



Tuesday, July 18, 2017

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

Re: ALS Workorder: 1706170
Project Name: SURV, MAY 2017
Project Number: S17-005

Dear Ms. Waters-Husted:

Six water samples were received from CH2M HILL Plateau Remediation Company, on 6/7/2017. The samples were scheduled for the following analysis:

Metals

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
Shiloh J. Summy
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, 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: 1706170
Client Name: CH2M HILL Plateau Remediation Company
Client Project Name: SURV, MAY 2017
Client Project Number: S17-005
Client PO Number: BOA 54854

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
B39CW4	1706170-1		WATER	06-Jun-17	11:00
B39CW9	1706170-2		WATER	06-Jun-17	11:00
B39CT6	1706170-3		WATER	06-Jun-17	10:30
B39CT2	1706170-4		WATER	06-Jun-17	10:30
B39CV3	1706170-5		WATER	06-Jun-17	10:50
B39CT8	1706170-6		WATER	06-Jun-17	10:50

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # **S17-005-015**
Page 1 of 1

CH2M Hill Plateau Remediation Company

Collector: Roger Friesz Jr. /CHPRC
Contact/Requester: Karen Waters-Husted
Telephone No.: 509-376-4650
SAF No.: S17-005
Sampling Origin: Hanford Site
Purchase Order/Charge Code: 300071
Project Title: SURV, MAY 2017
Logbook No.: HNF-N-506 92/88
Ice Chest No.: GWS-384
Shipped To (Lab): ALS Environmental Ft. Collins
Method of Shipment: Commercial Carrier
Bill of Lading/Air Bill No.: 77931559 5214
Protocol: SURV
Priority: 30 Days
Offsite Property No.: 8005
SPECIAL INSTRUCTIONS: PRIORITY
Hold Time:
Total Activity Exemption: Yes No

POSSIBLE SAMPLE HAZARDS/REMARKS
 *** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1

Sample No.	Filter	* Date	Time	No./Type Container	Sample Analysis	Holding Time	Preservative
B39CW4 ①	N	6-6-17	1100	1x500-mL G/P	6020_METALS_ICPMS: Chromium (1)	6 Months	HNO3 to pH <2
B39CW9 ②	Y	6-6-17	1100	1x500-mL G/P	6020_METALS_ICPMS: Chromium (1)	6 Months	HNO3 to pH <2

Relinquished By Roger Friesz Jr. /CHPRC	Date/Time JUN 06 2017 1245	Received By Ledy Wall /CHPRC	Date/Time JUN 06 2017	Print Ledy Wall	Sign Ledy Wall	Date/Time JUN 06 2017	Matrix *
Relinquished By Ledy Wall /CHPRC	Date/Time JUN 06 2017 1400	Received By FEDEX	Date/Time JUN 06 2017				
Relinquished By KED EX	Date/Time	Received By C. Trumble	Date/Time 6-7-17 0820				
Relinquished By	Date/Time	Received By	Date/Time				

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

07/18/2017
ALS1706170

REV.0

CH2M Hill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. #

S17-005-013

Page 1 of 1

Collector: Roger Friesz Jr. /CHPRC
Contact/Requester: Karen Waters-Husted
Telephone No.: 509-376-4650
SAF No.: S17-005
Sampling Origin: Hanford Site
Purchase Order/Charge Code: 300071
Project Title: SURV, MAY 2017
Logbook No.: HNF-N-506 92/88
Ice Chest No.: 645-394
Shipped To (Lab): ALS Environmental Ft. Collins
Method of Shipment: Commercial Carrier
Bill of Lading/Air Bill No.: 7793 1559 5214
Protocol: SURV
Priority: 30 Days **PRIORITY**
Offsite Property No.: 8005
Total Activity Exemption: Yes No

POSSIBLE SAMPLE HAZARDS/REMARKS

*** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1

SPECIAL INSTRUCTIONS

N/A

Sample No.	Filter	* Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B39CT6 (3)	Y	6-6-17	1030	1x500-mL G/P	6020_METALS_ICPMS: Chromium (1)	6 Months	HNO3 to pH <2
B39CT2 (9)	N	6-6-17	1030	1x500-mL G/P	6020_METALS_ICPMS: Chromium (1)	6 Months	HNO3 to pH <2

Relinquished By	Date/Time	Received By	Date/Time	Print	Sign	Matrix *
Roger Friesz Jr. /CHPRC	JUN 06 2017 1215	Lady Wall /CHPRC	JUN 06 2017 1245			S = Soil, DS = Drum Solids, SE = Sediment, DL = Drum Liquids, SO = Solid, T = Tissue, SL = Sludge, WI = Wipe, W = Water, O = Oil, A = Air, V = Vegetation, L = Liquid, X = Other
Lady Wall /CHPRC	JUN 06 2017 1400	FEDEX				
FEDEX		CTI Metals	6-7-17 0920			

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

Disposed By

Date/Time

Collector Roger Friesz Jr. /CHPRC
Contact/Requester Karen Waters-Husted
Telephone No. 509-376-4650
SAF No. S17-005
Sampling Origin Hanford Site
Purchase Order/Charge Code 300071
Project Title SURV, MAY 2017
Logbook No. HNF-N-506 82/88
Ice Chest No. GWS-394
Shipped To (Lab) ALS Environmental Ft. Collins
Method of Shipment Commercial Carrier
Bill of Lading/Air Bill No. 7793 1559 5214
Protocol SURV
Priority: 30 Days **PRIORITY**
Offsite Property No. 8005
SPECIAL INSTRUCTIONS N/A
Total Activity Exemption: Yes No

POSSIBLE SAMPLE HAZARDS/REMARKS

*** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B39CV3	Y	W	6-6-17	1050	1x500-mL G/P	6020_METALS_ICPMS: Chromium (1)	6 Months	HNO3 to pH <2
B39CT8	N	W	6-6-17	1050	1x500-mL G/P	6020_METALS_ICPMS: Chromium (1)	6 Months	HNO3 to pH <2

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix *
Roger Friesz Jr. /CHPRC			JUN 06 2017 1245	Lady Wall /CHPRC	Jesly Wall		JUN 06 2017 1245	S = Soil, SE = Sediment, SO = Solid, SL = Sludge, W = Water, O = Oil, A = Air, DS = Drum Solids, DL = Drum Liquids, T = Tissue, WI = Wipe, L = Liquid, V = Vegetation, X = Other
Lady Wall /CHPRC			JUN 06 2017 1400	FEDEX				
Lady Wall /CHPRC				CRIMBLE	CRIMBLE		6-17 0920	
Relinquished By			Date/Time	Received By			Date/Time	

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

Disposed By

Date/Time



ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: CHPRC

Workorder No: 1706170

Project Manager: _____

Initials: CDT Date: 6-7-17

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 of sediment: ___ dusting ___ moderate ___ heavy	Amount 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*: #2 #4	RAD ONLY	YES	<input checked="" type="radio"/> NO
Cooler #: <u>1</u>			
Temperature (°C): <u>Amb</u>			
No. of custody seals on cooler: <u>2</u>			
External µR/hr reading: <u>10</u>			
Background µR/hr reading: <u>10</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 / N/A Contact: _____ Date/Time: _____

Project Manager Signature / Date: Shelby Summy 6/7/17



Metals

Case Narrative

CH2M HILL Plateau Remediation Company

SURV, MAY 2017 -- S17-005

Work Order Number: 1706170

1. This report consists of 6 water samples for total recoverable and dissolved metals.
2. The samples were received intact at ambient temperature by ALS on 06/07/17.
3. The samples were filtered through a 0.45 micron filter and preserved with nitric acid to a pH less than two prior to analysis.
4. The samples were prepared and analyzed based on SW-846, 3rd Edition procedures.

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

5. Analysis by ICP-MS followed method 6020A and the current revision of SOP 827.
6. All standards and solutions are NIST traceable and were used within their recommended shelf life.
7. The samples were prepared and analyzed within the established hold times.

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

8. 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.
 - All laboratory control sample criteria were met.



- All initial and continuing calibration blanks were below the reporting limit for the requested analyte.
- All initial and continuing calibration verifications were within the acceptance criteria for the requested analyte.
- The interference check samples associated with Method 6020A were analyzed.

9. Matrix specific quality control procedures.

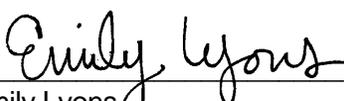
Sample 1706170-1 was designated as the quality control sample for this analysis.

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

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

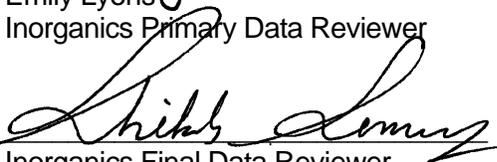
10. It is a standard practice that samples for ICP-MS are analyzed at a dilution. Sample -3 required a further dilution to bring chromium into the analytical range of the ICP-MS. The 10X factor can be considered an artifact of the prep and does not indicate a secondary dilution and is therefore not flagged 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.



Emily Lyons
Inorganics Primary Data Reviewer

7/18/17
Date



Lihb Lomuz
Inorganics Final Data Reviewer

7/18/17
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 CHROMIUM

Method SW6020A

Sample Results

Lab Name: ALS -- Fort Collins
Client Name: CH2M HILL Plateau Remediation Company
Client Project ID: SURV, MAY 2017 S17-005
Work Order Number: 1706170 **Final Volume:** 50 ml
Reporting Basis: As Received **Matrix:** WATER
Analyst: Brent A. Stanfield **Result Units:** UG/L

Client Sample ID	Lab ID	Date Collected	Date Prepared	Date Analyzed	Percent Moisture	Dilution Factor	Result	RptLimit/ LOQ/LOD	MDL/DL	Flag	Sample Aliquot
B39CW9	1706170-2	6/6/2017	6/20/2017	07/11/2017	N/A	10	3.4	10	3	B	50 ml
B39CT6	1706170-3	6/6/2017	6/20/2017	07/11/2017	N/A	100	30	100	30	U	50 ml
B39CV3	1706170-5	6/6/2017	6/20/2017	07/11/2017	N/A	10	11	10	3		50 ml

Comments:

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

Data Package ID: *im1706170-1*

Total Recoverable CHROMIUM

Method SW6020A

Sample Results

Lab Name: ALS -- Fort Collins
Client Name: CH2M HILL Plateau Remediation Company
Client Project ID: SURV, MAY 2017 S17-005
Work Order Number: 1706170 **Final Volume:** 50 ml
Reporting Basis: As Received **Matrix:** WATER
Analyst: Brent A. Stanfield **Result Units:** UG/L

Client Sample ID	Lab ID	Date Collected	Date Prepared	Date Analyzed	Percent Moisture	Dilution Factor	Result	RptLimit/ LOQ/LOD	MDL/DL	Flag	Sample Aliquot
B39CW4	1706170-1	6/6/2017	6/20/2017	07/11/2017	N/A	10	4.5	10	3	B	50 ml
B39CT2	1706170-4	6/6/2017	6/20/2017	07/11/2017	N/A	10	4.8	10	3	B	50 ml
B39CT8	1706170-6	6/6/2017	6/20/2017	07/11/2017	N/A	10	11	10	3		50 ml

Comments:

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

Data Package ID: *im1706170-1*

ALS1706170

ICPMS Metals

Method SW6020A

Method Blank

Lab Name: ALS -- Fort Collins

Work Order Number: 1706170

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: SURV, MAY 2017 S17-005

Lab ID: IP170620-10MB

Sample Matrix: WATER

Prep Batch: IP170620-10

Sample Aliquot: 50 ml

% Moisture: N/A

QCBatchID: IP170620-10-3

Final Volume: 50 ml

Date Collected: N/A

Run ID: IM170711-10A4

Result Units: UG/L

Date Extracted: 20-Jun-17

Cleanup: NONE

Clean DF: 1

Date Analyzed: 11-Jul-17

Basis: N/A

File Name: 077SMPL_

CASNO	Target Analyte	DF	Result	Result Qualifier	Reporting Limit	MDL
7440-47-3	CHROMIUM	10	3	U	10	3

Data Package ID: im1706170-1

ALS1706170

ICPMS Metals

Method SW6020A

Laboratory Control Sample

Lab Name: ALS -- Fort Collins

Work Order Number: 1706170

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: SURV, MAY 2017 S17-005

Lab ID: IM170620-10LCS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 06/20/2017

Date Analyzed: 07/11/2017

Prep Method: SW3005A

Prep Batch: IP170620-10

QCBatchID: IP170620-10-3

Run ID: IM170711-10A4

Cleanup: NONE

Basis: N/A

File Name: 078SMPL_

Sample Aliquot: 50 ml

Final Volume: 50 ml

Result Units: UG/L

Clean DF: 1

CASNO	Target Analyte	Spike Added	LCS Result	Reporting Limit	Result Qualifier	LCS % Rec.	Control Limits
7440-47-3	CHROMIUM	500	477	10		95	80 - 120%

Data Package ID: *im1706170-1*

ICPMS Metals

Method SW6020A

Matrix Spike And Matrix Spike Duplicate

Lab Name: ALS -- Fort Collins

Work Order Number: 1706170

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: SURV, MAY 2017 S17-005

Field ID: B39CW4	Sample Matrix: WATER	Prep Batch: IP170620-10	Sample Aliquot: 50 ml
LabID: 1706170-1MS	% Moisture: N/A	QCBatchID: IP170620-10-3	Final Volume: 50 ml
	Date Collected: 06-Jun-17	Run ID: IM170711-10A4	Result Units: UG/L
	Date Extracted: 20-Jun-17	Cleanup: NONE	File Name: 097SMPL_
	Date Analyzed: 11-Jul-17	Basis: As Received	
	Prep Method: SW3005 Rev A		

CASNO	Target Analyte	Sample Result	Samp Qual	MS Result	MS Qual	Reporting Limit	Spike Added	MS % Rec.	Control Limits
7440-47-3	CHROMIUM	4.5	B	492		10	500	97	75 - 125%

Field ID: B39CW4	Sample Matrix: WATER	Prep Batch: IP170620-10	Sample Aliquot: 50 ml
LabID: 1706170-1MSD	% Moisture: N/A	QCBatchID: IP170620-10-3	Final Volume: 50 ml
	Date Collected: 06-Jun-17	Run ID: IM170711-10A4	Result Units: UG/L
	Date Extracted: 20-Jun-17	Cleanup: NONE	File Name: 098SMPL_
	Date Analyzed: 11-Jul-17	Basis: As Received	
	Prep Method: SW3005 Rev A		

CASNO	Target Analyte	MSD Result	MSD Qual	Spike Added	MSD % Rec.	Reporting Limit	RPD Limit	RPD
7440-47-3	CHROMIUM	491		500	97	10	20	0

Data Package ID: *im1706170-1*

Prep Batch ID: IP170620-10

Start Date: 06/20/17	End Date: 06/20/17	Concentration Method: NONE	Batch Created By: ajl2
Start Time: 14:24	End Time: 18:00	Extract Method: SW3005A	Date Created: 06/20/17
Prep Analyst: Amanda J. Lynn		Initial Volume Units: ml	Time Created: 14:25
Comments:		Final Volume Units: ml	Validated By: ajl2
<div style="border: 1px solid black; height: 30px; width: 100%;"></div>			Date Validated: 06/20/17
			Time Validated: 15:39

QC Batch ID: IP170620-10-3

Lab ID	QC Type	Field ID	Matrix	Date Collected	Initial Wt/Vol	Final Wt/Vol	Cleanup Method	Cleanup DF	Order Number
IP170620-10	MB	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1706170
IM170620-10	LCS	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1706170
1706170-1	MS	B39CW4	WATER	6/6/2017	50	50	NONE	1	1706170
1706170-1	MSD	B39CW4	WATER	6/6/2017	50	50	NONE	1	1706170
1706170-1	DUP	B39CW4	WATER	6/6/2017	50	50	NONE	1	1706170
1706170-1	SMP	B39CW4	WATER	6/6/2017	50	50	NONE	1	1706170
1706170-2	SMP	B39CW9	WATER	6/6/2017	50	50	NONE	1	1706170
1706170-3	SMP	B39CT6	WATER	6/6/2017	50	50	NONE	1	1706170
1706170-4	SMP	B39CT2	WATER	6/6/2017	50	50	NONE	1	1706170
1706170-5	SMP	B39CV3	WATER	6/6/2017	50	50	NONE	1	1706170
1706170-6	SMP	B39CT8	WATER	6/6/2017	50	50	NONE	1	1706170

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		