ALS Environmental

Ft. Collins, Colorado LIMS Version: 6.820

Friday, July 29, 2016

Dave Todak
CH2M HILL Plateau Remediation Company
2420 Stevens Center
Richland, WA 99352

Re: ALS Workorder: 1607120
Project Name: FY15 100-K AB Waste Sites - Soil
Project Number: F16-002

Dear Mr. Todak:

One soil sample was received from CH2M HILL Plateau Remediation Company, on 7/8/2016. The sample was scheduled for the following analyses:

Metals
Inorganics

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
Julie Ellingson
Project Manager

ADDRESS 225 Commerce Drive, Fort Collins, Colorado, USA 80524 | PHONE +1 970 490 1511 | FAX +1 970 490 1522
ALS GROUP USA, CORP. Part of the ALS Laboratory Group An ALS Limited Company

environmental www.alsglobal.com
RIGHT SOLUTIONS RIGHT PARTNER

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Connecticut (CT)	PH-0232
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
L-A-B (DoD ELAP/ISO 170250)	L2257
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

ALS Environmental -- FC

Sample Number(s) Cross-Reference Table

OrderNum: 1607120
Client Name: CH2M HILL Plateau Remediation Company
Client Project Name: FY15 100-K AB Waste Sites - Soil
Client Project Number: F16-002
Client PO Number: BOA 54854

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
B35WP3	1607120-1		SOIL	07-Jul-16	7:15

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F16-002-080	PAGE 1 OF 1
COLLECTOR: Frank Hall /CHPRC	COMPANY CONTACT: TODAK, D	TELEPHONE NO.: 376-6427	PROJECT COORDINATOR: TODAK, D	PRICE CODE: 8C	DATA TURNAROUND
SAMPLING LOCATION: 100-K-105, Sample 2 EB	PROJECT DESIGNATION: FY15 100-K AB Waste Sites - Soil		SAF NO.: F16-002	AIR QUALITY ☐	15 Days / 15 Days
ICE CHEST NO.: GWS-564	FIELD LOGBOOK NO.: ~~HNF-N-~~ 507-34	ACTUAL SAMPLE DEPTH: Surface	COA: 303808	METHOD OF SHIPMENT: FEDERAL EXPRESS	ORIGINAL
SHIPPED TO: ALS Environmental Ft. Collins	OFFSITE PROPERTY NO.: 68804		BILL OF LADING/AIR BILL NO.: 7766 8970 4000		

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

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

SPECIAL HANDLING AND/OR STORAGE

PRESERVATION	None	None	Cool <=6C
HOLDING TIME	6 Months	28 Days	28 Days/48 Hours
TYPE OF CONTAINER	G/P	G	G/P
NO. OF CONTAINER(S)	1	1	1
VOLUME	250mL	60mL	60mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	7471_MERCURY _CV: COMMON (SOLIDS) (Mercury);	SEE ITEM (2) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME			
B35WP3 (1)	SOIL	JUL 07 2016	0715	✓	✓	✓

1607120

7/29/2016
ALS1607120

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM: Frank Hall /CHPRC	DATE/TIME: JUL 07 2016 0740	RECEIVED BY/STORED IN: Janelle Zunker CHPRC	DATE/TIME: JUL 07 2016 0740
RELINQUISHED BY/REMOVED FROM: Janelle Zunker CHPRC	DATE/TIME: JUL 07 2016 0745	RECEIVED BY/STORED IN: FEDEX	DATE/TIME:
RELINQUISHED BY/REMOVED FROM: Fedex	DATE/TIME: 7-8-16 0915	RECEIVED BY/STORED IN: Scott Malby	DATE/TIME: 7-8-16 0915
RELINQUISHED BY/REMOVED FROM	DATE/TIME:	RECEIVED BY/STORED IN	DATE/TIME:
RELINQUISHED BY/REMOVED FROM	DATE/TIME:	RECEIVED BY/STORED IN	DATE/TIME:
RELINQUISHED BY/REMOVED FROM	DATE/TIME:	RECEIVED BY/STORED IN	DATE/TIME:
RELINQUISHED BY/REMOVED FROM	DATE/TIME:	RECEIVED BY/STORED IN	DATE/TIME:

SPECIAL INSTRUCTIONS
(1) 6020_METALS_ICPMS: COMMON {Aluminum, Antimony, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Molybdenum, Selenium, Silver}; 6020_METALS_ICPMS: COMMON (Add-on) {Arsenic, Iron, Manganese, Nickel, Sodium, Strontium, Tin, Uranium, Vanadium, Zinc};
(2) 300.0_ANIONS_IC: COMMON {Chloride, Nitrogen in Nitrate, Nitrogen in Nitrite, Sulfate};

LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 5/26/2016 FSR ID = FSR32959 TRVL NUM = TRVL-16-159 A-6003-618 (REV 2)

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: CHPRC Workorder No: 1607120

Project Manager: JME Initials: SDM Date: 7-8-16

1. Does this project require any special handling in addition to standard ALS procedures?			YES	(NO)
2. Are custody seals on shipping containers intact?	NONE		(YES)	NO
3. Are Custody seals on sample containers intact?	NONE		(YES)	NO
4. Is there a COC (Chain-of-Custody) present or other representative documents?			(YES)	NO
5. Are the COC and bottle labels complete and legible?			(YES)	NO
6. Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)			(YES)	NO
7. Were airbills / shipping documents present and/or removable?	DROP OFF		(YES)	NO
8. Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	(N/A)		YES	NO
9. Are all aqueous non-preserved samples pH 4-9?	(N/A)		YES	NO
10. Is there sufficient sample for the requested analyses?			(YES)	NO
11. Were all samples placed in the proper containers for the requested analyses?			(YES)	NO
12. Are all samples within holding times for the requested analyses?			(YES)	NO
13. Were all sample containers received intact? (not broken or leaking, etc.)			(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	(N/A)		YES	NO
15. Do any water samples contain sediment? Amount Amount of sediment: ____ dusting ____ moderate ____ heavy	(N/A)		YES	NO
16. Were the samples shipped on ice?			(YES)	NO
17. Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #2 (#4)		RAD ONLY	(YES)	NO

Cooler #:	1							
Temperature (°C):	1.8							
No. of custody seals on cooler:	2							
DOT Survey/ Acceptance Information — External µR/hr reading:	12							
Background µR/hr reading:	11							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? (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: [signature] 7/8/16

*IR Gun #2: Oakton, SN 29922500201-0066
*IR Gun #4: Oakton, SN 2372220101-0002

Form 201r24.xls (06/04/2012)

1607120

ORIGIN ID:PSCA (509) 373-3580
JANELLE ZUNKER
CH2M
6269 LATAH ST.
RICHLAND, WA 99354
UNITED STATES US

SHIP DATE: 07JUL16
ACTWGT: 55.00 LB
CAD: 10706605/INET3730

BILL THIRD PARTY

TO JULIE ELLINGSON
ALS GLOBAL
225 COMMERCE DRIVE
FORT COLLINS CO 80524
(970) 490-1511
INV:
PO:
REF: 6304
DEPT:

12
-2

FedEx Express

540J1/5CBD/727F

1.82

FRI - 08 JUL 10:30A
PRIORITY OVERNIGHT
DSR
80524
CO-US DEN

TRK# 0201 7766 8970 4000

XH FTCA

1607120

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

Metals
Case Narrative

CH2M HILL Plateau Remediation Company

FY15 100-K AB Waste Sites - Soil – F16-002

Work Order Number: 1607120

1. This report consists of 1 soil sample.

2. The sample was received intact at 16.2°C by ALS on 07/11/16.

3. The sample was prepared and analyzed based on SW-846, 3rd Edition procedures.

   For analysis by ICP-MS, the sample was digested following method 3050B and the current revision of SOP 806.

   For analysis by Cold Vapor AA (CVAA), the sample was digested following method 7471A and the current revision of SOP 812.

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

   Analysis by CVAA followed method 7471A and the current revision of SOP 812.

5. All standards and solutions are NIST traceable and were used within their recommended shelf life.

6. The samples were prepared and analyzed within the established hold times.

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

7. General quality control procedures.
   - A preparation (method) blank and laboratory control sample were digested and analyzed with the sample in each digestion batch.
   - The preparation (method) blank associated with each digestion batch was below the reporting limit for the requested analytes. Aluminum, iron, manganese, strontium, and vanadium have results detected above the MDL. 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 analytes.
- All initial and continuing calibration verifications were within the acceptance criteria for the requested analytes.
- The interference check samples associated with Method 6020A were analyzed.

8. Matrix specific quality control procedures.

Sample 1607156-4 was designated as the quality control sample for the ICP-MS analysis. Sample 1607120-1 was designated as the quality control sample for the mercury 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 were met with the following exceptions:

Analyte	Sample ID
Antimony	1607156-4MS/MSD
Strontium	1607156-4MS/MSD

The native sample results are flagged for matrix spike failure and an analytical post spike was performed. The results of the spike were acceptable indicating that the matrix was not significantly affecting quantitation of these analytes.

- Matrix spike recoveries could not be evaluated for the following analytes:

Analyte	Sample ID
Aluminum	1607156-4
Barium	1607156-4
Iron	1607156-4
Manganese	1607156-4
Vanadium	1607156-4

The concentrations of these analytes in the native sample were greater than four times the concentration of matrix spike added during the digestion. When sample concentration is that much greater than the spike added, spike recoveries may not be accurate. The laboratory control sample indicates that the digestion and analysis were in control.

- A serial dilution was analyzed with the ICPMS batch. All acceptance criteria were met.

9. It is a standard practice that samples for ICP-MS are analyzed at 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.

Jill Latelle — 7/26/16
Jill Latelle — Date
Inorganics Primary Data Reviewer

7/28/16
Inorganics Final Data Reviewer — Date

Inorganic Data Reporting Qualifiers

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

- Result qualifier -- A “B” is entered if the reported value was obtained from a reading that was less than the Reporting Limit but greater than or equal to the Method Detection Limit (MDL). If the analyte was analyzed for but not detected a “U” is entered. For samples, negative values are reported as non-detects (“U” flagged). For blanks, if the absolute value of the negative value is above the MDL and below the reporting limit, then the result is “B” flagged.

- QC qualifier -- Specified entries and their meanings are as follows:

  E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

  M - Duplicate injection precision was not met.

  N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

  Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

  * - Duplicate analysis (relative percent difference) not within control limits.

  S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

  C - The analyte was detected in both the sample and the associated QC blank, and the sample concentration was <=20X the blank concentration.

  D - Analyte was reported at a secondary dilution factor, typically DF>1 (i.e., the primary preparation required dilution to either bring the analyte within the calibration range or to minimize interference). Required for organics/wetchem if the sample was diluted.

Total ICPMS Metals

Method SW6020A

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1607120
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: FY15 100-K AB Waste Sites - Soil F16-002

Field ID: B35WP3
Lab ID: 1607120-1

Sample Matrix: SOIL
% Moisture: 0.1
Date Collected: 07-Jul-16
Date Extracted: 13-Jul-16
Date Analyzed: 14-Jul-16
Prep Method: SW3050 Rev B

Prep Batch: IP160713-1
QCBatchID: IP160713-1-4
Run ID: IM160714-10A9
Cleanup: NONE
Basis: Dry Weight
File Name: 049SMPL_

Analyst: Brent A. Stanfield
Sample Aliquot: 1.033 g
Final Volume: 100 ml
Result Units: UG/KG
Clean DF: 1

CASNO	Target Analyte	Dilution Factor	Result	RptLimit/ LOQ/LOD	MDL/DL	Result Qualifier	EPA Qualifier
7429-90-5	ALUMINUM	10	35000	9700	1100		
7440-36-0	ANTIMONY	10	61	97	11	B	N
7440-38-2	ARSENIC	10	550	190	21		
7440-39-3	BARIUM	10	11000	480	19		
7440-41-7	BERYLLIUM	10	24	48	24	U	
7440-43-9	CADMIUM	10	8.3	190	8.3	U	
7440-47-3	CHROMIUM	10	250	970	79	B	
7440-48-4	COBALT	10	370	480	7.1	B	
7440-50-8	COPPER	10	940	1900	100	B	
7439-89-6	IRON	10	470000	9700	610		
7439-92-1	LEAD	10	3200	190	20		
7439-96-5	MANGANESE	10	82000	480	25		
7439-98-7	MOLYBDENUM	10	92	190	40	B	
7440-02-0	NICKEL	10	1000	1900	390	B	
7782-49-2	SELENIUM	10	64	970	64	U	
7440-22-4	SILVER	10	4.2	48	4.2	U	
7440-23-5	SODIUM	10	27000	97000	27000	U	
7440-24-6	STRONTIUM	10	290	480	43	BC	N
7440-31-5	TIN	10	380	970	120	BC	
7440-61-1	URANIUM	10	61	9.7	1.7		
7440-62-2	VANADIUM	10	190	480	56	B	
7440-66-6	ZINC	10	850	9700	680	B	

Data Package ID: *im1607120-1*

ICPMS Metals

Method SW6020A

Method Blank

Lab Name: ALS -- Fort Collins
Work Order Number: 1607120
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: FY15 100-K AB Waste Sites - Soil F16-002

Lab ID: IP160713-1MB

Sample Matrix: SOIL
% Moisture: N/A
Date Collected: N/A
Date Extracted: 13-Jul-16
Date Analyzed: 14-Jul-16

Prep Batch: IP160713-1
QCBatchID: IP160713-1-4
Run ID: IM160713-11A11
Cleanup: NONE
Basis: N/A
File Name: 206SMPL_

Sample Aliquot: 1 g
Final Volume: 100 ml
Result Units: UG/KG
Clean DF: 1

CASNO	Target Analyte	DF	Result	RptLimit/ LOQ/LOD	MDL/DL	Result Qualifier	EPA Qualifier
7440-36-0	ANTIMONY	10	12	100	12	U	
7440-38-2	ARSENIC	10	22	200	22	U	
7440-39-3	BARIUM	10	20	500	20	U	
7440-43-9	CADMIUM	10	8.6	200	8.6	U	
7440-47-3	CHROMIUM	10	82	1000	82	U	
7440-48-4	COBALT	10	7.4	500	7.4	U	
7440-50-8	COPPER	10	110	2000	110	U	
7439-89-6	IRON	10	3300	10000	630	B	
7439-92-1	LEAD	10	21	200	21	U	
7439-96-5	MANGANESE	10	36	500	26	B	
7439-98-7	MOLYBDENUM	10	41	200	41	U	
7440-02-0	NICKEL	10	410	2000	410	U	
7782-49-2	SELENIUM	10	66	1000	66	U	
7440-22-4	SILVER	10	4.4	50	4.4	U	
7440-23-5	SODIUM	10	28000	100000	28000	U	
7440-31-5	TIN	10	280	1000	120	B	
7440-61-1	URANIUM	10	1.8	10	1.8	U	
7440-62-2	VANADIUM	10	58	500	58	U	
7440-66-6	ZINC	10	700	10000	700	U	

Data Package ID: *im1607120-1*

ICPMS Metals

Method SW6020A

Method Blank

Lab Name: ALS -- Fort Collins
Work Order Number: 1607120
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: FY15 100-K AB Waste Sites - Soil F16-002

Lab ID: IP160713-1MB

Sample Matrix: SOIL
% Moisture: N/A
Date Collected: N/A
Date Extracted: 13-Jul-16
Date Analyzed: 14-Jul-16

Prep Batch: IP160713-1
QCBatchID: IP160713-1-4
Run ID: IM160714-10A9
Cleanup: NONE
Basis: N/A
File Name: 047SMPL_

Sample Aliquot: 1 g
Final Volume: 100 ml
Result Units: UG/KG
Clean DF: 1

CASNO	Target Analyte	DF	Result	RptLimit/ LOQ/LOD	MDL/DL	Result Qualifier	EPA Qualifier
7429-90-5	ALUMINUM	10	1900	10000	1100	B	
7440-41-7	BERYLLIUM	10	25	50	25	U	
7440-24-6	STRONTIUM	10	52	500	45	B	

Data Package ID: *im1607120-1*

ICPMS Metals

Method SW6020A

Laboratory Control Sample

Lab Name: ALS -- Fort Collins
Work Order Number: 1607120
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: FY15 100-K AB Waste Sites - Soil F16-002

Lab ID: IM160713-1LCS

Sample Matrix: SOIL
% Moisture: N/A
Date Collected: N/A
Date Extracted: 07/13/2016
Date Analyzed: 07/14/2016
Prep Method: SW3050B

Prep Batch: IP160713-1
QCBatchID: IP160713-1-4
Run ID: IM160714-10A9
Cleanup: NONE
Basis: N/A
File Name: 048SMPL_

Sample Aliquot: 1 g
Final Volume: 100 ml
Result Units: UG/KG
Clean DF: 1

CASNO	Target Analyte	Spike Added	LCS Result	Reporting Limit	Result Qualifier	LCS % Rec.	Control Limits
7429-90-5	ALUMINUM	500000	563000	10000		113	80 - 120%
7440-36-0	ANTIMONY	3000	2470	100		82	80 - 120%
7440-38-2	ARSENIC	10000	8170	200		82	80 - 120%
7440-39-3	BARIUM	10000	8600	500		86	80 - 120%
7440-41-7	BERYLLIUM	5000	5630	50		113	80 - 120%
7440-43-9	CADMIUM	3000	2540	200		85	80 - 120%
7440-47-3	CHROMIUM	50000	40700	1000		81	80 - 120%
7440-48-4	COBALT	10000	8470	500		85	80 - 120%
7440-50-8	COPPER	100000	87100	2000		87	80 - 120%
7439-89-6	IRON	500000	426000	10000		85	80 - 120%
7439-92-1	LEAD	5000	4400	200		88	80 - 120%
7439-96-5	MANGANESE	10000	8320	500		83	80 - 120%
7439-98-7	MOLYBDENUM	10000	8210	200		82	80 - 120%
7440-02-0	NICKEL	50000	41500	2000		83	80 - 120%
7782-49-2	SELENIUM	10000	8320	1000		83	80 - 120%
7440-22-4	SILVER	1000	906	50		91	80 - 120%
7440-23-5	SODIUM	1E+06	887000	100000		89	80 - 120%
7440-24-6	STRONTIUM	10000	11200	500		112	80 - 120%
7440-31-5	TIN	50000	51400	1000		103	80 - 120%
7440-61-1	URANIUM	1000	849	10		85	80 - 120%
7440-62-2	VANADIUM	10000	8090	500		81	80 - 120%
7440-66-6	ZINC	200000	164000	10000		82	80 - 120%

Data Package ID: *im1607120-1*

ICPMS Metals

Method SW6020A

Matrix Spike And Matrix Spike Duplicate

Lab Name: ALS -- Fort Collins
Work Order Number: 1607120
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: FY15 100-K AB Waste Sites - Soil F16-002

Field ID: SHARED QC
LabID: 1607156-4MS

Sample Matrix: SOIL
% Moisture: 1.6
Date Collected: 07-Jul-16
Date Extracted: 13-Jul-16
Date Analyzed: 14-Jul-16
Prep Method: SW3050 Rev B

Prep Batch: IP160713-1
QCBatchID: IP160713-1-4
Run ID: IM160714-10A9
Cleanup: NONE
Basis: Dry Weight

Sample Aliquot: 1.029 g
Final Volume: 100 ml
Result Units: UG/KG
File Name: 058SMPL_

CASNO	Target Analyte	Sample Result	Samp Qual	MS Result	MS Qual	Reporting Limit	Spike Added	MS % Rec.	Control Limits
7429-90-5	ALUMINUM	7200000		8720000		9880	494000	317	75 - 125%
7440-36-0	ANTIMONY	110		1840	N	98.8	2960	58	75 - 125%
7440-38-2	ARSENIC	2300		10900		198	9880	87	75 - 125%
7440-39-3	BARIUM	64000		71400		494	9880	78	75 - 125%
7440-41-7	BERYLLIUM	340		5470		49.4	4940	104	75 - 125%
7440-43-9	CADMIUM	72	B	2700		198	2960	89	75 - 125%
7440-47-3	CHROMIUM	8800		52800		988	49400	89	75 - 125%
7440-48-4	COBALT	7300		16500		494	9880	93	75 - 125%
7440-50-8	COPPER	13000		105000		1980	98800	93	75 - 125%
7439-89-6	IRON	1.8E+07		19500000		9880	494000	300	75 - 125%
7439-92-1	LEAD	4400		8900		198	4940	92	75 - 125%
7439-96-5	MANGANESE	310000		319000		494	9880	100	75 - 125%
7439-98-7	MOLYBDENUM	280		8780		198	9880	86	75 - 125%
7440-02-0	NICKEL	9000		54000		1980	49400	91	75 - 125%
7782-49-2	SELENIUM	500	B	8870		988	9880	85	75 - 125%
7440-22-4	SILVER	19	B	947		49.4	988	94	75 - 125%
7440-23-5	SODIUM	110000		1050000		98800	988000	95	75 - 125%
7440-24-6	STRONTIUM	24000		37800	N	494	9880	138	75 - 125%
7440-31-5	TIN	610	BC	53000		988	49400	106	75 - 125%
7440-61-1	URANIUM	330		1190		9.88	988	87	75 - 125%
7440-62-2	VANADIUM	42000		51900		494	9880	102	75 - 125%
7440-66-6	ZINC	39000		212000		9880	198000	87	75 - 125%

Data Package ID: *im1607120-1*

ICPMS Metals

Method SW6020A

Matrix Spike And Matrix Spike Duplicate

Lab Name: ALS -- Fort Collins
Work Order Number: 1607120
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: FY15 100-K AB Waste Sites - Soil F16-002

Field ID: SHARED QC
LabID: 1607156-4MSD

Sample Matrix: SOIL
% Moisture: 1.6
Date Collected: 07-Jul-16
Date Extracted: 13-Jul-16
Date Analyzed: 14-Jul-16
Prep Method: SW3050 Rev B

Prep Batch: IP160713-1
QCBatchID: IP160713-1-4
Run ID: IM160714-10A9
Cleanup: NONE
Basis: Dry Weight

Sample Aliquot: 1.021 g
Final Volume: 100 ml
Result Units: UG/KG
File Name: 059SMPL_

CASNO	Target Analyte	MSD Result	MSD Qual	Spike Added	MSD % Rec.	Reporting Limit	RPD Limit	RPD
7429-90-5	ALUMINUM	8920000		498000	355	9960	20	2
7440-36-0	ANTIMONY	1980	N	2990	63	99.6	20	7
7440-38-2	ARSENIC	11400		9960	91	199	20	5
7440-39-3	BARIUM	71000		9960	73	498	20	1
7440-41-7	BERYLLIUM	5700		4980	108	49.8	20	4
7440-43-9	CADMIUM	2780		2990	91	199	20	3
7440-47-3	CHROMIUM	54100		49800	91	996	20	2
7440-48-4	COBALT	16800		9960	95	498	20	2
7440-50-8	COPPER	109000		99600	96	1990	20	3
7439-89-6	IRON	20400000		498000	490	9960	20	5
7439-92-1	LEAD	9260		4980	99	199	20	4
7439-96-5	MANGANESE	312000		9960	33	498	20	2
7439-98-7	MOLYBDENUM	9060		9960	88	199	20	3
7440-02-0	NICKEL	56000		49800	94	1990	20	4
7782-49-2	SELENIUM	9310		9960	88	996	20	5
7440-22-4	SILVER	986		996	97	49.8	20	4
7440-23-5	SODIUM	1090000		996000	98	99600	20	4
7440-24-6	STRONTIUM	38000	N	9960	138	498	20	0
7440-31-5	TIN	52600		49800	105	996	20	1
7440-61-1	URANIUM	1360		996	103	9.96	20	13
7440-62-2	VANADIUM	54700		9960	129	498	20	5
7440-66-6	ZINC	223000		199000	92	9960	20	5

Data Package ID: *im1607120-1*

ICPMS Metals

Method SW6020

Analytical Spike Sample Recovery

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1607120
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: FY15 100-K AB Waste Sites - Soil F16-002

Field ID: SHARED QC
LabID: 1607156-4A

Run ID: IM160713-11A11
Date Analyzed: 7/14/2016
Result Units: ug/l

Target Analyte	Sample Result	Samp Qual	PS Result	PS Qual	Spike Added	PS % Rec.	Control Limits
ANTIMONY	0.115		2.74		3	88	75 - 125%
STRONTIUM	24.3		35.8		10	115	75 - 125%

Data Package ID: *im1607120-1*

Total Mercury

Method SW7471A

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1607120
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: FY15 100-K AB Waste Sites - Soil F16-002

Field ID: B35WP3
Lab ID: 1607120-1

Analysis ReqCode: **7471_MERCURY**

Sample Matrix: SOIL
% Moisture: 0.1
Date Collected: 07-Jul-16
Date Extracted: 22-Jul-16
Date Analyzed: 25-Jul-16
Prep Method: METHOD

Prep Batch: HG160722-2
QCBatchID: HG160722-2-1
Run ID: HG160725-1A2
Cleanup: NONE
Basis: Dry Weight
File Name: HG160725-1

Analyst: Nathan A. Quatier
Sample Aliquot: 0.632 g
Final Volume: 100 ml
Result Units: UG/KG
Clean DF: 1

CASNO	Target Analyte	Dilution Factor	Result	RptLimit/ LOQ/LOD	MDL/DL	Result Qualifier	EPA Qualifier
7439-97-6	MERCURY	1	3.4	32	3.4	U	

Data Package ID: *HG1607120-1*

Mercury

Method SW7471A

Method Blank

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1607120
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: FY15 100-K AB Waste Sites - Soil F16-002

Lab ID: HG160722-2MB

Sample Matrix: SOIL
% Moisture: N/A
Date Collected: N/A
Date Extracted: 22-Jul-16
Date Analyzed: 25-Jul-16

Prep Batch: HG160722-2
QCBatchID: HG160722-2-1
Run ID: HG160725-1A2
Cleanup: NONE
Basis: N/A
File Name: HG160725-1

Sample Aliquot: 0.6 g
Final Volume: 100 ml
Result Units: UG/KG
Clean DF: 1

CASNO	Target Analyte	DF	Result	RptLimit/ LOQ/LOD	MDL/DL	Result Qualifier	EPA Qualifier
7439-97-6	MERCURY	1	3.6	33	3.6	U	

Data Package ID: *HG1607120-1*

Mercury

Method SW7471A

Laboratory Control Sample

Lab Name: ALS -- Fort Collins
Work Order Number: 1607120
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: FY15 100-K AB Waste Sites - Soil F16-002

Lab ID: HG160722-2LCS

Sample Matrix: SOIL
% Moisture: N/A
Date Collected: N/A
Date Extracted: 07/22/2016
Date Analyzed: 07/25/2016
Prep Method: METHOD

Prep Batch: HG160722-2
QCBatchID: HG160722-2-1
Run ID: HG160725-1A2
Cleanup: NONE
Basis: N/A
File Name: HG160725-1

Sample Aliquot: 0.6 g
Final Volume: 100 ml
Result Units: UG/KG
Clean DF: 1

CASNO	Target Analyte	Spike Added	LCS Result	Reporting Limit	Result Qualifier	LCS % Rec.	Control Limits
7439-97-6	MERCURY	167	167	33.3		100	80 - 120%

Data Package ID: *HG1607120-1*

Mercury

Method SW7471A

Matrix Spike And Matrix Spike Duplicate

Lab Name: ALS -- Fort Collins
Work Order Number: 1607120
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: FY15 100-K AB Waste Sites - Soil F16-002

Field ID: B35WP3
LabID: 1607120-1MS

Sample Matrix: SOIL
% Moisture: 0.1
Date Collected: 07-Jul-16
Date Extracted: 22-Jul-16
Date Analyzed: 25-Jul-16
Prep Method: METHOD

Prep Batch: HG160722-2
QCBatchID: HG160722-2-1
Run ID: HG160725-1A2
Cleanup: NONE
Basis: Dry Weight

Sample Aliquot: 0.633 g
Final Volume: 100 ml
Result Units: UG/KG
File Name: HG160725-1

CASNO	Target Analyte	Sample Result	Samp Qual	MS Result	MS Qual	Reporting Limit	Spike Added	MS % Rec.	Control Limits
7439-97-6	MERCURY	3.4	U	325		31.6	316	103	80 - 120%

Field ID: B35WP3
LabID: 1607120-1MSD

Sample Matrix: SOIL
% Moisture: 0.1
Date Collected: 07-Jul-16
Date Extracted: 22-Jul-16
Date Analyzed: 25-Jul-16
Prep Method: METHOD

Prep Batch: HG160722-2
QCBatchID: HG160722-2-1
Run ID: HG160725-1A2
Cleanup: NONE
Basis: Dry Weight

Sample Aliquot: 0.634 g
Final Volume: 100 ml
Result Units: UG/KG
File Name: HG160725-1

CASNO	Target Analyte	MSD Result	MSD Qual	Spike Added	MSD % Rec.	Reporting Limit	RPD Limit	RPD
7439-97-6	MERCURY	300		316	95	31.6	20	8

Data Package ID: *HG1607120-1*

Inorganics

Case Narrative

CH2M HILL Plateau Remediation Company

FY15 100-K AB Waste Sites - Soil -- F16-002

Work Order Number: 1607120

1. This report consists of 1 water sample.
2. The sample was received cool and intact by ALS on 07/08/16.
3. The sample was prepared for analysis based on Environmental Monitoring Systems Laboratory (EMSL) Rev 2.1 procedures.
4. The sample was analyzed following EMSL procedures for the current revision of the following SOP and method:

Analyte	Method	SOP #
Chloride	300.0 Revision 2.1	1113
Nitrate as N	300.0 Revision 2.1	1113
Nitrite as N	300.0 Revision 2.1	1113
Sulfate	300.0 Revision 2.1	1113

5. All standards and solutions were used within their recommended shelf life.
6. 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.

7. General quality control procedures.
   - A preparation (method) blank, laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) were prepared and analyzed with the samples in this preparation batch.
   - The method blank associated with this batch was below the reporting limit for the requested analytes.

- 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.

8. Matrix specific quality control procedures.

   Sample 1607120-1 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 (MS) and matrix spike duplicate (MSD) were prepared and analyzed with this batch. All guidance criteria for precision and accuracy were met.

9. 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.

Megan Johnstone — 7/26/16
Megan Johnstone
Inorganics Primary Data Reviewer
Date

Julie Ellis — 7/28/16
Inorganics Final Data Reviewer
Date

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.

  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.

  C - The analyte was detected in both the sample and the associated QC blank, and the sample concentration was <=5X 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: 1607120
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: FY15 100-K AB Waste Sites - Soil F16-002

Field ID: B35WP3
Lab ID: 1607120-1

Analysis ReqCode: **300.0_ANIONS_I**

Sample Matrix: SOIL
% Moisture: 0.1
Date Collected: 07-Jul-16
Date Extracted: 22-Jul-16
Date Analyzed: 22-Jul-16
Prep Method: METHOD

Prep Batch: IC160722-2
QCBatchID: IC160722-2-1
Run ID: IC160722-1A2
Cleanup: NONE
Basis: Dry Weight
File Name: 160722IC3lims

Analyst: Charles B. Allen
Sample Aliquot: 3.97 g
Final Volume: 40 ml
Result Units: UG/KG
Clean DF: 1

CASNO	Target Analyte	Dilution Factor	Result	RptLimit/ LOQ/LOD	MDL/DL	Result Qualifier	EPA Qualifier
16887-00-6	CHLORIDE AnalysisTime: 21:52	1	1800	2000	610	B	
14797-65-0	NITRITE AS N AnalysisTime: 21:52	1	300	1000	300	U	
14797-55-8	NITRATE AS N AnalysisTime: 21:52	1	610	2000	610	U	
14808-79-8	SULFATE AnalysisTime: 21:52	1	3000	10000	3000	U	

Data Package ID: *ic1607120-1*

Ion Chromatography

Method EPA300.0 Revision 2.1

Method Blank

Lab Name: ALS -- Fort Collins
Work Order Number: 1607120
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: FY15 100-K AB Waste Sites - Soil F16-002

Lab ID: IC160722-2MB

Sample Matrix: SOIL
% Moisture: N/A
Date Collected: N/A
Date Extracted: 22-Jul-16
Date Analyzed: 22-Jul-16

Prep Batch: IC160722-2
QCBatchID: IC160722-2-1
Run ID: IC160722-1A2
Cleanup: NONE
Basis: N/A
File Name: 160722IC3lims

Sample Aliquot: 4 g
Final Volume: 40 ml
Result Units: UG/KG
Clean DF: 1

CASNO	Target Analyte	DF	Result	RptLimit/ LOQ/LOD	MDL/DL	Result Qualifier	EPA Qualifier
16887-00-6	CHLORIDE	1	600	2000	600	U	
14797-65-0	NITRITE AS N	1	300	1000	300	U	
14797-55-8	NITRATE AS N	1	600	2000	600	U	
14808-79-8	SULFATE	1	3000	10000	3000	U	

Data Package ID: *ic1607120-1*

Ion Chromatography

Method EPA300.0 Revision 2.1

Laboratory Control Sample and Laboratory Control Sample Duplicate

Lab Name: ALS -- Fort Collins
Work Order Number: 1607120
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: FY15 100-K AB Waste Sites - Soil F16-002

Lab ID: IC160722-2LCS

Sample Matrix: SOIL
% Moisture: N/A
Date Collected: N/A
Date Extracted: 07/22/2016
Date Analyzed: 07/22/2016
Prep Method: METHOD

Prep Batch: IC160722-2
QCBatchID: IC160722-2-1
Run ID: IC160722-1A2
Cleanup: NONE
Basis: N/A
File Name: 160722IC3lims

Sample Aliquot: 4 g
Final Volume: 40 ml
Result Units: UG/KG
Clean DF: 1

CASNO	Target Analyte	Spike Added	LCS Result	Reporting Limit	Result Qualifier	LCS % Rec.	Control Limits
16887-00-6	CHLORIDE	50000	52100	2000		104	85 - 115%
14797-65-0	NITRITE AS N	20000	20800	1000		104	85 - 115%
14797-55-8	NITRATE AS N	50000	52500	2000		105	85 - 115%
14808-79-8	SULFATE	200000	218000	10000		109	85 - 115%

Lab ID: IC160722-2LCSD

Sample Matrix: SOIL
% Moisture: N/A
Date Collected: N/A
Date Extracted: 07/22/2016
Date Analyzed: 07/22/2016
Prep Method: METHOD

Prep Batch: IC160722-2
QCBatchID: IC160722-2-1
Run ID: IC160722-1A2
Cleanup: NONE
Basis: N/A
File Name: 160722IC3lims

Sample Aliquot: 4 g
Final Volume: 40 ml
Result Units: UG/KG
Clean DF: 1

CASNO	Target Analyte	Spike Added	LCSD Result	Reporting Limit	Result Qualifier	LCSD % Rec.	RPD Limit	RPD
16887-00-6	CHLORIDE	50000	52200	2000		104	30	0
14797-65-0	NITRITE AS N	20000	20800	1000		104	30	0
14797-55-8	NITRATE AS N	50000	52600	2000		105	30	0
14808-79-8	SULFATE	200000	218000	10000		109	30	0

Data Package ID: *ic1607120-1*

Ion Chromatography

Method EPA300.0 Revision 2.1
Matrix Spike And Matrix Spike Duplicate

Lab Name: ALS -- Fort Collins
Work Order Number: 1607120
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: FY15 100-K AB Waste Sites - Soil F16-002

Field ID: B35WP3
LabID: 1607120-1MS

Sample Matrix: SOIL
% Moisture: 0.1
Date Collected: 07-Jul-16
Date Extracted: 22-Jul-16
Date Analyzed: 22-Jul-16
Prep Method: METHOD

Prep Batch: IC160722-2
QCBatchID: IC160722-2-1
Run ID: IC160722-1A2
Cleanup: NONE
Basis: Dry Weight

Sample Aliquot: 4.05 g
Final Volume: 40 ml
Result Units: UG/KG
File Name: 160722IC3lims

CASNO	Target Analyte	Sample Result	Samp Qual	MS Result	MS Qual	Reporting Limit	Spike Added	MS % Rec.	Control Limits
16887-00-6	CHLORIDE	1800	B	54300		1980	49400	106	85 - 115%
14797-65-0	NITRITE AS N	297	U	21400		989	19800	108	85 - 115%
14797-55-8	NITRATE AS N	593	U	52900		1980	49400	107	85 - 115%
14808-79-8	SULFATE	2970	U	221000		9890	198000	112	85 - 115%

Field ID: B35WP3
LabID: 1607120-1MSD

Sample Matrix: SOIL
% Moisture: 0.1
Date Collected: 07-Jul-16
Date Extracted: 22-Jul-16
Date Analyzed: 23-Jul-16
Prep Method: METHOD

Prep Batch: IC160722-2
QCBatchID: IC160722-2-1
Run ID: IC160722-1A2
Cleanup: NONE
Basis: Dry Weight

Sample Aliquot: 4.1 g
Final Volume: 40 ml
Result Units: UG/KG
File Name: 160722IC3lims

CASNO	Target Analyte	MSD Result	MSD Qual	Spike Added	MSD % Rec.	Reporting Limit	RPD Limit	RPD
16887-00-6	CHLORIDE	53600		48800	106	1950	30	1
14797-65-0	NITRITE AS N	21100		19500	108	977	30	2
14797-55-8	NITRATE AS N	52000		48800	107	1950	30	2
14808-79-8	SULFATE	217000		195000	111	9770	30	2

Data Package ID: *ic1607120-1*