Fall 9-21-2021

SILVER BOW CREEK/BUTTE AREA NPL SITE BUTTE PRIORITY SOILS OPERABLE UNIT

Pioneer Technical Services, Inc.

Atlantic Richfield Company

317 Anaconda Road
Butte MT 59701
Direct (406) 782-9964
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September 21, 2021

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RE: **Butte Priority Soils Operable Unit (BPSOU) Draft Final Quarterly Operations and Maintenance Report Butte Treatment Lagoon System – Second Quarter 2021**.

Agency Representatives:

I am writing you on behalf of Atlantic Richfield Company to submit the **Draft Final** Quarterly Operations and Maintenance Report Butte Treatment Lagoon System – **Second Quarter 2021.**

The report, appendices, and supplemental files may be downloaded at the following link:

Link: https://pioneertechnicalservices.sharepoint.com/:f:/s/submitted/EjtrCG-WL99IkSRubUG0934BUXkSXISFlYdAYTKfI5XNQg

If you have any questions or comments, please call me at (406) 723-1820.

Sincerely,

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BPSOU SharePoint - upload

SILVER BOW CREEK/BUTTE AREA NPL SITE
BUTTE PRIORITY SOILS OPERABLE UNIT

Draft Final

Quarterly Operations and Maintenance Report Butte Treatment Lagoon System – Second Quarter 2021

Atlantic Richfield Company

September 2021

SILVER BOW CREEK/BUTTE AREA NPL SITE
BUTTE PRIORITY SOILS OPERABLE UNIT

Draft Final

Quarterly Operations and Maintenance Report Butte Treatment Lagoon System – Second Quarter 2021

Prepared for:

Atlantic Richfield Company
317 Anaconda Road
Butte, Montana 59701

Prepared by:

Pioneer Technical Services, Inc.
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Butte, Montana 59701

September 2021

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DOCUMENT MODIFICATION SUMMARY

Revision No.	Author	Version	Description	Date
Rev 0	Brad Hollamon	Draft	Issued for Internal Atlantic Richfield Company Review	9/15/2021
Rev 01	Brad Hollamon	Draft Final	Issued for Agency Review	9/21/2021

1.0 INTRODUCTION

This quarterly operations and maintenance (O&M) report summarizes water quality monitoring results and flow data collection at the Butte Treatment Lagoons (BTL) during the second quarter of 2021, the period from April 1 to June 30 (referred to as quarter). Sample station locations monitored during this period are shown on Figure 1 and identified below by location name, station field identification, and sample identification:

Sample Station Name	Station Field Identification	Sample Identification
Effluent sample station	EFS-07	SS-1
Influent sample station	INF-04	SS-2
MSD-HCC station	MSD-HCC	SS-3

Various sample results and reports referenced in this text are included in Appendices A-C.

All work described in this document was performed as detailed in the BTL Groundwater Treatment System Routine Operation, Maintenance, and Monitoring (OM&M) Plan (Atlantic Richfield, 2021) (referred to as the *Routine OM&M Plan)*. Refer to the Routine OM&M Plan for additional details related to sampling and monitoring tasks. Samples collected were sent to Pace Analytical Laboratory for analysis. The laboratory completed data verification and validation (Level II) according to the laboratory quality assurance procedures. All data included in this quarterly report are provided as final. Final analytical data results are in Appendix A and the corresponding Data Summary Report (DSR) is in Appendix D.

Final validated data for the quarter are provided in the Data Validation Report (DVR), which is an appendix to the DSR (Appendix D). Data validation was conducted by an independent data validator—not involved with sampling activities and who does not work for the analytical laboratory—for all analytical data represented in this report.

2.0 SYSTEM DESCRIPTION SUMMARY

Impacted water from the West Camp Pump Station (WCP-1), Missoula Gulch baseflow, Butte Priority Soil Operable Unit (BPSOU) subdrain (subdrain), Butte Reduction Works (BRW) groundwater capture, Hydraulic Control Channel (HCC) groundwater capture, and BTL system D-cells is conveyed to the BTL collection cell, Cell D4, and then pumped from Cell D4 to the Chemical Addition System (CAS) building as influent flow, where pre-treatment water quality is monitored at SS-2. The influent flow is mixed with lime slurry to reach a target potential hydrogen (pH), which allows dissolved heavy metals to precipitate and separate from the collected groundwater as treated water flows through a series of lagoon cells in the remainder of the BTL system. The lime slurry is created by adding dry calcium hydroxide, delivered by an accurate measurement system measured by milligrams of lime (calcium hydroxide) per liter (mg/L) of influent water, to a portion of the influent water. The slurry is then added back to the remainder of the influent, and pH-adjusted influent flow is directed to three parallel lagoon cell systems. Each system consists of three, unlined, open water cells operating in parallel: A, B, and

C, where the A system is to the north and C to the south. The primary purpose of the first cell is to allow the chemical reaction to occur, introduce additional carbon dioxide to the system, and to capture sediment and chemical precipitates. A fourth series of smaller, non-treatment cells, the D cells, is to the south of lagoons A2 and A3. The D cells act as hydraulic barriers between the treatment cells and Silver Bow Creek. Treated effluent water is then discharged to Silver Bow Creek at the effluent station, SS-1.

3.0 MONITORING

Water quality samples are typically collected using automated ISCO samplers programmed to collect composite samples over a 24-hour period. Sample station and monitoring locations are shown on Figure 1. These composite samples are collected automatically twice each week at EFS-07 (SS-1) and once each week at INF-04 (SS-2). Field grab samples are collected at station MSD-HCC (SS-3) monthly. Samples are analyzed for total recoverable metals (aluminum, arsenic, cadmium, copper, iron, mercury, lead, silver, zinc, calcium, magnesium, uranium) and hardness.

In addition to total recoverable metals analysis, samples are also analyzed for alkalinity, total dissolved solids, total suspended solids, and nitrates/nitrites once per month. Quality control samples, field blank (SS-4) and field duplicate (T), are collected monthly. Field parameters are collected daily at many points within the system and real-time data are collected by an automated monitoring system.

Treated effluent meeting the water quality standards described in Table 1 of the Routine OM&M Plan (taken from the Montana Department of Environmental Quality [DEQ] Circular DEQ-7 Montana Numeric Water Quality Standards [DEQ, 2006]) is discharged to Silver Bow Creek at EFS-07. All reported total recoverable aluminum values are below the dissolved standard. If the total recoverable value exceeds the dissolved standard for aluminum, additional analysis will be performed on the dissolved sample to determine the dissolved fraction present in the sample. The dissolved aluminum results will then be reported and compared to the dissolved standard.

The DEQ-7 aquatic life standards for cadmium, copper, lead, silver, and zinc are dependent on effluent hardness with an upper limit of 400 mg/L calcium carbonate ($CaCO_3$). Hardness of BTL effluent is most commonly greater than 400 mg/L calcium carbonate resulting in a consistent maximum standard from sample to sample.

4.0 SYSTEM PERFORMANCE SUMMARY

No exceedances of DEQ-7 standards were observed for aluminum, iron, lead, mercury, silver, or zinc during this reporting period. Water quality graphics for the major contaminants of concern (COCs) (arsenic, cadmium, copper, zinc, silver, iron, mercury, and lead) are provided in Appendix A.2.

Two effluent samples (LAO-SS-1-041221 and LAO-SS-1-041521), both with a laboratory result of 0.011 mg/L exceeded the human health standard for arsenic of 0.010 mg/L. Samples LAO-SS-1-050621, LAO-SS-1-051021, and LAO-SS-2-051021 were analyzed for mercury by

method 245.1 (method detection limit [MDL] of 0.000045 mg/L) due to a reagent issue at the laboratory. These samples were re-analyzed for mercury by method 245.1 LL (MDL 0.0000047 mg/L) out of hold. Both analyses were reported as non-detects below the human health standard of 0.00005 mg/L. Exceedance information and COC statistics are shown in the Discharge Monitoring Report (DMR) Form in Appendix A.1. The maximum target for effluent pH, 9.50 standard units (SU), was not exceeded during this reporting period.

Complete BTL information for this reporting period is included with this report in separate electronic files, including an O&M events log and Field Data Summary file. The electronic file also includes graphical representations of the data. Analytical laboratory reports are also included with this report as separate electronic files for reference (as appropriate).

5.0 OPERATIONS SUMMARY

The BTL has been running under routine operations as described in the OM&M Plan. Further details of treatment operations and site events for this reporting period are described in the following sections.

5.1 Influent Conditions

Influent flow measured at SS-2 is summarized below. Appendix B contains a graphical representation of the influent flow data.

Influent Flow		
Total Flow	139.7	million gallons
Average Flow Rate	1,066	gallons per minute

5.2 BPSOU Subdrain Pump Station Conditions

Flow pumped from the Pump Station and Wet Vault water levels are summarized below. Appendix B contains a graphical representation of the flow data.

Pump System Flow		
Total Flow	58	million gallons
Average Flow Rate	442	gallons per minute

Wet Vault Levels		
Minimum	5,435.83	feet above mean sea level-National Geodetic Vertical Datum 29 (amsl-NGVD29)
Maximum	5,436.92	feet amsl-NGVD29
Average	5,435.87	feet amsl-NGVD29

5.3 West Camp Pump Station Conditions

The WCP-1 flow and water levels are summarized below. Appendix B contains graphical representation of the recorded data.

West Camp Pump System Flow		
Total Flow	20.8	million gallons
Average Flow Rate	159	gallons per minute

West Camp Water Levels		
Minimum	5,421.33	feet amsl-NGVD29
Maximum	5,421.74	feet amsl-NGVD29
Average	5,421.42	feet amsl-NGVD29

5.4 Missoula Gulch Baseflow and Hydraulic Control Channel Flow

Missoula Gulch baseflow and groundwater collected by the HCC surrounding Lower Area One (LAO) make up the remaining influent flow. The base flow (discharging groundwater) from the upper portion of the Missoula Gulch drainage typically ranges from 50 to 100 gallons per minute and eventually discharges to the HCC. The HCC flow is comprised of influent sources previously described, recaptured flow from the lagoon system, and captured untreated groundwater along the boundary of LAO. No flow measurement devices are in place to quantify the flow of groundwater from these sources.

5.5 Lime Addition

Daily lime usage, calculated on total lime dispensed via the gravimetric system, and dosage set point are listed below. Lime addition ceased for brief periods to accommodate general maintenance, and these periods were recorded in system notes.

Lime Set Point		
Minimum	115	mg/L
Maximum	130	mg/L
Most Common	120	mg/L

Daily Lime Dosage (calculated)		
Minimum	115	mg/L
Maximum	131	mg/L
Average	125	mg/L
Total Lime Usage	73	Tons

Post-treatment pH (minimum, maximum, and average) measured at station INDC, is listed below. Appendix B includes daily lime addition and influent flow data and resulting pH values through the treatment process.

Post-treatment pH at INDC		
Minimum	9.91	SU
Maximum	10.42	SU
Average	10.16	SU

5.6 Effluent Conditions

Effluent flow measured near SS-1 and the quarterly *effluent deficit* to influent flow are listed below. Appendix B provides graphical and tabulated data of influent and effluent flows.

Effluent Flow		
Total Flow	113.2	million gallons
Average Flow Rate	864	gallons per minute

Influent – Effluent Deficit		
System Loss/Recirculation	26.5	million gallons
Average system loss flow rate	202	gallons per minute

5.7 Effluent pH

Effluent pH (minimum, maximum, and average) measured at station SS-1 is listed below. The maximum target for pH, 9.50 SU, was not exceeded during this reporting period.

pH @ SS-1	
Minimum	9.08 SU
Maximum	9.45 SU
Average	9.27 SU
Exceedances above pH greater than 9.5	0

5.8 Inspection and Maintenance

Site operators completed routine maintenance and quarterly overview inspection tasks as listed in the Routine OM&M Plan. Appendix C contains a summary of the operator O&M events log. During the second quarter, the following tasks were completed:

- Monthly downloading and semi-annual maintenance of the subdrain area-velocity (AV) flow meters located in the subdrain.
- Annual maintenance of the site back-up generators was completed in June. Spring dredging was completed in the A1, B1, and C1 cells from April 5 to May 6, 2021.
- The dredging of lagoon cell A1 was initiated on April 7, 2021. Dredging was completed in lagoon cell C1 on May 5, 2021.

- Dredging of the D4 pond was completed from May 10 to June 4, 2021.
- The spring jetting of the subdrain was completed on June 15 and 16, 2021. Pigging of both the north and south discharge lines from the BPSOU vault to the discharge at the HCC was completed on June 17, 2021.

6.0 TRAINING

Site operators continued to review standard operating procedures relevant to work assignments, and also received training on seasonal tasks. Appendix C contains a training log for the quarter.

7.0 CONCLUSION

No exceedances of DEQ-7 water quality standards for aluminum, , iron, lead, mercury, silver, or zinc were observed in the BTL effluent samples, and the maximum effluent pH, 9.5 SU, was not exceeded. The BTL system performed effectively through the reporting period and operators continued to optimize treatment. Appendix A.2 contains a summary of analytical results at the effluent discharge point SS-1.

Two arsenic effluent samples exceeded the human health standard during the second quarter: arsenic values of 0.011 mg/L on 04/12/21 and 04/15/21, standard value of 0.010 mg/L. There were no upset conditions noted prior to these samples being collected.

8.0 REFERENCES

Atlantic Richfield Company, 2021. Revised Draft Final Butte Treatment Lagoons (BTL) Groundwater Treatment System Routine Operations, Maintenance, and Monitoring (OM&M) Plan. June 17, 2021.

DEQ, 2006. Circular DEQ-7 Montana Numeric Water Quality Standards. Montana Department of Environmental Quality, February 2006.

Figures

Figure 1. BTL and BPSOU Subdrain Routine Sampling and Monitoring Locations

Point Table			Point Table		
Description	Northing	Easting	Description	Northing	Easting
MH-MSD106	651209.02	1197905.47	HCC-01	651325.00	1193749.26
MH-MSD108	651265.29	1198781.03	HCC-01A	651326.53	1193021.75
MH-MSD110	651503.81	1199850.85	HCC-01B	651331.65	1192933.79
MH-MSD113	652414.06	1200906.31	HCC-02A	651364.64	1192780.84
MH-MSD116	653236.82	1201858.01	HCC-03	651895.05	1192245.96
MSD-HCC	651600.21	1194949.19	HCC-03A	651940.66	1192156.74
MSD-OUT	651324.20	1197083.50	HCC-04	652072.94	1191792.43
A1	651838.45	1192164.94	HCC-04A	652097.11	1191743.43
A2	651931.22	1191690.21	HCC-05	652280.66	1191254.87
A3	652055.47	1191180.80	HCC-05A	652303.23	1191210.43
B1	651484.14	1192551.84	HCC-06	652343.18	1191051.80
B2	651657.02	1192233.20	HCC-06A	652355.78	1191012.56
B3	651702.08	1192096.79	HCC-07	652188.07	1190724.00
C1	651464.96	1192558.36	INDC	651511.64	1192604.67
C3	651541.57	1192046.18	INF04	651457.40	1192637.70
			EFS-07	651925.98	1191093.47

LEGEND:

- BTL ANALYTICAL SAMPLE COLLECTION
- SUBDRAIN LOADING - FLOW WATER LEVEL, FIELD PARAMETERS. ANALYTICAL SAMPLES
- BTL FIELD DATA - LEVEL
- HCC STAFF GAUGE LOCATIONS
- BTL FIELD DATA- pH, TEMP, CONDUCTIVITY
- INDC

N

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAD 83
UNITS: FEET
SOURCE: PIONEER

SCALE IN FEET
0 100 200

FIGURE 1

BTL AND BPSOU SUBDRAIN ROUTINE SAMPLE AND MONITORING LOCATIONS

PIONEER TECHNICAL SERVICES, INC.
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

DATE: 2/2019

9/4/2019 5:02:31 PM P:\ARCO\BPSOU\2018\BTL-LAO\QUARTERLY OPERATIONS REPORT\2018 1Q REPORT\DWG\BTL-SMA-FG-PLN-001-18.DWG

Appendix A
Results and Reports

Appendix A.1
Discharge Monitoring Reports

SUMMARY OF ANALYTICAL RESULTS FOR EFS-07. Second Quarter 2021				
COC	**LOW**	**AVG**	**HIGH**	**EXCURSIONS**
ARSENIC (mg/l)	0.0046	0.0065	0.0110	2 out of 26
CADMIUM (mg/l)	0.00012	0.00021	0.00030	0 out of 26
COPPER (mg/l)	0.0093	0.0135	0.0230	0 out of 26
IRON (mg/l)	0.013	0.033	0.067	0 out of 26
LEAD (mg/l)	0.00013	0.00035	0.00110	0 out of 26
MERCURY (mg/l)	0.000005	0.000010	0.000045	0 out of 26
SILVER (mg/l)	0.00008	0.00008	0.00012	0 out of 26
ALUMINUM (mg/l)	0.0071	0.0164	0.0380	0 out of 26
ZINC (mg/l)	0.030	0.055	0.093	0 out of 26
pH (SU)	9.08	9.27	9.45	0 out of 91
HARDNESS (mg/l)	351	387	400	n/a

DISCHARGE MONITORING REPORT FORM

Name:	Atlantic Richfield Company
Address:	317 Anaconda Road
	Butte, MT 59701
Facility:	Butte Treatment Lagoons
Location:	Butte, Montana

Discharge Number
EFS-07
Comparison to ROD Standards

MONITORING PERIOD						
YEAR	MO	DAY		YEAR	MO	DAY
from **2021**	**4**	**1**	to	**2021**	**6**	**30**

PARAMETER		QUANTITY OR LOADING AVERAGE	QUANTITY OR LOADING MAXIMUM	QUANTITY OR LOADING UNITS	QUALITY OR CONCENTRATION MINIMUM	QUALITY OR CONCENTRATION AVERAGE	QUALITY OR CONCENTRATION MAXIMUM	QUALITY OR CONCENTRATION UNITS	NO. EX	FREQUENCY OF ANALYSES	SAMPLE TYPE
ARSENIC (Total)	SAMPLE MEASUREMENT	NA	NA		**0.0046**	**0.0065**	**0.0110**		**2/26**	**2/7**	**COMP**
	DISCHARGE STANDARD	NA	NA	NA	0.010 Daily Min		0.010 Daily Max	mg/l		Twice/Week	ISCO
CADMIUM *	SAMPLE MEASUREMENT	NA	NA	NA	**0.00012**	**0.00021**	**0.00030**		**0/26**	**2/7**	**COMP**
	DISCHARGE * STANDARD	NA	NA	NA	0.00069 Daily Min		0.00076 Daily Max	mg/l		Twice/Week	ISCO
COPPER *	SAMPLE MEASUREMENT	NA	NA	NA	**0.0093**	**0.0135**	**0.0230**		**0/26**	**2/7**	**COMP**
	DISCHARGE STANDARD	NA	NA	NA	0.0273 Daily Min		0.0305 Daily Max	mg/l		Twice/Week	ISCO
IRON	SAMPLE MEASUREMENT	NA	NA	NA	**0.013**	**0.033**	**0.067**		**0/26**	**2/7**	**COMP**
	DISCHARGE STANDARD	NA	NA	NA	1.0 Daily Min		1.0 Daily Max	mg/l		Twice/Week	ISCO
LEAD *	SAMPLE MEASUREMENT	NA	NA	NA	**0.00013**	**0.00035**	**0.00110**		**0/26**	**2/7**	**COMP**
	DISCHARGE * STANDARD	NA	NA	NA	0.015 Daily Min	0.015 HH	0.015 Daily Max	mg/l		Twice/Week	ISCO
MERCURY	SAMPLE MEASUREMENT	NA	NA	NA	**0.000005**	**0.000010**	**0.000045**		**0/26**	**2/7**	**COMP**
	DISCHARGE STANDARD	NA	NA	NA	Daily Min	0.00005 HH	Daily Max	mg/l		Twice/Week	ISCO
SILVER*	SAMPLE MEASUREMENT	NA	NA	NA	**0.00008**	**0.00008**	**0.00012**		**0/26**	**2/7**	**COMP**
	DISCHARGE STANDARD	NA	NA	NA	0.035 Daily Min		0.044 Daily Max	mg/l		Twice/week	ISCO

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachements here)

* Values are hardness corrected.

Reported total recoverable values for aluminum are compared to the chronic dissolved standard of 0.087 mg/L.
Mercury Reporting limit is 0.00005 mg/L, the detection limit is 0.0000045 mg/L and 0.0000047 mg/L.

DISCHARGE MONITORING REPORT FORM

Name: Atlantic Richfield Company								Discharge Number	
Address: 317 Anaconda Road								**EFS-07**	
Butte, MT 59701								Comparison to ROD Standards	
		MONITORING PERIOD							
Facility: Butte Treatment Lagoons		YEAR	MO	DAY		YEAR	MO	DAY	
Location: Butte, Montana	from	**2021**	**4**	**1**	to	**2021**	**6**	**30**	

PARAMETER		QUANTITY OR LOADING AVERAGE	QUANTITY OR LOADING MAXIMUM	QUANTITY OR LOADING UNITS	QUALITY OR CONCENTRATION MINIMUM	QUALITY OR CONCENTRATION AVERAGE	QUALITY OR CONCENTRATION MAXIMUM	QUALITY OR CONCENTRATION UNITS	NO. EX	FREQUENCY OF ANALYSES	SAMPLE TYPE
ALUMINUM	SAMPLE MEASUREMENT	NA	NA		**0.0071**	**0.0164**	**0.0380**		**N/A**	**2/7**	**COMP**
	DISCHARGE STANDARD	NA	NA	NA	0.087 Daily Min		0.087 Daily Max	mg/l		Twice/Week	ISCO
ZINC *	SAMPLE MEASUREMENT	NA	NA	NA	**0.030**	**0.055**	**0.093**		**0/26**	**2/7**	**COMP**
	DISCHARGE * STANDARD	NA	NA	NA	0.347 Daily Min		0.388 Daily Max	mg/l		Twice/Week	ISCO
pH	SAMPLE MEASUREMENT	NA	NA	NA	**9.08**	**9.27**	**9.45**		**0/91**	**7/7**	**INST**
	DISCHARGE STANDARD	NA	NA	NA	6.5 Daily Min		9.5 Daily Max	NA		Daily	Instan.
HARDNESS	SAMPLE MEASUREMENT	NA	NA	NA	**351**	**387**	**400**		**N/A**	**2/7**	**COMP**
	DISCHARGE STANDARD	NA	NA	NA	Daily Min		Daily Max	mg/l		Twice/Week	ISCO

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachements here)

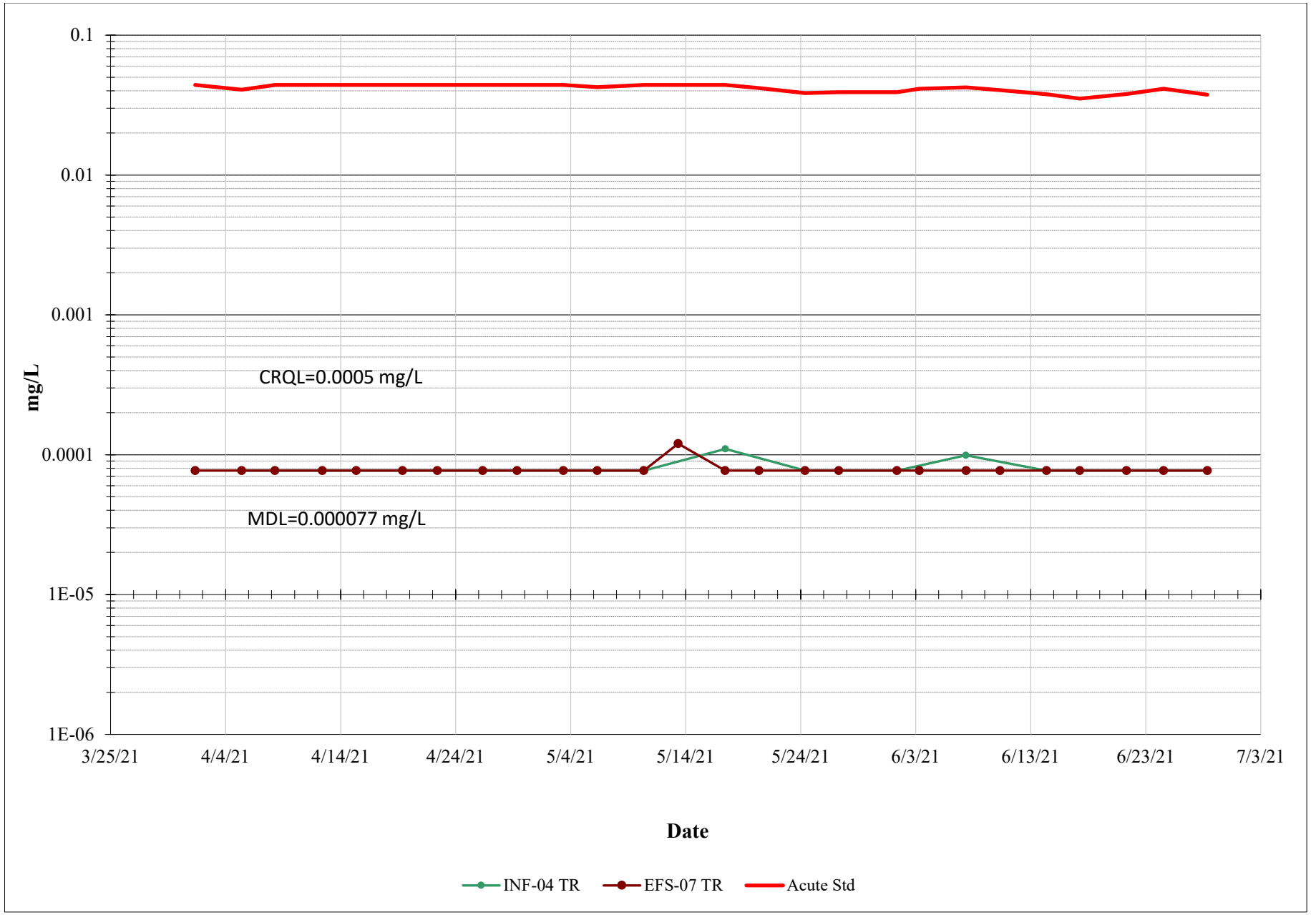
* Values are hardness corrected.

Reported total recoverable values for aluminum are compared to the chronic dissolved standard of 0.087 mg/L.
Mercury Reporting limit is 0.00005 mg/L, the detection limit is 0.0000045 mg/L and 0.0000047 mg/L.

Appendix A.2
Analytical Laboratory Results

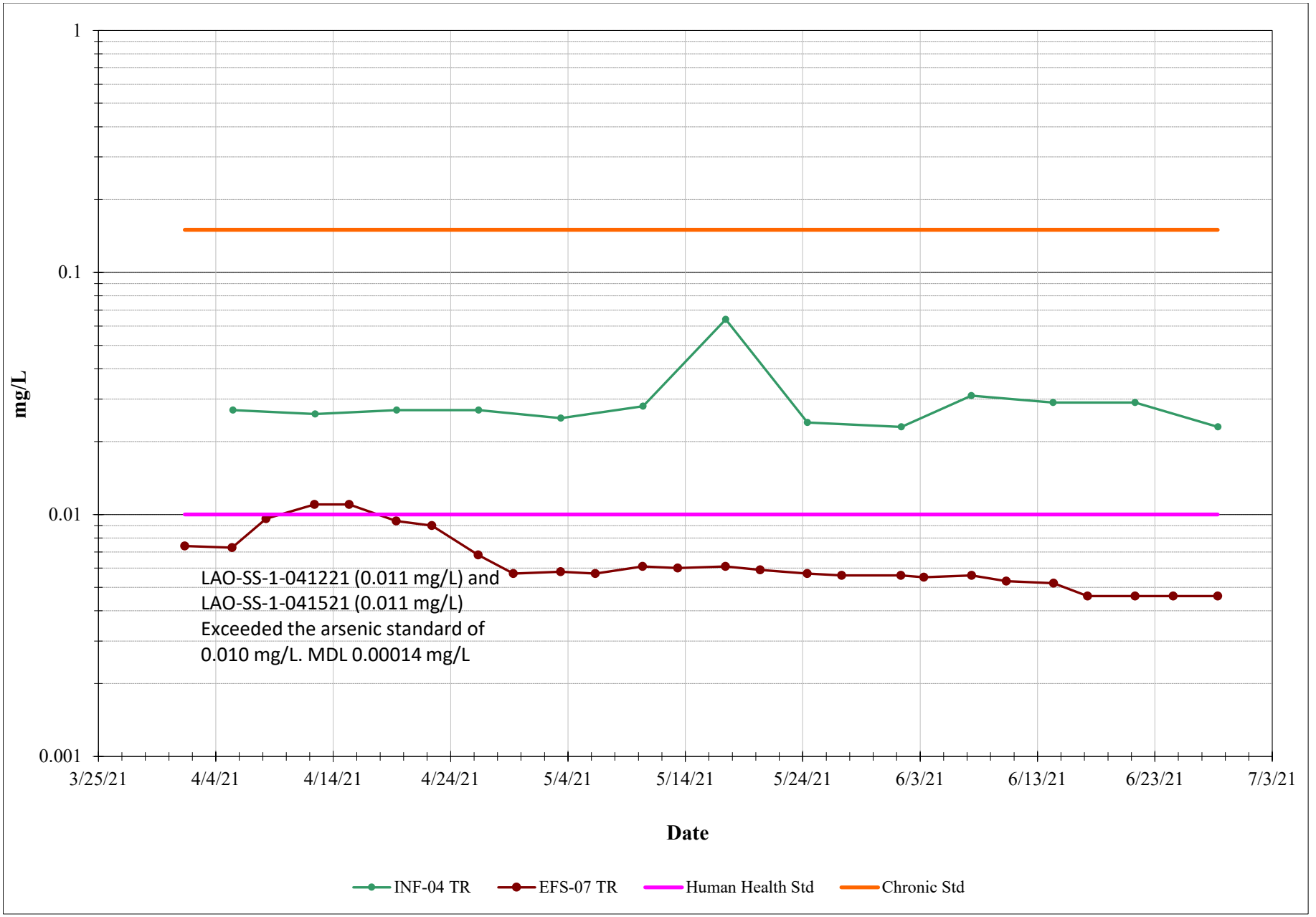
(Analytical results are provided electronically in the BTLChemicalDump Excel file included with this report)

Butte Treatment Lagoon System
Silver Concentration- Final



Silver maximum standard is DEQ-7 Acute Aquatic standard calculated based on effluent (EFS-07) hardness.

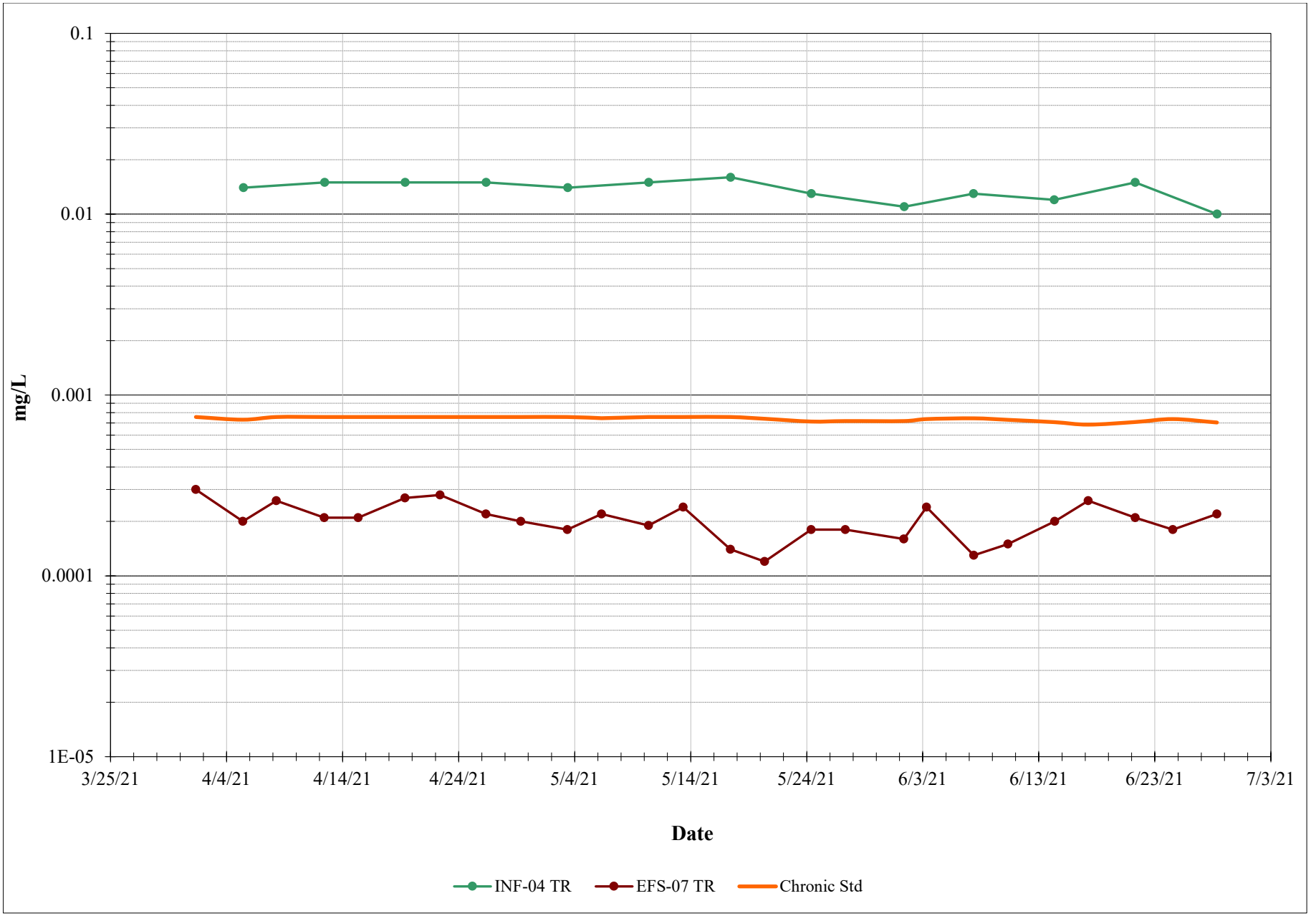
Butte Treatment Lagoon System
Arsenic Concentration- Final



Arsenic maximum standard is DEQ-7 Human Heath standard.

2021 2Q_BTLChemDump
8/24/2021

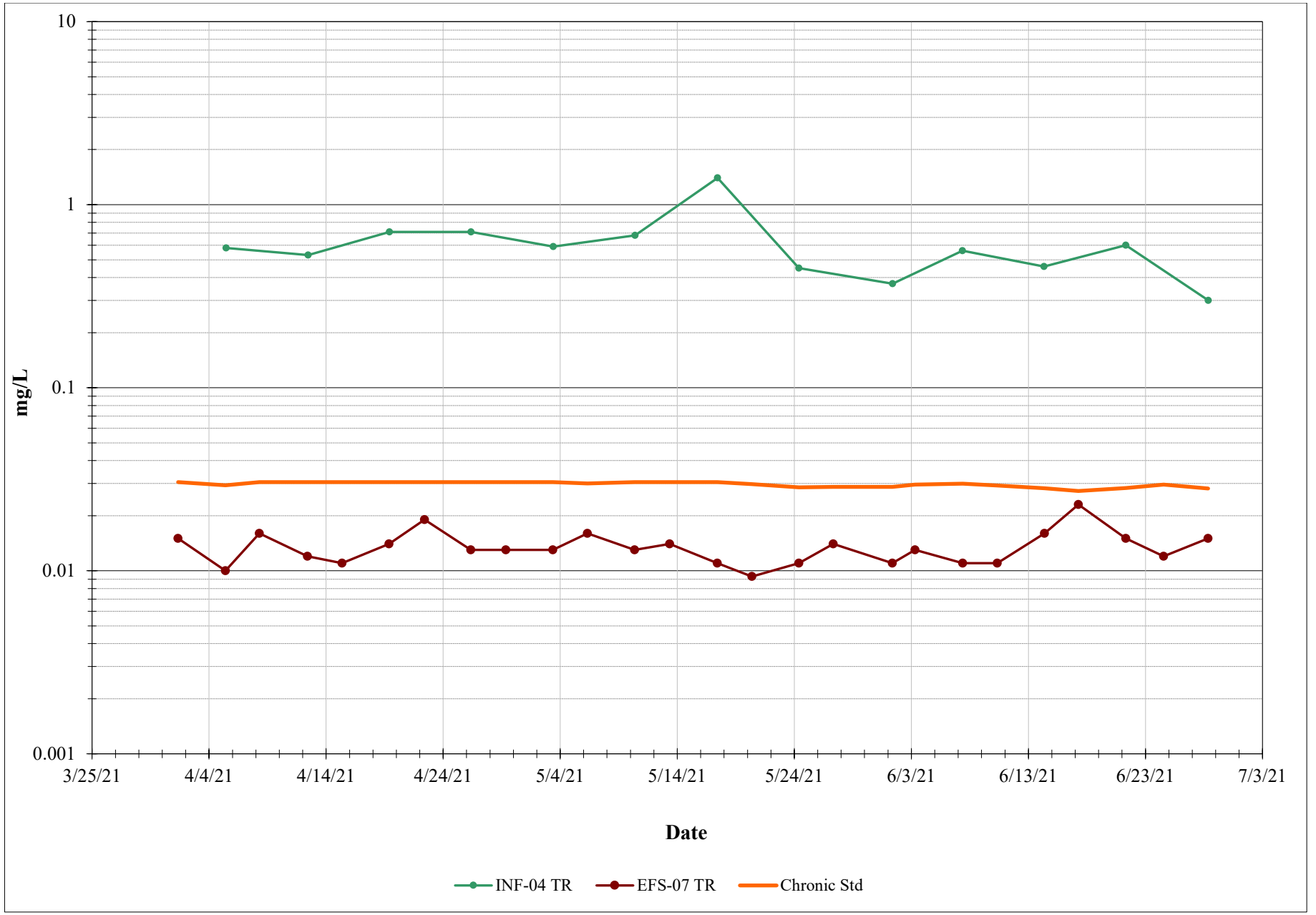
Butte Treatment Lagoon System
Cadmium Concentration- Final



Cadmium maximum standard is DEQ-7 Chronic Aquatic standard calculated based on effluent (EFS-07) hardness.

2021 2Q_BTLChemDump
8/24/2021

Butte Treatment Lagoon System
Copper Concentration- Final



Copper maximum standard is DEQ-7 Chronic Aquatic standard calculated based on effluent (EFS-07) hardness.

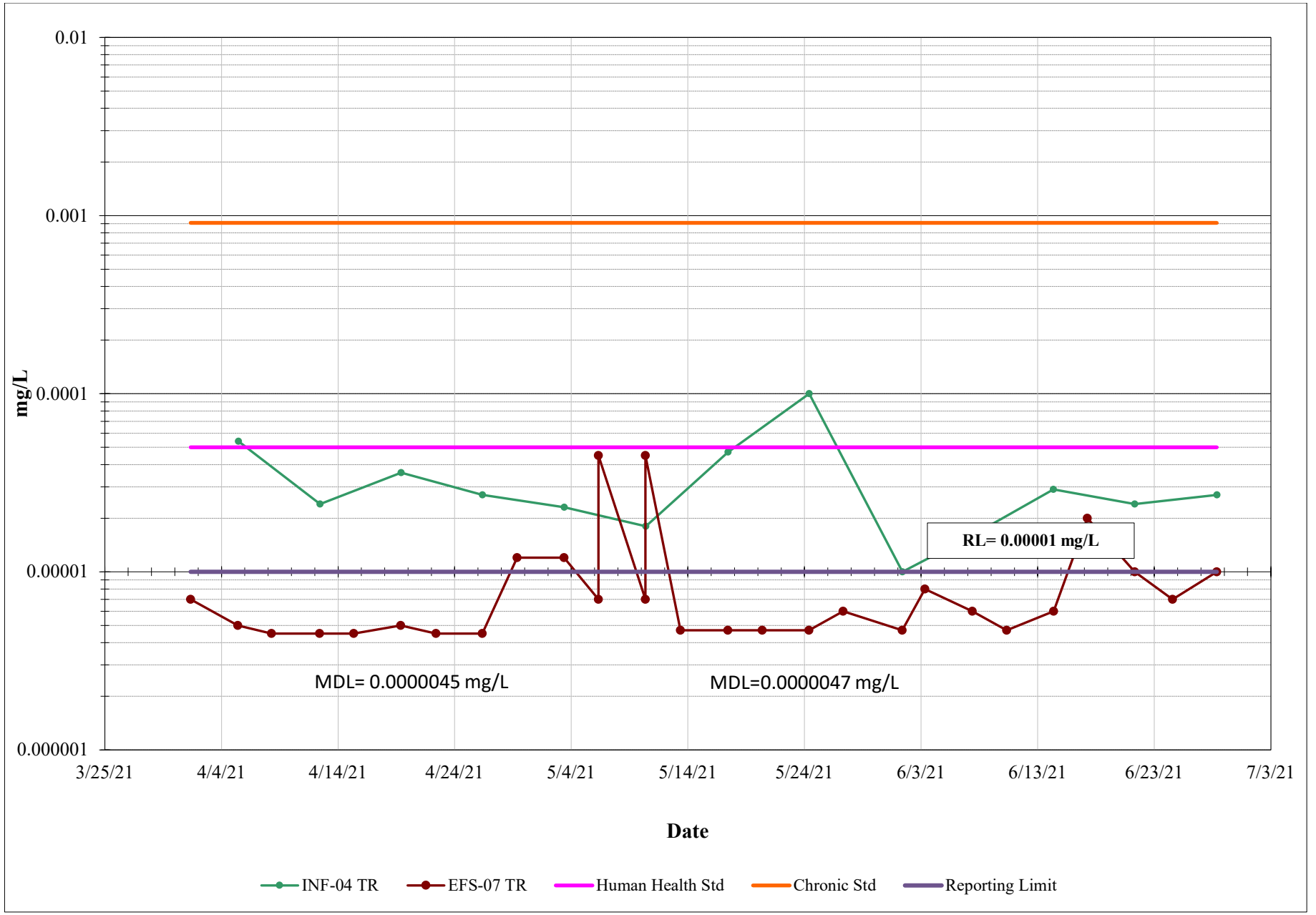
2021 2Q_BTLChemDump
8/24/2021

Butte Treatment Lagoon System
Iron Concentration- Final

Iron maximum standard is DEQ-7 Chronic Aquatic standard, Non-priority Pollutant value, 1.0 mg/L.

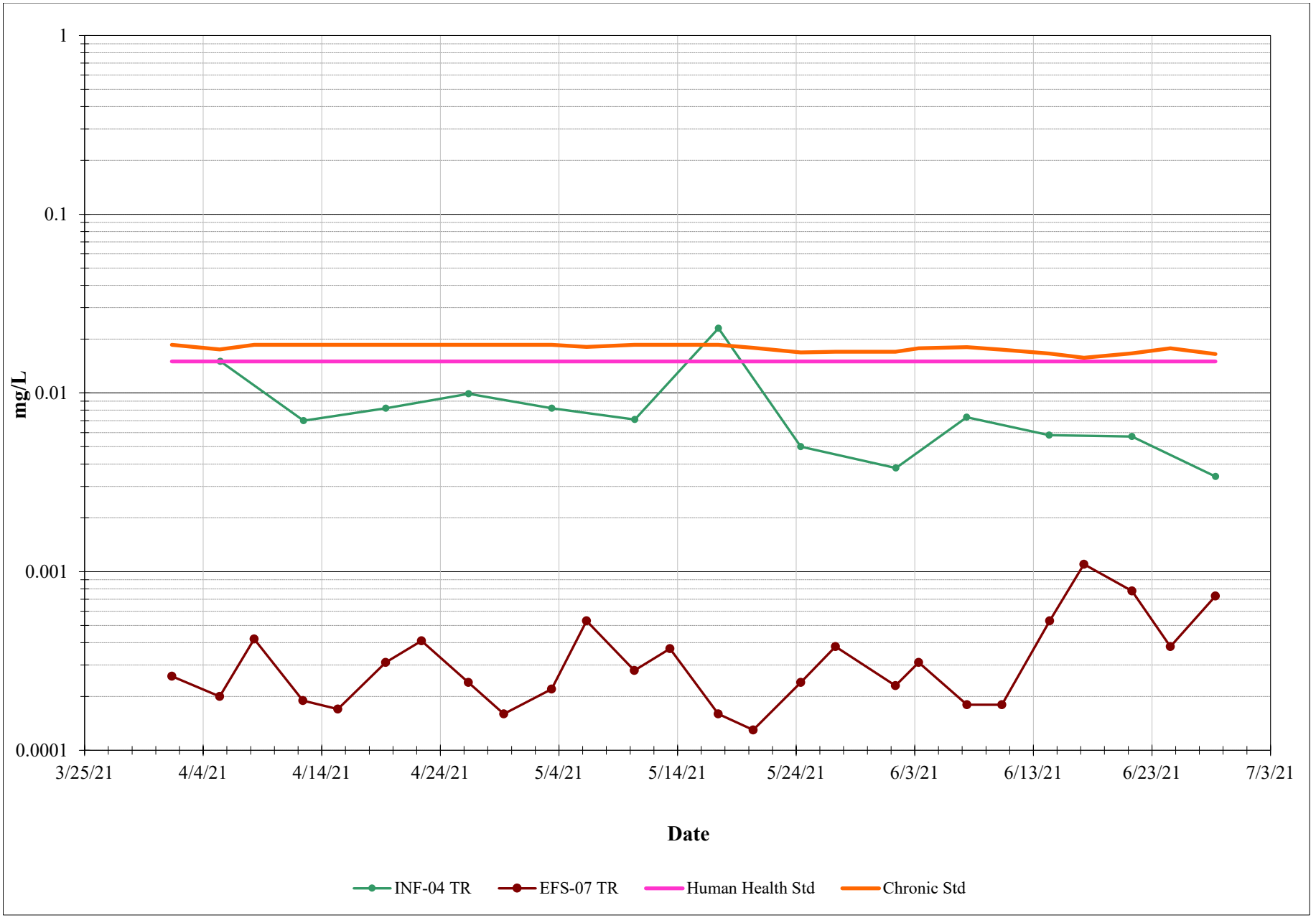
2021 2Q_BTLChemDump
8/24/2021

Butte Treatment Lagoon System
Mercury Concentration- Final



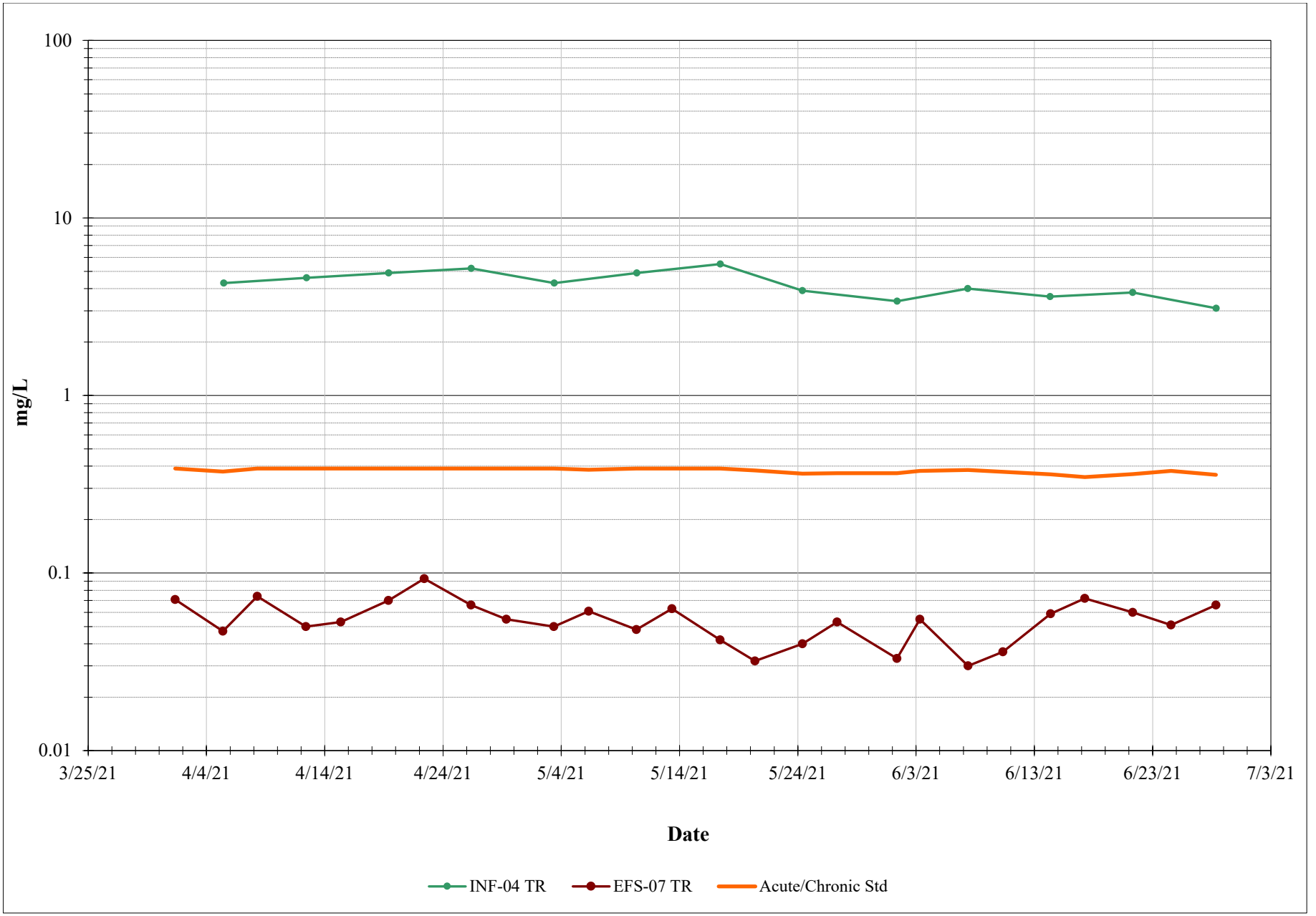
Mercury maximum standard is DEQ-7 Human Health standard.

Butte Treatment Lagoon System
Lead Concentration- Final



Lead maximum standard is DEQ-7 Human Health standard. Chronic Aquatic Life standard calculated based on effluent (EFS-07) hardness.

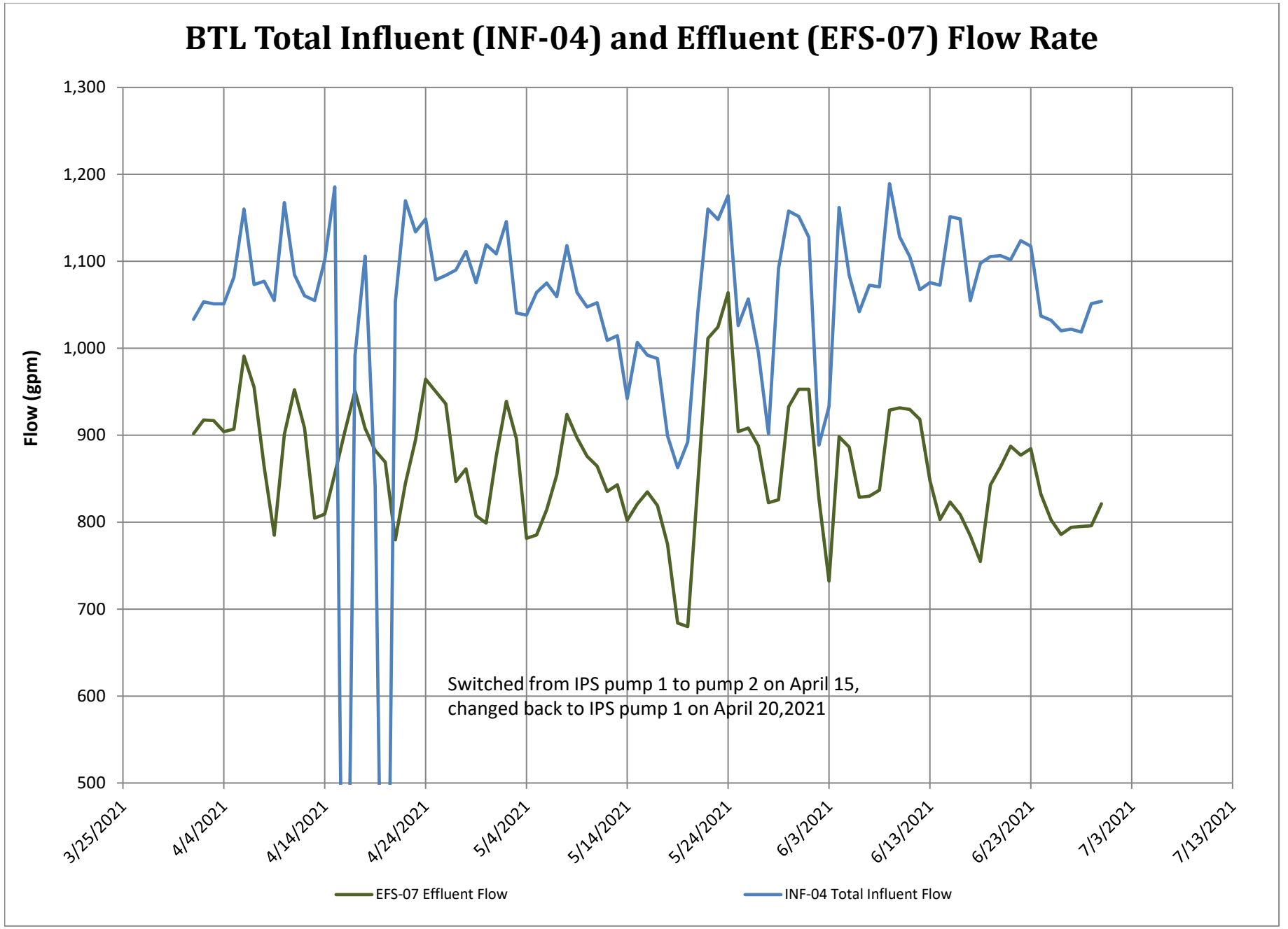
Butte Treatment Lagoon System
Zinc Concentration- Final

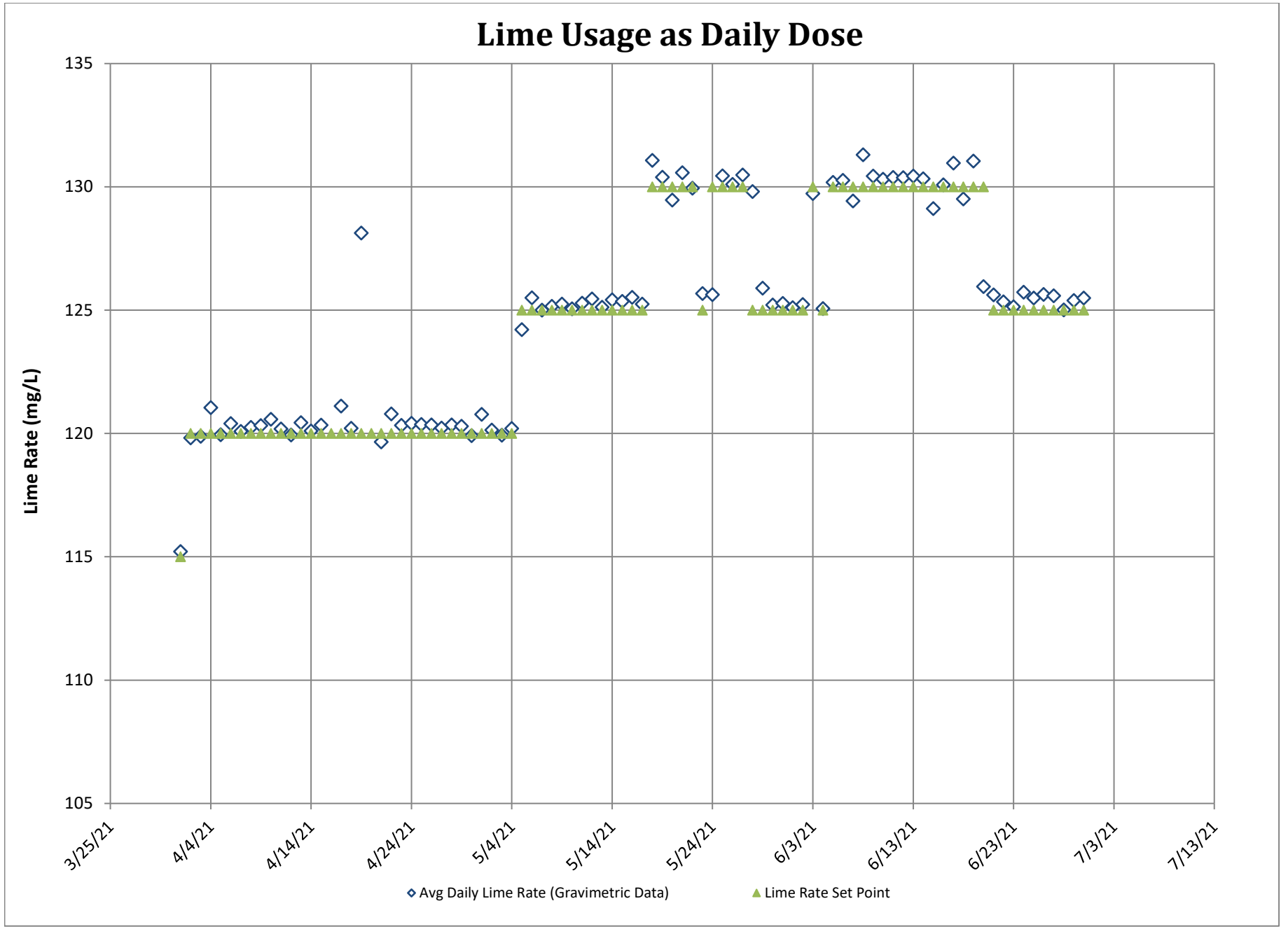


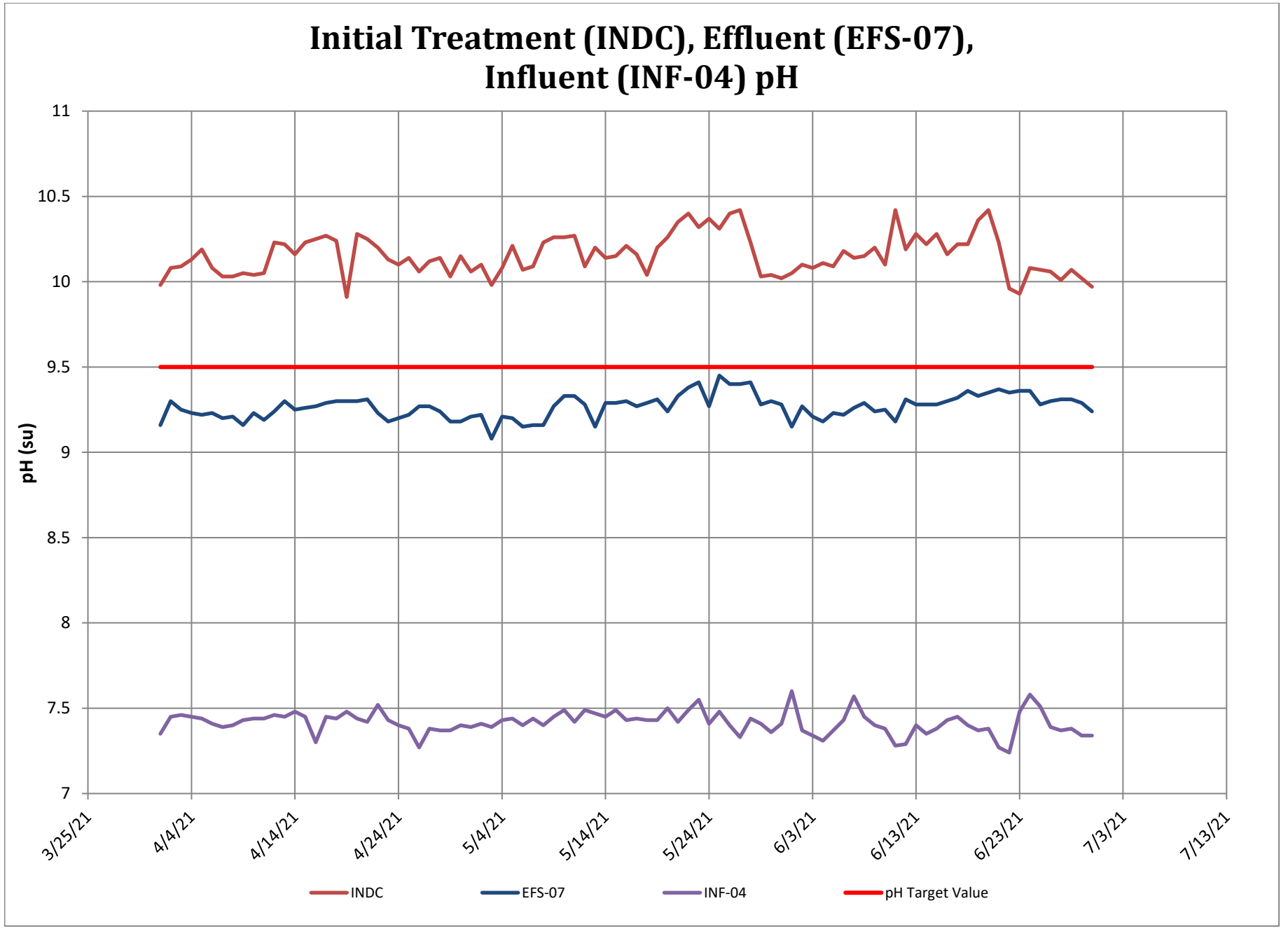
Zinc maximum standard is DEQ-7 Acute/Chronic standard calculated based on effluent (EFS-07) hardness.

2021 2Q_BTLChemDump
8/24/2021

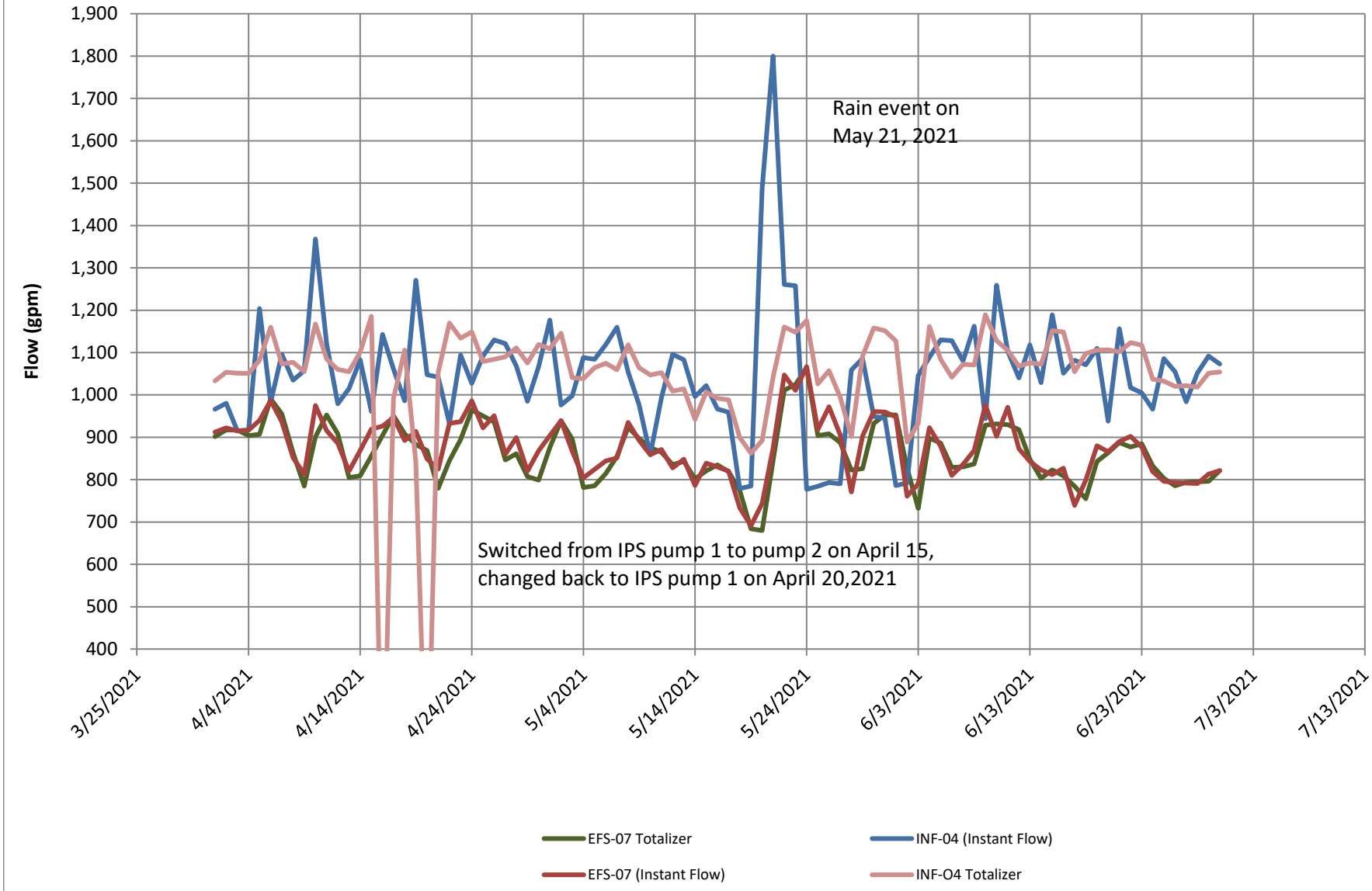
Appendix B
System Flows, Levels, and pH

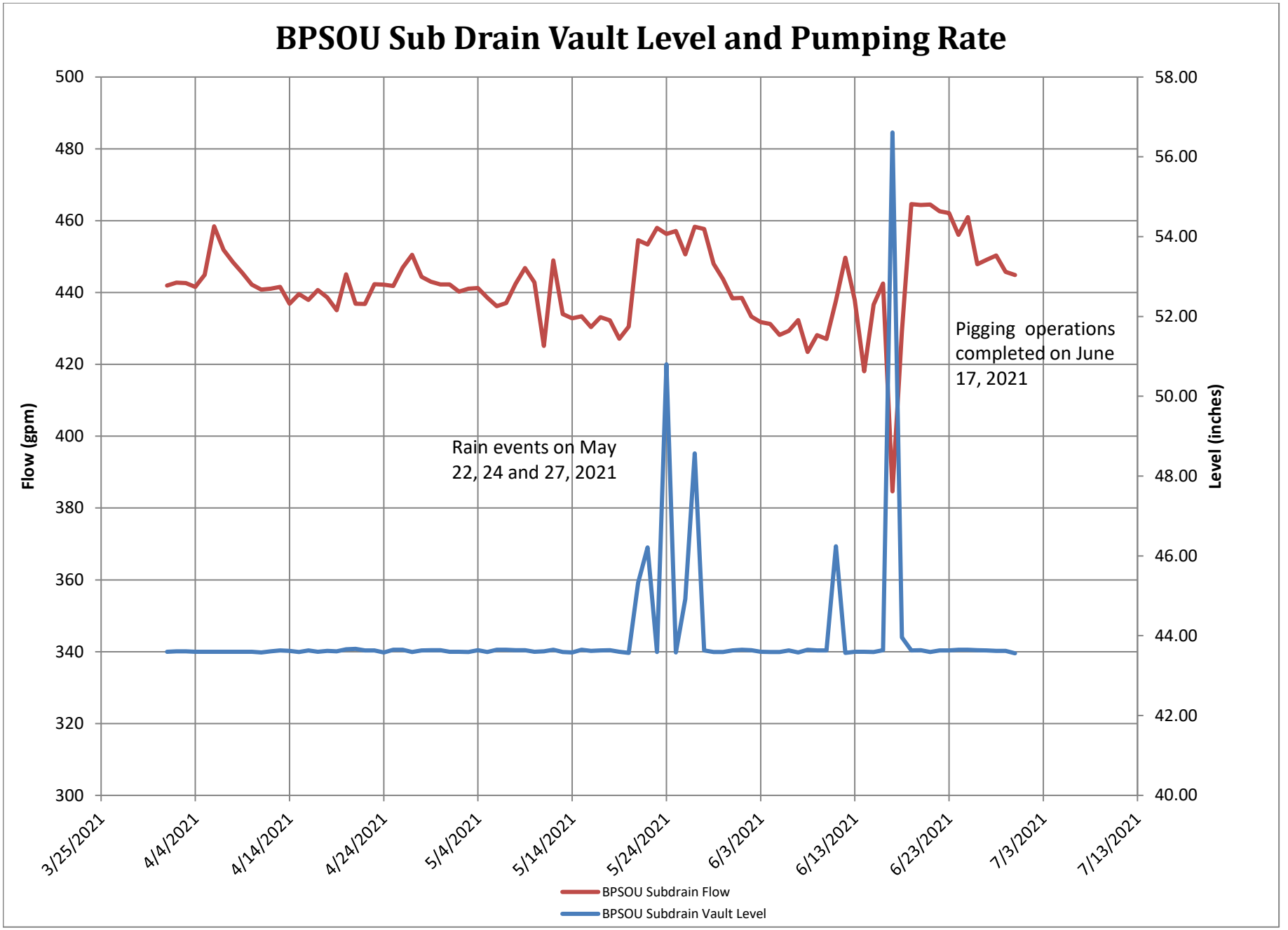

BTL Total Influent (INF-04) and Effluent (EFS-07) Flow Rate
Flow (gpm)
1,300
1,200
1,100
1,000
900
800
700
600
500
3/25/2021
4/4/2021
4/14/2021
4/24/2021
5/4/2021
5/14/2021
5/24/2021
6/3/2021
6/13/2021
6/23/2021
7/3/2021
7/13/2021
Switched from IPS pump 1 to pump 2 on April 15,
changed back to IPS pump 1 on April 20,2021
EFS-07 Effluent Flow
INF-04 Total Influent Flow

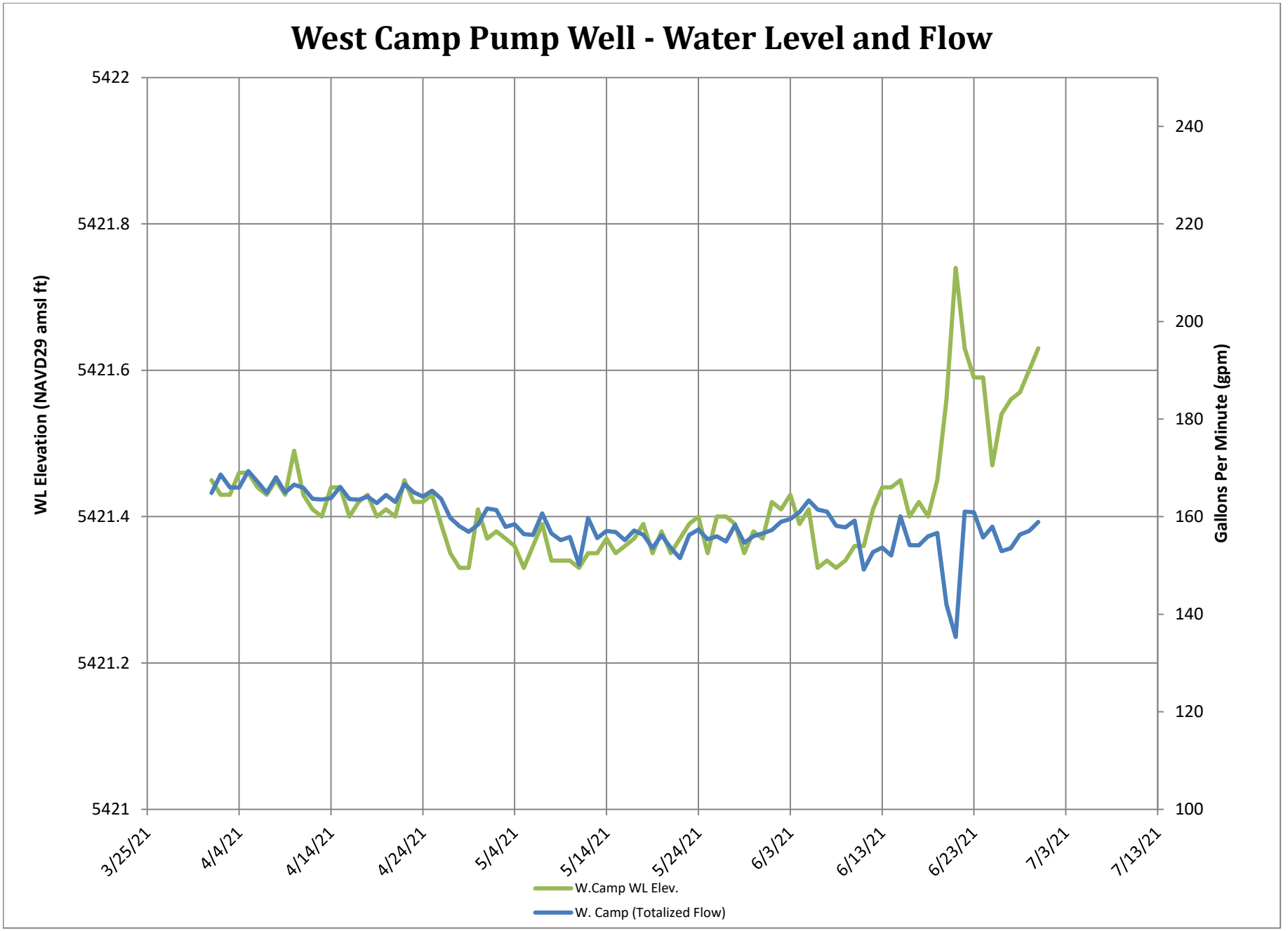

Lime Usage as Daily Dose
Lime Rate (mg/L)
135
130
125
120
115
110
105
3/25/21
4/4/21
4/14/21
4/24/21
5/4/21
5/14/21
5/24/21
6/3/21
6/13/21
6/23/21
7/3/21
7/13/21
Avg Daily Lime Rate (Gravimetric Data)
Lime Rate Set Point


Initial Treatment (INDC), Effluent (EFS-07), Influent (INF-04) pH
pH (su)
11
10.5
10
9.5
9
8.5
8
7.5
7
3/25/21
4/4/21
4/14/21
4/24/21
5/4/21
5/14/21
5/24/21
6/3/21
6/13/21
6/23/21
7/3/21
7/13/21
INDC
EFS-07
INF-04
pH Target Value

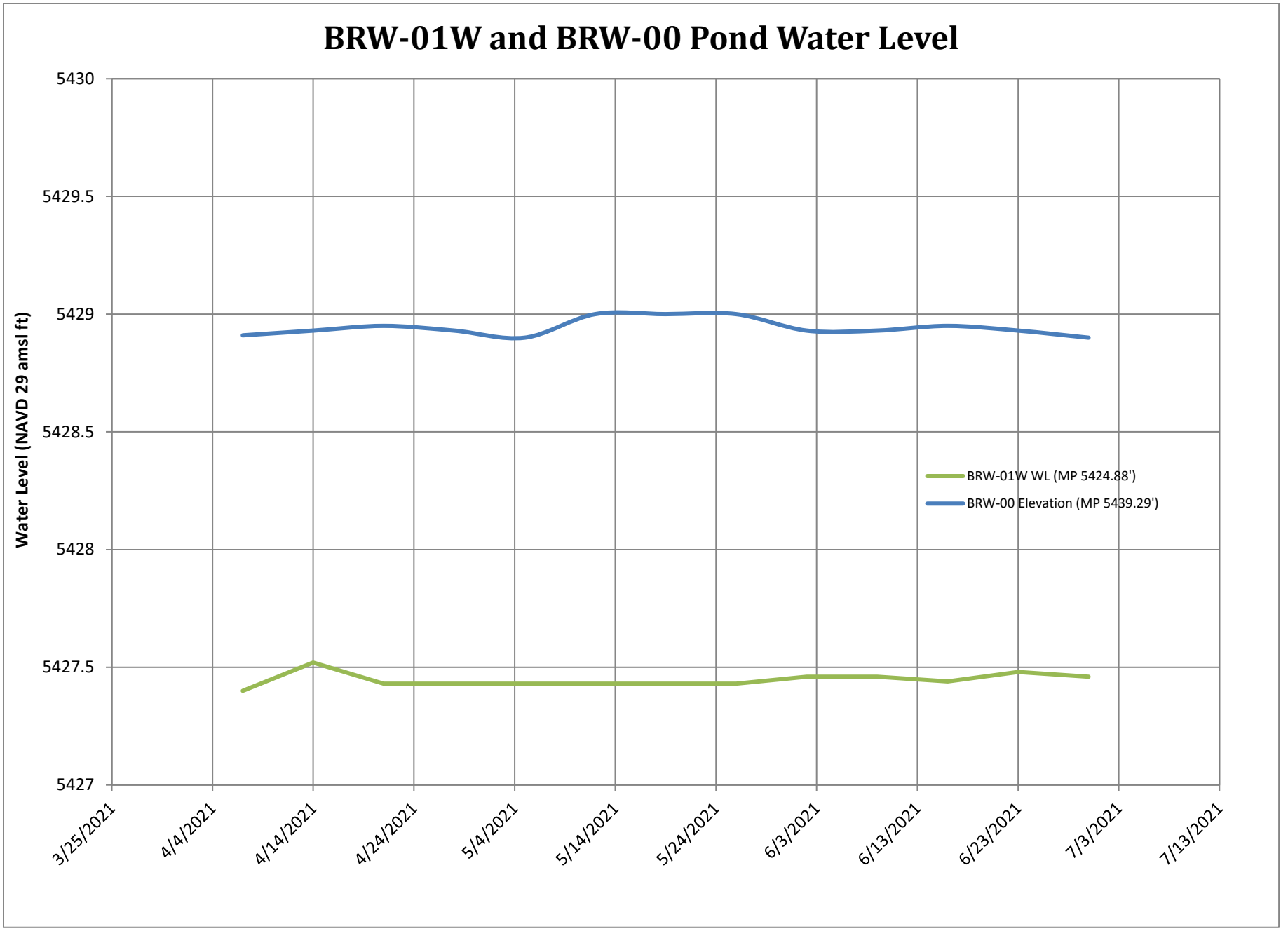
BTL Influent (INF-04) and Effluent (EFS-07) Flow Rate




BPSOU Sub Drain Vault Level and Pumping Rate
Flow (gpm)
Level (inches)
500
480
460
440
420
400
380
360
340
320
300
58.00
56.00
54.00
52.00
50.00
48.00
46.00
44.00
42.00
40.00
3/25/2021
4/4/2021
4/14/2021
4/24/2021
5/4/2021
5/14/2021
5/24/2021
6/3/2021
6/13/2021
6/23/2021
7/3/2021
7/13/2021
Rain events on May 22, 24 and 27, 2021
Pigging operations completed on June 17, 2021
BPSOU Subdrain Flow
BPSOU Subdrain Vault Level


West Camp Pump Well - Water Level and Flow
WL Elevation (NAVD29 amsl ft)
Gallons Per Minute (gpm)
5422
5421.8
5421.6
5421.4
5421.2
5421
240
220
200
180
160
140
120
100
3/25/21
4/4/21
4/14/21
4/24/21
5/4/21
5/14/21
5/24/21
6/3/21
6/13/21
6/23/21
7/3/21
7/13/21
W.Camp WL Elev.
W. Camp (Totalized Flow)

BRW-01W and BRW-00 Pond Water Level



Date	Actual Lime Rate (mg/L)	Total Lime Used - From Feeder Display (kg)	Calculated Influent Flow Rate (gpm)	Calculated Effluent Flow Rate (gpm)	Date	Actual Lime Rate (mg/L)	Total Lime Used - From Feeder Display (kg)	Calculated Influent Flow Rate (gpm)	Calculated Effluent Flow Rate (gpm)	Date	Actual Lime Rate (mg/L)	Total Lime Used - From Feeder Display (kg)	Calculated Influent Flow Rate (gpm)	Calculated Effluent Flow Rate (gpm)
4/1/2021	115	2,185,447	1,033	902	5/1/2021	121	2,206,654	1,109	876	6/1/2021	125	2,228,925	1,128	953
4/2/2021	120	2,186,080	1,053	918	5/2/2021	120	2,207,399	1,146	939	6/2/2021	125	2,229,521	889	827
4/3/2021	120	2,186,774	1,051	917	5/3/2021	120	2,208,117	1,041	896	6/3/2021	130	2,230,215	933	732
4/4/2021	121	2,187,465	1,051	904	5/4/2021	120	2,208,842	1,038	781	6/4/2021	125	2,230,952	1,162	898
4/5/2021	120	2,188,214	1,082	907	5/5/2021	124	2,209,535	1,064	785	6/5/2021	130	2,231,804	1,084	886
4/6/2021	120	2,188,970	1,160	991	5/6/2021	126	2,210,278	1,075	814	6/6/2021	130	2,232,513	1,042	829
4/7/2021	120	2,189,631	1,073	955	5/7/2021	125	2,211,090	1,059	854	6/7/2021	129	2,233,259	1,072	830
4/8/2021	120	2,190,283	1,077	864	5/8/2021	125	2,211,821	1,118	924	6/8/2021	131	2,233,988	1,071	837
4/9/2021	120	2,191,042	1,055	785	5/9/2021	125	2,212,439	1,064	897	6/9/2021	130	2,234,904	1,189	929
4/10/2021	121	2,191,748	1,168	901	5/10/2021	125	2,213,146	1,047	876	6/10/2021	130	2,235,619	1,128	932
4/11/2021	120	2,192,456	1,085	952	5/11/2021	125	2,213,874	1,052	864	6/11/2021	130	2,236,440	1,105	930
4/12/2021	120	2,193,267	1,060	908	5/12/2021	125	2,214,691	1,009	835	6/12/2021	130	2,237,159	1,067	918
4/13/2021	120	2,193,885	1,055	805	5/13/2021	125	2,215,354	1,014	843	6/13/2021	130	2,238,083	1,076	848
4/14/2021	120	2,194,621	1,101	809	5/14/2021	125	2,215,922	942	802	6/14/2021	130	2,238,739	1,072	803
4/15/2021	120	2,195,369	1,186	856	5/15/2021	125	2,216,616	1,007	821	6/15/2021	129	2,239,569	1,151	823
4/16/2021	NA	2,196,157	NA	904	5/16/2021	126	2,217,305	992	835	6/16/2021	130	2,240,358	1,149	809
4/17/2021	121	2,196,832	992	951	5/17/2021	125	2,217,996	988	819	6/17/2021	131	2,241,056	1,055	784
4/18/2021	120	2,197,529	1,106	908	5/18/2021	131	2,218,616	899	774	6/18/2021	130	2,241,855	1,098	755
4/19/2021	128	2,198,120	840	883	5/19/2021	130	2,219,212	863	684	6/19/2021	131	2,242,683	1,106	843
4/20/2021	NA	2,198,713	NA	869	5/20/2021	129	2,219,857	892	680	6/20/2021	126	2,243,403	1,106	864
4/21/2021	120	2,199,424	1,054	780	5/21/2021	131	2,220,645	1,042	844	6/21/2021	126	2,244,312	1,102	887
4/22/2021	121	2,200,170	1,170	845	5/22/2021	130	2,221,441	1,160	1,011	6/22/2021	125	2,244,965	1,124	877
4/23/2021	120	2,200,911	1,134	895	5/23/2021	126	2,222,200	1,148	1,024	6/23/2021	125	2,245,825	1,117	885
4/24/2021	120	2,201,657	1,149	965	5/24/2021	126	2,223,044	1,175	1,064	6/24/2021	126	2,246,600	1,037	832
4/25/2021	120	2,202,345	1,079	950	5/25/2021	130	2,223,733	1,026	904	6/25/2021	125	2,247,159	1,032	803
4/26/2021	120	2,203,135	1,084	936	5/26/2021	130	2,224,472	1,057	908	6/26/2021	126	2,247,780	1,020	786
4/27/2021	120	2,203,812	1,090	847	5/27/2021	130	2,225,187	995	888	6/27/2021	126	2,248,477	1,022	794
4/28/2021	120	2,204,541	1,111	861	5/28/2021	130	2,225,845	902	822	6/28/2021	125	2,249,241	1,019	795
4/29/2021	120	2,205,251	1,075	807	5/29/2021	126	2,226,537	1,092	826	6/29/2021	125	2,249,972	1,051	796
4/30/2021	120	2,206,018	1,119	799	5/30/2021	125	2,227,319	1,158	933	6/30/2021	125	2,250,763	1,054	821
					5/31/2021	125	2,228,108	1,152	953					

Weekly Influent - Effluent Summary; Q2 2021

Date	Influent (Gal.)	Effluent (Gal.)	Diff Inf-Eff (Gal.)	Diff Inf-Eff (gpm)	
4/2 to 4/8/21	10,868,604	9,295,273	1,573,331	156	
4/9 to 4/15/21	11,101,326	8,663,467	2,437,859	242	
4/16 to 4/22/21	10,451,702	8,864,095	1,587,607	158	
4/23 to 4/29/21	11,119,361	9,015,596	2,103,765	209	
4/30 to 5/6/21	10,931,617	8,482,834	2,448,783	243	
5/7 to 5/13/21	10,605,704	8,775,361	1,830,343	182	
5/14 to 5/20/21	9,479,515	7,797,173	1,682,342	167	
5/21 to 5/27/21	10,949,206	9,567,938	1,381,268	137	
5/28 to 6/3/21	10,443,517	8,706,953	1,736,564	172	
6/4 to 6/10/21	11,157,831	8,841,771	2,316,060	230	
6/11 to 6/17/21	11,053,276	8,517,866	2,535,410	252	
6/18 to 6/24/21	11,073,301	8,557,018	2,516,283	250	
6/25 to 7/1/21	10,459,430	8,082,138	2,377,292	236	
Total Quarter	139,694,390	113,167,483	26,526,907		Gallons

202	Quarterly Ave.

Appendix C
Operation and Maintenance Event, and Training Logs

2021 BTL O&M Events Log			
Start Date	**Time**	**Events Description**	**Source**
1-Apr-21	10:40	Operating dry vault pumps, north and south lines.	Daily MSD
1-Apr-21	10:40	Feed rate increased to 120 mg/l@ 13:00	Daily Cell
2-Apr-21	8:45	Operating dry vault pumps, north and south lines.	Daily MSD
3-Apr-21	9:00	Operating dry vault pumps, north and south lines.	Daily MSD
4-Apr-21	8:55	Operating dry vault pumps, north and south lines.	Daily MSD
5-Apr-21	10:20	Operating dry vault pumps, north and south lines.	Daily MSD
6-Apr-21	10:10	Operating dry vault pumps, north and south lines.	Daily MSD
7-Apr-21	8:45	Operating dry vault pumps, north and south lines.	Daily MSD
8-Apr-21	6:55	Operating dry vault pumps, north and south lines.	Daily MSD
9-Apr-21	9:15	Operating dry vault pumps, north and south lines.	Daily MSD
10-Apr-21	7:20	Operating dry vault pumps, north and south lines.	Daily MSD
11-Apr-21	7:15	Operating dry vault pumps, north and south lines.	Daily MSD
12-Apr-21	11:20	Operating dry vault pumps, north and south lines.	Daily MSD
13-Apr-21	8:45	Operating dry vault pumps, north and south lines.	Daily MSD
14-Apr-21	9:15	Operating dry vault pumps, north and south lines.	Daily MSD
15-Apr-21	8:20	Operating dry vault pumps, north and south lines.	Daily MSD
15-Apr-21	8:20	Switched to IPS pump #2 @10:45 now using IPS 3011 flow meter for lime feed signal	Daily Cell
16-Apr-21	9:15	Operating dry vault pumps, north and south lines.	Daily MSD
17-Apr-21	10:00	Operating dry vault pumps, north and south lines.	Daily MSD
18-Apr-21	9:05	Operating dry vault pumps, north and south lines.	Daily MSD
19-Apr-21	9:15	Operating dry vault pumps, north and south lines.	Daily MSD
20-Apr-21	8:45	Operating dry vault pumps, north and south lines.	Daily MSD
20-Apr-21	8:45	Switched to IPS pump #1 @8:30 now using IPS 3005 flow meter for lime feed signal	Daily Cell
21-Apr-21	9:15	Operating dry vault pumps, north and south lines.	Daily MSD
22-Apr-21	8:30	Operating dry vault pumps, north and south lines.	Daily MSD
23-Apr-21	8:25	Operating dry vault pumps, north and south lines.	Daily MSD
24-Apr-21	8:10	Operating dry vault pumps, north and south lines.	Daily MSD
25-Apr-21	7:30	Operating dry vault pumps, north and south lines.	Daily MSD
26-Apr-21	10:10	Operating dry vault pumps, north and south lines.	Daily MSD
27-Apr-21	8:55	Operating dry vault pumps, north and south lines.	Daily MSD
28-Apr-21	8:55	Operating dry vault pumps, north and south lines.	Daily MSD
29-Apr-21	9:05	Operating dry vault pumps, north and south lines.	Daily MSD
30-Apr-21	10:15	Operating dry vault pumps, north and south lines.	Daily MSD
1-May-21	7:10	Operating dry vault pumps, north and south lines.	Daily MSD
2-May-21	7:00	Operating dry vault pumps, north and south lines.	Daily MSD
3-May-21	8:20	Operating dry vault pumps, north and south lines.	Daily MSD
4-May-21	9:55	Operating dry vault pumps, north and south lines.	Daily MSD
4-May-21	9:55	Feed rate increased to 125 mg/l@ 15:30	Daily Cell
5-May-21	9:00	Operating dry vault pumps, north and south lines.	Daily MSD
6-May-21	9:15	Operating dry vault pumps, north and south lines.	Daily MSD
7-May-21	12:15	Operating dry vault pumps, north and south lines.	Daily MSD
8-May-21	11:15	Operating dry vault pumps, north and south lines.	Daily MSD
9-May-21	7:40	Operating dry vault pumps, north and south lines.	Daily MSD
10-May-21	7:26	Operating dry vault pumps, north and south lines.	Daily MSD
11-May-21	8:30	Operating dry vault pumps, north and south lines.	Daily MSD
12-May-21	12:10	Operating dry vault pumps, north and south lines.	Daily MSD
13-May-21	11:10	Operating dry vault pumps, north and south lines.	Daily MSD
14-May-21	8:20	Operating dry vault pumps, north and south lines.	Daily MSD
15-May-21	8:30	Operating dry vault pumps, north and south lines.	Daily MSD
16-May-21	8:55	Operating dry vault pumps, north and south lines.	Daily MSD
17-May-21	9:20	Operating dry vault pumps, north and south lines.	Daily MSD
17-May-21	9:20	Lime rate increased to 130mg/l@ 13:00 due to D4 dredging activities, Lime rate increased to 135mg/l@13:50, Increased to 140mg/l@14:50 Decreased to 130mg/l@1800	Daily Cell
18-May-21	8:40	Operating dry vault pumps, north and south lines.	Daily MSD
19-May-21	8:00	Operating dry vault pumps, north and south lines.	Daily MSD
20-May-21	8:35	Operating dry vault pumps, north and south lines.	Daily MSD
20-May-21	8:35	IPS pump was shut OFF @11:40 for 1 hour.	Daily Cell

2021 BTL O&M Events Log			
Start Date	**Time**	**Events Description**	**Source**
21-May-21	10:05	Operating dry vault pumps, north and south lines.	Daily MSD
22-May-21	9:20	Operating dry vault pumps, north and south lines.	Daily MSD
22-May-21	9:20	lime rate decreased to 125mg/l@ 9:30	Daily Cell
23-May-21	8:30	Operating dry vault pumps, north and south lines.	Daily MSD
24-May-21	9:40	Operating dry vault pumps, north and south lines.	Daily MSD
24-May-21	9:40	Lime rate increased to 130mg/l@ 7:30	Daily Cell
25-May-21	8:20	Operating dry vault pumps, north and south lines.	Daily MSD
26-May-21	8:00	Operating dry vault pumps, north and south lines.	Daily MSD
27-May-21	8:15	Operating dry vault pumps, north and south lines.	Daily MSD
27-May-21	8:15	lime rate decreased to 125mg/l@ 7:00 am	Daily Cell
28-May-21	9:00	Operating dry vault pumps, north and south lines.	Daily MSD
29-May-21	7:10	Operating dry vault pumps, north and south lines.	Daily MSD
30-May-21	6:55	Operating dry vault pumps, north and south lines.	Daily MSD
31-May-21	7:00	Operating dry vault pumps, north and south lines.	Daily MSD
1-Jun-21	8:30	Operating dry vault pumps, north and south lines.	Daily MSD
2-Jun-21	8:05	Operating dry vault pumps, north and south lines.	Daily MSD
2-Jun-21	8:05	lime rate increased to 130mg/l@ 12:00	Daily Cell
3-Jun-21	9:20	Operating dry vault pumps, north and south lines.	Daily MSD
3-Jun-21	9:20	lime rate decreased to 125mg/l@ 9:30	Daily Cell
4-Jun-21	7:40	Operating dry vault pumps, north and south lines.	Daily MSD
4-Jun-21	7:40	Lime rate increased to 130mg/l@ 9:00	Daily Cell
5-Jun-21	10:15	Operating dry vault pumps, north and south lines.	Daily MSD
6-Jun-21	9:15	Operating dry vault pumps, north and south lines.	Daily MSD
7-Jun-21	8:55	Operating dry vault pumps, north and south lines.	Daily MSD
8-Jun-21	7:45	Operating dry vault pumps, north and south lines.	Daily MSD
9-Jun-21	9:45	Operating dry vault pumps, north and south lines.	Daily MSD
10-Jun-21	7:10	Operating dry vault pumps, north and south lines.	Daily MSD
11-Jun-21	8:15	Operating dry vault pumps, north and south lines.	Daily MSD
12-Jun-21	7:00	Operating dry vault pumps, north and south lines.	Daily MSD
13-Jun-21	12:00	Operating dry vault pumps, north and south lines.	Daily MSD
14-Jun-21	8:40	Operating dry vault pumps, north and south lines.	Daily MSD
15-Jun-21	9:15	Operating dry vault pumps, north and south lines.	Daily MSD
16-Jun-21	8:30	Operating dry vault pumps, north and south lines. Switched to Drying bed discharge for jetting activities @ 9:00 switched back @ 15:40	Daily MSD
17-Jun-21	6:45	Operating dry vault pumps, north and south lines.	Daily MSD
18-Jun-21	7:30	Operating dry vault pumps, north and south lines.	Daily MSD
19-Jun-21	8:40	Operating dry vault pumps, north and south lines.	Daily MSD
20-Jun-21	7:25	Operating dry vault pumps, north and south lines.	Daily MSD
20-Jun-21	7:25	Lime rate decreased to 125mg/l@ 8:00	Daily Cell
21-Jun-21	12:20	Operating dry vault pumps, north and south lines.	Daily MSD
22-Jun-21	8:45	Operating dry vault pumps, north and south lines.	Daily MSD
23-Jun-21	11:50	Operating dry vault pumps, north and south lines.	Daily MSD
24-Jun-21	14:00	Operating dry vault pumps, north and south lines.	Daily MSD
25-Jun-21	9:00	Operating dry vault pumps, north and south lines.	Daily MSD
26-Jun-21	6:20	Operating dry vault pumps, north and south lines.	Daily MSD
27-Jun-21	6:15	Operating dry vault pumps, north and south lines.	Daily MSD
28-Jun-21	8:40	Operating dry vault pumps, north and south lines.	Daily MSD
29-Jun-21	9:05	Operating dry vault pumps, north and south lines.	Daily MSD
30-Jun-21	11:25	Operating dry vault pumps, north and south lines.	Daily MSD

Date	Time	Operator(s)/Staff	Temp	Weather	Operations	Contractor Work	Observations/Field Issues	Inspection Follow-Ups	Visitors to Site	Safety Topics/Meetings/Pre-Entries
1-Apr-21	10:40	Taylor Stanich	22 to 51F	Clear, sunny	Daily site checks, Daily parameters, weekly sampling, waterfowl survey, monthly group meeting, install equipment blank tubing in eff sample line, upload equis, weekly epa summary report		Operating dry vault pumps, north and south lines.	CO2 @ 10 cfh turned OFF @ 13:30		Weekly sampling review sds for HN03
2-Apr-21	8:45	Taylor Stanich, Kaleb Ferriter	34 to 63F	Clear, Sunny	Daily site checks, daily parameters, waterfowl survey, upload equis collect forms, clean c channel		Operating dry vault pumps, north and south lines.	C02 OFF		Review SOP for channel cleaning
3-Apr-21	9:00	Steve Lubick	34 to 63 F	Clear, Sunny	Daily site checks, daily parameters		Operating dry vault pumps, north and south lines.	C02 OFF		working alone-communication
4-Apr-21	8:55	Steve Lubick	32 to 62 F	Partly cloudy calm	Daily site checks, daily parameters		Operating dry vault pumps, north and south lines.	C02 OFF		working alone-communication
5-Apr-21	10:20	Taylor Stanich	29 to 36F	Overcast, snow showers	Daily site checks, Daily parameters, weekly sampling, waterfowl survey, upload equis form, MSD site/gen checks, close out emms tasks	JCI dredge set-up	Operating dry vault pumps, north and south lines.	C02 OFF		Weekly sampling review sds for HN03
6-Apr-21	10:10	Taylor Stanich, Kaleb Ferriter	23 to 52F	Sunny	Daily site checks, Daily parameters, cleaned channels, WCP/IPS site checks, dredge set up, upload equis form, waterfowl survey	JCI dredge set-up	Operating dry vault pumps, north and south lines.	C02 OFF		Hand protection
7-Apr-21	8:45	Taylor Stanich	22 to 53F	Sunny	Daily site checks, Daily parameters, waterfowl survey, BRW staff gauge monitoring, dredge ops oversight,	JCI dredge set-up/started dredging A1 @ 10:00	Operating dry vault pumps, north and south lines.	C02 OFF		Pinch points
8-Apr-21	6:55	Taylor Stanich, Rob Neff	18 to 36F	Overcast	Daily site checks, Daily parameters, waterfowl survey, weekly sampling,	JCI dredging A1	Operating dry vault pumps, north and south lines.	C02 OFF		Proper PPE
9-Apr-21	9:15	Taylor Stanich	17 to 45F	Mostly sunny	Daily site checks, Daily parameters, waterfowl survey, decant water from north drying bed, upload equis		Operating dry vault pumps, north and south lines.	C02 OFF		Biological hazards
10-Apr-21	7:20	Rob Neff	19 to 46F	Partly cloudy	Daily site checks, daily parameters,upload equis form		Operating dry vault pumps, north and south lines.	C02 OFF		Working alone-communication
11-Apr-21	7:15	Rob Neff	16 to 37F	Partly cloudy	Daily site checks, daily parameters,upload equis form		Operating dry vault pumps, north and south lines.	C02 OFF		Working alone-communication
12-Apr-21	11:20	Taylor Stanich	24 to 37F	Overcast	Daily site checks, Daily parameters, weekly sampling, waterfowl survey, close out emms taskss,	JCI dredging A1	Operating dry vault pumps, north and south lines.	C02 OFF		Weekly sampling review sds for HN03
13-Apr-21	8:45	Taylor Stanich, Kaleb Ferriter	18 to 36F	Partly Cloudy	Daily site checks, Daily parameters, waterfowl survey, upoad equis, Monthly eyewash/fire extinguisher checks, WCP and IPS site/gen checks	JCI dredging A1	Operating dry vault pumps, north and south lines.	C02 OFF		Monthly fire extinguishers
14-Apr-21	9:15	Taylor Stanich	20 to 35F	Overcast	Daily site checks, Daily parameters, BRW staff gauge monitoring, Monitor dredge operations, waterfowl survey, upoad equis	JCI dredging A1	Operating dry vault pumps, north and south lines.	C02 OFF		Aggressive geese nesting on dikes
15-Apr-21	8:20	Taylor Stanich	32 to 42F	Overcast	Daily site checks, Daily parameters, Weekly sampling, waterfowl survey, weekly epa summary report, upload equis collect form, IPS pump 1 maintenance	JCI dredging A1	Operating dry vault pumps, north and south lines.	C02 OFF		Hand protection

16-Apr-21	9:15	Taylor Stanich, Kaleb Ferriter	21 to 46F	Mostly Sunny	Daily site checks, daily parameters, Pump 1 maintenance, upload equis form, water fowl survey, Decant water from north drying bed		Operating dry vault pumps, north and south lines.	C02 OFF		Hi Po incident
17-Apr-21	10:00	Kaleb Ferriter	28 to 57F	Sunny	Daily site checks, daily parameters		Operating dry vault pumps, north and south lines.	C02 OFF		working alone-communication
18-Apr-21	9:05	Kaleb Ferriter	27 to 55F	Sunny	Daily site checks, daily parameters		Operating dry vault pumps, north and south lines.	C02 OFF		working alone-communication
19-Apr-21	9:15	Taylor Stanich, Kaleb Ferriter	12 to 34F	Snow showers	Daily site checks, daily parameters, waterfowl survey, Monthly compliance sampling, MSD site/gen checks, upload equis, monitor dredge ops	JCI dredging B1	Operating dry vault pumps, north and south lines.	C02 OFF		Monthly sampling-review sds for HNo3 and H2S04
20-Apr-21	8:25	Taylor Stanich, Kaleb Ferriter	16 to 39F	Sunny	Daily site checks, daily parameters, WCP/IPS site and gen inspection, upload equis, clean A channel	JCI dredging B1	Operating dry vault pumps, north and south lines.	C02 OFF		Hand tool safety
21-Apr-21	9:15	Taylor Stanich, Kaleb Ferriter	21 to 48F	Sunny	Daily site checks, daily parameters, BRW staff gauge monitoring, waterfowl survey, upload equis, inspect screw conveyor bolts, finish cleaning a channel	JCI dredging B1	Operating dry vault pumps, north and south lines.	C02 OFF		eye protection
22-Apr-21	8:30	Taylor Stanich	30 to 44F	Overcast	Daily site checks, Daily parameters, weekly sampling, weekly epa summary report, waterfowl survey, msd channel sediment sampling	JCI dredging B1	Operating dry vault pumps, north and south lines.	C02 OFF		Review SOP s-03 for sediment sampling
23-Apr-21	8:25	Taylor Stanich	25 to 48F	Overcast	Daily site checks, Daily parameters, waterfowl survey, upload equis, decant water from north drying bed		Operating dry vault pumps, north and south lines.	C02 OFF		Slips trips and falls
24-Apr-21	8:10	Taylor Stanich	26 to 48F	Overcast	Daily site checks, Daily parameters, Weekend checks		Operating dry vault pumps, north and south lines.	C02 OFF		working alone-communication
25-Apr-21	7:30	Taylor Stanich	27 to 48F	Overcast rain	Daily site checks, Daily parameters, Weekend checks		Operating dry vault pumps, north and south lines.	C02 OFF		working alone-communication
26-Apr-21	10:10	Taylor Stanich, Kaleb Ferriter	28 to 46F	Mostly Sunny	Daily site checks, daily parameters, MSD site/gen inspections, Weekly sampling, upload equis, Chipped A and C channel discharge, waterfowl survey	JCI dredging B1	Operating dry vault pumps, north and south lines.	C02 OFF		Muddy dike roads-drive with caution
27-Apr-21	9:00	Taylor Stanich, Kaleb Ferriter	21 to 55F	Sunny	Daily site checks, daily parameters, waterfowl survey, IPS and WCP site/generator checks, remove weed piles from IPS, Help JCI with dredge move to c	JCI dredging B1, moved to C1 @ 3:30	Operating dry vault pumps, north and south lines.	C02 OFF		Sanitation
28-Apr-21	9:00	Taylor Stanich, Kaleb Ferriter	32 to 61F	Cloudy	Daily site checks, Daily parameters, BRW staff guage monitoring, waterfowl survey, upload equis form, MSD subdrain downloads	JCI dredging C1	Operating dry vault pumps, north and south lines.	C02 OFF		Hand protection
29-Apr-21	9:05	Taylor Stanich	32 to 67F	Partly cloudy	Daily site checks, Daily parameters, weekly sampling, waterfowl survey, upload equis, Weekly epa summary report, decant water from north drying bed, site building maintenance	JCI dredging C1	Operating dry vault pumps, north and south lines.	C02 OFF		Weekly sampling review sds for HN03
30-Apr-21	10:15	Steve Lubick	41 to 73 F	Partly cloudy calm	Daily site checks, Daily parameters, waterfowl survey, upload equis, decant water from north drying bed		Operating dry vault pumps, north and south lines.	C02 OFF		Sunscreen
1-May-21	7:10	Rob Neff	36 to 64F	Partly cloudy	Daily site checks, Daily parameters, Upload equis, decant water from north drying bed		Operating dry vault pumps, north and south lines.	C02 OFF		Working alone-communication

2-May-21	7:00	Rob Neff	27 to 48F	Partly cloudy	Daily site checks, Daily parameters, Upload equis, decant water from north drying bed		Operating dry vault pumps, north and south lines.	C02 OFF		Working alone-communication
3-May-21	8:20	Taylor Stanich	25 to 54F	Moslty sunny	Daily site checks, Daily parameters, weekly sampling, waterfowl survey, MSD site/generator checks, upload equis, close out emms tasks,	JCI dredging C1	Operating dry vault pumps, north and south lines.	C02 OFF		Biological hazards
4-May-21	9:55	Kaleb Ferriter	34 to 54F	Cloudy	Daily site checks, daily parameters, waterfowl survey, equis, decanting, wcp site and gen inspection, ips site and gen inspection	JCI dredging C1	Operating dry vault pumps, north and south lines.	C02 OFF		working alone-communication
5-May-21	9:00	Kaleb Ferriter	32 to 60F	Sunny	Daily site checks, daily parameters, waterfowl survey, brw staff gauge monitoring, cleaned freeway wetlands, brought gmc to oreillys for check engine light, monthly fire extinguisher check	JCI dredging C1/Dredge demob	Operating dry vault pumps, north and south lines.	C02 OFF		eye protection
6-May-21	9:15	Steve Lubick	28 to 72 F	Partly cloudy calm	Daily site checks, Daily parameters, weekly sampling, waterfowl survey, upload equis.	JCI dredge demob	Operating dry vault pumps, north and south lines.	C02 OFF		Foot Protection
7-May-21	12:15	Kaleb Ferriter	32 to 57F	Cloudy	Daily site checks, daily parameters, filled out MSD logbooks for subdrain sampling, decanting, equis upload		Operating dry vault pumps, north and south lines.	C02 OFF		Working alone-communication
8-May-21	11:15	Kaleb Ferriter	28 to 41F	Cloudy, Windy	Daily site checks, daily parameters		Operating dry vault pumps, north and south lines.	C02 OFF		Working alone-communication
9-May-21	7:40	Kaleb Ferriter	30 to 50F	Partly Cloudy	Daily site checks, daily parameters		Operating dry vault pumps, north and south lines.	C02 OFF		Working alone-communication
10-May-21	7:26	Taylor Stanich, Steve Lubick	33 to 53F	Partly cloudy	Daily site checks, Daily parameters, Monthly compliance sampling, Backflush asb pump, waterfowl survey, MSD site/gen checks, upload equis forms, close out emms tasks	JCI D4 dredging ops set up	Operating dry vault pumps, north and south lines.	C02 OFF		Monthly sampling-review sds for HNo3 and H2S04
11-May-21	8:30	Taylor Stanich, Kaleb Ferriter	21 to 54F	Sunny	Daily site checks, daily parameters, waterfowl survey, IPS and WCP site/generator checks, MSD subdrain sampling, upload equis	JCI D4 dredging ops set up	Operating dry vault pumps, north and south lines.	C02 OFF		Review SOP for subdrain sampling
12-May-21	12:10	Taylor Stanich, Kaleb Ferriter	27 to 61	Sunny	Daily site checks, daily parameters, Monthly ops meeting, waterfowl survey, BRW staff gauge monitoring, Equis form corrections,	JCI D4 dredging ops set up	Operating dry vault pumps, north and south lines.	C02 OFF		Slips trips and falls
13-May-21	11:10	Taylor Stanich, Kaleb Ferriter	30 to 63F	Partly Cloudy	Daily site checks, Daily parameters, Weekly sampling, waterfowl survey, dredge ops oversight, monthly group meeting, upload equis	JCI D4 dredging ops set up	Operating dry vault pumps, north and south lines.	C02 OFF		Working aroung heavy equipment
14-May-21	8:20	Taylor Stanich	33 to 64F	Partly cloudy	Daily site checks, Daily parameters, weekly epa summary report, waterfowl survey, upload historical equis data		Operating dry vault pumps, north and south lines.	C02 OFF		Changing weather conditions
15-May-21	8:30	Steve Lubick	35 to 65 F	Clear calm	Daily site checks, daily parameters		Operating dry vault pumps, north and south lines.	C02 OFF		Working alone-communication
16-May-21	8:55	Steve Lubick	36 To 73 F	Clear calm	Daily site checks, daily parameters		Operating dry vault pumps, north and south lines.	C02 OFF		Working alone-communication
17-May-21	9:20	Taylor Stanich, Kaleb Ferriter	36 to 77F	Sunny	Daily site checks, Daily parameters, weekly sampling, waterfowl survey, msd site/generator checks, monitor D4 dredging, monitor channel PH, started 2Q inspections	JCI started dredging D4 @ 9:00	Operating dry vault pumps, north and south lines.	C02 OFF		Pinch points

18-May-21	8:40	Taylor Stanich, Kaleb Ferriter	39 to 68F	Sunny	Daily site checks, daily parameters. Waterfowl survey, WCP/IPS site and gen inspection, monitored dredging operations, monitored drying beds, monitored channel PH, 2Q inspection	JCI started dredging D4 @ 7:00	Operating dry vault pumps, north and south lines.	C02 OFF		Hydration
19-May-21	8:00	Taylor Stanich, Kaleb Ferriter	38 to 53F	Overcast	Daily site checks, Daily parameters, waterfowl survey, BRW staff guage monitoring, upload equis forms, Monitor D4 dredging, 2Q inspections	JCI dredging D4	Operating dry vault pumps, north and south lines.	C02 OFF		winter weather advisory
20-May-21	8:35	Taylor Stanich, Kaleb Ferriter	31 to 41F	Overcast, snow showers	Daily site checks, Daily parameters, weekly sampling, weekly epa summary report, waterfowl survey,	JCI dredging D4	Operating dry vault pumps, north and south lines.	C02 OFF		Snow showers
21-May-21	10:05	Taylor Stanich, Kaleb Ferriter	23 to 36F	Overcast, snow showers	Daily site checks, daily parameters, decanting,	JCI dredging D4	Operating dry vault pumps, north and south lines.	C02 OFF		Slips trips and falls
22-May-21	9:20	Taylor Stanich	27 to 37F	Partly cloudy	Daily site checks, Daily parameters, weekend checks		Operating dry vault pumps, north and south lines.	C02 OFF		working alone-communication
23-May-21	8:30	Taylor Stanich	23 to 40F	Overcast	Daily site checks, Daily parameters, weekend checks		Operating dry vault pumps, north and south lines.	C02 OFF		working alone-communication
24-May-21	9:40	Taylor Stanich, Kaleb Ferriter	39 to 52F	Overcast	Daily site checks, daily parameters. Waterfow survey, Weekly sampling, upload equis, decant water from north drying bed, MSD site/generator checks, air compressor #1 maintenance	JCI dredging D4	Operating dry vault pumps, north and south lines.	C02 OFF		Muddy roads
25-May-21	8:20	Taylor Stanich, Kaleb Ferriter	36 to 57F	Mostly Sunny	Daily site checks, daily parameters, waterfowl survey, WCP and IPS site/generator checks, HCC weed removal, 2Q site inspections, CB8 and CB9 check, freeway wetlands check,	JCI dredging D4	Operating dry vault pumps, north and south lines.	C02 @ 5CFH @ 10:00		watch for baby geese on site
26-May-21	8:50	Taylor Stanich, Kaleb Ferriter	36 to 48F	Mostly Cloudy	Daily site checks, daily parameters, waterfowl survey, BRW staff gauge monitoring, HCC weed removal, Air compressor #2 maintenance,	JCI dredging D4	Operating dry vault pumps, north and south lines.	C02 5CFH		review sop for BRW Staff Gauge monitoring.
27-May-21	8:15	Taylor Stanich, Kaleb Ferriter	35 to 65F	Clear sunny	Daily site checks, Daily parameters, waterfowl survey, weekly sampling, inspect screw conveyor bolts, weekly epa summary report	JCI dredging D4	Operating dry vault pumps, north and south lines.	C02 @ 5CFH, increased to 10 CFH @ 1300		Weekly sampling review sds for HN03
28-May-21	9:00	Kaleb Ferriter	36 to 57F	Mostly Sunny	daily site checks, daily parameters, waterfowl survey, picked up motor oil from ACE, reduced lime rate		Operating dry vault pumps, north and south lines.	C02 10CFH		Working alone-communication
29-May-21	7:10	Rob Neff	30 to 61F	Sunny	Daily site checks, Daily parameters, weekend checks, Upload equis, decant water from north drying bed		Operating dry vault pumps, north and south lines.	C02 10CFH		Working alone-communication
30-May-21	6:55	Rob Neff	36 to 70F	Sunny	Daily site checks, Daily parameters, weekend checks, Upload equis, decant water from north drying bed and south drying bed, Move crane from north drying bed to south drying bed,		Operating dry vault pumps, north and south lines.	C02 10CFH		Working alone-communication
31-May-21	7:00	Rob Neff	43 to 73F	Sunny	Daily site checks, Daily parameters, weekend checks, Upload equis, decant water from south drying bed,		Operating dry vault pumps, north and south lines.	C02 10CFH		Working alone-communication

1-Jun-21	8:30	Taylor Stanich	40 to 77F	Clear, sunny	Daily site checks, Daily parameters, Weekly sampling, MSD, WCP, and IPS site/generator checks, waterfowl survey, decant water from south drying bed, Close out weekly emms tasks	JCI Dredging D4	Operating dry vault pumps, north and south lines.	C02 OFF		Weekly sampling review sds for HN03
2-Jun-21	8:05	Taylor Stanich	41 to 77F	Clear, sunny	Daily site checks, Daily parameters, waterfowl suvey, BRW staff guage monitoring, upload equis, clean site vehicles, clean ops building, clean distrabution tank/weir gates	JCI dredging D4, finished @ 14:00 started dredge demob	Operating dry vault pumps, north and south lines.	C02 OFF		Hydration
3-Jun-21	9:20	Taylor Stanich	48 to 86F	Clear, sunny	Daily site checks, Daily parameters, weekly sampling, weekly epa summary report, monthly c02 inspection, upload equis, fix D3 level transducer, help JCI with dredge demob	JCI dredge demob	Operating dry vault pumps, north and south lines.	C02 OFF		Biological hazards
4-Jun-21	7:40	Taylor Stanich	48 to 82F	Mostly sunny	Daily site checks, Daily parameters, upload equis, D3 level transducer trouble shooting, decant water from south drying bed	JCI dredge demob	Operating dry vault pumps, north and south lines.	C02 OFF		Sun Exposure
5-Jun-21	10:15	Steve Lubick	46 to 75 F	Partly cloudy	Daily site checks, Daily parameters, weekend checks		Operating dry vault pumps, north and south lines.	C02 OFF		Working alone-communication
6-Jun-21	9:15	Steve Lubick	39 to 68 F	Partly cloudy breezy	Daily site checks, Daily parameters, weekend checks		Operating dry vault pumps, north and south lines.	C02 OFF		Working alone-communication
7-Jun-21	8:55	Taylor Stanich	34 to 76F	Moslty sunny	Daily site checks, daily parameters, MSD site/gen inspections, Weekly sampling, upload equis,		Operating dry vault pumps, north and south lines.	C02 OFF		Weekly sampling review sds for HN03 and H2s04
8-Jun-21	7:45	Taylor Stanich	38 to 70F	overcast	Daily site checks, Daily parameters, WCP and IPS site/generator checks, decant water from north drying bed, game camera checks		Operating dry vault pumps, north and south lines.	C02 OFF		Thunderstorms possible-30/30rule
9-Jun-21	9:45	Taylor Stanich	40 to 76F	Clear, sunny	Daily site checks, Daily parameters, monthly operations meeting, decant water from north drying bed, Monthly fire extinguisher checks		Operating dry vault pumps, north and south lines.	C02 OFF		Monthly fire extinguishers
10-Jun-21	7:10	Taylor Stanich	41 to 66F	Mostly cloudy	Daily site checks, Daily parameters, Weekly sampling, decant water from north drying bed, upload equis, install temperature probes @WSP		Operating dry vault pumps, north and south lines.	C02 OFF		hard hats
11-Jun-21	8:15	Taylor Stanich	32 to 64F	Mostly sunny	Daily site checks, Daily parameters, weekly epa summary report, upload historical equis data		Operating dry vault pumps, north and south lines.	C02 OFF		Tick season
12-Jun-21	7:00	Kaleb Ferriter	39 to 73F	Overcast	Weekend checks		Operating dry vault pumps, north and south lines.	C02 OFF		Working alone-communication
13-Jun-21	12:00	Kaleb Ferriter	35 to 80F	Sunny	Weekend checks		Operating dry vault pumps, north and south lines.	C02 OFF		Working alone-communication
14-Jun-21	8:40	Taylor Stanich, Kaleb Ferriter	45 to 90F	Sunny	Daily site checks, daily parameters, monthly sampling, Removed MSD subdrain flow modules for jetting/pigging, MSD site/gen checks, close out emms tasks		Operating dry vault pumps, north and south lines.	C02 OFF		Eye protection
15-Jun-21	9:15	Taylor Stanich	51 to 88F	Clear, sunny	Daily site checks, Daily parameters, upload equis, monitor MSD vault level for jetting, WCP and IPS site/generator checks, clean flow meters/check desicant	Tw enterprises-generator maintenance, JCI MSD jetting	Operating dry vault pumps, north and south lines.	C02 OFF		Review SOP for MSD jetting

16-Jun-21	8:30	Taylor Stanich	50 to 77F	Sunny	Daily site checks, daily parameters, BRW staff gauge readings, MSD jetting, monitor vault level for jetting, upload equis	JCI MSD jetting	Operating dry vault pumps, north and south lines.	C02 OFF		Warmer temps-stay hydrated
17-Jun-21	6:45	Taylor Stanich, Rob Neff	40 to 78F	Sunny	Daily site checks, Daily parameters, Weekly sampling, upload equis, MSD pigging	JCI-MSD pigging	Operating dry vault pumps, north and south lines.	C02 OFF		Pinch points
18-Jun-21	7:30	Taylor Stanich, Kaleb Ferriter	40 to 80F	Sunny	Daily site checks, daily parameters, decant water from north drying bed, Upload equis, upload msd flow data		Operating dry vault pumps, north and south lines.	C02 OFF		Driving Safety
19-Jun-21	8:40	Taylor Stanich	56F	Moslty sunny	Daily site checks, Daily parameters, weekend checks		Operating dry vault pumps, north and south lines.	C02 OFF		working alone-communication
20-Jun-21	7:25	Taylor Stanich	58F	Partly cloudy	Daily site checks, Daily parameters, weekend checks		Operating dry vault pumps, north and south lines.	C02 OFF		working alone-communication
21-Jun-21	12:20	Taylor Stanich, Kaleb Ferriter	70F	Mostly Sunny	Daily site checks, daily parameters, reinstalled flow meters into MSD, MSD site and gen check, picked up pressure washer from parrot, weekly sampling, dropped samples off ar FedEx, Decant water from north drying bed		Operating dry vault pumps, north and south lines.	C02 OFF		sun protection - long sleeves
22-Jun-21	8:45	Taylor Stanich, Kaleb Ferriter	48 to 78F	Clear, sunny	Daily site checks, Daily parameters, WCP and IPS site/generator checks, started cleaning distrabution channels, super sacker dry run	JCI-Super sacker set-up	Operating dry vault pumps, north and south lines.	C02 OFF		Hard Hats
23-Jun-21	11:50	Taylor Stanich, Kaleb Ferriter	56 to 79F	Parly cloudy	Daily site checks, Daily parameters, BRW staff gauge monitoring, clean conveyance channels C and B, upload equis,		Operating dry vault pumps, north and south lines.	C02 OFF		Review TRA for conveyance channel cleaning
24-Jun-21	14:00	Taylor Stanich, Kaleb Ferriter	50 to 79F	Mostly Sunny	Daily site checks, daily parameters, finished cleaning A and B channel, weekly sampling, equis upload, weekly epa summary report		Operating dry vault pumps, north and south lines.	C02 OFF		Eye protection
25-Jun-21	9:00	Kaleb Ferriter	46 to 73F	Sunny	Daily site checks, daily parameters, equis corrections, equis uploads		Operating dry vault pumps, north and south lines.	C02 OFF		working alone-communication
26-Jun-21	6:20	Rob Neff	46 to 77F	Partly cloudy	Daily site checks, daily parameters, equis uploads		Operating dry vault pumps, north and south lines.	C02 OFF		Working alone-communication
27-Jun-21	6:15	Rob Neff	48 to 81F	Sunny	Daily site checks, daily parameters, equis uploads		Operating dry vault pumps, north and south lines.	C02 OFF		Working alone-communication
28-Jun-21	8:40	Taylor Stanich, Kaleb Ferriter	48 to 88F	Sunny	Daily site checks, daily parameters, equis uploads, weekly sampling, MSD site/generator checks, security camera installation help, pond/vegitation inspections	Colbert elec.-security camera installation	Operating dry vault pumps, north and south lines.	C02 OFF		Hydration
29-Jun-21	9:05	Taylor Stanich	53 to 91F	Clear, sunny	Daily site checks, Daily parameters, WCP and IPS site/generator checks, replace D3 level transducer, pond/vegetation inspections, freeway wetlands weed removal	Colbert elec.-security camera installation	Operating dry vault pumps, north and south lines.	C02 OFF		Very hot daytime temps- heat stress
30-Jun-21	11:25	Taylor Stanich, Kaleb Ferriter	55 to 93F	Clear, sunny	Daily site checks, Daily parameters, BRW staff gauge monitoring, pond/veg/flood plain inspections, CB8 maintenance, upload equis	Colbert elec.-security camera installation	Operating dry vault pumps, north and south lines.	C02 OFF		Hand tool safety

Butte Treatment Lagoons
Operator SOP Training Log

Operator: Robert Neff

SOP Number	SOP Title	Operator Trained on Procedure (Date)	Operator Demonstrated Procedure (Date)	Supervisor Observing Procedure (Initials)	Operator Re-Trained on Procudure (Date)	Operator Annual Refresher (Date)	Notes/Comments, etc.
SOP	Procedure Title						
1	Chemical Addition System (CAS) Building Initial Arrival Operation Status Check	January-17	February-17	BH	July-17	Jan. 2021	
2	Daily Lower Area One (LAO) Cell Sampling and Analyzing.	January-17	February-17	BH	July-17	Jan. 2021	
3	Gravimetric Lime Addition System Startup.	February-17	March-17	BH	May. 2020		
4	West Camp Weekly Operations Check Procedure.	January-17	February-17	BH	July-17	May-19	
5	Metro Storm Drain Daily Inspection and Startup.	January-17	February-17	BH	July-17	October-19	
6	Influent Pump Station Startup.	February-17	March-17	BH	July-17	May. 2020	
7	Slurry Tank Feed Water Re-establishment.	February-17	March-17	BH			
8	Lower Area One (LAO) Lime Weighing Procedure						
9	Generator Inspection.	January-17	February-17	BH	July-17	May-19	
10	Screw Conveyor Cleaning.	January-17	February-17	BH			
11	Stop Log Removal/Installation.						
12	Accurate Feeder Helix Modification						
13	Outlet Structure Grab Sampling.	January-17	February-17	BH	July-17	Jan. 2021	
14	IPS Pump and Compressor Oil Change/Greasing.	February-17					
15	Super Sax Redundant Lime Feed System Start-Up/Shutdown						
16	Super Sax Lime Loading Procedure						
17	ISCO® Automatic Composite Water Sampling Procedures.	January-17	February-17	BH	July-17	Jan. 2021	
18	LAO CAS Building cleaning procedure	February-17	March-17	BH	July-17	May-19	
19	Slurry Tank and Discharge Pipe Cleaning.	February-17	March-17	BH			
20	MSD Jetting.	March-17					
21	MSD Pigging.	March-17					
22	IPS Intake Screen Cleaning	January-17	February-17	BH	July-17	Jan. 2021	
23	Maintenance of the Freeway Wetlands	February-17	March-17	BH	July-17	May-19	
24	Effluent Grab Sample.	January-17	February-17	BH	July-17	Jan. 2021	
25	Startup/Shutdown/Emergency Shutdown Procedure for the MSD Generator	February-17					
26	ASB Grunfos Pump Replacement/Filter Cleaning						
27	Quarterly Valve Exercise	February-17					
28	Volumetric Lime Addition Startup.						
29	UltraMeg Flowmeter Maintenance						
30	BRW Staff Gauge Monitoring	February-17	March-17	BH	July-17	May-19	
31	MSD Dry Vault Monitoring and Dewatering	January-17	February-17	BH	July-17	May-19	
32	Relay Switch Replacements						
33	LAO Dialer Alarm Callout Update.	February-17	March-17	BH	October-19		
34	LAO Security Procedures	January-17	February-17	BH	July-17	Jan. 2021	
35	Calibrate Accurate Feeder.	February-17					
36	Calibrate pH meter	January-17	February-17	BH	July-17	Jan. 2021	
37	Lime Silo Cleaning.	February-17	March-17	BH	July-17	April. 2020	
38	Air Compressor Maintenance.	February-17	March-17	BH			
39	Quarterly Level Tranducer Verification	February-17	May-19	TS			
40	Screw Conveyor Oil Change						
41	ISCO Automatic Sampler Programming/ Cleaning	January-17	February-17	BH	May-19	April. 2020	
42	WCP-1 Stop/Restart.	February-17	March-17	BH			
43	SoleinoidAir Cylinder Replacement-Salina Knife Gate						
44	WCP H2S Alarm Response.	January-17	February-17	BH	May-19		
45	CO2 Addition Monitoring/Adjustement	January-17	February-17	BH	October-19		
46	MSD Loading Study Sampling/Transducer Downloading	February-17	March-17	BH	July-17	April-19	
47	Site Overview Inspections	February-17	May-19	TS			
48	MSD Pump Station Start Up/Shut Down.	January-17	February-17	BH			
49	Transducer Verification/Replacement	February-17	May-19	TS			
50	Monthy Fire Extinguisher/Eye Wash Inspections	February-17	March-17	BH	July-17	May-19	

Employee Signature: Signature on Hard Copy Date:

Butte Treatment Lagoons
Operator SOP Training Log

Operator: Steve Lubick

SOP Number	SOP Title	Operator Trained on Procedure (Date)	Operator Demonstrated Procedure (Date)	Supervisor Observing Procedure (Initials)	Operator Re-Trained on Procudure (Date)	Operator Annual Refresher (Date)	Notes/Comments, etc.
SOP	**Procedure Title**						
1	Chemical Addition System (CAS) Building Initial Arrival Operation Status Check	January-15	February-15	BH	April-19	Jan. 2021	
2	Daily Lower Area One (LAO) Cell Sampling and Analyzing.	January-15	February-15	BH	April-19	Jan. 2021	
3	Gravimetric Lime Addition System Startup.	January-15	February-15	BH			
4	West Camp Weekly Operations Check Procedure.	February-17	March-17	BH	June. 2020		
5	Metro Storm Drain Daily Inspection and Startup.	January-15	February-15	BH			
6	Influent Pump Station Startup.	January-15	February-15	BH			
7	Slurry Tank Feed Water Re-establishment.	January-15	February-15	BH			
8	Lower Area One (LAO) Lime Weighing Procedure						
9	Generator Inspection.	February-17	March-17	BH			
10	Screw Conveyor Cleaning.						
11	Stop Log Removal/Installation.						
12	Accurate Feeder Helix Modification						
13	Outlet Structure Grab Sampling.	January-15	February-15	BH	April-19	Jan. 2021	
14	IPS Pump and Compressor Oil Change/Greasing.						
15	Super Sax Redundant Lime Feed System Start-Up/Shutdown						
16	Super Sax Lime Loading Procedure						
17	ISCO® Automatic Composite Water Sampling Procedures.	January-15	February-15	BH	April-19	Jan. 2021	
18	LAO CAS Building cleaning procedure						
19	Slurry Tank and Discharge Pipe Cleaning.						
20	MSD Jetting.	Sept.-15	April-16	BH	April-19	April. 2020	
21	MSD Pigging.						
22	IPS Intake Screen Cleaning	January-15	February-15	BH	May-19	Jan. 2021	
23	Maintenance of the Freeway Wetlands	May-19					
24	Effluent Grab Sample.	January-15	February-15	BH	April-19	Jan. 2021	
25	Startup/Shutdown/Emergency Shutdown Procedure for the MSD Generator						
26	ASB Grunfos Pump Replacement/Filter Cleaning						
27	Quarterly Valve Exercise						
28	Volumetric Lime Addition Startup.						
29	UltraMeg Flowmeter Maintenance						
30	BRW Staff Gauge Monitoring	May-19					
31	MSD Dry Vault Monitoring and Dewatering	January-15	February-15	BH	April-19	April. 2020	
32	Relay Switch Replacements						
33	LAO Dialer Alarm Callout Update.	May-19	October-19	TS			
34	LAO Security Procedures	January-15	February-15	BH	April-19	Jan. 2021	
35	Calibrate Accurate Feeder.						
36	Calibrate pH meter	January-15	February-15	BH	April-19	Jan. 2021	
37	Lime Silo Cleaning.						
38	Air Compressor Maintenance.						
39	Quarterly Level Tranducer Verification						
40	Screw Conveyor Oil Change						
41	ISCO Automatic Sampler Programming/ Cleaning	April. 2020					
42	WCP-1 Stop/Restart.	January-15	February-15	BH	June. 2020		
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44	WCP H2S Alarm Response.	January-15	February-15	BH			
45	CO2 Addition Monitoring/Adjustement	January-15	February-15	BH	October-19	Jan. 2021	
46	MSD Loading Study Sampling/Transducer Downloading						
47	Site Overview Inspections						
48	MSD Pump Station Start Up/Shut Down.	January-15	February-15	BH	April-19		
49	Transducer Verification/Replacement						
50	Monthy Fire Extinguisher/Eye Wash Inspections						

Employee Signature: Signature on Hard Copy Date:

Butte Treatment Lagoons
Operator SOP Training Log

Operator: Taylor Stanich

SOP Number	SOP Title	Operator Trained on Procedure (Date)	Operator Demonstrated Procedure (Date)	Supervisor Observing Procedure (Initials)	Operator Re-Trained on Procudure (Date)	Operator Annual Refresher (Date)	Notes/Comments, etc.
SOP	Procedure Title						
1	Chemical Addition System (CAS) Building Initial Arrival Operation Status Check	Dec. 2017	Jan. 2018	BH	April-19	Jan. 2021	
2	Daily Lower Area One (LAO) Cell Sampling and Analyzing.	Dec. 2017	Jan. 2018	BH	April-19	Jan. 2021	
3	Gravimetric Lime Addition System Startup.	Jan. 2019	April-19	BH	November-19	Jan. 2021	
4	West Camp Weekly Operations Check Procedure.	Dec. 2017	Jan. 2018	BH	April-19	Jan. 2021	
5	Metro Storm Drain Daily Inspection and Startup.	Dec. 2017	Jan. 2018	BH	April-19	Jan. 2021	
6	Influent Pump Station Startup.	Dec. 2017	Jan. 2018	BH	April-19	Jan. 2021	
7	Slurry Tank Feed Water Re-establishment.	Feb. 2018	April-19	BH	November-19	Jan. 2021	
8	Lower Area One (LAO) Lime Weighing Procedure						
9	Generator Inspection.	Dec. 2017	Jan. 2018	BH	April-19	Jan. 2021	
10	Screw Conveyor Cleaning.	July-18	June. 2020	BH	Dec. 2020		
11	Stop Log Removal/Installation.	Mar. 2018	June-19	BH	June. 2020	July. 2020	
12	Accurate Feeder Helix Modification	Jan. 2019	April-19	BH			
13	Outlet Structure Grab Sampling.	Dec. 2017	Jan. 2018	BH	April-19	Jan. 2021	
14	IPS Pump and Compressor Oil Change/Greasing.	Mar. 2018					
15	Super Sax Redundant Lime Feed System Start-Up/Shutdown						
16	Super Sax Lime Loading Procedure						
17	ISCO® Automatic Composite Water Sampling Procedures.	Dec. 2017	Jan. 2018	BH	April-19	Jan. 2021	
18	LAO CAS Building cleaning procedure	Mar. 2018	Aug. 2018	BH	April-19	April. 2020	
19	Slurry Tank and Discharge Pipe Cleaning.	Mar. 2018	April. 2020	BH	July. 2020	Dec. 2020	
20	MSD Jetting.						
21	MSD Pigging.	April-18	Oct. 2018	BH	April-19	Jan. 2021	
22	IPS Intake Screen Cleaning	Dec. 2017	Jan. 2018	BH	April-19	Jan. 2021	
23	Maintenance of the Freeway Wetlands	Feb. 2018	Aug. 2018	BH	April-19	Jan. 2021	
24	Effluent Grab Sample.	Dec. 2017	Jan. 2018	BH	April-19	Jan. 2021	
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26	ASB Grunfos Pump Replacement/Filter Cleaning	Feb. 2018	Dec. 2018	BH	April-19	April. 2020	
27	Quarterly Valve Exercise	Dec. 2017	Mar. 2018	BH	November-19	Mar. 2021	
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29	UltraMeg Flowmeter Maintenance	Sept. 2019	July. 2020	BH			
30	BRW Staff Gauge Monitoring	Dec. 2017	Jan. 2018	BH	April-19	Jan. 2021	
31	MSD Dry Vault Monitoring and Dewatering	Dec. 2017	Jan. 2018	BH	April-19	Jan. 2021	
32	Relay Switch Replacements						
33	LAO Dialer Alarm Callout Update.	Jan. 2019	October-19	BH	April. 2020	Jan. 2021	
34	LAO Security Procedures	Jan. 2018	Aug. 2018	BH	April-19	Jan. 2021	
35	Calibrate Accurate Feeder.	June-18	April-19	BH	November-19	Jan. 2021	
36	Calibrate pH meter	Dec. 2017	Jan. 2018	BH	April-19	Jan. 2021	
37	Lime Silo Cleaning.	Jan. 2018	June-18	BH	April-19	April. 2020	
38	Air Compressor Maintenance.	Mar. 2018	November-19	BH	May. 2020		
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42	WCP-1 Stop/Restart.	April-19	May. 2020	BH	Aug. 2020		
43	SoleinoidAir Cylinder Replacement-Salina Knife Gate						
44	WCP H2S Alarm Response.	Dec. 2017	Jan. 2018	BH	April-19	May. 2020	
45	CO2 Addition Monitoring/Adjustement	Dec. 2017	Jan. 2018	BH	Jan. 2020	Jan. 2021	
46	MSD Loading Study Sampling/Transducer Downloading	Dec. 2017	Jan. 2018	BH	April-19	Feb. 2021	
47	Site Overview Inspections	Dec. 2017	Mar. 2018	BH	Nov. 2019	Feb. 2021	
48	MSD Pump Station Start Up/Shut Down.	April-19	October-20	BH	May. 2020	Feb. 2021	
49	Transducer Verification/Replacement	Mar. 2018	June-18	BH	May-19	Mar. 2021	
50	Monthy Fire Extinguisher/Eye Wash Inspections	Dec. 2017	Jan. 2018	BH	April-19	Jan. 2021	

Employee Signature: Signature on Hard Copy Date:

Butte Treatment Lagoons
Operator SOP Training Log

Operator: Kaleb Ferriter

SOP Number	SOP Title	Operator Trained on Procedure (Date)	Operator Demonstrated Procedure (Date)	Supervisor Observing Procedure (Initials)	Operator Re-Trained on Procudure (Date)	Operator Annual Refresher (Date)	Notes/Comments, etc.
SOP	**Procedure Title**						
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4	West Camp Weekly Operations Check Procedure.	Feb. 2020	April. 2020	TS	Jan. 2021		
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7	Slurry Tank Feed Water Re-establishment.						
8	Lower Area One (LAO) Lime Weighing Procedure						
9	Generator Inspection.	Feb. 2020	April. 2020	TS	Jan. 2021		
10	Screw Conveyor Cleaning.	July. 2020	Dec. 2020	TS			
11	Stop Log Removal/Installation.	Jan. 2021					
12	Accurate Feeder Helix Modification						
13	Outlet Structure Grab Sampling.	Feb. 2020	April. 2020	TS	Jan. 2021		
14	IPS Pump and Compressor Oil Change/Greasing.	Oct. 2020					
15	Super Sax Redundant Lime Feed System Start-Up/Shutdown						
16	Super Sax Lime Loading Procedure						
17	ISCO® Automatic Composite Water Sampling Procedures.	April. 2020	Oct. 2020	TS	Jan. 2021		
18	LAO CAS Building cleaning procedure	July. 2020	Oct. 2020	TS			
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25	Startup/Shutdown/Emergency Shutdown Procedure for the MSD Generator						
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47	Site Overview Inspections	Mar. 2020	June. 2020	TS	Feb. 2021		
48	MSD Pump Station Start Up/Shut Down.						
49	Transducer Verification/Replacement	Mar. 2020	June. 2020	TS	Mar. 2021		
50	Monthy Fire Extinguisher/Eye Wash Inspections	Feb. 2020	April. 2020	TS			

Employee Signature: Signature on Hard Copy Date:

Appendix D
Data Summary Report

SILVER BOW CREEK/BUTTE AREA NPL SITE
BUTTE PRIORITY SOILS OPERABLE UNIT

Draft Final

Butte Treatment Lagoon System
Data Summary Report
Second Quarter 2021

Atlantic Richfield Company

September 2021

SILVER BOW CREEK/BUTTE AREA NPL SITE
BUTTE PRIORITY SOILS OPERABLE UNIT

Draft Final

Butte Treatment Lagoon System
Data Summary Report
Second Quarter 2021

Prepared for:

Atlantic Richfield Company
317 Anaconda Road
Butte, Montana 59701

Prepared by:

Pioneer Technical Services, Inc.
1101 S. Montana Street
Butte, Montana 59701

September 2021

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ABBREVIATIONS AND ACRONYMS

Acronym	Definition	Acronym	Definition
%D	Percent Difference	**LMS**	Laboratory Matrix Spike (sample)
%R	Percent Recovery	**MDL**	Method Detection Limit
BPSOU	Butte Priority Soils Operable Unit	**mg/L**	Milligrams per Liter
BRW	Butte Reduction Works	**mL**	milliliter
BTL	Butte Treatment Lagoons	**NFG**	National Functional Guidelines
CCV	Continuing Calibration Verification	**NPL**	National Priorities List
CD	Consent Decree	**Pace**	Pace Analytical Services, Inc.
CFRSSI	Clark Fork River Superfund Site Investigation	**Pioneer**	Pioneer Technical Services, Inc.
CLP	Contract Laboratory Program	**QA**	Quality Assurance
CRDL	Contract-Required Detection Limit	**QAPP**	Quality Assurance Project Plan
CRQL	Contract-Required Quantitation Limit	**QC**	Quality Control
DEQ	Department of Environmental Quality (Montana)	**RL**	Reporting Limit
DM/DV	Data Management/Data Validation	**RLL**	Required Reporting Limit
DQA	Data Quality Assessment	**ROD**	Record of Decision
DQO	Data Quality Objective	**RPD**	Relative Percent Difference
DSR	Data Summary Report	**RRL**	Required Reporting Limits
EPA	U.S. Environmental Protection Agency	**SOP**	Standard Operating Procedure
HCC	Hydraulic Control Channel	**SOW**	Statement of Work
ICS	Interference Check Sample	**SS**	Sampling Station
ICV	Initial Calibration Verification	**Stage 4**	Stage 4 Data Verification and Validation
ID	Identification (sample)	**TDS**	Total Dissolved Solids
LAO	Lower Area One	**TSS**	Total Suspended Solids
LCS	Laboratory Control Sample	**WCP-1**	West Camp Pump Station

ABSTRACT

This second quarter 2021 Data Summary Report (DSR) summarizes the analytical results from compliance sampling at the Butte Priority Soil Operable Unit (BPSOU) Butte Treatment Lagoons (BTL) Lower Area One (LAO) from April 1 to June 30, 2021. All data have undergone a Stage 4 data verification and validation in accordance with U.S. Environmental Protection Agency (EPA) *National Functional Guidelines* [NFG] *for Inorganic Superfund Data Review* (EPA, 2017) and EPA *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (EPA, 2009). For the quarter, a total of 43 natural samples were collected during 26 sampling events: 26 sampling events included sampling station (SS) LAO-SS-1, 13 sampling events included LAO-SS-2, and 3 sampling events included LAO-SS-3. This resulted in a total of 622 natural data points generated by Pace Analytical Services (Pace). Of the 622 natural data points collected, 552 points (89.0%) were designated as enforcement quality, 70 points (11%) were designated as screening quality, and no data points were rejected based on laboratory and field quality control (QC) sample results.

This DSR was prepared by Pioneer Technical Services, Inc. (Pioneer), 1101 S. Montana St, Butte, Montana 59701 for:

Atlantic Richfield Company
317 Anaconda Road
Butte, Montana 59701

The information presented in this DSR includes laboratory analytical results from water samples, related to monitoring activities performed during the second quarter of 2021.

STATEMENT OF AUTHENTICITY

Consistent with the provisions described in the 2020 U.S. EPA BPSOU Consent Decree (CD), which includes the 2006 BPSOU Record of Decision (ROD), the 2011 Explanation of Significant Differences to the 2006 ROD, and 2020 ROD Amendment as Appendix A (EPA, 2020), the data sets in this document are considered to be final data generated or evaluated. Consistent with the aforementioned orders, the signatories below hereby stipulate to the authenticity and accuracy of the data and hereby waive any evidentiary or other objection as to the authenticity and accuracy of reference in endangerment assessments, public health evaluations, feasibility studies, and remedial design/remedial action documents.

Approved by: _____ 9/21/2021
Dave Griffis
Liability Manager
Atlantic Richfield Company
Date

Approved by: _____ _____
Nikia Greene
Remedial Project Manager
U.S. Environmental Protection Agency
Region VIII
Date

Approved by: _____ _____
Daryl Reed
State Project Officer
Montana Department of Environmental Quality
Date

Approved by: _____ 9/21/2021
Shawn Bisch
Pioneer Technical Services, Inc.
Date

EXECUTIVE SUMMARY

This DSR summarizes data collected for the BPSOU BTL during the second quarter 2021 in accordance with the project work documents and long-term monitoring objectives for the BTL.

All sampling activities followed required protocols. Site-specific Standard Operating Procedures (SOPs) developed by Pioneer Technical Services, Inc. (Pioneer) followed the Clark Fork River Superfund Site Investigation (CFRSSI) procedures. The SOPs were followed for sample and data collection along with field and office protocols.
Samples collected were sent to Pace in Minneapolis, Minnesota, for analysis. Pioneer completed Stage 4 data verification and validation. All data included in this quarterly report are provided as final.

Data generated from the samples collected for the quarter sampling events were examined to ensure that project objectives were met. In total, 622 data points were generated from 43 natural samples collected in 26 sampling events: 70 data points were designated screening quality (11.0%) and 552 data points (89.0%) were designated enforcement quality based on laboratory and field QC sample results.

All data presented herein have undergone required Stage 4 data verification and validation.

1.0 INTRODUCTION

This DSR summarizes data collected for the BTL during the second quarter 2021. Specifically, this report summarizes sampling events that occurred from April 1 through June 30, 2021 (referred to as quarter), and provides the following:

- Data collected from weekly, twice weekly, and monthly sampling events throughout the quarter.

Information referenced throughout this DSR is included in the appendices below:

- Appendix A Data Validation Report (DVR)
- Appendix B Field Forms
- Appendix C Laboratory Level 4 Data Packages
- Appendix D Laboratory Data Electronic Data Deliverable Files

All work described in this document was performed as detailed in the BTL Groundwater Treatment System Routine Operation, Maintenance, and Monitoring (OM&M) Plan (Atlantic Richfield Company 2021) (referred to as the *Routine OM&M Plan)*. Refer to the Routine OM&M Plan for additional details related to sampling and monitoring tasks. The sampling events were conducted as specified in the BTL groundwater treatment system and subdrain sampling and monitoring Quality Assurance Project Plan (QAPP) (an appendix to the Routine OM&M Plan) (referred to as QAPP herein).

The Pioneer sampling team conducted the sampling and fieldwork during the quarter. Water chemistry samples were collected from sample station locations shown on Figure 1 and identified below by location name, station field identification and sample identification. Sample locations include:

Sample Station Name	Station Field Identification	Sample Identification
Effluent sample station	EFS-07	SS-1
Influent sample station	INF-04	SS-2
MSD-HCC station	MSD-HCC	SS-3

Samples collected were sent to Pace in Minneapolis, Minnesota, for analysis. The laboratory completed data verification and validation according to the laboratory quality procedures. All data included in this quarterly report are provided as final.

Data generated from the samples collected for the quarter were examined to ensure that project objectives were met. In total, 622 data points were generated from 43 natural samples collected in 26 sampling events: 70 data points were designated screening quality (11.0%) and 552 data points (89.0%) were designated enforcement quality based on laboratory and field QC sample results.

Personnel from Pioneer completed the water chemistry sampling activities. The water chemistry data collected had to undergo rigorous sampling and analysis procedures and meet quality QA/QC protocols and documentation requirements to be designated as enforcement quality. All data underwent a Stage 4 verification and validation in accordance with EPA NFG (EPA, 2017) and EPA *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (EPA, 2009). All data presented herein have undergone data validation in accordance with the CFRSSI Data Management/Data Validation (DM/DV) Plan Addendum (CFRSSI DM/DV Plan Addendum) (AERL, 2000a). Information pertaining to water chemistry, data quality, and data validation is provided in Section 3.0 and Appendix A.

This DSR contains the following information:

- Investigation objectives (Section 1.1).
- Site description and background (Sections 1.2 and 1.3).
- Sampling and analysis summary (Section 2.0).
- Water quality sample collection (Section 2.1).
- Data quality assessment (Section 3.0).
- Project objectives and sampling design review (Section 3.1).
- Preliminary data review (Section 3.2).
- Data verification and validation (Section 3.3).
- Conclusions on the quality of the data (Section 4.0).

Site-specific SOPs were developed by Pioneer in accordance with the CFRSSI SOP (ARCO, 1992a) and are included in the QAPP. The SOPs were followed for sample and data collection along with field and office protocols.

1.1 Objectives

The information compiled in this DSR verifies the data collected under BTL LAO operations. The QAPP identifies the primary monitoring objectives as the following:

- The surface water discharge monitoring activity objective of the BTL groundwater treatment system is to define the frequency, location, and analysis of discharge water quality.

- Document approved methods to sample and analyze water to provide data that are complete, precise, accurate, and defensible.

1.2 Investigation Site Description

The purpose of the BTL is to intercept impacted water from the West Camp Pump Station (WCP-1), Missoula Gulch baseflow, BPSOU subdrain (subdrain), Butte Reduction Works (BRW) groundwater capture, Hydraulic Control Channel (HCC) groundwater capture, and BTL system D-cells and convey it to the BTL collection cell (Cell D4). The water is then pumped from Cell

D4 to the Chemical Addition System building as influent flow, where pre-treatment water quality is monitored at SS-2. The influent flow is mixed with lime slurry to reach a target pH, which allows dissolved heavy metals to precipitate and separate from the collected groundwater as treated water flows through a series of lagoon cells in the remainder of the BTL system. The lime slurry is created by adding dry calcium hydroxide, delivered by an accurate measurement system measured by milligrams of lime (calcium hydroxide) per liter (mg/L) of influent water, to a portion of the influent water. The slurry is then added back to the remainder of the influent, and pH-adjusted influent flow is directed to three parallel lagoon cell systems. Each system consists of three, unlined, open water cells operating in parallel: A, B, and C, where the A system is to the north and C to the south. The primary purpose of the first cell is to allow the chemical reaction to occur, introduce additional carbon dioxide to the system, and to capture sediment and chemical precipitates. A fourth series of smaller, non-treatment cells, the D cells, is to the south of lagoons A2 and A3. The D cells act as hydraulic barriers between the treatment cells and Silver Bow Creek. Treated effluent water is then discharged to Silver Bow Creek at the effluent station, SS-1.

Construction details for the above described treatment system are documented in the *Final Butte Treatment Lagoons and West Camp Pump Station Upgrades Construction Completion Report* (Atlantic Richfield Company, 2014)

1.3 Background

The LAO is located within the BPSOU immediately west of the Butte-Silver Bow municipal water treatment facility on the western edge of the city of Butte in Silver Bow County, Montana. The entire LAO site is approximately 80 acres wide and 1 mile long. Currently, the full-scale water treatment system (BTL system) is operating within the northwest one-quarter of the LAO site as a portion of the final BPSOU remedy. Figure 1 shows the area. Remedial action activities completed in the LAO area in the late 1990s included removing approximately 1.2 million cubic yards of tailings and impacted soils and reconstructing the stream and floodplain. During remedial action activities in 1996, two demonstration wetlands projects were constructed within LAO. One demonstration was discontinued in 2005. The remaining demonstration system has undergone a series of improvements and modifications from 1999 through 2010. The Agency-approved, full-scale, permanent BTL system was constructed between 2011 and 2014. The BTL system can effectively treat Missoula Gulch base flow and WCP-1 groundwater entering the HCC, groundwater collected from the subdrain, groundwater collected from the BRW western areas (BRW-00 and BRW-01W), and groundwater collected within the BTL system at LAO.

2.0 DATA COLLECTION, EQUIPMENT MAINTENANCE, SAMPLING, AND LABORATORY ANALYSES SUMMARY

This section summarizes completed tasks that addressed the monitoring objectives described in the QAPP including sampling methods, field analysis methods, and analytical results for the quarter water chemistry sampling.

2.1 Water Quality Sample Collection

For the sampling events completed during the quarter, field technicians collected samples from the 3 surface water locations. Water chemistry samples were collected and sent to Pace for analysis. Dissolved samples were filtered through a 0.45-micron environmental filter. All sample containers were appropriately labeled with the site identification (ID), sampler, date, time, sample type, and preservation and filtration methods.

The following samples were collected for analysis at each sampling location during the quarter sampling events (Table 2 in the QAPP):

- Filtered water for dissolved metals. Collected in 250-milliliter (mL) Nalgene™ bottles pre-acidified by the laboratory with nitric acid.
- Raw water for total recoverable metals. Collected in 250-mL Nalgene™ bottles pre-acidified by the laboratory with nitric acid.
- Raw water for nitrate/nitrite. Collected in 250-mL Nalgene™ bottles pre-acidified by the laboratory with sulfuric acid.
- Raw water for sulfate, alkalinity, total dissolved solids (TDS) and total suspended solids (TSS). Collected in 1 liter Nalgene™ bottles.

2.1.1 Sample Analysis

Water chemistry samples for dissolved metals, total recoverable metals, nitrate/nitrite, sulfate, alkalinity, TDS, TSS, and associated QA/QC samples were packaged and shipped to Pace for analysis. Analytical reports are provided in Appendix C and water chemistry results (including QA/QC samples) and applicable laboratory flags, data validation qualifiers, and reason codes are included in Table A1 through Table A3 of Appendix A.

3.0 DATA QUALITY ASSESSMENT

The Data Quality Assessment (DQA) process (EPA, 2000) objective is to determine whether the project-specific objectives have been satisfied and if the analytical results are acceptable for project decision making. The DQA process consists of five steps that relate the quality of the results to the intended use of the data:

Step 1: Review sampling design (Section 3.1).
Step 2: Conduct preliminary data review (Section 3.2).
Step 3: Select statistical test(s), as appropriate, to evaluate data quality (not applicable).
Step 4: Verify assumptions (not applicable).
Step 5: Draw conclusions about the quality of the data (Section 4.0).

3.1 Project Objectives and Sampling Design Review

Project-specific objectives were defined to cover the requirements outlined in the BPSOU CD (and Appendix A of the BPSOU CD) (EPA, 2020) and were used in the sampling design.

3.2 Preliminary Data Review

A preliminary data review was conducted to determine if any problems or anomalies were present in the sample collection and analysis procedures. This was completed by evaluating data quality indicators (Section 3.2.1) followed by data verification and validation (Section 3.3).

3.2.1 Data Quality Indicators

Part of the DQA process is to evaluate the results against data quality indicators of precision, accuracy, representativeness, completeness, comparability, and sensitivity. An evaluation of each data quality indicator follows.

The summary of data points in the following sections includes only the natural samples (the samples collected at EFS-07, INF-04 and MSD-HCC locations) and does not include the field QC samples (the field duplicate and field blank samples). Note that the field QC samples underwent the same data validation procedures as the natural samples and results were included on the data validation checklists (Appendix A). The qualifications made to field QC samples are listed in Table A2 and Table A3 in Appendix A; however, the qualifications made to these samples are not included in the summary of qualifications made to natural data points, and the field QC samples are not included in Table A1.

3.2.1.1 Precision

Precision is the amount of scatter or variance that occurs in repeated measurements of a particular analyte. Acceptance or rejection of precision measurements is based on the relative percent difference (RPD) of the laboratory and field duplicates. For example, perfect precision would be a 0% RPD between duplicate samples (both samples would have the same analytical result). For total metals and wet chemistry analysis, when both results are greater than 5 times the Contract-Required Quantitation Limit (CRQL) acceptable precision is an RPD of plus or minus 20% in water samples. For samples with 1 or both results less than 5 times the CRQL (including non-detect), acceptable precision is met if the absolute difference between the 2 sample results is less than the CRQL. This precision requirement is derived from the Contract Laboratory Program (CLP) Statement of Work (SOW) (EPA, 2016) and the CFRSSI QAPP (ARCO, 1992b). For these sampling events, precision was assessed based on laboratory prepared and field duplicate sample analysis:

$$RPD = \frac{|x - y|}{\frac{(x + y)}{2}} \times 100$$

Where:

x = investigative sample result
y = duplicate sample result

Of the 622 natural data points associated with the quarter sampling events, 13 (2%) of these data points were qualified based on laboratory or field duplicate results that did not meet precision requirements, and the remaining 609 (98%) of the data points met the precision requirements.

3.2.1.2 Accuracy

Accuracy is the ability of the analytical procedure to determine the actual or known quantity of a particular substance in a sample. The percent recovery (%R) of initial calibration verification (ICV) samples, continuing calibration verification (CCV) samples, laboratory control samples (LCS), laboratory matrix spike samples (LMS), Pace's contract-required detection limit (CRDL) check samples, and the percent difference (%D) in the initial calibration standards are used to measure accuracy for metals, the forms of alkalinity, nitrogen (as nitrate [NO2] + nitrite [NO3]), and sulfate data. Perfect recovery would be 100% (the analysis result is exactly the known concentration of the ICV, CCV, LMS, LCS, or check samples). For metals—the forms of alkalinity, nitrogen (as NO2 + NO3), and sulfate data—an acceptable accuracy range for the ICV and CCV recoveries is 90-110%, and the acceptable range for LCS recoveries is 80-120%. For total metals, an acceptable accuracy range for LMS recoveries is 75% to 125% in water samples. For general chemistry analytes, the acceptable range for LMS recoveries, as listed in the CFRSSI QAPP (ARCO, 1992b), is 80-120% in water samples.

The %D between the actual concentration and measured concentration in calibration standards prior to sample analysis is also evaluated when evaluating accuracy. The %D according to the EPA NFG (EPA 2017) needs to be within plus or minus 30%. Calibration information for metals, forms of alkalinity, nitrogen (as NO2 + NO3), and sulfate was provided in the Level 4 data packages. For metals analysis, the %D for the serial dilution samples and the detection of analytes in the interference check samples (ICS) were also used to determine accuracy. Accuracy requirements for this project were derived from the EPA NFG, CLP SOW (EPA, 2016), and the CFRSSI QAPP (ARCO, 1992b).

Field and laboratory blanks were analyzed to assess artifacts introduced during sampling, transport, and/or analyses that may affect the accuracy of the data. In accordance with the CFRSSI QAPP (ARCO, 1992b), a data point is qualified as "U" if it is less than 5 times an associated blank result (initial calibration blank, continuing calibration blank, method blank, or field blank) that is greater than 2 times the method detection limit (MDL).

Data points are often qualified for more than 1 laboratory QA/QC result outside of control limits. As an example, 5 data points for metals analysis were qualified J due to a calibration standard %D outside control limits and a detection in the ICS outside control limits.

Of the 622 natural data points associated with the quarter sampling events, 50 (8%) of these data points were qualified for some combination of ICV, CCV, LCS, and LMS %R and/or calibration and serial dilution %D, a detection in the ICS outside of control limits, and/or a detection in an associated blank outside the control limits. The remaining 572 (92%) data points met the accuracy requirements.

3.2.1.3 Representativeness

Representativeness is a qualitative parameter that is addressed through proper design of the sampling program. The sampling program developed for the QAPP was designed to determine if

treated groundwater quality (at LAO-SS-1) meets the end-of-pipe discharge standards and the effectiveness of the BTL treatment system.

The laboratory results were reviewed, and a Stage 4 data verification and validation completed. Based on information provided by Pace, the chain of custody requirements were met for each of the sample events. Preservation requirements were met for all samples and all samples were analyzed within the appropriate holding times except for the alkalinity analyses in sample delivery group (SDG) 10565397, and the low-level mercury analyses in 10559768. Results were qualified for the holding time exceedance and are considered usable as screening quality data.

3.2.1.4 Completeness

Completeness is assessed to determine if enough valid data have been collected to meet the investigation needs. Completeness is assessed by comparing the number of valid sample results to the number of sample results planned for the investigation. The completeness target for this loading study investigation was 95% or greater as designated in the CFRSSI QAPP (ARCO, 1992b). Samples were collected twice weekly at LAO-SS-1 and once weekly at LAO-SS-2 throughout the quarter. Samples were collected at 1 additional surface water site (LAO-SS-3) once a month. All the required samples were collected. Pace analyzed all the surface water samples for the analytes listed in Table 2 of the QAPP.

In total, 622 natural data points were generated by the sampling events. All the natural data points were usable as no sample results were rejected, 100% of the planned samples were collected, and 100% of the planned analyses were performed. This meets the 95% QA/QC completeness Data Quality Objective (DQO) listed in the CFRSSI QAPP (ARCO, 1992b).

3.2.1.5 Comparability

Comparability is assessed to determine if one set of data can be compared to another set of data. Comparisons are made by examining and comparing the laboratory and field methods used to acquire sample data for different distinct data sets. The data sets summarized in this report include water samples collected by Pioneer and samples analyzed by Pace.

The water quality samples were collected using standard sampling methods and Pioneer SOPs. The sampling design, SOPs, and laboratory analytical methods are based on EPA and other industry standard practices and were documented in the field logbook.

Sample collection was completed by professionals who were properly trained in the SOPs and equipment use. Proper chain of custody and sample handling were observed during sample collection, delivery to the laboratory, and analysis. The analytical laboratories performed the sample analysis using industry standard methods.

Consequently, data from future surface water sampling events at BTL LAO using comparable sampling and analytical methods may be used in concert with this data set.

3.2.1.6 Sensitivity

Sensitivity is a quantitative measure and is evaluated by comparing the laboratory reporting limit (RL) or the laboratory MDL to the project-required detection limit.

To evaluate sensitivity, the required reporting limits (RRL) listed in the Montana Department of Environmental Quality (DEQ) Circular 7 (DEQ-7) (DEQ, 2019) for aluminum, arsenic, cadmium, copper, iron, lead, mercury, silver, zinc, and nitrogen (NO2 + NO3) are compared to the laboratory MDL. The remaining analytes (calcium, magnesium, uranium, hardness, total alkalinity, bicarbonate alkalinity, carbonate alkalinity, hydroxide alkalinity, TDS, TSS, and sulfate) have no RRL listed in a Montana Circular DEQ-7, and do not have Applicable or Relevant and Appropriate Requirements for this project.

The laboratory MDL met the RRL for all applicable analytes except nitrate (as NO2 + NO3). The RRL for nitrate (as NO2 + NO3) is 0.01 mg/L and the Pace MDL was 0.078 mg/L. All the natural sample results for nitrate (as NO2 + NO3) were detections above the MDL. The usability of sample results that had detectable levels of analytes is not affected by an MDL that is higher than the RRL. Additionally, the Montana Circular DEQ-7 (DEQ, 2019) human health standard for nitrate/nitrite is 10 mg/L; therefore, this MDL is considered low enough to meet project needs.

For the samples in SDG 10559768, Pace was unable to perform the low-level mercury analysis (MDL = 0.0047 micrograms per Liter [µg/L]) within the required hold time (28 days). Pace was instructed to perform the standard mercury analysis (MDL = 0.045 µg/L) within hold time and the low-level mercury analysis when possible. The low-level mercury analyses were performed with hold times of 32 and 29 days. The low-level mercury results for natural samples were all detections and were qualified "J-" for exceeding the hold time. The low-level mercury results for these samples are usable for the project and met the sensitivity requirement. The RRL for mercury (0.005 µg/L) was not met for the standard mercury analysis; however, the MDL for the standard mercury analysis was lower than Applicable or Relevant and Appropriate Requirements for mercury (0.05 µg/L) and so the results are usable for the project.

For analytes without an RRL, the laboratory MDLs are consistent with anticipated MDLs listed in Table 2 of the QAPP; therefore, this MDL is considered low enough to meet project needs.

3.3 Data Verification and Validation

All data presented herein have undergone a Stage 4 data verification and validation in accordance with EPA NFG (EPA, 2017) except when superseded by the CFRSSI DM/DV Plan (ARCO, 1992c) or CFRSSI DM/DV Plan Addendum (AERL, 2000a). Based on the DQA process outlined in the CFRSSI Pilot Data Report Addendum (AERL, 2000b), the quality of the data is ranked as enforcement quality, screening quality, or it is rejected.

Enforcement quality data are supported by rigorous sampling and analysis procedures, QA/QC protocols, and documentation requirements. Enforcement quality data, as defined in the CFRSSI DM/DV Plan (ARCO, 1992c), must meet Level A and Level B criteria (Appendix A) and remain unqualified during the data validation process (no J, J+, UJ, or R qualifications [U qualifications

are still considered enforcement data as these qualifications mean the result is non-detect, not estimated]). Enforcement quality data can be used for all Superfund activities.

Screening quality data, as defined in the CFRSSI DM/DV Plan (ARCO, 1992c), include data that were qualified during the validation process and that met Level A but not Level B criteria. Potential uses of screening quality data, depending on their quality, include site characterization, determining the presence or absence of contaminants, developing or refining sampling and analysis techniques, determining relative concentrations, scoping and planning for future studies, engineering studies and engineering design, monitoring during implementation of the response action, and the ongoing groundwater remedy optimization effort.

Data rejected during data validation cannot be used for any Superfund activities. No results from these sampling events were rejected.

Summaries of the analytical results from samples collected at the BTL site for the quarter sampling events are included in the following tables in Appendix A:

- Table A1 contains the analytical results with laboratory qualifiers; data validation qualifiers; enforcement, screening, and rejected classifications; and data validation reason codes.
- Table A2 contains the field duplicate pair samples with results, laboratory flags, data validation qualifiers, data validation reason codes, and QC criteria calculations.
- Table A3 contains the field blank samples with results, laboratory flags, data validation qualifiers, data validation reason codes, and QC criteria calculations.
- Table A4 contains sample identification information including the field sample name, sample type, sample location, laboratory sample name, sample date, analytical methods, and analytes.
- Table A5 contains the definitions for the laboratory qualifiers; data validation qualifiers; enforcement, screening, and rejected classification codes; and data validation reason codes.

The data validation checklists for the quarter sampling events for total metals, as well as general chemistry analyses, are included in Appendix A as Attachments A1 and A2, respectively. The Level A/B assessment checklist for the sampling events is included in Appendix A as Attachment B. The checklists are from the CFRSSI DM/DV Plan Addendum (AERL, 2000a). The data were validated according to the EPA NFG (EPA, 2017) except when superseded by the CFRSSI DM/DV Plan (ARCO, 1992c) and Addendum.

As shown in the Level A/B checklist in Appendix A (Attachment B), all the samples met both Level A and Level B criteria. No data were designated screening quality or rejected based on the results of Level A/Level B criteria. In Appendix A, Table A1 shows the enforcement, screening, or unusable designators for each natural data point.

Data were also evaluated using the Level A/B Checklists (Appendix A). All samples met both the Level A and Level B criteria defined in the CFRSSI DM/DV Plan (ARCO, 1992c) and CFRSSI DM/DV Plan Addendum (AERL, 2000a). Based on the qualifications and the Level A/B checklist, 23 data points were classified as screening quality (J, J+, or UJ qualifier).

Of the 622 natural data points generated by Pace for the quarter samples, 552 (89%) of the natural data points were considered enforcement quality and 70 (11%) natural data points were classified as screening quality. In Appendix A, Table A1 show the laboratory flags, data validation qualifiers, enforcement or screening designators, and the reason code for the qualification for each of the data points.

3.3.1 Laboratory Quality Control Samples

Based on information provided by Pace, the chain of custody requirements were met for the quarter sampling events. Receiving temperatures of samples for both events were within control limits and the samples were analyzed within the appropriate holding times. All required laboratory QA/QC samples were analyzed with each SDG, and 66 data points from the quarter events were qualified due to laboratory QA/QC sample results outside of control limits. The qualifications required based on the laboratory QC sample results are detailed in Appendix A in Attachment A1 and A2 and listed in Table A1.

3.3.2 Field Quality Control Samples

The quarter samples were collected following the requirements in the QAPP: 1 field duplicate and 1 field blank collected each month during a sampling event. During the events, 3 field duplicate and 3 field blanks were collected. The results for field QC samples are listed in Table A2 and Table A3. Qualifications required because of field QC sample results are detailed in Appendix A and listed in Table A1.

3.3.2.1 Field Blank Results

Field blank results are used to provide a measure of the effectiveness of field decontamination and help evaluate the cleanliness of disposable field equipment. Field blank results are listed in Table A3 in Appendix A.

Three field blank associated with the samples were submitted for analysis for the quarter sampling events. Although there were positive detections in the field blank result for calcium and magnesium in February greater than 2 times the MDL, no qualifications were warranted because all associated sample results were greater than 5 times the respective blank detections.

3.3.2.2 Field Duplicate Results

Field duplicates are used to assess field and laboratory precisions. Field duplicate results are listed in Table A2 in Appendix A. One field duplicate sample was submitted with the samples from each of the quarter events. The field duplicate samples were not analyzed for dissolved barium and dissolved silica. Therefore, the dissolved barium and dissolved silica results for both sampling events were qualified "J" due to not meeting the field duplicate collection frequency requirement. The remaining analytes met the requirements of 1 field duplicate collected per sampling event.

Sample results qualified "J" for poor field precision or for not meeting the field duplicate collection frequency requirement were assigned an FD or FDX reason code, respectively, in the results tables in Appendix A.

4.0 DATA QUALITY CONCLUSIONS

The laboratory samples were collected using standard sampling methods and in accordance with relevant Pioneer SOPs. The sampling design, SOPs, and laboratory analytical methods were based on EPA and other industry standard practices. Sample collection was completed by professionals who were properly trained in following SOPs and using equipment. Proper chain of custody and sample handling activities were observed during sample collection, delivery to the laboratory, and analysis. The analytical laboratories performed the sample analyses using industry standard methods. As shown in the checklists (Appendix A), all data met the Level A and Level B criteria.

Data generated from the samples collected for the quarter sampling events were examined to ensure that project objectives were met. The DQOs for the investigation are listed in the QAPP. A data QA/QC review was completed for each of the quarter sampling events

In total, 622 data points were generated by the 26 sampling events: 70 (11%) natural data points were designated screening quality and 552 (89%) natural data points were designated as enforcement quality based on laboratory and field QA/QC sample results (Appendix A).

4.1 Deviations

During the quarter events, there was two deviation to the QAPP:

Field grab samples were collected on April 8, 12, 15, 19, 22, and 26, 2021, at EFS-07 due to issues with the ISCO sampler and sample pump.

For the samples in SDG 10559768 collected on May 6 and May 10, 2021, Pace was unable to perform the low-level mercury analysis (MDL = 0.0047 µg/L) within the required hold time (28 days). Pace was instructed to perform the standard mercury analysis (MDL = 0.045 µg/L) within hold time and the low-level mercury analysis when possible. The low-level mercury analyses were performed with hold times of 32 and 29 days.

5.0 REFERENCES

AERL, 2000a. Clark Fork River Superfund Site Investigations Data Management/Data Validation Plan Addendum. June 2000.

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EPA, 2009. Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use. U.S. Environmental Protection Agency, January 2009.

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FIGURES

Point Table			Point Table		
Description	Northing	Easting	Description	Northing	Easting
MH-MSD106	651209.02	1197905.47	HCC-01	651325.00	1193749.26
MH-MSD108	651265.29	1198781.03	HCC-01A	651326.53	1193021.75
MH-MSD110	651503.81	1199850.85	HCC-01B	651331.65	1192933.79
MH-MSD113	652414.06	1200906.31	HCC-02A	651364.64	1192780.84
MH-MSD116	653236.82	1201858.01	HCC-03	651895.05	1192245.96
MSD-HCC	651600.21	1194949.19	HCC-03A	651940.66	1192156.74
MSD-OUT	651324.20	1197083.50	HCC-04	652072.94	1191792.43
A1	651838.45	1192164.94	HCC-04A	652097.11	1191743.43
A2	651931.22	1191690.21	HCC-05	652280.66	1191254.87
A3	652055.47	1191180.80	HCC-05A	652303.23	1191210.43
B1	651484.14	1192551.84	HCC-06	652343.18	1191051.80
B2	651657.02	1192233.20	HCC-06A	652355.78	1191012.56
B3	651702.08	1192096.79	HCC-07	652188.07	1190724.00
C1	651464.96	1192558.36	INDC	651511.64	1192604.67
C3	651541.57	1192046.18	INF04	651457.40	1192637.70
			EFS-07	651925.98	1191093.47

LEGEND:

- BTL ANALYTICAL SAMPLE COLLECTION
- SUBDRAIN LOADING - FLOW WATER LEVEL, FIELD PARAMETERS. ANALYTICAL SAMPLES
- BTL FIELD DATA - LEVEL
- HCC STAFF GAUGE LOCATIONS
- BTL FIELD DATA- pH, TEMP, CONDUCTIVITY
- INDC

N

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAD 83
UNITS: FEET
SOURCE: PIONEER

SCALE IN FEET
0 100 200

FIGURE 1

BTL AND BPSOU SUBDRAIN ROUTINE SAMPLE AND MONITORING LOCATIONS

PIONEER TECHNICAL SERVICES, INC.
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

DATE: 2/2019

9/4/2019 5:02:31 PM P:\ARCO\BPSOU\2018\BTL-LAO\QUARTERLY OPERATIONS REPORT\2018 1Q REPORT\DWG\BTL-SMA-FG-PLN-001-18.DWG

APPENDICES

Appendix A
Data Validation Report (DVR)

SILVER BOW CREEK/BUTTE AREA NPL SITE
BUTTE PRIORITY SOILS OPERABLE UNIT

Draft Final

Butte Treatment Lagoons Sampling Data Validation Report Second Quarter 2021

Atlantic Richfield Company

September 2021

SILVER BOW CREEK/BUTTE AREA NPL SITE
BUTTE PRIORITY SOILS OPERABLE UNIT

Draft Final

Butte Treatment Lagoons Sampling Data Validation Report – Second Quarter 2021

Prepared for:

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September 2021

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DOCUMENT MODIFICATION SUMMARY

Revision No.	Author	Version	Description	Date
Rev 0	Laura Moon	Draft Final	Issued for Agency Review	9/21/2021

1.0 DATA VALIDATION REPORT SUMMARY

This validation report summarizes the analytical results from samples collected for the compliance sampling at the Butte Treatment Lagoons (BTL) Lower Area One (LAO) from April 1, 2021, through June 30, 2021 (referred to as quarter). All data have undergone a Stage 4 data validation in accordance with the BTL groundwater treatment system and Butte Priority Soils Operable Unit (BPSOU) subdrain (subdrain) Quality Assurance Project Plan (QAPP) (Atlantic Richfield, 2021) (referred to as QAPP) and U.S. Environmental Protection Agency (EPA) *National Functional Guidelines* [NFG] *for Inorganic Superfund Data Review* (EPA, 2017). The samples were labelled according to EPA *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (EPA, 2009). All data presented herein have undergone data validation in accordance with the Clark Fork River Superfund Site Investigation (CFRSSI) Data Management/Data Validation (DM/DV) Plan Addendum (CFRSSI DM/DV Plan Addendum) (AERL, 2000). This report details the evaluation of laboratory reported data for the purpose of usability.

This document refers to the tables and attachments below.

- Table A1 contains the analytical results with laboratory qualifiers; data validation qualifiers; enforcement, screening, and rejected classifications; and data validation reason codes.
- Table A2 contains the field duplicate pair samples with results, laboratory flags, data validation qualifiers, data validation reason codes, and quality control (QC) criteria calculations.
- Table A3 contains the field blank samples with results, laboratory flags, data validation qualifiers, data validation reason codes, and QC criteria calculations.
- Table A4 contains sample identification information including the field sample name, sample type, sample location, laboratory sample name, sample date, analytical methods, and analytes.
- Table A5 contains the definitions for the laboratory qualifiers; data validation qualifiers; enforcement, screening, and rejected classification codes; and data validation reason codes.
- Attachment A contains the data validation checklists.
- Attachment B contains the Level A/B Assessment Checklist.

The full data packages received from the laboratory provided the information to perform a Stage 4 data validation. All data met the Level A and B criteria. Based on the validation process outlined in the CFRSSI DM/DV Plan (ARCO, 1992a), the quality of the data is ranked as enforcement quality, screening quality, or it is rejected. Enforcement quality data are defined in the CFRSSI DM/DV Plan as data that meet the Level A and B criteria (Attachment B) and are not qualified as estimated or rejected after the data validation process. For sample results qualified as estimated "J" by the laboratory because the reported result is between the method

detection limit (MDL) and analytical reporting limit (RL), values are considered enforcement data if no other qualifiers were required during validation. During data validation, results between the MDL and RL were assigned a Reason Code of "<RL" and, if no other qualifiers were required, were qualified "A" as defined in the CFRSSI DM/DV Plan (ARCO, 1992a) to indicate enforcement quality data. Enforcement quality data may be used for all purposes under the Superfund program including the following: site characterization, health and safety, Engineering Evaluation/Cost Analysis, remedial investigation/feasibility studies, evaluation of alternatives, confirmational purposes, risk assessments, and engineering design. As all samples met the Level A and B documentation criteria, the results that were not qualified as estimated (J, J+, J-, or UJ) or rejected for some exceedance of quality assurance (QA)/QC criteria were considered "enforcement" quality data and were assigned an "E" in Table A1.

Screening quality data, as defined in the CFRSSI DM/DV Plan (ARCO, 1992a), are those samples that do not meet the Level B criteria and/or were qualified as estimated (J, J+, J-, or UJ) during the data validation process. Potential uses of screening quality data, depending on their quality, include site characterization, determining the presence or absence of contaminants, developing or refining sampling and analysis techniques, determining relative concentrations, scoping and planning for future studies, engineering studies and engineering design, and monitoring during implementation of the response action. Sample results that were qualified as estimated during the validation process were considered "screening" quality data and assigned an "S" in Table A1.

Data rejected during data validation cannot be used for any Superfund activities. No results were rejected.

For the compliance sampling activities, samples were collected twice weekly at the lagoon discharge of the BTL LAO at station EFS-07 (sample number LAO-SS-1). Once a week, a sample was collected from the influent station INF-04 (sample number LAO-SS-2). Once a month, an additional sample was collected at the subdrain discharge at station MSD-HCC (sample number LAO-SS-3). The samples were sent weekly to Pace Analytical Services, Inc. (Pace) in Minneapolis, Minnesota. All the samples were analyzed for total recoverable aluminum, arsenic, cadmium, calcium, copper, iron, lead, magnesium, mercury, total hardness, silver, uranium, and zinc. Additionally, once a month samples were analyzed for total alkalinity, bicarbonate alkalinity, carbonate alkalinity, hydroxide alkalinity, sulfate, nitrogen (as nitrate [NO2] + nitrite [NO3]), total suspended solids (TSS), and total dissolved solids (TDS).

The summary of data points in this Data Validation Report includes only the natural samples (the samples collected at EFS-07 [LAO-SS-1], INF-04 [LAO-SS-2], and MSD-HCC [LAO-SS-3]) and does not include the field QC samples (the field duplicate and field blank samples). Note that the field QC samples underwent the same data validation procedures as the natural samples and are included on the data validation checklists in Attachment A. The qualifications made to field QC samples are listed in Table A2 and Table A3; however, the qualifications made to these samples are not included in the summary of qualifications made to natural data points, and the field QC samples are not included in Table A1.

In the quarter, a total of 43 natural samples were collected during 26 sampling events. The 26 sampling events included EFS-07 (LAO-SS-), 13 sampling events included INF-04 (LAO-SS-2), and 3 sampling events included MSD-HCC (LAO-SS-3). This resulted in a total of 622 natural data points generated by Pace. A summary by sample location is shown below:

Summary of Enforcement and Screening Quality Data Points from Each Sample Location

Sample Location	Samples	Data Points	Enforcement Data Points (% of total)	Screening Data Points (% of total)	Rejected Data Points (% of total)
EFS-07 (LAO-SS-1)*	26	364	309 (85%)	55 (15%)	0
INF-04 (LAO-SS-2)	13	194	186 (96%)	8 (4%)	0
MSD-HCC (LAO-SS-3)	3	64	57 (89%)	7 (11%)	0
Total for Natural Samples	42	622	552 (89%)	70 (11%)	0

* Compliance sampling point

Table A1 shows the laboratory flags, data validation qualifiers, enforcement or screening designators, and the reason code for the qualification for each data point.

2.0 QUALITY ASSURANCE/QUALITY CONTROL REVIEW OF INORGANIC DATA

Data validation checklists derived from the CFRSSI DM/DV Addendum (AERL, 2000) were completed for each of the weekly and monthly laboratory reports (Attachment A). Below are the deviations made to the checklists provided in the CFRSSI DM/DV Addendum guidance document:

- The Laboratory Data Validation Checklist for Metals Analysis by Inductively Coupled Plasma (ICP) or Graphite Furnace Atomic Absorption Spectrometry (GFAA) was revised slightly to more accurately reflect the information provided in the full data package provided by Pace and the requirements listed in the NFG (EPA, 2017). The checklist is included in Attachment A.1.

- The Data Validation Checklist for Field Quality Control was not filled out for each data package. Sections on field blanks and field duplicates were added to each Laboratory Data Validation Checklist worksheet.

- The Laboratory Data Validation Checklist for Metals Analysis by ICP or GFAA was modified for the general chemistry validation. The checklist is included in Attachment A.2. The guidelines for general or wet chemistry laboratory QA and QC listed in Table 11-5 of the CFRSSI QAPP (ARCO, 1992b) along with laboratory QA/QC control limits were used in evaluating the general chemistry results. The revised checklist more accurately reflects the information provided by the laboratory for these analyses.

The relevant data validation checklists were completed for each sample delivery group (SDG) and included the data validation performed for the methods and analytes listed below:

Data Validation Checklist	Method	Analyte(s)
Metals	EPA 200.8	Aluminum, arsenic, cadmium, calcium, copper, iron, lead, magnesium, silver, total hardness by 2340b, uranium, zinc
	EPA 245.1	Mercury
General Chemistry	SM 2320B	Total alkalinity, bicarbonate alkalinity, carbonate alkalinity, hydroxide alkalinity
	SM 2540C	Total Dissolved Solids
	SM 2540D	Total Suspended Solids
	SM 4500-NO3-H	Nitrogen (as NO2 + NO3)
	ASTM D516	Sulfate

One Level A/B Assessment was completed for all samples (Attachment B).

2.1 Field Quality Control Samples

The QAPP requirement for field duplicate collection frequency is 1 field duplicate sample per month, and the field blank collection frequency requirement is 1 per month.

The analytical RLs presented in the laboratory reports were used to evaluate the field duplicates. The field duplicate QC criteria calculations are listed in Table A2. The laboratory MDLs were used for the data review and validation of field blanks. The field blank results are listed in Table A3.

Any qualifications required based on the field QC sample results are detailed in the Data Validation Checklists (Attachment A) and are listed in Table A1 and Table A2

Please note that although the field QC samples (field duplicate and field blank samples) may receive a qualifier during the data validation process, the enforcement and screening quality summaries and the precision and accuracy assessment summaries do not include the field QC sample results. Only the results of the natural samples are included in the data quality assessment summaries.

2.1.1 Field Duplicate

Field duplicate samples were collected during each monthly sampling event; therefore, the collection frequency requirement for field duplicates was met.

If the field duplicate was collected from the EFS-07 (LAO-SS-1) sample location (effluent) and the results did not meet the field duplicate control limit, the result for both EFS-07 samples collected that week and the field duplicate results were qualified. If the field duplicate was collected at the INF-04 (LAO-SS-2) sample location (influent) and the results did not meet the field duplicate control limit, only the parent sample and the field duplicate result were qualified.

Table A2 contains the field duplicate pairs and the QC criteria calculations. Any qualifications required based on the field duplicate sample results are detailed in the data validation checklists (Attachment A) and are listed in Table A1 and Section 5.1.

2.1.2 Field Blanks

Field blank samples (bottle blanks and rinsate blanks) were collected during each monthly sampling event; therefore, the collection frequency requirement for field blanks was met.

The results of the field blanks are listed in Table A3. The rinsate blanks were collected from the dedicated sampler at EFS-07 (LAO-SS-1). If the results did not meet the field blank control limit, the results for both samples at EFS-07 collected that week were evaluated for qualifications.

Any qualifications required based on the field blank sample results are detailed in the data validation checklists (Attachment A) and are listed in Table A1 and Section 5.2.

2.2 Laboratory Quality Control Samples

The laboratory QC sample types vary depending on analytical method. The QC criteria used during data validation to evaluate the applicable laboratory QC samples are listed in Table 5 of the QAPP.

The Stage 4 data validation includes the evaluation of the following laboratory QC items as applicable per analytical method:

- Holding Times
- Preservation
- Tuning
- Calibration
- Initial Calibration Verification (ICV) and Continuing Calibration Verification (CCV) Standards
- Low Level Initial Calibration Verification Standards (LLICV) (also referred to as the Contract Required Detection Limit [CRDL] standards)
- Initial Calibration Blank (ICB) and Continuing Calibration Blank (CCB) Standards
- Method Blanks (MB)
- Interference Check Samples (ICS)
- Laboratory Control Sample (LCS) and LCS Duplicates (LCSD)
- Laboratory Duplicate Samples (LDS)
- Laboratory Matrix Spike (LMS), LMS duplicates (LMSD), and Post Digestion Spike Samples (PDS)
- Serial Dilution (SD)
- Internal Standards

The laboratory method detection limits (MDLs) were used for the data review and validation of laboratory method blanks and field blanks; and the laboratory instrument detection limits were used for the data review and validation of the laboratory instrument blanks (initial and continuing calibration blanks) as discussed in the CFRSSI QAPP (ARCO, 1992b).

The appropriate laboratory QC samples were analyzed with each sample group. Any qualifications required based on the laboratory QC sample results are detailed in the data validation checklists (Attachment A) and are listed in Table A1. Also refer to Section 5.1 and Section 5.2.

3.0 DEVIATIONS TO NATIONAL FUNCTIONAL GUIDELINES REQUIREMENTS

Below is a summary of discrepancies noted during the validation process between the requirements listed in the NFG (EPA, 2017) and Pace's responses to the deviation:

- Per the NFG "*The analyte concentrations in the CCV standard shall be different than the concentration used for the ICV standard*." Pace used the same standard for both the ICV standard and CCV standard; however, calibration standards were prepared using a separate source standard solution. "*The ICV and CCV are prepared from the same stock standard and analyzed at the same concentration as outlined in our Standard Operating Procedure, S- MN-I-492 rev.27, table 10.2*" (per communication with Pace Project Manager, Bob Michels).

- The NFG indicates at least 1 of the calibration standards be at or below the RL, but above the MDL. This was not the case for most of the calibrations reported. In response to this question Pace replied: "*The calibration sequence*[s] *for the ICP-MS instrumentation were initially set up in accordance to method 200.8 and were done with assistance of the instrument vendor upon installation of the equipment. Section 7.4.1 in EPA method 200.8 revision 5.4 recommends 'element concentrations in the standards should be sufficiently high to produce good measurement precision and to accurately define the slope of the response curve. Depending on the sensitivity if the instrument, concentrations ranging from 10-200 ug/L are suggested*.' *We have increased the calibration range of our instruments because of the observed sensitivity and performance of the instrument(s). The lower end of the calibration is verified daily with the analysis of a reporting limit check standard (CRDL). This is analyzed immediately following the initial calibration verification (ICV) and initial calibration blank (ICB)*."

- The calibration blank and 4 calibration standard results were reported for some of the U-238 calibrations throughout the year. As directed in the NFG, 5 calibration standards are required. Pace generally uses only 4 standards for U-238 calibration per their reply on 1/15/2018: "*The stock standard used for creating cal-5 standard does not contain uranium. These stock standards were determined at a corporate level and implemented consistently across the Pace network as standard practice*."

  Based on the above reply, if 4 standards for the U-238 calibration were reported, no results were qualified.

- The NFG requires at a minimum 5 internal standards from the following list: lithium, scandium, yttrium, rhodium, indium, terbium, holmium, lutetium, and bismuth. Pace used germanium, indium, iridium, scandium, terbium, and thorium as their internal standards. Pace's reply: "*Elements selected for internal standardization are outlined in Pace SOP S-MN-I- 492 Rev. 27, attachment II. Recommended internal standard elements were selected for use if samples did not contain significant native amounts or if the recommended internal standard were a reportable element. Alternative elements for the appropriate mass range were selected for use based on performance, these include Ge and Th.*"

  Pace updated their internal standard list (per ENV-SOP-MIN4-0043, "Metals Analysis by ICP/MS-Method 6020 and 200.8") to replace thorium with iridium, in order to analyze thorium as an analyte of interest. The internal standard change started in May 2021 and did not affect the quality of data. The recoveries of these elements in each data package could be easily compared. No qualifications were made based on the use of the different internal standards.

- The NFG requires the following for calibration: "*A blank and at least five calibration standards shall be used to establish each calibration curve…The curve must have a correlation coefficient of ≥ 0.995. The calculated percent differences (%Ds) for all of the non-zero standards must be within ±30% of the true value of the standard."* The majority of qualifications made during the quarter validation effort were due to the %D for calibration standards being greater than 30%. Pace was asked about the number of standards exceeding the %D requirement in the NFG. Pace replied, "*They are not a CLP laboratory and our data quality objectives may differ from those requirements specified within the National Functional Guidelines for Inorganic Review, 2017. Our data quality objectives are guided by BP Tech specs (where applicable), the method, and our internal SOP. The established acceptance criteria specific to the initial calibration is a correlation coefficient of ≥ 0.998 where we do not have a %D requirement established for each non-zero standard*."

  The %D for the calibration standard was not evaluated since Pace is not a Contract Laboratory Program (CLP) laboratory. Calibrations were evaluated during data validation following the QC criteria based on the applicable Pace Standard Operating Procedure (SOP) and are listed in Table 5 of the QAPP.

4.0 LEVEL A/B ASSESSMENT SUMMARY

Data that meet the Level A and Level B criteria and are not qualified as estimated or rejected are assessed as enforcement quality data and can be used for all Superfund purposes and activities. Data that meet only the Level A criteria and are not rejected can be assessed as screening quality data.

Screening quality data can be used only for certain activities, which include engineering studies and design. Data that do not meet both the Level A and B criteria are designated as unusable.

One Level A/B assessment checklist for all samples submitted to Pace for the quarter is included as Attachment B.

As this is compliance data, samples were collected and logged into an electronic spreadsheet. Water quality parameters collected from the sample point during the collection of the samples from the automatic samplers were stored on the meter, downloaded to the computer, and then recorded in a field book. Associated calibration information, sampler's initials, and date and time were also recorded in the field book. This information was reviewed for the Level A/B criteria.

As shown in Attachment B, all the samples met both Level A and Level B criteria. No data were designated screening quality or rejected based on the results of Level A/B assessment.

5.0 PRECISION, ACCURACY, REPRESENTATIVENESS, COMPLETENESS, COMPARABILITY, AND SENSITIVITY DATA SUMMARY

Data generated from the samples collected were examined to ensure that project objectives were met. The data quality objectives (DQO) for this investigation are listed in Section 2.4.1 of the QAPP. A Stage 4 QA/QC review was completed for each sample event.

For the quarter, the 26 sampling events resulted in 42 natural samples collected from 3 surface water sites. Additionally, 6 field blanks and 3 field duplicate samples were collected. The samples were shipped to Pace and analyzed for total recoverable aluminum, arsenic, calcium, cadmium, copper, iron, lead, magnesium, mercury, silver, uranium, zinc, and total hardness. Additionally, once-a-month samples were analyzed for total alkalinity, bicarbonate alkalinity, carbonate alkalinity, hydroxide alkalinity, sulfate, nitrogen (as NO2 + NO3), TSS, and TDS.

5.1 Precision

Precision is the amount of scatter or variance that occurs in repeated measurements of a particular analyte. Acceptance or rejection of precision measurements is based on the relative percent difference (RPD) of the laboratory and field duplicates. For example, perfect precision would be a 0% RPD between duplicate samples (both samples have the same analytical result) for results that are greater than 5 times the RL. For total metals and wet chemistry analysis, when both results are greater than 5 times the RL, acceptable precision is a RPD of plus or minus 20% in water samples. For samples with 1 or both results less than 5 times the RL (including non-detect), acceptable precision is met if the absolute difference between the 2 sample results is less than the RL. This precision requirement is derived from the CLP Statement of Work (SOW) (EPA, 2016) and the CFRSSI QAPP (ARCO, 1992b). For these sampling events, precision was assessed based on laboratory prepared and field duplicate sample analysis.

There were 9 instances where the field duplicate pair results did not meet the control limit. This resulted in the qualification of 13 natural data points due to poor field precision (9 qualifications were made to the parent samples and 4 additional qualifications were made to natural samples considered sufficiently similar to a parent sample). There were no instances where the laboratory duplicate pair results did not meet the control limit.

The natural samples qualified for poor field precision (DV Reason Code = FD) are listed below:

SDG	Lab Sample ID	Field Sample ID	Method	Analyte	DV Flag	DV Reason Code
10556183	10556183002	LAO-SS-1-041921	SM 2320B	Alkalinity, Bicarbonate (CaCO3)	J	FD
10559768	10559768001	LAO-SS-1-050621	EPA 200.8	Aluminum	J	FD, <RL
10559768	10559768001	LAO-SS-1-050621	EPA 200.8	Copper	UJ	RB, FD
10559768	10559768001	LAO-SS-1-050621	EPA 200.8	Lead	J	ICS, FD
10559768	10559768001	LAO-SS-1-050621	EPA 200.8	Zinc	J	FD
10559768	10559768002	LAO-SS-1-051021	SM 2320B	Alkalinity, Bicarbonate (CaCO3)	J	FD
10559768	10559768002	LAO-SS-1-051021	SM 2320B	Alkalinity, Carbonate (CaCO3)	J	FD
10559768	10559768002	LAO-SS-1-051021	EPA 200.8	Aluminum	J	FD, <RL
10559768	10559768002	LAO-SS-1-051021	EPA 200.8	Copper	UJ	RB, FD
10559768	10559768002	LAO-SS-1-051021	EPA 200.8	Lead	J	ICS, FD
10559768	10559768002	LAO-SS-1-051021	EPA 200.8	Zinc	J	FD
10565397	10565397002	LAO-SS-1-061421	SM 2320B	Alkalinity, Bicarbonate (CaCO3)	J	H, FD
10565397	10565397002	LAO-SS-1-061421	SM 2320B	Alkalinity, Carbonate (CaCO3)	UJ	H, FD

This resulted in 13 (2%) of the 622 natural data points associated with the natural samples collected during the quarter that did not meet the precision requirements, and 609 (98%) of the 622 natural data points associated with the natural samples collected that met the precision requirements.

5.2 Accuracy

Accuracy is the ability of the analytical procedure to determine the actual or known quantity of a particular substance in a sample.

The indicator of accuracy evaluated during the Stage 4 data validation of the analytical data is below:

Indicator of Accuracy	Applicable analytical method
Field Blank	EPA 200.8, EPA 245.1, SM 4500-NO3-H, SM 2320B, ASTM D516, SM 2540C/D
MB	
LCS	
LMS	
Calibration	EPA 200.8, EPA 245.1, SM 4500-NO3-H, SM 2320B, ASTM D516
ICV and CCV	
ICB and CCB	
LLICV	EPA 200.8, EPA 245.1
Tuning	EPA 200.8
ICS	
internal standards	
SD	

The QC criteria used during data validation for each QC sample are listed in Table 5 of the QAPP.

Field and laboratory blanks were analyzed to assess artifacts introduced during sampling, transport, and/or analyses that may affect the accuracy of the data. In accordance with the CFRSSI QAPP (ARCO, 1992b), a data point is qualified as U if it is less than 5 times an associated blank result (field blank, ICB, CCB, or MB) that does not meet the control limit.

The percent recoveries (%R) of the ICV, CCV, LLICV, ICS, LCS, and LMS are used to measure accuracy. The ICV, CCV, and LLICV measure instrument accuracy. The ICS is used to measure potential instrument interferences that can affect accuracy. The LCS measures sample preparation and analysis accuracy. The LMS measures the effect that the sample matrix has on accuracy. Perfect %R would be 100% (the analysis result is exactly the known concentration of the spike amount in the ICV, CCV, LLICV, LMS, or LCS).

An instrument tune or calibration that does not meet the criteria can affect the accuracy of analytical results.

The %D of the SD sample is used to measure the effect that the sample matrix has on accuracy. Perfect %D would be 0% (the analysis result is exactly the known concentration of the original sample prior to dilution).

The percent relative intensity of the internal standards for EPA 200.8 is used to determine the existence and magnitude of instrument drift and physical interferences of each sample that may affect the accuracy of the data.

Additionally, for the ICS, the detection of analytes not present in the ICS solution with an absolute value above the MDL measures the accuracy of analytes with concentrations that approximate those levels found in the ICS for samples with comparable or higher levels of interferents. Positive detections in the ICS solutions indicate the possibility of false positive results, and negative detections in the ICS indicate the possibility of false negative results for samples with high levels of interferents. For example, the BTL-LAO samples typically have concentrations of the interferent calcium greater than the amount of calcium in the ICS solutions and concentrations of lead, silver, and cadmium near the MDL. Therefore, lead, silver, and cadmium results are often qualified as estimate due to ICS results that indicate potential interferences for these analytes.

For the quarter data, qualifications were made to natural samples due to calibration (linear range, ICV, and CCV), ICS, LMS/LMSD, SD, and field blank control limit exceedances. These qualifications are detailed in the data validation checklists for each SDG in Attachment A. There were no qualifications made due to the remaining indicator of accuracy.

There were 8 natural data points qualified due to reasons related to calibration. One natural data point was qualified because the linear range of the calibration was exceeded (Reason Code = CL). Seven natural data points were qualified due an exceedance of the %R for the ICV and/or CCV (Reason Code = ICV and CCV) as listed below:

SDG	Lab Sample ID	Field Sample ID	Method	Analyte	DV Flag	DV Reason Code
10556183	10556183001	LAO-SS-1-041521	EPA 245.1	Mercury	UJ	CCV
10556183	10556183002	LAO-SS-1-041921	EPA 245.1	Mercury	J-	CCV, <RL
10556183	10556183002	LAO-SS-1-041921	ASTM D516-90-02	Sulfate	J-	ICV, CCV
10556183	10556183004	LAO-SS-2-041921	ASTM D516-90-02	Sulfate	J-	ICV, CCV
10556183	10556183005	LAO-SS-3-041921	ASTM D516-90-02	Sulfate	J-	ICV, CCV
10559768	10559768004	LAO-SS-2-051021	ASTM D516-90-02	Sulfate	J-	CCV
10559768	10559768005	LAO-SS-3-051021	ASTM D516-90-02	Sulfate	J-	CCV
10567614	10567614003	LAO-SS-2-062821	EPA 200.8	Copper	J	CL

There were 25 natural data points qualified for an ICS detection as listed below:

SDG	Lab Sample ID	Field Sample ID	Method	Analyte	DV Flag	DV Reason Code
10554243	10554243001	LAO-SS-1-040121	EPA 200.8	Lead	J+	ICS
10554243	10554243002	LAO-SS-1-040521	EPA 200.8	Lead	J+	ICS
10554243	10554243002	LAO-SS-1-040521	EPA 200.8	Zinc	J+	ICS
10555104	10555104001	LAO-SS-1-040821	EPA 200.8	Cadmium	J+	ICS
10555104	10555104002	LAO-SS-1-041221	EPA 200.8	Cadmium	J+	ICS
10557202	10557202001	LAO-SS-1-042221	EPA 200.8	Cadmium	J-	ICS
10557202	10557202002	LAO-SS-1-042621	EPA 200.8	Cadmium	J-	ICS
10558433	10558433002	LAO-SS-1-050321	EPA 200.8	Cadmium	J-	ICS
10559768	10559768001	LAO-SS-1-050621	EPA 200.8	Cadmium	J+	ICS
10559768	10559768001	LAO-SS-1-050621	EPA 200.8	Lead	J	ICS, FD
10559768	10559768002	LAO-SS-1-051021	EPA 200.8	Cadmium	J+	ICS
10559768	10559768002	LAO-SS-1-051021	EPA 200.8	Lead	J	ICS, FD
10560663	10560663001	LAO-SS-1-051321	EPA 200.8	Cadmium	J-	ICS
10560663	10560663002	LAO-SS-1-051721	EPA 200.8	Cadmium	J-	ICS
10562085	10562085001	LAO-SS-1-052021	EPA 200.8	Lead	J+	ICS
10562085	10562085002	LAO-SS-1-052421	EPA 200.8	Cadmium	J+	ICS
10562085	10562085002	LAO-SS-1-052421	EPA 200.8	Lead	J+	ICS
10564213	10564213001	LAO-SS-1-060321	EPA 200.8	Cadmium	J+	ICS
10564213	10564213002	LAO-SS-1-060721	EPA 200.8	Cadmium	J+	ICS
10565397	10565397001	LAO-SS-1-061021	EPA 200.8	Cadmium	J-	ICS
10565397	10565397001	LAO-SS-1-061021	EPA 200.8	Lead	UJ	ICS, RB
10565397	10565397002	LAO-SS-1-061421	EPA 200.8	Cadmium	J-	ICS
10565397	10565397002	LAO-SS-1-061421	EPA 200.8	Lead	UJ	ICS, RB
10566549	10566549002	LAO-SS-1-062121	EPA 200.8	Lead	J+	ICS
10567614	10567614001	LAO-SS-1-062421	EPA 200.8	Lead	J+	ICS

There were 4 natural data points qualified due to an exceedance of the %R for the LMS and/or LMSD (Reason Code = S%) as listed below:

SDG	Lab Sample ID	Field Sample ID	Method	Analyte	DV Flag	DV Reason Code
10559768	10559768002	LAO-SS-1-051021	SM 2320B	Alkalinity, Total as CaCO3	J-	S%
10559768	10559768002	LAO-SS-1-051021	SM 4500-NO3-H	Nitrogen, NO2 plus NO3	J-	S%
10565397	10565397002	LAO-SS-1-061421	SM 4500-NO3-H	Nitrogen, NO2 plus NO3	J-	S%
10565397	10565397002	LAO-SS-1-061421	ASTM D516-90-02	Sulfate	J+	S%

There were 8 natural data points qualified due to an exceedance of the %D for the SD (Reason Code = SD) as listed below:

SDG	Lab Sample ID	Field Sample ID	Method	Analyte	DV Flag	DV Reason Code
10554243	10554243001	LAO-SS-1-040121	EPA 200.8	Calcium	J	SD
10554243	10554243002	LAO-SS-1-040521	EPA 200.8	Calcium	J	SD
10565397	10565397001	LAO-SS-1-061021	EPA 200.8	Uranium	J	SD
10565397	10565397002	LAO-SS-1-061421	EPA 200.8	Uranium	J	SD
10566549	10566549001	LAO-SS-1-061721	EPA 200.8	Copper	J	SD
10566549	10566549001	LAO-SS-1-061721	EPA 200.8	Magnesium	J	SD
10566549	10566549002	LAO-SS-1-062121	EPA 200.8	Copper	J	SD
10566549	10566549002	LAO-SS-1-062121	EPA 200.8	Magnesium	J	SD

There were 7 natural data points qualified due to an exceedance of a rinsate blank (Reason Code = RB) as listed below:

SDG	Lab Sample ID	Field Sample ID	Method	Analyte	DV Flag	DV Reason Code
10556183	10556183001	LAO-SS-1-041521	EPA 200.8	Lead	U	RB
10556183	10556183002	LAO-SS-1-041921	EPA 200.8	Lead	U	RB
10559768	10559768001	LAO-SS-1-050621	EPA 200.8	Copper	UJ	RB, FD
10559768	10559768002	LAO-SS-1-051021	EPA 200.8	Copper	UJ	RB, FD
10565397	10565397001	LAO-SS-1-061021	EPA 200.8	Lead	UJ	ICS, RB
10565397	10565397002	LAO-SS-1-061421	EPA 200.8	Aluminum	U	RB
10565397	10565397002	LAO-SS-1-061421	EPA 200.8	Lead	UJ	ICS, RB

Note that there were 2 data points qualified for more than 1 indicator of accuracy (ICS and RB).

This resulted in 50 (8%) of the 622 natural data points associated with the natural samples collected that did not meet the accuracy requirements, and 572 (92%) of the 622 natural data points that did meet the accuracy requirements.

5.3 Representativeness

Representativeness is a qualitative parameter that is addressed through proper design of the sampling program. The sampling program defined in the QAPP was designed to determine if treated groundwater quality meets the end-of-pipe discharge standards at EFS-07 (LAO-SS-1) and the effectiveness of the BTL treatment system.

The laboratory results were reviewed, and a Stage 4 data validation completed. Based on information provided by Pace, the chain of custody requirements were met for each of the sample events. Preservation requirements were met for all samples and all samples were analyzed within the appropriate holding times except for the alkalinity analyses in SDG 10565397, and the low-level mercury analyses in 10559768. Results were qualified for the holding time exceedance and are considered usable as screening quality data. There were 16 natural data points qualified due to an exceedance of holding time (Reason Code = H) as listed below:

SDG	Lab Sample ID	Field Sample ID	Method	Analyte	DV Flag	DV Reason Code
10565397	10565397002	LAO-SS-1-061421	SM 2320B	Alkalinity, Total as CaCO3	J-	H
10565397	10565397002	LAO-SS-1-061421	SM 2320B	Alkalinity, Hydroxide (CaCO3)	UJ	H
10565397	10565397002	LAO-SS-1-061421	SM 2320B	Alkalinity, Bicarbonate (CaCO3)	J	H, FD
10565397	10565397002	LAO-SS-1-061421	SM 2320B	Alkalinity, Carbonate (CaCO3)	UJ	H, FD
10565397	10565397004	LAO-SS-2-061421	SM 2320B	Alkalinity, Total as CaCO3	J-	H
10565397	10565397004	LAO-SS-2-061421	SM 2320B	Alkalinity, Hydroxide (CaCO3)	UJ	H
10565397	10565397004	LAO-SS-2-061421	SM 2320B	Alkalinity, Bicarbonate (CaCO3)	J-	H
10565397	10565397004	LAO-SS-2-061421	SM 2320B	Alkalinity, Carbonate (CaCO3)	UJ	H
10565397	10565397005	LAO-SS-3-061421	SM 2320B	Alkalinity, Total as CaCO3	J-	H
10565397	10565397005	LAO-SS-3-061421	SM 2320B	Alkalinity, Hydroxide (CaCO3)	UJ	H
10565397	10565397005	LAO-SS-3-061421	SM 2320B	Alkalinity, Bicarbonate (CaCO3)	J-	H
10565397	10565397005	LAO-SS-3-061421	SM 2320B	Alkalinity, Carbonate (CaCO3)	UJ	H
10559768	10559768001	LAO-SS-1-050621	EPA 245.1	Mercury	J-	H, <RL
10559768	10559768002	LAO-SS-1-051021	EPA 245.1	Mercury	J-	H, <RL
10559768	10559768004	LAO-SS-2-051021	EPA 245.1	Mercury	J-	H
10559768	10559768005	LAO-SS-3-051021	EPA 245.1	Mercury	J-	H, <RL

The results were determined to be representative of the water quality present at BTL LAO during the quarter. The results can be used for evaluating compliance of the treated water with the appropriate performance standards.

5.4 Completeness

Completeness is assessed to determine if enough valid data have been collected to meet the investigation needs. Completeness is assessed by comparing the number of valid sample results to the number of sample results planned for the investigation. The completeness target for this investigation was 95% or greater as designated in the CFRSSI QAPP (ARCO, 1992b). Samples were collected twice weekly at EFS-07 (LAO-SS-1) and once weekly at INF-04 (LAO-SS-2) throughout the quarter. Samples were collected at 1 additional surface water site at MSD-HCC (LAO-SS-3) once a month. All the required samples were collected. Pace analyzed all the samples for the required analytes as listed in Table 2 of the QAPP. Additionally, there were 4 samples (LAO-SS-1-050621, LAO-SS-1-051021, LAO-SS-2-051021, and LAO-SS-3-051021) that had the standard mercury and the low-level mercury analyses performed as discussed in Section 5.6.

In total, 622 natural data points were generated by the sampling events. All the natural data points were usable as no sample results were rejected, 100% of the planned samples were collected, and 100% of the planned analyses were performed. This meets the 95% QA/QC completeness DQO listed in the CFRSSI QAPP (ARCO, 1992b).

5.5 Comparability

Comparability is assessed to determine if one set of data can be compared to another set of data. Comparisons are made by examining and comparing the laboratory and field methods used to acquire sample data for different distinct data sets. The data summarized in this report includes water samples collected by Pioneer and analyzed by Pace.

The water quality samples were collected using standard sampling methods and Pioneer SOPs. The sampling design, SOPs, and laboratory analytical methods are based on EPA and other industry standard practices and were documented in the field logbook.

Sample collection was completed by professionals who were properly trained in the SOPs and equipment use. Proper chain of custody and sample handling were observed during sample collection, delivery to the laboratory, and analysis. The analytical laboratories performed the sample analysis using industry standard methods.

Consequently, data from future surface water sampling events at BTL LAO using comparable sampling and analytical methods may be used in concert with this data set.

5.6 Sensitivity

Sensitivity is a quantitative measure and is evaluated by comparing the laboratory RL or the laboratory MDL to the project required detection limit.

To evaluate sensitivity, the required reporting limits (RRL) listed in the Montana Department of Environmental Quality (DEQ) Circular 7 (DEQ-7) (DEQ, 2019) for aluminum, arsenic, cadmium, copper, iron, lead, mercury, silver, zinc, and nitrogen (NO2 + NO3) are compared to the laboratory MDL. The remaining analytes (calcium, magnesium, uranium, hardness, total alkalinity, bicarbonate alkalinity, carbonate alkalinity, hydroxide alkalinity, TDS, TSS, and sulfate) have no RRL listed in a Montana Circular DEQ-7 and do not have Applicable or Relevant and Appropriate Requirements for this project.

The laboratory MDL met the RRL for all applicable analytes except nitrate (as NO2 + NO3). The RRL for nitrate (as NO2 + NO3) is 0.01 milligram per liter (mg/L) and the Pace MDL was 0.078 mg/L. All the natural sample results for nitrate (as NO2 + NO3) were detections above the MDL. The usability of sample results that had detectable levels of analytes is not affected by an MDL that is higher than the RRL. Additionally, the Montana Circular DEQ-7 human health standard for nitrate/nitrite is 10 mg/L; therefore, this MDL is considered low enough to meet project needs.

For the samples in SDG 10559768, Pace was unable to perform the low-level mercury analysis (MDL = 0.0047 micrograms per Liter [µg/L]) within the required hold time (28 days). Pace was instructed to perform the standard mercury analysis (MDL = 0.045 µg/L) within hold time and the low-level mercury analysis when possible. The low-level mercury analyses were performed with hold times of 32 and 29 days. The low-level mercury results for natural samples were all detections and were qualified "J-" for exceeding the hold time. The low-level mercury results for these samples were usable for the project and met the sensitivity requirement. The RRL for mercury (0.005 µg/L) was not met for the standard mercury analysis; however, the MDL for the standard mercury analysis was lower than Applicable or Relevant and Appropriate Requirements (ARAR) for mercury (0.05 µg/L) and are usable for the project. The samples, results, data validation qualifiers, and RRL and ARAR levels for mercury are summarized below:

	Mercury (µg/L)				Mercury, low-level (µg/L)				Mercury (µg/L)	
	MDL = 0.045 µg/L				MDL = 0.0047 µg/L					
Field Sample ID	Result	DV Flag	S/E	Reason Code	Result	DV Flag	S/E	Reason Code	RRL	ARAR
LAO-SS-1-050621	<0.045		E		0.007	J-	S	H, <RL	0.005	0.05
LAO-SS-1-051021	<0.045		E		0.007	J-	S	H, <RL	0.005	0.05
LAO-SS-2-051021	0.047	A	E	<RL	0.018	J-	S	H	0.005	0.05
LAO-SS-3-051021	<0.045		E		0.005	J-	S	H, <RL	0.005	0.05

For analytes without an RRL, the laboratory MDLs were consistent with anticipated MDLs listed in Table 2 of the QAPP; therefore, the sensitivity is considered low enough to meet project needs.

5.7 Overall Data Summary

The list following shows an overall summary of the validation performed on the data generated by Pace for the samples collected during the quarter sampling events.

	Total Natural		Level A/B	DV Flag J, J+, J-, or UJ	DV Flag R	DV Flag U or A	Enforcement Quality	Screening Quality	Rejected
Sample Location	Samples	Data Points	A/B	Data Points	Data Points	Data Points	Data Points (% of Total)	Data Points (% of Total)	Data Points (% of Total)
EFS-07 (LAO-SS-1)*	26	364	B	55	0	39	309	55	0
INF-04 (LAO-SS-2)	13	194	B	8	0	6	186	8	0
MSD-HCC (LAO-SS-3)	3	64	B	7	0	0	57	7	0
Total for Natural Samples	42	622	B	70	0	45	552	70	0

* Compliance sampling point

6.0 REFERENCES

AERL, 2000. Clark Fork River Superfund Site Investigations (CFRSSI) Data Management/Data Validation (DM/DV) Plan Addendum. Prepared for ARCO by Exponent, Lake Oswego, Oregon. June 2000.

ARCO, 1992a. Clark Fork River Superfund Site Investigations Data Management/Data Validation Plan, Atlantic Richfield Company, 1992.

ARCO, 1992b. Clark Fork River Superfund Site Investigation, Quality Assurance Project Plan, Atlantic Richfield Company, 1992.

Atlantic Richfield Company, 2021. Revised Draft Final Butte Treatment Lagoons (BTL) Groundwater Treatment System Routine Operations, Maintenance, and Monitoring (OM&M) Plan. June 17, 2021. Includes Butte Treatment Lagoons Groundwater Treatment System and BPSOU Subdrain Sampling and Monitoring Quality Assurance Project Plan (QAPP) as Appendix A.

DEQ, 2019. Circular DEQ-7 Montana Numeric Water Quality Standards Prepared by Montana Department of Environmental Quality Water Quality Planning Bureau, Water Quality Standards and Modeling Section. June 2019.

EPA, 2009. Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use. Environmental Protection Agency, January 2009.

EPA, 2016. EPA Contract Laboratory Program, Statement of Work for Inorganic Superfund Methods, Multi-Media, Multi-Concentration ISM02.4. U.S. Environmental Protection Agency, October 2016.

EPA, 2017. U.S. Environmental Protection Agency National Functional Guidelines for Inorganic Superfund Data Review, January 2017.

TABLES

Table A1. Analytical Results with Laboratory Qualifiers; Data Validation Qualifiers; Enforcement, Screening, and Rejected Classifications; and Data Validation Reason Codes

SDG			10554243					10554243					10554243					10555104					10555104					10555104				
Field Sample ID			LAO-SS-1-040121					LAO-SS-1-040521					LAO-SS-2-040521					LAO-SS-1-040821					LAO-SS-1-041221					LAO-SS-2-041221				
Lab Sample ID			10554243001					10554243002					10554243003					10555104001					10555104002					10555104003				
Sample Date			4/1/2021					4/5/2021					4/5/2021					4/8/2021					4/12/2021					4/12/2021				
Sample Type			Natural					Natural					Natural					Natural					Natural					Natural				
Analyte	Method	Units	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code
Aluminum	EPA 200.8	mg/l	0.027			E		0.02			E		0.12			E		0.015	J	A	E	<RL	0.008	J	A	E	<RL	0.087			E	
Arsenic	EPA 200.8	mg/l	0.0074			E		0.0073			E		0.027			E		0.0096			E		0.011			E		0.026			E	
Cadmium	EPA 200.8	mg/l	0.0003			E		0.0002			E		0.014			E		0.00026		J+	S	ICS	0.00021		J+	S	ICS	0.015			E	
Calcium	EPA 200.8	mg/l	107	P6	J	S	SD	99.1		J	S	SD	129			E		114	P6		E		105			E		125			E	
Copper	EPA 200.8	mg/l	0.015			E		0.01			E		0.58			E		0.016			E		0.012			E		0.53			E	
Iron	EPA 200.8	mg/l	0.03	J	A	E	<RL	0.014	J	A	E	<RL	2.2			E		0.04	J	A	E	<RL	0.016	J	A	E	<RL	1.9			E	
Lead	EPA 200.8	mg/l	0.00026		J+	S	ICS	0.0002		J+	S	ICS	0.015			E		0.00042			E		0.00019			E		0.007			E	
Magnesium	EPA 200.8	mg/l	35.6	P6		E		32.5			E		35.9			E		36.5	P6		E		36			E		36.1			E	
Mercury (low-level)	EPA 245.1	mg/l	0.000007	J,B	A	E	<RL	0.000005	J,B	A	E	<RL	0.000054			E		<0.0000045	U		E		<0.0000045	U		E		0.000024			E	
Silver	EPA 200.8	mg/l	<0.000077	U		E		<0.000077	U		E		<0.000077	U		E		<0.000077	U		E		<0.000077	U		E		<0.000077	U		E	
Uranium	EPA 200.8	mg/l	0.0088			E		0.008			E		0.013			E		0.0098			E		0.0093			E		0.013			E	
Zinc	EPA 200.8	mg/l	0.071			E		0.047		J+	S	ICS	4.3			E		0.074			E		0.05			E		4.6			E	
Total Hardness by 2340B	EPA 200.8	mg/l	415			E		382			E		470			E		434			E		410			E		460			E	
Alkalinity, Total as CaCO3	SM 2320B	mg/l																														
Alkalinity, Bicarbonate (CaCO3)	SM 2320B	mg/l																														
Alkalinity, Carbonate (CaCO3)	SM 2320B	mg/l																														
Alkalinity, Hydroxide (CaCO3)	SM 2320B	mg/l																														
Total Dissolved Solids	SM 2540C	mg/l																														
Total Suspended Solids	SM 2540D	mg/l																														
Nitrogen, NO2 plus NO3	SM 4500-NO3-H	mg/l																														
Sulfate	ASTM D516-90-02	mg/l																														
Mercury	EPA 245.1	mg/l																														

Notes:

Flag and Reason Codes are defined in Table A5.

< - Not detected at the method detection limit.

Abbreviations:

SDG = Sample Delivery Group

mg/l - milligram per liter

Table A1. Analytical Results with Laboratory Qualifiers; Data Validation Qualifiers; Enforcement, Screening, and Rejected Classifications; and Data Validation Reason Codes

		SDG	10556183					10556183					10556183					10556183					10557202					10557202							
		Field Sample ID	LAO-SS-1-041521					LAO-SS-1-041921					LAO-SS-2-041921					LAO-SS-3-041921					LAO-SS-1-042221					LAO-SS-1-042621							
		Lab Sample ID	10556183001					10556183002					10556183004					10556183005					10557202001					10557202002							
		Sample Date	4/15/2021					4/19/2021					4/19/2021					4/19/2021					4/22/2021					4/26/2021							
		Sample Type	Natural					Natural					Natural					Natural					Natural					Natural							
Analyte	Method	Units	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code			
Aluminum	EPA 200.8	mg/l	0.014	J	A	E	<RL	0.017	J	A	E	<RL	0.12			E		0.26			E		0.025			E		0.0088	J	A	E	<RL			
Arsenic	EPA 200.8	mg/l	0.011			E		0.0094			E		0.027			E		0.0048			E		0.009			E		0.0068			E				
Cadmium	EPA 200.8	mg/l	0.00021			E		0.00027			E		0.015			E		0.032			E		0.00028		J-	S	ICS	0.00022		J-	S	ICS			
Calcium	EPA 200.8	mg/l	116			E		112	P6		E		138			E		130			E		116	P6		E		110			E				
Copper	EPA 200.8	mg/l	0.011			E		0.014			E		0.71			E		2			E		0.019			E		0.013			E				
Iron	EPA 200.8	mg/l	0.014	J	A	E	<RL	0.039	J	A	E	<RL	2.5			E		6.8			E		0.067			E		0.022	J	A	E	<RL			
Lead	EPA 200.8	mg/l	0.00017	B	U	E	RB	0.00031	B	U	E	RB	0.0082			E		0.0018			E		0.00041			E		0.00024			E				
Magnesium	EPA 200.8	mg/l	38			E		36	P6		E		37			E		35.5			E		37.4	P6		E		36.1			E				
Mercury (low-level)	EPA 245.1	mg/l	<0.0000045	U	UJ	S	CCV	0.000005	J	J-	S	CCV, <RL	0.000036			E		<0.0000045	U		E		<0.0000045	U		E		<0.0000045	U		E				
Silver	EPA 200.8	mg/l	<0.000077	U		E		<0.000077	U		E		<0.000077	U		E		<0.000077	U		E		<0.000077	U		E		<0.000077	U		E				
Uranium	EPA 200.8	mg/l	0.0097			E		0.0086			E		0.014			E		0.012			E		0.0088			E		0.0079			E				
Zinc	EPA 200.8	mg/l	0.053			E		0.07			E		4.9			E		7.1			E		0.093			E		0.066			E				
Total Hardness by 2340B	EPA 200.8	mg/l	447			E		427			E		497			E		471			E		443			E		422			E				
Alkalinity, Total as CaCO3	SM 2320B	mg/l						54.5			E		123			E		77.2			E														
Alkalinity, Bicarbonate (CaCO3)	SM 2320B	mg/l						10.3		J	S	FD	123			E		77.2			E														
Alkalinity, Carbonate (CaCO3)	SM 2320B	mg/l						44.2			E		<2	U		E		<2	U		E														
Alkalinity, Hydroxide (CaCO3)	SM 2320B	mg/l						<2	U		E		<2	U		E		<2	U		E														
Total Dissolved Solids	SM 2540C	mg/l						708			E		764			E		826			E														
Total Suspended Solids	SM 2540D	mg/l						13.5	D6		E		9.2	J	A	E	<RL	15.8			E														
Nitrogen, NO2 plus NO3	SM 4500-NO3-H	mg/l						1.8			E		2			E		2.7			E														
Sulfate	ASTM D516-90-02	mg/l						344		J-	S	ICV, CCV	346		J-	S	ICV, CCV	431		J-	S	ICV, CCV													
Mercury	EPA 245.1	mg/l																																

Notes:

Flag and Reason Codes are defined in Table A5.

< - Not detected at the method detection limit.

Abbreviations:

SDG = Sample Delivery Group

mg/l - milligram per liter

Table A1. Analytical Results with Laboratory Qualifiers; Data Validation Qualifiers; Enforcement, Screening, and Rejected Classifications; and Data Validation Reason Codes

		SDG	10557202					10558433					10558433					10558433					10559768					10559768				
		Field Sample ID	LAO-SS-2-042621					LAO-SS-1-042921					LAO-SS-1-050321					LAO-SS-2-050321					LAO-SS-1-050621					LAO-SS-1-051021				
		Lab Sample ID	10557202003					10558433001					10558433002					10558433003					10559768001					10559768002				
		Sample Date	4/26/2021					4/29/2021					5/3/2021					5/3/2021					5/6/2021					5/10/2021				
		Sample Type	Natural					Natural					Natural					Natural					Natural					Natural				
Analyte	Method	Units	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code
Aluminum	EPA 200.8	mg/l	0.11			E		<0.0071	U		E		<0.0071	U		E		0.1			E		0.018	J	J	S	FD, <RL	0.012	J	J	S	FD, <RL
Arsenic	EPA 200.8	mg/l	0.027			E		0.0057			E		0.0058			E		0.025			E		0.0057			E		0.0061			E	
Cadmium	EPA 200.8	mg/l	0.015			E		0.0002			E		0.00018		J-	S	ICS	0.014			E		0.00022		J+	S	ICS	0.00019		J+	S	ICS
Calcium	EPA 200.8	mg/l	141			E		105	P6		E		105			E		132			E		102			E		115	P6		E	
Copper	EPA 200.8	mg/l	0.71			E		0.013			E		0.013			E		0.59			E		0.016		UJ	S	RB, FD	0.013		UJ	S	RB, FD
Iron	EPA 200.8	mg/l	2.4			E		0.021	J	A	E	<RL	0.024	J	A	E	<RL	2.1			E		0.048	J	A	E	<RL	0.039	J	A	E	<RL
Lead	EPA 200.8	mg/l	0.0099			E		0.00016			E		0.00022			E		0.0082			E		0.00053		J	S	ICS, FD	0.00028		J	S	ICS, FD
Magnesium	EPA 200.8	mg/l	39			E		34.6	P6,M1		E		34.9			E		36.8			E		33.5			E		37.5	P6		E	
Mercury (low-level)	EPA 245.1	mg/l	0.000027			E		0.000012	B		E		0.000012	B		E		0.000023	B		E		0.000007	J,H1,H2	J-	S	H, <RL	0.000007	J,H1	J-	S	H, <RL
Silver	EPA 200.8	mg/l	<0.000077	U		E		<0.000077	U		E		<0.000077	U		E		<0.000077	U		E		<0.000077	U		E		<0.000077	U		E	
Uranium	EPA 200.8	mg/l	0.014			E		0.0075			E		0.0069			E		0.013			E		0.007			E		0.0076			E	
Zinc	EPA 200.8	mg/l	5.2			E		0.055			E		0.05			E		4.3			E		0.061		J	S	FD	0.048		J	S	FD
Total Hardness by 2340B	EPA 200.8	mg/l	513			E		406			E		407			E		482			E		392			E		442			E	
Alkalinity, Total as CaCO3	SM 2320B	mg/l																										45.7	M1	J-	S	S%
Alkalinity, Bicarbonate (CaCO3)	SM 2320B	mg/l																										32.8		J	S	FD
Alkalinity, Carbonate (CaCO3)	SM 2320B	mg/l																										12.9		J	S	FD
Alkalinity, Hydroxide (CaCO3)	SM 2320B	mg/l																										<2	U		E	
Total Dissolved Solids	SM 2540C	mg/l																										728			E	
Total Suspended Solids	SM 2540D	mg/l																										<5	U		E	
Nitrogen, NO2 plus NO3	SM 4500-NO3-H	mg/l																										1.6	M1	J-	S	S%
Sulfate	ASTM D516-90-02	mg/l																										308	M6		E	
Mercury	EPA 245.1	mg/l																					<0.000045	U,MD		E		<0.000045	U,MD		E	

Notes:

Flag and Reason Codes are defined in Table A5.

< - Not detected at the method detection limit.

Abbreviations:

SDG = Sample Delivery Group

mg/l - milligram per liter

Table A1. Analytical Results with Laboratory Qualifiers; Data Validation Qualifiers; Enforcement, Screening, and Rejected Classifications; and Data Validation Reason Codes

		SDG	10559768					10559768					10560663					10560663					10560663					10562085				
		Field Sample ID	LAO-SS-2-051021					LAO-SS-3-051021					LAO-SS-1-051321					LAO-SS-1-051721					LAO-SS-2-051721					LAO-SS-1-052021				
		Lab Sample ID	10559768004					10559768005					10560663001					10560663002					10560663003					10562085001				
		Sample Date	5/10/2021					5/10/2021					5/13/2021					5/17/2021					5/17/2021					5/20/2021				
		Sample Type	Natural					Natural					Natural					Natural					Natural					Natural				
Analyte	Method	Units	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code
Aluminum	EPA 200.8	mg/l	0.11			E		0.22			E		0.012	J	A	E	<RL	<0.0071	U		E		0.33			E		0.0076	J	A	E	<RL
Arsenic	EPA 200.8	mg/l	0.028			E		0.0039			E		0.006			E		0.0061			E		0.064			E		0.0059			E	
Cadmium	EPA 200.8	mg/l	0.015			E		0.029			E		0.00024		J-	S	ICS	0.00014		J-	S	ICS	0.016			E		0.00012			E	
Calcium	EPA 200.8	mg/l	131			E		125			E		109			E		108			E		140			E		101	M6		E	
Copper	EPA 200.8	mg/l	0.68			E		1.8			E		0.014			E		0.011			E		1.4			E		0.0093			E	
Iron	EPA 200.8	mg/l	2.3			E		5.6			E		0.029	J	A	E	<RL	0.015	J	A	E	<RL	5.9			E		0.013	J	A	E	<RL
Lead	EPA 200.8	mg/l	0.0071			E		0.0014			E		0.00037			E		0.00016			E		0.023			E		0.00013		J+	S	ICS
Magnesium	EPA 200.8	mg/l	36.2			E		34.2			E		35.5			E		35.4			E		37.2			E		32.8			E	
Mercury (low-level)	EPA 245.1	mg/l	0.000018	H1	J-	S	H	0.000005	J,H1	J-	S	H, <RL	<0.0000047	U		E		<0.0000047	U		E		0.0001			E		<0.0000047	U		E	
Silver	EPA 200.8	mg/l	<0.000077	U		E		<0.000077	U		E		0.00012	J	A	E	<RL	<0.000077	U		E		0.00011	J	A	E	<RL	<0.000077	U		E	
Uranium	EPA 200.8	mg/l	0.014			E		0.012			E		0.0067			E		0.0063			E		0.015			E		0.0056			E	
Zinc	EPA 200.8	mg/l	4.9			E		6.8			E		0.063			E		0.042			E		5.5			E		0.032			E	
Total Hardness by 2340B	EPA 200.8	mg/l	477			E		454			E		420			E		414			E		502			E		388			E	
Alkalinity, Total as CaCO3	SM 2320B	mg/l	121			E		78.9			E																					
Alkalinity, Bicarbonate (CaCO3)	SM 2320B	mg/l	121			E		78.9			E																					
Alkalinity, Carbonate (CaCO3)	SM 2320B	mg/l	<2	U		E		<2	U		E																					
Alkalinity, Hydroxide (CaCO3)	SM 2320B	mg/l	<2	U		E		<2	U		E																					
Total Dissolved Solids	SM 2540C	mg/l	798			E		820			E																					
Total Suspended Solids	SM 2540D	mg/l	6.6	J	A	E	<RL	10.7			E																					
Nitrogen, NO2 plus NO3	SM 4500-NO3-H	mg/l	1.5			E		2.5			E																					
Sulfate	ASTM D516-90-02	mg/l	322		J-	S	CCV	367		J-	S	CCV																				
Mercury	EPA 245.1	mg/l	0.000047	J,1M	A	E	<RL	<0.000045	U,MD		E																					

Notes:

Flag and Reason Codes are defined in Table A5.

< - Not detected at the method detection limit.

Abbreviations:

SDG = Sample Delivery Group

mg/l - milligram per liter

Table A1. Analytical Results with Laboratory Qualifiers; Data Validation Qualifiers; Enforcement, Screening, and Rejected Classifications; and Data Validation Reason Codes

SDG			10562085					10562085					10563551					10563551					10563551					10564213				
Field Sample ID			LAO-SS-1-052421					LAO-SS-2-052421					LAO-SS-1-052721					LAO-SS-1-060121					LAO-SS-2-060121					LAO-SS-1-060321				
Lab Sample ID			10562085002					10562085003					10563551001					10563551002					10563551003					10564213001				
Sample Date			5/24/2021					5/24/2021					5/27/2021					6/1/2021					6/1/2021					6/3/2021				
Sample Type			Natural					Natural					Natural					Natural					Natural					Natural				
Analyte	Method	Units	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code
Aluminum	EPA 200.8	mg/l	<0.0071	U		E		0.085			E		0.025			E		0.0073	J	A	E	<RL	0.043			E		0.013	J	A	E	<RL
Arsenic	EPA 200.8	mg/l	0.0057			E		0.024			E		0.0056			E		0.0056			E		0.023			E		0.0055			E	
Cadmium	EPA 200.8	mg/l	0.00018		J+	S	ICS	0.013			E		0.00018			E		0.00016			E		0.011			E		0.00024		J+	S	ICS
Calcium	EPA 200.8	mg/l	97.9			E		116			E		98.1	P6		E		97.8			E		126			E		102			E	
Copper	EPA 200.8	mg/l	0.011			E		0.45			E		0.014			E		0.011			E		0.37			E		0.013			E	
Iron	EPA 200.8	mg/l	0.016	J	A	E	<RL	1.3			E		0.029	J	A	E	<RL	0.027	J	A	E	<RL	1.1			E		0.025	J	A	E	<RL
Lead	EPA 200.8	mg/l	0.00024		J+	S	ICS	0.005			E		0.00038			E		0.00023			E		0.0038			E		0.00031			E	
Magnesium	EPA 200.8	mg/l	30.6			E		31			E		31.1	P6		E		31.3			E		32.8			E		31.8			E	
Mercury (low-level)	EPA 245.1	mg/l	<0.0000047	U		E		0.00001			E		0.000006	J	A	E	<RL	<0.0000047	U		E		0.000016			E		0.000008	J	A	E	<RL
Silver	EPA 200.8	mg/l	<0.000077	U		E		<0.000077	U		E		<0.000077	U		E		<0.000077	U		E		<0.000077	U		E		<0.000077	U		E	
Uranium	EPA 200.8	mg/l	0.0069			E		0.014			E		0.007			E		0.0069			E		0.017			E		0.0055			E	
Zinc	EPA 200.8	mg/l	0.04			E		3.9			E		0.053			E		0.033			E		3.4			E		0.055			E	
Total Hardness by 2340B	EPA 200.8	mg/l	370			E		418			E		373			E		373			E		449			E		386			E	
Alkalinity, Total as CaCO3	SM 2320B	mg/l																														
Alkalinity, Bicarbonate (CaCO3)	SM 2320B	mg/l																														
Alkalinity, Carbonate (CaCO3)	SM 2320B	mg/l																														
Alkalinity, Hydroxide (CaCO3)	SM 2320B	mg/l																														
Total Dissolved Solids	SM 2540C	mg/l																														
Total Suspended Solids	SM 2540D	mg/l																														
Nitrogen, NO2 plus NO3	SM 4500-NO3-H	mg/l																														
Sulfate	ASTM D516-90-02	mg/l																														
Mercury	EPA 245.1	mg/l																														

Notes:

Flag and Reason Codes are defined in Table A5.

< - Not detected at the method detection limit.

Abbreviations:

SDG = Sample Delivery Group

mg/l - milligram per liter

Table A1. Analytical Results with Laboratory Qualifiers; Data Validation Qualifiers; Enforcement, Screening, and Rejected Classifications; and Data Validation Reason Codes

		SDG	10564213					10564213					10565397					10565397					10565397					10565397				
		Field Sample ID	LAO-SS-1-060721					LAO-SS-2-060721					LAO-SS-1-061021					LAO-SS-1-061421					LAO-SS-2-061421					LAO-SS-3-061421				
		Lab Sample ID	10564213002					10564213003					10565397001					10565397002					10565397004					10565397005				
		Sample Date	6/7/2021					6/7/2021					6/10/2021					6/14/2021					6/14/2021					6/14/2021				
		Sample Type	Natural					Natural					Natural					Natural					Natural					Natural				
Analyte	Method	Units	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code
Aluminum	EPA 200.8	mg/l	<0.0071	U		E		0.091			E		<0.0071	U		E		0.026		U	E	RB	0.065			E		0.17			E	
Arsenic	EPA 200.8	mg/l	0.0056			E		0.031			E		0.0053			E		0.0052			E		0.029			E		0.0043			E	
Cadmium	EPA 200.8	mg/l	0.00013		J+	S	ICS	0.013			E		0.00015		J-	S	ICS	0.0002		J-	S	ICS	0.012			E		0.025			E	
Calcium	EPA 200.8	mg/l	104	P6		E		140			E		98.7			E		91.3	P6		E		124			E		113			E	
Copper	EPA 200.8	mg/l	0.011			E		0.56			E		0.011			E		0.016			E		0.46			E		1.5			E	
Iron	EPA 200.8	mg/l	0.063			E		1.7			E		0.013	J	A	E	<RL	0.044	J	A	E	<RL	1.3			E		4.7			E	
Lead	EPA 200.8	mg/l	0.00018			E		0.0073			E		0.00018		UJ	S	ICS, RB	0.00053		UJ	S	ICS, RB	0.0058			E		0.0013			E	
Magnesium	EPA 200.8	mg/l	32.2	P6		E		35.8			E		32.6			E		33.5	P6		E		35.6			E		34.7			E	
Mercury (low-level)	EPA 245.1	mg/l	0.000006	J	A	E	<RL	0.000029			E		<0.0000047	U		E		0.000006	J	A	E	<RL	0.000024			E		<0.0000047	U		E	
Silver	EPA 200.8	mg/l	<0.000077	U		E		0.000099	J,B	A	E	<RL	<0.000077	U		E		<0.000077	U		E		<0.000077	U		E		<0.000077	U		E	
Uranium	EPA 200.8	mg/l	0.0053			E		0.014			E		0.0051		J	S	SD	0.0052		J	S	SD	0.014			E		0.012			E	
Zinc	EPA 200.8	mg/l	0.03			E		4			E		0.036			E		0.059			E		3.6			E		5.5			E	
Total Hardness by 2340B	EPA 200.8	mg/l	391			E		496			E		381			E		366			E		457			E		426			E	
Alkalinity, Total as CaCO3	SM 2320B	mg/l																35.7	H5	J-	S	H	109	H5	J-	S	H	81.4	H5	J-	S	H
Alkalinity, Bicarbonate (CaCO3)	SM 2320B	mg/l																35.7	H5	J	S	H, FD	109	H5	J-	S	H	81.4	H5	J-	S	H
Alkalinity, Carbonate (CaCO3)	SM 2320B	mg/l																<1.8	U,H5	UJ	S	H, FD	<1.8	U,H5	UJ	S	H	<1.8	U,H5	UJ	S	H
Alkalinity, Hydroxide (CaCO3)	SM 2320B	mg/l																<1.8	U,H5	UJ	S	H	<1.8	U,H5	UJ	S	H	<1.8	U,H5	UJ	S	H
Total Dissolved Solids	SM 2540C	mg/l																700			E		758			E		840			E	
Total Suspended Solids	SM 2540D	mg/l																<5	U		E		5.7	J	A	E	<RL	12			E	
Nitrogen, NO2 plus NO3	SM 4500-NO3-H	mg/l																1.4	M1	J-	S	S%	1.4			E		2.6			E	
Sulfate	ASTM D516-90-02	mg/l																302	M1	J+	S	S%	292			E		354			E	
Mercury	EPA 245.1	mg/l																														

Notes:

Flag and Reason Codes are defined in Table A5.

< - Not detected at the method detection limit.

Abbreviations:

SDG = Sample Delivery Group

mg/l - milligram per liter

Table A1. Analytical Results with Laboratory Qualifiers; Data Validation Qualifiers; Enforcement, Screening, and Rejected Classifications; and Data Validation Reason Codes

		SDG	10566549					10566549					10566549					10567614					10567614					10567614				
		Field Sample ID	LAO-SS-1-061721					LAO-SS-1-062121					LAO-SS-2-062121					LAO-SS-1-062421					LAO-SS-1-062821					LAO-SS-2-062821				
		Lab Sample ID	10566549001					10566549002					10566549003					10567614001					10567614002					10567614003				
		Sample Date	6/17/2021					6/21/2021					6/21/2021					6/24/2021					6/28/2021					6/28/2021				
		Sample Type	Natural					Natural					Natural					Natural					Natural					Natural				
Analyte	Method	Units	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code	Result	Lab Flag	DV Flag	S/E	Reason Code
Aluminum	EPA 200.8	mg/l	0.038			E		0.033			E		0.085			E		0.021			E		0.036			E		0.038			E	
Arsenic	EPA 200.8	mg/l	0.0046			E		0.0046			E		0.029			E		0.0046			E		0.0046			E		0.023			E	
Cadmium	EPA 200.8	mg/l	0.00026			E		0.00021			E		0.015			E		0.00018			E		0.00022			E		0.01			E	
Calcium	EPA 200.8	mg/l	95.8	P6		E		100			E		124			E		96.9	P6		E		91.9			E		114			E	
Copper	EPA 200.8	mg/l	0.023		J	S	SD	0.015		J	S	SD	0.6			E		0.012			E		0.015			E		0.3		J	S	CL
Iron	EPA 200.8	mg/l	0.058	B		E		0.053	B		E		2.4			E		0.03	J	A	E	<RL	0.056			E		1.3			E	
Lead	EPA 200.8	mg/l	0.0011			E		0.00078		J+	S	ICS	0.0057			E		0.00038		J+	S	ICS	0.00073			E		0.0034			E	
Magnesium	EPA 200.8	mg/l	27.3	P6	J	S	SD	28.3		J	S	SD	29			E		34.9	P6		E		32.7			E		35.7			E	
Mercury (low-level)	EPA 245.1	mg/l	0.00002			E		0.00001			E		0.000027			E		0.000007	J	A	E	<RL	0.00001			E		0.000015			E	
Silver	EPA 200.8	mg/l	<0.000077	U		E		<0.000077	U		E		<0.000077	U		E		<0.000077	U		E		<0.000077	U		E		<0.000077	U		E	
Uranium	EPA 200.8	mg/l	0.004			E		0.0036			E		0.013			E		0.0035			E		0.0032			E		0.012			E	
Zinc	EPA 200.8	mg/l	0.072			E		0.06			E		3.8			E		0.051			E		0.066			E		3.1			E	
Total Hardness by 2340B	EPA 200.8	mg/l	351			E		367			E		428			E		386			E		364			E		433			E	
Alkalinity, Total as CaCO3	SM 2320B	mg/l																														
Alkalinity, Bicarbonate (CaCO3)	SM 2320B	mg/l																														
Alkalinity, Carbonate (CaCO3)	SM 2320B	mg/l																														
Alkalinity, Hydroxide (CaCO3)	SM 2320B	mg/l																														
Total Dissolved Solids	SM 2540C	mg/l																														
Total Suspended Solids	SM 2540D	mg/l																														
Nitrogen, NO2 plus NO3	SM 4500-NO3-H	mg/l																														
Sulfate	ASTM D516-90-02	mg/l																														
Mercury	EPA 245.1	mg/l																														

Notes:

Flag and Reason Codes are defined in Table A5.

< - Not detected at the method detection limit.

Abbreviations:

SDG = Sample Delivery Group

mg/l - milligram per liter

Table A2. Field Duplicate Pair Samples with Results, Laboratory Flags, Data Validation Qualifiers, Data Validation Reason Codes, and QC Criteria Calculations

SDG			10556183						10556183									
Field Sample ID			LAO-SS-1-041921						LAO-SS-1T-041921									
Lab Sample ID			10556183002						10556183003									
Sample Date			4/19/2021						4/19/2021									
Sample Type			Natural Sample						Field Duplicate									
Analyte	Method	Units	Result	Lab Flag	DV Flag	Reason Code	DF	RL	Result	Lab Flag	DV Flag	Reason Code	DF	RL	Control Limit[1]	ABS DIF	RPD	Meets Control Limit?
Aluminum	EPA 200.8	mg/l	0.017	J	A	<RL	1	0.02	0.012	J	A	<RL	1	0.02	ABS DIF≤RL	0.005		Yes
Arsenic	EPA 200.8	mg/l	0.0094				1	0.0005	0.0094				1	0.0005	RPD≤20%		0%	Yes
Cadmium	EPA 200.8	mg/l	0.00027				1	0.00008	0.00023				1	0.00008	ABS DIF≤RL	0.00004		Yes
Calcium	EPA 200.8	mg/l	112	P6			20	0.8	112				20	0.8	RPD≤20%		0%	Yes
Copper	EPA 200.8	mg/l	0.014				1	0.001	0.013				1	0.001	RPD≤20%		7%	Yes
Iron	EPA 200.8	mg/l	0.039	J	A	<RL	1	0.05	0.026	J	A	<RL	1	0.05	ABS DIF≤RL	0.013		Yes
Lead	EPA 200.8	mg/l	0.00031	B	U	RB	1	0.0001	0.00023	B	U	RB	1	0.0001	ABS DIF≤RL	0.00008		Yes
Magnesium	EPA 200.8	mg/l	36	P6			20	0.2	36.5				20	0.2	RPD≤20%		1%	Yes
Mercury	EPA 245.1	mg/l	0.000005	J	J-	CCV, <RL	1	0.00001	<0.0000045	U	UJ	CCV	1	0.00001	ABS DIF≤RL	5E-07		Yes
Silver	EPA 200.8	mg/l	<0.000077	U			1	0.0005	<0.000077	U			1	0.0005	ABS DIF≤RL	both U		Yes
Uranium	EPA 200.8	mg/l	0.0086				1	0.0005	0.0088				1	0.0005	RPD≤20%		2%	Yes
Zinc	EPA 200.8	mg/l	0.07				1	0.005	0.059				1	0.005	RPD≤20%		17%	Yes
Total Hardness by 2340B	EPA 200.8	mg/l	427				20	2.8	431				20	2.8	RPD≤20%		1%	Yes
Alkalinity, Total as CaCO3	SM 2320B	mg/l	54.5				1	5	54				1	5	RPD≤20%		1%	Yes
Alkalinity, Bicarbonate (CaCO3)	SM 2320B	mg/l	10.3		J	FD	1	5	3.3	J	J	FD, <RL	1	5	ABS DIF≤RL	7		ABS DIFF>RL
Alkalinity, Carbonate (CaCO3)	SM 2320B	mg/l	44.2				1	5	50.7				1	5	RPD≤20%		14%	Yes
Alkalinity, Hydroxide (CaCO3)	SM 2320B	mg/l	<2	U			1	5	<2	U			1	5	ABS DIF≤RL	both U		Yes
Total Dissolved Solids	SM 2540C	mg/l	708				1	20	716				1	20	RPD≤20%		1%	Yes
Total Suspended Solids	SM 2540D	mg/l	13.5	D6			1	10	<5	U			1	10	ABS DIF≤RL	8.5		Yes
Nitrogen, NO2 plus NO3	SM 4500-NO3-H	mg/l	1.8				1	0.2	1.9				1	0.2	RPD≤20%		5%	Yes
Sulfate	ASTM D516-90-02	mg/l	344		J-	ICV, CCV	10	25	343		J-	ICV, CCV	10	25	RPD≤20%		0%	Yes

Notes:

Flag and Reason Codes are defined in Table A5.

< - Not detected at the method detection limit.

The qualifications made to the field duplicate samples (DV Flag/Reason Code) are not included in the summary of qualifications made to natural samples discussed in the Data Validation Report.

Abbreviations:

SDG = Sample Delivery Group
DF - dilution factor
RL - reporting limit
ABS DIF - absolute difference
RPD - relative percent difference
mg/l - milligram per liter

Footnotes:

1. If the control limit is an absolute difference less than the repoting limit, the minimum reporting limit will be used if the samples have varying dilution factors.

Table A2. Field Duplicate Pair Samples with Results, Laboratory Flags, Data Validation Qualifiers, Data Validation Reason Codes, and QC Criteria Calculations

SDG			10559768						10559768									
Field Sample ID			LAO-SS-1-051021						LAO-SS-1T-051021									
Lab Sample ID			10559768002						10559768003									
Sample Date			5/10/2021						5/10/2021									
Sample Type			Natural Sample						Field Duplicate									
Analyte	Method	Units	Result	Lab Flag	DV Flag	Reason Code	DF	RL	Result	Lab Flag	DV Flag	Reason Code	DF	RL	Control Limit[1]	ABS DIF	RPD	Meets Control Limit?
Aluminum	EPA 200.8	mg/l	0.012	J	J	FD, <RL	1	0.02	0.033		J	FD	1	0.02	ABS DIF≤RL	0.021		ABS DIFF>RL
Arsenic	EPA 200.8	mg/l	0.0061				1	0.0005	0.0058				1	0.0005	RPD≤20%		5%	Yes
Cadmium	EPA 200.8	mg/l	0.00019		J+	ICS	1	0.00008	0.00025		J+	ICS	1	0.00008	ABS DIF≤RL	0.00006		Yes
Calcium	EPA 200.8	mg/l	115	P6			20	0.8	107				10	0.4	RPD≤20%		7%	Yes
Copper	EPA 200.8	mg/l	0.013		UJ	RB, FD	1	0.001	0.016		UJ	RB, FD	1	0.001	RPD≤20%		21%	RPD>20%
Iron	EPA 200.8	mg/l	0.039	J	A	<RL	1	0.05	0.051				1	0.05	ABS DIF≤RL	0.012		Yes
Lead	EPA 200.8	mg/l	0.00028		J	ICS, FD	1	0.0001	0.00052		J	ICS, FD	1	0.0001	ABS DIF≤RL	0.00024		ABS DIFF>RL
Magnesium	EPA 200.8	mg/l	37.5	P6			20	0.2	34.6				10	0.1	RPD≤20%		8%	Yes
Mercury	EPA 245.1	mg/l	<0.000045	U,MD			1	0.0002	<0.000045	U,MD			1	0.0002	ABS DIF≤RL	both U		Yes
Silver	EPA 200.8	mg/l	<0.000077	U			1	0.0005	<0.000077	U			1	0.0005	ABS DIF≤RL	both U		Yes
Uranium	EPA 200.8	mg/l	0.0076				1	0.0005	0.0069				1	0.0005	RPD≤20%		10%	Yes
Zinc	EPA 200.8	mg/l	0.048		J	FD	1	0.005	0.062		J	FD	1	0.005	RPD≤20%		25%	RPD>20%
Total Hardness by 2340B	EPA 200.8	mg/l	442				20	2.8	411				10	1.4	RPD≤20%		7%	Yes
Alkalinity, Total as CaCO3	SM 2320B	mg/l	45.7	M1	J-	S%	1	5	46.9		J-	S%	1	5	RPD≤20%		3%	Yes
Alkalinity, Bicarbonate (CaCO3)	SM 2320B	mg/l	32.8		J	FD	1	5	11.3		J	FD	1	5	ABS DIF≤RL	21.5		ABS DIFF>RL
Alkalinity, Carbonate (CaCO3)	SM 2320B	mg/l	12.9		J	FD	1	5	35.6		J	FD	1	5	ABS DIF≤RL	22.7		ABS DIFF>RL
Alkalinity, Hydroxide (CaCO3)	SM 2320B	mg/l	<2	U			1	5	<2	U			1	5	ABS DIF≤RL	both U		Yes
Total Dissolved Solids	SM 2540C	mg/l	728				1	20	716				1	20	RPD≤20%		2%	Yes
Total Suspended Solids	SM 2540D	mg/l	<5	U			1	10	<5	U			1	10	ABS DIF≤RL	both U		Yes
Nitrogen, NO2 plus NO3	SM 4500-NO3-H	mg/l	1.6	M1	J-	S%	1	0.2	1.4		J-	S%	1	0.2	RPD≤20%		13%	Yes
Sulfate	ASTM D516-90-02	mg/l	308	M6			25	62.5	311				10	25	ABS DIF≤RL	3		Yes

Notes:

Flag and Reason Codes are defined in Table A5.

< - Not detected at the method detection limit.

The qualifications made to the field duplicate samples (DV Flag/Reason Code) are not included in the summary of qualifications made to natural samples discussed in the Data Validation Report.

Abbreviations:

SDG = Sample Delivery Group
DF - dilution factor
RL - reporting limit
ABS DIF - absolute difference
RPD - relative percent difference
mg/l - milligram per liter

Footnotes:

1. If the control limit is an absolute difference less than the repoting limit, the minimum reporting limit will be used if the samples have varying dilution factors.

Table A2. Field Duplicate Pair Samples with Results, Laboratory Flags, Data Validation Qualifiers, Data Validation Reason Codes, and QC Criteria Calculations

SDG			10565397						10565397									
Field Sample ID			LAO-SS-1-061421						LAO-SS-1T-061421									
Lab Sample ID			10565397002						10565397003									
Sample Date			6/14/2021						6/14/2021									
Sample Type			Natural Sample						Field Duplicate									
Analyte	Method	Units	Result	Lab Flag	DV Flag	Reason Code	DF	RL	Result	Lab Flag	DV Flag	Reason Code	DF	RL	Control Limit[1]	ABS DIF	RPD	Meets Control Limit?
Aluminum	EPA 200.8	mg/l	0.026		U	RB	1	0.02	0.028		U	RB	1	0.02	ABS DIF≤RL	0.002		Yes
Arsenic	EPA 200.8	mg/l	0.0052				1	0.0005	0.0053				1	0.0005	RPD≤20%		2%	Yes
Cadmium	EPA 200.8	mg/l	0.0002		J-	ICS	1	0.00008	0.00023		J-	ICS	1	0.00008	ABS DIF≤RL	0.00003		Yes
Calcium	EPA 200.8	mg/l	91.3	P6			10	0.4	94.4				10	0.4	RPD≤20%		3%	Yes
Copper	EPA 200.8	mg/l	0.016				1	0.001	0.016				1	0.001	RPD≤20%		0%	Yes
Iron	EPA 200.8	mg/l	0.044	J	A	<RL	1	0.05	0.042	J	A	<RL	1	0.05	ABS DIF≤RL	0.002		Yes
Lead	EPA 200.8	mg/l	0.00053		UJ	ICS, RB	1	0.0001	0.00059		UJ	ICS, RB	1	0.0001	RPD≤20%		11%	Yes
Magnesium	EPA 200.8	mg/l	33.5	P6			1	0.01	33.7				1	0.01	RPD≤20%		1%	Yes
Mercury	EPA 245.1	mg/l	0.000006	J	A	<RL	1	0.00001	0.000006	J	A	<RL	1	0.00001	ABS DIF≤RL	0		Yes
Silver	EPA 200.8	mg/l	<0.000077	U			1	0.0005	<0.000077	U			1	0.0005	ABS DIF≤RL	both U		Yes
Uranium	EPA 200.8	mg/l	0.0052		J	SD	1	0.0005	0.0052		J	SD	1	0.0005	RPD≤20%		0%	Yes
Zinc	EPA 200.8	mg/l	0.059				1	0.005	0.062				1	0.005	RPD≤20%		5%	Yes
Total Hardness by 2340B	EPA 200.8	mg/l	366				10	1.4	375				10	1.4	RPD≤20%		2%	Yes
Alkalinity, Total as CaCO3	SM 2320B	mg/l	35.7	H5	J-	H	1	5	41.7	H5	J-	H	1	5	RPD≤20%		16%	Yes
Alkalinity, Bicarbonate (CaCO3)	SM 2320B	mg/l	35.7	H5	J	H, FD	1	5	10.5	H5	J	H, FD	1	5	ABS DIF≤RL	25.2		ABS DIFF>RL
Alkalinity, Carbonate (CaCO3)	SM 2320B	mg/l	<1.8	U,H5	UJ	H, FD	1	5	31.3	H5	J	H, FD	1	5	ABS DIF≤RL	29.5		ABS DIFF>RL
Alkalinity, Hydroxide (CaCO3)	SM 2320B	mg/l	<1.8	U,H5	UJ	H	1	5	<1.8	U,H5	UJ	H	1	5	ABS DIF≤RL	both U		Yes
Total Dissolved Solids	SM 2540C	mg/l	700				1	20	686				1	20	RPD≤20%		2%	Yes
Total Suspended Solids	SM 2540D	mg/l	<5	U			1	10	5.3	J	A	<RL	1	10	ABS DIF≤RL	0.3		Yes
Nitrogen, NO2 plus NO3	SM 4500-NO3-H	mg/l	1.4	M1	J-	S%	1	0.2	1.4		J-	S%	1	0.2	RPD≤20%		0%	Yes
Sulfate	ASTM D516-90-02	mg/l	302	M1	J+	S%	25	62.5	285		J+	S%	25	62.5	ABS DIF≤RL	17		Yes

Notes:

Flag and Reason Codes are defined in Table A5.

< - Not detected at the method detection limit.

The qualifications made to the field duplicate samples (DV Flag/Reason Code) are not included in the summary of qualifications made to natural samples discussed in the Data Validation Report.

Abbreviations:

SDG = Sample Delivery Group

DF - dilution factor

RL - reporting limit

ABS DIF - absolute difference

RPD - relative percent difference

mg/l - milligram per liter

Footnotes:

1. If the control limit is an absolute difference less than the repoting limit, the minimum reporting limit will be used if the samples have varying dilution factors.

Table A3. Field Blank Samples with Results, Laboratory Flags, Data Validation Qualifiers, Data Validation Reason Codes, and QC Criteria Calculations

		SDG	10556183						10556183						10559768					
		Field Sample ID	LAO-SS-10-041921						LAO-SS-4-041921						LAO-SS-10-051021					
		Lab Sample ID	10556183007						10556183006						10559768007					
		Sample Date	04/19/21						04/19/21						05/10/21					
		Sample Type	Rinsate Blank						Bottle Blank						Rinsate Blank					
Analyte	Method	Units	Result	Lab Flag	DV Flag	Reason Code	MDL	<2xMDL	Result	Lab Flag	DV Flag	Reason Code	MDL	<2xMDL	Result	Lab Flag	DV Flag	Reason Code	MDL	<2xMDL
Aluminum	EPA 200.8	mg/l	<0.0071	U			0.0071	1	0.01	J	A	<RL	0.0071	1	<0.0071	U			0.0071	1
Arsenic	EPA 200.8	mg/l	<0.00014	U			0.00014	1	<0.00014	U			0.00014	1	<0.00014	U			0.00014	1
Cadmium	EPA 200.8	mg/l	<0.00003	U			0.00003	1	<0.00003	U			0.00003	1	<0.00003	U			0.00003	1
Calcium	EPA 200.8	mg/l	0.13				0.015	1	<0.015	U			0.015	1	0.083				0.015	1
Copper	EPA 200.8	mg/l	<0.00043	U			0.00043	1	<0.00043	U			0.00043	1	0.0039				0.00043	1
Iron	EPA 200.8	mg/l	<0.012	U			0.012	1	<0.012	U			0.012	1	<0.012	U			0.012	1
Lead	EPA 200.8	mg/l	0.00027	B			0.000043	1	<0.000043	U			0.000043	1	0.000064	J	A	<RL	0.000043	1
Magnesium	EPA 200.8	mg/l	0.067				0.0039	1	<0.0039	U			0.0039	1	0.0076	J	A	<RL	0.0039	1
Mercury	EPA 245.1	mg/l	<0.0000045	U			0.0000045	1	<0.0000045	U			0.0000045	1	<0.000045	U,MD			0.000045	1
Silver	EPA 200.8	mg/l	<0.000077	U			0.000077	1	<0.000077	U			0.000077	1	0.00016	J	A	<RL	0.000077	1
Uranium	EPA 200.8	mg/l	<0.000028	U			0.000028	1	<0.000028	U			0.000028	1	<0.000028	U			0.000028	1
Zinc	EPA 200.8	mg/l	0.0027	J	A	<RL	0.0023	1	<0.0023	U			0.0023	1	<0.0023	U			0.0023	1
Total Hardness by 2340B	EPA 200.8	mg/l	0.61				0.054	1	<0.054	U			0.054	1	0.24				0.054	1
Alkalinity, Total as CaCO3	SM 2320B	mg/l	<2	U			2	1	<2	U			2	1	<2	U			2	1
Alkalinity, Bicarbonate (CaCO3)	SM 2320B	mg/l	<2	U			2	1	<2	U			2	1	<2	U			2	1
Alkalinity, Carbonate (CaCO3)	SM 2320B	mg/l	<2	U			2	1	<2	U			2	1	<2	U			2	1
Alkalinity, Hydroxide (CaCO3)	SM 2320B	mg/l	<2	U			2	1	<2	U			2	1	<2	U			2	1
Total Dissolved Solids	SM 2540C	mg/l	<5	U			5	1	<5	U			5	1	11				5	1
Total Suspended Solids	SM 2540D	mg/l	<5	U			5	1	<5	U			5	1	<5	U			5	1
Nitrogen, NO2 plus NO3	SM 4500-NO3-H	mg/l	<0.078	U			0.078	1	<0.078	U			0.078	1	<0.078	U			0.078	1
Sulfate	ASTM D516-90-02	mg/l	<1.2	U	UJ	ICV, CCV	1.2	1	<1.2	U	UJ	ICV, CCV	1.2	1	<1.2	U	UJ	CCV	1.2	1

Notes:

The qualifications made to the field blank samples (DV Flag/Reason Code) are not included in the summary of qualifications made to natural samples discussed in the Data Validation Report.

Flag and Reason Codes are defined in Table A5.

< - Not detected at the method detection limit.

Abbreviations:

SDG = Sample Delivery Group

mg/l - milligram per liter

MDL - method detection limit

Table A3. Field Blank Samples with Results, Laboratory Flags, Data Validation Qualifiers, Data Validation Reason Codes, and QC Criteria Calculations

		SDG	10559768						10565397						10565397					
		Field Sample ID	LAO-SS-4-051021						LAO-SS-10-061421						LAO-SS-4-061421					
		Lab Sample ID	10559768006						10565397007						10565397006					
		Sample Date	05/10/21						06/14/21						06/14/21					
		Sample Type	Bottle Blank						Rinsate Blank						Bottle Blank					
Analyte	Method	Units	Result	Lab Flag	DV Flag	Reason Code	MDL	<2xMDL	Result	Lab Flag	DV Flag	Reason Code	MDL	<2xMDL	Result	Lab Flag	DV Flag	Reason Code	MDL	<2xMDL
Aluminum	EPA 200.8	mg/l	<0.0071	U			0.0071	1	0.017	J	A	<RL	0.0071	1	<0.0071	U			0.0071	1
Arsenic	EPA 200.8	mg/l	<0.00014	U			0.00014	1	<0.00014	U			0.00014	1	<0.00014	U			0.00014	1
Cadmium	EPA 200.8	mg/l	<0.00003	U			0.00003	1	<0.00003	U			0.00003	1	<0.00003	U			0.00003	1
Calcium	EPA 200.8	mg/l	0.018	J	A	<RL	0.015	1	0.81				0.015	1	0.019	J	A	<RL	0.015	1
Copper	EPA 200.8	mg/l	<0.00043	U			0.00043	1	0.00091	J	A	<RL	0.00043	1	<0.00043	U			0.00043	1
Iron	EPA 200.8	mg/l	<0.012	U			0.012	1	0.018	J	A	<RL	0.012	1	<0.012	U			0.012	1
Lead	EPA 200.8	mg/l	<0.000043	U			0.000043	1	0.00022				0.000043	1	<0.000043	U			0.000043	1
Magnesium	EPA 200.8	mg/l	<0.0039	U			0.0039	1	0.2				0.0039	1	0.0043	J,B	J+	CS, <RL	0.0039	1
Mercury	EPA 245.1	mg/l	<0.000045	U,MD			0.000045	1	<0.0000047	U			0.0000047	1	<0.0000047	U			0.0000047	1
Silver	EPA 200.8	mg/l	<0.000077	U			0.000077	1	<0.000077	U			0.000077	1	<0.000077	U			0.000077	1
Uranium	EPA 200.8	mg/l	<0.000028	U			0.000028	1	0.000043	J	A	<RL	0.000028	1	<0.000028	U			0.000028	1
Zinc	EPA 200.8	mg/l	<0.0023	U			0.0023	1	0.0044	J	A	<RL	0.0023	1	<0.0023	U			0.0023	1
Total Hardness by 2340B	EPA 200.8	mg/l	0.06	J	A	<RL	0.054	1	2.9				0.054	1	0.066	J	A	<RL	0.054	1
Alkalinity, Total as CaCO3	SM 2320B	mg/l	<2	U			2	1	2.3	J,H5	J-	H, <RL	1.8	1	<1.8	U,H5	UJ	H	1.8	1
Alkalinity, Bicarbonate (CaCO3)	SM 2320B	mg/l	<2	U			2	1	2.3	J,H5	J-	H, <RL	1.8	1	<1.8	U,H5	UJ	H	1.8	1
Alkalinity, Carbonate (CaCO3)	SM 2320B	mg/l	<2	U			2	1	<1.8	U,H5	UJ	H	1.8	1	<1.8	U,H5	UJ	H	1.8	1
Alkalinity, Hydroxide (CaCO3)	SM 2320B	mg/l	<2	U			2	1	<1.8	U,H5	UJ	H	1.8	1	<1.8	U,H5	UJ	H	1.8	1
Total Dissolved Solids	SM 2540C	mg/l	6	J	A	<RL	5	1	<5	U			5	1	<5	U			5	1
Total Suspended Solids	SM 2540D	mg/l	<5	U			5	1	<5	U			5	1	<5	U			5	1
Nitrogen, NO2 plus NO3	SM 4500-NO3-H	mg/l	<0.078	U			0.078	1	<0.078	U			0.078	1	0.094	J,B	A	<RL	0.078	1
Sulfate	ASTM D516-90-02	mg/l	<1.2	U	UJ	CCV	1.2	1	<1.2	U			1.2	1	<1.2	U			1.2	1

Notes:

The qualifications made to the field blank samples (DV Flag/Reason Code) are not included in the summary of qualifications made to natural samples discussed in the Data Validation Report.

Flag and Reason Codes are defined in Table A5.

< - Not detected at the method detection limit.

Abbreviations:

SDG = Sample Delivery Group

mg/l - milligram per liter

MDL - method detection limit

Table A4. Sample Identification

Field Sample ID	Sample Type	Station ID	SDG	Lab ID	Sample Date	EPA 200.8	EPA 245.1	SM 2320B	SM 2540C	SM 2540D	SM 4500-NO3-H	ASTM D516-90-02
LAO-SS-1-040121	Natural	LAO-SS-1	10554243	10554243001	4/1/2021	X	X					
LAO-SS-1-040521	Natural	LAO-SS-1	10554243	10554243002	4/5/2021	X	X					
LAO-SS-2-040521	Natural	LAO-SS-2	10554243	10554243003	4/5/2021	X	X					
LAO-SS-1-040821	Natural	LAO-SS-1	10555104	10555104001	4/8/2021	X	X					
LAO-SS-1-041221	Natural	LAO-SS-1	10555104	10555104002	4/12/2021	X	X					
LAO-SS-2-041221	Natural	LAO-SS-2	10555104	10555104003	4/12/2021	X	X					
LAO-SS-1-041521	Natural	LAO-SS-1	10556183	10556183001	4/15/2021	X	X					
LAO-SS-1-041921	Natural	LAO-SS-1	10556183	10556183002	4/19/2021	X	X	X	X	X	X	X
LAO-SS-1T-041921	Field Duplicate	LAO-SS-1T	10556183	10556183003	4/19/2021	X	X	X	X	X	X	X
LAO-SS-2-041921	Natural	LAO-SS-2	10556183	10556183004	4/19/2021	X	X	X	X	X	X	X
LAO-SS-3-041921	Natural	LAO-SS-3	10556183	10556183005	4/19/2021	X	X	X	X	X	X	X
LAO-SS-4-041921	Bottle Blank	LAO-SS-4	10556183	10556183006	4/19/2021	X	X	X	X	X	X	X
LAO-SS-10-041921	Rinsate Blank	LAO-SS-10	10556183	10556183007	4/19/2021	X	X	X	X	X	X	X
LAO-SS-1-042221	Natural	LAO-SS-1	10557202	10557202001	4/22/2021	X	X					
LAO-SS-1-042621	Natural	LAO-SS-1	10557202	10557202002	4/26/2021	X	X					
LAO-SS-2-042621	Natural	LAO-SS-2	10557202	10557202003	4/26/2021	X	X					
LAO-SS-1-042921	Natural	LAO-SS-1	10558433	10558433001	4/29/2021	X	X					
LAO-SS-1-050321	Natural	LAO-SS-1	10558433	10558433002	5/3/2021	X	X					
LAO-SS-2-050321	Natural	LAO-SS-2	10558433	10558433003	5/3/2021	X	X					
LAO-SS-1-050621	Natural	LAO-SS-1	10559768	10559768001	5/6/2021	X	X[1]					
LAO-SS-1-051021	Natural	LAO-SS-1	10559768	10559768002	5/10/2021	X	X[1]	X	X	X	X	X
LAO-SS-1T-051021	Field Duplicate	LAO-SS-1T	10559768	10559768003	5/10/2021	X	X[1]	X	X	X	X	X
LAO-SS-2-051021	Natural	LAO-SS-2	10559768	10559768004	5/10/2021	X	X[1]	X	X	X	X	X
LAO-SS-3-051021	Natural	LAO-SS-3	10559768	10559768005	5/10/2021	X	X[1]	X	X	X	X	X
LAO-SS-4-051021	Bottle Blank	LAO-SS-4	10559768	10559768006	5/10/2021	X	X[1]	X	X	X	X	X
LAO-SS-10-051021	Rinsate Blank	LAO-SS-10	10559768	10559768007	5/10/2021	X	X[1]	X	X	X	X	X
LAO-SS-1-051321	Natural	LAO-SS-1	10560663	10560663001	5/13/2021	X	X					
LAO-SS-1-051721	Natural	LAO-SS-1	10560663	10560663002	5/17/2021	X	X					
LAO-SS-2-051721	Natural	LAO-SS-2	10560663	10560663003	5/17/2021	X	X					
LAO-SS-1-052021	Natural	LAO-SS-1	10562085	10562085001	5/20/2021	X	X					
LAO-SS-1-052421	Natural	LAO-SS-1	10562085	10562085002	5/24/2021	X	X					
LAO-SS-2-052421	Natural	LAO-SS-2	10562085	10562085003	5/24/2021	X	X					
LAO-SS-1-052721	Natural	LAO-SS-1	10563551	10563551001	5/27/2021	X	X					
LAO-SS-1-060121	Natural	LAO-SS-1	10563551	10563551002	6/1/2021	X	X					
LAO-SS-2-060121	Natural	LAO-SS-2	10563551	10563551003	6/1/2021	X	X					
LAO-SS-1-060321	Natural	LAO-SS-1	10564213	10564213001	6/3/2021	X	X					
LAO-SS-1-060721	Natural	LAO-SS-1	10564213	10564213002	6/7/2021	X	X					
LAO-SS-2-060721	Natural	LAO-SS-2	10564213	10564213003	6/7/2021	X	X					
LAO-SS-1-061021	Natural	LAO-SS-1	10565397	10565397001	6/10/2021	X	X					
LAO-SS-1-061421	Natural	LAO-SS-1	10565397	10565397002	6/14/2021	X	X	X	X	X	X	X
LAO-SS-1T-061421	Field Duplicate	LAO-SS-1T	10565397	10565397003	6/14/2021	X	X	X	X	X	X	X
LAO-SS-2-061421	Natural	LAO-SS-2	10565397	10565397004	6/14/2021	X	X	X	X	X	X	X
LAO-SS-3-061421	Natural	LAO-SS-3	10565397	10565397005	6/14/2021	X	X	X	X	X	X	X
LAO-SS-4-061421	Bottle Blank	LAO-SS-4	10565397	10565397006	6/14/2021	X	X	X	X	X	X	X
LAO-SS-10-061421	Rinsate Blank	LAO-SS-10	10565397	10565397007	6/14/2021	X	X	X	X	X	X	X
LAO-SS-1-061721	Natural	LAO-SS-1	10566549	10566549001	6/17/2021	X	X					
LAO-SS-1-062121	Natural	LAO-SS-1	10566549	10566549002	6/21/2021	X	X					
LAO-SS-2-062121	Natural	LAO-SS-2	10566549	10566549003	6/21/2021	X	X					
LAO-SS-1-062421	Natural	LAO-SS-1	10567614	10567614001	6/24/2021	X	X					
LAO-SS-1-062821	Natural	LAO-SS-1	10567614	10567614002	6/28/2021	X	X					
LAO-SS-2-062821	Natural	LAO-SS-2	10567614	10567614003	6/28/2021	X	X					

[1]Standard mercury analysis in addition to low-level mercury analysis was performed for samples in SDG 10559768.

Method	**Analytes**
EPA 200.8	Aluminum, Arsenic, Cadmium, Calcium, Copper, Iron, Lead, Magnesium, Silver, Total Hardness by 2340B, Uranium, Zinc
EPA 245.1	Mercury
SM 2320B	Alkalinity, Total as CaCO3; Alkalinity, Bicarbonate (CaCO3); Alkalinity, Hydroxide (CaCO3); Alkalinity,Carbonate (CaCO3)
SM 2540C	Total Dissolved Solids
SM 2540D	Total Suspended Solids
SM 4500-NO3-H	Nitrogen, NO2 plus NO3
ASTM D516	Sulfate

Abbreviations:

SDG = Sample Delivery Group

Table A5. Laboratory Flags; Data Validation Qualifiers; Enforcement, Screening, and Rejected Codes; and Reason Codes Definitions

Lab Flag (Pace Analytical Services [Pace])

U = Indicates the compound was analyzed for, but not detected.
J = Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
B = Analyte was detected in the associated method blank.
D6 = The precision between the sample and sample duplicate exceeded laboratory control limits.
H1 = Analysis conducted outside the recognized method holding time.
H5 = Reanalysis conducted in excess of EPA method holding time. Results confirm original analysis performed in hold time.
M1 = Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
M6 = Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.
spike level.
1M = Analyte detected below the reporting limit, therefore result is an estimate.
H2 = Extraction or preparation was conducted outside of the recognized method holding time.
MD = The analyte was not detected at or above the Method Detection Limit.

DV Flag (Data Validation Qualifiers)

U = The result is qualified as non-detect due to the detection of the analyte in an associated QC blank.
sample.
J+ = The result is an estimated quantity, but the result may be biased high.
J- = The result is an estimated quantity, but the result may be biased low.
or imprecise.
A = results between the MDL and RL with no other qualifiers required are considered enforcement quality data.

S/E (Screening/Enforcement Quality Designation)

E = Enforcement quality.
S = Screening quality.
R = Unusable (Rejected) quality.

Reason Code (Data Validation Reason Codes)

<RL = Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
CCV = Qualified due to Continuming Calibration Verification recovery problems.
CL = Qualified because working range of instrument is exceeded.
CS = Qualified due to low-level calibration check standard percent recovery outside control window.
FD = Qualified due to field duplicate results outside of control limits.
H = Qualified due to analysis holding time exceedance.
ICS = Qualified due to detections in the Interference Check Sample.
ICV = Qualified due to Initial Calibration Verification recovery problems.
RB = Qualified due to detections in the rinsate blanks.
S% = Qualified due to percent recovery of the matrix spike outside of control limits.
SD = Qualified due to percent difference of serial dilution outside control limit.

Attachment A
Data Validation Checklists

Attachment A.1
Data Validation Checklists for Metals

Site: Butte Priority Soils Operable Unit	**Case No**: 10554243	**Laboratory**: Pace Analytical
Project: BTL-LAO Monitoring	**Matrix**: Water	**Analyses**: Total Metals: Al, As, Ca, Cd, Cu, Fe, Hg, Pb, Mg, Ag, U-238, and Zn Total Hardness (Calculation)
Sample Date: 4/1/2021, 4/5/2021	**Analysis Dates**: 4/13/2021, 4/17/2021, 4/19/2021	
Data Validator: S. Ward	**Validation Dates**: 5/12/2021	

1. Holding Times

Analyte	Laboratory	Matrix	Method	Holding Times (Days)	Collection Date	Analysis Date(s)	Holding Time Met (Y/N)	Affected Data Flagged (Y/N)
Al, As, Ca, Cd, Cu, Fe, Pb, Mg, Ag, U-238, Zn	Pace	Water	EPA Method 200.8	180	4/1/2021, 4/5/2021	4/17/2021, 4/19/2021	Y	NA
Total Hardness	Pace	Water	2340B (Calculation)	180			Y	NA
Mercury	Pace	Water	EPA Method 245.1	28		4/13/2021	Y	NA

*Reference for Holding Times – Clark Fork Superfund Site Investigations, Laboratory Analysis Plan (LAP) and PACE Analytical Guide (PAC) for Holding Times

Were any data flagged because of holding time? Y [ ] N [X]
Were any data flagged because of preservation problems? Y [ ] N [X]

Describe Any Actions Taken: None Required.

Comments: The receiving temperature as reported by the laboratory was 3.7 °C. The samples were shipped on ice and reported as properly preserved.

2. Instrument Calibration

Was the Tune analysis information performed?	Y [X]	N [ ]
Was the peak width and resolution of the masses within the required control limits?	Y [X]	N [ ]
Was the percent relative standard deviation ≤ 5% for all analytes in the Tune solutions?	Y [X]	N [ ]
Was the instrument successfully calibrated at the correct frequency?	Y [X]	N [ ]
Was the instrument calibrated with the appropriate standards and blanks?	Y [X]	N [ ]
Were Initial Calibration Verification (ICV) and Continuing Calibration Verification (CCV) samples analyzed?	Y [X]	N [ ]
Were ICV and CCV results within the control window?	Y [X]	N [ ]
Were any data flagged because of calibration problems?	Y [ ]	N [X]

Describe Any Actions Taken: None Required.

Comments: On the 4/16/2021 calibration, the lab rejected the CAL5 and CAL6 calibration standards for silver. CAL7 for Iron was also rejected by the lab. No qualifications are warranted.

On 4/16/2021, the initial He Tune had failing RSDs, but the Tune was performed again, and all RSDs passed.

On 4/19/2021, the initial He Tune had failing RSDs, but the Tune was performed again, and all RSDs passed.

All total metals and mercury calibrations, ICV, and CCV results were within the control limits.

3. Blanks

Were Initial and Continuing Calibration Blanks (ICB and CCBs) analyzed?	Y [X]	N [ ]
Were ICBs and CCBs within the control window?	Y [X]	N [ ]
Were Method Blanks (MBs) analyzed at the frequency of 1 per analytical batch?	Y [X]	N [ ]
Were MBs within the control window of less than two times the laboratory Method Detection Limit (MDL)?	Y [X]	N [ ]
Were any data flagged because of blank problems?	Y [ ]	N [X]

Describe Any Actions Taken: None Required.

Comments: Detection of silver in several CCBs analyzed on 4/16/2021-4/17/2021 require no qualification as the detects were less than 2 times the MDL as discussed in the CFRSSI QAPP (ARCO, 1992).

A detection of mercury in the MB requires no qualification as the detect was less than 2 times the MDL.

4. Interference Check Samples

Were ICP Interference Check Samples (ICS) within the control limits?	Y		N	X
Were any data flagged because of ICS problems?	Y	X	N	

Describe Any Actions Take: In the ICS Solution A analyzed on 4/17/2021, there was a detection of lead (0.076 ug/L) greater than the MDL (0.043 ug/L). The raw data showed that the levels for some interferents (Ca, Mg, and Na) are higher than the corresponding true values in the ICS Solution A. The lead results for samples LAO-SS-1-040121 and LAO-SS-1-040521 were qualified "J+" due to a detection in the ICS Solution A and the results (0.26 ug/L and 0.2 ug/L, respectively) being less than 10 times the absolute value of the detection (0.8 ug/L).

In the ICS Solution A analyzed on 4/17/2021, there was a detection of zinc (4.974 ug/L) greater than the MDL (2.3 ug/L). The raw data showed that the levels for some interferents (Ca, Mg, and Na) are higher than the corresponding true values in the ICS Solution A. The zinc result for sample LAO-SS-1-040521 was qualified "J+" due to a detection in the ICS Solution A and the result (47 ug/L) being less than 10 times the absolute value of the detection (49.74 ug/L).

Comments: On this work order (WO), analytes that were not present in ICS Solution A but were detected included: arsenic, cadmium, copper, lead, silver, uranium, and zinc. The percent recovery (%R) for Solution A and Solution AB were within the control limit.

In the ICS Solution A analyzed on 4/19/2021, there was a detection of cadmium (0.097 ug/L), lead (0.08 ug/L), and zinc (5.215 ug/L) greater than the MDL (0.03 ug/L, 0.043 ug/L, and 2.3 ug/L, respectively). Only aluminum was reported from the 4/19/2021 run; therefore, no qualifications were warranted.

In the ICS Solution A analyzed on 4/16/2021, there was a detection of lead (0.079 ug/L), and zinc (5.166 ug/L) greater than the MDL (0.043 ug/L and 2.3 ug/L, respectively). Lead and Zinc results for the associated samples were not analyzed on 4/16/2021; therefore, no qualifications were warranted.

5. Laboratory Control Samples

Were Laboratory Control Samples (LCS) analyzed at the frequency of 1 per batch?	Y	X	N	
What was the source of the LCS?	Unknown			
Were LCS results within the control window of 80 to 120%?	Y	X	N	
Were any data flagged because of LCS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: The %R for the LCS were within the control limits.

6. Duplicate Sample Results

Were Laboratory Duplicate Samples (LDS) analyzed at the frequency of 1 per batch?	Y	X	N	
Were LDS results within the control window ≤ 20% Relative Percent Difference (RPD)?	Y	X	N	
Were any data flagged because of LDS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: For batch 734119, the LMS and LMS Duplicate (LMSD) sample for mercury was generated from sample LAO-SS-1-040121 and used for the LDS calculation. The data user should be aware that the RPD was within control limits. No qualifications were warranted.

For batch 733778, the LMS and LMSD sample for total metals was generated from sample LAO-SS-1-040121 and used for the LDS calculations. The data user should be aware that all RPDs were within control limits. No qualifications were warranted.

7. Matrix Spike Sample Results

Were Laboratory Matrix Spike Samples (LMS) analyzed at the frequency of 1 per batch?	Y	X	N		
Were LMS results within the control window 75 to 125%?	Y		N	X	
Were any data flagged because of LMS problems?	Y		N	X	

Describe Any Actions Taken: None Required.

Comments: Sample LAO-SS-1-040121 was used to generate an LMS/LMSD sample pair for total metals. The %R for the LMS and LMSD for calcium (-337% and 262%, respectively) and magnesium (-119% and 66%, respectively) were outside control limits. Per the NFG, *"Spike recovery limits do not apply when the original sample concentration is ≥ 4 times the spike added. In such an event, the data shall be reported unflagged, even if the %R does not meet acceptance criteria"* (EPA, 2017). The original sample concentrations of these analytes were greater than 4 times the added spike amount; therefore, no qualifications were warranted. The remaining %R were within control limits (75-125%). A second LMS was performed on a sample not from this WO. The %R for the LMS for calcium (192%) was outside control limits. The original sample concentration of calcium was greater than 4 times the added spike amount; therefore, no qualifications were warranted.

Sample LAO-SS-1-040121 was used to generate an LMS/LMSD sample pair for total mercury. The %R for the LMS and LMSD were within control limits.

8. ICP Serial Dilutions

Were ICP Serial Dilutions (SD) analyzed at the frequency of 1 per batch?	Y	X	N		
Were SD percent differences (%D) results within the control limits?	Y		N	X	
Were any data flagged because of SD problems?	Y		N	X	

Describe Any Actions Taken: Sample LAO-SS-1-040121 was used to generate the SD. The %D for calcium (15.4%) is outside control limits, and the original sample concentration is greater than 50 times the MDL; therefore, sample LAO-SS-1-040121 was qualified "J". Per the NFG, "*For a SD that does not meet the technical criteria, apply the action to all samples of the same matrix if the samples are considered sufficiently similar"* (EPA, 2017). Sample LAO-SS-1-040521 is considered sufficiently similar; therefore, qualified "J".

Comments: Sample LAO-SS-1-040121 was used to generate the SD. The %Ds for aluminum (32.6%) and cadmium (15.5%) were outside control limits, but the original sample concentrations were less than 50 times the MDL; therefore, no qualifications were warranted.

9. Internal Standards

Were internal standards added to each sample in the analytical batch?	Y	X	N		
Were the percent relative intensity recoveries (%RI) within the control limits of 60 to 125%	Y	X	N		
Were any data flagged because of internal standard problems?	Y		N	X	

Describe Any Actions Taken: None Required.

Comments: Internal standards used on 4/16/2021 included: Ge-72, In-115, Sc-45-IS, and Tb-159. The Calibration 0 %RI equaled 100% for all internal standards. The remaining %RI ranged from 91.6% to 110.7%. The internal standards were within the control limits (60-125%); therefore, no qualifications were warranted.

Internal standards used on 4/19/2021 included: Ge-72, In-115, Sc-45-IS, and Tb-159. The Calibration 0 %RI equaled 100% for all internal standards. The remaining %RI ranged from 73.3% to 113.6%. The internal standards were within the control limits (60-125%); therefore, no qualifications were warranted.

10. Field Blanks

Were field blanks (FB) submitted as specified in the Sampling Analysis Plan (SAP)?	Y	X	N		
Were any data qualified because of field blank problems?	Y		N		N/A

Describe Any Actions Taken: None Required.

Comments: There was no field blank included in this work order. Field blanks are collected monthly and are summarized in the *Field Blank Samples with Results, Laboratory Flags, Data Validation Qualifiers, Data Validation Reason Codes, and QC Criteria Calculations* table in the Data Validation Report.

11. Field Duplicates

Were field duplicates submitted as specified in the SAP?	Y	X	N		
Were field duplicates within the control limits?	Y		N		N/A
Were any data qualified because of field duplicate problems?	Y		N		N/A

Describe Any Actions Taken: None required.

Comments: There was no field duplicate pair included in this work order. Field duplicates are collected monthly and are summarized in the *Field Duplicate Pair Samples with Results, Laboratory Flags, Data Validation Qualifiers, Data Validation Reason Codes, and QC Criteria Calculations* table in the Data Validation Report.

12. Overall Assessment

Are there analytical limitations of the data that users should be aware of? Y [X] N [ ]

If so, explain: On this WO 10554243, the following qualifications were made:

In additional to the qualifications outlined in the sections above, results which are reported between the method detection limit and the reporting limit were qualified "A" when no additional qualifications were warranted.

Field ID	Analyte	Final Qualification	Reason Code
LAO-SS-1-040121	Lead	J+	ICS
LAO-SS-1-040521	Lead	J+	ICS
LAO-SS-1-040521	Zinc	J+	ICS
LAO-SS-1-040121	Calcium	J	SD
LAO-SS-1-040521	Calcium	J	SD
LAO-SS-1-040121	Iron	A	<RL
LAO-SS-1-040121	Mercury	A	<RL
LAO-SS-1-040521	Iron	A	<RL
LAO-SS-1-040521	Mercury	A	<RL

Comments:

13. Authorization of Data Validation

Data Validator

Name: Sara Ward **Reviewed By:** Josie McElroy

Signature: Sara Ward Josie McElroy

Date: 5/12/2021 7/1/2021

Site: Butte Priority Soils Operable Unit	**Case No**: 10555104	**Laboratory**: Pace Analytical
Project: BTL-LAO Monitoring	**Matrix**: Water	**Analyses**: Total Metals: Al, As, Ca, Cd, Cu, Fe, Hg, Pb, Mg, Ag, U-238, and Zn Total Hardness (Calculation)
Sample Date: 4/8/2021, 4/12/2021	**Analysis Dates**: 4/15/2021, 4/21/2021, 4/22/2021	
Data Validator: S. Ward	**Validation Dates**: 5/14/2021	

1. Holding Times

Analyte	Laboratory	Matrix	Method	Holding Times (Days)	Collection Date	Analysis Date(s)	Holding Time Met (Y/N)	Affected Data Flagged (Y/N)
Al, As, Ca, Cd, Cu, Fe, Pb, Mg, Ag, U-238, Zn	Pace	Water	EPA Method 200.8	180	4/8/2021, 4/12/2021	4/21/2021, 4/22/2021	Y	NA
Total Hardness	Pace	Water	2340B (Calculation)	180			Y	NA
Mercury	Pace	Water	EPA Method 245.1	28		4/15/2021	Y	NA

*Reference for Holding Times – Clark Fork Superfund Site Investigations, Laboratory Analysis Plan (LAP) and PACE Analytical Guide (PAC) for Holding Times

Were any data flagged because of holding time? Y [ ] N [X]
Were any data flagged because of preservation problems? Y [ ] N [X]

Describe Any Actions Taken: None Required.

Comments: The receiving temperature as reported by the laboratory was 3.5 °C. The samples were shipped on ice and reported as properly preserved.

2. Instrument Calibration

Was the Tune analysis information performed?	Y	[X]	N	[ ]
Was the peak width and resolution of the masses within the required control limits?	Y	[X]	N	[ ]
Was the percent relative standard deviation ≤ 5% for all analytes in the Tune solutions?	Y	[X]	N	[ ]
Was the instrument successfully calibrated at the correct frequency?	Y	[X]	N	[ ]
Was the instrument calibrated with the appropriate standards and blanks?	Y	[X]	N	[ ]
Were Initial Calibration Verification (ICV) and Continuing Calibration Verification (CCV) samples analyzed?	Y	[X]	N	[ ]
Were ICV and CCV results within the control window?	Y	[ ]	N	[X]
Were any data flagged because of calibration problems?	Y	[ ]	N	[X]

Describe Any Actions Taken: None Required.

Comments: The CCV analyzed on 4/21/21 at 19:18 was out of limits for aluminum (89.7%). No reported results for aluminum were bracketed by this CCV; therefore, no qualifications were necessary.

All total metals and mercury calibrations, ICV, and remaining CCV results were within the control limits.

3. Blanks

Were Initial and Continuing Calibration Blanks (ICB and CCBs) analyzed?	Y	[X]	N	[ ]
Were ICBs and CCBs within the control window?	Y	[X]	N	[ ]
Were Method Blanks (MBs) analyzed at the frequency of 1 per analytical batch?	Y	[X]	N	[ ]
Were MBs within the control window of less than two times the laboratory Method Detection Limit (MDL)?	Y	[X]	N	[ ]
Were any data flagged because of blank problems?	Y	[ ]	N	[X]

Describe Any Actions Taken: None Required.

Comments: A detection of uranium-238 in the ICB analyzed on 4/21/2021 at 07:33 required no qualification as the detect was less than 2 times the MDL as discussed in the CFRSSI QAPP (ARCO, 1992).

4. Interference Check Samples

Were ICP Interference Check Samples (ICS) within the control limits?	Y		N	X
Were any data flagged because of ICS problems?	Y	X	N	

Describe Any Actions Take: In the ICS Solution A analyzed on 4/21/2021 at 15:00, there was a detection of cadmium (0.067 ug/L) greater than the MDL (0.030 ug/L). The raw data showed that the levels for some interferents (Ca, Mg, and Na) are higher than the corresponding true values in the ICS Solution A. The cadmium results for samples LAO-SS-1-040821 and LAO-SS-1-041221 were qualified "J+" due to a detection in the ICS Solution A and the results (0.26 ug/L and 0.21 ug/L, respectively) being less than 10 times the absolute value of the detection (0.67 ug/L).

Comments: On this work order (WO), analytes that were not present in ICS Solution A but were detected included: arsenic, cadmium, copper, lead, silver, uranium, and zinc. The percent recovery (%R) for Solution A and Solution AB were within the control limit.

In the ICS Solution A analyzed on 4/21/2021 at 08:02, there was a detection of cadmium (0.08 ug/L) and lead (0.078 ug/L) greater than the MDL (0.030 ug/L and 0.043 ug/L, respectively). No sample results were reported for cadmium or lead from this run; therefore, no qualifications were warranted.

In the ICS Solution A analyzed on 4/21/2021 at 15:00, there was a detection of silver (0.147 ug/L) greater than the MDL (0.077 ug/L). All sample results for silver were non-detect; therefore, no qualifications were warranted.

In the ICS Solution A analyzed on 4/22/2021, there was a detection of cadmium (0.075 ug/L) and lead (0.065 ug/L) greater than the MDL (0.030 ug/L and 0.043 ug/L, respectively). No sample results were reported for cadmium or lead from this run; therefore, no qualifications were warranted.

5. Laboratory Control Samples

Were Laboratory Control Samples (LCS) analyzed at the frequency of 1 per batch?	Y	X	N	
What was the source of the LCS?	Unknown			
Were LCS results within the control window of 80 to 120%?	Y	X	N	
Were any data flagged because of LCS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: The %R for the LCS were within the control limits.

6. Duplicate Sample Results

Were Laboratory Duplicate Samples (LDS) analyzed at the frequency of 1 per batch?	Y	X	N	
Were LDS results within the control window ≤ 20% Relative Percent Difference (RPD)?	Y	X	N	
Were any data flagged because of LDS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: For batch 735071, the LMS and LMS Duplicate (LMSD) sample for mercury was generated from sample LAO-SS-1-040821 and used for the LDS calculation. The data user should be aware that the RPD was within control limits. No qualifications were warranted.

For batch 734927, the LMS and LMSD sample for total metals was generated from sample LAO-SS-1-040821 and used for the LDS calculations. The data user should be aware that all RPDs were within control limits. No qualifications were warranted.

7. Matrix Spike Sample Results

Were Laboratory Matrix Spike Samples (LMS) analyzed at the frequency of 1 per batch?	Y	X	N	
Were LMS results within the control window 75 to 125%?	Y		N	X
Were any data flagged because of LMS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: Sample LAO-SS-1-040821 was used to generate an LMS/LMSD sample pair for total metals. The %R for the LMS and LMSD for calcium (-251% and -160%, respectively) and the LMSD for magnesium (60%) were outside control limits. Per the NFG, *"Spike recovery limits do not apply when the original sample concentration is ≥ 4 times the spike added. In such an event, the data shall be reported unflagged, even if the %R does not meet acceptance criteria"* (EPA, 2017). The original sample concentrations of these analytes were greater than 4 times the added spike amount; therefore, no qualifications were warranted. The remaining %R were within control limits (75-125%). A second LMS was performed on a sample not from this WO. The %R for the LMS for calcium (47%), copper (126%), magnesium (247%), silver (128%), and zinc (142%) were outside control limits. The original sample concentrations of calcium and magnesium were greater than 4 times the added spike amount. The sample concentrations of copper, silver, and zinc were less than 4 times the added spike amount, but since this LMS was generated from a sample not from this WO, no qualifications were warranted.

Sample LAO-SS-1-040821 was used to generate an LMS/LMSD sample pair for total mercury. The %R for the LMS and LMSD were within control limits.

8. ICP Serial Dilutions

Were ICP Serial Dilutions (SD) analyzed at the frequency of 1 per batch?	Y	X	N	
Were SD percent differences (%D) results within the control limits?	Y		N	X
Were any data flagged because of SD problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: Sample LAO-SS-1-040821 was used to generate the SD. The %Ds for cadmium (35.8%) and lead (15.8%) were outside control limits, but the original sample concentrations were less than 50 times the MDL; therefore, no qualifications were warranted.

9. Internal Standards

Were internal standards added to each sample in the analytical batch?	Y	X	N	
Were the percent relative intensity recoveries (%RI) within the control limits of 60 to 125%	Y	X	N	
Were any data flagged because of internal standard problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: Internal standards used on 4/21/2021 at 07:04 included: Ge-72, In-115, Sc-45-IS, and Tb-159. The Calibration 0 %RI equaled 100% for all internal standards. The remaining %RI ranged from 92.4% to 107.3%. The internal standards were within the control limits (60-125%); therefore, no qualifications were warranted.

Internal standards used on 4/21/2021 at 14:08 included: Ge-72, In-115, Sc-45-IS, and Tb-159. The Calibration 0 %RI equaled 100% for all internal standards. The remaining %RI ranged from 83.9% to 104.5%. The internal standards were within the control limits (60-125%); therefore, no qualifications were warranted.

Internal standards used on 4/22/2021 included: Ge-72, In-115, Sc-45-IS, and Tb-159. The Calibration 0 %RI equaled 100% for all internal standards. The remaining %RI ranged from 87.6% to 105.5%. The internal standards were within the control limits (60-125%); therefore, no qualifications were warranted.

10. Field Blanks

Were field blanks (FB) submitted as specified in the Sampling Analysis Plan (SAP)?	Y	X	N		
Were any data qualified because of field blank problems?	Y		N		N/A

Describe Any Actions Taken: None Required.

Comments: There was no field blank included in this work order. Field blanks are collected monthly and are summarized in the *Field Blank Samples with Results, Laboratory Flags, Data Validation Qualifiers, Data Validation Reason Codes, and QC Criteria Calculations* table in the Data Validation Report.

11. Field Duplicates

Were field duplicates submitted as specified in the SAP?	Y	X	N		
Were field duplicates within the control limits?	Y		N		N/A
Were any data qualified because of field duplicate problems?	Y		N		N/A

Describe Any Actions Taken: None Required.

Comments: There was no field duplicate pair included in this work order. Field duplicates are collected monthly and are summarized in the *Field Duplicate Pair Samples with Results, Laboratory Flags, Data Validation Qualifiers, Data Validation Reason Codes, and QC Criteria Calculations* table in the Data Validation Report.

12. Overall Assessment

Are there analytical limitations of the data that users should be aware of? Y [X] N [ ]

If so, explain: On this WO 10555104, the following qualifications were made:

In additional to the qualifications outlined in the sections above, results which are reported between the method detection limit and the reporting limit were qualified "A" when no additional qualifications were warranted.

Field ID	Analyte	Final Qualification	Reason Code
LAO-SS-1-040821	Cadmium	J+	ICS
LAO-SS-1-041221	Cadmium	J+	ICS
LAO-SS-1-040821	Aluminum	A	<RL
LAO-SS-1-040821	Iron	A	<RL
LAO-SS-1-041221	Aluminum	A	<RL
LAO-SS-1-041221	Iron	A	<RL

Comments:

13. Authorization of Data Validation

Data Validator

Name: Sara Ward **Reviewed By:** Shelby Green

Signature: Sara Ward Shelby Green

Date: 5/14/2021 7/6/2021

Site: Butte Priority Soils Operable Unit	**Case No**: 10556183	**Laboratory**: Pace Analytical
Project: BTL-LAO Monitoring	**Matrix**: Water	**Analyses**: Total Metals: Al, As, Ca, Cd, Cu, Fe, Hg, Pb, Mg, Ag, U-238, and Zn Total Hardness (Calculation)
Sample Date: 4/15/2021, 4/19/2021	**Analysis Dates**: 4/27/2021, 4/29/2021	
Data Validator: S. Ward	**Validation Dates**: 6/28/2021, 6/29/2021, 6/30/2021	

1. Holding Times

Analyte	Laboratory	Matrix	Method	Holding Times (Days)	Collection Date	Analysis Date(s)	Holding Time Met (Y/N)	Affected Data Flagged (Y/N)
Al, As, Ca, Cd, Cu, Fe, Pb, Mg, Ag, U-238, Zn	Pace	Water	EPA Method 200.8	180	4/15/2021, 4/19/2021	4/29/2021	Y	NA
Total Hardness	Pace	Water	2340B (Calculation)	180			Y	NA
Mercury	Pace	Water	EPA Method 245.1	28		4/27/2021	Y	NA

*Reference for Holding Times – Clark Fork Superfund Site Investigations, Laboratory Analysis Plan (LAP) and PACE Analytical Guide (PAC) for Holding Times

Were any data flagged because of holding time? Y [ ] N [X]
Were any data flagged because of preservation problems? Y [ ] N [X]

Describe Any Actions Taken: None Required.

Comments: The receiving temperature as reported by the laboratory was 3.1 °C. The samples were shipped on ice and reported as properly preserved. The laboratory sample condition upon receipt form showed the corrected cooler receipt temperature as 2.6 °C, but the COC had a temperature of 3.2 °C recorded. An email to the laboratory confirmed that the corrected receipt temperature was 3.1 °C.

2. Instrument Calibration

Was the Tune analysis information performed?	Y	X	N	
Was the peak width and resolution of the masses within the required control limits?	Y	X	N	
Was the percent relative standard deviation ≤ 5% for all analytes in the Tune solutions?	Y	X	N	
Was the instrument successfully calibrated at the correct frequency?	Y	X	N	
Was the instrument calibrated with the appropriate standards and blanks?	Y	X	N	
Were Initial Calibration Verification (ICV) and Continuing Calibration Verification (CCV) samples analyzed?	Y	X	N	
Were ICV and CCV results within the control window?	Y		N	X
Were any data flagged because of calibration problems?	Y	X	N	

Describe Any Actions Taken: The CCV analyzed 4/27/21 at 12:13 for mercury (93%) was outside control limits (95-115%). Samples LAO-SS-1-041521, LAO-SS-1-041921, and LAO-SS-1T-041921 were bracketed by this CCV; therefore, samples LAO-SS-1-041521 and LAO-SS-1T-041921 were qualified "UJ" and LAO-SS-1-041921 was qualified "J-".

Comments: All total metals calibrations, ICV, and CCV results were within the control limits.

3. Blanks

Were Initial and Continuing Calibration Blanks (ICB and CCBs) analyzed?	Y	X	N	
Were ICBs and CCBs within the control window?	Y	X	N	
Were Method Blanks (MBs) analyzed at the frequency of 1 per analytical batch?	Y	X	N	
Were MBs within the control window of less than two times the laboratory Method Detection Limit (MDL)?	Y	X	N	
Were any data flagged because of blank problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: A detection of lead (0.000044 mg/L) in the MB required no qualification as the detect was less than 2 times the MDL (0.000086 mg/L), as discussed in the CFRSSI QAPP (ARCO, 1992).

A detection of cadmium (0.000039 mg/L) in the ICB analyzed on 4/28/2021 at 13:52 required no qualification as the detect was less than 2 times the MDL (0.00006 mg/L), as discussed in the CFRSSI QAPP.

A detection of lead (0.000045 mg/L) in the CCB analyzed on 4/29/2021 at 02:44 required no qualification as the detect was less than 2 times the MDL (0.000086 mg/L), as discussed in the CFRSSI QAPP.

4. Interference Check Samples

Were ICP Interference Check Samples (ICS) within the control limits?	Y	X	N	
Were any data flagged because of ICS problems?	Y		N	X

Describe Any Actions Take: None Required.

Comments: On this work order (WO), analytes that were not present in ICS Solution A but were detected included: arsenic, cadmium, copper, lead, silver, uranium, and zinc. The percent recovery (%R) for Solution A and Solution AB were within the control limits.

5. Laboratory Control Samples

Were Laboratory Control Samples (LCS) analyzed at the frequency of 1 per batch?	Y	X	N	
What was the source of the LCS?	Unknown			
Were LCS results within the control window of 80 to 120%?	Y	X	N	
Were any data flagged because of LCS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: The %R for the LCS were within the control limits.

6. Duplicate Sample Results

Were Laboratory Duplicate Samples (LDS) analyzed at the frequency of 1 per batch?	Y	X	N	
Were LDS results within the control window ≤ 20% Relative Percent Difference (RPD)?	Y	X	N	
Were any data flagged because of LDS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: For batch 737510, the LMS and LMS Duplicate (LMSD) samples for mercury were generated from sample LAO-SS-1-041921 and used for the LDS calculation. The data user should be aware that the RPD was within control limits. No qualifications were warranted.

For batch 736538, the LMS and LMSD samples for total metals were generated from sample LAO-SS-1-041921 and used for the LDS calculations. The data user should be aware that all RPDs were within control limits. No qualifications were warranted.

7. Matrix Spike Sample Results

Were Laboratory Matrix Spike Samples (LMS) analyzed at the frequency of 1 per batch?	Y	X	N	
Were LMS results within the control window 75 to 125%?	Y		N	X
Were any data flagged because of LMS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: Sample LAO-SS-1-041921 was used to generate an LMS/LMSD sample pair for total metals. The %R for the LMS and LMSD for calcium (-305% and 7%, respectively) and magnesium (-49% and 33%, respectively) were outside control limits. Per the NFG, *"Spike recovery limits do not apply when the original sample concentration is ≥ 4 times the spike added. In such an event, the data shall be reported unflagged, even if the %R does not meet acceptance criteria"* (EPA, 2017). The original sample concentrations of these analytes were greater than 4 times the added spike amount; therefore, no qualifications were warranted. The remaining %R were within control limits (75-125%). A second LMS was performed on a sample not from this WO. The %R for the LMS were within control limits.

Sample LAO-SS-1-041921 was used to generate an LMS/LMSD sample pair for total mercury. The %R for the LMS and LMSD were within control limits.

8. ICP Serial Dilutions

Were ICP Serial Dilutions (SD) analyzed at the frequency of 1 per batch?	Y	X	N	
Were SD percent differences (%D) results within the control limits?	Y		N	X
Were any data flagged because of SD problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: Sample LAO-SS-1-041921 was used to generate the SD. The %Ds for cadmium (42.6%) and lead (102.3%) were outside control limits, but the original sample concentrations were less than 50 times the MDL; therefore, no qualifications were warranted.

9. Internal Standards

Were internal standards added to each sample in the analytical batch?	Y	X	N	
Were the percent relative intensity recoveries (%RI) within the control limits of 60 to 125%	Y	X	N	
Were any data flagged because of internal standard problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: Internal standards used on 4/29/2021 at 06:04 included: Ge-72, In-115, Sc-45-IS, Tb-159, and Th-232. The Calibration 0 %RI equaled 100% for all internal standards. The remaining %RI ranged from 88.3% to 104.7%. The internal standards were within the control limits (60-125%); therefore, no qualifications were warranted.

10. Field Blanks

Were field blanks (FB) submitted as specified in the Sampling Analysis Plan (SAP)?	Y	X	N	
Were any data qualified because of field blank problems?	Y	X	N	

Describe Any Actions Taken: The rinsate blank, LAO-SS-10-041921, had a lead detection (0.00027 mg/L) that was greater than 2 times the MDL (0.000086 mg/L). Since the rinsate blank is collected from a designated ISCO sampler that is located at LAO-SS-1, qualifications only apply to samples taken from that location. Samples LAO-SS-1-041521 (0.00017 mg/L), LAO-SS-1-041921 (0.00031 mg/L), and LAO-SS-1T-041921 (0.00023 mg/L) had lead detects reported less than 5 times the blank detect (0.00135 mg/L); therefore, these samples were qualified "U".

Comments: The field blank, LAO-SS-4-041921, had a detect of aluminum (0.01 mg/L) that was less than 2 times the MDL (0.0142 mg/L). No qualifications were required, as discussed in the CFRSSI QAPP (ARCO, 1992).

The rinsate blank, LAO-SS-10-041921, had detects for calcium (0.13 mg/L), magnesium (0.067 mg/L), and total hardness (0.61 mg/L) that were greater than 2 times the MDL (0.03 mg/L, 0.0078 mg/L, and 0.108 mg/L, respectively). All sample results for these analytes were either greater than 5 times the blank detect or non-detect; therefore, no qualifications were warranted.

11. Field Duplicates

Were field duplicates submitted as specified in the SAP?	Y	X	N	
Were field duplicates within the control limits?	Y		N	X
Were any data qualified because of field duplicate problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: The field duplicate pair for April 2021 was submitted on this WO: samples LAO-SS-1-041921 and LAO-SS-1T-041921. All results were within control limits.

12. Overall Assessment

Are there analytical limitations of the data that users should be aware of? Y [X] N [ ]

If so, explain: On this WO 10556183, the following qualifications were made:

In additional to the qualifications outlined in the sections above, results which are reported between the method detection limit and the reporting limit were qualified "A" when no additional qualifications were warranted.

The table below lists the qualifications on the natural samples:

Field ID	Analyte	Final Qualification	Reason Code
LAO-SS-1-041521	Mercury	UJ	CCV
LAO-SS-1-041921	Mercury	J-	CCV, <RL
LAO-SS-1-041521	Lead	U	RB
LAO-SS-1-041921	Lead	U	RB
LAO-SS-1-041521	Aluminum	A	<RL
LAO-SS-1-041521	Iron	A	<RL
LAO-SS-1-041921	Aluminum	A	<RL
LAO-SS-1-041921	Iron	A	<RL

The table below lists the qualifications on the field quality control samples:

Field ID	Analyte	Final Qualification	Reason Code
LAO-SS-1T-041921	Mercury	UJ	CCV
LAO-SS-1T-041921	Lead	U	RB
LAO-SS-1T-041921	Aluminum	A	<RL
LAO-SS-1T-041921	Iron	A	<RL
LAO-SS-4-041921	Aluminum	A	<RL
LAO-SS-10-041921	Zinc	A	<RL

Comments:

13. Authorization of Data Validation

Data Validator

Name: Sara Ward **Reviewed By:** Shelby Green

Signature: Sara Ward Shelby Green

Date: 6/30/2021 7/6/2021

Site: Butte Priority Soils Operable Unit	**Case No**: 10557202	**Laboratory**: Pace Analytical
Project: BTL-LAO Monitoring	**Matrix**: Water	**Analyses**: Total Metals: Al, As, Ca, Cd, Cu, Fe, Hg, Pb, Mg, Ag, U-238, and Zn Total Hardness (Calculation)
Sample Date: 4/22/2021, 4/26/2021	**Analysis Dates**: 4/29/2021, 5/10/2021	
Data Validator: S. Ward	**Validation Dates**: 6/30/2021	

1. Holding Times

Analyte	Laboratory	Matrix	Method	Holding Times (Days)	Collection Date	Analysis Date(s)	Holding Time Met (Y/N)	Affected Data Flagged (Y/N)
Al, As, Ca, Cd, Cu, Fe, Pb, Mg, Ag, U-238, Zn	Pace	Water	EPA Method 200.8	180	4/22/2021, 4/26/2021	5/10/2021	Y	NA
Total Hardness	Pace	Water	2340B (Calculation)	180			Y	NA
Mercury	Pace	Water	EPA Method 245.1	28		4/29/2021	Y	NA

*Reference for Holding Times – Clark Fork Superfund Site Investigations, Laboratory Analysis Plan (LAP) and PACE Analytical Guide (PAC) for Holding Times

Were any data flagged because of holding time?	Y [ ]	N [X]
Were any data flagged because of preservation problems?	Y [ ]	N [X]

Describe Any Actions Taken: None Required.

Comments: The receiving temperature as reported by the laboratory was 2.7 °C. The samples were shipped on ice and reported as properly preserved.

2. Instrument Calibration

Was the Tune analysis information performed?	Y [X]	N [ ]
Was the peak width and resolution of the masses within the required control limits?	Y [X]	N [ ]
Was the percent relative standard deviation ≤ 5% for all analytes in the Tune solutions?	Y [X]	N [ ]
Was the instrument successfully calibrated at the correct frequency?	Y [X]	N [ ]
Was the instrument calibrated with the appropriate standards and blanks?	Y [X]	N [ ]
Were Initial Calibration Verification (ICV) and Continuing Calibration Verification (CCV) samples analyzed?	Y [X]	N [ ]
Were ICV and CCV results within the control window?	Y [X]	N [ ]
Were any data flagged because of calibration problems?	Y [ ]	N [X]

Describe Any Actions Taken: None Required.

Comments: All total metals and mercury calibrations, ICV, and CCV results were within the control limits.

3. Blanks

Were Initial and Continuing Calibration Blanks (ICB and CCBs) analyzed?	Y [X]	N [ ]
Were ICBs and CCBs within the control window?	Y [X]	N [ ]
Were Method Blanks (MBs) analyzed at the frequency of 1 per analytical batch?	Y [X]	N [ ]
Were MBs within the control window of less than two times the laboratory Method Detection Limit (MDL)?	Y [X]	N [ ]
Were any data flagged because of blank problems?	Y [ ]	N [X]

Describe Any Actions Taken: None Required.

Comments: There were no detections for total metals or mercury in the MBs, ICBs, or CCBs.

4. Interference Check Samples

Were ICP Interference Check Samples (ICS) within the control limits?	Y		N	X
Were any data flagged because of ICS problems?	Y	X	N	

Describe Any Actions Take: In the ICS Solution A analyzed on 5/10/2021 at 10:48, there was an absolute detection of cadmium (0.037 ug/L) greater than the MDL (0.030 ug/L). The raw data showed that the levels for some interferents (Ca, Mg, and Na) were higher than the corresponding true values in the ICS Solution A. The cadmium results for samples LAO-SS-1-042221 and LAO-SS-1-042621 were qualified "J-" due to a negative detection in the ICS Solution A and the results (0.28 ug/L and 0.22 ug/L, respectively) being less than 10 times the absolute value of the detection (0.37 ug/L).

Comments: On this work order (WO), analytes that were not present in ICS Solution A but were detected included: arsenic, cadmium, copper, lead, silver, uranium, and zinc. The percent recovery (%R) for Solution A and Solution AB were within the control limits.

5. Laboratory Control Samples

Were Laboratory Control Samples (LCS) analyzed at the frequency of 1 per batch?	Y	X	N	
What was the source of the LCS?	Unknown			
Were LCS results within the control window of 80 to 120%?	Y	X	N	
Were any data flagged because of LCS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: The %R for the LCS were within the control limits.

6. Duplicate Sample Results

Were Laboratory Duplicate Samples (LDS) analyzed at the frequency of 1 per batch?	Y	X	N	
Were LDS results within the control window ≤ 20% Relative Percent Difference (RPD)?	Y	X	N	
Were any data flagged because of LDS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: For batch 738159, the LMS and LMS Duplicate (LMSD) samples for mercury were generated from sample LAO-SS-1-042221 and used for the LDS calculation. The data user should be aware that the RPD was within control limits. No qualifications were warranted.

For batch 738486, the LMS and LMSD samples for total metals were generated from sample LAO-SS-1-042221 and used for the LDS calculations. The data user should be aware that all RPDs were within control limits. No qualifications were warranted.

7. Matrix Spike Sample Results

Were Laboratory Matrix Spike Samples (LMS) analyzed at the frequency of 1 per batch?	Y	X	N	
Were LMS results within the control window 75 to 125%?	Y		N	X
Were any data flagged because of LMS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: Sample LAO-SS-1-042221 was used to generate an LMS/LMSD sample pair for total metals. The %R for the LMS and LMSD for calcium (-244% and -234%, respectively) and magnesium (-8% and -16%, respectively) were outside control limits. Per the NFG, *"Spike recovery limits do not apply when the original sample concentration is ≥ 4 times the spike added. In such an event, the data shall be reported unflagged, even if the %R does not meet acceptance criteria"* (EPA, 2017). The original sample concentrations of these analytes were greater than 4 times the added spike amount; therefore, no qualifications were warranted. The remaining %R were within control limits.

Sample LAO-SS-1-042221 was used to generate an LMS/LMSD sample pair for total mercury. The %R for the LMS and LMSD were within control limits.

8. ICP Serial Dilutions

Were ICP Serial Dilutions (SD) analyzed at the frequency of 1 per batch?	Y	X	N		
Were SD percent differences (%D) results within the control limits?	Y		N	X	
Were any data flagged because of SD problems?	Y		N	X	

Describe Any Actions Taken: None Required.

Comments: Sample LAO-SS-1-042221 was used to generate the SD. The %Ds for aluminum (2717.2%), cadmium (27.2%), and lead (23.2%) were outside control limits, but the original sample concentrations were less than 50 times the MDL; therefore, no qualifications were warranted.

9. Internal Standards

Were internal standards added to each sample in the analytical batch?	Y	X	N		
Were the percent relative intensity recoveries (%RI) within the control limits of 60 to 125%	Y	X	N		
Were any data flagged because of internal standard problems?	Y		N	X	

Describe Any Actions Taken: None Required.

Comments: Internal standards used on 5/10/2021 at 10:05 included: Ge-72, In-115, Ir-193-IS, Sc-45-IS, and Tb-159. The Calibration 0 %RI equaled 100% for all internal standards. The remaining %RI ranged from 84.8% to 104.3%. The internal standards were within the control limits; therefore, no qualifications were warranted.

10. Field Blanks

Were field blanks (FB) submitted as specified in the Sampling Analysis Plan (SAP)?	Y	X	N		
Were any data qualified because of field blank problems?	Y		N		N/A

Describe Any Actions Taken: None Required.

Comments: There was no field blank included in this WO. Field blanks are collected monthly and are summarized in the *Field Blank Samples with Results, Laboratory Flags, Data Validation Qualifiers, Data Validation Reason Codes, and QC Criteria Calculations* table in the Data Validation Report.

11. Field Duplicates

Were field duplicates submitted as specified in the SAP?	Y	X	N		
Were field duplicates within the control limits?	Y		N		N/A
Were any data qualified because of field duplicate problems?	Y		N		N/A

Describe Any Actions Taken: None required.

Comments: There was no field duplicate pair included in this WO. Field duplicates are collected monthly and are summarized in the *Field Duplicate Pair Samples with Results, Laboratory Flags, Data Validation Qualifiers, Data Validation Reason Codes, and QC Criteria Calculations* table in the Data Validation Report.

12. Overall Assessment

Are there analytical limitations of the data that users should be aware of?	Y	X	N	

If so, explain: On this WO 10557202, the following qualifications were made:

In additional to the qualifications outlined in the sections above, results which are reported between the method detection limit and the reporting limit were qualified "A" when no additional qualifications were warranted.

Field ID	Analyte	Final Qualification	Reason Code
LAO-SS-1-042221	Cadmium	J-	ICS
LAO-SS-1-042621	Cadmium	J-	ICS
LAO-SS-1-042621	Aluminum	A	<RL
LAO-SS-1-042621	Iron	A	<RL

Comments:

13. Authorization of Data Validation

Data Validator		
Name:	Sara Ward	**Reviewed By:** Shelby Green
Signature:	Sara Ward	Shelby Green
Date:	6/30/2021	7/16/2021

Site: Butte Priority Soils Operable Unit	**Case No**: 10558433	**Laboratory**: Pace Analytical
Project: BTL-LAO Monitoring	**Matrix**: Water	**Analyses**: Total Metals: Al, As, Ca, Cd, Cu, Fe, Hg, Pb, Mg, Ag, U-238, and Zn
Sample Date: 4/29/2021, 5/3/2021	**Analysis Dates**: 5/18/2021, 5/19/2021	Total Hardness (Calculation)
Data Validator: S. Ward	**Validation Dates**: 7/1/2021	

1. Holding Times

Analyte	Laboratory	Matrix	Method	Holding Times (Days)	Collection Date	Analysis Date(s)	Holding Time Met (Y/N)	Affected Data Flagged (Y/N)
Al, As, Ca, Cd, Cu, Fe, Pb, Mg, Ag, U-238, Zn	Pace	Water	EPA Method 200.8	180	4/29/2021, 5/3/2021	5/18/2021, 5/19/2021	Y	NA
Total Hardness	Pace	Water	2340B (Calculation)	180			Y	NA
Mercury	Pace	Water	EPA Method 245.1	28		5/18/2021	Y	NA

*Reference for Holding Times – Clark Fork Superfund Site Investigations, Laboratory Analysis Plan (LAP) and PACE Analytical Guide (PAC) for Holding Times

Were any data flagged because of holding time?	Y [ ]	N [X]
Were any data flagged because of preservation problems?	Y [ ]	N [X]

Describe Any Actions Taken: None Required.

Comments: The receiving temperature as reported by the laboratory was 0.2 °C. The samples were shipped on ice and reported as properly preserved.

2. Instrument Calibration

Was the Tune analysis information performed?	Y [X]	N [ ]
Was the peak width and resolution of the masses within the required control limits?	Y [X]	N [ ]
Was the percent relative standard deviation ≤ 5% for all analytes in the Tune solutions?	Y [X]	N [ ]
Was the instrument successfully calibrated at the correct frequency?	Y [X]	N [ ]
Was the instrument calibrated with the appropriate standards and blanks?	Y [X]	N [ ]
Were Initial Calibration Verification (ICV) and Continuing Calibration Verification (CCV) samples analyzed?	Y [X]	N [ ]
Were ICV and CCV results within the control window?	Y [X]	N [ ]
Were any data flagged because of calibration problems?	Y [ ]	N [X]

Describe Any Actions Taken: None Required.

Comments: All total metals and mercury calibrations, ICV, and CCV results were within the control limits.

3. Blanks

Were Initial and Continuing Calibration Blanks (ICB and CCBs) analyzed?	Y [X]	N [ ]
Were ICBs and CCBs within the control window?	Y [X]	N [ ]
Were Method Blanks (MBs) analyzed at the frequency of 1 per analytical batch?	Y [X]	N [ ]
Were MBs within the control window of less than two times the laboratory Method Detection Limit (MDL)?	Y [X]	N [ ]
Were any data flagged because of blank problems?	Y [ ]	N [X]

Describe Any Actions Taken: None Required.

Comments: The ICB analyzed 5/18/21 at 14:58 had detects for cadmium (0.033 ug/L) and silver (0.11 ug/L) less than 2 times the MDL (0.06 ug/L and 0.154 ug/L, respectively); therefore, no qualifications were warranted.

The CCBs analyzed 5/18/21 at 15:18, 5/18/21 at 16:04, 5/19/21 at 00:35, 5/19/21 at 01:16, 5/19/21 at 01:58, 5/19/21 at 02:27, and 5/19/21 at 03:05 had detects for silver (0.085 ug/L, 0.099 ug/L, 0.12 ug/L, 0.11 ug/L, 0.13 ug/L, and 0.14 ug/L) less than 2 times the MDL (0.154 ug/L); therefore, no qualifications were warranted.

The ICB analyzed 5/19/21 at 07:24 and CCBs analyzed 5/19/21 at 07:46, 5/19/21 at 09:49, 5/19/21 at 10:39, 5/19/21 at 11:01, and 5/19/21 at 11:27 had detects for silver (0.13 ug/L, 0.11 ug/L, 0.1 ug/L, and 0.091 ug/L) less than 2 times the MDL; therefore, no qualifications were warranted.

There was a detect for mercury in the MB (0.000006 mg/L) less than 2 times the MDL (0.000009 mg/L); therefore, no qualifications were warranted.

4. Interference Check Samples

Were ICP Interference Check Samples (ICS) within the control limits?	Y		N	X
Were any data flagged because of ICS problems?	Y	X	N	

Describe Any Actions Take: In the ICS Solution A analyzed on 5/19/2021 at 00:22, there was an absolute detection of cadmium (0.0387 ug/L) greater than the MDL (0.030 ug/L). The raw data showed that the levels for some interferents (Ca, Mg, and Na) were higher than the corresponding true values in the ICS Solution A. The cadmium result for sample LAO-SS-1-050321 was qualified "J-" due to a negative detection in the ICS Solution A and the result (0.18 ug/L) being less than 10 times the absolute value of the detection (0.387 ug/L). The other samples were either greater than 10 times the absolute value of the detection or analyzed on a different day.

Comments: On this work order (WO), analytes that were not present in ICS Solution A but were detected included: arsenic, cadmium, copper, lead, silver, uranium, and zinc. The percent recovery (%R) for Solution A and Solution AB were within the control limits.

In the ICS Solution A analyzed on 5/18/2021 at 15:05, there was a detection of silver (0.204 ug/L) greater than the MDL (0.077 ug/L). The raw data showed that the levels for some interferents (Ca, Mg, and Na) were higher than the corresponding true values in the ICS Solution A. All sample results for silver were non-detect; therefore, no qualifications were warranted.

In the ICS Solution A analyzed on 5/19/2021 at 00:22, there was a detection of silver (0.2004 ug/L) greater than the MDL (0.077 ug/L). The raw data showed that the levels for some interferents (Ca, Mg, and Na) were higher than the corresponding true values in the ICS Solution A. All sample results for silver were non-detect; therefore, no qualifications were warranted.

In the ICS Solution A analyzed on 5/19/2021 at 07:31, there was a detection of silver (0.212 ug/L) greater than the MDL (0.077 ug/L). The raw data showed that the levels for some interferents (Ca, Mg, and Na) were higher than the corresponding true values in the ICS Solution A. All sample results for silver were non-detect; therefore, no qualifications were warranted.

5. Laboratory Control Samples

Were Laboratory Control Samples (LCS) analyzed at the frequency of 1 per batch?	Y	X	N	
What was the source of the LCS?	Unknown			
Were LCS results within the control window of 80 to 120%?	Y	X	N	
Were any data flagged because of LCS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: The %R for the LCS were within the control limits.

6. Duplicate Sample Results

Were Laboratory Duplicate Samples (LDS) analyzed at the frequency of 1 per batch?	Y	X	N	
Were LDS results within the control window ≤ 20% Relative Percent Difference (RPD)?	Y	X	N	
Were any data flagged because of LDS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: For batch 741976, the LMS and LMS Duplicate (LMSD) samples for mercury were generated from sample LAO-SS-1-042921 and used for the LDS calculation. The data user should be aware that the RPD was within control limits. No qualifications were warranted.

For batch 741410, the LMS and LMSD samples for total metals were generated from sample LAO-SS-1-042921 and used for the LDS calculations. The data user should be aware that all RPDs were within control limits. No qualifications were warranted.

7. Matrix Spike Sample Results

Were Laboratory Matrix Spike Samples (LMS) analyzed at the frequency of 1 per batch?	Y	X	N		
Were LMS results within the control window 75 to 125%?	Y		N	X	
Were any data flagged because of LMS problems?	Y		N	X	

Describe Any Actions Taken: None Required.

Comments: Sample LAO-SS-1-042921 was used to generate an LMS/LMSD sample pair for total metals. The %R for the LMS and LMSD for calcium (204% and 545%, respectively) and magnesium (132% and 261%, respectively) were outside control limits. Per the NFG, *"Spike recovery limits do not apply when the original sample concentration is ≥ 4 times the spike added. In such an event, the data shall be reported unflagged, even if the %R does not meet acceptance criteria"* (EPA, 2017). The original sample concentrations of these analytes were greater than 4 times the added spike amount; therefore, no qualifications were warranted. An additional LMS sample was generated from a sample not from this WO. The %R for the LMS for magnesium (60%) was outside control limits. Because the LMS was from a different WO, no qualifications were warranted.

Sample LAO-SS-1-042921 was used to generate an LMS/LMSD sample pair for total mercury. The %R for the LMS and LMSD were within control limits. An additional LMS was generated from a sample not from this WO. The %R for the LMS was within control limits.

8. ICP Serial Dilutions

Were ICP Serial Dilutions (SD) analyzed at the frequency of 1 per batch?	Y	X	N		
Were SD percent differences (%D) results within the control limits?	Y		N	X	
Were any data flagged because of SD problems?	Y		N	X	

Describe Any Actions Taken: None Required.

Comments: Sample LAO-SS-1-042921 was used to generate the SD. The %Ds for cadmium (118.9%) and lead (166.7%) were outside control limits, but the original sample concentrations were less than 50 times the MDL; therefore, no qualifications were warranted.

9. Internal Standards

Were internal standards added to each sample in the analytical batch?	Y	X	N		
Were the percent relative intensity recoveries (%RI) within the control limits of 60 to 125%	Y	X	N		
Were any data flagged because of internal standard problems?	Y		N	X	

Describe Any Actions Taken: None Required.

Comments: Internal standards used on 5/18/2021 at 14:25 included: Ge-72, In-115, Ir-193-IS, Sc-45-IS, and Tb-159. The Calibration 0 %RI equaled 100% for all internal standards. The remaining %RI ranged from 72.0% to 103.0%. The internal standards were within the control limits; therefore, no qualifications were warranted.

Internal standards used on 5/19/2021 at 06:52 included: Ge-72, In-115, Ir-193-IS, Sc-45-IS, and Tb-159. The Calibration 0 %RI equaled 100% for all internal standards. The remaining %RI ranged from 86.8% to 104.1%. The internal standards were within the control limits; therefore, no qualifications were warranted.

10. Field Blanks

Were field blanks (FB) submitted as specified in the Sampling Analysis Plan (SAP)?	Y	X	N			
Were any data qualified because of field blank problems?	Y		N		N/A	

Describe Any Actions Taken: None Required.

Comments: There was no field blank included in this WO. Field blanks are collected monthly and are summarized in the *Field Blank Samples with Results, Laboratory Flags, Data Validation Qualifiers, Data Validation Reason Codes, and QC Criteria Calculations* table in the Data Validation Report.

11. Field Duplicates

Were field duplicates submitted as specified in the SAP?	Y	X	N		
Were field duplicates within the control limits?	Y		N		N/A
Were any data qualified because of field duplicate problems?	Y		N		N/A

Describe Any Actions Taken: None required.

Comments: There was no field duplicate pair included in this WO. Field duplicates are collected monthly and are summarized in the *Field Duplicate Pair Samples with Results, Laboratory Flags, Data Validation Qualifiers, Data Validation Reason Codes, and QC Criteria Calculations* table in the Data Validation Report.

12. Overall Assessment

Are there analytical limitations of the data that users should be aware of? Y [X] N [ ]

If so, explain: On this WO 10558433, the following qualifications were made:

In additional to the qualifications outlined in the sections above, results which are reported between the method detection limit and the reporting limit were qualified "A" when no additional qualifications were warranted.

Field ID	Analyte	Final Qualification	Reason Code
LAO-SS-1-050321	Cadmium	J-	ICS
LAO-SS-1-042921	Iron	A	<RL
LAO-SS-1-050321	Iron	A	<RL

Comments:

13. Authorization of Data Validation

Data Validator

Name: Sara Ward **Reviewed By:** Shelby Green

Signature: Sara Ward Shelby Green

Date: 7/1/2021 7/16/2021

Site: Butte Priority Soils Operable Unit	**Case No**: 10559768	**Laboratory**: Pace Analytical
Project: BTL-LAO Monitoring	**Matrix**: Water	**Analyses**: Total Metals: Al, As, Ca, Cd, Cu, Fe, Hg, Pb, Mg, Ag, U-238, and Zn Total Hardness (Calculation)
Sample Date: 5/6/2021, 5/10/2021	**Analysis Dates**: 5/27/2021, 6/1/2021, 6/3/2021, 6/8/2021, 6/25/2021	
Data Validator: S. Ward	**Validation Dates**: 8/23/2021, 8/24/2021	

1. Holding Times

Analyte	Laboratory	Matrix	Method	Holding Times (Days)	Collection Date	Analysis Date(s)	Holding Time Met (Y/N)	Affected Data Flagged (Y/N)
Al, As, Ca, Cd, Cu, Fe, Pb, Mg, Ag, U-238, Zn	Pace	Water	EPA Method 200.8	180	5/6/2021, 5/10/2021	5/27/2021, 6/1/2021, 6/3/2021, 6/25/2021	Y	NA
Total Hardness	Pace	Water	2340B (Calculation)	180			Y	NA
Mercury	Pace	Water	EPA Method 245.1	28		6/3/2021, 6/8/2021	N	Y

*Reference for Holding Times – Clark Fork Superfund Site Investigations, Laboratory Analysis Plan (LAP) and PACE Analytical Guide (PAC) for Holding Times

Were any data flagged because of holding time?	Y	X	N	
Were any data flagged because of preservation problems?	Y		N	X

Describe Any Actions Taken: The mercury-low level analysis was performed 1-5 days past the holding time. All natural samples had a detect for mercury. Mercury-low level results were qualified "J-" for detect results and "UJ" for non-detect results.

Comments: The receiving temperature as reported by the laboratory was 4.6 °C. The samples were shipped on ice and reported as properly preserved. There was no temperature blank present, so the temperature was averaged from 4 separate temperature readings.

2. Instrument Calibration

Was the Tune analysis information performed?	Y	X	N	
Was the peak width and resolution of the masses within the required control limits?	Y	X	N	
Was the percent relative standard deviation ≤ 5% for all analytes in the Tune solutions?	Y	X	N	
Was the instrument successfully calibrated at the correct frequency?	Y	X	N	
Was the instrument calibrated with the appropriate standards and blanks?	Y	X	N	
Were Initial Calibration Verification (ICV) and Continuing Calibration Verification (CCV) samples analyzed?	Y	X	N	
Were ICV and CCV results within the control window?	Y	X	N	
Were any data flagged because of calibration problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: For the 6/1/21 total metals calibration, the lab rejected the Cal 6 standard for uranium. The calibration was formed with 5 standards.

For the 6/2/21 total metals calibration, the lab rejected the Cal 7 standard for magnesium. The calibration was formed with 6 standards.

3. Blanks

Were Initial and Continuing Calibration Blanks (ICB and CCBs) analyzed?	Y	X	N	
Were ICBs and CCBs within the control window?	Y	X	N	
Were Method Blanks (MBs) analyzed at the frequency of 1 per analytical batch?	Y	X	N	
Were MBs within the control window of less than two times the laboratory Method Detection Limit (MDL)?	Y		N	X
Were any data flagged because of blank problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: A detection of silver in the CCBs (0.000150 mg/L, 0.000140 mg/L, 0.000130 mg/L, 0.000120 mg/L, 0.000130 mg/L) analyzed on 6/25/2021 required no qualification as the detects were less than 2 times the MDL (0.000154 mg/L), as discussed in the CFRSSI QAPP (ARCO, 1992).

A detection of magnesium in the CCBs (0.0044 mg/L and 0.0043 mg/L) analyzed on 6/25/2021 required no qualification as the detects were less than 2 times the MDL (0.0078 mg/L), as discussed in the CFRSSI QAPP.

A detection of magnesium in the MB (0.0081 mg/L) analyzed on 5/27/2021 was greater than 2 times the MDL (0.0078 mg/L) but required no qualifications since all associated magnesium results were greater the 5 times the blank level or non-detect.

4. Interference Check Samples

Were ICP Interference Check Samples (ICS) within the control limits?	Y		N	X
Were any data flagged because of ICS problems?	Y	X	N	

Describe Any Actions Take: In the ICS Solution A analyzed on 5/27/21 at 10:40, there was an absolute detection of cadmium (0.073 ug/L) greater than the MDL (0.030 ug/L). The raw data showed that the levels for some interferents (Ca, Mg, and Na) were higher than the corresponding true values in the ICS Solution A. The cadmium results for LAO-SS-1-050621 and LAO-SS-1T-051021 were qualified "J+" due to a detection in the ICS Solution A and the results being less than 10 times the ICSA detection.

In the ICS Solution A analyzed on 5/27/21 at 10:40, there was an absolute detection of lead (0.082 ug/L) greater than the MDL (0.043 ug/L). The raw data showed that the levels for some interferents (Ca, Mg, and Na) were higher than the corresponding true values in the ICS Solution A. The lead results for LAO-SS-1-050621 and LAO-SS-1T-051021 were qualified "J+" due to a detection in the ICS Solution A and the results being less than 10 times the ICSA detection.

In the ICS Solution A analyzed on 6/2/21 at 12:56, there was an absolute detection of cadmium (0.040 ug/L) greater than the MDL (0.030 ug/L). The raw data showed that the levels for some interferents (Ca, Mg, and Na) were higher than the corresponding true values in the ICS Solution A. The cadmium result for LAO-SS-1-051021 was qualified "J+" due to a detection in the ICS Solution A and the result being less than 10 times the ICSA detection.

In the ICS Solution A analyzed on 6/2/21 at 12:56, there was an absolute detection of lead (0.082 ug/L) greater than the MDL (0.043 ug/L). The raw data showed that the levels for some interferents (Ca, Mg, and Na) were higher than the corresponding true values in the ICS Solution A. The lead result for LAO-SS-1-051021 was qualified "J+" due to a detection in the ICS Solution A and the result being less than 10 times the ICSA detection.

Comments: On this work order (WO), analytes that were not present in ICS Solution A but were detected included: arsenic, cadmium, copper, lead, silver, uranium, and zinc. The percent recovery (%R) for Solution A and Solution AB were within the control limits.

In the ICS Solution A analyzed on 6/1/2021 at 10:52, there was an absolute detection of lead (0.079 ug/L) greater than the MDL (0.043 ug/L). The raw data showed that the levels for some interferents (Ca, Mg, and Na) were higher than the corresponding true values in the ICS Solution A. No results for lead were reported on 6/1/2021; therefore, no qualifications were warranted.

In the ICS Solution A analyzed on 6/25/2021 at 09:16, there was an absolute detection of lead (0.062 ug/L) and silver (0.107 ug/L) greater than the MDL (0.043 ug/L and 0.077 ug/L, respectively). The raw data for LAO-SS-10-051021 showed that the levels for the interferents (Ca, Mg, and Na) were not similar to the corresponding true values in the ICS Solution A; therefore, no qualifications were warranted.

5. Laboratory Control Samples

Were Laboratory Control Samples (LCS) analyzed at the frequency of 1 per batch?	Y	X	N	
What was the source of the LCS?	Unknown			
Were LCS results within the control window of 80 to 120%?	Y	X	N	
Were any data flagged because of LCS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: The %R for the LCS were within the control limits.

6. Duplicate Sample Results

Were Laboratory Duplicate Samples (LDS) analyzed at the frequency of 1 per batch?	Y	X	N	
Were LDS results within the control window ≤ 20% Relative Percent Difference (RPD)?	Y	X	N	
Were any data flagged because of LDS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: For batch 746249, the LMS and LMS Duplicate (LMSD) samples for mercury were generated from sample LAO-SS-1-050621 and used for the LDS calculation. The data user should be aware that the RPD was within control limits. No qualifications were warranted.

For batch 746557, the LMS and LMSD samples for mercury-low level were generated from sample LAO-SS-1T-051021 and used for the LDS calculation. The data user should be aware that the RPD was within control limits. No qualifications were warranted.

For batch 744521, the LMS and LMSD samples for total metals were generated from sample LAO-SS-1-051021 and used for the LDS calculations. The data user should be aware that all RPDs were within control limits. No qualifications were warranted.

For batch 751752, the LCS and LCSD samples for total metals were used for the LDS calculations. The data user should be aware that all RPDs were within control limits. No qualifications were warranted.

7. Matrix Spike Sample Results

Were Laboratory Matrix Spike Samples (LMS) analyzed at the frequency of 1 per batch?	Y	X	N	
Were LMS results within the control window 75 to 125%?	Y		N	X
Were any data flagged because of LMS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: Sample LAO-SS-1-051021 was used to generate an LMS/LMSD sample pair for total metals batch 744521. The %R for the LMS for calcium (-178%) and magnesium (2%) were outside control limits. Per the NFG, *"Spike recovery limits do not apply when the original sample concentration is ≥ 4 times the spike added. In such an event, the data shall be reported unflagged, even if the %R does not meet acceptance criteria"* (EPA, 2017). The original sample concentrations of these analytes were greater than 4 times the added spike amount; therefore, no qualifications were warranted. The remaining %R were within control limits (75-125%).

Sample LAO-SS-1-050621 was used to generate an LMS/LMSD sample pair for total mercury. The %R for the LMS and LMSD were within control limits.

Sample LAO-SS-1T-051021 was used to generate an LMS/LMSD sample pair for total mercury-low level. The %R for the LMS and LMSD were within control limits.

For total metals batch 751752, no LMS/LMSD was performed. The data was accepted based on the LCS/LCSD results.

8. ICP Serial Dilutions

Were ICP Serial Dilutions (SD) analyzed at the frequency of 1 per batch?	Y	X	N	
Were SD percent differences (%D) results within the control limits?	Y		N	X
Were any data flagged because of SD problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: Sample LAO-SS-1-051021 was used to generate the SD. The %D for cadmium (53.2%) was outside control limits, but the original sample concentration was less than 50 times the MDL; therefore, no qualifications were warranted.

9. Internal Standards

Were internal standards added to each sample in the analytical batch?	Y	X	N	
Were the percent relative intensity recoveries (%RI) within the control limits of 60 to 125%	Y	X	N	
Were any data flagged because of internal standard problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: Internal standards used on 5/27/2021 included: Ge-72, In-115, Ir-193, Sc-45-IS, and Tb-159. The Calibration 0 %RI equaled 100% for all internal standards. The remaining %RI ranged from 90.7% to 115.6%. The internal standards were within the control limits (60-125%); therefore, no qualifications were warranted.

Internal standards used on 6/1/2021 included: Ge-72, In-115, Ir-193, Sc-45-IS, and Tb-159. The Calibration 0 %RI equaled 100% for all internal standards. The remaining %RI ranged from 88.5% to 104.5%. The internal standards were within the control limits (60-125%); therefore, no qualifications were warranted.

Internal standards used on 6/2/2021 included: Ge-72, In-115, Ir-193, Sc-45-IS, and Tb-159. The Calibration 0 %RI equaled 100% for all internal standards. The remaining %RI ranged from 79% to 102.1%. The internal standards were within the control limits (60-125%); therefore, no qualifications were warranted.

Internal standards used on 6/25/2021 included: Ge-72, In-115, Ir-193, Sc-45-IS, and Tb-159. The Calibration 0 %RI equaled 100% for all internal standards. The remaining %RI ranged from 85.4% to 116.4%. The internal standards were within the control limits (60-125%); therefore, no qualifications were warranted.

10. Field Blanks

Were field blanks (FB) submitted as specified in the Sampling Analysis Plan (SAP)?	Y	X	N	
Were any data qualified because of field blank problems?	Y	X	N	

Describe Any Actions Taken: The rinsate blank, LAO-SS-10-051021, had a detection of copper (0.0039 mg/L) greater than 2 times the MDL (0.00086 mg/L). Since the rinsate blank was collected from a designated ISCO sampler that was located at LAO-SS-1, qualifications only applied to samples taken from that location. LAO-SS-1-050621 (0.016 mg/L), LAO-SS-1-051021 (0.013 mg/L), and LAO-SS-1T-051021 (0.016 mg/L) all had copper detections less than 5 times the rinsate blank detection (0.0195 mg/L); therefore, these samples were qualified "U".

Comments: The field blank, LAO-SS-4-051021, had detections of calcium (0.018 mg/L) and hardness (0.06 mg/L) that were less than 2 times the MDL (0.030 mg/L and 0.108 mg/L, respectively). No qualifications were required, as discussed in the CFRSSI QAPP (ARCO, 1992).

The rinsate blank, LAO-SS-10-051021, had detections of magnesium (0.0076 mg/L) and lead (0.000064 mg/L) that were less than 2 times the MDL (0.0078 mg/L and 0.000086 mg/L, respectively). No qualifications were required, as discussed in the CFRSSI QAPP.

The rinsate blank, LAO-SS-10-061421, had detections of calcium (0.083 mg/L), silver (0.00016 mg/L), and hardness (0.24 mg/L) that were greater than 2 times the MDL (0.03 mg/L, 0.000154 mg/L, and 0.108 mg/L, respectively). All LAO-SS-1 results for calcium, silver, and hardness were either greater than 5 times the blank detect or non-detect; therefore, no qualifications were warranted. Since the rinsate blank was collected from a designated ISCO sampler that was located at LAO-SS-1, qualifications only applied to samples taken from that location.

11. Field Duplicates

Were field duplicates submitted as specified in the SAP?	Y	X	N	
Were field duplicates within the control limits?	Y		N	X
Were any data qualified because of field duplicate problems?	Y	X	N	

Describe Any Actions Taken: The field duplicate pair for May 2021 was submitted on this WO: samples LAO-SS-1-051021 and LAO-SS-1T-051021. For aluminum and lead, the original and/or duplicate sample results were less than 5 times the reporting limit, and the absolute difference between the sample and duplicate was greater than the reporting limit. For copper and zinc, both the original and duplicate samples were greater than 5 times the reporting limit, and the RPD between the sample and duplicate was outside control limits (20%). LAO-SS-051021 and LAO-SS-1T-051021 were qualified "J" for aluminum, copper, lead, and zinc due to field duplicate precision. Per the NFG, "*For a duplicate sample analysis that does not meet the technical criteria, apply the action to all samples of the same matrix if the samples are considered sufficiently similar"* (EPA, 2017). Only LAO-SS-01-050621 was sufficiently similar to warrant a "J" qualification. LAO-SS-1-050621, LAO-SS-1-051021, and LAO-SS-1T-051021 had a previous qualification for lead of "J+" due to a detect in the ICS Solution A, so the final qualification for lead was "J". LAO-SS-1-050621, LAO-SS-1-051021, and LAO-SS-1T-051021 had a previous qualification for copper of "U" due to a detect in the rinsate blank, so the final qualification for copper was "UJ".

Comments: The field duplicate pair for May 2021 was submitted on this WO: samples LAO-SS-1-051021 and LAO-SS-1T-051021. All other total metals and mercury results were within control limits.

12. Overall Assessment

Are there analytical limitations of the data that users should be aware of? Y [X] N [ ]

If so, explain: On this WO 10559768, the following qualifications were made:

In additional to the qualifications outlined in the sections above, results which are reported between the method detection limit and the reporting limit were qualified "A" when no additional qualifications were warranted.

The table below lists the qualifications on the natural samples:

Field ID	Analyte	Final Qualification	Reason Code
LAO-SS-1-050621	Mercury-LL	J-	HT, <RL
LAO-SS-1-051021	Mercury-LL	J-	HT, <RL
LAO-SS-2-051021	Mercury-LL	J-	HT
LAO-SS-3-051021	Mercury-LL	J-	HT, <RL
LAO-SS-1-050621	Cadmium	J+	ICS
LAO-SS-1-050621	Lead	J	ICS, FD
LAO-SS-1-051021	Cadmium	J+	ICS
LAO-SS-1-051021	Lead	J	ICS, FD
LAO-SS-1-050621	Copper	UJ	RB, FD
LAO-SS-1-051021	Copper	UJ	RB, FD
LAO-SS-1-050621	Aluminum	J	FD, <RL
LAO-SS-1-050621	Zinc	J	FD
LAO-SS-1-051021	Aluminum	J	FD, <RL
LAO-SS-1-051021	Zinc	J	FD
LAO-SS-1-050621	Iron	A	<RL
LAO-SS-1-051021	Iron	A	<RL
LAO-SS-2-051021	Mercury	A	<RL

The table below lists the qualifications on the field quality control samples:

Field ID	Analyte	Final Qualification	Reason Code
LAO-SS-1T-051021	Mercury-LL	J-	HT, <RL
LAO-SS-4-051021	Mercury-LL	UJ	HT
LAO-SS-10-051021	Mercury-LL	UJ	HT
LAO-SS-1T-051021	Cadmium	J+	ICS
LAO-SS-1T-051021	Lead	J	ICS, FD
LAO-SS-1T-051021	Copper	UJ	RB, FD
LAO-SS-1T-051021	Aluminum	J	FD
LAO-SS-1T-051021	Zinc	J	FD
LAO-SS-4-051021	Calcium	A	<RL
LAO-SS-4-051021	Hardness	A	<RL
LAO-SS-10-051021	Lead	A	<RL
LAO-SS-10-051021	Magnesium	A	<RL
LAO-SS-10-051021	Silver	A	<RL

Comments:

13. Authorization of Data Validation

Data Validator

Name: Sara Ward **Reviewed By:** Shelby Green

Signature:  

Date: 8/26/2021 8/30/2021

Site: Butte Priority Soils Operable Unit	**Case No**: 10560663	**Laboratory**: Pace Analytical
Project: BTL-LAO Monitoring	**Matrix**: Water	**Analyses**: Total Metals: Al, As, Ca, Cd, Cu, Fe, Hg, Pb, Mg, Ag, U-238, and Zn Total Hardness (Calculation)
Sample Date: 5/13/2021, 5/17/2021	**Analysis Dates**: 6/1/2021, 6/3/2021, 6/8/2021	
Data Validator: S. Ward	**Validation Dates**: 7/1/2021, 7/2/2021	

1. Holding Times

Analyte	Laboratory	Matrix	Method	Holding Times (Days)	Collection Date	Analysis Date(s)	Holding Time Met (Y/N)	Affected Data Flagged (Y/N)
Al, As, Ca, Cd, Cu, Fe, Pb, Mg, Ag, U-238, Zn	Pace	Water	EPA Method 200.8	180	5/13/2021, 5/17/2021	6/1/2021, 6/3/2021	Y	NA
Total Hardness	Pace	Water	2340B (Calculation)	180			Y	NA
Mercury	Pace	Water	EPA Method 245.1	28		6/8/2021	Y	NA

*Reference for Holding Times – Clark Fork Superfund Site Investigations, Laboratory Analysis Plan (LAP) and PACE Analytical Guide (PAC) for Holding Times

Were any data flagged because of holding time? Y [ ] N [X]
Were any data flagged because of preservation problems? Y [ ] N [X]

Describe Any Actions Taken: None Required.

Comments: The receiving temperature as reported by the laboratory was 4.8 °C. The samples were shipped on ice and reported as properly preserved.

2. Instrument Calibration

Was the Tune analysis information performed?	Y [X]	N [ ]
Was the peak width and resolution of the masses within the required control limits?	Y [X]	N [ ]
Was the percent relative standard deviation ≤ 5% for all analytes in the Tune solutions?	Y [X]	N [ ]
Was the instrument successfully calibrated at the correct frequency?	Y [X]	N [ ]
Was the instrument calibrated with the appropriate standards and blanks?	Y [X]	N [ ]
Were Initial Calibration Verification (ICV) and Continuing Calibration Verification (CCV) samples analyzed?	Y [X]	N [ ]
Were ICV and CCV results within the control window?	Y [X]	N [ ]
Were any data flagged because of calibration problems?	Y [ ]	N [X]

Describe Any Actions Taken: None Required.

Comments: All total metals and mercury calibrations, ICV, and CCV results were within the control limits.

3. Blanks

Were Initial and Continuing Calibration Blanks (ICB and CCBs) analyzed?	Y [X]	N [ ]
Were ICBs and CCBs within the control window?	Y [X]	N [ ]
Were Method Blanks (MBs) analyzed at the frequency of 1 per analytical batch?	Y [X]	N [ ]
Were MBs within the control window of less than two times the laboratory Method Detection Limit (MDL)?	Y [X]	N [ ]
Were any data flagged because of blank problems?	Y [ ]	N [X]

Describe Any Actions Taken: None Required.

Comments: The MB had detections of magnesium (0.0046 mg/L) and silver (0.0001 mg/L) less than 2 times the MDL (0.0078 mg/L) and 0.000154 mg/L, respectively); therefore, no qualifications were warranted.

The ICB analyzed 6/1/21 at 11:29 (0.086 ug/L) and CCBs analyzed 6/1/21 at 22:19 (0.085 ug/L), 6/1/21 at 23:09 (0.093 ug/L), and 6/1/21 at 23:52 (0.095 ug/L) had detections of silver less than 2 times the MDL (0.0154 ug/L); therefore, no qualifications were warranted.

The CCB analyzed 6/1/21 at 22:19 had a detect of lead (0.055 ug/L) less than 2 times the MDL (0.086 ug/L); therefore, no qualifications were warranted.

4. Interference Check Samples

Were ICP Interference Check Samples (ICS) within the control limits?	Y		N	X
Were any data flagged because of ICS problems?	Y	X	N	

Describe Any Actions Take: In the ICS Solution A analyzed on 6/1/2021 at 22:23, there was an absolute detection of cadmium (0.044 ug/L) greater than the MDL (0.030 ug/L). The raw data showed that the levels for some interferents (Ca, Mg, and Na) were higher than the corresponding true values in the ICS Solution A. The cadmium results for samples LAO-SS-1-051321 and LAO-SS-1-051721 were qualified "J-" due to a negative detection in the ICS Solution A and the results (0.24 ug/L and 0.14 ug/L, respectively) being less than 10 times the absolute value of the detection (0.44 ug/L). LAO-SS-2-051721 was greater than 10 times the absolute value of the detection; therefore, no qualification for this sample was warranted.

Comments: On this work order (WO), analytes that were not present in ICS Solution A but were detected included: arsenic, cadmium, copper, lead, silver, uranium, and zinc. The percent recovery (%R) for Solution A and Solution AB were within control limits.

In the ICS Solution A analyzed on 6/3/2021 at 10:38, there was an absolute detection of cadmium (0.031 ug/L) greater than the MDL (0.030 ug/L). The raw data showed that the levels for some interferents (Ca, Mg, and Na) were higher than the corresponding true values in the ICS Solution A. No sample results for cadmium were reported on 6/3/2021; therefore, no qualifications were warranted.

5. Laboratory Control Samples

Were Laboratory Control Samples (LCS) analyzed at the frequency of 1 per batch?	Y	X	N	
What was the source of the LCS?	Unknown			
Were LCS results within the control window of 80 to 120%?	Y	X	N	
Were any data flagged because of LCS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: The %R for the LCS were within the control limits.

6. Duplicate Sample Results

Were Laboratory Duplicate Samples (LDS) analyzed at the frequency of 1 per batch?	Y	X	N	
Were LDS results within the control window ≤ 20% Relative Percent Difference (RPD)?	Y	X	N	
Were any data flagged because of LDS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: For batch 747139, the LDS for mercury was generated from sample LAO-SS-1-051321. The data user should be aware that the RPD was within control limits. No qualifications were warranted.

For batch 743967, the LDS for total metals was generated from sample LAO-SS-1-051321. The data user should be aware that all RPDs were within control limits. No qualifications were warranted.

7. Matrix Spike Sample Results

Were Laboratory Matrix Spike Samples (LMS) analyzed at the frequency of 1 per batch?	Y	X	N	
Were LMS results within the control window 75 to 125%?	Y		N	X
Were any data flagged because of LMS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: Sample LAO-SS-1-051321 was used to generate an LMS/LMSD sample pair for total metals. The %R for the LMS and LMSD for magnesium (59% and -12%, respectively) and the LMSD for calcium (-172%) were outside control limits. Per the NFG, *"Spike recovery limits do not apply when the original sample concentration is ≥ 4 times the spike added. In such an event, the data shall be reported unflagged, even if the %R does not meet acceptance criteria"* (EPA, 2017). The original sample concentrations of these analytes were greater than 4 times the added spike amount; therefore, no qualifications were warranted. An additional LMS was generated from a sample not from this work order. The %R for the LMS for calcium (-138%) and magnesium (71%) were outside control limits. The original sample concentration of calcium was greater than 4 times the added spike amount; therefore, no qualifications were warranted. The original sample concentration of magnesium was less than 4 times the added spike amount, but since the parent sample is not from this work order, no qualifications were warranted. The remaining %R were within control limits.

Sample LAO-SS-1-051321 was used to generate an LMS/LMSD sample pair for total mercury. The %R for the LMS and LMSD were within control limits.

8. ICP Serial Dilutions

Were ICP Serial Dilutions (SD) analyzed at the frequency of 1 per batch?	Y	X	N		
Were SD percent differences (%D) results within the control limits?	Y		N	X	
Were any data flagged because of SD problems?	Y		N	X	

Describe Any Actions Taken: None Required.

Comments: Sample LAO-SS-1-051321 was used to generate the SD. The %Ds for cadmium (31.8%), lead (10.4%), and silver (326.1%) were outside control limits, but the original sample concentrations were less than 50 times the MDL; therefore, no qualifications were warranted.

9. Internal Standards

Were internal standards added to each sample in the analytical batch?	Y	X	N		
Were the percent relative intensity recoveries (%RI) within the control limits of 60 to 125%	Y	X	N		
Were any data flagged because of internal standard problems?	Y		N	X	

Describe Any Actions Taken: None Required.

Comments: Internal standards used on 6/1/2021 at 10:43 included: Ge-72, In-115, Ir-193-IS, Sc-45-IS, and Tb-159. The Calibration 0 %RI equaled 100% for all internal standards. The remaining %RI ranged from 83.0% to 111.9%. The internal standards were within the control limits; therefore, no qualifications were warranted.

Internal standards used on 6/3/2021 at 09:50 included: Ge-72, In-115, Ir-193-IS, Sc-45-IS, and Tb-159. The Calibration 0 %RI equaled 100% for all internal standards. The remaining %RI ranged from 90.3% to 107.5%. The internal standards were within the control limits; therefore, no qualifications were warranted.

10. Field Blanks

Were field blanks (FB) submitted as specified in the Sampling Analysis Plan (SAP)?	Y	X	N			
Were any data qualified because of field blank problems?	Y		N		N/A	

Describe Any Actions Taken: None Required.

Comments: There was no field blank included in this work order. Field blanks are collected monthly and are summarized in the *Field Blank Samples with Results, Laboratory Flags, Data Validation Qualifiers, Data Validation Reason Codes, and QC Criteria Calculations* table in the Data Validation Report.

11. Field Duplicates

Were field duplicates submitted as specified in the SAP?	Y	X	N			
Were field duplicates within the control limits?	Y		N		N/A	
Were any data qualified because of field duplicate problems?	Y		N		N/A	

Describe Any Actions Taken: None required.

Comments: There was no field duplicate pair included in this work order. Field duplicates are collected monthly and are summarized in the *Field Duplicate Pair Samples with Results, Laboratory Flags, Data Validation Qualifiers, Data Validation Reason Codes, and QC Criteria Calculations* table in the Data Validation Report.

12. Overall Assessment

Are there analytical limitations of the data that users should be aware of? Y [X] N [ ]

If so, explain: On this WO 10560663, the following qualifications were made:

In additional to the qualifications outlined in the sections above, results which are reported between the method detection limit and the reporting limit were qualified "A" when no additional qualifications were warranted.

Field ID	Analyte	Final Qualification	Reason Code
LAO-SS-1-051321	Cadmium	J-	ICS
LAO-SS-1-051721	Cadmium	J-	ICS
LAO-SS-1-051321	Aluminum	A	<RL
LAO-SS-1-051321	Iron	A	<RL
LAO-SS-1-051321	Silver	A	<RL
LAO-SS-1-051721	Iron	A	<RL
LAO-SS-2-051721	Silver	A	<RL

Comments:

13. Authorization of Data Validation

Data Validator

Name: Sara Ward **Reviewed By:** Shelby Green

Signature: Sara Ward Shelby Green

Date: 7/2/2021 7/23/2021

Site: Butte Priority Soils Operable Unit	**Case No**: 10562085	**Laboratory**: Pace Analytical
Project: BTL-LAO Monitoring	**Matrix**: Water	**Analyses**: Total Metals: Al, As, Ca, Cd, Cu, Fe, Hg, Pb, Mg, Ag, U-238, and Zn Total Hardness (Calculation)
Sample Date: 5/20/2021, 5/24/2021	**Analysis Dates**: 6/1/2021, 6/3/2021, 6/16/2021	
Data Validator: S. Ward	**Validation Dates**: 7/1/2021, 7/2/2021	

1. Holding Times

Analyte	Laboratory	Matrix	Method	Holding Times (Days)	Collection Date	Analysis Date(s)	Holding Time Met (Y/N)	Affected Data Flagged (Y/N)
Al, As, Ca, Cd, Cu, Fe, Pb, Mg, Ag, U-238, Zn	Pace	Water	EPA Method 200.8	180	5/20/2021, 5/24/2021	6/1/2021, 6/3/2021	Y	NA
Total Hardness	Pace	Water	2340B (Calculation)	180			Y	NA
Mercury	Pace	Water	EPA Method 245.1	28		6/16/2021	Y	NA

*Reference for Holding Times – Clark Fork Superfund Site Investigations, Laboratory Analysis Plan (LAP) and PACE Analytical Guide (PAC) for Holding Times

Were any data flagged because of holding time? Y [ ] N [X]
Were any data flagged because of preservation problems? Y [ ] N [X]

Describe Any Actions Taken: None Required.

Comments: The receiving temperature as reported by the laboratory was 4.5 °C. The samples were shipped on ice and reported as properly preserved. There was no temperature blank present, so the temperature was averaged from 4 separate temperature readings.

2. Instrument Calibration

Was the Tune analysis information performed?	Y	X	N	
Was the peak width and resolution of the masses within the required control limits?	Y	X	N	
Was the percent relative standard deviation ≤ 5% for all analytes in the Tune solutions?	Y	X	N	
Was the instrument successfully calibrated at the correct frequency?	Y	X	N	
Was the instrument calibrated with the appropriate standards and blanks?	Y	X	N	
Were Initial Calibration Verification (ICV) and Continuing Calibration Verification (CCV) samples analyzed?	Y	X	N	
Were ICV and CCV results within the control window?	Y	X	N	
Were any data flagged because of calibration problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: All total metals and mercury calibrations, ICV, and CCV results were within the control limits.

For the 6/2/21 total metals calibration, the lab rejected the Cal 7 standard for magnesium. The calibration was formed with 6 standards.

For the 6/3/21 total metals calibration, the lab rejected the Cal 7 standard for magnesium. The calibration was formed with 6 standards.

For the 6/3/21 total metals calibration, the lab rejected the Cal 6 standard for arsenic and silver. The calibration was formed with 5 standards.

3. Blanks

Were Initial and Continuing Calibration Blanks (ICB and CCBs) analyzed?	Y	X	N	
Were ICBs and CCBs within the control window?	Y	X	N	
Were Method Blanks (MBs) analyzed at the frequency of 1 per analytical batch?	Y	X	N	
Were MBs within the control window of less than two times the laboratory Method Detection Limit (MDL)?	Y	X	N	
Were any data flagged because of blank problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: The MB had a detect of magnesium (0.0043 mg/L) less than 2 times the MDL (0.0078 mg/L); therefore, no qualifications were warranted.

4. Interference Check Samples

Were ICP Interference Check Samples (ICS) within the control limits?	Y		N	X
Were any data flagged because of ICS problems?	Y	X	N	

Describe Any Actions Take: In the ICS Solution A analyzed on 6/2/2021 at 12:56, there was a detection of cadmium (0.040 ug/L) greater than the MDL (0.030 ug/L). The raw data showed that the levels for some interferents (Ca, Mg, and Na) were higher than the corresponding true values in the ICS Solution A. The cadmium result for sample LAO-SS-1-052421 was qualified "J+" due to a detection in the ICS Solution A and the result (0.18 ug/L) being less than 10 times the absolute value of the detection (0.40 ug/L). The other sample results were reported on a different day or were greater than 10 times the detection; therefore, no additional qualifications were warranted.

In the ICS Solution A analyzed on 6/2/2021 at 12:56, there was a detection of lead (0.099 ug/L) greater than the MDL (0.043 ug/L). The raw data showed that the levels for some interferents (Ca, Mg, and Na) were higher than the corresponding true values in the ICS Solution A. The lead result for sample LAO-SS-1-052421 was qualified "J+" due to a detection in the ICS Solution A and the result (0.24 ug/L) being less than 10 times the absolute value of the detection (0.99 ug/L). The other sample results were reported on a different day or were greater than 10 times the detection; therefore, no additional qualifications were warranted.

In the ICS Solution A analyzed on 6/1/2021 at 19:16, there was a detection of lead (0.0957 ug/L) greater than the MDL (0.043 ug/L). The raw data showed that the levels for some interferents (Ca, Mg, and Na) were higher than the corresponding true values in the ICS Solution A. The lead result for sample LAO-SS-1-052021 was qualified "J+" due to a detection in the ICS Solution A and the result (0.13 ug/L) being less than 10 times the absolute value of the detection (0.957 ug/L). The other sample results were reported on a different day; therefore, no additional qualifications were warranted.

Comments: On this work order (WO), analytes that were not present in ICS Solution A but were detected included: arsenic, cadmium, copper, lead, silver, uranium, and zinc. The percent recovery (%R) for Solution A and Solution AB were within the control limits.

5. Laboratory Control Samples

Were Laboratory Control Samples (LCS) analyzed at the frequency of 1 per batch?	Y	X	N	
What was the source of the LCS?	Unknown			
Were LCS results within the control window of 80 to 120%?	Y	X	N	
Were any data flagged because of LCS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: The %R for the LCS were within the control limits.

6. Duplicate Sample Results

Were Laboratory Duplicate Samples (LDS) analyzed at the frequency of 1 per batch?	Y	X	N	
Were LDS results within the control window ≤ 20% Relative Percent Difference (RPD)?	Y	X	N	
Were any data flagged because of LDS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: For batch 749293, the laboratory matrix spike (LMS) and LMS Duplicate (LMSD) sample for mercury were generated from sample LAO-SS-1-052021 and were used for the LDS calculation. The RPD was within control limits. No qualifications were warranted.

For batch 745010, the LMS and LMSD sample for total metals was generated from sample LAO-SS-1-052021 and were used for the LDS calculations. All RPDs were within control limits. No qualifications were warranted.

7. Matrix Spike Sample Results

Were Laboratory Matrix Spike Samples (LMS) analyzed at the frequency of 1 per batch?	Y	X	N		
Were LMS results within the control window 75 to 125%?	Y		N	X	
Were any data flagged because of LMS problems?	Y		N	X	

Describe Any Actions Taken: None Required.

Comments: Sample LAO-SS-1-052021 was used to generate an LMS/LMSD sample pair for total metals. The %R for the LMS and LMSD for calcium (164% and 318%, respectively) and the LMS for magnesium (74%) were outside control limits. Per the NFG, *"Spike recovery limits do not apply when the original sample concentration is ≥ 4 times the spike added. In such an event, the data shall be reported unflagged, even if the %R does not meet acceptance criteria"* (EPA, 2017). The original sample concentrations of these analytes were greater than 4 times the added spike amount; therefore, no qualifications were warranted. An additional LMS was generated from a sample not from this work order. The %R for the LMS for calcium (-69%) and magnesium (68%) were outside control limits. Because the sample was from a different work order and is not considered sufficiently similar, no qualifications were warranted. The remaining %R were within control limits.

Sample LAO-SS-1-052021 was used to generate an LMS/LMSD sample pair for total mercury. The %R for the LMS and LMSD were within control limits. An additional LMS was generated from a sample not from this work order, and the %R was within control limits.

8. ICP Serial Dilutions

Were ICP Serial Dilutions (SD) analyzed at the frequency of 1 per batch?	Y	X	N		
Were SD percent differences (%D) results within the control limits?	Y		N	X	
Were any data flagged because of SD problems?	Y		N	X	

Describe Any Actions Taken: None Required.

Comments: Sample LAO-SS-1-052021 was used to generate the SD. The %Ds for aluminum (385.6%) and cadmium (39.8%) were outside control limits, but the original sample concentrations were less than 50 times the MDL; therefore, no qualifications were warranted.

9. Internal Standards

Were internal standards added to each sample in the analytical batch?	Y	X	N		
Were the percent relative intensity recoveries (%RI) within the control limits of 60 to 125%	Y	X	N		
Were any data flagged because of internal standard problems?	Y		N	X	

Describe Any Actions Taken: None Required.

Comments: Internal standards used on 6/2/2021 at 12:21 included: Ge-72, In-115, Ir-193-IS, Sc-45-IS, and Tb-159. The Calibration 0 %RI equaled 100% for all internal standards. The remaining %RI ranged from 68.4% to 102.1%. The internal standards were within the control limits; therefore, no qualifications were warranted.

Internal standards used on 6/1/2021 at 09:03 included: Ge-72, In-115, Ir-193-IS, Sc-45-IS, and Tb-159. The Calibration 0 %RI equaled 100% for all internal standards. The remaining %RI ranged from 86.2% to 107.5%. The internal standards were within the control limits; therefore, no qualifications were warranted.

10. Field Blanks

Were field blanks (FB) submitted as specified in the Sampling Analysis Plan (SAP)?	Y	X	N		
Were any data qualified because of field blank problems?	Y		N		N/A

Describe Any Actions Taken: None Required.

Comments: There was no field blank included in this work order. Field blanks are collected monthly and are summarized in the *Field Blank Samples with Results, Laboratory Flags, Data Validation Qualifiers, Data Validation Reason Codes, and QC Criteria Calculations* table in the Data Validation Report.

11. Field Duplicates

Were field duplicates submitted as specified in the SAP?	Y	X	N		
Were field duplicates within the control limits?	Y		N		N/A
Were any data qualified because of field duplicate problems?	Y		N		N/A

Describe Any Actions Taken: None required.

Comments: There was no field duplicate pair included in this work order. Field duplicates are collected monthly and are summarized in the *Field Duplicate Pair Samples with Results, Laboratory Flags, Data Validation Qualifiers, Data Validation Reason Codes, and QC Criteria Calculations* table in the Data Validation Report.

12. Overall Assessment

Are there analytical limitations of the data that users should be aware of? Y [X] N [ ]

If so, explain: On this WO 10562085, the following qualifications were made:

In additional to the qualifications outlined in the sections above, results which are reported between the method detection limit and the reporting limit were qualified "A" when no additional qualifications were warranted.

Field ID	Analyte	Final Qualification	Reason Code
LAO-SS-1-052021	Lead	J+	ICS
LAO-SS-1-052421	Cadmium	J+	ICS
LAO-SS-1-052421	Lead	J+	ICS
LAO-SS-1-052021	Aluminum	A	<RL
LAO-SS-1-052021	Iron	A	<RL
LAO-SS-1-052421	Iron	A	<RL

Comments:

13. Authorization of Data Validation

Data Validator

Name: Sara Ward **Reviewed By:** Shelby Green

Signature: Sara Ward Shelby Green

Date: 7/2/2021 7/27/2021

Site: Butte Priority Soils Operable Unit	**Case No**: 10563551	**Laboratory**: Pace Analytical
Project: BTL-LAO Monitoring	**Matrix**: Water	**Analyses**: Total Metals: Al, As, Ca, Cd, Cu, Fe, Hg, Pb, Mg, Ag, U-238, and Zn Total Hardness (Calculation)
Sample Date: 5/27/2021, 6/1/2021	**Analysis Dates**: 6/14/2021, 6/15/2021, 6/16/2021	
Data Validator: S. Ward	**Validation Dates**: 7/6/2021	

1. Holding Times

Analyte	Laboratory	Matrix	Method	Holding Times (Days)	Collection Date	Analysis Date(s)	Holding Time Met (Y/N)	Affected Data Flagged (Y/N)
Al, As, Ca, Cd, Cu, Fe, Pb, Mg, Ag, U-238, Zn	Pace	Water	EPA Method 200.8	180	5/27/2021, 6/1/2021	6/14/2021, 6/15/2021	Y	NA
Total Hardness	Pace	Water	2340B (Calculation)	180			Y	NA
Mercury	Pace	Water	EPA Method 245.1	28		6/16/2021	Y	NA

*Reference for Holding Times – Clark Fork Superfund Site Investigations, Laboratory Analysis Plan (LAP) and PACE Analytical Guide (PAC) for Holding Times

Were any data flagged because of holding time? Y [ ] N [X]
Were any data flagged because of preservation problems? Y [ ] N [X]

Describe Any Actions Taken: None Required.

Comments: The receiving temperature as reported by the laboratory was 2.0 °C. The samples were shipped on ice and reported as properly preserved. There was no temperature blank present, so the temperature was averaged from 4 separate temperature readings.

2. Instrument Calibration

Was the Tune analysis information performed?	Y	X	N	
Was the peak width and resolution of the masses within the required control limits?	Y	X	N	
Was the percent relative standard deviation ≤ 5% for all analytes in the Tune solutions?	Y	X	N	
Was the instrument successfully calibrated at the correct frequency?	Y	X	N	
Was the instrument calibrated with the appropriate standards and blanks?	Y	X	N	
Were Initial Calibration Verification (ICV) and Continuing Calibration Verification (CCV) samples analyzed?	Y	X	N	
Were ICV and CCV results within the control window?	Y	X	N	
Were any data flagged because of calibration problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: All total metals and mercury calibrations, ICV, and CCV results were within the control limits.

For the 6/14/21 total metals calibration, the lab rejected the Cal 6 standard for arsenic. The calibration was formed with 5 standards.

3. Blanks

Were Initial and Continuing Calibration Blanks (ICB and CCBs) analyzed?	Y	X	N	
Were ICBs and CCBs within the control window?	Y	X	N	
Were Method Blanks (MBs) analyzed at the frequency of 1 per analytical batch?	Y	X	N	
Were MBs within the control window of less than two times the laboratory Method Detection Limit (MDL)?	Y	X	N	
Were any data flagged because of blank problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: The CCBs analyzed 6/14/21 at 13:56 and 6/14/21 at 22:14 had detects of silver less than 2 times the MDL. The ICB and CCBs bracketing sample analysis were all reported non-detect.

4. Interference Check Samples

Were ICP Interference Check Samples (ICS) within the control limits?	Y		N	X
Were any data flagged because of ICS problems?	Y		N	X

Describe Any Actions Take: None Required.

Comments: In the ICS Solution A analyzed 6/14/2021 at 13:48, there was a detection of silver (0.155 ug/L) greater than the MDL (0.077 ug/L). The raw data showed that the levels for some interferents (Ca, Mg, and Na) were higher than the corresponding true values in the ICS Solution A. All silver results were reported non-detect; therefore, no qualifications were warranted.

On this work order (WO), analytes that were not present in ICS Solution A but were detected included: arsenic, cadmium, copper, lead, silver, uranium, and zinc. The percent recovery (%R) for Solution A and Solution AB were within the control limits.

5. Laboratory Control Samples

Were Laboratory Control Samples (LCS) analyzed at the frequency of 1 per batch?	Y	X	N	
What was the source of the LCS?	Unknown			
Were LCS results within the control window of 80 to 120%?	Y	X	N	
Were any data flagged because of LCS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: The %R for the LCS were within the control limits.

6. Duplicate Sample Results

Were Laboratory Duplicate Samples (LDS) analyzed at the frequency of 1 per batch?	Y	X	N	
Were LDS results within the control window ≤ 20% Relative Percent Difference (RPD)?	Y	X	N	
Were any data flagged because of LDS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: For batch 749295, the laboratory matrix spike (LMS) and LMS Duplicate (LMSD) samples for mercury were generated from sample LAO-SS-1-052721 and were used for the LDS calculation. The RPD was within control limits.

For batch 748162, the LMS and LMSD samples for total metals were generated from sample LAO-SS-1-052721 and were used for the LDS calculations. All RPDs were within control limits.

7. Matrix Spike Sample Results

Were Laboratory Matrix Spike Samples (LMS) analyzed at the frequency of 1 per batch?	Y	X	N	
Were LMS results within the control window 75 to 125%?	Y		N	X
Were any data flagged because of LMS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: Sample LAO-SS-1-052721 was used to generate an LMS/LMSD sample pair for total metals. The %R for the LMS for magnesium (138%) and the LMSD for calcium (0%) were outside control limits. Per the NFG, *"Spike recovery limits do not apply when the original sample concentration is ≥ 4 times the spike added. In such an event, the data shall be reported unflagged, even if the %R does not meet acceptance criteria"* (EPA, 2017). The original sample concentrations of these analytes were greater than 4 times the added spike amount; therefore, no qualifications were warranted. The remaining %R were within control limits. An additional LMS was generated from a sample not from this work order. The %R for the LMS for calcium (15%) was outside control limits. Because the sample was from a different work order and wasn't considered sufficiently similar to the samples from this work order, no qualifications were required.

Sample LAO-SS-1-052721 was used to generate an LMS/LMSD sample pair for total mercury. The %R for the LMS and LMSD were within control limits. An additional LMS was generated from a sample not from this work order, and the %R was within control limits.

8. ICP Serial Dilutions

Were ICP Serial Dilutions (SD) analyzed at the frequency of 1 per batch?	Y	X	N		
Were SD percent differences (%D) results within the control limits?	Y		N	X	
Were any data flagged because of SD problems?	Y		N	X	

Describe Any Actions Taken: None Required.

Comments: Sample LAO-SS-1-052721 was used to generate the SD. The %Ds for cadmium (18.9%) and lead (16.1%) were outside control limits, but the original sample concentrations were less than 50 times the MDL; therefore, no qualifications were warranted.

9. Internal Standards

Were internal standards added to each sample in the analytical batch?	Y	X	N		
Were the percent relative intensity recoveries (%RI) within the control limits of 60 to 125%	Y	X	N		
Were any data flagged because of internal standard problems?	Y		N	X	

Describe Any Actions Taken: None Required.

Comments: Internal standards used on 6/14/2021 at 13:13 included: Ge-72, In-115, Ir-193-IS, Sc-45-IS, and Tb-159. The Calibration 0 %RI equaled 100% for all internal standards. The remaining %RI ranged from 62.5% to 113.3%. The internal standards were within the control limits; therefore, no qualifications were warranted.

10. Field Blanks

Were field blanks (FB) submitted as specified in the Sampling Analysis Plan (SAP)?	Y	X	N		
Were any data qualified because of field blank problems?	Y		N		N/A

Describe Any Actions Taken: None Required.

Comments: There was no field blank included in this work order. Field blanks are collected monthly and are summarized in the *Field Blank Samples with Results, Laboratory Flags, Data Validation Qualifiers, Data Validation Reason Codes, and QC Criteria Calculations* table in the Data Validation Report.

11. Field Duplicates

Were field duplicates submitted as specified in the SAP?	Y	X	N		
Were field duplicates within the control limits?	Y		N		N/A
Were any data qualified because of field duplicate problems?	Y		N		N/A

Describe Any Actions Taken: None Required.

Comments: There was no field duplicate pair included in this work order. Field duplicates are collected monthly and are summarized in the *Field Duplicate Pair Samples with Results, Laboratory Flags, Data Validation Qualifiers, Data Validation Reason Codes, and QC Criteria Calculations* table in the Data Validation Report.

12. Overall Assessment

Are there analytical limitations of the data that users should be aware of?	Y	X	N	

If so, explain: On this WO 10563551, results which were reported between the method detection limit and the reporting limit were qualified "A", since no additional qualifications were warranted, and are listed in the following table:

Field ID	Analyte	Final Qualification	Reason Code
LAO-SS-1-052721	Iron	A	<RL
LAO-SS-1-052721	Mercury	A	<RL
LAO-SS-1-060121	Aluminum	A	<RL
LAO-SS-1-060121	Iron	A	<RL

Comments:

13. Authorization of Data Validation

Data Validator		
Name:	Sara Ward	**Reviewed By:** Shelby Green
Signature:	Sara Ward	Shelby Green
Date:	7/6/2021	7/28/2021

Site: Butte Priority Soils Operable Unit	**Case No**: 10564213	**Laboratory**: Pace Analytical
Project: BTL-LAO Monitoring	**Matrix**: Water	**Analyses**: Total Metals: Al, As, Ca, Cd, Cu, Fe, Hg, Pb, Mg, Ag, U-238, and Zn Total Hardness (Calculation)
Sample Date: 6/3/2021, 6/7/2021	**Analysis Dates**: 6/17/2021, 6/18/2021	
Data Validator: S. Ward	**Validation Dates**: 8/9/2021	

1. Holding Times

Analyte	Laboratory	Matrix	Method	Holding Times (Days)	Collection Date	Analysis Date(s)	Holding Time Met (Y/N)	Affected Data Flagged (Y/N)
Al, As, Ca, Cd, Cu, Fe, Pb, Mg, Ag, U-238, Zn	Pace	Water	EPA Method 200.8	180	6/3/2021, 6/7/2021	6/17/2021, 6/18/2021	Y	NA
Total Hardness	Pace	Water	2340B (Calculation)	180			Y	NA
Mercury	Pace	Water	EPA Method 245.1	28		6/17/2021	Y	NA

*Reference for Holding Times – Clark Fork Superfund Site Investigations, Laboratory Analysis Plan (LAP) and PACE Analytical Guide (PAC) for Holding Times

Were any data flagged because of holding time? Y [ ] N [X]
Were any data flagged because of preservation problems? Y [ ] N [X]

Describe Any Actions Taken: None Required.

Comments: The receiving temperature as reported by the laboratory was 2.0°C. There was no temperature blank present, so the temperature was averaged from 4 separate temperature readings. Samples LAO-SS-1-060321 for total metals, LAO-SS-1-060721 for dissolved metals, and LAO-SS-2-060721 for total metals were partially frozen upon arrival. The samples were shipped on ice and reported as properly preserved.

2. Instrument Calibration

Was the Tune analysis information performed?	Y	X	N	
Was the peak width and resolution of the masses within the required control limits?	Y	X	N	
Was the percent relative standard deviation ≤ 5% for all analytes in the Tune solutions?	Y	X	N	
Was the instrument successfully calibrated at the correct frequency?	Y	X	N	
Was the instrument calibrated with the appropriate standards and blanks?	Y	X	N	
Were Initial Calibration Verification (ICV) and Continuing Calibration Verification (CCV) samples analyzed?	Y	X	N	
Were ICV and CCV results within the control window?	Y	X	N	
Were any data flagged because of calibration problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: All total metals and mercury calibrations, ICV, and CCV results were within the control limits.

3. Blanks

Were Initial and Continuing Calibration Blanks (ICB and CCBs) analyzed?	Y	X	N	
Were ICBs and CCBs within the control window?	Y	X	N	
Were Method Blanks (MBs) analyzed at the frequency of 1 per analytical batch?	Y	X	N	
Were MBs within the control window of less than two times the laboratory Method Detection Limit (MDL)?	Y	X	N	
Were any data flagged because of blank problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: A detection of magnesium (0.0053 mg/L) and silver (0.000085 mg/L) in the MB required no qualification as the detects were less than 2 times the MDL (0.0078 mg/L and 0.000154 mg/L, respectively), as discussed in the CFRSSI QAPP (ARCO, 1992).

A detection of cadmium (0.000035 mg/L) in the ICB required no qualification as the detect was less than 2 times the MDL (0.00006 mg/L), as discussed in the CFRSSI QAPP.

A detection of silver (0.000088 mg/L) in the closing CCB required no qualification as the detect was less than 2 times the MDL (0.000154 mg/L), as discussed in the CFRSSI QAPP.

4. Interference Check Samples

Were ICP Interference Check Samples (ICS) within the control limits?	Y		N	X
Were any data flagged because of ICS problems?	Y	X	N	

Describe Any Actions Take: In the ICS Solution A analyzed on 6/17/2021 at 22:52, there was a detection of cadmium (0.042 ug/L) greater than the MDL (0.030 ug/L). The raw data showed that the levels for some interferents (Ca, Mg, and Na) were higher than the corresponding true values in the ICS Solution A. The cadmium results for LAO-SS-1-060321 and LAO-SS-1-060721 were qualified "J+" due to the cadmium results (0.24 ug/L and 0.13 ug/L) being less than 10 times the ICS Solution A detection (0.45 ug/L). The other sample result for cadmium was greater than 10 times the ICS Solution A detection; therefore, no additional qualifications were warranted.

Comments: On this work order (WO), analytes that were not present in ICS Solution A but were detected included: arsenic, cadmium, copper, lead, silver, uranium, and zinc. The percent recovery (%R) for Solution A and Solution AB were within the control limits.

5. Laboratory Control Samples

Were Laboratory Control Samples (LCS) analyzed at the frequency of 1 per batch?	Y	X	N	
What was the source of the LCS?	Unknown			
Were LCS results within the control window of 80 to 120%?	Y	X	N	
Were any data flagged because of LCS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: The %R for the LCS were within the control limits.

6. Duplicate Sample Results

Were Laboratory Duplicate Samples (LDS) analyzed at the frequency of 1 per batch?	Y	X	N	
Were LDS results within the control window ≤ 20% Relative Percent Difference (RPD)?	Y	X	N	
Were any data flagged because of LDS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: For batch 749419, the LMS and LMS Duplicate (LMSD) samples for mercury were generated from sample LAO-SS-2-060721 and used for the LDS calculation. The data user should be aware that the RPD was within control limits. No qualifications were warranted.

For batch 749574, the LMS and LMSD samples for total metals were generated from sample LAO-SS-1-060721 and used for the LDS calculations. The data user should be aware that all RPDs were within control limits. No qualifications were warranted.

7. Matrix Spike Sample Results

Were Laboratory Matrix Spike Samples (LMS) analyzed at the frequency of 1 per batch?	Y	X	N	
Were LMS results within the control window 75 to 125%?	Y		N	X
Were any data flagged because of LMS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: Sample LAO-SS-1-060721 was used to generate an LMS/LMSD sample pair for total metals. The %R for the LMS and LMSD for calcium (-197% and 11%, respectively) and magnesium (71% and 140%, respectively) were outside control limits. Per the NFG, *"Spike recovery limits do not apply when the original sample concentration is ≥ 4 times the spike added. In such an event, the data shall be reported unflagged, even if the %R does not meet acceptance criteria"* (EPA, 2017). The original sample concentrations of these analytes were greater than 4 times the added spike amount; therefore, no qualifications were warranted. The remaining %R were within control limits (75-125%).

Sample LAO-SS-2-060721 was used to generate an LMS/LMSD sample pair for total mercury. The %R for the LMS and LMSD were within control limits.

8. ICP Serial Dilutions

Were ICP Serial Dilutions (SD) analyzed at the frequency of 1 per batch?	Y	X	N		
Were SD percent differences (%D) results within the control limits?	Y		N	X	
Were any data flagged because of SD problems?	Y		N	X	

Describe Any Actions Taken: None Required.

Comments: Sample LAO-SS-1-060721 was used to generate the SD. The %D for cadmium (79.4%) was outside control limits, but the original sample concentration was less than 50 times the MDL; therefore, no qualifications were warranted.

9. Internal Standards

Were internal standards added to each sample in the analytical batch?	Y	X	N		
Were the percent relative intensity recoveries (%RI) within the control limits of 60 to 125%	Y	X	N		
Were any data flagged because of internal standard problems?	Y		N	X	

Describe Any Actions Taken: None Required.

Comments: Internal standards used on 6/17/2021 included: Ge-72, In-115, IR-193, Sc-45-IS, and Tb-159. The Calibration 0 %RI equaled 100% for all internal standards. The remaining %RI ranged from 92.4% to 114.5%. The internal standards were within the control limits (60-125%); therefore, no qualifications were warranted.

10. Field Blanks

Were field blanks (FB) submitted as specified in the Sampling Analysis Plan (SAP)?	Y	X	N		
Were any data qualified because of field blank problems?	Y		N		N/A

Describe Any Actions Taken: None Required.

Comments: There was no field blank included in this work order. Field blanks are collected monthly and are summarized in the *Field Blank Samples with Results, Laboratory Flags, Data Validation Qualifiers, Data Validation Reason Codes, and QC Criteria Calculations* table in the Data Validation Report.

11. Field Duplicates

Were field duplicates submitted as specified in the SAP?	Y	X	N		
Were field duplicates within the control limits?	Y		N		N/A
Were any data qualified because of field duplicate problems?	Y		N		N/A

Describe Any Actions Taken: None Required.

Comments: There was no field duplicate pair included in this work order. Field duplicates are collected monthly and are summarized in the *Field Duplicate Pair Samples with Results, Laboratory Flags, Data Validation Qualifiers, Data Validation Reason Codes, and QC Criteria Calculations* table in the Data Validation Report.

12. Overall Assessment

Are there analytical limitations of the data that users should be aware of? Y [X] N [ ]

If so, explain: On this WO 10564213, the following qualifications were made:

In additional to the qualifications outlined in the sections above, results which are reported between the method detection limit and the reporting limit were qualified "A" when no additional qualifications were warranted.

The table below lists the qualifications on the natural samples:

Field ID	Analyte	Final Qualification	Reason Code
LAO-SS-1-060321	Cadmium	J+	ICS
LAO-SS-1-060721	Cadmium	J+	ICS
LAO-SS-1-060321	Aluminum	A	<RL
LAO-SS-1-060321	Iron	A	<RL
LAO-SS-1-060321	Mercury	A	<RL
LAO-SS-1-060721	Mercury	A	<RL
LAO-SS-2-060721	Silver	A	<RL

Comments:

13. Authorization of Data Validation

Data Validator

Name: Sara Ward **Reviewed By:** Shelby Green

Signature: Sara Ward Shelby Green

Date: 8/9/2021 8/11/2021

Site: Butte Priority Soils Operable Unit	**Case No**: 10565397	**Laboratory**: Pace Analytical
Project: BTL-LAO Monitoring	**Matrix**: Water	**Analyses**: Total Metals: Al, As, Ca, Cd, Cu, Fe, Hg, Pb, Mg, Ag, U-238, and Zn Total Hardness (Calculation)
Sample Date: 6/10/2021, 6/14/2021	**Analysis Dates**: 6/18/2021, 6/30/2021, 7/1/2021	
Data Validator: S. Ward	**Validation Dates**: 7/27/2021	

1. Holding Times

Analyte	Laboratory	Matrix	Method	Holding Times (Days)	Collection Date	Analysis Date(s)	Holding Time Met (Y/N)	Affected Data Flagged (Y/N)
Al, As, Ca, Cd, Cu, Fe, Pb, Mg, Ag, U-238, Zn	Pace	Water	EPA Method 200.8	180	6/10/2021, 6/14/2021	6/30/2021, 7/1/2021	Y	NA
Total Hardness	Pace	Water	2340B (Calculation)	180			Y	NA
Mercury	Pace	Water	EPA Method 245.1	28		6/18/2021	Y	NA

*Reference for Holding Times – Clark Fork Superfund Site Investigations, Laboratory Analysis Plan (LAP) and PACE Analytical Guide (PAC) for Holding Times

Were any data flagged because of holding time? Y [ ] N [X]
Were any data flagged because of preservation problems? Y [ ] N [X]

Describe Any Actions Taken: None Required.

Comments: The receiving temperature as reported by the laboratory was 4.7 °C. The samples were shipped on ice and reported as properly preserved. There was no temperature blank present, so the temperature was averaged from 4 separate temperature readings.

2. Instrument Calibration

Was the Tune analysis information performed?	Y [X]	N [ ]
Was the peak width and resolution of the masses within the required control limits?	Y [X]	N [ ]
Was the percent relative standard deviation ≤ 5% for all analytes in the Tune solutions?	Y [X]	N [ ]
Was the instrument successfully calibrated at the correct frequency?	Y [X]	N [ ]
Was the instrument calibrated with the appropriate standards and blanks?	Y [X]	N [ ]
Were Initial Calibration Verification (ICV) and Continuing Calibration Verification (CCV) samples analyzed?	Y [X]	N [ ]
Were ICV and CCV results within the control window?	Y [X]	N [ ]
Were any data flagged because of calibration problems?	Y [X]	N [ ]

Describe Any Actions Taken: The LLICV analyzed 6/30/21 at 23:40 was outside control limits (60-140%) for magnesium (141.1%). The magnesium result for sample LAO-SS-4-06142021 was reported on 6/30/2021 with a detection less than the true value of the ICV; therefore, the result for magnesium was qualified "J+". All other results reported for magnesium on 6/30/2021 were greater than the true value of the ICV and required no additional qualifications.

Comments: For the 6/30/21 total metals calibration, the lab rejected the Cal 6 standard for silver. The calibration was formed with 5 standards.

The LLICV analyzed 6/30/21 at 23:40 was outside control limits for cadmium (163.8%). All results reported for cadmium on 6/30/2021 were non-detect; therefore, no qualifications were warranted.

3. Blanks

Were Initial and Continuing Calibration Blanks (ICB and CCBs) analyzed?	Y	X	N	
Were ICBs and CCBs within the control window?	Y	X	N	
Were Method Blanks (MBs) analyzed at the frequency of 1 per analytical batch?	Y	X	N	
Were MBs within the control window of less than two times the laboratory Method Detection Limit (MDL)?	Y	X	N	
Were any data flagged because of blank problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: A detection of silver in the CCBs (0.000120 mg/L, 0.000120 mg/L, 0.000110 mg/L, 0.000140 mg/L) analyzed on 6/30/2021 required no qualification as the detects were less than 2 times the MDL (0.000154 mg/L), as discussed in the CFRSSI QAPP (ARCO, 1992).

A detection of cadmium (0.000035 mg/L) in the CCB analyzed on 7/1/2021 at 00:20 required no qualification as the detect was less than 2 times the MDL (0.00006 mg/L), as discussed in the CFRSSI QAPP.

A detection of silver in the CCBs (0.000093 mg/L, 0.000090 mg/L, 0.000097 mg/L, 0.000090 mg/L) analyzed on 7/1/2021 required no qualification as the detects were less than 2 times the MDL (0.000154 mg/L), as discussed in the CFRSSI QAPP.

4. Interference Check Samples

Were ICP Interference Check Samples (ICS) within the control limits?	Y		N	X
Were any data flagged because of ICS problems?	Y	X	N	

Describe Any Actions Take: In the ICS Solution A analyzed on 7/1/2021 at 08:51, there was an absolute detection of cadmium (0.039 ug/L) greater than the MDL (0.030 ug/L). The raw data showed that the levels for some interferents (Ca, Mg, and Na) were higher than the corresponding true values in the ICS Solution A. The cadmium results for LAO-SS-1-061021, LAO-SS-1-061421, and LAO-SS-1T-061421 were qualified "J-" due to a negative detection in the ICS Solution A and the result being less than 10 times the ICS Solution A detect. The cadmium result for LAO-SS-10-061421 did not warrant qualification since the level of interferents in the sample is not similar to the level of interferents in the ICS Solution A. The other sample results for cadmium were greater than 10 time the ICS Solution A detect; therefore, no additional qualifications were warranted.

In the ICS Solution A analyzed on 7/1/2021 at 08:51, there was a detection of lead (0.088 ug/L) greater than the MDL (0.043 ug/L). The raw data showed that the levels for some interferents (Ca, Mg, and Na) were higher than the corresponding true values in the ICS Solution A. The lead results for LAO-SS-1-061021, LAO-SS-1-061421, and LAO-SS-1T-061421 were qualified "J+" due to a detection in the ICS Solution A and the results being less than 10 times the ICS Solution A detect. LAO-SS-10-061421 did not warrant qualification since the level of interferents in the sample is not similar to the level of interferents in the ICS Solution A.

Comments: On this work order (WO), analytes that were not present in ICS Solution A but were detected included: arsenic, cadmium, copper, lead, silver, uranium, and zinc. The percent recovery (%R) for Solution A and Solution AB were within the control limits.

In the ICS Solution A analyzed on 6/30/2021 at 16:27, there was an absolute detection of cadmium (0.057 ug/L) greater than the MDL (0.030 ug/L). The cadmium result for LAO-SS-4-061421 did not warrant qualification since the level of interferents in the sample is not similar to the level of interferents in the ICS Solution A. The other sample results for cadmium were reported on a different day; therefore, no additional qualifications were warranted.

In the ICS Solution A analyzed on 6/30/2021 at 16:27, there was a detection of lead (0.097 ug/L) and silver (0.102 ug/L) greater than the MDL (0.043 ug/L and 0.077 ug/L, respectively). The raw data showed that the levels for some interferents (Ca, Mg, and Na) were higher than the corresponding true values in the ICS Solution A. The lead and silver results reported on 6/30/2021 were either greater than 10 times the ICS Solution A detect or non-detect; therefore, no qualifications were warranted.

In the ICS Solution A analyzed on 7/1/2021 at 08:51, there was a detection of silver (0.097 ug/L) greater than the MDL (0.077 ug/L). The raw data showed that the levels for some interferents (Ca, Mg, and Na) were higher than the corresponding true values in the ICS Solution A. All silver results reported on 7/1/2021 were reported non-detect; therefore, no qualifications were warranted.

5. Laboratory Control Samples

Were Laboratory Control Samples (LCS) analyzed at the frequency of 1 per batch?	Y	X	N	
What was the source of the LCS?	Unknown			
Were LCS results within the control window of 80 to 120%?	Y	X	N	
Were any data flagged because of LCS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: The %R for the LCS were within the control limits.

6. Duplicate Sample Results

Were Laboratory Duplicate Samples (LDS) analyzed at the frequency of 1 per batch?	Y	X	N	
Were LDS results within the control window ≤ 20% Relative Percent Difference (RPD)?	Y	X	N	
Were any data flagged because of LDS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: For batch 749637, the LMS and LMS Duplicate (LMSD) samples for mercury were generated from sample LAO-SS-1-061421 and used for the LDS calculation. The data user should be aware that the RPD was within control limits. No qualifications were warranted.

For batch 751096, the LMS and LMSD samples for total metals were generated from sample LAO-SS-1-061421 and used for the LDS calculations. The data user should be aware that all RPDs were within control limits. No qualifications were warranted.

7. Matrix Spike Sample Results

Were Laboratory Matrix Spike Samples (LMS) analyzed at the frequency of 1 per batch?	Y	X	N	
Were LMS results within the control window 75 to 125%?	Y		N	X
Were any data flagged because of LMS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: Sample LAO-SS-1-061421 was used to generate an LMS/LMSD sample pair for total metals. The %R for the LMS and LMSD for calcium (356% and 382%, respectively) and the LMSD for magnesium (135%) were outside control limits. Per the NFG, *"Spike recovery limits do not apply when the original sample concentration is ≥ 4 times the spike added. In such an event, the data shall be reported unflagged, even if the %R does not meet acceptance criteria"* (EPA, 2017). The original sample concentrations of these analytes were greater than 4 times the added spike amount; therefore, no qualifications were warranted. The remaining %R were within control limits (75-125%). A second LMS was performed on a sample not from this WO. The %R for the LMS for calcium (128%) was outside control limits. Because the sample was from a different WO and could not be considered sufficiently similar to the samples on this WO, no qualifications were warranted.

Sample LAO-SS-1-061421 was used to generate an LMS/LMSD sample pair for total mercury. The %R for the LMS and LMSD were within control limits.

8. ICP Serial Dilutions

Were ICP Serial Dilutions (SD) analyzed at the frequency of 1 per batch?	Y	X	N	
Were SD percent differences (%D) results within the control limits?	Y		N	X
Were any data flagged because of SD problems?	Y	X	N	

Describe Any Actions Taken: Sample LAO-SS-1-061421 was used to generate the SD. The %D for uranium (12.2%) was outside control limits. Sample LAO-SS-1-061421 was qualified "J" due to the elevated %D. Per the NFG, "*For a SD that does not meet the technical criteria, apply the action to all samples of the same matrix if the samples are considered sufficiently similar"* (EPA, 2017). Samples LAO-SS-1-061021 and LAO-SS-1T-061421 were considered sufficiently similar; therefore, these samples were also qualified "J" for uranium.

Comments: Sample LAO-SS-1-061421 was used to generate the SD. The %Ds for arsenic (16.9%) and cadmium (54.8%) were outside control limits, but the original sample concentrations were less than 50 times the MDL; therefore, no qualifications were warranted.

9. Internal Standards

Were internal standards added to each sample in the analytical batch?	Y	X	N	
Were the percent relative intensity recoveries (%RI) within the control limits of 60 to 125%	Y	X	N	
Were any data flagged because of internal standard problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: Internal standards used on 6/30/2021 included: Ge-72, In-115, IR-193, Sc-45-IS, and Tb-159. The Calibration 0 %RI equaled 100% for all internal standards. The remaining %RI ranged from 73.7% to 121%. The internal standards were within the control limits (60-125%); therefore, no qualifications were warranted.

Internal standards used on 7/1/2021 included: Ge-72, In-115, IR-193, Sc-45-IS, and Tb-159. The Calibration 0 %RI equaled 100% for all internal standards. The remaining %RI ranged from 98.4% to 115.8%. The internal standards were within the control limits (60-125%); therefore, no qualifications were warranted.

10. Field Blanks

Were field blanks (FB) submitted as specified in the Sampling Analysis Plan (SAP)?	Y	X	N	
Were any data qualified because of field blank problems?	Y	X	N	

Describe Any Actions Taken: The rinsate blank, LAO-SS-10-061421, had detections of aluminum (0.017 mg/L), calcium (0.81 mg/L), lead (0.00022 mg/L), magnesium (0.2 mg/L), and hardness (2.9 mg/L) greater than 2 times the MDL (0.0142 mg/L, 0.03 mg/L, 0.000086 mg/L, 0.0078 mg/L, and 0.108 mg/L, respectively). Since the rinsate blank is collected from a designated ISCO sampler that is located at LAO-SS-1, qualifications only apply to samples taken from that location. Qualifications for detections less than 5 times the blank detect are listed in the table below:

Field ID	Aluminum		Calcium		Lead		Magnesium		Hardness	
	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Results	Qual
LAO-SS-1-061021	ND		98.7		0.00018	U	32.6		381	
LAO-SS-1-061421	0.026	U	91.3		0.00053	U	33.5		366	
LAO-SS-1T-061421	0.028	U	94.4		0.00059	U	33.7		375	

LAO-SS-1-061021, LAO-SS-1-061421, and LAO-SS-1T-061421 had a previous qualification of "J+" for lead due to a detect in the ICS Solution A. These samples will have a final qualification of "UJ" for lead.

Comments: The field blank, LAO-SS-4-061421, had detections of calcium (0.019 mg/L), magnesium (0.0043 mg/L), and hardness (0.066 mg/L) that were less than 2 times the MDL (0.030 mg/L, 0.0078 mg/L, and 0.108 mg/L, respectively). No qualifications were required, as discussed in the CFRSSI QAPP (ARCO, 1992).

The rinsate blank, LAO-SS-10-061421, had detections of iron (0.018 mg/L), uranium-238 (0.000043 mg/L), and zinc (0.0044 mg/L) that were less than 2 times the MDL (0.024 mg/L, 0.000056 mg/L, and 0.0046 mg/L, respectively). No qualifications were required, as discussed in the CFRSSI QAPP.

The rinsate blank, LAO-SS-10-061421, had a detection of copper (0.00091 mg/L) that was greater than 2 times the MDL (0.00086 mg/L). All sample results for copper were either greater than 5 times the blank detect or non-detect; therefore, no qualifications were warranted.

11. Field Duplicates

Were field duplicates submitted as specified in the SAP?	Y	X	N	
Were field duplicates within the control limits?	Y	X	N	
Were any data qualified because of field duplicate problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: The field duplicate pair for June 2021 was submitted on this WO: samples LAO-SS-1-061421 and LAO-SS-1T-061421. All results were within control limits.

12. Overall Assessment

Are there analytical limitations of the data that users should be aware of? Y [X] N [ ]

If so, explain: On this WO 10565397, the following qualifications were made:

In additional to the qualifications outlined in the sections above, results which are reported between the method detection limit and the reporting limit were qualified "A" when no additional qualifications were warranted.

The table below lists the qualifications on the natural samples:

Field ID	Analyte	Final Qualification	Reason Code
LAO-SS-1-061021	Cadmium	J-	ICS
LAO-SS-1-061421	Cadmium	J-	ICS
LAO-SS-1-061021	Lead	UJ	ICS, RB
LAO-SS-1-061421	Lead	UJ	ICS, RB
LAO-SS-1-061021	Uranium	J	SD
LAO-SS-1-061421	Uranium	J	SD
LAO-SS-1-061421	Aluminum	U	RB
LAO-SS-1-061021	Iron	A	<RL
LAO-SS-1-061421	Iron	A	<RL
LAO-SS-1-061421	Mercury	A	<RL

The table below lists the qualifications on the field quality control samples:

Field ID	Analyte	Final Qualification	Reason Code
LAO-SS-1T-061421	Cadmium	J-	ICS
LAO-SS-1T-061421	Lead	UJ	ICS, RB
LAO-SS-1T-061421	Uranium	J	SD
LAO-SS-1T-061421	Aluminum	U	RB
LAO-SS-4-061421	Calcium	A	<RL
LAO-SS-4-061421	Magnesium	J+	CS, <RL
LAO-SS-4-061421	Hardness	A	<RL
LAO-SS-1T-061421	Iron	A	<RL
LAO-SS-1T-061421	Mercury	A	<RL
LAO-SS-10-061421	Aluminum	A	<RL
LAO-SS-10-061421	Copper	A	<RL
LAO-SS-10-061421	Iron	A	<RL
LAO-SS-10-061421	Uranium	A	<RL
LAO-SS-10-061421	Zinc	A	<RL

Comments:

13. Authorization of Data Validation

Data Validator

Name: Sara Ward **Reviewed By:** Shelby Green

Signature:  

Date: 7/27/2021 8/10/2021

Site: Butte Priority Soils Operable Unit	**Case No**: 10566549	**Laboratory**: Pace Analytical
Project: BTL-LAO Monitoring	**Matrix**: Water	**Analyses**: Total Metals: Al, As, Ca, Cd, Cu, Fe, Hg, Pb, Mg, Ag, U-238, and Zn Total Hardness (Calculation)
Sample Date: 6/17/2021, 6/21/2021	**Analysis Dates**: 6/25/2021, 6/28/2021	
Data Validator: S. Ward	**Validation Dates**: 7/29/2021	

1. Holding Times

Analyte	Laboratory	Matrix	Method	Holding Times (Days)	Collection Date	Analysis Date(s)	Holding Time Met (Y/N)	Affected Data Flagged (Y/N)
Al, As, Ca, Cd, Cu, Fe, Pb, Mg, Ag, U-238, Zn	Pace	Water	EPA Method 200.8	180	6/17/2021, 6/21/2021	6/25/2021, 6/28/2021	Y	NA
Total Hardness	Pace	Water	2340B (Calculation)	180			Y	NA
Mercury	Pace	Water	EPA Method 245.1	28		6/28/2021	Y	NA

*Reference for Holding Times – Clark Fork Superfund Site Investigations, Laboratory Analysis Plan (LAP) and PACE Analytical Guide (PAC) for Holding Times

Were any data flagged because of holding time? Y [ ] N [X]
Were any data flagged because of preservation problems? Y [ ] N [X]

Describe Any Actions Taken: None Required.

Comments: The receiving temperature as reported by the laboratory was 1.6 °C. The samples were shipped on ice and reported as properly preserved. There was no temperature blank present, so the temperature was averaged from 4 separate temperature readings.

2. Instrument Calibration

Was the Tune analysis information performed?	Y [X]	N [ ]
Was the peak width and resolution of the masses within the required control limits?	Y [X]	N [ ]
Was the percent relative standard deviation ≤ 5% for all analytes in the Tune solutions?	Y [X]	N [ ]
Was the instrument successfully calibrated at the correct frequency?	Y [X]	N [ ]
Was the instrument calibrated with the appropriate standards and blanks?	Y [X]	N [ ]
Were Initial Calibration Verification (ICV) and Continuing Calibration Verification (CCV) samples analyzed?	Y [X]	N [ ]
Were ICV and CCV results within the control window?	Y [X]	N [ ]
Were any data flagged because of calibration problems?	Y [ ]	N [X]

Describe Any Actions Taken: None Required.

Comments: All total metals and mercury calibrations, ICV, and CCV results were within the control limits.

3. Blanks

Were Initial and Continuing Calibration Blanks (ICB and CCBs) analyzed?	Y [X]	N [ ]
Were ICBs and CCBs within the control window?	Y [X]	N [ ]
Were Method Blanks (MBs) analyzed at the frequency of 1 per analytical batch?	Y [X]	N [ ]
Were MBs within the control window of less than two times the laboratory Method Detection Limit (MDL)?	Y [X]	N [ ]
Were any data flagged because of blank problems?	Y [ ]	N [X]

Describe Any Actions Taken: None Required.

Comments: A detection of iron in the MB (0.014 mg/L) required no qualification as the detect was less than 2 times the MDL (0.024 mg/L), as discussed in the CFRSSI QAPP (ARCO, 1992).

4. Interference Check Samples

Were ICP Interference Check Samples (ICS) within the control limits?	Y		N	X
Were any data flagged because of ICS problems?	Y	X	N	

Describe Any Actions Take: In the ICS Solution A analyzed on 6/25/2021 at 12:31, there was a detection of lead (0.085 ug/L) greater than the MDL (0.043 ug/L). The raw data showed that the levels for some interferents (Ca, Mg, and Na) were higher than the corresponding true values in the ICS Solution A. The lead result for LAO-SS-1-062121 was qualified "J+" due to the lead result (0.78 ug/L) being less than 10 times the ICS Solution A detection (0.85 ug/L). The other sample results for lead were greater than 10 times the ICS Solution A detection; therefore, no additional qualifications were warranted.

Comments: On this work order (WO), analytes that were not present in ICS Solution A but were detected included: arsenic, cadmium, copper, lead, silver, uranium, and zinc. The percent recovery (%R) for Solution A and Solution AB were within the control limits.

In the ICS Solution A analyzed on 6/28/2021 at 10:44, there was a detection of lead (0.084 ug/L) greater than the MDL (0.043 ug/L). The raw data showed that the levels for some interferents (Ca, Mg, and Na) were higher than the corresponding true values in the ICS Solution A. No lead results were reported on 6/28/2021; therefore, no qualifications were warranted.

5. Laboratory Control Samples

Were Laboratory Control Samples (LCS) analyzed at the frequency of 1 per batch?	Y	X	N	
What was the source of the LCS?	Unknown			
Were LCS results within the control window of 80 to 120%?	Y	X	N	
Were any data flagged because of LCS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: The %R for the LCS were within the control limits.

6. Duplicate Sample Results

Were Laboratory Duplicate Samples (LDS) analyzed at the frequency of 1 per batch?	Y	X	N	
Were LDS results within the control window ≤ 20% Relative Percent Difference (RPD)?	Y	X	N	
Were any data flagged because of LDS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: For batch 751617, the LMS and LMS Duplicate (LMSD) samples for mercury were generated from sample LAO-SS-1-061721 and used for the LDS calculation. The data user should be aware that the RPD was within control limits. No qualifications were warranted.

For batch 751524, the LMS and LMSD samples for total metals were generated from sample LAO-SS-1-061721 and used for the LDS calculations. The data user should be aware that all RPDs were within control limits. No qualifications were warranted.

7. Matrix Spike Sample Results

Were Laboratory Matrix Spike Samples (LMS) analyzed at the frequency of 1 per batch?	Y	X	N	
Were LMS results within the control window 75 to 125%?	Y		N	X
Were any data flagged because of LMS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: Sample LAO-SS-1-061721 was used to generate an LMS/LMSD sample pair for total metals. The %R for the LMS and LMSD for calcium (-26% and 322%, respectively) and magnesium (49% and 160%, respectively) were outside control limits. Per the NFG, *"Spike recovery limits do not apply when the original sample concentration is ≥ 4 times the spike added. In such an event, the data shall be reported unflagged, even if the %R does not meet acceptance criteria"* (EPA, 2017). The original sample concentrations of these analytes were greater than 4 times the added spike amount; therefore, no qualifications were warranted. The remaining %R were within control limits (75-125%). A second LMS was performed on a sample not from this WO. The %R for the LMS for calcium (474%) and magnesium (185%) was outside control limits. Because the sample was from a different WO, no qualifications were required. The remaining %R were within control limits.

Sample LAO-SS-1-061721 was used to generate an LMS/LMSD sample pair for total mercury. The %R for the LMS and LMSD were within control limits.

8. ICP Serial Dilutions

Were ICP Serial Dilutions (SD) analyzed at the frequency of 1 per batch?	Y	X	N		
Were SD percent differences (%D) results within the control limits?	Y		N	X	
Were any data flagged because of SD problems?	Y	X	N		

Describe Any Actions Taken: Sample LAO-SS-1-061721 was used to generate the SD. The %D for copper (15.1%) and magnesium (12.5%) were outside control limits. LAO-SS-1-061721 was qualified "J" due to the elevated %Ds. Per the NFG, "*For a SD that does not meet the technical criteria, apply the action to all samples of the same matrix if the samples are considered sufficiently similar"* (EPA, 2017). LAO-SS-1-062121 is considered sufficiently similar; therefore, this sample was also qualified "J" for copper and magnesium.

Comments: Sample LAO-SS-1-061421 was used to generate the SD. The %Ds for aluminum (24.3%), cadmium (19.8%), iron (17.4%), lead (14.3%), and zinc (16.2%) were outside control limits, but the original sample concentrations were less than 50 times the MDL; therefore, no qualifications were warranted.

9. Internal Standards

Were internal standards added to each sample in the analytical batch?	Y	X	N		
Were the percent relative intensity recoveries (%RI) within the control limits of 60 to 125%	Y	X	N		
Were any data flagged because of internal standard problems?	Y		N	X	

Describe Any Actions Taken: None Required.

Comments: Internal standards used on 6/25/2021 included: Ge-72, In-115, IR-193, Sc-45-IS, and Tb-159. The Calibration 0 %RI equaled 100% for all internal standards. The remaining %RI ranged from 63.3% to 121.9%. The internal standards were within the control limits (60-125%); therefore, no qualifications were warranted.

Internal standards used on 6/28/2021 included: Ge-72, In-115, IR-193, Sc-45-IS, and Tb-159. The Calibration 0 %RI equaled 100% for all internal standards. The remaining %RI ranged from 92.3% to 111.1%. The internal standards were within the control limits (60-125%); therefore, no qualifications were warranted.

10. Field Blanks

Were field blanks (FB) submitted as specified in the Sampling Analysis Plan (SAP)?	Y	X	N			
Were any data qualified because of field blank problems?	Y		N		N/A	

Describe Any Actions Taken: None Required.

Comments: There was no field blank included in this work order. Field blanks are collected monthly and are summarized in the *Field Blank Samples with Results, Laboratory Flags, Data Validation Qualifiers, Data Validation Reason Codes, and QC Criteria Calculations* table in the Data Validation Report.

11. Field Duplicates

Were field duplicates submitted as specified in the SAP?	Y	X	N			
Were field duplicates within the control limits?	Y		N		N/A	
Were any data qualified because of field duplicate problems?	Y		N		N/A	

Describe Any Actions Taken: None Required.

Comments: There was no field duplicate pair included in this work order. Field duplicates are collected monthly and are summarized in the *Field Duplicate Pair Samples with Results, Laboratory Flags, Data Validation Qualifiers, Data Validation Reason Codes, and QC Criteria Calculations* table in the Data Validation Report.

12. Overall Assessment

Are there analytical limitations of the data that users should be aware of? Y [X] N [ ]

If so, explain: On this WO 10566549, the following qualifications were made:

In additional to the qualifications outlined in the sections above, results which are reported between the method detection limit and the reporting limit were qualified "A" when no additional qualifications were warranted.

The table below lists the qualifications on the natural samples:

Field ID	Analyte	Final Qualification	Reason Code
LAO-SS-1-062121	Lead	J+	ICS
LAO-SS-1-061721	Copper	J	SD
LAO-SS-1-062121	Copper	J	SD
LAO-SS-1-061721	Magnesium	J	SD
LAO-SS-1-062121	Magnesium	J	SD

Comments:

13. Authorization of Data Validation

Data Validator

Name: Sara Ward **Reviewed By:** Shelby Green

Signature: Sara Ward Shelby Green

Date: 7/29/2021 8/10/2021

Site: Butte Priority Soils Operable Unit	**Case No**: 10567614	**Laboratory**: Pace Analytical
Project: BTL-LAO Monitoring	**Matrix**: Water	**Analyses**: Total Metals: Al, As, Ca, Cd, Cu, Fe, Hg, Pb, Mg, Ag, U-238, and Zn Total Hardness (Calculation)
Sample Date: 6/24/2021, 6/28/2021	**Analysis Dates**: 7/8/2021, 7/9/2021	
Data Validator: S. Ward	**Validation Dates**: 8/9/2021	

1. Holding Times

Analyte	Laboratory	Matrix	Method	Holding Times (Days)	Collection Date	Analysis Date(s)	Holding Time Met (Y/N)	Affected Data Flagged (Y/N)
Al, As, Ca, Cd, Cu, Fe, Pb, Mg, Ag, U-238, Zn	Pace	Water	EPA Method 200.8	180	6/24/2021, 6/28/2021	7/9/2021	Y	NA
Total Hardness	Pace	Water	2340B (Calculation)	180			Y	NA
Mercury	Pace	Water	EPA Method 245.1	28		7/8/2021	Y	NA

*Reference for Holding Times – Clark Fork Superfund Site Investigations, Laboratory Analysis Plan (LAP) and PACE Analytical Guide (PAC) for Holding Times

Were any data flagged because of holding time?	Y [ ]	N [X]
Were any data flagged because of preservation problems?	Y [ ]	N [X]

Describe Any Actions Taken: None Required.

Comments: The receiving temperature as reported by the laboratory was 2.6°C. The samples were shipped on ice and reported as properly preserved.

2. Instrument Calibration

Was the Tune analysis information performed?	Y [X]	N [ ]
Was the peak width and resolution of the masses within the required control limits?	Y [X]	N [ ]
Was the percent relative standard deviation (%RSD) ≤ 5% for all analytes in the Tune solutions?	Y [X]	N [ ]
Was the instrument successfully calibrated at the correct frequency?	Y [X]	N [ ]
Was the instrument calibrated with the appropriate standards and blanks?	Y [ ]	N [X]
Were Initial Calibration Verification (ICV) and Continuing Calibration Verification (CCV) samples analyzed?	Y [X]	N [ ]
Were ICV and CCV results within the control window?	Y [X]	N [ ]
Were any data flagged because of calibration problems?	Y [X]	N [ ]

Describe Any Actions Taken: The high calibration standard for copper was 0.25 mg/L. The copper result for sample LAO-SS-2-062821 (0.30 mg/L) was greater than the high calibration standard; therefore, the result was qualified "J".

Comments: The lab rejected the CAL6 calibration standards for copper and silver. No qualifications were warranted.

The initial H2 Tune had failing RSDs, but the Tune was performed again, and all RSDs passed.

3. Blanks

Were Initial and Continuing Calibration Blanks (ICB and CCBs) analyzed?	Y [X]	N [ ]
Were ICBs and CCBs within the control window?	Y [X]	N [ ]
Were Method Blanks (MBs) analyzed at the frequency of 1 per analytical batch?	Y [X]	N [ ]
Were MBs within the control window of less than two times the laboratory Method Detection Limit (MDL)?	Y [X]	N [ ]
Were any data flagged because of blank problems?	Y [ ]	N [X]

Describe Any Actions Taken: None Required.

Comments: A detection of calcium (0.016 mg/L) in the MB required no qualification as the detect was less than 2 times the MDL (0.030 mg/L), as discussed in the CFRSSI QAPP (ARCO, 1992).

4. Interference Check Samples

Were ICP Interference Check Samples (ICS) within the control limits?	Y		N	X
Were any data flagged because of ICS problems?	Y	X	N	

Describe Any Actions Take: In the ICS Solution A analyzed on 7/9/2021 at 08:10, there was a detection of lead (0.048 ug/L) greater than the MDL (0.043 ug/L). The raw data showed that the levels for some interferents (Ca, Mg, and Na) were higher than the corresponding true values in the ICS Solution A. The lead result for sample LAO-SS-1-062421 was qualified "J+" due to the lead result being less than 10 times the ICS Solution A detection (0.48 ug/L). The other sample results for lead were greater than 10 times the ICS Solution A detection; therefore, no additional qualifications were warranted.

Comments: On this work order (WO), analytes that were not present in ICS Solution A but were detected included: arsenic, cadmium, copper, lead, silver, uranium, and zinc. The percent recovery (%R) for Solution A and Solution AB were within the control limits.

In the ICS Solution A analyzed on 7/9/2021 at 08:10, there was a detection of silver (0.092 ug/L) greater than the MDL (0.077 ug/L). The raw data showed that the levels for some interferents (Ca, Mg, and Na) were higher than the corresponding true values in the ICS Solution A. All results for silver were non-detect; therefore, no qualifications were warranted.

5. Laboratory Control Samples

Were Laboratory Control Samples (LCS) analyzed at the frequency of 1 per batch?	Y	X	N	
What was the source of the LCS?	Unknown			
Were LCS results within the control window of 80 to 120%?	Y	X	N	
Were any data flagged because of LCS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: The %R for the LCS were within the control limits.

6. Duplicate Sample Results

Were Laboratory Duplicate Samples (LDS) analyzed at the frequency of 1 per batch?	Y	X	N	
Were LDS results within the control window ≤ 20% Relative Percent Difference (RPD)?	Y	X	N	
Were any data flagged because of LDS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: For batch 754455, the LMS and LMS Duplicate (LMSD) samples for mercury were generated from sample LAO-SS-1-062421 and used for the LDS calculation. The data user should be aware that the RPD was within control limits. No qualifications were warranted.

For batch 753524, the LMS and LMSD samples for total metals were generated from sample LAO-SS-1-062421 and used for the LDS calculations. The data user should be aware that all RPDs were within control limits. No qualifications were warranted.

7. Matrix Spike Sample Results

Were Laboratory Matrix Spike Samples (LMS) analyzed at the frequency of 1 per batch?	Y	X	N	
Were LMS results within the control window 75 to 125%?	Y		N	X
Were any data flagged because of LMS problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: Sample LAO-SS-1-062421 was used to generate an LMS/LMSD sample pair for total metals. The %R for the LMS for calcium (547%) and the LMS and LMSD for magnesium (153% and 4%, respectively) were outside control limits. Per the NFG, *"Spike recovery limits do not apply when the original sample concentration is ≥ 4 times the spike added. In such an event, the data shall be reported unflagged, even if the %R does not meet acceptance criteria"* (EPA, 2017). The original sample concentrations of these analytes were greater than 4 times the added spike amount; therefore, no qualifications were warranted. The remaining %R were within control limits (75-125%). A second LMS was performed on a sample not from this WO. The %R for calcium (1960%) and magnesium (487%) were outside control limits. Because the sample was from a different WO, no qualifications were required. The remaining %R were within control limits.

Sample LAO-SS-1-062421 was used to generate an LMS/LMSD sample pair for total mercury. The %R for the LMS and LMSD were within control limits.

8. ICP Serial Dilutions

Were ICP Serial Dilutions (SD) analyzed at the frequency of 1 per batch?	Y	X	N		
Were SD percent differences (%D) results within the control limits?	Y		N	X	
Were any data flagged because of SD problems?	Y		N	X	

Describe Any Actions Taken: None Required.

Comments: Sample LAO-SS-1-062421 was used to generate the SD. The %D for cadmium (18.9%) was outside control limits, but the original sample concentration was less than 50 times the MDL; therefore, no qualifications were warranted.

9. Internal Standards

Were internal standards added to each sample in the analytical batch?	Y	X	N		
Were the percent relative intensity recoveries (%RI) within the control limits of 60 to 125%	Y	X	N		
Were any data flagged because of internal standard problems?	Y		N	X	

Describe Any Actions Taken: None Required.

Comments: Internal standards used on 6/17/2021 included: Ge-72, In-115, IR-193, Sc-45-IS, and Tb-159. The Calibration 0 %RI equaled 100% for all internal standards. The remaining %RI ranged from 72.6% to 103.2%. The internal standards were within the control limits (60-125%); therefore, no qualifications were warranted.

10. Field Blanks

Were field blanks (FB) submitted as specified in the Sampling Analysis Plan (SAP)?	Y	X	N		
Were any data qualified because of field blank problems?	Y		N		N/A

Describe Any Actions Taken: None Required.

Comments: There was no field blank included in this work order. Field blanks are collected monthly and are summarized in the *Field Blank Samples with Results, Laboratory Flags, Data Validation Qualifiers, Data Validation Reason Codes, and QC Criteria Calculations* table in the Data Validation Report.

11. Field Duplicates

Were field duplicates submitted as specified in the SAP?	Y	X	N		
Were field duplicates within the control limits?	Y		N		N/A
Were any data qualified because of field duplicate problems?	Y		N		N/A

Describe Any Actions Taken: None Required.

Comments: There was no field duplicate pair included in this work order. Field duplicates are collected monthly and are summarized in the *Field Duplicate Pair Samples with Results, Laboratory Flags, Data Validation Qualifiers, Data Validation Reason Codes, and QC Criteria Calculations* table in the Data Validation Report.

12. Overall Assessment

Are there analytical limitations of the data that users should be aware of? Y [X] N [ ]

If so, explain: On this WO 10567614, the following qualifications were made:

In additional to the qualifications outlined in the sections above, results which are reported between the method detection limit and the reporting limit were qualified "A" when no additional qualifications were warranted.

The table below lists the qualifications on the natural samples:

Field ID	Analyte	Final Qualification	Reason Code
LAO-SS-1-062421	Lead	J+	ICS
LAO-SS-2-062821	Copper	J	CL
LAO-SS-1-062421	Iron	A	<RL
LAO-SS-1-062421	Mercury	A	<RL

Comments:

13. Authorization of Data Validation

Data Validator

Name: Sara Ward **Reviewed By:** Shelby Green

Signature: Sara Ward

Date: 8/9/2021 8/24/2021

Attachment A.2
Data Validation Checklists for General Chemistry

Site: Butte Priority Soils Operable Unit	**Case No:** 10556183	**Laboratory:** Pace Analytical
Project: BTL-LAO Monitoring	**Matrix:** Water	**Analyses:** Alkalinity Forms, Total Dissolved Solids (TDS), Total Suspended Solids (TSS), NO2+NO3, and Sulfate (SO_4)
Sample Dates: 4/19/2021	**Analysis Dates:** 4/23/2021, 4/26/2021, 4/28/2021, 4/30/2021	
Data Validator: S. Ward	**Validation Dates:** 6/29/2021, 6/30/2021	

1. Holding Times

Analyte	Laboratory	Matrix	Method	Holding Times (Days)	Collection Date	Analysis Date(s)	Holding Time Met (Y/N)	Affected Data Flagged (Y/N)
Alkalinity, Hydroxide Total Alkalinity Alkalinity, Bicarbonate, Alkalinity, Carbonate	Pace	Water	SM 2320B	14	4/19/2021	4/23/2021	Y	NA
Total Dissolved Solids	Pace	Water	SM 2540C	7		4/26/2021	Y	NA
Total Suspended Solids	Pace	Water	SM 2540D	7		4/26/2021	Y	NA
Nitrogen, $NO_2 + NO_3$	Pace	Water	SM4500-NO3 H	28		4/28/2021	Y	NA
Sulfate	Pace	Water	ASTM D516	28		4/30/2021	Y	NA

*Reference for Holding Times – Clark Fork Superfund Site Investigations, Laboratory Analysis Plan (LAP) and PACE Analytical Guide (PAC) for Holding Times

Were any data flagged because of holding time?	Y	N X
Were any data flagged because of preservation problems?	Y	N X

Describe Any Actions Taken: None Required.

Comments: The receiving temperature as reported by the laboratory was 3.1 °C. The samples were shipped on ice and reported as properly preserved. The laboratory sample condition upon receipt form showed the corrected cooler receipt temperature as 2.6 °C, but the COC had a temperature of 3.2 °C recorded. An email to the laboratory confirmed that the corrected receipt temperature was 3.1 °C.

2. Instrument Calibration

Was the instrument successfully calibrated at the correct frequency?	Y	X	N	
Was the instrument calibrated with appropriate standards and blanks?	Y	X	N	
Was the Initial Calibration Verification (ICV) sample analyzed?	Y	X	N	
Were ICV and Continuing Calibration Verifications (CCV) samples within the control window?	Y		N	X
Were any data flagged because of calibration problems?	Y	X	N	

Describe Any Actions Taken: The ICV percent recovery (%R) (85.2%) and all bracketing CCV %R (85%, 84.3%, and 83.3%) for sulfate were outside control limits (90-110%). All sulfate results in this work order (WO) were qualified "J-" for detect values or "UJ" for non-detect values, as shown in Section 9 of this checklist.

Comments: The ICV and CCV results for total alkalinity and nitrogen, NO2 plus NO3 were within the control limits.

3. Blanks

Were Method Blanks (MBs) analyzed at the frequency of 1 per analytical batch?	Y	X	N	
Were MBs within the control window of less than 2 times the Method Detection Limit (MDL)?	Y	X	N	
Were any data flagged because of blank problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: Nitrogen, NO2 plus NO3 was detected in the bracketing Continuing Calibration Blanks (CCBs) (0.053 mg/L, 0.064 mg/L) on 4/28/2021 at a level that was less than 2 times the MDL (0.104 mg/L), as discussed in the CFRSSI QAPP (ARCO, 1992). Therefore, no qualifications were required.

The Initial Calibration Blank (ICB), CCBs, and MB for the remaining analytes were within control limits.

4. Laboratory Control Samples

Were Laboratory Control Samples (LCS) analyzed at the frequency of 1 per batch?	Y [X]	N [ ]
What was the source of the LCS?	Unknown	
Were LCS results within the control window of 80 to 120%?	Y [X]	N [ ]
Were any data flagged because of LCS problems?	Y [ ]	N [X]

Describe Any Actions Taken: None Required.

Comments: All the %R for the LCS were within the control limits.

5. Duplicate Sample Results

Were Laboratory Duplicate Samples (LDS) analyzed at the frequency of 1 per batch?	Y [X]	N [ ]
Were LDS results within the control window ≤ 20% Relative Percent Difference (RPD)?	Y [ ]	N [X]
Were any data flagged because of LDS problems?	Y [ ]	N [X]

Describe Any Actions Taken: None Required.

Comments: For alkalinity, total as CaCO3, the LDS were created from an LCS and LCS Duplicate (LCSD) sample pair, as well as sample LAO-SS-1-041921 and one sample not from this sample event. The %RPDs were within control limits.

For sulfate, the LDS were created from an LCS and LCSD sample pair, as well as sample LAO-SS-1-041921 and one sample not from this sample event. The %RPDs were within control limits.

For nitrogen, NO2 plus NO3, the LDS were created from sample LAO-SS-1-041921 and three samples not from this sample event. The %RPD for one sample not from this sample event (26.1%) was outside control limits (20%). Since the sample was not from this sample event, no qualifications were warranted.

For total dissolved solids, the LDS were created from sample LAO-SS-1-041921 and a sample not from this sample event. The %RPDs were within control limits.

For total suspended solids, the LDS were created from sample LAO-SS-1-041921 and a sample not from this sample event. The %RPDs were within control limits.

6. Matrix Spike Sample Results

Were Laboratory Matrix Spike Samples (LMS) analyzed at the frequency of 1 per batch?	Y [X]	N [ ]
Were LMS results within the control window 80-120%?	Y [ ]	N [X]
Were any data flagged because of LMS problems?	Y [ ]	N [X]

Describe Any Actions Taken: None Required.

Comments: For alkalinity, total as CaCO3, the LMS and LMS Duplicate (LMSD) were created from sample LAO-SS-1-041921 and one sample not from this sample event.

For sulfate, the LMS and LMSD were created from sample LAO-SS-1-041921 and one sample not from this sample event.

For NO2 plus NO3, the LMS and LMSD were created from sample LAO-SS-1-041921 and three samples not from this sample event. The %R for the LMSD for one sample not from this sample event (58%) was outside control limits (80-120%). Since the sample was not from this sample event, no qualifications were warranted.

The data user should be aware that remaining LMS/LMSD %Rs were within control limits.

7. Field Blanks

Were field blanks submitted as specified in the Sampling Analysis Plan (SAP)?	Y [X]	N [ ]
Were any data qualified because of field blank problems?	Y [ ]	N [X]

Describe Any Actions Taken: None Required.

Comments: The field blank, sample LAO-SS-4-041921, was submitted on this WO and had no detects for total alkalinity, sulfate, NO2 plus NO3, total dissolved solids, or total suspended solids.

The rinsate blank, sample LAO-SS-10-041921, was submitted on this WO and had no detects for total alkalinity, sulfate, NO2 plus NO3, total dissolved solids, or total suspended solids.

8. Field Duplicates

Were field duplicates submitted as specified in the Sampling Analysis Plan (SAP)?	Y	X	N	
Were field duplicates within the control limits?	Y		N	X
Were any data qualified because of field duplicate problems?	Y	X	N	

Describe Any Actions Taken: The field duplicate pair for April 2021 was submitted on this WO: samples LAO-SS-1-041921 and LAO-SS-1T-041921. The alkalinity, bicarbonate primary and duplicate sample results were less than 5 times the Reporting Limit (RL). The absolute difference between the primary sample and duplicate sample was greater than the RL; therefore, the samples were qualified "J" for alkalinity, bicarbonate due to poor field precision. Per the NFG, "For a duplicate sample analysis that does not meet the technical criteria, apply the action to all samples of the same matrix if the samples are considered sufficiently similar." (EPA, 2017). The remaining samples on this WO are sufficiently different based on concentrations and sample locations to warrant no qualification.

Comments: The rest of the results for the field duplicate pair were within control limits.

9. Overall Assessment

Are there analytical limitations of the data that users should be aware of?	Y	X	N	

If so, explain: On this WO 10556183, the following qualifications were made:

In additional to the qualifications outlined in the sections above, results which are reported between the method detection limit and the reporting limit were qualified "A" when no additional qualifications were warranted.

The table below lists the qualifications on the natural samples:

Field ID	Analyte	Final Qualification	Reason Code
LAO-SS-1-041921	Sulfate	J-	ICV, CCV
LAO-SS-2-041921	Sulfate	J-	ICV, CCV
LAO-SS-3-041921	Sulfate	J-	ICV, CCV
LAO-SS-1-041921	Alkalinity, bicarbonate	J	FD
LAO-SS-2-041921	Total suspended solids	A	<RL

The table below list the qualifications on the field quality control samples:

Field ID	Analyte	Final Qualification	Reason Code
LAO-SS-1T-041921	Sulfate	J-	ICV, CCV
LAO-SS-4-041921	Sulfate	UJ	ICV, CCV
LAO-SS-10-041921	Sulfate	UJ	ICV, CCV
LAO-SS-1T-041921	Alkalinity, bicarbonate	J	FD, <RL

Comments:

10. Authorization of Data Validation

Data Validator

Name: Sara Ward **Reviewed By:** Shelby Green

Signature: Sara Ward Shelby Green

Date: 6/30/2021 7/7/2021

Stage 4 Data Validation Checklist for General Chemistry Sample Analysis

Site: Butte Priority Soils Operable Unit	**Case No:** 10559768	**Laboratory:** Pace Analytical
Project: BTL-LAO Monitoring	**Matrix:** Water	**Analyses:** Alkalinity Forms, Total Dissolved Solids (TDS), Total Suspended Solids (TSS), NO2+NO3, and Sulfate (SO_4)
Sample Dates: 5/10/2021	**Analysis Dates:** 5/14/2021, 5/17/2021, 5/19/2021, 5/21/2021, 5/23/2021	
Data Validator: S. Ward	**Validation Dates:** 8/24/2021, 8/25/2021	

1. Holding Times

Analyte	Laboratory	Matrix	Method	Holding Times (Days)	Collection Date	Analysis Date(s)	Holding Time Met (Y/N)	Affected Data Flagged (Y/N)
Alkalinity, Hydroxide Total Alkalinity Alkalinity, Bicarbonate, Alkalinity, Carbonate	Pace	Water	SM 2320B	14	5/10/2021	5/21/2021, 5/23/2021	Y	NA
Total Dissolved Solids	Pace	Water	SM 2540C	7		5/17/2021	Y	NA
Total Suspended Solids	Pace	Water	SM 2540D	7		5/17/2021	Y	NA
Nitrogen, $NO_2 + NO_3$	Pace	Water	SM4500-NO3 H	28		5/19/2021	Y	NA
Sulfate	Pace	Water	ASTM D516	28		5/14/2021	Y	NA

*Reference for Holding Times – Clark Fork Superfund Site Investigations, Laboratory Analysis Plan (LAP) and PACE Analytical Guide (PAC) for Holding Times

Were any data flagged because of holding time? Y [ ] N [X]
Were any data flagged because of preservation problems? Y [ ] N [X]

Describe Any Actions Taken: None Required.

Comments: The receiving temperature as reported by the laboratory was 4.6 °C. The samples were shipped on ice and reported as properly preserved. There was no temperature blank present, so the temperature was averaged from 4 separate temperature readings.

2. Instrument Calibration

Was the instrument successfully calibrated at the correct frequency?	Y [X]	N [ ]
Was the instrument calibrated with appropriate standards and blanks?	Y [X]	N [ ]
Was the Initial Calibration Verification (ICV) sample analyzed?	Y [X]	N [ ]
Were ICV and Continuing Calibration Verifications (CCV) samples within the control window?	Y [ ]	N [X]
Were any data flagged because of calibration problems?	Y [X]	N [ ]

Describe Any Actions Taken: The ICV and CCVs for the sulfate run on 5/14/21 starting at 16:55 were all low outside control limits (90-110%). LAO-SS-2-051021 and LAO-SS-3-051021 were qualified "J-" and LAO-SS-4-051021 and LAO-SS-10-051021 were qualified "UJ" due to non-detect results.

Comments: The ICV and CCV results for total alkalinity and nitrogen, NO2 plus NO3 were within control limits.

3. Blanks

Were Method Blanks (MBs) analyzed at the frequency of 1 per analytical batch?	Y [X]	N [ ]
Were MBs within the control window of less than 2 times the Instrument Detection Limit (IDL)?	Y [X]	N [ ]
Were any data flagged because of blank problems?	Y [ ]	N [X]

Describe Any Actions Taken: None Required.

Comments: Nitrogen, NO2 plus NO3 was detected in the Continuing Calibration Blank (CCB) analyzed 5/19/21 at 11:15 (0.056 mg/L) at a level that was less than 2 times the IDL (0.104 mg/L), as discussed in the CFRSSI QAPP (ARCO, 1992). Therefore, no qualifications were required.

The ICB, CCBs, and MB for the remaining analytes were within control limits.

4. Laboratory Control Samples

Were Laboratory Control Samples (LCS) analyzed at the frequency of 1 per batch?	Y [X]	N [ ]
What was the source of the LCS?	Unknown	
Were LCS results within the control window of 80 to 120%?	Y [X]	N [ ]
Were any data flagged because of LCS problems?	Y [ ]	N [X]

Describe Any Actions Taken: None Required.

Comments: All the %R for the LCS were within the control limits.

5. Duplicate Sample Results

Were Laboratory Duplicate Samples (LDS) analyzed at the frequency of 1 per batch?	Y [X]	N [ ]
Were LDS results within the control window ≤ 20% Relative Percent Difference (RPD)?	Y [X]	N [ ]
Were any data flagged because of LDS problems?	Y [ ]	N [X]

Describe Any Actions Taken: None Required.

Comments: For alkalinity, total as CaCO3, the LDS were created from two LCS and LCS Duplicate (LCSD) sample pairs, as well as sample LAO-SS-1-051021 and two samples not from this sample event. The %RPDs were within control limits.

For sulfate, the LDS were created from two LCS and LCSD sample pairs, as well as sample LAO-SS-1-051021 and two samples not from this sample event. The %RPDs were within control limits.

For nitrogen, NO2 plus NO3, the LDS were created from sample LAO-SS-1-051021 and a sample not from this sample event. The %RPDs were within control limits.

For total dissolved solids, the LDS were created from sample LAO-SS-1-051021 and a sample not from this sample event. The %RPDs were within control limits.

For total suspended solids, the LDS were created from sample LAO-SS-1-051021 and a sample not from this sample event. The %RPDs were within control limits.

6. Matrix Spike Sample Results

Were Laboratory Matrix Spike Samples (LMS) analyzed at the frequency of 1 per batch?	Y [X]	N [ ]
Were LMS results within the control window 80-120%?	Y [ ]	N [X]
Were any data flagged because of LMS problems?	Y [X]	N [ ]

Describe Any Actions Taken: For alkalinity, total as CaCO3, the LMS and LMSD were created from sample LAO-SS-1-051021 and two samples not from this sample event. The %R for the LMS (78%) and LMSD (73%) created from LAO-SS-1-051021 were outside control limits (80-120%). Sample LAO-SS-1-051021 was qualified "J-" for Total Alkalinity. Per the NFG, "*For a spike sample analysis that does not meet the technical criteria, apply the action to all samples of the same matrix if the samples are considered sufficiently similar"* (EPA, 2017). LAO-SS-1T-051021 was considered sufficiently similar; therefore, the sample was qualified "J-" for Total Alkalinity.

For NO2 plus NO3, the LMS and LMSD were created from sample LAO-SS-1-051021 and a sample not from this sample event. The %R for the LMS (69%) and the LMSD (74%) created from LAO-SS-1-051021 was outside control limits (80-120%). Sample LAO-SS-1-051021 was qualified "J-". Per the NFG, "*For a spike sample analysis that does not meet the technical criteria, apply the action to all samples of the same matrix if the samples are considered sufficiently similar"* (EPA, 2017). LAO-SS-1T-051021 was considered sufficiently similar; therefore, the sample was qualified "J-" for NO2 plus NO3.

Comments: For sulfate, the LMS and LMSD were created from sample LAO-SS-1-051021 and two samples not from this sample event. The %R for the LMS (132%) created from LAO-SS-1-051021 was outside control limits (80-120%). Per the NFG, *"Spike recovery limits do not apply when the original sample concentration is ≥ 4 times the spike added. In such an event, the data shall be reported unflagged, even if the %R does not meet acceptance criteria"* (EPA, 2017). The original sample concentration of sulfate was greater than 4 times the added spike amount; therefore, no qualifications were warranted.

7. Field Blanks

Were field blanks submitted as specified in the Sampling Analysis Plan (SAP)?	Y	X	N	
Were any data qualified because of field blank problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: The field blank, sample LAO-SS-4-051021, was submitted on this WO and had no detects for total alkalinity, sulfate, NO2 plus NO3, or total suspended solids.

Total dissolved solids were detected in LAO-SS-4-051021 (6 mg/L) at a level that was less than 2 times the MDL (10 mg/L), as discussed in the CFRSSI QAPP (ARCO, 1992). Therefore, no qualifications were required.

The rinsate blank, sample LAO-SS-10-051021, was submitted on this WO and had no detects for total alkalinity, sulfate, NO2 plus NO3, or total suspended solids.

Total dissolved solids were detected in LAO-SS-10-051021 (11 mg/L) at a level that was greater than 2 times the MDL (10 mg/L). Qualifications only applied to the LAO-SS-1 samples since the rinsate blank was collected from a specific ISCO sampler that was located at this location. All LAO-SS-1 samples were greater than 5 times the rinsate blank (55 mg/L); therefore, no qualifications were required.

8. Field Duplicates

Were field duplicates submitted as specified in the Sampling Analysis Plan (SAP)?	Y	X	N	
Were field duplicates within the control limits?	Y		N	X
Were any data qualified because of field duplicate problems?	Y	X	N	

Describe Any Actions Taken: The field duplicate pair for May 2021 was submitted on this WO: samples LAO-SS-1-051021 and LAO-SS-1T-051021. The alkalinity, bicarbonate duplicate and the alkalinity, carbonate primary sample results were less than 5 times the Reporting Limit (RL). The absolute difference between the primary sample and duplicate sample was greater than the RL; therefore, the samples were qualified "J" for alkalinity, bicarbonate and alkalinity, carbonate due to poor field precision. Per the NFG, "For a duplicate sample analysis that does not meet the technical criteria, apply the action to all samples of the same matrix if the samples are considered sufficiently similar." (EPA, 2017). The remaining samples on this WO were sufficiently different based on concentrations and sample locations to warrant no qualification.

Comments: The rest of the results for the field duplicate pair were within control limits.

9. Overall Assessment

Are there analytical limitations of the data that users should be aware of? Y [X] N [ ]

If so, explain: On this WO 10559768, the following qualifications were made:

In additional to the qualifications outlined in the sections above, results which are reported between the method detection limit and the reporting limit were qualified "A" when no additional qualifications were warranted.

The table below lists the qualifications on the natural samples:

Field ID	Analyte	Final Qualification	Reason Code
LAO-SS-2-051021	Sulfate	J-	CCV
LAO-SS-3-051021	Sulfate	J-	CCV
LAO-SS-1-051021	Alkalinity, bicarbonate	J	FD
LAO-SS-1-051021	Alkalinity, carbonate	J	FD
LAO-SS-1-051021	Alkalinity, Total	J-	S%
LAO-SS-1-051021	Nitrogen, NO2+NO3	J-	S%
LAO-SS-2-051021	Total Suspended Solids	A	<RL

The table below list the qualifications on the field quality control samples:

Field ID	Analyte	Final Qualification	Reason Code
LAO-SS-4-051021	Sulfate	UJ	CCV
LAO-SS-10-051021	Sulfate	UJ	CCV
LAO-SS-1T-051021	Alkalinity, bicarbonate	J	FD
LAO-SS-1T-051021	Alkalinity, carbonate	J	FD
LAO-SS-1T-051021	Alkalinity, Total	J-	S%
LAO-SS-1T-051021	Nitrogen, NO2+NO3	J-	S%
LAO-SS-4-051021	Total Dissolved Solids	A	<RL

Comments:

10. Authorization of Data Validation

Data Validator
Name: Sara Ward **Reviewed By:** Shelby Green

Signature: Sara Ward

Date: 8/26/2021 8/30/2021

Site: Butte Priority Soils Operable Unit	**Case No:** 10565397	**Laboratory:** Pace Analytical
Project: BTL-LAO Monitoring	**Matrix:** Water	**Analyses:** Alkalinity Forms, Total Dissolved Solids (TDS), Total Suspended Solids (TSS), NO2+NO3, and Sulfate (SO_4)
Sample Dates: 6/14/2021	**Analysis Dates:** 6/16/2021, 6/21/2021, 6/24/2021, 7/1/2021	
Data Validator: S. Ward	**Validation Dates:** 6/29/2021, 6/30/2021	

1. Holding Times

Analyte	Laboratory	Matrix	Method	Holding Times (Days)	Collection Date	Analysis Date(s)	Holding Time Met (Y/N)	Affected Data Flagged (Y/N)
Alkalinity, Hydroxide Total Alkalinity Alkalinity, Bicarbonate, Alkalinity, Carbonate	Pace	Water	SM 2320B	14	6/14/2021	7/1/2021	N	Y
Total Dissolved Solids	Pace	Water	SM 2540C	7		6/21/2021	Y	NA
Total Suspended Solids	Pace	Water	SM 2540D	7		6/21/2021	Y	NA
Nitrogen, $NO_2 + NO_3$	Pace	Water	SM4500-NO3 H	28		6/16/2021	Y	NA
Sulfate	Pace	Water	ASTM D516	28		6/24/2021	Y	NA

*Reference for Holding Times – Clark Fork Superfund Site Investigations, Laboratory Analysis Plan (LAP) and PACE Analytical Guide (PAC) for Holding Times

Were any data flagged because of holding time?	Y [X]	N [ ]
Were any data flagged because of preservation problems?	Y [ ]	N [X]

Describe Any Actions Taken: Alkalinity, Hydroxide; Total Alkalinity; Alkalinity, Bicarbonate; and Alkalinity, Carbonate were analyzed 3 days past the 14-day holding time. All samples were qualified "J-" for detect values and "UJ" for non-detect values.

Comments: The receiving temperature as reported by the laboratory was 4.7 °C. The samples were shipped on ice and reported as properly preserved. There was no temperature blank present, so the temperature was averaged from 4 separate temperature readings.

2. Instrument Calibration

Was the instrument successfully calibrated at the correct frequency?	Y [X]	N [ ]
Was the instrument calibrated with appropriate standards and blanks?	Y [X]	N [ ]
Was the Initial Calibration Verification (ICV) sample analyzed?	Y [X]	N [ ]
Were ICV and Continuing Calibration Verifications (CCV) samples within the control window?	Y [X]	N [ ]
Were any data flagged because of calibration problems?	Y [ ]	N [X]

Describe Any Actions Taken: None Required.

Comments: The ICV and CCV results for total alkalinity, sulfate, and nitrogen, NO2 plus NO3 were within the control limits.

3. Blanks

Were Method Blanks (MBs) analyzed at the frequency of 1 per analytical batch?	Y [X]	N [ ]
Were MBs within the control window of less than 2 times the Method Detection Limit (MDL)?	Y [X]	N [ ]
Were any data flagged because of blank problems?	Y [ ]	N [X]

Describe Any Actions Taken: None Required.

Comments: Nitrogen, NO2 plus NO3 was detected in the bracketing Initial Calibration Blank (ICB) and Continuing Calibration Blanks (CCBs) (0.075 mg/L, 0.058 mg/L, 0.069 mg/L, 0.066 mg/L, and 0.060 mg/L) on 6/16/2021 at a level that was less than 2 times the IDL (0.104 mg/L), as discussed in the CFRSSI QAPP (ARCO, 1992). Therefore, no qualifications were required.

Nitrogen, NO2 plus NO3 was detected in the MB (0.079 mg/L) at a level that was less than 2 times the MDL (0.156 mg/L), as discussed in the CFRSSI QAPP. Therefore, no qualifications were required.

The ICB, CCBs, and MB for the remaining analytes were within control limits.

4. Laboratory Control Samples

Were Laboratory Control Samples (LCS) analyzed at the frequency of 1 per batch?	Y [X]	N [ ]
What was the source of the LCS?	Unknown	
Were LCS results within the control window of 80 to 120%?	Y [X]	N [ ]
Were any data flagged because of LCS problems?	Y [ ]	N [X]

Describe Any Actions Taken: None Required.

Comments: All the %R for the LCS were within the control limits.

5. Duplicate Sample Results

Were Laboratory Duplicate Samples (LDS) analyzed at the frequency of 1 per batch?	Y [X]	N [ ]
Were LDS results within the control window ≤ 20% Relative Percent Difference (RPD)?	Y [X]	N [ ]
Were any data flagged because of LDS problems?	Y [ ]	N [X]

Describe Any Actions Taken: None Required.

Comments: For alkalinity, total as CaCO3, the LDS were created from an LCS and LCS Duplicate (LCSD) sample pair, as well as sample LAO-SS-1-061421 and one sample not from this sample event. The %RPDs were within control limits.

For sulfate, the LDS were created from two LCS and LCSD sample pairs, as well as sample LAO-SS-1-061421, LAO-SS-4-061421, and two sampled not from this sample event. The %RPDs were within control limits.

For nitrogen, NO2 plus NO3, the LDS were created from sample LAO-SS-1-061421 and a sample not from this sample event. The %RPDs were within control limits.

For total dissolved solids, the LDS were created from sample LAO-SS-1-061421 and a sample not from this sample event. The %RPDs were within control limits.

For total suspended solids, the LDS were created from sample LAO-SS-1-061421 and a sample not from this sample event. The %RPDs were within control limits.

6. Matrix Spike Sample Results

Were Laboratory Matrix Spike Samples (LMS) analyzed at the frequency of 1 per batch?	Y [X]	N [ ]
Were LMS results within the control window 80-120%?	Y [ ]	N [X]
Were any data flagged because of LMS problems?	Y [X]	N [ ]

Describe Any Actions Taken: For sulfate, the LMS and LMSD were created from sample LAO-SS-1-061421, LAO-SS-4-061421, and two samples not from this sample event. The %R for the LMS/LMSD (142% and 126%, respectively) created from a sample not from this work order and the LMS (142%) created from LAO-SS-1-061421 were outside control limits (80-120%). No qualifications were warranted for the sample not from this work order. Sample LAO-SS-1-061421 was qualified "J+". Per the NFG, "*For a spike sample analysis that does not meet the technical criteria, apply the action to all samples of the same matrix if the samples are considered sufficiently similar"* (EPA, 2017). LAO-SS-1T-061421 was considered sufficiently similar; therefore, the sample was qualified "J+" for sulfate.

For NO2 plus NO3, the LMS and LMSD were created from sample LAO-SS-1-061421 and a sample not from this sample event. The %R for the LMSD (72%) created from LAO-SS-1-061421 was outside control limits (80-120%). Sample LAO-SS-1-061421 was qualified "J-". Per the NFG, "*For a spike sample analysis that does not meet the technical criteria, apply the action to all samples of the same matrix if the samples are considered sufficiently similar"* (EPA, 2017). LAO-SS-1T-061421 was considered sufficiently similar; therefore, the sample was qualified "J-" for NO2 plus NO3.

Comments: For alkalinity, total as CaCO3, the LMS and LMSD were created from sample LAO-SS-1-061421 and one sample not from this sample event.

The data user should be aware that remaining LMS/LMSD %Rs were within control limits.

7. Field Blanks

Were field blanks submitted as specified in the Sampling Analysis Plan (SAP)?	Y	X	N	
Were any data qualified because of field blank problems?	Y		N	X

Describe Any Actions Taken: None Required.

Comments: The field blank, sample LAO-SS-4-061421, was submitted on this WO and had no detects for total alkalinity, sulfate, total dissolved solids, or total suspended solids.

Nitrogen, NO2 plus NO3 was detected in LAO-SS-4-061421 (0.094 mg/L) at a level that was less than 2 times the MDL (0.156 mg/L), as discussed in the CFRSSI QAPP (ARCO, 1992). Therefore, no qualifications were required.

The rinsate blank, sample LAO-SS-10-061421, was submitted on this WO and had no detects for sulfate, NO2 plus NO3, total dissolved solids, or total suspended solids.

Total alkalinity was detected in LAO-SS-10-061421 (2.3 mg/L) at a level that was less than 2 times the MDL (3.6 mg/L), as discussed in the CFRSSI QAPP. Therefore, no qualifications were required.

8. Field Duplicates

Were field duplicates submitted as specified in the Sampling Analysis Plan (SAP)?	Y	X	N	
Were field duplicates within the control limits?	Y		N	X
Were any data qualified because of field duplicate problems?	Y	X	N	

Describe Any Actions Taken: The field duplicate pair for June 2021 was submitted on this WO: samples LAO-SS-1-061421 and LAO-SS-1T-061421. The alkalinity, bicarbonate duplicate and the alkalinity, carbonate primary sample results were less than 5 times the Reporting Limit (RL). The absolute difference between the primary sample and duplicate sample was greater than the RL; therefore, the samples were qualified "J" for alkalinity, bicarbonate and alkalinity, carbonate due to poor field precision. Per the NFG, "For a duplicate sample analysis that does not meet the technical criteria, apply the action to all samples of the same matrix if the samples are considered sufficiently similar." (EPA, 2017). The remaining samples on this WO are sufficiently different based on concentrations and sample locations to warrant no qualification.

Comments: The rest of the results for the field duplicate pair were within control limits.

9. Overall Assessment

Are there analytical limitations of the data that users should be aware of? Y [X] N [ ]

If so, explain: On this WO 10565397, the following qualifications were made:

In additional to the qualifications outlined in the sections above, results which are reported between the method detection limit and the reporting limit were qualified "A" when no additional qualifications were warranted.

The table below lists the qualifications on the natural samples:

Field ID	Analyte	Final Qualification	Reason Code
LAO-SS-1-061421	Sulfate	J+	S%
LAO-SS-1-061421	Nitrogen, NO2+NO3	J-	S%
LAO-SS-1-061421	Alkalinity, bicarbonate	J	FD, H
LAO-SS-1-061421	Alkalinity, carbonate	UJ	FD, H
LAO-SS-2-061421	Total suspended solids	A	<RL
LAO-SS-1-061421	Alkalinity, hydroxide	UJ	H
LAO-SS-1-061421	Alkalinity, total	J-	H
LAO-SS-2-061421	Alkalinity, hydroxide	UJ	H
LAO-SS-2-061421	Alkalinity, total	J-	H
LAO-SS-2-061421	Alkalinity, bicarbonate	J-	H
LAO-SS-2-061421	Alkalinity, carbonate	UJ	H
LAO-SS-3-061421	Alkalinity, hydroxide	UJ	H
LAO-SS-3-061421	Alkalinity, total	J-	H
LAO-SS-3-061421	Alkalinity, bicarbonate	J-	H
LAO-SS-3-061421	Alkalinity, carbonate	UJ	H

The table below list the qualifications on the field quality control samples:

Field ID	Analyte	Final Qualification	Reason Code
LAO-SS-1T-061421	Sulfate	J+	S%
LAO-SS-1T-061421	Nitrogen, NO2+NO3	J-	S%
LAO-SS-1T-061421	Alkalinity, bicarbonate	J	FD, H
LAO-SS-1T-061421	Alkalinity, carbonate	J	FD, H
LAO-SS-1T-061421	Total suspended solids	A	<RL
LAO-SS-4-061421	Nitrogen, NO2+NO3	A	<RL
LAO-SS-10-061421	Alkalinity, Total	J-	<RL, H
LAO-SS-10-061421	Alkalinity, bicarbonate	J-	<RL, H
LAO-SS-1T-061421	Alkalinity, hydroxide	UJ	H
LAO-SS-1T-061421	Alkalinity, total	J-	H
LAO-SS-4-061421	Alkalinity, hydroxide	UJ	H
LAO-SS-4-061421	Alkalinity, total	UJ	H
LAO-SS-4-061421	Alkalinity, bicarbonate	UJ	H
LAO-SS-4-061421	Alkalinity, carbonate	UJ	H
LAO-SS-10-061421	Alkalinity, hydroxide	UJ	H
LAO-SS-10-061421	Alkalinity, carbonate	UJ	H

Comments:

10. Authorization of Data Validation

Data Validator

Name: Sara Ward **Reviewed By:** Shelby Green

Signature: Sara Ward Shelby Green

Date: 7/29/2021 8/10/2021

Attachment B
Level A/B Assessment Checklist

Level A/B Assessment Checklist

1. General Information

Site: Butte Treatment Lagoons, Lower Area One. Butte, Montana
Project: 2021 Q2 BTL LAO Compliance Sampling
Client: Atlantic Richfield Company
Sample Matrix: Water

2. Screening Result

Data are:

1. Unusable
2. Level A
3. Level B 10554243, 10555104, 10556183, 10557202, 10558433, 10559768, 10560663, 10562085, 10563551, 10564213, 10565397, 10566549, and 10567614

I. **Level A**

Criteria – The following must be fully documented.	Yes/No	Comments
1. Sampling date	Yes	Field Sample Data Sheet
2. Sampling team or leader	Yes	Field Sample Data Sheet and COC
3. Physical description of sampling location	Yes	Field Sample Data Sheet
4. Sample depth (soils)	N/A	
5. Sample collection technique	Yes	SAP, Automatic Samplers, and Field Sample Data Sheet
6. Field preparation technique	Yes	SOP, Field Sample Data Sheet
7. Sample preservation technique	Yes	Field Sample Data Sheet and COC
8. Sample shipping records	Yes	COC

II**. Level B**

Criteria – The following must be fully documented.	Yes/No	Comments
1. Field instrumentation methods and standardization complete	Yes	Field Book
2. Sample container preparation	Yes	Field Sample Data Sheet
3. Collection of field replicates (1/20 minimum)	Yes	Automatic Samples
4. Proper and decontaminated sampling equipment	Yes	
5. Field custody documentation	Yes	COC The 10557202 the chain-of-custody (COC) did not have a relinquished Signature, date, and time; however, sampler name and ship date are on the COC. The custody seals were also signed, dated, and placed on the coolers prior to shipment. The 10560663 the COC did not have a relinquished date, and

		time; however, sampler name, signature and ship date are on the COC. The custody seals were also signed, dated, and placed on the coolers prior to shipment.
6. Shipping custody documentation	Yes	COC
7. Traceable sample designation number	Yes	Field Sample Data Sheet and COC
8. Field notebook(s), custody records in secure repository	Yes	Pioneer Butte Office
9. Completed field forms	Yes	Field Sample Data Sheets, Electronic Forms

Appendix B
Copies of Field Forms

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE 4/1/2021 TIME 8:30

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 8:30 Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1-040121	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-040121	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
8:30		9.5	9.16	734			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ INF-04 DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-2-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-2-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-2-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ MSD-HCC DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-3-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-3-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-3-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE TIME _____

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1T-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1T-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: Field duplicate of LAO-SS-1-

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ Field Blank DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-4-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-4-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-4-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE 4/5/2021 TIME 9:30

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 9:30 Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1-040521	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-040521	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
9:30		8.7	9.22	721			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ INF-04 DATE 4/5/2021 TIME 11:00

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 11:00 Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-2-040521	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-2-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-2-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
11:00		7.6	7.44	752			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ MSD-HCC DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-3-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-3-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-3-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE TIME _____

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1T-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1T-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: Field duplicate of LAO-SS-1-

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ Field Blank DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-4-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-4-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-4-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE 4/8/2021 TIME 7:00

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 7:00 Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1-040821	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-040821	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
7:00		9.1	9.21	742			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ INF-04 DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-2-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-2-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-2-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ MSD-HCC DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-3-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-3-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-3-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE TIME _____

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1T-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1T-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: Field duplicate of LAO-SS-1-

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ Field Blank DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-4-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-4-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-4-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE 4/12/2021 TIME 10:00

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 10:00 Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1-041221	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-041221	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
10:00		6.4	9.24	686			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ INF-04 DATE 4/12/2021 TIME 11:00

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 11:00 Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-2-041221	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-2-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-2-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
11:00		5.9	7.46	740			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ MSD-HCC DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-3-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-3-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-3-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE TIME _____

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1T-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1T-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: Field duplicate of LAO-SS-1-

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ Field Blank DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-4-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-4-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-4-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE 4/15/2021 TIME 8:30

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 8:30 Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1-041521	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-041521	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
8:30		5.1	9.26	662			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ INF-04 DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-2-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-2-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-2-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ MSD-HCC DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-3-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-3-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-3-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE TIME _____

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1T-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1T-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: Field duplicate of LAO-SS-1-

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ Field Blank DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-4-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-4-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-4-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE 4/19/2021 TIME 10:00

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 9:10 Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1-041921	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-041921	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-041921	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1-041921	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
9:10		6.9	9.3	679			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ INF-04 DATE 4/19/2021 TIME 9:45

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 9:45 Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-2-041921	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-2-041921	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-2-041921	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
9:45		6.2	7.48	722			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ MSD-HCC DATE 4/19/2021 TIME 11:00

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 10:00 Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-3-041921	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-3-041921	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-3-041921	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
11:00		7.4	6.27	769			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE 4/19/2021 TIME 10:10

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 9:20 Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1T-041921	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-041921	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1T-041921	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
10:10							

FIELD REMARKS: Field duplicate of LAO-SS-1-041921

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ Field Blank DATE 4/19/2021 TIME 9:30

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 8:30 Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-4-041921	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-4-041921	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-4-041921	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
9:30							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ Field Blank DATE 4/19/2021 TIME 9:00

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 9:00 Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-10-041921	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-10-041921	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-10-041921	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
9:00							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE 4/22/2021 TIME 9:45

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 9:45 Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1-042221	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-042221	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
9:45		10.1	9.23	751			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ INF-04 DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-2-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-2-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-2-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ MSD-HCC DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-3-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-3-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-3-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE TIME _____

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1T-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1T-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: Field duplicate of LAO-SS-1-

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ Field Blank DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-4-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-4-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-4-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE 4/26/2021 TIME 8:45

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 8:45 Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1-042621	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-042621	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
8:45		10	9.27	740			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ INF-04 DATE _____4/26/2021_____ TIME 9:15

SAMPLERS KF WEATHER CONDITIONS _____

SAMPLE TIME 9:15 _____ Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-2-042621	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-2-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-2-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
9:15		10.2	7.27	803			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ MSD-HCC DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-3-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-3-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-3-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE TIME _____

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1T-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1T-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: Field duplicate of LAO-SS-1-

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ Field Blank DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-4-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-4-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-4-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE 4/29/2021 TIME 8:30

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 8:30 Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1-042921	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-042921	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
8:30		11.5	9.18	770			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ INF-04 DATE TIME

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME 0:00 _____ Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-2-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-2-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-2-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
0:00							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ MSD-HCC DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-3-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-3-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-3-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE TIME _____

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1T-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1T-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: Field duplicate of LAO-SS-1-

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ Field Blank DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-4-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-4-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-4-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE 5/3/2021 TIME 9:00

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 9:00 Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1-050321	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-050321	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
9:00		8.3	9.08	711			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ INF-04 DATE 5/3/2021 TIME 9:45

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 9:45 _____ Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-2-050321	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-2-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-2-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
9:45		9.5	7.39	804			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ MSD-HCC DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-3-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-3-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-3-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE TIME _____

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1T-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1T-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: Field duplicate of LAO-SS-1-

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ Field Blank DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-4-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-4-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-4-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE 5/6/2021 TIME 7:50

SAMPLERS SL WEATHER CONDITIONS _____

SAMPLE TIME 7:50 Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1-050621	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-050621	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
7:50		13.9	9.15	813			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ INF-04 DATE 5/3/2021 TIME 9:45

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 9:45 _____ Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-2-050321	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-2-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-2-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
9:45		9.5	7.39	804			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ MSD-HCC DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-3-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-3-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-3-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE TIME _____

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1T-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1T-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: Field duplicate of LAO-SS-1-

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ Field Blank DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-4-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-4-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-4-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE 5/10/2021 TIME 8:40

SAMPLERS TS, SL WEATHER CONDITIONS _____

SAMPLE TIME 8:40 Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1-051021	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-051021	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-051021	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1-051021	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
8:40		10.4	9.33	726			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ INF-04 DATE 5/10/2021 TIME 9:30

SAMPLERS TS, SL WEATHER CONDITIONS _____

SAMPLE TIME 9:30 Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-2-051021	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-2-051021	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-2-051021	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
9:30		8.1	7.49	755			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ MSD-HCC DATE 5/10/2021 TIME 10:00

SAMPLERS TS, SL WEATHER CONDITIONS _____

SAMPLE TIME 10:00 Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-3-051021	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-3-051021	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-3-051021	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
10:00		8.2	6.27	774			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE TIME 8:50

SAMPLERS TS, SL WEATHER CONDITIONS _____

SAMPLE TIME 8:50 Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1T-051021	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-051021	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-051021	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1T-051021	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
8:50							

FIELD REMARKS: Field duplicate of LAO-SS-1-051021

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ Field Blank DATE 5/10/2021 TIME 8:00

SAMPLERS TS, SL WEATHER CONDITIONS _____

SAMPLE TIME 8:00 Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-4-051021	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-4-051021	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-4-051021	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ Equipment Blank DATE 5/10/2021 TIME 8:35

SAMPLERS TS, SL WEATHER CONDITIONS _____

SAMPLE TIME 8:35 Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-10-051021	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-10-051021	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-10-051021	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE 5/13/2021 TIME 8:30

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 8:30 Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1-051321	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-051321	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
8:30		12.3	9.15	779			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ INF-04 DATE 5/3/2021 TIME 9:45

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 9:45 _____ Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-2-050321	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-2-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-2-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
9:45		9.5	7.39	804			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ MSD-HCC DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-3-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-3-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-3-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE TIME _____

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1T-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1T-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: Field duplicate of LAO-SS-1-

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ Field Blank DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-4-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-4-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-4-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE 5/17/2021 TIME 10:15

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 10:15 Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1-051721	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-051721	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
10:15		15.2	9.27	833			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ INF-04 DATE _____5/17/2021_____ TIME 10:45

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 10:45 _____ Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-2-051721	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-2-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-2-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
10:45		11.5	7.44	830			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ MSD-HCC DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-3-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-3-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-3-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE TIME _____

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1T-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1T-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: Field duplicate of LAO-SS-1-

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ Field Blank DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-4-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-4-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-4-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE 5/20/2021 TIME 9:00

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 9:00 Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1-052021	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-052021	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
9:00		6.4	9.24	674			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ INF-04 DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-2-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-2-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-2-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ MSD-HCC DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-3-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-3-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-3-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE TIME _____

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1T-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1T-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: Field duplicate of LAO-SS-1-

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ Field Blank DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-4-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-4-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-4-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE 5/24/2021 TIME 9:15

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 9:15 Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1-052421	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-052421	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
9:15		11.4	9.27	728			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ INF-04 DATE _____5/24/2021_____ TIME 9:30

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 9:30 _____ Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-2-052421	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-2-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-2-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
9:30		8.3	7.41	732			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ MSD-HCC DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-3-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-3-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-3-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE TIME _____

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1T-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1T-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: Field duplicate of LAO-SS-1-

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ Field Blank DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-4-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-4-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-4-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE _____05/27/2021____ TIME _____7:40_____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME 7:40 Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1-052721	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-052721	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
7:40		11.7	9.4	721			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ INF-04 DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-2-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-2-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-2-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ MSD-HCC DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-3-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-3-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-3-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE TIME _____

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1T-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1T-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: Field duplicate of LAO-SS-1-

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ Field Blank DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-4-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-4-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-4-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE 6/1/2021 TIME 9:00

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 9:00 Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1-060121	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-060121	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
9:00		11.4	9.15	716			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ INF-04 DATE _____6/1/2021_____ TIME 9:45

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 9:45 _____ Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-2-060121	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-2-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-2-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
9:45		6.7	7.6	724			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ MSD-HCC DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-3-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-3-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-3-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE TIME _____

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1T-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1T-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: Field duplicate of LAO-SS-1-

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ Field Blank DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-4-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-4-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-4-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE _____06/03/2021____ TIME _____7:45_____

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME _____7:45_____ Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1-060321	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-060321	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
7:45		20.5	9.18	909			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ INF-04 DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-2-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-2-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-2-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ MSD-HCC DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-3-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-3-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-3-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE TIME _____

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1T-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1T-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: Field duplicate of LAO-SS-1-

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ Field Blank DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-4-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-4-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-4-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE 6/7/2021 TIME 9:30

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 9:30 Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1-060721	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-060721	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
9:30		17.1	9.26	850			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ INF-04 DATE _____6/7/2021_____ TIME 9:00

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 9:00 _____ Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-2-060721	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-2-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-2-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
9:00		6.5	7.57	832			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ MSD-HCC DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-3-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-3-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-3-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE TIME _____

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1T-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1T-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: Field duplicate of LAO-SS-1-

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ Field Blank DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-4-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-4-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-4-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE _____06/10/2021____ TIME 8:15

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 8:15 Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1-061021	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-061021	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
8:15		16.3	9.25	837			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ INF-04 DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-2-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-2-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-2-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ MSD-HCC DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-3-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-3-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-3-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE TIME _____

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1T-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1T-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: Field duplicate of LAO-SS-1-

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ Field Blank DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-4-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-4-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-4-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO
WELL/STATION _____ EFS-07 DATE 6/14/2021 TIME 9:00
SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 9:00 Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1-061421	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-061421	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-061421	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1-061421	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
9:00		18.1	9.28	870			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ INF-04 DATE 6/14/2021 TIME 8:10

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 8:10 Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-2-061421	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-2-061421	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-2-061421	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
8:10		13.4	7.35	861			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ MSD-HCC DATE 6/14/2021 TIME 10:00

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 10:00 Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-3-061421	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-3-061421	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-3-061421	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
10:00		11.2	6.1	865			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE 6/14/2021 TIME 9:10

SAMPLERS TS, WEATHER CONDITIONS _____

SAMPLE TIME 9:10 Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1T-061421	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-061421	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1T-061421	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
9:10							

FIELD REMARKS: Field duplicate of LAO-SS-1-061421

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ Field Blank DATE 6/14/2021 TIME 8:00

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 8:00 Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-4-061421	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-4-061421	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-4-061421	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ Field Blank DATE 6/14/2021 TIME 9:20

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 9:20 Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-10-061421	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-10-061421	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-10-061421	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE _____06/17/2021____ TIME 6:20

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 6:20 Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1-061721	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-061721	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
6:20		17.5	9.32	861			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ INF-04 DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-2-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-2-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-2-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ MSD-HCC DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-3-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-3-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-3-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE TIME _____

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1T-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1T-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: Field duplicate of LAO-SS-1-

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ Field Blank DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-4-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-4-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-4-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE _____06/21/2021____ TIME 7:40

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 7:40 Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1-062121	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-062121	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
7:40		21.7	9.37	952			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ INF-04 DATE 6/21/2021 TIME 7:35

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 7:35 Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-2-062121	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-2-062121	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-2-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
7:35		18.2	7.27	988			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ MSD-HCC DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-3-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-3-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-3-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE TIME _____

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1T-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1T-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: Field duplicate of LAO-SS-1-

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ Field Blank DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-4-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-4-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-4-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE _____06/24/2021____ TIME 13:30

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 13:30 Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1-062421	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-062421	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
13:30		22.3	9.36	981			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ INF-04 DATE TIME

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME 0:00 Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-2-062121	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-2-062121	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-2-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
0:00							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ MSD-HCC DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-3-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-3-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-3-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE TIME _____

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1T-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1T-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: Field duplicate of LAO-SS-1-

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ Field Blank DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-4-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-4-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-4-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE _____06/28/2021____ TIME 8:30

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 8:30 Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1-062821	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-062821	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
8:30		19.7	9.31	914			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ INF-04 DATE 6/28/2021 TIME 9:00

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME 9:00 Grab Composite Yes

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-2-062821	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-2-062821	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-2-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							
9:00		14.2	7.38	888			

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ MSD-HCC DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-3-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-3-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-3-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ EFS-07 DATE TIME _____

SAMPLERS TS WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab YES Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-1T-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	250ml	√	HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-1T-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-1T-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: Field duplicate of LAO-SS-1-

FIELD SAMPLE DATA SHEET

Project Name: BTL/LAO

WELL/STATION _____ Field Blank DATE _____ TIME _____

SAMPLERS _____ WEATHER CONDITIONS _____

SAMPLE TIME _____ Grab Yes Composite

SAMPLE DATA:

SAMPLE #	VOLUME	CHECK IF FILTERED	PRES.	ANALYSIS REQUESTED
LAO-SS-4-	250 ml		HNO3	Al, As, Cd, Cu, Ca, Fe, Pb, Mg, Hg, Ag, Zn, Hardness Calc.
LAO-SS-4-	1 Liter		Raw	Alkalinity, TDS, TSS, Sulfate
LAO-SS-4-	250 ml		H2SO4	NO2/NO3

FIELD PARAMATERS:

TIME	Amount Purged Gal	Temp °C	pH SU	SC µS/cm	ORP mV	DO mg/L	
FINAL FIELD PARAMETERS PRIOR TO SAMPLING							

FIELD REMARKS: _____

Appendix C
Laboratory Data Packages

Provided as a separate electronic file

Appendix D
Electronic Data Deliverable File

Provided separately