2 s TPU	MDC	Flags		
10098-97-2	Sr-90	1.26E+01 +/-	3.24E+00	1.02E+00		1.11E+01 +/-	2.85E+00	9.53E-01		13.00	20

Comments:**Qualifiers/Flags:**

+ - Duplicate RPD not within limits.
 U - Result is less than the sample specific MDC.
 Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
 Y2 - Chemical Yield outside default limits.
 M - Requested MDC not met.
 M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
 L - LCS Recovery below lower control limit.
 H - LCS Recovery above upper control limit.
 P - LCS, Matrix Spike Recovery within control limits.
 N - Matrix Spike Recovery outside control limits
 NC - Not Calculated for duplicate results less than 5 times MDC

Abbreviations:

TPU - Total Propagated Uncertainty
 BDL - Below Detection Limit
 NR - Not Reported

Data Package ID: SR1909241-1

Strontium-90 by GFPC

PAI 724 Rev 13

Sample Results**Lab Name:** ALS -- Fort Collins**Work Order Number:** 1909241**Client Name:** CH2M HILL Plateau Remediation Company**ClientProject ID:** AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	B3RP44
Lab ID:	1909241-2

Sample Matrix: WATER**Prep SOP:** PAI 707 Rev 15**Date Collected:** 11-Sep-19**Date Prepared:** 08-Oct-19**Date Analyzed:** 13-Oct-19**Prep Batch:** SR191008-2**QCBatchID:** SR191008-2-1**Run ID:** SR191008-2A**Count Time:** 90 minutes**Report Basis:** Unfiltered**Final Aliquot:** 994 ml**Prep Basis:** Unfiltered**Moisture(%):** NA**Result Units:** pCi/l**File Name:** SRC1013B**Analysis ReqCode:** SRISO_SEP_PR

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10098-97-2	Sr-90	-1.16E-01 +/- 2.19E-01	5.29E-01	1E+00	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
STRONTIUM	1.110E+03	1.06E+03	ug	95.7	40 - 110 %	

Comments:**Qualifiers/Flags:**

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: SR1909241-1

Strontium-90 by GFPC

PAI 724 Rev 13

Sample Results**Lab Name:** ALS -- Fort Collins**Work Order Number:** 1909241**Client Name:** CH2M HILL Plateau Remediation Company**ClientProject ID:** AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	B3RPW2
Lab ID:	1909241-3

Sample Matrix: WATER**Prep Batch:** SR191008-2**Final Aliquot:** 994 ml**Prep SOP:** PAI 707 Rev 15**QCBatchID:** SR191008-2-1**Prep Basis:** Unfiltered**Date Collected:** 11-Sep-19**Run ID:** SR191008-2A**Moisture(%):** NA**Date Prepared:** 08-Oct-19**Count Time:** 90 minutes**Result Units:** pCi/l**Analysis ReqCode:** SRISO_SEP_PR**Date Analyzed:** 13-Oct-19**Report Basis:** Unfiltered**File Name:** SRC1013B

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10098-97-2	Sr-90	-2.81E-02 +/- 2.15E-01	5.08E-01	1E+00	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
STRONTIUM	1.190E+03	1.13E+03	ug	95.4	40 - 110 %	

Comments:**Qualifiers/Flags:**

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: SR1909241-1

Strontium-90 by GFPC

PAI 724 Rev 13

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1909241
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	B3RP32
Lab ID:	1909241-5

Sample Matrix: WATER
Prep SOP: PAI 707 Rev 15
Date Collected: 11-Sep-19
Date Prepared: 08-Oct-19
Date Analyzed: 13-Oct-19

Prep Batch: SR191008-2
QCBatchID: SR191008-2-1
Run ID: SR191008-2A
Count Time: 90 minutes
Report Basis: Unfiltered

Final Aliquot: 994 ml
Prep Basis: Unfiltered
Moisture(%): NA
Result Units: pCi/l
File Name: SRC1013B

Analysis ReqCode: SRISO_SEP_PR

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10098-97-2	Sr-90	-3.58E-02 +/- 2.31E-01	5.46E-01	1E+00	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
STRONTIUM	1.160E+03	1.07E+03	ug	92.2	40 - 110 %	

Comments:

Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
- Y2 - Chemical Yield outside default limits.
- M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
- M - The requested MDC was not met.

Abbreviations:

- TPU - Total Propagated Uncertainty
- MDC - Sample specific Minimum Detectable Concentration
- BDL - Below Detection Limit
- DL - Decision Level

Data Package ID: SR1909241-1

Strontium-90 by GFPC

PAI 724 Rev 13

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1909241
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	B3RPW3
Lab ID:	1909241-8

Sample Matrix: WATER
Prep SOP: PAI 707 Rev 15
Date Collected: 11-Sep-19
Date Prepared: 08-Oct-19
Date Analyzed: 13-Oct-19

Prep Batch: SR191008-2
QCBatchID: SR191008-2-1
Run ID: SR191008-2A
Count Time: 90 minutes
Report Basis: Unfiltered

Final Aliquot: 994 ml
Prep Basis: Unfiltered
Moisture(%): NA
Result Units: pCi/l
File Name: SRC1013B

Analysis ReqCode: SRISO_SEP_PR

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10098-97-2	Sr-90	2.41E-01 +/- 2.68E-01	5.69E-01	1E+00	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
STRONTIUM	1.180E+03	1.07E+03	ug	90.4	40 - 110 %	

Comments:

Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
- Y2 - Chemical Yield outside default limits.
- M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
- M - The requested MDC was not met.

Abbreviations:

- TPU - Total Propagated Uncertainty
- MDC - Sample specific Minimum Detectable Concentration
- BDL - Below Detection Limit
- DL - Decision Level

Data Package ID: SR1909241-1

Strontium-90 by GFPC

PAI 724 Rev 13

Sample Results**Lab Name:** ALS -- Fort Collins**Work Order Number:** 1909241**Client Name:** CH2M HILL Plateau Remediation Company**ClientProject ID:** AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	B3RP31
Lab ID:	1909241-10

Sample Matrix: WATER**Prep SOP:** PAI 707 Rev 15**Date Collected:** 11-Sep-19**Date Prepared:** 08-Oct-19**Date Analyzed:** 13-Oct-19**Prep Batch:** SR191008-2**QCBatchID:** SR191008-2-1**Run ID:** SR191008-2A**Count Time:** 90 minutes**Report Basis:** Unfiltered**Final Aliquot:** 994 ml**Prep Basis:** Unfiltered**Moisture(%):** NA**Result Units:** pCi/l**File Name:** SRC1013B**Analysis ReqCode:** SRISO_SEP_PR

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10098-97-2	Sr-90	1.45E-01 +/- 2.52E-01	5.56E-01	1E+00	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
STRONTIUM	1.030E+03	9.54E+02	ug	92.7	40 - 110 %	

Comments:**Qualifiers/Flags:**

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: SR1909241-1

Strontium-90 by GFPC

PAI 724 Rev 13

Sample Results**Lab Name:** ALS -- Fort Collins**Work Order Number:** 1909241**Client Name:** CH2M HILL Plateau Remediation Company**ClientProject ID:** AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	B3RR72
Lab ID:	1909241-14

Sample Matrix: WATER**Prep SOP:** PAI 707 Rev 15**Date Collected:** 12-Sep-19**Date Prepared:** 08-Oct-19**Date Analyzed:** 13-Oct-19**Prep Batch:** SR191008-2**QC Batch ID:** SR191008-2-1**Run ID:** SR191008-2A**Count Time:** 90 minutes**Report Basis:** Unfiltered**Final Aliquot:** 994 ml**Prep Basis:** Unfiltered**Moisture(%):** NA**Result Units:** pCi/l**File Name:** SRC1013B**Analysis ReqCode:** SRISO_SEP_PR

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10098-97-2	Sr-90	4.24E-01 +/- 2.82E-01	5.44E-01	1E+00	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
STRONTIUM	1.170E+03	1.12E+03	ug	96.1	40 - 110 %	

Comments:**Qualifiers/Flags:**

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: SR1909241-1

Strontium-90 by GFPC

PAI 724 Rev 13

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1909241
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	B3RR62
Lab ID:	1909241-15

Sample Matrix: WATER
Prep SOP: PAI 707 Rev 15
Date Collected: 12-Sep-19
Date Prepared: 08-Oct-19
Date Analyzed: 13-Oct-19

Prep Batch: SR191008-2
QC Batch ID: SR191008-2-1
Run ID: SR191008-2A
Count Time: 90 minutes
Report Basis: Unfiltered

Final Aliquot: 994 ml
Prep Basis: Unfiltered
Moisture(%): NA
Result Units: pCi/l
File Name: SRC1013B

Analysis ReqCode: SRISO_SEP_PR

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10098-97-2	Sr-90	-6.14E-02 +/- 2.31E-01	5.50E-01	1E+00	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
STRONTIUM	1.180E+03	1.09E+03	ug	92.9	40 - 110 %	

Comments:

Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
- Y2 - Chemical Yield outside default limits.
- M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
- M - The requested MDC was not met.

Abbreviations:

- TPU - Total Propagated Uncertainty
- MDC - Sample specific Minimum Detectable Concentration
- BDL - Below Detection Limit
- DL - Decision Level

Data Package ID: SR1909241-1

Prep Batch ID: SR191008-2

Start Date: 10/08/19	End Date: 10/08/19	Concentration Method: NONE	Batch Created By: jxh
Start Time: 12:58	End Time: 12:58	Extract Method: PAI 70715	Date Created: 10/08/19
Prep Analyst: Jirushaya Hantula		Initial Volume Units: ml	Time Created: 13:00
Comments:		Final Volume Units: ml	Validated By: jxh
<div style="border: 1px solid black; height: 30px; width: 100%;"></div>			Date Validated: 10/11/19
			Time Validated: 12:54

QC Batch ID: SR191008-2-1

Lab ID	QC Type	Field ID	Matrix	Date Collected	Initial Wt/Vol	Final Wt/Vol	Cleanup Method	Cleanup DF	Order Number
SR191008-2	CAR	XXXXXX	WATER	XXXXXX	1000	1000	NONE	1	1909241
SR191008-2	MB	XXXXXX	WATER	XXXXXX	1000	994.01	NONE	1	1909241
SR191008-2	LCS	XXXXXX	WATER	XXXXXX	1000	994.01	NONE	1	1909241
SR191008-2	LCSD	XXXXXX	WATER	XXXXXX	1000	994.01	NONE	1	1909241
1909241-10	SMP	B3RP31	WATER	9/11/2019	1000	994.01	NONE	1	1909241
1909241-14	SMP	B3RR72	WATER	9/12/2019	1000	994.01	NONE	1	1909241
1909241-15	SMP	B3RR62	WATER	9/12/2019	1000	994.01	NONE	1	1909241
1909241-2	SMP	B3RP44	WATER	9/11/2019	1000	994.01	NONE	1	1909241
1909241-3	SMP	B3RPW2	WATER	9/11/2019	1000	994.01	NONE	1	1909241
1909241-5	SMP	B3RP32	WATER	9/11/2019	1000	994.01	NONE	1	1909241
1909241-8	SMP	B3RPW3	WATER	9/11/2019	1000	994.01	NONE	1	1909241
1909305-2	SMP	XXXXXX	WATER	XXXXXX	1000	994.01	NONE	1	1909305
1909305-3	SMP	XXXXXX	WATER	XXXXXX	1000	994.01	NONE	1	1909305
1909305-4	SMP	XXXXXX	WATER	XXXXXX	1000	994.01	NONE	1	1909305

QC Types

CAR	Carrier reference sample	DLS	Detection Limit Standard
DUP	Laboratory Duplicate	LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicat	LODV	Limit of Detection Verification
LOQV	Limit of Quantitation Verification	MB	Method Blank
MS	Laboratory Matrix Spike	MSD	Laboratory Matrix Spike Duplicate
REP	Sample replicate	RVS	Reporting Level Verification Standar
SMP	Field Sample	SYS	Sample Yield Spike



Technetium-99

Case Narrative

CH2M HILL Plateau Remediation Company

AQUIFER TUBES, OCTOBER 2019 – X20-001

Work Order Number: 1909241

1. The sample was prepared according to the current revision of SOP 755, with procedure modifications outlined in QASS 378635 and 378636.
2. The sample was analyzed for the presence of ⁹⁹Tc according to the current revision of SOP 704. The analysis was completed on 10/08/2019.
3. The analysis results for the sample are reported in units of pCi/L. The sample was not filtered prior to analysis.
4. The duplicate of sample 1909245-11 is shared for this work order. The duplicate was performed on a CH2M HILL Plateau Remediation Company sample and the results are acceptable. The results can be found in the following report.
5. In accordance with project specific instructions, the evaluation threshold for Relative Percent Difference (RPD) has been set at 20%. RPD is defined as:

$$RPD = \frac{|S - D|}{(S + D)/2} * 100$$

Where: S = sample activity result and D = duplicate activity result.

6. No anomalous situations were encountered during the preparation or analysis of this sample. All quality control criteria were met.



The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Pik Yee Yuen
Pik Yee Yuen
Radiochemistry Primary Data Reviewer

10/10/19
Date

Kath M. A.
Radiochemistry Final Data Reviewer

10/15/19
Date

Technetium-99 by Liquid Scintillation

PAI 704_Tc99 Rev 12

Method Blank Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Lab ID: TC191002-2MB	Sample Matrix: WATER	Prep Batch: TC191002-2	Final Aliquot: 250 ml
	Prep SOP: PAI 755 Rev 12	QCBatchID: TC191002-2-1	Result Units: pCi/l
	Date Collected: 02-Oct-19	Run ID: TC191002-2A	File Name: Z20191007_1030
	Date Prepared: 02-Oct-19	Count Time: 30 minutes	
	Date Analyzed: 08-Oct-19		

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14133-76-7	Tc-99	-1.07E-01 +/- 1.15E+00	2.11E+00	2.00E+01	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Tc-99m	3.540E+04	3.52E+04	Pci	99.4	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

DL - Decision Level

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

Data Package ID: TC1909241-1

Technetium-99 by Liquid Scintillation

PAI 704_Tc99 Rev 12

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins
Work Order Number: 1909241
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Lab ID: TC191002-2LCS	Sample Matrix: WATER	Prep Batch: TC191002-2	Final Aliquot: 250 ml
	Prep SOP: PAI 755 Rev 12	QCBatchID: TC191002-2-1	Result Units: pCi/l
	Date Collected: 02-Oct-19	Run ID: TC191002-2A	File Name: Z20191007_1030
	Date Prepared: 02-Oct-19	Count Time: 30 minutes	
	Date Analyzed: 08-Oct-19		

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
14133-76-7	Tc-99	9.15E+02 +/- 1.47E+02	2.30E+00	9.110E+02	100	75 - 125	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Tc-99m	3.540E+04	3.28E+04	Pci	92.7	40 - 110 %	

Comments:

Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
- Y2 - Chemical Yield outside default limits.
- L - LCS Recovery below lower control limit.
- H - LCS Recovery above upper control limit.
- P - LCS Recovery within control limits.
- M - The requested MDC was not met.
- M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

- TPU - Total Propagated Uncertainty
- MDC - Minimum Detectable Concentration

Data Package ID: TC1909241-1

Technetium-99 by Liquid Scintillation

PAI 704_Tc99 Rev 12

Duplicate Sample Results (DER)

Lab Name: ALS -- Fort Collins
Work Order Number: 1909241
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	Shared QC
Lab ID:	1909245-11DUP

Sample Matrix: WATER
Prep SOP: PAI 755 Rev 12
Date Collected: 11-Sep-19
Date Prepared: 02-Oct-19
Date Analyzed: 07-Oct-19

Prep Batch: TC191002-2
QC Batch ID: TC191002-2-1
Run ID: TC191002-2A
Count Time: 30 minutes
Report Basis: Unfiltered

Final Aliquot: 100 ml
Prep Basis: Unfiltered
Moisture(%): NA
Result Units: pCi/l
File Name: Z20191007_1030

CASNO	Analyte	Sample				Duplicate				DER	DER Lim
		Result +/-	2 s TPU	MDC	Flags	Result +/-	2 s TPU	MDC	Flags		
14133-76-7	Tc-99	2.85E+02 +/-	4.80E+01	6.01E+00		2.60E+02 +/-	4.40E+01	5.80E+00		0.745	3

Comments:

Duplicate Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
- Y2 - Chemical Yield outside default limits.
- D - DER is greater than Control Limit of 3
- LT - Result is less than Request MDC, greater than sample specific MDC
- M - Requested MDC not met.
- M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
- L - LCS Recovery below lower control limit.
- H - LCS Recovery above upper control limit.
- P - LCS, Matrix Spike Recovery within control limits.
- N - Matrix Spike Recovery outside control limits

Abbreviations:

- TPU - Total Propagated Uncertainty
- DER - Duplicate Error Ratio
- BDL - Below Detection Limit
- NR - Not Reported

Data Package ID: TC1909241-1

Technetium-99 by Liquid Scintillation

PAI 704_Tc99 Rev 12

Duplicate Sample Results (RPD)

Lab Name: ALS -- Fort Collins
Work Order Number: 1909241
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	Shared QC
Lab ID:	1909245-11DUP

Sample Matrix: WATER
Prep SOP: PAI 755 Rev 12
Date Collected: 11-Sep-19
Date Prepared: 02-Oct-19
Date Analyzed: 07-Oct-19

Prep Batch: TC191002-2
QCBatchID: TC191002-2-1
Run ID: TC191002-2A
Count Time: 30 minutes
Report Basis: Unfiltered

Final Aliquot: 100 ml
Prep Basis: Unfiltered
Moisture(%): NA
Result Units: pCi/l
File Name: Z20191007_1030

CASNO	Analyte	Sample				Duplicate				RPD	RPD Lim
		Result +/-	2 s TPU	MDC	Flags	Result +/-	2 s TPU	MDC	Flags		
14133-76-7	Tc-99	2.85E+02 +/-	4.80E+01	6.01E+00		2.60E+02 +/-	4.40E+01	5.80E+00		9.00	20

Comments:

Qualifiers/Flags:

- + - Duplicate RPD not within limits.
- U - Result is less than the sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
- Y2 - Chemical Yield outside default limits.
- M - Requested MDC not met.
- M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
- L - LCS Recovery below lower control limit.
- H - LCS Recovery above upper control limit.
- P - LCS, Matrix Spike Recovery within control limits.
- N - Matrix Spike Recovery outside control limits
- NC - Not Calculated for duplicate results less than 5 times MDC

Abbreviations:

- TPU - Total Propagated Uncertainty
- BDL - Below Detection Limit
- NR - Not Reported

Data Package ID: TC1909241-1

Technetium-99 by Liquid Scintillation

PAI 704_Tc99 Rev 12

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1909241
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	Shared QC
Lab ID:	1909245-11

Sample Matrix: WATER	Prep Batch: TC191002-2	Final Aliquot: 100 ml
Prep SOP: PAI 755 Rev 12	QCBatchID: TC191002-2-1	Prep Basis: Unfiltered
Date Collected: 11-Sep-19	Run ID: TC191002-2A	Moisture(%): NA
Date Prepared: 02-Oct-19	Count Time: 30 minutes	Result Units: pCi/l
Date Analyzed: 07-Oct-19	Report Basis: Unfiltered	File Name: Z20191007_1030

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14133-76-7	Tc-99	2.85E+02 +/- 4.80E+01	6.01E+00	2E+01	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Tc-99m	3.540E+04	3.15E+04	Pci	89.1	40 - 110 %	

Comments:

Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
- Y2 - Chemical Yield outside default limits.
- M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
- M - The requested MDC was not met.

Abbreviations:

- TPU - Total Propagated Uncertainty
- MDC - Sample specific Minimum Detectable Concentration
- BDL - Below Detection Limit
- DL - Decision Level

Data Package ID: TC1909241-1

Technetium-99 by Liquid Scintillation

PAI 704_Tc99 Rev 12

Sample Duplicate Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	Shared QC
Lab ID:	1909245-11DUP

Sample Matrix: WATER

Prep SOP: PAI 755 Rev 12

Date Collected: 11-Sep-19

Date Prepared: 02-Oct-19

Date Analyzed: 07-Oct-19

Prep Batch: TC191002-2

QCBatchID: TC191002-2-1

Run ID: TC191002-2A

Count Time: 30 minutes

Report Basis: Unfiltered

Final Aliquot: 100 ml

Prep Basis: Unfiltered

Moisture(%): NA

Result Units: pCi/l

File Name: Z20191007_1030

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14133-76-7	Tc-99	2.60E+02 +/- 4.40E+01	5.80E+00	2E+01	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Tc-99m	3.540E+04	3.29E+04	Pci	93.1	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

D - DER is greater than Control Limit of 3

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: TC1909241-1

Date Printed:

Thursday, October 10, 2019

ALS -- Fort Collins

LIMS Version: 6.912

Page 1 of 1

Technetium-99 by Liquid Scintillation

PAI 704_Tc99 Rev 12

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1909241
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	B3RR62
Lab ID:	1909241-15

Sample Matrix: WATER
Prep SOP: PAI 755 Rev 12
Date Collected: 12-Sep-19
Date Prepared: 02-Oct-19
Date Analyzed: 07-Oct-19

Prep Batch: TC191002-2
QCBatchID: TC191002-2-1
Run ID: TC191002-2A
Count Time: 30 minutes
Report Basis: Unfiltered

Final Aliquot: 100 ml
Prep Basis: Unfiltered
Moisture(%): NA
Result Units: pCi/l
File Name: Z20191007_1030

Analysis ReqCode: TC99_SEP_LSC

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14133-76-7	Tc-99	6.41E+00 +/- 4.16E+00	5.99E+00	2E+01	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Tc-99m	3.540E+04	3.19E+04	Pci	90.3	40 - 110 %	

Comments:

Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
- Y2 - Chemical Yield outside default limits.
- M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
- M - The requested MDC was not met.

Abbreviations:

- TPU - Total Propagated Uncertainty
- MDC - Sample specific Minimum Detectable Concentration
- BDL - Below Detection Limit
- DL - Decision Level

Data Package ID: TC1909241-1

Prep Batch ID: TC191002-2

Start Date: 10/02/19	End Date: 10/02/19	Concentration Method: NONE	Batch Created By: jcp
Start Time: 10:07	End Time: 10:07	Extract Method: PAI 75512	Date Created: 10/02/19
Prep Analyst: John C. Petrovic		Initial Volume Units: ml	Time Created: 10:08
Comments:		Final Volume Units: ml	Validated By: jcp
<div style="border: 1px solid black; height: 30px; width: 100%;"></div>			Date Validated: 10/03/19
			Time Validated: 10:02

QC Batch ID: TC191002-2-1

Lab ID	QC Type	Field ID	Matrix	Date Collected	Initial Wt/Vol	Final Wt/Vol	Cleanup Method	Cleanup DF	Order Number
TC191002-2	MB	XXXXXX	WATER	XXXXXX	250	250	NONE	1	1909245
TC191002-2CB1	MB	XXXXXX	WATER	XXXXXX	250	250	NONE	1	1909245
TC191002-2CB2	MB	XXXXXX	WATER	XXXXXX	250	250	NONE	1	1909245
TC191002-2CB3	MB	XXXXXX	WATER	XXXXXX	250	250	NONE	1	1909245
TC191002-2	LCS	XXXXXX	WATER	XXXXXX	250	250	NONE	1	1909245
1909245-11	DUP	XXXXXX	WATER	XXXXXX	100	100	NONE	1	1909245
1909241-15	SMP	B3RR62	WATER	9/12/2019	100	100	NONE	1	1909241
1909242-7	SMP	XXXXXX	WATER	XXXXXX	100	100	NONE	1	1909242
1909245-10	SMP	XXXXXX	WATER	XXXXXX	100	100	NONE	1	1909245
1909245-11	SMP	XXXXXX	WATER	XXXXXX	100	100	NONE	1	1909245
1909245-3	SMP	XXXXXX	WATER	XXXXXX	100	100	NONE	1	1909245
1909245-8	SMP	XXXXXX	WATER	XXXXXX	100	100	NONE	1	1909245
1909305-2	SMP	XXXXXX	WATER	XXXXXX	100	100	NONE	1	1909305
1909373-1	SMP	XXXXXX	WATER	XXXXXX	100	100	NONE	1	1909373
1909378-3	SMP	XXXXXX	WATER	XXXXXX	100	100	NONE	1	1909378
1909382-1	SMP	XXXXXX	WATER	XXXXXX	100	100	NONE	1	1909382
1909382-2	SMP	XXXXXX	WATER	XXXXXX	100	100	NONE	1	1909382

QC Types

CAR	Carrier reference sample	DLS	Detection Limit Standard
DUP	Laboratory Duplicate	LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicat	LODV	Limit of Detection Verification
LOQV	Limit of Quantitation Verification	MB	Method Blank
MS	Laboratory Matrix Spike	MSD	Laboratory Matrix Spike Duplicate
REP	Sample replicate	RVS	Reporting Level Verification Standar
SMP	Field Sample	SYS	Sample Yield Spike

ALS Laboratory Group - Fort Collins

QUALITY ASSURANCE SUMMARY SHEET

PAR W.O. # / BATCH General
 TEST Tc99
 METHOD Prep
 SOP/REV (PREP) 755
 SOP/REV (ANAL) _____

Briefly document any QA or other problems or deviations associated with the analysis of samples. Problems could result from: log-in, color, odor, dilution, consistency, scheduling, equipment, or instrumentation, or may include documentation of minor deviations necessary due to unique DQO's or sample characteristics.

0288112109

Tc99^m 711.2613.17 was used as a tracer for this batch. It has a half-life of 6 hours and therefore must be delivered the day of prep and diluted to a working level solution. The procedure noted below is standard for all Tc99^m dilutions.

1. Open the Pb shielded container and carefully remove the vial containing the Tc99^m primary standard.
2. Withdraw a 1 mL aliquot of the Tc99^m primary standard from the vial using a 10 mL syringe fitted with a hypodermic needle. Dispense the aliquot into a disposable beaker that contains ~100 mL of DI water. Cap and mix well. This intermediate solution is a 1/100x dilution of the primary standard.
3. Using a 10 mL syringe, transfer 10 mL of the intermediate solution prepared in step 2 into a disposable beaker that contains ~70 mL of DI water. Cap and mix well. This working standard solution is a 1/800x dilution of the primary standard.

0288112109

0288112109

Attach vendor label

Rx# 817907
 CardinalHealth
 CARDINAL HEALTH 414, LLC
 DENVER
 10400 48TH AVE, STE B
 DENVER CO 80239
 303.373.0579

Date Ordered : 02Oct2019
 Date/Time Prepared : 03Oct2019 00:58 MT
ALS LABORATORY GROUP
 225 COMMERCE DR
 FORT COLLINS CO 80524-2762
1 0430 Fort Collins

Safetrac
 CH102884

CAUTION

RADIOACTIVE MATERIALS

Patient : **SOURCE, Tc99m**
 Product : Tc-99m **Sodium Pertechnetate Unit Dose mCi (No)**
 Disp Amt : **0.55 mCi**
 Calibration : **03Oct2019 08:00 MT**
 Source - Not for Human Use For Calibration Use Only
 Indication : **Point Source mCi**
 Dispense Date : **03Oct2019** Lot# : **E19276-0027** Price(est) : **N/A**
 Use By : **04Oct2019 00:58 MT** Physician : **Charles Orchard, RSO** NPT :
 Notes : NDC : RPh : **A.Worthem**

Caution: Federal law prohibits dispensing without a prescription - Rx only
 All Tc-99m drugs are below 0.15 uCi of Mo-99/mCi of Tc-99m at BUD.

TECHNICIAN/ANALYST Crystal Shreffler

DATE 8/12/09

DEPARTMENT MANAGER Jelly Z

DATE 8/12/09

378636

FORM 302r6.doc (4/22/04)

ALS Laboratory Group - Fort Collins

QUALITY ASSURANCE SUMMARY SHEET

PAR W.O. # / BATCH Generic
 TEST Tc99
 METHOD Prep
 SOP/REV (PREP) 755
 SOP/REV (ANAL) _____

Briefly document any QA or other problems or deviations associated with the analysis of samples. Problems could result from: log-in, color, odor, dilution, consistency, scheduling, equipment, or instrumentation, or may include documentation of minor deviations necessary due to unique DQO's or sample characteristics.

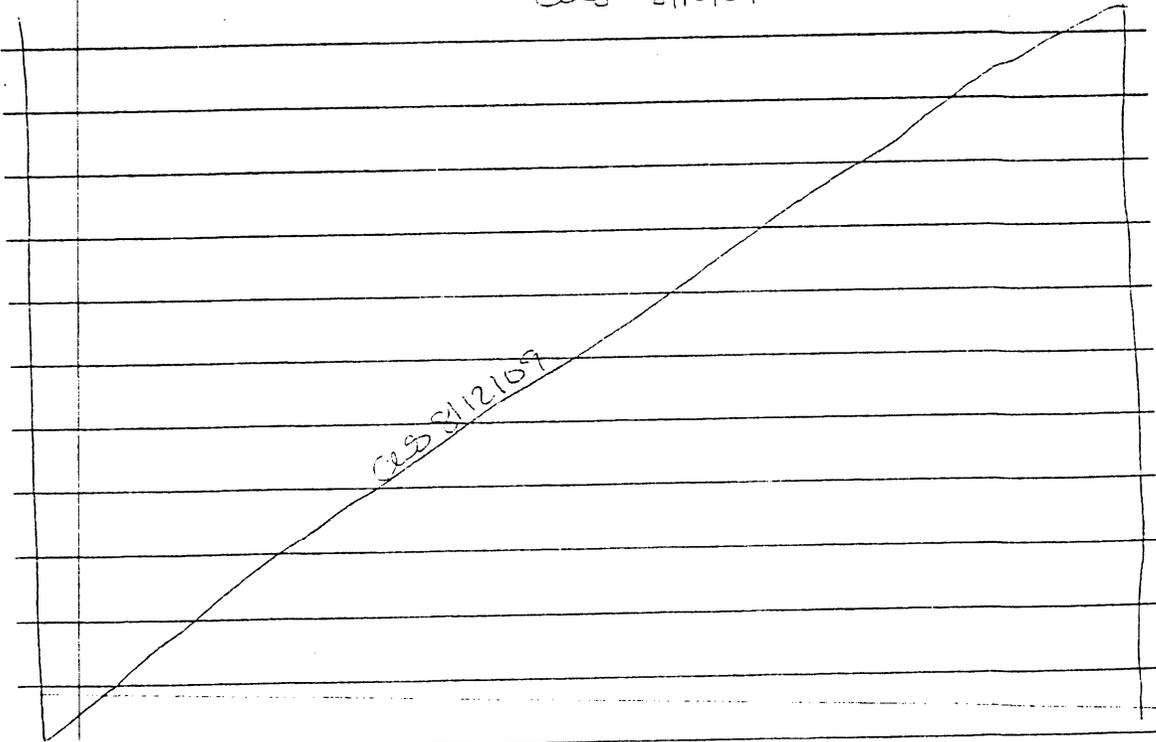
cus 8/12/09

cus 8/12/09

Due to possible matrix interference, a ferric hydroxide precipitation was performed on all samples per SOP 755, section 8.2.10

cus 8/12/09

cus 8/12/09



TECHNICIAN/ANALYST Crystal Sheaffer

DATE 8/12/09

DEPARTMENT MANAGER [Signature]

DATE 8/12/09

378635

FORM 302r6.doc (4/22/04)



Tritium Case Narrative

CH2M HILL Plateau Remediation Company AQUIFER TUBES, OCTOBER 2019 – X20-001

Work Order Number: 1909241

1. The sample was prepared according to the current revision of SOP 700.
2. The sample was analyzed for the presence of tritium according to the current revision of SOP 704. The analysis was completed on 10/01/2019.
3. The duplicate of sample 1909245-9 and the matrix spikes of sample 1909213-3 are shared for this work order. The duplicate and matrix spikes were performed on CH2M HILL Plateau Remediation Company samples and the results are acceptable. The results can be found in the following report.
4. The analysis results for the sample are reported in units of pCi/L. The sample was not filtered prior to analysis.
5. In accordance with project specific instructions, the evaluation threshold for Relative Percent Difference (RPD) has been set at 20%. RPD is defined as:

$$RPD = \frac{|S - D|}{(S + D)/2} * 100$$

Where: S = sample activity result and D = duplicate activity result. RPD is not evaluated for sample/duplicate pairs where the reported activity for either is less than 5 times the sample specific MDC. These samples are identified with an "NC" flag on the Duplicate Sample Results (RPD) page.

6. No anomalous situations were encountered during the preparation or analysis of this sample. All quality control criteria were met.



The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Pik Yee Yuen
Pik Yee Yuen
Radiochemistry Primary Data Reviewer

10/10/19
Date

Kath M. W.
Radiochemistry Final Data Reviewer

10/15/19
Date

Tritium by Liquid Scintillation

PAI 704 Rev 12

Method Blank Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1909241
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Lab ID: 3H190926-1MB	Sample Matrix: WATER	Prep Batch: 3H190926-1	Final Aliquot: 10.0 ml
	Prep SOP: PAI 700 Rev 15	QCBatchID: 3H190926-1-2	Result Units: pCi/l
	Date Collected: 26-Sep-19	Run ID: 3H190926-1C	File Name: B60_04_093001
	Date Prepared: 26-Sep-19	Count Time: 90 minutes	
	Date Analyzed: 01-Oct-19		

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10028-17-8	H-3	-5.11E+01 +/- 1.82E+02	3.09E+02	4.00E+02	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
 Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
 Y2 - Chemical Yield outside default limits.

Abbreviations:

TPU - Total Propagated Uncertainty
 MDC - Sample specific Minimum Detectable Concentration
 BDL - Below Detection Limit

M - Requested MDC not met.
 B - Analyte concentration greater than MDC.
 B3 - Analyte concentration greater than MDC but less than Requested MDC.
 DL - Decision Level

Data Package ID: H31909241-1

Tritium by Liquid Scintillation

PAI 704 Rev 12

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins
Work Order Number: 1909241
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Lab ID: 3H190926-1LCS	Sample Matrix: WATER	Prep Batch: 3H190926-1	Final Aliquot: 9.84 ml
	Prep SOP: PAI 700 Rev 15	QCBatchID: 3H190926-1-2	Result Units: pCi/l
	Date Collected: 26-Sep-19	Run ID: 3H190926-1C	File Name: B60_04_093001
	Date Prepared: 26-Sep-19	Count Time: 90 minutes	
	Date Analyzed: 01-Oct-19		

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
10028-17-8	H-3	1.60E+04 +/- 2.46E+03	3.13E+02	1.650E+04	96.6	80 - 120	

Comments:

Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
- Y2 - Chemical Yield outside default limits.
- L - LCS Recovery below lower control limit.
- H - LCS Recovery above upper control limit.
- P - LCS Recovery within control limits.
- M - The requested MDC was not met.
- M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

- TPU - Total Propagated Uncertainty
- MDC - Minimum Detectable Concentration

Data Package ID: H31909241-1

Tritium by Liquid Scintillation

PAI 704 Rev 12

Matrix Spike Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1909241
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	Shared QC
Lab ID:	1909213-3MS

Sample Matrix: WATER
Prep SOP: PAI 700 Rev 15
Date Collected: 10-Sep-19
Date Prepared: 26-Sep-19
Date Analyzed: 30-Sep-19

Prep Batch: 3H190926-1
QCBatchID: 3H190926-1-2
Run ID: 3H190926-1C
Count Time: 90 minutes
Report Basis: Unfiltered

Final Aliquot: 9.84 ml
Prep Basis: Unfiltered
Moisture(%): 100.000
Result Units: pCi/l
File Name: B60_04_093001

Analysis ReqCode: TRITIUM_DIST_L

CASNO	Target Nuclide	Matrix Spike	Sample Results	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
10028-17-8	H-3	1.58E+04	4.38E+02	3.14E+02	1.650E+04	92.7	80 - 120	

Comments:

Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- Y1 - Chemical Yield in control at 100-110%. Quantitative yield is assumed.
- Y2 - Chemical Yield outside default limits.
- N - Matrix Spike Recovery outside control limits
- P - Matrix Spike Recovery within control limits
- M - The requested MDC was not met.
- M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

MDC - Sample specific Minimum Detectable Concentration

Data Package ID: H31909241-1

Tritium by Liquid Scintillation

PAI 704 Rev 12

Matrix Spike Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1909241
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	Shared QC
Lab ID:	1909213-3MSD

Sample Matrix: WATER
Prep SOP: PAI 700 Rev 15
Date Collected: 10-Sep-19
Date Prepared: 26-Sep-19
Date Analyzed: 30-Sep-19

Prep Batch: 3H190926-1
QCBatchID: 3H190926-1-2
Run ID: 3H190926-1C
Count Time: 90 minutes
Report Basis: Unfiltered

Final Aliquot: 9.84 ml
Prep Basis: Unfiltered
Moisture(%): 100.000
Result Units: pCi/l
File Name: B60_04_093001

Analysis ReqCode: TRITIUM_DIST_L

CASNO	Target Nuclide	Matrix Spike	Sample Results	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
10028-17-8	H-3	1.67E+04	4.38E+02	3.14E+02	1.650E+04	98.0	80 - 120	

Comments:

Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- Y1 - Chemical Yield in control at 100-110%. Quantitative yield is assumed.
- Y2 - Chemical Yield outside default limits.
- N - Matrix Spike Recovery outside control limits
- P - Matrix Spike Recovery within control limits
- M - The requested MDC was not met.
- M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

MDC - Sample specific Minimum Detectable Concentration

Data Package ID: H31909241-1

Tritium by Liquid Scintillation

PAI 704 Rev 12

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1909241
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	Shared QC
Lab ID:	1909213-3

Sample Matrix: WATER	Prep Batch: 3H190926-1	Final Aliquot: 10.0 ml
Prep SOP: PAI 700 Rev 15	QCBatchID: 3H190926-1-2	Prep Basis: Unfiltered
Date Collected: 10-Sep-19	Run ID: 3H190926-1C	Moisture(%): 100.000
Date Prepared: 26-Sep-19	Count Time: 90 minutes	Result Units: pCi/l
Date Analyzed: 30-Sep-19	Report Basis: Unfiltered	File Name: B60_04_093001

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10028-17-8	H-3	4.38E+02 +/- 2.07E+02	3.09E+02	4E+02	NA	

Comments:

Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
- Y2 - Chemical Yield outside default limits.
- M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
- M - The requested MDC was not met.

Abbreviations:

- TPU - Total Propagated Uncertainty
- MDC - Sample specific Minimum Detectable Concentration
- BDL - Below Detection Limit
- DL - Decision Level

Data Package ID: H31909241-1

Tritium by Liquid Scintillation

PAI 704 Rev 12

Duplicate Sample Results (DER)

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	Shared QC
Lab ID:	1909213-3MSD

Sample Matrix: WATER

Prep SOP: PAI 700 Rev 15

Date Collected: 10-Sep-19

Date Prepared: 26-Sep-19

Date Analyzed: 30-Sep-19

Prep Batch: 3H190926-1

QCBatchID: 3H190926-1-2

Run ID: 3H190926-1C

Count Time: 90 minutes

Report Basis: Unfiltered

Final Aliquot: 9.84 ml

Prep Basis: Unfiltered

Moisture(%): 100.000

Result Units: pCi/l

File Name: B60_04_093001

CASNO	Analyte	Sample				Duplicate				DER	DER Lim
		Result +/-	2 s TPU	MDC	Flags	Result +/-	2 s TPU	MDC	Flags		
10028-17-8	H-3	1.58E+04 +/-	2.44E+03	3.14E+02		1.67E+04 +/-	2.57E+03	3.14E+02		0.249	2.13

Comments:

Duplicate Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
- Y2 - Chemical Yield outside default limits.
- W - DER is greater than Warning Limit of 1.42
- D - DER is greater than Control Limit of 2.13
- LT - Result is less than Request MDC, greater than sample specific MDC
- M - Requested MDC not met.
- M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
- L - LCS Recovery below lower control limit.
- H - LCS Recovery above upper control limit.
- P - LCS, Matrix Spike Recovery within control limits.
- N - Matrix Spike Recovery outside control limits

Abbreviations:

- TPU - Total Propagated Uncertainty
- DER - Duplicate Error Ratio
- BDL - Below Detection Limit
- NR - Not Reported

Data Package ID: H31909241-1

Tritium by Liquid Scintillation

PAI 704 Rev 12

Duplicate Sample Results (RPD)

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	Shared QC
Lab ID:	1909213-3MSD

Sample Matrix: WATER
 Prep SOP: PAI 700 Rev 15
 Date Collected: 10-Sep-19
 Date Prepared: 26-Sep-19
 Date Analyzed: 30-Sep-19

Prep Batch: 3H190926-1
 QCBatchID: 3H190926-1-2
 Run ID: 3H190926-1C
 Count Time: 90 minutes
 Report Basis: Unfiltered

Final Aliquot: 9.84 ml
 Prep Basis: Unfiltered
 Moisture(%): 100.000
 Result Units: pCi/l
 File Name: B60_04_093001

CASNO	Analyte	Sample				Duplicate				RPD	RPD Lim
		Result +/-	2 s TPU	MDC	Flags	Result +/-	2 s TPU	MDC	Flags		
10028-17-8	H-3	1.58E+04 +/- 2.44E+03		3.14E+02		1.67E+04 +/- 2.57E+03		3.14E+02		5.00	20

Comments:

Qualifiers/Flags:

- + - Duplicate RPD not within limits.
- U - Result is less than the sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
- Y2 - Chemical Yield outside default limits.
- M - Requested MDC not met.
- M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
- L - LCS Recovery below lower control limit.
- H - LCS Recovery above upper control limit.
- P - LCS, Matrix Spike Recovery within control limits.
- N - Matrix Spike Recovery outside control limits
- NC - Not Calculated for duplicate results less than 5 times MDC

Abbreviations:

- TPU - Total Propagated Uncertainty
- BDL - Below Detection Limit
- NR - Not Reported

Data Package ID: H31909241-1

Tritium by Liquid Scintillation

PAI 704 Rev 12

Duplicate Sample Results (DER)

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	Shared QC
Lab ID:	1909245-9DUP

Sample Matrix: WATER
 Prep SOP: PAI 700 Rev 15
 Date Collected: 11-Sep-19
 Date Prepared: 26-Sep-19
 Date Analyzed: 01-Oct-19

Prep Batch: 3H190926-1
 QCBatchID: 3H190926-1-2
 Run ID: 3H190926-1C
 Count Time: 90 minutes
 Report Basis: Unfiltered

Final Aliquot: 10.0 ml
 Prep Basis: Unfiltered
 Moisture(%): 100.000
 Result Units: pCi/l
 File Name: B60_04_093001

CASNO	Analyte	Sample				Duplicate				DER	DER Lim
		Result +/-	2 s TPU	MDC	Flags	Result +/-	2 s TPU	MDC	Flags		
10028-17-8	H-3	5.92E+02 +/-	2.19E+02	3.09E+02		5.31E+02 +/-	2.14E+02	3.09E+02		0.198	2.13

Comments:

Duplicate Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
- Y2 - Chemical Yield outside default limits.
- W - DER is greater than Warning Limit of 1.42
- D - DER is greater than Control Limit of 2.13
- LT - Result is less than Request MDC, greater than sample specific MDC
- M - Requested MDC not met.
- M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
- L - LCS Recovery below lower control limit.
- H - LCS Recovery above upper control limit.
- P - LCS, Matrix Spike Recovery within control limits.
- N - Matrix Spike Recovery outside control limits

Abbreviations:

- TPU - Total Propagated Uncertainty
- DER - Duplicate Error Ratio
- BDL - Below Detection Limit
- NR - Not Reported

Data Package ID: H31909241-1

Tritium by Liquid Scintillation

PAI 704 Rev 12

Duplicate Sample Results (RPD)

Lab Name: ALS -- Fort Collins

Work Order Number: 1909241

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	Shared QC
Lab ID:	1909245-9DUP

Sample Matrix: WATER
 Prep SOP: PAI 700 Rev 15
 Date Collected: 11-Sep-19
 Date Prepared: 26-Sep-19
 Date Analyzed: 01-Oct-19

Prep Batch: 3H190926-1
 QCBatchID: 3H190926-1-2
 Run ID: 3H190926-1C
 Count Time: 90 minutes
 Report Basis: Unfiltered

Final Aliquot: 10.0 ml
 Prep Basis: Unfiltered
 Moisture(%): 100.000
 Result Units: pCi/l
 File Name: B60_04_093001

CASNO	Analyte	Sample				Duplicate				RPD	RPD Lim
		Result +/-	2 s TPU	MDC	Flags	Result +/-	2 s TPU	MDC	Flags		
10028-17-8	H-3	5.92E+02 +/-	2.19E+02	3.09E+02		5.31E+02 +/-	2.14E+02	3.09E+02		NC	20

Comments:

Qualifiers/Flags:

- + - Duplicate RPD not within limits.
- U - Result is less than the sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
- Y2 - Chemical Yield outside default limits.
- M - Requested MDC not met.
- M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
- L - LCS Recovery below lower control limit.
- H - LCS Recovery above upper control limit.
- P - LCS, Matrix Spike Recovery within control limits.
- N - Matrix Spike Recovery outside control limits
- NC - Not Calculated for duplicate results less than 5 times MDC

Abbreviations:

- TPU - Total Propagated Uncertainty
- BDL - Below Detection Limit
- NR - Not Reported

Data Package ID: H31909241-1

Tritium by Liquid Scintillation

PAI 704 Rev 12

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1909241
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	Shared QC
Lab ID:	1909245-9

Sample Matrix: WATER
Prep SOP: PAI 700 Rev 15
Date Collected: 11-Sep-19
Date Prepared: 26-Sep-19
Date Analyzed: 01-Oct-19

Prep Batch: 3H190926-1
QCBatchID: 3H190926-1-2
Run ID: 3H190926-1C
Count Time: 90 minutes
Report Basis: Unfiltered

Final Aliquot: 10.0 ml
Prep Basis: Unfiltered
Moisture(%): 100.000
Result Units: pCi/l
File Name: B60_04_093001

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10028-17-8	H-3	5.92E+02 +/- 2.19E+02	3.09E+02	4E+02	NA	

Comments:

Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
- Y2 - Chemical Yield outside default limits.
- M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
- M - The requested MDC was not met.

Abbreviations:

- TPU - Total Propagated Uncertainty
- MDC - Sample specific Minimum Detectable Concentration
- BDL - Below Detection Limit
- DL - Decision Level

Data Package ID: H31909241-1

Tritium by Liquid Scintillation

PAI 704 Rev 12

Sample Duplicate Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1909241
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: Shared QC	Sample Matrix: WATER	Prep Batch: 3H190926-1	Final Aliquot: 10.0 ml
Lab ID: 1909245-9DUP	Prep SOP: PAI 700 Rev 15	QCBatchID: 3H190926-1-2	Prep Basis: Unfiltered
	Date Collected: 11-Sep-19	Run ID: 3H190926-1C	Moisture(%): 100.000
	Date Prepared: 26-Sep-19	Count Time: 90 minutes	Result Units: pCi/l
	Date Analyzed: 01-Oct-19	Report Basis: Unfiltered	File Name: B60_04_093001

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10028-17-8	H-3	5.31E+02 +/- 2.14E+02	3.09E+02	4E+02	NA	

Comments:

Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
- Y2 - Chemical Yield outside default limits.
- M - The requested MDC was not met.
- M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.
- W - DER is greater than Warning Limit of 1.42

- D - DER is greater than Control Limit of 2.13

Abbreviations:

- TPU - Total Propagated Uncertainty
- MDC - Sample specific Minimum Detectable Concentration
- BDL - Below Detection Limit
- DL - Decision Level

Data Package ID: H31909241-1

Date Printed:

Thursday, October 10, 2019

ALS -- Fort Collins

LIMS Version: 6.912

Page 1 of 1

Tritium by Liquid Scintillation

PAI 704 Rev 12

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1909241
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID:	B3RNR7
Lab ID:	1909241-1

Sample Matrix: WATER	Prep Batch: 3H190926-1	Final Aliquot: 10.0 ml
Prep SOP: PAI 700 Rev 15	QCBatchID: 3H190926-1-2	Prep Basis: Unfiltered
Date Collected: 11-Sep-19	Run ID: 3H190926-1C	Moisture(%): 100.000
Date Prepared: 26-Sep-19	Count Time: 90 minutes	Result Units: pCi/l
Date Analyzed: 01-Oct-19	Report Basis: Unfiltered	File Name: B60_04_093001

Analysis ReqCode: TRITIUM_DIST_L

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10028-17-8	H-3	2.68E+03 +/- 4.76E+02	3.09E+02	4E+02	NA	

Comments:

Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
- Y2 - Chemical Yield outside default limits.
- M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
- M - The requested MDC was not met.

Abbreviations:

- TPU - Total Propagated Uncertainty
- MDC - Sample specific Minimum Detectable Concentration
- BDL - Below Detection Limit
- DL - Decision Level

Data Package ID: H31909241-1

Prep Batch ID: 3H190926-1

Start Date: 09/26/19	End Date: 09/26/19	Concentration Method: NONE	Batch Created By: rgs
Start Time: 11:25	End Time: 11:25	Extract Method: PAI 70015	Date Created: 09/26/19
Prep Analyst: Reilly G. Stockton		Initial Volume Units: ml	Time Created: 11:25
Comments:		Final Volume Units: ml	Validated By: rgs
<div style="border: 1px solid black; height: 30px; width: 100%;"></div>			Date Validated: 09/29/19
			Time Validated: 7:26

QC Batch ID: 3H190926-1-2

Lab ID	QC Type	Field ID	Matrix	Date Collected	Initial Wt/Vol	Final Wt/Vol	Cleanup Method	Cleanup DF	Order Number
3H190926-1	MB	XXXXXX	WATER	XXXXXX	30	10	NONE	1	1909213
3H190926-1CB1	MB	XXXXXX	WATER	XXXXXX	30	10	NONE	1	1909213
3H190926-1CB2	MB	XXXXXX	WATER	XXXXXX	30	10	NONE	1	1909213
3H190926-1CB3	MB	XXXXXX	WATER	XXXXXX	30	10	NONE	1	1909213
3H190926-1	LCS	XXXXXX	WATER	XXXXXX	30	9.8361	NONE	1	1909213
1909213-3	MS	XXXXXX	WATER	XXXXXX	30	9.8361	NONE	1	1909213
1909213-3	MSD	XXXXXX	WATER	XXXXXX	30	9.8361	NONE	1	1909213
1909245-9	DUP	XXXXXX	WATER	XXXXXX	30	10	NONE	1	1909245
1909213-3	SMP	XXXXXX	WATER	XXXXXX	30	10	NONE	1	1909213
1909216-1	SMP	XXXXXX	WATER	XXXXXX	30	10	NONE	1	1909216
1909216-6	SMP	XXXXXX	WATER	XXXXXX	30	10	NONE	1	1909216
1909233-2	SMP	XXXXXX	WATER	XXXXXX	30	10	NONE	1	1909233
1909233-3	SMP	XXXXXX	WATER	XXXXXX	30	10	NONE	1	1909233
1909241-1	SMP	B3RNR7	WATER	9/11/2019	30	10	NONE	1	1909241
1909243-2	SMP	XXXXXX	WATER	XXXXXX	30	10	NONE	1	1909243
1909245-9	SMP	XXXXXX	WATER	XXXXXX	30	10	NONE	1	1909245

QC Types

CAR	Carrier reference sample	DLS	Detection Limit Standard
DUP	Laboratory Duplicate	LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicat	LODV	Limit of Detection Verification
LOQV	Limit of Quantitation Verification	MB	Method Blank
MS	Laboratory Matrix Spike	MSD	Laboratory Matrix Spike Duplicate
REP	Sample replicate	RVS	Reporting Level Verification Standar
SMP	Field Sample	SYS	Sample Yield Spike