



Tuesday, January 02, 2018

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

Re: ALS Workorder: 1712334  
Project Name: RCRA, DECEMBER 2017  
Project Number: W18-012

Dear Ms. Waters-Husted:

Two water samples were received from CH2M HILL Plateau Remediation Company, on 12/15/2017. 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  
Julie Ellingson  
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

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**OrderNum:** 1712334

**Client Name:** CH2M HILL Plateau Remediation Company

**Client Project Name:** RCRA, DECEMBER 2017

**Client Project Number:** W18-012

**Client PO Number:** BOA 54854

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Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
B3FK27	1712334-1		WATER	13-Dec-17	12:24
B3FK31	1712334-2		WATER	13-Dec-17	12:24





ALS Environmental - Fort Collins  
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: CHPRC  
Project Manager: JE

Workorder No: 1712334  
Initials: KS Date: 12-15-17

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?		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>11</u>			
Background µR/hr reading: <u>11</u>			
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.

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

Project Manager Signature / Date: Kell M. O. 12/19/17

ORIGIN D/FSCA (509) 528-9428  
LESLY WALL  
CHINA  
6257 LATAH ST.  
6259 LATAH ST.  
RICHLAND, WA 99354  
UNITED STATES US

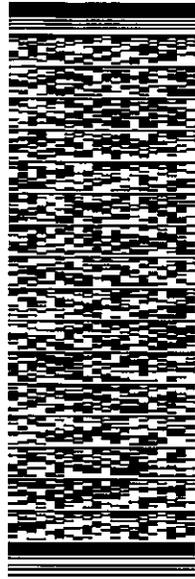
SHIP DATE: 14DEC17  
ACTWGT: 10.00 LB  
CAD: 107056051/NET3920  
BILL THIRD PARTY

TO JULIE ELLINGSON  
ALS GLOBAL  
225 COMMERCE DRIVE

11-2

FORT COLLINS CO 80524  
(970) 490-1511  
REF: PTR#89651COOLERR#GWS#45  
DEPT:

549J1574C104C



17211712334

TRK# 7709 9458 4695  
0201

FRI - 15 DEC 10:30A  
PRIORITY OVERNIGHT

XH FTCA

DSR 80524  
CO-US DEN



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1712334



# Metals

## Case Narrative

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### **CH2M HILL Plateau Remediation Company**

RCRA, DECEMBER 2017 – W18-012

Work Order Number: 1712334

1. This report consists of 2 water samples for total recoverable and dissolved metals.
2. The samples were received intact at ambient temperature by ALS on 12/15/17.
3. The sample for dissolved metals had been filtered prior to receipt. All samples had a pH less than 2 upon receipt.
4. The samples were prepared and analyzed based on SW-846, 3<sup>rd</sup> Edition procedure.

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

5. Analysis by Trace ICP followed method 6010B and the current revision of SOP 834.
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 each digestion batch.
  - The preparation (method) blank associated with each digestion batch was below the reporting limit for the requested analytes. Sample results have been compared to the blank results. Iron 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.
- The interference check samples and high standard read-backs associated with Method 6010B were within acceptance criteria.

9. Matrix specific quality control procedures.

Sample 1712334-1 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 each batch. All acceptance criteria for accuracy were met.
- A serial dilution was analyzed with this ICP batch. All acceptance criteria were met with the following exception:

<u>Analyte</u>	<u>Sample ID</u>
Sodium	-1L

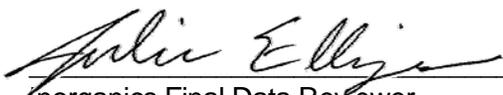
The associated sample results are flagged for serial dilution failure.

10. 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.

  
\_\_\_\_\_  
Emily Lyons  
Inorganics Primary Data Reviewer

1/2/18  
Date

  
\_\_\_\_\_  
Julie Ellis  
Inorganics Final Data Reviewer

1/2/18  
Date



### Inorganic Data Reporting Qualifiers

The following qualifiers are used 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.

# Total Recoverable ICP Metals

Method SW6010B

Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1712334

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: RCRA, DECEMBER 2017 W18-012

Field ID:	B3FK27
Lab ID:	1712334-1

Sample Matrix: WATER  
 % Moisture: N/A  
 Date Collected: 13-Dec-17  
 Date Extracted: 19-Dec-17  
 Date Analyzed: 19-Dec-17  
 Prep Method: SW3005 Rev A

Prep Batch: IP171219-10  
 QCBatchID: IP171219-10-1  
 Run ID: IP171219-1A5  
 Cleanup: NONE  
 Basis: As Received  
 File Name:

Analyst: Amanda J. Lynn  
 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	6.2	U	20	6.2
7440-38-2	ARSENIC	1	11		10	3.2
7440-39-3	BARIUM	1	25		20	4.8
7440-43-9	CADMIUM	1	0.79	U	5	0.79
7440-70-2	CALCIUM	1	21000		1000	120
7440-47-3	CHROMIUM	1	17		10	1.3
7440-48-4	COBALT	1	1.9	U	10	1.9
7440-50-8	COPPER	1	1.7	U	8	1.7
7439-89-6	IRON	1	170	C	50	17
7439-95-4	MAGNESIUM	1	7100		750	97
7439-96-5	MANGANESE	1	6.2		5	1.5
7440-02-0	NICKEL	1	17	B	20	2.9
7440-09-7	POTASSIUM	1	3700		1000	150
7440-22-4	SILVER	1	1.2	U	10	1.2
7440-23-5	SODIUM	1	28000	, E	500	110
7440-62-2	VANADIUM	1	28		10	0.98
7440-66-6	ZINC	1	2.8	U	20	2.8

Data Package ID: IP1712334-1

# Dissolved ICP Metals

Method SW6010B

Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1712334

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: RCRA, DECEMBER 2017 W18-012

Field ID:	B3FK31
Lab ID:	1712334-2

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 13-Dec-17

Date Extracted: 19-Dec-17

Date Analyzed: 19-Dec-17

Prep Method: SW3005 Rev A

Prep Batch: IP171219-10

QCBatchID: IP171219-10-1

Run ID: IP171219-1A5

Cleanup: NONE

Basis: As Received

File Name:

Analyst: Amanda J. Lynn

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	6.2	U	20	6.2
7440-38-2	ARSENIC	1	3.2	U	10	3.2
7440-39-3	BARIUM	1	24		20	4.8
7440-43-9	CADMIUM	1	0.79	U	5	0.79
7440-70-2	CALCIUM	1	20000		1000	120
7440-47-3	CHROMIUM	1	12		10	1.3
7440-48-4	COBALT	1	1.9	U	10	1.9
7440-50-8	COPPER	1	2	B	8	1.7
7439-89-6	IRON	1	150	C	50	17
7439-95-4	MAGNESIUM	1	6900		750	97
7439-96-5	MANGANESE	1	11		5	1.5
7440-02-0	NICKEL	1	13	B	20	2.9
7440-09-7	POTASSIUM	1	3100		1000	150
7440-22-4	SILVER	1	1.3	B	10	1.2
7440-23-5	SODIUM	1	27000		500	110
7440-62-2	VANADIUM	1	27		10	0.98
7440-66-6	ZINC	1	2.8	U	20	2.8

Data Package ID: IP1712334-1

**ICP Metals**  
**Method SW6010B**  
**Method Blank**

Lab Name: ALS -- Fort Collins

Work Order Number: 1712334

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: RCRA, DECEMBER 2017 W18-012

Lab ID: IP171219-10MB

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 19-Dec-17

Date Analyzed: 19-Dec-17

Prep Batch: IP171219-10

QCBatchID: IP171219-10-1

Run ID: IP171219-1A5

Cleanup: NONE

Basis: N/A

File Name:

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	6.2	U	20	6.2
7440-38-2	ARSENIC	1	3.2	U	10	3.2
7440-39-3	BARIUM	1	4.8	U	20	4.8
7440-43-9	CADMIUM	1	0.79	U	5	0.79
7440-70-2	CALCIUM	1	120	U	1000	120
7440-47-3	CHROMIUM	1	1.3	U	10	1.3
7440-48-4	COBALT	1	1.9	U	10	1.9
7440-50-8	COPPER	1	1.7	U	8	1.7
7439-89-6	IRON	1	30	B	50	17
7439-95-4	MAGNESIUM	1	97	U	750	97
7439-96-5	MANGANESE	1	1.5	U	5	1.5
7440-02-0	NICKEL	1	2.9	U	20	2.9
7440-09-7	POTASSIUM	1	150	U	1000	150
7440-22-4	SILVER	1	1.2	U	10	1.2
7440-23-5	SODIUM	1	110	U	500	110
7440-62-2	VANADIUM	1	0.98	U	10	0.98
7440-66-6	ZINC	1	2.8	U	20	2.8

Data Package ID: IP1712334-1

**ICP Metals**  
**Method SW6010B**  
**Laboratory Control Sample**

Lab Name: ALS -- Fort Collins  
Work Order Number: 1712334  
Client Name: CH2M HILL Plateau Remediation Company  
ClientProject ID: RCRA, DECEMBER 2017 W18-012

Lab ID: IP171219-10LCS

Sample Matrix: WATER  
% Moisture: N/A  
Date Collected: N/A  
Date Extracted: 12/19/2017  
Date Analyzed: 12/19/2017  
Prep Method: SW3005A

Prep Batch: IP171219-10  
QCBatchID: IP171219-10-1  
Run ID: IP171219-1A5  
Cleanup: NONE  
Basis: N/A  
File Name:

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	518	20		104	80 - 120%
7440-38-2	ARSENIC	1000	985	10		98	80 - 120%
7440-39-3	BARIUM	1000	1020	20		102	80 - 120%
7440-43-9	CADMIUM	50	50.3	5		101	80 - 120%
7440-70-2	CALCIUM	40000	39300	1000		98	80 - 120%
7440-47-3	CHROMIUM	200	177	10		89	80 - 120%
7440-48-4	COBALT	500	497	10		99	80 - 120%
7440-50-8	COPPER	250	253	8		101	80 - 120%
7439-89-6	IRON	1000	1070	50		107	80 - 120%
7439-95-4	MAGNESIUM	40000	39800	750		100	80 - 120%
7439-96-5	MANGANESE	500	496	5		99	80 - 120%
7440-02-0	NICKEL	500	496	20		99	80 - 120%
7440-09-7	POTASSIUM	40000	41100	1000		103	80 - 120%
7440-22-4	SILVER	100	104	10		104	80 - 120%
7440-23-5	SODIUM	40000	40700	500		102	80 - 120%
7440-62-2	VANADIUM	500	479	10		96	80 - 120%
7440-66-6	ZINC	500	507	20		101	80 - 120%

Data Package ID: IP1712334-1

**ICP Metals**  
**Method SW6010B**  
**Matrix Spike And Matrix Spike Duplicate**

**Lab Name:** ALS -- Fort Collins  
**Work Order Number:** 1712334  
**Client Name:** CH2M HILL Plateau Remediation Company  
**ClientProject ID:** RCRA, DECEMBER 2017 W18-012

<b>Field ID:</b> B3FK27	<b>Sample Matrix:</b> WATER	<b>Prep Batch:</b> IP171219-10	<b>Sample Aliquot:</b> 50 ml
<b>LabID:</b> 1712334-1MS	<b>% Moisture:</b> N/A	<b>QCBatchID:</b> IP171219-10-1	<b>Final Volume:</b> 50 ml
	<b>Date Collected:</b> 13-Dec-17	<b>Run ID:</b> IP171219-1A5	<b>Result Units:</b> UG/L
	<b>Date Extracted:</b> 19-Dec-17	<b>Cleanup:</b> NONE	<b>File Name:</b>
	<b>Date Analyzed:</b> 19-Dec-17	<b>Basis:</b> As Received	
	<b>Prep Method:</b> SW3005 Rev A		

CASNO	Target Analyte	Sample Result	Samp Qual	MS Result	MS Qual	Reporting Limit	Spike Added	MS % Rec.	Control Limits
7440-36-0	ANTIMONY	6.2	U	526		20	500	105	80 - 120%
7440-38-2	ARSENIC	11		1030		10	1000	102	80 - 120%
7440-39-3	BARIUM	25		1060		20	1000	104	80 - 120%
7440-43-9	CADMIUM	0.79	U	51.2		5	50	102	80 - 120%
7440-70-2	CALCIUM	21000		59500		1000	40000	97	80 - 120%
7440-47-3	CHROMIUM	17		219		10	200	101	80 - 120%
7440-48-4	COBALT	1.9	U	509		10	500	102	80 - 120%
7440-50-8	COPPER	1.7	U	256		8	250	102	80 - 120%
7439-89-6	IRON	170	C	1210		50	1000	103	80 - 120%
7439-95-4	MAGNESIUM	7100		47400		750	40000	101	80 - 120%
7439-96-5	MANGANESE	6.2		513		5	500	101	80 - 120%
7440-02-0	NICKEL	17	B	531		20	500	103	80 - 120%
7440-09-7	POTASSIUM	3700		43800		1000	40000	100	80 - 120%
7440-22-4	SILVER	1.2	U	103		10	100	103	80 - 120%
7440-23-5	SODIUM	28000		66000		500	40000	96	80 - 120%
7440-62-2	VANADIUM	28		523		10	500	99	80 - 120%
7440-66-6	ZINC	2.8	U	518		20	500	104	80 - 120%

**Data Package ID:** IP1712334-1

# ICP Metals

Method SW6010B

Matrix Spike And Matrix Spike Duplicate

Lab Name: ALS -- Fort Collins

Work Order Number: 1712334

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: RCRA, DECEMBER 2017 W18-012

Field ID: B3FK27	Sample Matrix: WATER	Prep Batch: IP171219-10	Sample Aliquot: 50 ml
LabID: 1712334-1MSD	% Moisture: N/A	QCBatchID: IP171219-10-1	Final Volume: 50 ml
	Date Collected: 13-Dec-17	Run ID: IP171219-1A5	Result Units: UG/L
	Date Extracted: 19-Dec-17	Cleanup: NONE	File Name:
	Date Analyzed: 19-Dec-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
7440-36-0	ANTIMONY	522		500	104	20	20	1
7440-38-2	ARSENIC	1040		1000	103	10	20	1
7440-39-3	BARIUM	1080		1000	105	20	20	2
7440-43-9	CADMIUM	51.2		50	102	5	20	0
7440-70-2	CALCIUM	59600		40000	98	1000	20	0
7440-47-3	CHROMIUM	227		200	105	10	20	4
7440-48-4	COBALT	513		500	103	10	20	1
7440-50-8	COPPER	268		250	107	8	20	5
7439-89-6	IRON	1200		1000	103	50	20	0
7439-95-4	MAGNESIUM	46800		40000	99	750	20	1
7439-96-5	MANGANESE	508		500	100	5	20	1
7440-02-0	NICKEL	532		500	103	20	20	0
7440-09-7	POTASSIUM	44800		40000	103	1000	20	2
7440-22-4	SILVER	105		100	105	10	20	2
7440-23-5	SODIUM	69000		40000	103	500	20	4
7440-62-2	VANADIUM	520		500	98	10	20	1
7440-66-6	ZINC	517		500	103	20	20	0

Data Package ID: IP1712334-1

**Prep Batch ID: IP171219-10**

<b>Start Date:</b> 12/19/17	<b>End Date:</b> 12/19/17	<b>Concentration Method:</b> NONE	<b>Batch Created By:</b> ajl2
<b>Start Time:</b> 10:22	<b>End Time:</b> 18:00	<b>Extract Method:</b> SW3005A	<b>Date Created:</b> 12/19/17
<b>Prep Analyst:</b> Amanda J. Lynn		<b>Initial Volume Units:</b> ml	<b>Time Created:</b> 10:22
<b>Comments:</b>		<b>Final Volume Units:</b> ml	<b>Validated By:</b> ajl2
<div style="border: 1px solid black; height: 30px; width: 100%;"></div>			<b>Date Validated:</b> 12/19/17
			<b>Time Validated:</b> 10:54

QC Batch ID: IP171219-10-1

Lab ID	QC Type	Field ID	Matrix	Date Collected	Initial Wt/Vol	Final Wt/Vol	Cleanup Method	Cleanup DF	Order Number
IP171219-10	MB	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1712334
IP171219-10	LCS	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1712334
1712334-1	MS	B3FK27	WATER	12/13/2017	50	50	NONE	1	1712334
1712334-1	MSD	B3FK27	WATER	12/13/2017	50	50	NONE	1	1712334
1712334-1	DUP	B3FK27	WATER	12/13/2017	50	50	NONE	1	1712334
1712334-1	SMP	B3FK27	WATER	12/13/2017	50	50	NONE	1	1712334
1712334-2	SMP	B3FK31	WATER	12/13/2017	50	50	NONE	1	1712334

**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		