



ARS Aleut Analytical, LLC  
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Anchorage, AK 99503  
Phone: 907-258-2155  
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8/16/2016

Kenai Watershed Forum  
44129 Sterling Highway  
Soldotna, AK 99669  
Attn: Branden Bornemann

Work Order #: A1607443  
Date: 8/16/2016  
Work ID: KWF Baseline Monitoring 2016  
Date Received: 7/26/2016  
Proj #: 2016

#### Sample Identification

Lab Sample Number	Client Description	Lab Sample Number	Client Description
A1607443-01	RM 70 Jim's Landing	A1607443-02	RM 74 Russian River
A1607443-03	RM 82 Kenai Lake Bridge		

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: A1607443*

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:**

Three (3) samples were received 7/26/2016 11:19 AM at a temperature of 9.2°C at ARS Aleut Analytical - Anchorage. The sample was received on ice within 24 hours of being sampled. The samples were received in good condition and in order per chain of custody.

### **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 is a subcontracted test and has been represented to us as having met criteria:

Test Method: 200.8 - Metals by ICP/MS -200.8 metals - Aqueous

## Detailed Analytical Report

ARS Aleut Analytical, LLC

Workorder (SDG): A1607443

Project: KWF Baseline Monitoring 2016

Client: Kenai Watershed Forum

Client Project Number: 2016

### Report Section: Client Sample Report

Client Sample Name: **RM 70 Jim's Landing**

Matrix: Aqueous

Collection Date: 7/26/2016 10:11:00AM

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

Lab Sample Number: A1607443-01A

Analysis Date: 8/15/2016 6:00:00PM

Prep Date: 08-15-2016 18:08

Instrument: Thermospectr

Analytical Method ID: SM4500-NO3E - Nitrogen (Nitrate), Cadmium Reduction Method -

File Name:

Prep Method ID:

Dilution Factor: 1

Prep Batch Number: A160816001

Report Basis: As Received

Analyst Initials: LL

Sample prep wt./vol: 25.00 ml

Prep Extract Vol: 25.00 ml

pH on receipt: < 2.00

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>run #:</u>
Nitrate-Nitrite as Nitrogen		0.171		mg/L	0.10	0.028	1

The following test was conducted by: TestAmerica - Denver

Lab Sample Number: A1607443-01B

Analysis Date: 8/6/2016 9:18:00PM

Prep Date: 08-05-2016 14:08

Instrument:

Analytical Method ID: 200.8 - Metals by ICP/MS - Total

File Name:

Prep Method ID:

Dilution Factor: 1

Prep Batch Number: R1608101340-12

Report Basis: As Received

Analyst Initials: CMK

Sample prep wt./vol:

Prep Extract Vol: ml

pH on receipt: < 2.00

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>run #:</u>
Calcium	7440-70-2	14,000		ug/L	200	35	1
Iron	7439-89-6	190		ug/L	100	22	
Magnesium	7439-96-4	1,100		ug/L	200	11	

## Detailed Analytical Report

ARS Aleut Analytical, LLC

Workorder (SDG): A1607443

Project: KWF Baseline Monitoring 2016

Client: Kenai Watershed Forum

Client Project Number: 2016

### Report Section: Client Sample Report

Client Sample Name: RM 74 Russian River

Matrix: Aqueous

Collection Date: 7/26/2016 9:30:00AM

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

Lab Sample Number: A1607443-02A

Analysis Date: 8/15/2016 6:00:00PM

Prep Date: 08-15-2016 18:08

Instrument: Thermospectr

Analytical Method ID: SM4500-NO3E - Nitrogen (Nitrate), Cadmium Reduction Method -

File Name:

Prep Method ID:

Dilution Factor: 1

Prep Batch Number: A160816001

Report Basis: As Received

Analyst Initials: LL

Sample prep wt./vol: 25.00 ml

Prep Extract Vol: 25.00 ml

pH on receipt: < 2.00

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>run #:</u>
Nitrate-Nitrite as Nitrogen		0.227		mg/L	0.10	0.028	1

The following test was conducted by: TestAmerica - Denver

Lab Sample Number: A1607443-02B

Analysis Date: 8/6/2016 9:32:00PM

Prep Date: 08-05-2016 14:08

Instrument:

Analytical Method ID: 200.8 - Metals by ICP/MS - Total

File Name:

Prep Method ID:

Dilution Factor: 1

Prep Batch Number: R1608101340-12

Report Basis: As Received

Analyst Initials: CMK

Sample prep wt./vol:

Prep Extract Vol: ml

pH on receipt: < 2.00

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>run #:</u>
Calcium	7440-70-2	16,000		ug/L	200	35	1
Iron	7439-89-6	ND		ug/L	100	22	
Magnesium	7439-96-4	1,100		ug/L	200	11	

## Detailed Analytical Report

ARS Aleut Analytical, LLC

Workorder (SDG): A1607443

Project: KWF Baseline Monitoring 2016

Client: Kenai Watershed Forum

Client Project Number: 2016

### Report Section: Client Sample Report

Client Sample Name: **RM 82 Kenai Lake Bridge**

Matrix: Aqueous

Collection Date: 7/26/2016 8:37:00AM

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

Lab Sample Number: A1607443-03A

Analysis Date: 8/15/2016 6:00:00PM

Prep Date: 08-15-2016 18:08

Instrument: Thermospectr

Analytical Method ID: SM4500-NO3E - Nitrogen (Nitrate), Cadmium Reduction Method - File Name:

Prep Method ID:

Dilution Factor: 1

Prep Batch Number: A160816001

Report Basis: As Received

Analyst Initials: LL

Sample prep wt./vol: 25.00 ml

Prep Extract Vol: 25.00 ml

pH on receipt: < 2.00

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>run #:</u>
Nitrate-Nitrite as Nitrogen		0.181		mg/L	0.10	0.028	1

The following test was conducted by: TestAmerica - Denver

Lab Sample Number: A1607443-03B

Analysis Date: 8/6/2016 9:34:00PM

Prep Date: 08-05-2016 14:08

Instrument:

Analytical Method ID: 200.8 - Metals by ICP/MS - Total

File Name:

Prep Method ID:

Dilution Factor: 1

Prep Batch Number: R1608101340-12

Report Basis: As Received

Analyst Initials: CMK

Sample prep wt./vol:

Prep Extract Vol: ml

pH on receipt: < 2.00

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>run #:</u>
Calcium	7440-70-2	14,000		ug/L	200	35	1
Iron	7439-89-6	170		ug/L	100	22	
Magnesium	7439-96-4	1,100		ug/L	200	11	

## Detailed Analytical Report

ARS Aleut Analytical, LLC

Workorder (SDG): A1607443

Project: KWF Baseline Monitoring 2016

Client: Kenai Watershed Forum

Client Project Number: 2016

### Report Section: Method Blank Report

Client Sample Name: MB

Matrix: Aqueous

Collection Date: 8/15/2016 6:00:00PM

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

Lab Sample Number: A160816001-MB

Analysis Date: 8/15/2016 6:00:00PM

Prep Date: 08-15-2016 18:08

Instrument: Thermospectr

Analytical Method ID: SM4500-NO3E - Nitrogen (Nitrate), Cadmium Reduction Method - File Name:

Prep Method ID:

Dilution Factor: 1

Prep Batch Number: A160816001

Report Basis: As Received

Analyst Initials: LL

Sample prep wt./vol: 25.00 ml

Prep Extract Vol: 25.00 ml

pH on receipt: 0.00

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

## Detailed Analytical Report

ARS Aleut Analytical, LLC

Workorder (SDG): A1607443

**Project:** KWF Baseline Monitoring 2016

**Client:** Kenai Watershed Forum

**Client Project Number:** 2016

**Report Section:** Method Blank Report

**Client Sample Name:** MB 280-336543/1-A

Matrix:

Collection Date: 8/5/2016 2:40:00PM

The following test was conducted by: TestAmerica - Denver

Lab Sample Number: MB 280-336543/1-A

Analysis Date: 8/6/2016 9:02:00PM

Prep Date: 08-05-2016 14:08

Instrument:

Analytical Method ID: 200.8 - Metals by ICP/MS - Total

File Name:

Prep Method ID:

Dilution Factor: 1

Prep Batch Number: R1608101340-12

Report Basis: As Received

Analyst Initials: CMK

Sample prep wt./vol:

Prep Extract Vol: ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>run #:</u>
Calcium	7440-70-2	ND		ug/L	200	35	1
Iron	7439-89-6	ND		ug/L	100	22	
Magnesium	7439-96-4	ND		ug/L	200	11	

## Detailed Analytical Report

ARS Aleut Analytical, LLC

Workorder (SDG): A1607443

Project: KWF Baseline Monitoring 2016

Client: Kenai Watershed Forum

Client Project Number: 2016

Tests Run at: Analytica Environmental Laboratories - Anchorage, Alaska

Workorder (SDG): A1607443

Project: KWF Baseline Monitoring 2016

Project Number:

Prep Batch: A160816001

### QUALITY CONTROL REPORT

#### SAMPLE DUPLICATE REPORT

Analysis: SM4500-NO3E - Nitrogen (Nitrate), Cadmium Reduction Method -Base Sample:A1607443-02A  
Prep Date: 8/15/2016

Samp. Anal. Date: 8/15/2016 6:00:00PM

Units: mg/L

DUP Anal. Date: 8/15/2016 6:00:00PM

Matrix: Aqueous

<u>Analyte Name</u>	<u>SampResult</u>	<u>DUPRes.</u>	<u>RPD</u>	<u>RPDLim</u>	<u>Flag</u>
Nitrate-Nitrite as Nitrogen	0.227	0.235	3.5	20	

#### LCS REPORT

Analysis: SM4500-NO3E - Nitrogen (Nitrate), Cadmium Reduction Method -MB: A160816001-MB  
Prep Date: 8/15/2016

MB Anal. Date: 8/15/2016 6:00:00PM

Units: mg/L

LCS Anal. Date: 8/15/2016 6:00:00PM

Matrix: Aqueous

<u>Analyte Name</u>	<u>SampResult</u>	<u>LCSRes.</u>	<u>SPLev</u>	<u>Recov.</u>	<u>Recov Lim</u>	<u>RPDLim</u>	<u>Flag</u>
Nitrate-Nitrite as Nitrogen	ND	0.597	0.614	97.2	90 - 110		

#### MS REPORT

Analysis: SM4500-NO3E - Nitrogen (Nitrate), Cadmium Reduction Method -Parent: A1607443-02A  
Prep Date: 8/15/2016

Samp. Anal. Date: 8/15/2016 6:00:00PM

Units: mg/L

MS Anal. Date: 8/15/2016 6:00:00PM

Matrix: Aqueous

<u>Analyte Name</u>	<u>SampResult</u>	<u>MSRes.</u>	<u>SPLev</u>	<u>Recov.</u>	<u>Recov Lim</u>	<u>Flag</u>
Nitrate-Nitrite as Nitrogen	0.227	0.515	0.320	90.0	80 - 120	



## Detailed Analytical Report

ARS Aleut Analytical, LLC

Workorder (SDG): A1607443

**Project:** KWF Baseline Monitoring 2016

**Client:** Kenai Watershed Forum

**Client Project Number:** 2016

### 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 significance. Otherwise it indicates that a matrix bias may exist at the analytical step.

## Detailed Analytical Report

ARS Aleut Analytical, LLC

Workorder (SDG): A1607443

Project: KWF Baseline Monitoring 2016

Client: Kenai Watershed Forum

Client Project Number: 2016

Tests Run at: TestAmerica - Denver

Workorder (SDG): A1607443

Project: KWF Baseline Monitoring 2016

Project Number:

Prep Batch: R1608101340-12

### QUALITY CONTROL REPORT

#### LCS REPORT

Analysis: 200.8 - Metals by ICP/MS - Total

MB: MB 280-336543/1-A

Prep Date: 8/5/2016

MB Anal. Date: 8/6/2016 9:02:00PM

Units: ug/L

LCS Anal. Date: 8/6/2016 9:05:00PM

Matrix:

<u>Analyte Name</u>	<u>SampResult</u>	<u>LCSRes.</u>	<u>SPLev</u>	<u>Recov.</u>	<u>Recov Lim</u>	<u>RPDLim</u>	<u>Flag</u>
Calcium	ND	50,600	50,000	101.2	90 - 111		
Iron	ND	1,020	1,000	102.0	89 - 115		
Magnesium	ND	51,500	50,000	103.0	90 - 113		

#### 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 significance. Otherwise it indicates that a matrix bias may exist at the analytical step.

## Detailed Analytical Report

ARS Aleut Analytical, LLC

Workorder (SDG): A1607443

Project: KWF Baseline Monitoring 2016

Client: Kenai Watershed Forum

Client Project Number: 2016

### QC BATCH ASSOCIATIONS - BY METHOD BLANK

Lab Project ID: 181,174 Lab Project Number: A1607443

Prep Date: 8/5/2016

Lab Method Blank Id: MB 280-336543/1-A

Prep Batch ID: R1608101340-12

Method: 200.8 - Metals by ICP/MS - Total

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

<u>SampleNum</u>	<u>ClientSampleName</u>	<u>DataFile</u>	<u>AnalysisDate</u>
A1607443-01B	RM 70 Jim's Landing		8/6/2016 9:18:00PM
A1607443-02B	RM 74 Russian River		8/6/2016 9:32:00PM
A1607443-03B	RM 82 Kenai Lake Bridge		8/6/2016 9:34:00PM
LCS 280-336543/2-A	LCS 280-336543/2-A		8/6/2016 9:05:00PM

Prep Date: 8/15/2016

Lab Method Blank Id: A160816001-MB

Prep Batch ID: A160816001

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

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

<u>SampleNum</u>	<u>ClientSampleName</u>	<u>DataFile</u>	<u>AnalysisDate</u>
A1607443-01A	RM 70 Jim's Landing		8/15/2016 6:00:00PM
A1607443-02A	RM 74 Russian River		8/15/2016 6:00:00PM
A1607443-03A	RM 82 Kenai Lake Bridge		8/15/2016 6:00:00PM
A160816001-LCS	LCS		8/15/2016 6:00:00PM
A1607443-02A-DUP	DUP		8/15/2016 6:00:00PM
A1607443-02A-MS	MS		8/15/2016 6:00:00PM

## Detailed Analytical Report

ARS Aleut Analytical, LLC

Workorder (SDG): A1607443

**Project:** KWF Baseline Monitoring 2016

**Client:** Kenai Watershed Forum

**Client Project Number:** 2016

### 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

## Detailed Analytical Report

ARS Aleut Analytical, LLC

Workorder (SDG): A1607443

**Project:** KWF Baseline Monitoring 2016

**Client:** Kenai Watershed Forum

**Client Project Number:** 2016

### REPORTING CONVENTIONS FOR THIS REPORT

A1607443

<u>TestPkgName</u>	<u>Basis</u>	<u># Sig Figs</u>	<u>Reporting Limit</u>
200.8 (Aqueous) - Total	As Received	2	Report to PQL
4500-NO3E (Aqueous) - Nitrate+Nitrite pres	As Received	3	Report to PQL



AAA Chain of Custody Form

4307 Arctic Blvd. ARS Corporate Office 475 Hall Street 701 W. Parks Hwy. #203  
Anchorage, AK 99503 2609 North River Road Fairbanks, AK 99701 Wasilla, AK 99554  
(907) 258-2155 Port Allen, LA 70767 (907) 456-3116 (907) 373-5440  
(907) 258-6634 fax 225 381 2991 (907) 456-3125 fax (907) 258-6634 fax

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Chain of Custody No.:

Client Name & Address:

Kenai Watershed Forum

44129 Sterling Hwy

Soldotna, AK 99669

Contact Person: Brandon Bornemann

Phone No: 907-260-5449 c.953.2605

Fax No: (907) 260-5412

E-mail: branden@kenaiwatershed.org

Special Instructions/Comments:

TEAM ID: US Forest Service  
Project Name: Kenai River Baseline Project - July 2016

Section To be Completed by AAA  
Quote ID No: A16030019 LGN: A1607443

Turnaround Time for Results (TAT)

Standard Expedited (< 10 days, prior authorization required)  
(please specify due date below; add'l charges may apply)

Results Due Date:

P.O. or Contract

Lab Bottle Order No:

Client Sample Identification / Location

RM 70- Jim's Landing

RM 74- Russian River

RM 82- Kenai Lake Bridge

Date Sampled

Time Sampled

Matrix (S-DW-WW-Other)

No. of Containers

Nitrate SM4500-NO3E

Lot #: H2SO4  
Pres: H2SO4

200.8 Metals by ICP-Total TR

Lot #: HNO3  
Pres: HNO3

200.8 Dissolved Metals

Lot #: HNO3  
Pres: HNO3

Total Phos SM4500

Lot #: H2SO4  
Pres: H2SO4

Lot #: Pres:

Lot #: Pres:

Lot #: Pres:

Field Preserved

Field Filtered

MS/MSD ?

Collected/Relinquished by:

Date

Time

Received by:

Date

Time

Relinquished by:

Date

Time

Received by:

Date

Time

Relinquished by:

Date

Time

Received by:

Date

Time

Name of Sampler: (printed)

Chain-of-Custody Seal?

ANC WAS FBKS

Initiated By:

9.2

Temp/Loc:

6/1/01

Thermo ID#:

C/24

Shipping Via:

To be Completed by AAA

\*Received on ice within 24 hrs. of sampling