



Thursday, July 19, 2018

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

Re: ALS Workorder: 1806449
Project Name: Surv, June 2018
Project Number: S18-006

Dear Ms. Waters-Husted:

Three water samples were received from CH2M HILL Plateau Remediation Company, on 6/20/2018. The samples were scheduled for the following analyses:

Metals
Strontium-90

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

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

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

Sincerely,

ALS Environmental
Katie M. O'Brien
Project Manager

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

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1806449

Client Name: CH2M HILL Plateau Remediation Company

Client Project Name: Surv, June 2018

Client Project Number: S18-006

Client PO Number: BOA 54854

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
B3JB76	1806449-1		WATER	18-Jun-18	13:21
B3JB73	1806449-2		WATER	18-Jun-18	12:37
B3JF14	1806449-3		WATER	18-Jun-18	12:37

CH2M Hill Plateau Remediation Company		1806449		C.O.C.# S18-006-119 Page 1 of 1	
Collector: Jeff Tuckson CHPRC		Contact/Requester: Karen Waters-Husted		Telephone No.: 509-376-4650	
SAF No.: S18-006		Sampling Origin: Hanford Site		Purchase Order/Charge Code: 300071	
Project Title: Surv, June 2018		Logbook No.: HNF-N-506 99/57		Ice Chest No.: GWS-563	
Shipped To (Lab): ALS Environmental Ft. Collins		Method of Shipment: Commercial Carrier		Bill of Lading/Air Bill No.: 772509834569	
Protocol: SURV		Priority: 30 Days		Offsite Property No.: 9570	
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
B3JB76	N	JUN 18 2018	1321	2x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON
Holding Time			Preservative		
6 Months			HNO3 to pH <2		

Relinquished By: Jeff Tuckson CHPRC	Signature	JUN 18 2018	Date/Time	Received By: SSU-1	Signature	JUN 18 2018	Date/Time
Relinquished By: SSU-1	Signature	JUN 19 2018	Date/Time	Received By: Daniel Klug CHPRC	Signature	JUN 19 2018	Date/Time
Relinquished By: Daniel Klug CHPRC	Signature	JUN 19 2018	Date/Time	Received By: FEDEX	Signature		Date/Time
Relinquished By: FED EX	Signature	JUN 19 2018	Date/Time	Received By: C. Timble	Signature	6-20-18	Date/Time
Relinquished By: C. Timble	Signature		Date/Time	Disposed By:			Date/Time:
FINAL SAMPLE DISPOSITION Disposal Method (e.g., Return to customer, per lab procedure, used in process):				Matrix * S = Soil DS = Drum Solids SE = Sediment DL = Drum Liquid SO = Solid T = Tissue SL = Sludge WI = Wipe W = Water L = Liquid O = Oil V = Vegetation A = Air X = Other			



ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: CHPRC

Workorder No: 1806449

Project Manager: KO

Initials: COT Date: 6-20-18

1. Does this project require any special handling in addition to standard ALS procedures?		YES	<input checked="" type="radio"/> NO
2. Are custody seals on shipping containers intact?	NONE	<input checked="" type="radio"/> YES	NO
3. Are Custody seals on sample containers intact?	NONE	<input checked="" type="radio"/> YES	NO
4. Is there a COC (Chain-of-Custody) present or other representative documents?		<input checked="" type="radio"/> YES	NO
5. Are the COC and bottle labels complete and legible?		<input checked="" type="radio"/> YES	NO
6. Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)		<input checked="" type="radio"/> YES	NO
7. Were airbills / shipping documents present and/or removable?	DROP OFF	<input checked="" type="radio"/> YES	NO
8. Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	N/A	<input checked="" type="radio"/> YES	NO
9. Are all aqueous non-preserved samples pH 4-9?	<input checked="" type="radio"/> N/A	YES	NO
10. Is there sufficient sample for the requested analyses?		<input checked="" type="radio"/> YES	NO
11. Were all samples placed in the proper containers for the requested analyses?		<input checked="" type="radio"/> YES	NO
12. Are all samples within holding times for the requested analyses?		<input checked="" type="radio"/> YES	NO
13. Were all sample containers received intact? (not broken or leaking, etc.)		<input checked="" type="radio"/> YES	NO
14. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon) headspace free? Size of bubble: ___ < green pea ___ > green pea	<input checked="" type="radio"/> N/A	YES	NO
15. Do any water samples contain sediment? Amount Amount of sediment: ___ dusting ___ moderate ___ heavy	N/A	YES	<input checked="" type="radio"/> NO
16. Were the samples shipped on ice?		<input checked="" type="radio"/> YES	<input checked="" type="radio"/> NO
17. Were cooler temperatures measured at 0.1-6.0°C?	IR gun used*: #1 #3 #4	RAD ONLY	YES <input checked="" type="radio"/> NO <input checked="" type="radio"/>
Cooler #: <u>1</u>			
Temperature (°C): <u>Amb</u>			
No. of custody seals on cooler: <u>2</u>			
External µR/hr reading: <u>12</u>			
Background µR/hr reading: <u>12</u>			
Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? <input checked="" type="radio"/> YES / NO / NA (If no, see Form 008.)			

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16.

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

Project Manager Signature / Date: _____

ORIGIN ID: PSCA (509) 528-9426
LESLY WALL
CH2M
6267 LATAH ST.
6289 LATAH ST.
RICHLAND, WA 99354
UNITED STATES US

SHIP DATE: 19 JUN 18
ACTWGT: 35.00 LB
CAD: 10706805/INET3980
BILL THIRD PARTY

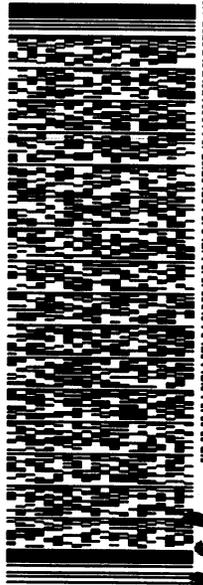
TO JULIE ELLINGSON
ALS GLOBAL
225 COMMERCE DRIVE

12-2

FORT COLLINS CO 80524
(970) 490-1511
INV
PO

REF: PTR#9570000LE# GWS-555

DEPT
THMB



J18118812891ur

352.12/83DF/DCA5

TRK#
0201 7725 0983 4569

WED - 20 JUN 10:30A
PRIORITY OVERNIGHT
DSR

XH FTCA

CO-US 80524
DEN



After printing this label:

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Metals

Case Narrative

CH2M HILL Plateau Remediation Company

Surv, June 2018 – S18-006

Work Order Number: 1806449

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

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

2. Analysis by Trace ICP followed method 6010B 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 analyte. Sample results have been compared to the blank results and are flagged as appropriate. Potassium and sodium 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 6010B were within acceptance criteria.

6. Matrix specific quality control procedures.

Sample 1806447-1 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.

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

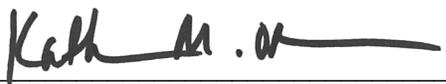
7. Sample dilutions were not required for the requested analysis.

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.



Emily Lyons
Inorganics Primary Data Reviewer

7/17/18
Date



Inorganics Final Data Reviewer

7/19/18
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 SW6010B

Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1806449

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: Surv, June 2018 S18-006

Field ID:	B3JB73
Lab ID:	1806449-2

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 18-Jun-18

Date Extracted: 27-Jun-18

Date Analyzed: 03-Jul-18

Prep Method: SW3005 Rev A

Prep Batch: IP180627-4

QCBatchID: IP180627-4-3

Run ID: IT180703-1A3

Cleanup: NONE

Basis: As Received

File Name: 180703A.

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	160		50	36
7440-70-2	CALCIUM	1	94000		1000	210
7439-89-6	IRON	1	30	U	50	30
7439-95-4	MAGNESIUM	1	19000		750	89
7440-09-7	POTASSIUM	1	8000		1000	130
7440-23-5	SODIUM	1	39000		500	38
7440-62-2	VANADIUM	1	5.4	B	10	0.43

Data Package ID: IT1806449-1

Total Recoverable ICP Metals

Method SW6010B

Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1806449

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: Surv, June 2018 S18-006

Field ID:	B3JF14
Lab ID:	1806449-3

Sample Matrix: WATER
% Moisture: N/A
Date Collected: 18-Jun-18
Date Extracted: 27-Jun-18
Date Analyzed: 03-Jul-18
Prep Method: SW3005 Rev A

Prep Batch: IP180627-4
QCBatchID: IP180627-4-3
Run ID: IT180703-1A3
Cleanup: NONE
Basis: As Received
File Name: 180703A.

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	160		50	36
7440-70-2	CALCIUM	1	94000		1000	210
7439-89-6	IRON	1	50	B	50	30
7439-95-4	MAGNESIUM	1	20000		750	89
7440-09-7	POTASSIUM	1	8000		1000	130
7440-23-5	SODIUM	1	39000		500	38
7440-62-2	VANADIUM	1	5.3	B	10	0.43

Data Package ID: IT1806449-1

ICP Metals

Method SW6010B

Method Blank

Lab Name: ALS -- Fort Collins

Work Order Number: 1806449

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: Surv, June 2018 S18-006

Lab ID: IP180627-4MB

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 27-Jun-18

Date Analyzed: 03-Jul-18

Prep Batch: IP180627-4

QCBatchID: IP180627-4-3

Run ID: IT180703-1A3

Cleanup: NONE

Basis: N/A

File Name: 180703A.

Sample Aliquot: 50 ml

Final Volume: 50 ml

Result Units: UG/L

Clean DF: 1

CASNO	Target Analyte	DF	Result	Result Qualifier	Reporting Limit	MDL
7440-42-8	BORON	1	36	U	50	36
7440-70-2	CALCIUM	1	210	U	1000	210
7439-89-6	IRON	1	30	U	50	30
7439-95-4	MAGNESIUM	1	89	U	750	89
7440-09-7	POTASSIUM	1	150	B	1000	130
7440-23-5	SODIUM	1	65	B	500	38
7440-62-2	VANADIUM	1	0.43	U	10	0.43

Data Package ID: IT1806449-1

ICP Metals

Method SW6010B Laboratory Control Sample

Lab Name: ALS -- Fort Collins

Work Order Number: 1806449

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: Surv, June 2018 S18-006

Lab ID: IP180627-4LCS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 06/27/2018

Date Analyzed: 07/03/2018

Prep Method: SW3005A

Prep Batch: IP180627-4

QCBatchID: IP180627-4-3

Run ID: IT180703-1A3

Cleanup: NONE

Basis: N/A

File Name: 180703A.

Sample Aliquot: 50 ml

Final Volume: 50 ml

Result Units: UG/L

Clean DF: 1

CASNO	Target Analyte	Spike Added	LCS Result	Reporting Limit	Result Qualifier	LCS % Rec.	Control Limits
7440-42-8	BORON	1000	985	50		99	80 - 120%
7440-70-2	CALCIUM	40000	38100	1000		95	80 - 120%
7439-89-6	IRON	1000	1010	50		101	80 - 120%
7439-95-4	MAGNESIUM	40000	38300	750		96	80 - 120%
7440-09-7	POTASSIUM	40000	43600	1000		109	80 - 120%
7440-23-5	SODIUM	40000	39300	500		98	80 - 120%
7440-62-2	VANADIUM	500	479	10		96	80 - 120%

Data Package ID: IT1806449-1

ICP Metals

Method SW6010B

Matrix Spike And Matrix Spike Duplicate

Lab Name: ALS -- Fort Collins

Work Order Number: 1806449

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: Surv, June 2018 S18-006

Field ID: SHARED QC LabID: 1806447-1MS	Sample Matrix: WATER % Moisture: N/A Date Collected: 18-Jun-18 Date Extracted: 27-Jun-18 Date Analyzed: 03-Jul-18 Prep Method: SW3005 Rev A	Prep Batch: IP180627-4 QCBatchID: IP180627-4-3 Run ID: IT180703-1A3 Cleanup: NONE Basis: As Received	Sample Aliquot: 50 ml Final Volume: 50 ml Result Units: UG/L File Name: 180703A.
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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	976		50	1000	98	80 - 120%
7440-70-2	CALCIUM	26000		63000		1000	40000	94	80 - 120%
7439-89-6	IRON	670		1700		50	1000	103	80 - 120%
7439-95-4	MAGNESIUM	5300		42900		750	40000	94	80 - 120%
7440-09-7	POTASSIUM	1200	C	44500		1000	40000	108	80 - 120%
7440-23-5	SODIUM	2600		42000		500	40000	98	80 - 120%
7440-62-2	VANADIUM	0.74	B	486		10	500	97	80 - 120%

Field ID: SHARED QC LabID: 1806447-1MSD	Sample Matrix: WATER % Moisture: N/A Date Collected: 18-Jun-18 Date Extracted: 27-Jun-18 Date Analyzed: 03-Jul-18 Prep Method: SW3005 Rev A	Prep Batch: IP180627-4 QCBatchID: IP180627-4-3 Run ID: IT180703-1A3 Cleanup: NONE Basis: As Received	Sample Aliquot: 50 ml Final Volume: 50 ml Result Units: UG/L File Name: 180703A.
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CASNO	Target Analyte	MSD Result	MSD Qual	Spike Added	MSD % Rec.	Reporting Limit	RPD Limit	RPD
7440-42-8	BORON	988		1000	99	50	20	1
7440-70-2	CALCIUM	63400		40000	95	1000	20	1
7439-89-6	IRON	1710		1000	104	50	20	1
7439-95-4	MAGNESIUM	43300		40000	95	750	20	1
7440-09-7	POTASSIUM	44900		40000	109	1000	20	1
7440-23-5	SODIUM	42300		40000	99	500	20	1
7440-62-2	VANADIUM	492		500	98	10	20	1

Data Package ID: IT1806449-1

ICP Metals

Method SW6010

Duplicate Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1806449

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: Surv, June 2018 S18-006

Field ID:	SHARED QC
Lab ID:	1806447-1D

Sample Matrix: WATER
% Moisture: N/A
Date Collected: 06/18/2018
Date Extracted: 06/27/2018
Date Analyzed: 07/03/2018

Prep Batch: IP180627-4
QCBatchID: IP180627-4-3
Run ID: IT180703-1A3
Cleanup: NONE
Basis: As Received
File Name: 180703A.

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

CASNO	Target Analyte	Sample Result	Samp Qual	Duplicate Result	Dup Qual	Reporting Limit	Dilution Factor	RPD	RPD Limit
7440-42-8	BORON	36	U	36	U	50	1		20
7440-70-2	CALCIUM	26000		25600		1000	1	0	20
7439-89-6	IRON	670		611		50	1	9	20
7439-95-4	MAGNESIUM	5300		5320		750	1	0	20
7440-09-7	POTASSIUM	1200	C	1190		1000	1		20
7440-23-5	SODIUM	2600		2610		500	1	0	20
7440-62-2	VANADIUM	0.74	B	0.586	B	10	1		20

Data Package ID: IT1806449-1

Prep Batch ID: IP180627-4

Start Date: 06/27/18	End Date: 06/27/18	Concentration Method: NONE	Batch Created By: jml
Start Time: 16:16	End Time: 18:16	Extract Method: SW3005A	Date Created: 06/27/18
Prep Analyst: Jill M. Latelle		Initial Volume Units: ml	Time Created: 16:16
Comments:		Final Volume Units: ml	Validated By: jml
<div style="border: 1px solid black; height: 30px; width: 100%;"></div>			Date Validated: 06/27/18
			Time Validated: 17:39

QC Batch ID: IP180627-4-3

Lab ID	QC Type	Field ID	Matrix	Date Collected	Initial Wt/Vol	Final Wt/Vol	Cleanup Method	Cleanup DF	Order Number
IP180627-4	MB	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1806447
IP180627-4	LCS	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1806447
1806447-1	MS	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1806447
1806447-1	MSD	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1806447
1806447-1	DUP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1806447
1806447-1	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1806447
1806447-2	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1806447
1806449-2	SMP	B3JB73	WATER	6/18/2018	50	50	NONE	1	1806449
1806449-3	SMP	B3JF14	WATER	6/18/2018	50	50	NONE	1	1806449
1806509-1	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1806509
1806509-2	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1806509

QC Types

CAR	Carrier reference sample	DUP	Laboratory Duplicate
LCS	Laboratory Control Sample	LCSD	Laboratory Control Sample Duplicat
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

Surv, June 2018 – S18-006

Work Order Number: 1806449

1. The sample was prepared according to the current revision of SOP 707.
2. The sample was analyzed for the presence of ⁹⁰Sr according to the current revision of SOP 724. The analysis was completed on 07/03/2018.
3. Total radio-strontium is reported as ⁹⁰Sr. The presence of other radioisotopes of strontium may cause positive bias in the measured strontium concentration.
4. The analysis results for the sample are reported in units of pCi/L. The sample was not filtered prior to analysis.
5. Sample volume was insufficient to allow preparation of a duplicate. A laboratory control sample duplicate (LCSD) was prepared in lieu of a client sample duplicate.
6. In accordance with project specific instructions, the evaluation threshold for Relative Percent Difference (RPD) has been set at 20%. RPD is defined as:

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

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

7. No anomalous situations were encountered during the preparation and analysis of 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

7/11/18
Date

Kath M. W.
Radiochemistry Final Data Reviewer

7/19/18
Date

Strontium-90 by GFPC

PAI 724 Rev 12

Method Blank Results

Lab Name: ALS -- Fort Collins
 Work Order Number: 1806449
 Client Name: CH2M HILL Plateau Remediation Company
 ClientProject ID: Surv, June 2018 S18-006

Lab ID: SR180627-1MB	Sample Matrix: WATER	Prep Batch: SR180627-1	Final Aliquot: 995 ml
	Prep SOP: PAI 707 Rev 14	QCBatchID: SR180627-1-2	Result Units: pCi/l
	Date Collected: 27-Jun-18	Run ID: SR180627-1A	File Name: SRC0703B
	Date Prepared: 27-Jun-18	Count Time: 300 minutes	
	Date Analyzed: 03-Jul-18		

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10098-97-2	Sr-90	1.50E-02 +/- 1.37E-01	2.86E-01	1.00E+00	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
STRONTIUM	1.040E+03	9.08E+02	ug	87.3	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.
 LT - Result is less than Requested MDC, greater than sample specific MDC.

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: SR1806449-1

Strontium-90 by GFPC

PAI 724 Rev 12

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins
Work Order Number: 1806449
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: Surv, June 2018 S18-006

Lab ID: SR180627-1LCS

Sample Matrix: WATER
Prep SOP: PAI 707 Rev 14
Date Collected: 27-Jun-18
Date Prepared: 27-Jun-18
Date Analyzed: 03-Jul-18

Prep Batch: SR180627-1
QCBatchID: SR180627-1-2
Run ID: SR180627-1A
Count Time: 30 minutes

Final Aliquot: 995 ml
Result Units: pCi/l
File Name: SRC0703C

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
10098-97-2	Sr-90	1.11E+01 +/- 2.84E+00	8.98E-01	1.070E+01	104	75 - 125	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
STRONTIUM	1.040E+03	9.49E+02	ug	91.2	40 - 110 %	

Comments:

Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- LT - Result is less than Requested MDC, greater than 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: SR1806449-1

Strontium-90 by GFPC

PAI 724 Rev 12

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins
Work Order Number: 1806449
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: Surv, June 2018 S18-006

Lab ID: SR180627-1LCSD	Sample Matrix: WATER	Prep Batch: SR180627-1	Final Aliquot: 995 ml
	Prep SOP: PAI 707 Rev 14	QCBatchID: SR180627-1-2	Result Units: pCi/l
	Date Collected: 27-Jun-18	Run ID: SR180627-1A	File Name: SRC0703C
	Date Prepared: 27-Jun-18	Count Time: 30 minutes	
	Date Analyzed: 03-Jul-18		

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	9.36E-01	1.070E+01	104	75 - 125	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
STRONTIUM	1.070E+03	9.33E+02	ug	87.0	40 - 110 %	

Comments:

Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- LT - Result is less than Requested MDC, greater than 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: SR1806449-1

Strontium-90 by GFPC
PAI 724 Rev 12
Duplicate Sample Results (DER)

Lab Name: ALS -- Fort Collins
Work Order Number: 1806449
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: Surv, June 2018 S18-006

Field ID:	
Lab ID:	SR180627-1LCSD

Sample Matrix: WATER
Prep SOP: PAI 707 Rev 14
Date Collected: 27-Jun-18
Date Prepared: 27-Jun-18
Date Analyzed: 03-Jul-18

Prep Batch: SR180627-1
QCBatchID: SR180627-1-2
Run ID: SR180627-1A
Count Time: 30 minutes

Final Aliquot: 995 ml
Prep Basis: Unfiltered
Moisture(%): NA
Result Units: pCi/l
File Name: SRC0703C

CASNO	Analyte	Sample				Duplicate				DER	DER Lim
		Result +/-	2 s TPU	MDC	Flags	Result +/-	2 s TPU	MDC	Flags		
10098-97-2	Sr-90	1.11E+01 +/- 2.84E+00		8.98E-01		1.11E+01 +/- 2.85E+00		9.36E-01		0.00309	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: SR1806449-1

Strontium-90 by GFPC

PAI 724 Rev 12

Duplicate Sample Results (RPD)

Lab Name: ALS -- Fort Collins
Work Order Number: 1806449
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: Surv, June 2018 S18-006

Field ID:	
Lab ID:	SR180627-1LCSD

Sample Matrix: WATER
Prep SOP: PAI 707 Rev 14
Date Collected: 27-Jun-18
Date Prepared: 27-Jun-18
Date Analyzed: 03-Jul-18

Prep Batch: SR180627-1
QCBatchID: SR180627-1-2
Run ID: SR180627-1A
Count Time: 30 minutes

Final Aliquot: 995 ml
Prep Basis: Unfiltered
Moisture(%): NA
Result Units: pCi/l
File Name: SRC0703C

CASNO	Analyte	Sample				Duplicate				RPD	RPD Lim
		Result +/-	2 s TPU	MDC	Flags	Result +/-	2 s TPU	MDC	Flags		
10098-97-2	Sr-90	1.11E+01 +/- 2.84E+00		8.98E-01		1.11E+01 +/- 2.85E+00		9.36E-01		0.00	20

Comments:

Qualifiers/Flags:

- + - Duplicate RPD not within limits.
- LT - Result is less than Request MDC, greater than sample specific MDC
- 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: SR1806449-1

Strontium-90 by GFPC

PAI 724 Rev 12

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1806449
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: Surv, June 2018 S18-006

Field ID:	B3JB76
Lab ID:	1806449-1

Sample Matrix: WATER
Prep SOP: PAI 707 Rev 14
Date Collected: 18-Jun-18
Date Prepared: 27-Jun-18
Date Analyzed: 03-Jul-18

Prep Batch: SR180627-1
QCBatchID: SR180627-1-2
Run ID: SR180627-1A
Count Time: 75 minutes
Report Basis: Unfiltered

Final Aliquot: 995 ml
Prep Basis: Unfiltered
Moisture(%): NA
Result Units: pCi/l
File Name: SRC0703

Analysis ReqCode: SRISO_SEP_PR

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10098-97-2	Sr-90	1.24E+02 +/- 2.92E+01	5.67E-01	1E+00	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
STRONTIUM	1.230E+03	1.09E+03	ug	88.7	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.
- LT - Result is less than Requested MDC, greater than sample specific MDC.
- 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: SR1806449-1

Prep Batch ID: SR180627-1

Start Date: 06/27/18	End Date: 06/27/18	Concentration Method: NONE	Batch Created By: rgs
Start Time: 7:32	End Time: 7:32	Extract Method: PAI 70714	Date Created: 06/27/18
Prep Analyst: Reilly G. Stockton		Initial Volume Units: ml	Time Created: 7:32
Comments:		Final Volume Units: ml	Validated By: rgs
<div style="border: 1px solid black; height: 30px; width: 100%;"></div>			Date Validated: 06/29/18
			Time Validated: 8:11

QC Batch ID: SR180627-1-2

Lab ID	QC Type	Field ID	Matrix	Date Collected	Initial Wt/Vol	Final Wt/Vol	Cleanup Method	Cleanup DF	Order Number
SR180627-1	CAR	XXXXXX	WATER	XXXXXX	1000	1000	NONE	1	1806446
SR180627-1	MB	XXXXXX	WATER	XXXXXX	1000	994.50	NONE	1	1806446
SR180627-1	LCS	XXXXXX	WATER	XXXXXX	1000	994.50	NONE	1	1806446
SR180627-1	LCSD	XXXXXX	WATER	XXXXXX	1000	994.50	NONE	1	1806446
1806446-1	SMP	XXXXXX	WATER	XXXXXX	1000	994.50	NONE	1	1806446
1806449-1	SMP	B3JB76	WATER	6/18/2018	1000	994.50	NONE	1	1806449
1806510-3	SMP	XXXXXX	WATER	XXXXXX	1000	994.50	NONE	1	1806510
1806511-2	SMP	XXXXXX	WATER	XXXXXX	1000	994.50	NONE	1	1806511
1806512-5	SMP	XXXXXX	WATER	XXXXXX	1000	994.50	NONE	1	1806512
1806512-6	SMP	XXXXXX	WATER	XXXXXX	1000	994.50	NONE	1	1806512
1806512-7	SMP	XXXXXX	WATER	XXXXXX	1000	994.50	NONE	1	1806512
1806564-1	SMP	XXXXXX	WATER	XXXXXX	1000	994.50	NONE	1	1806564
1806565-1	SMP	XXXXXX	WATER	XXXXXX	1000	994.50	NONE	1	1806565
1806565-2	SMP	XXXXXX	WATER	XXXXXX	1000	994.50	NONE	1	1806565
1806608-1	SMP	XXXXXX	WATER	XXXXXX	1000	994.50	NONE	1	1806608

QC Types

CAR	Carrier reference sample	DUP	Laboratory Duplicate
LCS	Laboratory Control Sample	LCSD	Laboratory Control Sample Duplicat
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		