ARS Aleut Analytical, LLC
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5/18/2018

Kenai Watershed Forum
44129 Sterling Highway
Soldotna, AK 99669
Attn: Jeff Sires

Work Order #: A1804335
Date: 5/18/2018
Work ID: KWF
Date Received: 4/24/2018
Proj #: KWF

Sample Identification

Lab Sample Number	Client Description	Lab Sample Number	Client Description
A1804335-01	RM 79.5 - Juneau Creek		

Enclosed are the analytical results for the submitted sample(s). Please review the CASE NARRATIVE for a discussion of any data and/or quality control issues. Listings of data qualifiers, analytical codes, key dates, and QC relationships are provided at the end of the report.

Sincerely,

Jerry Baker
Project Manager

"The Science of Analysis, The Art of Service"

Case Narrative

ARS Aleut Analytical, LLC
Work Order: A1804335

Samples were prepared and analyzed according to EPA or equivalent methods outlined in the following references:

Methods for the Determination of Metals in Environmental Samples, EPA/600/R-94/111, May 1994.

Standard Methods for the Examination of Water and Wastewater, 21st Edition, 2005.

SAMPLE RECEIPT:

One (1) sample was received 4/24/2017 10:52 AM at ARS Aleut Analytical – Anchorage. The samples was received in Anchorage at a temperature of 6.3°C. The sample was received in good condition and in order per chain of custody.

Samples requiring metals analyses were subcontracted to Test America - Denver and arrived 4/27/2018 9:10 AM and at a temperature of 16.7°C.

Samples requiring inorganic analyses were subcontracted to Test America - Houston and arrived 4/27/2018 9:10 AM and at a temperature of 0.6°C. Please see sample results for individual analysis locations.

REVIEW FOR COMPLIANCE WITH ANALYTICA QA PLAN:

A summary of our review is shown below.
All analytical results contained in this report have been reviewed under Analytica's internal quality assurance and quality control program. Any deviations in quality control parameters for specific analyses are noted in the following text.

All method specifications were met for the following tests, unless otherwise noted:

Test Method: SM4500-NO3E - Nitrogen (Nitrate), Cadmium Reduction Method - nitrate+nitrite pres f - Aqueous

The following are subcontracted tests and have been represented to us as having met criteria:

Test Method: 200.7 - Metals by ICP - 200.7 metals – Aqueous

Test Method: SM4500-PE - Total Phos HACH 8190 - Aqueous

Workorder (SDG): A1804335

Project: **KWF**

Client: **Kenai Watershed Forum**

Client Project Number: **KWF**

Report Section: Client Sample Report

Client Sample Name: **RM 79.5 - Juneau Creek**

Matrix: Aqueous Collection Date: 4/24/2018 12:06:00PM

The following test was conducted by: ARS Aleut Analytical,LLC

Lab Sample Number: A1804335-01A Analysis Date: 5/8/2018 4:35:00PM
Prep Date: 05-08-2018 16:05 Instrument: Thermospectr
Analytical Method ID: SM4500-NO3E - Nitrogen (Nitrate), Cadmium Reduction Method - N File Name:
Prep Method ID: Dilution Factor: 1
Prep Batch Number: A180515002
Report Basis: As Received Analyst Initials: AAS/CS
Sample prep wt./vol: 25.00 ml Prep Extract Vol: 25.00 ml
pH on receipt: < 2.00

Analyte	CASNo	Result	Flags	Units	PQL	MDL	run #:
Nitrate-Nitrite as Nitrogen		**0.373**		mg/L	0.10	0.028	1

The following test was conducted by: TestAmerica - Houston

Lab Sample Number: A1804335-01C Analysis Date: 5/10/2018 2:25:00PM
Prep Date: 05-10-2018 05:05 Instrument:
Analytical Method ID: SM4500-PE - Phos File Name:
Prep Method ID: 4500-PB Dilution Factor: 1
Prep Batch Number: R1805150606-7
Report Basis: As Received Analyst Initials: SC1
Sample prep wt./vol: Prep Extract Vol: ml
pH on receipt: < 2.00

Analyte	CASNo	Result	Flags	Units	PQL	MDL	run #:
Phosphorous, Total		**ND**		mg/L	0.050	0.021	1

The following test was conducted by: TestAmerica - Denver

Lab Sample Number: A1804335-01B Analysis Date: 5/3/2018 10:35:00PM
Prep Date: 05-03-2018 08:05 Instrument:
Analytical Method ID: 200. 7 - Metals by ICP - 200.7 metals File Name:
Prep Method ID: Dilution Factor: 1
Prep Batch Number: R1805140632-13
Report Basis: As Received Analyst Initials: SJS
Sample prep wt./vol: Prep Extract Vol: ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL	run #:
Calcium	7440-70-2	**16,000**		ug/L	200	35	1
Magnesium	7439-96-4	**1,400**		ug/L	200	11	

Lab Sample Number: A1804335-01B Analysis Date: 5/7/2018 6:56:00PM
Prep Date: 05-03-2018 08:05 Instrument:
Analytical Method ID: 200. 7 - Metals by ICP - 200.7 metals File Name:
Prep Method ID: Dilution Factor: 1
Prep Batch Number: R1805140632-13
Report Basis: As Received Analyst Initials: SJS
Sample prep wt./vol: Prep Extract Vol: ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL	run #:

Detailed Analytical Report

ARS Aleut Analytical, LLC

Workorder (SDG): A1804335

Project: **KWF**

Client: **Kenai Watershed Forum**

Client Project Number: **KWF**

Report Section: **Client Sample Report**

Client Sample Name: **RM 79.5 - Juneau Creek**

Matrix: Aqueous

Collection Date: 4/24/2018 12:06:00PM

Lab Sample Number: A1804335-01B

Prep Date: 05-03-2018 08:05

Analytical Method ID: 200. 7 - Metals by ICP - 200.7 metals

Prep Method ID:

Prep Batch Number: R1805140632-13

Report Basis: As Received

Sample prep wt./vol:

Analysis Date: 5/7/2018 6:56:00PM

Instrument:

File Name:

Dilution Factor: 1

Analyst Initials: SJS

Prep Extract Vol: ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL	run #:
Iron	7439-89-6	**ND**		ug/L	100	22	2

Detailed Analytical Report

ARS Aleut Analytical, LLC

Workorder (SDG): A1804335

Project: **KWF**

Client: **Kenai Watershed Forum**

Client Project Number: **KWF**

Report Section: Method Blank Report

Client Sample Name: **MB**

Matrix: Aqueous Collection Date: 5/8/2018 4:35:00PM

The following test was conducted by: ARS Aleut Analytical,LLC

Lab Sample Number:	A180515002-MB	Analysis Date:	5/8/2018 4:35:00PM
Prep Date:	05-08-2018 16:05	Instrument:	Thermospectr
Analytical Method ID:	SM4500-NO3E - Nitrogen (Nitrate), Cadmium Reduction Method - N	File Name:	
Prep Method ID:		Dilution Factor:	1
Prep Batch Number:	A180515002		
Report Basis:	As Received	Analyst Initials:	AAS/CS
Sample prep wt./vol:	25.00 ml	Prep Extract Vol:	25.00 ml
pH on receipt:	0.00		

Analyte	CASNo	Result	Flags	Units	PQL	MDL	run #:
Nitrate-Nitrite as Nitrogen		ND		mg/L	0.10	0.028	1

Detailed Analytical Report

ARS Aleut Analytical, LLC

Workorder (SDG): A1804335

Project: **KWF**

Client: **Kenai Watershed Forum**

Client Project Number: **KWF**

Report Section: Method Blank Report

Client Sample Name: **MB 600-238187/3-A**

Matrix: Collection Date: 5/10/2018 5:12:00AM

The following test was conducted by: TestAmerica - Houston

Lab Sample Number:	MB 600-238187/3-A	Analysis Date:	5/10/2018 2:25:00PM
Prep Date:	05-10-2018 05:05	Instrument:	
Analytical Method ID:	SM4500-PE - Phos	File Name:	
Prep Method ID:	4500-PB	Dilution Factor:	1
Prep Batch Number:	R1805150606-7		
Report Basis:	As Received	Analyst Initials:	SC1
Sample prep wt./vol:		Prep Extract Vol:	ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL	run #:
Phosphorous, Total		ND		mg/L	0.050	0.021	1

Workorder (SDG): A1804335

Project: **KWF**

Client: **Kenai Watershed Forum**

Client Project Number: **KWF**

Report Section: Method Blank Report

Client Sample Name: **MB 280-413330/1-A**

Matrix: Collection Date: 5/3/2018 8:41:00AM

The following test was conducted by: TestAmerica - Denver

Lab Sample Number: MB 280-413330/1-A
Prep Date: 05-03-2018 08:05
Analytical Method ID: 200. 7 - Metals by ICP - 200.7 metals
Prep Method ID:
Prep Batch Number: R1805140632-13
Report Basis: As Received
Sample prep wt./vol:

Analysis Date: 5/3/2018 10:31:00PM
Instrument:
File Name:
Dilution Factor: 1
Analyst Initials: SJS
Prep Extract Vol: ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL	run #:
Calcium	7440-70-2	**ND**		ug/L	200	35	1
Magnesium	7439-96-4	**ND**		ug/L	200	11	

Lab Sample Number: MB 280-413330/1-A
Prep Date: 05-03-2018 08:05
Analytical Method ID: 200. 7 - Metals by ICP - 200.7 metals
Prep Method ID:
Prep Batch Number: R1805140632-13
Report Basis: As Received
Sample prep wt./vol:

Analysis Date: 5/7/2018 6:51:00PM
Instrument:
File Name:
Dilution Factor: 1
Analyst Initials: SJS
Prep Extract Vol: ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL	run #:
Iron	7439-89-6	**ND**		ug/L	100	22	2

Workorder (SDG): A1804335

Project: **KWF**

Client: **Kenai Watershed Forum**

Client Project Number: **KWF**

Tests Run at: Analytica Environmental Laboratories - Anchorage, Alaska

Workorder (SDG): A1804335

Project: KWF

Project Number:

QUALITY CONTROL REPORT

Prep Batch: **A180515002**

LCS REPORT

Analysis: SM4500-NO3E - Nitrogen (Nitrate), Cadmium Reduction Method -MB: A180515002-MB

Prep Date: 5/8/2018

MB Anal. Date: 5/8/2018 4:35:00PM Units: mg/L

LCS Anal. Date: 5/8/2018 4:35:00PM Matrix: Aqueous

Analyte Name	SampResult	LCSRes.	SPLev	Recov.	Recov Lim	RPDLim	Flag
Nitrate-Nitrite as Nitrogen	ND	0.694	0.690	100.5	90 - 110		

FOOTNOTES TO QC REPORT

Note 1: Results are shown to three significant figures to avoid rounding errors in calculations.

Note 2: If the sample concentration is greater than 4 times the spike level, a recovery is not meaningful, and the result should be used as a replicate. In such cases the spike is not as high as expected random measurement variability of the sample result itself.

Note 3: For sample duplicates, if the result is less than the PQL, the duplicate RPD is not applicable. If the sample and duplicate results are not five times the PQL or greater, then the RPD is not expected to fall within the window shown and the comparison should be made on the basis of the absolute difference. Analytica uses the criterion that the absolute difference should be less than the PQL for water or less than 2XPQL for other matrices.

Note 4: For serial dilutions, if the result is less than the PQL, the duplicate RPD is not applicable. If the sample result is not 50 times the MDL or greater, then the fact that the RPD does not meet the 10% criterion has little signifcance. Otherwise it indicates that a matrix bias may exist at the analytical step.

Workorder (SDG): A1804335

Project: **KWF**

Client: **Kenai Watershed Forum**

Client Project Number: **KWF**

Tests Run at: TestAmerica - Denver
Workorder (SDG): A1804335
Project: KWF
Project Number:

QUALITY CONTROL REPORT

Prep Batch: **R1805140632-13**

LCS REPORT

Analysis: 200. 7 - Metals by ICP - 200.7 metals
MB: MB 280-413330/1-A
Prep Date: 5/3/2018
MB Anal. Date: 5/3/2018 10:31:00PM
Units: ug/L
LCS Anal. Date: 5/3/2018 10:33:00PM
Matrix:

Analyte Name	SampResult	LCSRes.	SPLev	Recov.	Recov Lim	RPDLim	Flag
Calcium	ND	46,200	50,000	92.4	90 - 111		
Iron	ND	1,050	1,000	105.0	89 - 115		
Magnesium	ND	50,800	50,000	101.6	90 - 113		

Prep Batch: **R1805150606-7**

LCS REPORT

Analysis: SM4500-PE - Phos
MB: MB 600-238187/3-A
Prep Date: 5/10/2018
MB Anal. Date: 5/10/2018 2:25:00PM
Units: mg/L
LCS Anal. Date: 5/10/2018 2:25:00PM
Matrix:

Analyte Name	SampResult	LCSRes.	SPLev	Recov.	Recov Lim	RPDLim	Flag
Phosphorous, Total	ND	0.477	0.500	95.4	90 - 110		

MS/MSD REPORT

Analysis: SM4500-PE - Phos
Parent: A1804335-01C
Prep Date: 5/10/2018
Samp. Anal. Date: 5/10/2018 2:25:00PM
Units: mg/L
MS Anal. Date: 5/10/2018 2:25:00PM MSD Anal. Date: 5/10/2018 2:25:00PM
Matrix: Aqueous

Analyte Name	SampResult	MSRes.	MSDRes	SPLev	SPDLev	Recov.	MSD Rec.	RPD	Recov Lim	RPDLim	Flag
Phosphorous, Total	ND	0.511	0.523	0.498	0.500	102.6	104.6	2.3	75 - 125	0	*RPD*

Workorder (SDG): A1804335

Project: **KWF**

Client: **Kenai Watershed Forum**

Client Project Number: **KWF**

FOOTNOTES TO QC REPORT

Note 1: Results are shown to three significant figures to avoid rounding errors in calculations.

Note 2: If the sample concentration is greater than 4 times the spike level, a recovery is not meaningful, and the result should be used as a replicate. In such cases the spike is not as high as expected random measurement variability of the sample result itself.

Note 3: For sample duplicates, if the result is less than the PQL, the duplicate RPD is not applicable. If the sample and duplicate results are not five times the PQL or greater, then the RPD is not expected to fall within the window shown and the comparison should be made on the basis of the absolute difference. Analytica uses the criterion that the absolute difference should be less than the PQL for water or less than 2XPQL for other matrices.

Note 4: For serial dilutions, if the result is less than the PQL, the duplicate RPD is not applicable. If the sample result is not 50 times the MDL or greater, then the fact that the RPD does not meet the 10% criterion has little signifcance. Otherwise it indicates that a matrix bias may exist at the analytical step.

Workorder (SDG): A1804335

Project: **KWF**

Client: **Kenai Watershed Forum**

Client Project Number: **KWF**

QC BATCH ASSOCIATIONS - BY METHOD BLANK

Lab Project ID: **194,303** **Lab Project Number:** **A1804335**

Prep Date: 5/3/2018

Lab Method Blank Id: MB 280-413330/1-A
Prep Batch ID: R1805140632-13
Method: 200. 7 - Metals by ICP - 200.7 metals

This Method blank and sample preparation batch are associated with the following samples, spikes, and duplicates:

SampleNum	ClientSampleName	DataFile	AnalysisDate
A1804335-01B	RM 79.5 - Juneau Creek		5/3/2018 10:35:00PM
A1804335-01B	RM 79.5 - Juneau Creek		5/7/2018 6:56:00PM
LCS 280-413330/2-A	LCS 280-413330/2-A		5/3/2018 10:33:00PM
LCS 280-413330/2-A	LCS 280-413330/2-A		5/7/2018 6:53:00PM

Prep Date: 5/10/2018

Lab Method Blank Id: MB 600-238187/3-A
Prep Batch ID: R1805150606-7
Method: SM4500-PE - Phos

This Method blank and sample preparation batch are associated with the following samples, spikes, and duplicates:

SampleNum	ClientSampleName	DataFile	AnalysisDate
A1804335-01C	RM 79.5 - Juneau Creek		5/10/2018 2:25:00PM
LCS 600-238187/4-A	LCS 600-238187/4-A		5/10/2018 2:25:00PM
280-109099-1	A1804335-01C		5/10/2018 2:25:00PM
280-109099-1	A1804335-01C		5/10/2018 2:25:00PM

Prep Date: 5/8/2018

Lab Method Blank Id: A180515002-MB
Prep Batch ID: A180515002
Method: SM4500-NO3E - Nitrogen (Nitrate), Cadmium Reduction Method -

This Method blank and sample preparation batch are associated with the following samples, spikes, and duplicates:

SampleNum	ClientSampleName	DataFile	AnalysisDate
A1804328-01A	Batch QC		5/8/2018 4:35:00PM
A1804335-01A	RM 79.5 - Juneau Creek		5/8/2018 4:35:00PM
A180515002-LCS	LCS		5/8/2018 4:35:00PM
A1804328-01A-DUP	DUP		5/8/2018 4:35:00PM
A1804328-01A-MS	MS		5/8/2018 4:35:00PM

Workorder (SDG): A1804335

Project: **KWF**

Client: **Kenai Watershed Forum**

Client Project Number: **KWF**

DATA FLAGS AND DEFINITIONS

The PQL is the Method Quantitation Limit as defined by USACE.
Reporting Limit: Limit below which results are shown as "ND". This may be the PQL, MDL, or a value between. See the report conventions below.

Result Field:

ND = Not Detected at or above the Reporting Limit
NA = Analyte not applicable (see Case Narrative for discussion)

Qualifier Fields:

LOW = Recovery is below Lower Control Limit
HIGH = Recovery , RPD, or other parameter is above Upper Control Limit
E = Reported concentration is above the instrument calibration upper range

Organic Analysis Flags:

B = Analyte was detected in the laboratory method blank
J = Analyte was detected above MDL or Reporting Limit but below the Quant Limit (PQL)

Inorganic Analysis Flags:

J = Analyte was detected above the Reporting Limit but below the Quant Limit (PQL)
W = Post digestion spike did not meet criteria
S = Reported value determined by the Method of Standard Additions (MSA)

Several ways of defining the limit of detection and quantitation are prevalent in the laboratory industry and may appear in Analytica reports. These include the following:

MRL = "minimum reporting level", from the EPA Safe Drinking Water program (SDW)
PQL = "practical quantitation limit", from SW-846
EQL = "estimated quantitation limit", from SW-846
LOQ = "limit of quantitation", from a number of authoritative sources

In Analytica's work, all of these terms have the same meaning, equivalent to the EPA definition of the MRL. This reporting level is supported by a satisfactory calibration data point which is at that level or lower, and also is supported by a method detection limit (MDL) determined by the procedure in 40CFR. The MDL is lower than the MRL and represents an estimate of the level where positive detections have a 99% probability of being real, but where quantitation accuracy is unknown.

The MRL as defined by Analytica is the lowest demonstrated point of known quantitation accuracy.
The MRL should not be confused with the MCL, which is the EPA-defined "maximum contaminant level" allowed for certain regulated targets under specific regulations, such as the National Primary Drinking Water Regulations. Normally, the MRL is set at a level which is much lower than the MCL in order to ensure that levels are well below those limits. Not all target analytes have MCL levels established.

Other Flags may be applied. See Case Narrative for Description

Workorder (SDG): A1804335

Project: **KWF**

Client: **Kenai Watershed Forum**

Client Project Number: **KWF**

REPORTING CONVENTIONS FOR THIS REPORT

A1804335

TestPkgName	Basis	# Sig Figs	Reporting Limit
200.7 (Aqueous) - 200.7 metals	As Received	2	Report to PQL
4500-NO3E (Aqueous) - Nitrate+Nitrite pres	As Received	3	Report to PQL
4500-PE/4500-PB (Aqueous) - Phos	As Received	2	Report to PQL