



Wednesday, October 09, 2019

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

Re: ALS Workorder: 1909213
Project Name: SURV, September 2019
Project Number: S19-009

Dear Ms. Waters-Husted:

Five water samples were received from CH2M HILL Plateau Remediation Company, on 9/12/2019. The samples were scheduled for the following analyses:

- Inorganics
- Metals
- Tritium

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

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

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

Sincerely,

ALS Environmental
Katie M. 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.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1909213

Client Name: CH2M HILL Plateau Remediation Company

Client Project Name: SURV, September 2019

Client Project Number: S19-009

Client PO Number: BOA 54854

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
B3R860	1909213-1		WATER	10-Sep-19	9:40
B3R856	1909213-2		WATER	10-Sep-19	9:40
B3R8J2	1909213-3		WATER	10-Sep-19	8:21
B3R8J6	1909213-4		WATER	10-Sep-19	8:21
B3R7D7	1909213-5		WATER	11-Sep-19	9:36

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		C.O.C.# S19-009-269
Collector: Roger Friesz Jr. CHPRC		Telephone No.: 509-376-4650		Page 1 of 1
SAF No.: S19-009	Contact/Requester: Karen Waters-Husted	Purchase Order/Charge Code: 300071		
Project Title: SURV, September 2019	Sampling Origin: Hanford Site	Ice Chest No.: GWS-707		
Shipped To (Lab): ALS Environmental Ft. Collins	Logbook No.: HNF-N-506-105-37	Bill of Lading/Air Bill No.: 776216603740		
Protocol: CERCLA	Method of Shipment: Commercial Carrier	Offsite Property No.: 11582		
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. B3R7D7	Filter * N	Date 9-11-19	Time 0930	No/Type Container 1x125-mL P
Sample Analysis		Sample Analysis		Preservative Cool <=6C
300.0 ANIONS_IC: COMMON;		300.0 ANIONS_IC: GW 02		Holding Time 48 Hours

Relinquished By		Received By		Matrix *	
Print First and Last Name	Signature	Print First and Last Name	Signature	S = Soil	DS = Drum Solids
Roger Friesz Jr. CHPRC Janelle Zunker CHPRC		Janelle Zunker CHPRC FEDEX		SE = Sediment <td>DL = Drum Liquids </td>	DL = Drum Liquids
FEDEX	FEDEX	Kelli Jean Smith	FEDEX	SO = Solid <td>T = Tissue </td>	T = Tissue
				SL = Sludge <td>WI = Wipe </td>	WI = Wipe
				W = Water <td>L = Liquid </td>	L = Liquid
				O = Oil <td>V = Vegetation </td>	V = Vegetation
				A = Air <td>X = Other </td>	X = Other

FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process):	Disposed By:	Date/Time:
Printed On 7/20/2019			

1909213

UNITED STATES
TRACY BACON
CH2M
6267 LATAH ST.
RICHLAND WA 99352
UNITED STATES US

SHIP DATE: 11SEP19
ACTWGT: 15.00 LB
CAD: 1070668051/MNET4160
BILL THIRD PARTY

(509) 531-0450

TO JULIE ELLINGSON
ALS GLOBAL-FORT COLLINS
225 COMMERCE DR

14-2

FORT COLLINS CO 80524
(970) 490-1511
REF: PTH#1582
PO. DEPT:

1.6

567J19D04.05A2



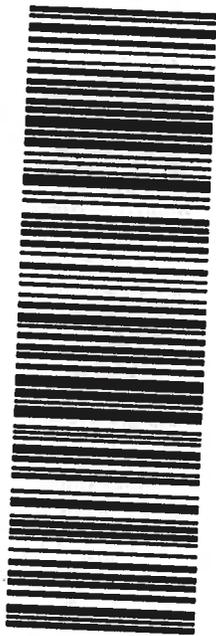
TRK# 7762 1670 5639
0201

THU - 12 SEP 10:30A

PRIORITY OVERNIGHT

XH FTCA

DSR 80524
CO-US DEN



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1209213

1909213

ORIGIN ID: PSCA (309) 531-0450
TROY BACON
CH2M
6287 LATAH ST.
RICHLAND, WA 99352
UNITED STATES US

SHIP DATE: 11SEP19
ACT WGT: 82.00 LB
CAD: 107066057/NET4160
BILL THIRD PARTY

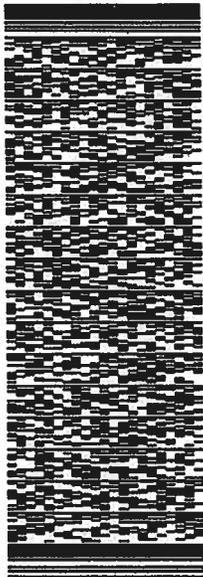
TO JULIE ELLINGSON
ALS GLOBAL-FORT COLLINS
225 COMMERCE DR

13-2

FORT COLLINS CO 80524
(970) 490-1511
REF: PTR#11570
P.O. DEPT.

1-2

567 J16D0405A2

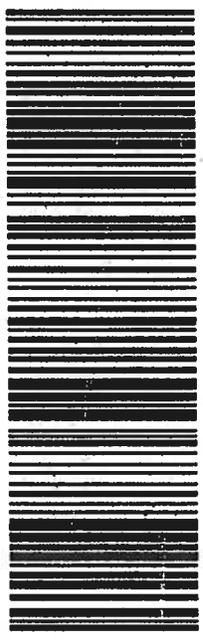


TRK# 7762 1005 8223
0201

THU - 12 SEP 10:30A
PRIORITY OVERNIGHT
DSR

XHFTCA

80524
DEN
CO-US



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1909213



Inorganics

Case Narrative

CH2M HILL Plateau Remediation Company

SURV, September 2019 -- S19-009

Work Order Number: 1909213

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:

<u>Analyte</u>	<u>Method</u>	<u>SOP #</u>
Bromide	300.0 Revision 2.1	1113
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
Orthophosphate as P	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. Orthophosphate as P 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 1909215-2 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.

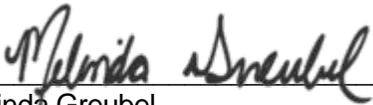
A matrix spike (MS) was prepared and analyzed with this batch. All guidance criteria for precision and accuracy were met with the following exception:

<u>Analyte</u>	<u>Sample ID</u>
Orthophosphate as P	1909215-2MS

The native sample result is flagged for orthophosphate as P. The laboratory control sample indicates that the procedure was in control.

7. It is a standard practice that samples for CHPRC on the ion chromatograph are analyzed at a dilution. The 2X factor can be considered an artifact of the prep and does not indicate a secondary dilution and is therefore not flagged as a dilution.
8. Manual integrations are performed when needed to provide consistent and defensible data following the guidelines in the current revision of SOP 939.

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



 Melinda Greubel
 Inorganics Primary Data Reviewer

10/8/19

 Date



 Kath M. O.
 Inorganics Final Data Reviewer

10/9/19

 Date



Inorganic Data Reporting Qualifiers

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

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

Ion Chromatography

Method EPA300.0 Revision 2.1

Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1909213

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: SURV, September 2019 S19-009

Field ID: B3R7D7

Lab ID: 1909213-5

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 11-Sep-19

Date Extracted: 12-Sep-19

Date Analyzed: 12-Sep-19

Prep Method: NONE

Prep Batch: IC190912-1

QCBatchID: IC190912-1-1

Run ID: IC190912-1A3

Cleanup: NONE

Basis: As Received

File Name: 190912IC3LIMS

Analyst: Lainey M. Lloyd

Sample Aliquot: 5 ml

Final Volume: 5 ml

Result Units: MG/L

Clean DF: 1

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
16984-48-8	FLUORIDE AnalysisTime: 13:18	2	0.71		0.2	0.06
16887-00-6	CHLORIDE AnalysisTime: 13:18	2	17		0.4	0.12
14797-65-0	NITRITE AS N AnalysisTime: 13:18	2	0.18	B	0.2	0.06
24959-67-9	BROMIDE AnalysisTime: 13:18	2	0.12	U	0.4	0.12
14797-55-8	NITRATE AS N AnalysisTime: 13:18	2	4.8		0.4	0.12
14265-44-2	ORTHOPHOSPHATE AS P AnalysisTime: 13:18	2	0.45	BC	1	0.3
14808-79-8	SULFATE AnalysisTime: 13:18	2	81		2	0.6

Data Package ID: IC1909213-1

Date Printed: Tuesday, October 08, 2019

ALS -- Fort Collins

Page 1 of 1

LIMS Version: 6.912

Ion Chromatography

Method EPA300.0 Revision 2.1

Method Blank

Lab Name: ALS -- Fort Collins

Work Order Number: 1909213

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: SURV, September 2019 S19-009

Lab ID: IC190912-1MB

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 12-Sep-19

Date Analyzed: 12-Sep-19

Prep Batch: IC190912-1

QCBatchID: IC190912-1-1

Run ID: IC190912-1A3

Cleanup: NONE

Basis: N/A

File Name: 190912IC3LIMS

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	0.03	U	0.1	0.03
24959-67-9	BROMIDE	1	0.06	U	0.2	0.06
14797-55-8	NITRATE AS N	1	0.06	U	0.2	0.06
14265-44-2	ORTHOPHOSPHATE AS P	1	0.46	B	0.5	0.15
14808-79-8	SULFATE	1	0.3	U	1	0.3

Data Package ID: IC1909213-1

Ion Chromatography

Method EPA300.0 Revision 2.1

Laboratory Control Sample and Laboratory Control Sample Duplicate

Lab Name: ALS -- Fort Collins

Work Order Number: 1909213

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: SURV, September 2019 S19-009

Lab ID: IC190912-1LCS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 09/12/2019

Date Analyzed: 09/12/2019

Prep Method: NONE

Prep Batch: IC190912-1

QCBatchID: IC190912-1-1

Run ID: IC190912-1A3

Cleanup: NONE

Basis: N/A

File Name: 190912IC3LIMS

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	0.1		100	90 - 110%
16887-00-6	CHLORIDE	10	10.1	0.2		101	90 - 110%
14797-65-0	NITRITE AS N	5	4.94	0.1		99	90 - 110%
24959-67-9	BROMIDE	10	9.88	0.2		99	90 - 110%
14797-55-8	NITRATE AS N	10	9.81	0.2		98	90 - 110%
14265-44-2	ORTHOPHOSPHATE AS P	10	10.9	0.5		109	90 - 110%
14808-79-8	SULFATE	50	49.9	1		100	90 - 110%

Lab ID: IC190912-1LCSD

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 09/12/2019

Date Analyzed: 09/12/2019

Prep Method: NONE

Prep Batch: IC190912-1

QCBatchID: IC190912-1-1

Run ID: IC190912-1A3

Cleanup: NONE

Basis: N/A

File Name: 190912IC3LIMS

Sample Aliquot: 5 ml

Final Volume: 5 ml

Result Units: MG/L

Clean DF: 1

CASNO	Target Analyte	Spike Added	LCSD Result	Reporting Limit	Result Qualifier	LCSD % Rec.	RPD Limit	RPD
16984-48-8	FLUORIDE	5	4.97	0.1		99	15	1
16887-00-6	CHLORIDE	10	9.97	0.2		100	15	1
14797-65-0	NITRITE AS N	5	4.93	0.1		98	15	0
24959-67-9	BROMIDE	10	9.96	0.2		100	15	1
14797-55-8	NITRATE AS N	10	9.81	0.2		98	15	0
14265-44-2	ORTHOPHOSPHATE AS P	10	9.61	0.5		96	15	13
14808-79-8	SULFATE	50	49.8	1		100	15	0

Data Package ID: IC1909213-1

Ion Chromatography

Method EPA300.0 Revision 2.1

Matrix Spike

Lab Name: ALS -- Fort Collins

Work Order Number: 1909213

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: SURV, September 2019 S19-009

Field ID:	SHARED QC
LabID:	1909215-2MS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 10-Sep-19

Date Extracted: 12-Sep-19

Date Analyzed: 12-Sep-19

Prep Batch: IC190912-1

QCBatchID: IC190912-1-1

Run ID: IC190912-1A3

Cleanup: NONE

Basis: As Received

Sample Aliquot: 5 ml

Final Volume: 5 ml

Result Units: MG/L

File Name: 190912IC3LIMS

CASNO	Target Analyte	Sample Result	Samp Qual	MS Result	MS Qual	Reporting Limit	Spike Added	MS % Rec.	Control Limits
16984-48-8	FLUORIDE	0.2	U	4.16		0.2	4	104	85 - 115%
16887-00-6	CHLORIDE	2.1		12.3		0.4	10	102	85 - 115%
14797-65-0	NITRITE AS N	0.29		4.37		0.2	4	102	85 - 115%
24959-67-9	BROMIDE	400	U	9730		400	10000	97	85 - 115%
14797-55-8	NITRATE AS N	0.64		10.5		0.4	10	99	85 - 115%
14265-44-2	ORTHOPHOSPHATE AS P	3100		7740	N	1000	4000	117	85 - 115%
14808-79-8	SULFATE	9		47.4		2	40	96	85 - 115%

Data Package ID: IC1909213-1

Prep Batch ID: IC190912-1

Start Date: 09/12/19	End Date: 09/12/19	Concentration Method: NONE	Batch Created By: lml
Start Time: 8:00	End Time: 16:00	Extract Method: NONE	Date Created: 09/12/19
Prep Analyst: Lainey M. Lloyd		Initial Volume Units: ml	Time Created: 14:58
Comments:		Final Volume Units: ml	Validated By: lml
<div style="border: 1px solid black; height: 30px; width: 100%;"></div>			Date Validated: 09/16/19
			Time Validated: 14:00

QC Batch ID: IC190912-1-1

Lab ID	QC Type	Field ID	Matrix	Date Collected	Initial Wt/Vol	Final Wt/Vol	Cleanup Method	Cleanup DF	Order Number
IC190912-1	MB	XXXXXX	WATER	XXXXXX	5	5	NONE	1	1909215
IC190912-1	LCS	XXXXXX	WATER	XXXXXX	5	5	NONE	1	1909215
IC190912-1	LCSD	XXXXXX	WATER	XXXXXX	5	5	NONE	1	1909215
1909215-2	MS	XXXXXX	WATER	XXXXXX	5	5	NONE	1	1909215
1909218-9	MS	XXXXXX	WATER	XXXXXX	5	5	NONE	1	1909218
1909213-5	SMP	B3R7D7	WATER	9/11/2019	5	5	NONE	1	1909213
1909214-1	SMP	XXXXXX	WATER	XXXXXX	5	5	NONE	1	1909214
1909214-3	SMP	XXXXXX	WATER	XXXXXX	5	5	NONE	1	1909214
1909214-4	SMP	XXXXXX	WATER	XXXXXX	5	5	NONE	1	1909214
1909214-5	SMP	XXXXXX	WATER	XXXXXX	5	5	NONE	1	1909214
1909215-2	SMP	XXXXXX	WATER	XXXXXX	5	5	NONE	1	1909215
1909218-5	SMP	XXXXXX	WATER	XXXXXX	5	5	NONE	1	1909218
1909218-9	SMP	XXXXXX	WATER	XXXXXX	5	5	NONE	1	1909218

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

SURV, September 2019 -- S19-009

Work Order Number: 1909213

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

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

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

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

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

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

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



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

6. Matrix specific quality control procedures.

Sample 1909172-2 was designated as the quality control sample for each analysis. Sample 1909172-6 was also designated as the quality control sample for the ICP Trace analysis. Results for the shared quality control samples are included at the client's request.

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

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

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

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

Megan Johnstone
 Megan Johnstone
 Inorganics Primary Data Reviewer

10/9/19
 Date

Kath M. O.
 Inorganics Final Data Reviewer

10/9/19
 Date



Inorganic Data Reporting Qualifiers

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

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

Dissolved ICP Metals

Method SW6010D

Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1909213

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: SURV, September 2019 S19-009

Field ID:	B3R860
Lab ID:	1909213-1

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 10-Sep-19

Date Extracted: 28-Sep-19

Date Analyzed: 30-Sep-19

Prep Method: SW3005 Rev A

Prep Batch: IP190928-4

QCBatchID: IP190928-4-3

Run ID: IT190930-1A4

Cleanup: NONE

Basis: As Received

File Name: 190930A.

Analyst: Steve Workman

Sample Aliquot: 50 ml

Final Volume: 50 ml

Result Units: UG/L

Clean DF: 1

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
7440-36-0	ANTIMONY	1	0.75	U	20	0.75
7440-38-2	ARSENIC	1	4.4	BC	10	0.46
7440-39-3	BARIUM	1	30		20	2.6
7440-43-9	CADMIUM	1	0.11	U	5	0.11
7440-70-2	CALCIUM	1	37000		1000	210
7440-47-3	CHROMIUM	1	4.9	B	10	2.4
7440-48-4	COBALT	1	0.19	U	10	0.19
7440-50-8	COPPER	1	0.51	U	8	0.51
7439-89-6	IRON	1	30	U	50	30
7439-95-4	MAGNESIUM	1	11000		750	89
7439-96-5	MANGANESE	1	1.5	B	5	0.49
7440-02-0	NICKEL	1	4.4	B	20	1.1
7440-09-7	POTASSIUM	1	5500	C	1000	130
7440-22-4	SILVER	1	0.73	U	10	0.73
7440-23-5	SODIUM	1	25000		500	38
7440-62-2	VANADIUM	1	17		10	0.43
7440-66-6	ZINC	1	0.62	U	20	0.62

Data Package ID: *it1909213-1*

Total Recoverable ICP Metals

Method SW6010D

Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1909213

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: SURV, September 2019 S19-009

Field ID:	B3R856
Lab ID:	1909213-2

Sample Matrix: WATER
 % Moisture: N/A
 Date Collected: 10-Sep-19
 Date Extracted: 28-Sep-19
 Date Analyzed: 30-Sep-19
 Prep Method: SW3005 Rev A

Prep Batch: IP190928-4
 QCBatchID: IP190928-4-3
 Run ID: IT190930-1A4
 Cleanup: NONE
 Basis: As Received
 File Name: 190930A.

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

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
7440-36-0	ANTIMONY	1	0.75	U	20	0.75
7440-38-2	ARSENIC	1	8.1	BC	10	0.46
7440-39-3	BARIUM	1	30		20	2.6
7440-43-9	CADMIUM	1	0.11	U	5	0.11
7440-70-2	CALCIUM	1	37000		1000	210
7440-47-3	CHROMIUM	1	17		10	2.4
7440-48-4	COBALT	1	0.19	U	10	0.19
7440-50-8	COPPER	1	0.51	U	8	0.51
7439-89-6	IRON	1	66		50	30
7439-95-4	MAGNESIUM	1	11000		750	89
7439-96-5	MANGANESE	1	1.8	B	5	0.49
7440-02-0	NICKEL	1	8.8	B	20	1.1
7440-09-7	POTASSIUM	1	5500	C	1000	130
7440-22-4	SILVER	1	0.73	U	10	0.73
7440-23-5	SODIUM	1	25000		500	38
7440-62-2	VANADIUM	1	17		10	0.43
7440-66-6	ZINC	1	0.62	U	20	0.62

Data Package ID: *it1909213-1*

Total Recoverable ICP Metals

Method SW6010D

Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1909213

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: SURV, September 2019 S19-009

Field ID:	B3R8J2
Lab ID:	1909213-3

Sample Matrix: WATER
 % Moisture: N/A
 Date Collected: 10-Sep-19
 Date Extracted: 28-Sep-19
 Date Analyzed: 30-Sep-19
 Prep Method: SW3005 Rev A

Prep Batch: IP190928-4
 QCBatchID: IP190928-4-2
 Run ID: IT190930-1A4
 Cleanup: NONE
 Basis: As Received
 File Name: 190930A.

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

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
7440-42-8	BORON	1	36	U	50	36
7440-70-2	CALCIUM	1	110000		1000	210
7439-89-6	IRON	1	440		50	30
7439-95-4	MAGNESIUM	1	30000		750	89
7440-09-7	POTASSIUM	1	11000		1000	130
7440-23-5	SODIUM	1	21000		500	38
7440-62-2	VANADIUM	1	13		10	0.43

Data Package ID: *it1909213-1*

Dissolved ICP Metals

Method SW6010D

Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1909213

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: SURV, September 2019 S19-009

Field ID:	B3R8J6
Lab ID:	1909213-4

Sample Matrix: WATER
 % Moisture: N/A
 Date Collected: 10-Sep-19
 Date Extracted: 28-Sep-19
 Date Analyzed: 30-Sep-19
 Prep Method: SW3005 Rev A

Prep Batch: IP190928-4
 QCBatchID: IP190928-4-2
 Run ID: IT190930-1A4
 Cleanup: NONE
 Basis: As Received
 File Name: 190930A.

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

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
7440-42-8	BORON	1	36	U	50	36
7440-70-2	CALCIUM	1	110000		1000	210
7439-89-6	IRON	1	30	U	50	30
7439-95-4	MAGNESIUM	1	31000		750	89
7440-09-7	POTASSIUM	1	11000		1000	130
7440-23-5	SODIUM	1	21000		500	38
7440-62-2	VANADIUM	1	13		10	0.43

Data Package ID: *it1909213-1*

Total Recoverable ICPMS Metals

Method SW6020B

Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1909213

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: SURV, September 2019 S19-009

Field ID: B3R8J2

Lab ID: 1909213-3

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 10-Sep-19

Date Extracted: 28-Sep-19

Date Analyzed: 09-Oct-19

Prep Method: SW3005 Rev A

Prep Batch: IP190928-4

QCBatchID: IP190928-4-1

Run ID: IM191009-10A2

Cleanup: NONE

Basis: As Received

File Name: 058SMPL_

Analyst: Nicole C. Chirban

Sample Aliquot: 50 ml

Final Volume: 50 ml

Result Units: UG/L

Clean DF: 1

Analysis ReqCode: 6020_METALS_I

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
7429-90-5	ALUMINUM	10	10	U	100	10
7440-36-0	ANTIMONY	10	0.12	U	1	0.12
7440-38-2	ARSENIC	10	3.8		2	0.39
7440-39-3	BARIUM	10	69		5	0.56
7440-41-7	BERYLLIUM	10	0.054	U	0.5	0.054
7440-43-9	CADMIUM	10	0.083	U	2	0.083
7440-47-3	CHROMIUM	10	10		10	0.46
7440-48-4	COBALT	10	0.18	B	5	0.11
7440-50-8	COPPER	10	0.71	B	8	0.32
7439-92-1	LEAD	10	0.079	U	2	0.079
7439-96-5	MANGANESE	10	2.8	B	5	0.36
7439-98-7	MOLYBDENUM	10	2.2		2	0.079
7440-02-0	NICKEL	10	4.3	B	20	0.92
7782-49-2	SELENIUM	10	21		10	0.65
7440-22-4	SILVER	10	0.029	U	0.5	0.029
7440-24-6	STRONTIUM	10	590		5	0.32
7440-28-0	THALLIUM	10	0.0041	U	0.1	0.0041
7440-29-1	THORIUM	10	0.016	U	0.2	0.016
7440-31-5	TIN	10	0.79	BC	10	0.12
7440-61-1	URANIUM	10	3.8		0.1	0.0049
7440-66-6	ZINC	10	4.9	B	100	1.4

Data Package ID: IM1909213-1

Dissolved ICPMS Metals

Method SW6020B

Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1909213

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: SURV, September 2019 S19-009

Field ID: B3R8J6
Lab ID: 1909213-4

Sample Matrix: WATER
% Moisture: N/A
Date Collected: 10-Sep-19
Date Extracted: 28-Sep-19
Date Analyzed: 09-Oct-19
Prep Method: SW3005 Rev A

Prep Batch: IP190928-4
QCBatchID: IP190928-4-1
Run ID: IM191009-10A2
Cleanup: NONE
Basis: As Received
File Name: 059SMPL_

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

Analysis ReqCode: 6020_METALS_I

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
7429-90-5	ALUMINUM	10	10	U	100	10
7440-36-0	ANTIMONY	10	0.12	U	1	0.12
7440-38-2	ARSENIC	10	4.1		2	0.39
7440-39-3	BARIUM	10	65		5	0.56
7440-41-7	BERYLLIUM	10	0.054	U	0.5	0.054
7440-43-9	CADMIUM	10	0.083	U	2	0.083
7440-47-3	CHROMIUM	10	2.9	B	10	0.46
7440-48-4	COBALT	10	0.37	B	5	0.11
7440-50-8	COPPER	10	0.32	U	8	0.32
7439-92-1	LEAD	10	0.079	U	2	0.079
7439-96-5	MANGANESE	10	0.8	B	5	0.36
7439-98-7	MOLYBDENUM	10	2.2		2	0.079
7440-02-0	NICKEL	10	2.3	B	20	0.92
7782-49-2	SELENIUM	10	19		10	0.65
7440-22-4	SILVER	10	0.029	U	0.5	0.029
7440-24-6	STRONTIUM	10	590		5	0.32
7440-28-0	THALLIUM	10	0.0041	U	0.1	0.0041
7440-29-1	THORIUM	10	0.016	U	0.2	0.016
7440-31-5	TIN	10	0.76	BC	10	0.12
7440-61-1	URANIUM	10	3.8		0.1	0.0049
7440-66-6	ZINC	10	1.4	U	100	1.4

Data Package ID: IM1909213-1

ICP Metals

Method SW6010D

Method Blank

Lab Name: ALS -- Fort Collins

Work Order Number: 1909213

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: SURV, September 2019 S19-009

Lab ID: IP190928-4MB

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 28-Sep-19

Date Analyzed: 30-Sep-19

Prep Batch: IP190928-4

QCBatchID: IP190928-4-3

Run ID: IT190930-1A4

Cleanup: NONE

Basis: N/A

File Name: 190930A.

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
7440-36-0	ANTIMONY	1	0.75	U	20	0.75
7440-38-2	ARSENIC	1	3.2	B	10	0.46
7440-39-3	BARIUM	1	2.6	U	20	2.6
7440-42-8	BORON	1	36	U	50	36
7440-43-9	CADMIUM	1	0.11	U	5	0.11
7440-70-2	CALCIUM	1	210	U	1000	210
7440-47-3	CHROMIUM	1	2.4	U	10	2.4
7440-48-4	COBALT	1	0.19	U	10	0.19
7440-50-8	COPPER	1	0.51	U	8	0.51
7439-89-6	IRON	1	30	U	50	30
7439-95-4	MAGNESIUM	1	89	U	750	89
7439-96-5	MANGANESE	1	0.49	U	5	0.49
7440-02-0	NICKEL	1	1.1	U	20	1.1
7440-09-7	POTASSIUM	1	280	B	1000	130
7440-22-4	SILVER	1	0.73	U	10	0.73
7440-23-5	SODIUM	1	110	B	500	38
7440-62-2	VANADIUM	1	0.43	U	10	0.43
7440-66-6	ZINC	1	0.62	U	20	0.62

Data Package ID: *it1909213-1*

ICP Metals

Method SW6010D

Laboratory Control Sample

Lab Name: ALS -- Fort Collins

Work Order Number: 1909213

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: SURV, September 2019 S19-009

Lab ID: IP190928-4LCS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 09/28/2019

Date Analyzed: 09/30/2019

Prep Method: SW3005A

Prep Batch: IP190928-4

QCBatchID: IP190928-4-3

Run ID: IT190930-1A4

Cleanup: NONE

Basis: N/A

File Name: 190930A.

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
7440-36-0	ANTIMONY	500	475	20		95	80 - 120%
7440-38-2	ARSENIC	1000	927	10		93	80 - 120%
7440-39-3	BARIUM	1000	995	20		99	80 - 120%
7440-42-8	BORON	1000	979	50		98	80 - 120%
7440-43-9	CADMIUM	50	47.1	5		94	80 - 120%
7440-70-2	CALCIUM	40000	39400	1000		99	80 - 120%
7440-47-3	CHROMIUM	200	206	10		103	80 - 120%
7440-48-4	COBALT	500	519	10		104	80 - 120%
7440-50-8	COPPER	250	250	8		100	80 - 120%
7439-89-6	IRON	1000	972	50		97	80 - 120%
7439-95-4	MAGNESIUM	40000	41500	750		104	80 - 120%
7439-96-5	MANGANESE	500	521	5		104	80 - 120%
7440-02-0	NICKEL	500	462	20		92	80 - 120%
7440-09-7	POTASSIUM	40000	40200	1000		101	80 - 120%
7440-22-4	SILVER	100	97.9	10		98	80 - 120%
7440-23-5	SODIUM	40000	42600	500		106	80 - 120%
7440-62-2	VANADIUM	500	489	10		98	80 - 120%
7440-66-6	ZINC	500	510	20		102	80 - 120%

Data Package ID: *it1909213-1*

Date Printed: Wednesday, October 09, 2019

ALS -- Fort Collins

Page 1 of 1

LIMS Version: 6.912

ICP Metals

Method SW6010D

Matrix Spike And Matrix Spike Duplicate

Lab Name: ALS -- Fort Collins

Work Order Number: 1909213

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: SURV, September 2019 S19-009

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: 30-Sep-19 Prep Method: SW3005 Rev A	Prep Batch: IP190928-4 QCBatchID: IP190928-4-2 Run ID: IT190930-1A4 Cleanup: NONE Basis: As Received	Sample Aliquot: 50 ml Final Volume: 50 ml Result Units: UG/L File Name: 190930A.
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CASNO	Target Analyte	Sample Result	Samp Qual	MS Result	MS Qual	Reporting Limit	Spike Added	MS % Rec.	Control Limits
7440-42-8	BORON	36	U	997		50	1000	100	80 - 120%
7440-70-2	CALCIUM	70000		110000		1000	40000	100	80 - 120%
7439-89-6	IRON	30	U	962		50	1000	96	80 - 120%
7439-95-4	MAGNESIUM	12000		53200		750	40000	104	80 - 120%
7440-09-7	POTASSIUM	2300	C	43600		1000	40000	103	80 - 120%
7440-23-5	SODIUM	5800		48000		500	40000	106	80 - 120%
7440-62-2	VANADIUM	1.5	B	487		10	500	97	80 - 120%

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: 30-Sep-19 Prep Method: SW3005 Rev A	Prep Batch: IP190928-4 QCBatchID: IP190928-4-2 Run ID: IT190930-1A4 Cleanup: NONE Basis: As Received	Sample Aliquot: 50 ml Final Volume: 50 ml Result Units: UG/L File Name: 190930A.
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CASNO	Target Analyte	MSD Result	MSD Qual	Spike Added	MSD % Rec.	Reporting Limit	RPD Limit	RPD
7440-42-8	BORON	997		1000	100	50	20	0
7440-70-2	CALCIUM	110000		40000	100	1000	20	0
7439-89-6	IRON	961		1000	96	50	20	0
7439-95-4	MAGNESIUM	53200		40000	104	750	20	0
7440-09-7	POTASSIUM	43600		40000	103	1000	20	0
7440-23-5	SODIUM	48000		40000	106	500	20	0
7440-62-2	VANADIUM	487		500	97	10	20	0

Data Package ID: *it1909213-1*

ICP Metals

Method SW6010D

Matrix Spike And Matrix Spike Duplicate

Lab Name: ALS -- Fort Collins

Work Order Number: 1909213

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: SURV, September 2019 S19-009

Field ID: SHARED QC

LabID: 1909172-6MS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 09-Sep-19

Date Extracted: 28-Sep-19

Date Analyzed: 30-Sep-19

Prep Method: SW3005 Rev A

Prep Batch: IP190928-4

QC BatchID: IP190928-4-3

Run ID: IT190930-1A4

Cleanup: NONE

Basis: As Received

Sample Aliquot: 50 ml

Final Volume: 50 ml

Result Units: UG/L

File Name: 190930A.

CASNO	Target Analyte	Sample Result	Samp Qual	MS Result	MS Qual	Reporting Limit	Spike Added	MS % Rec.	Control Limits
7440-36-0	ANTIMONY	0.75	U	474		20	500	95	80 - 120%
7440-38-2	ARSENIC	0.92	BC	923		10	1000	92	80 - 120%
7440-39-3	BARIUM	39		1030		20	1000	100	80 - 120%
7440-43-9	CADMIUM	0.11	U	46.8		5	50	94	80 - 120%
7440-70-2	CALCIUM	59000		99000		1000	40000	100	80 - 120%
7440-47-3	CHROMIUM	4.7	B	208		10	200	101	80 - 120%
7440-48-4	COBALT	0.19	U	514		10	500	103	80 - 120%
7440-50-8	COPPER	0.51	U	253		8	250	101	80 - 120%
7439-89-6	IRON	170		1140		50	1000	96	80 - 120%
7439-95-4	MAGNESIUM	10000		52100		750	40000	104	80 - 120%
7439-96-5	MANGANESE	16		533		5	500	103	80 - 120%
7440-02-0	NICKEL	1.1	U	457		20	500	91	80 - 120%
7440-09-7	POTASSIUM	2500	C	44000		1000	40000	104	80 - 120%
7440-22-4	SILVER	0.73	U	99.8		10	100	100	80 - 120%
7440-23-5	SODIUM	5600		48100		500	40000	106	80 - 120%
7440-62-2	VANADIUM	3.9	B	491		10	500	97	80 - 120%
7440-66-6	ZINC	1.4	B	504		20	500	101	80 - 120%

Data Package ID: *it1909213-1*

ICP Metals

Method SW6010D

Matrix Spike And Matrix Spike Duplicate

Lab Name: ALS -- Fort Collins

Work Order Number: 1909213

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: SURV, September 2019 S19-009

Field ID: SHARED QC

LabID: 1909172-6MSD

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 09-Sep-19

Date Extracted: 28-Sep-19

Date Analyzed: 30-Sep-19

Prep Method: SW3005 Rev A

Prep Batch: IP190928-4

QC BatchID: IP190928-4-3

Run ID: IT190930-1A4

Cleanup: NONE

Basis: As Received

Sample Aliquot: 50 ml

Final Volume: 50 ml

Result Units: UG/L

File Name: 190930A.

CASNO	Target Analyte	MSD Result	MSD Qual	Spike Added	MSD % Rec.	Reporting Limit	RPD Limit	RPD
7440-36-0	ANTIMONY	473		500	95	20	20	0
7440-38-2	ARSENIC	932		1000	93	10	20	1
7440-39-3	BARIUM	1030		1000	99	20	20	0
7440-43-9	CADMIUM	47.5		50	95	5	20	1
7440-70-2	CALCIUM	99000		40000	100	1000	20	0
7440-47-3	CHROMIUM	210		200	102	10	20	1
7440-48-4	COBALT	514		500	103	10	20	0
7440-50-8	COPPER	254		250	101	8	20	0
7439-89-6	IRON	1140		1000	97	50	20	0
7439-95-4	MAGNESIUM	52200		40000	105	750	20	0
7439-96-5	MANGANESE	533		500	103	5	20	0
7440-02-0	NICKEL	456		500	91	20	20	0
7440-09-7	POTASSIUM	44000		40000	104	1000	20	0
7440-22-4	SILVER	98.7		100	99	10	20	1
7440-23-5	SODIUM	47900		40000	106	500	20	0
7440-62-2	VANADIUM	491		500	97	10	20	0
7440-66-6	ZINC	508		500	101	20	20	1

Data Package ID: *it1909213-1*

Prep Batch ID: IP190928-4

Start Date: 09/28/19	End Date: 09/28/19	Concentration Method: NONE	Batch Created By: jml
Start Time: 10:37	End Time: 18:00	Extract Method: SW3005A	Date Created: 09/28/19
Prep Analyst: Jill M. Latelle		Initial Volume Units: ml	Time Created: 10:37
Comments:		Final Volume Units: ml	Validated By: jml
<div style="border: 1px solid black; height: 30px; width: 100%;"></div>			Date Validated: 09/28/19
			Time Validated: 11:22

QC Batch ID: IP190928-4-2

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
IP190928-4	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
1909172-10	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909172
1909172-11	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909172
1909172-14	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909172
1909172-15	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909172
1909172-2	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909172
1909172-3	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909172
1909172-4	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909172
1909172-5	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909172
1909172-8	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909172
1909172-9	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909172
1909213-3	SMP	B3R8J2	WATER	9/10/2019	50	50	NONE	1	1909213
1909213-4	SMP	B3R8J6	WATER	9/10/2019	50	50	NONE	1	1909213

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: IP190928-4

Start Date: 09/28/19	End Date: 09/28/19	Concentration Method: NONE	Batch Created By: jml
Start Time: 10:37	End Time: 18:00	Extract Method: SW3005A	Date Created: 09/28/19
Prep Analyst: Jill M. Latelle		Initial Volume Units: ml	Time Created: 10:37
Comments:		Final Volume Units: ml	Validated By: jml
			Date Validated: 09/28/19
			Time Validated: 11:22

QC Batch ID: IP190928-4-3

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
IP190928-4	LCS	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909172
1909172-6	MS	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909172
1909172-6	MSD	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909172
1909172-6	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909172
1909172-7	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909172
1909213-1	SMP	B3R860	WATER	9/10/2019	50	50	NONE	1	1909213
1909213-2	SMP	B3R856	WATER	9/10/2019	50	50	NONE	1	1909213

QC Types

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

ICPMS Metals

Method SW6020B

Method Blank

Lab Name: ALS -- Fort Collins

Work Order Number: 1909213

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: SURV, September 2019 S19-009

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: IP190928-4-1

Run ID: IM191009-10A2

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
7429-90-5	ALUMINUM	10	10	U	100	10
7440-36-0	ANTIMONY	10	0.12	U	1	0.12
7440-38-2	ARSENIC	10	0.39	U	2	0.39
7440-39-3	BARIUM	10	0.56	U	5	0.56
7440-41-7	BERYLLIUM	10	0.054	U	0.5	0.054
7440-43-9	CADMIUM	10	0.083	U	2	0.083
7440-47-3	CHROMIUM	10	0.46	U	10	0.46
7440-48-4	COBALT	10	0.11	U	5	0.11
7440-50-8	COPPER	10	0.32	U	8	0.32
7439-92-1	LEAD	10	0.12	B	2	0.079
7439-96-5	MANGANESE	10	0.36	U	5	0.36
7439-98-7	MOLYBDENUM	10	0.079	U	2	0.079
7440-02-0	NICKEL	10	0.92	U	20	0.92
7782-49-2	SELENIUM	10	0.65	U	10	0.65
7440-22-4	SILVER	10	0.029	U	0.5	0.029
7440-24-6	STRONTIUM	10	0.32	U	5	0.32
7440-28-0	THALLIUM	10	0.0041	U	0.1	0.0041
7440-29-1	THORIUM	10	0.016	U	0.2	0.016
7440-31-5	TIN	10	1.1	B	10	0.12
7440-61-1	URANIUM	10	0.03	B	0.1	0.0049
7440-66-6	ZINC	10	1.4	U	100	1.4

Data Package ID: IM1909213-1

ICPMS Metals

Method SW6020B

Laboratory Control Sample

Lab Name: ALS -- Fort Collins

Work Order Number: 1909213

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: SURV, September 2019 S19-009

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: IP190928-4-1

Run ID: IM191009-10A2

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
7429-90-5	ALUMINUM	5000	4540	100		91	80 - 120%
7440-36-0	ANTIMONY	30	29.8	1		99	80 - 120%
7440-38-2	ARSENIC	100	96.8	2		97	80 - 120%
7440-39-3	BARIUM	100	98.8	5		99	80 - 120%
7440-41-7	BERYLLIUM	50	51.5	0.5		103	80 - 120%
7440-43-9	CADMIUM	30	31.1	2		104	80 - 120%
7440-47-3	CHROMIUM	500	496	10		99	80 - 120%
7440-48-4	COBALT	100	99.8	5		100	80 - 120%
7440-50-8	COPPER	1000	1000	8		100	80 - 120%
7439-92-1	LEAD	50	48.4	2		97	80 - 120%
7439-96-5	MANGANESE	100	97.8	5		98	80 - 120%
7439-98-7	MOLYBDENUM	100	98.9	2		99	80 - 120%
7440-02-0	NICKEL	500	511	20		102	80 - 120%
7782-49-2	SELENIUM	100	104	10		104	80 - 120%
7440-22-4	SILVER	10	10.2	0.5		102	80 - 120%
7440-24-6	STRONTIUM	100	98	5		98	80 - 120%
7440-28-0	THALLIUM	2	2.1	0.1		105	80 - 120%
7440-29-1	THORIUM	10	9.54	0.2		95	80 - 120%
7440-31-5	TIN	500	490	10		98	80 - 120%
7440-61-1	URANIUM	10	10.3	0.1		103	80 - 120%
7440-66-6	ZINC	2000	1860	100		93	80 - 120%

Data Package ID: IM1909213-1

Date Printed: Wednesday, October 09, 2019

ALS -- Fort Collins

Page 1 of 1

LIMS Version: 6.912

ICPMS Metals

Method SW6020B

Matrix Spike And Matrix Spike Duplicate

Lab Name: ALS -- Fort Collins

Work Order Number: 1909213

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: SURV, September 2019 S19-009

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: IP190928-4-1

Run ID: IM191009-10A2

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
7429-90-5	ALUMINUM	11	B	4490		100	5000	90	75 - 125%
7440-36-0	ANTIMONY	0.21	B	30.5		1	30	101	75 - 125%
7440-38-2	ARSENIC	0.39	U	95.5		2	100	95	75 - 125%
7440-39-3	BARIUM	59		157		5	100	98	75 - 125%
7440-41-7	BERYLLIUM	0.054	U	50.7		0.5	50	101	75 - 125%
7440-43-9	CADMIUM	0.083	U	30.8		2	30	103	75 - 125%
7440-47-3	CHROMIUM	3.2	B	489		10	500	97	75 - 125%
7440-48-4	COBALT	0.29	B	97.8		5	100	97	75 - 125%
7440-50-8	COPPER	0.32	U	976		8	1000	98	75 - 125%
7439-92-1	LEAD	0.37	BC	47.8		2	50	95	75 - 125%
7439-96-5	MANGANESE	0.36	U	97		5	100	97	75 - 125%
7439-98-7	MOLYBDENUM	0.51	B	99.8		2	100	99	75 - 125%
7440-02-0	NICKEL	0.92	U	502		20	500	100	75 - 125%
7782-49-2	SELENIUM	2.2	B	101		10	100	99	75 - 125%
7440-22-4	SILVER	0.029	U	10.1		0.5	10	101	75 - 125%
7440-24-6	STRONTIUM	250		350		5	100	102	75 - 125%
7440-28-0	THALLIUM	0.0041	U	2.02		0.1	2	101	75 - 125%
7440-29-1	THORIUM	0.016	U	9.52		0.2	10	95	75 - 125%
7440-31-5	TIN	1.2	BC	495		10	500	99	75 - 125%
7440-61-1	URANIUM	1.1		11.6		0.1	10	104	75 - 125%
7440-66-6	ZINC	1.4	U	1790		100	2000	89	75 - 125%

Data Package ID: IM1909213-1

ICPMS Metals

Method SW6020B

Matrix Spike And Matrix Spike Duplicate

Lab Name: ALS -- Fort Collins

Work Order Number: 1909213

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: SURV, September 2019 S19-009

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: IP190928-4-1

Run ID: IM191009-10A2

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
7429-90-5	ALUMINUM	4550		5000	91	100	20	1
7440-36-0	ANTIMONY	30.4		30	101	1	20	0
7440-38-2	ARSENIC	97.5		100	98	2	20	2
7440-39-3	BARIUM	155		100	96	5	20	1
7440-41-7	BERYLLIUM	51.1		50	102	0.5	20	1
7440-43-9	CADMIUM	31.1		30	104	2	20	1
7440-47-3	CHROMIUM	491		500	98	10	20	1
7440-48-4	COBALT	98.4		100	98	5	20	1
7440-50-8	COPPER	974		1000	97	8	20	0
7439-92-1	LEAD	47.6		50	94	2	20	1
7439-96-5	MANGANESE	97.1		100	97	5	20	0
7439-98-7	MOLYBDENUM	99.8		100	99	2	20	0
7440-02-0	NICKEL	500		500	100	20	20	0
7782-49-2	SELENIUM	103		100	100	10	20	1
7440-22-4	SILVER	10.4		10	104	0.5	20	2
7440-24-6	STRONTIUM	353		100	105	5	20	1
7440-28-0	THALLIUM	2.1		2	105	0.1	20	4
7440-29-1	THORIUM	9.67		10	97	0.2	20	2
7440-31-5	TIN	496		500	99	10	20	0
7440-61-1	URANIUM	11.4		10	103	0.1	20	1
7440-66-6	ZINC	1770		2000	89	100	20	1

Data Package ID: IM1909213-1

Prep Batch ID: IP190928-4

Start Date: 09/28/19	End Date: 09/28/19	Concentration Method: NONE	Batch Created By: jml
Start Time: 10:37	End Time: 18:00	Extract Method: SW3005A	Date Created: 09/28/19
Prep Analyst: Jill M. Latelle		Initial Volume Units: ml	Time Created: 10:37
Comments:		Final Volume Units: ml	Validated By: jml
<div style="border: 1px solid black; height: 30px; width: 100%;"></div>			Date Validated: 09/28/19
			Time Validated: 11:22

QC Batch ID: IP190928-4-1

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
1909172-10	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909172
1909172-11	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909172
1909172-14	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909172
1909172-15	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909172
1909172-2	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909172
1909172-3	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909172
1909172-4	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909172
1909172-5	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909172
1909172-8	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909172
1909172-9	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1909172
1909213-3	SMP	B3R8J2	WATER	9/10/2019	50	50	NONE	1	1909213
1909213-4	SMP	B3R8J6	WATER	9/10/2019	50	50	NONE	1	1909213

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



Tritium

Case Narrative

CH2M HILL Plateau Remediation Company

SURV, September 2019 – S19-009

Work Order Number: 1909213

1. The sample was prepared according to the current revision of SOP 700.
2. The sample was analyzed for the presence of tritium according to the current revision of SOP 704. The analysis was completed on 10/01/2019.
3. The duplicate of sample 1909245-9 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.
4. The analysis results for the sample are reported in units of pCi/L. The sample was not filtered prior to analysis.
5. In accordance with project specific instructions, the evaluation threshold for Relative Percent Difference (RPD) has been set at 20%. RPD is defined as:

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

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

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



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

Pik Yee Yuen
Pik Yee Yuen
Radiochemistry Primary Data Reviewer

10/8/19
Date

Kath M. W.
Radiochemistry Final Data Reviewer

10/9/19
Date

Tritium by Liquid Scintillation

PAI 704 Rev 12

Method Blank Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1909213
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: SURV, September 2019 S19-009

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

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

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

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

Data Package ID: H31909213-1

Tritium by Liquid Scintillation

PAI 704 Rev 12

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins
Work Order Number: 1909213
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: SURV, September 2019 S19-009

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

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

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

Data Package ID: H31909213-1

Tritium by Liquid Scintillation

PAI 704 Rev 12

Matrix Spike Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1909213
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: SURV, September 2019 S19-009

Field ID:	B3R8J2
Lab ID:	1909213-3MS

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

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

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

Analysis ReqCode: TRITIUM_DIST_L

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

Comments:

Qualifiers/Flags:

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

Abbreviations:

MDC - Sample specific Minimum Detectable Concentration

Data Package ID: H31909213-1

Tritium by Liquid Scintillation

PAI 704 Rev 12

Matrix Spike Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1909213
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: SURV, September 2019 S19-009

Field ID:	B3R8J2
Lab ID:	1909213-3MSD

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

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

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

Analysis ReqCode: TRITIUM_DIST_L

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

Comments:

Qualifiers/Flags:

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

Abbreviations:

MDC - Sample specific Minimum Detectable Concentration

Data Package ID: H31909213-1

Tritium by Liquid Scintillation

PAI 704 Rev 12

Duplicate Sample Results (DER)

Lab Name: ALS -- Fort Collins

Work Order Number: 1909213

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: SURV, September 2019 S19-009

Field ID:	B3R8J2
Lab ID:	1909213-3MSD

Sample Matrix: WATER

Prep SOP: PAI 700 Rev 15

Date Collected: 10-Sep-19

Date Prepared: 26-Sep-19

Date Analyzed: 30-Sep-19

Prep Batch: 3H190926-1

QCBatchID: 3H190926-1-2

Run ID: 3H190926-1C

Count Time: 90 minutes

Report Basis: Unfiltered

Final Aliquot: 9.84 ml

Prep Basis: Unfiltered

Moisture(%): 100.000

Result Units: pCi/l

File Name: B60_04_093001

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

Comments:

Duplicate Qualifiers/Flags:

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

Abbreviations:

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

Data Package ID: H31909213-1

Tritium by Liquid Scintillation

PAI 704 Rev 12

Duplicate Sample Results (RPD)

Lab Name: ALS -- Fort Collins
Work Order Number: 1909213
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: SURV, September 2019 S19-009

Field ID:	B3R8J2
Lab ID:	1909213-3MSD

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

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

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

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

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

Data Package ID: H31909213-1

Tritium by Liquid Scintillation

PAI 704 Rev 12

Duplicate Sample Results (DER)

Lab Name: ALS -- Fort Collins
Work Order Number: 1909213
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: SURV, September 2019 S19-009

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

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

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

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

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

Comments:

Duplicate Qualifiers/Flags:

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

Abbreviations:

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

Data Package ID: H31909213-1

Tritium by Liquid Scintillation

PAI 704 Rev 12

Duplicate Sample Results (RPD)

Lab Name: ALS -- Fort Collins
Work Order Number: 1909213
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: SURV, September 2019 S19-009

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

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

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

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

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

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

Data Package ID: H31909213-1

Tritium by Liquid Scintillation

PAI 704 Rev 12

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1909213
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: SURV, September 2019 S19-009

Field ID:	Shared QC
Lab ID:	1909245-9

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

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

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

Data Package ID: H31909213-1

Tritium by Liquid Scintillation

PAI 704 Rev 12

Sample Duplicate Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1909213
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: SURV, September 2019 S19-009

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Field ID: Shared QC</td> </tr> <tr> <td style="padding: 2px;">Lab ID: 1909245-9DUP</td> </tr> </table>	Field ID: Shared QC	Lab ID: 1909245-9DUP	<p>Sample Matrix: WATER Prep SOP: PAI 700 Rev 15 Date Collected: 11-Sep-19 Date Prepared: 26-Sep-19 Date Analyzed: 01-Oct-19</p>	<p>Prep Batch: 3H190926-1 QCBatchID: 3H190926-1-2 Run ID: 3H190926-1C Count Time: 90 minutes Report Basis: Unfiltered</p>	<p>Final Aliquot: 10.0 ml Prep Basis: Unfiltered Moisture(%): 100.000 Result Units: pCi/l File Name: B60_04_093001</p>
Field ID: Shared QC					
Lab ID: 1909245-9DUP					

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

Comments:

Qualifiers/Flags:

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

- D - DER is greater than Control Limit of 2.13

Abbreviations:

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

Data Package ID: H31909213-1

Date Printed:

Thursday, October 03, 2019

ALS -- Fort Collins

LIMS Version: 6.912

Page 1 of 1

Tritium by Liquid Scintillation

PAI 704 Rev 12

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1909213
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: SURV, September 2019 S19-009

Field ID:	B3R8J2
Lab ID:	1909213-3

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

Analysis ReqCode: TRITIUM_DIST_L

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

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

Data Package ID: H31909213-1

Prep Batch ID: 3H190926-1

Start Date: 09/26/19 **End Date:** 09/26/19 **Concentration Method:** NONE **Batch Created By:** rgs
Start Time: 11:25 **End Time:** 11:25 **Extract Method:** PAI 70015 **Date Created:** 09/26/19
Prep Analyst: Reilly G. Stockton **Initial Volume Units:** ml **Time Created:** 11:25
Comments: **Final Volume Units:** ml **Validated By:** rgs
 Date Validated: 09/29/19
 Time Validated: 7:26

QC Batch ID: 3H190926-1-2

Lab ID	QC Type	Field ID	Matrix	Date Collected	Initial Wt/Vol	Final Wt/Vol	Cleanup Method	Cleanup DF	Order Number
3H190926-1	MB	XXXXXX	WATER	XXXXXX	30	10	NONE	1	1909213
3H190926-1CB1	MB	XXXXXX	WATER	XXXXXX	30	10	NONE	1	1909213
3H190926-1CB2	MB	XXXXXX	WATER	XXXXXX	30	10	NONE	1	1909213
3H190926-1CB3	MB	XXXXXX	WATER	XXXXXX	30	10	NONE	1	1909213
3H190926-1	LCS	XXXXXX	WATER	XXXXXX	30	9.8361	NONE	1	1909213
1909213-3	MS	B3R8J2	WATER	9/10/2019	30	9.8361	NONE	1	1909213
1909213-3	MSD	B3R8J2	WATER	9/10/2019	30	9.8361	NONE	1	1909213
1909245-9	DUP	XXXXXX	WATER	XXXXXX	30	10	NONE	1	1909245
1909213-3	SMP	B3R8J2	WATER	9/10/2019	30	10	NONE	1	1909213
1909216-1	SMP	XXXXXX	WATER	XXXXXX	30	10	NONE	1	1909216
1909216-6	SMP	XXXXXX	WATER	XXXXXX	30	10	NONE	1	1909216
1909233-2	SMP	XXXXXX	WATER	XXXXXX	30	10	NONE	1	1909233
1909233-3	SMP	XXXXXX	WATER	XXXXXX	30	10	NONE	1	1909233
1909241-1	SMP	XXXXXX	WATER	XXXXXX	30	10	NONE	1	1909241
1909243-2	SMP	XXXXXX	WATER	XXXXXX	30	10	NONE	1	1909243
1909245-9	SMP	XXXXXX	WATER	XXXXXX	30	10	NONE	1	1909245

QC Types

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