



ARS Aleut Analytical, LLC
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8/24/2017

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

Work Order #: A1707350
Date: 8/24/2017
Work ID: KWF Baseline Monitoring July 2017
Date Received: 7/25/2017
Proj #: KWF Baseline Monitoring July 2017

Sample Identification

Lab Sample Number	Client Description	Lab Sample Number	Client Description
A1707350-01	RM70 -Jims Landing	A1707350-02	RM74 -Russian River
A1707350-03	RM82 -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,

Mary Curry
Project Manager

"The Science of Analysis, The Art of Service"

Case Narrative

ARS Aleut Analytical, LLC

Work Order: A1707350

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, 22nd Edition, 2012.

SAMPLE RECEIPT:

Three (3) samples were received on 7/25/2017 12:15:00 PM at a temperature of 7.1°C at AAA - Anchorage. The samples were received in good condition and in order per chain of custody.

REVIEW FOR COMPLIANCE WITH AAA QA PLAN

A summary of our review is shown below.

All analytical results contained in this report have been reviewed under AAA's internal quality assurance and quality control program. Any deviations in quality control parameters for specific analyses are noted in the following text. A complete quality assurance report, including laboratory control, matrix spike, and sample duplicate recoveries, is kept on file in our office and is available upon request.

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

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

The following is a subcontracted test and has been represented to us as having met criteria, unless otherwise noted:

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

Detailed Analytical Report

ARS Aleut Analytical, LLC

Workorder (SDG): A1707350

Project: KWF Baseline Monitoring July 2017

Client: Kenai Watershed Forum

Client Project Number: KWF Baseline Monitoring July 2017

Report Section: Client Sample Report

Client Sample Name: **RM70 -Jims Landing**

Matrix: Aqueous

Collection Date: 7/25/2017 11:15:00AM

The following test was conducted by: TestAmerica - Denver

Lab Sample Number: A1707350-01B

Prep Date: 08-16-2017

Analytical Method ID: 200.7 - Metals by ICP - 200.7 metals

Prep Method ID:

Prep Batch Number: R1708231302-71

Report Basis: As Received

Sample prep wt./vol:

Analysis Date: 8/22/2017 11:41:00AM

Instrument:

File Name:

Dilution Factor: 1

Analyst Initials: CBAILEY

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	13,100		ug/L	300	100	1
Iron	7439-89-6	74.2		ug/L	60	20	
Magnesium	7439-96-4	1,040		ug/L	60	20	

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

Lab Sample Number: A1707350-01D

Prep Date: 08-10-2017 12:08

Analytical Method ID: SM4500-PE - Total Phos HACH 8190

Prep Method ID: 4500-PE

Prep Batch Number: F170810003

Report Basis: As Received

Sample prep wt./vol: 5.00 ml

pH on receipt: < 2.00

Analysis Date: 8/10/2017 12:55:00PM

Instrument: Spectrophoto

File Name:

Dilution Factor: 1

Analyst Initials: SC

Prep Extract Vol: 5.00 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>
Phosphorous, Total		ND		mg/L	0.10	0.025	1

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

Lab Sample Number: A1707350-01A

Prep Date: 08-08-2017 12:08

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

Prep Method ID:

Prep Batch Number: F170810005

Report Basis: As Received

Sample prep wt./vol: 25.00 ml

pH on receipt: < 2.00

Analysis Date: 8/8/2017 12:20:00PM

Instrument: Spectrophoto

Dilution Factor: 1

Analyst Initials: SC

Prep Extract Vol: 25.00 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>
Nitrate-Nitrite as Nitrogen		0.218		mg/L	0.10	0.015	1

Detailed Analytical Report

ARS Aleut Analytical, LLC

Workorder (SDG): A1707350

Project: KWF Baseline Monitoring July 2017

Client: Kenai Watershed Forum

Client Project Number: KWF Baseline Monitoring July 2017

Report Section: Client Sample Report

Client Sample Name: **RM74 -Russian River**

Matrix: Aqueous

Collection Date: 7/25/2017 10:25:00AM

The following test was conducted by: TestAmerica - Denver

Lab Sample Number: A1707350-02B

Analysis Date: 8/22/2017 11:53:00AM

Prep Date: 08-16-2017

Instrument:

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

File Name:

Prep Method ID:

Dilution Factor: 1

Prep Batch Number: R1708231302-71

Report Basis: As Received

Analyst Initials: CBAILEY

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	15,200		ug/L	300	100	1
Iron	7439-89-6	25.4	J	ug/L	60	20	
Magnesium	7439-96-4	1,010		ug/L	60	20	

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

Lab Sample Number: A1707350-02D

Analysis Date: 8/10/2017 12:55:00PM

Prep Date: 08-10-2017 12:08

Instrument: Spectrophoto

Analytical Method ID: SM4500-PE - Total Phos HACH 8190

File Name:

Prep Method ID: 4500-PE

Dilution Factor: 1

Prep Batch Number: F170810003

Report Basis: As Received

Analyst Initials: SC

Sample prep wt./vol: 5.00 ml

Prep Extract Vol: 5.00 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>
Phosphorous, Total		ND		mg/L	0.10	0.025	1

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

Lab Sample Number: A1707350-02A

Analysis Date: 8/8/2017 12:20:00PM

Prep Date: 08-08-2017 12:08

Instrument: Spectrophoto

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

Prep Method ID:

Dilution Factor: 1

Prep Batch Number: F170810005

Report Basis: As Received

Analyst Initials: SC

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		0.283		mg/L	0.10	0.015	1

Detailed Analytical Report

ARS Aleut Analytical, LLC

Workorder (SDG): A1707350

Project: KWF Baseline Monitoring July 2017

Client: Kenai Watershed Forum

Client Project Number: KWF Baseline Monitoring July 2017

Report Section: Client Sample Report

Client Sample Name: **RM82 -Kenai Lake Bridge**

Matrix: Aqueous

Collection Date: 7/25/2017 9:15:00AM

The following test was conducted by: TestAmerica - Denver

Lab Sample Number: A1707350-03B

Prep Date: 08-16-2017

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

Prep Method ID:

Prep Batch Number: R1708231302-71

Report Basis: As Received

Sample prep wt./vol:

Analysis Date: 8/22/2017 11:56:00AM

Instrument:

File Name:

Dilution Factor: 1

Analyst Initials: CBAILEY

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	12,900		ug/L	300	100	1
Iron	7439-89-6	66.8		ug/L	60	20	
Magnesium	7439-96-4	1,000		ug/L	60	20	

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

Lab Sample Number: A1707350-03D

Prep Date: 08-10-2017 12:08

Analytical Method ID: SM4500-PE - Total Phos HACH 8190

Prep Method ID: 4500-PE

Prep Batch Number: F170810003

Report Basis: As Received

Sample prep wt./vol: 5.00 ml

pH on receipt: < 2.00

Analysis Date: 8/10/2017 12:55:00PM

Instrument: Spectrophoto

File Name:

Dilution Factor: 1

Analyst Initials: SC

Prep Extract Vol: 5.00 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>
Phosphorous, Total		ND		mg/L	0.10	0.025	1

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

Lab Sample Number: A1707350-03A

Prep Date: 08-08-2017 12:08

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

Prep Method ID:

Prep Batch Number: F170810005

Report Basis: As Received

Sample prep wt./vol: 25.00 ml

pH on receipt: < 2.00

Analysis Date: 8/8/2017 12:20:00PM

Instrument: Spectrophoto

Dilution Factor: 1

Analyst Initials: SC

Prep Extract Vol: 25.00 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>
Nitrate-Nitrite as Nitrogen		0.221		mg/L	0.10	0.015	1

Detailed Analytical Report

ARS Aleut Analytical, LLC

Workorder (SDG): A1707350

Project: KWF Baseline Monitoring July 2017

Client: Kenai Watershed Forum

Client Project Number: KWF Baseline Monitoring July 2017

Report Section: Method Blank Report

Client Sample Name:

Matrix:

Collection Date: 8/22/2017 11:25:00AM

The following test was conducted by: TestAmerica - Denver

Lab Sample Number: ARS1-B17-01726-03

Prep Date: 08-16-2017

Analytical Method ID: 200.7 - Metals by ICP - 200.7 metals

Prep Method ID:

Prep Batch Number: R1708231302-71

Report Basis: As Received

Sample prep wt./vol:

Analysis Date: 8/22/2017 11:25:00AM

Instrument:

File Name:

Dilution Factor: 1

Analyst Initials: CBAILEY

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	300	100	1
Iron	7439-89-6	ND		ug/L	60	20	
Magnesium	7439-96-4	ND		ug/L	60	20	

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

Lab Sample Number: F170810003-MB

Prep Date: 08-10-2017 12:08

Analytical Method ID: SM4500-PE - Total Phos HACH 8190

Prep Method ID: 4500-PE

Prep Batch Number: F170810003

Report Basis: As Received

Sample prep wt./vol: 5.00 ml

pH on receipt: 0.00

Analysis Date: 8/10/2017 12:55:00PM

Instrument: Spectrophoto

File Name:

Dilution Factor: 1

Analyst Initials: SC

Prep Extract Vol: 5.00 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>
Phosphorous, Total		ND		mg/L	0.10	0.025	1

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

Lab Sample Number: F170810005-MB

Prep Date: 08-08-2017 12:08

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

Prep Method ID:

Prep Batch Number: F170810005

Report Basis: As Received

Sample prep wt./vol: 25.00 ml

pH on receipt: 0.00

Analysis Date: 8/8/2017 12:20:00PM

Instrument: Spectrophoto

Dilution Factor: 1

Analyst Initials: SC

Prep Extract Vol: 25.00 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>
Nitrate-Nitrite as Nitrogen		ND		mg/L	0.10	0.015	1

Detailed Analytical Report

ARS Aleut Analytical, LLC

Workorder (SDG): A1707350

Project: KWF Baseline Monitoring July 2017

Client: Kenai Watershed Forum

Client Project Number: KWF Baseline Monitoring July 2017

Tests Run at: Analytica Environmental Laboratories - Anchorage, Alaska

Workorder (SDG): A1707350

Project: KWF Baseline Monitoring July 2017

Project Number:

QUALITY CONTROL REPORT

Prep Batch: F170810005

SAMPLE DUPLICATE REPORT

Analysis: SM4500-NO3E - Nitrogen (Nitrate), Cadmium Reduction Method - Base Sample: A1707350-01A
Prep Date: 8/8/2017

Samp. Anal. Date: 8/8/2017 12:20:00PM

Units: mg/L

DUP Anal. Date: 8/8/2017 12:20:00PM

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	0.218	0.207	5.2	20	

LCS REPORT

Analysis: SM4500-NO3E - Nitrogen (Nitrate), Cadmium Reduction Method - MB: F170810005-MB
Prep Date: 8/8/2017

MB Anal. Date: 8/8/2017 12:20:00PM

Units: mg/L

LCS Anal. Date: 8/8/2017 12:20:00PM

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	0.351	0.328	107.0	90 - 110		

MS REPORT

Analysis: SM4500-NO3E - Nitrogen (Nitrate), Cadmium Reduction Method - Parent: A1707350-01A
Prep Date: 8/8/2017

Samp. Anal. Date: 8/8/2017 12:20:00PM

Units: mg/L

MS Anal. Date: 8/8/2017 12:20:00PM

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	0.218	0.394	0.171	103.0	80 - 120	

Prep Batch: F170810003

SAMPLE DUPLICATE REPORT

Analysis: SM4500-PE - Total Phos HACH 8190
Base Sample: A1707350-01D
Prep Date: 8/10/2017

Samp. Anal. Date: 8/10/2017 12:55:00PM

Units: mg/L

DUP Anal. Date: 8/10/2017 12:55:00PM

Matrix: Aqueous

<u>Analyte Name</u>	<u>SampResult</u>	<u>DUPRes.</u>	<u>RPD</u>	<u>RPDLim</u>	<u>Flag</u>
Phosphorous, Total	ND	ND	0.0	0	

Detailed Analytical Report

ARS Aleut Analytical, LLC

Workorder (SDG): A1707350

Project: KWF Baseline Monitoring July 2017

Client: Kenai Watershed Forum

Client Project Number: KWF Baseline Monitoring July 2017

Tests Run at:

Workorder (SDG): A1707350

Project: KWF Baseline Monitoring July 2017

Project Number:

Prep Batch: F170810003

QUALITY CONTROL REPORT

LCS REPORT

Analysis: SM4500-PE - Total Phos HACH 8190

MB: F170810003-MB

Prep Date: 8/10/2017

MB Anal. Date: 8/10/2017 12:55:00PM

Units: mg/L

LCS Anal. Date: 8/10/2017 12:55:00PM

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>
Phosphorous, Total	ND	0.293	0.320	91.7	90 - 110		

MS/MSD REPORT

Analysis: SM4500-PE - Total Phos HACH 8190

Parent: A1707350-01D

Prep Date: 8/10/2017

Samp. Anal. Date: 8/10/2017 12:55:00PM

Units: mg/L

MS Anal. Date: 8/10/2017 12:55:00PMMSD Anal. Date: 8/10/2017 12:55:00PM

Matrix: Aqueous

<u>Analyte Name</u>	<u>SampResult</u>	<u>MSRes.</u>	<u>MSDRes</u>	<u>SPLev</u>	<u>SPDLev</u>	<u>Recov.</u>	<u>MSD Rec.</u>	<u>RPD</u>	<u>Recov Lim</u>	<u>RPDLim</u>	<u>Flag</u>
Phosphorous, Total	ND	0.0717	0.202	0.0648	0.194	110.6	103.9	95.2	80 - 120	0	RPD

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): A1707350

Project: KWF Baseline Monitoring July 2017

Client: Kenai Watershed Forum

Client Project Number: KWF Baseline Monitoring July 2017

Detailed Analytical Report

ARS Aleut Analytical, LLC

Workorder (SDG): A1707350

Project: KWF Baseline Monitoring July 2017

Client: Kenai Watershed Forum

Client Project Number: KWF Baseline Monitoring July 2017

QC BATCH ASSOCIATIONS - BY METHOD BLANK

Lab Project ID: 188,886 Lab Project Number: A1707350

Prep Date: 8/10/2017

Lab Method Blank Id: F170810003-MB

Prep Batch ID: F170810003

Method: SM4500-PE - Total Phos HACH 8190

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>
A1707350-01D	RM70 -Jims Landing		8/10/2017 12:55:00PM
A1707350-02D	RM74 -Russian River		8/10/2017 12:55:00PM
A1707350-03D	RM82 -Kenai Lake Bridge		8/10/2017 12:55:00PM
F170810003-LCS	LCS		8/10/2017 12:55:00PM
A1707350-01D-DUP	DUP		8/10/2017 12:55:00PM
A1707350-01D-MS	MS		8/10/2017 12:55:00PM
A1707350-01D-MSD	MSD		8/10/2017 12:55:00PM

Prep Date: 8/8/2017

Lab Method Blank Id: F170810005-MB

Prep Batch ID: F170810005

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>
A1707350-01A	RM70 -Jims Landing		8/8/2017 12:20:00PM
A1707350-02A	RM74 -Russian River		8/8/2017 12:20:00PM
A1707350-03A	RM82 -Kenai Lake Bridge		8/8/2017 12:20:00PM
F170810005-LCS	LCS		8/8/2017 12:20:00PM
A1707350-01A-DUP	DUP		8/8/2017 12:20:00PM
A1707350-01A-MS	MS		8/8/2017 12:20:00PM

Prep Date: 8/16/2017

Lab Method Blank Id: ARS1-B17-01726-03

Prep Batch ID: R1708231302-71

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:

<u>SampleNum</u>	<u>ClientSampleName</u>	<u>DataFile</u>	<u>AnalysisDate</u>
A1707350-01B	RM70 -Jims Landing		8/22/2017 11:41:00AM
A1707350-02B	RM74 -Russian River		8/22/2017 11:53:00AM
A1707350-03B	RM82 -Kenai Lake Bridge		8/22/2017 11:56:00AM

Detailed Analytical Report

ARS Aleut Analytical, LLC

Workorder (SDG): A1707350

Project: KWF Baseline Monitoring July 2017

Client: Kenai Watershed Forum

Client Project Number: KWF Baseline Monitoring July 2017

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



ARS International, LLC

Laboratory Analysis Report

ARS1-17-02293

Prepared for:

ARS Aleut Analytical, LLC

**Data Reporting
3710 Woodland Drive Suite 900
Anchorage, AK 99517**

datareporting@amrad.com

Phone: 907-258-2155

Project Manager Review

Management Review

Notes: ARS International, LLC assumes no liability for the use or the interpretation of any analytical results provided other than the cost of the analysis itself. Reproduction of this report in less than full requires the written consent of the client.

Contact Person: Questions regarding this analytical report should be addressed to:

**Project Manager
ProjectManagers@amrad.com**

**Phone: 225.381.2991
Fax: 225.381.2996**





2609 North River Road, Port Allen, Louisiana 70767

1 (800) 401-4277 FAX (225) 381-2996

ARS Sample Delivery Group: ARS1-17-02293

Client Sample ID: A1707350-01B

Sample Collection Date: 07/25/17

Sample Matrix: Aqueous

Percent Solids: N/A

Request or PO Number: 8600

ARS Sample ID: ARS1-17-02293-001

Date Received: 08/01/17

Report Date: 08/23/17

Inorganics

Preparation Method: ARS-154/200.7

Analysis Method: ARS-166/EPA 200.7

CAS#	Analyte	Analysis Result	LOD	LOQ	CRDL	Dilution Factor	Qual	Analysis Units	Analysis Date/Time	Analysis Technician
7440-70-2	Calcium	1.31E+4	100	300	NP	1		ug/L	08/22/17 11:41	CBAILEY
7439-89-6	Iron	74.2	20.0	60.0	NP	1		ug/L	08/22/17 11:41	CBAILEY
7439-95-4	Magnesium	1.04E+3	20.0	60.0	NP	1		ug/L	08/22/17 11:41	CBAILEY

Project Manager Review

Notes: American Radiation Services, Inc. assumes no liability for the use or interpretation of any analytical results provided other than the cost of the analysis itself. Reproduction of this report in less than full requires the written consent of the client.

LELAP Certificate# 01949



2609 North River Road, Port Allen, Louisiana 70767

1 (800) 401-4277 FAX (225) 381-2996

ARS Sample Delivery Group: ARS1-17-02293

Client Sample ID: A1707350-02B

Sample Collection Date: 07/25/17

Sample Matrix: Aqueous

Percent Solids: N/A

Request or PO Number: 8600

ARS Sample ID: ARS1-17-02293-002

Date Received: 08/01/17

Report Date: 08/23/17

Inorganics

Preparation Method: ARS-154/200.7

Analysis Method: ARS-166/EPA 200.7

CAS#	Analyte	Analysis Result	LOD	LOQ	CRDL	Dilution Factor	Qual	Analysis Units	Analysis Date/Time	Analysis Technician
7440-70-2	Calcium	1.52E+4	100	300	NP	1		ug/L	08/22/17 11:53	CBAILEY
7439-89-6	Iron	25.4	20.0	60.0	NP	1	J	ug/L	08/22/17 11:53	CBAILEY
7439-95-4	Magnesium	1.01E+3	20.0	60.0	NP	1		ug/L	08/22/17 11:53	CBAILEY

Project Manager Review

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LELAP Certificate# 01949



2609 North River Road, Port Allen, Louisiana 70767

1 (800) 401-4277 FAX (225) 381-2996

ARS Sample Delivery Group: ARS1-17-02293

Client Sample ID: A1707350-03B

Sample Collection Date: 07/25/17

Sample Matrix: Aqueous

Percent Solids: N/A

Request or PO Number: 8600

ARS Sample ID: ARS1-17-02293-003

Date Received: 08/01/17

Report Date: 08/23/17

Inorganics

Preparation Method: ARS-154/200.7

Analysis Method: ARS-166/EPA 200.7

CAS#	Analyte	Analysis Result	LOD	LOQ	CRDL	Dilution Factor	Qual	Analysis Units	Analysis Date/Time	Analysis Technician
7440-70-2	Calcium	1.29E+4	100	300	NP	1		ug/L	08/22/17 11:56	CBAILEY
7439-89-6	Iron	66.8	20.0	60.0	NP	1		ug/L	08/22/17 11:56	CBAILEY
7439-95-4	Magnesium	1.00E+3	20.0	60.0	NP	1		ug/L	08/22/17 11:56	CBAILEY

Project Manager Review

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QC Results per Analytical Batch

Analytical Batch	ARS1-B17-01726
SDG	ARS1-17-02293
Analysis	MET-200.7-AQ
Method	ARS-154/166/EPA 200.7
Analysis Code	MET-200.7-AQ
Report Units	ug/L

Laboratory Control Sample		Analysis Date		08/22/17 11:19	Analysis Technician		CBAILEY	
CAS #	Analyte	LCS Results	LCSD Results	Known Value	% Rec	Limits	RPD	Limits
7440-70-2	Calcium	4.72E+3	4.86E+3	5.00E+3	97.2	88 - 112	N/A	25
7439-89-6	Iron	4.82E+3	4.95E+3	5.00E+3	99.0	86 - 114	N/A	25
7439-95-4	Magnesium	4.86E+3	5.01E+3	5.00E+3	100	82 - 118	N/A	25

Method Blank		Analysis Date	08/22/17 11:25	Analysis Technician	CBAILEY
CAS #	Analyte	Blank Results	Qualifier	LOD	LOQ
7440-70-2	Calcium	<100	U	100	300
7439-89-6	Iron	<20.0	U	20.0	60.0
7439-95-4	Magnesium	<20.0	U	20.0	60.0

Matrix Spike		Analysis Date		08/22/17 11:30		Analysis Technician		CBAILEY	
QC Type	Analyte	MS Results	MSO Sample	MSO Results	Expected Value	MS % Rec	Limits	RPD	Limits
MS	Calcium	2.27E+4	13	1.81E+4	5.00E+3	92.4	60 - 140	N/A	25
MSD	Calcium	2.29E+4	13	1.81E+4	5.00E+3	96.7	60 - 140	N/A	25
MS	Iron	4.81E+3	13	<20.0	5.00E+3	95.9	60 - 140	N/A	25
MSD	Iron	4.85E+3	13	<20.0	5.00E+3	96.7	60 - 140	N/A	25
MS	Magnesium	1.14E+4	13	6.84E+3	5.00E+3	91.9	60 - 140	N/A	25
MSD	Magnesium	1.15E+4	13	6.84E+3	5.00E+3	94.1	60 - 140	N/A	25

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Project Manager Review

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Notes (Case Narrative):

Comments:

- 1.0) All MDA/MDC values are calculated on a sample specific basis.
- 2.0) Soil and Sludge analysis are reported on a wet basis or an as received basis unless otherwise indicated.
- 3.0) Data in this report are within the limits of uncertainty specified in the reference method unless otherwise specified.
- 4.0) Modified analysis procedures are procedures that are modified to meet the certain specifications. An example may be the use of a water method to analyze a solid matrix due to the lack of an officially recognized procedure for the analysis of the solid matrix. Modified analyses are indicated by the subsequent addition of "m" to the procedure number (i.e. 900.0M).
- 5.0) Total activity is actually total gamma activity and is determined utilizing the prominent gamma emitters from the naturally occurring radioactive decay chains and other prominent radioactive nuclides. Total activity may be lower than the actual total activity due to the extent of secular equilibrium achieved in the various decay chains at the time of analysis. The total activity is not representative of nuclides that emit solely alpha or beta particles.
- 6.0) Ra-228 is determined via secular equilibrium with its daughter, Actinium 228 (Gamma Spectroscopy only).
- 7.0) U-238 is determined via secular equilibrium with its daughter, Thorium 234 (Gamma Spectroscopy only).
- 8.0) All gamma spectroscopy was performed utilizing high purity germanium detectors (**HPGe**).
- 9.0) ARS makes every attempt to match sample density to calibrated density; however, in some cases, it is not practical or possible to do so and data results may be affected (Gamma Spectroscopy only).
- 10.0) Gamma spectroscopy results are calculated values based on the **ORTEC**[®] GammaVision ENV32 Analysis Engine.
- 11.0) ACLASS DOD and ISO 17025 certification applies only to the following analytes and methods: Gross Alpha and Gross Beta (EPA 900, SM7110B&C, SW846 9310); Radium 226 (EPA 903, EPA 903.1, SM 7500 Ra-B, SW846 9315); Radium 228 (EPA 904, SM 7500 Ra-B SW846 9320); Iodine-131(EPA 901.1); Uranium by ICPMS (EPA 200.8); Strontium 89/90 (EPA 905, Eichrom SRW01, HASL 300 Sr-03-RC); Tritium (EPA 906, EPA 906M); Gamma Emitters (EPA 901.1, SM7120B, HASL 300 Ga-01-R); Americium-241, Curium 242/244, Plutonium 239/240 and 241, Thorium 228/230/232, Uranium 234/233 and 238 (Eichrom ACW03 VBS); Lead 210 (HASL 300 Pb-01-RC, Eichrom OTW01); Polonium 210 (HASL 300 Po-01-RC, HASL 300 Po-02-RC); Technetium-99 (Eichrom TCW02, Eichrom TCS01M).

Method References:

- 1.0) **EPA 600/4-80-032**; Prescribed Procedures for the Measurements of Radioactivity in Drinking Water, August 1980.
- 2.0) **Standard Methods for the Examination of Water and Wastewater** (On-Line Edition)
- 3.0) **EPA SW-846**; Test Methods for Evaluating Solid Waste, (On-Line edition)
- 4.0) **EPA 600/4/79-020**; Methods for Chemical Analysis of Water and Waste, March 1983.
- 5.0) **HASL 300**; The Procedures Manual of the Environmental Measurements Laboratory, Volume I, 28th Edition February, 1997.

Definitions:

CRDL	Contract Required Detection Limit
CSU	Combined Standard Uncertainty
DLC	Decision Level Concentration (ANSI N42.23) or critical level
DO	Duplicate Original
DUP	Method Duplicate
LCS/LCSD	Laboratory Control Sample/Laboratory Control Sample Duplicate
MDA	Minimum Detectable Activity
MDC	(Minimum Detectable Concentration) minimum concentration of the analyte that ARS can detect utilizing the specific analysis
MBL	Method Blank
MS/MSD	Matrix Spike/Matrix Spike Duplicate
N/A	Not Applicable
NP	Not Provided
NR	Not Referenced
LOD	Limit of Detection
LOQ	Limit of Quantitation

Data Qualifiers:

B	The analyte is found in both the associated method blank and the sample. This flag indicates probable blank contamination.
D	Sample analysis accomplished through dilution.
J	The reported result is an estimated value above the limit of detection but outside of quantitation range (e.g., matrix interference was observed).
Q	One or more quality control criteria failed (e.g., LCS recovery, surrogate spike recovery, or CCV recovery).
U	Activity is below the MDC, MDA, MDL, or LOD
N	The analyte is a tentatively identified compound using mass spectrometry or any non-customer requested compounds that are tentatively identified.
*	LCS/LCSD or MS/MSD fails RPD criteria.
S	Spike
SC	Subcontracted out to another qualified laboratory
H	Holding time exceeded

LELAP Cert# 01949

NELAP Cert# E87558

ARS-059-010

Revision: 9.1

Revision Date: 03-14-2017

ANALYTICA CHAIN OF CUSTODY FOR INTRA-COMPANY ANALYSIS

COC Number: 188886-3

ARS Aleut Analytical, LLC
3710 Woodland Dr. Suite 900
Anchorage, AK 99517
Report to: Jerry Baker
phone: 907-258-2155

PO Number: 8600Requested Turnaround: 8-16-17

Preserve @ Ca0

Testing Laboratory:

Client Identifier: **RM70 -Jims Landing**

Analytica ID	Test Method	Method Description	Sample Date	Matrix	Comments
A1707350-01B	200.7	200.7 (Aqueous) - 200.7 metals	7/25/2017 11:15	Aqueous	

Client Identifier: **RM74 -Russian River**

Analytica ID	Test Method	Method Description	Sample Date	Matrix	Comments
A1707350-02B	200.7	200.7 (Aqueous) - 200.7 metals	7/25/2017 10:25	Aqueous	

Client Identifier: **RM82 -Kenai Lake Bridge**

Analytica ID	Test Method	Method Description	Sample Date	Matrix	Comments
A1707350-03B	200.7	200.7 (Aqueous) - 200.7 metals	7/25/2017 9:15	Aqueous	

Analytica Relinquished by:	Date/Time:	Received by:	Date/Time:
<i>D. A. P. S.</i>	7-31-17	<i>Kate Dingle</i>	8/1/17 13:22
Relinquished by:	Date/Time:	Received by:	Date/Time:

200.7: Ca Fe Mg

Detailed Analytical Report

ARS Aleut Analytical, LLC

Workorder (SDG): A1707350

Project: KWF Baseline Monitoring July 2017

Client: Kenai Watershed Forum

Client Project Number: KWF Baseline Monitoring July 2017

REPORTING CONVENTIONS FOR THIS REPORT

A1707350

<u>TestPkgName</u>	<u>Basis</u>	<u># Sig Figs</u>	<u>Reporting Limit</u>
200.7 (Aqueous) - 200.7 metals	As Received	3	Report to MDL, J qual below PQL
4500-NO3E (Aqueous) - nitrate+nitrite pres f	As Received	3	Report to PQL
4500-PE/4500-PE (Aqueous) - Total Phos HACH 8190	As Received	2	Report to PQL



AAA Chain of Custody

Custody form MUST be signed

Please provide as much information as possible

Anchorage Laboratory
3710 Woodland Dr. Suite 900
Anchorage, AK 99517
907.258.2155 907.258.6634
fax

Mat-Su Service Center
701 East Parks Highway #206
Wasilla, AK 99654
907.373.5440
fax

Fairbanks Laboratory
475 Hall Street
Fairbanks, AK 99701
907.456.3116
907.456.3125 fax
225.381.2991 fax

ARS Corporate Office
2609 North River Road
Port Allen, LA 70767
225.381.2991
225.381.2996 fax

Formerly Analytica Group

Client/Company Name & Address: Kenai Watershed Forum 44129 Sterling Hwy Soldotna, AK 99669		TEAM ID: US Forest Forest Project Name: Kenai River Baseline Project - July 2017		Section To Be Completed by AAA Quote Number: A17040002 LGN: A1707350	
Contact Person: Jeff Sires		<input type="checkbox"/> Standard <input type="checkbox"/> Expedited (prior authorization required for < 10 days) please specify due date below; additional charges may apply		Account #: <input type="checkbox"/> Check <input type="checkbox"/> Credit	
Phone No: 907-260-5449 c:953-9635		Requested Date for Results:		Invoice Contact Name & Address & Phone:	
Fax No: 907-260-5412		Results to STATE: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Routine <input type="checkbox"/> Non-Routine		PO/Contract No.:	
E-mail: jeff@kenaiwatershed.org		Requested Analysis/Method		Requested Analysis/Method	
Special Instructions/Requirements:		Requested Analysis/Method		Requested Analysis/Method	
Kit Preparation/Shipping Charge:		Requested Analysis/Method		Requested Analysis/Method	
Client Sample Identification (Name, Designation, Location, etc.)		Requested Analysis/Method		Requested Analysis/Method	
1 RM 70 - Jim's Landing		Requested Analysis/Method		Requested Analysis/Method	
2 RM 74 - Russian River		Requested Analysis/Method		Requested Analysis/Method	
3 RM 82 - Kenai Lake Bridge		Requested Analysis/Method		Requested Analysis/Method	
4		Requested Analysis/Method		Requested Analysis/Method	
5		Requested Analysis/Method		Requested Analysis/Method	
6		Requested Analysis/Method		Requested Analysis/Method	
7		Requested Analysis/Method		Requested Analysis/Method	
8		Requested Analysis/Method		Requested Analysis/Method	
9		Requested Analysis/Method		Requested Analysis/Method	
10		Requested Analysis/Method		Requested Analysis/Method	
Relinquished by: <i>Matthew R Maxey</i>		Date: 7/25/17 Time: 12:15		Section To Be Completed by AAA Condition of Custody Seal: Intact Broken	
Relinquished by:		Date: 7/25/17 Time: 12:15pm		Receiving location: <i>Soldotna # 87225</i>	
Relinquished by:		Date: Time:		Temperature on arrival: 7.1 °C	
Relinquished by:		Date: Time:		Thermometer ID # _____ Measurement method: <input checked="" type="radio"/> Temp Blank <input type="radio"/> Other	
Name of Sampler: (printed) <i>Matthew R Maxey</i>		Shipping method/Tracking number:		Shipping method/Tracking number:	