Saturday, December 30, 2017

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

Re: ALS Workorder: 1710034
Project Name: 100-N Apatite BARRIER, SEP 2017
Project Number: I17-009

Dear Ms. Waters-Husted:

Eight water samples were received from CH2M HILL Plateau Remediation Company, on 10/3/2017. The samples were scheduled for the following analysis:

Metals

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

This report was originally submitted on 11/01/2017. Sample # 5 had an incorrect sample ID. It is being resubmitted with the correct ID.

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 theis data package is in compliance with the SOW, both technically and for completeness, including a full description of, explanation of, and corrective actions for, an 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.

PROBLEM AND DISCREPANCY (P&D) REPORT

P&D Number:	PD18-0037
Rev. Number:	0
Laboratory:	ALS
SDG Number:	ALS1710034
Date Initiated:	11/02/2017

SAMPLE EVENT INFORMATION

SAF NUM(S): I17-009

SAMPLING INFORMATION

NUMBER OF SAMPLES: 2

SAMPLE MATRIX: WATER

ISSUE BACKGROUND

CLASS: Data Issues

TYPE: Missing sample data

DESCRIPTION: Sample B3BR80 is not reported in the hard copy or EDD. The hard copy report has B3BR76 reported two times with different results.

RESOLUTION

PROPOSED RESOLUTION: Please correct the issue and resubmit the hard copy and electronic copy data packages

FINAL RESOLUTION: accept resolution

SUBMITTED BY:

MEDLEY, HA 11/14/2017

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1710034
Client Name: CH2M HILL Plateau Remediation Company
Client Project Name: 100-N Apatite BARRIER, SEP 2017
Client Project Number: I17-009
Client PO Number: BOA 54854

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
B3BR22	1710034-1		WATER	01-Oct-17	12:56
B3BR18	1710034-2		WATER	01-Oct-17	12:56
B3BR45	1710034-3		WATER	01-Oct-17	13:50
B3BR50	1710034-4		WATER	01-Oct-17	13:50
B3BR80	1710034-5		WATER	01-Oct-17	10:40
B3BR76	1710034-6		WATER	01-Oct-17	10:40
B3BR89	1710034-7		WATER	01-Oct-17	9:34
B3BR85	1710034-8		WATER	01-Oct-17	9:34

1710034

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	C.O.C. # I17-009-018
		Page 1 of 1

Collector: Larry Rosane /CHPRC	**Contact/Requester:** Karen Waters-Husted	**Telephone No.:** 509-376-4650
SAF No.: I17-009	**Sampling Origin:** Hanford Site	**Purchase Order/Charge Code:** 300071
Project Title: 100-N APATITE BARRIER, SEP 201	**Logbook No.:** HNF-N-506-95-38	**Ice Chest No.:** GWS-652
Shipped To (Lab): ALS Environmental Ft. Collins	**Method of Shipment** Commercial Carrier	**Bill of Lading/Air Bill No.:** 7703 9449 5042
Protocol CERCLA	**Priority:** 30 Days	**Offsite Property No.:** 8516

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	Holding Time	Preservative
B3BR22 1	Y	W	10-1-17	1256	1x500-mL G/P	6010_METALS_ICP: COMMON	6 Months	HNO3 to pH <2
B3BR18 2	N	W	10-1-17	1256	1x500-mL G/P	6010_METALS_ICP: COMMON	6 Months	HNO3 to pH <2

Relinquished By: Larry Rosane /CHPRC — Larry Rosane — OCT 0 1 2017 1317	Received By: SSU-1 — OCT 0 1 2017 1317	Matrix *	
Print First and Last Name / Signature / Date/Time	Print First and Last Name / Signature / Date/Time	S = Soil	DS = Drum Solids
Relinquished By: SSU-1 — OCT 0 2 2017 0800	Received By: Troy Bacon CHPRC — Troy L. Bacon — OCT 0 2 2017 0800	SE = Sediment	DL = Drum Liquid
Print First and Last Name / Signature / Date/Time	Print First and Last Name / Signature / Date/Time	SO = Solid	T = Tissue
Relinquished By: Troy Bacon CHPRC — Troy L. Bacon — OCT 0 2 2017 1400	Received By: FEDEX	SL = Sludge	WI = Wipe
Print First and Last Name / Signature / Date/Time	Print First and Last Name / Signature / Date/Time	W = Water	L = Liquid
Relinquished By: FedEx	Received By: Shiloh Sonny — Shiloh Sonny — 10/3/17 0930	O = Oil	V = Vegetation
Print First and Last Name / Signature / Date/Time	Print First and Last Name / Signature / Date/Time	A = Air	X = Other

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

Printed On 8/1/2017 — FSR ID = FSR48918 — A-6004-842 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 1710034	C.O.C. # I17-009-022 Page 1 of 1

Collector: Malcom Chunn CHPRC	**Contact/Requester:** Karen Waters-Husted	**Telephone No.:** 509-376-4650
SAF No.: I17-009	**Sampling Origin:** Hanford Site	**Purchase Order/Charge Code:** 300071
Project Title: 100-N APATITE BARRIER, SEP 201	**Logbook No.:** HNF-N-506 ,96,18	**Ice Chest No.:** GWS-657
Shipped To (Lab): ALS Environmental Ft. Collins	**Method of Shipment** Commercial Carrier	**Bill of Lading/Air Bill No.:** 770394495042
Protocol CERCLA	**Priority:** 30 Days	**Offsite Property No.:** 8516

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	Holding Time	Preservative
B3BR45 3	N	W	OCT 0 1 2017	1350	1x500-mL G/P	6010_METALS_ICP: COMMON	6 Months	HNO3 to pH <2
B3BR50 4	Y	W	↓	↓	1x500-mL G/P	6010_METALS_ICP: COMMON	6 Months	HNO3 to pH <2

Relinquished By: Print First and Last Name	Signature	Date/Time	Received By: Print First and Last Name	Signature	Date/Time
Malcom Chunn CHPRC	MRC	OCT 0 1 2017 1430	SSU-1		OCT 0 1 2017 1430
SSU-1		OCT 0 2 2017 0806	Troy Bacon CHPRC	Troy L. Bacon	OCT 0 2 2017 0800
Troy Bacon CHPRC	Troy L. Bacon	OCT 0 2 2017 1400	FEDEX		
Fed Ex			Shiloh Sonny		10/3/17 0930

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

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

Printed On 7/21/2017 FSR ID = FSR48425 A-6004-842 (REV 3)

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 1710034	C.O.C. # I17-009-024 Page 1 of 1

Collector: Larry Rosane /CHPRC	**Contact/Requester:** Karen Waters-Husted	**Telephone No.:** 509-376-4650
SAF No.: I17-009	**Sampling Origin:** Hanford Site	**Purchase Order/Charge Code:** 300071
Project Title: 100-N APATITE BARRIER, SEP 201	**Logbook No.:** HNF-N-506-95-38	**Ice Chest No.:** GWS-652
Shipped To (Lab): ALS Environmental Ft. Collins	**Method of Shipment** Commercial Carrier	**Bill of Lading/Air Bill No.:** 7703 9449 5042
Protocol CERCLA	**Priority:** 30 Days	**Offsite Property No.:** ~~BOT~~ 85516 RW:10/2/17

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	Holding Time	Preservative
B3BR80 5	Y	W	10-1-17	1040	1x500-mL G/P	6010_METALS_ICP: COMMON	6 Months	HNO3 to pH <2
B3BR76 6	N	W	10-1-17	1040	1x500-mL G/P	6010_METALS_ICP: COMMON	6 Months	HNO3 to pH <2

A/B JK 10/4/17

Relinquished By: Larry Rosane /CHPRC — Larry Rosane — OCT 0 1 2017 1317 (Print First and Last Name / Signature / Date/Time)	Received By: SSU-1 — OCT 0 1 2017 1317	Matrix *	
Relinquished By: SSU-1 — OCT 0 2 2017 0800	Received By: Troy Bacon CHPRC — Troy L. Bacon — OCT 0 2 2017 0800	S = Soil	DS = Drum Solids
Relinquished By: Troy Bacon CHPRC — Troy L. Bacon — OCT 0 2 2017 1400	Received By: FEDEX	SE = Sediment	DL = Drum Liquid
Relinquished By: FedEx	Received By: Shiloh Sommy — 10/3/17 0930	SO = Solid	T = Tissue
		SL = Sludge	WI = Wipe
		W = Water	L = Liquid
		O = Oil	V = Vegetation
		A = Air	X = Other

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

Printed On 7/21/2017 — FSR ID = FSR48427 — A-6004-842 (REV 3)

14 LBS.

1710034

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	C.O.C.# I17-009-025 Page 1 of 1

Collector: Larry Rosane /CHPRC	**Contact/Requester:** Karen Waters-Husted	**Telephone No.:** 509-376-4650
SAF No.: I17-009	**Sampling Origin:** Hanford Site	**Purchase Order/Charge Code:** 300071
Project Title: 100-N APATITE BARRIER, SEP 201	**Logbook No.:** HNF-N-506-95-38	**Ice Chest No.:** GWS-652
Shipped To (Lab): ALS Environmental Ft. Collins	**Method of Shipment** Commercial Carrier	**Bill of Lading/Air Bill No.:** 7703 9449 5042
Protocol CERCLA	**Priority:** 30 Days	**Offsite Property No.:** 8516

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	Holding Time	Preservative
B3BR89 7	Y	W	10-1-17	0934	1x500-mL G/P	6010_METALS_ICP: COMMON	6 Months	HNO3 to pH <2
B3BR85 8	N	W	10-1-17	0934	1x500-mL G/P	6010_METALS_ICP: COMMON	6 Months	HNO3 to pH <2

8 of 14 JA 10/4/17

Relinquished By: Larry Rosane /CHPRC — Larry Rosane — OCT 0 1 2017 1004 (Print First and Last Name / Signature / Date/Time)	Received By: SSU-1 — OCT 0 1 2017 1004	Matrix *	
Relinquished By: SSU-1 — OCT 0 2 2017 0800	Received By: Troy Bacon CHPRC — Troy L. Bacon — OCT 0 2 2017 0800	S = Soil	DS = Drum Solids
Relinquished By: Troy Bacon CHPRC — Troy L. Bacon — OCT 0 2 2017 1400	Received By: FEDEX	SE = Sediment	DL = Drum Liquid
Relinquished By: Fed Ex	Received By: Shiloh Sommy — 10/3/17 0930	SO = Solid	T = Tissue
		SL = Sludge	WI = Wipe
		W = Water	L = Liquid
		O = Oil	V = Vegetation
		A = Air	X = Other

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

Printed On 7/21/2017 — FSR ID = FSR48428 — A-6004-842 (REV 3)

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: CHPRC Workorder No: 1710034

Project Manager: _____ Initials: DS Date: 10-03-17

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):	AMB							
No. of custody seals on cooler:	2							
DOT Survey/ Acceptance Information — External µR/hr reading:	10							
Background µR/hr reading:								

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? **YES / NO / NA** (If no, see Form 008.)

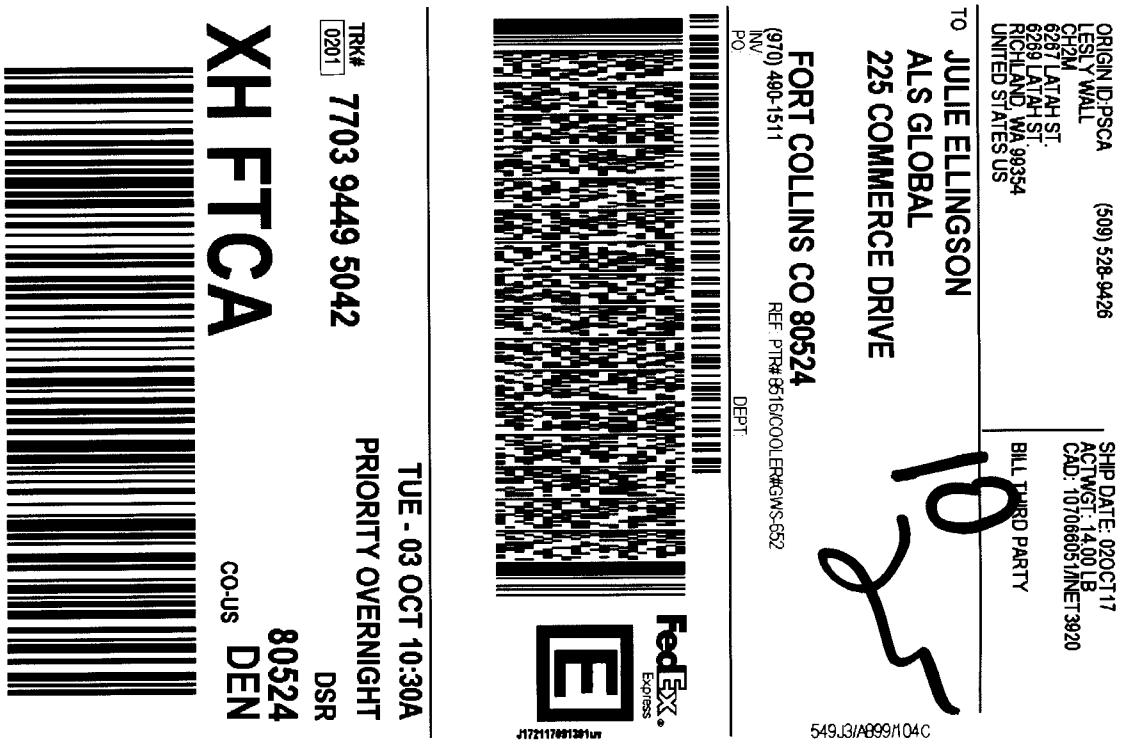
Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16.

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

Project Manager Signature / Date: Chilah Lumry 10/4/17

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

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



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

100-N Apatite BARRIER, SEP 2017 – I17-009

Work Order Number: 1710034

1. This report consists of 8 water samples for total recoverable and dissolved metals.

2. The samples were received intact at ambient temperature by ALS on 10/03/17.

3. The samples 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, 3rd Edition procedures.

   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 this digestion batch.
   - The preparation (method) blank associated with this digestion batch was below the reporting limit for the requested analytes. Sample results have been compared to the blank results. Arsenic and potassium 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.

9. Matrix specific quality control procedures.

   Sample 1710034-1 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. 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.

Jill Latelle — 10/31/17
Jill Latelle — Date
Inorganics Primary Data Reviewer

10/31/17
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.

Dissolved ICP Metals

Method SW6010B

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1710034
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: 100-N Apatite BARRIER, SEP 2017 I17-009

Field ID: B3BR22
Lab ID: 1710034-1

Sample Matrix: WATER
% Moisture: N/A
Date Collected: 01-Oct-17
Date Extracted: 11-Oct-17
Date Analyzed: 12-Oct-17
Prep Method: SW3005 Rev A

Prep Batch: IP171011-7
QCBatchID: IP171011-7-1
Run ID: IT171012-1A2
Cleanup: NONE
Basis: As Received
File Name: 171012A.

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

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
7440-36-0	ANTIMONY	1	6.2	U	20	6.2
7440-38-2	ARSENIC	1	3.2	U	10	3.2
7440-39-3	BARIUM	1	28		20	4.8
7440-43-9	CADMIUM	1	0.79	U	5	0.79
7440-70-2	CALCIUM	1	45000		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	17	U	50	17
7439-95-4	MAGNESIUM	1	7800		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	1800	C	1000	150
7440-22-4	SILVER	1	1.2	U	10	1.2
7440-23-5	SODIUM	1	3500		500	110
7440-62-2	VANADIUM	1	2.6	B	10	0.98
7440-66-6	ZINC	1	4.5	B	20	2.8

Data Package ID: *IT1710034-1*

Total Recoverable ICP Metals

Method SW6010B

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1710034
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: 100-N Apatite BARRIER, SEP 2017 I17-009

Field ID: B3BR18
Lab ID: 1710034-2

Sample Matrix: WATER
% Moisture: N/A
Date Collected: 01-Oct-17
Date Extracted: 11-Oct-17
Date Analyzed: 12-Oct-17
Prep Method: SW3005 Rev A

Prep Batch: IP171011-7
QCBatchID: IP171011-7-1
Run ID: IT171012-1A2
Cleanup: NONE
Basis: As Received
File Name: 171012A.

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

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
7440-36-0	ANTIMONY	1	6.2	U	20	6.2
7440-38-2	ARSENIC	1	4.6	BC	10	3.2
7440-39-3	BARIUM	1	29		20	4.8
7440-43-9	CADMIUM	1	0.79	U	5	0.79
7440-70-2	CALCIUM	1	46000		1000	120
7440-47-3	CHROMIUM	1	1.9	B	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	59		50	17
7439-95-4	MAGNESIUM	1	7900		750	97
7439-96-5	MANGANESE	1	5.9		5	1.5
7440-02-0	NICKEL	1	2.9	U	20	2.9
7440-09-7	POTASSIUM	1	1800	C	1000	150
7440-22-4	SILVER	1	1.2	U	10	1.2
7440-23-5	SODIUM	1	3600		500	110
7440-62-2	VANADIUM	1	3.3	B	10	0.98
7440-66-6	ZINC	1	2.8	U	20	2.8

Data Package ID: *IT1710034-1*

Total Recoverable ICP Metals

Method SW6010B

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1710034
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: 100-N Apatite BARRIER, SEP 2017 I17-009

Field ID: B3BR45
Lab ID: 1710034-3

Sample Matrix: WATER
% Moisture: N/A
Date Collected: 01-Oct-17
Date Extracted: 11-Oct-17
Date Analyzed: 12-Oct-17
Prep Method: SW3005 Rev A

Prep Batch: IP171011-7
QCBatchID: IP171011-7-1
Run ID: IT171012-1A2
Cleanup: NONE
Basis: As Received
File Name: 171012A.

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

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
7440-36-0	ANTIMONY	1	6.2	U	20	6.2
7440-38-2	ARSENIC	1	11	C	10	3.2
7440-39-3	BARIUM	1	10	B	20	4.8
7440-43-9	CADMIUM	1	0.79	U	5	0.79
7440-70-2	CALCIUM	1	14000		1000	120
7440-47-3	CHROMIUM	1	2.2	B	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	110		50	17
7439-95-4	MAGNESIUM	1	3200		750	97
7439-96-5	MANGANESE	1	8.6		5	1.5
7440-02-0	NICKEL	1	2.9	U	20	2.9
7440-09-7	POTASSIUM	1	1600	C	1000	150
7440-22-4	SILVER	1	1.2	U	10	1.2
7440-23-5	SODIUM	1	43000		500	110
7440-62-2	VANADIUM	1	13		10	0.98
7440-66-6	ZINC	1	2.8	U	20	2.8

Data Package ID: *IT1710034-1*

Dissolved ICP Metals

Method SW6010B

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1710034
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: 100-N Apatite BARRIER, SEP 2017 I17-009

Field ID: B3BR50
Lab ID: 1710034-4

Sample Matrix: WATER
% Moisture: N/A
Date Collected: 01-Oct-17
Date Extracted: 11-Oct-17
Date Analyzed: 12-Oct-17
Prep Method: SW3005 Rev A

Prep Batch: IP171011-7
QCBatchID: IP171011-7-1
Run ID: IT171012-1A2
Cleanup: NONE
Basis: As Received
File Name: 171012A.

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

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
7440-36-0	ANTIMONY	1	6.2	U	20	6.2
7440-38-2	ARSENIC	1	9.5	BC	10	3.2
7440-39-3	BARIUM	1	8.5	B	20	4.8
7440-43-9	CADMIUM	1	0.79	U	5	0.79
7440-70-2	CALCIUM	1	14000		1000	120
7440-47-3	CHROMIUM	1	2.5	B	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	17	U	50	17
7439-95-4	MAGNESIUM	1	3100		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	1600	C	1000	150
7440-22-4	SILVER	1	1.2	U	10	1.2
7440-23-5	SODIUM	1	43000		500	110
7440-62-2	VANADIUM	1	14		10	0.98
7440-66-6	ZINC	1	2.8	U	20	2.8

Data Package ID: *IT1710034-1*

Dissolved ICP Metals

Method SW6010B

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1710034
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: 100-N Apatite BARRIER, SEP 2017 I17-009

Field ID: B3BR80
Lab ID: 1710034-5

Sample Matrix: WATER
% Moisture: N/A
Date Collected: 01-Oct-17
Date Extracted: 11-Oct-17
Date Analyzed: 12-Oct-17
Prep Method: SW3005 Rev A

Prep Batch: IP171011-7
QCBatchID: IP171011-7-1
Run ID: IT171012-1A2
Cleanup: NONE
Basis: As Received
File Name: 171012A.

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

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
7440-36-0	ANTIMONY	1	6.2	U	20	6.2
7440-38-2	ARSENIC	1	3.2	U	10	3.2
7440-39-3	BARIUM	1	47		20	4.8
7440-43-9	CADMIUM	1	0.79	U	5	0.79
7440-70-2	CALCIUM	1	54000		1000	120
7440-47-3	CHROMIUM	1	2.6	B	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	550		50	17
7439-95-4	MAGNESIUM	1	8500		750	97
7439-96-5	MANGANESE	1	1.9	B	5	1.5
7440-02-0	NICKEL	1	2.9	U	20	2.9
7440-09-7	POTASSIUM	1	1700	C	1000	150
7440-22-4	SILVER	1	1.2	U	10	1.2
7440-23-5	SODIUM	1	4200		500	110
7440-62-2	VANADIUM	1	1.8	B	10	0.98
7440-66-6	ZINC	1	25		20	2.8

Data Package ID: *IT1710034-1*

Total Recoverable ICP Metals

Method SW6010B

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1710034
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: 100-N Apatite BARRIER, SEP 2017 I17-009

Field ID: B3BR76
Lab ID: 1710034-6

Sample Matrix: WATER
% Moisture: N/A
Date Collected: 01-Oct-17
Date Extracted: 11-Oct-17
Date Analyzed: 12-Oct-17
Prep Method: SW3005 Rev A

Prep Batch: IP171011-7
QCBatchID: IP171011-7-1
Run ID: IT171012-1A2
Cleanup: NONE
Basis: As Received
File Name: 171012A.

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

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
7440-36-0	ANTIMONY	1	6.2	U	20	6.2
7440-38-2	ARSENIC	1	3.2	U	10	3.2
7440-39-3	BARIUM	1	48		20	4.8
7440-43-9	CADMIUM	1	0.79	U	5	0.79
7440-70-2	CALCIUM	1	54000		1000	120
7440-47-3	CHROMIUM	1	2	B	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	60		50	17
7439-95-4	MAGNESIUM	1	8500		750	97
7439-96-5	MANGANESE	1	2.5	B	5	1.5
7440-02-0	NICKEL	1	2.9	U	20	2.9
7440-09-7	POTASSIUM	1	1700	C	1000	150
7440-22-4	SILVER	1	1.2	U	10	1.2
7440-23-5	SODIUM	1	4300		500	110
7440-62-2	VANADIUM	1	1.7	B	10	0.98
7440-66-6	ZINC	1	2.8	U	20	2.8

Data Package ID: *IT1710034-1*

Dissolved ICP Metals

Method SW6010B

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1710034
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: 100-N Apatite BARRIER, SEP 2017 I17-009

Field ID: B3BR89
Lab ID: 1710034-7

Sample Matrix: WATER
% Moisture: N/A
Date Collected: 01-Oct-17
Date Extracted: 11-Oct-17
Date Analyzed: 12-Oct-17
Prep Method: SW3005 Rev A

Prep Batch: IP171011-7
QCBatchID: IP171011-7-1
Run ID: IT171012-1A2
Cleanup: NONE
Basis: As Received
File Name: 171012A.

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

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
7440-36-0	ANTIMONY	1	6.2	U	20	6.2
7440-38-2	ARSENIC	1	3.2	U	10	3.2
7440-39-3	BARIUM	1	29		20	4.8
7440-43-9	CADMIUM	1	0.79	U	5	0.79
7440-70-2	CALCIUM	1	67000		1000	120
7440-47-3	CHROMIUM	1	2.5	B	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	17	U	50	17
7439-95-4	MAGNESIUM	1	10000		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	1900	C	1000	150
7440-22-4	SILVER	1	1.2	U	10	1.2
7440-23-5	SODIUM	1	4100		500	110
7440-62-2	VANADIUM	1	1.7	B	10	0.98
7440-66-6	ZINC	1	2.8	U	20	2.8

Data Package ID: *IT1710034-1*

Total Recoverable ICP Metals

Method SW6010B

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1710034
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: 100-N Apatite BARRIER, SEP 2017 I17-009

Field ID: B3BR85
Lab ID: 1710034-8

Sample Matrix: WATER
% Moisture: N/A
Date Collected: 01-Oct-17
Date Extracted: 11-Oct-17
Date Analyzed: 12-Oct-17
Prep Method: SW3005 Rev A

Prep Batch: IP171011-7
QCBatchID: IP171011-7-1
Run ID: IT171012-1A2
Cleanup: NONE
Basis: As Received
File Name: 171012A.

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

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
7440-36-0	ANTIMONY	1	6.2	U	20	6.2
7440-38-2	ARSENIC	1	3.2	U	10	3.2
7440-39-3	BARIUM	1	33		20	4.8
7440-43-9	CADMIUM	1	0.79	U	5	0.79
7440-70-2	CALCIUM	1	66000		1000	120
7440-47-3	CHROMIUM	1	3.2	B	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	350		50	17
7439-95-4	MAGNESIUM	1	10000		750	97
7439-96-5	MANGANESE	1	31		5	1.5
7440-02-0	NICKEL	1	2.9	U	20	2.9
7440-09-7	POTASSIUM	1	2000	C	1000	150
7440-22-4	SILVER	1	1.2	U	10	1.2
7440-23-5	SODIUM	1	4100		500	110
7440-62-2	VANADIUM	1	2.6	B	10	0.98
7440-66-6	ZINC	1	3.7	B	20	2.8

Data Package ID: *IT1710034-1*

ICP Metals

Method SW6010B

Method Blank

Lab Name: ALS -- Fort Collins
Work Order Number: 1710034
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: 100-N Apatite BARRIER, SEP 2017 I17-009

Lab ID: IP171011-7MB

Sample Matrix: WATER
% Moisture: N/A
Date Collected: N/A
Date Extracted: 11-Oct-17
Date Analyzed: 12-Oct-17

Prep Batch: IP171011-7
QCBatchID: IP171011-7-1
Run ID: IT171012-1A2
Cleanup: NONE
Basis: N/A
File Name: 171012A.

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	4.7	B	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	17	U	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	160	B	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: *IT1710034-1*

ICP Metals

Method SW6010B

Laboratory Control Sample

Lab Name: ALS -- Fort Collins
Work Order Number: 1710034
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: 100-N Apatite BARRIER, SEP 2017 I17-009

Lab ID: IP171011-7LCS

Sample Matrix: WATER
% Moisture: N/A
Date Collected: N/A
Date Extracted: 10/11/2017
Date Analyzed: 10/12/2017
Prep Method: SW3005A

Prep Batch: IP171011-7
QCBatchID: IP171011-7-1
Run ID: IT171012-1A2
Cleanup: NONE
Basis: N/A
File Name: 171012A.

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	498	20		100	80 - 120%
7440-38-2	ARSENIC	1000	1020	10		102	80 - 120%
7440-39-3	BARIUM	1000	993	20		99	80 - 120%
7440-43-9	CADMIUM	50	51.1	5		102	80 - 120%
7440-70-2	CALCIUM	40000	40200	1000		101	80 - 120%
7440-47-3	CHROMIUM	200	203	10		102	80 - 120%
7440-48-4	COBALT	500	510	10		102	80 - 120%
7440-50-8	COPPER	250	255	8		102	80 - 120%
7439-89-6	IRON	1000	957	50		96	80 - 120%
7439-95-4	MAGNESIUM	40000	39800	750		100	80 - 120%
7439-96-5	MANGANESE	500	502	5		100	80 - 120%
7440-02-0	NICKEL	500	500	20		100	80 - 120%
7440-09-7	POTASSIUM	40000	42500	1000		106	80 - 120%
7440-22-4	SILVER	100	101	10		101	80 - 120%
7440-23-5	SODIUM	40000	42400	500		106	80 - 120%
7440-62-2	VANADIUM	500	507	10		101	80 - 120%
7440-66-6	ZINC	500	505	20		101	80 - 120%

Data Package ID: *IT1710034-1*

ICP Metals

Method SW6010B

Matrix Spike And Matrix Spike Duplicate

Lab Name: ALS -- Fort Collins
Work Order Number: 1710034
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: 100-N Apatite BARRIER, SEP 2017 I17-009

Field ID: B3BR22
LabID: 1710034-1MS

Sample Matrix: WATER
% Moisture: N/A
Date Collected: 01-Oct-17
Date Extracted: 11-Oct-17
Date Analyzed: 12-Oct-17
Prep Method: SW3005 Rev A

Prep Batch: IP171011-7
QCBatchID: IP171011-7-1
Run ID: IT171012-1A2
Cleanup: NONE
Basis: As Received

Sample Aliquot: 50 ml
Final Volume: 50 ml
Result Units: UG/L
File Name: 171012A.

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	507		20	500	101	80 - 120%
7440-38-2	ARSENIC	3.2	U	1050		10	1000	105	80 - 120%
7440-39-3	BARIUM	28		1030		20	1000	100	80 - 120%
7440-43-9	CADMIUM	0.79	U	51.7		5	50	103	80 - 120%
7440-70-2	CALCIUM	45000		85700		1000	40000	102	80 - 120%
7440-47-3	CHROMIUM	1.3	U	205		10	200	103	80 - 120%
7440-48-4	COBALT	1.9	U	511		10	500	102	80 - 120%
7440-50-8	COPPER	1.7	U	260		8	250	104	80 - 120%
7439-89-6	IRON	17	U	960		50	1000	96	80 - 120%
7439-95-4	MAGNESIUM	7800		47700		750	40000	100	80 - 120%
7439-96-5	MANGANESE	1.5	U	500		5	500	100	80 - 120%
7440-02-0	NICKEL	2.9	U	509		20	500	102	80 - 120%
7440-09-7	POTASSIUM	1800	C	45600		1000	40000	110	80 - 120%
7440-22-4	SILVER	1.2	U	102		10	100	102	80 - 120%
7440-23-5	SODIUM	3500		47400		500	40000	110	80 - 120%
7440-62-2	VANADIUM	2.6	B	511		10	500	102	80 - 120%
7440-66-6	ZINC	4.5	B	499		20	500	99	80 - 120%

Data Package ID: *IT1710034-1*

ICP Metals

Method SW6010B

Matrix Spike And Matrix Spike Duplicate

Lab Name: ALS -- Fort Collins
Work Order Number: 1710034
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: 100-N Apatite BARRIER, SEP 2017 I17-009

Field ID: B3BR22
LabID: 1710034-1MSD

Sample Matrix: WATER
% Moisture: N/A
Date Collected: 01-Oct-17
Date Extracted: 11-Oct-17
Date Analyzed: 12-Oct-17
Prep Method: SW3005 Rev A

Prep Batch: IP171011-7
QCBatchID: IP171011-7-1
Run ID: IT171012-1A2
Cleanup: NONE
Basis: As Received

Sample Aliquot: 50 ml
Final Volume: 50 ml
Result Units: UG/L
File Name: 171012A.

CASNO	Target Analyte	MSD Result	MSD Qual	Spike Added	MSD % Rec.	Reporting Limit	RPD Limit	RPD
7440-36-0	ANTIMONY	510		500	102	20	20	0
7440-38-2	ARSENIC	1060		1000	106	10	20	1
7440-39-3	BARIUM	1040		1000	102	20	20	1
7440-43-9	CADMIUM	51.9		50	104	5	20	0
7440-70-2	CALCIUM	86700		40000	104	1000	20	1
7440-47-3	CHROMIUM	205		200	103	10	20	0
7440-48-4	COBALT	512		500	102	10	20	0
7440-50-8	COPPER	265		250	106	8	20	2
7439-89-6	IRON	961		1000	96	50	20	0
7439-95-4	MAGNESIUM	48600		40000	102	750	20	2
7439-96-5	MANGANESE	502		500	100	5	20	0
7440-02-0	NICKEL	509		500	102	20	20	0
7440-09-7	POTASSIUM	46900		40000	113	1000	20	3
7440-22-4	SILVER	102		100	102	10	20	0
7440-23-5	SODIUM	48500		40000	113	500	20	2
7440-62-2	VANADIUM	515		500	102	10	20	1
7440-66-6	ZINC	499		500	99	20	20	0

Data Package ID: *IT1710034-1*

Prep Batch ID: IP171011-7

Start Date: 10/11/17
Start Time: 15:43
Prep Analyst: Amanda J. Lynn

End Date: 10/11/17
End Time: 18:00

Concentration Method: NONE
Extract Method: SW3005A
Initial Volume Units: ml
Final Volume Units: ml

Batch Created By: ajl2
Date Created: 10/11/17
Time Created: 15:43
Validated By: ajl2
Date Validated: 10/11/17
Time Validated: 16:29

Comments:

QC Batch ID: IP171011-7-1

Lab ID	QC Type	Field ID	Matrix	Date Collected	Initial Wt/Vol	Final Wt/Vol	Cleanup Method	Cleanup DF	Order Number
IP171011-7	MB	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1710034
IP171011-7	LCS	XXXXXX	WATER	XXXXXX	50	50	NONE	1	1710034
1710034-1	MS	B3BR22	WATER	10/1/2017	50	50	NONE	1	1710034
1710034-1	MSD	B3BR22	WATER	10/1/2017	50	50	NONE	1	1710034
1710034-1	DUP	B3BR22	WATER	10/1/2017	50	50	NONE	1	1710034
1710034-1	SMP	B3BR22	WATER	10/1/2017	50	50	NONE	1	1710034
1710034-2	SMP	B3BR18	WATER	10/1/2017	50	50	NONE	1	1710034
1710034-3	SMP	B3BR45	WATER	10/1/2017	50	50	NONE	1	1710034
1710034-4	SMP	B3BR50	WATER	10/1/2017	50	50	NONE	1	1710034
1710034-5	SMP	B3BR80	WATER	10/1/2017	50	50	NONE	1	1710034
1710034-6	SMP	B3BR76	WATER	10/1/2017	50	50	NONE	1	1710034
1710034-7	SMP	B3BR89	WATER	10/1/2017	50	50	NONE	1	1710034
1710034-8	SMP	B3BR85	WATER	10/1/2017	50	50	NONE	1	1710034

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			