Ft. Collins, Colorado

LIMS Version: 6.912

Tuesday, October 15, 2019

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

Re: ALS Workorder: 1909305
Project Name: AQUIFER TUBES, OCTOBER 2019
Project Number: X20-001

Dear Ms. Waters-Husted:

Six water samples were received from CH2M HILL Plateau Remediation Company, on 9/17/2019. The samples were scheduled for the following analyses:

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

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. OBrien
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.

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ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1909305
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
B3RNV9	1909305-1		WATER	16-Sep-19	10:03
B3RR61	1909305-2		WATER	12-Sep-19	10:11
B3RP84	1909305-3		WATER	16-Sep-19	11:13
B3RR19	1909305-4		WATER	12-Sep-19	8:27
B3RR26	1909305-5		WATER	12-Sep-19	8:55
B3RR30	1909305-6		WATER	12-Sep-19	8:55

ALS1909305

Oct. 15, 2019

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 20162 1909305	C.O.C. # X20-001-459 Page 1 of 1

Collector:	Mike Esparza /CHPRC	**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 10362	**Ice Chest No.:**	GWS-690
Shipped To (Lab):	ALS Environmental Ft. Collins	**Method of Shipment**	Commercial Carrier	**Bill of Lading/Air Bill No.:**	7762 5304 3430
Protocol:	SURV	**Priority:**	30 Days	**Offsite Property No.:**	11602

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

SPECIAL INSTRUCTIONS
N/A

	Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
1	B3RNV9	N	W	SEP 16 2019	1003	1x125-mL P	300.0_ANIONS_IC: COMMON	48 Hours	Cool <=6C

Relinquished By			Received By		
Print First and Last Name	*Signature*	*Date/Time*	*Print First and Last Name*	*Signature*	*Date/Time*
Mike Esparza /CHPRC		SEP 16 2019 1231	Janelle Zunker CHPRC		SEP 16 2019 1231
Janelle Zunker CHPRC		SEP 16 2019 1400	FEDEX	FEDEX	
	FEDEX		Erik Evans		8/17/19 0945

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

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

FSR ID = FSR83667

A-6004-842 (REV 3)

Rev. 0

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 1909305	C.O.C. # X20-001-003 Page 1 of 1

Collector:	Mike Esparza /CHPRC	**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 · 103/61	**Ice Chest No.:**	GWS-607
Shipped To (Lab):	ALS Environmental Ft. Collins	**Method of Shipment**	Commercial Carrier	**Bill of Lading/Air Bill No.:**	7762467575 14
Protocol:	SURV	**Priority:**	30 Days	**Offsite Property No.:**	1592

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

SPECIAL INSTRUCTIONS
N/A

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
2 B3RR61	N	W	AUG 1 2 2019	1011	5x40-mL aGs*	8260_VOA_GCMS: COMMON; 8260_VOA_GCMS: GW 01	14 Days	HCl or H2SO4 to pH <2 / Cool <=6C
2 B3RR61	N	W	AUG 1 2 2019	1011	2x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2
2 B3RR61	N	W	AUG 1 2 2019	1011	1x500-mL G/P	TC99_SEP_LSC: COMMON	6 Months	HNO3 to pH <2

JL 9-12-19
SEP 1 2 2019

Relinquished By			Received By		
Print First and Last Name	Signature	Date/Time	Print First and Last Name	Signature	Date/Time
Mike Esparza /CHPRC	Mike E	Sep AUG 1 2 2019 1200	Jeff Lucas /CHPRC	JL	SEP 1 2 2019 AUG 1 2 2019 1200
Jeff Lucas /CHPRC	JL	SEP 1 2 2019 1300	SSU-1	SSU-1	SEP 1 2 2019 1300
SSU-1	SSU-1	SEP 1 2 2019 0730	Janelle Zunker CHPRC	J Z	SEP 1 2 2019 0730
Janelle Zunker CHPRC	J Z	SEP 1 2 2019 1400	FEDEX	FEDEX	
	FEDEX		Erik Evans	Erik E	9/17/19 0945

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

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

ALS1909305
Oct. 15, 2019
Rev. 0

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 1909305	C.O.C. # X20-001-061 Page 1 of 1

Collector: Juan Aguilar /CHPRC	**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-506-63159	**Ice Chest No.:** GWS-690
Shipped To (Lab): ALS Environmental Ft. Collins	**Method of Shipment** Commercial Carrier	**Bill of Lading/Air Bill No.:** 7762 5304 3430
Protocol: SURV	**Priority:** 30 Days	**Offsite Property No.:** 11602

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

SPECIAL INSTRUCTIONS
N/A

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
3 B3RP84	N	W	9-16-19	1113	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	Date/Time	Print First and Last Name	Signature	Date/Time
Juan Aguilar /CHPRC		SEP 16 2019 1205	Troy Bacon /CHPRC	Troy L. Bacon	SEP 16 2019 1205
Troy Bacon /CHPRC	Troy L. Bacon	SEP 16 2019	FEDEX	FEDEX	
	FEDEX		Erik Evans	Erik Evans	9/17/19 0945

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

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

ALS1909305 Oct. 15, 2019 Rev. 0 5 of 98

ALS1909305

Oct. 15, 2019

CH2MHill Plateau Remediation Company	49105	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 1909305	C.O.C. # X20-001-069 Page 1 of 1

Collector:	Mike Esparza /CHPRC	**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-506 103/61	**Ice Chest No.:**	GWS-607
Shipped To (Lab):	ALS Environmental Ft. Collins	**Method of Shipment**	Commercial Carrier	**Bill of Lading/Air Bill No.:**	7762467575 4
Protocol:	SURV	**Priority:**	30 Days	**Offsite Property No.:**	11592

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

SPECIAL INSTRUCTIONS
N/A

	Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
4	B3RR19	N	W	SEP 1 2 2019 AUG 1 2 2019 9-12-19	0827	5x40-mL aGs*	8260_VOA_GCMS: COMMON	14 Days	HCl or H2SO4 to pH <2 / Cool <=6C
4	B3RR19	N	W	AUG 1 2 2019 SEP 1 2 2019 9-12-19	0827	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	Print First and Last Name	Signature	Date/Time	
Mike Esparza /CHPRC	9-12-19	SEP 1 2 2019 1200 AUG 1 2 2019	Jeff Lucas /CHPRC	1200	~~AUG 1 2 2019~~	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
Jeff Lucas /CHPRC	SEP 1 2 2019	1300	SSU-1	SSU-1 SEP 1 2 2019 9-12-19	1300	
SSU-1	SSU-1 SEP 1 6 2019	0730	Janelle Zunker CHPRC	SEP 1 6 2019	0730	
Janelle Zunker CHPRC	SEP 1 6 2019	1400	FEDEX	FEDEX		
	FEDEX		Erik Evans		9/17/19 OALLS	

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 FSR ID = FSR83693 A-6004-842 (REV 3)

Rev. 0

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 1909305	C.O.C. # X20-001-070 Page 1 of 1

Collector:	Mike Esparza /CHPRC	**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-506 103/61	**Ice Chest No.:**	BWS-607
Shipped To (Lab):	ALS Environmental Ft. Collins	**Method of Shipment**	Commercial Carrier	**Bill of Lading/Air Bill No.:**	7762467554
Protocol:	SURV	**Priority:**	30 Days	**Offsite Property No.:**	11592

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

SPECIAL INSTRUCTIONS
N/A

	Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
5	B3RR26	N	W	AUG 1 2 2019 Sep 9-12-19	0853	1x500-mL G/P	6020_METALS_ICPMS: Chromium (1)	6 Months	HNO3 to pH <2
5	B3RR26	N	W	Sep		5x40-mL aGs*	8260_VOA_GCMS: COMMON	14 Days	HCl or H2SO4 to pH <2 / Cool <=6C
6	B3RR30	~~N~~ X 9-12-19	W	AUG 1 2 2019 9-12-19	0853	1x500-mL G/P	6020_METALS_ICPMS: Chromium (1)	6 Months	HNO3 to pH <2

Sample was not filtered

Relinquished By			Received By		
Print First and Last Name	Signature	Date/Time	Print First and Last Name	Signature	Date/Time
Mike Esparza /CHPRC	Sep	AUG 1 2 2019 1200	Jeff Lucas /CHPRC	Sep	AUG 1 2 2019 1200
Jeff Lucas /CHPRC	SEP 1 2 2019 9-12-19	1300	SSU-1	SSU-1 SEP 1 2 2019 9-13-19	
SSU-1 Janelle Zunker CHPRC	SSU-1 SEP 1 2 2019 9-16-19	0730	Janelle Zunker CHPRC	SEP 1 2 2019 9-16-19	0730
Janelle Zunker CHPRC	SEP 1 2 2019 9-16-19	1400	FEDEX	FEDEX	
	FEDEX		Erik Evans		9/17/19 0945

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

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

FSR ID = FSR83694

A-6004-842 (REV 3)

ALS1909305 Oct. 15, 2019 Rev. 0

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: CHPRC Workorder No: 1909305

Project Manager: KMO Initials: EE Date: 9/17/19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
2.	Are custody seals on **shipping** containers intact?	NONE	YES	NO *
3.	Are custody seals on **sample** containers intact?	NONE	YES	NO *
4.	Is there a COC (chain-of-custody) present?		YES	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		YES	NO *
6.	Are short-hold samples present?		YES	NO
7.	Are all samples within holding times for the requested analyses?		YES	NO *
8.	Were all sample containers received intact? (not broken or leaking)		YES	NO *
9.	Is there sufficient sample for the requested analyses?		YES	NO *
10.	Are all samples in the proper containers for the requested analyses?		YES	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	YES	NO *
12.	Are all aqueous non-preserved samples pH 4-9?	N/A	YES	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	YES	NO
14.	Were the samples shipped on ice?		YES	NO
15.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 #3 #4	RAD ONLY	YES	NO

Cooler #:	1	2							
Temperature (°C):	3.8	1.2							
No. of custody seals on cooler:	2	2							
DOT Survey/ Acceptance Information — External µR/hr reading:	14	13							
Background µR/hr reading:	13								

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: EE

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: 9/17/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

1909305

ORIGIN ID:PSCA (509) 531-0450
TROY BACON
CH2M
6267 LATAH ST.
RICHLAND, WA 99352
UNITED STATES US

SHIP DATE: 16SEP19
ACTWGT: 49.00 LB
CAD: 107066051/INET4160

BILL THIRD PARTY

TO JULIE ELLINGSON
ALS GLOBAL-FORT COLLINS
225 COMMERCE DR
FORT COLLINS CO 80524
(970) 490-1511
INV:
PO:
REF: PTR#11592
DEPT:

14-2

3.8°C

567J1/9D04/05A2

FedEx Express

J1829190624/01uv

TUE - 17 SEP 10:30A
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80524
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TRK# 0201 7762 4675 7514

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1909305

ORIGIN ID:PSCA (509) 531-0450
TROY BACON
CH2M
6267 LATAH ST.
RICHLAND, WA 99352
UNITED STATES US

SHIP DATE: 16SEP19
ACTWGT: 20.00 LB
CAD: 107066051/INET4160

BILL THIRD PARTY

TO JULIE ELLINGSON
ALS GLOBAL-FORT COLLINS
225 COMMERCE DR
FORT COLLINS CO 80524
(970) 490-1511
INV:
PO:
REF: PTR#11602
DEPT:

13-2

1.2°C

567J1/9D04/05A2

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J1929190824/01/01

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TRK# 0201 7762 5304 3430

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GC/MS Volatiles

Case Narrative

CH2M HILL Plateau Remediation Company

AQUIFER TUBES, OCTOBER 2019 – X20-001

Work Order Number: 1909305

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. 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.

   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

Mindy Norton
Organics Primary Data Reviewer

10/9/19
Date

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: 1909305
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: *VL1909305-1*

GC/MS Volatiles

Method SW8260_25C

Method Blank

Lab Name: ALS -- Fort Collins
Work Order Number: 1909305
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

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: *VL1909305-1*

GC/MS Volatiles

Method SW8260_25C

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1909305
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: B3RR61
Lab ID: 1909305-2

Analysis ReqCode: 8260_VOA_GCM

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: D73382

Analyst: Cory C. Lewis
Sample Aliquot: 10 ml
Final Volume: 10 ml
Result Units: UG/L
Clean DF: 1

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	1.4		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: *VL1909305-1*

GC/MS Volatiles

Method SW8260_25C

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1909305
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: B3RR61
Lab ID: 1909305-2

Analysis ReqCode: **8260_VOA_GCM**

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: VL190918-4-2
Run ID: VL190918-4A
Cleanup: NONE
Basis: As Received
File Name: D73382

Analyst: Cory C. Lewis
Sample Aliquot: 1 ml
Final Volume: 1 ml
Result Units: UG/L
Clean DF: 1

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL

Surrogate Recovery

CASNO	Surrogate Analyte	Result	Flag	Spike Amount	Percent Recovery	Control Limits
460-00-4	4-BROMOFLUOROBENZENE	25.6		25	102	85 - 115
1868-53-7	DIBROMOFLUOROMETHANE	25.2		25	101	84 - 118
2037-26-5	TOLUENE-D8	25.3		25	101	85 - 115

Data Package ID: *VL1909305-1*

GC/MS Volatiles

Method SW8260_25C

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1909305
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: B3RR19
Lab ID: 1909305-4

Analysis ReqCode: 8260_VOA_GCM

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: VL190918-4-2
Run ID: VL190918-4A
Cleanup: NONE
Basis: As Received
File Name: D73383

Analyst: Cory C. Lewis
Sample Aliquot: 10 ml
Final Volume: 10 ml
Result Units: UG/L
Clean DF: 1

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: *VL1909305-1*

GC/MS Volatiles

Method SW8260_25C

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1909305
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: B3RR19
Lab ID: 1909305-4

Analysis ReqCode: **8260_VOA_GCM**

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: VL190918-4-2
Run ID: VL190918-4A
Cleanup: NONE
Basis: As Received
File Name: D73383

Analyst: Cory C. Lewis
Sample Aliquot: 1 ml
Final Volume: 1 ml
Result Units: UG/L
Clean DF: 1

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL

Surrogate Recovery

CASNO	Surrogate Analyte	Result	Flag	Spike Amount	Percent Recovery	Control Limits
460-00-4	4-BROMOFLUOROBENZENE	25.2		25	101	85 - 115
1868-53-7	DIBROMOFLUOROMETHANE	25.1		25	101	84 - 118
2037-26-5	TOLUENE-D8	25.1		25	100	85 - 115

Data Package ID: *VL1909305-1*

GC/MS Volatiles

Method SW8260_25C

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1909305
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: B3RR26
Lab ID: 1909305-5

Analysis ReqCode: 8260_VOA_GCM

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: VL190918-4-2
Run ID: VL190918-4A
Cleanup: NONE
Basis: As Received
File Name: D73384

Analyst: Cory C. Lewis
Sample Aliquot: 10 ml
Final Volume: 10 ml
Result Units: UG/L
Clean DF: 1

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: *VL1909305-1*

GC/MS Volatiles

Method SW8260_25C

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1909305
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: B3RR26
Lab ID: 1909305-5

Analysis ReqCode: **8260_VOA_GCM**

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: VL190918-4-2
Run ID: VL190918-4A
Cleanup: NONE
Basis: As Received
File Name: D73384

Analyst: Cory C. Lewis
Sample Aliquot: 1 ml
Final Volume: 1 ml
Result Units: UG/L
Clean DF: 1

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL

Surrogate Recovery

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

Data Package ID: *VL1909305-1*

GC/MS Volatiles

Method SW8260_25C

Laboratory Control Sample and Laboratory Control Sample Duplicate

Lab Name: ALS -- Fort Collins
Work Order Number: 1909305
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: *VL1909305-1*

GC/MS Volatiles

Method SW8260_25C

Laboratory Control Sample and Laboratory Control Sample Duplicate

Lab Name: ALS -- Fort Collins
Work Order Number: 1909305
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
QCBatchID: 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: *VL1909305-1*

GC/MS Volatiles

Method SW8260_25C

Laboratory Control Sample and Laboratory Control Sample Duplicate

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1909305
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: *VL1909305-1*

GC/MS Volatiles

Method SW8260_25C

Matrix Spike And Matrix Spike Duplicate

Lab Name: ALS -- Fort Collins
Work Order Number: 1909305
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: SHARED QC
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: *VL1909305-1*

GC/MS Volatiles

Method SW8260_25C

Matrix Spike And Matrix Spike Duplicate

Lab Name: ALS -- Fort Collins
Work Order Number: 1909305
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: SHARED QC
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: *VL1909305-1*

GC/MS Volatiles

Method SW8260_25C
Matrix Spike And Matrix Spike Duplicate

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1909305
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: *VL1909305-1*

Prep Batch ID: VL190918-4

Start Date: 09/18/19
Start Time: 9:48
Prep Analyst: Cory C. Lewis

End Date: 09/18/19
End Time: 19:32

Concentration Method: NONE
Extract Method: SW5030C
Initial Volume Units: ml
Final Volume Units: ml

Batch Created By: CCL
Date Created: 09/18/19
Time Created: 11:31
Validated By: CCL
Date Validated: 09/19/19
Time Validated: 8:17

Comments:

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	XXXXXX	WATER	XXXXXX	10	10	NONE	1	1909241
1909241-1	MSD	XXXXXX	WATER	XXXXXX	10	10	NONE	1	1909241
1909241-1	SMP	XXXXXX	WATER	XXXXXX	10	10	NONE	1	1909241
1909241-15	SMP	XXXXXX	WATER	XXXXXX	10	10	NONE	1	1909241
1909241-2	SMP	XXXXXX	WATER	XXXXXX	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	B3RR61	WATER	9/12/2019	10	10	NONE	1	1909305
1909305-4	SMP	B3RR19	WATER	9/12/2019	10	10	NONE	1	1909305
1909305-5	SMP	B3RR26	WATER	9/12/2019	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
Start Time: 9:48
Prep Analyst: Cory C. Lewis

End Date: 09/18/19
End Time: 19:32

Concentration Method: NONE
Extract Method: SW5030C
Initial Volume Units: ml
Final Volume Units: ml

Batch Created By: CCL
Date Created: 09/18/19
Time Created: 11:31
Validated By: CCL
Date Validated: 09/19/19
Time Validated: 8:17

Comments:

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	XXXXXX	WATER	XXXXXX	10	10	NONE	1	1909241
1909305-2	SMP	B3RR61	WATER	9/12/2019	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: 1909305

1. The sample was prepared for analysis based on Environmental Monitoring Systems Laboratory (EMSL) Rev 2.1 procedures.

2. The sample was analyzed following EMSL procedures for the current revisions of the following SOPs and methods:

Analyte	Method	SOP #
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 sample was 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 sample 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. Nitrite as N, was 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 1908661-1 was designated as the quality control sample for this analysis. Results for the shared quality control samples from the batch 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 (MS) was prepared and analyzed with this batch. All guidance criteria for precision and accuracy were met.
- Matrix spike recoveries could not be evaluated for the following analyte:

Analyte	Sample ID
Chloride	1908661-1MS

The chloride concentration in the native sample was above the analytical range; therefore accurate quantitation of the MS recovery was not possible. The LCS, ICV, and CCV results indicate the procedure was in control for chloride.

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 — 10/9/19
Melinda Greubel — Date
Inorganics Primary Data Reviewer

10/15/19
Inorganics Final Data Reviewer — 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 <=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: 1909305
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: B3RNV9
Lab ID: 1909305-1

Sample Matrix: WATER
% Moisture: N/A
Date Collected: 16-Sep-19
Date Extracted: 17-Sep-19
Date Analyzed: 18-Sep-19
Prep Method: NONE

Prep Batch: IC190917-2
QCBatchID: IC190917-2-1
Run ID: IC190917-1a3
Cleanup: NONE
Basis: As Received
File Name: 190917IC3LIMS

Analyst: Keli J. Smith
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: 02:07	1	0.13		0.1	0.03
16887-00-6	CHLORIDE AnalysisTime: 02:07	1	19		0.2	0.06
14797-65-0	NITRITE AS N AnalysisTime: 02:07	1	0.055	BC	0.1	0.03
14797-55-8	NITRATE AS N AnalysisTime: 02:07	1	15		0.2	0.06
14808-79-8	SULFATE AnalysisTime: 02:07	1	41		1	0.3

Data Package ID: *IC1909305-1*

Ion Chromatography

Method EPA300.0 Revision 2.1

Method Blank

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1909305
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Lab ID: IC190917-2MB

Sample Matrix: WATER
% Moisture: N/A
Date Collected: N/A
Date Extracted: 17-Sep-19
Date Analyzed: 17-Sep-19

Prep Batch: IC190917-2
QCBatchID: IC190917-2-1
Run ID: IC190917-1a3
Cleanup: NONE
Basis: N/A
File Name: 190917IC3LIMS

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	0.06	U	0.2	0.06
14797-65-0	NITRITE AS N	1	0.066	B	0.1	0.03
14797-55-8	NITRATE AS N	1	0.06	U	0.2	0.06
14808-79-8	SULFATE	1	0.3	U	1	0.3

Data Package ID: *IC1909305-1*

Ion Chromatography

Method EPA300.0 Revision 2.1

Laboratory Control Sample and Laboratory Control Sample Duplicate

Lab Name: ALS -- Fort Collins
Work Order Number: 1909305
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Lab ID: IC190917-2LCS

Sample Matrix: WATER
% Moisture: N/A
Date Collected: N/A
Date Extracted: 09/17/2019
Date Analyzed: 09/17/2019
Prep Method: NONE

Prep Batch: IC190917-2
QCBatchID: IC190917-2-1
Run ID: IC190917-1a3
Cleanup: NONE
Basis: N/A
File Name: 190917IC3LIMS

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	5.16	0.1		103	90 - 110%
16887-00-6	CHLORIDE	10	10.3	0.2		103	90 - 110%
14797-65-0	NITRITE AS N	5	5.17	0.1		103	90 - 110%
14797-55-8	NITRATE AS N	10	10.2	0.2		102	90 - 110%
14808-79-8	SULFATE	50	51.2	1		102	90 - 110%

Lab ID: IC190917-2LCSD

Sample Matrix: WATER
% Moisture: N/A
Date Collected: N/A
Date Extracted: 09/17/2019
Date Analyzed: 09/17/2019
Prep Method: NONE

Prep Batch: IC190917-2
QCBatchID: IC190917-2-1
Run ID: IC190917-1a3
Cleanup: NONE
Basis: N/A
File Name: 190917IC3LIMS

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	5.17	0.1		103	15	0
16887-00-6	CHLORIDE	10	10.3	0.2		103	15	0
14797-65-0	NITRITE AS N	5	5.17	0.1		103	15	0
14797-55-8	NITRATE AS N	10	10.2	0.2		102	15	0
14808-79-8	SULFATE	50	51.8	1		104	15	1

Data Package ID: *IC1909305-1*

Ion Chromatography

Method EPA300.0 Revision 2.1

Matrix Spike

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1909305
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: SHARED QC
LabID: 1908661-1MS

Sample Matrix: WATER
% Moisture: N/A
Date Collected: 23-Aug-19
Date Extracted: 17-Sep-19
Date Analyzed: 18-Sep-19

Prep Batch: IC190917-2
QCBatchID: IC190917-2-1
Run ID: IC190917-1a3
Cleanup: NONE
Basis: As Received

Sample Aliquot: 5 ml
Final Volume: 5 ml
Result Units: MG/L
File Name: 190917IC3LIMS

CASNO	Target Analyte	Sample Result	Samp Qual	MS Result	MS Qual	Reporting Limit	Spike Added	MS % Rec.	Control Limits
16984-48-8	FLUORIDE	0.4		2.47		0.1	2	103	85 - 115%
14797-65-0	NITRITE AS N	56	B	2260		100	2000	110	85 - 115%
14797-55-8	NITRATE AS N	17000		21900		200	5000	104	85 - 115%
14808-79-8	SULFATE	16		35.2		1	20	95	85 - 115%

Data Package ID: *IC1909305-1*

Prep Batch ID: IC190917-2

Start Date: 09/17/19
Start Time: 8:00
Prep Analyst: Lainey M. Lloyd

End Date: 09/17/19
End Time: 17:00

Concentration Method: NONE
Extract Method: NONE
Initial Volume Units: ml
Final Volume Units: ml

Batch Created By: lml
Date Created: 09/17/19
Time Created: 13:26
Validated By: kjs
Date Validated: 09/20/19
Time Validated: 12:21

Comments:

QC Batch ID: IC190917-2-1

Lab ID	QC Type	Field ID	Matrix	Date Collected	Initial Wt/Vol	Final Wt/Vol	Cleanup Method	Cleanup DF	Order Number
IC190917-2	MB	XXXXXX	WATER	XXXXXX	5	5	NONE	1	1908661
IC190917-2	LCS	XXXXXX	WATER	XXXXXX	5	5	NONE	1	1908661
IC190917-2	LCSD	XXXXXX	WATER	XXXXXX	5	5	NONE	1	1908661
1908661-1	MS	XXXXXX	WATER	XXXXXX	5	5	NONE	1	1908661
1908661-1	SMP	XXXXXX	WATER	XXXXXX	5	5	NONE	1	1908661
1908661-3	SMP	XXXXXX	WATER	XXXXXX	5	5	NONE	1	1908661
1908661-5	SMP	XXXXXX	WATER	XXXXXX	5	5	NONE	1	1908661
1908731-1	SMP	XXXXXX	WATER	XXXXXX	5	5	NONE	1	1908731
1908731-3	SMP	XXXXXX	WATER	XXXXXX	5	5	NONE	1	1908731
1908731-4	SMP	XXXXXX	WATER	XXXXXX	5	5	NONE	1	1908731
1909304-1	SMP	XXXXXX	WATER	XXXXXX	5	5	NONE	1	1909304
1909304-2	SMP	XXXXXX	WATER	XXXXXX	5	5	NONE	1	1909304
1909305-1	SMP	B3RNV9	WATER	9/16/2019	5	5	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	

Metals

Case Narrative

CH2M HILL Plateau Remediation Company

AQUIFER TUBES, OCTOBER 2019 -- X20-001

Work Order Number: 1909305

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

   For analysis by 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.

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 analyte. Sample results have been compared to the blank results and are flagged as appropriate.
   - All laboratory control sample criteria were met.
   - All initial and continuing calibration blanks were below the reporting limit for the requested analyte.
   - All initial and continuing calibration verifications were within the acceptance criteria for the requested analyte.

- The interference check samples associated with Method 6020B were analyzed.

6. Matrix specific quality control procedures.

   Sample 1909172-2 was designated as the quality control sample for this 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 this batch. All acceptance criteria for accuracy and precision were met.
   - A serial dilution was analyzed with this ICP batch. All acceptance criteria were met with.

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 — 10/9/19
Megan Johnstone — Date
Inorganics Primary Data Reviewer

10/15/19
Inorganics Final Data Reviewer — 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 <=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 CHROMIUM

Method SW6020B

Sample Results

Lab Name: **ALS -- Fort Collins**
Client Name: CH2M HILL Plateau Remediation Company
Client Project ID: AQUIFER TUBES, OCTOBER 2019 X20-001
Work Order Number: 1909305 **Final Volume:** 50 ml
Reporting Basis: As Received **Matrix:** WATER
Analyst: Nicole C. Chirban **Result Units:** UG/L

Client Sample ID	Lab ID	Date Collected	Date Prepared	Date Analyzed	Percent Moisture	Dilution Factor	Result	RptLimit/ LOQ/LOD	MDL/DL	Flag	Sample Aliquot
B3RR26	1909305-5	9/12/2019	9/28/2019	10/09/2019	N/A	10	1.8	10	0.46	B	50 ml
B3RR30	1909305-6	9/12/2019	9/28/2019	10/09/2019	N/A	10	1.8	10	0.46	B	50 ml

Comments:

1. ND or U = Not Detected at or above the client requested detection limit.

Data Package ID: *IM1909305-1*

ICPMS Metals

Method SW6020B

Method Blank

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1909305
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Lab ID: IP190928-4MB

Sample Matrix: WATER
% Moisture: N/A
Date Collected: N/A
Date Extracted: 28-Sep-19
Date Analyzed: 09-Oct-19

Prep Batch: IP190928-4
QCBatchID: IP190928-4-5
Run ID: IM191009-10A3
Cleanup: NONE
Basis: N/A
File Name: 040SMPL_

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
7440-47-3	CHROMIUM	10	0.46	U	10	0.46

Data Package ID: *IM1909305-1*

ICPMS Metals

Method SW6020B

Laboratory Control Sample

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1909305
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Lab ID: IM190928-4LCS

Sample Matrix: WATER
% Moisture: N/A
Date Collected: N/A
Date Extracted: 09/28/2019
Date Analyzed: 10/09/2019
Prep Method: SW3005A

Prep Batch: IP190928-4
QCBatchID: IP190928-4-5
Run ID: IM191009-10A3
Cleanup: NONE
Basis: N/A
File Name: 041SMPL_

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
7440-47-3	CHROMIUM	500	496	10		99	80 - 120%

Data Package ID: *IM1909305-1*

ICPMS Metals

Method SW6020B

Matrix Spike And Matrix Spike Duplicate

Lab Name: ALS -- Fort Collins
Work Order Number: 1909305
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: SHARED QC
LabID: 1909172-2MS

Sample Matrix: WATER
% Moisture: N/A
Date Collected: 09-Sep-19
Date Extracted: 28-Sep-19
Date Analyzed: 09-Oct-19
Prep Method: SW3005 Rev A

Prep Batch: IP190928-4
QCBatchID: IP190928-4-5
Run ID: IM191009-10A3
Cleanup: NONE
Basis: As Received

Sample Aliquot: 50 ml
Final Volume: 50 ml
Result Units: UG/L
File Name: 044SMPL_

CASNO	Target Analyte	Sample Result	Samp Qual	MS Result	MS Qual	Reporting Limit	Spike Added	MS % Rec.	Control Limits
7440-47-3	CHROMIUM	3.2	B	489		10	500	97	75 - 125%

Field ID: SHARED QC
LabID: 1909172-2MSD

Sample Matrix: WATER
% Moisture: N/A
Date Collected: 09-Sep-19
Date Extracted: 28-Sep-19
Date Analyzed: 09-Oct-19
Prep Method: SW3005 Rev A

Prep Batch: IP190928-4
QCBatchID: IP190928-4-5
Run ID: IM191009-10A3
Cleanup: NONE
Basis: As Received

Sample Aliquot: 50 ml
Final Volume: 50 ml
Result Units: UG/L
File Name: 045SMPL_

CASNO	Target Analyte	MSD Result	MSD Qual	Spike Added	MSD % Rec.	Reporting Limit	RPD Limit	RPD
7440-47-3	CHROMIUM	491		500	98	10	20	1

Data Package ID: *IM1909305-1*

Prep Batch ID: IP190928-4

Start Date: 09/28/19
Start Time: 10:37
Prep Analyst: Jill M. Latelle

End Date: 09/28/19
End Time: 18:00

Concentration Method: NONE
Extract Method: SW3005A
Initial Volume Units: ml
Final Volume Units: ml

Batch Created By: jml
Date Created: 09/28/19
Time Created: 10:37
Validated By: jml
Date Validated: 09/28/19
Time Validated: 11:22

Comments:

QC Batch ID: IP190928-4-5

Lab ID	QC Type	Field ID	Matrix	Date Collected	Initial Wt/Vol	Final Wt/Vol	Cleanup Method	Cleanup DF	Order Number
IP190928-4	MB	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909172
IM190928-4	LCS	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909172
1909172-2	MS	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909172
1909172-2	MSD	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909172
1909172-2	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909172
1909305-5	SMP	B3RR26	WATER	9/12/2019	50	50	NONE	1	1909305
1909305-6	SMP	B3RR30	WATER	9/12/2019	50	50	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	

Strontium-90

Case Narrative

CH2M HILL Plateau Remediation Company

AQUIFER TUBES, OCTOBER 2019 – X20-001

Work Order Number: 1909305

1. The samples were prepared according to the current revision of SOP 707.

2. The samples were analyzed for the presence of ^{90}Sr according to the current revision of SOP 724. The analyses were completed on 10/13/2019.

3. Total radio-strontium is reported as ^{90}Sr. 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:

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

   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 — 10/14/19

Pik Yee Yuen
Radiochemistry Primary Data Reviewer

Date

10/15/19

Radiochemistry Final Data Reviewer

Date

Strontium-90 by GFPC

PAI 724 Rev 13

Method Blank Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1909305
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: *SR1909305-1*

Strontium-90 by GFPC

PAI 724 Rev 13

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins
Work Order Number: 1909305
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Lab ID: SR191008-2LCS

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	1.26E+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: *SR1909305-1*

Strontium-90 by GFPC

PAI 724 Rev 13

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins
Work Order Number: 1909305
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: *SR1909305-1*

Strontium-90 by GFPC

PAI 724 Rev 13

Duplicate Sample Results (DER)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1909305
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: *SR1909305-1*

Strontium-90 by GFPC

PAI 724 Rev 13

Duplicate Sample Results (RPD)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1909305
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: *SR1909305-1*

Strontium-90 by GFPC

PAI 724 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1909305
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: B3RR61
Lab ID: 1909305-2

Analysis ReqCode: **SRISO_SEP_PR**

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
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

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10098-97-2	Sr-90	4.07E-02 +/- 2.67E-01	6.15E-01	1E+00	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
STRONTIUM	1.200E+03	1.09E+03	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.

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: *SR1909305-1*

Strontium-90 by GFPC

PAI 724 Rev 13

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1909305
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: B3RP84
Lab ID: 1909305-3

Analysis ReqCode: SRISO_SEP_PR

Sample Matrix: WATER
Prep SOP: PAI 707 Rev 15
Date Collected: 16-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

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10098-97-2	Sr-90	1.09E-02 +/- 2.48E-01	5.77E-01	1E+00	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
STRONTIUM	1.140E+03	1.01E+03	ug	88.5	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.

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: *SR1909305-1*

Strontium-90 by GFPC

PAI 724 Rev 13

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1909305
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: B3RR19
Lab ID: 1909305-4

Analysis ReqCode: SRISO_SEP_PR

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
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

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10098-97-2	Sr-90	-1.14E-02 +/- 2.41E-01	5.63E-01	1E+00	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
STRONTIUM	1.090E+03	9.95E+02	ug	91.7	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: *SR1909305-1*

Prep Batch ID: SR191008-2

Start Date: 10/08/19
Start Time: 12:58
Prep Analyst: Jirushaya Hantula

End Date: 10/08/19
End Time: 12:58

Concentration Method: NONE
Extract Method: PAI 70715
Initial Volume Units: ml
Final Volume Units: ml

Batch Created By: jxh
Date Created: 10/08/19
Time Created: 13:00
Validated By: jxh
Date Validated: 10/11/19
Time Validated: 12:54

Comments:

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	XXXXXX	WATER	XXXXXX	1000	994.01	NONE	1	1909241
1909241-14	SMP	XXXXXX	WATER	XXXXXX	1000	994.01	NONE	1	1909241
1909241-15	SMP	XXXXXX	WATER	XXXXXX	1000	994.01	NONE	1	1909241
1909241-2	SMP	XXXXXX	WATER	XXXXXX	1000	994.01	NONE	1	1909241
1909241-3	SMP	XXXXXX	WATER	XXXXXX	1000	994.01	NONE	1	1909241
1909241-5	SMP	XXXXXX	WATER	XXXXXX	1000	994.01	NONE	1	1909241
1909241-8	SMP	XXXXXX	WATER	XXXXXX	1000	994.01	NONE	1	1909241
1909305-2	SMP	B3RR61	WATER	9/12/2019	1000	994.01	NONE	1	1909305
1909305-3	SMP	B3RP84	WATER	9/16/2019	1000	994.01	NONE	1	1909305
1909305-4	SMP	B3RR19	WATER	9/12/2019	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: 1909305

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 ^{99}Tc 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:

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

   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 — 10/14/19

Pik Yee Yuen
Radiochemistry Primary Data Reviewer

Date

10/15/19

Radiochemistry Final Data Reviewer

Date

Technetium-99 by Liquid Scintillation

PAI 704_Tc99 Rev 12

Method Blank Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1909305
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Lab ID: TC191002-2MB

Sample Matrix: WATER
Prep SOP: PAI 755 Rev 12
Date Collected: 02-Oct-19
Date Prepared: 02-Oct-19
Date Analyzed: 08-Oct-19

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

Final Aliquot: 250 ml
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	-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.

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: *TC1909305-1*

Technetium-99 by Liquid Scintillation

PAI 704_Tc99 Rev 12

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins
Work Order Number: 1909305
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Lab ID: TC191002-2LCS

Sample Matrix: WATER
Prep SOP: PAI 755 Rev 12
Date Collected: 02-Oct-19
Date Prepared: 02-Oct-19
Date Analyzed: 08-Oct-19

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

Final Aliquot: 250 ml
Result Units: pCi/l
File Name: Z20191007_1030

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: *TC1909305-1*

Technetium-99 by Liquid Scintillation

PAI 704_Tc99 Rev 12

Duplicate Sample Results (DER)

Lab Name: ALS -- Fort Collins
Work Order Number: 1909305
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				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: *TC1909305-1*

Technetium-99 by Liquid Scintillation

PAI 704_Tc99 Rev 12

Duplicate Sample Results (RPD)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1909305
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: *TC1909305-1*

Technetium-99 by Liquid Scintillation

PAI 704_Tc99 Rev 12

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1909305
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 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	2.85E+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: *TC1909305-1*

Technetium-99 by Liquid Scintillation

PAI 704_Tc99 Rev 12

Sample Duplicate Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1909305
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: *TC1909305-1*

Date Printed: Monday, October 14, 2019

ALS -- Fort Collins

LIMS Version: 6.912

Technetium-99 by Liquid Scintillation

PAI 704_Tc99 Rev 12

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1909305
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: AQUIFER TUBES, OCTOBER 2019 X20-001

Field ID: B3RR61
Lab ID: 1909305-2

Analysis ReqCode: TC99_SEP_LSC

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

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14133-76-7	Tc-99	7.56E+00 +/- 4.18E+00	5.73E+00	2E+01	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Tc-99m	3.540E+04	3.34E+04	Pci	94.3	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: *TC1909305-1*

Prep Batch ID: TC191002-2

Start Date: 10/02/19
Start Time: 10:07
Prep Analyst: John C. Petrovic

End Date: 10/02/19
End Time: 10:07

Concentration Method: NONE
Extract Method: PAI 75512
Initial Volume Units: ml
Final Volume Units: ml

Batch Created By: jcp
Date Created: 10/02/19
Time Created: 10:08
Validated By: jcp
Date Validated: 10/03/19
Time Validated: 10:02

Comments:

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	XXXXXX	WATER	XXXXXX	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	B3RR61	WATER	9/12/2019	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.

CWS 8/12/09

$Tc99^m$ 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 Tc99m 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.

CWS 8/12/09

CWS 8/12/09

Attach vendor la

CardinalHealth
CARDINAL HEALTH 414, LLC
DENVER
10400 48TH AVE,STE B
DENVER CO 80238
303.373.0579

Rx# 817907
Date Ordered : 02Oct2019
Date/Time Prepared : 03Oct2019 00:58 MT
ALS LABORATORY GROUP
225 COMMERCE DR
FORT COLLINS CO 60524-2762
1 0430 Fort Collins

Safetrac™ CH102984

Patient : SOURCE, Tc99m
Product : Tc-99m Sodium Pertechnetate Unit Dose mCi (HC)
Disp Amt : 0.55 mCi
Calibration: 03Oct2019 08:00 MT
Patient ID :
Ordered Amount : 0.50 mCi
Volume : 10.00 mL
Conc : 0.06 mCi/mL
CAUTION RADIOACTIVE MATERIALS
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 Cristal Sheuffer DATE 8/12/09

DEPARTMENT MANAGER [signature] 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.

CWS 8/12/09

CWS 8/12/09

CWS 8/12/09

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

CWS 8/12/09

CWS 8/12/09

TECHNICIAN/ANALYST Crystal Shewfelt DATE 8/12/09

DEPARTMENT MANAGER [signature] DATE 8/12/09

378635 FORM 302r6.doc (4/22/04)