



# WILLOW BASELINE WATER QUALITY MONITORING

180458-MBI-HH-RPT-001  
December 23, 2020

MSA Contract No. 296937

Prepared By:

**Michael Baker**  
INTERNATIONAL

Michael Baker International  
3900 C Street Suite 900  
Anchorage, AK 99503

## Table of Contents

<b>1. INTRODUCTION</b> .....	<b>1</b>
<b>2. METHODS</b> .....	<b>3</b>
2.1. Sampling Locations .....	4
2.2. In-Situ Measurements .....	10
Instrument Calibration .....	10
Instrument Accuracy .....	10
2.3. Laboratory Sample Collection & Analysis .....	11
Sample Collection .....	11
Sample Collection – PFAS .....	11
Laboratory Analyses .....	12
<b>3. RESULTS</b> .....	<b>14</b>
3.1. Lake Descriptions .....	14
LAKE M0015/R0056 (Middle Snowman Lake) .....	14
LAKE M0235 .....	15
LAKE L9911/R0061 .....	16
LAKE M0305 .....	17
LAKE MM1707 .....	18
3.2. In-Situ Measurements .....	19
3.3. Laboratory Analysis .....	21
<b>4. REFERENCES</b> .....	<b>24</b>
<b>Appendix A. Lake Bathymetry Maps</b> .....	<b>A-1</b>
<b>Appendix B. Laboratory Reports</b> .....	<b>B-2</b>

## Figures

Figure 1: Willow Water Quality Monitoring Lakes .....	2
Figure 2: Lake M0015/R0056 (Middle Snowman Lake) .....	5
Figure 3: Lake M0235 .....	6
Figure 4: Lake L9911/R0061 .....	7
Figure 5: Lake M0305 .....	8
Figure 6: Lake MM1707 .....	9

## Photos

Photo 1: Equipment used to collect water quality data and samples; September 9, 2020 .....	3
Photo 2: Preparing for sampling at Lake M0015/R0065; September 9, 2020 .....	3
Photo 3: Field personnel collecting samples at Lake M0015/R0056; September 9, 2020 .....	14
Photo 4: Crew member recording in-situ measurements; September 8, 2020 .....	15
Photo 5: Lake L9911/R0061, looking east; September 9, 2020 .....	16
Photo 6: Lake M0305, looking west; September 10, 2020 .....	17
Photo 7: Lake MM1707, looking north; September 10, 2020 .....	18

## Tables

Table 1: Water Quality Sampling Locations .....	1
Table 2: In-Situ Water Quality Parameters .....	10
Table 3: Instrument Accuracy .....	11
Table 4: In-Situ Water Quality Results Summary .....	20
Table 5: Laboratory Analytical Results of PFAS .....	21
Table 6: Laboratory Analytical Results of DRO, RRO and Total Metals.....	23

## Acronyms & Abbreviations

°C	Degrees Celsius
ADEC	Alaska Department of Environmental Conservation
Arctic Fox	Arctic Fox Environmental, Inc.
ASDP	Alpine Satellite Development Plan
COPA	ConocoPhillips Alaska, Inc.
DO	Dissolved oxygen
DRO	Diesel range organics
EPA	Environmental Protection Agency
FID	Flame ionization detector
GC	Gas chromatography
HDPE	High-density polyethylene
ICP	Inductively coupled plasma
MS	Mass spectrometry
µS/cm	Microsiemens per centimeter
mS/cm	Millisiemens per centimeter
mg/L	Milligrams per liter
ng/L	Nanograms per liter
Michael Baker	Michael Baker International
NTU	Nephelometric Turbidity Units
PFAS	Per- and Polyfluoroalkyl Substances
pH	Potential of hydrogen
ppt	Parts per thousand
PSS	Practical Salinity Scale
RCRA	Resource Conservation and Recovery Act
RRO	Residual range organics
SG	Silica gel
SU	Standard units

# 1. INTRODUCTION

The 2020 Willow Baseline Water Quality Monitoring Report presents the results of lake monitoring conducted in September 2020 for ConocoPhillips Alaska, Inc. (COPA). This is the initial water quality sampling effort performed at select lakes in the proposed Willow development area in support of environmental monitoring. No oil and gas facilities—gravel or pipeline infrastructure—have been constructed in Willow; only winter exploration activities have been performed. Lakes were selected due to their proximity to proposed pads and infrastructure development.

This report includes water sampling results from lakes M0015/R0056 (Middle Snowman Lake), M0235, L9911/R0061, M0305, and MM1707. An overview of the study lakes relative to proposed Willow facilities is presented in Figure 1.

The water quality monitoring program included in-situ sampling of the five lakes for temperature, conductivity/specific conductance, dissolved oxygen (DO), salinity, turbidity, and pH. Water samples were collected at each lake for laboratory analyses of Per- and Polyfluoroalkyl substances (PFAS); dissolved hydrocarbons: diesel range organics (DRO) and residual range organics (RRO); zinc; and Resource Conservation and Recovery Act 8 (RCRA 8) metals. A summary of lakes and sampling locations are presented in Table 1.

Sampling for PFAS occurred at one location near the shore of each lake. Sampling for the other parameters occurred at one location in the deepest area of each lake. The deepest area was identified based on bathymetry maps provided by COPA.

**Table 1: Water Quality Sampling Locations**

Sample Location	Description	Lat (WGS84)	Long (WGS84)
<b>M0015/R0056 (Middle Snowman Lake)</b>	deepest area of lake	N 70.10901	W 152.05298
	lake shore (PFAS sampling)	N 70.10191	W 152.05464
<b>M0235</b>	deepest area of lake	N 70.23987	W 152.18524
	lake shore (PFAS sampling)	N 70.23272	W 152.18259
<b>L9911/R0061</b>	deepest area of lake	N 70.16468	W 151.79243
	lake shore (PFAS sampling)	N 70.16368	W 151.79969
<b>M0305</b>	deepest area of lake	N 70.28111	W 152.19642
	lake shore (PFAS sampling)	N 70.28089	W 152.20204
<b>MM1707</b>	deepest area of lake	N 70.20332	W 152.31049
	lake shore (PFAS sampling)	N 70.19440	W 152.30152

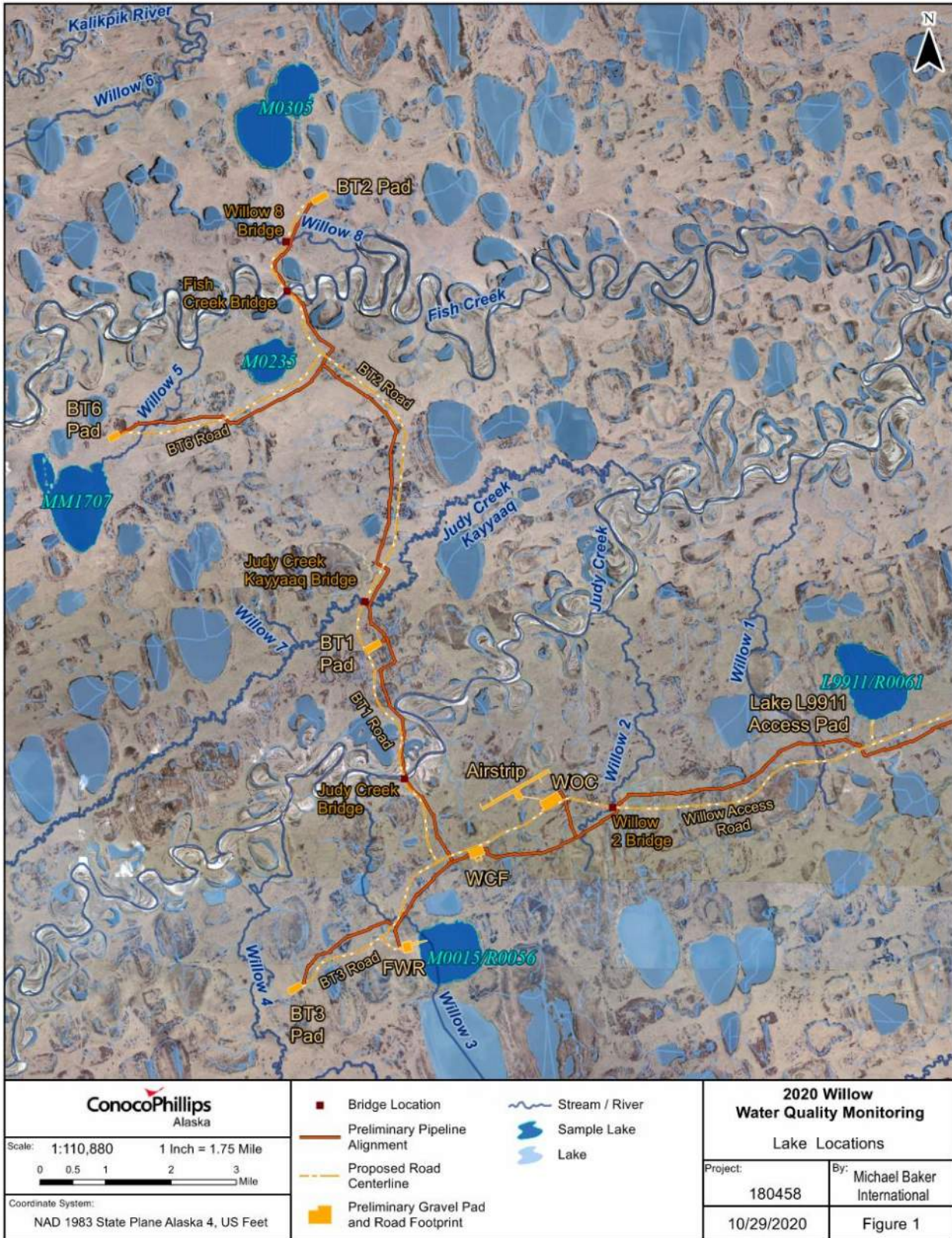


Figure 1: Willow Water Quality Monitoring Lakes

## 2. METHODS

Field investigations were conducted by a two-person Michael Baker International (Michael Baker) team. Safety precautions were followed as outlined in the North Slope Water Resources 2020 Health, Safety, and Environmental Plan (Michael Baker 2020a) and the 2020 Summer Hydrology Monitoring – Job Safety Analysis (Michael Baker 2020b). Special consideration was required for PFAS sampling, which was performed following procedures provided by the PFAS Sampling Standard Operating Procedure (Michael Baker 2020c). The SOP was informed by the Michigan Department of Environmental Quality’s General PFAS Sampling Guidance (MDEQ 2018).

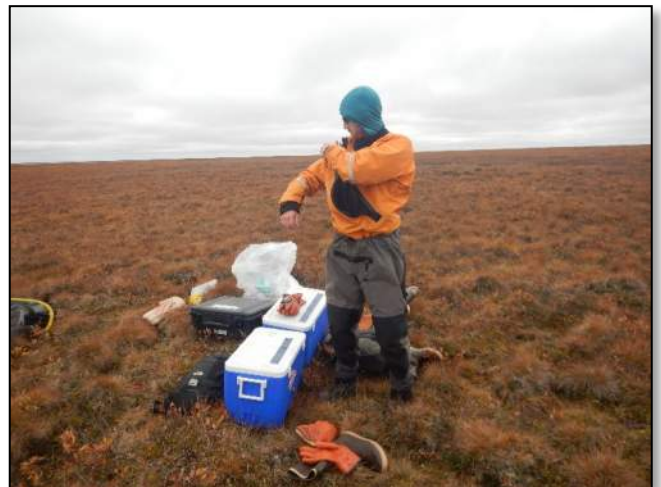
Parameters were measured in-situ, determined by laboratory analysis, or calculated based on the results of in-situ measurement and/or laboratory analysis. Field sampling methods were based on U.S. Geological Survey (USGS 2006), Ward and Harr (1990), and U.S. Army Corps of Engineers (USACE 1987) methods. In-situ water quality measurement instruments were provided by TTT Environmental. Sample collection kits and laboratory analyses were provided by Arctic Fox Environmental (Arctic Fox), or managed by Arctic Fox to a subcontractor for those analyses not performed in-house. Results of parameters requiring calculation were determined by Michael Baker personnel.

The field crew traveled by helicopter to each lake and sample locations were accessed from shore and using inflatable kayaks (Photo 1 and Photo 2). Locations were identified and recorded using a handheld global positioning system (GPS) Garmin Oregon 650t device referenced to the World Geodetic System of 1984 (WGS84) coordinate system.

Measurements and samples were collected at M0235 on September 8<sup>th</sup>, L9911 and M0015/R0065 on September 9<sup>th</sup>, and M0305 and MM1707 on September 10<sup>th</sup>.



**Photo 1: Equipment used to collect water quality data and samples; September 9, 2020**



**Photo 2: Preparing for sampling at Lake M0015/R0065; September 9, 2020**

## 2.1. Sampling Locations

Historically, results of in-situ water quality monitoring of North Slope lakes indicate that hydraulically isolated lakes are typically well-mixed during open water conditions. Sampling locations for all parameters except PFAS were identified prior to the site visit and assume data collected at one location are representative of conditions throughout the water body. Single-point sampling locations in the deepest area of each lake were selected based on bathymetry maps. If in-situ sampling results indicated stratification, sampling at additional depths would have been performed.

The PFAS sampling was performed close to the shore to reduce the potential for cross-contamination by introducing waterproof and flotation devices to lake water (see Sample Collection – PFAS for additional discussion). Locations were selected in the field based on wind direction and helicopter approach.

The sampling locations are shown in Figure 2 through Figure 6.



Figure 2: Lake M0015/R0056 (Middle Snowman Lake)



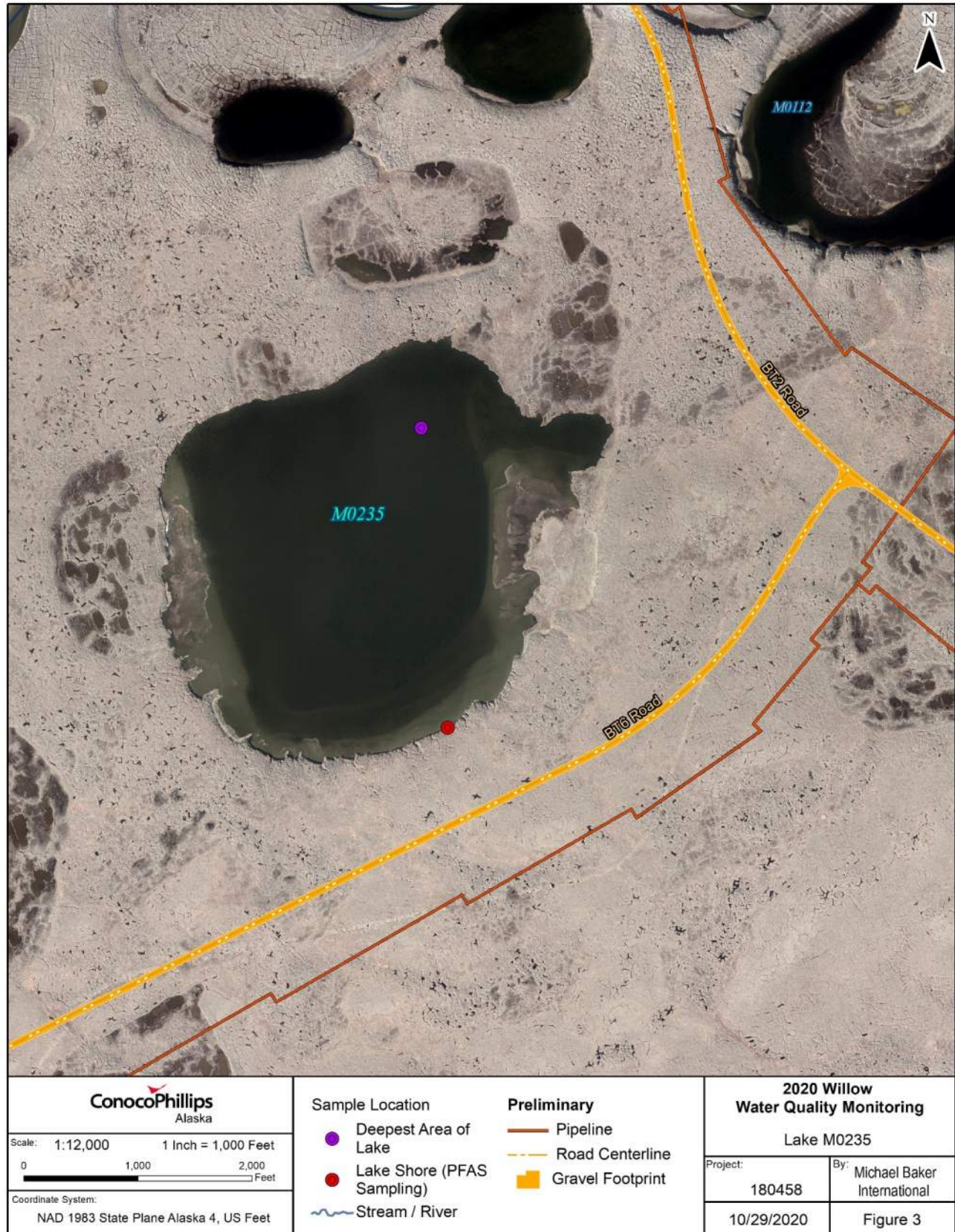


Figure 3: Lake M0235



Figure 4: Lake L9911/R0061

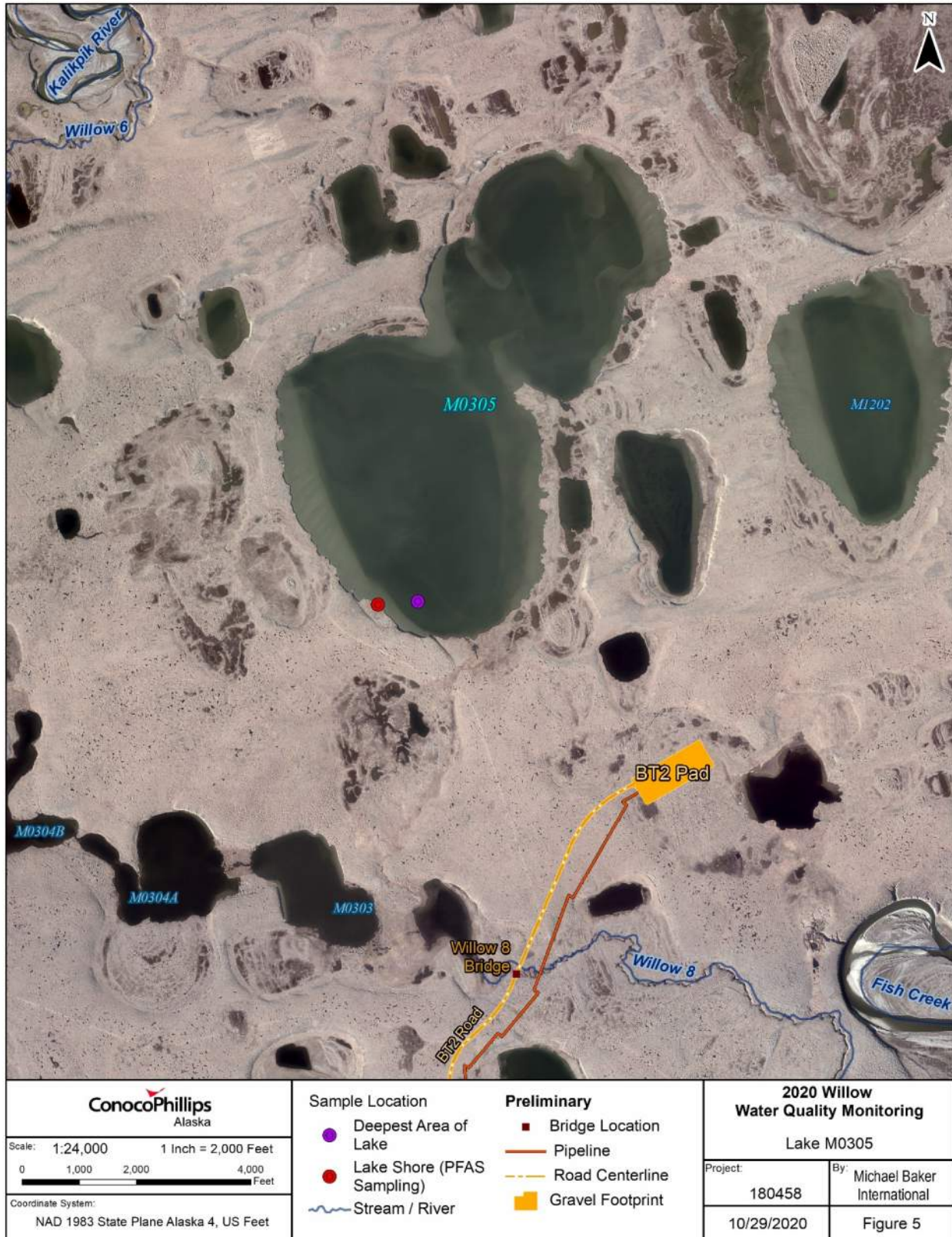


Figure 5: Lake M0305



Figure 6: Lake MM1707

## 2.2. In-Situ Measurements

In-situ parameters were measured at 1- and 2-foot intervals throughout the water column. A list of water quality parameters collected is presented in Table 2.

**Table 2: In-Situ Water Quality Parameters**

Parameter	Units	
Total Depth	ft	feet
Temperature	°C	degrees Celsius
Turbidity	NTU	Nephelometric Turbidity Units
Conductivity	µS/cm	microsiemens per centimeter
Specific Conductance	µS/cm	microsiemens per centimeter
Dissolved Oxygen	mg/L	milligrams per liter
	% saturation	percent saturation
Salinity	ppt	parts per thousand
pH	SU	standard units

Turbidity refers to the cloudiness of a fluid caused by suspended solids that tend to be invisible to the naked eye. As particles in a fluid will scatter light focused on them, turbidity can be measured by the quantity of reflected light for a given quantity of particulates. A Nephelometer is equipped with a detector next to the light beam and is used to measure turbidity.

Conductivity is a measurement of the water's ability to carry an electrical current. Dissolved salts (ions) are conductors of electrical current, and conductivity is proportional to the ion concentration (salinity) in an aqueous solution. The salinity is calculated using the in-situ conductivity and temperature, and the conversions defined by the Practical Salinity Scale (PSS) of 1978 (YSI 2012). The PSS is derived for standard seawater with a known ion composition; therefore, using the PSS for freshwater with unknown ion composition provides an estimate of the salinity.

Specific conductance is a metric commonly used to report the concentration of salts in freshwater. Conductivity measurements are temperature dependent. Specific conductance is calculated from in-situ conductivity and temperature using a site-specific temperature correction coefficient. The correction coefficient is determined for a site by relating the conductivity of a sample at the in-situ temperature and the conductivity of the same sample at 25 degrees Celsius (°C). Michael Baker completed this analysis for the Colville River in 2005 resulting in a correction coefficient of 0.0196 (Michael Baker 2006). Lacking a site-specific temperature coefficient, the Colville River correction coefficient was used for the Willow lakes. That value is within the 2%/°C range typically used for freshwater sources.

### INSTRUMENT CALIBRATION

A YSI 650 MDS handheld unit with YSI 6920 V2 Sonde sensor was calibrated by TTT Environmental according to the manufacturer's specifications. The morning of sampling, the YSI 6920 V2 meter was calibrated for conductivity and pH and checked for DO by Michael Baker field team members as directed by the manufacturer. An optical DO sensor was used for the DO sampling. Prior to each field sampling event, the meter probes were thoroughly rinsed with lake water.

### INSTRUMENT ACCURACY

The accuracies of the YSI 6920 V2 Sonde sensors are presented in Table 3 (YSI 2012).

**Table 3: Instrument Accuracy**

Parameter	Accuracy
Temperature	+/- 0.15°C
Turbidity	+/- 2% of the reading or 0.3 NTU (whichever is greater)
Conductivity	+/- 0.5% of reading + 0.001 mS/cm
Dissolved Oxygen	+/- 1% of the reading or 0.1 mg/L (whichever is greater)
	+/- 1% of the reading or 1% air saturation (whichever is greater)
Salinity	+/- 1.0% of reading or 0.1 ppt (whichever is greater)
pH	+/- 0.2 units

### 2.3. Laboratory Sample Collection & Analysis

#### SAMPLE COLLECTION

Frequent wind and shallow depths typically prevent oxyclines (notable change in oxygen concentration with depth), haloclines (notable change in salinity with depth), and thermoclines (notable change in temperature with depth) from developing in North Slope lakes during the summer. The in-situ water quality measurements were homogenous through the water column at each lake; therefore, a representative single point laboratory sample at mid-depth was collected at each lake. If in-situ sampling indicated significant lake stratification, multiple samples would have been collected throughout the water column and combined for laboratory analysis. A duplicate sample was collected at mid-depth from randomly selected Lake M0305 for laboratory analysis quality control.

Water samples were collected from lakes using a 1.6-inch by 12-inch disposable high-density polyethylene (HDPE) bailer (350 milliliter capacity). Nitrile gloves were worn during sample collection and changed between samples. A new bailer was used for each lake and discarded after use.

Sample storage, transport, and documentation kits were provided by Arctic Fox. Samples were transferred from bailers to bottles which were stored in coolers before, during, and after sample collection to maintain temperature and follow chain of custody procedures. Field samples were transported to Arctic Fox within 24 hours of initial sample collection.

#### SAMPLE COLLECTION – PFAS

Per- and Polyfluoroalkyl substances are an emerging category of contaminants. They are used as a coating that resists oil, heat, water, stains, and grease and can be found in waterproof clothes, flotation devices, non-stick cookware, food packaging, stain-resistant rugs and carpet, personal care products, flame-resistant products, and fire-fighting foams. They are not naturally occurring in the environment, and their use in products is not well documented. Many chemicals in the PFAS group do not break down in the environment, can move through soils, can contaminate drinking water sources, and can bioaccumulate in fish and wildlife over time. The contaminants are highly mobile in the environment once introduced (EPA 2020 and CDC 2017). Laboratory methodology is limited to identification and quantification of less than 30 of the currently over 4,000 different known PFAS compounds, and detection limits for those are very low (EPA 2018).

Considering the above, PFAS sampling was performed using special procedures to limit the potential for contamination being introduced to the sampling environment (Michael Baker 2020c). Sampling was conducted from the shore prior to launching the kayaks to performing the non-PFAS lake samples. The field crew made sure not to enter the water or disturb shoreline soil prior to or during sampling. The sampling location was

selected at the deepest part of the shoreline at least 300 feet from the helicopter landing spot. The helicopter approached each lake from downwind. The field crew changed into cotton clothes prior to sampling and did not use shampoo, deodorant, sunscreen, or insect repellent. The cotton clothes were washed without fabric softener prior to use and stored in plastic zip-lock bags. Clothing was changed and stored away from the dry suits, kayaks, and portable floatation devices (PFDs) used to collect the non-PFAS lake samples. After the PFAS sample was taken, field crew changed out of the cotton clothes and placed them back into the plastic zip-lock bags away from other sampling gear. No food or food packaging was introduced to the sampling environment.

### LABORATORY ANALYSES

Laboratory analyses were performed to detect and quantify if detected: RCRA 8 metals, zinc, DRO, RRO, and PFAS constituents in water samples. Analysis procedures are summarized below.

#### SW6020 (RCRA METALS)

The RCRA metals laboratory analysis method SW6020, developed by the U.S. Environmental Protection Agency (EPA) Office of Solid Waste, employs inductively coupled plasma– mass spectrometry (ICP-MS) to determine trace elements, including metals in solution (EPA 2006). Elements tested for include: arsenic, barium, cadmium, chromium, lead, selenium, and silver. This method measures ions produced by a radio frequency ICP. High temperatures are used to produce ions, which are then entrained in a plasma gas and extracted. The ions are separated on the basis of their mass-to-charge ratio with a mass spectrometer.

#### 6010D (METALS ICP)

The EPA Method 6010D was used to test for zinc. This method can be used to test for boron, iron, magnesium, manganese, potassium, sodium, strontium, antimony, beryllium, aluminum, copper, nickel, thallium, and selenium. Inductively coupled plasma-optical emission spectrometry (ICP-OES) is a spectrometric technique used to determine trace elements in aqueous solutions. In ICP-OES, a sample solution is aspirated continuously into an inductively coupled, argon-plasma discharge, where analytes of interest are converted to excited-state, gas-phase atoms or ions. As the excited-state atoms or ions return to their ground state, they emit energy in the form of light at wavelengths that are characteristic of each specific element. The intensity of the energy emitted at the chosen wavelength is proportional to the amount of that element in the analyzed sample.

#### AK 102 (DIESEL RANGE ORGANICS)

The AK 102 method for DRO, developed by the Alaska Department of Environmental Conservation (ADEC), is based on a solvent extraction, gas chromatography (GC) procedure for the detection of semi-volatile petroleum products such as diesels. Other non-petroleum compounds of similar characteristics may be detected with this method. Samples spiked with a surrogate (o-Terphenyl) are extracted with methylene chloride. The GC is temperature programmed to facilitate separation of organic compounds detected by a flame ionization detector (FID). Quantification is based on FID response compared to a diesel calibration standard.

#### AK 103 (RESIDUAL RANGE ORGANICS)

The AK 103 method for RRO, developed by ADEC, was originally designed to measure lubricating or motor oils and other heavy petroleum products in soils. The *Underground Storage Tanks Procedures* (ADEC 2009) identifies the method as adequate for determining such compounds in solution. The method is an extension of ADEC AK 102, employing solvent extractions and GC to identify heavier RRO. Quantification is based on FID response compared to a residuals calibration standard.

#### SILICA GEL CLEANUP FOR DRO & RRO

Laboratory samples containing organic plant material are especially susceptible to background biogenic

interference and may result in false positive results for DRO or RRO defined petroleum hydrocarbon ranges (ADEC 2006). The silica gel (SG) procedure is recommended by the ADEC in *Technical Memorandum 06-001, Biogenic Interference and Silica Gel Cleanup* (ADEC 2006) to evaluate the presence and degree of biogenic interference. This procedure is used to preferentially remove biogenic compounds from a sample leaving the non-biodegraded petroleum hydrocarbon compounds. The remaining sample, presumably free of biogenic interference, is then tested for DRO and RRO according to AK 102 and AK 103, respectively.

### **PER- & POLYFLUOROALKYL (PFAS)**

Presence and quantification of PFAS were determined by Method 537.1, which the laboratory modified to test for an additional 10 constituents. Method 537.1 is a solid phase extraction (SPE) liquid chromatography/tandem mass spectrometry (LC/MS/MS) method for the determination of selected PFAS in drinking water (EPA 2018). The sample and surrogates are passed through a SPE cartridge containing polystyrenedivinylbenzene (SDVB) which extracts the method analytes and surrogates. The compounds are eluted from the solid phase sorbent with a small amount of methanol. The extract is concentrated to dryness with nitrogen in a heated water bath, and then adjusted with methanol. An injection is made into an LC equipped with a C18 column that is interfaced to an MS/MS. The analytes are separated and identified by comparing the acquired mass spectra and retention times to reference spectra and retention times for calibration standards acquired under identical LC/MS/MS conditions (EPA 2018).

Method 533 is an alternative to Method 537.1, used to identify other PFAS compounds. New methods are currently being created and tested for non-potable water sources (Method 8327 and 3512).



## 3. RESULTS

### 3.1. Lake Descriptions

#### LAKE M0015/R0056 (MIDDLE SNOWMAN LAKE)

Lake M0015 is to the east of the proposed airport and facilities. The lake is a proposed freshwater resource for the Willow development. The lake is 482 acres and has a maximum depth of 6.7 feet. The lake is fed by the Lower Snowman Lake (R0064) to the south. The outlet feeds into Willow 3 Creek that flows into Judy Creek. At the time of sampling, the outlet of the lake was flowing.



Photo 3: Field personnel collecting samples at Lake M0015/R0056; September 9, 2020

**LAKE M0235**

Lake M0235 is south of the proposed Fish Creek road crossing on the north side of the Willow Development. Proposed roads BT2 and BT6 are to the east and south, respectively. The lake drains into a series of smaller lake/ponds that drain toward Fish Creek with no defined channel or outflow location. Fish Creek is 0.6 miles to the north. The size of the lake is 229 acres and has a maximum depth of 7.7 feet.



**Photo 4: Crew member recording in-situ measurements; September 8, 2020**

**LAKE L9911/R0061**

Lake L9911/R0061 is to the north of the proposed Willow Access Road. A spur road is proposed to withdraw water from the lake. The lake drains through a series of lakes and small swale into Judy Creek, which is 3 miles to the north. The lake is 559 acres and has a maximum depth of 8.0 feet (Photo 5).



**Photo 5: Lake L9911/R0061, looking east; September 9, 2020**

**LAKE M0305**

Lake M0305 is located northwest of the proposed BT2 Pad (Photo 6). The outlet of the lake flows through a small swale to the south. This swale flows into a small pond which outflows into Willow 8, which flows into Fish Creek. The south west side of the lake is 743 acres and has a maximum depth of 8.7 feet.



**Photo 6: Lake M0305, looking west; September 10, 2020**

**LAKE MM1707**

Lake MM1707 is located south west of proposed BT6 Pad (Photo 7). The lake outlets into Willow 5 that flows into Fish Creek. The lake is 657 acres and the maximum depth is 6.7 feet.



**Photo 7: Lake MM1707, looking north; September 10, 2020**

### 3.2. In-Situ Measurements

In-situ measurements were collected throughout the water column at the deepest part of each lake. Based on the relative homogeneity of results in all locations, the lakes were determined to be well-mixed at the time of sampling. The in-situ measurements for the water quality results are tabulated in Table 4.

Average turbidity for lakes M0015, M0235, L9911, M0305, MM1707 were 1.8 NTU, 0.9 NTU, 1.2 NTU, 1.6 NTU, and 0.7 NTU respectively. According to the meter manufacturer, a used instrument can contaminate a zero standard to almost 1.0 NTU.

Temperatures in all lakes ranged from a maximum of 4.7°C in Lake M0235 to a minimum of 3.7°C in Lake M0305. The temperature in all five lakes remained consistent with depth. Specific conductance was homogenous throughout the water column at all sample locations but was notably different between lakes. Specific conductance was 186  $\mu\text{S}/\text{cm}$  in Lake M0015, 163  $\mu\text{S}/\text{cm}$  in Lake M0235, 177  $\mu\text{S}/\text{cm}$  in Lake L9911, 93  $\mu\text{S}/\text{cm}$  in Lake M0305, and 144  $\mu\text{S}/\text{cm}$  in Lake MM1707.

Concentrations of DO were relatively homogenous throughout the water column at all sample locations. The average DO in Lake M0015 was 12.76 mg/L, Lake M0235 was 12.87 mg/L, Lake L9911 was 12.63 mg/L, Lake M0305 was 12.85 mg/L, and Lake MM1707 was 13.00 mg/L. A 100% saturation level is based on standard temperature and pressure conditions. The average percent-saturation in Lake M0015 was 97.5%, Lake M0235 was 100.1%, Lake L9911 was 97.1%, Lake M0305 was 97.4%, and Lake MM1707 was 98.6%.

Salinity remained consistent with water column depth at all sampling locations. Lakes M0015, M0235, L9911, M0305, and MM1707 had concentrations of 0.09 ppt, 0.08 ppt, 0.08 ppt, 0.04 ppt, and 0.07 ppt, respectively.

Average pH was 7.6 in Lake M0015, 6.9 in Lake M0235, 7.3 in Lake L9911, 7.4 in Lake M0305, and 7.4 in Lake MM1707. PH was relatively consistent with depth at all sampling locations.

Table 4: In-Situ Water Quality Results Summary

Location Sample Date Time	Total Depth (ft)	Turbidity (NTU)	Sample Depth (ft)	Temp (°C)	Conductivity (µS/cm)	Specific Conductance (µS/cm)	DO (mg/L)	DO (% Saturation)	Salinity (ppt)	pH
<b>AWQS 18 AAC 70 Action Level<sup>7</sup></b>	--	<b>5 NTU above natural conditio ns<sup>6</sup></b>	--	<b>≥ 15</b>	--	--	<b>between 7 and 17</b>	<b>≥ 110</b>	--	<b>6.5 ≤ pH ≤ 8.5; +/- 0.5 from natural conditions</b>
<b>M0015/R0056 (Middle Snowman Lake) 9/9/20 2:25pm</b>	5.0	1.8	2.0	4.1	110	186	12.74	97.5	0.09	7.6
			3.0	4.1	110	186	12.74	97.5	0.09	7.6
			4.0	4.1	110	186	12.74	97.5	0.09	7.6
<b>M0235 9/8/20 2:06pm</b>	7.0	0.9	2.0	4.7	98	163	12.88	100.1	0.08	7.0
			3.0	4.7	98	163	12.89	100.2	0.08	7.0
			4.0	4.7	98	163	12.88	100.1	0.08	6.9
			5.0	4.7	98	163	12.88	100.1	0.08	6.7
			6.0	4.7	99	164	12.88	100.1	0.08	6.8
<b>L9911/R0061 9/9/20 11:12am</b>	7.5	1.2	2.0	4.3	105	177	12.62	97.1	0.08	7.4
			3.0	4.3	105	177	12.61	97.0	0.08	7.3
			4.0	4.3	105	177	12.62	97.1	0.08	7.3
			5.0	4.3	105	177	12.62	97.1	0.08	7.3
			6.0	4.3	105	177	12.62	97.1	0.08	7.2
			7.0	4.2	105	177	12.64	97.0	0.08	7.2
<b>M0305 9/10/20 10:25am</b>	7.0	1.6	2.0	3.7	54	93	12.85	97.3	0.04	7.4
			3.0	3.7	54	93	12.85	97.3	0.04	7.4
			4.0	3.7	54	93	12.87	97.4	0.04	7.4
			5.0	3.7	54	93	12.88	97.5	0.04	7.4
			6.0	3.7	54	93	12.88	97.5	0.04	7.4
<b>MM1707 9/10/20 1:15pm</b>	6.0	0.7	2.0	3.8	84	144	12.99	98.6	0.07	8.1
			3.0	3.8	84	144	13.00	98.7	0.07	8.1
			4.0	3.8	84	144	12.99	98.6	0.07	8.1
			5.0	3.8	84	144	12.99	98.6	0.07	8.1

**Notes:**

1. Sample depth is measured from the water surface.
2. Turbidity, temperature, conductivity, dissolved oxygen, and salinity were measured using a YSI 650-6920V2 meter.
3. Turbidity is presented as an average of the sampled values in the water column.
4. Negative turbidity is typically traced to minute contamination of the zero calibration standard. According to the meter manufacturer, a used instrument can contaminate a zero standard to almost 1.0 NTU.
5. Specific conductance (referenced to 25°C) was obtained using a conversion coefficient of 0.0196 based on empirical data.
6. From 18 AAC 70, no more than 5 NTU above national conditions when natural conditions are 50 NTU or less, 10% increase when natural conditions are above 50 NTU, or exceed a maximum increase of 25 NTU.
7. Drinking water or aquatic life/wildlife, whichever is most conservative; updated March 2020.

### 3.3. Laboratory Analysis

With the exception of arsenic, barium, and chromium, analytical results show that RCRA 8 metals were not detected above the laboratory detection limit. Arsenic was present in Lake M0235 at 20 µg/L which is below the EPA's RCRA limit of 5,000 µg/L. The ADEC cleanup level is 0.52 µg/L for sites with anthropogenic contributions. Arsenic is a naturally occurring compound and has been measured in the surrounding rivers of all sizes (ABR 2015 & USGS 2020). Barium was detected in all lakes at concentrations below the ADEC cleanup level of 2,000 µg/L. The highest measured concentration of barium was 102 µg/L in Lake L9911. Barium is not uncommon in arctic waters at concentrations similar to those measured at the lakes (Guay and Falkner 1998). Chromium was detected in Lake MM1707 at 12 µg/L, which is below the ADEC cleanup level of 22,000 µg/L.

The DRO and RRO were not detected above the laboratory detection limit in any of the lakes. DRO and RRO was not sampled at Lake M0235 due to incorrect sample bottles.

The PFAS sampling resulted in only two lakes containing constituents above the laboratory detection limits. Perfluorononanoic acid (PFNA) was measured in Lake L9911 at a concentration of 3.5 ng/L with a detection limit of 1.8 ng/L. Perfluorobutanoic acid (PFBA) was measured in Lake M0235 at a concentration of 4.4 ng/L which is at the laboratory detection limit. Researchers have found similar results in arctic lakes on Cronwallis Island in Nunavut, Canada with mean levels of PFNA ranging from 0.3 to 4.1 ng/L (Stock et al., 2007 and NCBI 2020). These PFAS constituents have also been found in glacial ice cores, surface snow, and downstream water samples in Svalbard, Norway (Kwok 2013).

Alaska DEC is relying on the EPA drinking water maximum contaminant levels (MCL) rather than establishing state specific MCL. The EPA, however, has not established MCL for PFAS and is only providing recommendations at this time.

Laboratory analytical results are presented in Table 5, Table 6, and Appendix B.

Table 5. Laboratory Analytical Results of PFAS

Constituent	ADEC Action Levels PFAS <sup>1</sup> (ng/L)	Willow Lakes Results (ng/L) <sup>2</sup>				
		M0015/R0056 (Middle Snowman Lake)	M0235	L9911/R0061	M0305	MM1707
Perfluorooctanoic acid (PFOA)	70	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.7)	ND (1.8)
Perfluorooctanesulfonic acid (PFOS)	70	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.7)	ND (1.8)
Perfluorohexanesulfonic acid (PFHxS)	-	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.7)	ND (1.8)
Perfluoroundecanoic acid (PFUnA)	-	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.7)	ND (1.8)
Perflorodecanesulfonic acid (PFDS)	-	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.7)	ND (1.8)
Perfluorotetradecanoic acid (PFTA)	-	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.7)	ND (1.8)
Perfluorodecanoic acid (PFDA)	-	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.7)	ND (1.8)
Perfluorotridecanoic acid (PFTrDA)	-	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.7)	ND (1.8)
Perfluorononanoic acid (PFNA)	-	ND (1.8)	ND (1.8)	<b>3.5 (1.8)</b>	ND (1.7)	ND (1.8)
Perfluoropentanesulfonic acid (PFPeS)		ND (1.8)	ND (1.8)	ND (1.8)	ND (1.7)	ND (1.8)
Perfluorononanesulfonic acid (PFNS)	-	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.7)	ND (1.8)



Constituent	ADEC Action Levels PFAS <sup>1</sup> (ng/L)	Willow Lakes Results (ng/L) <sup>2</sup>				
		M0015/R0056 (Middle Snowman Lake)	M0235	L9911/R0061	M0305	MM1707
Perfluoroheptanoic acid (PFHpA)	-	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.7)	ND (1.8)
Perfluorobutanoic acid (PFBA)	-	ND (4.6)	<b>4.4 (4.4)</b>	ND (4.6)	ND (4.2)	ND (4.4)
Perfluorododecanoic acid (PFDoA)	-	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.7)	ND (1.8)
Perfluorohexanoic acid (PFHxA)	-	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.7)	ND (1.8)
Perfluoropentanoic acid (PFPeA)	-	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.7)	ND (1.8)
Perfluorobutanesulfonic acid (PFBS)	-	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.7)	ND (1.8)
Perfluoroheptanesulfonic acid (PFHpS)	-	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.7)	ND (1.8)
N-ethyl perfluorooctanesulfonamidoacetic acid (NETFOSAA)	-	ND (4.6)	ND (4.4)	ND (4.6)	ND (4.2)	ND (4.4)
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	-	ND (4.6)	ND (4.4)	ND (4.6)	ND (4.2)	ND (4.4)
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	-	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.7)	ND (1.8)
4:2 FTS	-	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.7)	ND (1.8)
6:2 FTS	-	ND (4.6)	ND (4.4)	ND (4.6)	ND (4.2)	ND (4.4)
8:2 FTS	-	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.7)	ND (1.8)
Perfluorooctanesulfonamide (PFOSA)	-	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.7)	ND (1.8)
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	-	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.7)	ND (1.8)
Hexafluoropropylene oxide dimer acid (HFPO-DA/Gen X)	-	ND (3.7)	ND (3.6)	ND (3.7)	ND (3.4)	ND (3.5)
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	-	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.7)	ND (1.8)

**Notes:**

1. ADEC aligns with EPA LHA as the Action Level (ADEC 2019b), which supersedes 18 AAC 75.345 Table C values of 400 ng/L for PFOS and PFOA.

2. Detection levels are dependent on the collected sample volume; therefore, the detection levels are different from sample to sample. The lake specific detection level for each constituent is presented in parenthesis next to the result and available in the lab results in Appendix B.

Table 6: Laboratory Analytical Results of DRO, RRO and Total Metals

Constituent	ADEC Action Levels	EPA Allowable Limit	Minimum Reporting Limit (lab) (µg/L)	Willow Lakes Results (µg/L)				
	18 AAC 75.345 Table C <sup>1</sup> (µg/L)	RCRA 8 Metals (µg/L)		M0015/R0056 (Middle Snowman Lake)	M0235	L9911/R0061	M0305	MM1707
<b>Arsenic</b>	0.52 <sup>2</sup>	5,000	10	ND	20	ND	ND	ND
<b>Barium</b>	3,800	100,000	50	70	78	102	60	73
<b>Cadmium</b>	9.2	1,000	4	ND	ND	ND	ND	ND
<b>Chromium</b>	22,000 (CrIII) 0.35 (CrVI)	5,000	10	ND	ND	ND	ND	12
<b>Lead</b>	15	5,000	8	ND	ND	ND	ND	ND
<b>Mercury</b>	0.52	200	3	ND	ND	ND	ND	ND
<b>Selenium</b>	100	1,000	80	ND	ND	ND	ND	ND
<b>Silver</b>	94	5,000	10	ND	ND	ND	ND	ND
<b>Diesel Range Organics (DRO)</b>	1,500		130	ND	-	ND	ND	ND
<b>Residual Range Organics (RRO)</b>	1,100		290	ND	-	ND	ND	ND
<b>Zinc</b>	6,000		40	ND	ND	ND	ND	ND

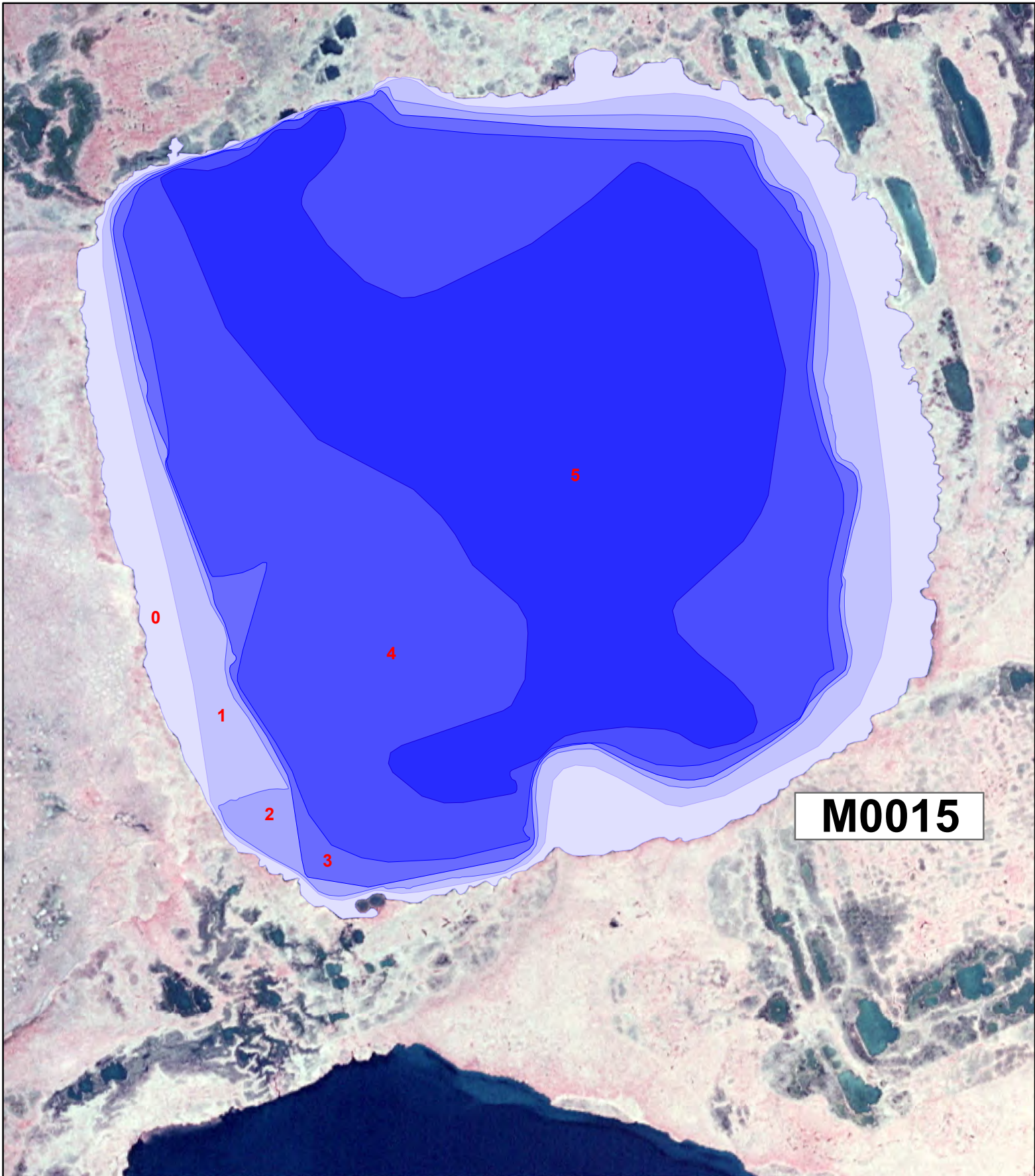
**Notes:**  
 1. Groundwater; updated October 2018.  
 2. Inorganic Arsenic

## 4. REFERENCES

- ABR Inc. – Environmental Research & Services. 2015. A Summary of Water Quality Analyses from the Colville River and Other High Latitude Alaskan and Canadian Rivers.
- Alaska Department of Environmental Conservation (ADEC). 2006. Biogenic Interference and Silica Gel Cleanup. Technical Memorandum – 06-001. Division of Spill Prevention and Response, Contaminated Sites Remediation Program.
- 2009. Water Quality Standards. 18 AAC 70. Underground Storage Tanks Procedures. Division of Spill Prevention and Response, Contaminated Sites Remediation Program.
- 2019a. Oil and Other Hazardous Substances Pollution Control. 18 AAC 75. Groundwater and surface water cleanup levels. 18 AAC 75.345 Table C.
- 2019b. Action Levels for PFAS in Water and Guidance on Sampling Groundwater and Drinking Water. Technical Memorandum.
- Alaska Department of Fish and Game (ADF&G). 2008. Fish Habitat Permit FH04-111-0135 Amendment #1.
- Centers for Disease Control and Prevention (CDC). 2017.  
[https://www.cdc.gov/biomonitoring/PFAS\\_FactSheet.html](https://www.cdc.gov/biomonitoring/PFAS_FactSheet.html)
- Guay, C.K. and K.K. Falkner (Guay and Falkner). 1998. A Survey of Dissolved Barium in the Estuaries of Major Arctic Rivers and Adjacent Seas. *Continental Shelf Research* 18:8 859-882.
- Kwok, K.Y., E. Yamazaki, N. Yamashita, S. Taniyasu, M.B. Murphy, Y. Horii, G. Petrick, R. Kallerborn, K. Kannan, K. Murano, P.K.S. Lam. 2013. Transport of Perfluoroalkyl Substances (PFAS) from an Arctic Glacier to Downstream Locations. *Sci. Total Environment* 447 (2013) 46-55.
- Michael Baker International (Michael Baker) 2020a. North Slope Water Resources 2020 Health, Safety, and Environment Plan. Prepared for ConocoPhillips Alaska, Inc.
- 2020b. 2020 Summer Hydrology Monitoring Programs – Job Safety Analysis. Prepared for ConocoPhillips Alaska, Inc.
- 2020c. 2020 Willow WQ PFAS Sampling – Standard Operating Procedures (SOP)
- 2006. Colville River Ice Bridge Monitoring. April.
- Michigan Department of Environmental Quality (MDEQ). 2018. General PFAS Sampling Guidance
- National Center for Biotechnology Information (NCBI). 2020. PubChem Compound Summary for CID 67821, Perfluorononanoic acid. Retrieved November 17, 2020  
from <https://pubchem.ncbi.nlm.nih.gov/compound/Perfluorononanoic-acid>.
- North Slope Borough (NSB). 2004 North Slope Borough Ordinance Serial No. 75-6-46
- Stock, N.L., V.I. Furdui, D.C.G. Muir and S.A. Mabury, 2007. Perfluoroalkyl contaminants in the Canadian arctic: Evidence of atmospheric transport and local contamination. *Environmental Science and Technology*, 41:3529-3536 <https://pubs.acs.org/doi/10.1021/es062709x>

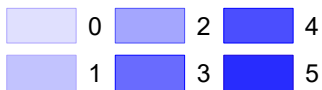
- United States Army Corps of Engineers (USACE). 1987. Reservoir Water Quality Analysis. Engineering Manual EM- 1110-2-1201.
- United States Environmental Protection Agency (EPA). 2006. 2006 Edition of the Drinking Water Standards and Health Advisories. EPA 822-R-06-013
- 2018. Method 537.1 – Determination of Selected Per- and Polyfluorinated Alkyl Substances in Drinking Water By Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS). EPA/600/R-18/352.
- 2020. Basic Information on PFAS. <https://www.epa.gov/pfas/basic-information-pfas>
- United States Geological Survey (USGS). 2006. National Field Manual for the Collection of Water-Quality Data. Book 9 Handbooks for Water-Resources Investigations. Chapter A4 Collection of Water Samples.
- 2020. USGS Water-Quality Data for USA. U.S. Department of Interior. Available online at: <http://waterdata.usgs.gov/nwis/qw>.
- Ward, J.R. and C.A. Harr eds. 1990. Methods for Collection and Processing Surface-Water and Bed-Material Samples for Physical and Chemical Analyses. Open-File Report 90-147.
- YSI Incorporated. 2012. YSI 6-Series Multiparameter Water Quality Sonde User Manual.

## **Appendix A. Lake Bathymetry Maps**



**M0015**

**Depth in Feet**



Imagery used from BLM aerial photographs  
July 18, 2002.  
NAD83, UTM Zone 5



**ConocoPhillips**  
Alaska

Prepared by:



**Depth Contours at Lake M0015**

based on transects surveyed on July 30, 2018

SCALE:



**Lake M0015**

**Other Names:** R0056, W17301  
**Location:** 70.10864°N 152.05727°W  
**USGS Quad Sheet:** Harrison Bay A-4: T9N R1W Sec. 23-26  
**Habitat:** Tundra Lake  
**Area:** 482 acres  
**Maximum Depth:** 6.7 feet in 2018 (7.5 ft in 2004)  
**Active Outlet:** Yes  
**Total Lake Volume:** 614.718 million gallons (July 30, 2018 data)  
**Water Volume Under 4 ft of ice:** 101.163 million gallons  
**Water Volume Under 5 ft of ice:** 18.803 million gallons  
**Water Volume Under 7 ft of ice:** 0.000 million gallons

**Potential Aggregate:** 140.5 acres (water depth 4 ft or less)  
 41.674 million gallons

**Maximum Recommended Winter Removal:** **5.641 million gallons**  
 (30% of water volume under 5 ft of ice)  
 (Resistant species present)

**Water Chemistry:**

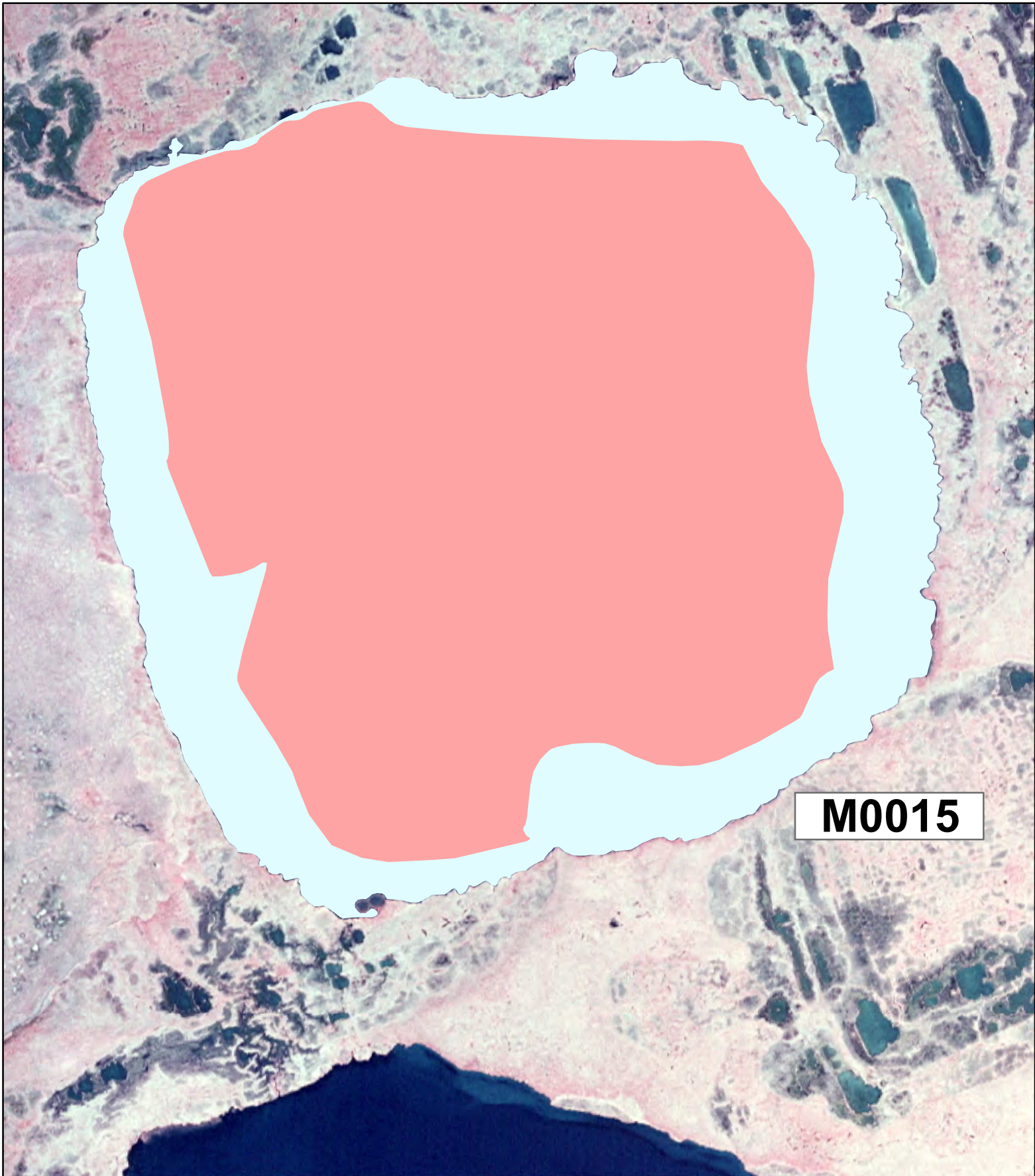
Date of Test	Calcium (mg/l)	Magnesium (mg/l)	Sodium (mg/l)	Chloride (mg/l)	Total Hardness [CaCO <sub>3</sub> ] (mg/l)	Specific Conductance (microS/cm)	Turbidity (NTU)	pH	Source
2000	21.2	3.9	10.1	23.5	69	--	--	--	2000 survey
Jul 13 04	--	--	--	--	--	179	3.9	7.82	Moulton 2004
Jul 23 04	--	--	--	--	--	188	0.8	7.88	Moulton 2004
Jul 24 04	--	--	--	--	--	190	0.8	8.10	Moulton 2004
Jul 25 04	--	--	--	--	--	191	1.6	8.00	Moulton 2004
Jul 26 04	--	--	--	--	--	193	1.7	7.76	Moulton 2004
Jul 21 17	--	--	--	--	--	189	1.3	8.19	Morris 2017
Jul 22 17	--	--	--	--	--	190	3.0	8.07	Morris 2017
Jul 23 17	--	--	--	--	--	192	4.3	8.03	Morris 2017
Jul 24 17	--	--	--	--	--	188	3.5	8.15	Morris 2017
Jul 18 18	--	--	--	--	--	158	4.5	7.91	Morris 2018
Jul 19 18	--	--	--	--	--	156	33.3	7.66	Morris 2018
Jul 20 18	--	--	--	--	--	140	8.4	7.86	Morris 2018
Jul 21 18	--	--	--	--	--	157	6.9	7.95	Morris 2018
Jul 30 18	18.0	3.3	8.7	19.0	59	164	8.1	8.02	Morris 2018

**Catch Record:**

Gear	Date	Effort (hours)	Species	Number Caught	Fork Length (mm)
Gill Net	Jul 21 00	12.2	None	0	
Minnow Traps	Jul 21 00	10.5	None	0	
Fyke Net	Jul 24-26, 04	72.6	Ninespine stickleback	3,258	
	Jul 22-24, 17	70.5	Ninespine stickleback	24,104	
	Jul 18-21, 18	70.1	Alaska blackfish	1	71
			Ninespine stickleback	204	

Latitude	Longitude	Date	Instrument Level to VEBM (feet)	Water Surface Elevation (feet)
70.11086	-152.07848	7/30/2018	4.95	-1.98

Last Revised: December 6, 2018



**M0015**

**Ice Chip Areas**

- 4 feet or shallower - available for ice chips
- Deeper than 4 feet - unavailable for ice chips



Source: Esri, DigitalGlobe, GeoEye, Earthstar

Imagery used from BLM aerial photographs July 18, 2002. NAD83, UTM Zone 5



Prepared by:



**Area Available for Ice Chip Collection at Lake M0015**

based on transects surveyed on July 30, 2018  
not to be used for navigation or to direct the operation of heavy equipment

SCALE:







**M0015**

**Depth Transects Surveyed**

— = Transect Survey Line

Imagery used from BLM aerial photographs  
July 18, 2002.  
NAD83, UTM Zone 5



**ConocoPhillips**  
Alaska

Prepared by:

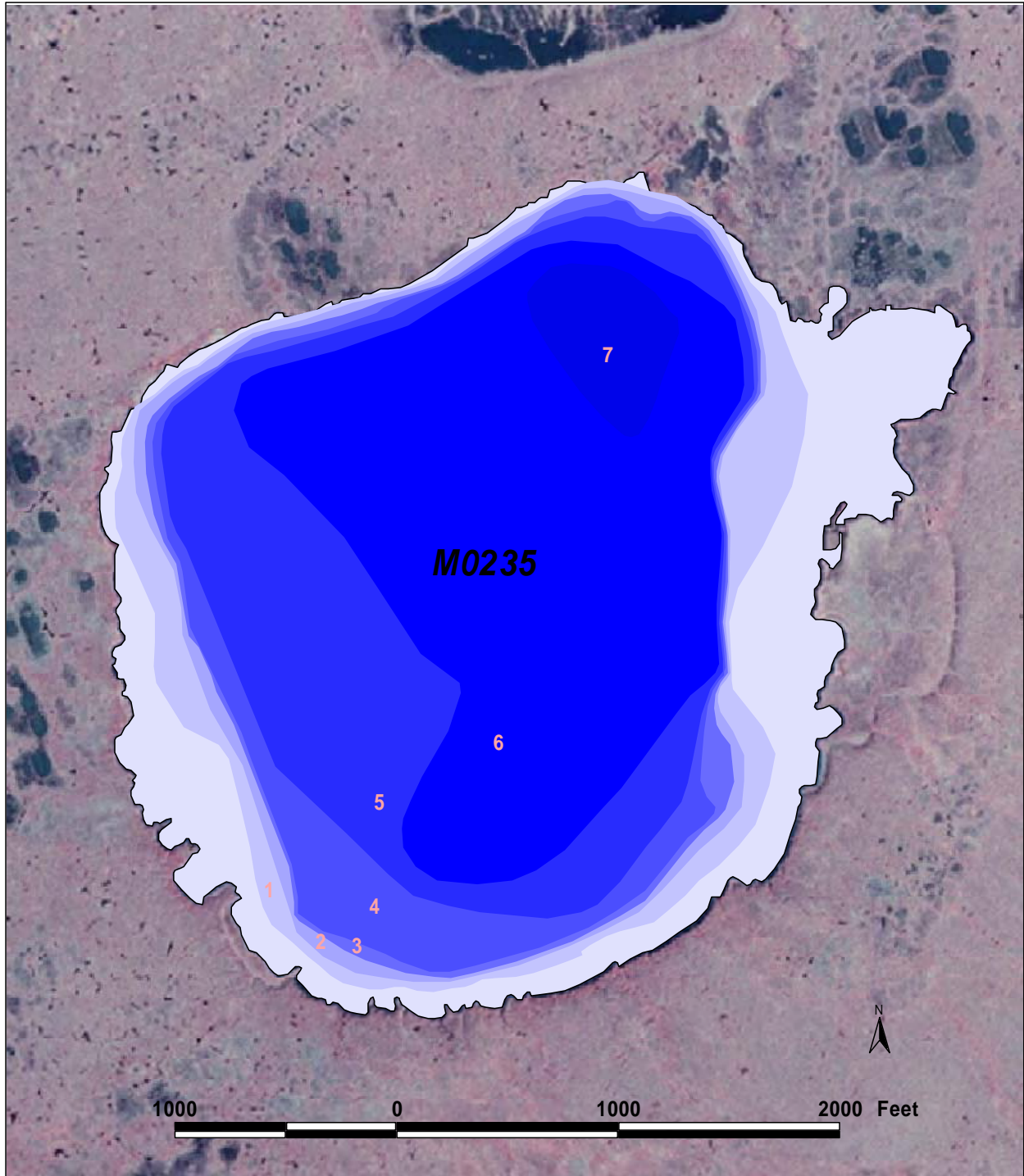


**Depth Transects Surveyed  
at Lake M0015**

surveyed on July 30, 2018  
not to be used for navigation or to direct the operation of heavy equipment

SCALE:





Depth contours of lake M0235 based on transects surveyed on August 13, 2002  
(depth in 1 foot intervals)

(not to be used for navigation or to direct the operation of heavy equipment)

## Lake M0235

**Other Names:**

**Location:** 70.23618°N 152.18804°W

**USGS Quad Sheet:** Harrison Bay A-4: T10N R1W, Sec. 8

**Habitat:**

**Area:** 229 acres

**Maximum Depth:** 7.7 feet

**Active Outlet:**

**Total Lake Volume:** 327.0 million gallons (August 13, 2002 data)

**Water Volume Under 4 ft of ice:** 98.3 million gallons

**Water Volume Under 5 ft of ice:** 51.1 million gallons

**Water Volume Under 7 ft of ice:** 0.8 million gallons

**Potential Ice Aggregate:** 69.9 acres (water depth 4 ft or less)  
5.47 million gallons

**Maximum Recommended Winter Removal:** **65.41 million gallons**  
(No Fish Concern, 20% of lake volume)  
(does not include volume associated with ice aggregate)

### Water Chemistry:

---

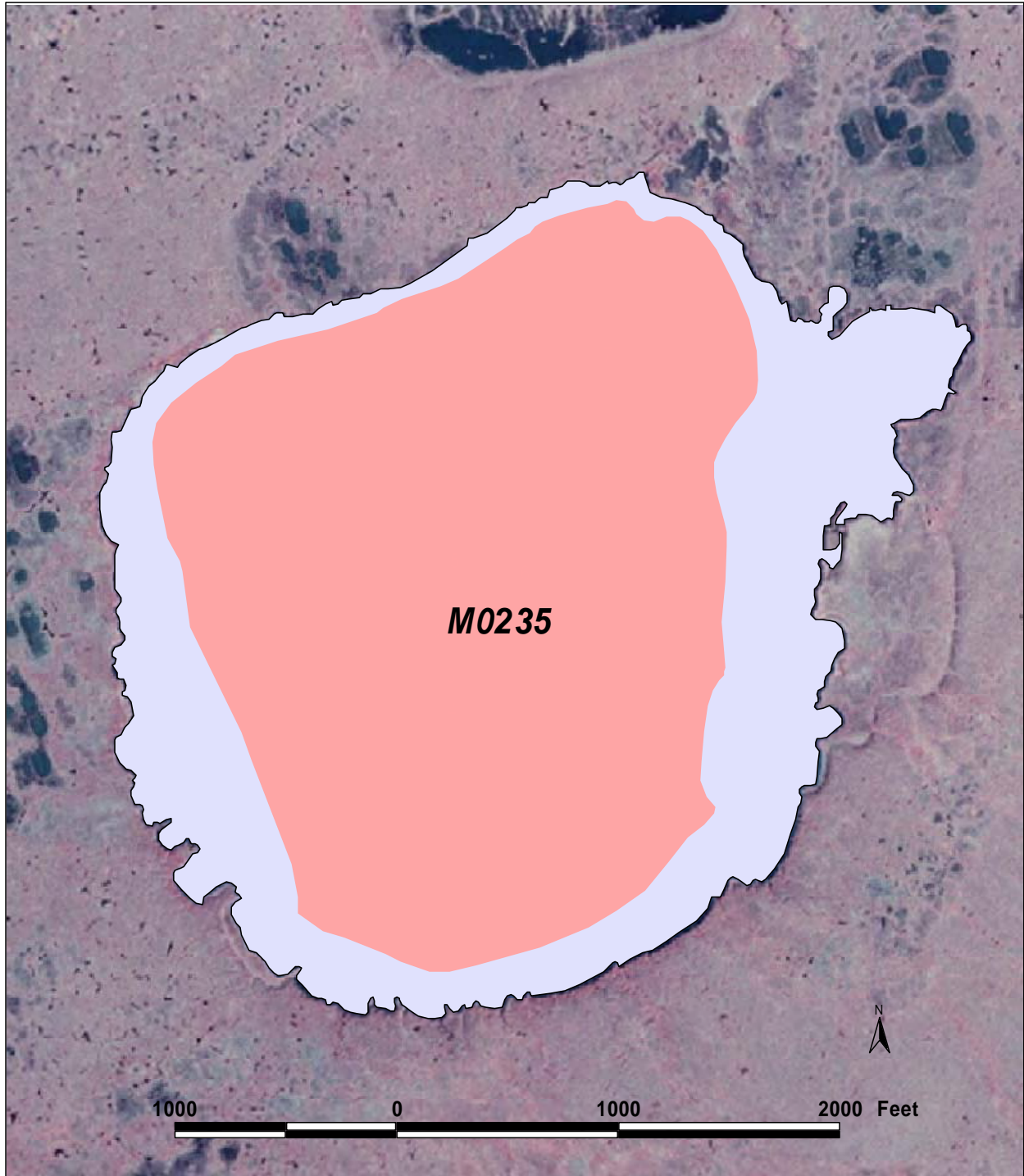
Year of Test	Calcium (mg/l)	Magnesium (mg/l)	Sodium (mg/l)	Chloride (mg/l)	Total Hardness [CaCO <sub>3</sub> ] (mg/l)	Specific Conductance (microS/cm)	Turbidity (NTU)	pH	Source
2002	28.3	4.58	10.3	30.3	89.6	110	1.2	7.73	L. Moulton

### Catch Record:

---

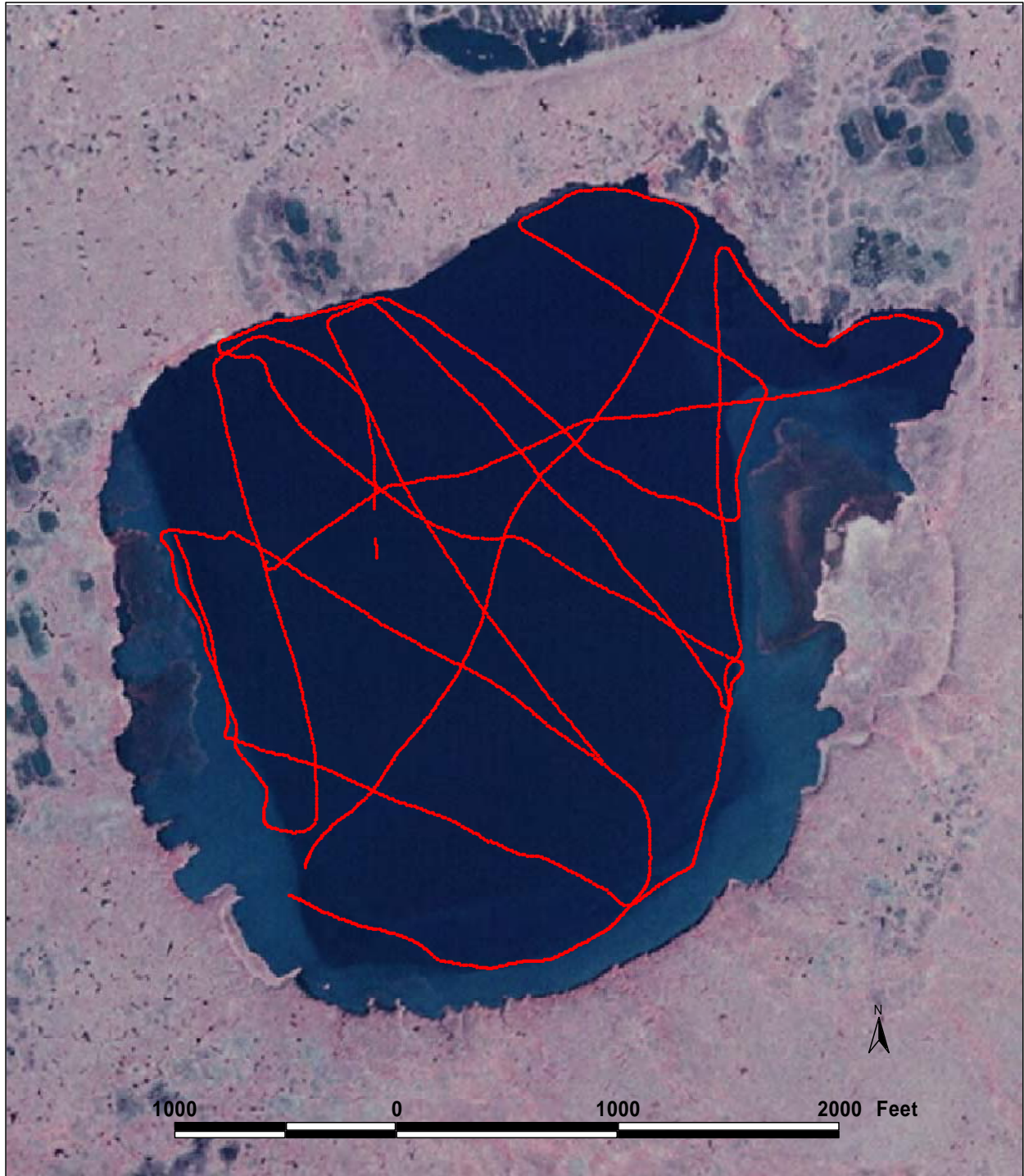
Gear	Date	Effort (hours)	Species	Number Caught
Gill Net	Aug 13 02	10.3	None	0
Minnow Trap	Aug 13 02	10.7	None	0
Seine	Aug 13 02	3 hauls	None	0

---



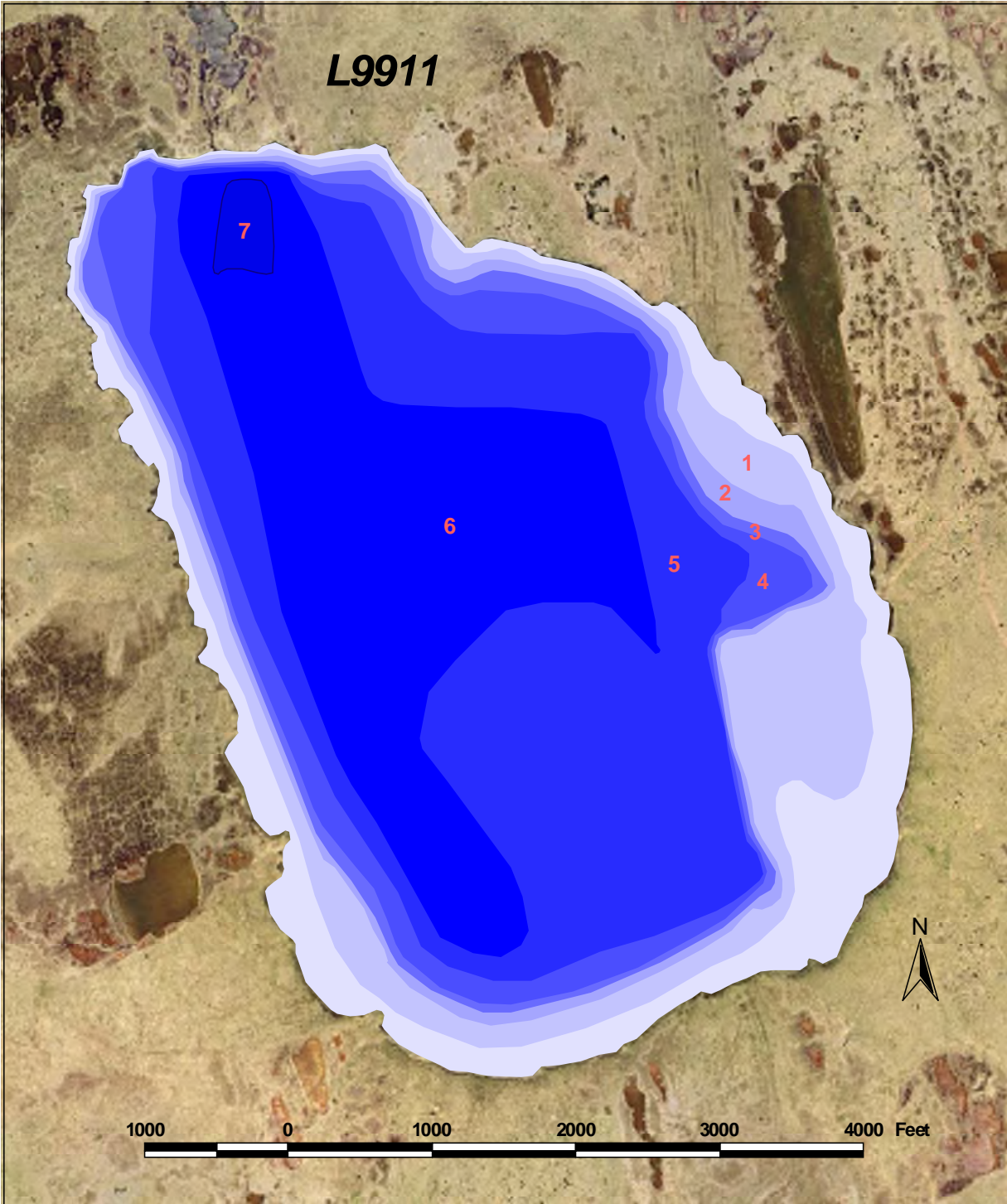
Regions of lake M0235 less than 4 ft deep (light blue), and likely to be available for ice chips, based on transects surveyed on August 13, 2002

(not to be used for navigation or to direct the operation of heavy equipment)



Depth transects surveyed at lake M0235 on August 13, 2002

(not to be used for navigation or to direct the operation of heavy equipment)



Depth contours of lake L991 based on transects surveyed on August 31, 2002  
(depth in 1 foot intervals).

(not to be used for navigation or to direct operation of heavy equipment)

## Lake L9911

### Other Names:

**Location:** 70.17016°N 151.78795°W  
**USGS Quad Sheet:** Harrison Bay A-3: T9N/10N R1E Sec. 35/36/1/2  
**Habitat:** Tundra Lake  
**Area:** 559 acres  
**Maximum Depth:** 8.0 feet  
**Active Outlet:** No  
**Total Lake Volume:** 1585.78 million gallons (2002 data)  
**Water Volume Under 4 ft of ice:** 426.81 million gallons  
**Water Volume Under 5 ft of ice:** 196.93 million gallons  
**Water Volume Under 7 ft of ice:** 1.12 million gallons

**Potential Ice Aggregate:** 181.81 acres (water depth 4 ft or less)  
 14.23 million gallons

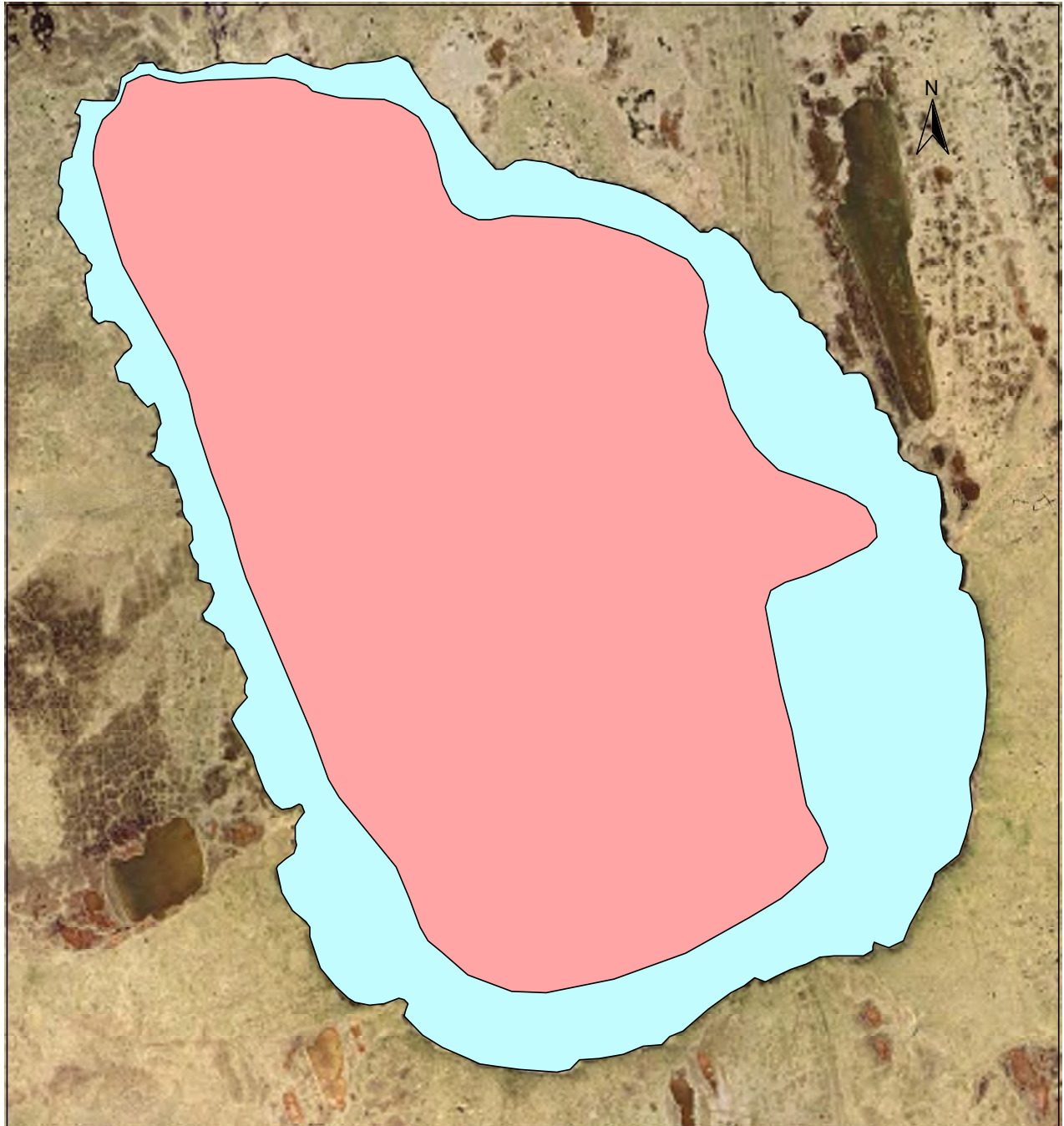
**Maximum Recommended Winter Removal:** **59.08 million gallons**  
 (30% of water volume under 5 ft of ice)  
 (does not include volume associated with ice aggregate)

### Water Chemistry:

Date of Test	Calcium (mg/l)	Magnesium (mg/l)	Sodium (mg/l)	Chloride (mg/l)	Total Hardness [CaCO <sub>3</sub> ] (mg/l)	Specific Conductance (microS/cm)	Turbidity (NTU)	pH	Source
1999	27.5	3.8	5.0	11.9	84.2	--	--	--	J. Lobdell
Jul 25 99	--	--	--	--	--	178.9	--	8.22	L. Moulton
Jul 23 04	--	--	--	--	--	163.4	0.7	7.91	L. Moulton
Jul 24 04	--	--	--	--	--	165.3	0.7	8.01	L. Moulton
Jul 25 04	--	--	--	--	--	166.3	1.0	7.91	L. Moulton

### Catch Record:

Gear	Date	Effort (hours)	Species	Number Caught
Gill Net	Jul 25 99	4.1	None	0
Fyke Net	Jul 23-25, 04	69.1	Ninespine stickleback	3,816



1000 0 1000 2000 3000 Feet

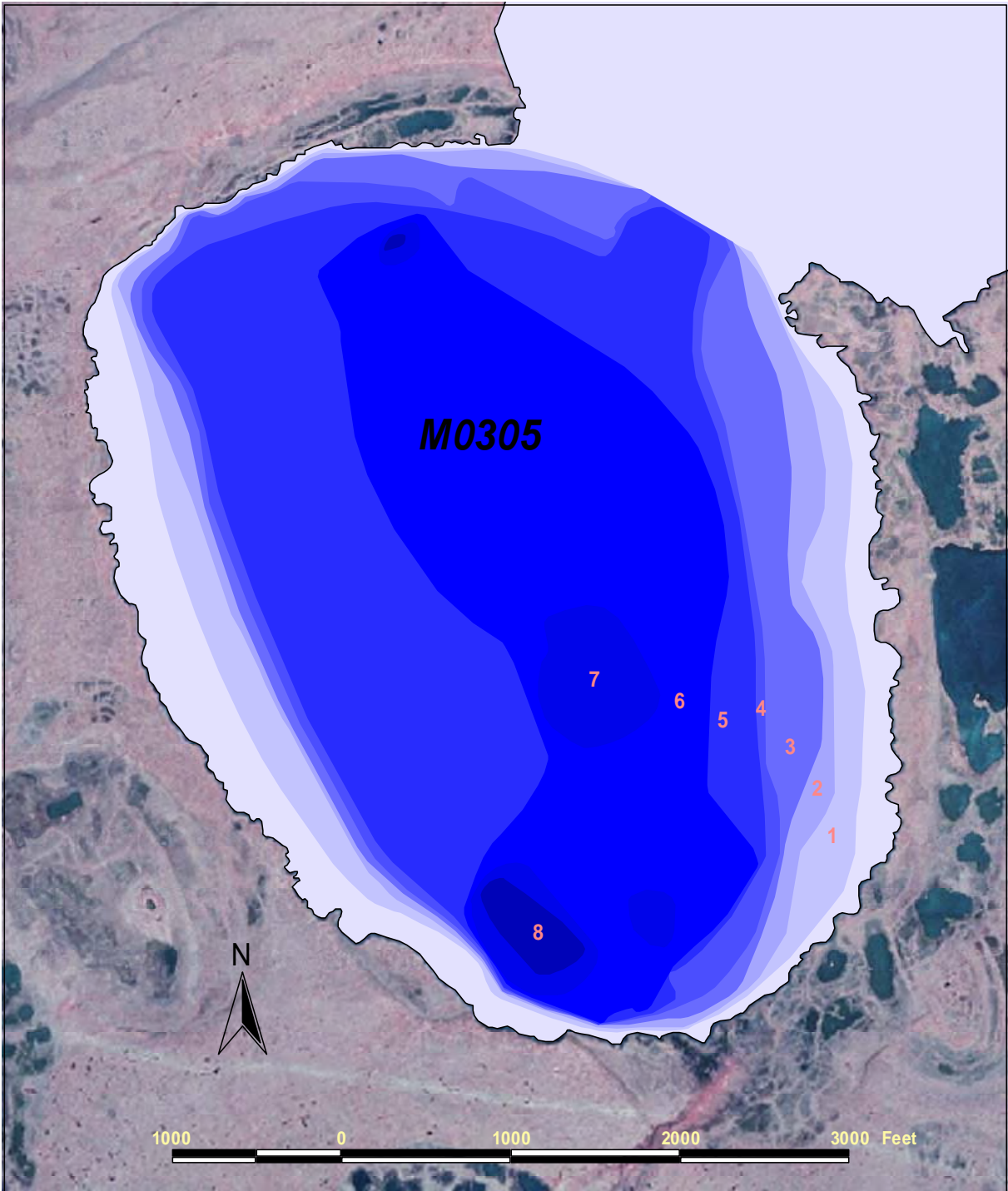
Regions of lake L991 less than 4 ft deep (light shaded) and likely to be available for ice chips, based on transects surveyed on August 31, 2002.





1000 0 1000 2000 3000 Feet

Depth transects surveyed at lake L9911 on August 31, 2002.



Depth contours of lake M0305 based on transects surveyed on July 24, 2003  
(depth in 1 foot intervals).

(not to be used for navigation or to direct operation of heavy equipment)

## Lake M0305

**Other Names:**

**Location:** 70.28695°N 152.19686°W  
**USGS Quad Sheet:** Harrison Bay B-4: T11N R1W Sec. 16/17/20/21/29  
**Habitat:** Tundra Lake  
**Area:** 743 acres  
**Maximum Depth:** 8.7 feet  
**Active Outlet:** No  
**Total Lake Volume:** 665.85 million gallons (July 24, 2003 data)  
**Water Volume Under 4 ft of ice:** 189.48 million gallons  
**Water Volume Under 5 ft of ice:** 96.26 million gallons  
**Water Volume Under 7 ft of ice:** 4.33 million gallons

**Potential Aggregate:** 142.0 acres (water depth 4 ft or less)  
11.11 million gallons

**Maximum Recommended Winter Removal:** **28.88 million gallons**  
(30% of volume under 5 feet of ice)  
(does not include volume associated with ice aggregate)

**Water Chemistry:**

---

Year of Test	Calcium (mg/l)	Magnesium (mg/l)	Sodium (mg/l)	Chloride (mg/l)	Total Hardness [CaCO <sub>3</sub> ] (mg/l)	Specific Conductance (microS/cm)	Turbidity (NTU)	pH	Source
2003	18.0	2.8	6.4	15	56	141	3.4	7.95	L. Moulton

**Catch Record:**

---

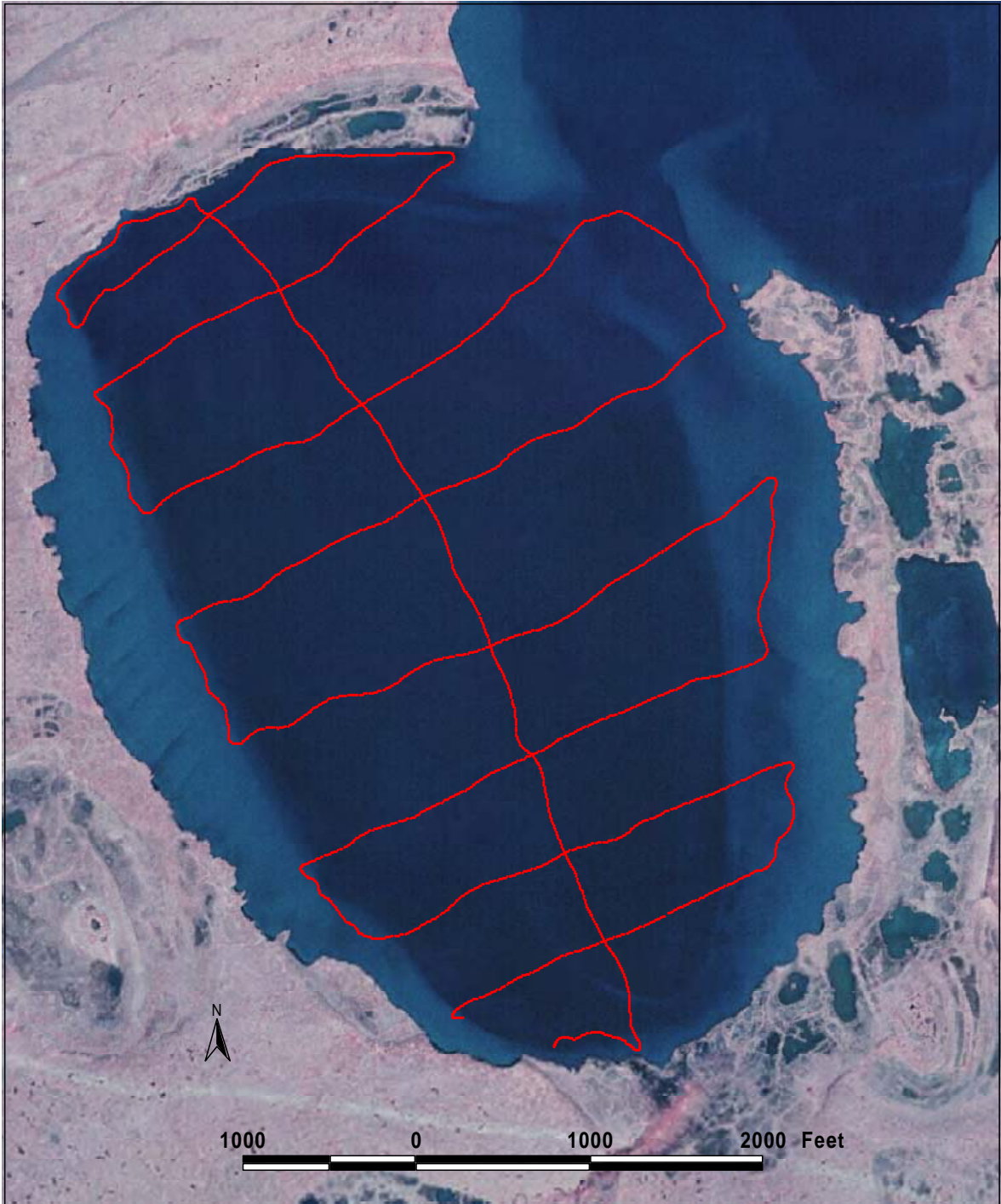
Gear	Date	Effort (hours)	Species	Number Caught
Gill Net	Jul 24 03	6.0	None	0
Minnow Trap	Jul 24 03	6.0	Ninespine stickleback	3

---



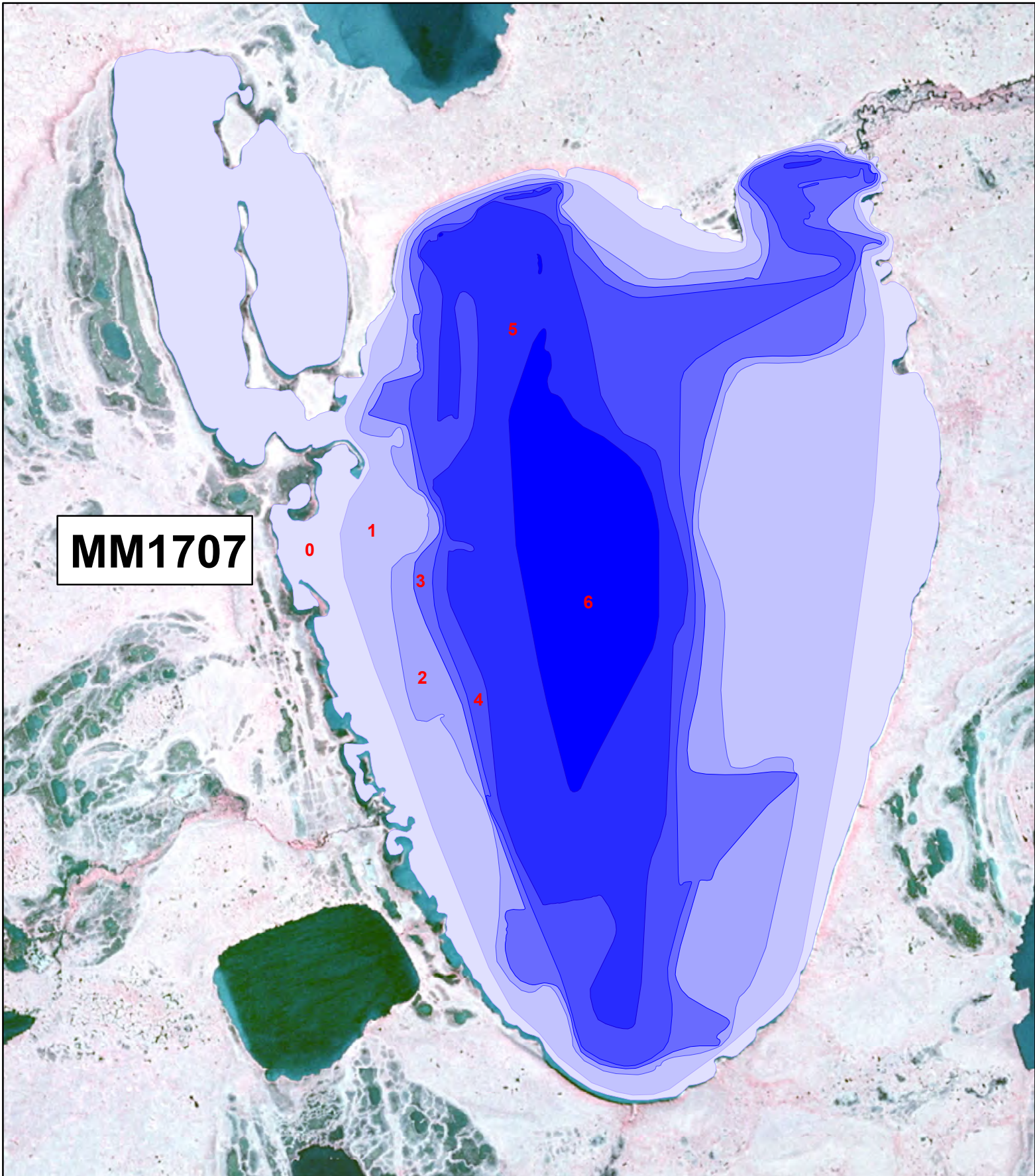
Regions of lake M0305 less than 4 feet deep (light blue) and likely to be available for ice chips, based on transects surveyed on July 24, 2003.

(not to be used for navigation or to direct operation of heavy equipment)



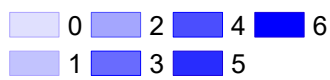
Depth transects surveyed at lake M0305 on July 24, 2003

(not to be used for navigation or to direct operation of heavy equipment)



**MM1707**

**Depth in Feet**



Imagery used from BLM aerial photographs  
July 18, 2002.  
NAD83, UTM Zone 5



**ConocoPhillips**  
Alaska

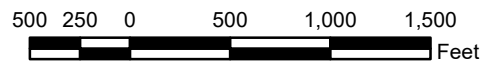
Prepared by:



**Depth Contours at Lake MM1707**

based on transects surveyed on July 25, 2017

**SCALE:**



**Lake MM1707**

**Other Names:** None known  
**Location:** 70.20165°N 152.30995°W  
**USGS Quad Sheet:** Harrison Bay A-4: T10N R2W, Sect 14,23,24,25,26  
**Habitat:** Drainage lake  
**Area:** 657 acres  
**Maximum Depth:** 6.7 feet  
**Active Outlet:** Yes  
**Total Lake Volume:** 622.55 million gallons (July 25, 2017 data)  
**Water Volume Under 4 ft of ice:** 104.32 million gallons  
**Water Volume Under 5 ft of ice:** 39.27 million gallons  
**Water Volume Under 7 ft of ice:** 0.00 million gallons

**Potential Ice Aggregate:** 416.1 acres (water depth 4 ft or less)  
 123.4 million gallons

**Maximum Recommended Winter Removal:** **0.00 million gallons**  
 (Sensitive species present, 15% of water volume under 7 ft of ice)

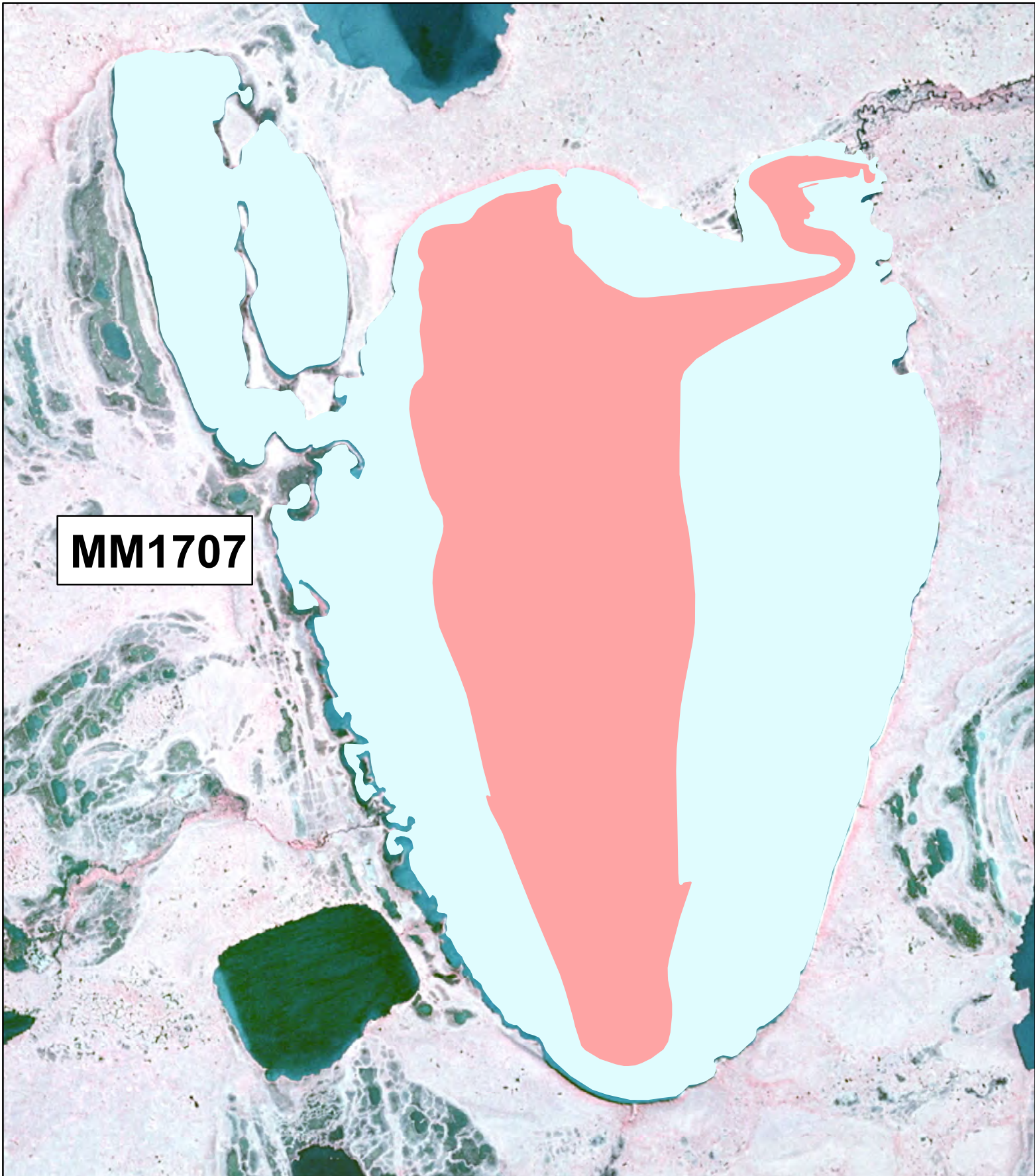
**Water Chemistry:**

Year of Test	Calcium (mg/l)	Magnesium (mg/l)	Sodium (mg/l)	Chloride (mg/l)	Total Hardness [CaCO3] (mg/l)	Specific Conductance (microS/cm)	Turbidity (NTU)	pH	Source
2017	24.0	4.1	9.5	24.0	77.0	195.7	1.3	8.05	C. Moulton

**Catch Record:**

Gear	Date	Effort (hours)	Species	Number Caught	Fork Length (mm)
Gill Net	Jul 26 2017	7.7	BDWF	5	404-482
			GRAY	2	105, 107
Minnow Trap	Jul 26 2017	8.3	None	1	

Data Last Revised: August 14, 2017



**MM1707**

**Ice Chip Areas**

- 4 feet or shallower - available for ice chips
- Deeper than 4 feet - unavailable for ice chips

Imagery used from BLM aerial photographs  
July 18, 2002.  
NAD83, UTM Zone 5



Source: Esri, DigitalGlobe,  
GeoEye, Earthstar

**ConocoPhillips**  
Alaska

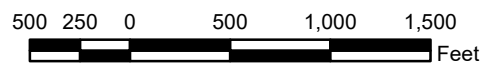
Prepared by:



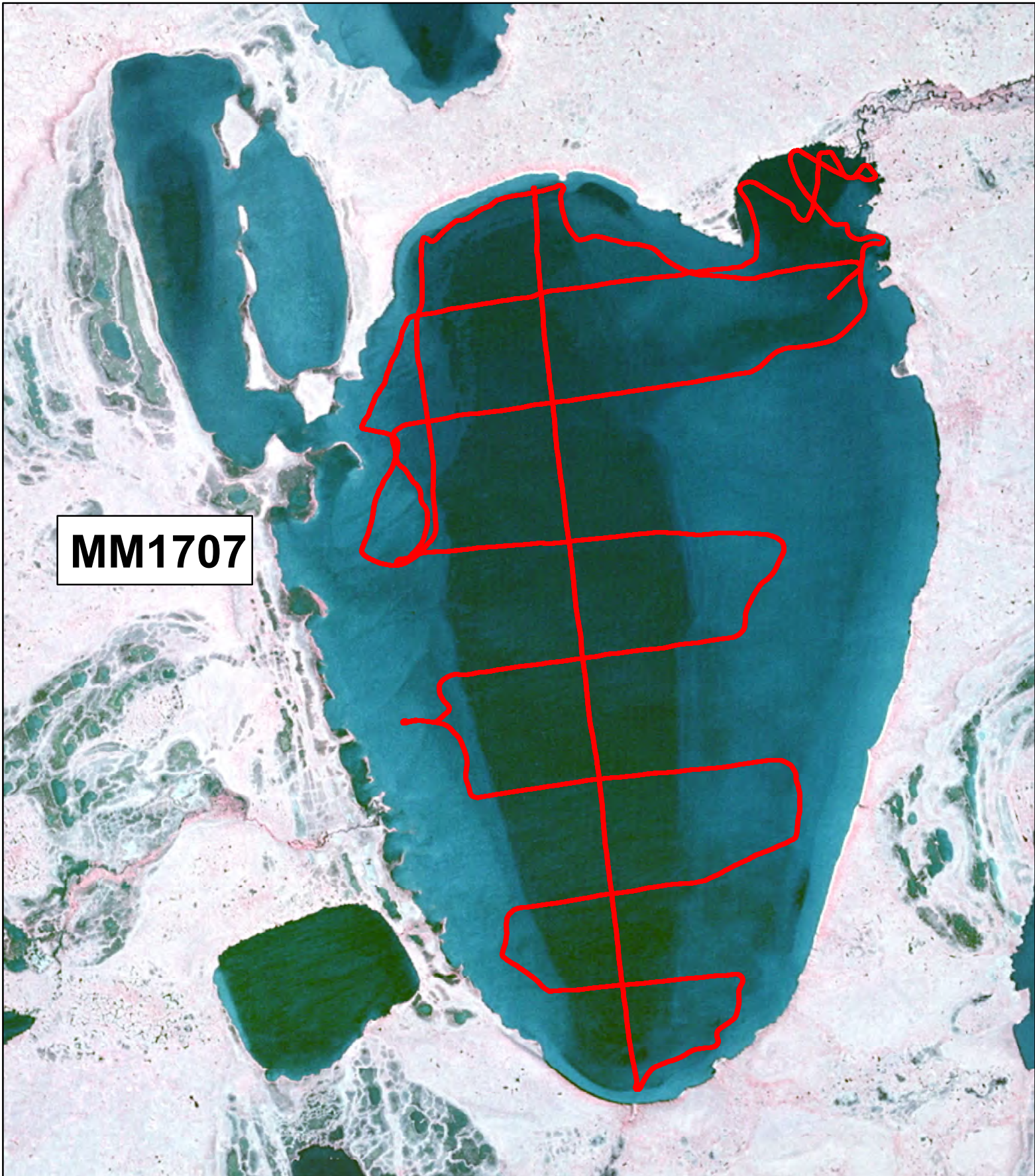
**Area Available for Ice Chip Collection at Lake MM1707**

based on transects surveyed on July 25, 2017  
not to be used for navigation or to direct the operation of heavy equipment

SCALE:







**MM1707**

**Depth Transects Surveyed**

— = Transect Survey Line

Imagery used from BLM aerial photographs  
July 18, 2002.  
NAD83, UTM Zone 5



Source: Esri, DigitalGlobe,  
GeoEye, Earthstar

**ConocoPhillips**  
Alaska

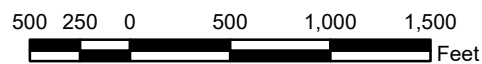
Prepared by:



**Depth Transects Surveyed  
at Lake MM1707**

surveyed on July 25, 2017  
not to be used for navigation or to direct the operation of heavy equipment

SCALE:



## **Appendix B. Laboratory Reports**



# Arctic Fox Environmental, Inc.

PO Box 340043 | Prudhoe Bay, AK 99734 | PHONE: (907) 659-2145 | FAX: (907) 659-2146 | www.arcticfoxenv.com

## Analytical Services Order and Chain of Custody Form

90075

0920-4659

H<sub>2</sub>SO<sub>4</sub>  
H<sub>4</sub>-HCE  
H<sub>5</sub>-HCE  
N/A

Client Name and Address: MICHAEL BAKER INTL. 3900C ST, SUITE 900 ANCHORAGE, AK 99503 Contact Person: DEVON ROE 231-730-0596		Account Number:		NATHIO		NACH		Na Thio		HNO <sub>3</sub>		H <sub>2</sub> SO <sub>4</sub>		HCl		HNO <sub>3</sub> Preservative															
P.O. or Contract Number:		Authorization Number:		BOD, COLOR, PH (1)		T COLI (2)		CYANIDE (3)		ECOLI (4)		SG, TDS, TSS (5)		METALS (7)		NO <sub>2</sub> NO <sub>3</sub> (8)		O + Y (9)		ODOR (10)		COD (11)		DOC (13)		TOC (14)		DOC (15)		ALGAE (16)	
Phone Number: 907-273-1600 Fax Number: 907-273-1699		Sampled By: DEVON ROE		PWS Number: STEVEN ORIBATTI																											
E-mail: DEVON.ROE@MBAKERINTL.COM		Send Results to ADEC: <input type="checkbox"/> YES <input type="checkbox"/> No																													
Project Name: WILLOW WTP #178123																															
Data Deliverables: Level I <input type="checkbox"/> Level II <input type="checkbox"/> Level III <input type="checkbox"/> EDD/Format:																															
Requested Turnaround Time and Special Instructions:																															

Client Sample ID	Date Sampled	Time Sampled	Matrix	AF Sample ID	Number of Containers	1/4 HDPE	150 mL	1	150 mL	3x 1L	200 mL	1L	125 mL	125 mL	125 mL	3x 10 mL	Remarks
M0235	9/8/20	2:40 PM	L	AF71976													
Trip Blank	-	-	L	AF71976A	3												

Relinquished By (1):	Date: 9/9/20	Time: 7:45	Received By:	Date: 9/10/20	Time: 0800	<b>TO BE COMPLETED BY LABORATORY</b> Location Received/ Temp on Arrival: ANC <input type="checkbox"/> _____ °C FBK <input type="checkbox"/> _____ °C PB <input checked="" type="checkbox"/> 5.3 °C Chain of Custody Seal <input type="checkbox"/> INTACT <input type="checkbox"/> BROKEN <input type="checkbox"/> ABSENT Shipping Bill Number: _____					
Relinquished By (2):	Date:	Time:	Received By:	Date:	Time:						
Relinquished By (3):	Date:	Time:	Received for lab by:	Date:	Time:						

Expedited.



# Arctic Fox Environmental, Inc.

PO Box 340043 | Prudhoe Bay, AK 99734 | PHONE: (907) 659-2145 | FAX: (907) 659-2146 | www.arcticfoxenv.com

Michael Baker International  
3900 C St Ste 900  
Anchorage, AK 99503

Report Date: 10/14/2020  
Date Arrived: 9/10/2020  
Date Sampled: 9/8/2020  
Time Sampled: 1640  
Collected By: Devon Roe

Attn: Devon Roe / Haley Runa / Kieran Brawn  
Phone: (907) 273-1666 / (907) 575-8652

Email: [Devon.Roe@mbakerintl.com](mailto:Devon.Roe@mbakerintl.com)  
[Haley.Runa@mbakerintl.com](mailto:Haley.Runa@mbakerintl.com)  
[Kieran.Brawn@mbakerintl.com](mailto:Kieran.Brawn@mbakerintl.com)

AF Lab #: AF71976  
Client Sample ID: MO235  
Location/Project: Willow WTP #178123  
COC#: 90075  
Sample Matrix: Liquid

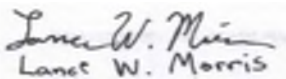
### Flag Definitions

MDL = Method Reporting Limit  
B = Below Regulatory Minimum  
H = Above Regulatory Maximum  
M = Matrix Interference  
J = Best Available Estimate  
U = Less Than Detection Limit  
D = Lost to Dilution

Comments: Attached are the results for analyses of your samples. Some samples were analyzed by Eurofins in Tacoma, WA; ALS Laboratories in Kelso, WA; Greenwater Laboratories in Palatka, FL.  
Tracking information is as follows:

Michael Baker Intl Sample ID: MO235  
Analyses Requested: See attached report  
Arctic Fox ID: AF71976  
Time Sampled: 1640  
Matrix: Liquid  
Eurofins Lab ID: 580-97430-1  
ALS Lab ID: K2007930-001  
GreenWater Lab ID: AF71976-MO235

Parameter	Result	Units	RL	RCRA Limits	Flag	Analysis Method	Analysis Date
<b>HACH Colorimeter II</b>							
Free Chlorine	0.05	mg/L				Colorimetric	10/2/2020
<b>SM5210B</b>							
BOD	<2	mg/L	2			SM5210B	9/10/2020
<b>SM2120-B</b>							
Color	<5	Color Units	5			SM2120-B	9/11/2020
<b>EPA150.2</b>							
pH	7.6	Units				EPA150.2	9/11/2020
<b>SM9223B</b>							
Total Coliform	Detected					SM9223B	9/10/2020
E. Coli	Not Detected						
<b>SM9223B</b>							
E-Coli	<1	MPN/100ml				SM9223B	9/10/2020

  
Lance W. Morris

Reported by: Ralph E. Allphin / Timothy D. Johnson / Lance W. Morris / Sky Allphin  
Arctic Fox Environmental, Inc.



# Arctic Fox Environmental, Inc.

PO Box 340043 | Prudhoe Bay, AK 99734 | PHONE: (907) 659-2145 | FAX: (907) 659-2146 | www.arcticfoxenv.com

Michael Baker International  
3900 C St Ste 900  
Anchorage, AK 99503

Report Date: 10/14/2020  
Date Arrived: 9/10/2020  
Date Sampled: 9/8/2020  
Time Sampled: 1640  
Collected By: Devon Roe

Attn: Devon Roe / Haley Runa / Kieran Brawn  
Phone: (907) 273-1666 / (907) 575-8652

Email: [Devon.Roe@mbakerintl.com](mailto:Devon.Roe@mbakerintl.com)  
[Haley.Runa@mbakerintl.com](mailto:Haley.Runa@mbakerintl.com)  
[Kieran.Brawn@mbakerintl.com](mailto:Kieran.Brawn@mbakerintl.com)

### Flag Definitions

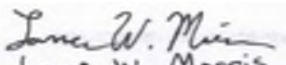
MDL = Method Reporting Limit  
B = Below Regulatory Minimum  
H = Above Regulatory Maximum  
M = Matrix Interference  
J = Best Available Estimate  
U = Less Than Detection Limit  
D = Lost to Dilution

AF Lab #: AF71976  
Client Sample ID: MO235  
Location/Project: Willow WTP #178123  
COC#: 90075  
Sample Matrix: Liquid

Comments: Attached are the results for analyses of your samples.  
Some samples were analyzed by Eurofins in Tacoma, Washington.  
Tracking information is as follows:

Michael Baker Intl Sample ID: MO235  
Analyses Requested: See attached report  
Arctic Fox ID: AF71976  
Time Sampled: 1640  
Matrix: Liquid  
Eurofins Lab ID: 580-97430-1  
ALS Lab ID: K2007930-001  
GreenWater Lab ID: AF71976-MO235

Parameter	Result	Units	RL	RCRA Limits	Flag	Analysis Method	Analysis Date
<b>EPA830.7300</b>							
Specific Gravity	0.99	g/mL				EPA830.7300	9/11/2020
<b>SM 2540D</b>							
Total Suspended Solids	<2	mg/L	2			SM2540D	9/13/2020
<b>SM2540C</b>							
Total Dissolved Solids	136	mg/L	10			SM2540C	9/13/2020
<b>6020A Total Metals</b>							
Arsenic	0.020	mg/L	0.010	5.0		6020A	9/14/2020
Barium	0.078	mg/L	0.050	100.0		6020A	
Cadmium	<MRL	mg/L	0.004	1.0		6020A	
Chromium	<MRL	mg/L	0.010	5.0		6020A	
Lead	<MRL	mg/L	0.008	5.0		6020A	
Mercury	<MRL	mg/L	0.003	0.200		6020A	
Selenium	<MRL	mg/L	0.080	1.0		6020A	
Silver	<MRL	mg/L	0.010	5.0		6020A	

  
Lance W. Morris

Reported by: Ralph E. Allphin / Timothy D. Johnson / Lance W. Morris / Sky Allphin  
Arctic Fox Environmental, Inc.



# Arctic Fox Environmental, Inc.

PO Box 340043 | Prudhoe Bay, AK 99734 | PHONE: (907) 659-2145 | FAX: (907) 659-2146 | [www.arcticfoxenv.com](http://www.arcticfoxenv.com)

---

Michael Baker International  
3900 C St Ste 900  
Anchorage, AK 99503

Attn: Devon Roe / Haley Runa / Kieran Brawn  
Phone: (907) 273-1666 / (907) 575-8652

Email: [Devon.Roe@mbakerintl.com](mailto:Devon.Roe@mbakerintl.com)  
[Haley.Runa@mbakerintl.com](mailto:Haley.Runa@mbakerintl.com)  
[Kieran.Brawn@mbakerintl.com](mailto:Kieran.Brawn@mbakerintl.com)

AF Lab #: AF71976A  
Client Sample ID: Trip Blank  
Location/Project: Willow WTP #178123  
COC#: 90075  
Sample Matrix: Liquid

Report Date: 10/14/2020  
Date Arrived:  
Date Sampled:  
Time Sampled:  
Collected By:

#### Flag Definitions

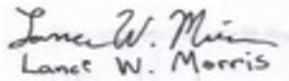
MDL = Method Reporting Limit  
B = Below Regulatory Minimum  
H = Above Regulatory Maximum  
M = Matrix Interference  
J = Best Available Estimate  
U = Less Than Detection Limit  
D = Lost to Dilution

Comments: Attached are the results for analyses of your samples.  
Some samples were analyzed by Eurofins in Tacoma, WA.  
Tracking information is as follows:

Michael Baker Intl Sample ID: Trip Blank  
Analyses Requested: VOC  
Arctic Fox ID: AF71976A  
Time Sampled: NA  
Matrix: Liquid  
Eurofins Lab ID: 580-97430-2

---

---



Lance W. Morris

---

Reported by: Ralph E. Allphin / Timothy D. Johnson / Lance W. Morris / Sky Allphin  
Arctic Fox Environmental, Inc.

## ANALYTICAL REPORT

Eurofins TestAmerica, Seattle  
5755 8th Street East  
Tacoma, WA 98424  
Tel: (253)922-2310

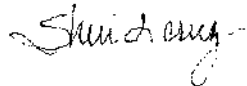
Laboratory Job ID: 580-97430-1

Client Project/Site: 0920-4659 / Willow WTP #178123

**For:**

Arctic Fox Environmental, Inc  
Pouch 340043  
Prudhoe Bay, Alaska 99734

Attn: Arctic Fox



*Authorized for release by:  
9/28/2020 5:26:19 PM*

Sheri Cruz, Project Manager I  
(253)922-2310  
[Sheri.Cruz@Eurofinset.com](mailto:Sheri.Cruz@Eurofinset.com)

LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:

[www.eurofinsus.com/Env](http://www.eurofinsus.com/Env)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*



# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Case Narrative . . . . .	3
Definitions . . . . .	5
Client Sample Results . . . . .	6
QC Sample Results . . . . .	11
Chronicle . . . . .	33
Certification Summary . . . . .	34
Sample Summary . . . . .	39
Chain of Custody . . . . .	40
Receipt Checklists . . . . .	45



# Case Narrative

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

## Job ID: 580-97430-1

Laboratory: Eurofins TestAmerica, Seattle

### Narrative

#### Job Narrative 580-97430-1

#### Comments

No additional comments.

#### Receipt

The samples were received on 9/12/2020 11:00 AM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 4.8° C.

Samples received out of hold for method 300, 5540C, 5910B, 2150, and 3500\_Fe. We are unable to do viscosity, Free Cl-, and Sr+2

#### GC/MS VOA

Method 8260D: The continuing calibration verification (CCV) associated with batch 580-338300 recovered above the upper control limit for cis-1,3-Dichloropropene, Hexachlorobutadiene and t-Butylbenzene. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The associated samples are impacted: AF71976A-Trip Blank (580-97430-2) and (CCVIS 580-338300/3).

Method 8260D: The CCV for analytical batch 580-338300 recovered outside control limits for the following analytes: Dichlorodifluoromethane and Naphthalene. These analytes have been identified as a poor performing analyte when analyzed using this method; therefore, re-extraction/re-analysis was not performed. These results have been reported and qualified.

Method 8260D: The following analytes recovered outside control limits for the LCSD associated with analytical batch 580-338300: 1,1,2-Trichloroethane and 1,3-Dichloropropane. This is not indicative of a systematic control problem because these were random marginal exceedances. Qualified results have been reported.

Method 8260D: The RPD of the laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for analytical batch 580-338300 recovered outside control limits for the following analytes: 1,1,1,2-Tetrachloroethane, 1,1,2-Trichloroethane, 1,2,3-Trichlorobenzene, 1,3-Dichloropropane, Chlorodibromomethane, Naphthalene and trans-1,3-Dichloropropene

Method 8260D: Surrogate recovery for the following sample was outside control limits: AF71976A-Trip Blank (580-97430-2). Surrogate out high not chemically associated to analytes with hits. The data was reported.

Method 8260D: Surrogate recovery for the following sample was outside control limits: AF71976 (580-97430-1). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

#### General Chemistry

Method 5910B: The following sample was received outside of holding time: AF71976 (580-97430-1).

Method SM 3500 FE D: The following samples were received outside of holding time: AF71976 (580-97430-1).

Method SM 5540C: The following sample was received outside of holding time: AF71976 (580-97430-1).

Method SM 2150B: The following sample was received outside of holding time: AF71976 (580-97430-1).

Method 300.0: The following sample was received outside of holding time: AF71976 (580-97430-1).

Method 300.0: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for analytical batch 580-338346 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

# Case Narrative

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

---

## Job ID: 580-97430-1 (Continued)

---

### Laboratory: Eurofins TestAmerica, Seattle (Continued)

Method SM 2150B: The associated sample(s) were ran using a plastic container per PM/client approval. A glass container must be used for odor analysis per the SOP. AF71976 (580-97430-1)

Method SM 3500 FE D: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for analytical batch 280-509469 were outside control limits. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### VOA Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



# Definitions/Glossary

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

## Qualifiers

### GC/MS VOA

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
*1	LCS/LCSD RPD exceeds control limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
X	Surrogate recovery exceeds control limits

### General Chemistry

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.
F2	MS/MSD RPD exceeds control limits
H	Sample was prepped or analyzed beyond the specified holding time
H3	Sample was received and analyzed past holding time.
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# Client Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

**Client Sample ID: AF71976**

**Lab Sample ID: 580-97430-1**

**Date Collected: 09/08/20 14:40**

**Matrix: Water**

**Date Received: 09/12/20 11:00**

**Method: 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	ND		0.010		mg/L			09/15/20 19:56	1
Chloromethane	ND		0.020		mg/L			09/15/20 19:56	1
Vinyl chloride	ND		0.0010		mg/L			09/15/20 19:56	1
Bromomethane	ND		0.0060		mg/L			09/15/20 19:56	1
Chloroethane	ND		0.0050		mg/L			09/15/20 19:56	1
Trichlorofluoromethane	ND		0.0030		mg/L			09/15/20 19:56	1
1,1-Dichloroethene	ND		0.0040		mg/L			09/15/20 19:56	1
Methylene Chloride	ND		0.0050		mg/L			09/15/20 19:56	1
Methyl tert-butyl ether	ND		0.0020		mg/L			09/15/20 19:56	1
trans-1,2-Dichloroethene	ND		0.0030		mg/L			09/15/20 19:56	1
1,1-Dichloroethane	ND		0.0020		mg/L			09/15/20 19:56	1
2,2-Dichloropropane	ND		0.0030		mg/L			09/15/20 19:56	1
cis-1,2-Dichloroethene	ND		0.0030		mg/L			09/15/20 19:56	1
2-Butanone (MEK)	ND		20		ug/L			09/15/20 19:56	1
Bromochloromethane	ND		0.0020		mg/L			09/15/20 19:56	1
Chloroform	ND		0.0050		mg/L			09/15/20 19:56	1
1,1,1-Trichloroethane	ND		0.0030		mg/L			09/15/20 19:56	1
Carbon tetrachloride	ND		0.0030		mg/L			09/15/20 19:56	1
1,1-Dichloropropene	ND		0.0030		mg/L			09/15/20 19:56	1
1,2-Dichloroethane	ND		0.0020		mg/L			09/15/20 19:56	1
Trichloroethene	ND		0.0030		mg/L			09/15/20 19:56	1
1,2-Dichloropropane	ND		0.0010		mg/L			09/15/20 19:56	1
Dibromomethane	ND		0.0020		mg/L			09/15/20 19:56	1
Bromodichloromethane	ND		0.0020		mg/L			09/15/20 19:56	1
cis-1,3-Dichloropropene	ND		0.0010		mg/L			09/15/20 19:56	1
<b>Toluene</b>	<b>0.13</b>		0.0020		mg/L			09/15/20 19:56	1
trans-1,3-Dichloropropene	ND	*1	0.0010		mg/L			09/15/20 19:56	1
Tetrachloroethene	ND		0.0030		mg/L			09/15/20 19:56	1
Dibromochloromethane	ND	*1	0.0020		mg/L			09/15/20 19:56	1
1,2-Dibromoethane	ND		0.0020		mg/L			09/15/20 19:56	1
Chlorobenzene	ND		0.0020		mg/L			09/15/20 19:56	1
1,1,1,2-Tetrachloroethane	ND	*1	0.0020		mg/L			09/15/20 19:56	1
<b>Ethylbenzene</b>	<b>0.036</b>		0.0030		mg/L			09/15/20 19:56	1
m-Xylene & p-Xylene	ND		0.0030		mg/L			09/15/20 19:56	1
o-Xylene	ND		0.0020		mg/L			09/15/20 19:56	1
<b>Styrene</b>	<b>0.12</b>		0.0050		mg/L			09/15/20 19:56	1
Bromoform	ND		0.0030		mg/L			09/15/20 19:56	1
Isopropylbenzene	ND		0.0020		mg/L			09/15/20 19:56	1
Bromobenzene	ND		0.0020		mg/L			09/15/20 19:56	1
1,1,2,2-Tetrachloroethane	ND		0.0030		mg/L			09/15/20 19:56	1
1,2,3-Trichloropropane	ND		0.0020		mg/L			09/15/20 19:56	1
<b>N-Propylbenzene</b>	<b>0.0034</b>		0.0030		mg/L			09/15/20 19:56	1
2-Chlorotoluene	ND		0.0030		mg/L			09/15/20 19:56	1
4-Chlorotoluene	ND		0.0020		mg/L			09/15/20 19:56	1
t-Butylbenzene	ND		0.0030		mg/L			09/15/20 19:56	1
1,2,4-Trimethylbenzene	ND		0.0030		mg/L			09/15/20 19:56	1
sec-Butylbenzene	ND		0.0030		mg/L			09/15/20 19:56	1
4-Isopropyltoluene	ND		0.0030		mg/L			09/15/20 19:56	1
1,3-Dichlorobenzene	ND		0.0020		mg/L			09/15/20 19:56	1

Eurofins TestAmerica, Seattle

# Client Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

**Client Sample ID: AF71976**

**Lab Sample ID: 580-97430-1**

**Date Collected: 09/08/20 14:40**

**Matrix: Water**

**Date Received: 09/12/20 11:00**

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.0040		mg/L			09/15/20 19:56	1
n-Butylbenzene	ND		0.0030		mg/L			09/15/20 19:56	1
1,2-Dichlorobenzene	ND		0.0020		mg/L			09/15/20 19:56	1
1,2-Dibromo-3-Chloropropane	ND		0.010		mg/L			09/15/20 19:56	1
1,2,4-Trichlorobenzene	ND		0.0020		mg/L			09/15/20 19:56	1
Hexachlorobutadiene	ND		0.0060		mg/L			09/15/20 19:56	1
1,2,3-Trichlorobenzene	ND	*1	0.0050		mg/L			09/15/20 19:56	1
1,3,5-Trimethylbenzene	ND		0.0030		mg/L			09/15/20 19:56	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	114		80 - 120		09/15/20 19:56	1
1,2-Dichloroethane-d4 (Surr)	123		80 - 126		09/15/20 19:56	1
4-Bromofluorobenzene (Surr)	79	X	80 - 120		09/15/20 19:56	1
Dibromofluoromethane (Surr)	89		80 - 120		09/15/20 19:56	1

## Method: 8260D - Volatile Organic Compounds by GC/MS - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.15		mg/L			09/20/20 19:30	50
1,1,2-Trichloroethane	ND		0.050		mg/L			09/20/20 19:30	50
1,3-Dichloropropane	ND		0.10		mg/L			09/20/20 19:30	50
Naphthalene	ND		0.20		mg/L			09/20/20 19:30	50

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		80 - 120		09/20/20 19:30	50
1,2-Dichloroethane-d4 (Surr)	99		80 - 126		09/20/20 19:30	50
4-Bromofluorobenzene (Surr)	98		80 - 120		09/20/20 19:30	50
Dibromofluoromethane (Surr)	98		80 - 120		09/20/20 19:30	50

## Method: 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		2.5		mg/L		09/14/20 09:48	09/15/20 14:37	1
Iron	ND		0.50		mg/L		09/14/20 09:48	09/15/20 14:37	1
<b>Magnesium</b>	<b>3.9</b>		1.1		mg/L		09/14/20 09:48	09/15/20 14:37	1
Manganese	ND		0.020		mg/L		09/14/20 09:48	09/15/20 14:37	1
Potassium	ND		3.3		mg/L		09/14/20 09:48	09/15/20 14:37	1
<b>Sodium</b>	<b>7.7</b>		2.0		mg/L		09/14/20 09:48	09/15/20 14:37	1
Strontium	ND		0.10		mg/L		09/14/20 09:48	09/15/20 14:37	1
Antimony	ND		0.060		mg/L		09/14/20 09:48	09/15/20 14:37	1
Beryllium	ND		0.020		mg/L		09/14/20 09:48	09/15/20 14:37	1
Nickel	ND		0.020		mg/L		09/14/20 09:48	09/15/20 14:37	1
Copper	ND		0.060		mg/L		09/14/20 09:48	09/15/20 14:37	1
Aluminum	ND		1.5		mg/L		09/14/20 09:48	09/15/20 14:37	1
Zinc	ND		0.040		mg/L		09/14/20 09:48	09/15/20 14:37	1
Selenium	ND		0.10		mg/L		09/14/20 09:48	09/15/20 14:37	1
Titanium	ND		0.030		mg/L		09/14/20 09:48	09/15/20 14:37	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>HEM (Oil &amp; Grease)</b>	<b>14</b>		5.1		mg/L		09/15/20 10:34	09/15/20 15:26	1
SGT-HEM	ND		5.1		mg/L		09/15/20 10:34	09/15/20 15:26	1
<b>HEM Polar (Oil and Grease - Polar)</b>	<b>14</b>		5.1		mg/L		09/15/20 10:34	09/15/20 15:26	1

Eurofins TestAmerica, Seattle

# Client Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

**Client Sample ID: AF71976**

**Lab Sample ID: 580-97430-1**

Date Collected: 09/08/20 14:40

Matrix: Water

Date Received: 09/12/20 11:00

## General Chemistry (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrite as N	ND	H H3	0.40		mg/L			09/15/20 14:30	1
<b>Chloride</b>	<b>20</b>		0.90		mg/L			09/15/20 14:30	1
Nitrate as N	ND	H H3	0.20		mg/L			09/15/20 14:30	1
Bromide	ND		1.0		mg/L			09/15/20 14:30	1
Sulfate	ND		1.2		mg/L			09/15/20 14:30	1
<b>Fluoride</b>	<b>1.3</b>		0.20		mg/L			09/15/20 14:30	1
Cyanide, Total	ND		0.060		mg/L		09/18/20 13:52	09/18/20 15:11	1
Nitrate as N	ND		0.15		mg/L			09/25/20 14:50	1
<b>UV254</b>	<b>0.13</b>	<b>H H3</b>	0.0090		1/cm			09/15/20 18:07	1
Sulfide	ND		4.0		mg/L		09/16/20 12:00	09/16/20 12:56	1
Odor	ND	H H3	1.0		T.O.N.			09/18/20 10:50	1
<b>Alkalinity as CaCO3</b>	<b>49</b>		5.0		mg/L			09/15/20 09:07	1
<b>Bicarbonate Alkalinity as CaCO3</b>	<b>49</b>		5.0		mg/L			09/15/20 09:07	1
Carbonate Alkalinity as CaCO3	ND		5.0		mg/L			09/15/20 09:07	1
Hydroxide Alkalinity as CaCO3	ND		5.0		mg/L			09/15/20 09:07	1
<b>Hardness as calcium carbonate</b>	<b>57</b>		2.0		mg/L			09/15/20 18:24	1
Ferrous Iron	ND	HF	0.20		mg/L			09/17/20 13:21	1
Ammonia as N	ND		0.50		mg/L			09/17/20 14:22	1
<b>Chemical Oxygen Demand</b>	<b>21</b>		10		mg/L		09/19/20 11:23	09/19/20 16:31	1
<b>Total Organic Carbon</b>	<b>7.6</b>		1.5		mg/L			09/21/20 19:19	1
Methylene Blue Active Substances	ND	H H3	0.10		mg/L			09/15/20 15:29	1
Total Phosphorus as P	ND		0.25		mg/L		09/22/20 10:55	09/22/20 10:59	1

## General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Dissolved Organic Carbon</b>	<b>7.9</b>		1.5		mg/L			09/19/20 18:37	1

# Client Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

**Client Sample ID: AF71976A-Trip Blank**

**Lab Sample ID: 580-97430-2**

**Date Collected: 09/08/20 00:01**

**Matrix: Water**

**Date Received: 09/12/20 11:00**

**Method: 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	ND		0.010		mg/L			09/15/20 17:01	1
Chloromethane	ND		0.020		mg/L			09/15/20 17:01	1
Vinyl chloride	ND		0.0010		mg/L			09/15/20 17:01	1
Bromomethane	ND		0.0060		mg/L			09/15/20 17:01	1
Chloroethane	ND		0.0050		mg/L			09/15/20 17:01	1
Trichlorofluoromethane	ND		0.0030		mg/L			09/15/20 17:01	1
1,1-Dichloroethene	ND		0.0040		mg/L			09/15/20 17:01	1
Methylene Chloride	ND		0.0050		mg/L			09/15/20 17:01	1
Methyl tert-butyl ether	ND		0.0020		mg/L			09/15/20 17:01	1
trans-1,2-Dichloroethene	ND		0.0030		mg/L			09/15/20 17:01	1
1,1-Dichloroethane	ND		0.0020		mg/L			09/15/20 17:01	1
2,2-Dichloropropane	ND		0.0030		mg/L			09/15/20 17:01	1
cis-1,2-Dichloroethene	ND		0.0030		mg/L			09/15/20 17:01	1
2-Butanone (MEK)	ND		20		ug/L			09/15/20 17:01	1
Bromochloromethane	ND		0.0020		mg/L			09/15/20 17:01	1
Chloroform	ND		0.0050		mg/L			09/15/20 17:01	1
1,1,1-Trichloroethane	ND		0.0030		mg/L			09/15/20 17:01	1
Carbon tetrachloride	ND		0.0030		mg/L			09/15/20 17:01	1
1,1-Dichloropropene	ND		0.0030		mg/L			09/15/20 17:01	1
Benzene	ND		0.0030		mg/L			09/15/20 17:01	1
1,2-Dichloroethane	ND		0.0020		mg/L			09/15/20 17:01	1
Trichloroethene	ND		0.0030		mg/L			09/15/20 17:01	1
1,2-Dichloropropane	ND		0.0010		mg/L			09/15/20 17:01	1
Dibromomethane	ND		0.0020		mg/L			09/15/20 17:01	1
Bromodichloromethane	ND		0.0020		mg/L			09/15/20 17:01	1
cis-1,3-Dichloropropene	ND		0.0010		mg/L			09/15/20 17:01	1
Toluene	ND		0.0020		mg/L			09/15/20 17:01	1
trans-1,3-Dichloropropene	ND	*1	0.0010		mg/L			09/15/20 17:01	1
1,1,2-Trichloroethane	ND	**1	0.0010		mg/L			09/15/20 17:01	1
Tetrachloroethene	ND		0.0030		mg/L			09/15/20 17:01	1
1,3-Dichloropropane	ND	**1	0.0020		mg/L			09/15/20 17:01	1
Dibromochloromethane	ND	*1	0.0020		mg/L			09/15/20 17:01	1
1,2-Dibromoethane	ND		0.0020		mg/L			09/15/20 17:01	1
Chlorobenzene	ND		0.0020		mg/L			09/15/20 17:01	1
1,1,1,2-Tetrachloroethane	ND	*1	0.0020		mg/L			09/15/20 17:01	1
Ethylbenzene	ND		0.0030		mg/L			09/15/20 17:01	1
m-Xylene & p-Xylene	ND		0.0030		mg/L			09/15/20 17:01	1
o-Xylene	ND		0.0020		mg/L			09/15/20 17:01	1
Styrene	ND		0.0050		mg/L			09/15/20 17:01	1
Bromoform	ND		0.0030		mg/L			09/15/20 17:01	1
Isopropylbenzene	ND		0.0020		mg/L			09/15/20 17:01	1
Bromobenzene	ND		0.0020		mg/L			09/15/20 17:01	1
1,1,2,2-Tetrachloroethane	ND		0.0030		mg/L			09/15/20 17:01	1
1,2,3-Trichloropropane	ND		0.0020		mg/L			09/15/20 17:01	1
N-Propylbenzene	ND		0.0030		mg/L			09/15/20 17:01	1
2-Chlorotoluene	ND		0.0030		mg/L			09/15/20 17:01	1
4-Chlorotoluene	ND		0.0020		mg/L			09/15/20 17:01	1
t-Butylbenzene	ND		0.0030		mg/L			09/15/20 17:01	1
1,2,4-Trimethylbenzene	ND		0.0030		mg/L			09/15/20 17:01	1

Eurofins TestAmerica, Seattle

# Client Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

**Client Sample ID: AF71976A-Trip Blank**

**Lab Sample ID: 580-97430-2**

Date Collected: 09/08/20 00:01

Matrix: Water

Date Received: 09/12/20 11:00

**Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
sec-Butylbenzene	ND		0.0030		mg/L			09/15/20 17:01	1
4-Isopropyltoluene	ND		0.0030		mg/L			09/15/20 17:01	1
1,3-Dichlorobenzene	ND		0.0020		mg/L			09/15/20 17:01	1
1,4-Dichlorobenzene	ND		0.0040		mg/L			09/15/20 17:01	1
n-Butylbenzene	ND		0.0030		mg/L			09/15/20 17:01	1
1,2-Dichlorobenzene	ND		0.0020		mg/L			09/15/20 17:01	1
1,2-Dibromo-3-Chloropropane	ND		0.010		mg/L			09/15/20 17:01	1
<b>1,2,4-Trichlorobenzene</b>	<b>0.0042</b>		0.0020		mg/L			09/15/20 17:01	1
Hexachlorobutadiene	ND		0.0060		mg/L			09/15/20 17:01	1
1,3,5-Trimethylbenzene	ND		0.0030		mg/L			09/15/20 17:01	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	135	X	80 - 120		09/15/20 17:01	1
1,2-Dichloroethane-d4 (Surr)	103		80 - 126		09/15/20 17:01	1
4-Bromofluorobenzene (Surr)	108		80 - 120		09/15/20 17:01	1
Dibromofluoromethane (Surr)	100		80 - 120		09/15/20 17:01	1

**Method: 8260D - Volatile Organic Compounds by GC/MS - RA**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	ND		0.0040		mg/L			09/20/20 14:56	1
1,2,3-Trichlorobenzene	ND		0.0050		mg/L			09/20/20 14:56	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		80 - 120		09/20/20 14:56	1
1,2-Dichloroethane-d4 (Surr)	99		80 - 126		09/20/20 14:56	1
4-Bromofluorobenzene (Surr)	97		80 - 120		09/20/20 14:56	1
Dibromofluoromethane (Surr)	98		80 - 120		09/20/20 14:56	1



# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

## Method: 8260D - Volatile Organic Compounds by GC/MS

**Lab Sample ID: MB 580-338300/5**  
**Matrix: Water**  
**Analysis Batch: 338300**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Dichlorodifluoromethane	ND		0.010		mg/L			09/15/20 15:46	1
Chloromethane	ND		0.020		mg/L			09/15/20 15:46	1
Vinyl chloride	ND		0.0010		mg/L			09/15/20 15:46	1
Bromomethane	ND		0.0060		mg/L			09/15/20 15:46	1
Chloroethane	ND		0.0050		mg/L			09/15/20 15:46	1
Trichlorofluoromethane	ND		0.0030		mg/L			09/15/20 15:46	1
1,1-Dichloroethene	ND		0.0040		mg/L			09/15/20 15:46	1
Methylene Chloride	ND		0.0050		mg/L			09/15/20 15:46	1
Methyl tert-butyl ether	ND		0.0020		mg/L			09/15/20 15:46	1
trans-1,2-Dichloroethene	ND		0.0030		mg/L			09/15/20 15:46	1
1,1-Dichloroethane	ND		0.0020		mg/L			09/15/20 15:46	1
2,2-Dichloropropane	ND		0.0030		mg/L			09/15/20 15:46	1
cis-1,2-Dichloroethene	ND		0.0030		mg/L			09/15/20 15:46	1
2-Butanone (MEK)	ND		20		ug/L			09/15/20 15:46	1
Bromochloromethane	ND		0.0020		mg/L			09/15/20 15:46	1
Chloroform	ND		0.0050		mg/L			09/15/20 15:46	1
1,1,1-Trichloroethane	ND		0.0030		mg/L			09/15/20 15:46	1
Carbon tetrachloride	ND		0.0030		mg/L			09/15/20 15:46	1
1,1-Dichloropropene	ND		0.0030		mg/L			09/15/20 15:46	1
Benzene	ND		0.0030		mg/L			09/15/20 15:46	1
1,2-Dichloroethane	ND		0.0020		mg/L			09/15/20 15:46	1
Trichloroethene	ND		0.0030		mg/L			09/15/20 15:46	1
1,2-Dichloropropane	ND		0.0010		mg/L			09/15/20 15:46	1
Dibromomethane	ND		0.0020		mg/L			09/15/20 15:46	1
Bromodichloromethane	ND		0.0020		mg/L			09/15/20 15:46	1
cis-1,3-Dichloropropene	ND		0.0010		mg/L			09/15/20 15:46	1
Toluene	ND		0.0020		mg/L			09/15/20 15:46	1
trans-1,3-Dichloropropene	ND		0.0010		mg/L			09/15/20 15:46	1
1,1,2-Trichloroethane	ND		0.0010		mg/L			09/15/20 15:46	1
Tetrachloroethene	ND		0.0030		mg/L			09/15/20 15:46	1
1,3-Dichloropropane	ND		0.0020		mg/L			09/15/20 15:46	1
Dibromochloromethane	ND		0.0020		mg/L			09/15/20 15:46	1
1,2-Dibromoethane	ND		0.0020		mg/L			09/15/20 15:46	1
Chlorobenzene	ND		0.0020		mg/L			09/15/20 15:46	1
1,1,1,2-Tetrachloroethane	ND		0.0020		mg/L			09/15/20 15:46	1
Ethylbenzene	ND		0.0030		mg/L			09/15/20 15:46	1
m-Xylene & p-Xylene	ND		0.0030		mg/L			09/15/20 15:46	1
o-Xylene	ND		0.0020		mg/L			09/15/20 15:46	1
Styrene	ND		0.0050		mg/L			09/15/20 15:46	1
Bromoform	ND		0.0030		mg/L			09/15/20 15:46	1
Isopropylbenzene	ND		0.0020		mg/L			09/15/20 15:46	1
Bromobenzene	ND		0.0020		mg/L			09/15/20 15:46	1
1,1,2,2-Tetrachloroethane	ND		0.0030		mg/L			09/15/20 15:46	1
1,2,3-Trichloropropane	ND		0.0020		mg/L			09/15/20 15:46	1
N-Propylbenzene	ND		0.0030		mg/L			09/15/20 15:46	1
2-Chlorotoluene	ND		0.0030		mg/L			09/15/20 15:46	1
4-Chlorotoluene	ND		0.0020		mg/L			09/15/20 15:46	1
t-Butylbenzene	ND		0.0030		mg/L			09/15/20 15:46	1

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: MB 580-338300/5**  
**Matrix: Water**  
**Analysis Batch: 338300**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4-Trimethylbenzene	ND		0.0030		mg/L			09/15/20 15:46	1
sec-Butylbenzene	ND		0.0030		mg/L			09/15/20 15:46	1
4-Isopropyltoluene	ND		0.0030		mg/L			09/15/20 15:46	1
1,3-Dichlorobenzene	ND		0.0020		mg/L			09/15/20 15:46	1
1,4-Dichlorobenzene	ND		0.0040		mg/L			09/15/20 15:46	1
n-Butylbenzene	ND		0.0030		mg/L			09/15/20 15:46	1
1,2-Dichlorobenzene	ND		0.0020		mg/L			09/15/20 15:46	1
1,2-Dibromo-3-Chloropropane	ND		0.010		mg/L			09/15/20 15:46	1
1,2,4-Trichlorobenzene	ND		0.0020		mg/L			09/15/20 15:46	1
Hexachlorobutadiene	ND		0.0060		mg/L			09/15/20 15:46	1
Naphthalene	0.00444		0.0040		mg/L			09/15/20 15:46	1
1,2,3-Trichlorobenzene	0.00585		0.0050		mg/L			09/15/20 15:46	1
1,3,5-Trimethylbenzene	ND		0.0030		mg/L			09/15/20 15:46	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		80 - 120		09/15/20 15:46	1
1,2-Dichloroethane-d4 (Surr)	103		80 - 126		09/15/20 15:46	1
4-Bromofluorobenzene (Surr)	100		80 - 120		09/15/20 15:46	1
Dibromofluoromethane (Surr)	103		80 - 120		09/15/20 15:46	1

**Lab Sample ID: LCS 580-338300/6**  
**Matrix: Water**  
**Analysis Batch: 338300**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Dichlorodifluoromethane	0.0100	0.00843	J	mg/L		84	47 - 133
Chloromethane	0.0100	0.00924	J	mg/L		92	52 - 135
Vinyl chloride	0.0100	0.00899		mg/L		90	65 - 130
Bromomethane	0.0100	0.00971		mg/L		97	66 - 125
Chloroethane	0.0100	0.00909		mg/L		91	65 - 132
Trichlorofluoromethane	0.0100	0.00866		mg/L		87	64 - 130
1,1-Dichloroethene	0.0100	0.0106		mg/L		106	70 - 129
Methylene Chloride	0.0100	0.0101		mg/L		101	77 - 120
Methyl tert-butyl ether	0.0100	0.0108		mg/L		108	72 - 130
trans-1,2-Dichloroethene	0.0100	0.0100		mg/L		100	70 - 130
1,1-Dichloroethane	0.0100	0.0104		mg/L		104	81 - 129
2,2-Dichloropropane	0.0100	0.0108		mg/L		108	53 - 150
cis-1,2-Dichloroethene	0.0100	0.0106		mg/L		106	76 - 129
2-Butanone (MEK)	50.0	55.9		ug/L		112	73 - 137
Bromochloromethane	0.0100	0.0104		mg/L		104	78 - 120
Chloroform	0.0100	0.0107		mg/L		107	73 - 127
1,1,1-Trichloroethane	0.0100	0.0107		mg/L		107	74 - 130
Carbon tetrachloride	0.0100	0.0108		mg/L		108	72 - 129
1,1-Dichloropropene	0.0100	0.0105		mg/L		105	74 - 131
Benzene	0.0100	0.0110		mg/L		110	82 - 122
1,2-Dichloroethane	0.0100	0.0107		mg/L		107	76 - 126
Trichloroethene	0.0100	0.0109		mg/L		109	81 - 125
1,2-Dichloropropane	0.0100	0.0107		mg/L		107	80 - 126

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: LCS 580-338300/6**  
**Matrix: Water**  
**Analysis Batch: 338300**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Dibromomethane	0.0100	0.0104		mg/L		104	80 - 120
Bromodichloromethane	0.0100	0.0101		mg/L		101	75 - 124
cis-1,3-Dichloropropene	0.0100	0.0100		mg/L		100	77 - 120
Toluene	0.0100	0.00970		mg/L		97	80 - 120
trans-1,3-Dichloropropene	0.0100	0.00884		mg/L		88	70 - 122
1,1,2-Trichloroethane	0.0100	0.00933		mg/L		93	80 - 121
Tetrachloroethene	0.0100	0.00897		mg/L		90	76 - 120
1,3-Dichloropropane	0.0100	0.00969		mg/L		97	79 - 120
Dibromochloromethane	0.0100	0.0100		mg/L		100	60 - 125
1,2-Dibromoethane	0.0100	0.0104		mg/L		104	79 - 120
Chlorobenzene	0.0100	0.0104		mg/L		104	80 - 120
1,1,1,2-Tetrachloroethane	0.0100	0.0102		mg/L		102	79 - 120
Ethylbenzene	0.0100	0.0104		mg/L		104	80 - 120
m-Xylene & p-Xylene	0.0100	0.0104		mg/L		104	80 - 120
o-Xylene	0.0100	0.0102		mg/L		102	80 - 125
Styrene	0.0100	0.0102		mg/L		102	76 - 127
Bromoform	0.0100	0.0101		mg/L		101	28 - 139
Isopropylbenzene	0.0100	0.0109		mg/L		109	75 - 129
Bromobenzene	0.0100	0.0103		mg/L		103	80 - 120
1,1,2,2-Tetrachloroethane	0.0100	0.0103		mg/L		103	74 - 124
1,2,3-Trichloropropane	0.0100	0.0106		mg/L		106	76 - 124
N-Propylbenzene	0.0100	0.0103		mg/L		103	80 - 128
2-Chlorotoluene	0.0100	0.0104		mg/L		104	80 - 120
4-Chlorotoluene	0.0100	0.0102		mg/L		102	80 - 120
t-Butylbenzene	0.0100	0.0107		mg/L		107	80 - 129
1,2,4-Trimethylbenzene	0.0100	0.0109		mg/L		109	80 - 131
sec-Butylbenzene	0.0100	0.0110		mg/L		110	78 - 131
4-Isopropyltoluene	0.0100	0.0106		mg/L		106	77 - 131
1,3-Dichlorobenzene	0.0100	0.0102		mg/L		102	69 - 127
1,4-Dichlorobenzene	0.0100	0.0101		mg/L		101	80 - 120
n-Butylbenzene	0.0100	0.0104		mg/L		104	78 - 120
1,2-Dichlorobenzene	0.0100	0.0100		mg/L		100	80 - 120
1,2-Dibromo-3-Chloropropane	0.0100	0.00878	J	mg/L		88	65 - 125
1,2,4-Trichlorobenzene	0.0100	0.00978		mg/L		98	73 - 128
Hexachlorobutadiene	0.0100	0.0107		mg/L		107	74 - 125
Naphthalene	0.0100	0.00753		mg/L		75	75 - 134
1,2,3-Trichlorobenzene	0.0100	0.0105		mg/L		105	74 - 139
1,3,5-Trimethylbenzene	0.0100	0.0105		mg/L		105	80 - 131

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	94		80 - 120
1,2-Dichloroethane-d4 (Surr)	103		80 - 126
4-Bromofluorobenzene (Surr)	105		80 - 120
Dibromofluoromethane (Surr)	99		80 - 120

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: LCSD 580-338300/7**  
**Matrix: Water**  
**Analysis Batch: 338300**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD
									Limit
Dichlorodifluoromethane	0.0100	0.00781	J	mg/L		78	47 - 133	8	15
Chloromethane	0.0100	0.00870	J	mg/L		87	52 - 135	6	14
Vinyl chloride	0.0100	0.00783		mg/L		78	65 - 130	14	14
Bromomethane	0.0100	0.00930		mg/L		93	66 - 125	4	14
Chloroethane	0.0100	0.00823		mg/L		82	65 - 132	10	18
Trichlorofluoromethane	0.0100	0.00871		mg/L		87	64 - 130	0	14
1,1-Dichloroethene	0.0100	0.00987		mg/L		99	70 - 129	7	17
Methylene Chloride	0.0100	0.00976		mg/L		98	77 - 120	3	18
Methyl tert-butyl ether	0.0100	0.00988		mg/L		99	72 - 130	9	18
trans-1,2-Dichloroethene	0.0100	0.00972		mg/L		97	70 - 130	3	21
1,1-Dichloroethane	0.0100	0.00974		mg/L		97	81 - 129	7	15
2,2-Dichloropropane	0.0100	0.0103		mg/L		103	53 - 150	5	15
cis-1,2-Dichloroethene	0.0100	0.00973		mg/L		97	76 - 129	9	15
2-Butanone (MEK)	50.0	48.4		ug/L		97	73 - 137	14	24
Bromochloromethane	0.0100	0.00987		mg/L		99	78 - 120	5	13
Chloroform	0.0100	0.00996		mg/L		100	73 - 127	7	14
1,1,1-Trichloroethane	0.0100	0.0101		mg/L		101	74 - 130	6	11
Carbon tetrachloride	0.0100	0.0102		mg/L		102	72 - 129	6	11
1,1-Dichloropropene	0.0100	0.00992		mg/L		99	74 - 131	6	14
Benzene	0.0100	0.0101		mg/L		101	82 - 122	9	14
1,2-Dichloroethane	0.0100	0.00988		mg/L		99	76 - 126	8	11
Trichloroethene	0.0100	0.0101		mg/L		101	81 - 125	7	13
1,2-Dichloropropane	0.0100	0.00958		mg/L		96	80 - 126	11	14
Dibromomethane	0.0100	0.00988		mg/L		99	80 - 120	6	11
Bromodichloromethane	0.0100	0.00949		mg/L		95	75 - 124	7	13
cis-1,3-Dichloropropene	0.0100	0.00958		mg/L		96	77 - 120	5	20
Toluene	0.0100	0.00916		mg/L		92	80 - 120	6	13
trans-1,3-Dichloropropene	0.0100	0.00708	*1	mg/L		71	70 - 122	22	14
1,1,2-Trichloroethane	0.0100	0.00759	**1	mg/L		76	80 - 121	20	14
Tetrachloroethene	0.0100	0.00825		mg/L		82	76 - 120	8	13
1,3-Dichloropropane	0.0100	0.00753	**1	mg/L		75	79 - 120	25	13
Dibromochloromethane	0.0100	0.00850	*1	mg/L		85	60 - 125	16	13
1,2-Dibromoethane	0.0100	0.00957		mg/L		96	79 - 120	8	12
Chlorobenzene	0.0100	0.00960		mg/L		96	80 - 120	8	10
1,1,1,2-Tetrachloroethane	0.0100	0.00917	*1	mg/L		92	79 - 120	11	10
Ethylbenzene	0.0100	0.00955		mg/L		96	80 - 120	8	14
m-Xylene & p-Xylene	0.0100	0.00983		mg/L		98	80 - 120	6	14
o-Xylene	0.0100	0.00967		mg/L		97	80 - 125	5	16
Styrene	0.0100	0.00955		mg/L		95	76 - 127	7	16
Bromoform	0.0100	0.00877		mg/L		88	28 - 139	14	15
Isopropylbenzene	0.0100	0.0101		mg/L		101	75 - 129	8	12
Bromobenzene	0.0100	0.00986		mg/L		99	80 - 120	4	13
1,1,2,2-Tetrachloroethane	0.0100	0.00967		mg/L		97	74 - 124	7	18
1,2,3-Trichloropropane	0.0100	0.0100		mg/L		100	76 - 124	6	16
N-Propylbenzene	0.0100	0.00986		mg/L		99	80 - 128	4	13
2-Chlorotoluene	0.0100	0.00973		mg/L		97	80 - 120	7	15
4-Chlorotoluene	0.0100	0.00985		mg/L		98	80 - 120	4	14
t-Butylbenzene	0.0100	0.0104		mg/L		104	80 - 129	3	14

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: LCSD 580-338300/7**  
**Matrix: Water**  
**Analysis Batch: 338300**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,4-Trimethylbenzene	0.0100	0.0105		mg/L		105	80 - 131	4	16
sec-Butylbenzene	0.0100	0.0106		mg/L		106	78 - 131	4	15
4-Isopropyltoluene	0.0100	0.0102		mg/L		102	77 - 131	3	20
1,3-Dichlorobenzene	0.0100	0.00965		mg/L		96	69 - 127	5	14
1,4-Dichlorobenzene	0.0100	0.00963		mg/L		96	80 - 120	5	17
n-Butylbenzene	0.0100	0.0101		mg/L		101	78 - 120	4	14
1,2-Dichlorobenzene	0.0100	0.00979		mg/L		98	80 - 120	3	15
1,2-Dibromo-3-Chloropropane	0.0100	0.0100		mg/L		100	65 - 125	13	17
1,2,4-Trichlorobenzene	0.0100	0.0104		mg/L		104	73 - 128	6	20
Hexachlorobutadiene	0.0100	0.0106		mg/L		106	74 - 125	2	22
Naphthalene	0.0100	0.0118	*1	mg/L		118	75 - 134	44	23
1,2,3-Trichlorobenzene	0.0100	0.0138	*1	mg/L		138	74 - 139	27	26
1,3,5-Trimethylbenzene	0.0100	0.0102		mg/L		102	80 - 131	3	14

Surrogate	LCSD %Recovery	LCSD Qualifier	LCSD Limits
Toluene-d8 (Surr)	100		80 - 120
1,2-Dichloroethane-d4 (Surr)	102		80 - 126
4-Bromofluorobenzene (Surr)	102		80 - 120
Dibromofluoromethane (Surr)	101		80 - 120

**Lab Sample ID: MB 580-338660/6**  
**Matrix: Water**  
**Analysis Batch: 338660**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	ND		0.010		mg/L			09/20/20 11:00	1
Chloromethane	ND		0.020		mg/L			09/20/20 11:00	1
Vinyl chloride	ND		0.0010		mg/L			09/20/20 11:00	1
Bromomethane	ND		0.0060		mg/L			09/20/20 11:00	1
Chloroethane	ND		0.0050		mg/L			09/20/20 11:00	1
Trichlorofluoromethane	ND		0.0030		mg/L			09/20/20 11:00	1
1,1-Dichloroethene	ND		0.0040		mg/L			09/20/20 11:00	1
Methylene Chloride	ND		0.0050		mg/L			09/20/20 11:00	1
Methyl tert-butyl ether	ND		0.0020		mg/L			09/20/20 11:00	1
trans-1,2-Dichloroethene	ND		0.0030		mg/L			09/20/20 11:00	1
1,1-Dichloroethane	ND		0.0020		mg/L			09/20/20 11:00	1
2,2-Dichloropropane	ND		0.0030		mg/L			09/20/20 11:00	1
cis-1,2-Dichloroethene	ND		0.0030		mg/L			09/20/20 11:00	1
2-Butanone (MEK)	ND		20		ug/L			09/20/20 11:00	1
Bromochloromethane	ND		0.0020		mg/L			09/20/20 11:00	1
Chloroform	ND		0.0050		mg/L			09/20/20 11:00	1
1,1,1-Trichloroethane	ND		0.0030		mg/L			09/20/20 11:00	1
Carbon tetrachloride	ND		0.0030		mg/L			09/20/20 11:00	1
1,1-Dichloropropene	ND		0.0030		mg/L			09/20/20 11:00	1
Benzene	ND		0.0030		mg/L			09/20/20 11:00	1
1,2-Dichloroethane	ND		0.0020		mg/L			09/20/20 11:00	1
Trichloroethene	ND		0.0030		mg/L			09/20/20 11:00	1
1,2-Dichloropropane	ND		0.0010		mg/L			09/20/20 11:00	1

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: MB 580-338660/6**  
**Matrix: Water**  
**Analysis Batch: 338660**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibromomethane	ND		0.0020		mg/L			09/20/20 11:00	1
Bromodichloromethane	ND		0.0020		mg/L			09/20/20 11:00	1
cis-1,3-Dichloropropene	ND		0.0010		mg/L			09/20/20 11:00	1
Toluene	ND		0.0020		mg/L			09/20/20 11:00	1
trans-1,3-Dichloropropene	ND		0.0010		mg/L			09/20/20 11:00	1
1,1,2-Trichloroethane	ND		0.0010		mg/L			09/20/20 11:00	1
1,3-Dichloropropane	ND		0.0020		mg/L			09/20/20 11:00	1
Dibromochloromethane	ND		0.0020		mg/L			09/20/20 11:00	1
1,2-Dibromoethane	ND		0.0020		mg/L			09/20/20 11:00	1
Chlorobenzene	ND		0.0020		mg/L			09/20/20 11:00	1
1,1,1,2-Tetrachloroethane	ND		0.0020		mg/L			09/20/20 11:00	1
Ethylbenzene	ND		0.0030		mg/L			09/20/20 11:00	1
m-Xylene & p-Xylene	ND		0.0030		mg/L			09/20/20 11:00	1
o-Xylene	ND		0.0020		mg/L			09/20/20 11:00	1
Styrene	ND		0.0050		mg/L			09/20/20 11:00	1
Isopropylbenzene	ND		0.0020		mg/L			09/20/20 11:00	1
Bromobenzene	ND		0.0020		mg/L			09/20/20 11:00	1
1,1,2,2-Tetrachloroethane	ND		0.0030		mg/L			09/20/20 11:00	1
1,2,3-Trichloropropane	ND		0.0020		mg/L			09/20/20 11:00	1
N-Propylbenzene	ND		0.0030		mg/L			09/20/20 11:00	1
2-Chlorotoluene	ND		0.0030		mg/L			09/20/20 11:00	1
4-Chlorotoluene	ND		0.0020		mg/L			09/20/20 11:00	1
t-Butylbenzene	ND		0.0030		mg/L			09/20/20 11:00	1
1,2,4-Trimethylbenzene	ND		0.0030		mg/L			09/20/20 11:00	1
sec-Butylbenzene	ND		0.0030		mg/L			09/20/20 11:00	1
4-Isopropyltoluene	ND		0.0030		mg/L			09/20/20 11:00	1
1,3-Dichlorobenzene	ND		0.0020		mg/L			09/20/20 11:00	1
1,4-Dichlorobenzene	ND		0.0040		mg/L			09/20/20 11:00	1
n-Butylbenzene	ND		0.0030		mg/L			09/20/20 11:00	1
1,2-Dichlorobenzene	ND		0.0020		mg/L			09/20/20 11:00	1
1,2-Dibromo-3-Chloropropane	ND		0.010		mg/L			09/20/20 11:00	1
1,2,4-Trichlorobenzene	ND		0.0020		mg/L			09/20/20 11:00	1
Naphthalene	ND		0.0040		mg/L			09/20/20 11:00	1
1,2,3-Trichlorobenzene	ND		0.0050		mg/L			09/20/20 11:00	1
1,3,5-Trimethylbenzene	ND		0.0030		mg/L			09/20/20 11:00	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		80 - 120		09/20/20 11:00	1
1,2-Dichloroethane-d4 (Surr)	101		80 - 126		09/20/20 11:00	1
4-Bromofluorobenzene (Surr)	97		80 - 120		09/20/20 11:00	1
Dibromofluoromethane (Surr)	100		80 - 120		09/20/20 11:00	1

**Lab Sample ID: LCS 580-338660/7**  
**Matrix: Water**  
**Analysis Batch: 338660**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Dichlorodifluoromethane	0.0100	0.0102		mg/L		102	47 - 133

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: LCS 580-338660/7**  
**Matrix: Water**  
**Analysis Batch: 338660**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloromethane	0.0100	0.0103	J	mg/L		103	52 - 135
Vinyl chloride	0.0100	0.0102		mg/L		102	65 - 130
Bromomethane	0.0100	0.0106		mg/L		106	66 - 125
Chloroethane	0.0100	0.0103		mg/L		103	65 - 132
Trichlorofluoromethane	0.0100	0.0101		mg/L		101	64 - 130
1,1-Dichloroethene	0.0100	0.00983		mg/L		98	70 - 129
Methylene Chloride	0.0100	0.00972		mg/L		97	77 - 120
Methyl tert-butyl ether	0.0100	0.00966		mg/L		97	72 - 130
trans-1,2-Dichloroethene	0.0100	0.00933		mg/L		93	70 - 130
1,1-Dichloroethane	0.0100	0.00922		mg/L		92	81 - 129
2,2-Dichloropropane	0.0100	0.0107		mg/L		107	53 - 150
cis-1,2-Dichloroethene	0.0100	0.00905		mg/L		90	76 - 129
2-Butanone (MEK)	50.0	48.0		ug/L		96	73 - 137
Bromochloromethane	0.0100	0.00937		mg/L		94	78 - 120
Chloroform	0.0100	0.00949		mg/L		95	73 - 127
1,1,1-Trichloroethane	0.0100	0.00988		mg/L		99	74 - 130
Carbon tetrachloride	0.0100	0.0103		mg/L		103	72 - 129
1,1-Dichloropropene	0.0100	0.00976		mg/L		98	74 - 131
Benzene	0.0100	0.00950		mg/L		95	82 - 122
1,2-Dichloroethane	0.0100	0.00972		mg/L		97	76 - 126
Trichloroethene	0.0100	0.00917		mg/L		92	81 - 125
1,2-Dichloropropane	0.0100	0.00933		mg/L		93	80 - 126
Dibromomethane	0.0100	0.00989		mg/L		99	80 - 120
Bromodichloromethane	0.0100	0.00928		mg/L		93	75 - 124
cis-1,3-Dichloropropene	0.0100	0.00988		mg/L		99	77 - 120
Toluene	0.0100	0.00975		mg/L		98	80 - 120
trans-1,3-Dichloropropene	0.0100	0.00936		mg/L		94	70 - 122
1,1,2-Trichloroethane	0.0100	0.00922		mg/L		92	80 - 121
1,3-Dichloropropane	0.0100	0.00933		mg/L		93	79 - 120
Dibromochloromethane	0.0100	0.00915		mg/L		92	60 - 125
1,2-Dibromoethane	0.0100	0.00923		mg/L		92	79 - 120
Chlorobenzene	0.0100	0.00944		mg/L		94	80 - 120
1,1,1,2-Tetrachloroethane	0.0100	0.00929		mg/L		93	79 - 120
Ethylbenzene	0.0100	0.00942		mg/L		94	80 - 120
m-Xylene & p-Xylene	0.0100	0.00954		mg/L		95	80 - 120
o-Xylene	0.0100	0.00933		mg/L		93	80 - 125
Styrene	0.0100	0.00904		mg/L		90	76 - 127
Isopropylbenzene	0.0100	0.00949		mg/L		95	75 - 129
Bromobenzene	0.0100	0.00917		mg/L		92	80 - 120
1,1,2,2-Tetrachloroethane	0.0100	0.0103		mg/L		103	74 - 124
1,2,3-Trichloropropane	0.0100	0.00975		mg/L		98	76 - 124
N-Propylbenzene	0.0100	0.00971		mg/L		97	80 - 128
2-Chlorotoluene	0.0100	0.00981		mg/L		98	80 - 120
4-Chlorotoluene	0.0100	0.00964		mg/L		96	80 - 120
t-Butylbenzene	0.0100	0.00988		mg/L		99	80 - 129
1,2,4-Trimethylbenzene	0.0100	0.00966		mg/L		97	80 - 131
sec-Butylbenzene	0.0100	0.00984		mg/L		98	78 - 131
4-Isopropyltoluene	0.0100	0.00963		mg/L		96	77 - 131
1,3-Dichlorobenzene	0.0100	0.00899		mg/L		90	69 - 127

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: LCS 580-338660/7**  
**Matrix: Water**  
**Analysis Batch: 338660**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,4-Dichlorobenzene	0.0100	0.00932		mg/L		93	80 - 120
n-Butylbenzene	0.0100	0.00984		mg/L		98	78 - 120
1,2-Dichlorobenzene	0.0100	0.00922		mg/L		92	80 - 120
1,2-Dibromo-3-Chloropropane	0.0100	0.00948	J	mg/L		95	65 - 125
1,2,4-Trichlorobenzene	0.0100	0.00922		mg/L		92	73 - 128
Naphthalene	0.0100	0.00958		mg/L		96	75 - 134
1,2,3-Trichlorobenzene	0.0100	0.00939		mg/L		94	74 - 139
1,3,5-Trimethylbenzene	0.0100	0.00985		mg/L		99	80 - 131

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	100		80 - 120
1,2-Dichloroethane-d4 (Surr)	100		80 - 126
4-Bromofluorobenzene (Surr)	97		80 - 120
Dibromofluoromethane (Surr)	100		80 - 120

**Lab Sample ID: LCSD 580-338660/8**  
**Matrix: Water**  
**Analysis Batch: 338660**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dichlorodifluoromethane	0.0100	0.0107		mg/L		107	47 - 133	5	15
Chloromethane	0.0100	0.0103	J	mg/L		103	52 - 135	0	14
Vinyl chloride	0.0100	0.0107		mg/L		107	65 - 130	5	14
Bromomethane	0.0100	0.0108		mg/L		108	66 - 125	2	14
Chloroethane	0.0100	0.00992		mg/L		99	65 - 132	3	18
Trichlorofluoromethane	0.0100	0.0103		mg/L		103	64 - 130	2	14
1,1-Dichloroethene	0.0100	0.0105		mg/L		105	70 - 129	6	17
Methylene Chloride	0.0100	0.00991		mg/L		99	77 - 120	2	18
Methyl tert-butyl ether	0.0100	0.00959		mg/L		96	72 - 130	1	18
trans-1,2-Dichloroethene	0.0100	0.00997		mg/L		100	70 - 130	7	21
1,1-Dichloroethane	0.0100	0.0103		mg/L		103	81 - 129	11	15
2,2-Dichloropropane	0.0100	0.0109		mg/L		109	53 - 150	2	15
cis-1,2-Dichloroethene	0.0100	0.0103		mg/L		103	76 - 129	13	15
2-Butanone (MEK)	50.0	46.7		ug/L		93	73 - 137	3	24
Bromochloromethane	0.0100	0.0100		mg/L		100	78 - 120	7	13
Chloroform	0.0100	0.0103		mg/L		103	73 - 127	8	14
1,1,1-Trichloroethane	0.0100	0.00988		mg/L		99	74 - 130	0	11
Carbon tetrachloride	0.0100	0.0103		mg/L		103	72 - 129	0	11
1,1-Dichloropropene	0.0100	0.00978		mg/L		98	74 - 131	0	14
Benzene	0.0100	0.0101		mg/L		101	82 - 122	6	14
1,2-Dichloroethane	0.0100	0.00956		mg/L		96	76 - 126	2	11
Trichloroethene	0.0100	0.00989		mg/L		99	81 - 125	8	13
1,2-Dichloropropane	0.0100	0.00971		mg/L		97	80 - 126	4	14
Dibromomethane	0.0100	0.00950		mg/L		95	80 - 120	4	11
Bromodichloromethane	0.0100	0.00966		mg/L		97	75 - 124	4	13
cis-1,3-Dichloropropene	0.0100	0.00991		mg/L		99	77 - 120	0	20
Toluene	0.0100	0.00992		mg/L		99	80 - 120	2	13
trans-1,3-Dichloropropene	0.0100	0.00957		mg/L		96	70 - 122	2	14

Eurofins TestAmerica, Seattle



# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 580-338660/8  
 Matrix: Water  
 Analysis Batch: 338660

Client Sample ID: Lab Control Sample Dup  
 Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,2-Trichloroethane	0.0100	0.00919		mg/L		92	80 - 121	0	14
1,3-Dichloropropane	0.0100	0.00948		mg/L		95	79 - 120	2	13
Dibromochloromethane	0.0100	0.00934		mg/L		93	60 - 125	2	13
1,2-Dibromoethane	0.0100	0.00933		mg/L		93	79 - 120	1	12
Chlorobenzene	0.0100	0.00945		mg/L		94	80 - 120	0	10
1,1,1,2-Tetrachloroethane	0.0100	0.00960		mg/L		96	79 - 120	3	10
Ethylbenzene	0.0100	0.00961		mg/L		96	80 - 120	2	14
m-Xylene & p-Xylene	0.0100	0.00963		mg/L		96	80 - 120	1	14
o-Xylene	0.0100	0.00954		mg/L		95	80 - 125	2	16
Styrene	0.0100	0.00919		mg/L		92	76 - 127	2	16
Isopropylbenzene	0.0100	0.00974		mg/L		97	75 - 129	3	12
Bromobenzene	0.0100	0.00924		mg/L		92	80 - 120	1	13
1,1,2,2-Tetrachloroethane	0.0100	0.0101		mg/L		101	74 - 124	2	18
1,2,3-Trichloropropane	0.0100	0.00942		mg/L		94	76 - 124	3	16
N-Propylbenzene	0.0100	0.00966		mg/L		97	80 - 128	1	13
2-Chlorotoluene	0.0100	0.00978		mg/L		98	80 - 120	0	15
4-Chlorotoluene	0.0100	0.00987		mg/L		99	80 - 120	2	14
t-Butylbenzene	0.0100	0.0100		mg/L		100	80 - 129	2	14
1,2,4-Trimethylbenzene	0.0100	0.00981		mg/L		98	80 - 131	2	16
sec-Butylbenzene	0.0100	0.0101		mg/L		101	78 - 131	3	15
4-Isopropyltoluene	0.0100	0.00982		mg/L		98	77 - 131	2	20
1,3-Dichlorobenzene	0.0100	0.00881		mg/L		88	69 - 127	2	14
1,4-Dichlorobenzene	0.0100	0.00940		mg/L		94	80 - 120	1	17
n-Butylbenzene	0.0100	0.0103		mg/L		103	78 - 120	4	14
1,2-Dichlorobenzene	0.0100	0.00937		mg/L		94	80 - 120	2	15
1,2-Dibromo-3-Chloropropane	0.0100	0.00910	J	mg/L		91	65 - 125	4	17
1,2,4-Trichlorobenzene	0.0100	0.00971		mg/L		97	73 - 128	5	20
Naphthalene	0.0100	0.00979		mg/L		98	75 - 134	2	23
1,2,3-Trichlorobenzene	0.0100	0.00998		mg/L		100	74 - 139	6	26
1,3,5-Trimethylbenzene	0.0100	0.00992		mg/L		99	80 - 131	1	14

Surrogate	LCSD %Recovery	LCSD Qualifier	LCSD Limits
Toluene-d8 (Surr)	100		80 - 120
1,2-Dichloroethane-d4 (Surr)	99		80 - 126
4-Bromofluorobenzene (Surr)	97		80 - 120
Dibromofluoromethane (Surr)	100		80 - 120

## Method: 6010D - Metals (ICP)

Lab Sample ID: MB 580-338145/22-A  
 Matrix: Water  
 Analysis Batch: 338335

Client Sample ID: Method Blank  
 Prep Type: Total Recoverable  
 Prep Batch: 338145

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		2.5		mg/L		09/14/20 09:48	09/15/20 14:28	1
Iron	ND		0.50		mg/L		09/14/20 09:48	09/15/20 14:28	1
Magnesium	ND		1.1		mg/L		09/14/20 09:48	09/15/20 14:28	1
Manganese	ND		0.020		mg/L		09/14/20 09:48	09/15/20 14:28	1
Potassium	ND		3.3		mg/L		09/14/20 09:48	09/15/20 14:28	1

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

## Method: 6010D - Metals (ICP) (Continued)

**Lab Sample ID: MB 580-338145/22-A**  
**Matrix: Water**  
**Analysis Batch: 338335**

**Client Sample ID: Method Blank**  
**Prep Type: Total Recoverable**  
**Prep Batch: 338145**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	ND		2.0		mg/L		09/14/20 09:48	09/15/20 14:28	1
Strontium	ND		0.10		mg/L		09/14/20 09:48	09/15/20 14:28	1
Antimony	ND		0.060		mg/L		09/14/20 09:48	09/15/20 14:28	1
Beryllium	ND		0.020		mg/L		09/14/20 09:48	09/15/20 14:28	1
Nickel	ND		0.020		mg/L		09/14/20 09:48	09/15/20 14:28	1
Copper	ND		0.060		mg/L		09/14/20 09:48	09/15/20 14:28	1
Aluminum	ND		1.5		mg/L		09/14/20 09:48	09/15/20 14:28	1
Zinc	ND		0.040		mg/L		09/14/20 09:48	09/15/20 14:28	1
Selenium	ND		0.10		mg/L		09/14/20 09:48	09/15/20 14:28	1
Titanium	ND		0.030		mg/L		09/14/20 09:48	09/15/20 14:28	1

**Lab Sample ID: LCS 580-338145/23-A**  
**Matrix: Water**  
**Analysis Batch: 338335**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total Recoverable**  
**Prep Batch: 338145**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	10.0	10.0		mg/L		100	80 - 120
Iron	20.0	20.3		mg/L		102	80 - 120
Magnesium	20.0	20.3		mg/L		102	80 - 120
Manganese	1.00	0.940		mg/L		94	80 - 120
Potassium	20.0	18.3		mg/L		92	80 - 120
Sodium	20.0	19.3		mg/L		97	80 - 120
Strontium	1.00	0.983		mg/L		98	80 - 120
Antimony	1.00	0.921		mg/L		92	80 - 120
Beryllium	1.00	1.04		mg/L		104	80 - 120
Nickel	1.00	0.994		mg/L		99	80 - 120
Copper	1.00	0.944		mg/L		94	80 - 120
Aluminum	20.0	19.4		mg/L		97	80 - 120
Zinc	1.00	1.02		mg/L		102	80 - 120
Selenium	1.00	0.996		mg/L		100	80 - 120
Titanium	1.00	1.01		mg/L		101	80 - 120

**Lab Sample ID: LCSD 580-338145/24-A**  
**Matrix: Water**  
**Analysis Batch: 338335**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total Recoverable**  
**Prep Batch: 338145**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	10.0	10.0		mg/L		100	80 - 120	0	20
Iron	20.0	20.5		mg/L		102	80 - 120	1	20
Magnesium	20.0	20.6		mg/L		103	80 - 120	1	20
Manganese	1.00	0.953		mg/L		95	80 - 120	1	20
Potassium	20.0	18.3		mg/L		92	80 - 120	0	20
Sodium	20.0	19.5		mg/L		98	80 - 120	1	20
Strontium	1.00	0.991		mg/L		99	80 - 120	1	20
Antimony	1.00	0.929		mg/L		93	80 - 120	1	20
Beryllium	1.00	1.05		mg/L		105	80 - 120	1	20
Nickel	1.00	1.00		mg/L		100	80 - 120	1	20
Copper	1.00	0.952		mg/L		95	80 - 120	1	20
Aluminum	20.0	19.7		mg/L		98	80 - 120	2	20

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

## Method: 6010D - Metals (ICP) (Continued)

**Lab Sample ID: LCSD 580-338145/24-A**  
**Matrix: Water**  
**Analysis Batch: 338335**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total Recoverable**  
**Prep Batch: 338145**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Zinc	1.00	1.04		mg/L		104	80 - 120	2	20
Selenium	1.00	1.01		mg/L		101	80 - 120	2	20
Titanium	1.00	1.02		mg/L		102	80 - 120	1	20

**Lab Sample ID: 580-97430-1 MS**  
**Matrix: Water**  
**Analysis Batch: 338335**

**Client Sample ID: AF71976**  
**Prep Type: Total Recoverable**  
**Prep Batch: 338145**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	ND		10.0	9.84		mg/L		98	80 - 120		
Iron	ND		20.0	20.2		mg/L		101	80 - 120		
Magnesium	3.9		20.0	23.9		mg/L		100	80 - 120		
Manganese	ND		1.00	0.934		mg/L		93	80 - 120		
Potassium	ND		20.0	18.8		mg/L		91	80 - 120		
Sodium	7.7		20.0	27.0		mg/L		96	80 - 120		
Strontium	ND		1.00	1.01		mg/L		97	80 - 120		
Antimony	ND		1.00	0.911		mg/L		91	80 - 120		
Beryllium	ND		1.00	1.04		mg/L		104	80 - 120		
Nickel	ND		1.00	0.976		mg/L		98	80 - 120		
Copper	ND		1.00	0.928		mg/L		93	80 - 120		
Aluminum	ND		20.0	19.6		mg/L		98	80 - 120		
Zinc	ND		1.00	1.01		mg/L		101	80 - 120		
Selenium	ND		1.00	0.979		mg/L		98	80 - 120		
Titanium	ND		1.00	1.01		mg/L		101	80 - 120		

**Lab Sample ID: 580-97430-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 338335**

**Client Sample ID: AF71976**  
**Prep Type: Total Recoverable**  
**Prep Batch: 338145**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	ND		10.0	9.98		mg/L		100	80 - 120	1	20
Iron	ND		20.0	20.4		mg/L		102	80 - 120	1	20
Magnesium	3.9		20.0	24.2		mg/L		102	80 - 120	1	20
Manganese	ND		1.00	0.951		mg/L		94	80 - 120	2	20
Potassium	ND		20.0	19.0		mg/L		91	80 - 120	1	20
Sodium	7.7		20.0	27.2		mg/L		98	80 - 120	1	20
Strontium	ND		1.00	1.04		mg/L		100	80 - 120	3	20
Antimony	ND		1.00	0.938		mg/L		94	80 - 120	3	20
Beryllium	ND		1.00	1.08		mg/L		108	80 - 120	4	20
Nickel	ND		1.00	1.00		mg/L		100	80 - 120	2	20
Copper	ND		1.00	0.949		mg/L		95	80 - 120	2	20
Aluminum	ND		20.0	19.6		mg/L		98	80 - 120	0	20
Zinc	ND		1.00	1.01		mg/L		101	80 - 120	0	20
Selenium	ND		1.00	1.02		mg/L		102	80 - 120	4	20
Titanium	ND		1.00	1.04		mg/L		104	80 - 120	3	20

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

## Method: 6010D - Metals (ICP) (Continued)

**Lab Sample ID: 580-97430-1 DU**  
**Matrix: Water**  
**Analysis Batch: 338335**

**Client Sample ID: AF71976**  
**Prep Type: Total Recoverable**  
**Prep Batch: 338145**

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Boron	ND		ND		mg/L		NC	20
Iron	ND		ND		mg/L		NC	20
Magnesium	3.9		3.93		mg/L		1	20
Manganese	ND		ND		mg/L		NC	20
Potassium	ND		ND		mg/L		NC	20
Sodium	7.7		7.86		mg/L		2	20
Strontium	ND		ND		mg/L		NC	20
Antimony	ND		ND		mg/L		NC	20
Beryllium	ND		ND		mg/L		NC	20
Nickel	ND		ND		mg/L		NC	20
Copper	ND		ND		mg/L		NC	20
Aluminum	ND		ND		mg/L		NC	20
Zinc	ND		ND		mg/L		NC	20
Selenium	ND		ND		mg/L		NC	20
Titanium	ND		ND		mg/L		NC	20

## Method: 1664A - HEM and SGT-HEM

**Lab Sample ID: MB 580-338247/1-A**  
**Matrix: Water**  
**Analysis Batch: 338306**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 338247**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
HEM (Oil & Grease)	ND		5.3		mg/L		09/15/20 10:34	09/15/20 15:26	1
SGT-HEM	ND		5.3		mg/L		09/15/20 10:34	09/15/20 15:26	1
HEM Polar (Oil and Grease - Polar)	ND		5.3		mg/L		09/15/20 10:34	09/15/20 15:26	1

**Lab Sample ID: LCS 580-338247/2-A**  
**Matrix: Water**  
**Analysis Batch: 338306**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 338247**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
SGT-HEM	21.6	16.6		mg/L		77	64 - 132

**Lab Sample ID: LCSD 580-338247/3-A**  
**Matrix: Water**  
**Analysis Batch: 338306**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 338247**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
SGT-HEM	20.8	16.5		mg/L		79	64 - 132	1	34

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

## Method: 300.0 - Anions, Ion Chromatography

**Lab Sample ID: MB 580-338346/8**  
**Matrix: Water**  
**Analysis Batch: 338346**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		0.90		mg/L			09/15/20 14:53	1
Bromide	ND		1.0		mg/L			09/15/20 14:53	1
Sulfate	ND		1.2		mg/L			09/15/20 14:53	1
Fluoride	ND		0.20		mg/L			09/15/20 14:53	1

**Lab Sample ID: LCS 580-338346/9**  
**Matrix: Water**  
**Analysis Batch: 338346**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	50.0	51.5		mg/L		103	90 - 110
Bromide	10.0	9.62		mg/L		96	90 - 110
Sulfate	50.0	51.0		mg/L		102	90 - 110
Fluoride	5.00	4.79		mg/L		96	90 - 110

**Lab Sample ID: LCSD 580-338346/10**  
**Matrix: Water**  
**Analysis Batch: 338346**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	50.0	51.5		mg/L		103	90 - 110	0	15
Bromide	10.0	9.62		mg/L		96	90 - 110	0	15
Sulfate	50.0	51.2		mg/L		102	90 - 110	0	15
Fluoride	5.00	4.82		mg/L		96	90 - 110	0	15

**Lab Sample ID: 580-97427-O-1 MS**  
**Matrix: Water**  
**Analysis Batch: 338346**

**Client Sample ID: Matrix Spike**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	11	F1	50.0	67.2	F1	mg/L		111	90 - 110
Bromide	ND		10.0	10.3		mg/L		103	90 - 110
Sulfate	ND		50.0	55.4		mg/L		109	90 - 110
Fluoride	1.2	F1	5.00	4.94	F1	mg/L		74	90 - 110

**Lab Sample ID: 580-97427-O-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 338346**

**Client Sample ID: Matrix Spike Duplicate**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	11	F1	50.0	67.2	F1	mg/L		111	90 - 110	0	15
Bromide	ND		10.0	10.3		mg/L		103	90 - 110	0	15
Sulfate	ND		50.0	55.0		mg/L		109	90 - 110	1	15
Fluoride	1.2	F1	5.00	4.98	F1	mg/L		75	90 - 110	1	15

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

## Method: 300.0 - Anions, Ion Chromatography (Continued)

**Lab Sample ID: MB 580-338348/8**  
**Matrix: Water**  
**Analysis Batch: 338348**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrite as N	ND		0.40		mg/L			09/15/20 14:53	1
Nitrate as N	ND		0.20		mg/L			09/15/20 14:53	1

**Lab Sample ID: LCS 580-338348/9**  
**Matrix: Water**  
**Analysis Batch: 338348**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrite as N	5.00	4.98		mg/L		100	90 - 110
Nitrate as N	5.00	4.87		mg/L		97	90 - 110

**Lab Sample ID: LCSD 580-338348/10**  
**Matrix: Water**  
**Analysis Batch: 338348**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrite as N	5.00	4.99		mg/L		100	90 - 110	0	15
Nitrate as N	5.00	4.84		mg/L		97	90 - 110	0	15

**Lab Sample ID: 580-97427-O-1 MS**  
**Matrix: Water**  
**Analysis Batch: 338348**

**Client Sample ID: Matrix Spike**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrite as N	ND		5.00	5.31		mg/L		106	90 - 110
Nitrate as N	ND		5.00	5.28		mg/L		104	90 - 110

**Lab Sample ID: 580-97427-O-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 338348**

**Client Sample ID: Matrix Spike Duplicate**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrite as N	ND		5.00	5.32		mg/L		106	90 - 110	0	15
Nitrate as N	ND		5.00	5.28		mg/L		104	90 - 110	0	15

## Method: 335.4 - Cyanide, Total

**Lab Sample ID: MB 580-338599/1-A**  
**Matrix: Water**  
**Analysis Batch: 338603**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 338599**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	ND		0.060		mg/L		09/18/20 13:52	09/18/20 14:57	1

**Lab Sample ID: LCS 580-338599/2-A**  
**Matrix: Water**  
**Analysis Batch: 338603**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 338599**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	0.500	0.494		mg/L		99	90 - 110

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

## Method: 335.4 - Cyanide, Total (Continued)

**Lab Sample ID: LCSD 580-338599/3-A**  
**Matrix: Water**  
**Analysis Batch: 338603**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 338599**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Cyanide, Total	0.500	0.477		mg/L		95	90 - 110	4	10

**Lab Sample ID: 580-97427-J-1-B MS**  
**Matrix: Water**  
**Analysis Batch: 338603**

**Client Sample ID: Matrix Spike**  
**Prep Type: Total/NA**  
**Prep Batch: 338599**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Cyanide, Total	ND		0.500	0.493		mg/L		99	90 - 110		

**Lab Sample ID: 580-97427-J-1-C MSD**  
**Matrix: Water**  
**Analysis Batch: 338603**

**Client Sample ID: Matrix Spike Duplicate**  
**Prep Type: Total/NA**  
**Prep Batch: 338599**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Cyanide, Total	ND		0.500	0.489		mg/L		98	90 - 110	1	10

## Method: 353.2 - Nitrogen, Nitrate-Nitrite

**Lab Sample ID: MB 580-339180/12**  
**Matrix: Water**  
**Analysis Batch: 339180**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	ND		0.15		mg/L			09/25/20 14:29	1

**Lab Sample ID: 580-97396-C-1 DU**  
**Matrix: Water**  
**Analysis Batch: 339180**

**Client Sample ID: Duplicate**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Nitrate as N	1.4		1.40		mg/L		0.07	20

## Method: 5910B - Organic Constituents, UV Absorbing

**Lab Sample ID: MB 680-634418/2**  
**Matrix: Water**  
**Analysis Batch: 634418**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
UV254	ND		0.0090		1/cm			09/15/20 18:07	1

**Lab Sample ID: LCS 680-634418/3**  
**Matrix: Water**  
**Analysis Batch: 634418**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
UV254	0.144	0.158		1/cm		110	80 - 120

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

## Method: 9034 - Sulfide, Acid soluble and Insoluble (Titrimetric)

**Lab Sample ID: MB 280-509269/2-A**  
**Matrix: Water**  
**Analysis Batch: 509277**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 509269**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	ND		4.0		mg/L		09/16/20 12:00	09/16/20 12:56	1

**Lab Sample ID: LCS 280-509269/1-A**  
**Matrix: Water**  
**Analysis Batch: 509277**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 509269**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfide	19.2	14.4		mg/L		75	44 - 110

**Lab Sample ID: 280-140438-F-3-B MS**  
**Matrix: Water**  
**Analysis Batch: 509277**

**Client Sample ID: Matrix Spike**  
**Prep Type: Total/NA**  
**Prep Batch: 509269**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfide	ND		19.2	13.6		mg/L		67	44 - 110

**Lab Sample ID: 280-140438-F-3-C MSD**  
**Matrix: Water**  
**Analysis Batch: 509277**

**Client Sample ID: Matrix Spike Duplicate**  
**Prep Type: Total/NA**  
**Prep Batch: 509269**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Sulfide	ND		19.2	14.4		mg/L		71	44 - 110	6	20

## Method: SM 2150B - Odor

**Lab Sample ID: MB 440-624925/1**  
**Matrix: Water**  
**Analysis Batch: 624925**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Odor	ND		1.0		T.O.N.			09/18/20 10:50	1

## Method: SM 2320B - Alkalinity

**Lab Sample ID: LCS 580-338232/2**  
**Matrix: Water**  
**Analysis Batch: 338232**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity as CaCO3	100	96.6		mg/L		97	85 - 115

**Lab Sample ID: 580-97394-F-1 DU**  
**Matrix: Water**  
**Analysis Batch: 338232**

**Client Sample ID: Duplicate**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Alkalinity as CaCO3	160		153		mg/L		2	17
Bicarbonate Alkalinity as CaCO3	160		153		mg/L		2	20
Carbonate Alkalinity as CaCO3	ND		ND		mg/L		NC	20
Hydroxide Alkalinity as CaCO3	ND		ND		mg/L		NC	20

Eurofins TestAmerica, Seattle



# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

## Method: SM 2340C - Hardness, Total (mg/l as CaCO3)

**Lab Sample ID: MB 580-338341/1**  
**Matrix: Water**  
**Analysis Batch: 338341**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	ND		2.0		mg/L			09/15/20 18:24	1

**Lab Sample ID: LCS 580-338341/2**  
**Matrix: Water**  
**Analysis Batch: 338341**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hardness as calcium carbonate	1000	980		mg/L		98	90 - 110

**Lab Sample ID: 580-97230-E-1 DU**  
**Matrix: Water**  
**Analysis Batch: 338341**

**Client Sample ID: Duplicate**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Hardness as calcium carbonate	63		63.0		mg/L		0.6	20

## Method: SM 3500 FE D - Iron, Ferrous and Ferric

**Lab Sample ID: MB 280-509469/11**  
**Matrix: Water**  
**Analysis Batch: 509469**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ferrous Iron	ND		0.20		mg/L			09/17/20 13:15	1

**Lab Sample ID: LCS 280-509469/9**  
**Matrix: Water**  
**Analysis Batch: 509469**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ferrous Iron	2.00	1.94		mg/L		97	85 - 121

**Lab Sample ID: LCSD 280-509469/10**  
**Matrix: Water**  
**Analysis Batch: 509469**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ferrous Iron	2.00	1.96		mg/L		98	85 - 121	1	10

**Lab Sample ID: 280-140509-C-11 MS**  
**Matrix: Water**  
**Analysis Batch: 509469**

**Client Sample ID: Matrix Spike**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Ferrous Iron	0.28	F1 F2	2.00	1.67	F1	mg/L		69	85 - 121

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

## Method: SM 3500 FE D - Iron, Ferrous and Ferric (Continued)

Lab Sample ID: 280-140509-C-11 MSD  
 Matrix: Water  
 Analysis Batch: 509469

Client Sample ID: Matrix Spike Duplicate  
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ferrous Iron	0.28	F1 F2	2.00	1.40	F1 F2	mg/L		56	85 - 121	17	10

## Method: SM 4500 NH3 G - Ammonia

Lab Sample ID: MB 580-338513/1  
 Matrix: Water  
 Analysis Batch: 338513

Client Sample ID: Method Blank  
 Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia as N	ND		0.50		mg/L			09/17/20 14:22	1

Lab Sample ID: LCS 580-338513/2  
 Matrix: Water  
 Analysis Batch: 338513

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia as N	2.00	1.86		mg/L		93	90 - 110

Lab Sample ID: 580-97238-F-1 MS  
 Matrix: Water  
 Analysis Batch: 338513

Client Sample ID: Matrix Spike  
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia as N	0.71		2.00	2.70		mg/L		99	90 - 110

Lab Sample ID: 580-97238-F-1 MSD  
 Matrix: Water  
 Analysis Batch: 338513

Client Sample ID: Matrix Spike Duplicate  
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ammonia as N	0.71		2.00	2.68		mg/L		99	90 - 110	1	20

Lab Sample ID: 580-97238-F-1 DU  
 Matrix: Water  
 Analysis Batch: 338513

Client Sample ID: Duplicate  
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Ammonia as N	0.71		0.677		mg/L		5	20

## Method: SM 5220D - COD

Lab Sample ID: MB 580-338621/3-A  
 Matrix: Water  
 Analysis Batch: 338643

Client Sample ID: Method Blank  
 Prep Type: Total/NA  
 Prep Batch: 338621

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	ND		10		mg/L		09/19/20 11:22	09/19/20 16:31	1

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

## Method: SM 5220D - COD (Continued)

**Lab Sample ID: LCS 580-338621/4-A**  
**Matrix: Water**  
**Analysis Batch: 338643**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 338621**  
 %Rec.

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Chemical Oxygen Demand	75.0	76.9		mg/L		103	80 - 120

**Lab Sample ID: LCSD 580-338621/5-A**  
**Matrix: Water**  
**Analysis Batch: 338643**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 338621**  
 %Rec. RPD

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Chemical Oxygen Demand	75.0	78.6		mg/L		105	80 - 120	2	20

**Lab Sample ID: 580-97392-A-2-E MS**  
**Matrix: Water**  
**Analysis Batch: 338643**

**Client Sample ID: Matrix Spike**  
**Prep Type: Total/NA**  
**Prep Batch: 338621**  
 %Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Chemical Oxygen Demand	40		25.0	69.2		mg/L		118	75 - 125

**Lab Sample ID: 580-97392-A-2-D DU**  
**Matrix: Water**  
**Analysis Batch: 338643**

**Client Sample ID: Duplicate**  
**Prep Type: Total/NA**  
**Prep Batch: 338621**  
 RPD

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Chemical Oxygen Demand	40		39.0		mg/L		2	20

## Method: SM 5310B - Organic Carbon, Total (TOC)

**Lab Sample ID: MB 580-338832/4**  
**Matrix: Water**  
**Analysis Batch: 338832**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	ND		1.5		mg/L			09/21/20 18:32	1

**Lab Sample ID: LCS 580-338832/5**  
**Matrix: Water**  
**Analysis Batch: 338832**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
 %Rec.

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Total Organic Carbon	10.0	9.89		mg/L		99	85 - 115

**Lab Sample ID: LCSD 580-338832/6**  
**Matrix: Water**  
**Analysis Batch: 338832**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
 %Rec. RPD

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Total Organic Carbon	10.0	9.89		mg/L		99	85 - 115	0	20

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

## Method: SM 5310B - Organic Carbon, Total (TOC) (Continued)

**Lab Sample ID: 580-97430-1 MS**  
**Matrix: Water**  
**Analysis Batch: 338832**

**Client Sample ID: AF71976**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	7.6		10.0	17.2		mg/L		96	85 - 115

**Lab Sample ID: 580-97430-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 338832**

**Client Sample ID: AF71976**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon	7.6		10.0	17.2		mg/L		97	85 - 115	0	20

**Lab Sample ID: 580-97430-1 DU**  
**Matrix: Water**  
**Analysis Batch: 338832**

**Client Sample ID: AF71976**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Organic Carbon	7.6		7.23		mg/L		5	20

## Method: SM 5310B - Organic Carbon, Dissolved (DOC)

**Lab Sample ID: MB 580-338596/1-A**  
**Matrix: Water**  
**Analysis Batch: 338695**

**Client Sample ID: Method Blank**  
**Prep Type: Dissolved**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Organic Carbon	ND		1.5		mg/L			09/19/20 17:49	1

**Lab Sample ID: LCS 580-338596/2-A**  
**Matrix: Water**  
**Analysis Batch: 338695**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Dissolved**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Dissolved Organic Carbon	10.0	10.1		mg/L		101	85 - 115

**Lab Sample ID: LCSD 580-338596/3-A**  
**Matrix: Water**  
**Analysis Batch: 338695**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Dissolved**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dissolved Organic Carbon	10.0	10.1		mg/L		101	85 - 115	0	20

**Lab Sample ID: 580-97430-1 MS**  
**Matrix: Water**  
**Analysis Batch: 338695**

**Client Sample ID: AF71976**  
**Prep Type: Dissolved**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Dissolved Organic Carbon	7.9		10.0	17.0		mg/L		91	85 - 115

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

## Method: SM 5310B - Organic Carbon, Dissolved (DOC) (Continued)

**Lab Sample ID: 580-97430-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 338695**

**Client Sample ID: AF71976**  
**Prep Type: Dissolved**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dissolved Organic Carbon	7.9		10.0	17.2		mg/L		93	85 - 115	1	20

**Lab Sample ID: 580-97430-1 DU**  
**Matrix: Water**  
**Analysis Batch: 338695**

**Client Sample ID: AF71976**  
**Prep Type: Dissolved**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Dissolved Organic Carbon	7.9		7.91		mg/L		0.5	20

## Method: SM 5540C - Methylene Blue Active Substances (MBAS)

**Lab Sample ID: MB 440-624499/4**  
**Matrix: Water**  
**Analysis Batch: 624499**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methylene Blue Active Substances	ND		0.10		mg/L			09/15/20 15:29	1

**Lab Sample ID: LCS 440-624499/5**  
**Matrix: Water**  
**Analysis Batch: 624499**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Methylene Blue Active Substances	0.250	0.253		mg/L		101	90 - 110

**Lab Sample ID: LCSD 440-624499/6**  
**Matrix: Water**  
**Analysis Batch: 624499**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methylene Blue Active Substances	0.250	0.259		mg/L		104	90 - 110	2	20

**Lab Sample ID: MRL 440-624499/3**  
**Matrix: Water**  
**Analysis Batch: 624499**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Methylene Blue Active Substances	0.100	0.121		mg/L		121	50 - 150

**Lab Sample ID: 580-97431-D-1 MS**  
**Matrix: Water**  
**Analysis Batch: 624499**

**Client Sample ID: Matrix Spike**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Methylene Blue Active Substances	ND		0.250	0.283		mg/L		113	50 - 125

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

## Method: SM 5540C - Methylene Blue Active Substances (MBAS) (Continued)

**Lab Sample ID: 580-97431-D-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 624499**

**Client Sample ID: Matrix Spike Duplicate**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methylene Blue Active Substances	ND		0.250	0.242		mg/L		97	50 - 125	15	20

## Method: SM4500\_P\_F - Phosphorus, Total

**Lab Sample ID: MB 580-338789/1-A**  
**Matrix: Water**  
**Analysis Batch: 338792**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 338789**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Phosphorus as P	ND		0.25		mg/L		09/22/20 10:55	09/22/20 10:59	1

**Lab Sample ID: LCS 580-338789/2-A**  
**Matrix: Water**  
**Analysis Batch: 338792**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 338789**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Phosphorus as P	2.00	1.98		mg/L		99	90 - 110

**Lab Sample ID: 580-97335-C-1-C MS**  
**Matrix: Water**  
**Analysis Batch: 338792**

**Client Sample ID: Matrix Spike**  
**Prep Type: Total/NA**  
**Prep Batch: 338789**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Phosphorus as P	ND		2.00	2.03		mg/L		92	80 - 120

**Lab Sample ID: 580-97335-C-1-D MSD**  
**Matrix: Water**  
**Analysis Batch: 338792**

**Client Sample ID: Matrix Spike Duplicate**  
**Prep Type: Total/NA**  
**Prep Batch: 338789**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Phosphorus as P	ND		2.00	2.03		mg/L		92	80 - 120	0	20

**Lab Sample ID: 580-97335-C-1-B DU**  
**Matrix: Water**  
**Analysis Batch: 338792**

**Client Sample ID: Duplicate**  
**Prep Type: Total/NA**  
**Prep Batch: 338789**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Phosphorus as P	ND		ND		mg/L		NC	20

# Lab Chronicle

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

**Client Sample ID: AF71976**

**Lab Sample ID: 580-97430-1**

**Date Collected: 09/08/20 14:40**

**Matrix: Water**

**Date Received: 09/12/20 11:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	338300	09/15/20 19:56	T1W	TAL SEA
Total/NA	Analysis	8260D	DL	50	338660	09/20/20 19:30	JSM	TAL SEA
Total Recoverable	Prep	3005A			338145	09/14/20 09:48	ART	TAL SEA
Total Recoverable	Analysis	6010D		1	338335	09/15/20 14:37	TMH	TAL SEA
Total/NA	Prep	1664A			338247	09/15/20 10:34	FCG	TAL SEA
Total/NA	Analysis	1664A		1	338306	09/15/20 15:26	FCG	TAL SEA
Total/NA	Analysis	300.0		1	338346	09/15/20 14:30	AAC	TAL SEA
Total/NA	Analysis	300.0		1	338348	09/15/20 14:30	AAC	TAL SEA
Total/NA	Prep	Distill/CN			338599	09/18/20 13:52	R1K	TAL SEA
Total/NA	Analysis	335.4		1	338603	09/18/20 15:11	R1K	TAL SEA
Total/NA	Analysis	353.2		1	339180	09/25/20 14:50	R1K	TAL SEA
Total/NA	Analysis	5910B		1	634418	09/15/20 18:07	JLD	TAL SAV
Total/NA	Prep	9030B			509269	09/16/20 12:00	SAH	TAL DEN
Total/NA	Analysis	9034		1	509277	09/16/20 12:56	SAH	TAL DEN
Total/NA	Analysis	SM 2150B		1	624925	09/18/20 10:50	ST	TAL IRV
Total/NA	Analysis	SM 2320B		1	338232	09/15/20 09:07	AAC	TAL SEA
Total/NA	Analysis	SM 2340C		1	338341	09/15/20 18:24	MLT	TAL SEA
Total/NA	Analysis	SM 3500 FE D		1	509469	09/17/20 13:21	BWH	TAL DEN
Total/NA	Analysis	SM 4500 NH3 G		1	338513	09/17/20 14:22	AAC	TAL SEA
Total/NA	Prep	SM 5220			338621	09/19/20 11:23	MLT	TAL SEA
Total/NA	Analysis	SM 5220D		1	338643	09/19/20 16:31	MLT	TAL SEA
Dissolved	Filtration	FILTRATION			338596	09/18/20 13:49	HCC	TAL SEA
Dissolved	Analysis	SM 5310B		1	338695	09/19/20 18:37	R1K	TAL SEA
Total/NA	Analysis	SM 5310B		1	338832	09/21/20 19:19	RBL	TAL SEA
Total/NA	Analysis	SM 5540C		1	624499	09/15/20 15:29	KMY	TAL IRV
Total/NA	Prep	SM 4500 P B			338789	09/22/20 10:55	AAC	TAL SEA
Total/NA	Analysis	SM4500_P_F		1	338792	09/22/20 10:59	AAC	TAL SEA

**Client Sample ID: AF71976A-Trip Blank**

**Lab Sample ID: 580-97430-2**

**Date Collected: 09/08/20 00:01**

**Matrix: Water**

**Date Received: 09/12/20 11:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	338300	09/15/20 17:01	T1W	TAL SEA
Total/NA	Analysis	8260D	RA	1	338660	09/20/20 14:56	JSM	TAL SEA

**Laboratory References:**

- TAL DEN = Eurofins TestAmerica, Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100
- TAL IRV = Eurofins Calscience Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022
- TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858
- TAL SEA = Eurofins TestAmerica, Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

# Accreditation/Certification Summary

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

## Laboratory: Eurofins TestAmerica, Seattle

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-024	01-14-22

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
1664A	1664A	Water	HEM (Oil & Grease)
1664A	1664A	Water	HEM Polar (Oil and Grease - Polar)
1664A	1664A	Water	SGT-HEM
300.0		Water	Bromide
300.0		Water	Chloride
300.0		Water	Fluoride
300.0		Water	Nitrate as N
300.0		Water	Nitrite as N
300.0		Water	Sulfate
335.4	Distill/CN	Water	Cyanide, Total
353.2		Water	Nitrate as N
6010D	3005A	Water	Aluminum
6010D	3005A	Water	Boron
6010D	3005A	Water	Iron
6010D	3005A	Water	Magnesium
6010D	3005A	Water	Potassium
6010D	3005A	Water	Sodium
6010D	3005A	Water	Strontium
6010D	3005A	Water	Titanium
8260D		Water	1,1,1,2-Tetrachloroethane
8260D		Water	1,1,1-Trichloroethane
8260D		Water	1,1,2,2-Tetrachloroethane
8260D		Water	1,1,2-Trichloroethane
8260D		Water	1,1-Dichloroethane
8260D		Water	1,1-Dichloroethene
8260D		Water	1,1-Dichloropropene
8260D		Water	1,2,3-Trichlorobenzene
8260D		Water	1,2,3-Trichloropropane
8260D		Water	1,2,4-Trichlorobenzene
8260D		Water	1,2,4-Trimethylbenzene
8260D		Water	1,2-Dibromo-3-Chloropropane
8260D		Water	1,2-Dibromoethane
8260D		Water	1,2-Dichlorobenzene
8260D		Water	1,2-Dichloroethane
8260D		Water	1,2-Dichloropropane
8260D		Water	1,3,5-Trimethylbenzene
8260D		Water	1,3-Dichlorobenzene
8260D		Water	1,3-Dichloropropane
8260D		Water	1,4-Dichlorobenzene
8260D		Water	2,2-Dichloropropane
8260D		Water	2-Butanone (MEK)
8260D		Water	2-Chlorotoluene
8260D		Water	4-Chlorotoluene
8260D		Water	4-Isopropyltoluene
8260D		Water	Benzene



# Accreditation/Certification Summary

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

## Laboratory: Eurofins TestAmerica, Seattle (Continued)

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-024	01-14-22
8260D	Water	Bromobenzene	
8260D	Water	Bromochloromethane	
8260D	Water	Bromodichloromethane	
8260D	Water	Bromoform	
8260D	Water	Bromomethane	
8260D	Water	Carbon tetrachloride	
8260D	Water	Chlorobenzene	
8260D	Water	Chloroethane	
8260D	Water	Chloroform	
8260D	Water	Chloromethane	
8260D	Water	cis-1,2-Dichloroethene	
8260D	Water	cis-1,3-Dichloropropene	
8260D	Water	Dibromochloromethane	
8260D	Water	Dibromomethane	
8260D	Water	Dichlorodifluoromethane	
8260D	Water	Ethylbenzene	
8260D	Water	Hexachlorobutadiene	
8260D	Water	Isopropylbenzene	
8260D	Water	Methyl tert-butyl ether	
8260D	Water	Methylene Chloride	
8260D	Water	m-Xylene & p-Xylene	
8260D	Water	Naphthalene	
8260D	Water	n-Butylbenzene	
8260D	Water	N-Propylbenzene	
8260D	Water	o-Xylene	
8260D	Water	sec-Butylbenzene	
8260D	Water	Styrene	
8260D	Water	t-Butylbenzene	
8260D	Water	Tetrachloroethene	
8260D	Water	Toluene	
8260D	Water	trans-1,2-Dichloroethene	
8260D	Water	trans-1,3-Dichloropropene	
8260D	Water	Trichloroethene	
8260D	Water	Trichlorofluoromethane	
8260D	Water	Vinyl chloride	
SM 2320B	Water	Alkalinity as CaCO <sub>3</sub>	
SM 2320B	Water	Bicarbonate Alkalinity as CaCO <sub>3</sub>	
SM 2320B	Water	Carbonate Alkalinity as CaCO <sub>3</sub>	
SM 2320B	Water	Hydroxide Alkalinity as CaCO <sub>3</sub>	
SM 2340C	Water	Hardness as calcium carbonate	
SM 4500 NH <sub>3</sub> G	Water	Ammonia as N	
SM 5220D	SM 5220	Water	Chemical Oxygen Demand
SM 5310B	Water	Dissolved Organic Carbon	
SM4500_P_F	SM 4500 P B	Water	Total Phosphorus as P

# Accreditation/Certification Summary

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

## Laboratory: Eurofins Calscience Irvine

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska	State	CA01531	06-30-21
Arizona	State	AZ0671	10-13-20
California	Los Angeles County Sanitation Districts	10256	06-30-21
California	State	2706	06-30-21
Guam	State	20-004R	01-23-21
Hawaii	State	CA01531	01-29-21
Kansas	NELAP	E-10420	07-31-21
Nevada	State	CA015312021-1	07-31-21
Oregon	NELAP	4028 - 008	01-29-21
USDA	US Federal Programs	P330-18-00214	07-09-21
Washington	State	C900	09-03-21

# Accreditation/Certification Summary

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

## Laboratory: Eurofins TestAmerica, Denver

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
A2LA	Dept. of Defense ELAP	2907.01	10-31-21
A2LA	ISO/IEC 17025	2907.01	10-31-21
Alabama	State Program	40730	09-30-12 *
Alaska (UST)	State	18-001	02-08-21
Alaska (UST)	State	18-001	02-08-21
Arizona	State	AZ0713	12-20-20
Arkansas DEQ	State	19-047-0	06-01-21
California	State	2513	01-08-21
Connecticut	State	PH-0686	09-30-20
Florida	NELAP	E87667-57	07-01-21
Georgia	State	4025-011	01-09-21
Illinois	NELAP	2000172019-1	04-30-21
Iowa	State	IA#370	12-01-20
Kansas	NELAP	E-10166	04-30-21
Louisiana	NELAP	30785	06-30-14 *
Louisiana	NELAP	30785	06-30-21
Maine	State	2019011 (231)	03-03-21
Minnesota	NELAP	1788752	12-31-20
Nevada	State	CO000262020-1	07-31-21
New Hampshire	NELAP	205319	04-29-21
New Jersey	NELAP	190002	06-30-21
New York	NELAP	59923	04-01-21
North Carolina (WW/SW)	State	358	12-31-20
North Dakota	State	R-034	01-08-21
Oklahoma	State	2018-006	09-01-21
Oregon	NELAP	4025-011	01-08-21
Pennsylvania	NELAP	013	07-31-21
South Carolina	State	72002001	01-08-21
Texas	NELAP	T104704183-19-17	09-30-20
US Fish & Wildlife	US Federal Programs	058448	08-01-21
USDA	US Federal Programs	P330-18-00099	03-26-21
Utah	NELAP	QUAN5	06-30-13 *
Utah	NELAP	CO000262019-11	07-31-21
Virginia	NELAP	10490	06-14-21
Washington	State	C583-19	08-03-21
West Virginia DEP	State	354	11-30-20
Wyoming (UST)	A2LA	2907.01	10-31-21

\* Accreditation/Certification renewal pending - accreditation/certification considered valid.

# Accreditation/Certification Summary

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

## Laboratory: Eurofins TestAmerica, Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
	AFCEE	SAVLAB	
Alabama	State	41450	06-30-21
Alaska	State	GA00006	06-30-21
Alaska (UST)	State	17-016	09-30-20
ANAB	Dept. of Defense ELAP	L2463	09-22-22
ANAB	ISO/IEC 17025	L2463.01	09-22-22
Arizona	State	AZ0808	12-14-20
Arkansas DEQ	State	19-015-0	02-02-21
California	State	2939	06-30-21
Colorado	State	GA00006	12-31-20
Connecticut	State	PH-0161	03-31-21
Florida	NELAP	E87052	06-30-21
Georgia	State	E87052	06-30-21
Georgia (DW)	State	803	06-30-21
Guam	State	19-007R	04-17-21
Hawaii	State	<cert No.>	06-30-21
Illinois	NELAP	200022	11-30-20
Indiana	State	C-GA-02	06-30-21
Iowa	State	353	06-30-21
Kansas	NELAP	E-10322	10-15-20
Kentucky (DW)	State	KY90084	12-31-21
Kentucky (UST)	State	<cert No.>	06-30-21
Kentucky (WW)	State	KY90084	12-31-20
Louisiana	NELAP	02011	06-30-21
Louisiana (DW)	State	LA009	12-31-20
Maine	State	GA00006	09-26-20
Maryland	State	250	12-31-20
Massachusetts	State	M-GA006	06-30-21
Michigan	State	9925	06-30-21
Mississippi	State	<cert No.>	06-30-21
Nebraska	State	NE-OS-7-04	06-30-21
New Jersey	NELAP	GA769	06-30-21
New Mexico	State	GA00006	06-30-21
New York	NELAP	10842	04-01-21
North Carolina (DW)	State	13701	07-31-21
North Carolina (WW/SW)	State	269	12-31-20
Pennsylvania	NELAP	68-00474	06-30-21
Puerto Rico	State	GA00006	01-01-21
South Carolina	State	98001	06-30-21
Tennessee	State	02961	06-30-21
Texas	NELAP	T1047004185-19-14	11-30-20
Texas	TCEQ Water Supply	T104704185	06-30-21
US Fish & Wildlife	US Federal Programs	LE058448-0	08-01-21
USDA	US Federal Programs	P330-18-00313	10-29-21
Virginia	NELAP	10509	06-14-21
Washington	State	C805	06-10-21
West Virginia (DW)	State	9950C	12-31-20
West Virginia DEP	State	094	07-31-20 *
Wisconsin	State	999819810	08-31-21
Wyoming	State	8TMS-L	06-30-21

\* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Eurofins TestAmerica, Seattle

# Sample Summary

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4659 / Willow WTP #178123

Job ID: 580-97430-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
580-97430-1	AF71976	Water	09/08/20 14:40	09/12/20 11:00	
580-97430-2	AF71976A-Trip Blank	Water	09/08/20 00:01	09/12/20 11:00	

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11



**TestAmerica Seattle**

5755 8th Street East

Tacoma, WA 98424  
phone 253.922.2310 fax 253.922.5047

**Chain of Custody Record**

**TestAmerica**

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Regulatory Program:  DW  NPDES  RCRA  Other:   

Client Contact: Arctic Fox Environmental  
Project Manager: Tim Johnson/Lance Morris  
Site Contact: Tim J. Lance M.  
Date: 9/10/20  
COC No: 98073

Pouch 340043  
Tel/Fax: 907-659-2145  
Lab Contact: Tim J. Lance M.  
Carrier:     
2 of 2 COCs

Prudhoe Bay, AK 99734  
Analysis Turnaround Time  
Sampler: Debra Mack

Phone 907-659-2145  
CALENDAR DAYS  WORKING DAYS   
For Lab Use Only:

FAX 907-659-2146  
TAT if different from Below  
Walk-in Client:  No

Project Name: W, 110 W WTP #12817.5  
 2 weeks  
Lab Sampling:  No

Site:     
 1 week Standard

P.O.# 0920-4659  
 3 days Rush

1 day

Sample Identification

Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	Sample Specific Notes
9/8/20	1440	G	L	16	X	X	VOC Sulfides H <sub>2</sub> S H <sub>2</sub> Se
			L	3			

AF71976-MDZ.35

AF71976A-Top Blank

Preservation Used: 1= Ice, 2= HCl, 3= H2SO4, 4= HNO3, 5= NaOH, 6= Other   

Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown

Return to Client  Disposal by Lab  Archive for \_\_\_\_\_ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact:  Yes  No  
Custody Seal No.: \_\_\_\_\_ Cooler Temp. (°C): Obs'd \_\_\_\_\_ Corr'd \_\_\_\_\_ Therm ID No.: \_\_\_\_\_

Relinquished by:    Company: Arctic Fox Env. Date/Time: 9/10/20 1300 Received by:    Company: TASE2 Date/Time: 9-12-20 1100

Relinquished by: \_\_\_\_\_ Company: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Received by: \_\_\_\_\_ Company: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Relinquished by: \_\_\_\_\_ Company: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Received in Laboratory by: \_\_\_\_\_ Company: \_\_\_\_\_ Date/Time: \_\_\_\_\_







Chain of Custody Record

<b>Client Information (Sub Contract Lab)</b> Company: TestAmerica Laboratories, Inc. Address: 5102 LaRoche Avenue, Savannah, GA, 31404 Phone: 912-364-7358(Tel) 912-352-0165(Fax) Email:		Sampler: Curt. Sharp I. Phone: Sheri Cruz@Eurofins.com State: Alaska (UST)		COC No: 580-97430-1 Page: Page 1 of 1 Job #: 580-97430-1	
Due Date Requested: 9/24/2020 TAT Requested (days):		Analysis Requested:		Preservation Codes: A - HCl, M - Heptane B - NaOH, N - None C - AsAcO2, O - AcAcO2 D - Nitric Acid, P - NaCO3S E - HNO3, Q - Na2SO4 F - H2SO4, R - Na2S2O5 G - Ammonia, S - H2SO4 H - Acetic Acid, T - TSP Benzaldehyde I - 30% U - Acetone J - DI Water, V - HCl K - EDTA, W - 4:1 L - BDA, X - 4:1 Z - other (specify)	
Project Name: 0920-4659 / Willow WTP #176123 Site:		Field Filtered Sample Type (Yes or No) <input checked="" type="checkbox"/>		Total Number of Containers: 1	
Sample Identification - Client ID (Lab ID) AF71976 (580-97430-1)		Sample Type (C=Cmp, G=grab) Preservation Code: Water		Special Instructions/Note:	
Sample Date: 9/8/20 Sample Time: 14:40 Alaskan		Platform HS/MSD Type (Yes or No) <input checked="" type="checkbox"/>		Platform HS/MSD Type (Yes or No) <input checked="" type="checkbox"/>	
<p><b>Possible Hazard Identification</b></p> <p>Unconfirmed</p> <p>Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2</p> <p>Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)  <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months</p> <p>Special Instructions/OC Requirements:</p>					
Requisitioned by: Tom Stankus Date/Time: 9/14/20		Received by: [Signature] Date/Time: 9-15-20 1055		Company: TA-SK Company:	
Requisitioned by:		Received by:		Company:	
Requisitioned by:		Received by:		Company:	
Custody Seals Intact: A Yes A No Custody Seal No:		Cooler Temperature(s) °C and Other Remarks:		3.8/4.3	

# Login Sample Receipt Checklist

Client: Arctic Fox Environmental, Inc

Job Number: 580-97430-1

**Login Number: 97430**

**List Source: Eurofins TestAmerica, Seattle**

**List Number: 1**

**Creator: Hobbs, Kenneth F**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



## Login Sample Receipt Checklist

Client: Arctic Fox Environmental, Inc

Job Number: 580-97430-1

**Login Number: 97430**  
**List Number: 3**  
**Creator: Ornelas, Olga**

**List Source: Eurofins Irvine**  
**List Creation: 09/15/20 11:49 AM**

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



# Login Sample Receipt Checklist

Client: Arctic Fox Environmental, Inc

Job Number: 580-97430-1

**Login Number: 97430**

**List Number: 4**

**Creator: Schade, Daniel B**

**List Source: Eurofins TestAmerica, Denver**

**List Creation: 09/15/20 01:30 PM**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

# Login Sample Receipt Checklist

Client: Arctic Fox Environmental, Inc

Job Number: 580-97430-1

**Login Number: 97430**  
**List Number: 2**  
**Creator: Sims, Robert D**

**List Source: Eurofins TestAmerica, Savannah**  
**List Creation: 09/15/20 12:10 PM**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	





September 30, 2020

Service Request No:K2007930

Lance Morris  
Arctic Fox Laboratory  
100 Airport Way  
Prudhoe Bay, AK 99734

**Laboratory Results for: Willow WTP + Willow WQ**

Dear Lance,

Enclosed are the results of the sample(s) submitted to our laboratory September 14, 2020  
For your reference, these analyses have been assigned our service request number **K2007930**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3376. You may also contact me via email at [Mark.Harris@alsglobal.com](mailto:Mark.Harris@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Mark Harris  
Project Manager

ADDRESS 1317 S. 13th Avenue, Kelso, WA 98626  
PHONE +1 360 577 7222 | FAX +1 360 636 1068  
ALS Group USA, Corp.  
dba ALS Environmental



# Narrative Documents

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360) 577-7222 Fax (360) 425-9096  
[www.alsglobal.com](http://www.alsglobal.com)





**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water

**Service Request:** K2007930  
**Date Received:** 09/14/2020

**CASE NARRATIVE**

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier II level requested by the client.

**Sample Receipt:**

Three water samples were received for analysis at ALS Environmental on 09/14/2020. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

**Metals:**

No significant anomalies were noted with this analysis.

**General Chemistry:**

No significant anomalies were noted with this analysis.

*Noel D. O'Connell*

Approved by \_\_\_\_\_

Date 09/30/2020

**SAMPLE DETECTION SUMMARY**

**CLIENT ID: AF71976-M0235**

**Lab ID: K2007930-001**

<b>Analyte</b>	<b>Results</b>	<b>Flag</b>	<b>MDL</b>	<b>MRL</b>	<b>Units</b>	<b>Method</b>
Silica as SiO <sub>2</sub> , Dissolved	490			450	ug/L	6010C
Silica	600			450	ug/L	6010C



## Sample Receipt Information

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360) 577-7222 Fax (360) 425-9096  
[www.alsglobal.com](http://www.alsglobal.com)



**Cooler Receipt and Preservation Form**

Client Arctic Fox Env. Service Request K20 07930  
 Received: 9/14/20 Opened: 9/14/20 By: [Signature] Unloaded: 9/14/20 By: [Signature]

Samples were received via? USPS Fed Ex UPS DHL PDX Courier Hand Delivered  
 Samples were received in: (circle) Cooler Box Envelope Other NA  
 Were custody seals on coolers? NA Y N If yes, how many and where? 1 front  
 If present, were custody seals intact? Y N If present, were they signed and dated? Y N  
 Was a Temperature Blank present in cooler? NA Y N If yes, notate the temperature in the appropriate column below:  
 If no, take the temperature of a representative sample bottle contained within the cooler; notate in the column "Sample Temp":  
 Were samples received within the method specified temperature ranges? NA Y N  
 If no, were they received on ice and same day as collected? If not, notate the cooler # below and notify the PM. NA Y N  
 applicable, tissue samples were received: Frozen Partially Thawed Thawed

Temp Blank	Sample Temp	IR Gun	Cooler #/COC ID /NA	Out of temp indicate with 'X'	PM Notified if out of temp	Tracking Number NA	Filed
<u>8.3</u>	<u>-</u>	<u>Flou</u>	<u>(circle)</u>	<u>X</u>	<u>X</u>	<u>0272156 8890</u>	<u>X</u>

Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves Boxes  
 Were custody papers properly filled out (ink, signed, etc.)? Small NA Y N  
 Were samples received in good condition (unbroken) NA Y N  
 Were all sample labels complete (ie, analysis, preservation, etc.)? NA Y N  
 0. Did all sample labels and tags agree with custody papers? NA Y N  
 1. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N  
 2. Were the pH-preserved bottles (see SMO GEN SOP) received at the appropriate pH? Indicate in the table below NA Y N  
 3. Were VOA vials received without headspace? Indicate in the table below NA Y N  
 4. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, Resolutions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



## Miscellaneous Forms

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360) 577-7222 Fax (360) 425-9096  
[www.alsglobal.com](http://www.alsglobal.com)

### **Inorganic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### **Metals Data Qualifiers**

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Organic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Additional Petroleum Hydrocarbon Specific Qualifiers**

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEH	<a href="http://dec.alaska.gov/eh/lab/cs/csapproval.htm">http://dec.alaska.gov/eh/lab/cs/csapproval.htm</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L16-58-R4
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	<a href="http://health.hawaii.gov/">http://health.hawaii.gov/</a>	-
ISO 17025	<a href="http://www.pjllabs.com/">http://www.pjllabs.com/</a>	L16-57
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/page/la-lab-accreditation">http://www.deq.louisiana.gov/page/la-lab-accreditation</a>	03016
Maine DHS	<a href="http://www.maine.gov/dhhs/">http://www.maine.gov/dhhs/</a>	WA01276
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/enforcement/oqa.html">http://www.nj.gov/dep/enforcement/oqa.html</a>	WA005
New York - DOH	<a href="https://www.wadsworth.org/regulatory/elap">https://www.wadsworth.org/regulatory/elap</a>	12060
North Carolina DEQ	<a href="https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification">https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/EnvironmentalLabCertification/">http://www.scdhec.gov/environment/EnvironmentalLabCertification/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wyoming (EPA Region 8)	<a href="https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water">https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

ALS Group USA, Corp.  
dba ALS Environmental

Analyst Summary report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ/

**Service Request:** K2007930

**Sample Name:** AF71976-M0235  
**Lab Code:** K2007930-001  
**Sample Matrix:** Water

**Date Collected:** 09/8/20  
**Date Received:** 09/14/20

**Analysis Method**  
6010C

**Extracted/Digested By**  
ABOYER

**Analyzed By**  
RMOORE

**Sample Name:** AF71986-M0015/R0056  
**Lab Code:** K2007930-002  
**Sample Matrix:** Water

**Date Collected:** 09/9/20  
**Date Received:** 09/14/20

**Analysis Method**  
6010C

**Extracted/Digested By**  
ABOYER

**Analyzed By**  
RMOORE

**Sample Name:** AF71989-L9911  
**Lab Code:** K2007930-003  
**Sample Matrix:** Water

**Date Collected:** 09/9/20  
**Date Received:** 09/14/20

**Analysis Method**  
6010C

**Extracted/Digested By**  
ABOYER

**Analyzed By**  
RMOORE



# Sample Results

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360) 577-7222 Fax (360) 425-9096  
[www.alsglobal.com](http://www.alsglobal.com)



# Metals

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360) 577-7222 Fax (360) 425-9096  
[www.alsglobal.com](http://www.alsglobal.com)

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water  
**Sample Name:** AF71976-M0235  
**Lab Code:** K2007930-001

**Service Request:** K2007930  
**Date Collected:** 09/08/20 14:40  
**Date Received:** 09/14/20 12:15  
**Basis:** NA

Dissolved Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Silica as SiO2	6010C	<b>490</b>	ug/L	450	1	09/29/20 17:32	09/28/20	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water  
**Sample Name:** AF71976-M0235  
**Lab Code:** K2007930-001

**Service Request:** K2007930  
**Date Collected:** 09/08/20 14:40  
**Date Received:** 09/14/20 12:15  
**Basis:** NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Silica	6010C	600	ug/L	450	1	09/29/20 17:06	09/28/20	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water  
**Sample Name:** AF71986-M0015/R0056  
**Lab Code:** K2007930-002

**Service Request:** K2007930  
**Date Collected:** 09/09/20 15:00  
**Date Received:** 09/14/20 12:15  
**Basis:** NA

Dissolved Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Silica as SiO2	6010C	ND U	ug/L	450	1	09/29/20 17:35	09/28/20	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water  
**Sample Name:** AF71986-M0015/R0056  
**Lab Code:** K2007930-002

**Service Request:** K2007930  
**Date Collected:** 09/09/20 15:00  
**Date Received:** 09/14/20 12:15  
**Basis:** NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Silica	6010C	ND U	ug/L	450	1	09/29/20 17:27	09/28/20	



ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water  
**Sample Name:** AF71989-L9911  
**Lab Code:** K2007930-003

**Service Request:** K2007930  
**Date Collected:** 09/09/20 11:12  
**Date Received:** 09/14/20 12:15  
**Basis:** NA

Dissolved Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Silica as SiO2	6010C	ND U	ug/L	450	1	09/29/20 17:38	09/28/20	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water  
**Sample Name:** AF71989-L9911  
**Lab Code:** K2007930-003

**Service Request:** K2007930  
**Date Collected:** 09/09/20 11:12  
**Date Received:** 09/14/20 12:15

**Basis:** NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Silica	6010C	ND U	ug/L	450	1	09/29/20 17:29	09/28/20	



# QC Summary Forms

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360) 577-7222 Fax (360) 425-9096  
[www.alsglobal.com](http://www.alsglobal.com)



# Metals

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360) 577-7222 Fax (360) 425-9096  
[www.alsglobal.com](http://www.alsglobal.com)

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** KQ2014031-02

**Service Request:** K2007930  
**Date Collected:** NA  
**Date Received:** NA  
**Basis:** NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Silica	6010C	ND U	ug/L	450	1	09/29/20 16:58	09/28/20	

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water

**Service Request:** K2007930  
**Date Collected:** 09/08/20  
**Date Received:** 09/14/20  
**Date Analyzed:** 09/29/20  
**Date Extracted:** 09/28/20

**Matrix Spike Summary**  
**Total Metals**

**Sample Name:** AF71976-M0235  
**Lab Code:** K2007930-001  
**Analysis Method:** 6010C  
**Prep Method:** EPA CLP ILM04.0

**Units:** ug/L  
**Basis:** NA

**Matrix Spike**  
KQ2014031-06

<u>Analyte Name</u>	<u>Sample Result</u>	<u>Result</u>	<u>Spike Amount</u>	<u>% Rec</u>	<u>% Rec Limits</u>
Silica	600	21300	21400	97	75-125

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Matrix Spike and Matrix Spike Duplicate Data is presented for information purposes only. The matrix may or may not be relevant to samples reported in this report. The laboratory evaluates system performance based on the LCS and LCSD control limits.

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water

**Service Request:** K2007930  
**Date Collected:** 09/08/20  
**Date Received:** 09/14/20  
**Date Analyzed:** 09/29/20

Replicate Sample Summary

Total Metals

**Sample Name:** AF71976-M0235  
**Lab Code:** K2007930-001

**Units:** ug/L  
**Basis:** NA

Analyte Name	Analysis Method	MRL	Sample Result	Duplicate Sample	Average	RPD	RPD Limit
				KQ2014031-04			
Silica	6010C	450	600	600	600	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water

**Service Request:** K2007930  
**Date Analyzed:** 09/29/20

**Lab Control Sample Summary**  
**Total Metals**

**Units:**ug/L  
**Basis:**NA

**Lab Control Sample**  
KQ2014031-03

<b>Analyte Name</b>	<b>Analytical Method</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Silica	6010C	21000	21400	98	80-120



## Arctic Fox Environmental Algal ID and Enumeration Report

Prepared: October 14, 2020

Prepared By: GreenWater Laboratories

Samples: 3

1. AF71976-M0235 (Collected on 9/8/20)
2. AF71986-M0015/R0056 (Collected on 9/9/20)
3. AF71989-L9911 (Collected on 9/9/20)

### Sample 1: AF71976-M0235

Total cell numbers in the AF71976-M0235 sample collected on 9/8/20 were 17,541 cells/mL. Blue-green algae (Cyanobacteria; 14,260 cells/mL) were the dominant algal group in the sample accounting for 81.3% of total cell numbers. Other algal groups in the sample were diatoms (Bacillariophyceae; 48 cells/mL), desmids (Charophyta; 3 cells/mL), green algae (Chlorophyta; 2,678 cells/mL), golden-brown algae (Chrysophyceae; 94 cells/mL), dinoflagellates (Dinophyceae; 0.2 cells/mL) and unknown algae (Unknown; 458 cells/mL). The most abundant species was the colonial cyanophyte *Aphanocapsa delicatissima* (5,890 cells/mL; Fig. 1).

Total numbers of potentially toxigenic cyanobacteria (PTOX Cyano) were 56 cells/mL (0.3% of total cell numbers). PTOX Cyano species present included *Pseudanabaena* sp. (56 cells/mL; Fig. 2).

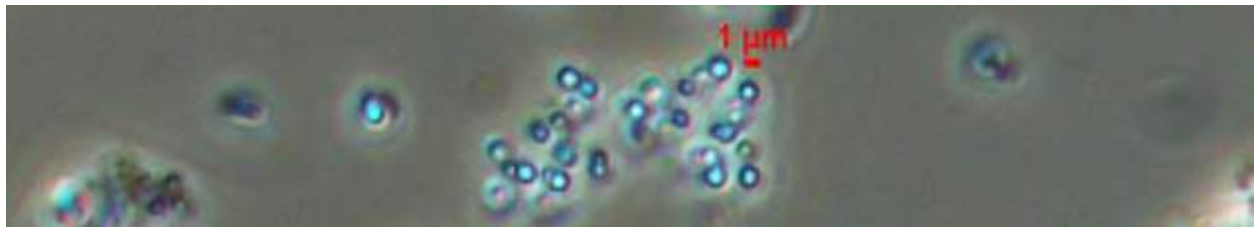


Fig. 1 *Aphanocapsa delicatissima* 400X (scale bar = 1 $\mu$ m)

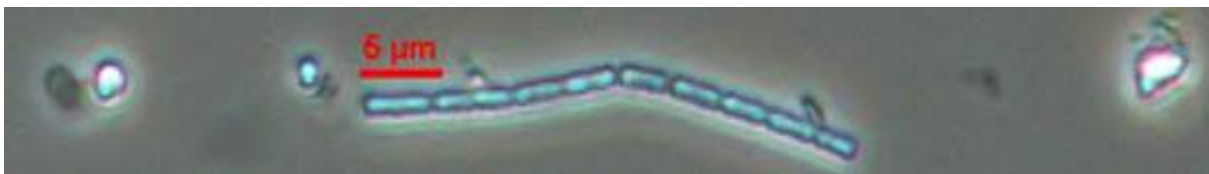


Fig. 2 *Pseudanabaena* sp. 400X (scale bar = 5 $\mu$ m)

**Sample 2: AF71986-M0015/R0056**

Total cell numbers in the AF71986-M0015/R0056 sample collected on 9/9/20 were 22,224 cells/mL. Blue-green algae (Cyanobacteria; 17,452 cells/mL) were the dominant algal group in the sample accounting for 78.5% of total cell numbers. Other algal groups in the sample were diatoms (Bacillariophyceae; 2,684 cells/mL), desmids (Charophyta; 12 cells/mL), green algae (Chlorophyta; 1,726 cells/mL), golden-brown algae (Chrysophyceae; 84 cells/mL), cryptophytes (Cryptophyta; 3 cells/mL), dinoflagellates (Dinophyceae; 0.1 cells/mL) and unknown algae (Unknown; 264 cells/mL). The most abundant species was the colonial cyanophyte *Aphanocapsa delicatissima* (7,121 cells/mL; Fig. 3).

Total numbers of potentially toxigenic cyanobacteria (PTOX Cyano) were 56 cells/mL (0.3% of total cell numbers). PTOX Cyano species present included *Radiocystis elongata* (46 cells/mL; Fig. 4), *Pseudanabaena mucicola* (8 cells/mL; Fig. 5) and cf. *Phormidium* sp. (2 cells/mL; Fig. 6).

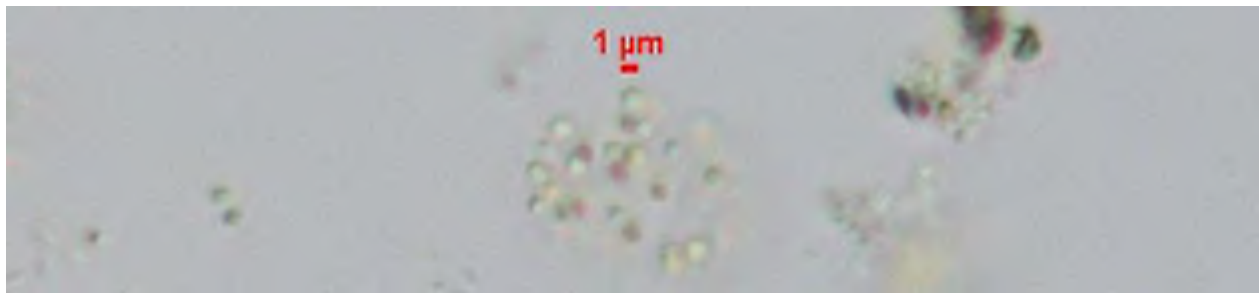


Fig. 3 *Aphanocapsa delicatissima* 400X (scale bar = 1 $\mu$ m)

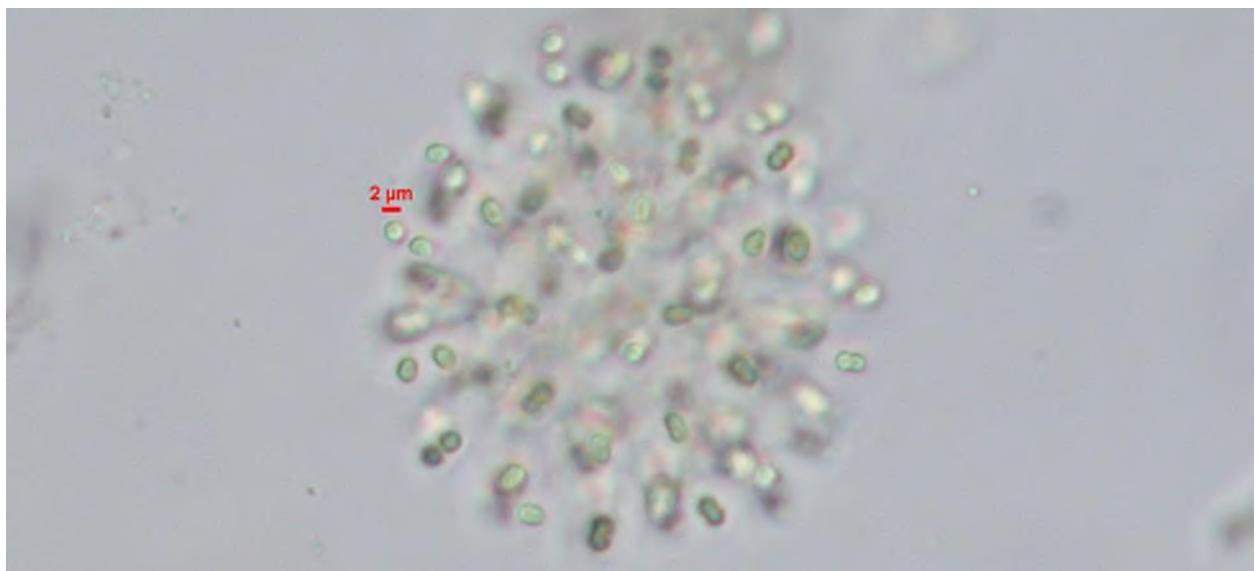


Fig. 4 *Radiocystis elongata* 400X (scale bar = 2 $\mu$ m)



Fig. 5 *Pseudanabaena mucicola* 400X (scale bar = 2 $\mu$ m)



Fig. 6 cf. *Phormidium* sp. 400X (scale bar = 5 $\mu$ m)

### Sample 3: AF71989-L9911

Total cell numbers in the AF71989-L9911 sample collected on 9/9/20 were 11,502 cells/mL. Blue-green algae (Cyanobacteria; 8,269 cells/mL) were the dominant algal group in the sample accounting for 71.9% of total cell numbers. Other algal groups in the sample were diatoms (Bacillariophyceae; 1,724 cells/mL), desmids (Charophyta; 76 cells/mL), green algae (Chlorophyta; 876 cells/mL), golden-brown algae (Chrysophyceae; 96 cells/mL), dinoflagellates (Dinophyceae; 1 cell/mL) and unknown algae (Unknown; 461 cells/mL). The most abundant species was the colonial cyanophyte *Aphanocapsa incerta* (3,539 cells/mL; Fig. 7).

Total numbers of potentially toxigenic cyanobacteria (PTOX Cyano) were 56 cells/mL (0.3% of total cell numbers). PTOX Cyano species present included *Pseudanabaena mucicola* (21 cells/mL) and *Snowella lacustris* (12 cells/mL; Fig. 8).

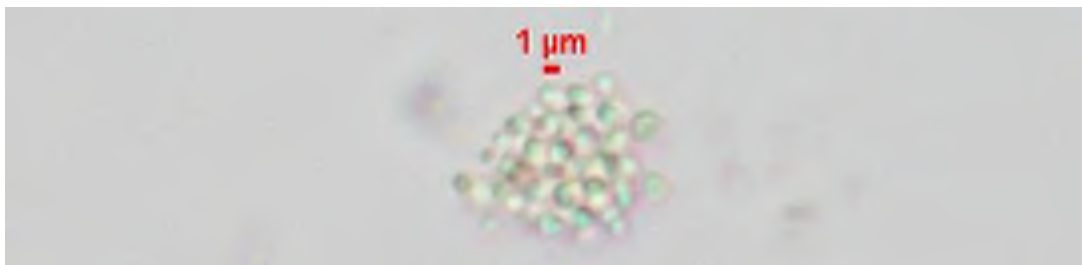


Fig. 7 *Aphanocapsa incerta* 400X (scale bar = 1 $\mu$ m)

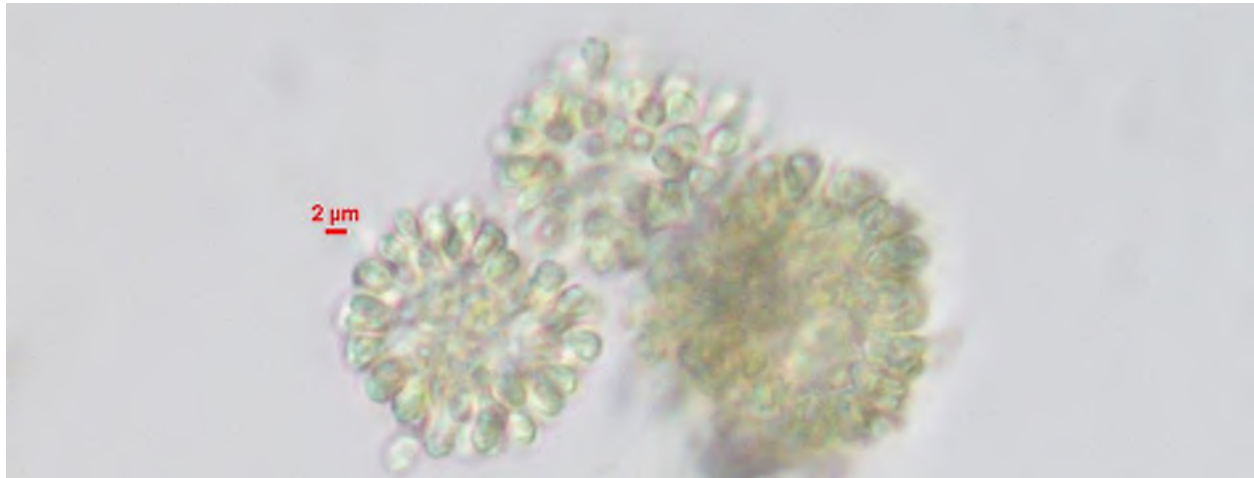


Fig. 8 *Snowella lacustris* 400X (scale bar = 2 $\mu$ m)

Sample ID	Sample Site	Sampling Date	Taxa	Algal Group	Counting Unit	Cells/Unit	Species Units/mL	Species Cells/mL	Group Total Units/mL	Group Total Cells/mL	Sample Total Units/mL	Sample Total Cells/mL
AF71976-M0235	Willow WTP #178123	9/8/2020	centric diatom sp.	Bacillariophyceae	cell	1	39	39	48	48	3,619	17,541
AF71976-M0235	Willow WTP #178123	9/8/2020	Nitzschia sp.	Bacillariophyceae	cell	1	3	3				
AF71976-M0235	Willow WTP #178123	9/8/2020	Nitzschia sp.	Bacillariophyceae	cell	1	3	3				
AF71976-M0235	Willow WTP #178123	9/8/2020	pennate diatom sp.	Bacillariophyceae	cell	1	3	3				
AF71976-M0235	Willow WTP #178123	9/8/2020	Amphora sp.	Bacillariophyceae	cell	1	0.1	0.1				
AF71976-M0235	Willow WTP #178123	9/8/2020	Nitzschia sp.	Bacillariophyceae	cell	1	0.1	0.1				
AF71976-M0235	Willow WTP #178123	9/8/2020	pennate diatom sp.	Bacillariophyceae	cell	1	0.1	0.1				
AF71976-M0235	Willow WTP #178123	9/8/2020	Navicula sp.	Bacillariophyceae	cell	1	0.1	0.1				
AF71976-M0235	Willow WTP #178123	9/8/2020	Cosmarium sp.	Charophyta	cell	1	3	3	3	3		
AF71976-M0235	Willow WTP #178123	9/8/2020	Staurastrum sp.	Charophyta	cell	1	0.1	0.1				
AF71976-M0235	Willow WTP #178123	9/8/2020	chlorophyte unicell, oval spp.	Chlorophyta	cell	1	1,610	1,610	2,355	2,678		
AF71976-M0235	Willow WTP #178123	9/8/2020	chlorophyte unicell, sphere spp.	Chlorophyta	cell	1	380	380				
AF71976-M0235	Willow WTP #178123	9/8/2020	Oocystis spp. (unicell)	Chlorophyta	cell	1	105	105				
AF71976-M0235	Willow WTP #178123	9/8/2020	Fusola viridis	Chlorophyta	colony	2	52	105				
AF71976-M0235	Willow WTP #178123	9/8/2020	chlorophyte tetrad spp.	Chlorophyta	colony	4	26	105				
AF71976-M0235	Willow WTP #178123	9/8/2020	chlorophyte cell pair spp.	Chlorophyta	colony	2	52	105				
AF71976-M0235	Willow WTP #178123	9/8/2020	chlorophyte colony sp.	Chlorophyta	colony	7	13	92				
AF71976-M0235	Willow WTP #178123	9/8/2020	Crucigenia/Tetrastrum sp.	Chlorophyta	colony	8	6	45				
AF71976-M0235	Willow WTP #178123	9/8/2020	Nephrochlamys sp.	Chlorophyta	cell	1	26	26				
AF71976-M0235	Willow WTP #178123	9/8/2020	chlorophyte flagellate sp.	Chlorophyta	cell	1	26	26				
AF71976-M0235	Willow WTP #178123	9/8/2020	Tetraedron minimum	Chlorophyta	cell	1	26	26				
AF71976-M0235	Willow WTP #178123	9/8/2020	Pseudodidymocystis fina	Chlorophyta	colony	2	8	17				
AF71976-M0235	Willow WTP #178123	9/8/2020	Monoraphidium circinale	Chlorophyta	cell	1	13	13				
AF71976-M0235	Willow WTP #178123	9/8/2020	chlorophyte colony sp.	Chlorophyta	colony	3	3	8				
AF71976-M0235	Willow WTP #178123	9/8/2020	Desmodesmus spp. (2-celled)	Chlorophyta	colony	2	3	6				
AF71976-M0235	Willow WTP #178123	9/8/2020	Didymocystis/Pseudodidymocystis sp.	Chlorophyta	colony	2	3	6				
AF71976-M0235	Willow WTP #178123	9/8/2020	chlorophyte unicell sp.	Chlorophyta	cell	1	3	3				
AF71976-M0235	Willow WTP #178123	9/8/2020	Botryococcus sp.	Chlorophyta	colony	36	0.1	2				
AF71976-M0235	Willow WTP #178123	9/8/2020	chlorophyte unicell sp.	Chlorophyta	cell	1	0.1	0.1				
AF71976-M0235	Willow WTP #178123	9/8/2020	chrysophyte flagellate sp.	Chrysophyceae	cell	1	79	79	94	94		
AF71976-M0235	Willow WTP #178123	9/8/2020	chrysophyte flagellate sp.	Chrysophyceae	cell	1	13	13				
AF71976-M0235	Willow WTP #178123	9/8/2020	chrysophyte flagellate sp.	Chrysophyceae	cell	1	3	3				
AF71976-M0235	Willow WTP #178123	9/8/2020	Aphanocapsa delicatissima	Cyanobacteria	colony	18	327	5,890	660	14,260		
AF71976-M0235	Willow WTP #178123	9/8/2020	Aphanocapsa sp.	Cyanobacteria	colony	26	131	3,403				
AF71976-M0235	Willow WTP #178123	9/8/2020	Anathece sp.	Cyanobacteria	colony	94	26	2,461				
AF71976-M0235	Willow WTP #178123	9/8/2020	Coelosphaerium sp.	Cyanobacteria	colony	38	39	1,492				
AF71976-M0235	Willow WTP #178123	9/8/2020	Cyanodictyon sp.	Cyanobacteria	colony	15	26	393				
AF71976-M0235	Willow WTP #178123	9/8/2020	Aphanocapsa sp.	Cyanobacteria	colony	20	13	262				
AF71976-M0235	Willow WTP #178123	9/8/2020	cyanophyte tetrad spp.	Cyanobacteria	colony	4	65	262				
AF71976-M0235	Willow WTP #178123	9/8/2020	Pseudanabaena sp.	Cyanobacteria	filament	10	6	56				
AF71976-M0235	Willow WTP #178123	9/8/2020	cyanophyte unicell, oval/rod spp.	Cyanobacteria	cell	1	26	26				
AF71976-M0235	Willow WTP #178123	9/8/2020	Aphanocapsa incerta	Cyanobacteria	colony	110	0.1	15				
AF71976-M0235	Willow WTP #178123	9/8/2020	dinoflagellate sp.	Dinophyceae	cell	1	0.2	0.2	0.2	0.2		
AF71976-M0235	Willow WTP #178123	9/8/2020	unknown flagellate spp.	Unknown	cell	1	380	380	458	458		
AF71976-M0235	Willow WTP #178123	9/8/2020	microflagellate spp.	Unknown	cell	1	39	39				
AF71976-M0235	Willow WTP #178123	9/8/2020	unknown unicell, oval spp.	Unknown	cell	1	26	26				
AF71976-M0235	Willow WTP #178123	9/8/2020	unknown unicell, sphere spp.	Unknown	cell	1	13	13				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	centric diatom sp.	Bacillariophyceae	cell	1	2,304	2,304	2,577	2,684	5,449	22,224
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Fragilaria sp.	Bacillariophyceae	cell	1	175	175				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Diatoma tenuis	Bacillariophyceae	colony	4	35	140				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Nitzschia sp.	Bacillariophyceae	cell	1	35	35				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Nitzschia sp.	Bacillariophyceae	cell	1	17	17				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	pennate diatom sp.	Bacillariophyceae	cell	1	3	3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Urosolenia sp.	Bacillariophyceae	cell	1	3	3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	centric diatom sp.	Bacillariophyceae	cell	1	3	3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Navicula sp.	Bacillariophyceae	cell	1	3	3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Fragilaria sp.	Bacillariophyceae	colony	5	0.4	2				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	centric diatom chain sp.	Bacillariophyceae	chain	4	0.1	0.3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	pennate diatom sp.	Bacillariophyceae	cell	1	0.1	0.1				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Cosmarium sp.	Charophyta	cell	1	8	8	12	12		

Sample ID	Sample Site	Sampling Date	Taxa	Algal Group	Counting Unit	Cells/Unit	Species	Species	Group Total	Group Total	Sample Total	Sample Total
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Staurastrum sp.	Charophyta	cell	1	3	3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Staurastrum sp.	Charophyta	cell	1	0.3	0.3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Staurastrum sp.	Charophyta	cell	1	0.1	0.1				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Staurastrum sp.	Charophyta	cell	1	0.1	0.1				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	chlorophyte unicell, oval spp.	Chlorophyta	cell	1	436	436	1,305	1,726		
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	chlorophyte unicell, sphere spp.	Chlorophyta	cell	1	332	332				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Fusola viridis	Chlorophyta	colony	2	70	140				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Koliella longiseta	Chlorophyta	cell	1	87	87				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Lagerheimia genevensis	Chlorophyta	cell	1	87	87				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Desmodesmus spp. (2-celled)	Chlorophyta	colony	2	35	70				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Tetraedron minimum	Chlorophyta	cell	1	70	70				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Desmodesmus abundans	Chlorophyta	colony	4	17	70				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	chlorophyte colony sp.	Chlorophyta	colony	4	17	70				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Ankistrodesmus spiralis	Chlorophyta	colony	3	19	58				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Nephrochlamys sp.	Chlorophyta	cell	1	35	35				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Didymocystis/Pseudodidymocystis sp.	Chlorophyta	colony	2	17	35				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	chlorophyte cell pair spp.	Chlorophyta	colony	2	17	35				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	chlorophyte colony sp.	Chlorophyta	colony	10	3	28				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Pseudodidymocystis fina	Chlorophyta	colony	2	11	22				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Desmodesmus communis	Chlorophyta	colony	4	6	22				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Kirchneriella irregularis	Chlorophyta	colony	8	3	22				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Stichococcus sp.	Chlorophyta	filament	35	1	19				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Oocystis spp. (unicell)	Chlorophyta	cell	1	17	17				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Oocystis parva	Chlorophyta	colony	2	6	11				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Scenedesmus sp.	Chlorophyta	colony	4	3	11				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Oocystis pusilla	Chlorophyta	colony	3	3	8				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Pseudopediastrum boryanum	Chlorophyta	colony	19	0.4	8				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Botryococcus sp.	Chlorophyta	colony	108	0.1	7				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Planctonema lauterbornii	Chlorophyta	filament	49	0.1	7				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Pseudodidymocystis planctonica	Chlorophyta	colony	2	3	6				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Oocystis lacustris	Chlorophyta	colony	2	3	6				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Ankistrodesmus spiralis	Chlorophyta	cell	1	3	3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Monoraphidium contortum	Chlorophyta	cell	1	3	3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Coelastrum pseudomicroporum	Chlorophyta	colony	16	0.1	1				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Oedogonium sp.	Chlorophyta	filament	12	0.1	1				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Oocystis sp.	Chlorophyta	colony	2	0.1	0.1				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Monoraphidium sp.	Chlorophyta	cell	1	0.1	0.1				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	chrysophyte flagellate sp.	Chrysophyceae	cell	1	52	52	84	84		
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Dinobryon sp.	Chrysophyceae	cell	1	17	17				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Dinobryon sp.	Chrysophyceae	cell	1	8	8				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Dinobryon sp.	Chrysophyceae	cell	1	3	3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Chromulina sp.	Chrysophyceae	cell	1	3	3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	cryptophyte sp.	Cryptophyta	cell	1	3	3	3	3		
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Aphanocapsa delicatissima	Cyanobacteria	colony	17	419	7,121	1,222	17,452		
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Aphanocapsa sp.	Cyanobacteria	colony	14	314	4,398				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Anathece sp.	Cyanobacteria	colony	12	192	2,304				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Aphanocapsa incerta	Cyanobacteria	colony	25	87	2,182				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	cyanophyte tetrad spp.	Cyanobacteria	colony	4	140	559				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Cyanodictyon sp.	Cyanobacteria	colony	7	35	244				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Cyanodictyon planctonicum	Cyanobacteria	colony	10	17	175				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Coelomoron sp.	Cyanobacteria	colony	52	3	145				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Aphanocapsa cf. elachista	Cyanobacteria	colony	50	3	139				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Eucapsis sp.	Cyanobacteria	colony	14	6	78				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Radiocystis elongata	Cyanobacteria	colony	86	1	46				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	oscillatorialean filament sp.	Cyanobacteria	filament	8	3	22				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Anathece sp.	Cyanobacteria	colony	315	0.1	21				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Pseudanabaena mucicola	Cyanobacteria	filament	3	3	8				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Aphanothece sp.	Cyanobacteria	colony	120	0.1	8				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	cf. Phormidium sp.	Cyanobacteria	filament	37	0.1	2				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Dinoflagellate sp.	Dinophyceae	cell	1	0.1	0.1	0.1	0.1		
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	unknown unicell, sphere spp.	Unknown	cell	1	87	87	247	264		

Sample ID	Sample Site	Sampling Date	Taxa	Algal Group	Counting Unit	Cells/Unit	Species	Species	Group Total	Group Total	Sample Total	Sample Total
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	microflagellate spp.	Unknown	cell	1	70	70				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	unknown flagellate spp.	Unknown	cell	1	70	70				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	unknown colony sp.	Unknown	colony	7	3	19				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	unknown unicell, oval spp.	Unknown	cell	1	17	17				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	centric diatom sp.	Bacillariophyceae	cell	1	775	775	1,273	1,724	2,833	11,502
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Diatoma tenuis	Bacillariophyceae	colony	4	136	545				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Fragilaria sp.	Bacillariophyceae	cell	1	283	283				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	centric diatom chain sp.	Bacillariophyceae	chain	3	21	63				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	centric diatom sp.	Bacillariophyceae	cell	1	31	31				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	pennate diatom sp.	Bacillariophyceae	cell	1	10	10				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Navicula sp.	Bacillariophyceae	cell	1	10	10				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Nitzschia sp.	Bacillariophyceae	cell	1	3	3				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Nitzschia sp.	Bacillariophyceae	cell	1	3	3				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Fragilaria sp.	Bacillariophyceae	colony	6	0.1	1				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Cosmarium sp.	Charophyta	cell	1	63	63	76	76		
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Cosmarium sp.	Charophyta	cell	1	10	10				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Cosmarium sp.	Charophyta	cell	1	3	3				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Teilingia sp.	Charophyta	filament	2	0.1	0.3				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	chlorophyte unicell, sphere spp.	Chlorophyta	cell	1	251	251	639	876		
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	chlorophyte unicell, oval spp.	Chlorophyta	cell	1	157	157				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Mychonastes sp.	Chlorophyta	colony	12	10	126				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Tetraedron minimum	Chlorophyta	cell	1	63	63				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Oocystis spp. (unicell)	Chlorophyta	cell	1	52	52				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	chlorophyte colony sp.	Chlorophyta	colony	4	10	42				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	chlorophyte cell pair spp.	Chlorophyta	colony	2	21	42				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Pseudodidymocystis fina	Chlorophyta	colony	2	10	21				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	chlorophyte unicell sp.	Chlorophyta	cell	1	21	21				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Botryococcus sp.	Chlorophyta	colony	43	0.5	20				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Tetraedrus lagerheimii	Chlorophyta	colony	4	3	11				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	chlorophyte colony sp.	Chlorophyta	colony	4	3	11				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Chlamydomonas sp.	Chlorophyta	cell	1	10	10				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Nephrochlamys sp.	Chlorophyta	cell	1	10	10				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Eudorina elegans	Chlorophyta	colony	20	0.3	7				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Stichococcus sp.	Chlorophyta	filament	44	0.1	6				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Kirchneriella obesa	Chlorophyta	colony	2	3	6				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Mucidosphaerium pulchellum	Chlorophyta	colony	2	3	6				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Fusola viridis	Chlorophyta	cell	1	6	6				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	chlorophyte unicell sp.	Chlorophyta	cell	1	3	3				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Kirchneriella irregularis	Chlorophyta	colony	32	0.1	2				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Oedogonium sp.	Chlorophyta	filament	29	0.1	2				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Coenochloris foitii	Chlorophyta	colony	8	0.1	1				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Desmodesmus sp.	Chlorophyta	colony	8	0.1	1				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Desmodesmus sp.	Chlorophyta	colony	4	0.1	0.3				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Ochromonas sp.	Chrysophyceae	cell	1	42	42	82	96		
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Dinobyron sp.	Chrysophyceae	colony	6	3	17				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	chrysophyte flagellate sp.	Chrysophyceae	cell	1	10	10				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Chrysococcus sp.	Chrysophyceae	cell	1	10	10				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	chrysophyte statocyst sp.	Chrysophyceae	cell	1	10	10				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Dinobyron sp.	Chrysophyceae	cell	1	3	3				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Dinobyron sp.	Chrysophyceae	cell	1	3	3				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Aphanocapsa incerta	Cyanobacteria	colony	26	136	3,539	386	8,269		
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Aphanocapsa delicatissima	Cyanobacteria	colony	21	105	2,199				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	oscillatorial filament sp.	Cyanobacteria	filament	62	19	1,209				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Aphanocapsa sp.	Cyanobacteria	colony	13	42	545				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Cyanodictyon sp.	Cyanobacteria	colony	16	21	335				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Anathece sp.	Cyanobacteria	colony	14	10	147				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Eucapsis sp.	Cyanobacteria	colony	13	10	136				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	cyanophyte tetrad spp.	Cyanobacteria	colony	4	21	84				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Woronichinia elorantae	Cyanobacteria	colony	161	0.2	32				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Pseudanabaena mucicola	Cyanobacteria	filament	2	10	21				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Snowella lacustris	Cyanobacteria	colony	175	0.1	12				

Sample ID	Sample Site	Sampling Date	Taxa	Algal Group	Counting Unit	Cells/Unit	Species	Species	Group Total	Group Total	Sample Total	Sample Total
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	cyanophyte unicell, sphere spp.	Cyanobacteria	cell	1	10	10				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Eucapsis sp.	Cyanobacteria	colony	2	0.1	0.1				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	dinoflagellate sp.	Dinophyceae	cell	1	1	1	1	1		
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	dinoflagellate sp.	Dinophyceae	cell	1	0.1	0.1				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	dinoflagellate sp.	Dinophyceae	cell	1	0.1	0.1				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	unknown unicell, sphere spp.	Unknown	cell	1	147	147	377	461		
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	unknown flagellate spp.	Unknown	cell	1	147	147				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	unknown colony sp.	Unknown	colony	9	10	94				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	unknown unicell, oval spp.	Unknown	cell	1	42	42				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	microflagellate spp.	Unknown	cell	1	31	31				





# Arctic Fox Environmental, Inc.

PO Box 340043 | Prudhoe Bay, AK 99734 | PHONE: (907) 659-2145 | FAX: (907) 659-2146 | www.arcticfoxenv.com

## Analytical Services Order and Chain of Custody Form

90073

PAGE 1

0920 - 466Z

Client Name and Address: MICHAEL BAKER INTERNATIONAL 3900 C ST SUITE 900 ANCHORAGE, AK 99503 Contact Person: DEVON ROE 231-730-0596				Account Number:		Number of Containers	BOD, COLOR, PH	② T. COLI	③ CYANOC	④ E. COLI	⑤ SG TDS, TSS	⑥	⑦ METALS	⑧ NO <sub>2</sub> NO <sub>3</sub>	⑨ OXY	⑩ ORP	⑪	Preservative ←	
P.O. or Contract Number:				P.O. or Contract Number:															
Authorization Number:				Authorization Number:															
Sampled By:				Sampled By:															
Phone Number: Fax Number:				PWS Number:															
E-mail: DEVON.ROE@MBAKERINTL.COM				Send Results to ADEC: <input type="checkbox"/> YES <input type="checkbox"/> No															
Project Name: WILLOW WTP & WILLOW WQ				Requested Turnaround Time and Special Instructions:															
Data Deliverables: Level I <input type="checkbox"/> Level II <input type="checkbox"/> Level III <input type="checkbox"/> EDD/Format:																			
Client Sample ID	Date Sampled	Time Sampled	Matrix	AF Sample ID															
L9911	9/9/20	11:12		AF71989															
Trip Blank	—	—		AF71990															
				MISSED IT IN THE SEA OF BOTTLES WILL TRY TO GET IT 9/10															
Relinquished By (1):				Date: 9/10/20	Time: 7:28	Received By:	9/10/20	TO BE COMPLETED BY LABORATORY											
Relinquished By (2):				Date:	Time:	Received By:		Location Received/ Temp on Arrival: ANC <input type="checkbox"/> °C FBK <input type="checkbox"/> °C PB <input checked="" type="checkbox"/> 0.9 °C											
Relinquished By (3):				Date:	Time:	Received for lab by:		Chain of Custody Seal <input type="checkbox"/> INTACT <input type="checkbox"/> BROKEN <input type="checkbox"/> ABSENT											
				Shipping Bill Number:															





# Arctic Fox Environmental, Inc.

PO Box 340043 | Prudhoe Bay, AK 99734 | PHONE: (907) 659-2145 | FAX: (907) 659-2146 | www.arcticfoxenv.com

Michael Baker International  
3900 C St Ste 900  
Anchorage, AK 99503

Report Date: 10/14/2020  
Date Arrived: 9/10/2020  
Date Sampled: 9/9/2020  
Time Sampled: 1112  
Collected By: DTR & SAO

Attn: Devon Roe / Haley Runa / Kieran Brawn  
Phone: (907) 273-1666 / (907) 575-8652

Email: [Devon.Roe@mbakerintl.com](mailto:Devon.Roe@mbakerintl.com)  
[Haley.Runa@mbakerintl.com](mailto:Haley.Runa@mbakerintl.com)  
[Kieran.Brawn@mbakerintl.com](mailto:Kieran.Brawn@mbakerintl.com)

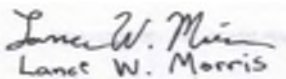
AF Lab #: AF71989  
Client Sample ID: LL9911  
Location/Project: Willow WTP & Willow WQ  
COC#: 90073-90074  
Sample Matrix: Liquid

Flag Definitions  
MDL = Method Reporting Limit  
B = Below Regulatory Minimum  
H = Above Regulatory Maximum  
M = Matrix Interference  
J = Best Available Estimate  
U = Less Than Detection Limit  
D = Lost to Dilution

Comments: Attached are the results for analyses of your samples. Some samples were analyzed by Eurofins in Tacoma, WA; ALS Laboratories in Kelso, WA; Greenwater Laboratories in Palatka, FL.  
Tracking information is as follows:

Michael Baker Intl Sample ID: LL9911  
Analyses Requested: See attached report  
Arctic Fox ID: AF71989  
Time Sampled: 1112  
Matrix: Liquid  
Eurofins Lab ID: 580-97427-1  
ALS Lab ID: K2007930-003  
GreenWater Lab ID: AF71989-L9911

Parameter	Result	Units	RL	RCRA Limits	Flag	Analysis Method	Analysis Date
<b>HACH Colorimeter II</b>							
Free Chlorine	0.02	mg/L				Colorimetric	10/2/2020
<b>SM5210B</b>							
BOD	<3	mg/L	3			SM5210B	9/10/2020
<b>SM2120-B</b>							
Color	<5	Color Units	5			SM2120-B	9/11/2020
<b>EPA150.2</b>							
pH	7.9	Units				EPA150.2	9/11/2020
<b>SM9223B</b>							
Total Coliform	Not Detected					SM9223B	9/10/2020
E. Coli	Not Detected						
<b>SM9223B</b>							
E-Coli	<1	MPN/100ml				SM9223B	9/10/2020

  
Lance W. Morris

Reported by: Ralph E. Allphin / Timothy D. Johnson / Lance W. Morris / Sky Allphin  
Arctic Fox Environmental, Inc.



# Arctic Fox Environmental, Inc.

PO Box 340043 | Prudhoe Bay, AK 99734 | PHONE: (907) 659-2145 | FAX: (907) 659-2146 | www.arcticfoxenv.com

Michael Baker International  
3900 C St Ste 900  
Anchorage, AK 99503

Report Date: 10/14/2020  
Date Arrived: 9/10/2020  
Date Sampled: 9/9/2020  
Time Sampled: 1112  
Collected By: DTR & SAO

Attn: Devon Roe / Haley Runa / Kieran Brawn  
Phone: (907) 273-1666 / (907) 575-8652

Email: [Devon.Roe@mbakerintl.com](mailto:Devon.Roe@mbakerintl.com)  
[Haley.Runa@mbakerintl.com](mailto:Haley.Runa@mbakerintl.com)  
[Kieran.Brawn@mbakerintl.com](mailto:Kieran.Brawn@mbakerintl.com)

### Flag Definitions

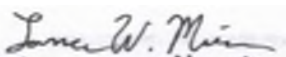
MDL = Method Reporting Limit  
B = Below Regulatory Minimum  
H = Above Regulatory Maximum  
M = Matrix Interference  
J = Best Available Estimate  
U = Less Than Detection Limit  
D = Lost to Dilution

AF Lab #: AF71989  
Client Sample ID: LL9911  
Location/Project: Willow WTP & Willow WQ  
COC#: 90073-90074  
Sample Matrix: Liquid

Comments: Attached are the results for analyses of your samples.  
Some samples were analyzed by Eurofins in Tacoma, Washington.  
Tracking information is as follows:

Michael Baker Intl Sample ID: LL9911  
Analyses Requested: See attached report  
Arctic Fox ID: AF71989  
Time Sampled: 1112  
Matrix: Liquid  
Eurofins Lab ID: 580-97427-1  
ALS Lab ID: K2007930-003  
GreenWater Lab ID: AF71989-L9911

Parameter	Result	Units	RL	RCRA Limits	Flag	Analysis Method	Analysis Date
<b>EPA 830.7300</b>							
Specific Gravity	0.99	g/mL				EPA830.7300	9/11/2020
<b>SM 2540D</b>							
Total Suspended Solids	<2	mg/L	2			SM2540D	9/13/2020
<b>SM2540C</b>							
Total Dissolved Solids	130	mg/L	10			SM2540C	9/13/2020
<b>6020A Total Metals</b>							
Arsenic	<MRL	mg/L	0.010	5.0		6020A	9/14/2020
Barium	0.102	mg/L	0.050	100.0		6020A	
Cadmium	<MRL	mg/L	0.004	1.0		6020A	
Chromium	<MRL	mg/L	0.010	5.0		6020A	
Lead	<MRL	mg/L	0.008	5.0		6020A	
Mercury	<MRL	mg/L	0.003	0.200		6020A	
Selenium	<MRL	mg/L	0.080	1.0		6020A	
Silver	<MRL	mg/L	0.010	5.0		6020A	

  
Lance W. Morris

Reported by: Ralph E. Allphin / Timothy D. Johnson / Lance W. Morris / Sky Allphin  
Arctic Fox Environmental, Inc.



# Arctic Fox Environmental, Inc.

PO Box 340043 | Prudhoe Bay, AK 99734 | PHONE: (907) 659-2145 | FAX: (907) 659-2146 | [www.arcticfoxenv.com](http://www.arcticfoxenv.com)

---

Michael Baker International  
3900 C St Ste 900  
Anchorage, AK 99503

Attn: Devon Roe / Haley Runa / Kieran Brawn  
Phone: (907) 273-1666 / (907) 575-8652

Email: [Devon.Roe@mbakerintl.com](mailto:Devon.Roe@mbakerintl.com)  
[Haley.Runa@mbakerintl.com](mailto:Haley.Runa@mbakerintl.com)  
[Kieran.Brawn@mbakerintl.com](mailto:Kieran.Brawn@mbakerintl.com)

AF Lab #: AF71990  
Client Sample ID: Trip Blank  
Location/Project: Willow WTP & Willow WQ  
COC#: 90073-97004  
Sample Matrix: Liquid

Comments: Attached are the results for analyses of your samples.  
These samples were analyzed by Eurofinsin Tacoma, WA.  
Tracking information is as follows:

Michael Baker Intl Sample ID: Trip Blank  
Analyses Requested: VOC  
Arctic Fox ID: AF71990  
Time Sampled: NA  
Matrix: Liquid  
Eurofins Lab ID: 580-97427-2

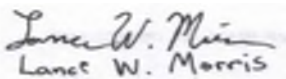
---

---

Report Date: 10/14/2020  
Date Arrived:  
Date Sampled:  
Time Sampled:  
Collected By:

#### Flag Definitions

MDL = Method Reporting Limit  
B = Below Regulatory Minimum  
H = Above Regulatory Maximum  
M = Matrix Interference  
J = Best Available Estimate  
U = Less Than Detection Limit  
D = Lost to Dilution



Lance W. Morris

---

Reported by: Ralph E. Allphin / Timothy D. Johnson / Lance W. Morris / Sky Allphin  
Arctic Fox Environmental, Inc.

## ANALYTICAL REPORT

Eurofins TestAmerica, Seattle  
5755 8th Street East  
Tacoma, WA 98424  
Tel: (253)922-2310

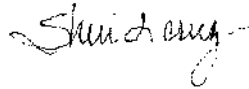
Laboratory Job ID: 580-97427-1

Client Project/Site: 0920-4662 / Willow WTP and Willow WQ  
Revision: 1

**For:**

Arctic Fox Environmental, Inc  
Pouch 340043  
Prudhoe Bay, Alaska 99734

Attn: Arctic Fox



*Authorized for release by:  
10/5/2020 12:11:45 PM*

Sheri Cruz, Project Manager I  
(253)922-2310  
[Sheri.Cruz@Eurofinset.com](mailto:Sheri.Cruz@Eurofinset.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:

[www.eurofinsus.com/Env](http://www.eurofinsus.com/Env)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*



# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Case Narrative . . . . .	3
Definitions . . . . .	5
Client Sample Results . . . . .	7
QC Sample Results . . . . .	13
Chronicle . . . . .	45
Certification Summary . . . . .	47
Sample Summary . . . . .	53
Chain of Custody . . . . .	54
Receipt Checklists . . . . .	60
Field Data Sheets . . . . .	65
Isotope Dilution Summary . . . . .	66

# Case Narrative

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Job ID: 580-97427-1

Laboratory: Eurofins TestAmerica, Seattle

### Narrative

#### Job Narrative 580-97427-1

#### Comments

10/1/2020 client requested additional analytes be added to the original COC for PFOA/PFOS.

#### Receipt

The samples were received on 9/12/2020 11:00 AM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 0.7° C.

Samples received out of hold for method 300, 5540C, 5910B, 2150, and 3500\_Fe. We are unable to perform viscosity, Free Cl-, and Sr+2

#### Receipt Exceptions

Container for Sulfide required preservation upon receipt  
Methods for subcontract required subsampling. AF71989 (580-97427-1)

#### GC/MS VOA

Method 8260D: The continuing calibration verification (CCV) associated with batch 580-338300 recovered above the upper control limit for cis-1,3-Dichloropropene, Hexachlorobutadiene and t-Butylbenzene. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The associated samples are impacted: AF71990-Trip Blank (580-97427-2) and (CCVIS 580-338300/3).

Method 8260D: The CCV for analytical batch 580-338300 recovered outside control limits for the following analytes: Dichlorodifluoromethane and Naphthalene. These analytes have been identified as a poor performing analyte when analyzed using this method; therefore, re-extraction/re-analysis was not performed. These results have been reported and qualified.

Method 8260D: The method blank for preparation batch 338300 contained 1,2,3-Trichlorobenzene and Naphthalene above the reporting limit (RL). None of the samples associated with this method blank contained the target compound; therefore, re-extraction and/or re-analysis of samples were not performed.

Method 8260D: The following analytes recovered outside control limits for the LCSD associated with analytical batch 580-338300: 1,1,2-Trichloroethane and 1,3-Dichloropropane. This is not indicative of a systematic control problem because these were random marginal exceedances. Qualified results have been reported.

Method 8260D: The RPD of the laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for analytical batch 580-338300 recovered outside control limits for the following analytes: 1,1,1,2-Tetrachloroethane, 1,1,2-Trichloroethane, 1,2,3-Trichlorobenzene, 1,3-Dichloropropane, Chlorodibromomethane, Naphthalene and trans-1,3-Dichloropropene

Method 8260D: The RPD of the laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for analytical batch 580-338901 recovered outside control limits for the following analytes: Dibromochloromethane, 1,2-Dibromoethane and Bromomethane.

Method 8260D: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for analytical batch 580-338901 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### GC Semi VOA

Method AK102 & 103: AF71989 (580-97427-1), (LCS 580-338273/2-A), (LCS 580-338273/2-B), (LCSD 580-338273/3-A) and (LCSD 580-338273/3-B) were re-extracted and re-analyzed due to LCS/LCSD failures in the initial extraction. Two sets of data for the affected analytes are reported.

Method AK102 & 103: AF71989 (580-97427-1), (LCS 580-339227/2-A) and (LCSD 580-339227/3-A) were re-extracted outside of holding time and re-analyzed due to LCS/LCSD failures in the initial extraction. Inadvertently, the second extraction also had similar failures; since there was no more sample volume remaining, further re-extraction and re-analysis was not performed. Two sets of data for the affected



# Case Narrative

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Job ID: 580-97427-1 (Continued)

### Laboratory: Eurofins TestAmerica, Seattle (Continued)

analytes are reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

#### LCMS

Method EPA 537(Mod): The first level standard from the initial calibration curve is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5amu; therefore, detection of the analyte serves as verification that the assigned mass is within +/- 0.5amu of the true value, which meets the DoD/DOE QSM tune criterion.

The Isotope Dilution Analyte (IDA) recovery associated with the following samples is below the method recommended limit for 13C2 PFTeDA: AF71989 (580-97427-1). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the samples.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### General Chemistry

Method SM 2150B: The associated sample(s) were ran using a plastic container per PM/client approval. A glass container must be used for odor analysis per the SOP. AF71989 (580-97427-1)

Method 300.0: The following sample was received outside of holding time: AF71989 (580-97427-1).

Method 300.0: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for analytical batch 580-338346 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method SM 3500 FE D: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for analytical batch 280-509469 were outside control limits. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method SM 3500 FE D: The following samples were received outside of holding time: AF71989 (580-97427-1).

Method SM 5540C: The following sample was received outside of holding time: AF71989 (580-97427-1).

Method SM 2150B: The following sample was received outside of holding time: AF71989 (580-97427-1).

Method 5910B: The following sample was received outside of holding time: AF71989 (580-97427-1).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### Organic Prep

Method 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-412514.

3535 PFC  
Water  
320-412514

Method 3510C: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP) associated with all samples in preparation batch 339227 so LCS and LCSD were used instead.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### VOA Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

# Definitions/Glossary

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Qualifiers

### GC/MS VOA

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
*1	LCS/LCSD RPD exceeds control limits.
F1	MS and/or MSD recovery exceeds control limits.
F2	MS/MSD RPD exceeds control limits
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

### GC Semi VOA

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
H	Sample was prepped or analyzed beyond the specified holding time

### LCMS

Qualifier	Qualifier Description
*5	isotope dilution analyte is outside acceptance limits.

### Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

### General Chemistry

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.
F2	MS/MSD RPD exceeds control limits
H	Sample was prepped or analyzed beyond the specified holding time
H3	Sample was received and analyzed past holding time.
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit

Eurofins TestAmerica, Seattle

# Definitions/Glossary

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Glossary (Continued)

Abbreviation	These commonly used abbreviations may or may not be present in this report.
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

1

2

3

4

5

6

7

8

9

10

11

12

13

# Client Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

**Client Sample ID: AF71989**

**Lab Sample ID: 580-97427-1**

**Date Collected: 09/09/20 11:12**

**Matrix: Water**

**Date Received: 09/12/20 11:00**

**Method: 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	ND		1.0		mg/L			09/23/20 07:36	100
Chloromethane	ND		2.0		mg/L			09/23/20 07:36	100
Vinyl chloride	ND		0.10		mg/L			09/23/20 07:36	100
Bromomethane	ND	*1	0.60		mg/L			09/23/20 07:36	100
Chloroethane	ND		0.50		mg/L			09/23/20 07:36	100
Trichlorofluoromethane	ND		0.30		mg/L			09/23/20 07:36	100
1,1-Dichloroethene	ND		0.40		mg/L			09/23/20 07:36	100
Methylene Chloride	ND		0.50		mg/L			09/23/20 07:36	100
Methyl tert-butyl ether	ND		0.20		mg/L			09/23/20 07:36	100
trans-1,2-Dichloroethene	ND		0.30		mg/L			09/23/20 07:36	100
1,1-Dichloroethane	ND		0.20		mg/L			09/23/20 07:36	100
2,2-Dichloropropane	ND		0.30		mg/L			09/23/20 07:36	100
cis-1,2-Dichloroethene	ND		0.30		mg/L			09/23/20 07:36	100
2-Butanone (MEK)	ND		2000		ug/L			09/23/20 07:36	100
Bromochloromethane	ND		0.20		mg/L			09/23/20 07:36	100
Chloroform	ND		0.50		mg/L			09/23/20 07:36	100
1,1,1-Trichloroethane	ND		0.30		mg/L			09/23/20 07:36	100
Carbon tetrachloride	ND		0.30		mg/L			09/23/20 07:36	100
1,1-Dichloropropene	ND		0.30		mg/L			09/23/20 07:36	100
Benzene	ND		0.30		mg/L			09/23/20 07:36	100
1,2-Dichloroethane	ND		0.20		mg/L			09/23/20 07:36	100
Trichloroethene	ND		0.30		mg/L			09/23/20 07:36	100
1,2-Dichloropropane	ND		0.10		mg/L			09/23/20 07:36	100
Dibromomethane	ND		0.20		mg/L			09/23/20 07:36	100
Bromodichloromethane	ND		0.20		mg/L			09/23/20 07:36	100
cis-1,3-Dichloropropene	ND		0.10		mg/L			09/23/20 07:36	100
Toluene	ND		0.20		mg/L			09/23/20 07:36	100
trans-1,3-Dichloropropene	ND		0.10		mg/L			09/23/20 07:36	100
1,1,2-Trichloroethane	ND		0.10		mg/L			09/23/20 07:36	100
Tetrachloroethene	ND		0.30		mg/L			09/23/20 07:36	100
1,3-Dichloropropane	ND		0.20		mg/L			09/23/20 07:36	100
Dibromochloromethane	ND	*1	0.20		mg/L			09/23/20 07:36	100
1,2-Dibromoethane	ND	*1	0.20		mg/L			09/23/20 07:36	100
Chlorobenzene	ND		0.20		mg/L			09/23/20 07:36	100
1,1,1,2-Tetrachloroethane	ND		0.20		mg/L			09/23/20 07:36	100
Ethylbenzene	ND		0.30		mg/L			09/23/20 07:36	100
m-Xylene & p-Xylene	ND		0.30		mg/L			09/23/20 07:36	100
o-Xylene	ND		0.20		mg/L			09/23/20 07:36	100
Styrene	ND		0.50		mg/L			09/23/20 07:36	100
Bromoform	ND		0.30		mg/L			09/23/20 07:36	100
Isopropylbenzene	ND		0.20		mg/L			09/23/20 07:36	100
Bromobenzene	ND		0.20		mg/L			09/23/20 07:36	100
1,1,2,2-Tetrachloroethane	ND		0.30		mg/L			09/23/20 07:36	100
1,2,3-Trichloropropane	ND		0.20		mg/L			09/23/20 07:36	100
N-Propylbenzene	ND		0.30		mg/L			09/23/20 07:36	100
2-Chlorotoluene	ND		0.30		mg/L			09/23/20 07:36	100
4-Chlorotoluene	ND		0.20		mg/L			09/23/20 07:36	100
t-Butylbenzene	ND		0.30		mg/L			09/23/20 07:36	100
1,2,4-Trimethylbenzene	ND		0.30		mg/L			09/23/20 07:36	100

Eurofins TestAmerica, Seattle

# Client Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

**Client Sample ID: AF71989**

**Lab Sample ID: 580-97427-1**

**Date Collected: 09/09/20 11:12**

**Matrix: Water**

**Date Received: 09/12/20 11:00**

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
sec-Butylbenzene	ND		0.30		mg/L			09/23/20 07:36	100
4-Isopropyltoluene	ND		0.30		mg/L			09/23/20 07:36	100
1,3-Dichlorobenzene	ND		0.20		mg/L			09/23/20 07:36	100
1,4-Dichlorobenzene	ND		0.40		mg/L			09/23/20 07:36	100
n-Butylbenzene	ND		0.30		mg/L			09/23/20 07:36	100
1,2-Dichlorobenzene	ND		0.20		mg/L			09/23/20 07:36	100
1,2-Dibromo-3-Chloropropane	ND		1.0		mg/L			09/23/20 07:36	100
1,2,4-Trichlorobenzene	ND		0.20		mg/L			09/23/20 07:36	100
Hexachlorobutadiene	ND		0.60		mg/L			09/23/20 07:36	100
Naphthalene	ND		0.40		mg/L			09/23/20 07:36	100
1,2,3-Trichlorobenzene	ND		0.50		mg/L			09/23/20 07:36	100
1,3,5-Trimethylbenzene	ND		0.30		mg/L			09/23/20 07:36	100

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	104		80 - 120		09/23/20 07:36	100
1,2-Dichloroethane-d4 (Surr)	92		80 - 126		09/23/20 07:36	100
4-Bromofluorobenzene (Surr)	105		80 - 120		09/23/20 07:36	100
Dibromofluoromethane (Surr)	88		80 - 120		09/23/20 07:36	100

## Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (nC10-<nC25)	ND	*	0.13		mg/L		09/15/20 12:45	09/17/20 17:29	1
DRO (nC10-<nC25)	ND	H *	0.12		mg/L		09/26/20 10:36	09/28/20 17:30	1
RRO (nC25-nC36)	ND		0.29		mg/L		09/15/20 12:45	09/17/20 17:29	1
RRO (nC25-nC36)	ND		0.29		mg/L		09/15/20 12:45	09/17/20 20:10	1
DRO (nC10-<nC25)	ND	*	0.13		mg/L		09/15/20 12:45	09/17/20 20:10	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	80		50 - 150	09/15/20 12:45	09/17/20 20:10	1
n-Triacontane-d62	85		50 - 150	09/15/20 12:45	09/17/20 20:10	1
o-Terphenyl	81		50 - 150	09/15/20 12:45	09/17/20 17:29	1
o-Terphenyl	77		50 - 150	09/26/20 10:36	09/28/20 17:30	1
n-Triacontane-d62	87		50 - 150	09/15/20 12:45	09/17/20 17:29	1
n-Triacontane-d62	89		50 - 150	09/26/20 10:36	09/28/20 17:30	1

## Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC) - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (nC10-<nC25)	ND	H *	0.12		mg/L		09/26/20 10:36	09/27/20 23:04	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	75		50 - 150	09/26/20 10:36	09/27/20 23:04	1
n-Triacontane-d62	82		50 - 150	09/26/20 10:36	09/27/20 23:04	1

## Method: EPA 537(Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:46	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:46	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:46	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:46	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:46	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:46	1

Eurofins TestAmerica, Seattle

# Client Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

**Client Sample ID: AF71989**

**Lab Sample ID: 580-97427-1**

**Date Collected: 09/09/20 11:12**

**Matrix: Water**

**Date Received: 09/12/20 11:00**

**Method: EPA 537(Mod) - PFAS for QSM 5.1, Table B-15 (Continued)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorodecanoic acid (PFDA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:46	1
Perfluorotridecanoic acid (PFTrIA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:46	1
<b>Perfluorononanoic acid (PFNA)</b>	<b>3.5</b>		1.8		ng/L		09/15/20 18:44	09/16/20 13:46	1
Perfluoropentanesulfonic acid (PFPeS)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:46	1
Perfluorononanesulfonic acid (PFNS)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:46	1
Perfluoroheptanoic acid (PFHpA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:46	1
Perfluorobutanoic acid (PFBA)	ND		4.6		ng/L		09/15/20 18:44	09/16/20 13:46	1
Perfluorododecanoic acid (PFDoA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:46	1
Perfluorohexanoic acid (PFHxA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:46	1
Perfluoropentanoic acid (PFPeA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:46	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:46	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:46	1
9Cl-PF3ONS	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:46	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:46	1
4:2 FTS	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:46	1
HFPO-DA (GenX)	ND		3.7		ng/L		09/15/20 18:44	09/16/20 13:46	1
6:2 FTS	ND		4.6		ng/L		09/15/20 18:44	09/16/20 13:46	1
11Cl-PF3OUdS	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:46	1
8:2 FTS	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:46	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		4.6		ng/L		09/15/20 18:44	09/16/20 13:46	1
Perfluorooctanesulfonamide (PFOSA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:46	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		4.6		ng/L		09/15/20 18:44	09/16/20 13:46	1
<b>Isotope Dilution</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C4 PFOA	87		50 - 150				09/15/20 18:44	09/16/20 13:46	1
13C4 PFOS	91		50 - 150				09/15/20 18:44	09/16/20 13:46	1
18O2 PFHxS	96		50 - 150				09/15/20 18:44	09/16/20 13:46	1
13C2 PFHxA	82		50 - 150				09/15/20 18:44	09/16/20 13:46	1
13C3 PFBS	86		50 - 150				09/15/20 18:44	09/16/20 13:46	1
13C8 FOSA	86		50 - 150				09/15/20 18:44	09/16/20 13:46	1
13C2 PFDoA	63		50 - 150				09/15/20 18:44	09/16/20 13:46	1
13C5 PFPeA	76		50 - 150				09/15/20 18:44	09/16/20 13:46	1
13C2 PFTeDA	37	*5	50 - 150				09/15/20 18:44	09/16/20 13:46	1
13C5 PFNA	89		50 - 150				09/15/20 18:44	09/16/20 13:46	1
13C2 PFDA	86		50 - 150				09/15/20 18:44	09/16/20 13:46	1
M2-6:2 FTS	134		50 - 150				09/15/20 18:44	09/16/20 13:46	1
M2-4:2 FTS	143		50 - 150				09/15/20 18:44	09/16/20 13:46	1
d5-NEtFOSAA	76		50 - 150				09/15/20 18:44	09/16/20 13:46	1
d3-NMeFOSAA	74		50 - 150				09/15/20 18:44	09/16/20 13:46	1
13C2 PFUnA	80		50 - 150				09/15/20 18:44	09/16/20 13:46	1
13C4 PFHpA	85		50 - 150				09/15/20 18:44	09/16/20 13:46	1
13C3 HFPO-DA	79		50 - 150				09/15/20 18:44	09/16/20 13:46	1
M2-8:2 FTS	121		50 - 150				09/15/20 18:44	09/16/20 13:46	1
13C4 PFBA	62		50 - 150				09/15/20 18:44	09/16/20 13:46	1

Eurofins TestAmerica, Seattle

# Client Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

**Client Sample ID: AF71989**

**Lab Sample ID: 580-97427-1**

**Date Collected: 09/09/20 11:12**

**Matrix: Water**

**Date Received: 09/12/20 11:00**

## Method: 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		2.5		mg/L		09/16/20 11:26	09/16/20 16:59	1
Iron	ND		0.50		mg/L		09/16/20 11:26	09/16/20 16:59	1
<b>Magnesium</b>	<b>3.8</b>		1.1		mg/L		09/16/20 11:26	09/16/20 16:59	1
Manganese	ND		0.020		mg/L		09/16/20 11:26	09/16/20 16:59	1
Potassium	ND		3.3		mg/L		09/16/20 11:26	09/16/20 16:59	1
<b>Sodium</b>	<b>5.0</b>		2.0		mg/L		09/16/20 11:26	09/16/20 16:59	1
Strontium	ND		0.10		mg/L		09/16/20 11:26	09/16/20 16:59	1
Antimony	ND		0.060		mg/L		09/16/20 11:26	09/16/20 16:59	1
Beryllium	ND		0.020		mg/L		09/16/20 11:26	09/16/20 16:59	1
Aluminum	ND		1.5		mg/L		09/16/20 11:26	09/16/20 16:59	1
Copper	ND		0.060		mg/L		09/16/20 11:26	09/16/20 16:59	1
Nickel	ND		0.020		mg/L		09/16/20 11:26	09/16/20 16:59	1
Thallium	ND		0.10		mg/L		09/16/20 11:26	09/16/20 16:59	1
Zinc	ND		0.040		mg/L		09/16/20 11:26	09/16/20 16:59	1
Selenium	ND		0.10		mg/L		09/16/20 11:26	09/16/20 16:59	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HEM (Oil & Grease)	ND		5.1		mg/L		09/22/20 10:15	09/22/20 13:59	1
SGT-HEM	ND		5.1		mg/L		09/22/20 10:15	09/22/20 13:59	1
HEM Polar (Oil and Grease - Polar)	ND		5.1		mg/L		09/22/20 10:15	09/22/20 13:59	1
Nitrite as N	ND	H H3	0.40		mg/L			09/15/20 13:55	1
<b>Chloride</b>	<b>11</b>	<b>F1</b>	0.90		mg/L			09/15/20 13:55	1
Nitrate as N	ND	H H3	0.20		mg/L			09/15/20 13:55	1
Bromide	ND		1.0		mg/L			09/15/20 13:55	1
Sulfate	ND		1.2		mg/L			09/15/20 13:55	1
<b>Fluoride</b>	<b>1.2</b>	<b>F1</b>	0.20		mg/L			09/15/20 13:55	1
Cyanide, Total	ND		0.060		mg/L		09/18/20 13:52	09/18/20 15:05	1
Nitrate as N	ND		0.15		mg/L			09/25/20 14:48	1
<b>UV254</b>	<b>0.077</b>	<b>H H3</b>	0.0090		1/cm			09/15/20 18:07	1
Sulfide	ND		4.0		mg/L		09/16/20 12:00	09/16/20 12:56	1
Odor	ND	H H3	1.0		T.O.N.			09/18/20 10:50	1
<b>Alkalinity as CaCO3</b>	<b>61</b>		5.0		mg/L			09/15/20 09:07	1
<b>Bicarbonate Alkalinity as CaCO3</b>	<b>61</b>		5.0		mg/L			09/15/20 09:07	1
Carbonate Alkalinity as CaCO3	ND		5.0		mg/L			09/15/20 09:07	1
Hydroxide Alkalinity as CaCO3	ND		5.0		mg/L			09/15/20 09:07	1
<b>Hardness as calcium carbonate</b>	<b>71</b>		2.0		mg/L			09/15/20 18:24	1
Ferrous Iron	ND	HF	0.20		mg/L			09/17/20 13:21	1
Ammonia as N	ND		0.50		mg/L			09/17/20 14:22	1
<b>Chemical Oxygen Demand</b>	<b>17</b>		10		mg/L		09/19/20 11:23	09/19/20 16:31	1
<b>Total Organic Carbon</b>	<b>5.7</b>		1.5		mg/L			09/21/20 20:39	1
Methylene Blue Active Substances	ND	H H3	0.10		mg/L			09/15/20 15:29	1
Total Phosphorus as P	ND		0.25		mg/L		09/22/20 10:55	09/22/20 10:59	1

## General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Dissolved Organic Carbon</b>	<b>5.0</b>		1.5		mg/L			09/19/20 19:41	1

Eurofins TestAmerica, Seattle

# Client Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

**Client Sample ID: AF71990-Trip Blank**

**Lab Sample ID: 580-97427-2**

**Date Collected: 09/09/20 11:12**

**Matrix: Water**

**Date Received: 09/12/20 11:00**

**Method: 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	ND		0.010		mg/L			09/15/20 17:51	1
Chloromethane	ND		0.020		mg/L			09/15/20 17:51	1
Vinyl chloride	ND		0.0010		mg/L			09/15/20 17:51	1
Bromomethane	ND		0.0060		mg/L			09/15/20 17:51	1
Chloroethane	ND		0.0050		mg/L			09/15/20 17:51	1
Trichlorofluoromethane	ND		0.0030		mg/L			09/15/20 17:51	1
1,1-Dichloroethene	ND		0.0040		mg/L			09/15/20 17:51	1
Methylene Chloride	ND		0.0050		mg/L			09/15/20 17:51	1
Methyl tert-butyl ether	ND		0.0020		mg/L			09/15/20 17:51	1
trans-1,2-Dichloroethene	ND		0.0030		mg/L			09/15/20 17:51	1
1,1-Dichloroethane	ND		0.0020		mg/L			09/15/20 17:51	1
2,2-Dichloropropane	ND		0.0030		mg/L			09/15/20 17:51	1
cis-1,2-Dichloroethene	ND		0.0030		mg/L			09/15/20 17:51	1
2-Butanone (MEK)	ND		20		ug/L			09/15/20 17:51	1
Bromochloromethane	ND		0.0020		mg/L			09/15/20 17:51	1
Chloroform	ND		0.0050		mg/L			09/15/20 17:51	1
1,1,1-Trichloroethane	ND		0.0030		mg/L			09/15/20 17:51	1
Carbon tetrachloride	ND		0.0030		mg/L			09/15/20 17:51	1
1,1-Dichloropropene	ND		0.0030		mg/L			09/15/20 17:51	1
Benzene	ND		0.0030		mg/L			09/15/20 17:51	1
1,2-Dichloroethane	ND		0.0020		mg/L			09/15/20 17:51	1
Trichloroethene	ND		0.0030		mg/L			09/15/20 17:51	1
1,2-Dichloropropane	ND		0.0010		mg/L			09/15/20 17:51	1
Dibromomethane	ND		0.0020		mg/L			09/15/20 17:51	1
Bromodichloromethane	ND		0.0020		mg/L			09/15/20 17:51	1
cis-1,3-Dichloropropene	ND		0.0010		mg/L			09/15/20 17:51	1
Toluene	ND		0.0020		mg/L			09/15/20 17:51	1
trans-1,3-Dichloropropene	ND	*1	0.0010		mg/L			09/15/20 17:51	1
1,1,2-Trichloroethane	ND	**1	0.0010		mg/L			09/15/20 17:51	1
Tetrachloroethene	ND		0.0030		mg/L			09/15/20 17:51	1
1,3-Dichloropropane	ND	**1	0.0020		mg/L			09/15/20 17:51	1
Dibromochloromethane	ND	*1	0.0020		mg/L			09/15/20 17:51	1
1,2-Dibromoethane	ND		0.0020		mg/L			09/15/20 17:51	1
Chlorobenzene	ND		0.0020		mg/L			09/15/20 17:51	1
1,1,1,2-Tetrachloroethane	ND	*1	0.0020		mg/L			09/15/20 17:51	1
Ethylbenzene	ND		0.0030		mg/L			09/15/20 17:51	1
m-Xylene & p-Xylene	ND		0.0030		mg/L			09/15/20 17:51	1
o-Xylene	ND		0.0020		mg/L			09/15/20 17:51	1
Styrene	ND		0.0050		mg/L			09/15/20 17:51	1
Bromoform	ND		0.0030		mg/L			09/15/20 17:51	1
Isopropylbenzene	ND		0.0020		mg/L			09/15/20 17:51	1
Bromobenzene	ND		0.0020		mg/L			09/15/20 17:51	1
1,1,2,2-Tetrachloroethane	ND		0.0030		mg/L			09/15/20 17:51	1
1,2,3-Trichloropropane	ND		0.0020		mg/L			09/15/20 17:51	1
N-Propylbenzene	ND		0.0030		mg/L			09/15/20 17:51	1
2-Chlorotoluene	ND		0.0030		mg/L			09/15/20 17:51	1
4-Chlorotoluene	ND		0.0020		mg/L			09/15/20 17:51	1
t-Butylbenzene	ND		0.0030		mg/L			09/15/20 17:51	1
1,2,4-Trimethylbenzene	ND		0.0030		mg/L			09/15/20 17:51	1

Eurofins TestAmerica, Seattle



# Client Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

**Client Sample ID: AF71990-Trip Blank**

**Lab Sample ID: 580-97427-2**

**Date Collected: 09/09/20 11:12**

**Matrix: Water**

**Date Received: 09/12/20 11:00**

**Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
sec-Butylbenzene	ND		0.0030		mg/L			09/15/20 17:51	1
4-Isopropyltoluene	ND		0.0030		mg/L			09/15/20 17:51	1
1,3-Dichlorobenzene	ND		0.0020		mg/L			09/15/20 17:51	1
1,4-Dichlorobenzene	ND		0.0040		mg/L			09/15/20 17:51	1
n-Butylbenzene	ND		0.0030		mg/L			09/15/20 17:51	1
1,2-Dichlorobenzene	ND		0.0020		mg/L			09/15/20 17:51	1
1,2-Dibromo-3-Chloropropane	ND		0.010		mg/L			09/15/20 17:51	1
1,2,4-Trichlorobenzene	ND		0.0020		mg/L			09/15/20 17:51	1
Hexachlorobutadiene	ND		0.0060		mg/L			09/15/20 17:51	1
Naphthalene	ND	*1	0.0040		mg/L			09/15/20 17:51	1
1,2,3-Trichlorobenzene	ND	*1	0.0050		mg/L			09/15/20 17:51	1
1,3,5-Trimethylbenzene	ND		0.0030		mg/L			09/15/20 17:51	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Toluene-d8 (Surr)	99		80 - 120					09/15/20 17:51	1
1,2-Dichloroethane-d4 (Surr)	103		80 - 126					09/15/20 17:51	1
4-Bromofluorobenzene (Surr)	102		80 - 120					09/15/20 17:51	1
Dibromofluoromethane (Surr)	99		80 - 120					09/15/20 17:51	1

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: 8260D - Volatile Organic Compounds by GC/MS

**Lab Sample ID: MB 580-338300/5**  
**Matrix: Water**  
**Analysis Batch: 338300**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Dichlorodifluoromethane	ND		0.010		mg/L			09/15/20 15:46	1
Chloromethane	ND		0.020		mg/L			09/15/20 15:46	1
Vinyl chloride	ND		0.0010		mg/L			09/15/20 15:46	1
Bromomethane	ND		0.0060		mg/L			09/15/20 15:46	1
Chloroethane	ND		0.0050		mg/L			09/15/20 15:46	1
Trichlorofluoromethane	ND		0.0030		mg/L			09/15/20 15:46	1
1,1-Dichloroethene	ND		0.0040		mg/L			09/15/20 15:46	1
Methylene Chloride	ND		0.0050		mg/L			09/15/20 15:46	1
Methyl tert-butyl ether	ND		0.0020		mg/L			09/15/20 15:46	1
trans-1,2-Dichloroethene	ND		0.0030		mg/L			09/15/20 15:46	1
1,1-Dichloroethane	ND		0.0020		mg/L			09/15/20 15:46	1
2,2-Dichloropropane	ND		0.0030		mg/L			09/15/20 15:46	1
cis-1,2-Dichloroethene	ND		0.0030		mg/L			09/15/20 15:46	1
2-Butanone (MEK)	ND		20		ug/L			09/15/20 15:46	1
Bromochloromethane	ND		0.0020		mg/L			09/15/20 15:46	1
Chloroform	ND		0.0050		mg/L			09/15/20 15:46	1
1,1,1-Trichloroethane	ND		0.0030		mg/L			09/15/20 15:46	1
Carbon tetrachloride	ND		0.0030		mg/L			09/15/20 15:46	1
1,1-Dichloropropene	ND		0.0030		mg/L			09/15/20 15:46	1
Benzene	ND		0.0030		mg/L			09/15/20 15:46	1
1,2-Dichloroethane	ND		0.0020		mg/L			09/15/20 15:46	1
Trichloroethene	ND		0.0030		mg/L			09/15/20 15:46	1
1,2-Dichloropropane	ND		0.0010		mg/L			09/15/20 15:46	1
Dibromomethane	ND		0.0020		mg/L			09/15/20 15:46	1
Bromodichloromethane	ND		0.0020		mg/L			09/15/20 15:46	1
cis-1,3-Dichloropropene	ND		0.0010		mg/L			09/15/20 15:46	1
Toluene	ND		0.0020		mg/L			09/15/20 15:46	1
trans-1,3-Dichloropropene	ND		0.0010		mg/L			09/15/20 15:46	1
1,1,2-Trichloroethane	ND		0.0010		mg/L			09/15/20 15:46	1
Tetrachloroethene	ND		0.0030		mg/L			09/15/20 15:46	1
1,3-Dichloropropane	ND		0.0020		mg/L			09/15/20 15:46	1
Dibromochloromethane	ND		0.0020		mg/L			09/15/20 15:46	1
1,2-Dibromoethane	ND		0.0020		mg/L			09/15/20 15:46	1
Chlorobenzene	ND		0.0020		mg/L			09/15/20 15:46	1
1,1,1,2-Tetrachloroethane	ND		0.0020		mg/L			09/15/20 15:46	1
Ethylbenzene	ND		0.0030		mg/L			09/15/20 15:46	1
m-Xylene & p-Xylene	ND		0.0030		mg/L			09/15/20 15:46	1
o-Xylene	ND		0.0020		mg/L			09/15/20 15:46	1
Styrene	ND		0.0050		mg/L			09/15/20 15:46	1
Bromoform	ND		0.0030		mg/L			09/15/20 15:46	1
Isopropylbenzene	ND		0.0020		mg/L			09/15/20 15:46	1
Bromobenzene	ND		0.0020		mg/L			09/15/20 15:46	1
1,1,2,2-Tetrachloroethane	ND		0.0030		mg/L			09/15/20 15:46	1
1,2,3-Trichloropropane	ND		0.0020		mg/L			09/15/20 15:46	1
N-Propylbenzene	ND		0.0030		mg/L			09/15/20 15:46	1
2-Chlorotoluene	ND		0.0030		mg/L			09/15/20 15:46	1
4-Chlorotoluene	ND		0.0020		mg/L			09/15/20 15:46	1
t-Butylbenzene	ND		0.0030		mg/L			09/15/20 15:46	1

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: MB 580-338300/5**  
**Matrix: Water**  
**Analysis Batch: 338300**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
1,2,4-Trimethylbenzene	ND		0.0030		mg/L			09/15/20 15:46	1
sec-Butylbenzene	ND		0.0030		mg/L			09/15/20 15:46	1
4-Isopropyltoluene	ND		0.0030		mg/L			09/15/20 15:46	1
1,3-Dichlorobenzene	ND		0.0020		mg/L			09/15/20 15:46	1
1,4-Dichlorobenzene	ND		0.0040		mg/L			09/15/20 15:46	1
n-Butylbenzene	ND		0.0030		mg/L			09/15/20 15:46	1
1,2-Dichlorobenzene	ND		0.0020		mg/L			09/15/20 15:46	1
1,2-Dibromo-3-Chloropropane	ND		0.010		mg/L			09/15/20 15:46	1
1,2,4-Trichlorobenzene	ND		0.0020		mg/L			09/15/20 15:46	1
Hexachlorobutadiene	ND		0.0060		mg/L			09/15/20 15:46	1
Naphthalene	0.00444		0.0040		mg/L			09/15/20 15:46	1
1,2,3-Trichlorobenzene	0.00585		0.0050		mg/L			09/15/20 15:46	1
1,3,5-Trimethylbenzene	ND		0.0030		mg/L			09/15/20 15:46	1

Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
Toluene-d8 (Surr)	101		80 - 120		09/15/20 15:46	1
1,2-Dichloroethane-d4 (Surr)	103		80 - 126		09/15/20 15:46	1
4-Bromofluorobenzene (Surr)	100		80 - 120		09/15/20 15:46	1
Dibromofluoromethane (Surr)	103		80 - 120		09/15/20 15:46	1

**Lab Sample ID: LCS 580-338300/6**  
**Matrix: Water**  
**Analysis Batch: 338300**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloromethane	0.0100	0.00924	J	mg/L		92	52 - 135
Vinyl chloride	0.0100	0.00899		mg/L		90	65 - 130
Bromomethane	0.0100	0.00971		mg/L		97	66 - 125
Chloroethane	0.0100	0.00909		mg/L		91	65 - 132
Trichlorofluoromethane	0.0100	0.00866		mg/L		87	64 - 130
1,1-Dichloroethene	0.0100	0.0106		mg/L		106	70 - 129
Methylene Chloride	0.0100	0.0101		mg/L		101	77 - 120
Methyl tert-butyl ether	0.0100	0.0108		mg/L		108	72 - 130
trans-1,2-Dichloroethene	0.0100	0.0100		mg/L		100	70 - 130
1,1-Dichloroethane	0.0100	0.0104		mg/L		104	81 - 129
2,2-Dichloropropane	0.0100	0.0108		mg/L		108	53 - 150
cis-1,2-Dichloroethene	0.0100	0.0106		mg/L		106	76 - 129
2-Butanone (MEK)	50.0	55.9		ug/L		112	73 - 137
Bromochloromethane	0.0100	0.0104		mg/L		104	78 - 120
Chloroform	0.0100	0.0107		mg/L		107	73 - 127
1,1,1-Trichloroethane	0.0100	0.0107		mg/L		107	74 - 130
Carbon tetrachloride	0.0100	0.0108		mg/L		108	72 - 129
1,1-Dichloropropene	0.0100	0.0105		mg/L		105	74 - 131
Benzene	0.0100	0.0110		mg/L		110	82 - 122
1,2-Dichloroethane	0.0100	0.0107		mg/L		107	76 - 126
Trichloroethene	0.0100	0.0109		mg/L		109	81 - 125
1,2-Dichloropropane	0.0100	0.0107		mg/L		107	80 - 126

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: LCS 580-338300/6**  
**Matrix: Water**  
**Analysis Batch: 338300**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Dibromomethane	0.0100	0.0104		mg/L		104	80 - 120
Bromodichloromethane	0.0100	0.0101		mg/L		101	75 - 124
cis-1,3-Dichloropropene	0.0100	0.0100		mg/L		100	77 - 120
Toluene	0.0100	0.00970		mg/L		97	80 - 120
trans-1,3-Dichloropropene	0.0100	0.00884		mg/L		88	70 - 122
1,1,2-Trichloroethane	0.0100	0.00933		mg/L		93	80 - 121
Tetrachloroethene	0.0100	0.00897		mg/L		90	76 - 120
1,3-Dichloropropane	0.0100	0.00969		mg/L		97	79 - 120
Dibromochloromethane	0.0100	0.0100		mg/L		100	60 - 125
1,2-Dibromoethane	0.0100	0.0104		mg/L		104	79 - 120
Chlorobenzene	0.0100	0.0104		mg/L		104	80 - 120
1,1,1,2-Tetrachloroethane	0.0100	0.0102		mg/L		102	79 - 120
Ethylbenzene	0.0100	0.0104		mg/L		104	80 - 120
m-Xylene & p-Xylene	0.0100	0.0104		mg/L		104	80 - 120
o-Xylene	0.0100	0.0102		mg/L		102	80 - 125
Styrene	0.0100	0.0102		mg/L		102	76 - 127
Bromoform	0.0100	0.0101		mg/L		101	28 - 139
Isopropylbenzene	0.0100	0.0109		mg/L		109	75 - 129
Bromobenzene	0.0100	0.0103		mg/L		103	80 - 120
1,1,2,2-Tetrachloroethane	0.0100	0.0103		mg/L		103	74 - 124
1,2,3-Trichloropropane	0.0100	0.0106		mg/L		106	76 - 124
N-Propylbenzene	0.0100	0.0103		mg/L		103	80 - 128
2-Chlorotoluene	0.0100	0.0104		mg/L		104	80 - 120
4-Chlorotoluene	0.0100	0.0102		mg/L		102	80 - 120
t-Butylbenzene	0.0100	0.0107		mg/L		107	80 - 129
1,2,4-Trimethylbenzene	0.0100	0.0109		mg/L		109	80 - 131
sec-Butylbenzene	0.0100	0.0110		mg/L		110	78 - 131
4-Isopropyltoluene	0.0100	0.0106		mg/L		106	77 - 131
1,3-Dichlorobenzene	0.0100	0.0102		mg/L		102	69 - 127
1,4-Dichlorobenzene	0.0100	0.0101		mg/L		101	80 - 120
n-Butylbenzene	0.0100	0.0104		mg/L		104	78 - 120
1,2-Dichlorobenzene	0.0100	0.0100		mg/L		100	80 - 120
1,2-Dibromo-3-Chloropropane	0.0100	0.00878	J	mg/L		88	65 - 125
1,2,4-Trichlorobenzene	0.0100	0.00978		mg/L		98	73 - 128
Hexachlorobutadiene	0.0100	0.0107		mg/L		107	74 - 125
Naphthalene	0.0100	0.00753		mg/L		75	75 - 134
1,2,3-Trichlorobenzene	0.0100	0.0105		mg/L		105	74 - 139
1,3,5-Trimethylbenzene	0.0100	0.0105		mg/L		105	80 - 131

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	94		80 - 120
1,2-Dichloroethane-d4 (Surr)	103		80 - 126
4-Bromofluorobenzene (Surr)	105		80 - 120
Dibromofluoromethane (Surr)	99		80 - 120

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: LCSD 580-338300/7**  
**Matrix: Water**  
**Analysis Batch: 338300**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD
									Limit
Dichlorodifluoromethane	0.0100	0.00781	J	mg/L		78	47 - 133	8	15
Chloromethane	0.0100	0.00870	J	mg/L		87	52 - 135	6	14
Vinyl chloride	0.0100	0.00783		mg/L		78	65 - 130	14	14
Bromomethane	0.0100	0.00930		mg/L		93	66 - 125	4	14
Chloroethane	0.0100	0.00823		mg/L		82	65 - 132	10	18
Trichlorofluoromethane	0.0100	0.00871		mg/L		87	64 - 130	0	14
1,1-Dichloroethene	0.0100	0.00987		mg/L		99	70 - 129	7	17
Methylene Chloride	0.0100	0.00976		mg/L		98	77 - 120	3	18
Methyl tert-butyl ether	0.0100	0.00988		mg/L		99	72 - 130	9	18
trans-1,2-Dichloroethene	0.0100	0.00972		mg/L		97	70 - 130	3	21
1,1-Dichloroethane	0.0100	0.00974		mg/L		97	81 - 129	7	15
2,2-Dichloropropane	0.0100	0.0103		mg/L		103	53 - 150	5	15
cis-1,2-Dichloroethene	0.0100	0.00973		mg/L		97	76 - 129	9	15
2-Butanone (MEK)	50.0	48.4		ug/L		97	73 - 137	14	24
Bromochloromethane	0.0100	0.00987		mg/L		99	78 - 120	5	13
Chloroform	0.0100	0.00996		mg/L		100	73 - 127	7	14
1,1,1-Trichloroethane	0.0100	0.0101		mg/L		101	74 - 130	6	11
Carbon tetrachloride	0.0100	0.0102		mg/L		102	72 - 129	6	11
1,1-Dichloropropene	0.0100	0.00992		mg/L		99	74 - 131	6	14
Benzene	0.0100	0.0101		mg/L		101	82 - 122	9	14
1,2-Dichloroethane	0.0100	0.00988		mg/L		99	76 - 126	8	11
Trichloroethene	0.0100	0.0101		mg/L		101	81 - 125	7	13
1,2-Dichloropropane	0.0100	0.00958		mg/L		96	80 - 126	11	14
Dibromomethane	0.0100	0.00988		mg/L		99	80 - 120	6	11
Bromodichloromethane	0.0100	0.00949		mg/L		95	75 - 124	7	13
cis-1,3-Dichloropropene	0.0100	0.00958		mg/L		96	77 - 120	5	20
Toluene	0.0100	0.00916		mg/L		92	80 - 120	6	13
trans-1,3-Dichloropropene	0.0100	0.00708	*1	mg/L		71	70 - 122	22	14
1,1,2-Trichloroethane	0.0100	0.00759	**1	mg/L		76	80 - 121	20	14
Tetrachloroethene	0.0100	0.00825		mg/L		82	76 - 120	8	13
1,3-Dichloropropane	0.0100	0.00753	**1	mg/L		75	79 - 120	25	13
Dibromochloromethane	0.0100	0.00850	*1	mg/L		85	60 - 125	16	13
1,2-Dibromoethane	0.0100	0.00957		mg/L		96	79 - 120	8	12
Chlorobenzene	0.0100	0.00960		mg/L		96	80 - 120	8	10
1,1,1,2-Tetrachloroethane	0.0100	0.00917	*1	mg/L		92	79 - 120	11	10
Ethylbenzene	0.0100	0.00955		mg/L		96	80 - 120	8	14
m-Xylene & p-Xylene	0.0100	0.00983		mg/L		98	80 - 120	6	14
o-Xylene	0.0100	0.00967		mg/L		97	80 - 125	5	16
Styrene	0.0100	0.00955		mg/L		95	76 - 127	7	16
Bromoform	0.0100	0.00877		mg/L		88	28 - 139	14	15
Isopropylbenzene	0.0100	0.0101		mg/L		101	75 - 129	8	12
Bromobenzene	0.0100	0.00986		mg/L		99	80 - 120	4	13
1,1,2,2-Tetrachloroethane	0.0100	0.00967		mg/L		97	74 - 124	7	18
1,2,3-Trichloropropane	0.0100	0.0100		mg/L		100	76 - 124	6	16
N-Propylbenzene	0.0100	0.00986		mg/L		99	80 - 128	4	13
2-Chlorotoluene	0.0100	0.00973		mg/L		97	80 - 120	7	15
4-Chlorotoluene	0.0100	0.00985		mg/L		98	80 - 120	4	14
t-Butylbenzene	0.0100	0.0104		mg/L		104	80 - 129	3	14

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: LCSD 580-338300/7**  
**Matrix: Water**  
**Analysis Batch: 338300**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,4-Trimethylbenzene	0.0100	0.0105		mg/L		105	80 - 131	4	16
sec-Butylbenzene	0.0100	0.0106		mg/L		106	78 - 131	4	15
4-Isopropyltoluene	0.0100	0.0102		mg/L		102	77 - 131	3	20
1,3-Dichlorobenzene	0.0100	0.00965		mg/L		96	69 - 127	5	14
1,4-Dichlorobenzene	0.0100	0.00963		mg/L		96	80 - 120	5	17
n-Butylbenzene	0.0100	0.0101		mg/L		101	78 - 120	4	14
1,2-Dichlorobenzene	0.0100	0.00979		mg/L		98	80 - 120	3	15
1,2-Dibromo-3-Chloropropane	0.0100	0.0100		mg/L		100	65 - 125	13	17
1,2,4-Trichlorobenzene	0.0100	0.0104		mg/L		104	73 - 128	6	20
Hexachlorobutadiene	0.0100	0.0106		mg/L		106	74 - 125	2	22
Naphthalene	0.0100	0.0118	*1	mg/L		118	75 - 134	44	23
1,2,3-Trichlorobenzene	0.0100	0.0138	*1	mg/L		138	74 - 139	27	26
1,3,5-Trimethylbenzene	0.0100	0.0102		mg/L		102	80 - 131	3	14

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
<i>Toluene-d8 (Surr)</i>	100		80 - 120
<i>1,2-Dichloroethane-d4 (Surr)</i>	102		80 - 126
<i>4-Bromofluorobenzene (Surr)</i>	102		80 - 120
<i>Dibromofluoromethane (Surr)</i>	101		80 - 120

**Lab Sample ID: MB 580-338901/5**  
**Matrix: Water**  
**Analysis Batch: 338901**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	ND		0.010		mg/L		09/22/20 23:43	23:43	1
Chloromethane	ND		0.020		mg/L		09/22/20 23:43	23:43	1
Vinyl chloride	ND		0.0010		mg/L		09/22/20 23:43	23:43	1
Bromomethane	ND		0.0060		mg/L		09/22/20 23:43	23:43	1
Chloroethane	ND		0.0050		mg/L		09/22/20 23:43	23:43	1
Trichlorofluoromethane	ND		0.0030		mg/L		09/22/20 23:43	23:43	1
1,1-Dichloroethene	ND		0.0040		mg/L		09/22/20 23:43	23:43	1
Methylene Chloride	ND		0.0050		mg/L		09/22/20 23:43	23:43	1
Methyl tert-butyl ether	ND		0.0020		mg/L		09/22/20 23:43	23:43	1
trans-1,2-Dichloroethene	ND		0.0030		mg/L		09/22/20 23:43	23:43	1
1,1-Dichloroethane	ND		0.0020		mg/L		09/22/20 23:43	23:43	1
2,2-Dichloropropane	ND		0.0030		mg/L		09/22/20 23:43	23:43	1
cis-1,2-Dichloroethene	ND		0.0030		mg/L		09/22/20 23:43	23:43	1
2-Butanone (MEK)	ND		20		ug/L		09/22/20 23:43	23:43	1
Bromochloromethane	ND		0.0020		mg/L		09/22/20 23:43	23:43	1
Chloroform	ND		0.0050		mg/L		09/22/20 23:43	23:43	1
1,1,1-Trichloroethane	ND		0.0030		mg/L		09/22/20 23:43	23:43	1
Carbon tetrachloride	ND		0.0030		mg/L		09/22/20 23:43	23:43	1
1,1-Dichloropropene	ND		0.0030		mg/L		09/22/20 23:43	23:43	1
Benzene	ND		0.0030		mg/L		09/22/20 23:43	23:43	1
1,2-Dichloroethane	ND		0.0020		mg/L		09/22/20 23:43	23:43	1
Trichloroethene	ND		0.0030		mg/L		09/22/20 23:43	23:43	1
1,2-Dichloropropane	ND		0.0010		mg/L		09/22/20 23:43	23:43	1

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: MB 580-338901/5**  
**Matrix: Water**  
**Analysis Batch: 338901**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibromomethane	ND		0.0020		mg/L			09/22/20 23:43	1
Bromodichloromethane	ND		0.0020		mg/L			09/22/20 23:43	1
cis-1,3-Dichloropropene	ND		0.0010		mg/L			09/22/20 23:43	1
Toluene	ND		0.0020		mg/L			09/22/20 23:43	1
trans-1,3-Dichloropropene	ND		0.0010		mg/L			09/22/20 23:43	1
1,1,2-Trichloroethane	ND		0.0010		mg/L			09/22/20 23:43	1
Tetrachloroethene	ND		0.0030		mg/L			09/22/20 23:43	1
1,3-Dichloropropane	ND		0.0020		mg/L			09/22/20 23:43	1
Dibromochloromethane	ND		0.0020		mg/L			09/22/20 23:43	1
1,2-Dibromoethane	ND		0.0020		mg/L			09/22/20 23:43	1
Chlorobenzene	ND		0.0020		mg/L			09/22/20 23:43	1
1,1,1,2-Tetrachloroethane	ND		0.0020		mg/L			09/22/20 23:43	1
Ethylbenzene	ND		0.0030		mg/L			09/22/20 23:43	1
m-Xylene & p-Xylene	ND		0.0030		mg/L			09/22/20 23:43	1
o-Xylene	ND		0.0020		mg/L			09/22/20 23:43	1
Styrene	ND		0.0050		mg/L			09/22/20 23:43	1
Bromoform	ND		0.0030		mg/L			09/22/20 23:43	1
Isopropylbenzene	ND		0.0020		mg/L			09/22/20 23:43	1
Bromobenzene	ND		0.0020		mg/L			09/22/20 23:43	1
1,1,2,2-Tetrachloroethane	ND		0.0030		mg/L			09/22/20 23:43	1
1,2,3-Trichloropropane	ND		0.0020		mg/L			09/22/20 23:43	1
N-Propylbenzene	ND		0.0030		mg/L			09/22/20 23:43	1
2-Chlorotoluene	ND		0.0030		mg/L			09/22/20 23:43	1
4-Chlorotoluene	ND		0.0020		mg/L			09/22/20 23:43	1
t-Butylbenzene	ND		0.0030		mg/L			09/22/20 23:43	1
1,2,4-Trimethylbenzene	ND		0.0030		mg/L			09/22/20 23:43	1
sec-Butylbenzene	ND		0.0030		mg/L			09/22/20 23:43	1
4-Isopropyltoluene	ND		0.0030		mg/L			09/22/20 23:43	1
1,3-Dichlorobenzene	ND		0.0020		mg/L			09/22/20 23:43	1
1,4-Dichlorobenzene	ND		0.0040		mg/L			09/22/20 23:43	1
n-Butylbenzene	ND		0.0030		mg/L			09/22/20 23:43	1
1,2-Dichlorobenzene	ND		0.0020		mg/L			09/22/20 23:43	1
1,2-Dibromo-3-Chloropropane	ND		0.010		mg/L			09/22/20 23:43	1
1,2,4-Trichlorobenzene	ND		0.0020		mg/L			09/22/20 23:43	1
Hexachlorobutadiene	ND		0.0060		mg/L			09/22/20 23:43	1
Naphthalene	ND		0.0040		mg/L			09/22/20 23:43	1
1,2,3-Trichlorobenzene	ND		0.0050		mg/L			09/22/20 23:43	1
1,3,5-Trimethylbenzene	ND		0.0030		mg/L			09/22/20 23:43	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		80 - 120		09/22/20 23:43	1
1,2-Dichloroethane-d4 (Surr)	99		80 - 126		09/22/20 23:43	1
4-Bromofluorobenzene (Surr)	100		80 - 120		09/22/20 23:43	1
Dibromofluoromethane (Surr)	115		80 - 120		09/22/20 23:43	1

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: LCS 580-338901/6**  
**Matrix: Water**  
**Analysis Batch: 338901**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Dichlorodifluoromethane	0.0100	0.00937	J	mg/L		94	47 - 133
Chloromethane	0.0100	0.00923	J	mg/L		92	52 - 135
Vinyl chloride	0.0100	0.00852		mg/L		85	65 - 130
Bromomethane	0.0100	0.00739		mg/L		74	66 - 125
Chloroethane	0.0100	0.00878		mg/L		88	65 - 132
Trichlorofluoromethane	0.0100	0.00905		mg/L		91	64 - 130
1,1-Dichloroethene	0.0100	0.00955		mg/L		95	70 - 129
Methylene Chloride	0.0100	0.00875		mg/L		87	77 - 120
Methyl tert-butyl ether	0.0100	0.00984		mg/L		98	72 - 130
trans-1,2-Dichloroethene	0.0100	0.00968		mg/L		97	70 - 130
1,1-Dichloroethane	0.0100	0.0100		mg/L		100	81 - 129
2,2-Dichloropropane	0.0100	0.00909		mg/L		91	53 - 150
cis-1,2-Dichloroethene	0.0100	0.00942		mg/L		94	76 - 129
2-Butanone (MEK)	50.0	46.3		ug/L		93	73 - 137
Bromochloromethane	0.0100	0.0117		mg/L		117	78 - 120
Chloroform	0.0100	0.00991		mg/L		99	73 - 127
1,1,1-Trichloroethane	0.0100	0.0103		mg/L		103	74 - 130
Carbon tetrachloride	0.0100	0.00913		mg/L		91	72 - 129
1,1-Dichloropropene	0.0100	0.00922		mg/L		92	74 - 131
Benzene	0.0100	0.0102		mg/L		102	82 - 122
1,2-Dichloroethane	0.0100	0.0110		mg/L		110	76 - 126
Trichloroethene	0.0100	0.0104		mg/L		104	81 - 125
1,2-Dichloropropane	0.0100	0.00906		mg/L		91	80 - 126
Dibromomethane	0.0100	0.0112		mg/L		112	80 - 120
Bromodichloromethane	0.0100	0.0110		mg/L		110	75 - 124
cis-1,3-Dichloropropene	0.0100	0.00963		mg/L		96	77 - 120
Toluene	0.0100	0.0108		mg/L		108	80 - 120
trans-1,3-Dichloropropene	0.0100	0.00886		mg/L		89	70 - 122
1,1,2-Trichloroethane	0.0100	0.00901		mg/L		90	80 - 121
Tetrachloroethene	0.0100	0.00970		mg/L		97	76 - 120
1,3-Dichloropropane	0.0100	0.00906		mg/L		91	79 - 120
Dibromochloromethane	0.0100	0.00824		mg/L		82	60 - 125
1,2-Dibromoethane	0.0100	0.00890		mg/L		89	79 - 120
Chlorobenzene	0.0100	0.00934		mg/L		93	80 - 120
1,1,1,2-Tetrachloroethane	0.0100	0.00936		mg/L		94	79 - 120
Ethylbenzene	0.0100	0.0102		mg/L		102	80 - 120
m-Xylene & p-Xylene	0.0100	0.0102		mg/L		102	80 - 120
o-Xylene	0.0100	0.00966		mg/L		97	80 - 125
Styrene	0.0100	0.00965		mg/L		96	76 - 127
Bromoform	0.0100	0.00899		mg/L		90	28 - 139
Isopropylbenzene	0.0100	0.00951		mg/L		95	75 - 129
Bromobenzene	0.0100	0.0103		mg/L		103	80 - 120
1,1,2,2-Tetrachloroethane	0.0100	0.00997		mg/L		100	74 - 124
1,2,3-Trichloropropane	0.0100	0.0111		mg/L		111	76 - 124
N-Propylbenzene	0.0100	0.0107		mg/L		107	80 - 128
2-Chlorotoluene	0.0100	0.0101		mg/L		101	80 - 120
4-Chlorotoluene	0.0100	0.0101		mg/L		101	80 - 120
t-Butylbenzene	0.0100	0.0103		mg/L		103	80 - 129

Eurofins TestAmerica, Seattle



# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: LCS 580-338901/6**  
**Matrix: Water**  
**Analysis Batch: 338901**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trimethylbenzene	0.0100	0.0104		mg/L		104	80 - 131
sec-Butylbenzene	0.0100	0.0105		mg/L		105	78 - 131
4-Isopropyltoluene	0.0100	0.0106		mg/L		106	77 - 131
1,3-Dichlorobenzene	0.0100	0.00885		mg/L		89	69 - 127
1,4-Dichlorobenzene	0.0100	0.00979		mg/L		98	80 - 120
n-Butylbenzene	0.0100	0.0101		mg/L		101	78 - 120
1,2-Dichlorobenzene	0.0100	0.0105		mg/L		105	80 - 120
1,2-Dibromo-3-Chloropropane	0.0100	0.0101		mg/L		101	65 - 125
1,2,4-Trichlorobenzene	0.0100	0.00926		mg/L		93	73 - 128
Hexachlorobutadiene	0.0100	0.0102		mg/L		102	74 - 125
Naphthalene	0.0100	0.0107		mg/L		107	75 - 134
1,2,3-Trichlorobenzene	0.0100	0.0110		mg/L		110	74 - 139
1,3,5-Trimethylbenzene	0.0100	0.0102		mg/L		102	80 - 131

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	102		80 - 120
1,2-Dichloroethane-d4 (Surr)	100		80 - 126
4-Bromofluorobenzene (Surr)	99		80 - 120
Dibromofluoromethane (Surr)	104		80 - 120

**Lab Sample ID: LCSD 580-338901/7**  
**Matrix: Water**  
**Analysis Batch: 338901**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dichlorodifluoromethane	0.0100	0.00907	J	mg/L		91	47 - 133	3	15
Chloromethane	0.0100	0.0106	J	mg/L		106	52 - 135	14	14
Vinyl chloride	0.0100	0.00959		mg/L		96	65 - 130	12	14
Bromomethane	0.0100	0.00965	*1	mg/L		96	66 - 125	26	14
Chloroethane	0.0100	0.00961		mg/L		96	65 - 132	9	18
Trichlorofluoromethane	0.0100	0.00997		mg/L		100	64 - 130	10	14
1,1-Dichloroethene	0.0100	0.0104		mg/L		104	70 - 129	9	17
Methylene Chloride	0.0100	0.00980		mg/L		98	77 - 120	11	18
Methyl tert-butyl ether	0.0100	0.0110		mg/L		110	72 - 130	11	18
trans-1,2-Dichloroethene	0.0100	0.00990		mg/L		99	70 - 130	2	21
1,1-Dichloroethane	0.0100	0.0101		mg/L		101	81 - 129	0	15
2,2-Dichloropropane	0.0100	0.00960		mg/L		96	53 - 150	5	15
cis-1,2-Dichloroethene	0.0100	0.00987		mg/L		99	76 - 129	5	15
2-Butanone (MEK)	50.0	49.1		ug/L		98	73 - 137	6	24
Bromochloromethane	0.0100	0.0107		mg/L		107	78 - 120	9	13
Chloroform	0.0100	0.00975		mg/L		97	73 - 127	2	14
1,1,1-Trichloroethane	0.0100	0.0109		mg/L		109	74 - 130	5	11
Carbon tetrachloride	0.0100	0.00946		mg/L		95	72 - 129	4	11
1,1-Dichloropropene	0.0100	0.00949		mg/L		95	74 - 131	3	14
Benzene	0.0100	0.00991		mg/L		99	82 - 122	3	14
1,2-Dichloroethane	0.0100	0.0114		mg/L		114	76 - 126	4	11
Trichloroethene	0.0100	0.00989		mg/L		99	81 - 125	5	13
1,2-Dichloropropane	0.0100	0.00935		mg/L		93	80 - 126	3	14

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: LCSD 580-338901/7**  
**Matrix: Water**  
**Analysis Batch: 338901**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dibromomethane	0.0100	0.0110		mg/L		110	80 - 120	2	11
Bromodichloromethane	0.0100	0.0113		mg/L		113	75 - 124	3	13
cis-1,3-Dichloropropene	0.0100	0.00975		mg/L		97	77 - 120	1	20
Toluene	0.0100	0.0101		mg/L		101	80 - 120	6	13
trans-1,3-Dichloropropene	0.0100	0.00950		mg/L		95	70 - 122	7	14
1,1,2-Trichloroethane	0.0100	0.0102		mg/L		102	80 - 121	13	14
Tetrachloroethene	0.0100	0.00961		mg/L		96	76 - 120	1	13
1,3-Dichloropropane	0.0100	0.00886		mg/L		89	79 - 120	2	13
Dibromochloromethane	0.0100	0.0107	*1	mg/L		107	60 - 125	25	13
1,2-Dibromoethane	0.0100	0.0107	*1	mg/L		107	79 - 120	19	12
Chlorobenzene	0.0100	0.00930		mg/L		93	80 - 120	0	10
1,1,1,2-Tetrachloroethane	0.0100	0.00994		mg/L		99	79 - 120	6	10
Ethylbenzene	0.0100	0.00986		mg/L		99	80 - 120	3	14
m-Xylene & p-Xylene	0.0100	0.0102		mg/L		102	80 - 120	0	14
o-Xylene	0.0100	0.00992		mg/L		99	80 - 125	3	16
Styrene	0.0100	0.00933		mg/L		93	76 - 127	3	16
Bromoform	0.0100	0.00955		mg/L		95	28 - 139	6	15
Isopropylbenzene	0.0100	0.00981		mg/L		98	75 - 129	3	12
Bromobenzene	0.0100	0.00992		mg/L		99	80 - 120	4	13
1,1,2,2-Tetrachloroethane	0.0100	0.00974		mg/L		97	74 - 124	2	18
1,2,3-Trichloropropane	0.0100	0.0118		mg/L		118	76 - 124	6	16
N-Propylbenzene	0.0100	0.0103		mg/L		103	80 - 128	4	13
2-Chlorotoluene	0.0100	0.0108		mg/L		108	80 - 120	7	15
4-Chlorotoluene	0.0100	0.00949		mg/L		95	80 - 120	6	14
t-Butylbenzene	0.0100	0.0106		mg/L		106	80 - 129	2	14
1,2,4-Trimethylbenzene	0.0100	0.0101		mg/L		101	80 - 131	2	16
sec-Butylbenzene	0.0100	0.0107		mg/L		107	78 - 131	2	15
4-Isopropyltoluene	0.0100	0.0105		mg/L		105	77 - 131	1	20
1,3-Dichlorobenzene	0.0100	0.00905		mg/L		91	69 - 127	2	14
1,4-Dichlorobenzene	0.0100	0.00985		mg/L		98	80 - 120	1	17
n-Butylbenzene	0.0100	0.00991		mg/L		99	78 - 120	2	14
1,2-Dichlorobenzene	0.0100	0.0102		mg/L		102	80 - 120	3	15
1,2-Dibromo-3-Chloropropane	0.0100	0.0115		mg/L		115	65 - 125	13	17
1,2,4-Trichlorobenzene	0.0100	0.00983		mg/L		98	73 - 128	6	20
Hexachlorobutadiene	0.0100	0.0109		mg/L		109	74 - 125	6	22
Naphthalene	0.0100	0.0110		mg/L		110	75 - 134	3	23
1,2,3-Trichlorobenzene	0.0100	0.0110		mg/L		110	74 - 139	0	26
1,3,5-Trimethylbenzene	0.0100	0.0104		mg/L		104	80 - 131	1	14

Surrogate	LCSD		Limits
	%Recovery	Qualifier	
Toluene-d8 (Surr)	97		80 - 120
1,2-Dichloroethane-d4 (Surr)	106		80 - 126
4-Bromofluorobenzene (Surr)	98		80 - 120
Dibromofluoromethane (Surr)	105		80 - 120

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 580-97420-C-2 MS

Matrix: Water

Analysis Batch: 338901

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec. Limits
	Result	Qualifier	Added	Result	Qualifier				
Dichlorodifluoromethane	ND	F1	0.0100	ND	F1	mg/L		30	47 - 133
Chloromethane	ND	F1	0.0100	ND	F1	mg/L		33	52 - 135
Vinyl chloride	ND	F1	0.0100	0.00380	F1	mg/L		38	65 - 130
Bromomethane	ND	F1 *1	0.0100	ND	F1	mg/L		36	66 - 125
Chloroethane	ND	F1	0.0100	ND	F1	mg/L		39	65 - 132
Trichlorofluoromethane	ND	F1	0.0100	0.00355	F1	mg/L		36	64 - 130
1,1-Dichloroethene	ND	F1	0.0100	0.00570	F1	mg/L		57	70 - 129
Methylene Chloride	ND	F1	0.0100	ND	F1	mg/L		46	77 - 120
Methyl tert-butyl ether	ND	F1	0.0100	0.00462	F1	mg/L		46	72 - 130
trans-1,2-Dichloroethene	ND	F1	0.0100	0.00540	F1	mg/L		54	70 - 130
1,1-Dichloroethane	ND	F1	0.0100	0.00531	F1	mg/L		53	81 - 129
2,2-Dichloropropane	ND	F1	0.0100	0.00391	F1	mg/L		39	53 - 150
cis-1,2-Dichloroethene	ND	F1	0.0100	0.00506	F1	mg/L		51	76 - 129
2-Butanone (MEK)	ND	F1	50.0	29.6	F1	ug/L		59	73 - 137
Bromochloromethane	ND	F1	0.0100	0.00593	F1	mg/L		59	78 - 120
Chloroform	ND	F1	0.0100	0.00529	F1	mg/L		53	73 - 127
1,1,1-Trichloroethane	ND	F1	0.0100	0.00503	F1	mg/L		50	74 - 130
Carbon tetrachloride	ND	F1	0.0100	0.00494	F1	mg/L		49	72 - 129
1,1-Dichloropropene	ND	F1	0.0100	0.00570	F1	mg/L		57	74 - 131
Benzene	ND	F1	0.0100	0.00619	F1	mg/L		62	82 - 122
1,2-Dichloroethane	ND	F1	0.0100	0.00624	F1	mg/L		62	76 - 126
Trichloroethene	ND	F1	0.0100	0.00568	F1	mg/L		57	81 - 125
1,2-Dichloropropane	ND	F1	0.0100	0.00569	F1	mg/L		57	80 - 126
Dibromomethane	ND	F1	0.0100	0.00599	F1	mg/L		60	80 - 120
Bromodichloromethane	ND	F1	0.0100	0.00593	F1	mg/L		59	75 - 124
cis-1,3-Dichloropropene	ND	F1	0.0100	0.00593	F1	mg/L		59	77 - 120
Toluene	ND	F1	0.0100	0.00599	F1	mg/L		60	80 - 120
trans-1,3-Dichloropropene	ND	F1	0.0100	0.00572	F1	mg/L		57	70 - 122
1,1,2-Trichloroethane	ND	F1	0.0100	0.00615	F1	mg/L		61	80 - 121
Tetrachloroethene	ND	F2 F1	0.0100	0.00573	F1	mg/L		57	76 - 120
1,3-Dichloropropane	ND	F1	0.0100	0.00557	F1	mg/L		56	79 - 120
Dibromochloromethane	ND	F2 F1 *1	0.0100	0.00516	F1	mg/L		52	60 - 125
1,2-Dibromoethane	ND	F1 *1	0.0100	0.00581	F1	mg/L		58	79 - 120
Chlorobenzene	ND	F1	0.0100	0.00569	F1	mg/L		57	80 - 120
1,1,1,2-Tetrachloroethane	ND	F1	0.0100	0.00465	F1	mg/L		46	79 - 120
Ethylbenzene	ND	F1	0.0100	0.00560	F1	mg/L		56	80 - 120
m-Xylene & p-Xylene	ND	F1	0.0100	0.00552	F1	mg/L		55	80 - 120
o-Xylene	ND	F1	0.0100	0.00511	F1	mg/L		51	80 - 125
Styrene	ND	F1	0.0100	0.00570	F1	mg/L		57	76 - 127
Bromoform	ND		0.0100	0.00526		mg/L		53	28 - 139
Isopropylbenzene	ND	F1	0.0100	0.00470	F1	mg/L		47	75 - 129
Bromobenzene	ND	F1	0.0100	0.00574	F1	mg/L		57	80 - 120
1,1,2,2-Tetrachloroethane	ND	F1	0.0100	0.00513	F1	mg/L		51	74 - 124
1,2,3-Trichloropropane	ND	F2 F1	0.0100	0.00525	F1	mg/L		52	76 - 124
N-Propylbenzene	ND	F1	0.0100	0.00523	F1	mg/L		52	80 - 128
2-Chlorotoluene	ND	F1	0.0100	0.00557	F1	mg/L		56	80 - 120
4-Chlorotoluene	ND	F1	0.0100	0.00543	F1	mg/L		54	80 - 120
t-Butylbenzene	ND	F2 F1	0.0100	0.00471	F1	mg/L		47	80 - 129

Eurofins TestAmerica, Seattle



# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 580-97420-C-2 MSD

Client Sample ID: Matrix Spike Duplicate

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 338901

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD		Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
				Result	Qualifier						
Dibromomethane	ND	F1	0.0100	0.00546	F1	mg/L		55	80 - 120	9	11
Bromodichloromethane	ND	F1	0.0100	0.00578	F1	mg/L		58	75 - 124	2	13
cis-1,3-Dichloropropene	ND	F1	0.0100	0.00491	F1	mg/L		49	77 - 120	19	20
Toluene	ND	F1	0.0100	0.00566	F1	mg/L		57	80 - 120	6	13
trans-1,3-Dichloropropene	ND	F1	0.0100	0.00520	F1	mg/L		52	70 - 122	10	14
1,1,2-Trichloroethane	ND	F1	0.0100	0.00545	F1	mg/L		55	80 - 121	12	14
Tetrachloroethene	ND	F2 F1	0.0100	0.00496	F2 F1	mg/L		50	76 - 120	14	13
1,3-Dichloropropane	ND	F1	0.0100	0.00487	F1	mg/L		49	79 - 120	13	13
Dibromochloromethane	ND	F2 F1 *1	0.0100	0.00440	F2 F1	mg/L		44	60 - 125	16	13
1,2-Dibromoethane	ND	F1 *1	0.0100	0.00565	F1	mg/L		57	79 - 120	3	12
Chlorobenzene	ND	F1	0.0100	0.00527	F1	mg/L		53	80 - 120	8	10
1,1,1,2-Tetrachloroethane	ND	F1	0.0100	0.00446	F1	mg/L		45	79 - 120	4	10
Ethylbenzene	ND	F1	0.0100	0.00523	F1	mg/L		52	80 - 120	7	14
m-Xylene & p-Xylene	ND	F1	0.0100	0.00518	F1	mg/L		52	80 - 120	6	14
o-Xylene	ND	F1	0.0100	0.00502	F1	mg/L		50	80 - 125	2	16
Styrene	ND	F1	0.0100	0.00523	F1	mg/L		52	76 - 127	9	16
Bromoform	ND		0.0100	0.00475		mg/L		47	28 - 139	10	15
Isopropylbenzene	ND	F1	0.0100	0.00451	F1	mg/L		45	75 - 129	4	12
Bromobenzene	ND	F1	0.0100	0.00521	F1	mg/L		52	80 - 120	10	13
1,1,2,2-Tetrachloroethane	ND	F1	0.0100	0.00462	F1	mg/L		46	74 - 124	11	18
1,2,3-Trichloropropane	ND	F2 F1	0.0100	0.00444	F2 F1	mg/L		44	76 - 124	17	16
N-Propylbenzene	ND	F1	0.0100	0.00486	F1	mg/L		49	80 - 128	7	13
2-Chlorotoluene	ND	F1	0.0100	0.00508	F1	mg/L		51	80 - 120	9	15
4-Chlorotoluene	ND	F1	0.0100	0.00486	F1	mg/L		49	80 - 120	11	14
t-Butylbenzene	ND	F2 F1	0.0100	0.00406	F2 F1	mg/L		41	80 - 129	15	14
1,2,4-Trimethylbenzene	ND	F1	0.0100	0.00441	F1	mg/L		44	80 - 131	9	16
sec-Butylbenzene	ND	F1	0.0100	0.00425	F1	mg/L		42	78 - 131	12	15
4-Isopropyltoluene	ND	F1	0.0100	0.00426	F1	mg/L		43	77 - 131	11	20
1,3-Dichlorobenzene	ND	F1	0.0100	0.00455	F1	mg/L		46	69 - 127	5	14
1,4-Dichlorobenzene	ND	F1	0.0100	0.00487	F1	mg/L		49	80 - 120	9	17
n-Butylbenzene	ND	F1	0.0100	0.00421	F1	mg/L		42	78 - 120	7	14
1,2-Dichlorobenzene	ND	F1	0.0100	0.00473	F1	mg/L		47	80 - 120	9	15
1,2-Dibromo-3-Chloropropane	ND	F1	0.0100	ND	F1	mg/L		50	65 - 125	0	17
1,2,4-Trichlorobenzene	ND	F1	0.0100	0.00461	F1	mg/L		46	73 - 128	2	20
Hexachlorobutadiene	ND	F1	0.0100	ND	F1	mg/L		39	74 - 125	2	22
Naphthalene	ND	F1	0.0100	0.00489	F1	mg/L		49	75 - 134	8	23
1,2,3-Trichlorobenzene	ND	F1	0.0100	ND	F1	mg/L		48	74 - 139	3	26
1,3,5-Trimethylbenzene	ND	F1	0.0100	0.00437	F1	mg/L		44	80 - 131	9	14

Surrogate	MSD %Recovery	MSD Qualifier	Limits
Toluene-d8 (Surr)	103		80 - 120
1,2-Dichloroethane-d4 (Surr)	96		80 - 126
4-Bromofluorobenzene (Surr)	106		80 - 120
Dibromofluoromethane (Surr)	93		80 - 120

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC)

**Lab Sample ID: MB 580-338273/1-A**  
**Matrix: Water**  
**Analysis Batch: 338468**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 338273**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
RRO (nC25-nC36)	ND		0.25		mg/L		09/15/20 12:45	09/17/20 18:09	1
DRO (nC10-<nC25)	ND		0.11		mg/L		09/15/20 12:45	09/17/20 18:09	1
Surrogate	MB	MB	Limits			Prepared	Analyzed	Dil Fac	
	%Recovery	Qualifier							
<i>o</i> -Terphenyl	69		50 - 150			09/15/20 12:45	09/17/20 18:09	1	
<i>n</i> -Triacontane-d62	81		50 - 150			09/15/20 12:45	09/17/20 18:09	1	

**Lab Sample ID: MB 580-338273/1-B**  
**Matrix: Water**  
**Analysis Batch: 338468**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 338273**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
RRO (nC25-nC36)	ND		0.25		mg/L		09/15/20 12:45	09/17/20 16:28	1
DRO (nC10-<nC25)	ND		0.11		mg/L		09/15/20 12:45	09/17/20 16:28	1
Surrogate	MB	MB	Limits			Prepared	Analyzed	Dil Fac	
	%Recovery	Qualifier							
<i>o</i> -Terphenyl	67		50 - 150			09/15/20 12:45	09/17/20 16:28	1	
<i>n</i> -Triacontane-d62	80		50 - 150			09/15/20 12:45	09/17/20 16:28	1	

**Lab Sample ID: LCS 580-338273/2-A**  
**Matrix: Water**  
**Analysis Batch: 338468**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 338273**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
DRO (nC10-<nC25)	0.500	0.341	*	mg/L		68	75 - 125
Surrogate	LCS	LCS	Limits			%Rec	%Rec. Limits
	%Recovery	Qualifier					
<i>o</i> -Terphenyl	83		50 - 150				
<i>n</i> -Triacontane-d62	78		50 - 150				

**Lab Sample ID: LCS 580-338273/2-B**  
**Matrix: Water**  
**Analysis Batch: 338468**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 338273**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
DRO (nC10-<nC25)	0.500	0.354	*	mg/L		71	75 - 125
Surrogate	LCS	LCS	Limits			%Rec	%Rec. Limits
	%Recovery	Qualifier					
<i>o</i> -Terphenyl	83		50 - 150				
<i>n</i> -Triacontane-d62	83		50 - 150				

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC) (Continued)

**Lab Sample ID: LCSD 580-338273/3-A**  
**Matrix: Water**  
**Analysis Batch: 338468**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 338273**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
RRO (nC25-nC36)	0.500	0.485		mg/L		97	60 - 120	7	20
DRO (nC10-<nC25)	0.500	0.313	*	mg/L		63	75 - 125	9	20

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
<i>o</i> -Terphenyl	82		50 - 150
<i>n</i> -Triacontane-d62	84		50 - 150

**Lab Sample ID: LCSD 580-338273/3-B**  
**Matrix: Water**  
**Analysis Batch: 338468**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 338273**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
RRO (nC25-nC36)	0.500	0.488		mg/L		98	60 - 120	3	20
DRO (nC10-<nC25)	0.500	0.308	*	mg/L		62	75 - 125	14	20

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
<i>o</i> -Terphenyl	81		50 - 150
<i>n</i> -Triacontane-d62	87		50 - 150

**Lab Sample ID: MB 580-339227/1-A**  
**Matrix: Water**  
**Analysis Batch: 339300**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 339227**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
RRO (nC25-nC36)	ND		0.25		mg/L		09/26/20 10:36	09/27/20 18:02	1
DRO (nC10-<nC25)	ND		0.11		mg/L		09/26/20 10:36	09/27/20 18:02	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
<i>o</i> -Terphenyl	69		50 - 150	09/26/20 10:36	09/27/20 18:02	1
<i>n</i> -Triacontane-d62	73		50 - 150	09/26/20 10:36	09/27/20 18:02	1

**Lab Sample ID: MB 580-339227/1-B**  
**Matrix: Water**  
**Analysis Batch: 339385**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 339227**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
RRO (nC25-nC36)	ND		0.25		mg/L		09/26/20 10:36	09/28/20 16:28	1
DRO (nC10-<nC25)	ND		0.11		mg/L		09/26/20 10:36	09/28/20 16:28	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
<i>o</i> -Terphenyl	72		50 - 150	09/26/20 10:36	09/28/20 16:28	1
<i>n</i> -Triacontane-d62	82		50 - 150	09/26/20 10:36	09/28/20 16:28	1

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC) (Continued)

**Lab Sample ID: LCS 580-339227/2-A**  
**Matrix: Water**  
**Analysis Batch: 339300**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 339227**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
RRO (nC25-nC36)	0.500	0.422		mg/L		84	60 - 120
DRO (nC10-<nC25)	0.500	0.326	*	mg/L		65	75 - 125
<b>LCS LCS</b>							
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				
<i>o-Terphenyl</i>	86		50 - 150				
<i>n-Triacontane-d62</i>	80		50 - 150				

**Lab Sample ID: LCS 580-339227/2-B**  
**Matrix: Water**  
**Analysis Batch: 339385**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 339227**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
RRO (nC25-nC36)	0.500	0.441		mg/L		88	60 - 120
DRO (nC10-<nC25)	0.500	0.336	*	mg/L		67	75 - 125
<b>LCS LCS</b>							
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				
<i>o-Terphenyl</i>	82		50 - 150				
<i>n-Triacontane-d62</i>	90		50 - 150				

**Lab Sample ID: LCSD 580-339227/3-A**  
**Matrix: Water**  
**Analysis Batch: 339300**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 339227**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
RRO (nC25-nC36)	0.500	0.441		mg/L		88	60 - 120	4	20
DRO (nC10-<nC25)	0.500	0.337	*	mg/L		67	75 - 125	4	20
<b>LCSD LCSD</b>									
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>						
<i>o-Terphenyl</i>	96		50 - 150						
<i>n-Triacontane-d62</i>	89		50 - 150						

**Lab Sample ID: LCSD 580-339227/3-B**  
**Matrix: Water**  
**Analysis Batch: 339385**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 339227**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
RRO (nC25-nC36)	0.500	0.460		mg/L		92	60 - 120	4	20
DRO (nC10-<nC25)	0.500	0.352	*	mg/L		70	75 - 125	5	20
<b>LCSD LCSD</b>									
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>						
<i>o-Terphenyl</i>	86		50 - 150						
<i>n-Triacontane-d62</i>	92		50 - 150						



# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: EPA 537(Mod) - PFAS for QSM 5.1, Table B-15

**Lab Sample ID: MB 320-412514/1-A**  
**Matrix: Water**  
**Analysis Batch: 412734**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 412514**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Perfluorooctanoic acid (PFOA)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluorodecanoic acid (PFDA)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluorononanoic acid (PFNA)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluoropentanesulfonic acid (PFPeS)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluorononanesulfonic acid (PFNS)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluorobutanoic acid (PFBA)	ND		5.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluorododecanoic acid (PFDoA)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluorohexanoic acid (PFHxA)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluoropentanoic acid (PFPeA)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
9CI-PF3ONS	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
4:2 FTS	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
HFPO-DA (GenX)	ND		4.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
6:2 FTS	ND		5.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
11CI-PF3OUdS	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
8:2 FTS	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		5.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluorooctanesulfonamide (PFOSA)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		5.0		ng/L		09/15/20 18:44	09/16/20 12:59	1

Isotope Dilution	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
13C4 PFOA	83		50 - 150	09/15/20 18:44	09/16/20 12:59	1
13C4 PFOS	92		50 - 150	09/15/20 18:44	09/16/20 12:59	1
18O2 PFHxS	93		50 - 150	09/15/20 18:44	09/16/20 12:59	1
13C2 PFHxA	82		50 - 150	09/15/20 18:44	09/16/20 12:59	1
13C3 PFBS	89		50 - 150	09/15/20 18:44	09/16/20 12:59	1
13C8 FOSA	82		50 - 150	09/15/20 18:44	09/16/20 12:59	1
13C2 PFDoA	81		50 - 150	09/15/20 18:44	09/16/20 12:59	1
13C5 PFPeA	87		50 - 150	09/15/20 18:44	09/16/20 12:59	1
13C2 PFTeDA	78		50 - 150	09/15/20 18:44	09/16/20 12:59	1
13C5 PFNA	91		50 - 150	09/15/20 18:44	09/16/20 12:59	1
13C2 PFDA	87		50 - 150	09/15/20 18:44	09/16/20 12:59	1
M2-6:2 FTS	101		50 - 150	09/15/20 18:44	09/16/20 12:59	1
M2-4:2 FTS	108		50 - 150	09/15/20 18:44	09/16/20 12:59	1
d5-NEtFOSAA	83		50 - 150	09/15/20 18:44	09/16/20 12:59	1
d3-NMeFOSAA	81		50 - 150	09/15/20 18:44	09/16/20 12:59	1

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: EPA 537(Mod) - PFAS for QSM 5.1, Table B-15 (Continued)

**Lab Sample ID: MB 320-412514/1-A**  
**Matrix: Water**  
**Analysis Batch: 412734**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 412514**

Isotope Dilution	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
13C2 PFUnA	87		50 - 150	09/15/20 18:44	09/16/20 12:59	1
13C4 PFHpA	90		50 - 150	09/15/20 18:44	09/16/20 12:59	1
13C3 HFPO-DA	82		50 - 150	09/15/20 18:44	09/16/20 12:59	1
M2-8:2 FTS	98		50 - 150	09/15/20 18:44	09/16/20 12:59	1
13C4 PFBA	83		50 - 150	09/15/20 18:44	09/16/20 12:59	1

**Lab Sample ID: LCS 320-412514/2-A**  
**Matrix: Water**  
**Analysis Batch: 412734**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 412514**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorooctanoic acid (PFOA)	40.0	43.3		ng/L		108	70 - 130
Perfluorooctanesulfonic acid (PFOS)	37.1	38.8		ng/L		104	70 - 130
Perfluorohexanesulfonic acid (PFHxS)	36.4	34.7		ng/L		95	59 - 119
Perfluoroundecanoic acid (PFUnA)	40.0	38.4		ng/L		96	68 - 128
Perfluorodecanesulfonic acid (PFDS)	38.6	37.6		ng/L		98	71 - 131
Perfluorotetradecanoic acid (PFTeA)	40.0	37.9		ng/L		95	70 - 130
Perfluorodecanoic acid (PFDA)	40.0	36.9		ng/L		92	76 - 136
Perfluorotridecanoic acid (PFTriA)	40.0	41.7		ng/L		104	71 - 131
Perfluorononanoic acid (PFNA)	40.0	41.6		ng/L		104	75 - 135
Perfluoropentanesulfonic acid (PFPeS)	37.5	37.9		ng/L		101	66 - 126
Perfluoronanesulfonic acid (PFNS)	38.4	37.8		ng/L		98	75 - 135
Perfluoroheptanoic acid (PFHpA)	40.0	38.6		ng/L		97	72 - 132
Perfluorobutanoic acid (PFBA)	40.0	43.1		ng/L		108	76 - 136
Perfluorododecanoic acid (PFDoA)	40.0	39.1		ng/L		98	71 - 131
Perfluorohexanoic acid (PFHxA)	40.0	42.0		ng/L		105	73 - 133
Perfluoropentanoic acid (PFPeA)	40.0	39.5		ng/L		99	71 - 131
Perfluorobutanesulfonic acid (PFBS)	35.4	36.1		ng/L		102	67 - 127
Perfluoroheptanesulfonic Acid (PFHpS)	38.1	40.6		ng/L		107	76 - 136
9CI-PF3ONS	37.3	36.3		ng/L		97	75 - 135
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.7	39.8		ng/L		106	79 - 139
4:2 FTS	37.4	36.7		ng/L		98	79 - 139
HFPO-DA (GenX)	40.0	40.6		ng/L		101	51 - 173
6:2 FTS	37.9	39.8		ng/L		105	59 - 175
11CI-PF3OUdS	37.7	39.0		ng/L		103	54 - 114
8:2 FTS	38.3	37.5		ng/L		98	75 - 135
N-ethylperfluorooctanesulfonamidoacetic acid (NETFOSAA)	40.0	40.4		ng/L		101	76 - 136
Perfluorooctanesulfonamide (PFOSA)	40.0	40.9		ng/L		102	73 - 133

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: EPA 537(Mod) - PFAS for QSM 5.1, Table B-15 (Continued)

**Lab Sample ID: LCS 320-412514/2-A**  
**Matrix: Water**  
**Analysis Batch: 412734**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 412514**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	40.0	45.7		ng/L		114	76 - 136
<b>LCS LCS</b>							
<b>Isotope Dilution</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				
13C4 PFOA	83		50 - 150				
13C4 PFOS	89		50 - 150				
18O2 PFHxS	92		50 - 150				
13C2 PFHxA	80		50 - 150				
13C3 PFBS	88		50 - 150				
13C8 FOSA	83		50 - 150				
13C2 PFDa	84		50 - 150				
13C5 PFPeA	83		50 - 150				
13C2 PFTeDA	79		50 - 150				
13C5 PFNA	86		50 - 150				
13C2 PFDA	90		50 - 150				
M2-6:2 FTS	99		50 - 150				
M2-4:2 FTS	98		50 - 150				
d5-NEtFOSAA	79		50 - 150				
d3-NMeFOSAA	76		50 - 150				
13C2 PFUnA	84		50 - 150				
13C4 PFHpA	88		50 - 150				
13C3 HFPO-DA	79		50 - 150				
M2-8:2 FTS	94		50 - 150				
13C4 PFBA	81		50 - 150				

**Lab Sample ID: LCSD 320-412514/3-A**  
**Matrix: Water**  
**Analysis Batch: 412734**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 412514**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanoic acid (PFOA)	40.0	38.1		ng/L		95	70 - 130	13	30
Perfluorooctanesulfonic acid (PFOS)	37.1	35.2		ng/L		95	70 - 130	10	30
Perfluorohexanesulfonic acid (PFHxS)	36.4	30.8		ng/L		85	59 - 119	12	30
Perfluoroundecanoic acid (PFUnA)	40.0	40.5		ng/L		101	68 - 128	5	30
Perfluorodecanesulfonic acid (PFDS)	38.6	34.4		ng/L		89	71 - 131	9	30
Perfluorotetradecanoic acid (PFTeA)	40.0	32.8		ng/L		82	70 - 130	14	30
Perfluorodecanoic acid (PFDA)	40.0	39.0		ng/L		97	76 - 136	6	30
Perfluorotridecanoic acid (PFTriA)	40.0	37.2		ng/L		93	71 - 131	11	30
Perfluorononanoic acid (PFNA)	40.0	36.8		ng/L		92	75 - 135	12	30
Perfluoropentanesulfonic acid (PFPeS)	37.5	37.0		ng/L		99	66 - 126	2	30
Perfluorononanesulfonic acid (PFNS)	38.4	36.1		ng/L		94	75 - 135	5	30
Perfluoroheptanoic acid (PFHpA)	40.0	38.7		ng/L		97	72 - 132	0	30
Perfluorobutanoic acid (PFBA)	40.0	39.3		ng/L		98	76 - 136	9	30

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: EPA 537(Mod) - PFAS for QSM 5.1, Table B-15 (Continued)

**Lab Sample ID: LCSD 320-412514/3-A**  
**Matrix: Water**  
**Analysis Batch: 412734**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 412514**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorododecanoic acid (PFDoA)	40.0	37.9		ng/L		95	71 - 131	3	30
Perfluorohexanoic acid (PFHxA)	40.0	38.7		ng/L		97	73 - 133	8	30
Perfluoropentanoic acid (PFPeA)	40.0	35.9		ng/L		90	71 - 131	10	30
Perfluorobutanesulfonic acid (PFBS)	35.4	35.5		ng/L		101	67 - 127	1	30
Perfluoroheptanesulfonic Acid (PFHpS)	38.1	36.9		ng/L		97	76 - 136	10	30
9CI-PF3ONS	37.3	35.4		ng/L		95	75 - 135	2	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.7	37.0		ng/L		98	79 - 139	7	30
4:2 FTS	37.4	32.4		ng/L		87	79 - 139	12	30
HFPO-DA (GenX)	40.0	37.7		ng/L		94	51 - 173	7	30
6:2 FTS	37.9	33.6		ng/L		89	59 - 175	17	30
11CI-PF3OUdS	37.7	38.0		ng/L		101	54 - 114	3	30
8:2 FTS	38.3	34.6		ng/L		90	75 - 135	8	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	40.0	35.9		ng/L		90	76 - 136	12	30
Perfluorooctanesulfonamide (PFOSA)	40.0	39.5		ng/L		99	73 - 133	4	30
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	40.0	39.1		ng/L		98	76 - 136	16	30

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
13C4 PFOA	89		50 - 150
13C4 PFOS	93		50 - 150
18O2 PFHxS	98		50 - 150
13C2 PFHxA	87		50 - 150
13C3 PFBS	90		50 - 150
13C8 FOSA	89		50 - 150
13C2 PFDoA	87		50 - 150
13C5 PFPeA	89		50 - 150
13C2 PFTeDA	80		50 - 150
13C5 PFNA	97		50 - 150
13C2 PFDA	93		50 - 150
M2-6:2 FTS	104		50 - 150
M2-4:2 FTS	115		50 - 150
d5-NEtFOSAA	86		50 - 150
d3-NMeFOSAA	87		50 - 150
13C2 PFUnA	88		50 - 150
13C4 PFHpA	89		50 - 150
13C3 HFPO-DA	81		50 - 150
M2-8:2 FTS	106		50 - 150
13C4 PFBA	86		50 - 150

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: 6010D - Metals (ICP)

**Lab Sample ID: MB 580-338381/15-A**  
**Matrix: Water**  
**Analysis Batch: 338478**

**Client Sample ID: Method Blank**  
**Prep Type: Total Recoverable**  
**Prep Batch: 338381**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		2.5		mg/L		09/16/20 11:26	09/16/20 16:35	1
Iron	ND		0.50		mg/L		09/16/20 11:26	09/16/20 16:35	1
Magnesium	ND		1.1		mg/L		09/16/20 11:26	09/16/20 16:35	1
Manganese	ND		0.020		mg/L		09/16/20 11:26	09/16/20 16:35	1
Potassium	ND		3.3		mg/L		09/16/20 11:26	09/16/20 16:35	1
Sodium	ND		2.0		mg/L		09/16/20 11:26	09/16/20 16:35	1
Strontium	ND		0.10		mg/L		09/16/20 11:26	09/16/20 16:35	1
Antimony	ND		0.060		mg/L		09/16/20 11:26	09/16/20 16:35	1
Beryllium	ND		0.020		mg/L		09/16/20 11:26	09/16/20 16:35	1
Aluminum	ND		1.5		mg/L		09/16/20 11:26	09/16/20 16:35	1
Copper	ND		0.060		mg/L		09/16/20 11:26	09/16/20 16:35	1
Nickel	ND		0.020		mg/L		09/16/20 11:26	09/16/20 16:35	1
Thallium	ND		0.10		mg/L		09/16/20 11:26	09/16/20 16:35	1
Zinc	ND		0.040		mg/L		09/16/20 11:26	09/16/20 16:35	1
Selenium	ND		0.10		mg/L		09/16/20 11:26	09/16/20 16:35	1

**Lab Sample ID: LCS 580-338381/16-A**  
**Matrix: Water**  
**Analysis Batch: 338478**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total Recoverable**  
**Prep Batch: 338381**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	10.0	9.94		mg/L		99	80 - 120
Iron	20.0	19.9		mg/L		100	80 - 120
Magnesium	20.0	19.9		mg/L		100	80 - 120
Manganese	1.00	0.925		mg/L		93	80 - 120
Potassium	20.0	18.9		mg/L		94	80 - 120
Sodium	20.0	19.3		mg/L		97	80 - 120
Strontium	1.00	0.968		mg/L		97	80 - 120
Antimony	1.00	0.925		mg/L		93	80 - 120
Beryllium	1.00	0.978		mg/L		98	80 - 120
Aluminum	20.0	19.5		mg/L		97	80 - 120
Copper	1.00	0.939		mg/L		94	80 - 120
Nickel	1.00	1.00		mg/L		100	80 - 120
Thallium	1.00	0.989		mg/L		99	80 - 120
Zinc	1.00	1.00		mg/L		100	80 - 120
Selenium	1.00	0.966		mg/L		97	80 - 120

**Lab Sample ID: LCSD 580-338381/17-A**  
**Matrix: Water**  
**Analysis Batch: 338478**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total Recoverable**  
**Prep Batch: 338381**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Boron	10.0	10.0		mg/L		100	80 - 120	1	20
Iron	20.0	20.2		mg/L		101	80 - 120	2	20
Magnesium	20.0	20.3		mg/L		102	80 - 120	2	20
Manganese	1.00	0.951		mg/L		95	80 - 120	3	20
Potassium	20.0	19.1		mg/L		96	80 - 120	1	20
Sodium	20.0	19.7		mg/L		98	80 - 120	2	20
Strontium	1.00	0.999		mg/L		100	80 - 120	3	20

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: 6010D - Metals (ICP) (Continued)

**Lab Sample ID: LCSD 580-338381/17-A**  
**Matrix: Water**  
**Analysis Batch: 338478**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total Recoverable**  
**Prep Batch: 338381**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	1.00	0.941		mg/L		94	80 - 120	2	20
Beryllium	1.00	1.02		mg/L		102	80 - 120	4	20
Aluminum	20.0	19.7		mg/L		98	80 - 120	1	20
Copper	1.00	0.958		mg/L		96	80 - 120	2	20
Nickel	1.00	1.02		mg/L		102	80 - 120	2	20
Thallium	1.00	1.01		mg/L		101	80 - 120	2	20
Zinc	1.00	1.01		mg/L		101	80 - 120	1	20
Selenium	1.00	0.987		mg/L		99	80 - 120	2	20

**Lab Sample ID: 580-97462-G-9-C MS**  
**Matrix: Water**  
**Analysis Batch: 338478**

**Client Sample ID: Matrix Spike**  
**Prep Type: Total Recoverable**  
**Prep Batch: 338381**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	ND		10.0	10.6		mg/L		104	80 - 120		
Iron	ND		20.0	21.1		mg/L		104	80 - 120		
Magnesium	41		20.0	60.8		mg/L		99	80 - 120		
Manganese	0.69		1.00	1.65		mg/L		95	80 - 120		
Potassium	6.4		20.0	26.5		mg/L		101	80 - 120		
Sodium	98		20.0	116	4	mg/L		91	80 - 120		
Strontium	0.55		1.00	1.55		mg/L		101	80 - 120		
Antimony	ND		1.00	0.992		mg/L		99	80 - 120		
Beryllium	ND		1.00	1.04		mg/L		104	80 - 120		
Aluminum	ND		20.0	20.4		mg/L		102	80 - 120		
Copper	ND		1.00	0.981		mg/L		98	80 - 120		
Nickel	ND		1.00	1.06		mg/L		105	80 - 120		
Thallium	ND		1.00	0.981		mg/L		97	80 - 120		
Zinc	ND		1.00	1.07		mg/L		107	80 - 120		
Selenium	ND		1.00	1.00		mg/L		100	80 - 120		

**Lab Sample ID: 580-97462-G-9-D MSD**  
**Matrix: Water**  
**Analysis Batch: 338478**

**Client Sample ID: Matrix Spike Duplicate**  
**Prep Type: Total Recoverable**  
**Prep Batch: 338381**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	ND		10.0	10.5		mg/L		104	80 - 120	0	20
Iron	ND		20.0	20.6		mg/L		102	80 - 120	2	20
Magnesium	41		20.0	59.9		mg/L		94	80 - 120	2	20
Manganese	0.69		1.00	1.64		mg/L		94	80 - 120	1	20
Potassium	6.4		20.0	25.9		mg/L		97	80 - 120	2	20
Sodium	98		20.0	115	4	mg/L		86	80 - 120	1	20
Strontium	0.55		1.00	1.52		mg/L		97	80 - 120	2	20
Antimony	ND		1.00	0.980		mg/L		98	80 - 120	1	20
Beryllium	ND		1.00	1.03		mg/L		103	80 - 120	1	20
Aluminum	ND		20.0	19.9		mg/L		100	80 - 120	3	20
Copper	ND		1.00	0.965		mg/L		97	80 - 120	2	20
Nickel	ND		1.00	1.04		mg/L		103	80 - 120	2	20
Thallium	ND		1.00	0.991		mg/L		98	80 - 120	1	20
Zinc	ND		1.00	1.06		mg/L		106	80 - 120	1	20

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: 6010D - Metals (ICP) (Continued)

**Lab Sample ID: 580-97462-G-9-D MSD**  
**Matrix: Water**  
**Analysis Batch: 338478**

**Client Sample ID: Matrix Spike Duplicate**  
**Prep Type: Total Recoverable**  
**Prep Batch: 338381**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Selenium	ND		1.00	0.999		mg/L		100	80 - 120	0	20

**Lab Sample ID: 580-97462-G-9-B DU**  
**Matrix: Water**  
**Analysis Batch: 338478**

**Client Sample ID: Duplicate**  
**Prep Type: Total Recoverable**  
**Prep Batch: 338381**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Boron	ND		ND		mg/L		NC	20
Iron	ND		ND		mg/L		NC	20
Magnesium	41		41.2		mg/L		0.5	20
Manganese	0.69		0.693		mg/L		0.2	20
Potassium	6.4		6.43		mg/L		0.3	20
Sodium	98		98.5		mg/L		0.7	20
Strontium	0.55		0.551		mg/L		0.7	20
Antimony	ND		ND		mg/L		NC	20
Beryllium	ND		ND		mg/L		NC	20
Aluminum	ND		ND		mg/L		NC	20
Copper	ND		ND		mg/L		NC	20
Nickel	ND		ND		mg/L		NC	20
Thallium	ND		ND		mg/L		NC	20
Zinc	ND		ND		mg/L		NC	20
Selenium	ND		ND		mg/L		NC	20

## Method: 1664A - HEM and SGT-HEM

**Lab Sample ID: MB 580-338783/1-A**  
**Matrix: Water**  
**Analysis Batch: 338829**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 338783**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HEM (Oil & Grease)	ND		5.6		mg/L		09/22/20 10:15	09/22/20 13:59	1
SGT-HEM	ND		5.6		mg/L		09/22/20 10:15	09/22/20 13:59	1
HEM Polar (Oil and Grease - Polar)	ND		5.6		mg/L		09/22/20 10:15	09/22/20 13:59	1

**Lab Sample ID: LCS 580-338783/2-A**  
**Matrix: Water**  
**Analysis Batch: 338829**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 338783**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
HEM (Oil & Grease)	45.1	40.6		mg/L		90	78 - 114
SGT-HEM	22.6	14.9		mg/L		66	64 - 132

**Lab Sample ID: LCSD 580-338783/3-A**  
**Matrix: Water**  
**Analysis Batch: 338829**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 338783**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
HEM (Oil & Grease)	44.0	40.7		mg/L		93	78 - 114	0	18
SGT-HEM	22.0	14.2		mg/L		65	64 - 132	5	34

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: 300.0 - Anions, Ion Chromatography

**Lab Sample ID: MB 580-338346/8**  
**Matrix: Water**  
**Analysis Batch: 338346**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		0.90		mg/L			09/15/20 14:53	1
Bromide	ND		1.0		mg/L			09/15/20 14:53	1
Sulfate	ND		1.2		mg/L			09/15/20 14:53	1
Fluoride	ND		0.20		mg/L			09/15/20 14:53	1

**Lab Sample ID: LCS 580-338346/9**  
**Matrix: Water**  
**Analysis Batch: 338346**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	50.0	51.5		mg/L		103	90 - 110
Bromide	10.0	9.62		mg/L		96	90 - 110
Sulfate	50.0	51.0		mg/L		102	90 - 110
Fluoride	5.00	4.79		mg/L		96	90 - 110

**Lab Sample ID: LCSD 580-338346/10**  
**Matrix: Water**  
**Analysis Batch: 338346**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	50.0	51.5		mg/L		103	90 - 110	0	15
Bromide	10.0	9.62		mg/L		96	90 - 110	0	15
Sulfate	50.0	51.2		mg/L		102	90 - 110	0	15
Fluoride	5.00	4.82		mg/L		96	90 - 110	0	15

**Lab Sample ID: 580-97427-1 MS**  
**Matrix: Water**  
**Analysis Batch: 338346**

**Client Sample ID: AF71989**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	11	F1	50.0	67.2	F1	mg/L		111	90 - 110
Bromide	ND		10.0	10.3		mg/L		103	90 - 110
Sulfate	ND		50.0	55.4		mg/L		109	90 - 110
Fluoride	1.2	F1	5.00	4.94	F1	mg/L		74	90 - 110

**Lab Sample ID: 580-97427-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 338346**

**Client Sample ID: AF71989**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	11	F1	50.0	67.2	F1	mg/L		111	90 - 110	0	15
Bromide	ND		10.0	10.3		mg/L		103	90 - 110	0	15
Sulfate	ND		50.0	55.0		mg/L		109	90 - 110	1	15
Fluoride	1.2	F1	5.00	4.98	F1	mg/L		75	90 - 110	1	15



# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: 300.0 - Anions, Ion Chromatography (Continued)

**Lab Sample ID: MB 580-338348/8**  
**Matrix: Water**  
**Analysis Batch: 338348**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrite as N	ND		0.40		mg/L			09/15/20 14:53	1
Nitrate as N	ND		0.20		mg/L			09/15/20 14:53	1

**Lab Sample ID: LCS 580-338348/9**  
**Matrix: Water**  
**Analysis Batch: 338348**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrite as N	5.00	4.98		mg/L		100	90 - 110
Nitrate as N	5.00	4.87		mg/L		97	90 - 110

**Lab Sample ID: LCSD 580-338348/10**  
**Matrix: Water**  
**Analysis Batch: 338348**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrite as N	5.00	4.99		mg/L		100	90 - 110	0	15
Nitrate as N	5.00	4.84		mg/L		97	90 - 110	0	15

**Lab Sample ID: 580-97427-1 MS**  
**Matrix: Water**  
**Analysis Batch: 338348**

**Client Sample ID: AF71989**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrite as N	ND	H H3	5.00	5.31		mg/L		106	90 - 110
Nitrate as N	ND	H H3	5.00	5.28		mg/L		104	90 - 110

**Lab Sample ID: 580-97427-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 338348**

**Client Sample ID: AF71989**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrite as N	ND	H H3	5.00	5.32		mg/L		106	90 - 110	0	15
Nitrate as N	ND	H H3	5.00	5.28		mg/L		104	90 - 110	0	15

## Method: 335.4 - Cyanide, Total

**Lab Sample ID: MB 580-338599/1-A**  
**Matrix: Water**  
**Analysis Batch: 338603**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 338599**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	ND		0.060		mg/L		09/18/20 13:52	09/18/20 14:57	1

**Lab Sample ID: LCS 580-338599/2-A**  
**Matrix: Water**  
**Analysis Batch: 338603**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 338599**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	0.500	0.494		mg/L		99	90 - 110

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: 335.4 - Cyanide, Total (Continued)

**Lab Sample ID: LCSD 580-338599/3-A**  
**Matrix: Water**  
**Analysis Batch: 338603**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 338599**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Cyanide, Total	0.500	0.477		mg/L		95	90 - 110	4	10

**Lab Sample ID: 580-97427-1 MS**  
**Matrix: Water**  
**Analysis Batch: 338603**

**Client Sample ID: AF71989**  
**Prep Type: Total/NA**  
**Prep Batch: 338599**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Cyanide, Total	ND		0.500	0.493		mg/L		99	90 - 110

**Lab Sample ID: 580-97427-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 338603**

**Client Sample ID: AF71989**  
**Prep Type: Total/NA**  
**Prep Batch: 338599**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Cyanide, Total	ND		0.500	0.489		mg/L		98	90 - 110	1	10

## Method: 353.2 - Nitrogen, Nitrate-Nitrite

**Lab Sample ID: MB 580-339180/12**  
**Matrix: Water**  
**Analysis Batch: 339180**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	ND		0.15		mg/L			09/25/20 14:29	1

**Lab Sample ID: 580-97396-C-1 DU**  
**Matrix: Water**  
**Analysis Batch: 339180**

**Client Sample ID: Duplicate**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Nitrate as N	1.4		1.40		mg/L		0.07	20

## Method: 5910B - Organic Constituents, UV Absorbing

**Lab Sample ID: MB 680-634418/2**  
**Matrix: Water**  
**Analysis Batch: 634418**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
UV254	ND		0.0090		1/cm			09/15/20 18:07	1

**Lab Sample ID: LCS 680-634418/3**  
**Matrix: Water**  
**Analysis Batch: 634418**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
UV254	0.144	0.158		1/cm		110	80 - 120

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: 9034 - Sulfide, Acid soluble and Insoluble (Titrimetric)

Lab Sample ID: MB 280-509269/2-A  
 Matrix: Water  
 Analysis Batch: 509277

Client Sample ID: Method Blank  
 Prep Type: Total/NA  
 Prep Batch: 509269

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	ND		4.0		mg/L		09/16/20 12:00	09/16/20 12:56	1

Lab Sample ID: LCS 280-509269/1-A  
 Matrix: Water  
 Analysis Batch: 509277

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA  
 Prep Batch: 509269

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfide	19.2	14.4		mg/L		75	44 - 110

Lab Sample ID: 280-140438-F-3-B MS  
 Matrix: Water  
 Analysis Batch: 509277

Client Sample ID: Matrix Spike  
 Prep Type: Total/NA  
 Prep Batch: 509269

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfide	ND		19.2	13.6		mg/L		67	44 - 110

Lab Sample ID: 280-140438-F-3-C MSD  
 Matrix: Water  
 Analysis Batch: 509277

Client Sample ID: Matrix Spike Duplicate  
 Prep Type: Total/NA  
 Prep Batch: 509269

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Sulfide	ND		19.2	14.4		mg/L		71	44 - 110	6	20

## Method: SM 2150B - Odor

Lab Sample ID: MB 440-624925/1  
 Matrix: Water  
 Analysis Batch: 624925

Client Sample ID: Method Blank  
 Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Odor	ND		1.0		T.O.N.			09/18/20 10:50	1

## Method: SM 2320B - Alkalinity

Lab Sample ID: LCS 580-338232/2  
 Matrix: Water  
 Analysis Batch: 338232

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity as CaCO3	100	96.6		mg/L		97	85 - 115

Lab Sample ID: 580-97394-F-1 DU  
 Matrix: Water  
 Analysis Batch: 338232

Client Sample ID: Duplicate  
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Alkalinity as CaCO3	160		153		mg/L		2	17
Bicarbonate Alkalinity as CaCO3	160		153		mg/L		2	20
Carbonate Alkalinity as CaCO3	ND		ND		mg/L		NC	20
Hydroxide Alkalinity as CaCO3	ND		ND		mg/L		NC	20

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: SM 2340C - Hardness, Total (mg/l as CaCO3)

**Lab Sample ID: MB 580-338341/1**  
**Matrix: Water**  
**Analysis Batch: 338341**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	ND		2.0		mg/L			09/15/20 18:24	1

**Lab Sample ID: LCS 580-338341/2**  
**Matrix: Water**  
**Analysis Batch: 338341**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hardness as calcium carbonate	1000	980		mg/L		98	90 - 110

**Lab Sample ID: 580-97230-E-1 DU**  
**Matrix: Water**  
**Analysis Batch: 338341**

**Client Sample ID: Duplicate**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Hardness as calcium carbonate	63		63.0		mg/L		0.6	20

## Method: SM 3500 FE D - Iron, Ferrous and Ferric

**Lab Sample ID: MB 280-509469/11**  
**Matrix: Water**  
**Analysis Batch: 509469**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ferrous Iron	ND		0.20		mg/L			09/17/20 13:15	1

**Lab Sample ID: LCS 280-509469/9**  
**Matrix: Water**  
**Analysis Batch: 509469**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ferrous Iron	2.00	1.94		mg/L		97	85 - 121

**Lab Sample ID: LCSD 280-509469/10**  
**Matrix: Water**  
**Analysis Batch: 509469**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ferrous Iron	2.00	1.96		mg/L		98	85 - 121	1	10

**Lab Sample ID: 280-140509-C-11 MS**  
**Matrix: Water**  
**Analysis Batch: 509469**

**Client Sample ID: Matrix Spike**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Ferrous Iron	0.28	F1 F2	2.00	1.67	F1	mg/L		69	85 - 121

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: SM 3500 FE D - Iron, Ferrous and Ferric (Continued)

Lab Sample ID: 280-140509-C-11 MSD  
 Matrix: Water  
 Analysis Batch: 509469

Client Sample ID: Matrix Spike Duplicate  
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ferrous Iron	0.28	F1 F2	2.00	1.40	F1 F2	mg/L		56	85 - 121	17	10

## Method: SM 4500 NH3 G - Ammonia

Lab Sample ID: MB 580-338513/1  
 Matrix: Water  
 Analysis Batch: 338513

Client Sample ID: Method Blank  
 Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia as N	ND		0.50		mg/L			09/17/20 14:22	1

Lab Sample ID: LCS 580-338513/2  
 Matrix: Water  
 Analysis Batch: 338513

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia as N	2.00	1.86		mg/L		93	90 - 110

Lab Sample ID: 580-97238-F-1 MS  
 Matrix: Water  
 Analysis Batch: 338513

Client Sample ID: Matrix Spike  
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia as N	0.71		2.00	2.70		mg/L		99	90 - 110

Lab Sample ID: 580-97238-F-1 MSD  
 Matrix: Water  
 Analysis Batch: 338513

Client Sample ID: Matrix Spike Duplicate  
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ammonia as N	0.71		2.00	2.68		mg/L		99	90 - 110	1	20

Lab Sample ID: 580-97238-F-1 DU  
 Matrix: Water  
 Analysis Batch: 338513

Client Sample ID: Duplicate  
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Ammonia as N	0.71		0.677		mg/L		5	20

## Method: SM 5220D - COD

Lab Sample ID: MB 580-338621/3-A  
 Matrix: Water  
 Analysis Batch: 338643

Client Sample ID: Method Blank  
 Prep Type: Total/NA  
 Prep Batch: 338621

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	ND		10		mg/L		09/19/20 11:22	09/19/20 16:31	1

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: SM 5220D - COD (Continued)

**Lab Sample ID: LCS 580-338621/4-A**  
**Matrix: Water**  
**Analysis Batch: 338643**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 338621**  
 %Rec.

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Chemical Oxygen Demand	75.0	76.9		mg/L		103	80 - 120

**Lab Sample ID: LCSD 580-338621/5-A**  
**Matrix: Water**  
**Analysis Batch: 338643**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 338621**  
 %Rec. RPD

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Chemical Oxygen Demand	75.0	78.6		mg/L		105	80 - 120	2	20

**Lab Sample ID: 580-97392-A-2-E MS**  
**Matrix: Water**  
**Analysis Batch: 338643**

**Client Sample ID: Matrix Spike**  
**Prep Type: Total/NA**  
**Prep Batch: 338621**  
 %Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Chemical Oxygen Demand	40		25.0	69.2		mg/L		118	75 - 125

**Lab Sample ID: 580-97392-A-2-D DU**  
**Matrix: Water**  
**Analysis Batch: 338643**

**Client Sample ID: Duplicate**  
**Prep Type: Total/NA**  
**Prep Batch: 338621**  
 RPD

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Chemical Oxygen Demand	40		39.0		mg/L		2	20

## Method: SM 5310B - Organic Carbon, Total (TOC)

**Lab Sample ID: MB 580-338832/4**  
**Matrix: Water**  
**Analysis Batch: 338832**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	ND		1.5		mg/L			09/21/20 18:32	1

**Lab Sample ID: LCS 580-338832/5**  
**Matrix: Water**  
**Analysis Batch: 338832**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
 %Rec.

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Total Organic Carbon	10.0	9.89		mg/L		99	85 - 115

**Lab Sample ID: LCSD 580-338832/6**  
**Matrix: Water**  
**Analysis Batch: 338832**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
 %Rec. RPD

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Total Organic Carbon	10.0	9.89		mg/L		99	85 - 115	0	20

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: SM 5310B - Organic Carbon, Total (TOC) (Continued)

**Lab Sample ID: 580-97430-K-1 MS**  
**Matrix: Water**  
**Analysis Batch: 338832**

**Client Sample ID: Matrix Spike**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	7.6		10.0	17.2		mg/L		96	85 - 115

**Lab Sample ID: 580-97430-K-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 338832**

**Client Sample ID: Matrix Spike Duplicate**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon	7.6		10.0	17.2		mg/L		97	85 - 115	0	20

**Lab Sample ID: 580-97430-K-1 DU**  
**Matrix: Water**  
**Analysis Batch: 338832**

**Client Sample ID: Duplicate**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Organic Carbon	7.6		7.23		mg/L		5	20

## Method: SM 5310B - Organic Carbon, Dissolved (DOC)

**Lab Sample ID: MB 580-338596/1-A**  
**Matrix: Water**  
**Analysis Batch: 338695**

**Client Sample ID: Method Blank**  
**Prep Type: Dissolved**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Organic Carbon	ND		1.5		mg/L			09/19/20 17:49	1

**Lab Sample ID: LCS 580-338596/2-A**  
**Matrix: Water**  
**Analysis Batch: 338695**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Dissolved**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Dissolved Organic Carbon	10.0	10.1		mg/L		101	85 - 115

**Lab Sample ID: LCSD 580-338596/3-A**  
**Matrix: Water**  
**Analysis Batch: 338695**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Dissolved**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dissolved Organic Carbon	10.0	10.1		mg/L		101	85 - 115	0	20

**Lab Sample ID: 580-97430-L-1-A MS**  
**Matrix: Water**  
**Analysis Batch: 338695**

**Client Sample ID: Matrix Spike**  
**Prep Type: Dissolved**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Dissolved Organic Carbon	7.9		10.0	17.0		mg/L		91	85 - 115

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: SM 5310B - Organic Carbon, Dissolved (DOC) (Continued)

**Lab Sample ID: 580-97430-L-1-A MSD**  
**Matrix: Water**  
**Analysis Batch: 338695**

**Client Sample ID: Matrix Spike Duplicate**  
**Prep Type: Dissolved**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dissolved Organic Carbon	7.9		10.0	17.2		mg/L		93	85 - 115	1	20

**Lab Sample ID: 580-97430-L-1-A DU**  
**Matrix: Water**  
**Analysis Batch: 338695**

**Client Sample ID: Duplicate**  
**Prep Type: Dissolved**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Dissolved Organic Carbon	7.9		7.91		mg/L		0.5	20

## Method: SM 5540C - Methylene Blue Active Substances (MBAS)

**Lab Sample ID: MB 440-624499/4**  
**Matrix: Water**  
**Analysis Batch: 624499**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methylene Blue Active Substances	ND		0.10		mg/L			09/15/20 15:29	1

**Lab Sample ID: LCS 440-624499/5**  
**Matrix: Water**  
**Analysis Batch: 624499**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Methylene Blue Active Substances	0.250	0.253		mg/L		101	90 - 110

**Lab Sample ID: LCSD 440-624499/6**  
**Matrix: Water**  
**Analysis Batch: 624499**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methylene Blue Active Substances	0.250	0.259		mg/L		104	90 - 110	2	20

**Lab Sample ID: MRL 440-624499/3**  
**Matrix: Water**  
**Analysis Batch: 624499**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Methylene Blue Active Substances	0.100	0.121		mg/L		121	50 - 150

**Lab Sample ID: 580-97431-D-1 MS**  
**Matrix: Water**  
**Analysis Batch: 624499**

**Client Sample ID: Matrix Spike**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Methylene Blue Active Substances	ND		0.250	0.283		mg/L		113	50 - 125



# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: SM 5540C - Methylene Blue Active Substances (MBAS) (Continued)

**Lab Sample ID: 580-97431-D-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 624499**

**Client Sample ID: Matrix Spike Duplicate**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methylene Blue Active Substances	ND		0.250	0.242		mg/L		97	50 - 125	15	20

## Method: SM4500\_P\_F - Phosphorus, Total

**Lab Sample ID: MB 580-338789/1-A**  
**Matrix: Water**  
**Analysis Batch: 338792**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 338789**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Phosphorus as P	ND		0.25		mg/L		09/22/20 10:55	09/22/20 10:59	1

**Lab Sample ID: LCS 580-338789/2-A**  
**Matrix: Water**  
**Analysis Batch: 338792**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 338789**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Phosphorus as P	2.00	1.98		mg/L		99	90 - 110

**Lab Sample ID: 580-97335-C-1-C MS**  
**Matrix: Water**  
**Analysis Batch: 338792**

**Client Sample ID: Matrix Spike**  
**Prep Type: Total/NA**  
**Prep Batch: 338789**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Phosphorus as P	ND		2.00	2.03		mg/L		92	80 - 120

**Lab Sample ID: 580-97335-C-1-D MSD**  
**Matrix: Water**  
**Analysis Batch: 338792**

**Client Sample ID: Matrix Spike Duplicate**  
**Prep Type: Total/NA**  
**Prep Batch: 338789**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Phosphorus as P	ND		2.00	2.03		mg/L		92	80 - 120	0	20

**Lab Sample ID: 580-97335-C-1-B DU**  
**Matrix: Water**  
**Analysis Batch: 338792**

**Client Sample ID: Duplicate**  
**Prep Type: Total/NA**  
**Prep Batch: 338789**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Phosphorus as P	ND		ND		mg/L		NC	20

# Lab Chronicle

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

**Client Sample ID: AF71989**

**Lab Sample ID: 580-97427-1**

**Date Collected: 09/09/20 11:12**

**Matrix: Water**

**Date Received: 09/12/20 11:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		100	338901	09/23/20 07:36	JSM	TAL SEA
Total/NA	Prep	3510C			338273	09/15/20 12:45	T1L	TAL SEA
Total/NA	Cleanup	3630C			338340	09/15/20 18:19	T1L	TAL SEA
Total/NA	Analysis	AK102 & 103		1	338468	09/17/20 17:29	JKM	TAL SEA
Total/NA	Prep	3510C			338273	09/15/20 12:45	T1L	TAL SEA
Total/NA	Analysis	AK102 & 103		1	338468	09/17/20 20:10	JKM	TAL SEA
Total/NA	Prep	3510C	RE		339227	09/26/20 10:36	RJL	TAL SEA
Total/NA	Analysis	AK102 & 103	RE	1	339300	09/27/20 23:04	T1W	TAL SEA
Total/NA	Prep	3510C			339227	09/26/20 10:36	RJL	TAL SEA
Total/NA	Cleanup	3630C			339274	09/26/20 18:54	RJL	TAL SEA
Total/NA	Analysis	AK102 & 103		1	339385	09/28/20 17:30	ADB	TAL SEA
Total/NA	Prep	3535			412514	09/15/20 18:44	VP	TAL SAC
Total/NA	Analysis	EPA 537(Mod)		1	412734	09/16/20 13:46	D1R	TAL SAC
Total Recoverable	Prep	3005A			338381	09/16/20 11:26	ART	TAL SEA
Total Recoverable	Analysis	6010D		1	338478	09/16/20 16:59	TMH	TAL SEA
Total/NA	Prep	1664A			338783	09/22/20 10:15	FCG	TAL SEA
Total/NA	Analysis	1664A		1	338829	09/22/20 13:59	FCG	TAL SEA
Total/NA	Analysis	300.0		1	338346	09/15/20 13:55	AAC	TAL SEA
Total/NA	Analysis	300.0		1	338348	09/15/20 13:55	AAC	TAL SEA
Total/NA	Prep	Distill/CN			338599	09/18/20 13:52	R1K	TAL SEA
Total/NA	Analysis	335.4		1	338603	09/18/20 15:05	R1K	TAL SEA
Total/NA	Analysis	353.2		1	339180	09/25/20 14:48	R1K	TAL SEA
Total/NA	Analysis	5910B		1	634418	09/15/20 18:07	JLD	TAL SAV
Total/NA	Prep	9030B			509269	09/16/20 12:00	SAH	TAL DEN
Total/NA	Analysis	9034		1	509277	09/16/20 12:56	SAH	TAL DEN
Total/NA	Analysis	SM 2150B		1	624925	09/18/20 10:50	ST	TAL IRV
Total/NA	Analysis	SM 2320B		1	338232	09/15/20 09:07	AAC	TAL SEA
Total/NA	Analysis	SM 2340C		1	338341	09/15/20 18:24	MLT	TAL SEA
Total/NA	Analysis	SM 3500 FE D		1	509469	09/17/20 13:21	BWH	TAL DEN
Total/NA	Analysis	SM 4500 NH3 G		1	338513	09/17/20 14:22	AAC	TAL SEA
Total/NA	Prep	SM 5220			338621	09/19/20 11:23	MLT	TAL SEA
Total/NA	Analysis	SM 5220D		1	338643	09/19/20 16:31	MLT	TAL SEA
Dissolved	Filtration	FILTRATION			338596	09/18/20 13:49	HCC	TAL SEA
Dissolved	Analysis	SM 5310B		1	338695	09/19/20 19:41	R1K	TAL SEA
Total/NA	Analysis	SM 5310B		1	338832	09/21/20 20:39	RBL	TAL SEA
Total/NA	Analysis	SM 5540C		1	624499	09/15/20 15:29	KMY	TAL IRV
Total/NA	Prep	SM 4500 P B			338789	09/22/20 10:55	AAC	TAL SEA
Total/NA	Analysis	SM4500_P_F		1	338792	09/22/20 10:59	AAC	TAL SEA

# Lab Chronicle

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

**Client Sample ID: AF71990-Trip Blank**

**Lab Sample ID: 580-97427-2**

**Date Collected: 09/09/20 11:12**

**Matrix: Water**

**Date Received: 09/12/20 11:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	338300	09/15/20 17:51	T1W	TAL SEA

**Laboratory References:**

- TAL DEN = Eurofins TestAmerica, Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100
- TAL IRV = Eurofins Calscience Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022
- TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600
- TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858
- TAL SEA = Eurofins TestAmerica, Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310



# Accreditation/Certification Summary

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Laboratory: Eurofins TestAmerica, Seattle

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-024	01-14-22

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
1664A	1664A	Water	HEM (Oil & Grease)
1664A	1664A	Water	HEM Polar (Oil and Grease - Polar)
1664A	1664A	Water	SGT-HEM
300.0		Water	Bromide
300.0		Water	Chloride
300.0		Water	Fluoride
300.0		Water	Nitrate as N
300.0		Water	Nitrite as N
300.0		Water	Sulfate
335.4	Distill/CN	Water	Cyanide, Total
353.2		Water	Nitrate as N
6010D	3005A	Water	Aluminum
6010D	3005A	Water	Boron
6010D	3005A	Water	Iron
6010D	3005A	Water	Magnesium
6010D	3005A	Water	Potassium
6010D	3005A	Water	Sodium
6010D	3005A	Water	Strontium
8260D		Water	1,1,1,2-Tetrachloroethane
8260D		Water	1,1,1-Trichloroethane
8260D		Water	1,1,2,2-Tetrachloroethane
8260D		Water	1,1,2-Trichloroethane
8260D		Water	1,1-Dichloroethane
8260D		Water	1,1-Dichloroethene
8260D		Water	1,1-Dichloropropene
8260D		Water	1,2,3-Trichlorobenzene
8260D		Water	1,2,3-Trichloropropane
8260D		Water	1,2,4-Trichlorobenzene
8260D		Water	1,2,4-Trimethylbenzene
8260D		Water	1,2-Dibromo-3-Chloropropane
8260D		Water	1,2-Dibromoethane
8260D		Water	1,2-Dichlorobenzene
8260D		Water	1,2-Dichloroethane
8260D		Water	1,2-Dichloropropane
8260D		Water	1,3,5-Trimethylbenzene
8260D		Water	1,3-Dichlorobenzene
8260D		Water	1,3-Dichloropropane
8260D		Water	1,4-Dichlorobenzene
8260D		Water	2,2-Dichloropropane
8260D		Water	2-Butanone (MEK)
8260D		Water	2-Chlorotoluene
8260D		Water	4-Chlorotoluene
8260D		Water	4-Isopropyltoluene
8260D		Water	Benzene
8260D		Water	Bromobenzene

# Accreditation/Certification Summary

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Laboratory: Eurofins TestAmerica, Seattle (Continued)

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-024	01-14-22
8260D	Water	Bromochloromethane	
8260D	Water	Bromodichloromethane	
8260D	Water	Bromoform	
8260D	Water	Bromomethane	
8260D	Water	Carbon tetrachloride	
8260D	Water	Chlorobenzene	
8260D	Water	Chloroethane	
8260D	Water	Chloroform	
8260D	Water	Chloromethane	
8260D	Water	cis-1,2-Dichloroethene	
8260D	Water	cis-1,3-Dichloropropene	
8260D	Water	Dibromochloromethane	
8260D	Water	Dibromomethane	
8260D	Water	Dichlorodifluoromethane	
8260D	Water	Ethylbenzene	
8260D	Water	Hexachlorobutadiene	
8260D	Water	Isopropylbenzene	
8260D	Water	Methyl tert-butyl ether	
8260D	Water	Methylene Chloride	
8260D	Water	m-Xylene & p-Xylene	
8260D	Water	Naphthalene	
8260D	Water	n-Butylbenzene	
8260D	Water	N-Propylbenzene	
8260D	Water	o-Xylene	
8260D	Water	sec-Butylbenzene	
8260D	Water	Styrene	
8260D	Water	t-Butylbenzene	
8260D	Water	Tetrachloroethene	
8260D	Water	Toluene	
8260D	Water	trans-1,2-Dichloroethene	
8260D	Water	trans-1,3-Dichloropropene	
8260D	Water	Trichloroethene	
8260D	Water	Trichlorofluoromethane	
8260D	Water	Vinyl chloride	
SM 2320B	Water	Alkalinity as CaCO <sub>3</sub>	
SM 2320B	Water	Bicarbonate Alkalinity as CaCO <sub>3</sub>	
SM 2320B	Water	Carbonate Alkalinity as CaCO <sub>3</sub>	
SM 2320B	Water	Hydroxide Alkalinity as CaCO <sub>3</sub>	
SM 2340C	Water	Hardness as calcium carbonate	
SM 4500 NH <sub>3</sub> G	Water	Ammonia as N	
SM 5220D	SM 5220	Water	Chemical Oxygen Demand
SM 5310B	Water	Water	Dissolved Organic Carbon
SM4500_P_F	SM 4500 P B	Water	Total Phosphorus as P

# Accreditation/Certification Summary

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Laboratory: Eurofins Calscience Irvine

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska	State	CA01531	06-30-21
Arizona	State	AZ0671	10-13-20
California	Los Angeles County Sanitation Districts	10256	06-30-21
California	State	2706	06-30-21
Guam	State	20-004R	01-23-21
Hawaii	State	CA01531	01-29-21
Kansas	NELAP	E-10420	07-31-21
Nevada	State	CA015312021-1	07-31-21
Oregon	NELAP	4028 - 008	01-29-21
USDA	US Federal Programs	P330-18-00214	07-09-21
Washington	State	C900	09-03-21

# Accreditation/Certification Summary

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Laboratory: Eurofins TestAmerica, Denver

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
A2LA	Dept. of Defense ELAP	2907.01	10-31-21
A2LA	ISO/IEC 17025	2907.01	10-31-21
Alabama	State Program	40730	09-30-12 *
Alaska (UST)	State	18-001	02-08-21
Alaska (UST)	State	18-001	02-08-21
Arizona	State	AZ0713	12-20-20
Arkansas DEQ	State	19-047-0	06-01-21
California	State	2513	01-08-21
Connecticut	State	PH-0686	09-30-20
Florida	NELAP	E87667-57	07-01-21
Georgia	State	4025-011	01-09-21
Illinois	NELAP	2000172019-1	04-30-21
Iowa	State	IA#370	12-01-20
Kansas	NELAP	E-10166	04-30-21
Louisiana	NELAP	30785	06-30-14 *
Louisiana	NELAP	30785	06-30-21
Maine	State	2019011 (231)	03-03-21
Minnesota	NELAP	1788752	12-31-20
Nevada	State	CO000262020-1	07-31-21
New Hampshire	NELAP	205319	04-29-21
New Jersey	NELAP	190002	06-30-21
New York	NELAP	59923	04-01-21
North Carolina (WW/SW)	State	358	12-31-20
North Dakota	State	R-034	01-08-21
Oklahoma	State	2018-006	09-01-21
Oregon	NELAP	4025-011	01-08-21
Pennsylvania	NELAP	013	07-31-21
South Carolina	State	72002001	01-08-21
Texas	NELAP	T104704183-19-17	09-30-20
US Fish & Wildlife	US Federal Programs	058448	08-01-21
USDA	US Federal Programs	P330-18-00099	03-26-21
Utah	NELAP	QUAN5	06-30-13 *
Utah	NELAP	CO000262019-11	07-31-21
Virginia	NELAP	10490	06-14-21
Washington	State	C583-19	08-03-21
West Virginia DEP	State	354	11-30-20
Wisconsin	State	999615430	08-31-21
Wyoming (UST)	A2LA	2907.01	10-31-21

\* Accreditation/Certification renewal pending - accreditation/certification considered valid.

# Accreditation/Certification Summary

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Laboratory: Eurofins TestAmerica, Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-020	01-20-21
ANAB	Dept. of Defense ELAP	L2468	01-20-21
ANAB	Dept. of Energy	L2468.01	01-20-21
ANAB	ISO/IEC 17025	L2468	01-20-21
Arizona	State	AZ0708	08-11-21
Arkansas DEQ	State	88-0691	06-17-21
California	State	2897	01-31-22
Colorado	State	CA0004	08-31-21
Connecticut	State	PH-0691	06-30-21
Florida	NELAP	E87570	06-30-21
Georgia	State	4040	01-30-21
Hawaii	State	<cert No.>	01-29-21
Illinois	NELAP	200060	03-17-21
Kansas	NELAP	E-10375	10-31-20
Louisiana	NELAP	01944	06-30-21
Maine	State	CA00004	04-14-22
Michigan	State	9947	08-03-23
Nevada	State	CA000442021-1	07-31-21
New Hampshire	NELAP	2997	04-18-21
New Jersey	NELAP	CA005	06-30-21
New York	NELAP	11666	04-01-21
Oregon	NELAP	4040	01-29-21
Pennsylvania	NELAP	68-01272	03-31-21
Texas	NELAP	T104704399-19-13	06-01-21
US Fish & Wildlife	US Federal Programs	58448	07-31-21
USDA	US Federal Programs	P330-18-00239	07-31-21
Utah	NELAP	CA000442019-01	02-28-21
Vermont	State	VT-4040	04-16-21
Virginia	NELAP	460278	03-14-21
Washington	State	C581	05-05-21
West Virginia (DW)	State	9930C	12-31-20
Wisconsin	State	998204680	08-31-21
Wyoming	State Program	8TMS-L	01-28-19 *

\* Accreditation/Certification renewal pending - accreditation/certification considered valid.



# Accreditation/Certification Summary

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Laboratory: Eurofins TestAmerica, Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
	AFCEE	SAVLAB	
Alabama	State	41450	06-30-21
Alaska	State	GA00006	06-30-21
Alaska (UST)	State	17-016	09-30-20
ANAB	Dept. of Defense ELAP	L2463	09-22-22
ANAB	ISO/IEC 17025	L2463.01	09-22-22
Arizona	State	AZ0808	12-14-20
Arkansas DEQ	State	19-015-0	02-02-21
California	State	2939	06-30-21
Colorado	State	GA00006	12-31-20
Connecticut	State	PH-0161	03-31-21
Florida	NELAP	E87052	06-30-21
Georgia	State	E87052	06-30-21
Georgia (DW)	State	803	06-30-21
Guam	State	19-007R	04-17-21
Hawaii	State	<cert No.>	06-30-21
Illinois	NELAP	200022	11-30-20
Indiana	State	C-GA-02	06-30-21
Iowa	State	353	06-30-21
Kansas	NELAP	E-10322	10-15-20
Kentucky (DW)	State	KY90084	12-31-21
Kentucky (UST)	State	<cert No.>	06-30-21
Kentucky (WW)	State	KY90084	12-31-20
Louisiana	NELAP	02011	06-30-21
Louisiana (DW)	State	LA009	12-31-20
Maryland	State	250	12-31-20
Massachusetts	State	M-GA006	06-30-21
Michigan	State	9925	06-30-21
Mississippi	State	<cert No.>	06-30-21
Nebraska	State	NE-OS-7-04	06-30-21
New Jersey	NELAP	GA769	06-30-21
New Mexico	State	GA00006	06-30-21
New York	NELAP	10842	04-01-21
North Carolina (DW)	State	13701	07-31-21
North Carolina (WW/SW)	State	269	12-31-20
Pennsylvania	NELAP	68-00474	06-30-21
Puerto Rico	State	GA00006	01-01-21
South Carolina	State	98001	06-30-21
Tennessee	State	02961	06-30-21
Texas	NELAP	T1047004185-19-14	11-30-20
Texas	TCEQ Water Supply	T104704185	06-30-21
US Fish & Wildlife	US Federal Programs	LE058448-0	08-01-21
USDA	US Federal Programs	P330-18-00313	10-29-21
Virginia	NELAP	10509	06-14-21
Washington	State	C805	06-10-21
West Virginia (DW)	State	9950C	12-31-20
West Virginia DEP	State	094	07-31-20 *
Wisconsin	State	999819810	08-31-21
Wyoming	State	8TMS-L	06-30-21

\* Accreditation/Certification renewal pending - accreditation/certification considered valid.

# Sample Summary

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
580-97427-1	AF71989	Water	09/09/20 11:12	09/12/20 11:00	
580-97427-2	AF71990-Trip Blank	Water	09/09/20 11:12	09/12/20 11:00	

1

2

3

4

5

6

7

8

9

10

11

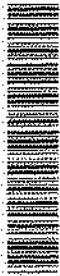
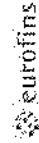
12

13





# Chain of Custody Record



<b>Client Information (Sub Contract Lab)</b> Client Contact: Shipping/Receiving Company: TestAmerica Laboratories, Inc. Address: 4935 Yarrow Street, City: Anvada State, ZIP: CO, 80002 Phone: 303-736-0100 (Tel) 303-431-7171 (Fax) Email:		Lab #M: Cruz, Sheri L E-Mail: Sheri.Cruz@Eurofins.com Accreditations Required (See note): State - Alaska (UST)		COL No: 580-80696-1 Page: Page 1 of 1 Lab #I: 580-87427-1	
Due Date Requested: 9/18/2020 TAT Requested (days):	Matrix (W-water, S-saline, G-grab)	Sample Type (C-catch, G-grab)	Sample Time (1:12 Alaskan)	Sample Date (9/9/20)	Field Filtered Sample (Yes or No)
Project Name: 0920-4667 / Willow WTP and Willow WO Sub:	Preservation Code: Water	Platform MS/MSD (Yes or No)	3500 FE 0	9034 CR/9030B (MOD) Suite	Analysis Requested
Sample Identification - Client ID (Lab ID) AP71989 (580-97427-1)					
Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Na2CO3 E - NaHCO3 F - MeOH G - Amiche H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:					
Special Instructions/Note: (This area is for handwritten notes and is not scanned)					
Possible Hazard Identification Unconfirmed Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2 Empty Kit Relinquished by:					
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months Special Instructions/OC Requirements:					
Relinquished by: Tom Stankov Date/Time: 9/14/20		Relinquished by:		Date/Time:	
Relinquished by:		Relinquished by:		Date/Time:	
Relinquished by:		Relinquished by:		Date/Time:	
Custody Seals Intact A Yes <input type="checkbox"/> No <input type="checkbox"/>		Custody Seal No.		Company: STADEN Date/Time: 9-15-20 1025 Received by:	
Coolup, Temperature, and Other Remarks: 0.3, 1.21, 0.2, DS 9-15-20					



**Chain of Custody Record**



<b>Client Information (Sub Contract Lab)</b>		Sampler		Lab PM		Carrier Tracking No(s)		COC No	
Client Contact:		Phone:		E-Mail:		State of Origin		Page	
Shipping/Receiving		Company		Accreditations Required (See note):		Job #		580-80894.1	
Eurofins Calscience LLC		17461 Denian Ave. Suite 100.		9/18/2020		TAT Requested (days)		580-97427-1	
City:		State, Zip:		PO #		WO #		Preservation Codes:	
Irving		CA, 92614-5817		949-261-1022(Tel) 949-260-3297(Fax)		Project #		A - HCl B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amelcer H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Phone		Email		Project Name		Site		M - Hexane N - None O - ASHMOZ P - NaZnO4S Q - Na2SO3 R - Na2SO3 S - H2SO4 T - TSP Dodecylhydrate U - Acetone V - MCAA W - pH 4-5 Z - other (Specify)	
949-261-1022(Tel) 949-260-3297(Fax)		88015384		88015384		SSOWP			
Date Requested:		Sample Date		Sample Time		Sample Type		Matrix	
9/18/2020		9/9/20		11:12		G-grab		(Water, Soil, Sediment, Other)	
TAT Requested (days)		Sample Date		Sample Time		Sample Type		Preservation Code	
11-12		9/9/20		11:12		G-grab		Water	
Alaskan		Alaskan		Alaskan		G-grab		Water	
Field Filtered Sample (Yes or No)		Field Filtered Sample (Yes or No)		Field Filtered Sample (Yes or No)		Field Filtered Sample (Yes or No)		Field Filtered Sample (Yes or No)	
X		X		X		X		X	
SM150, Odor B		SM150, Odor B		SM150, Odor B		SM150, Odor B		SM150, Odor B	
5540C		5540C		5540C		5540C		5540C	
Total Number of Containers		Total Number of Containers		Total Number of Containers		Total Number of Containers		Total Number of Containers	
1		1		1		1		1	
Special Instructions/Note:		Special Instructions/Note:		Special Instructions/Note:		Special Instructions/Note:		Special Instructions/Note:	
Sample Identification - Client ID (Lab ID)		Sample Identification - Client ID (Lab ID)		Sample Identification - Client ID (Lab ID)		Sample Identification - Client ID (Lab ID)		Sample Identification - Client ID (Lab ID)	
AF71989 (580-97427-1)		AF71989 (580-97427-1)		AF71989 (580-97427-1)		AF71989 (580-97427-1)		AF71989 (580-97427-1)	
Possible Hazard Identification		Possible Hazard Identification		Possible Hazard Identification		Possible Hazard Identification		Possible Hazard Identification	
Unconfirmed		Unconfirmed		Unconfirmed		Unconfirmed		Unconfirmed	
Deliverable Requested: I, II, III, IV, Other (specify)		Deliverable Requested: I, II, III, IV, Other (specify)		Deliverable Requested: I, II, III, IV, Other (specify)		Deliverable Requested: I, II, III, IV, Other (specify)		Deliverable Requested: I, II, III, IV, Other (specify)	
Primary Deliverable Rank: 2		Primary Deliverable Rank: 2		Primary Deliverable Rank: 2		Primary Deliverable Rank: 2		Primary Deliverable Rank: 2	
Empty Kit Requiring by		Empty Kit Requiring by		Empty Kit Requiring by		Empty Kit Requiring by		Empty Kit Requiring by	
Date/Time		Date/Time		Date/Time		Date/Time		Date/Time	
9/14/20		9/14/20		9/14/20		9/14/20		9/14/20	
Company		Company		Company		Company		Company	
Tom Blanks		Tom Blanks		Tom Blanks		Tom Blanks		Tom Blanks	
Date/Time		Date/Time		Date/Time		Date/Time		Date/Time	
9/14/20		9/14/20		9/14/20		9/14/20		9/14/20	
Company		Company		Company		Company		Company	
EC IPV		EC IPV		EC IPV		EC IPV		EC IPV	
Date/Time		Date/Time		Date/Time		Date/Time		Date/Time	
9/14/20		9/14/20		9/14/20		9/14/20		9/14/20	
Company		Company		Company		Company		Company	
EC IPV		EC IPV		EC IPV		EC IPV		EC IPV	
Cooler Temperature and Other Remarks:		Cooler Temperature and Other Remarks:		Cooler Temperature and Other Remarks:		Cooler Temperature and Other Remarks:		Cooler Temperature and Other Remarks:	
189 30/3.4		189 30/3.4		189 30/3.4		189 30/3.4		189 30/3.4	
Custody Seal No.:		Custody Seal No.:		Custody Seal No.:		Custody Seal No.:		Custody Seal No.:	
9		9		9		9		9	

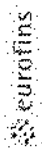
Note: Since laboratory accreditation is subject to change, Eurofins TestAmerica places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/matrix being analyzed, the samples must be shipped back to the Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins TestAmerica.

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)  
 Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months

Special Instructions/QC Requirements:



**Chain of Custody Record**



<b>Client Information (Sub Contract Lab)</b> Client Contact: <b>Cruz, Sheri L.</b> Shipping/Receiving: <b>Sheri.Cruz@Eurofinsnet.com</b> Company: <b>TestAmerica Laboratories, Inc.</b>		Job #/ID: <b>580-97427-1</b> State of Origin: <b>Alaska</b> Page 1 of 1
Address: <b>5102 LaRoche Avenue, Savannah, GA 31404</b> Phone: <b>912-354-7858(Tel) 912-352-0165(Fax)</b> Email: <b>EE@tla.com</b>		Due Date Requested: <b>9/24/2020</b> TAT Requested (days): <b>1</b>
Project Name: <b>0920-4652 / Willow WTP and Willow WO</b> Project #: <b>56015364</b> Site: <b>SEOWF</b>		Accreditation Required (See note): <b>State - Alaska (UST)</b>
<b>Analysis Requested</b>		
Total Number of Containers: <b>1</b>		
Special Instructions/Note:		
Sample Identification - Client ID (Lab ID): <b>AF71989 (560-97427-1)</b>		
Sample Date: <b>9/9/20</b>	Sample Time: <b>11:12 Alaskan</b>	Matrix: <b>Water</b>
Sample Type (C=Comp, G=grab): <b>G=grab</b>	Preservation Code:	Matrix (W=Water, S=Soil, G=Grab, O=Other): <b>Water</b>
Field Filtered Sample (Yes or No): <b>X</b>	Perform MS/MSD (Yes or No): <b>X</b>	Other:
Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Ammonia H - Ascorbic Acid I - Ice J - Full Water K - EDTA L - EDTA M - Hexane N - None O - Acetic Acid P - Na2SO4 Q - Na2S2O3 R - H2SO4 S - TSP Dioxin/hydrate T - Acetone U - MCA V - 99% EtOH W - Other (Specify)		
Possible Hazard Identification: <input type="checkbox"/> Unconfirmed <input type="checkbox"/> Deliverable Requested: I, II, III, IV, Other (specify)		
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month): <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For Months		
Special Instructions/OC Requirements:		
Primary Deliverable Rank: 2		
Empty Kit Requisitioned by:		
Requisitioned by: <b>Tom Blankenship</b>	Date: <b>9/14/20</b>	Company: <b>TA-SEA</b>
Requisitioned by:	Date/Time:	Company:
Requisitioned by:	Date/Time:	Company:
Custody Seals Intact: <b>A Yes A No</b>	Custody Seal No.: <b>3.8/42</b>	Cookie Temperature (°C) and Other Remarks:



# Login Sample Receipt Checklist

Client: Arctic Fox Environmental, Inc

Job Number: 580-97427-1

**Login Number: 97427**

**List Source: Eurofins TestAmerica, Seattle**

**List Number: 1**

**Creator: Hobbs, Kenneth F**

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

## Login Sample Receipt Checklist

Client: Arctic Fox Environmental, Inc

Job Number: 580-97427-1

**Login Number: 97427**  
**List Number: 3**  
**Creator: Ornelas, Olga**

**List Source: Eurofins Irvine**  
**List Creation: 09/15/20 11:49 AM**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

# Login Sample Receipt Checklist

Client: Arctic Fox Environmental, Inc

Job Number: 580-97427-1

**Login Number: 97427**  
**List Number: 4**  
**Creator: Schade, Daniel B**

**List Source: Eurofins TestAmerica, Denver**  
**List Creation: 09/15/20 01:30 PM**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



## Login Sample Receipt Checklist

Client: Arctic Fox Environmental, Inc

Job Number: 580-97427-1

**Login Number: 97427**  
**List Number: 5**  
**Creator: Saephan, Kae C**

**List Source: Eurofins TestAmerica, Sacramento**  
**List Creation: 09/15/20 01:16 PM**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	483885
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	ob: 2.7c corr: 3.2c
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

# Login Sample Receipt Checklist

Client: Arctic Fox Environmental, Inc

Job Number: 580-97427-1

**Login Number: 97427**  
**List Number: 2**  
**Creator: Sims, Robert D**

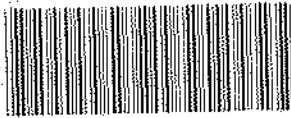
**List Source: Eurofins TestAmerica, Savannah**  
**List Creation: 09/15/20 12:10 PM**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



Environment Testing  
TestAmerica

Sacramento  
Sample Receiving Notes



580-97427 Field Sheet

Tracking #: 9138 9657 4395

SO / PO / SAT / 2-Day / Ground / UPS / CDO / Courier  
GSO / OnTrac / Goldstreak / USPS / Other

Job: \_\_\_\_\_

Use this form to record Sample Custody Seal, Cooler Custody Seal, Temperature & corrected Temperature & other observations.  
File in the job folder with the COC.

Therm. ID: AM7 Corr. Factor: (+) 0.5 °C

Ice  Wet  Gel  Other

Cooler Custody Seal: 483585

Cooler ID: \_\_\_\_\_

Temp Observed: 2.7 °C Corrected: 3.2 °C  
From: Temp Blank  Sample

Opening/Processing The Shipment	Yes	No	NA
Cooler compromised/tampered with?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Cooler Temperature is acceptable?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Initials: JS Date: 9/15/20

Unpacking/Labeling The Samples	Yes	No	NA
COC is complete w/o discrepancies?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Samples compromised/tampered with?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Sample containers have legible labels?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample custody seal?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Containers are not broken or leaking?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample date/times are provided?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Appropriate containers are used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample bottles are completely filled?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample preservatives verified?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Samples w/o discrepancies?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Zero headspace?*	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Alkalinity has no headspace?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Perchlorate has headspace? (Methods 314, 331, 6850)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Multiphasic samples are not present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

\*Containers requiring zero headspace have no headspace, or bubble < 6 mm (1/4")

Initials: JS Date: 09/15/20

Notes: \_\_\_\_\_

Trizma Lot #(s): \_\_\_\_\_

Login Completion	Yes	No	NA
Receipt Temperature on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Samples received within hold time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NCM Filed?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Log Release checked in TALS?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Initials: JS Date: 09/15/20

# Isotope Dilution Summary

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4662 / Willow WTP and Willow WQ

Job ID: 580-97427-1

## Method: EPA 537(Mod) - PFAS for QSM 5.1, Table B-15

Matrix: Water

Prep Type: Total/NA

### Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFOA (50-150)	PFOS (50-150)	PFHxS (50-150)	PFHxA (50-150)	C3PFBS (50-150)	PFOSA (50-150)	PFDoA (50-150)	PFPeA (50-150)
580-97427-1	AF71989	87	91	96	82	86	86	63	76
LCS 320-412514/2-A	Lab Control Sample	83	89	92	80	88	83	84	83
LCSD 320-412514/3-A	Lab Control Sample Dup	89	93	98	87	90	89	87	89
MB 320-412514/1-A	Method Blank	83	92	93	82	89	82	81	87

### Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFTDA (50-150)	PFNA (50-150)	PFDA (50-150)	M262FTS (50-150)	M242FTS (50-150)	d5NEFOS (50-150)	d3NMFOS (50-150)	PFUnA (50-150)
580-97427-1	AF71989	37 *5	89	86	134	143	76	74	80
LCS 320-412514/2-A	Lab Control Sample	79	86	90	99	98	79	76	84
LCSD 320-412514/3-A	Lab Control Sample Dup	80	97	93	104	115	86	87	88
MB 320-412514/1-A	Method Blank	78	91	87	101	108	83	81	87

### Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	C4PFHA (50-150)	HFPODA (50-150)	M282FTS (50-150)	PFBA (50-150)
580-97427-1	AF71989	85	79	121	62
LCS 320-412514/2-A	Lab Control Sample	88	79	94	81
LCSD 320-412514/3-A	Lab Control Sample Dup	89	81	106	86
MB 320-412514/1-A	Method Blank	90	82	98	83

#### Surrogate Legend

- PFOA = 13C4 PFOA
- PFOS = 13C4 PFOS
- PFHxS = 18O2 PFHxS
- PFHxA = 13C2 PFHxA
- C3PFBS = 13C3 PFBS
- PFOSA = 13C8 FOSA
- PFDoA = 13C2 PFDoA
- PFPeA = 13C5 PFPeA
- PFTDA = 13C2 PFTeDA
- PFNA = 13C5 PFNA
- PFDA = 13C2 PFDA
- M262FTS = M2-6:2 FTS
- M242FTS = M2-4:2 FTS
- d5NEFOS = d5-NEtFOSAA
- d3NMFOS = d3-NMeFOSAA
- PFUnA = 13C2 PFUnA
- C4PFHA = 13C4 PFHpA
- HFPODA = 13C3 HFPO-DA
- M282FTS = M2-8:2 FTS
- PFBA = 13C4 PFBA



September 30, 2020

Service Request No:K2007930

Lance Morris  
Arctic Fox Laboratory  
100 Airport Way  
Prudhoe Bay, AK 99734

**Laboratory Results for: Willow WTP + Willow WQ**

Dear Lance,

Enclosed are the results of the sample(s) submitted to our laboratory September 14, 2020  
For your reference, these analyses have been assigned our service request number **K2007930**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3376. You may also contact me via email at [Mark.Harris@alsglobal.com](mailto:Mark.Harris@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Mark Harris  
Project Manager

ADDRESS 1317 S. 13th Avenue, Kelso, WA 98626  
PHONE +1 360 577 7222 | FAX +1 360 636 1068  
ALS Group USA, Corp.  
dba ALS Environmental





# Narrative Documents

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360) 577-7222 Fax (360) 425-9096  
[www.alsglobal.com](http://www.alsglobal.com)



**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water

**Service Request:** K2007930  
**Date Received:** 09/14/2020

**CASE NARRATIVE**

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier II level requested by the client.

**Sample Receipt:**

Three water samples were received for analysis at ALS Environmental on 09/14/2020. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

**Metals:**

No significant anomalies were noted with this analysis.

**General Chemistry:**

No significant anomalies were noted with this analysis.

*Noel D. O'Connell*

Approved by \_\_\_\_\_

Date 09/30/2020

**SAMPLE DETECTION SUMMARY****CLIENT ID: AF71976-M0235****Lab ID: K2007930-001**

<b>Analyte</b>	<b>Results</b>	<b>Flag</b>	<b>MDL</b>	<b>MRL</b>	<b>Units</b>	<b>Method</b>
Silica as SiO <sub>2</sub> , Dissolved	490			450	ug/L	6010C
Silica	600			450	ug/L	6010C



## Sample Receipt Information

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360) 577-7222 Fax (360) 425-9096  
[www.alsglobal.com](http://www.alsglobal.com)



### Cooler Receipt and Preservation Form

Client Arctic Fox Env. Service Request K20 07930  
 Received: 9/14/20 Opened: 9/14/20 By: [Signature] Unloaded: 9/14/20 By: [Signature]

Samples were received via? USPS Fed Ex UPS DHL PDX Courier Hand Delivered  
 Samples were received in: (circle) Cooler Box Envelope Other NA  
 Were custody seals on coolers? NA Y N If yes, how many and where? 1 front  
 If present, were custody seals intact? Y N If present, were they signed and dated? Y N  
 Was a Temperature Blank present in cooler? NA Y N If yes, notate the temperature in the appropriate column below:  
 If no, take the temperature of a representative sample bottle contained within the cooler; notate in the column "Sample Temp":  
 Were samples received within the method specified temperature ranges? NA Y N  
 If no, were they received on ice and same day as collected? If not, notate the cooler # below and notify the PM. NA Y N  
 applicable, tissue samples were received: Frozen Partially Thawed Thawed

Temp Blank	Sample Temp	IR Gun	Cooler #/COC ID /NA	Out of temp indicate with 'X'	PM Notified if out of temp	Tracking Number NA	Filed
<u>8.3</u>	<u>-</u>	<u>Flou</u>	<u>(circle)</u>	<u>X</u>	<u>X</u>	<u>0272156 8890</u>	<u>X</u>

Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves Boxes  
 Were custody papers properly filled out (ink, signed, etc.)? Small NA Y N  
 Were samples received in good condition (unbroken) NA Y N  
 Were all sample labels complete (ie, analysis, preservation, etc.)? NA Y N  
 0. Did all sample labels and tags agree with custody papers? NA Y N  
 1. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N  
 2. Were the pH-preserved bottles (see SMO GEN SOP) received at the appropriate pH? Indicate in the table below NA Y N  
 3. Were VOA vials received without headspace? Indicate in the table below NA Y N  
 4. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, Resolutions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



# Miscellaneous Forms

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360) 577-7222 Fax (360) 425-9096  
[www.alsglobal.com](http://www.alsglobal.com)

### **Inorganic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### **Metals Data Qualifiers**

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Organic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Additional Petroleum Hydrocarbon Specific Qualifiers**

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.



**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEH	<a href="http://dec.alaska.gov/eh/lab/cs/csapproval.htm">http://dec.alaska.gov/eh/lab/cs/csapproval.htm</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L16-58-R4
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	<a href="http://health.hawaii.gov/">http://health.hawaii.gov/</a>	-
ISO 17025	<a href="http://www.pjllabs.com/">http://www.pjllabs.com/</a>	L16-57
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/page/la-lab-accreditation">http://www.deq.louisiana.gov/page/la-lab-accreditation</a>	03016
Maine DHS	<a href="http://www.maine.gov/dhhs/">http://www.maine.gov/dhhs/</a>	WA01276
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/enforcement/oqa.html">http://www.nj.gov/dep/enforcement/oqa.html</a>	WA005
New York - DOH	<a href="https://www.wadsworth.org/regulatory/elap">https://www.wadsworth.org/regulatory/elap</a>	12060
North Carolina DEQ	<a href="https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification">https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/EnvironmentalLabCertification/">http://www.scdhec.gov/environment/EnvironmentalLabCertification/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wyoming (EPA Region 8)	<a href="https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water">https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.

## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

ALS Group USA, Corp.  
dba ALS Environmental

Analyst Summary report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ/

**Service Request:** K2007930

**Sample Name:** AF71976-M0235  
**Lab Code:** K2007930-001  
**Sample Matrix:** Water

**Date Collected:** 09/8/20  
**Date Received:** 09/14/20

**Analysis Method**  
6010C

**Extracted/Digested By**  
ABOYER

**Analyzed By**  
RMOORE

**Sample Name:** AF71986-M0015/R0056  
**Lab Code:** K2007930-002  
**Sample Matrix:** Water

**Date Collected:** 09/9/20  
**Date Received:** 09/14/20

**Analysis Method**  
6010C

**Extracted/Digested By**  
ABOYER

**Analyzed By**  
RMOORE

**Sample Name:** AF71989-L9911  
**Lab Code:** K2007930-003  
**Sample Matrix:** Water

**Date Collected:** 09/9/20  
**Date Received:** 09/14/20

**Analysis Method**  
6010C

**Extracted/Digested By**  
ABOYER

**Analyzed By**  
RMOORE



# Sample Results

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360) 577-7222 Fax (360) 425-9096  
[www.alsglobal.com](http://www.alsglobal.com)



# Metals

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360) 577-7222 Fax (360) 425-9096  
[www.alsglobal.com](http://www.alsglobal.com)

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water  
**Sample Name:** AF71976-M0235  
**Lab Code:** K2007930-001

**Service Request:** K2007930  
**Date Collected:** 09/08/20 14:40  
**Date Received:** 09/14/20 12:15  
**Basis:** NA

Dissolved Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Silica as SiO2	6010C	<b>490</b>	ug/L	450	1	09/29/20 17:32	09/28/20	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water  
**Sample Name:** AF71976-M0235  
**Lab Code:** K2007930-001

**Service Request:** K2007930  
**Date Collected:** 09/08/20 14:40  
**Date Received:** 09/14/20 12:15  
**Basis:** NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Silica	6010C	600	ug/L	450	1	09/29/20 17:06	09/28/20	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water  
**Sample Name:** AF71986-M0015/R0056  
**Lab Code:** K2007930-002

**Service Request:** K2007930  
**Date Collected:** 09/09/20 15:00  
**Date Received:** 09/14/20 12:15  
**Basis:** NA

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Date Extracted	Q
Silica as SiO2	6010C	ND U	ug/L	450	1	09/29/20 17:35	09/28/20	



ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water  
**Sample Name:** AF71986-M0015/R0056  
**Lab Code:** K2007930-002

**Service Request:** K2007930  
**Date Collected:** 09/09/20 15:00  
**Date Received:** 09/14/20 12:15  
**Basis:** NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Silica	6010C	ND U	ug/L	450	1	09/29/20 17:27	09/28/20	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water  
**Sample Name:** AF71989-L9911  
**Lab Code:** K2007930-003

**Service Request:** K2007930  
**Date Collected:** 09/09/20 11:12  
**Date Received:** 09/14/20 12:15  
**Basis:** NA

Dissolved Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Silica as SiO2	6010C	ND U	ug/L	450	1	09/29/20 17:38	09/28/20	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water  
**Sample Name:** AF71989-L9911  
**Lab Code:** K2007930-003

**Service Request:** K2007930  
**Date Collected:** 09/09/20 11:12  
**Date Received:** 09/14/20 12:15  
**Basis:** NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Silica	6010C	ND U	ug/L	450	1	09/29/20 17:29	09/28/20	



# QC Summary Forms

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360) 577-7222 Fax (360) 425-9096  
[www.alsglobal.com](http://www.alsglobal.com)



# Metals

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360) 577-7222 Fax (360) 425-9096  
[www.alsglobal.com](http://www.alsglobal.com)

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** KQ2014031-02

**Service Request:** K2007930  
**Date Collected:** NA  
**Date Received:** NA  
**Basis:** NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Silica	6010C	ND U	ug/L	450	1	09/29/20 16:58	09/28/20	

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water

**Service Request:** K2007930  
**Date Collected:** 09/08/20  
**Date Received:** 09/14/20  
**Date Analyzed:** 09/29/20  
**Date Extracted:** 09/28/20

**Matrix Spike Summary**  
**Total Metals**

**Sample Name:** AF71976-M0235  
**Lab Code:** K2007930-001  
**Analysis Method:** 6010C  
**Prep Method:** EPA CLP ILM04.0

**Units:** ug/L  
**Basis:** NA

**Matrix Spike**  
KQ2014031-06

<u>Analyte Name</u>	<u>Sample Result</u>	<u>Result</u>	<u>Spike Amount</u>	<u>% Rec</u>	<u>% Rec Limits</u>
Silica	600	21300	21400	97	75-125

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Matrix Spike and Matrix Spike Duplicate Data is presented for information purposes only. The matrix may or may not be relevant to samples reported in this report. The laboratory evaluates system performance based on the LCS and LCSD control limits.

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water

**Service Request:** K2007930  
**Date Collected:** 09/08/20  
**Date Received:** 09/14/20  
**Date Analyzed:** 09/29/20

Replicate Sample Summary

Total Metals

**Sample Name:** AF71976-M0235  
**Lab Code:** K2007930-001

**Units:** ug/L  
**Basis:** NA

Analyte Name	Analysis Method	MRL	Sample Result	Duplicate Sample	Average	RPD	RPD Limit
				KQ2014031-04 Result			
Silica	6010C	450	600	600	600	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.



ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water

**Service Request:** K2007930  
**Date Analyzed:** 09/29/20

**Lab Control Sample Summary**  
**Total Metals**

**Units:**ug/L  
**Basis:**NA

**Lab Control Sample**  
KQ2014031-03

<b>Analyte Name</b>	<b>Analytical Method</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Silica	6010C	21000	21400	98	80-120

## Arctic Fox Environmental Algal ID and Enumeration Report

Prepared: October 14, 2020

Prepared By: GreenWater Laboratories

Samples: 3

1. AF71976-M0235 (Collected on 9/8/20)
2. AF71986-M0015/R0056 (Collected on 9/9/20)
3. AF71989-L9911 (Collected on 9/9/20)

### Sample 1: AF71976-M0235

Total cell numbers in the AF71976-M0235 sample collected on 9/8/20 were 17,541 cells/mL. Blue-green algae (Cyanobacteria; 14,260 cells/mL) were the dominant algal group in the sample accounting for 81.3% of total cell numbers. Other algal groups in the sample were diatoms (Bacillariophyceae; 48 cells/mL), desmids (Charophyta; 3 cells/mL), green algae (Chlorophyta; 2,678 cells/mL), golden-brown algae (Chrysophyceae; 94 cells/mL), dinoflagellates (Dinophyceae; 0.2 cells/mL) and unknown algae (Unknown; 458 cells/mL). The most abundant species was the colonial cyanophyte *Aphanocapsa delicatissima* (5,890 cells/mL; Fig. 1).

Total numbers of potentially toxigenic cyanobacteria (PTOX Cyano) were 56 cells/mL (0.3% of total cell numbers). PTOX Cyano species present included *Pseudanabaena* sp. (56 cells/mL; Fig. 2).

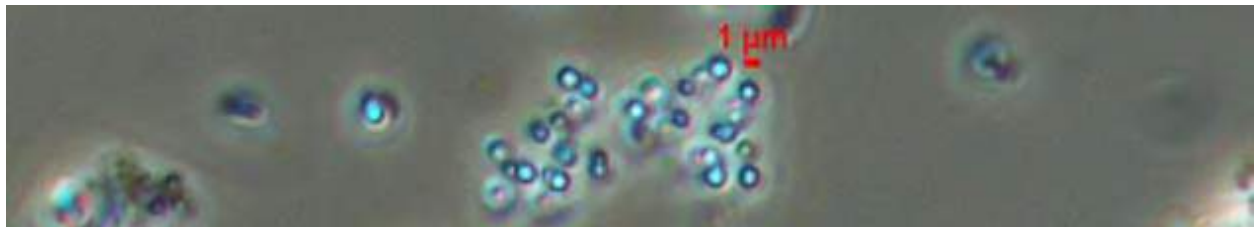


Fig. 1 *Aphanocapsa delicatissima* 400X (scale bar = 1 $\mu$ m)

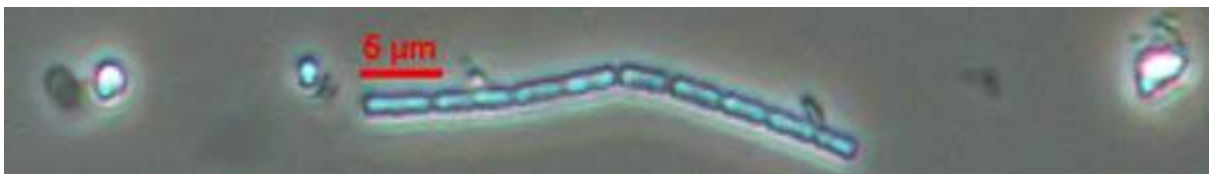


Fig. 2 *Pseudanabaena* sp. 400X (scale bar = 5 $\mu$ m)

**Sample 2: AF71986-M0015/R0056**

Total cell numbers in the AF71986-M0015/R0056 sample collected on 9/9/20 were 22,224 cells/mL. Blue-green algae (Cyanobacteria; 17,452 cells/mL) were the dominant algal group in the sample accounting for 78.5% of total cell numbers. Other algal groups in the sample were diatoms (Bacillariophyceae; 2,684 cells/mL), desmids (Charophyta; 12 cells/mL), green algae (Chlorophyta; 1,726 cells/mL), golden-brown algae (Chrysophyceae; 84 cells/mL), cryptophytes (Cryptophyta; 3 cells/mL), dinoflagellates (Dinophyceae; 0.1 cells/mL) and unknown algae (Unknown; 264 cells/mL). The most abundant species was the colonial cyanophyte *Aphanocapsa delicatissima* (7,121 cells/mL; Fig. 3).

Total numbers of potentially toxigenic cyanobacteria (PTOX Cyano) were 56 cells/mL (0.3% of total cell numbers). PTOX Cyano species present included *Radiocystis elongata* (46 cells/mL; Fig. 4), *Pseudanabaena mucicola* (8 cells/mL; Fig. 5) and cf. *Phormidium* sp. (2 cells/mL; Fig. 6).

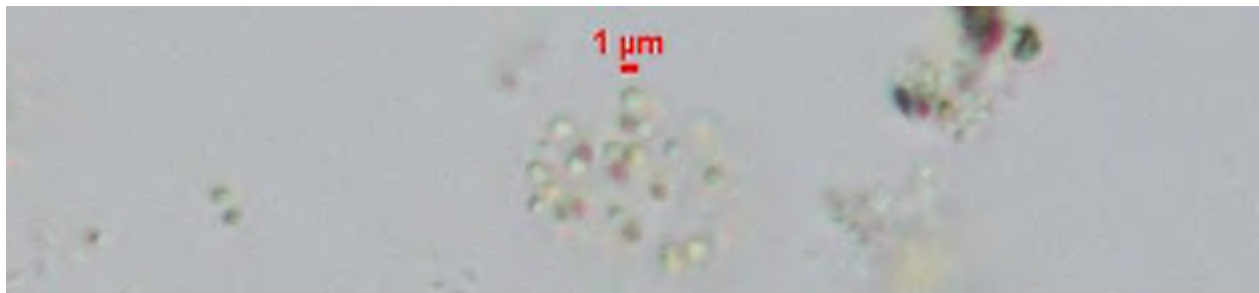


Fig. 3 *Aphanocapsa delicatissima* 400X (scale bar = 1 $\mu$ m)

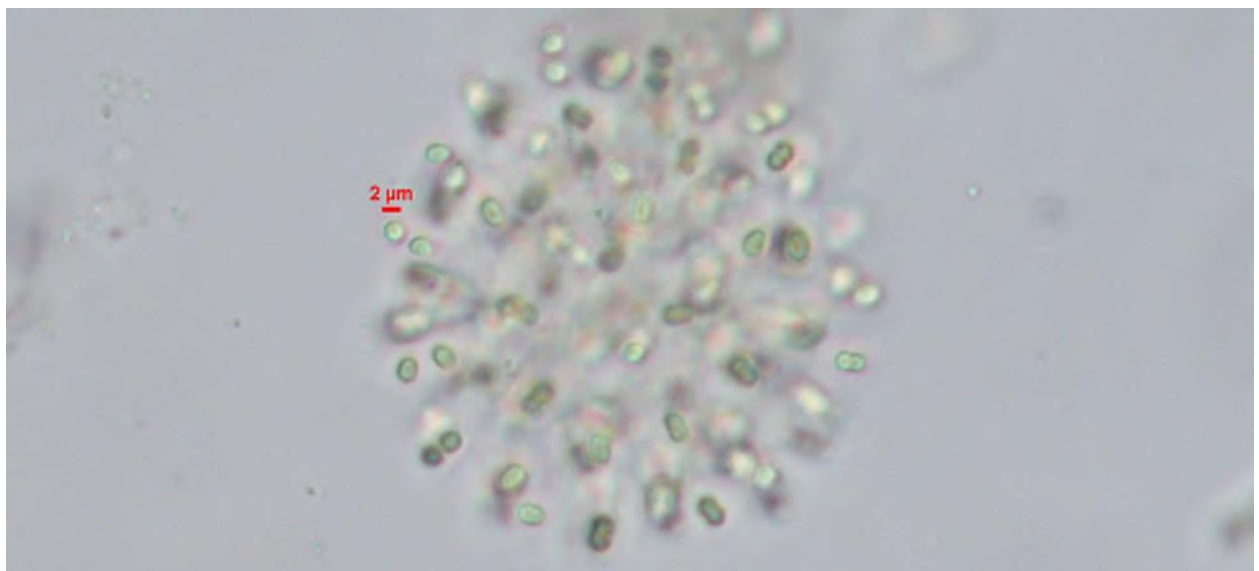


Fig. 4 *Radiocystis elongata* 400X (scale bar = 2 $\mu$ m)



Fig. 5 *Pseudanabaena mucicola* 400X (scale bar = 2 $\mu$ m)



Fig. 6 cf. *Phormidium* sp. 400X (scale bar = 5 $\mu$ m)

### Sample 3: AF71989-L9911

Total cell numbers in the AF71989-L9911 sample collected on 9/9/20 were 11,502 cells/mL. Blue-green algae (Cyanobacteria; 8,269 cells/mL) were the dominant algal group in the sample accounting for 71.9% of total cell numbers. Other algal groups in the sample were diatoms (Bacillariophyceae; 1,724 cells/mL), desmids (Charophyta; 76 cells/mL), green algae (Chlorophyta; 876 cells/mL), golden-brown algae (Chrysophyceae; 96 cells/mL), dinoflagellates (Dinophyceae; 1 cell/mL) and unknown algae (Unknown; 461 cells/mL). The most abundant species was the colonial cyanophyte *Aphanocapsa incerta* (3,539 cells/mL; Fig. 7).

Total numbers of potentially toxigenic cyanobacteria (PTOX Cyano) were 56 cells/mL (0.3% of total cell numbers). PTOX Cyano species present included *Pseudanabaena mucicola* (21 cells/mL) and *Snowella lacustris* (12 cells/mL; Fig. 8).

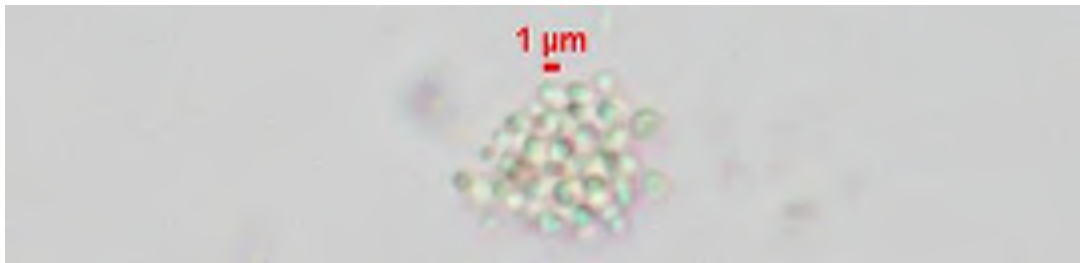


Fig. 7 *Aphanocapsa incerta* 400X (scale bar = 1 $\mu$ m)

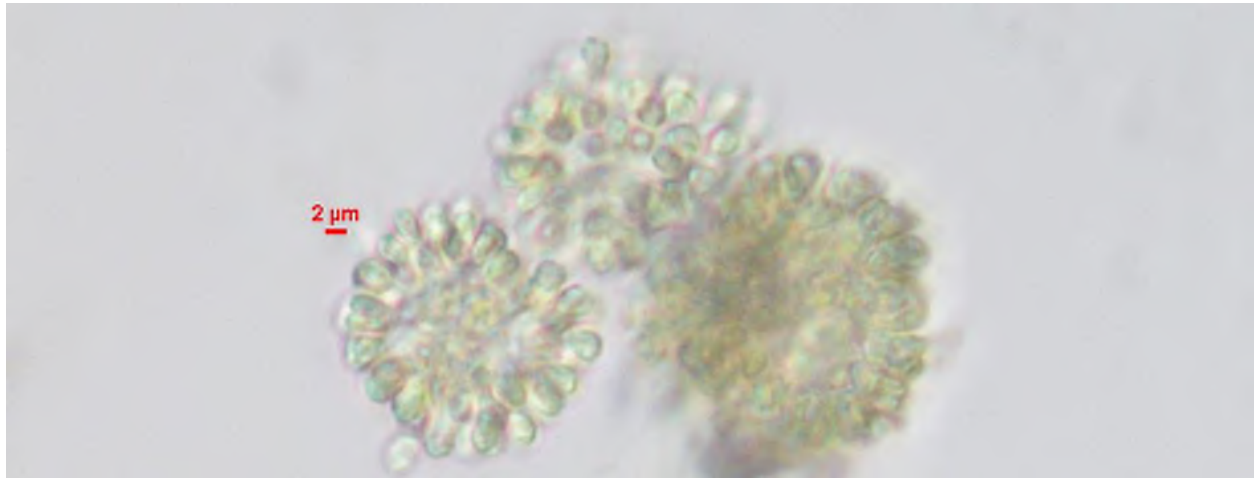


Fig. 8 *Snowella lacustris* 400X (scale bar = 2 $\mu$ m)

Sample ID	Sample Site	Sampling Date	Taxa	Algal Group	Counting Unit	Cells/Unit	Species Units/mL	Species Cells/mL	Group Total Units/mL	Group Total Cells/mL	Sample Total Units/mL	Sample Total Cells/mL
AF71976-M0235	Willow WTP #178123	9/8/2020	centric diatom sp.	Bacillariophyceae	cell	1	39	39	48	48	3,619	17,541
AF71976-M0235	Willow WTP #178123	9/8/2020	Nitzschia sp.	Bacillariophyceae	cell	1	3	3				
AF71976-M0235	Willow WTP #178123	9/8/2020	Nitzschia sp.	Bacillariophyceae	cell	1	3	3				
AF71976-M0235	Willow WTP #178123	9/8/2020	pennate diatom sp.	Bacillariophyceae	cell	1	3	3				
AF71976-M0235	Willow WTP #178123	9/8/2020	Amphora sp.	Bacillariophyceae	cell	1	0.1	0.1				
AF71976-M0235	Willow WTP #178123	9/8/2020	Nitzschia sp.	Bacillariophyceae	cell	1	0.1	0.1				
AF71976-M0235	Willow WTP #178123	9/8/2020	pennate diatom sp.	Bacillariophyceae	cell	1	0.1	0.1				
AF71976-M0235	Willow WTP #178123	9/8/2020	Navicula sp.	Bacillariophyceae	cell	1	0.1	0.1				
AF71976-M0235	Willow WTP #178123	9/8/2020	Cosmarium sp.	Charophyta	cell	1	3	3	3	3		
AF71976-M0235	Willow WTP #178123	9/8/2020	Staurastrum sp.	Charophyta	cell	1	0.1	0.1				
AF71976-M0235	Willow WTP #178123	9/8/2020	chlorophyte unicell, oval spp.	Chlorophyta	cell	1	1,610	1,610	2,355	2,678		
AF71976-M0235	Willow WTP #178123	9/8/2020	chlorophyte unicell, sphere spp.	Chlorophyta	cell	1	380	380				
AF71976-M0235	Willow WTP #178123	9/8/2020	Oocystis spp. (unicell)	Chlorophyta	cell	1	105	105				
AF71976-M0235	Willow WTP #178123	9/8/2020	Fusola viridis	Chlorophyta	colony	2	52	105				
AF71976-M0235	Willow WTP #178123	9/8/2020	chlorophyte tetrad spp.	Chlorophyta	colony	4	26	105				
AF71976-M0235	Willow WTP #178123	9/8/2020	chlorophyte cell pair spp.	Chlorophyta	colony	2	52	105				
AF71976-M0235	Willow WTP #178123	9/8/2020	chlorophyte colony sp.	Chlorophyta	colony	7	13	92				
AF71976-M0235	Willow WTP #178123	9/8/2020	Crucigenia/Tetrastrum sp.	Chlorophyta	colony	8	6	45				
AF71976-M0235	Willow WTP #178123	9/8/2020	Nephrochlamys sp.	Chlorophyta	cell	1	26	26				
AF71976-M0235	Willow WTP #178123	9/8/2020	chlorophyte flagellate sp.	Chlorophyta	cell	1	26	26				
AF71976-M0235	Willow WTP #178123	9/8/2020	Tetraedron minimum	Chlorophyta	cell	1	26	26				
AF71976-M0235	Willow WTP #178123	9/8/2020	Pseudodidymocystis fina	Chlorophyta	colony	2	8	17				
AF71976-M0235	Willow WTP #178123	9/8/2020	Monoraphidium circinale	Chlorophyta	cell	1	13	13				
AF71976-M0235	Willow WTP #178123	9/8/2020	chlorophyte colony sp.	Chlorophyta	colony	3	3	8				
AF71976-M0235	Willow WTP #178123	9/8/2020	Desmodesmus spp. (2-celled)	Chlorophyta	colony	2	3	6				
AF71976-M0235	Willow WTP #178123	9/8/2020	Didymocystis/Pseudodidymocystis sp.	Chlorophyta	colony	2	3	6				
AF71976-M0235	Willow WTP #178123	9/8/2020	chlorophyte unicell sp.	Chlorophyta	cell	1	3	3				
AF71976-M0235	Willow WTP #178123	9/8/2020	Botryococcus sp.	Chlorophyta	colony	36	0.1	2				
AF71976-M0235	Willow WTP #178123	9/8/2020	chlorophyte unicell sp.	Chlorophyta	cell	1	0.1	0.1				
AF71976-M0235	Willow WTP #178123	9/8/2020	chrysophyte flagellate sp.	Chrysophyceae	cell	1	79	79	94	94		
AF71976-M0235	Willow WTP #178123	9/8/2020	chrysophyte flagellate sp.	Chrysophyceae	cell	1	13	13				
AF71976-M0235	Willow WTP #178123	9/8/2020	chrysophyte flagellate sp.	Chrysophyceae	cell	1	3	3				
AF71976-M0235	Willow WTP #178123	9/8/2020	Aphanocapsa delicatissima	Cyanobacteria	colony	18	327	5,890	660	14,260		
AF71976-M0235	Willow WTP #178123	9/8/2020	Aphanocapsa sp.	Cyanobacteria	colony	26	131	3,403				
AF71976-M0235	Willow WTP #178123	9/8/2020	Anathece sp.	Cyanobacteria	colony	94	26	2,461				
AF71976-M0235	Willow WTP #178123	9/8/2020	Coelosphaerium sp.	Cyanobacteria	colony	38	39	1,492				
AF71976-M0235	Willow WTP #178123	9/8/2020	Cyanodictyon sp.	Cyanobacteria	colony	15	26	393				
AF71976-M0235	Willow WTP #178123	9/8/2020	Aphanocapsa sp.	Cyanobacteria	colony	20	13	262				
AF71976-M0235	Willow WTP #178123	9/8/2020	cyanophyte tetrad spp.	Cyanobacteria	colony	4	65	262				
AF71976-M0235	Willow WTP #178123	9/8/2020	Pseudanabaena sp.	Cyanobacteria	filament	10	6	56				
AF71976-M0235	Willow WTP #178123	9/8/2020	cyanophyte unicell, oval/rod spp.	Cyanobacteria	cell	1	26	26				
AF71976-M0235	Willow WTP #178123	9/8/2020	Aphanocapsa incerta	Cyanobacteria	colony	110	0.1	15				
AF71976-M0235	Willow WTP #178123	9/8/2020	dinoflagellate sp.	Dinophyceae	cell	1	0.2	0.2	0.2	0.2		
AF71976-M0235	Willow WTP #178123	9/8/2020	unknown flagellate spp.	Unknown	cell	1	380	380	458	458		
AF71976-M0235	Willow WTP #178123	9/8/2020	microflagellate spp.	Unknown	cell	1	39	39				
AF71976-M0235	Willow WTP #178123	9/8/2020	unknown unicell, oval spp.	Unknown	cell	1	26	26				
AF71976-M0235	Willow WTP #178123	9/8/2020	unknown unicell, sphere spp.	Unknown	cell	1	13	13				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	centric diatom sp.	Bacillariophyceae	cell	1	2,304	2,304	2,577	2,684	5,449	22,224
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Fragilaria sp.	Bacillariophyceae	cell	1	175	175				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Diatoma tenuis	Bacillariophyceae	colony	4	35	140				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Nitzschia sp.	Bacillariophyceae	cell	1	35	35				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Nitzschia sp.	Bacillariophyceae	cell	1	17	17				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	pennate diatom sp.	Bacillariophyceae	cell	1	3	3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Urosolenia sp.	Bacillariophyceae	cell	1	3	3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	centric diatom sp.	Bacillariophyceae	cell	1	3	3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Navicula sp.	Bacillariophyceae	cell	1	3	3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Fragilaria sp.	Bacillariophyceae	colony	5	0.4	2				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	centric diatom chain sp.	Bacillariophyceae	chain	4	0.1	0.3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	pennate diatom sp.	Bacillariophyceae	cell	1	0.1	0.1				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Cosmarium sp.	Charophyta	cell	1	8	8	12	12		

Sample ID	Sample Site	Sampling Date	Taxa	Algal Group	Counting Unit	Cells/Unit	Species	Species	Group Total	Group Total	Sample Total	Sample Total
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Staurastrum sp.	Charophyta	cell	1	3	3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Staurastrum sp.	Charophyta	cell	1	0.3	0.3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Staurastrum sp.	Charophyta	cell	1	0.1	0.1				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Staurastrum sp.	Charophyta	cell	1	0.1	0.1				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	chlorophyte unicell, oval spp.	Chlorophyta	cell	1	436	436	1,305	1,726		
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	chlorophyte unicell, sphere spp.	Chlorophyta	cell	1	332	332				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Fusola viridis	Chlorophyta	colony	2	70	140				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Koliella longiseta	Chlorophyta	cell	1	87	87				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Lagerheimia genevensis	Chlorophyta	cell	1	87	87				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Desmodesmus spp. (2-celled)	Chlorophyta	colony	2	35	70				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Tetraedron minimum	Chlorophyta	cell	1	70	70				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Desmodesmus abundans	Chlorophyta	colony	4	17	70				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	chlorophyte colony sp.	Chlorophyta	colony	4	17	70				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Ankistrodesmus spiralis	Chlorophyta	colony	3	19	58				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Nephrochlamys sp.	Chlorophyta	cell	1	35	35				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Didymocystis/Pseudodidymocystis sp.	Chlorophyta	colony	2	17	35				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	chlorophyte cell pair spp.	Chlorophyta	colony	2	17	35				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	chlorophyte colony sp.	Chlorophyta	colony	10	3	28				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Pseudodidymocystis fina	Chlorophyta	colony	2	11	22				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Desmodesmus communis	Chlorophyta	colony	4	6	22				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Kirchneriella irregularis	Chlorophyta	colony	8	3	22				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Stichococcus sp.	Chlorophyta	filament	35	1	19				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Oocystis spp. (unicell)	Chlorophyta	cell	1	17	17				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Oocystis parva	Chlorophyta	colony	2	6	11				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Scenedesmus sp.	Chlorophyta	colony	4	3	11				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Oocystis pusilla	Chlorophyta	colony	3	3	8				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Pseudopediastrum boryanum	Chlorophyta	colony	19	0.4	8				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Botryococcus sp.	Chlorophyta	colony	108	0.1	7				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Planctonema lauterbornii	Chlorophyta	filament	49	0.1	7				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Pseudodidymocystis planctonica	Chlorophyta	colony	2	3	6				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Oocystis lacustris	Chlorophyta	colony	2	3	6				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Ankistrodesmus spiralis	Chlorophyta	cell	1	3	3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Monoraphidium contortum	Chlorophyta	cell	1	3	3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Coelastrum pseudomicroporum	Chlorophyta	colony	16	0.1	1				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Oedogonium sp.	Chlorophyta	filament	12	0.1	1				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Oocystis sp.	Chlorophyta	colony	2	0.1	0.1				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Monoraphidium sp.	Chlorophyta	cell	1	0.1	0.1				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	chrysophyte flagellate sp.	Chrysophyceae	cell	1	52	52	84	84		
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Dinobryon sp.	Chrysophyceae	cell	1	17	17				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Dinobryon sp.	Chrysophyceae	cell	1	8	8				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Dinobryon sp.	Chrysophyceae	cell	1	3	3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Chromulina sp.	Chrysophyceae	cell	1	3	3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	cryptophyte sp.	Cryptophyta	cell	1	3	3	3	3		
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Aphanocapsa delicatissima	Cyanobacteria	colony	17	419	7,121	1,222	17,452		
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Aphanocapsa sp.	Cyanobacteria	colony	14	314	4,398				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Anathece sp.	Cyanobacteria	colony	12	192	2,304				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Aphanocapsa incerta	Cyanobacteria	colony	25	87	2,182				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	cyanophyte tetrad spp.	Cyanobacteria	colony	4	140	559				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Cyanodictyon sp.	Cyanobacteria	colony	7	35	244				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Cyanodictyon planctonicum	Cyanobacteria	colony	10	17	175				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Coelomoron sp.	Cyanobacteria	colony	52	3	145				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Aphanocapsa cf. elachista	Cyanobacteria	colony	50	3	139				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Eucapsis sp.	Cyanobacteria	colony	14	6	78				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Radiocystis elongata	Cyanobacteria	colony	86	1	46				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	oscillatorialean filament sp.	Cyanobacteria	filament	8	3	22				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Anathece sp.	Cyanobacteria	colony	315	0.1	21				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Pseudanabaena mucicola	Cyanobacteria	filament	3	3	8				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Aphanothece sp.	Cyanobacteria	colony	120	0.1	8				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	cf. Phormidium sp.	Cyanobacteria	filament	37	0.1	2				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Dinoflagellate sp.	Dinophyceae	cell	1	0.1	0.1	0.1	0.1		
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	unknown unicell, sphere spp.	Unknown	cell	1	87	87	247	264		

Sample ID	Sample Site	Sampling Date	Taxa	Algal Group	Counting Unit	Cells/Unit	Species	Species	Group Total	Group Total	Sample Total	Sample Total
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	microflagellate spp.	Unknown	cell	1	70	70				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	unknown flagellate spp.	Unknown	cell	1	70	70				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	unknown colony sp.	Unknown	colony	7	3	19				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	unknown unicell, oval spp.	Unknown	cell	1	17	17				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	centric diatom sp.	Bacillariophyceae	cell	1	775	775	1,273	1,724	2,833	11,502
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Diatoma tenuis	Bacillariophyceae	colony	4	136	545				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Fragilaria sp.	Bacillariophyceae	cell	1	283	283				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	centric diatom chain sp.	Bacillariophyceae	chain	3	21	63				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	centric diatom sp.	Bacillariophyceae	cell	1	31	31				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	pennate diatom sp.	Bacillariophyceae	cell	1	10	10				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Navicula sp.	Bacillariophyceae	cell	1	10	10				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Nitzschia sp.	Bacillariophyceae	cell	1	3	3				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Nitzschia sp.	Bacillariophyceae	cell	1	3	3				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Fragilaria sp.	Bacillariophyceae	colony	6	0.1	1				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Cosmarium sp.	Charophyta	cell	1	63	63	76	76		
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Cosmarium sp.	Charophyta	cell	1	10	10				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Cosmarium sp.	Charophyta	cell	1	3	3				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Teilingia sp.	Charophyta	filament	2	0.1	0.3				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	chlorophyte unicell, sphere spp.	Chlorophyta	cell	1	251	251	639	876		
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	chlorophyte unicell, oval spp.	Chlorophyta	cell	1	157	157				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Mychonastes sp.	Chlorophyta	colony	12	10	126				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Tetraedron minimum	Chlorophyta	cell	1	63	63				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Oocystis spp. (unicell)	Chlorophyta	cell	1	52	52				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	chlorophyte colony sp.	Chlorophyta	colony	4	10	42				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	chlorophyte cell pair spp.	Chlorophyta	colony	2	21	42				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Pseudodidymocystis fina	Chlorophyta	colony	2	10	21				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	chlorophyte unicell sp.	Chlorophyta	cell	1	21	21				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Botryococcus sp.	Chlorophyta	colony	43	0.5	20				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Tetraedrus lagerheimii	Chlorophyta	colony	4	3	11				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	chlorophyte colony sp.	Chlorophyta	colony	4	3	11				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Chlamydomonas sp.	Chlorophyta	cell	1	10	10				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Nephrochlamys sp.	Chlorophyta	cell	1	10	10				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Eudorina elegans	Chlorophyta	colony	20	0.3	7				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Stichococcus sp.	Chlorophyta	filament	44	0.1	6				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Kirchneriella obesa	Chlorophyta	colony	2	3	6				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Mucidosphaerium pulchellum	Chlorophyta	colony	2	3	6				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Fusola viridis	Chlorophyta	cell	1	6	6				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	chlorophyte unicell sp.	Chlorophyta	cell	1	3	3				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Kirchneriella irregularis	Chlorophyta	colony	32	0.1	2				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Oedogonium sp.	Chlorophyta	filament	29	0.1	2				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Coenochloris foitii	Chlorophyta	colony	8	0.1	1				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Desmodesmus sp.	Chlorophyta	colony	8	0.1	1				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Desmodesmus sp.	Chlorophyta	colony	4	0.1	0.3				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Ochromonas sp.	Chrysophyceae	cell	1	42	42	82	96		
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Dinobyron sp.	Chrysophyceae	colony	6	3	17				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	chrysophyte flagellate sp.	Chrysophyceae	cell	1	10	10				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Chrysococcus sp.	Chrysophyceae	cell	1	10	10				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	chrysophyte statocyst sp.	Chrysophyceae	cell	1	10	10				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Dinobyron sp.	Chrysophyceae	cell	1	3	3				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Dinobyron sp.	Chrysophyceae	cell	1	3	3				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Aphanocapsa incerta	Cyanobacteria	colony	26	136	3,539	386	8,269		
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Aphanocapsa delicatissima	Cyanobacteria	colony	21	105	2,199				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	oscillatorial filament sp.	Cyanobacteria	filament	62	19	1,209				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Aphanocapsa sp.	Cyanobacteria	colony	13	42	545				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Cyanodictyon sp.	Cyanobacteria	colony	16	21	335				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Anathece sp.	Cyanobacteria	colony	14	10	147				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Eucapsis sp.	Cyanobacteria	colony	13	10	136				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	cyanophyte tetrad spp.	Cyanobacteria	colony	4	21	84				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Woronichinia elorantae	Cyanobacteria	colony	161	0.2	32				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Pseudanabaena mucicola	Cyanobacteria	filament	2	10	21				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Snowella lacustris	Cyanobacteria	colony	175	0.1	12				



Sample ID	Sample Site	Sampling Date	Taxa	Algal Group	Counting Unit	Cells/Unit	Species	Species	Group Total	Group Total	Sample Total	Sample Total
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	cyanophyte unicell, sphere spp.	Cyanobacteria	cell	1	10	10				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Eucapsis sp.	Cyanobacteria	colony	2	0.1	0.1				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	dinoflagellate sp.	Dinophyceae	cell	1	1	1	1	1		
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	dinoflagellate sp.	Dinophyceae	cell	1	0.1	0.1				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	dinoflagellate sp.	Dinophyceae	cell	1	0.1	0.1				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	unknown unicell, sphere spp.	Unknown	cell	1	147	147	377	461		
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	unknown flagellate spp.	Unknown	cell	1	147	147				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	unknown colony sp.	Unknown	colony	9	10	94				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	unknown unicell, oval spp.	Unknown	cell	1	42	42				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	microflagellate spp.	Unknown	cell	1	31	31				





# Arctic Fox Environmental, Inc.

PO Box 340043 | Prudhoe Bay, AK 99734 | PHONE: (907) 659-2145 | FAX: (907) 659-2146 | www.arcticfoxenv.com

## Analytical Services Order and Chain of Custody Form

90078

PAGE 2

FOR WILLOW  
WQ

Client Name and Address:		Account Number:		Number of Containers	11	12	13	14	15	16	PRESERVATIVE
P.O. or Contract Number:		P.O. or Contract Number:									
Contact Person:		Authorization Number:									
Phone Number:		Sampled By:									
Fax Number:		PWS Number:		17	18	19	20	21	22	23	
E-mail:		Send Results to ADEC:									
Project Name:		<input type="checkbox"/> YES <input type="checkbox"/> No									
Data Deliverables: Level I <input type="checkbox"/> Level II <input type="checkbox"/> Level III <input type="checkbox"/> EDD/Format:											
Requested Turnaround Time and Special Instructions:											
Client Sample ID	Date Sampled	Time Sampled	Matrix	AF Sample ID	11	12	13	14	15	16	Remarks
M0015/ROOSE	9/9/20	15:00		AF71986	✓	✓	✓	✓	3	1	
M0235	9/9/20	16:52		AF71987							
Trip Blank				AF71988					3		
Relinquished By (1):				Date:	Time:	Received By:		TO BE COMPLETED BY LABORATORY			
Relinquished By (2):				Date:	Time:	Received By:		Location Received/ ANC <input type="checkbox"/> °C FBK <input type="checkbox"/> °C PB <input checked="" type="checkbox"/> 0.9 °C			
Relinquished By (3):				Date:	Time:	Received for lab by:		Chain of Custody Seal <input type="checkbox"/> INTACT <input type="checkbox"/> BROKEN <input type="checkbox"/> ABSENT			
								Shipping Bill Number:			



# Arctic Fox Environmental, Inc.

PO Box 340043 | Prudhoe Bay, AK 99734 | PHONE: (907) 659-2145 | FAX: (907) 659-2146 | www.arcticfoxenv.com

Michael Baker International  
3900 C St Ste 900  
Anchorage, AK 99503

Report Date: 10/14/2020  
Date Arrived: 9/10/2020  
Date Sampled: 9/9/2020  
Time Sampled: 1500  
Collected By: DTR & SAO

Attn: Devon Roe / Haley Runa / Kieran Brawn  
Phone: (907) 273-1666 / (907) 575-8652

Email: [Devon.Roe@mbakerintl.com](mailto:Devon.Roe@mbakerintl.com)  
[Haley.Runa@mbakerintl.com](mailto:Haley.Runa@mbakerintl.com)  
[Kieran.Brawn@mbakerintl.com](mailto:Kieran.Brawn@mbakerintl.com)

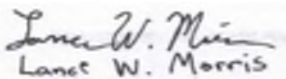
AF Lab #: AF71986  
Client Sample ID: MOO15/ROO56  
Location/Project: Willow WTP & Willow WQ  
COC#: 90077-90078  
Sample Matrix: Liquid

Flag Definitions  
MDL = Method Reporting Limit  
B = Below Regulatory Minimum  
H = Above Regulatory Maximum  
M = Matrix Interference  
J = Best Available Estimate  
U = Less Than Detection Limit  
D = Lost to Dilution

Comments: Attached are the results for analyses of your samples. Some samples were analyzed by Eurofins in Tacoma, WA; ALS Laboratories in Kelso, WA; Greenwater Laboratories in Palatka, FL.  
Tracking information is as follows:

Michael Baker Intl Sample ID: MOO15/ROO56  
Analyses Requested: See attached report  
Arctic Fox ID: AF71986  
Time Sampled: 1500  
Matrix: Liquid  
Eurofins Lab ID: 580-97431-1  
ALS Lab ID: K2007930-002  
GreenWater Lab ID: AF71986-MOO15/ROO56

Parameter	Result	Units	RL	RCRA Limits	Flag	Analysis Method	Analysis Date
<b>HACH Colorimeter II</b>							
Free Chlorine	0.02	mg/L				Colorimetric	10/2/2020
<b>SM5210B</b>							
BOD	<2	mg/L	2			SM5210B	9/10/2020
<b>SM2120-B</b>							
Color	<5	Color Units	5			SM2120-B	9/11/2020
<b>EPA150.2</b>							
pH	7.8	Units				EPA150.2	9/11/2020
<b>SM9223B</b>							
Total Coliform	Detected					SM9223B	9/10/2020
E. Coli	Not Detected						
<b>SM9223B</b>							
E-Coli	<1	MPN/100ml				SM9223B	9/10/2020

  
Lance W. Morris

Reported by: Ralph E. Allphin / Timothy D. Johnson / Lance W. Morris / Sky Allphin  
Arctic Fox Environmental, Inc.



# Arctic Fox Environmental, Inc.

PO Box 340043 | Prudhoe Bay, AK 99734 | PHONE: (907) 659-2145 | FAX: (907) 659-2146 | www.arcticfoxenv.com

Michael Baker International  
3900 C St Ste 900  
Anchorage, AK 99503

Attn: Devon Roe / Haley Runa / Kieran Brawn  
Phone: (907) 273-1666 / (907) 575-8652

Email: [Devon.Roe@mbakerintl.com](mailto:Devon.Roe@mbakerintl.com)  
[Haley.Runa@mbakerintl.com](mailto:Haley.Runa@mbakerintl.com)  
[Kieran.Brawn@mbakerintl.com](mailto:Kieran.Brawn@mbakerintl.com)

AF Lab #: AF71986  
Client Sample ID: MOO15/ROO56  
Location/Project: Willow WTP & Willow WQ  
COC#: 90077-90078  
Sample Matrix: Liquid

Report Date: 10/14/2020  
Date Arrived: 9/10/2020  
Date Sampled: 9/9/2020  
Time Sampled: 1500  
Collected By: DTR & SAO

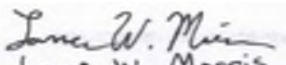
### Flag Definitions

MDL = Method Reporting Limit  
B = Below Regulatory Minimum  
H = Above Regulatory Maximum  
M = Matrix Interference  
J = Best Available Estimate  
U = Less Than Detection Limit  
D = Lost to Dilution

Comments: Attached are the results for analyses of your samples.  
Some samples were analyzed by Eurofins in Tacoma, Washington.  
Tracking information is as follows:

Michael Baker Intl Sample ID: MOO15/ROO56  
Analyses Requested: See attached report  
Arctic Fox ID: AF71986  
Time Sampled: 1500  
Matrix: Liquid  
Eurofins Lab ID: 580-97431-1  
ALS Lab ID: K2007930-002  
GreenWater Lab ID: AF71986-MOO15/ROO56

Parameter	Result	Units	RL	RCRA Limits	Flag	Analysis Method	Analysis Date
<b>EPA 830.7300</b>							
Specific Gravity	0.99	g/mL				EPA830.7300	9/11/2020
<b>SM 2540D</b>							
Total Suspended Solids	3	mg/L	2			SM2540D	9/13/2020
<b>SM2540C</b>							
Total Dissolved Solids	143	mg/L	10			SM2540C	9/13/2020
<b>6020A Total Metals</b>							
Arsenic	<MRL	mg/L	0.010	5.0		6020A	9/14/2020
Barium	0.070	mg/L	0.050	100.0		6020A	
Cadmium	<MRL	mg/L	0.004	1.0		6020A	
Chromium	<MRL	mg/L	0.010	5.0		6020A	
Lead	<MRL	mg/L	0.008	5.0		6020A	
Mercury	<MRL	mg/L	0.003	0.200		6020A	
Selenium	<MRL	mg/L	0.080	1.0		6020A	
Silver	<MRL	mg/L	0.010	5.0		6020A	

  
Lance W. Morris

Reported by: Ralph E. Allphin / Timothy D. Johnson / Lance W. Morris / Sky Allphin  
Arctic Fox Environmental, Inc.



# Arctic Fox Environmental, Inc.

PO Box 340043 | Prudhoe Bay, AK 99734 | PHONE: (907) 659-2145 | FAX: (907) 659-2146 | [www.arcticfoxenv.com](http://www.arcticfoxenv.com)

---

Michael Baker International  
3900 C St Ste 900  
Anchorage, AK 99503

Attn: Devon Roe / Haley Runa / Kieran Brawn  
Phone: (907) 273-1666 / (907) 575-8652

Email: [Devon.Roe@mbakerintl.com](mailto:Devon.Roe@mbakerintl.com)  
[Haley.Runa@mbakerintl.com](mailto:Haley.Runa@mbakerintl.com)  
[Kieran.Brawn@mbakerintl.com](mailto:Kieran.Brawn@mbakerintl.com)

AF Lab #: AF71987  
Client Sample ID: MOO235  
Location/Project: Willow WTP & Willow WQ  
COC#: 90077-90078  
Sample Matrix: Liquid

Report Date: 10/14/2020  
Date Arrived: 9/10/2020  
Date Sampled: 9/9/2020  
Time Sampled: 1652  
Collected By: DTR & SAO

#### Flag Definitions

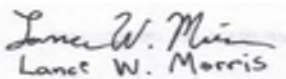
MDL = Method Reporting Limit  
B = Below Regulatory Minimum  
H = Above Regulatory Maximum  
M = Matrix Interference  
J = Best Available Estimate  
U = Less Than Detection Limit  
D = Lost to Dilution

Comments: Attached are the results for analyses of your samples.  
These samples were analyzed by Eurofinsin Tacoma, WA.  
Tracking information is as follows:

Michael Baker Intl Sample ID: MOO235  
Analyses Requested: PFAS by EPA 537  
Arctic Fox ID: AF71987  
Time Sampled: 1652  
Matrix: Liquid  
Eurofins Lab ID: 580-97431-2

---

---



Lance W. Morris

---

Reported by: Ralph E. Allphin / Timothy D. Johnson / Lance W. Morris / Sky Allphin  
Arctic Fox Environmental, Inc.



# Arctic Fox Environmental, Inc.

PO Box 340043 | Prudhoe Bay, AK 99734 | PHONE: (907) 659-2145 | FAX: (907) 659-2146 | [www.arcticfoxenv.com](http://www.arcticfoxenv.com)

---

Michael Baker International  
3900 C St Ste 900  
Anchorage, AK 99503

Attn: Devon Roe / Haley Runa / Kieran Brawn  
Phone: (907) 273-1666 / (907) 575-8652

Email: [Devon.Roe@mbakerintl.com](mailto:Devon.Roe@mbakerintl.com)  
[Haley.Runa@mbakerintl.com](mailto:Haley.Runa@mbakerintl.com)  
[Kieran.Brawn@mbakerintl.com](mailto:Kieran.Brawn@mbakerintl.com)

AF Lab #: AF71988  
Client Sample ID: Trip Blank  
Location/Project: Willow WTP & Willow WQ  
COC#: 90077-90078  
Sample Matrix: Liquid

Comments: Attached are the results for analyses of your samples.  
These samples were analyzed by Eurofinsin Tacoma, WA.  
Tracking information is as follows:

Michael Baker Intl Sample ID: Trip Blank  
Analyses Requested: VOC  
Arctic Fox ID: AF71988  
Time Sampled: NA  
Matrix: Liquid  
Eurofins Lab ID: 580-97431-3

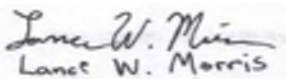
---

---

Report Date: 10/14/2020  
Date Arrived:  
Date Sampled:  
Time Sampled:  
Collected By:

#### Flag Definitions

MDL = Method Reporting Limit  
B = Below Regulatory Minimum  
H = Above Regulatory Maximum  
M = Matrix Interference  
J = Best Available Estimate  
U = Less Than Detection Limit  
D = Lost to Dilution



Lance W. Morris

---

Reported by: Ralph E. Allphin / Timothy D. Johnson / Lance W. Morris / Sky Allphin  
Arctic Fox Environmental, Inc.

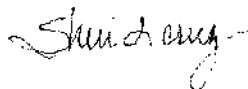
## ANALYTICAL REPORT

Eurofins TestAmerica, Seattle  
5755 8th Street East  
Tacoma, WA 98424  
Tel: (253)922-2310

Laboratory Job ID: 580-97431-1  
Client Project/Site: 0920-4661/Willow WTP and WQ  
Revision: 1

For:  
Arctic Fox Environmental, Inc  
Pouch 340043  
Prudhoe Bay, Alaska 99734

Attn: Arctic Fox



Authorized for release by:  
10/5/2020 1:20:59 PM

Sheri Cruz, Project Manager I  
(253)922-2310  
[Sheri.Cruz@Eurofinset.com](mailto:Sheri.Cruz@Eurofinset.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:  
[www.eurofinsus.com/Env](http://www.eurofinsus.com/Env)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*





# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Case Narrative . . . . .	3
Definitions . . . . .	5
Client Sample Results . . . . .	7
QC Sample Results . . . . .	16
Chronicle . . . . .	41
Certification Summary . . . . .	43
Sample Summary . . . . .	49
Chain of Custody . . . . .	50
Receipt Checklists . . . . .	56
Field Data Sheets . . . . .	61
Isotope Dilution Summary . . . . .	62

# Case Narrative

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Job ID: 580-97431-1

Laboratory: Eurofins TestAmerica, Seattle

### Narrative

#### Job Narrative 580-97431-1

#### Comments

10/1/2020 client requested additional analytes than originally listed on COC for PFOA/PFOS.

#### Receipt

The samples were received on 9/12/2020 11:00 AM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 3.2° C.

Samples received out of hold for method 300, 5540C, 5910B, 2150, and 3500\_Fe. We are unable to do viscosity, Free Cl-, and Sr+2

#### Receipt Exceptions

sample required subsample for workshare methods. AF71986 (580-97431-1)

#### GC/MS VOA

Method 8260D: The continuing calibration verification (CCV) associated with batch 580-338300 recovered above the upper control limit for cis-1,3-Dichloropropene, Hexachlorobutadiene and t-Butylbenzene. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The associated samples are impacted: AF71988-Trip blank (580-97431-3) and (CCVIS 580-338300/3).

Method 8260D: The CCV for analytical batch 580-338300 recovered outside control limits for the following analytes: Dichlorodifluoromethane and Naphthalene. These analytes have been identified as a poor performing analyte when analyzed using this method; therefore, re-extraction/re-analysis was not performed. These results have been reported and qualified.

Method 8260D: The method blank for preparation batch 338300 contained 1,2,3-Trichlorobenzene and Naphthalene above the reporting limit (RL). None of the samples associated with this method blank contained the target compound; therefore, re-extraction and/or re-analysis of samples were not performed.

Method 8260D: The following analytes recovered outside control limits for the LCSD associated with analytical batch 580-338300: 1,1,2-Trichloroethane and 1,3-Dichloropropane. This is not indicative of a systematic control problem because these were random marginal exceedances. Qualified results have been reported.

Method 8260D: The RPD of the laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for analytical batch 580-338300 recovered outside control limits for the following analytes: 1,1,1,2-Tetrachloroethane, 1,1,2-Trichloroethane, 1,2,3-Trichlorobenzene, 1,3-Dichloropropane, Chlorodibromomethane, Naphthalene and trans-1,3-Dichloropropene

Method 8260D: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for analytical batch 580-338901 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method 8260D: The following sample was diluted due to the nature of the sample matrix: AF71986 (580-97431-1). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### GC Semi VOA

Method AK102 & 103: AF71986 (580-97431-1), (LCS 580-338273/2-A), (LCS 580-338273/2-B), (LCSD 580-338273/3-A) and (LCSD 580-338273/3-B) were re-extracted and re-analyzed due to LCS/LCSD failures in the initial extraction. Two sets of data for the affected analytes are reported.

Method AK102 & 103: AF71986 (580-97431-1), (LCS 580-339227/2-A) and (LCSD 580-339227/3-A) were re-extracted outside of holding time and re-analyzed due to LCS/LCSD failures in the initial extraction. Inadvertently, the second extraction also had similar failures; since there was no more sample volume remaining, further re-extraction and re-analysis was not performed. Two sets of data for the affected analytes are reported.

# Case Narrative

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

---

## Job ID: 580-97431-1 (Continued)

---

### Laboratory: Eurofins TestAmerica, Seattle (Continued)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

#### LCMS

Method EPA 537(Mod): The first level standard from the initial calibration curve is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5amu; therefore, detection of the analyte serves as verification that the assigned mass is within +/- 0.5amu of the true value, which meets the DoD/DOE QSM tune criterion.

The Isotope Dilution Analyte (IDA) recovery associated with the following samples is below the method recommended limit for 13C2 PFTeDA: AF71987 (580-97431-2). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the samples.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### General Chemistry

Method 300.0: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for analytical batch 580-338346 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method 300.0: The following sample was received outside of holding time: AF71986 (580-97431-1).

Method 5910B: The following sample was received outside of holding time: AF71986 (580-97431-1).

Method SM 5540C: The following sample was received outside of holding time: AF71986 (580-97431-1).

Method SM 2150B: The associated sample(s) were ran using a plastic container per PM/client approval. A glass container must be used for odor analysis per the SOP. AF71986 (580-97431-1)

Method SM 2150B: The following sample was received outside of holding time: AF71986 (580-97431-1).

Method SM 3500 FE D: The following samples were received outside of holding time: AF71986 (580-97431-1).

Method SM 3500 FE D: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for analytical batch 280-509469 were outside control limits. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### Organic Prep

Method 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-412514.

3535 PFC  
Water  
320-412514

Method 3510C: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP) associated with all samples in preparation batch 339227 so LCS and LCSD were used instead.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### VOA Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

# Definitions/Glossary

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Qualifiers

### GC/MS VOA

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
*1	LCS/LCSD RPD exceeds control limits.
B	Compound was found in the blank and sample.
F1	MS and/or MSD recovery exceeds control limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
X	Surrogate recovery exceeds control limits

### GC Semi VOA

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
H	Sample was prepped or analyzed beyond the specified holding time

### LCMS

Qualifier	Qualifier Description
*5	Isotope dilution analyte is outside acceptance limits.

### General Chemistry

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.
F2	MS/MSD RPD exceeds control limits
H	Sample was prepped or analyzed beyond the specified holding time
H3	Sample was received and analyzed past holding time.
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)

Eurofins TestAmerica, Seattle

# Definitions/Glossary

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Glossary (Continued)

Abbreviation	These commonly used abbreviations may or may not be present in this report.
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

1

2

3

4

5

6

7

8

9

10

11

12

13

# Client Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

**Client Sample ID: AF71986**

**Lab Sample ID: 580-97431-1**

**Date Collected: 09/09/20 15:00**

**Matrix: Water**

**Date Received: 09/12/20 11:00**

**Method: 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	ND		0.010		mg/L			09/16/20 00:03	1
Chloromethane	ND		0.020		mg/L			09/16/20 00:03	1
Vinyl chloride	ND		0.0010		mg/L			09/16/20 00:03	1
Bromomethane	ND		0.0060		mg/L			09/16/20 00:03	1
Chloroethane	ND		0.0050		mg/L			09/16/20 00:03	1
Trichlorofluoromethane	ND		0.0030		mg/L			09/16/20 00:03	1
1,1-Dichloroethene	ND		0.0040		mg/L			09/16/20 00:03	1
Methylene Chloride	ND		0.0050		mg/L			09/16/20 00:03	1
Methyl tert-butyl ether	ND		0.0020		mg/L			09/16/20 00:03	1
trans-1,2-Dichloroethene	ND		0.0030		mg/L			09/16/20 00:03	1
1,1-Dichloroethane	ND		0.0020		mg/L			09/16/20 00:03	1
2,2-Dichloropropane	ND		0.0030		mg/L			09/16/20 00:03	1
cis-1,2-Dichloroethene	ND		0.0030		mg/L			09/16/20 00:03	1
2-Butanone (MEK)	ND		20		ug/L			09/16/20 00:03	1
Bromochloromethane	ND		0.0020		mg/L			09/16/20 00:03	1
Chloroform	ND		0.0050		mg/L			09/16/20 00:03	1
1,1,1-Trichloroethane	ND		0.0030		mg/L			09/16/20 00:03	1
Carbon tetrachloride	ND		0.0030		mg/L			09/16/20 00:03	1
1,1-Dichloropropene	ND		0.0030		mg/L			09/16/20 00:03	1
<b>Benzene</b>	<b>0.014</b>		0.0030		mg/L			09/16/20 00:03	1
1,2-Dichloroethane	ND		0.0020		mg/L			09/16/20 00:03	1
Trichloroethene	ND		0.0030		mg/L			09/16/20 00:03	1
1,2-Dichloropropane	ND		0.0010		mg/L			09/16/20 00:03	1
Dibromomethane	ND		0.0020		mg/L			09/16/20 00:03	1
Bromodichloromethane	ND		0.0020		mg/L			09/16/20 00:03	1
cis-1,3-Dichloropropene	ND		0.0010		mg/L			09/16/20 00:03	1
<b>Toluene</b>	<b>0.0055</b>		0.0020		mg/L			09/16/20 00:03	1
trans-1,3-Dichloropropene	ND	*1	0.0010		mg/L			09/16/20 00:03	1
Tetrachloroethene	ND		0.0030		mg/L			09/16/20 00:03	1
Dibromochloromethane	ND	*1	0.0020		mg/L			09/16/20 00:03	1
1,2-Dibromoethane	ND		0.0020		mg/L			09/16/20 00:03	1
Chlorobenzene	ND		0.0020		mg/L			09/16/20 00:03	1
1,1,1,2-Tetrachloroethane	ND	*1	0.0020		mg/L			09/16/20 00:03	1
<b>Ethylbenzene</b>	<b>0.0047</b>		0.0030		mg/L			09/16/20 00:03	1
<b>m-Xylene &amp; p-Xylene</b>	<b>0.019</b>		0.0030		mg/L			09/16/20 00:03	1
<b>o-Xylene</b>	<b>0.0071</b>		0.0020		mg/L			09/16/20 00:03	1
Styrene	ND		0.0050		mg/L			09/16/20 00:03	1
Bromoform	ND		0.0030		mg/L			09/16/20 00:03	1
Isopropylbenzene	ND		0.0020		mg/L			09/16/20 00:03	1
Bromobenzene	ND		0.0020		mg/L			09/16/20 00:03	1
1,1,2,2-Tetrachloroethane	ND		0.0030		mg/L			09/16/20 00:03	1
1,2,3-Trichloropropane	ND		0.0020		mg/L			09/16/20 00:03	1
<b>N-Propylbenzene</b>	<b>0.023</b>		0.0030		mg/L			09/16/20 00:03	1
<b>2-Chlorotoluene</b>	<b>0.013</b>		0.0030		mg/L			09/16/20 00:03	1
4-Chlorotoluene	ND		0.0020		mg/L			09/16/20 00:03	1
t-Butylbenzene	ND		0.0030		mg/L			09/16/20 00:03	1
<b>sec-Butylbenzene</b>	<b>0.0037</b>		0.0030		mg/L			09/16/20 00:03	1
<b>4-Isopropyltoluene</b>	<b>0.0067</b>		0.0030		mg/L			09/16/20 00:03	1
1,3-Dichlorobenzene	ND		0.0020		mg/L			09/16/20 00:03	1

Eurofins TestAmerica, Seattle

# Client Sample Results

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

**Client Sample ID: AF71986**

**Lab Sample ID: 580-97431-1**

**Date Collected: 09/09/20 15:00**

**Matrix: Water**

**Date Received: 09/12/20 11:00**

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.0040		mg/L			09/16/20 00:03	1
n-Butylbenzene	ND		0.0030		mg/L			09/16/20 00:03	1
1,2-Dichlorobenzene	ND		0.0020		mg/L			09/16/20 00:03	1
1,2-Dibromo-3-Chloropropane	ND		0.010		mg/L			09/16/20 00:03	1
1,2,4-Trichlorobenzene	ND		0.0020		mg/L			09/16/20 00:03	1
Hexachlorobutadiene	ND		0.0060		mg/L			09/16/20 00:03	1
<b>Naphthalene</b>	<b>0.0058</b>	<b>B *1</b>	0.0040		mg/L			09/16/20 00:03	1
1,2,3-Trichlorobenzene	ND	*1	0.0050		mg/L			09/16/20 00:03	1
<b>1,3,5-Trimethylbenzene</b>	<b>0.088</b>		0.0030		mg/L			09/16/20 00:03	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Toluene-d8 (Surr)	117		80 - 120					09/16/20 00:03	1
1,2-Dichloroethane-d4 (Surr)	128	X	80 - 126					09/16/20 00:03	1
4-Bromofluorobenzene (Surr)	69	X	80 - 120					09/16/20 00:03	1
Dibromofluoromethane (Surr)	107		80 - 120					09/16/20 00:03	1

## Method: 8260D - Volatile Organic Compounds by GC/MS - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2-Trichloroethane	ND		0.10		mg/L			09/23/20 07:12	100
1,3-Dichloropropane	ND		0.20		mg/L			09/23/20 07:12	100
1,2,4-Trimethylbenzene	ND		0.30		mg/L			09/23/20 07:12	100
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Toluene-d8 (Surr)	105		80 - 120					09/23/20 07:12	100
1,2-Dichloroethane-d4 (Surr)	90		80 - 126					09/23/20 07:12	100
4-Bromofluorobenzene (Surr)	101		80 - 120					09/23/20 07:12	100
Dibromofluoromethane (Surr)	95		80 - 120					09/23/20 07:12	100

## Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (nC10-<nC25)	ND	*	0.12		mg/L		09/15/20 12:45	09/17/20 17:49	1
DRO (nC10-<nC25)	ND	H *	0.12		mg/L		09/26/20 16:22	09/28/20 17:50	1
RRO (nC25-nC36)	ND		0.28		mg/L		09/15/20 12:45	09/17/20 17:49	1
RRO (nC25-nC36)	ND		0.28		mg/L		09/15/20 12:45	09/17/20 20:30	1
DRO (nC10-<nC25)	ND	*	0.12		mg/L		09/15/20 12:45	09/17/20 20:30	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
o-Terphenyl	73		50 - 150				09/15/20 12:45	09/17/20 20:30	1
n-Triacontane-d62	81		50 - 150				09/15/20 12:45	09/17/20 20:30	1
o-Terphenyl	73		50 - 150				09/15/20 12:45	09/17/20 17:49	1
o-Terphenyl	76		50 - 150				09/26/20 16:22	09/28/20 17:50	1
n-Triacontane-d62	81		50 - 150				09/15/20 12:45	09/17/20 17:49	1
n-Triacontane-d62	90		50 - 150				09/26/20 16:22	09/28/20 17:50	1

## Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC) - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (nC10-<nC25)	ND	H *	0.12		mg/L		09/26/20 16:22	09/27/20 23:24	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
o-Terphenyl	77		50 - 150				09/26/20 16:22	09/27/20 23:24	1
n-Triacontane-d62	89		50 - 150				09/26/20 16:22	09/27/20 23:24	1

Eurofins TestAmerica, Seattle

# Client Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

**Client Sample ID: AF71986**

**Lab Sample ID: 580-97431-1**

**Date Collected: 09/09/20 15:00**

**Matrix: Water**

**Date Received: 09/12/20 11:00**

**Method: EPA 537(Mod) - PFAS for QSM 5.1, Table B-15**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:27	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:27	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:27	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:27	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:27	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:27	1
Perfluorodecanoic acid (PFDA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:27	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:27	1
Perfluorononanoic acid (PFNA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:27	1
Perfluoropentanesulfonic acid (PFPeS)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:27	1
Perfluorononanesulfonic acid (PFNS)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:27	1
Perfluoroheptanoic acid (PFHpA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:27	1
Perfluorobutanoic acid (PFBA)	ND		4.6		ng/L		09/15/20 18:44	09/16/20 13:27	1
Perfluorododecanoic acid (PFDoA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:27	1
Perfluorohexanoic acid (PFHxA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:27	1
Perfluoropentanoic acid (PFPeA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:27	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:27	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:27	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		4.6		ng/L		09/15/20 18:44	09/16/20 13:27	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		4.6		ng/L		09/15/20 18:44	09/16/20 13:27	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:27	1
4:2 FTS	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:27	1
6:2 FTS	ND		4.6		ng/L		09/15/20 18:44	09/16/20 13:27	1
8:2 FTS	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:27	1
Perfluorooctanesulfonamide (PFOSA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:27	1
9Cl-PF3ONS	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:27	1
HFPO-DA (GenX)	ND		3.7		ng/L		09/15/20 18:44	09/16/20 13:27	1
11Cl-PF3OUdS	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:27	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOA	84		50 - 150	09/15/20 18:44	09/16/20 13:27	1
13C4 PFOS	84		50 - 150	09/15/20 18:44	09/16/20 13:27	1
18O2 PFHxS	89		50 - 150	09/15/20 18:44	09/16/20 13:27	1
13C2 PFHxA	79		50 - 150	09/15/20 18:44	09/16/20 13:27	1
13C3 PFBS	85		50 - 150	09/15/20 18:44	09/16/20 13:27	1
13C8 FOSA	79		50 - 150	09/15/20 18:44	09/16/20 13:27	1
13C2 PFDoA	62		50 - 150	09/15/20 18:44	09/16/20 13:27	1
13C5 PFPeA	79		50 - 150	09/15/20 18:44	09/16/20 13:27	1
13C2 PFTeDA	50		50 - 150	09/15/20 18:44	09/16/20 13:27	1
13C5 PFNA	86		50 - 150	09/15/20 18:44	09/16/20 13:27	1
13C2 PFDA	76		50 - 150	09/15/20 18:44	09/16/20 13:27	1
13C2 PFUnA	78		50 - 150	09/15/20 18:44	09/16/20 13:27	1
13C4 PFHpA	84		50 - 150	09/15/20 18:44	09/16/20 13:27	1
13C4 PFBA	67		50 - 150	09/15/20 18:44	09/16/20 13:27	1
d5-NEtFOSAA	73		50 - 150	09/15/20 18:44	09/16/20 13:27	1
d3-NMeFOSAA	68		50 - 150	09/15/20 18:44	09/16/20 13:27	1

Eurofins TestAmerica, Seattle



# Client Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

**Client Sample ID: AF71986**

**Lab Sample ID: 580-97431-1**

**Date Collected: 09/09/20 15:00**

**Matrix: Water**

**Date Received: 09/12/20 11:00**

**Method: EPA 537(Mod) - PFAS for QSM 5.1, Table B-15 (Continued)**

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
M2-6:2 FTS	103		50 - 150	09/15/20 18:44	09/16/20 13:27	1
M2-4:2 FTS	110		50 - 150	09/15/20 18:44	09/16/20 13:27	1
13C3 HFPO-DA	76		50 - 150	09/15/20 18:44	09/16/20 13:27	1
M2-8:2 FTS	106		50 - 150	09/15/20 18:44	09/16/20 13:27	1

**Method: 6010D - Metals (ICP) - Total Recoverable**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		2.5		mg/L		09/14/20 09:48	09/14/20 20:06	1
Iron	ND		0.50		mg/L		09/14/20 09:48	09/14/20 20:06	1
<b>Magnesium</b>	<b>3.9</b>		1.1		mg/L		09/14/20 09:48	09/14/20 20:06	1
Manganese	ND		0.020		mg/L		09/14/20 09:48	09/14/20 20:06	1
Potassium	ND		3.3		mg/L		09/14/20 09:48	09/14/20 20:06	1
<b>Sodium</b>	<b>9.5</b>		2.0		mg/L		09/14/20 09:48	09/14/20 20:06	1
Strontium	ND		0.10		mg/L		09/14/20 09:48	09/14/20 20:06	1
Antimony	ND		0.060		mg/L		09/14/20 09:48	09/14/20 20:06	1
Beryllium	ND		0.020		mg/L		09/14/20 09:48	09/14/20 20:06	1
Thallium	ND		0.10		mg/L		09/14/20 09:48	09/14/20 20:06	1
Nickel	ND		0.020		mg/L		09/14/20 09:48	09/14/20 20:06	1
Copper	ND		0.060		mg/L		09/14/20 09:48	09/14/20 20:06	1
Aluminum	ND		1.5		mg/L		09/14/20 09:48	09/14/20 20:06	1
Zinc	ND		0.040		mg/L		09/14/20 09:48	09/14/20 20:06	1
Selenium	ND		0.10		mg/L		09/14/20 09:48	09/14/20 20:06	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HEM (Oil & Grease)	ND		5.1		mg/L		09/22/20 10:15	09/22/20 13:59	1
SGT-HEM	ND		5.1		mg/L		09/22/20 10:15	09/22/20 13:59	1
HEM Polar (Oil and Grease - Polar)	ND		5.1		mg/L		09/22/20 10:15	09/22/20 13:59	1
Nitrite as N	ND	H H3	0.40		mg/L			09/15/20 14:42	1
<b>Chloride</b>	<b>22</b>		0.90		mg/L			09/15/20 14:42	1
Nitrate as N	ND	H H3	0.20		mg/L			09/15/20 14:42	1
Bromide	ND		1.0		mg/L			09/15/20 14:42	1
Sulfate	ND		1.2		mg/L			09/15/20 14:42	1
<b>Fluoride</b>	<b>1.2</b>		0.20		mg/L			09/15/20 14:42	1
<b>Cyanide, Total</b>	<b>0.33</b>		0.060		mg/L		09/18/20 13:52	09/18/20 15:13	1
Nitrate as N	ND		0.15		mg/L			09/25/20 14:51	1
<b>UV254</b>	<b>0.051</b>	<b>H H3</b>	0.0090		1/cm			09/15/20 18:07	1
Sulfide	ND		4.0		mg/L		09/16/20 12:00	09/16/20 12:56	1
Odor	ND	H H3	1.0		T.O.N.			09/18/20 10:50	1
<b>Alkalinity as CaCO3</b>	<b>71</b>		5.0		mg/L			09/15/20 09:07	1
<b>Bicarbonate Alkalinity as CaCO3</b>	<b>71</b>		5.0		mg/L			09/15/20 09:07	1
Carbonate Alkalinity as CaCO3	ND		5.0		mg/L			09/15/20 09:07	1
Hydroxide Alkalinity as CaCO3	ND		5.0		mg/L			09/15/20 09:07	1
<b>Hardness as calcium carbonate</b>	<b>61</b>		2.0		mg/L			09/15/20 18:24	1
<b>Ferrous Iron</b>	<b>0.22</b>	<b>HF</b>	0.20		mg/L			09/17/20 13:21	1
Ammonia as N	ND		0.50		mg/L			09/17/20 14:22	1
<b>Chemical Oxygen Demand</b>	<b>24</b>		10		mg/L		09/19/20 11:23	09/19/20 16:31	1
<b>Total Organic Carbon</b>	<b>4.6</b>		1.5		mg/L			09/21/20 20:23	1
Methylene Blue Active Substances	ND	H H3	0.10		mg/L			09/15/20 15:29	1
Total Phosphorus as P	ND		0.25		mg/L		09/22/20 10:55	09/22/20 10:59	1

Eurofins TestAmerica, Seattle

# Client Sample Results

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

**Client Sample ID: AF71986**

**Lab Sample ID: 580-97431-1**

**Date Collected: 09/09/20 15:00**

**Matrix: Water**

**Date Received: 09/12/20 11:00**

## General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Organic Carbon	5.1		1.5		mg/L			09/19/20 19:57	1

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13

# Client Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

**Client Sample ID: AF71987**

**Lab Sample ID: 580-97431-2**

**Date Collected: 09/09/20 16:52**

**Matrix: Water**

**Date Received: 09/12/20 11:00**

**Method: EPA 537(Mod) - PFAS for QSM 5.1, Table B-15**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:37	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:37	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:37	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:37	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:37	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:37	1
Perfluorodecanoic acid (PFDA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:37	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:37	1
Perfluorononanoic acid (PFNA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:37	1
Perfluoropentanesulfonic acid (PFPeS)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:37	1
Perfluorononanesulfonic acid (PFNS)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:37	1
Perfluoroheptanoic acid (PFHpA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:37	1
<b>Perfluorobutanoic acid (PFBA)</b>	<b>4.4</b>		4.4		ng/L		09/15/20 18:44	09/16/20 13:37	1
Perfluorododecanoic acid (PFDoA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:37	1
Perfluorohexanoic acid (PFHxA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:37	1
Perfluoropentanoic acid (PFPeA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:37	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:37	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:37	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		4.4		ng/L		09/15/20 18:44	09/16/20 13:37	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		4.4		ng/L		09/15/20 18:44	09/16/20 13:37	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:37	1
4:2 FTS	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:37	1
6:2 FTS	ND		4.4		ng/L		09/15/20 18:44	09/16/20 13:37	1
8:2 FTS	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:37	1
Perfluorooctanesulfonamide (PFOSA)	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:37	1
9Cl-PF3ONS	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:37	1
HFPO-DA (GenX)	ND		3.6		ng/L		09/15/20 18:44	09/16/20 13:37	1
11Cl-PF3OUdS	ND		1.8		ng/L		09/15/20 18:44	09/16/20 13:37	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOA	78		50 - 150	09/15/20 18:44	09/16/20 13:37	1
13C4 PFOS	80		50 - 150	09/15/20 18:44	09/16/20 13:37	1
18O2 PFHxS	83		50 - 150	09/15/20 18:44	09/16/20 13:37	1
13C2 PFHxA	77		50 - 150	09/15/20 18:44	09/16/20 13:37	1
13C3 PFBS	75		50 - 150	09/15/20 18:44	09/16/20 13:37	1
13C8 FOSA	76		50 - 150	09/15/20 18:44	09/16/20 13:37	1
13C2 PFDoA	61		50 - 150	09/15/20 18:44	09/16/20 13:37	1
13C5 PFPeA	65		50 - 150	09/15/20 18:44	09/16/20 13:37	1
13C2 PFTeDA	48	*5	50 - 150	09/15/20 18:44	09/16/20 13:37	1
13C5 PFNA	78		50 - 150	09/15/20 18:44	09/16/20 13:37	1
13C2 PFDA	77		50 - 150	09/15/20 18:44	09/16/20 13:37	1
13C2 PFUnA	72		50 - 150	09/15/20 18:44	09/16/20 13:37	1
13C4 PFHpA	79		50 - 150	09/15/20 18:44	09/16/20 13:37	1
13C4 PFBA	51		50 - 150	09/15/20 18:44	09/16/20 13:37	1
d5-NEtFOSAA	66		50 - 150	09/15/20 18:44	09/16/20 13:37	1
d3-NMeFOSAA	64		50 - 150	09/15/20 18:44	09/16/20 13:37	1

Eurofins TestAmerica, Seattle

# Client Sample Results

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

**Client Sample ID: AF71987**

**Date Collected: 09/09/20 16:52**

**Date Received: 09/12/20 11:00**

**Lab Sample ID: 580-97431-2**

**Matrix: Water**

**Method: EPA 537(Mod) - PFAS for QSM 5.1, Table B-15 (Continued)**

<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
M2-6:2 FTS	109		50 - 150	09/15/20 18:44	09/16/20 13:37	1
M2-4:2 FTS	121		50 - 150	09/15/20 18:44	09/16/20 13:37	1
13C3 HFPO-DA	70		50 - 150	09/15/20 18:44	09/16/20 13:37	1
M2-8:2 FTS	96		50 - 150	09/15/20 18:44	09/16/20 13:37	1

# Client Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

**Client Sample ID: AF71988-Trip blank**

**Lab Sample ID: 580-97431-3**

**Date Collected: 09/09/20 00:01**

**Matrix: Water**

**Date Received: 09/12/20 11:00**

**Method: 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	ND		0.010		mg/L			09/15/20 18:15	1
Chloromethane	ND		0.020		mg/L			09/15/20 18:15	1
Vinyl chloride	ND		0.0010		mg/L			09/15/20 18:15	1
Bromomethane	ND		0.0060		mg/L			09/15/20 18:15	1
Chloroethane	ND		0.0050		mg/L			09/15/20 18:15	1
Trichlorofluoromethane	ND		0.0030		mg/L			09/15/20 18:15	1
1,1-Dichloroethene	ND		0.0040		mg/L			09/15/20 18:15	1
Methylene Chloride	ND		0.0050		mg/L			09/15/20 18:15	1
Methyl tert-butyl ether	ND		0.0020		mg/L			09/15/20 18:15	1
trans-1,2-Dichloroethene	ND		0.0030		mg/L			09/15/20 18:15	1
1,1-Dichloroethane	ND		0.0020		mg/L			09/15/20 18:15	1
2,2-Dichloropropane	ND		0.0030		mg/L			09/15/20 18:15	1
cis-1,2-Dichloroethene	ND		0.0030		mg/L			09/15/20 18:15	1
2-Butanone (MEK)	ND		20		ug/L			09/15/20 18:15	1
Bromochloromethane	ND		0.0020		mg/L			09/15/20 18:15	1
Chloroform	ND		0.0050		mg/L			09/15/20 18:15	1
1,1,1-Trichloroethane	ND		0.0030		mg/L			09/15/20 18:15	1
Carbon tetrachloride	ND		0.0030		mg/L			09/15/20 18:15	1
1,1-Dichloropropene	ND		0.0030		mg/L			09/15/20 18:15	1
Benzene	ND		0.0030		mg/L			09/15/20 18:15	1
1,2-Dichloroethane	ND		0.0020		mg/L			09/15/20 18:15	1
Trichloroethene	ND		0.0030		mg/L			09/15/20 18:15	1
1,2-Dichloropropane	ND		0.0010		mg/L			09/15/20 18:15	1
Dibromomethane	ND		0.0020		mg/L			09/15/20 18:15	1
Bromodichloromethane	ND		0.0020		mg/L			09/15/20 18:15	1
cis-1,3-Dichloropropene	ND		0.0010		mg/L			09/15/20 18:15	1
Toluene	ND		0.0020		mg/L			09/15/20 18:15	1
trans-1,3-Dichloropropene	ND	*1	0.0010		mg/L			09/15/20 18:15	1
1,1,2-Trichloroethane	ND	**1	0.0010		mg/L			09/15/20 18:15	1
Tetrachloroethene	ND		0.0030		mg/L			09/15/20 18:15	1
1,3-Dichloropropane	ND	**1	0.0020		mg/L			09/15/20 18:15	1
Dibromochloromethane	ND	*1	0.0020		mg/L			09/15/20 18:15	1
1,2-Dibromoethane	ND		0.0020		mg/L			09/15/20 18:15	1
Chlorobenzene	ND		0.0020		mg/L			09/15/20 18:15	1
1,1,1,2-Tetrachloroethane	ND	*1	0.0020		mg/L			09/15/20 18:15	1
Ethylbenzene	ND		0.0030		mg/L			09/15/20 18:15	1
m-Xylene & p-Xylene	ND		0.0030		mg/L			09/15/20 18:15	1
o-Xylene	ND		0.0020		mg/L			09/15/20 18:15	1
Styrene	ND		0.0050		mg/L			09/15/20 18:15	1
Bromoform	ND		0.0030		mg/L			09/15/20 18:15	1
Isopropylbenzene	ND		0.0020		mg/L			09/15/20 18:15	1
Bromobenzene	ND		0.0020		mg/L			09/15/20 18:15	1
1,1,2,2-Tetrachloroethane	ND		0.0030		mg/L			09/15/20 18:15	1
1,2,3-Trichloropropane	ND		0.0020		mg/L			09/15/20 18:15	1
N-Propylbenzene	ND		0.0030		mg/L			09/15/20 18:15	1
2-Chlorotoluene	ND		0.0030		mg/L			09/15/20 18:15	1
4-Chlorotoluene	ND		0.0020		mg/L			09/15/20 18:15	1
t-Butylbenzene	ND		0.0030		mg/L			09/15/20 18:15	1
1,2,4-Trimethylbenzene	ND		0.0030		mg/L			09/15/20 18:15	1

Eurofins TestAmerica, Seattle

# Client Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

**Client Sample ID: AF71988-Trip blank**

**Lab Sample ID: 580-97431-3**

**Date Collected: 09/09/20 00:01**

**Matrix: Water**

**Date Received: 09/12/20 11:00**

**Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
sec-Butylbenzene	ND		0.0030		mg/L			09/15/20 18:15	1
4-Isopropyltoluene	ND		0.0030		mg/L			09/15/20 18:15	1
1,3-Dichlorobenzene	ND		0.0020		mg/L			09/15/20 18:15	1
1,4-Dichlorobenzene	ND		0.0040		mg/L			09/15/20 18:15	1
n-Butylbenzene	ND		0.0030		mg/L			09/15/20 18:15	1
1,2-Dichlorobenzene	ND		0.0020		mg/L			09/15/20 18:15	1
1,2-Dibromo-3-Chloropropane	ND		0.010		mg/L			09/15/20 18:15	1
1,2,4-Trichlorobenzene	ND		0.0020		mg/L			09/15/20 18:15	1
Hexachlorobutadiene	ND		0.0060		mg/L			09/15/20 18:15	1
Naphthalene	ND	*1	0.0040		mg/L			09/15/20 18:15	1
1,2,3-Trichlorobenzene	ND	*1	0.0050		mg/L			09/15/20 18:15	1
1,3,5-Trimethylbenzene	ND		0.0030		mg/L			09/15/20 18:15	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Toluene-d8 (Surr)	98		80 - 120					09/15/20 18:15	1
1,2-Dichloroethane-d4 (Surr)	103		80 - 126					09/15/20 18:15	1
4-Bromofluorobenzene (Surr)	100		80 - 120					09/15/20 18:15	1
Dibromofluoromethane (Surr)	99		80 - 120					09/15/20 18:15	1

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Method: 8260D - Volatile Organic Compounds by GC/MS

**Lab Sample ID: MB 580-338300/5**  
**Matrix: Water**  
**Analysis Batch: 338300**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Dichlorodifluoromethane	ND		0.010		mg/L			09/15/20 15:46	1
Chloromethane	ND		0.020		mg/L			09/15/20 15:46	1
Vinyl chloride	ND		0.0010		mg/L			09/15/20 15:46	1
Bromomethane	ND		0.0060		mg/L			09/15/20 15:46	1
Chloroethane	ND		0.0050		mg/L			09/15/20 15:46	1
Trichlorofluoromethane	ND		0.0030		mg/L			09/15/20 15:46	1
1,1-Dichloroethene	ND		0.0040		mg/L			09/15/20 15:46	1
Methylene Chloride	ND		0.0050		mg/L			09/15/20 15:46	1
Methyl tert-butyl ether	ND		0.0020		mg/L			09/15/20 15:46	1
trans-1,2-Dichloroethene	ND		0.0030		mg/L			09/15/20 15:46	1
1,1-Dichloroethane	ND		0.0020		mg/L			09/15/20 15:46	1
2,2-Dichloropropane	ND		0.0030		mg/L			09/15/20 15:46	1
cis-1,2-Dichloroethene	ND		0.0030		mg/L			09/15/20 15:46	1
2-Butanone (MEK)	ND		20		ug/L			09/15/20 15:46	1
Bromochloromethane	ND		0.0020		mg/L			09/15/20 15:46	1
Chloroform	ND		0.0050		mg/L			09/15/20 15:46	1
1,1,1-Trichloroethane	ND		0.0030		mg/L			09/15/20 15:46	1
Carbon tetrachloride	ND		0.0030		mg/L			09/15/20 15:46	1
1,1-Dichloropropene	ND		0.0030		mg/L			09/15/20 15:46	1
Benzene	ND		0.0030		mg/L			09/15/20 15:46	1
1,2-Dichloroethane	ND		0.0020		mg/L			09/15/20 15:46	1
Trichloroethene	ND		0.0030		mg/L			09/15/20 15:46	1
1,2-Dichloropropane	ND		0.0010		mg/L			09/15/20 15:46	1
Dibromomethane	ND		0.0020		mg/L			09/15/20 15:46	1
Bromodichloromethane	ND		0.0020		mg/L			09/15/20 15:46	1
cis-1,3-Dichloropropene	ND		0.0010		mg/L			09/15/20 15:46	1
Toluene	ND		0.0020		mg/L			09/15/20 15:46	1
trans-1,3-Dichloropropene	ND		0.0010		mg/L			09/15/20 15:46	1
1,1,2-Trichloroethane	ND		0.0010		mg/L			09/15/20 15:46	1
Tetrachloroethene	ND		0.0030		mg/L			09/15/20 15:46	1
1,3-Dichloropropane	ND		0.0020		mg/L			09/15/20 15:46	1
Dibromochloromethane	ND		0.0020		mg/L			09/15/20 15:46	1
1,2-Dibromoethane	ND		0.0020		mg/L			09/15/20 15:46	1
Chlorobenzene	ND		0.0020		mg/L			09/15/20 15:46	1
1,1,1,2-Tetrachloroethane	ND		0.0020		mg/L			09/15/20 15:46	1
Ethylbenzene	ND		0.0030		mg/L			09/15/20 15:46	1
m-Xylene & p-Xylene	ND		0.0030		mg/L			09/15/20 15:46	1
o-Xylene	ND		0.0020		mg/L			09/15/20 15:46	1
Styrene	ND		0.0050		mg/L			09/15/20 15:46	1
Bromoform	ND		0.0030		mg/L			09/15/20 15:46	1
Isopropylbenzene	ND		0.0020		mg/L			09/15/20 15:46	1
Bromobenzene	ND		0.0020		mg/L			09/15/20 15:46	1
1,1,2,2-Tetrachloroethane	ND		0.0030		mg/L			09/15/20 15:46	1
1,2,3-Trichloropropane	ND		0.0020		mg/L			09/15/20 15:46	1
N-Propylbenzene	ND		0.0030		mg/L			09/15/20 15:46	1
2-Chlorotoluene	ND		0.0030		mg/L			09/15/20 15:46	1
4-Chlorotoluene	ND		0.0020		mg/L			09/15/20 15:46	1
t-Butylbenzene	ND		0.0030		mg/L			09/15/20 15:46	1

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: MB 580-338300/5**  
**Matrix: Water**  
**Analysis Batch: 338300**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
1,2,4-Trimethylbenzene	ND		0.0030		mg/L			09/15/20 15:46	1
sec-Butylbenzene	ND		0.0030		mg/L			09/15/20 15:46	1
4-Isopropyltoluene	ND		0.0030		mg/L			09/15/20 15:46	1
1,3-Dichlorobenzene	ND		0.0020		mg/L			09/15/20 15:46	1
1,4-Dichlorobenzene	ND		0.0040		mg/L			09/15/20 15:46	1
n-Butylbenzene	ND		0.0030		mg/L			09/15/20 15:46	1
1,2-Dichlorobenzene	ND		0.0020		mg/L			09/15/20 15:46	1
1,2-Dibromo-3-Chloropropane	ND		0.010		mg/L			09/15/20 15:46	1
1,2,4-Trichlorobenzene	ND		0.0020		mg/L			09/15/20 15:46	1
Hexachlorobutadiene	ND		0.0060		mg/L			09/15/20 15:46	1
Naphthalene	0.00444		0.0040		mg/L			09/15/20 15:46	1
1,2,3-Trichlorobenzene	0.00585		0.0050		mg/L			09/15/20 15:46	1
1,3,5-Trimethylbenzene	ND		0.0030		mg/L			09/15/20 15:46	1

Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
Toluene-d8 (Surr)	101		80 - 120		09/15/20 15:46	1
1,2-Dichloroethane-d4 (Surr)	103		80 - 126		09/15/20 15:46	1
4-Bromofluorobenzene (Surr)	100		80 - 120		09/15/20 15:46	1
Dibromofluoromethane (Surr)	103		80 - 120		09/15/20 15:46	1

**Lab Sample ID: LCS 580-338300/6**  
**Matrix: Water**  
**Analysis Batch: 338300**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloromethane	0.0100	0.00924	J	mg/L		92	52 - 135
Vinyl chloride	0.0100	0.00899		mg/L		90	65 - 130
Bromomethane	0.0100	0.00971		mg/L		97	66 - 125
Chloroethane	0.0100	0.00909		mg/L		91	65 - 132
Trichlorofluoromethane	0.0100	0.00866		mg/L		87	64 - 130
1,1-Dichloroethene	0.0100	0.0106		mg/L		106	70 - 129
Methylene Chloride	0.0100	0.0101		mg/L		101	77 - 120
Methyl tert-butyl ether	0.0100	0.0108		mg/L		108	72 - 130
trans-1,2-Dichloroethene	0.0100	0.0100		mg/L		100	70 - 130
1,1-Dichloroethane	0.0100	0.0104		mg/L		104	81 - 129
2,2-Dichloropropane	0.0100	0.0108		mg/L		108	53 - 150
cis-1,2-Dichloroethene	0.0100	0.0106		mg/L		106	76 - 129
2-Butanone (MEK)	50.0	55.9		ug/L		112	73 - 137
Bromochloromethane	0.0100	0.0104		mg/L		104	78 - 120
Chloroform	0.0100	0.0107		mg/L		107	73 - 127
1,1,1-Trichloroethane	0.0100	0.0107		mg/L		107	74 - 130
Carbon tetrachloride	0.0100	0.0108		mg/L		108	72 - 129
1,1-Dichloropropene	0.0100	0.0105		mg/L		105	74 - 131
Benzene	0.0100	0.0110		mg/L		110	82 - 122
1,2-Dichloroethane	0.0100	0.0107		mg/L		107	76 - 126
Trichloroethene	0.0100	0.0109		mg/L		109	81 - 125
1,2-Dichloropropane	0.0100	0.0107		mg/L		107	80 - 126

Eurofins TestAmerica, Seattle



# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: LCS 580-338300/6**  
**Matrix: Water**  
**Analysis Batch: 338300**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Dibromomethane	0.0100	0.0104		mg/L		104	80 - 120
Bromodichloromethane	0.0100	0.0101		mg/L		101	75 - 124
cis-1,3-Dichloropropene	0.0100	0.0100		mg/L		100	77 - 120
Toluene	0.0100	0.00970		mg/L		97	80 - 120
trans-1,3-Dichloropropene	0.0100	0.00884		mg/L		88	70 - 122
1,1,2-Trichloroethane	0.0100	0.00933		mg/L		93	80 - 121
Tetrachloroethene	0.0100	0.00897		mg/L		90	76 - 120
1,3-Dichloropropane	0.0100	0.00969		mg/L		97	79 - 120
Dibromochloromethane	0.0100	0.0100		mg/L		100	60 - 125
1,2-Dibromoethane	0.0100	0.0104		mg/L		104	79 - 120
Chlorobenzene	0.0100	0.0104		mg/L		104	80 - 120
1,1,1,2-Tetrachloroethane	0.0100	0.0102		mg/L		102	79 - 120
Ethylbenzene	0.0100	0.0104		mg/L		104	80 - 120
m-Xylene & p-Xylene	0.0100	0.0104		mg/L		104	80 - 120
o-Xylene	0.0100	0.0102		mg/L		102	80 - 125
Styrene	0.0100	0.0102		mg/L		102	76 - 127
Bromoform	0.0100	0.0101		mg/L		101	28 - 139
Isopropylbenzene	0.0100	0.0109		mg/L		109	75 - 129
Bromobenzene	0.0100	0.0103		mg/L		103	80 - 120
1,1,2,2-Tetrachloroethane	0.0100	0.0103		mg/L		103	74 - 124
1,2,3-Trichloropropane	0.0100	0.0106		mg/L		106	76 - 124
N-Propylbenzene	0.0100	0.0103		mg/L		103	80 - 128
2-Chlorotoluene	0.0100	0.0104		mg/L		104	80 - 120
4-Chlorotoluene	0.0100	0.0102		mg/L		102	80 - 120
t-Butylbenzene	0.0100	0.0107		mg/L		107	80 - 129
1,2,4-Trimethylbenzene	0.0100	0.0109		mg/L		109	80 - 131
sec-Butylbenzene	0.0100	0.0110		mg/L		110	78 - 131
4-Isopropyltoluene	0.0100	0.0106		mg/L		106	77 - 131
1,3-Dichlorobenzene	0.0100	0.0102		mg/L		102	69 - 127
1,4-Dichlorobenzene	0.0100	0.0101		mg/L		101	80 - 120
n-Butylbenzene	0.0100	0.0104		mg/L		104	78 - 120
1,2-Dichlorobenzene	0.0100	0.0100		mg/L		100	80 - 120
1,2-Dibromo-3-Chloropropane	0.0100	0.00878	J	mg/L		88	65 - 125
1,2,4-Trichlorobenzene	0.0100	0.00978		mg/L		98	73 - 128
Hexachlorobutadiene	0.0100	0.0107		mg/L		107	74 - 125
Naphthalene	0.0100	0.00753		mg/L		75	75 - 134
1,2,3-Trichlorobenzene	0.0100	0.0105		mg/L		105	74 - 139
1,3,5-Trimethylbenzene	0.0100	0.0105		mg/L		105	80 - 131

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	94		80 - 120
1,2-Dichloroethane-d4 (Surr)	103		80 - 126
4-Bromofluorobenzene (Surr)	105		80 - 120
Dibromofluoromethane (Surr)	99		80 - 120

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: LCSD 580-338300/7**  
**Matrix: Water**  
**Analysis Batch: 338300**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD
									Limit
Dichlorodifluoromethane	0.0100	0.00781	J	mg/L		78	47 - 133	8	15
Chloromethane	0.0100	0.00870	J	mg/L		87	52 - 135	6	14
Vinyl chloride	0.0100	0.00783		mg/L		78	65 - 130	14	14
Bromomethane	0.0100	0.00930		mg/L		93	66 - 125	4	14
Chloroethane	0.0100	0.00823		mg/L		82	65 - 132	10	18
Trichlorofluoromethane	0.0100	0.00871		mg/L		87	64 - 130	0	14
1,1-Dichloroethene	0.0100	0.00987		mg/L		99	70 - 129	7	17
Methylene Chloride	0.0100	0.00976		mg/L		98	77 - 120	3	18
Methyl tert-butyl ether	0.0100	0.00988		mg/L		99	72 - 130	9	18
trans-1,2-Dichloroethene	0.0100	0.00972		mg/L		97	70 - 130	3	21
1,1-Dichloroethane	0.0100	0.00974		mg/L		97	81 - 129	7	15
2,2-Dichloropropane	0.0100	0.0103		mg/L		103	53 - 150	5	15
cis-1,2-Dichloroethene	0.0100	0.00973		mg/L		97	76 - 129	9	15
2-Butanone (MEK)	50.0	48.4		ug/L		97	73 - 137	14	24
Bromochloromethane	0.0100	0.00987		mg/L		99	78 - 120	5	13
Chloroform	0.0100	0.00996		mg/L		100	73 - 127	7	14
1,1,1-Trichloroethane	0.0100	0.0101		mg/L		101	74 - 130	6	11
Carbon tetrachloride	0.0100	0.0102		mg/L		102	72 - 129	6	11
1,1-Dichloropropene	0.0100	0.00992		mg/L		99	74 - 131	6	14
Benzene	0.0100	0.0101		mg/L		101	82 - 122	9	14
1,2-Dichloroethane	0.0100	0.00988		mg/L		99	76 - 126	8	11
Trichloroethene	0.0100	0.0101		mg/L		101	81 - 125	7	13
1,2-Dichloropropane	0.0100	0.00958		mg/L		96	80 - 126	11	14
Dibromomethane	0.0100	0.00988		mg/L		99	80 - 120	6	11
Bromodichloromethane	0.0100	0.00949		mg/L		95	75 - 124	7	13
cis-1,3-Dichloropropene	0.0100	0.00958		mg/L		96	77 - 120	5	20
Toluene	0.0100	0.00916		mg/L		92	80 - 120	6	13
trans-1,3-Dichloropropene	0.0100	0.00708	*1	mg/L		71	70 - 122	22	14
1,1,2-Trichloroethane	0.0100	0.00759	**1	mg/L		76	80 - 121	20	14
Tetrachloroethene	0.0100	0.00825		mg/L		82	76 - 120	8	13
1,3-Dichloropropane	0.0100	0.00753	**1	mg/L		75	79 - 120	25	13
Dibromochloromethane	0.0100	0.00850	*1	mg/L		85	60 - 125	16	13
1,2-Dibromoethane	0.0100	0.00957		mg/L		96	79 - 120	8	12
Chlorobenzene	0.0100	0.00960		mg/L		96	80 - 120	8	10
1,1,1,2-Tetrachloroethane	0.0100	0.00917	*1	mg/L		92	79 - 120	11	10
Ethylbenzene	0.0100	0.00955		mg/L		96	80 - 120	8	14
m-Xylene & p-Xylene	0.0100	0.00983		mg/L		98	80 - 120	6	14
o-Xylene	0.0100	0.00967		mg/L		97	80 - 125	5	16
Styrene	0.0100	0.00955		mg/L		95	76 - 127	7	16
Bromoform	0.0100	0.00877		mg/L		88	28 - 139	14	15
Isopropylbenzene	0.0100	0.0101		mg/L		101	75 - 129	8	12
Bromobenzene	0.0100	0.00986		mg/L		99	80 - 120	4	13
1,1,2,2-Tetrachloroethane	0.0100	0.00967		mg/L		97	74 - 124	7	18
1,2,3-Trichloropropane	0.0100	0.0100		mg/L		100	76 - 124	6	16
N-Propylbenzene	0.0100	0.00986		mg/L		99	80 - 128	4	13
2-Chlorotoluene	0.0100	0.00973		mg/L		97	80 - 120	7	15
4-Chlorotoluene	0.0100	0.00985		mg/L		98	80 - 120	4	14
t-Butylbenzene	0.0100	0.0104		mg/L		104	80 - 129	3	14

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: LCSD 580-338300/7**  
**Matrix: Water**  
**Analysis Batch: 338300**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,4-Trimethylbenzene	0.0100	0.0105		mg/L		105	80 - 131	4	16
sec-Butylbenzene	0.0100	0.0106		mg/L		106	78 - 131	4	15
4-Isopropyltoluene	0.0100	0.0102		mg/L		102	77 - 131	3	20
1,3-Dichlorobenzene	0.0100	0.00965		mg/L		96	69 - 127	5	14
1,4-Dichlorobenzene	0.0100	0.00963		mg/L		96	80 - 120	5	17
n-Butylbenzene	0.0100	0.0101		mg/L		101	78 - 120	4	14
1,2-Dichlorobenzene	0.0100	0.00979		mg/L		98	80 - 120	3	15
1,2-Dibromo-3-Chloropropane	0.0100	0.0100		mg/L		100	65 - 125	13	17
1,2,4-Trichlorobenzene	0.0100	0.0104		mg/L		104	73 - 128	6	20
Hexachlorobutadiene	0.0100	0.0106		mg/L		106	74 - 125	2	22
Naphthalene	0.0100	0.0118	*1	mg/L		118	75 - 134	44	23
1,2,3-Trichlorobenzene	0.0100	0.0138	*1	mg/L		138	74 - 139	27	26
1,3,5-Trimethylbenzene	0.0100	0.0102		mg/L		102	80 - 131	3	14

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
Toluene-d8 (Surr)	100		80 - 120
1,2-Dichloroethane-d4 (Surr)	102		80 - 126
4-Bromofluorobenzene (Surr)	102		80 - 120
Dibromofluoromethane (Surr)	101		80 - 120

**Lab Sample ID: MB 580-338901/5**  
**Matrix: Water**  
**Analysis Batch: 338901**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2-Trichloroethane	ND		0.0010		mg/L			09/22/20 23:43	1
1,3-Dichloropropane	ND		0.0020		mg/L			09/22/20 23:43	1
1,2,4-Trimethylbenzene	ND		0.0030		mg/L			09/22/20 23:43	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		80 - 120		09/22/20 23:43	1
1,2-Dichloroethane-d4 (Surr)	99		80 - 126		09/22/20 23:43	1
4-Bromofluorobenzene (Surr)	100		80 - 120		09/22/20 23:43	1
Dibromofluoromethane (Surr)	115		80 - 120		09/22/20 23:43	1

**Lab Sample ID: LCS 580-338901/6**  
**Matrix: Water**  
**Analysis Batch: 338901**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,2-Trichloroethane	0.0100	0.00901		mg/L		90	80 - 121
1,3-Dichloropropane	0.0100	0.00906		mg/L		91	79 - 120
1,2,4-Trimethylbenzene	0.0100	0.0104		mg/L		104	80 - 131

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	102		80 - 120
1,2-Dichloroethane-d4 (Surr)	100		80 - 126
4-Bromofluorobenzene (Surr)	99		80 - 120

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: LCS 580-338901/6**  
**Matrix: Water**  
**Analysis Batch: 338901**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Dibromofluoromethane (Surr)	104		80 - 120

**Lab Sample ID: LCSD 580-338901/7**  
**Matrix: Water**  
**Analysis Batch: 338901**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,2-Trichloroethane	0.0100	0.0102		mg/L		102	80 - 121	13	14
1,3-Dichloropropane	0.0100	0.00886		mg/L		89	79 - 120	2	13
1,2,4-Trimethylbenzene	0.0100	0.0101		mg/L		101	80 - 131	2	16

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
Toluene-d8 (Surr)	97		80 - 120
1,2-Dichloroethane-d4 (Surr)	106		80 - 126
4-Bromofluorobenzene (Surr)	98		80 - 120
Dibromofluoromethane (Surr)	105		80 - 120

**Lab Sample ID: 580-97420-C-2 MS**  
**Matrix: Water**  
**Analysis Batch: 338901**

**Client Sample ID: Matrix Spike**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,2-Trichloroethane	ND	F1	0.0100	0.00615	F1	mg/L		61	80 - 121
1,3-Dichloropropane	ND	F1	0.0100	0.00557	F1	mg/L		56	79 - 120
1,2,4-Trimethylbenzene	ND	F1	0.0100	0.00481	F1	mg/L		48	80 - 131

Surrogate	MS %Recovery	MS Qualifier	Limits
Toluene-d8 (Surr)	104		80 - 120
1,2-Dichloroethane-d4 (Surr)	93		80 - 126
4-Bromofluorobenzene (Surr)	101		80 - 120
Dibromofluoromethane (Surr)	87		80 - 120

**Lab Sample ID: 580-97420-C-2 MSD**  
**Matrix: Water**  
**Analysis Batch: 338901**

**Client Sample ID: Matrix Spike Duplicate**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,2-Trichloroethane	ND	F1	0.0100	0.00545	F1	mg/L		55	80 - 121	12	14
1,3-Dichloropropane	ND	F1	0.0100	0.00487	F1	mg/L		49	79 - 120	13	13
1,2,4-Trimethylbenzene	ND	F1	0.0100	0.00441	F1	mg/L		44	80 - 131	9	16

Surrogate	MSD %Recovery	MSD Qualifier	Limits
Toluene-d8 (Surr)	103		80 - 120
1,2-Dichloroethane-d4 (Surr)	96		80 - 126
4-Bromofluorobenzene (Surr)	106		80 - 120
Dibromofluoromethane (Surr)	93		80 - 120

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC)

**Lab Sample ID: MB 580-338273/1-A**  
**Matrix: Water**  
**Analysis Batch: 338468**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 338273**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
RRO (nC25-nC36)	ND		0.25		mg/L		09/15/20 12:45	09/17/20 18:09	1
DRO (nC10-<nC25)	ND		0.11		mg/L		09/15/20 12:45	09/17/20 18:09	1
Surrogate	MB	MB	Limits			Prepared	Analyzed	Dil Fac	
	%Recovery	Qualifier							
<i>o</i> -Terphenyl	69		50 - 150			09/15/20 12:45	09/17/20 18:09	1	
<i>n</i> -Triacontane-d62	81		50 - 150			09/15/20 12:45	09/17/20 18:09	1	

**Lab Sample ID: MB 580-338273/1-B**  
**Matrix: Water**  
**Analysis Batch: 338468**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 338273**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
RRO (nC25-nC36)	ND		0.25		mg/L		09/15/20 12:45	09/17/20 16:28	1
DRO (nC10-<nC25)	ND		0.11		mg/L		09/15/20 12:45	09/17/20 16:28	1
Surrogate	MB	MB	Limits			Prepared	Analyzed	Dil Fac	
	%Recovery	Qualifier							
<i>o</i> -Terphenyl	67		50 - 150			09/15/20 12:45	09/17/20 16:28	1	
<i>n</i> -Triacontane-d62	80		50 - 150			09/15/20 12:45	09/17/20 16:28	1	

**Lab Sample ID: LCS 580-338273/2-A**  
**Matrix: Water**  
**Analysis Batch: 338468**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 338273**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
DRO (nC10-<nC25)	0.500	0.341	*	mg/L		68	75 - 125
Surrogate	LCS	LCS	Limits			%Rec	%Rec. Limits
	%Recovery	Qualifier					
<i>o</i> -Terphenyl	83		50 - 150				
<i>n</i> -Triacontane-d62	78		50 - 150				

**Lab Sample ID: LCS 580-338273/2-B**  
**Matrix: Water**  
**Analysis Batch: 338468**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 338273**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
DRO (nC10-<nC25)	0.500	0.354	*	mg/L		71	75 - 125
Surrogate	LCS	LCS	Limits			%Rec	%Rec. Limits
	%Recovery	Qualifier					
<i>o</i> -Terphenyl	83		50 - 150				
<i>n</i> -Triacontane-d62	83		50 - 150				

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC) (Continued)

**Lab Sample ID: LCSD 580-338273/3-A**  
**Matrix: Water**  
**Analysis Batch: 338468**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 338273**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
RRO (nC25-nC36)	0.500	0.485		mg/L		97	60 - 120	7	20
DRO (nC10-<nC25)	0.500	0.313	*	mg/L		63	75 - 125	9	20

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
<i>o</i> -Terphenyl	82		50 - 150
<i>n</i> -Triacontane-d62	84		50 - 150

**Lab Sample ID: LCSD 580-338273/3-B**  
**Matrix: Water**  
**Analysis Batch: 338468**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 338273**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
RRO (nC25-nC36)	0.500	0.488		mg/L		98	60 - 120	3	20
DRO (nC10-<nC25)	0.500	0.308	*	mg/L		62	75 - 125	14	20

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
<i>o</i> -Terphenyl	81		50 - 150
<i>n</i> -Triacontane-d62	87		50 - 150

**Lab Sample ID: MB 580-339227/1-A**  
**Matrix: Water**  
**Analysis Batch: 339300**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 339227**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
RRO (nC25-nC36)	ND		0.25		mg/L		09/26/20 10:36	09/27/20 18:02	1
DRO (nC10-<nC25)	ND		0.11		mg/L		09/26/20 10:36	09/27/20 18:02	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
<i>o</i> -Terphenyl	69		50 - 150	09/26/20 10:36	09/27/20 18:02	1
<i>n</i> -Triacontane-d62	73		50 - 150	09/26/20 10:36	09/27/20 18:02	1

**Lab Sample ID: MB 580-339227/1-B**  
**Matrix: Water**  
**Analysis Batch: 339385**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 339227**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
RRO (nC25-nC36)	ND		0.25		mg/L		09/26/20 10:36	09/28/20 16:28	1
DRO (nC10-<nC25)	ND		0.11		mg/L		09/26/20 10:36	09/28/20 16:28	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
<i>o</i> -Terphenyl	72		50 - 150	09/26/20 10:36	09/28/20 16:28	1
<i>n</i> -Triacontane-d62	82		50 - 150	09/26/20 10:36	09/28/20 16:28	1

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC) (Continued)

**Lab Sample ID: LCS 580-339227/2-A**  
**Matrix: Water**  
**Analysis Batch: 339300**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 339227**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
RRO (nC25-nC36)	0.500	0.422		mg/L		84	60 - 120
DRO (nC10-<nC25)	0.500	0.326	*	mg/L		65	75 - 125
<b>LCS LCS</b>							
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				
<i>o-Terphenyl</i>	86		50 - 150				
<i>n-Triacontane-d62</i>	80		50 - 150				

**Lab Sample ID: LCS 580-339227/2-B**  
**Matrix: Water**  
**Analysis Batch: 339385**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 339227**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
RRO (nC25-nC36)	0.500	0.441		mg/L		88	60 - 120
DRO (nC10-<nC25)	0.500	0.336	*	mg/L		67	75 - 125
<b>LCS LCS</b>							
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				
<i>o-Terphenyl</i>	82		50 - 150				
<i>n-Triacontane-d62</i>	90		50 - 150				

**Lab Sample ID: LCSD 580-339227/3-A**  
**Matrix: Water**  
**Analysis Batch: 339300**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 339227**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
RRO (nC25-nC36)	0.500	0.441		mg/L		88	60 - 120	4	20
DRO (nC10-<nC25)	0.500	0.337	*	mg/L		67	75 - 125	4	20
<b>LCSD LCSD</b>									
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>						
<i>o-Terphenyl</i>	96		50 - 150						
<i>n-Triacontane-d62</i>	89		50 - 150						

**Lab Sample ID: LCSD 580-339227/3-B**  
**Matrix: Water**  
**Analysis Batch: 339385**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 339227**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
RRO (nC25-nC36)	0.500	0.460		mg/L		92	60 - 120	4	20
DRO (nC10-<nC25)	0.500	0.352	*	mg/L		70	75 - 125	5	20
<b>LCSD LCSD</b>									
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>						
<i>o-Terphenyl</i>	86		50 - 150						
<i>n-Triacontane-d62</i>	92		50 - 150						

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Method: EPA 537(Mod) - PFAS for QSM 5.1, Table B-15

**Lab Sample ID: MB 320-412514/1-A**  
**Matrix: Water**  
**Analysis Batch: 412734**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 412514**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Perfluorooctanoic acid (PFOA)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluorodecanoic acid (PFDA)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluorononanoic acid (PFNA)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluoropentanesulfonic acid (PFPeS)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluorononanesulfonic acid (PFNS)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluorobutanoic acid (PFBA)	ND		5.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluorododecanoic acid (PFDoA)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluorohexanoic acid (PFHxA)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluoropentanoic acid (PFPeA)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		5.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		5.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
4:2 FTS	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
6:2 FTS	ND		5.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
8:2 FTS	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
Perfluorooctanesulfonamide (PFOSA)	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
9CI-PF3ONS	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
HFPO-DA (GenX)	ND		4.0		ng/L		09/15/20 18:44	09/16/20 12:59	1
11CI-PF3OUdS	ND		2.0		ng/L		09/15/20 18:44	09/16/20 12:59	1

Isotope Dilution	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
13C4 PFOA	83		50 - 150	09/15/20 18:44	09/16/20 12:59	1
13C4 PFOS	92		50 - 150	09/15/20 18:44	09/16/20 12:59	1
18O2 PFHxS	93		50 - 150	09/15/20 18:44	09/16/20 12:59	1
13C2 PFHxA	82		50 - 150	09/15/20 18:44	09/16/20 12:59	1
13C3 PFBS	89		50 - 150	09/15/20 18:44	09/16/20 12:59	1
13C8 FOSA	82		50 - 150	09/15/20 18:44	09/16/20 12:59	1
13C2 PFDoA	81		50 - 150	09/15/20 18:44	09/16/20 12:59	1
13C5 PFPeA	87		50 - 150	09/15/20 18:44	09/16/20 12:59	1
13C2 PFTeDA	78		50 - 150	09/15/20 18:44	09/16/20 12:59	1
13C5 PFNA	91		50 - 150	09/15/20 18:44	09/16/20 12:59	1
13C2 PFDA	87		50 - 150	09/15/20 18:44	09/16/20 12:59	1
13C2 PFUnA	87		50 - 150	09/15/20 18:44	09/16/20 12:59	1
13C4 PFHpA	90		50 - 150	09/15/20 18:44	09/16/20 12:59	1
13C4 PFBA	83		50 - 150	09/15/20 18:44	09/16/20 12:59	1
d5-NEtFOSAA	83		50 - 150	09/15/20 18:44	09/16/20 12:59	1

Eurofins TestAmerica, Seattle



# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Method: EPA 537(Mod) - PFAS for QSM 5.1, Table B-15 (Continued)

**Lab Sample ID: MB 320-412514/1-A**  
**Matrix: Water**  
**Analysis Batch: 412734**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 412514**

Isotope Dilution	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
d3-NMeFOSAA	81		50 - 150	09/15/20 18:44	09/16/20 12:59	1
M2-6:2 FTS	101		50 - 150	09/15/20 18:44	09/16/20 12:59	1
M2-4:2 FTS	108		50 - 150	09/15/20 18:44	09/16/20 12:59	1
13C3 HFPO-DA	82		50 - 150	09/15/20 18:44	09/16/20 12:59	1
M2-8:2 FTS	98		50 - 150	09/15/20 18:44	09/16/20 12:59	1

**Lab Sample ID: LCS 320-412514/2-A**  
**Matrix: Water**  
**Analysis Batch: 412734**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 412514**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorooctanoic acid (PFOA)	40.0	43.3		ng/L		108	70 - 130
Perfluorooctanesulfonic acid (PFOS)	37.1	38.8		ng/L		104	70 - 130
Perfluorohexanesulfonic acid (PFHxS)	36.4	34.7		ng/L		95	59 - 119
Perfluoroundecanoic acid (PFUnA)	40.0	38.4		ng/L		96	68 - 128
Perfluorodecanesulfonic acid (PFDS)	38.6	37.6		ng/L		98	71 - 131
Perfluorotetradecanoic acid (PFTeA)	40.0	37.9		ng/L		95	70 - 130
Perfluorodecanoic acid (PFDA)	40.0	36.9		ng/L		92	76 - 136
Perfluorotridecanoic acid (PFTriA)	40.0	41.7		ng/L		104	71 - 131
Perfluorononanoic acid (PFNA)	40.0	41.6		ng/L		104	75 - 135
Perfluoropentanesulfonic acid (PFPeS)	37.5	37.9		ng/L		101	66 - 126
Perfluoronanesulfonic acid (PFNS)	38.4	37.8		ng/L		98	75 - 135
Perfluoroheptanoic acid (PFHpA)	40.0	38.6		ng/L		97	72 - 132
Perfluorobutanoic acid (PFBA)	40.0	43.1		ng/L		108	76 - 136
Perfluorododecanoic acid (PFDoA)	40.0	39.1		ng/L		98	71 - 131
Perfluorohexanoic acid (PFHxA)	40.0	42.0		ng/L		105	73 - 133
Perfluoropentanoic acid (PFPeA)	40.0	39.5		ng/L		99	71 - 131
Perfluorobutanesulfonic acid (PFBS)	35.4	36.1		ng/L		102	67 - 127
Perfluoroheptanesulfonic Acid (PFHpS)	38.1	40.6		ng/L		107	76 - 136
N-ethylperfluorooctanesulfonamidoacetic acid (NETFOSAA)	40.0	40.4		ng/L		101	76 - 136
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	40.0	45.7		ng/L		114	76 - 136
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.7	39.8		ng/L		106	79 - 139
4:2 FTS	37.4	36.7		ng/L		98	79 - 139
6:2 FTS	37.9	39.8		ng/L		105	59 - 175
8:2 FTS	38.3	37.5		ng/L		98	75 - 135
Perfluorooctanesulfonamide (PFOSA)	40.0	40.9		ng/L		102	73 - 133
9CI-PF3ONS	37.3	36.3		ng/L		97	75 - 135
HFPO-DA (GenX)	40.0	40.6		ng/L		101	51 - 173

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Method: EPA 537(Mod) - PFAS for QSM 5.1, Table B-15 (Continued)

**Lab Sample ID: LCS 320-412514/2-A**  
**Matrix: Water**  
**Analysis Batch: 412734**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 412514**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
11CI-PF3OUdS	37.7	39.0		ng/L		103	54 - 114
<b>LCS LCS</b>							
<b>Isotope Dilution</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				
13C4 PFOA	83		50 - 150				
13C4 PFOS	89		50 - 150				
18O2 PFHxS	92		50 - 150				
13C2 PFHxA	80		50 - 150				
13C3 PFBS	88		50 - 150				
13C8 FOSA	83		50 - 150				
13C2 PFDoA	84		50 - 150				
13C5 PFPeA	83		50 - 150				
13C2 PFTeDA	79		50 - 150				
13C5 PFNA	86		50 - 150				
13C2 PFDA	90		50 - 150				
13C2 PFUnA	84		50 - 150				
13C4 PFHpA	88		50 - 150				
13C4 PFBA	81		50 - 150				
d5-NEtFOSAA	79		50 - 150				
d3-NMeFOSAA	76		50 - 150				
M2-6:2 FTS	99		50 - 150				
M2-4:2 FTS	98		50 - 150				
13C3 HFPO-DA	79		50 - 150				
M2-8:2 FTS	94		50 - 150				

**Lab Sample ID: LCSD 320-412514/3-A**  
**Matrix: Water**  
**Analysis Batch: 412734**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 412514**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanoic acid (PFOA)	40.0	38.1		ng/L		95	70 - 130	13	30
Perfluorooctanesulfonic acid (PFOS)	37.1	35.2		ng/L		95	70 - 130	10	30
Perfluorohexanesulfonic acid (PFHxS)	36.4	30.8		ng/L		85	59 - 119	12	30
Perfluoroundecanoic acid (PFUnA)	40.0	40.5		ng/L		101	68 - 128	5	30
Perfluorodecanesulfonic acid (PFDS)	38.6	34.4		ng/L		89	71 - 131	9	30
Perfluorotetradecanoic acid (PFTeA)	40.0	32.8		ng/L		82	70 - 130	14	30
Perfluorodecanoic acid (PFDA)	40.0	39.0		ng/L		97	76 - 136	6	30
Perfluorotridecanoic acid (PFTriA)	40.0	37.2		ng/L		93	71 - 131	11	30
Perfluorononanoic acid (PFNA)	40.0	36.8		ng/L		92	75 - 135	12	30
Perfluoropentanesulfonic acid (PFPeS)	37.5	37.0		ng/L		99	66 - 126	2	30
Perfluorononanesulfonic acid (PFNS)	38.4	36.1		ng/L		94	75 - 135	5	30
Perfluoroheptanoic acid (PFHpA)	40.0	38.7		ng/L		97	72 - 132	0	30
Perfluorobutanoic acid (PFBA)	40.0	39.3		ng/L		98	76 - 136	9	30

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Method: EPA 537(Mod) - PFAS for QSM 5.1, Table B-15 (Continued)

**Lab Sample ID: LCSD 320-412514/3-A**  
**Matrix: Water**  
**Analysis Batch: 412734**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 412514**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorododecanoic acid (PFDoA)	40.0	37.9		ng/L		95	71 - 131	3	30
Perfluorohexanoic acid (PFHxA)	40.0	38.7		ng/L		97	73 - 133	8	30
Perfluoropentanoic acid (PFPeA)	40.0	35.9		ng/L		90	71 - 131	10	30
Perfluorobutanesulfonic acid (PFBS)	35.4	35.5		ng/L		101	67 - 127	1	30
Perfluoroheptanesulfonic Acid (PFHpS)	38.1	36.9		ng/L		97	76 - 136	10	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	40.0	35.9		ng/L		90	76 - 136	12	30
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	40.0	39.1		ng/L		98	76 - 136	16	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.7	37.0		ng/L		98	79 - 139	7	30
4:2 FTS	37.4	32.4		ng/L		87	79 - 139	12	30
6:2 FTS	37.9	33.6		ng/L		89	59 - 175	17	30
8:2 FTS	38.3	34.6		ng/L		90	75 - 135	8	30
Perfluorooctanesulfonamide (PFOSA)	40.0	39.5		ng/L		99	73 - 133	4	30
9CI-PF3ONS	37.3	35.4		ng/L		95	75 - 135	2	30
HFPO-DA (GenX)	40.0	37.7		ng/L		94	51 - 173	7	30
11CI-PF3OUdS	37.7	38.0		ng/L		101	54 - 114	3	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	LCSD Limits
13C4 PFOA	89		50 - 150
13C4 PFOS	93		50 - 150
18O2 PFHxS	98		50 - 150
13C2 PFHxA	87		50 - 150
13C3 PFBS	90		50 - 150
13C8 FOSA	89		50 - 150
13C2 PFDoA	87		50 - 150
13C5 PFPeA	89		50 - 150
13C2 PFTeDA	80		50 - 150
13C5 PFNA	97		50 - 150
13C2 PFDA	93		50 - 150
13C2 PFUnA	88		50 - 150
13C4 PFHpA	89		50 - 150
13C4 PFBA	86		50 - 150
d5-NEtFOSAA	86		50 - 150
d3-NMeFOSAA	87		50 - 150
M2-6:2 FTS	104		50 - 150
M2-4:2 FTS	115		50 - 150
13C3 HFPO-DA	81		50 - 150
M2-8:2 FTS	106		50 - 150

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Method: 6010D - Metals (ICP)

**Lab Sample ID: MB 580-338145/22-A**  
**Matrix: Water**  
**Analysis Batch: 338245**

**Client Sample ID: Method Blank**  
**Prep Type: Total Recoverable**  
**Prep Batch: 338145**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		2.5		mg/L		09/14/20 09:48	09/14/20 19:13	1
Iron	ND		0.50		mg/L		09/14/20 09:48	09/14/20 19:13	1
Magnesium	ND		1.1		mg/L		09/14/20 09:48	09/14/20 19:13	1
Manganese	ND		0.020		mg/L		09/14/20 09:48	09/14/20 19:13	1
Potassium	ND		3.3		mg/L		09/14/20 09:48	09/14/20 19:13	1
Sodium	ND		2.0		mg/L		09/14/20 09:48	09/14/20 19:13	1
Strontium	ND		0.10		mg/L		09/14/20 09:48	09/14/20 19:13	1
Antimony	ND		0.060		mg/L		09/14/20 09:48	09/14/20 19:13	1
Beryllium	ND		0.020		mg/L		09/14/20 09:48	09/14/20 19:13	1
Thallium	ND		0.10		mg/L		09/14/20 09:48	09/14/20 19:13	1
Nickel	ND		0.020		mg/L		09/14/20 09:48	09/14/20 19:13	1
Copper	ND		0.060		mg/L		09/14/20 09:48	09/14/20 19:13	1
Aluminum	ND		1.5		mg/L		09/14/20 09:48	09/14/20 19:13	1
Zinc	ND		0.040		mg/L		09/14/20 09:48	09/14/20 19:13	1
Selenium	ND		0.10		mg/L		09/14/20 09:48	09/14/20 19:13	1

**Lab Sample ID: 580-97430-E-1-B DU ^10**  
**Matrix: Water**  
**Analysis Batch: 338245**

**Client Sample ID: Duplicate**  
**Prep Type: Total Recoverable**  
**Prep Batch: 338145**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Boron	ND		ND		mg/L		NC	20
Iron	ND		ND		mg/L		NC	20
Magnesium	ND		ND		mg/L		NC	20
Manganese	ND		ND		mg/L		NC	20
Potassium	ND		ND		mg/L		NC	20
Sodium	ND		ND		mg/L		NC	20
Strontium	ND		ND		mg/L		NC	20
Antimony	ND		ND		mg/L		NC	20
Beryllium	ND		ND		mg/L		NC	20
Thallium	ND		ND		mg/L		NC	20
Nickel	ND		ND		mg/L		NC	20
Copper	ND		ND		mg/L		NC	20
Aluminum	ND		ND		mg/L		NC	20
Zinc	ND		ND		mg/L		NC	20
Selenium	ND		ND		mg/L		NC	20

## Method: 1664A - HEM and SGT-HEM

**Lab Sample ID: MB 580-338783/1-A**  
**Matrix: Water**  
**Analysis Batch: 338829**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 338783**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HEM (Oil & Grease)	ND		5.6		mg/L		09/22/20 10:15	09/22/20 13:59	1
SGT-HEM	ND		5.6		mg/L		09/22/20 10:15	09/22/20 13:59	1
HEM Polar (Oil and Grease - Polar)	ND		5.6		mg/L		09/22/20 10:15	09/22/20 13:59	1

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Method: 1664A - HEM and SGT-HEM (Continued)

**Lab Sample ID: LCS 580-338783/2-A**  
**Matrix: Water**  
**Analysis Batch: 338829**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 338783**  
**%Rec.**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
HEM (Oil & Grease)	45.1	40.6		mg/L		90	78 - 114
SGT-HEM	22.6	14.9		mg/L		66	64 - 132

**Lab Sample ID: LCSD 580-338783/3-A**  
**Matrix: Water**  
**Analysis Batch: 338829**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 338783**  
**%Rec.**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
HEM (Oil & Grease)	44.0	40.7		mg/L		93	78 - 114	0	18
SGT-HEM	22.0	14.2		mg/L		65	64 - 132	5	34

## Method: 300.0 - Anions, Ion Chromatography

**Lab Sample ID: MB 580-338346/8**  
**Matrix: Water**  
**Analysis Batch: 338346**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		0.90		mg/L			09/15/20 14:53	1
Bromide	ND		1.0		mg/L			09/15/20 14:53	1
Sulfate	ND		1.2		mg/L			09/15/20 14:53	1
Fluoride	ND		0.20		mg/L			09/15/20 14:53	1

**Lab Sample ID: LCS 580-338346/9**  
**Matrix: Water**  
**Analysis Batch: 338346**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**%Rec.**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Chloride	50.0	51.5		mg/L		103	90 - 110
Bromide	10.0	9.62		mg/L		96	90 - 110
Sulfate	50.0	51.0		mg/L		102	90 - 110
Fluoride	5.00	4.79		mg/L		96	90 - 110

**Lab Sample ID: LCSD 580-338346/10**  
**Matrix: Water**  
**Analysis Batch: 338346**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**%Rec.**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Chloride	50.0	51.5		mg/L		103	90 - 110	0	15
Bromide	10.0	9.62		mg/L		96	90 - 110	0	15
Sulfate	50.0	51.2		mg/L		102	90 - 110	0	15
Fluoride	5.00	4.82		mg/L		96	90 - 110	0	15

**Lab Sample ID: 580-97427-O-1 MS**  
**Matrix: Water**  
**Analysis Batch: 338346**

**Client Sample ID: Matrix Spike**  
**Prep Type: Total/NA**  
**%Rec.**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Chloride	11	F1	50.0	67.2	F1	mg/L		111	90 - 110
Bromide	ND		10.0	10.3		mg/L		103	90 - 110

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Method: 300.0 - Anions, Ion Chromatography (Continued)

**Lab Sample ID: 580-97427-O-1 MS**  
**Matrix: Water**  
**Analysis Batch: 338346**

**Client Sample ID: Matrix Spike**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	ND		50.0	55.4		mg/L		109	90 - 110
Fluoride	1.2	F1	5.00	4.94	F1	mg/L		74	90 - 110

**Lab Sample ID: 580-97427-O-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 338346**

**Client Sample ID: Matrix Spike Duplicate**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	11	F1	50.0	67.2	F1	mg/L		111	90 - 110	0	15
Bromide	ND		10.0	10.3		mg/L		103	90 - 110	0	15
Sulfate	ND		50.0	55.0		mg/L		109	90 - 110	1	15
Fluoride	1.2	F1	5.00	4.98	F1	mg/L		75	90 - 110	1	15

**Lab Sample ID: MB 580-338348/8**  
**Matrix: Water**  
**Analysis Batch: 338348**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrite as N	ND		0.40		mg/L			09/15/20 14:53	1
Nitrate as N	ND		0.20		mg/L			09/15/20 14:53	1

**Lab Sample ID: LCS 580-338348/9**  
**Matrix: Water**  
**Analysis Batch: 338348**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrite as N	5.00	4.98		mg/L		100	90 - 110
Nitrate as N	5.00	4.87		mg/L		97	90 - 110

**Lab Sample ID: LCSD 580-338348/10**  
**Matrix: Water**  
**Analysis Batch: 338348**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrite as N	5.00	4.99		mg/L		100	90 - 110	0	15
Nitrate as N	5.00	4.84		mg/L		97	90 - 110	0	15

**Lab Sample ID: 580-97427-O-1 MS**  
**Matrix: Water**  
**Analysis Batch: 338348**

**Client Sample ID: Matrix Spike**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrite as N	ND		5.00	5.31		mg/L		106	90 - 110
Nitrate as N	ND		5.00	5.28		mg/L		104	90 - 110

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 580-97427-O-1 MSD  
 Matrix: Water  
 Analysis Batch: 338348

Client Sample ID: Matrix Spike Duplicate  
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrite as N	ND		5.00	5.32		mg/L		106	90 - 110	0	15
Nitrate as N	ND		5.00	5.28		mg/L		104	90 - 110	0	15

## Method: 335.4 - Cyanide, Total

Lab Sample ID: MB 580-338599/1-A  
 Matrix: Water  
 Analysis Batch: 338603

Client Sample ID: Method Blank  
 Prep Type: Total/NA  
 Prep Batch: 338599

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	ND		0.060		mg/L		09/18/20 13:52	09/18/20 14:57	1

Lab Sample ID: LCS 580-338599/2-A  
 Matrix: Water  
 Analysis Batch: 338603

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA  
 Prep Batch: 338599

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	0.500	0.494		mg/L		99	90 - 110

Lab Sample ID: LCSD 580-338599/3-A  
 Matrix: Water  
 Analysis Batch: 338603

Client Sample ID: Lab Control Sample Dup  
 Prep Type: Total/NA  
 Prep Batch: 338599

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cyanide, Total	0.500	0.477		mg/L		95	90 - 110	4	10

Lab Sample ID: 580-97427-J-1-B MS  
 Matrix: Water  
 Analysis Batch: 338603

Client Sample ID: Matrix Spike  
 Prep Type: Total/NA  
 Prep Batch: 338599

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	ND		0.500	0.493		mg/L		99	90 - 110

Lab Sample ID: 580-97427-J-1-C MSD  
 Matrix: Water  
 Analysis Batch: 338603

Client Sample ID: Matrix Spike Duplicate  
 Prep Type: Total/NA  
 Prep Batch: 338599

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cyanide, Total	ND		0.500	0.489		mg/L		98	90 - 110	1	10

## Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 580-339180/12  
 Matrix: Water  
 Analysis Batch: 339180

Client Sample ID: Method Blank  
 Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	ND		0.15		mg/L			09/25/20 14:29	1

Eurolins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Method: 353.2 - Nitrogen, Nitrate-Nitrite (Continued)

Lab Sample ID: 580-97396-C-1 DU  
 Matrix: Water  
 Analysis Batch: 339180

Client Sample ID: Duplicate  
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Nitrate as N	1.4		1.40		mg/L		0.07	20

## Method: 5910B - Organic Constituents, UV Absorbing

Lab Sample ID: MB 680-634418/2  
 Matrix: Water  
 Analysis Batch: 634418

Client Sample ID: Method Blank  
 Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
UV254	ND		0.0090		1/cm			09/15/20 18:07	1

Lab Sample ID: LCS 680-634418/3  
 Matrix: Water  
 Analysis Batch: 634418

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
UV254	0.144	0.158		1/cm		110	80 - 120

## Method: 9034 - Sulfide, Acid soluble and Insoluble (Titrimetric)

Lab Sample ID: MB 280-509269/2-A  
 Matrix: Water  
 Analysis Batch: 509277

Client Sample ID: Method Blank  
 Prep Type: Total/NA  
 Prep Batch: 509269

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	ND		4.0		mg/L		09/16/20 12:00	09/16/20 12:56	1

Lab Sample ID: LCS 280-509269/1-A  
 Matrix: Water  
 Analysis Batch: 509277

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA  
 Prep Batch: 509269

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfide	19.2	14.4		mg/L		75	44 - 110

Lab Sample ID: 280-140438-F-3-B MS  
 Matrix: Water  
 Analysis Batch: 509277

Client Sample ID: Matrix Spike  
 Prep Type: Total/NA  
 Prep Batch: 509269

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfide	ND		19.2	13.6		mg/L		67	44 - 110

Lab Sample ID: 280-140438-F-3-C MSD  
 Matrix: Water  
 Analysis Batch: 509277

Client Sample ID: Matrix Spike Duplicate  
 Prep Type: Total/NA  
 Prep Batch: 509269

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Sulfide	ND		19.2	14.4		mg/L		71	44 - 110	6	20

Eurofins TestAmerica, Seattle



# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Method: SM 2150B - Odor

Lab Sample ID: MB 440-624925/1  
 Matrix: Water  
 Analysis Batch: 624925

Client Sample ID: Method Blank  
 Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Odor	ND		1.0		T.O.N.			09/18/20 10:50	1

## Method: SM 2320B - Alkalinity

Lab Sample ID: LCS 580-338232/2  
 Matrix: Water  
 Analysis Batch: 338232

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity as CaCO3	100	96.6		mg/L		97	85 - 115

Lab Sample ID: 580-97394-F-1 DU  
 Matrix: Water  
 Analysis Batch: 338232

Client Sample ID: Duplicate  
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Alkalinity as CaCO3	160		153		mg/L		2	17
Bicarbonate Alkalinity as CaCO3	160		153		mg/L		2	20
Carbonate Alkalinity as CaCO3	ND		ND		mg/L		NC	20
Hydroxide Alkalinity as CaCO3	ND		ND		mg/L		NC	20

## Method: SM 2340C - Hardness, Total (mg/l as CaCO3)

Lab Sample ID: MB 580-338341/1  
 Matrix: Water  
 Analysis Batch: 338341

Client Sample ID: Method Blank  
 Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	ND		2.0		mg/L			09/15/20 18:24	1

Lab Sample ID: LCS 580-338341/2  
 Matrix: Water  
 Analysis Batch: 338341

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hardness as calcium carbonate	1000	980		mg/L		98	90 - 110

Lab Sample ID: 580-97230-E-1 DU  
 Matrix: Water  
 Analysis Batch: 338341

Client Sample ID: Duplicate  
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Hardness as calcium carbonate	63		63.0		mg/L		0.6	20

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Method: SM 3500 FE D - Iron, Ferrous and Ferric

**Lab Sample ID: MB 280-509469/11**  
**Matrix: Water**  
**Analysis Batch: 509469**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ferrous Iron	ND		0.20		mg/L			09/17/20 13:15	1

**Lab Sample ID: LCS 280-509469/9**  
**Matrix: Water**  
**Analysis Batch: 509469**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ferrous Iron	2.00	1.94		mg/L		97	85 - 121

**Lab Sample ID: LCSD 280-509469/10**  
**Matrix: Water**  
**Analysis Batch: 509469**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ferrous Iron	2.00	1.96		mg/L		98	85 - 121	1	10

**Lab Sample ID: 280-140509-C-11 MS**  
**Matrix: Water**  
**Analysis Batch: 509469**

**Client Sample ID: Matrix Spike**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Ferrous Iron	0.28	F1 F2	2.00	1.67	F1	mg/L		69	85 - 121

**Lab Sample ID: 280-140509-C-11 MSD**  
**Matrix: Water**  
**Analysis Batch: 509469**

**Client Sample ID: Matrix Spike Duplicate**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ferrous Iron	0.28	F1 F2	2.00	1.40	F1 F2	mg/L		56	85 - 121	17	10

## Method: SM 4500 NH3 G - Ammonia

**Lab Sample ID: MB 580-338513/1**  
**Matrix: Water**  
**Analysis Batch: 338513**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia as N	ND		0.50		mg/L			09/17/20 14:22	1

**Lab Sample ID: LCS 580-338513/2**  
**Matrix: Water**  
**Analysis Batch: 338513**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia as N	2.00	1.86		mg/L		93	90 - 110

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Method: SM 4500 NH3 G - Ammonia (Continued)

**Lab Sample ID: 580-97238-F-1 MS**  
**Matrix: Water**  
**Analysis Batch: 338513**

**Client Sample ID: Matrix Spike**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia as N	0.71		2.00	2.70		mg/L		99	90 - 110

**Lab Sample ID: 580-97238-F-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 338513**

**Client Sample ID: Matrix Spike Duplicate**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ammonia as N	0.71		2.00	2.68		mg/L		99	90 - 110	1	20

**Lab Sample ID: 580-97238-F-1 DU**  
**Matrix: Water**  
**Analysis Batch: 338513**

**Client Sample ID: Duplicate**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Ammonia as N	0.71		0.677		mg/L		5	20

## Method: SM 5220D - COD

**Lab Sample ID: MB 580-338621/3-A**  
**Matrix: Water**  
**Analysis Batch: 338643**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 338621**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	ND		10		mg/L		09/19/20 11:22	09/19/20 16:31	1

**Lab Sample ID: LCS 580-338621/4-A**  
**Matrix: Water**  
**Analysis Batch: 338643**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 338621**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chemical Oxygen Demand	75.0	76.9		mg/L		103	80 - 120

**Lab Sample ID: LCSD 580-338621/5-A**  
**Matrix: Water**  
**Analysis Batch: 338643**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 338621**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chemical Oxygen Demand	75.0	78.6		mg/L		105	80 - 120	2	20

**Lab Sample ID: 580-97392-A-2-E MS**  
**Matrix: Water**  
**Analysis Batch: 338643**

**Client Sample ID: Matrix Spike**  
**Prep Type: Total/NA**  
**Prep Batch: 338621**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chemical Oxygen Demand	40		25.0	69.2		mg/L		118	75 - 125

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Method: SM 5220D - COD (Continued)

**Lab Sample ID: 580-97392-A-2-D DU**  
**Matrix: Water**  
**Analysis Batch: 338643**

**Client Sample ID: Duplicate**  
**Prep Type: Total/NA**  
**Prep Batch: 338621**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Chemical Oxygen Demand	40		39.0		mg/L		2	20

## Method: SM 5310B - Organic Carbon, Total (TOC)

**Lab Sample ID: MB 580-338832/4**  
**Matrix: Water**  
**Analysis Batch: 338832**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	ND		1.5		mg/L			09/21/20 18:32	1

**Lab Sample ID: LCS 580-338832/5**  
**Matrix: Water**  
**Analysis Batch: 338832**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	10.0	9.89		mg/L		99	85 - 115

**Lab Sample ID: LCSD 580-338832/6**  
**Matrix: Water**  
**Analysis Batch: 338832**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon	10.0	9.89		mg/L		99	85 - 115	0	20

**Lab Sample ID: 580-97430-K-1 MS**  
**Matrix: Water**  
**Analysis Batch: 338832**

**Client Sample ID: Matrix Spike**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	7.6		10.0	17.2		mg/L		96	85 - 115

**Lab Sample ID: 580-97430-K-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 338832**

**Client Sample ID: Matrix Spike Duplicate**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon	7.6		10.0	17.2		mg/L		97	85 - 115	0	20

**Lab Sample ID: 580-97430-K-1 DU**  
**Matrix: Water**  
**Analysis Batch: 338832**

**Client Sample ID: Duplicate**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Organic Carbon	7.6		7.23		mg/L		5	20

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Method: SM 5310B - Organic Carbon, Dissolved (DOC)

**Lab Sample ID: MB 580-338596/1-A**  
**Matrix: Water**  
**Analysis Batch: 338695**

**Client Sample ID: Method Blank**  
**Prep Type: Dissolved**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Organic Carbon	ND		1.5		mg/L			09/19/20 17:49	1

**Lab Sample ID: LCS 580-338596/2-A**  
**Matrix: Water**  
**Analysis Batch: 338695**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Dissolved**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Dissolved Organic Carbon	10.0	10.1		mg/L		101	85 - 115

**Lab Sample ID: LCSD 580-338596/3-A**  
**Matrix: Water**  
**Analysis Batch: 338695**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Dissolved**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dissolved Organic Carbon	10.0	10.1		mg/L		101	85 - 115	0	20

**Lab Sample ID: 580-97430-L-1-A MS**  
**Matrix: Water**  
**Analysis Batch: 338695**

**Client Sample ID: Matrix Spike**  
**Prep Type: Dissolved**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Dissolved Organic Carbon	7.9		10.0	17.0		mg/L		91	85 - 115

**Lab Sample ID: 580-97430-L-1-A MSD**  
**Matrix: Water**  
**Analysis Batch: 338695**

**Client Sample ID: Matrix Spike Duplicate**  
**Prep Type: Dissolved**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dissolved Organic Carbon	7.9		10.0	17.2		mg/L		93	85 - 115	1	20

**Lab Sample ID: 580-97430-L-1-A DU**  
**Matrix: Water**  
**Analysis Batch: 338695**

**Client Sample ID: Duplicate**  
**Prep Type: Dissolved**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Dissolved Organic Carbon	7.9		7.91		mg/L		0.5	20

## Method: SM 5540C - Methylene Blue Active Substances (MBAS)

**Lab Sample ID: MB 440-624499/4**  
**Matrix: Water**  
**Analysis Batch: 624499**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methylene Blue Active Substances	ND		0.10		mg/L			09/15/20 15:29	1

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Method: SM 5540C - Methylene Blue Active Substances (MBAS) (Continued)

**Lab Sample ID: LCS 440-624499/5**  
**Matrix: Water**  
**Analysis Batch: 624499**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Methylene Blue Active Substances	0.250	0.253		mg/L		101	90 - 110

**Lab Sample ID: LCSD 440-624499/6**  
**Matrix: Water**  
**Analysis Batch: 624499**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methylene Blue Active Substances	0.250	0.259		mg/L		104	90 - 110	2	20

**Lab Sample ID: MRL 440-624499/3**  
**Matrix: Water**  
**Analysis Batch: 624499**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Methylene Blue Active Substances	0.100	0.121		mg/L		121	50 - 150

**Lab Sample ID: 580-97431-1 MS**  
**Matrix: Water**  
**Analysis Batch: 624499**

**Client Sample ID: AF71986**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Methylene Blue Active Substances	ND	H H3	0.250	0.283		mg/L		113	50 - 125

**Lab Sample ID: 580-97431-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 624499**

**Client Sample ID: AF71986**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methylene Blue Active Substances	ND	H H3	0.250	0.242		mg/L		97	50 - 125	15	20

## Method: SM4500\_P\_F - Phosphorus, Total

**Lab Sample ID: MB 580-338789/1-A**  
**Matrix: Water**  
**Analysis Batch: 338792**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 338789**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Phosphorus as P	ND		0.25		mg/L		09/22/20 10:55	09/22/20 10:59	1

**Lab Sample ID: LCS 580-338789/2-A**  
**Matrix: Water**  
**Analysis Batch: 338792**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 338789**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Phosphorus as P	2.00	1.98		mg/L		99	90 - 110

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Method: SM4500\_P\_F - Phosphorus, Total (Continued)

**Lab Sample ID: 580-97335-C-1-C MS**  
**Matrix: Water**  
**Analysis Batch: 338792**

**Client Sample ID: Matrix Spike**  
**Prep Type: Total/NA**  
**Prep Batch: 338789**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Total Phosphorus as P	ND		2.00	2.03		mg/L		92	80 - 120

**Lab Sample ID: 580-97335-C-1-D MSD**  
**Matrix: Water**  
**Analysis Batch: 338792**

**Client Sample ID: Matrix Spike Duplicate**  
**Prep Type: Total/NA**  
**Prep Batch: 338789**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Total Phosphorus as P	ND		2.00	2.03		mg/L		92	80 - 120	0	20

**Lab Sample ID: 580-97335-C-1-B DU**  
**Matrix: Water**  
**Analysis Batch: 338792**

**Client Sample ID: Duplicate**  
**Prep Type: Total/NA**  
**Prep Batch: 338789**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Total Phosphorus as P	ND		ND		mg/L		NC	20

# Lab Chronicle

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

**Client Sample ID: AF71986**

**Lab Sample ID: 580-97431-1**

**Date Collected: 09/09/20 15:00**

**Matrix: Water**

**Date Received: 09/12/20 11:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	338300	09/16/20 00:03	T1W	TAL SEA
Total/NA	Analysis	8260D	DL	100	338901	09/23/20 07:12	JSM	TAL SEA
Total/NA	Prep	3510C			338273	09/15/20 12:45	T1L	TAL SEA
Total/NA	Cleanup	3630C			338340	09/15/20 18:19	T1L	TAL SEA
Total/NA	Analysis	AK102 & 103		1	338468	09/17/20 17:49	JKM	TAL SEA
Total/NA	Prep	3510C			338273	09/15/20 12:45	T1L	TAL SEA
Total/NA	Analysis	AK102 & 103		1	338468	09/17/20 20:30	JKM	TAL SEA
Total/NA	Prep	3510C	RE		339227	09/26/20 16:22	RJL	TAL SEA
Total/NA	Analysis	AK102 & 103	RE	1	339300	09/27/20 23:24	T1W	TAL SEA
Total/NA	Prep	3510C			339227	09/26/20 16:22	RJL	TAL SEA
Total/NA	Cleanup	3630C			339274	09/26/20 18:54	RJL	TAL SEA
Total/NA	Analysis	AK102 & 103		1	339385	09/28/20 17:50	ADB	TAL SEA
Total/NA	Prep	3535			412514	09/15/20 18:44	VP	TAL SAC
Total/NA	Analysis	EPA 537(Mod)		1	412734	09/16/20 13:27	D1R	TAL SAC
Total Recoverable	Prep	3005A			338145	09/14/20 09:48	ART	TAL SEA
Total Recoverable	Analysis	6010D		1	338245	09/14/20 20:06	TMH	TAL SEA
Total/NA	Prep	1664A			338783	09/22/20 10:15	FCG	TAL SEA
Total/NA	Analysis	1664A		1	338829	09/22/20 13:59	FCG	TAL SEA
Total/NA	Analysis	300.0		1	338346	09/15/20 14:42	AAC	TAL SEA
Total/NA	Analysis	300.0		1	338348	09/15/20 14:42	AAC	TAL SEA
Total/NA	Prep	Distill/CN			338599	09/18/20 13:52	R1K	TAL SEA
Total/NA	Analysis	335.4		1	338603	09/18/20 15:13	R1K	TAL SEA
Total/NA	Analysis	353.2		1	339180	09/25/20 14:51	R1K	TAL SEA
Total/NA	Analysis	5910B		1	634418	09/15/20 18:07	JLD	TAL SAV
Total/NA	Prep	9030B			509269	09/16/20 12:00	SAH	TAL DEN
Total/NA	Analysis	9034		1	509277	09/16/20 12:56	SAH	TAL DEN
Total/NA	Analysis	SM 2150B		1	624925	09/18/20 10:50	ST	TAL IRV
Total/NA	Analysis	SM 2320B		1	338232	09/15/20 09:07	AAC	TAL SEA
Total/NA	Analysis	SM 2340C		1	338341	09/15/20 18:24	MLT	TAL SEA
Total/NA	Analysis	SM 3500 FE D		1	509469	09/17/20 13:21	BWH	TAL DEN
Total/NA	Analysis	SM 4500 NH3 G		1	338513	09/17/20 14:22	AAC	TAL SEA
Total/NA	Prep	SM 5220			338621	09/19/20 11:23	MLT	TAL SEA
Total/NA	Analysis	SM 5220D		1	338643	09/19/20 16:31	MLT	TAL SEA
Dissolved	Filtration	FILTRATION			338596	09/18/20 13:49	HCC	TAL SEA
Dissolved	Analysis	SM 5310B		1	338695	09/19/20 19:57	R1K	TAL SEA
Total/NA	Analysis	SM 5310B		1	338832	09/21/20 20:23	RBL	TAL SEA
Total/NA	Analysis	SM 5540C		1	624499	09/15/20 15:29	KMY	TAL IRV
Total/NA	Prep	SM 4500 P B			338789	09/22/20 10:55	AAC	TAL SEA
Total/NA	Analysis	SM4500_P_F		1	338792	09/22/20 10:59	AAC	TAL SEA



# Lab Chronicle

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

**Client Sample ID: AF71987**

**Lab Sample ID: 580-97431-2**

**Date Collected: 09/09/20 16:52**

**Matrix: Water**

**Date Received: 09/12/20 11:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			412514	09/15/20 18:44	VP	TAL SAC
Total/NA	Analysis	EPA 537(Mod)		1	412734	09/16/20 13:37	D1R	TAL SAC

**Client Sample ID: AF71988-Trip blank**

**Lab Sample ID: 580-97431-3**

**Date Collected: 09/09/20 00:01**

**Matrix: Water**

**Date Received: 09/12/20 11:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	338300	09/15/20 18:15	T1W	TAL SEA

**Laboratory References:**

- TAL DEN = Eurofins TestAmerica, Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100
- TAL IRV = Eurofins Calscience Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022
- TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600
- TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858
- TAL SEA = Eurofins TestAmerica, Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310



# Accreditation/Certification Summary

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Laboratory: Eurofins TestAmerica, Seattle

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-024	01-14-22

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
1664A	1664A	Water	HEM (Oil & Grease)
1664A	1664A	Water	HEM Polar (Oil and Grease - Polar)
1664A	1664A	Water	SGT-HEM
300.0		Water	Bromide
300.0		Water	Chloride
300.0		Water	Fluoride
300.0		Water	Nitrate as N
300.0		Water	Nitrite as N
300.0		Water	Sulfate
335.4	Distill/CN	Water	Cyanide, Total
353.2		Water	Nitrate as N
6010D	3005A	Water	Aluminum
6010D	3005A	Water	Boron
6010D	3005A	Water	Iron
6010D	3005A	Water	Magnesium
6010D	3005A	Water	Potassium
6010D	3005A	Water	Sodium
6010D	3005A	Water	Strontium
8260D		Water	1,1,1,2-Tetrachloroethane
8260D		Water	1,1,1-Trichloroethane
8260D		Water	1,1,2,2-Tetrachloroethane
8260D		Water	1,1,2-Trichloroethane
8260D		Water	1,1-Dichloroethane
8260D		Water	1,1-Dichloroethene
8260D		Water	1,1-Dichloropropene
8260D		Water	1,2,3-Trichlorobenzene
8260D		Water	1,2,3-Trichloropropane
8260D		Water	1,2,4-Trichlorobenzene
8260D		Water	1,2,4-Trimethylbenzene
8260D		Water	1,2-Dibromo-3-Chloropropane
8260D		Water	1,2-Dibromoethane
8260D		Water	1,2-Dichlorobenzene
8260D		Water	1,2-Dichloroethane
8260D		Water	1,2-Dichloropropane
8260D		Water	1,3,5-Trimethylbenzene
8260D		Water	1,3-Dichlorobenzene
8260D		Water	1,3-Dichloropropane
8260D		Water	1,4-Dichlorobenzene
8260D		Water	2,2-Dichloropropane
8260D		Water	2-Butanone (MEK)
8260D		Water	2-Chlorotoluene
8260D		Water	4-Chlorotoluene
8260D		Water	4-Isopropyltoluene
8260D		Water	Benzene
8260D		Water	Bromobenzene

# Accreditation/Certification Summary

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Laboratory: Eurofins TestAmerica, Seattle (Continued)

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-024	01-14-22
8260D	Water	Bromochloromethane	
8260D	Water	Bromodichloromethane	
8260D	Water	Bromoform	
8260D	Water	Bromomethane	
8260D	Water	Carbon tetrachloride	
8260D	Water	Chlorobenzene	
8260D	Water	Chloroethane	
8260D	Water	Chloroform	
8260D	Water	Chloromethane	
8260D	Water	cis-1,2-Dichloroethene	
8260D	Water	cis-1,3-Dichloropropene	
8260D	Water	Dibromochloromethane	
8260D	Water	Dibromomethane	
8260D	Water	Dichlorodifluoromethane	
8260D	Water	Ethylbenzene	
8260D	Water	Hexachlorobutadiene	
8260D	Water	Isopropylbenzene	
8260D	Water	Methyl tert-butyl ether	
8260D	Water	Methylene Chloride	
8260D	Water	m-Xylene & p-Xylene	
8260D	Water	Naphthalene	
8260D	Water	n-Butylbenzene	
8260D	Water	N-Propylbenzene	
8260D	Water	o-Xylene	
8260D	Water	sec-Butylbenzene	
8260D	Water	Styrene	
8260D	Water	t-Butylbenzene	
8260D	Water	Tetrachloroethene	
8260D	Water	Toluene	
8260D	Water	trans-1,2-Dichloroethene	
8260D	Water	trans-1,3-Dichloropropene	
8260D	Water	Trichloroethene	
8260D	Water	Trichlorofluoromethane	
8260D	Water	Vinyl chloride	
SM 2320B	Water	Alkalinity as CaCO3	
SM 2320B	Water	Bicarbonate Alkalinity as CaCO3	
SM 2320B	Water	Carbonate Alkalinity as CaCO3	
SM 2320B	Water	Hydroxide Alkalinity as CaCO3	
SM 2340C	Water	Hardness as calcium carbonate	
SM 4500 NH3 G	Water	Ammonia as N	
SM 5220D	SM 5220	Water	Chemical Oxygen Demand
SM 5310B		Water	Dissolved Organic Carbon
SM4500_P_F	SM 4500 P B	Water	Total Phosphorus as P

# Accreditation/Certification Summary

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Laboratory: Eurofins Calscience Irvine

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska	State	CA01531	06-30-21
Arizona	State	AZ0671	10-13-20
California	Los Angeles County Sanitation Districts	10256	06-30-21
California	State	2706	06-30-21
Guam	State	20-004R	01-23-21
Hawaii	State	CA01531	01-29-21
Kansas	NELAP	E-10420	07-31-21
Nevada	State	CA015312021-1	07-31-21
Oregon	NELAP	4028 - 008	01-29-21
USDA	US Federal Programs	P330-18-00214	07-09-21
Washington	State	C900	09-03-21

# Accreditation/Certification Summary

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Laboratory: Eurofins TestAmerica, Denver

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
A2LA	Dept. of Defense ELAP	2907.01	10-31-21
A2LA	ISO/IEC 17025	2907.01	10-31-21
Alabama	State Program	40730	09-30-12 *
Alaska (UST)	State	18-001	02-08-21
Alaska (UST)	State	18-001	02-08-21
Arizona	State	AZ0713	12-20-20
Arkansas DEQ	State	19-047-0	06-01-21
California	State	2513	01-08-21
Connecticut	State	PH-0686	09-30-20
Florida	NELAP	E87667-57	07-01-21
Georgia	State	4025-011	01-09-21
Illinois	NELAP	2000172019-1	04-30-21
Iowa	State	IA#370	12-01-20
Kansas	NELAP	E-10166	04-30-21
Louisiana	NELAP	30785	06-30-14 *
Louisiana	NELAP	30785	06-30-21
Maine	State	2019011 (231)	03-03-21
Minnesota	NELAP	1788752	12-31-20
Nevada	State	CO000262020-1	07-31-21
New Hampshire	NELAP	205319	04-29-21
New Jersey	NELAP	190002	06-30-21
New York	NELAP	59923	04-01-21
North Carolina (WW/SW)	State	358	12-31-20
North Dakota	State	R-034	01-08-21
Oklahoma	State	2018-006	09-01-21
Oregon	NELAP	4025-011	01-08-21
Pennsylvania	NELAP	013	07-31-21
South Carolina	State	72002001	01-08-21
Texas	NELAP	T104704183-19-17	09-30-20
US Fish & Wildlife	US Federal Programs	058448	08-01-21
USDA	US Federal Programs	P330-18-00099	03-26-21
Utah	NELAP	QUAN5	06-30-13 *
Utah	NELAP	CO000262019-11	07-31-21
Virginia	NELAP	10490	06-14-21
Washington	State	C583-19	08-03-21
West Virginia DEP	State	354	11-30-20
Wisconsin	State	999615430	08-31-21
Wyoming (UST)	A2LA	2907.01	10-31-21

\* Accreditation/Certification renewal pending - accreditation/certification considered valid.

# Accreditation/Certification Summary

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Laboratory: Eurofins TestAmerica, Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-020	01-20-21
ANAB	Dept. of Defense ELAP	L2468	01-20-21
ANAB	Dept. of Energy	L2468.01	01-20-21
ANAB	ISO/IEC 17025	L2468	01-20-21
Arizona	State	AZ0708	08-11-21
Arkansas DEQ	State	88-0691	06-17-21
California	State	2897	01-31-22
Colorado	State	CA0004	08-31-21
Connecticut	State	PH-0691	06-30-21
Florida	NELAP	E87570	06-30-21
Georgia	State	4040	01-30-21
Hawaii	State	<cert No.>	01-29-21
Illinois	NELAP	200060	03-17-21
Kansas	NELAP	E-10375	10-31-20
Louisiana	NELAP	01944	06-30-21
Maine	State	CA00004	04-14-22
Michigan	State	9947	08-03-23
Nevada	State	CA000442021-1	07-31-21
New Hampshire	NELAP	2997	04-18-21
New Jersey	NELAP	CA005	06-30-21
New York	NELAP	11666	04-01-21
Oregon	NELAP	4040	01-29-21
Pennsylvania	NELAP	68-01272	03-31-21
Texas	NELAP	T104704399-19-13	06-01-21
US Fish & Wildlife	US Federal Programs	58448	07-31-21
USDA	US Federal Programs	P330-18-00239	07-31-21
Utah	NELAP	CA000442019-01	02-28-21
Vermont	State	VT-4040	04-16-21
Virginia	NELAP	460278	03-14-21
Washington	State	C581	05-05-21
West Virginia (DW)	State	9930C	12-31-20
Wisconsin	State	998204680	08-31-21
Wyoming	State Program	8TMS-L	01-28-19 *

\* Accreditation/Certification renewal pending - accreditation/certification considered valid.

# Accreditation/Certification Summary

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Laboratory: Eurofins TestAmerica, Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
	AFCEE	SAVLAB	
Alabama	State	41450	06-30-21
Alaska	State	GA00006	06-30-21
Alaska (UST)	State	17-016	09-30-20
ANAB	Dept. of Defense ELAP	L2463	09-22-22
ANAB	ISO/IEC 17025	L2463.01	09-22-22
Arizona	State	AZ0808	12-14-20
Arkansas DEQ	State	19-015-0	02-02-21
California	State	2939	06-30-21
Colorado	State	GA00006	12-31-20
Connecticut	State	PH-0161	03-31-21
Florida	NELAP	E87052	06-30-21
Georgia	State	E87052	06-30-21
Georgia (DW)	State	803	06-30-21
Guam	State	19-007R	04-17-21
Hawaii	State	<cert No.>	06-30-21
Illinois	NELAP	200022	11-30-20
Indiana	State	C-GA-02	06-30-21
Iowa	State	353	06-30-21
Kansas	NELAP	E-10322	10-15-20
Kentucky (DW)	State	KY90084	12-31-21
Kentucky (UST)	State	<cert No.>	06-30-21
Kentucky (WW)	State	KY90084	12-31-20
Louisiana	NELAP	02011	06-30-21
Louisiana (DW)	State	LA009	12-31-20
Maryland	State	250	12-31-20
Massachusetts	State	M-GA006	06-30-21
Michigan	State	9925	06-30-21
Mississippi	State	<cert No.>	06-30-21
Nebraska	State	NE-OS-7-04	06-30-21
New Jersey	NELAP	GA769	06-30-21
New Mexico	State	GA00006	06-30-21
New York	NELAP	10842	04-01-21
North Carolina (DW)	State	13701	07-31-21
North Carolina (WW/SW)	State	269	12-31-20
Pennsylvania	NELAP	68-00474	06-30-21
Puerto Rico	State	GA00006	01-01-21
South Carolina	State	98001	06-30-21
Tennessee	State	02961	06-30-21
Texas	NELAP	T1047004185-19-14	11-30-20
Texas	TCEQ Water Supply	T104704185	06-30-21
US Fish & Wildlife	US Federal Programs	LE058448-0	08-01-21
USDA	US Federal Programs	P330-18-00313	10-29-21
Virginia	NELAP	10509	06-14-21
Washington	State	C805	06-10-21
West Virginia (DW)	State	9950C	12-31-20
West Virginia DEP	State	094	07-31-20 *
Wisconsin	State	999819810	08-31-21
Wyoming	State	8TMS-L	06-30-21

\* Accreditation/Certification renewal pending - accreditation/certification considered valid.

# Sample Summary

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
580-97431-1	AF71986	Water	09/09/20 15:00	09/12/20 11:00	
580-97431-2	AF71987	Water	09/09/20 16:52	09/12/20 11:00	
580-97431-3	AF71988-Trip blank	Water	09/09/20 00:01	09/12/20 11:00	

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13





### Chain of Custody Record

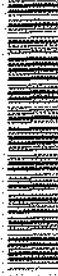
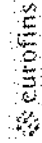
Tacoma, WA 98424  
phone 253.922.2310 fax 253.922.5047

Regulatory Program:  DW  NPDES  RCRA  Other:

TestAmerica Laboratories, Inc.

Client Contact		Project Manager: <u>Tim Johnson/Lance Morris</u>		Site Contact: <u>Tim J./Lance M.</u>		Date: <u>9/10/20</u>		COC No: <u>90077 / 90078</u>					
Arctic Fox Environmental Pouch 340043		Tel/Fax: <u>907-659-2145</u>		Lab Contact: <u>Tim J./Lance M.</u>		Carrier:		<u>2</u> of <u>2</u> COCs					
Prudhoe Bay, AK 99734		Analysis Turnaround Time		Filtered Sample (Y/N)   Perform MS/MSD (Y/N)   TOC   VOC   DRO/RO - Silica (G)   PESA/PDS (YES)   Sulphide   Sulfide X   X   X   X   X   X   X   X		Sampler: <u>PTB and SAO</u> For Lab Use Only: Walk-in Client: <input type="checkbox"/> No Lab Sampling: <input type="checkbox"/> No Job / SDG No.:		Sample Specific Notes:					
Phone 907-659-2145		<input checked="" type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS											
FAX 907-659-2146		TAT if different from Below _____											
Project Name: <u>Willow WTR and WQ</u>		<input checked="" type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <u>Standard</u> <input type="checkbox"/> 3 days Rush <input type="checkbox"/> 1 day											
Site:		PO# <u>0920-4661</u>		Sample Date		Sample Time		Sample Type (C=Comp, G=Grab)		Matrix		# of	
AF71986 - M0015 / R0056		9/9/20		1500		G		L		2		2	
987 - M0235		9/9/20		1652		G		L		2		2	
988 - Trip Blank								L		3		3	
Preservation Used: 1= Ice, 2= HCl, 3= H2SO4, 4= HNO3, 5= NaOH, 6= Other <u>1/2/3/4</u>						6 3 2 - 5							
Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.						Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)							
<input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown						<input type="checkbox"/> Return to Client <input type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for _____ Months							
Special Instructions/QC Requirements & Comments:													
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Cooler Temp. (°C): Obs'd: _____		Cor'd: _____		Therm ID No.:					
Relinquished by: <u>[Signature]</u>		Company: <u>Arctic Fox Env.</u>		Date/Time: <u>9/10/20 1800</u>		Received by: <u>[Signature]</u>		Company: <u>TASeal</u>		Date/Time: <u>9-12-20 1100</u>			
Relinquished by:		Company:		Date/Time:		Received by:		Company:		Date/Time:			
Relinquished by:		Company:		Date/Time:		Received in Laboratory by:		Company:		Date/Time:			

Chain of Custody Record



<b>Client Information (Sub Contract Lab)</b> Client Contact: _____ Shipping/Receiving: _____ Company: TestAmerica Laboratories, Inc. Address: 4955 Yarrow Street, City: Anacapa State: CO CO: 806002 Phone: 303-736-0100 (Tel) 303-431-7171 (Fax) Email: _____ Project Name: 0920-4661/Willow WTP and WO S#P: 58015304 S#C: 580147		Lab Pkt: Cur. Sheet 1 E-Mail: Shen.Cruz@Eurolines.com State of Origin: Alaska Accreditations Required (See note): State - Alaska (UST)	
Due Date Requested: 9/18/2020 MAT Requested (days): _____		Analysis Requested: _____ Preservation Codes: A - HCl B - HgCl <sub>2</sub> C - Zn Acetate D - Nitric Acid E - NaHSO <sub>4</sub> F - H <sub>2</sub> SO <sub>4</sub> G - Acetic H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other: _____ M - Hosing N - None O - As <sub>2</sub> S <sub>3</sub> P - Na <sub>2</sub> CO <sub>3</sub> Q - Na <sub>2</sub> SO <sub>3</sub> R - Na <sub>2</sub> SO <sub>4</sub> S - H <sub>2</sub> SO <sub>4</sub> T - TSP Dodecylsulfate U - Acetone V - H <sub>2</sub> SO <sub>4</sub> W - H <sub>2</sub> O <sub>2</sub> X - Other (specify)	
Sample Date: 9/8/20 Sample Time: 15:00 Matrix: Water Sample Type (C=Comp, G=grab): Aged Preservation Code: _____ Field Filtered Sample (Yes or No): <input checked="" type="checkbox"/> No Perform MS/MSD (Yes or No): <input checked="" type="checkbox"/> No 9034, Cal/9030B (MCR) Suite 3500 FE 0		Total Number of Containers: 2 Special Instructions/Note: _____	
Sample Identification - Client ID (Lab ID) AF71966 (580-97431-1)			
Note: Since laboratory accreditation is subject to change, Eurolines TestAmerica places the ownership of method, analysis & accreditation compliance upon our subcontracted laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis, the sample must be shipped back to the Eurolines TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurolines TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurolines TestAmerica.			
Possible Hazard Identification Unconfirmed _____ Deliverable Requested: I, II, III, IV, Other (specify) _____ Primary Deliverable Rank: 2 Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months Special Instructions/OC Requirements: _____			
Empty Kit Relinquished by: Tom Santschi Date/Time: 9/14/20		Received by: D. Jones Date/Time: 9-15-20 1025 Company: Eurolines	
Relinquished by: _____ Date/Time: _____		Relinquished by: _____ Date/Time: _____	
Relinquished by: _____ Date/Time: _____		Relinquished by: _____ Date/Time: _____	
Custody Seals Intact: A Yes <input type="checkbox"/> No <input type="checkbox"/>		Custody Seal No: 03, 12, 11, 0-2, DS 9-15-20	







<b>Client Information (Sub Contract Lab)</b> Client Contact: Shari Cruz@Eurofins.com Shipping/Receiving: Shari Cruz@Eurofins.com Company: State - Alaska (UST)		Samples: Cruz, Shari L. Matrix: Shari Cruz@Eurofins.com		CCL# No: 580-97431-1 Page: Page 1 of 1 Job #: 580-97431-1	
Address: 5102 LaRoche Avenue, City: Savannah State, Zip: GA, 31404 Phone: 912-354-7658 (Tel) 912-352-0165 (Fax) Email:		Date Requested: 9/24/2020 TAT Requested (days):		Preservation Codes: A - HCL B - NaOH C - 20% Acetate D - Nitric Acid E - Nitric/SO <sub>2</sub> F - MeOH G - Acetone H - Acetic Acid I - Ice J - DI Water K - EDTA L - EPA Other:	
Project Name: 0920-4861 Willow WTP and WO Site:		Project #: 58015384 SSSWW		Analysis Requested:	
Sample Identification - Client ID (Lab ID) AF71866 (580-97431-1)		Sample Date: 9/9/20	Sample Time: 15:00 Alaskan	Sample Type (C=Comp, G=grab) Matrix (Water, Seabed, Overbank, In-stream, AAS)	Preservation Code: Water
Field Filtered Sample (Yes or No)		Field Filtered Sample (Yes or No)		Total Number of Containers	
Perform MS/MSD (Yes or No)		Perform MS/MSD (Yes or No)		Special Instructions/Note:	
State - Alaska (UST)		State - Alaska (UST)		State - Alaska (UST)	

Note: Since laboratory accreditation are subject to change, Eurofins TestAmerica places the ownership of method, analysis & accreditation compliance upon our subcontracted laboratories. This sample shipment is forwarded under the lab's jurisdiction. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis, the samples must be shipped back to the Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are correct to date, return the signed Chain of Custody attesting to said compliance to Eurofins TestAmerica.

**Possible Hazard Identification**  
 Unconfirmed  
 Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2

Empty Kit Requisitioned by: [Signature] Date: 9/14/20  
 Requisitioned by: [Signature] Date/Time: [Blank]  
 Requisitioned by: [Signature] Date/Time: [Blank]

Custody Seals Intact: [Blank] Custody Seal No.: [Blank]  
 A Yes B No

Received by: [Signature] Date/Time: 9-15-20 10:55  
 Received by: [Blank] Date/Time: [Blank]  
 Received by: [Blank] Date/Time: [Blank]

Method of Signature: [Blank]  
 Disposal By Lab: [Blank] Disposal For: [Blank] Months: [Blank]

Company: [Blank]  
 Company: [Blank]  
 Company: [Blank]

Temperature(s) / Chain Other Remarks: 3.8/4.2

# Login Sample Receipt Checklist

Client: Arctic Fox Environmental, Inc

Job Number: 580-97431-1

**Login Number: 97431**

**List Source: Eurofins TestAmerica, Seattle**

**List Number: 1**

**Creator: Hobbs, Kenneth F**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

## Login Sample Receipt Checklist

Client: Arctic Fox Environmental, Inc

Job Number: 580-97431-1

**Login Number: 97431**  
**List Number: 3**  
**Creator: Ornelas, Olga**

**List Source: Eurofins Irvine**  
**List Creation: 09/15/20 11:49 AM**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



# Login Sample Receipt Checklist

Client: Arctic Fox Environmental, Inc

Job Number: 580-97431-1

**Login Number: 97431**  
**List Number: 4**  
**Creator: Schade, Daniel B**

**List Source: Eurofins TestAmerica, Denver**  
**List Creation: 09/15/20 01:30 PM**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

## Login Sample Receipt Checklist

Client: Arctic Fox Environmental, Inc

Job Number: 580-97431-1

**Login Number: 97431**  
**List Number: 5**  
**Creator: Saephan, Kae C**

**List Source: Eurofins TestAmerica, Sacramento**  
**List Creation: 09/15/20 01:16 PM**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	483885
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	ob: 2.7c corr: 3.2c
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

# Login Sample Receipt Checklist

Client: Arctic Fox Environmental, Inc

Job Number: 580-97431-1

**Login Number: 97431**  
**List Number: 2**  
**Creator: Sims, Robert D**

**List Source: Eurofins TestAmerica, Savannah**  
**List Creation: 09/15/20 12:10 PM**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



# Isotope Dilution Summary

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4661/Willow WTP and WQ

Job ID: 580-97431-1

## Method: EPA 537(Mod) - PFAS for QSM 5.1, Table B-15

Matrix: Water

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFOA (50-150)	PFOS (50-150)	PFHxS (50-150)	PFHxA (50-150)	C3PFBS (50-150)	PFOSA (50-150)	PFDoA (50-150)	PFPeA (50-150)
580-97431-1	AF71986	84	84	89	79	85	79	62	79
580-97431-2	AF71987	78	80	83	77	75	76	61	65
LCS 320-412514/2-A	Lab Control Sample	83	89	92	80	88	83	84	83
LCSD 320-412514/3-A	Lab Control Sample Dup	89	93	98	87	90	89	87	89
MB 320-412514/1-A	Method Blank	83	92	93	82	89	82	81	87

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFTDA (50-150)	PFNA (50-150)	PFDA (50-150)	PFUnA (50-150)	C4PFHA (50-150)	PFBA (50-150)	d5NEFOS (50-150)	d3NMFOS (50-150)
580-97431-1	AF71986	50	86	76	78	84	67	73	68
580-97431-2	AF71987	48 *5	78	77	72	79	51	66	64
LCS 320-412514/2-A	Lab Control Sample	79	86	90	84	88	81	79	76
LCSD 320-412514/3-A	Lab Control Sample Dup	80	97	93	88	89	86	86	87
MB 320-412514/1-A	Method Blank	78	91	87	87	90	83	83	81

		Percent Isotope Dilution Recovery (Acceptance Limits)			
Lab Sample ID	Client Sample ID	M262FTS (50-150)	M242FTS (50-150)	HFPODA (50-150)	M282FTS (50-150)
580-97431-1	AF71986	103	110	76	106
580-97431-2	AF71987	109	121	70	96
LCS 320-412514/2-A	Lab Control Sample	99	98	79	94
LCSD 320-412514/3-A	Lab Control Sample Dup	104	115	81	106
MB 320-412514/1-A	Method Blank	101	108	82	98

### Surrogate Legend

- PFOA = 13C4 PFOA
- PFOS = 13C4 PFOS
- PFHxS = 18O2 PFHxS
- PFHxA = 13C2 PFHxA
- C3PFBS = 13C3 PFBS
- PFOSA = 13C8 FOSA
- PFDoA = 13C2 PFDoA
- PFPeA = 13C5 PFPeA
- PFTDA = 13C2 PFTeDA
- PFNA = 13C5 PFNA
- PFDA = 13C2 PFDA
- PFUnA = 13C2 PFUnA
- C4PFHA = 13C4 PFHpA
- PFBA = 13C4 PFBA
- d5NEFOS = d5-NEtFOSAA
- d3NMFOS = d3-NMeFOSAA
- M262FTS = M2-6:2 FTS
- M242FTS = M2-4:2 FTS
- HFPODA = 13C3 HFPO-DA
- M282FTS = M2-8:2 FTS



September 30, 2020

Service Request No:K2007930

Lance Morris  
Arctic Fox Laboratory  
100 Airport Way  
Prudhoe Bay, AK 99734

**Laboratory Results for: Willow WTP + Willow WQ**

Dear Lance,

Enclosed are the results of the sample(s) submitted to our laboratory September 14, 2020  
For your reference, these analyses have been assigned our service request number **K2007930**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3376. You may also contact me via email at [Mark.Harris@alsglobal.com](mailto:Mark.Harris@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Mark Harris  
Project Manager

ADDRESS 1317 S. 13th Avenue, Kelso, WA 98626  
PHONE +1 360 577 7222 | FAX +1 360 636 1068  
ALS Group USA, Corp.  
dba ALS Environmental



# Narrative Documents

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360) 577-7222 Fax (360) 425-9096  
[www.alsglobal.com](http://www.alsglobal.com)



**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water

**Service Request:** K2007930  
**Date Received:** 09/14/2020

**CASE NARRATIVE**

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier II level requested by the client.

**Sample Receipt:**

Three water samples were received for analysis at ALS Environmental on 09/14/2020. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

**Metals:**

No significant anomalies were noted with this analysis.

**General Chemistry:**

No significant anomalies were noted with this analysis.

*Noel D. O'Connell*

Approved by \_\_\_\_\_

Date 09/30/2020



**SAMPLE DETECTION SUMMARY**

**CLIENT ID: AF71976-M0235**

**Lab ID: K2007930-001**

<b>Analyte</b>	<b>Results</b>	<b>Flag</b>	<b>MDL</b>	<b>MRL</b>	<b>Units</b>	<b>Method</b>
Silica as SiO <sub>2</sub> , Dissolved	490			450	ug/L	6010C
Silica	600			450	ug/L	6010C



## Sample Receipt Information

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360) 577-7222 Fax (360) 425-9096  
[www.alsglobal.com](http://www.alsglobal.com)



**Cooler Receipt and Preservation Form**

Client Arctic Fox Env. Service Request K20 07930  
 Received: 9/14/20 Opened: 9/14/20 By: [Signature] Unloaded: 9/14/20 By: [Signature]

Samples were received via? USPS Fed Ex UPS DHL PDX Courier Hand Delivered  
 Samples were received in: (circle) Cooler Box Envelope Other NA  
 Were custody seals on coolers? NA Y N If yes, how many and where? 1 front  
 If present, were custody seals intact? Y N If present, were they signed and dated? Y N  
 Was a Temperature Blank present in cooler? NA Y N If yes, notate the temperature in the appropriate column below:  
 If no, take the temperature of a representative sample bottle contained within the cooler; notate in the column "Sample Temp":  
 Were samples received within the method specified temperature ranges? NA Y N  
 If no, were they received on ice and same day as collected? If not, notate the cooler # below and notify the PM. NA Y N  
 applicable, tissue samples were received: Frozen Partially Thawed Thawed

Temp Blank	Sample Temp	IR Gun	Cooler #/COC ID /NA	Out of temp indicate with 'X'	PM Notified if out of temp	Tracking Number NA	Filed
<u>8.3</u>	<u>-</u>	<u>Flou</u>	<u>(circle)</u>	<u>X</u>	<u>X</u>	<u>0272156 8890</u>	<u>X</u>

Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves Boxes  
 Were custody papers properly filled out (ink, signed, etc.)? Small NA Y N  
 Were samples received in good condition (unbroken) NA Y N  
 Were all sample labels complete (ie, analysis, preservation, etc.)? NA Y N  
 0. Did all sample labels and tags agree with custody papers? NA Y N  
 1. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N  
 2. Were the pH-preserved bottles (see SMO GEN SOP) received at the appropriate pH? Indicate in the table below NA Y N  
 3. Were VOA vials received without headspace? Indicate in the table below NA Y N  
 4. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, Resolutions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



# Miscellaneous Forms

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360) 577-7222 Fax (360) 425-9096  
[www.alsglobal.com](http://www.alsglobal.com)

### **Inorganic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### **Metals Data Qualifiers**

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Organic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Additional Petroleum Hydrocarbon Specific Qualifiers**

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEH	<a href="http://dec.alaska.gov/eh/lab/cs/csapproval.htm">http://dec.alaska.gov/eh/lab/cs/csapproval.htm</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L16-58-R4
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	<a href="http://health.hawaii.gov/">http://health.hawaii.gov/</a>	-
ISO 17025	<a href="http://www.pjllabs.com/">http://www.pjllabs.com/</a>	L16-57
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/page/la-lab-accreditation">http://www.deq.louisiana.gov/page/la-lab-accreditation</a>	03016
Maine DHS	<a href="http://www.maine.gov/dhhs/">http://www.maine.gov/dhhs/</a>	WA01276
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/enforcement/oqa.html">http://www.nj.gov/dep/enforcement/oqa.html</a>	WA005
New York - DOH	<a href="https://www.wadsworth.org/regulatory/elap">https://www.wadsworth.org/regulatory/elap</a>	12060
North Carolina DEQ	<a href="https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification">https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/EnvironmentalLabCertification/">http://www.scdhec.gov/environment/EnvironmentalLabCertification/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wyoming (EPA Region 8)	<a href="https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water">https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.

## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.



ALS Group USA, Corp.  
dba ALS Environmental

Analyst Summary report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ/

**Service Request:** K2007930

**Sample Name:** AF71976-M0235  
**Lab Code:** K2007930-001  
**Sample Matrix:** Water

**Date Collected:** 09/8/20  
**Date Received:** 09/14/20

**Analysis Method**  
6010C

**Extracted/Digested By**  
ABOYER

**Analyzed By**  
RMOORE

**Sample Name:** AF71986-M0015/R0056  
**Lab Code:** K2007930-002  
**Sample Matrix:** Water

**Date Collected:** 09/9/20  
**Date Received:** 09/14/20

**Analysis Method**  
6010C

**Extracted/Digested By**  
ABOYER

**Analyzed By**  
RMOORE

**Sample Name:** AF71989-L9911  
**Lab Code:** K2007930-003  
**Sample Matrix:** Water

**Date Collected:** 09/9/20  
**Date Received:** 09/14/20

**Analysis Method**  
6010C

**Extracted/Digested By**  
ABOYER

**Analyzed By**  
RMOORE



# Sample Results

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360) 577-7222 Fax (360) 425-9096  
[www.alsglobal.com](http://www.alsglobal.com)



# Metals

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360) 577-7222 Fax (360) 425-9096  
[www.alsglobal.com](http://www.alsglobal.com)

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water  
**Sample Name:** AF71976-M0235  
**Lab Code:** K2007930-001

**Service Request:** K2007930  
**Date Collected:** 09/08/20 14:40  
**Date Received:** 09/14/20 12:15  
**Basis:** NA

Dissolved Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Silica as SiO2	6010C	<b>490</b>	ug/L	450	1	09/29/20 17:32	09/28/20	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water  
**Sample Name:** AF71976-M0235  
**Lab Code:** K2007930-001

**Service Request:** K2007930  
**Date Collected:** 09/08/20 14:40  
**Date Received:** 09/14/20 12:15  
**Basis:** NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Silica	6010C	600	ug/L	450	1	09/29/20 17:06	09/28/20	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water  
**Sample Name:** AF71986-M0015/R0056  
**Lab Code:** K2007930-002

**Service Request:** K2007930  
**Date Collected:** 09/09/20 15:00  
**Date Received:** 09/14/20 12:15  
**Basis:** NA

Dissolved Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Silica as SiO2	6010C	ND U	ug/L	450	1	09/29/20 17:35	09/28/20	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water  
**Sample Name:** AF71986-M0015/R0056  
**Lab Code:** K2007930-002

**Service Request:** K2007930  
**Date Collected:** 09/09/20 15:00  
**Date Received:** 09/14/20 12:15  
**Basis:** NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Silica	6010C	ND U	ug/L	450	1	09/29/20 17:27	09/28/20	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water  
**Sample Name:** AF71989-L9911  
**Lab Code:** K2007930-003

**Service Request:** K2007930  
**Date Collected:** 09/09/20 11:12  
**Date Received:** 09/14/20 12:15  
**Basis:** NA

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Date Extracted	Q
Silica as SiO2	6010C	ND U	ug/L	450	1	09/29/20 17:38	09/28/20	



ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water  
**Sample Name:** AF71989-L9911  
**Lab Code:** K2007930-003

**Service Request:** K2007930  
**Date Collected:** 09/09/20 11:12  
**Date Received:** 09/14/20 12:15

**Basis:** NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Silica	6010C	ND U	ug/L	450	1	09/29/20 17:29	09/28/20	



# QC Summary Forms

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360) 577-7222 Fax (360) 425-9096  
[www.alsglobal.com](http://www.alsglobal.com)



# Metals

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360) 577-7222 Fax (360) 425-9096  
[www.alsglobal.com](http://www.alsglobal.com)

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** KQ2014031-02

**Service Request:** K2007930  
**Date Collected:** NA  
**Date Received:** NA  
**Basis:** NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Silica	6010C	ND U	ug/L	450	1	09/29/20 16:58	09/28/20	

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water

**Service Request:** K2007930  
**Date Collected:** 09/08/20  
**Date Received:** 09/14/20  
**Date Analyzed:** 09/29/20  
**Date Extracted:** 09/28/20

**Matrix Spike Summary**  
**Total Metals**

**Sample Name:** AF71976-M0235  
**Lab Code:** K2007930-001  
**Analysis Method:** 6010C  
**Prep Method:** EPA CLP ILM04.0

**Units:** ug/L  
**Basis:** NA

**Matrix Spike**  
KQ2014031-06

<u>Analyte Name</u>	<u>Sample Result</u>	<u>Result</u>	<u>Spike Amount</u>	<u>% Rec</u>	<u>% Rec Limits</u>
Silica	600	21300	21400	97	75-125

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Matrix Spike and Matrix Spike Duplicate Data is presented for information purposes only. The matrix may or may not be relevant to samples reported in this report. The laboratory evaluates system performance based on the LCS and LCSD control limits.

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water

**Service Request:** K2007930  
**Date Collected:** 09/08/20  
**Date Received:** 09/14/20  
**Date Analyzed:** 09/29/20

Replicate Sample Summary

Total Metals

**Sample Name:** AF71976-M0235  
**Lab Code:** K2007930-001

**Units:** ug/L  
**Basis:** NA

Analyte Name	Analysis Method	MRL	Sample Result	Duplicate Sample	Average	RPD	RPD Limit
				KQ2014031-04			
Silica	6010C	450	600	600	600	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Arctic Fox Environmental, Inc.  
**Project:** Willow WTP + Willow WQ  
**Sample Matrix:** Water

**Service Request:** K2007930  
**Date Analyzed:** 09/29/20

**Lab Control Sample Summary**  
**Total Metals**

**Units:**ug/L  
**Basis:**NA

**Lab Control Sample**  
KQ2014031-03

<b>Analyte Name</b>	<b>Analytical Method</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Silica	6010C	21000	21400	98	80-120

## Arctic Fox Environmental Algal ID and Enumeration Report

Prepared: October 14, 2020

Prepared By: GreenWater Laboratories

Samples: 3

1. AF71976-M0235 (Collected on 9/8/20)
2. AF71986-M0015/R0056 (Collected on 9/9/20)
3. AF71989-L9911 (Collected on 9/9/20)

### Sample 1: AF71976-M0235

Total cell numbers in the AF71976-M0235 sample collected on 9/8/20 were 17,541 cells/mL. Blue-green algae (Cyanobacteria; 14,260 cells/mL) were the dominant algal group in the sample accounting for 81.3% of total cell numbers. Other algal groups in the sample were diatoms (Bacillariophyceae; 48 cells/mL), desmids (Charophyta; 3 cells/mL), green algae (Chlorophyta; 2,678 cells/mL), golden-brown algae (Chrysophyceae; 94 cells/mL), dinoflagellates (Dinophyceae; 0.2 cells/mL) and unknown algae (Unknown; 458 cells/mL). The most abundant species was the colonial cyanophyte *Aphanocapsa delicatissima* (5,890 cells/mL; Fig. 1).

Total numbers of potentially toxigenic cyanobacteria (PTOX Cyano) were 56 cells/mL (0.3% of total cell numbers). PTOX Cyano species present included *Pseudanabaena* sp. (56 cells/mL; Fig. 2).

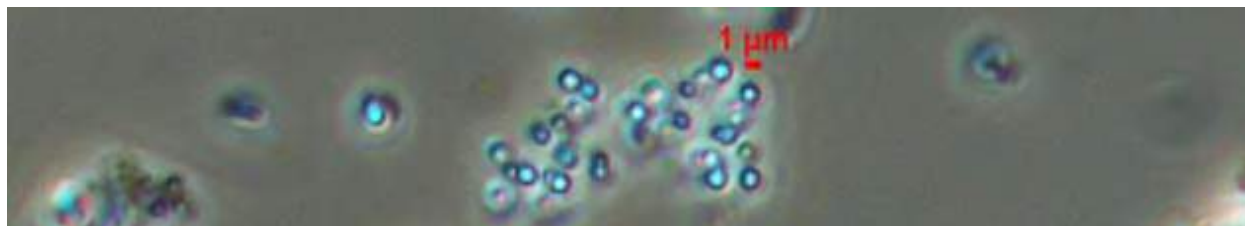


Fig. 1 *Aphanocapsa delicatissima* 400X (scale bar = 1 $\mu$ m)

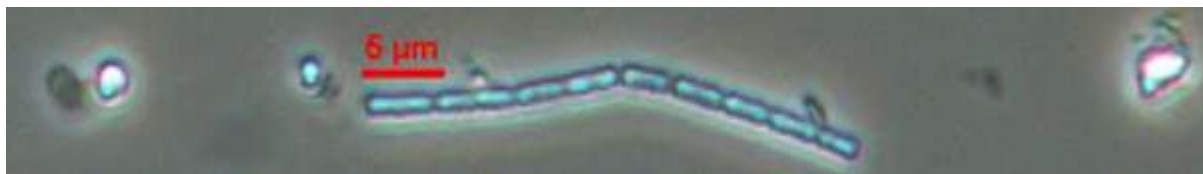


Fig. 2 *Pseudanabaena* sp. 400X (scale bar = 5 $\mu$ m)



**Sample 2: AF71986-M0015/R0056**

Total cell numbers in the AF71986-M0015/R0056 sample collected on 9/9/20 were 22,224 cells/mL. Blue-green algae (Cyanobacteria; 17,452 cells/mL) were the dominant algal group in the sample accounting for 78.5% of total cell numbers. Other algal groups in the sample were diatoms (Bacillariophyceae; 2,684 cells/mL), desmids (Charophyta; 12 cells/mL), green algae (Chlorophyta; 1,726 cells/mL), golden-brown algae (Chrysophyceae; 84 cells/mL), cryptophytes (Cryptophyta; 3 cells/mL), dinoflagellates (Dinophyceae; 0.1 cells/mL) and unknown algae (Unknown; 264 cells/mL). The most abundant species was the colonial cyanophyte *Aphanocapsa delicatissima* (7,121 cells/mL; Fig. 3).

Total numbers of potentially toxigenic cyanobacteria (PTOX Cyano) were 56 cells/mL (0.3% of total cell numbers). PTOX Cyano species present included *Radiocystis elongata* (46 cells/mL; Fig. 4), *Pseudanabaena mucicola* (8 cells/mL; Fig. 5) and cf. *Phormidium* sp. (2 cells/mL; Fig. 6).

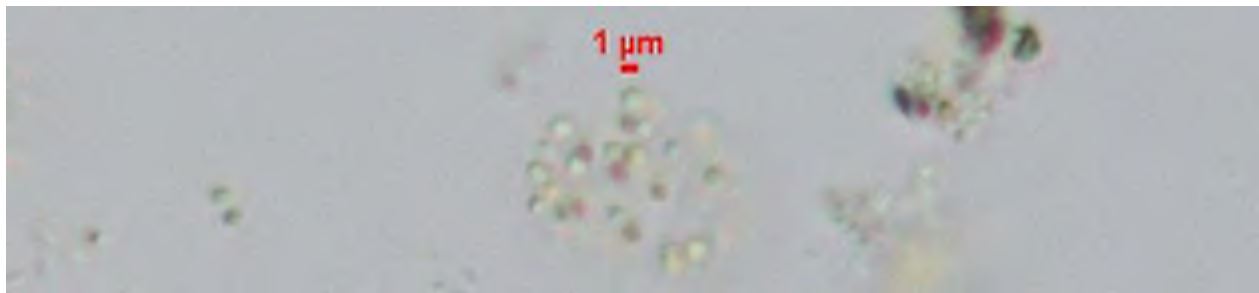


Fig. 3 *Aphanocapsa delicatissima* 400X (scale bar = 1 $\mu$ m)

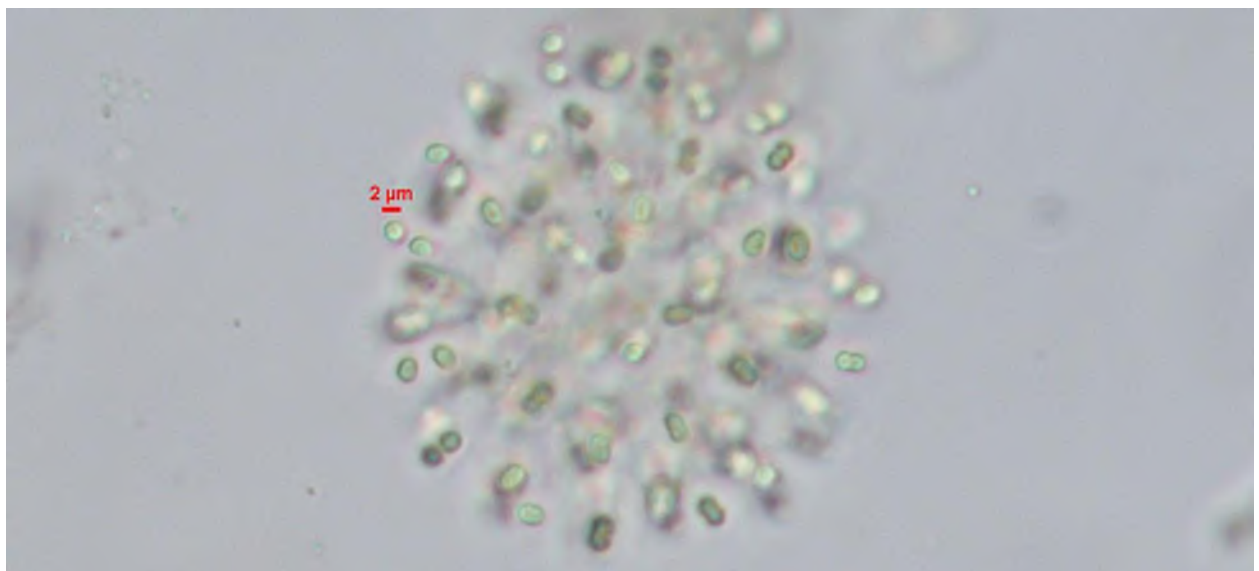


Fig. 4 *Radiocystis elongata* 400X (scale bar = 2 $\mu$ m)



Fig. 5 *Pseudanabaena mucicola* 400X (scale bar = 2 $\mu$ m)



Fig. 6 cf. *Phormidium* sp. 400X (scale bar = 5 $\mu$ m)

### Sample 3: AF71989-L9911

Total cell numbers in the AF71989-L9911 sample collected on 9/9/20 were 11,502 cells/mL. Blue-green algae (Cyanobacteria; 8,269 cells/mL) were the dominant algal group in the sample accounting for 71.9% of total cell numbers. Other algal groups in the sample were diatoms (Bacillariophyceae; 1,724 cells/mL), desmids (Charophyta; 76 cells/mL), green algae (Chlorophyta; 876 cells/mL), golden-brown algae (Chrysophyceae; 96 cells/mL), dinoflagellates (Dinophyceae; 1 cell/mL) and unknown algae (Unknown; 461 cells/mL). The most abundant species was the colonial cyanophyte *Aphanocapsa incerta* (3,539 cells/mL; Fig. 7).

Total numbers of potentially toxigenic cyanobacteria (PTOX Cyano) were 56 cells/mL (0.3% of total cell numbers). PTOX Cyano species present included *Pseudanabaena mucicola* (21 cells/mL) and *Snowella lacustris* (12 cells/mL; Fig. 8).

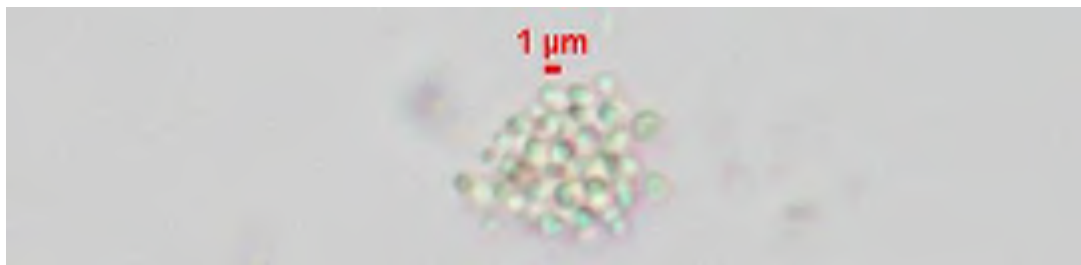


Fig. 7 *Aphanocapsa incerta* 400X (scale bar = 1 $\mu$ m)

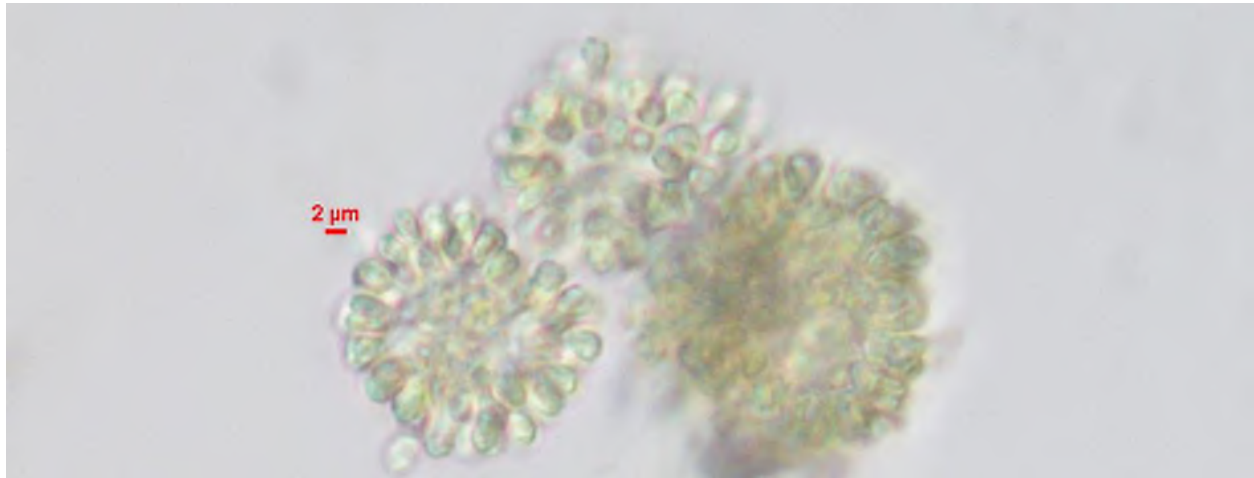


Fig. 8 *Snowella lacustris* 400X (scale bar = 2 $\mu$ m)

Sample ID	Sample Site	Sampling Date	Taxa	Algal Group	Counting Unit	Cells/Unit	Species Units/mL	Species Cells/mL	Group Total Units/mL	Group Total Cells/mL	Sample Total Units/mL	Sample Total Cells/mL
AF71976-M0235	Willow WTP #178123	9/8/2020	centric diatom sp.	Bacillariophyceae	cell	1	39	39	48	48	3,619	17,541
AF71976-M0235	Willow WTP #178123	9/8/2020	Nitzschia sp.	Bacillariophyceae	cell	1	3	3				
AF71976-M0235	Willow WTP #178123	9/8/2020	Nitzschia sp.	Bacillariophyceae	cell	1	3	3				
AF71976-M0235	Willow WTP #178123	9/8/2020	pennate diatom sp.	Bacillariophyceae	cell	1	3	3				
AF71976-M0235	Willow WTP #178123	9/8/2020	Amphora sp.	Bacillariophyceae	cell	1	0.1	0.1				
AF71976-M0235	Willow WTP #178123	9/8/2020	Nitzschia sp.	Bacillariophyceae	cell	1	0.1	0.1				
AF71976-M0235	Willow WTP #178123	9/8/2020	pennate diatom sp.	Bacillariophyceae	cell	1	0.1	0.1				
AF71976-M0235	Willow WTP #178123	9/8/2020	Navicula sp.	Bacillariophyceae	cell	1	0.1	0.1				
AF71976-M0235	Willow WTP #178123	9/8/2020	Cosmarium sp.	Charophyta	cell	1	3	3	3	3		
AF71976-M0235	Willow WTP #178123	9/8/2020	Staurastrum sp.	Charophyta	cell	1	0.1	0.1				
AF71976-M0235	Willow WTP #178123	9/8/2020	chlorophyte unicell, oval spp.	Chlorophyta	cell	1	1,610	1,610	2,355	2,678		
AF71976-M0235	Willow WTP #178123	9/8/2020	chlorophyte unicell, sphere spp.	Chlorophyta	cell	1	380	380				
AF71976-M0235	Willow WTP #178123	9/8/2020	Oocystis spp. (unicell)	Chlorophyta	cell	1	105	105				
AF71976-M0235	Willow WTP #178123	9/8/2020	Fusola viridis	Chlorophyta	colony	2	52	105				
AF71976-M0235	Willow WTP #178123	9/8/2020	chlorophyte tetrad spp.	Chlorophyta	colony	4	26	105				
AF71976-M0235	Willow WTP #178123	9/8/2020	chlorophyte cell pair spp.	Chlorophyta	colony	2	52	105				
AF71976-M0235	Willow WTP #178123	9/8/2020	chlorophyte colony sp.	Chlorophyta	colony	7	13	92				
AF71976-M0235	Willow WTP #178123	9/8/2020	Crucigenia/Tetrastrum sp.	Chlorophyta	colony	8	6	45				
AF71976-M0235	Willow WTP #178123	9/8/2020	Nephrochlamys sp.	Chlorophyta	cell	1	26	26				
AF71976-M0235	Willow WTP #178123	9/8/2020	chlorophyte flagellate sp.	Chlorophyta	cell	1	26	26				
AF71976-M0235	Willow WTP #178123	9/8/2020	Tetraedron minimum	Chlorophyta	cell	1	26	26				
AF71976-M0235	Willow WTP #178123	9/8/2020	Pseudodidymocystis fina	Chlorophyta	colony	2	8	17				
AF71976-M0235	Willow WTP #178123	9/8/2020	Monoraphidium circinale	Chlorophyta	cell	1	13	13				
AF71976-M0235	Willow WTP #178123	9/8/2020	chlorophyte colony sp.	Chlorophyta	colony	3	3	8				
AF71976-M0235	Willow WTP #178123	9/8/2020	Desmodesmus spp. (2-celled)	Chlorophyta	colony	2	3	6				
AF71976-M0235	Willow WTP #178123	9/8/2020	Didymocystis/Pseudodidymocystis sp.	Chlorophyta	colony	2	3	6				
AF71976-M0235	Willow WTP #178123	9/8/2020	chlorophyte unicell sp.	Chlorophyta	cell	1	3	3				
AF71976-M0235	Willow WTP #178123	9/8/2020	Botryococcus sp.	Chlorophyta	colony	36	0.1	2				
AF71976-M0235	Willow WTP #178123	9/8/2020	chlorophyte unicell sp.	Chlorophyta	cell	1	0.1	0.1				
AF71976-M0235	Willow WTP #178123	9/8/2020	chrysophyte flagellate sp.	Chrysophyceae	cell	1	79	79	94	94		
AF71976-M0235	Willow WTP #178123	9/8/2020	chrysophyte flagellate sp.	Chrysophyceae	cell	1	13	13				
AF71976-M0235	Willow WTP #178123	9/8/2020	chrysophyte flagellate sp.	Chrysophyceae	cell	1	3	3				
AF71976-M0235	Willow WTP #178123	9/8/2020	Aphanocapsa delicatissima	Cyanobacteria	colony	18	327	5,890	660	14,260		
AF71976-M0235	Willow WTP #178123	9/8/2020	Aphanocapsa sp.	Cyanobacteria	colony	26	131	3,403				
AF71976-M0235	Willow WTP #178123	9/8/2020	Anathece sp.	Cyanobacteria	colony	94	26	2,461				
AF71976-M0235	Willow WTP #178123	9/8/2020	Coelosphaerium sp.	Cyanobacteria	colony	38	39	1,492				
AF71976-M0235	Willow WTP #178123	9/8/2020	Cyanodictyon sp.	Cyanobacteria	colony	15	26	393				
AF71976-M0235	Willow WTP #178123	9/8/2020	Aphanocapsa sp.	Cyanobacteria	colony	20	13	262				
AF71976-M0235	Willow WTP #178123	9/8/2020	cyanophyte tetrad spp.	Cyanobacteria	colony	4	65	262				
AF71976-M0235	Willow WTP #178123	9/8/2020	Pseudanabaena sp.	Cyanobacteria	filament	10	6	56				
AF71976-M0235	Willow WTP #178123	9/8/2020	cyanophyte unicell, oval/rod spp.	Cyanobacteria	cell	1	26	26				
AF71976-M0235	Willow WTP #178123	9/8/2020	Aphanocapsa incerta	Cyanobacteria	colony	110	0.1	15				
AF71976-M0235	Willow WTP #178123	9/8/2020	dinoflagellate sp.	Dinophyceae	cell	1	0.2	0.2	0.2	0.2		
AF71976-M0235	Willow WTP #178123	9/8/2020	unknown flagellate spp.	Unknown	cell	1	380	380	458	458		
AF71976-M0235	Willow WTP #178123	9/8/2020	microflagellate spp.	Unknown	cell	1	39	39				
AF71976-M0235	Willow WTP #178123	9/8/2020	unknown unicell, oval spp.	Unknown	cell	1	26	26				
AF71976-M0235	Willow WTP #178123	9/8/2020	unknown unicell, sphere spp.	Unknown	cell	1	13	13				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	centric diatom sp.	Bacillariophyceae	cell	1	2,304	2,304	2,577	2,684	5,449	22,224
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Fragilaria sp.	Bacillariophyceae	cell	1	175	175				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Diatoma tenuis	Bacillariophyceae	colony	4	35	140				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Nitzschia sp.	Bacillariophyceae	cell	1	35	35				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Nitzschia sp.	Bacillariophyceae	cell	1	17	17				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	pennate diatom sp.	Bacillariophyceae	cell	1	3	3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Urosolenia sp.	Bacillariophyceae	cell	1	3	3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	centric diatom sp.	Bacillariophyceae	cell	1	3	3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Navicula sp.	Bacillariophyceae	cell	1	3	3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Fragilaria sp.	Bacillariophyceae	colony	5	0.4	2				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	centric diatom chain sp.	Bacillariophyceae	chain	4	0.1	0.3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	pennate diatom sp.	Bacillariophyceae	cell	1	0.1	0.1				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Cosmarium sp.	Charophyta	cell	1	8	8	12	12		

Sample ID	Sample Site	Sampling Date	Taxa	Algal Group	Counting Unit	Cells/Unit	Species	Species	Group Total	Group Total	Sample Total	Sample Total
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Staurastrum sp.	Charophyta	cell	1	3	3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Staurastrum sp.	Charophyta	cell	1	0.3	0.3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Staurastrum sp.	Charophyta	cell	1	0.1	0.1				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Staurastrum sp.	Charophyta	cell	1	0.1	0.1				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	chlorophyte unicell, oval spp.	Chlorophyta	cell	1	436	436	1,305	1,726		
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	chlorophyte unicell, sphere spp.	Chlorophyta	cell	1	332	332				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Fusola viridis	Chlorophyta	colony	2	70	140				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Koliella longiseta	Chlorophyta	cell	1	87	87				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Lagerheimia genevensis	Chlorophyta	cell	1	87	87				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Desmodesmus spp. (2-celled)	Chlorophyta	colony	2	35	70				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Tetraedron minimum	Chlorophyta	cell	1	70	70				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Desmodesmus abundans	Chlorophyta	colony	4	17	70				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	chlorophyte colony sp.	Chlorophyta	colony	4	17	70				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Ankistrodesmus spiralis	Chlorophyta	colony	3	19	58				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Nephrochlamys sp.	Chlorophyta	cell	1	35	35				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Didymocystis/Pseudodidymocystis sp.	Chlorophyta	colony	2	17	35				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	chlorophyte cell pair spp.	Chlorophyta	colony	2	17	35				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	chlorophyte colony sp.	Chlorophyta	colony	10	3	28				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Pseudodidymocystis fina	Chlorophyta	colony	2	11	22				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Desmodesmus communis	Chlorophyta	colony	4	6	22				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Kirchneriella irregularis	Chlorophyta	colony	8	3	22				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Stichococcus sp.	Chlorophyta	filament	35	1	19				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Oocystis spp. (unicell)	Chlorophyta	cell	1	17	17				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Oocystis parva	Chlorophyta	colony	2	6	11				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Scenedesmus sp.	Chlorophyta	colony	4	3	11				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Oocystis pusilla	Chlorophyta	colony	3	3	8				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Pseudopediastrum boryanum	Chlorophyta	colony	19	0.4	8				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Botryococcus sp.	Chlorophyta	colony	108	0.1	7				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Planctonema lauterbornii	Chlorophyta	filament	49	0.1	7				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Pseudodidymocystis planctonica	Chlorophyta	colony	2	3	6				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Oocystis lacustris	Chlorophyta	colony	2	3	6				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Ankistrodesmus spiralis	Chlorophyta	cell	1	3	3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Monoraphidium contortum	Chlorophyta	cell	1	3	3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Coelastrum pseudomicroporum	Chlorophyta	colony	16	0.1	1				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Oedogonium sp.	Chlorophyta	filament	12	0.1	1				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Oocystis sp.	Chlorophyta	colony	2	0.1	0.1				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Monoraphidium sp.	Chlorophyta	cell	1	0.1	0.1				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	chrysophyte flagellate sp.	Chrysophyceae	cell	1	52	52	84	84		
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Dinobryon sp.	Chrysophyceae	cell	1	17	17				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Dinobryon sp.	Chrysophyceae	cell	1	8	8				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Dinobryon sp.	Chrysophyceae	cell	1	3	3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Chromulina sp.	Chrysophyceae	cell	1	3	3				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	cryptophyte sp.	Cryptophyta	cell	1	3	3	3	3		
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Aphanocapsa delicatissima	Cyanobacteria	colony	17	419	7,121	1,222	17,452		
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Aphanocapsa sp.	Cyanobacteria	colony	14	314	4,398				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Anathece sp.	Cyanobacteria	colony	12	192	2,304				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Aphanocapsa incerta	Cyanobacteria	colony	25	87	2,182				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	cyanophyte tetrad spp.	Cyanobacteria	colony	4	140	559				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Cyanodictyon sp.	Cyanobacteria	colony	7	35	244				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Cyanodictyon planctonicum	Cyanobacteria	colony	10	17	175				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Coelomoron sp.	Cyanobacteria	colony	52	3	145				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Aphanocapsa cf. elachista	Cyanobacteria	colony	50	3	139				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Eucapsis sp.	Cyanobacteria	colony	14	6	78				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Radiocystis elongata	Cyanobacteria	colony	86	1	46				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	oscillatorialean filament sp.	Cyanobacteria	filament	8	3	22				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Anathece sp.	Cyanobacteria	colony	315	0.1	21				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Pseudanabaena mucicola	Cyanobacteria	filament	3	3	8				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Aphanothece sp.	Cyanobacteria	colony	120	0.1	8				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	cf. Phormidium sp.	Cyanobacteria	filament	37	0.1	2				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	Dinoflagellate sp.	Dinophyceae	cell	1	0.1	0.1	0.1	0.1		
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	unknown unicell, sphere spp.	Unknown	cell	1	87	87	247	264		

Sample ID	Sample Site	Sampling Date	Taxa	Algal Group	Counting Unit	Cells/Unit	Species	Species	Group Total	Group Total	Sample Total	Sample Total
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	microflagellate spp.	Unknown	cell	1	70	70				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	unknown flagellate spp.	Unknown	cell	1	70	70				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	unknown colony sp.	Unknown	colony	7	3	19				
AF71986-M0015/R0056	Willow WTP and Willow WQ	9/9/2020	unknown unicell, oval spp.	Unknown	cell	1	17	17				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	centric diatom sp.	Bacillariophyceae	cell	1	775	775	1,273	1,724	2,833	11,502
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Diatoma tenuis	Bacillariophyceae	colony	4	136	545				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Fragilaria sp.	Bacillariophyceae	cell	1	283	283				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	centric diatom chain sp.	Bacillariophyceae	chain	3	21	63				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	centric diatom sp.	Bacillariophyceae	cell	1	31	31				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	pennate diatom sp.	Bacillariophyceae	cell	1	10	10				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Navicula sp.	Bacillariophyceae	cell	1	10	10				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Nitzschia sp.	Bacillariophyceae	cell	1	3	3				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Nitzschia sp.	Bacillariophyceae	cell	1	3	3				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Fragilaria sp.	Bacillariophyceae	colony	6	0.1	1				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Cosmarium sp.	Charophyta	cell	1	63	63	76	76		
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Cosmarium sp.	Charophyta	cell	1	10	10				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Cosmarium sp.	Charophyta	cell	1	3	3				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Teilingia sp.	Charophyta	filament	2	0.1	0.3				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	chlorophyte unicell, sphere spp.	Chlorophyta	cell	1	251	251	639	876		
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	chlorophyte unicell, oval spp.	Chlorophyta	cell	1	157	157				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Mychonastes sp.	Chlorophyta	colony	12	10	126				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Tetraedron minimum	Chlorophyta	cell	1	63	63				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Oocystis spp. (unicell)	Chlorophyta	cell	1	52	52				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	chlorophyte colony sp.	Chlorophyta	colony	4	10	42				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	chlorophyte cell pair spp.	Chlorophyta	colony	2	21	42				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Pseudodidymocystis fina	Chlorophyta	colony	2	10	21				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	chlorophyte unicell sp.	Chlorophyta	cell	1	21	21				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Botryococcus sp.	Chlorophyta	colony	43	0.5	20				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Tetraedrus lagerheimii	Chlorophyta	colony	4	3	11				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	chlorophyte colony sp.	Chlorophyta	colony	4	3	11				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Chlamydomonas sp.	Chlorophyta	cell	1	10	10				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Nephrochlamys sp.	Chlorophyta	cell	1	10	10				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Eudorina elegans	Chlorophyta	colony	20	0.3	7				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Stichococcus sp.	Chlorophyta	filament	44	0.1	6				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Kirchneriella obesa	Chlorophyta	colony	2	3	6				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Mucidosphaerium pulchellum	Chlorophyta	colony	2	3	6				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Fusola viridis	Chlorophyta	cell	1	6	6				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	chlorophyte unicell sp.	Chlorophyta	cell	1	3	3				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Kirchneriella irregularis	Chlorophyta	colony	32	0.1	2				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Oedogonium sp.	Chlorophyta	filament	29	0.1	2				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Coenochloris foitii	Chlorophyta	colony	8	0.1	1				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Desmodesmus sp.	Chlorophyta	colony	8	0.1	1				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Desmodesmus sp.	Chlorophyta	colony	4	0.1	0.3				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Ochromonas sp.	Chrysophyceae	cell	1	42	42	82	96		
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Dinobyron sp.	Chrysophyceae	colony	6	3	17				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	chrysophyte flagellate sp.	Chrysophyceae	cell	1	10	10				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Chrysococcus sp.	Chrysophyceae	cell	1	10	10				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	chrysophyte statocyst sp.	Chrysophyceae	cell	1	10	10				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Dinobyron sp.	Chrysophyceae	cell	1	3	3				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Dinobyron sp.	Chrysophyceae	cell	1	3	3				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Aphanocapsa incerta	Cyanobacteria	colony	26	136	3,539	386	8,269		
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Aphanocapsa delicatissima	Cyanobacteria	colony	21	105	2,199				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	oscillatorial filament sp.	Cyanobacteria	filament	62	19	1,209				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Aphanocapsa sp.	Cyanobacteria	colony	13	42	545				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Cyanodictyon sp.	Cyanobacteria	colony	16	21	335				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Anathece sp.	Cyanobacteria	colony	14	10	147				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Eucapsis sp.	Cyanobacteria	colony	13	10	136				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	cyanophyte tetrad spp.	Cyanobacteria	colony	4	21	84				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Woronichinia elorantae	Cyanobacteria	colony	161	0.2	32				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Pseudanabaena mucicola	Cyanobacteria	filament	2	10	21				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Snowella lacustris	Cyanobacteria	colony	175	0.1	12				

Sample ID	Sample Site	Sampling Date	Taxa	Algal Group	Counting Unit	Cells/Unit	Species	Species	Group Total	Group Total	Sample Total	Sample Total
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	cyanophyte unicell, sphere spp.	Cyanobacteria	cell	1	10	10				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	Eucapsis sp.	Cyanobacteria	colony	2	0.1	0.1				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	dinoflagellate sp.	Dinophyceae	cell	1	1	1	1	1		
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	dinoflagellate sp.	Dinophyceae	cell	1	0.1	0.1				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	dinoflagellate sp.	Dinophyceae	cell	1	0.1	0.1				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	unknown unicell, sphere spp.	Unknown	cell	1	147	147	377	461		
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	unknown flagellate spp.	Unknown	cell	1	147	147				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	unknown colony sp.	Unknown	colony	9	10	94				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	unknown unicell, oval spp.	Unknown	cell	1	42	42				
AF71889-L9911	Willow WTP and Willow WQ	9/9/2020	microflagellate spp.	Unknown	cell	1	31	31				



PO Box 340043 | Prudhoe Bay, AK 99734 | PHONE: (907) 659-2145 | FAX: (907) 659-2146 | www.arcticfoxenv.com

Client Name and Address: MICHAEL BAKER INTERNATIONAL 3900 CST, SUITE 900 ANCHORAGE, AK 99503 Contact Person: DEVON ROE 231-730-0596					Account Number:					Number of Containers	HCL	HCL	HNO3	← Preservative
Phone Number: 907-273-1464 Fax Number:					P.O. or Contract Number:									
E-mail: DEVON.ROE@MBAKERINTL.COM					Authorization Number:									
Project Name: WILLOW WQ					Sampled By: DR LSAO									
Data Deliverables: Level I <input type="checkbox"/> Level II <input type="checkbox"/> Level III <input type="checkbox"/> EDD/Format:					PWS Number:									
Requested Turnaround Time and Special Instructions:					Send Results to ADEC: <input type="checkbox"/> YES <input type="checkbox"/> No									
Client Sample ID	Date Sampled	Time Sampled	Matrix	AF Sample ID	DRO/RRO		DRO/RRO SILICA GEL		TOTAL METALS	PFAS	Remarks			
M0305 - PFAS	9/10/20	9:30	GARB	AF71994	1					2				
M0305	↓	10:40	C	AF71997	1	1	1							
MM1767 - PFAS		12:10		AF71995						2				
MM1767		13:30		AF71998	1	1	1							
M0305 - PFAS DUP		9:32		AF71996							2			
M0305 DUP		10:45		AF71999	1	1	1							
Relinquished By (1):	Date: 9/11/20	Time: 9:04	Received By:	9/11/20 1400	TO BE COMPLETED BY LABORATORY									
Relinquished By (2):	Date:	Time:	Received By:		Location Received/ ANC <input type="checkbox"/> °C FBK <input type="checkbox"/> °C PB <input checked="" type="checkbox"/> 0.5 °C Temp on Arrival: 3178									
Relinquished By (3):	Date:	Time:	Received for lab by:		Chain of Custody Seal <input type="checkbox"/> INTACT <input type="checkbox"/> BROKEN <input type="checkbox"/> ABSENT									
				Shipping Bill Number: _____										





# Arctic Fox Environmental, Inc.

PO Box 340043 | Prudhoe Bay, AK 99734 | PHONE: (907) 659-2145 | FAX: (907) 659-2146 | [www.arcticfoxenv.com](http://www.arcticfoxenv.com)

---

Michael Baker International  
3900 C St Ste 900  
Anchorage, AK 99503

Attn: Devon Roe / Haley Runa  
Phone: (907) 273-1666

Email: [Devon.Roe@mbakerintl.com](mailto:Devon.Roe@mbakerintl.com)  
[Haley.Runa@mbakerintl.com](mailto:Haley.Runa@mbakerintl.com)

AF Lab #: AF71994  
Client Sample ID: M0305-PFAS  
Location/Project: Willow WQ  
COC#: 90081  
Sample Matrix: Liquid

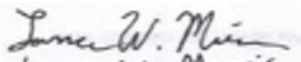
Report Date: 10/1/2020  
Date Arrived: 9/11/2020  
Date Sampled: 9/10/2020  
Time Sampled: 0930  
Collected By: DTR & SAO

#### Flag Definitions

MDL = Method Reporting Limit  
B = Below Regulatory Minimum  
H = Above Regulatory Maximum  
M = Matrix Interference  
J = Best Available Estimate  
U = Less Than Detection Limit  
D = Lost to Dilution

Comments: Attached are the results for analyses of your samples.  
These samples were analyzed by Eurofins in Tacoma, Washington.  
Tracking information is as follows:

Michael Baker Intl Sample ID: M0305-PFAS  
Analyses Requested: PFAS  
Arctic Fox ID: AF71994  
Time Sampled: 0930  
Matrix: Liquid  
Eurofins Lab ID: 580-97459-1



Lance W. Morris

---

Reported by: Ralph E. Allphin / Timothy D. Johnson / Lance W. Morris / Sky Allphin  
Arctic Fox Environmental, Inc.



# Arctic Fox Environmental, Inc.

PO Box 340043 | Prudhoe Bay, AK 99734 | PHONE: (907) 659-2145 | FAX: (907) 659-2146 | [www.arcticfoxenv.com](http://www.arcticfoxenv.com)

---

Michael Baker International  
3900 C St Ste 900  
Anchorage, AK 99503

Attn: Devon Roe / Haley Runa  
Phone: (907) 273-1666

Email: [Devon.Roe@mbakerintl.com](mailto:Devon.Roe@mbakerintl.com)  
[Haley.Runa@mbakerintl.com](mailto:Haley.Runa@mbakerintl.com)

AF Lab #: AF71995  
Client Sample ID: MM1707-PFAS  
Location/Project: Willow WQ  
COC#: 90081  
Sample Matrix: Liquid

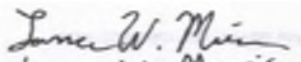
Report Date: 10/1/2020  
Date Arrived: 9/11/2020  
Date Sampled: 9/10/2020  
Time Sampled: 1210  
Collected By: DTR & SAO

#### Flag Definitions

MDL = Method Reporting Limit  
B = Below Regulatory Minimum  
H = Above Regulatory Maximum  
M = Matrix Interference  
J = Best Available Estimate  
U = Less Than Detection Limit  
D = Lost to Dilution

Comments: Attached are the results for analyses of your samples.  
These samples were analyzed by Eurofins in Tacoma, Washington.  
Tracking information is as follows:

Michael Baker Intl Sample ID: MM1707-PFAS  
Analyses Requested: PFAS  
Arctic Fox ID: AF71995  
Time Sampled: 1210  
Matrix: Liquid  
Eurofins Lab ID: 580-97459-2



Lance W. Morris

---

Reported by: Ralph E. Allphin / Timothy D. Johnson / Lance W. Morris / Sky Allphin  
Arctic Fox Environmental, Inc.



# Arctic Fox Environmental, Inc.

PO Box 340043 | Prudhoe Bay, AK 99734 | PHONE: (907) 659-2145 | FAX: (907) 659-2146 | [www.arcticfoxenv.com](http://www.arcticfoxenv.com)

---

Michael Baker International  
3900 C St Ste 900  
Anchorage, AK 99503

Attn: Devon Roe / Haley Runa  
Phone: (907) 273-1666

Email: [Devon.Roe@mbakerintl.com](mailto:Devon.Roe@mbakerintl.com)  
[Haley.Runa@mbakerintl.com](mailto:Haley.Runa@mbakerintl.com)

AF Lab #: AF71996  
Client Sample ID: M0305-PFAS Dup  
Location/Project: Willow WQ  
COC#: 90081  
Sample Matrix: Liquid

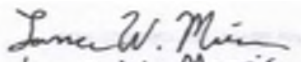
Report Date: 10/1/2020  
Date Arrived: 9/11/2020  
Date Sampled: 9/10/2020  
Time Sampled: 0932  
Collected By: DTR & SAO

#### Flag Definitions

MDL = Method Reporting Limit  
B = Below Regulatory Minimum  
H = Above Regulatory Maximum  
M = Matrix Interference  
J = Best Available Estimate  
U = Less Than Detection Limit  
D = Lost to Dilution

Comments: Attached are the results for analyses of your samples.  
These samples were analyzed by Eurofins in Tacoma, Washington.  
Tracking information is as follows:

Michael Baker Intl Sample ID: M0305-PFAS Dup  
Analyses Requested: PFAS  
Arctic Fox ID: AF71996  
Time Sampled: 0932  
Matrix: Liquid  
Eurofins Lab ID: 580-97459-3



Lance W. Morris

---

Reported by: Ralph E. Allphin / Timothy D. Johnson / Lance W. Morris / Sky Allphin  
Arctic Fox Environmental, Inc.



# Arctic Fox Environmental, Inc.

PO Box 340043 | Prudhoe Bay, AK 99734 | PHONE: (907) 659-2145 | FAX: (907) 659-2146 | www.arcticfoxenv.com

Michael Baker International  
3900 C St Ste 900  
Anchorage, AK 99503

Attn: Devon Roe / Haley Runa  
Phone: (907) 273-1666

Email: [Devon.Roe@mbakerintl.com](mailto:Devon.Roe@mbakerintl.com)  
[Haley.Runa@mbakerintl.com](mailto:Haley.Runa@mbakerintl.com)

AF Lab #: AF71997  
Client Sample ID: M0305  
Location/Project: Willow WQ  
COC#: 90081  
Sample Matrix: Liquid

Report Date: 10/1/2020  
Date Arrived: 9/11/2020  
Date Sampled: 9/10/2020  
Time Sampled: 1040  
Collected By: DTR & SAO

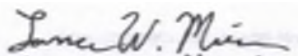
### Flag Definitions

MDL = Method Reporting Limit  
B = Below Regulatory Minimum  
H = Above Regulatory Maximum  
M = Matrix Interference  
J = Best Available Estimate  
U = Less Than Detection Limit  
D = Lost to Dilution

Comments: Attached are the results for analyses of your samples.  
Some samples were analyzed by Eurofins in Tacoma, Washington.  
Tracking information is as follows:

Michael Baker Intl Sample ID: M0305  
Analyses Requested: DRO RRO with Silica Gel cleanup  
Arctic Fox ID: AF71997  
Time Sampled: 1040  
Matrix: Liquid  
Eurofins Lab ID: 580-97459-4

Parameter	Result	Units	RL	RCRA Limits	Flag	Analysis Method	Analysis Date
<b>6020A Total Metals</b>							9/14/2020
Arsenic	<MRL	mg/l	0.010	5.0		6020A	
Barium	0.060	mg/l	0.050	100.0		6020A	
Cadmium	<MRL	mg/l	0.004	1.0		6020A	
Chromium	<MRL	mg/l	0.010	5.0		6020A	
Lead	<MRL	mg/l	0.008	5.0		6020A	
Mercury	<MRL	mg/l	0.003	0.200		6020A	
Selenium	<MRL	mg/l	0.080	1.0		6020A	
Silver	<MRL	mg/l	0.010	5.0		6020A	

  
Lance W. Morris

Reported by: Ralph E. Allphin / Timothy D. Johnson / Lance W. Morris / Sky Allphin  
Arctic Fox Environmental, Inc.



# Arctic Fox Environmental, Inc.

PO Box 340043 | Prudhoe Bay, AK 99734 | PHONE: (907) 659-2145 | FAX: (907) 659-2146 | www.arcticfoxenv.com

Michael Baker International  
3900 C St Ste 900  
Anchorage, AK 99503

Attn: Devon Roe / Haley Runa  
Phone: (907) 273-1666

Email: [Devon.Roe@mbakerintl.com](mailto:Devon.Roe@mbakerintl.com)  
[Haley.Runa@mbakerintl.com](mailto:Haley.Runa@mbakerintl.com)

AF Lab #: AF71998  
Client Sample ID: MM1707  
Location/Project: Willow WQ  
COC#: 90081  
Sample Matrix: Liquid

Report Date: 10/1/2020  
Date Arrived: 9/11/2020  
Date Sampled: 9/10/2020  
Time Sampled: 1313  
Collected By: DTR & SAO

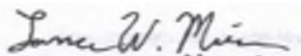
### Flag Definitions

MDL = Method Reporting Limit  
B = Below Regulatory Minimum  
H = Above Regulatory Maximum  
M = Matrix Interference  
J = Best Available Estimate  
U = Less Than Detection Limit  
D = Lost to Dilution

Comments: Attached are the results for analyses of your samples.  
Some samples were analyzed by Eurofins in Tacoma, Washington.  
Tracking information is as follows:

Michael Baker Intl Sample ID: MM1707  
Analyses Requested: DRO RRO with Silica Gel cleanup  
Arctic Fox ID: AF71998  
Time Sampled: 1313  
Matrix: Liquid  
Eurofins Lab ID: 580-97459-5

Parameter	Result	Units	RL	RCRA Limits	Flag	Analysis Method	Analysis Date
<b>6020A Total Metals</b>							9/14/2020
Arsenic	<MRL	mg/l	0.010	5.0		6020A	
Barium	0.073	mg/l	0.050	100.0		6020A	
Cadmium	<MRL	mg/l	0.004	1.0		6020A	
Chromium	0.012	mg/l	0.010	5.0		6020A	
Lead	<MRL	mg/l	0.008	5.0		6020A	
Mercury	<MRL	mg/l	0.003	0.200		6020A	
Selenium	<MRL	mg/l	0.080	1.0		6020A	
Silver	<MRL	mg/l	0.010	5.0		6020A	

  
Lance W. Morris

Reported by: Ralph E. Allphin / Timothy D. Johnson / Lance W. Morris / Sky Allphin  
Arctic Fox Environmental, Inc.



# Arctic Fox Environmental, Inc.

PO Box 340043 | Prudhoe Bay, AK 99734 | PHONE: (907) 659-2145 | FAX: (907) 659-2146 | www.arcticfoxenv.com

Michael Baker International  
3900 C St Ste 900  
Anchorage, AK 99503

Attn: Devon Roe / Haley Runa  
Phone: (907) 273-1666

Email: [Devon.Roe@mbakerintl.com](mailto:Devon.Roe@mbakerintl.com)  
[Haley.Runa@mbakerintl.com](mailto:Haley.Runa@mbakerintl.com)

AF Lab #: AF71999  
Client Sample ID: M0305 Dup  
Location/Project: Willow WQ  
COC#: 90081  
Sample Matrix: Liquid

Report Date: 10/1/2020  
Date Arrived: 9/11/2020  
Date Sampled: 9/10/2020  
Time Sampled: 1045  
Collected By: DTR & SAO

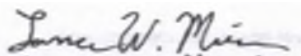
### Flag Definitions

MDL = Method Reporting Limit  
B = Below Regulatory Minimum  
H = Above Regulatory Maximum  
M = Matrix Interference  
J = Best Available Estimate  
U = Less Than Detection Limit  
D = Lost to Dilution

Comments: Attached are the results for analyses of your samples.  
Some samples were analyzed by Eurofins in Tacoma, Washington.  
Tracking information is as follows:

Michael Baker Intl Sample ID: M0305 Dup  
Analyses Requested: DRO RRO with Silica Gel cleanup  
Arctic Fox ID: AF71999  
Time Sampled: 1045  
Matrix: Liquid  
Eurofins Lab ID: 580-97459-6

Parameter	Result	Units	RL	RCRA Limits	Flag	Analysis Method	Analysis Date
<b>6020A Total Metals</b>							9/14/2020
Arsenic	<MRL	mg/l	0.010	5.0		6020A	
Barium	0.061	mg/l	0.050	100.0		6020A	
Cadmium	<MRL	mg/l	0.004	1.0		6020A	
Chromium	<MRL	mg/l	0.010	5.0		6020A	
Lead	<MRL	mg/l	0.008	5.0		6020A	
Mercury	<MRL	mg/l	0.003	0.200		6020A	
Selenium	<MRL	mg/l	0.080	1.0		6020A	
Silver	<MRL	mg/l	0.010	5.0		6020A	

  
Lance W. Morris

Reported by: Ralph E. Allphin / Timothy D. Johnson / Lance W. Morris / Sky Allphin  
Arctic Fox Environmental, Inc.

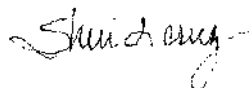
## ANALYTICAL REPORT

Eurofins TestAmerica, Seattle  
5755 8th Street East  
Tacoma, WA 98424  
Tel: (253)922-2310

Laboratory Job ID: 580-97459-1  
Client Project/Site: 0920-4663/Willow WQ

For:  
Arctic Fox Environmental, Inc  
Pouch 340043  
Prudhoe Bay, Alaska 99734

Attn: Arctic Fox



Authorized for release by:  
9/30/2020 2:30:57 PM

Sheri Cruz, Project Manager I  
(253)922-2310  
[Sheri.Cruz@Eurofinset.com](mailto:Sheri.Cruz@Eurofinset.com)

### LINKS

Review your project  
results through  
**Total Access**

Have a Question?



Visit us at:  
[www.eurofinsus.com/Env](http://www.eurofinsus.com/Env)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

1
2
3
4
5
6
7
8
9
10
11
12
13



# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Case Narrative . . . . .	3
Definitions . . . . .	4
Client Sample Results . . . . .	5
QC Sample Results . . . . .	14
Chronicle . . . . .	20
Certification Summary . . . . .	22
Sample Summary . . . . .	23
Chain of Custody . . . . .	24
Receipt Checklists . . . . .	26
Field Data Sheets . . . . .	28
Isotope Dilution Summary . . . . .	29



# Case Narrative

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4663/Willow WQ

Job ID: 580-97459-1

---

## Job ID: 580-97459-1

---

Laboratory: Eurofins TestAmerica, Seattle

### Narrative

---

#### Job Narrative 580-97459-1

#### Comments

No additional comments.

#### Receipt

The samples were received on 9/15/2020 11:00 AM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 0.1° C.

#### GC Semi VOA

Method AK102 & 103: The laboratory control sample duplicate (LCSD) for preparation batch 580-338587 and 580-338615 and analytical batch 580-338631 recovered outside control limits for the following analytes: RRO (nC25-nC36). These analytes were biased high in the LCSD and were not detected in the associated samples; therefore, the data have been reported.

Method AK102 & 103: The laboratory control sample (LCS) and / or laboratory control sample duplicate (LCSD) for preparation batch 580-338587 and analytical batch 580-338622 recovered outside control limits for the following analytes: RRO (nC25-nC36). These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### LCMS

Method EPA 537(Mod): The first level standard from the initial calibration curve is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5amu; therefore, detection of the analyte serves as verification that the assigned mass is within +/- 0.5amu of the true value, which meets the DoD/DOE QSM tune criterion.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### Organic Prep

Method 3510C: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP) associated with all samples in this batch so LCS and LCSD were used instead.

Method 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP) associated with preparation batch 320-413369.

Method Code: 3535\_PFC

Matrix: Water

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

# Definitions/Glossary

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4663/Willow WQ

Job ID: 580-97459-1

## Qualifiers

### GC Semi VOA

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# Client Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4663/Willow WQ

Job ID: 580-97459-1

**Client Sample ID: AF71994**

**Lab Sample ID: 580-97459-1**

**Date Collected: 09/10/20 09:30**

**Matrix: Water**

**Date Received: 09/15/20 11:00**

**Method: EPA 537(Mod) - PFAS for QSM 5.1, Table B-15**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		4.2		ng/L		09/17/20 18:25	09/18/20 16:10	1
Perfluoropentanoic acid (PFPeA)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:10	1
Perfluorohexanoic acid (PFHxA)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:10	1
Perfluoroheptanoic acid (PFHpA)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:10	1
Perfluorooctanoic acid (PFOA)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:10	1
Perfluorononanoic acid (PFNA)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:10	1
Perfluorodecanoic acid (PFDA)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:10	1
Perfluoroundecanoic acid (PFUnA)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:10	1
Perfluorododecanoic acid (PFDoA)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:10	1
Perfluorotridecanoic acid (PFTriA)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:10	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:10	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:10	1
Perfluoropentanesulfonic acid (PFPeS)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:10	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:10	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:10	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:10	1
Perfluorononanesulfonic acid (PFNS)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:10	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:10	1
Perfluorooctanesulfonamide (PFOSA)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:10	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		4.2		ng/L		09/17/20 18:25	09/18/20 16:10	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		4.2		ng/L		09/17/20 18:25	09/18/20 16:10	1
4:2 FTS	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:10	1
6:2 FTS	ND		4.2		ng/L		09/17/20 18:25	09/18/20 16:10	1
8:2 FTS	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:10	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:10	1
HFPO-DA (GenX)	ND		3.4		ng/L		09/17/20 18:25	09/18/20 16:10	1
9Cl-PF3ONS	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:10	1
11Cl-PF3OUdS	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:10	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	67		50 - 150	09/17/20 18:25	09/18/20 16:10	1
13C5 PFPeA	85		50 - 150	09/17/20 18:25	09/18/20 16:10	1
13C2 PFHxA	90		50 - 150	09/17/20 18:25	09/18/20 16:10	1
13C4 PFHpA	91		50 - 150	09/17/20 18:25	09/18/20 16:10	1
13C4 PFOA	91		50 - 150	09/17/20 18:25	09/18/20 16:10	1
13C5 PFNA	101		50 - 150	09/17/20 18:25	09/18/20 16:10	1
13C2 PFDA	100		50 - 150	09/17/20 18:25	09/18/20 16:10	1
13C2 PFUnA	96		50 - 150	09/17/20 18:25	09/18/20 16:10	1
13C2 PFDoA	90		50 - 150	09/17/20 18:25	09/18/20 16:10	1
13C2 PFTeDA	74		50 - 150	09/17/20 18:25	09/18/20 16:10	1
13C3 PFBS	86		50 - 150	09/17/20 18:25	09/18/20 16:10	1
18O2 PFHxS	89		50 - 150	09/17/20 18:25	09/18/20 16:10	1
13C4 PFOS	88		50 - 150	09/17/20 18:25	09/18/20 16:10	1
13C8 FOSA	91		50 - 150	09/17/20 18:25	09/18/20 16:10	1
d3-NMeFOSAA	81		50 - 150	09/17/20 18:25	09/18/20 16:10	1
d5-NEtFOSAA	82		50 - 150	09/17/20 18:25	09/18/20 16:10	1

Eurofins TestAmerica, Seattle

# Client Sample Results

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4663/Willow WQ

Job ID: 580-97459-1

**Client Sample ID: AF71994**

**Lab Sample ID: 580-97459-1**

**Date Collected: 09/10/20 09:30**

**Matrix: Water**

**Date Received: 09/15/20 11:00**

**Method: EPA 537(Mod) - PFAS for QSM 5.1, Table B-15 (Continued)**

<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
M2-6:2 FTS	115		50 - 150	09/17/20 18:25	09/18/20 16:10	1
M2-8:2 FTS	108		50 - 150	09/17/20 18:25	09/18/20 16:10	1
M2-4:2 FTS	106		50 - 150	09/17/20 18:25	09/18/20 16:10	1
13C3 HFPO-DA	84		50 - 150	09/17/20 18:25	09/18/20 16:10	1

# Client Sample Results

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4663/Willow WQ

Job ID: 580-97459-1

**Client Sample ID: AF71995**

**Lab Sample ID: 580-97459-2**

**Date Collected: 09/10/20 12:10**

**Matrix: Water**

**Date Received: 09/15/20 11:00**

**Method: EPA 537(Mod) - PFAS for QSM 5.1, Table B-15**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		4.4		ng/L		09/17/20 18:25	09/18/20 16:20	1
Perfluoropentanoic acid (PFPeA)	ND		1.8		ng/L		09/17/20 18:25	09/18/20 16:20	1
Perfluorohexanoic acid (PFHxA)	ND		1.8		ng/L		09/17/20 18:25	09/18/20 16:20	1
Perfluoroheptanoic acid (PFHpA)	ND		1.8		ng/L		09/17/20 18:25	09/18/20 16:20	1
Perfluorooctanoic acid (PFOA)	ND		1.8		ng/L		09/17/20 18:25	09/18/20 16:20	1
Perfluorononanoic acid (PFNA)	ND		1.8		ng/L		09/17/20 18:25	09/18/20 16:20	1
Perfluorodecanoic acid (PFDA)	ND		1.8		ng/L		09/17/20 18:25	09/18/20 16:20	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8		ng/L		09/17/20 18:25	09/18/20 16:20	1
Perfluorododecanoic acid (PFDoA)	ND		1.8		ng/L		09/17/20 18:25	09/18/20 16:20	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8		ng/L		09/17/20 18:25	09/18/20 16:20	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8		ng/L		09/17/20 18:25	09/18/20 16:20	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.8		ng/L		09/17/20 18:25	09/18/20 16:20	1
Perfluoropentanesulfonic acid (PFPeS)	ND		1.8		ng/L		09/17/20 18:25	09/18/20 16:20	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.8		ng/L		09/17/20 18:25	09/18/20 16:20	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.8		ng/L		09/17/20 18:25	09/18/20 16:20	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.8		ng/L		09/17/20 18:25	09/18/20 16:20	1
Perfluorononanesulfonic acid (PFNS)	ND		1.8		ng/L		09/17/20 18:25	09/18/20 16:20	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.8		ng/L		09/17/20 18:25	09/18/20 16:20	1
Perfluorooctanesulfonamide (PFOSA)	ND		1.8		ng/L		09/17/20 18:25	09/18/20 16:20	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		4.4		ng/L		09/17/20 18:25	09/18/20 16:20	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		4.4		ng/L		09/17/20 18:25	09/18/20 16:20	1
4:2 FTS	ND		1.8		ng/L		09/17/20 18:25	09/18/20 16:20	1
6:2 FTS	ND		4.4		ng/L		09/17/20 18:25	09/18/20 16:20	1
8:2 FTS	ND		1.8		ng/L		09/17/20 18:25	09/18/20 16:20	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.8		ng/L		09/17/20 18:25	09/18/20 16:20	1
HFPO-DA (GenX)	ND		3.5		ng/L		09/17/20 18:25	09/18/20 16:20	1
9Cl-PF3ONS	ND		1.8		ng/L		09/17/20 18:25	09/18/20 16:20	1
11Cl-PF3OUdS	ND		1.8		ng/L		09/17/20 18:25	09/18/20 16:20	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	67		50 - 150	09/17/20 18:25	09/18/20 16:20	1
13C5 PFPeA	83		50 - 150	09/17/20 18:25	09/18/20 16:20	1
13C2 PFHxA	86		50 - 150	09/17/20 18:25	09/18/20 16:20	1
13C4 PFHpA	90		50 - 150	09/17/20 18:25	09/18/20 16:20	1
13C4 PFOA	90		50 - 150	09/17/20 18:25	09/18/20 16:20	1
13C5 PFNA	101		50 - 150	09/17/20 18:25	09/18/20 16:20	1
13C2 PFDA	93		50 - 150	09/17/20 18:25	09/18/20 16:20	1
13C2 PFUnA	93		50 - 150	09/17/20 18:25	09/18/20 16:20	1
13C2 PFDoA	87		50 - 150	09/17/20 18:25	09/18/20 16:20	1
13C2 PFTeDA	73		50 - 150	09/17/20 18:25	09/18/20 16:20	1
13C3 PFBS	85		50 - 150	09/17/20 18:25	09/18/20 16:20	1
18O2 PFHxS	86		50 - 150	09/17/20 18:25	09/18/20 16:20	1
13C4 PFOS	86		50 - 150	09/17/20 18:25	09/18/20 16:20	1
13C8 FOSA	91		50 - 150	09/17/20 18:25	09/18/20 16:20	1
d3-NMeFOSAA	82		50 - 150	09/17/20 18:25	09/18/20 16:20	1
d5-NEtFOSAA	81		50 - 150	09/17/20 18:25	09/18/20 16:20	1

Eurofins TestAmerica, Seattle

# Client Sample Results

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4663/Willow WQ

Job ID: 580-97459-1

**Client Sample ID: AF71995**

**Lab Sample ID: 580-97459-2**

**Date Collected: 09/10/20 12:10**

**Matrix: Water**

**Date Received: 09/15/20 11:00**

**Method: EPA 537(Mod) - PFAS for QSM 5.1, Table B-15 (Continued)**

<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
M2-6:2 FTS	108		50 - 150	09/17/20 18:25	09/18/20 16:20	1
M2-8:2 FTS	103		50 - 150	09/17/20 18:25	09/18/20 16:20	1
M2-4:2 FTS	104		50 - 150	09/17/20 18:25	09/18/20 16:20	1
13C3 HFPO-DA	83		50 - 150	09/17/20 18:25	09/18/20 16:20	1

# Client Sample Results

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4663/Willow WQ

Job ID: 580-97459-1

**Client Sample ID: AF71996**

**Lab Sample ID: 580-97459-3**

**Date Collected: 09/10/20 09:32**

**Matrix: Water**

**Date Received: 09/15/20 11:00**

**Method: EPA 537(Mod) - PFAS for QSM 5.1, Table B-15**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		4.3		ng/L		09/17/20 18:25	09/18/20 16:29	1
Perfluoropentanoic acid (PFPeA)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:29	1
Perfluorohexanoic acid (PFHxA)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:29	1
Perfluoroheptanoic acid (PFHpA)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:29	1
Perfluorooctanoic acid (PFOA)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:29	1
Perfluorononanoic acid (PFNA)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:29	1
Perfluorodecanoic acid (PFDA)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:29	1
Perfluoroundecanoic acid (PFUnA)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:29	1
Perfluorododecanoic acid (PFDoA)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:29	1
Perfluorotridecanoic acid (PFTriA)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:29	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:29	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:29	1
Perfluoropentanesulfonic acid (PFPeS)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:29	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:29	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:29	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:29	1
Perfluorononanesulfonic acid (PFNS)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:29	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:29	1
Perfluorooctanesulfonamide (PFOSA)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:29	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		4.3		ng/L		09/17/20 18:25	09/18/20 16:29	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		4.3		ng/L		09/17/20 18:25	09/18/20 16:29	1
4:2 FTS	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:29	1
6:2 FTS	ND		4.3		ng/L		09/17/20 18:25	09/18/20 16:29	1
8:2 FTS	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:29	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:29	1
HFPO-DA (GenX)	ND		3.4		ng/L		09/17/20 18:25	09/18/20 16:29	1
9Cl-PF3ONS	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:29	1
11Cl-PF3OUdS	ND		1.7		ng/L		09/17/20 18:25	09/18/20 16:29	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	67		50 - 150	09/17/20 18:25	09/18/20 16:29	1
13C5 PFPeA	85		50 - 150	09/17/20 18:25	09/18/20 16:29	1
13C2 PFHxA	88		50 - 150	09/17/20 18:25	09/18/20 16:29	1
13C4 PFHpA	89		50 - 150	09/17/20 18:25	09/18/20 16:29	1
13C4 PFOA	91		50 - 150	09/17/20 18:25	09/18/20 16:29	1
13C5 PFNA	102		50 - 150	09/17/20 18:25	09/18/20 16:29	1
13C2 PFDA	96		50 - 150	09/17/20 18:25	09/18/20 16:29	1
13C2 PFUnA	103		50 - 150	09/17/20 18:25	09/18/20 16:29	1
13C2 PFDoA	88		50 - 150	09/17/20 18:25	09/18/20 16:29	1
13C2 PFTeDA	72		50 - 150	09/17/20 18:25	09/18/20 16:29	1
13C3 PFBS	86		50 - 150	09/17/20 18:25	09/18/20 16:29	1
18O2 PFHxS	86		50 - 150	09/17/20 18:25	09/18/20 16:29	1
13C4 PFOS	87		50 - 150	09/17/20 18:25	09/18/20 16:29	1
13C8 FOSA	91		50 - 150	09/17/20 18:25	09/18/20 16:29	1
d3-NMeFOSAA	84		50 - 150	09/17/20 18:25	09/18/20 16:29	1
d5-NEtFOSAA	84		50 - 150	09/17/20 18:25	09/18/20 16:29	1

Eurofins TestAmerica, Seattle

# Client Sample Results

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4663/Willow WQ

Job ID: 580-97459-1

**Client Sample ID: AF71996**

**Lab Sample ID: 580-97459-3**

**Date Collected: 09/10/20 09:32**

**Matrix: Water**

**Date Received: 09/15/20 11:00**

**Method: EPA 537(Mod) - PFAS for QSM 5.1, Table B-15 (Continued)**

<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
M2-6:2 FTS	113		50 - 150	09/17/20 18:25	09/18/20 16:29	1
M2-8:2 FTS	106		50 - 150	09/17/20 18:25	09/18/20 16:29	1
M2-4:2 FTS	100		50 - 150	09/17/20 18:25	09/18/20 16:29	1
13C3 HFPO-DA	85		50 - 150	09/17/20 18:25	09/18/20 16:29	1



# Client Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4663/Willow WQ

Job ID: 580-97459-1

**Client Sample ID: AF71997**

**Lab Sample ID: 580-97459-4**

**Date Collected: 09/10/20 10:40**

**Matrix: Water**

**Date Received: 09/15/20 11:00**

**Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (nC10-<nC25)	ND		0.13		mg/L		09/18/20 13:31	09/19/20 13:47	1
RRO (nC25-nC36)	ND	*	0.29		mg/L		09/18/20 13:31	09/19/20 13:47	1
RRO (nC25-nC36)	ND	*	0.29		mg/L		09/18/20 13:31	09/29/20 17:34	1
DRO (nC10-<nC25)	ND		0.13		mg/L		09/18/20 13:31	09/29/20 17:34	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
<i>o</i> -Terphenyl	81		50 - 150	09/18/20 13:31	09/29/20 17:34	1
<i>n</i> -Triacontane-d62	88		50 - 150	09/18/20 13:31	09/29/20 17:34	1
<i>o</i> -Terphenyl	87		50 - 150	09/18/20 13:31	09/19/20 13:47	1
<i>n</i> -Triacontane-d62	95		50 - 150	09/18/20 13:31	09/19/20 13:47	1

# Client Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4663/Willow WQ

Job ID: 580-97459-1

**Client Sample ID: AF71998**

**Lab Sample ID: 580-97459-5**

**Date Collected: 09/10/20 13:30**

**Matrix: Water**

**Date Received: 09/15/20 11:00**

**Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (nC10-<nC25)	ND		0.13		mg/L		09/18/20 13:31	09/19/20 14:07	1
RRO (nC25-nC36)	ND	*	0.30		mg/L		09/18/20 13:31	09/19/20 14:07	1
RRO (nC25-nC36)	ND	*	0.30		mg/L		09/18/20 13:31	09/29/20 18:16	1
DRO (nC10-<nC25)	ND		0.13		mg/L		09/18/20 13:31	09/29/20 18:16	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
<i>o</i> -Terphenyl	77		50 - 150	09/18/20 13:31	09/29/20 18:16	1
<i>n</i> -Triacontane-d62	88		50 - 150	09/18/20 13:31	09/29/20 18:16	1
<i>o</i> -Terphenyl	78		50 - 150	09/18/20 13:31	09/19/20 14:07	1
<i>n</i> -Triacontane-d62	84		50 - 150	09/18/20 13:31	09/19/20 14:07	1

# Client Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4663/Willow WQ

Job ID: 580-97459-1

**Client Sample ID: AF71999**

**Lab Sample ID: 580-97459-6**

**Date Collected: 09/10/20 10:45**

**Matrix: Water**

**Date Received: 09/15/20 11:00**

**Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (nC10-<nC25)	ND		0.13		mg/L		09/18/20 13:31	09/19/20 14:27	1
RRO (nC25-nC36)	ND	*	0.29		mg/L		09/18/20 13:31	09/19/20 14:27	1
RRO (nC25-nC36)	ND	*	0.29		mg/L		09/18/20 13:31	09/29/20 18:37	1
DRO (nC10-<nC25)	ND		0.13		mg/L		09/18/20 13:31	09/29/20 18:37	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
<i>o</i> -Terphenyl	79		50 - 150	09/18/20 13:31	09/29/20 18:37	1
<i>n</i> -Triacontane-d62	91		50 - 150	09/18/20 13:31	09/29/20 18:37	1
<i>o</i> -Terphenyl	82		50 - 150	09/18/20 13:31	09/19/20 14:27	1
<i>n</i> -Triacontane-d62	92		50 - 150	09/18/20 13:31	09/19/20 14:27	1

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4663/Willow WQ

Job ID: 580-97459-1

## Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC)

**Lab Sample ID: MB 580-338587/1-A**  
**Matrix: Water**  
**Analysis Batch: 338622**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 338587**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
RRO (nC25-nC36)	ND		0.25		mg/L		09/18/20 13:31	09/19/20 14:53	1
DRO (nC10-<nC25)	ND		0.11		mg/L		09/18/20 13:31	09/19/20 14:53	1
Surrogate	MB	MB	Limits			Prepared	Analyzed	Dil Fac	
	%Recovery	Qualifier							
<i>o</i> -Terphenyl	82		50 - 150			09/18/20 13:31	09/19/20 14:53	1	
<i>n</i> -Triacontane-d62	91		50 - 150			09/18/20 13:31	09/19/20 14:53	1	

**Lab Sample ID: MB 580-338587/1-B**  
**Matrix: Water**  
**Analysis Batch: 338631**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 338587**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
RRO (nC25-nC36)	ND		0.25		mg/L		09/18/20 13:31	09/19/20 12:46	1
DRO (nC10-<nC25)	ND		0.11		mg/L		09/18/20 13:31	09/19/20 12:46	1
Surrogate	MB	MB	Limits			Prepared	Analyzed	Dil Fac	
	%Recovery	Qualifier							
<i>o</i> -Terphenyl	81		50 - 150			09/18/20 13:31	09/19/20 12:46	1	
<i>n</i> -Triacontane-d62	85		50 - 150			09/18/20 13:31	09/19/20 12:46	1	

**Lab Sample ID: LCS 580-338587/2-A**  
**Matrix: Water**  
**Analysis Batch: 338622**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 338587**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
DRO (nC10-<nC25)	0.500	0.449		mg/L		90	75 - 125
Surrogate	LCS	LCS	Limits			%Rec	%Rec. Limits
	%Recovery	Qualifier					
<i>o</i> -Terphenyl	87		50 - 150				
<i>n</i> -Triacontane-d62	93		50 - 150				

**Lab Sample ID: LCS 580-338587/2-B**  
**Matrix: Water**  
**Analysis Batch: 338631**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 338587**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
DRO (nC10-<nC25)	0.500	0.444		mg/L		89	75 - 125
Surrogate	LCS	LCS	Limits			%Rec	%Rec. Limits
	%Recovery	Qualifier					
<i>o</i> -Terphenyl	83		50 - 150				
<i>n</i> -Triacontane-d62	79		50 - 150				

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4663/Willow WQ

Job ID: 580-97459-1

## Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC) (Continued)

**Lab Sample ID: LCSD 580-338587/3-A**  
**Matrix: Water**  
**Analysis Batch: 338622**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 338587**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
RRO (nC25-nC36)	0.500	0.613	*	mg/L		123	60 - 120	10	20
DRO (nC10-<nC25)	0.500	0.493		mg/L		99	75 - 125	9	20
<b>LCSD LCSD</b>									
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>						
<i>o</i> -Terphenyl	91		50 - 150						
<i>n</i> -Triacontane-d62	90		50 - 150						

**Lab Sample ID: LCSD 580-338587/3-B**  
**Matrix: Water**  
**Analysis Batch: 338631**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 338587**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
RRO (nC25-nC36)	0.500	0.653	*	mg/L		131	60 - 120	14	20
DRO (nC10-<nC25)	0.500	0.505		mg/L		101	75 - 125	13	20
<b>LCSD LCSD</b>									
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>						
<i>o</i> -Terphenyl	94		50 - 150						
<i>n</i> -Triacontane-d62	90		50 - 150						

## Method: EPA 537(Mod) - PFAS for QSM 5.1, Table B-15

**Lab Sample ID: MB 320-413369/1-A**  
**Matrix: Water**  
**Analysis Batch: 413868**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 413369**

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Perfluorobutanoic acid (PFBA)	ND		5.0		ng/L		09/17/20 18:25	09/18/20 15:43	1
Perfluoropentanoic acid (PFPeA)	ND		2.0		ng/L		09/17/20 18:25	09/18/20 15:43	1
Perfluorohexanoic acid (PFHxA)	ND		2.0		ng/L		09/17/20 18:25	09/18/20 15:43	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0		ng/L		09/17/20 18:25	09/18/20 15:43	1
Perfluorooctanoic acid (PFOA)	ND		2.0		ng/L		09/17/20 18:25	09/18/20 15:43	1
Perfluorononanoic acid (PFNA)	ND		2.0		ng/L		09/17/20 18:25	09/18/20 15:43	1
Perfluorodecanoic acid (PFDA)	ND		2.0		ng/L		09/17/20 18:25	09/18/20 15:43	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0		ng/L		09/17/20 18:25	09/18/20 15:43	1
Perfluorododecanoic acid (PFDoA)	ND		2.0		ng/L		09/17/20 18:25	09/18/20 15:43	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0		ng/L		09/17/20 18:25	09/18/20 15:43	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0		ng/L		09/17/20 18:25	09/18/20 15:43	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0		ng/L		09/17/20 18:25	09/18/20 15:43	1
Perfluoropentanesulfonic acid (PFPeS)	ND		2.0		ng/L		09/17/20 18:25	09/18/20 15:43	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0		ng/L		09/17/20 18:25	09/18/20 15:43	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		2.0		ng/L		09/17/20 18:25	09/18/20 15:43	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0		ng/L		09/17/20 18:25	09/18/20 15:43	1
Perfluorononanesulfonic acid (PFNS)	ND		2.0		ng/L		09/17/20 18:25	09/18/20 15:43	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.0		ng/L		09/17/20 18:25	09/18/20 15:43	1
Perfluorooctanesulfonamide (PFOSA)	ND		2.0		ng/L		09/17/20 18:25	09/18/20 15:43	1

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4663/Willow WQ

Job ID: 580-97459-1

## Method: EPA 537(Mod) - PFAS for QSM 5.1, Table B-15 (Continued)

**Lab Sample ID: MB 320-413369/1-A**  
**Matrix: Water**  
**Analysis Batch: 413868**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 413369**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		5.0		ng/L		09/17/20 18:25	09/18/20 15:43	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		5.0		ng/L		09/17/20 18:25	09/18/20 15:43	1
4:2 FTS	ND		2.0		ng/L		09/17/20 18:25	09/18/20 15:43	1
6:2 FTS	ND		5.0		ng/L		09/17/20 18:25	09/18/20 15:43	1
8:2 FTS	ND		2.0		ng/L		09/17/20 18:25	09/18/20 15:43	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.0		ng/L		09/17/20 18:25	09/18/20 15:43	1
HFPO-DA (GenX)	ND		4.0		ng/L		09/17/20 18:25	09/18/20 15:43	1
9CI-PF3ONS	ND		2.0		ng/L		09/17/20 18:25	09/18/20 15:43	1
11CI-PF3OUdS	ND		2.0		ng/L		09/17/20 18:25	09/18/20 15:43	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	87		50 - 150	09/17/20 18:25	09/18/20 15:43	1
13C5 PFPeA	90		50 - 150	09/17/20 18:25	09/18/20 15:43	1
13C2 PFHxA	88		50 - 150	09/17/20 18:25	09/18/20 15:43	1
13C4 PFHpA	92		50 - 150	09/17/20 18:25	09/18/20 15:43	1
13C4 PFOA	93		50 - 150	09/17/20 18:25	09/18/20 15:43	1
13C5 PFNA	101		50 - 150	09/17/20 18:25	09/18/20 15:43	1
13C2 PFDA	98		50 - 150	09/17/20 18:25	09/18/20 15:43	1
13C2 PFUnA	94		50 - 150	09/17/20 18:25	09/18/20 15:43	1
13C2 PFDoA	87		50 - 150	09/17/20 18:25	09/18/20 15:43	1
13C2 PFTeDA	88		50 - 150	09/17/20 18:25	09/18/20 15:43	1
13C3 PFBS	89		50 - 150	09/17/20 18:25	09/18/20 15:43	1
18O2 PFHxS	91		50 - 150	09/17/20 18:25	09/18/20 15:43	1
13C4 PFOS	91		50 - 150	09/17/20 18:25	09/18/20 15:43	1
13C8 FOSA	82		50 - 150	09/17/20 18:25	09/18/20 15:43	1
d3-NMeFOSAA	78		50 - 150	09/17/20 18:25	09/18/20 15:43	1
d5-NEtFOSAA	77		50 - 150	09/17/20 18:25	09/18/20 15:43	1
M2-6:2 FTS	110		50 - 150	09/17/20 18:25	09/18/20 15:43	1
M2-8:2 FTS	108		50 - 150	09/17/20 18:25	09/18/20 15:43	1
M2-4:2 FTS	108		50 - 150	09/17/20 18:25	09/18/20 15:43	1
13C3 HFPO-DA	83		50 - 150	09/17/20 18:25	09/18/20 15:43	1

**Lab Sample ID: LCS 320-413369/2-A**  
**Matrix: Water**  
**Analysis Batch: 413868**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 413369**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorobutanoic acid (PFBA)	40.0	42.4		ng/L		106	76 - 136
Perfluoropentanoic acid (PFPeA)	40.0	39.1		ng/L		98	71 - 131
Perfluorohexanoic acid (PFHxA)	40.0	41.7		ng/L		104	73 - 133
Perfluoroheptanoic acid (PFHpA)	40.0	40.0		ng/L		100	72 - 132
Perfluorooctanoic acid (PFOA)	40.0	43.2		ng/L		108	70 - 130
Perfluorononanoic acid (PFNA)	40.0	38.7		ng/L		97	75 - 135
Perfluorodecanoic acid (PFDA)	40.0	41.6		ng/L		104	76 - 136
Perfluoroundecanoic acid (PFUnA)	40.0	37.8		ng/L		95	68 - 128

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4663/Willow WQ

Job ID: 580-97459-1

## Method: EPA 537(Mod) - PFAS for QSM 5.1, Table B-15 (Continued)

**Lab Sample ID: LCS 320-413369/2-A**  
**Matrix: Water**  
**Analysis Batch: 413868**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 413369**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorododecanoic acid (PFDoA)	40.0	35.4		ng/L		88	71 - 131
Perfluorotridecanoic acid (PFTriA)	40.0	41.1		ng/L		103	71 - 131
Perfluorotetradecanoic acid (PFTeA)	40.0	39.6		ng/L		99	70 - 130
Perfluorobutanesulfonic acid (PFBS)	35.4	35.5		ng/L		100	67 - 127
Perfluoropentanesulfonic acid (PFPeS)	37.5	39.2		ng/L		105	66 - 126
Perfluorohexanesulfonic acid (PFHxS)	36.4	35.2		ng/L		97	59 - 119
Perfluoroheptanesulfonic Acid (PFHpS)	38.1	41.2		ng/L		108	76 - 136
Perfluorooctanesulfonic acid (PFOS)	37.1	39.7		ng/L		107	70 - 130
Perfluorononanesulfonic acid (PFNS)	38.4	39.2		ng/L		102	75 - 135
Perfluorodecanesulfonic acid (PFDS)	38.6	36.7		ng/L		95	71 - 131
Perfluorooctanesulfonamide (PFOSA)	40.0	42.8		ng/L		107	73 - 133
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	40.0	39.5		ng/L		99	76 - 136
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	40.0	39.8		ng/L		100	76 - 136
4:2 FTS	37.4	37.0		ng/L		99	79 - 139
6:2 FTS	37.9	36.2		ng/L		95	59 - 175
8:2 FTS	38.3	37.7		ng/L		98	75 - 135
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.7	37.5		ng/L		100	79 - 139
HFPO-DA (GenX)	40.0	41.2		ng/L		103	51 - 173
9CI-PF3ONS	37.3	35.1		ng/L		94	75 - 135
11CI-PF3OUdS	37.7	36.1		ng/L		96	54 - 114

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C4 PFBA	85		50 - 150
13C5 PFPeA	88		50 - 150
13C2 PFHxA	86		50 - 150
13C4 PFHpA	91		50 - 150
13C4 PFOA	88		50 - 150
13C5 PFNA	101		50 - 150
13C2 PFDA	104		50 - 150
13C2 PFUnA	105		50 - 150
13C2 PFDoA	111		50 - 150
13C2 PFTeDA	89		50 - 150
13C3 PFBS	89		50 - 150
18O2 PFHxS	89		50 - 150
13C4 PFOS	90		50 - 150
13C8 FOSA	88		50 - 150
d3-NMeFOSAA	86		50 - 150
d5-NEtFOSAA	86		50 - 150

Eurofins TestAmerica, Seattle

# QC Sample Results

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4663/Willow WQ

Job ID: 580-97459-1

## Method: EPA 537(Mod) - PFAS for QSM 5.1, Table B-15 (Continued)

**Lab Sample ID: LCS 320-413369/2-A**  
**Matrix: Water**  
**Analysis Batch: 413868**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 413369**

Isotope Dilution	LCS		Limits
	%Recovery	Qualifier	
M2-6:2 FTS	107		50 - 150
M2-8:2 FTS	107		50 - 150
M2-4:2 FTS	102		50 - 150
13C3 HFPO-DA	84		50 - 150

**Lab Sample ID: LCSD 320-413369/3-A**  
**Matrix: Water**  
**Analysis Batch: 413868**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 413369**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec.	RPD	RPD Limit
							Limits		
Perfluorobutanoic acid (PFBA)	40.0	41.5		ng/L		104	76 - 136	2	30
Perfluoropentanoic acid (PFPeA)	40.0	37.3		ng/L		93	71 - 131	5	30
Perfluorohexanoic acid (PFHxA)	40.0	40.7		ng/L		102	73 - 133	2	30
Perfluoroheptanoic acid (PFHpA)	40.0	38.8		ng/L		97	72 - 132	3	30
Perfluorooctanoic acid (PFOA)	40.0	42.0		ng/L		105	70 - 130	3	30
Perfluorononanoic acid (PFNA)	40.0	40.2		ng/L		100	75 - 135	4	30
Perfluorodecanoic acid (PFDA)	40.0	39.5		ng/L		99	76 - 136	5	30
Perfluoroundecanoic acid (PFUnA)	40.0	39.7		ng/L		99	68 - 128	5	30
Perfluorododecanoic acid (PFDoA)	40.0	37.3		ng/L		93	71 - 131	5	30
Perfluorotridecanoic acid (PFTriA)	40.0	38.1		ng/L		95	71 - 131	8	30
Perfluorotetradecanoic acid (PFTeA)	40.0	40.3		ng/L		101	70 - 130	2	30
Perfluorobutanesulfonic acid (PFBS)	35.4	34.8		ng/L		98	67 - 127	2	30
Perfluoropentanesulfonic acid (PFPeS)	37.5	37.1		ng/L		99	66 - 126	6	30
Perfluorohexanesulfonic acid (PFHxS)	36.4	34.7		ng/L		95	59 - 119	1	30
Perfluoroheptanesulfonic Acid (PFHpS)	38.1	41.0		ng/L		108	76 - 136	0	30
Perfluorooctanesulfonic acid (PFOS)	37.1	38.8		ng/L		104	70 - 130	2	30
Perfluorononanesulfonic acid (PFNS)	38.4	38.2		ng/L		99	75 - 135	2	30
Perfluorodecanesulfonic acid (PFDS)	38.6	37.1		ng/L		96	71 - 131	1	30
Perfluorooctanesulfonamide (PFOSA)	40.0	43.3		ng/L		108	73 - 133	1	30
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	40.0	38.8		ng/L		97	76 - 136	2	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	40.0	39.9		ng/L		100	76 - 136	0	30
4:2 FTS	37.4	35.0		ng/L		94	79 - 139	6	30
6:2 FTS	37.9	34.9		ng/L		92	59 - 175	4	30
8:2 FTS	38.3	38.2		ng/L		100	75 - 135	1	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.7	36.5		ng/L		97	79 - 139	3	30
HFPO-DA (GenX)	40.0	41.7		ng/L		104	51 - 173	1	30
9CI-PF3ONS	37.3	34.7		ng/L		93	75 - 135	1	30
11CI-PF3OUdS	37.7	37.4		ng/L		99	54 - 114	4	30

Eurofins TestAmerica, Seattle



# QC Sample Results

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4663/Willow WQ

Job ID: 580-97459-1

## Method: EPA 537(Mod) - PFAS for QSM 5.1, Table B-15 (Continued)

<i>Isotope Dilution</i>	<i>LCS D LCS D</i>		<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
13C4 PFBA	83		50 - 150
13C5 PFPeA	88		50 - 150
13C2 PFHxA	87		50 - 150
13C4 PFHpA	89		50 - 150
13C4 PFOA	86		50 - 150
13C5 PFNA	98		50 - 150
13C2 PFDA	99		50 - 150
13C2 PFUnA	99		50 - 150
13C2 PFDaA	106		50 - 150
13C2 PFTeDA	94		50 - 150
13C3 PFBS	87		50 - 150
18O2 PFHxS	87		50 - 150
13C4 PFOS	87		50 - 150
13C8 FOSA	83		50 - 150
d3-NMeFOSAA	84		50 - 150
d5-NEtFOSAA	85		50 - 150
M2-6:2 FTS	107		50 - 150
M2-8:2 FTS	103		50 - 150
M2-4:2 FTS	98		50 - 150
13C3 HFPO-DA	82		50 - 150

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13

# Lab Chronicle

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4663/Willow WQ

Job ID: 580-97459-1

**Client Sample ID: AF71994**

**Lab Sample ID: 580-97459-1**

**Date Collected: 09/10/20 09:30**

**Matrix: Water**

**Date Received: 09/15/20 11:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			413369	09/17/20 18:25	FX	TAL SAC
Total/NA	Analysis	EPA 537(Mod)		1	413868	09/18/20 16:10	RS1	TAL SAC

**Client Sample ID: AF71995**

**Lab Sample ID: 580-97459-2**

**Date Collected: 09/10/20 12:10**

**Matrix: Water**

**Date Received: 09/15/20 11:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			413369	09/17/20 18:25	FX	TAL SAC
Total/NA	Analysis	EPA 537(Mod)		1	413868	09/18/20 16:20	RS1	TAL SAC

**Client Sample ID: AF71996**

**Lab Sample ID: 580-97459-3**

**Date Collected: 09/10/20 09:32**

**Matrix: Water**

**Date Received: 09/15/20 11:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			413369	09/17/20 18:25	FX	TAL SAC
Total/NA	Analysis	EPA 537(Mod)		1	413868	09/18/20 16:29	RS1	TAL SAC

**Client Sample ID: AF71997**

**Lab Sample ID: 580-97459-4**

**Date Collected: 09/10/20 10:40**

**Matrix: Water**

**Date Received: 09/15/20 11:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			338587	09/18/20 13:31	JBT	TAL SEA
Total/NA	Cleanup	3630C			338615	09/18/20 13:31	JBT	TAL SEA
Total/NA	Analysis	AK102 & 103		1	338631	09/19/20 13:47	TL1	TAL SEA
Total/NA	Prep	3510C			338587	09/18/20 13:31	JBT	TAL SEA
Total/NA	Analysis	AK102 & 103		1	339487	09/29/20 17:34	ADB	TAL SEA

**Client Sample ID: AF71998**

**Lab Sample ID: 580-97459-5**

**Date Collected: 09/10/20 13:30**

**Matrix: Water**

**Date Received: 09/15/20 11:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			338587	09/18/20 13:31	JBT	TAL SEA
Total/NA	Cleanup	3630C			338615	09/18/20 13:31	JBT	TAL SEA
Total/NA	Analysis	AK102 & 103		1	338631	09/19/20 14:07	TL1	TAL SEA
Total/NA	Prep	3510C			338587	09/18/20 13:31	JBT	TAL SEA
Total/NA	Analysis	AK102 & 103		1	339487	09/29/20 18:16	ADB	TAL SEA

# Lab Chronicle

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4663/Willow WQ

Job ID: 580-97459-1

**Client Sample ID: AF71999**

**Lab Sample ID: 580-97459-6**

**Date Collected: 09/10/20 10:45**

**Matrix: Water**

**Date Received: 09/15/20 11:00**

<u>Prep Type</u>	<u>Batch Type</u>	<u>Batch Method</u>	<u>Run</u>	<u>Dilution Factor</u>	<u>Batch Number</u>	<u>Prepared or Analyzed</u>	<u>Analyst</u>	<u>Lab</u>
Total/NA	Prep	3510C			338587	09/18/20 13:31	JBT	TAL SEA
Total/NA	Cleanup	3630C			338615	09/18/20 13:31	JBT	TAL SEA
Total/NA	Analysis	AK102 & 103		1	338631	09/19/20 14:27	TL1	TAL SEA
Total/NA	Prep	3510C			338587	09/18/20 13:31	JBT	TAL SEA
Total/NA	Analysis	AK102 & 103		1	339487	09/29/20 18:37	ADB	TAL SEA

**Laboratory References:**

TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

TAL SEA = Eurofins TestAmerica, Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

# Accreditation/Certification Summary

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4663/Willow WQ

Job ID: 580-97459-1

## Laboratory: Eurofins TestAmerica, Seattle

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-024	01-14-22

## Laboratory: Eurofins TestAmerica, Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-020	01-20-21
ANAB	Dept. of Defense ELAP	L2468	01-20-21
ANAB	Dept. of Energy	L2468.01	01-20-21
ANAB	ISO/IEC 17025	L2468	01-20-21
Arizona	State	AZ0708	08-11-21
Arkansas DEQ	State	88-0691	06-17-21
California	State	2897	01-31-22
Colorado	State	CA0004	08-31-21
Connecticut	State	PH-0691	06-30-21
Florida	NELAP	E87570	06-30-21
Georgia	State	4040	01-30-21
Hawaii	State	<cert No.>	01-29-21
Illinois	NELAP	200060	03-17-21
Kansas	NELAP	E-10375	10-31-20
Louisiana	NELAP	01944	06-30-21
Maine	State	CA00004	04-14-22
Michigan	State	9947	08-03-23
Nevada	State	CA000442021-1	07-31-21
New Hampshire	NELAP	2997	04-18-21
New Jersey	NELAP	CA005	06-30-21
New York	NELAP	11666	04-01-21
Oregon	NELAP	4040	01-29-21
Pennsylvania	NELAP	68-01272	03-31-21
Texas	NELAP	T104704399-19-13	06-01-21
US Fish & Wildlife	US Federal Programs	58448	07-31-21
USDA	US Federal Programs	P330-18-00239	07-31-21
Utah	NELAP	CA000442019-01	02-28-21
Vermont	State	VT-4040	04-16-21
Virginia	NELAP	460278	03-14-21
Washington	State	C581	05-05-21
West Virginia (DW)	State	9930C	12-31-20
Wisconsin	State	998204680	08-31-21
Wyoming	State Program	8TMS-L	01-28-19 *

\* Accreditation/Certification renewal pending - accreditation/certification considered valid.

# Sample Summary

Client: Arctic Fox Environmental, Inc  
Project/Site: 0920-4663/Willow WQ

Job ID: 580-97459-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
580-97459-1	AF71994	Water	09/10/20 09:30	09/15/20 11:00	
580-97459-2	AF71995	Water	09/10/20 12:10	09/15/20 11:00	
580-97459-3	AF71996	Water	09/10/20 09:32	09/15/20 11:00	
580-97459-4	AF71997	Water	09/10/20 10:40	09/15/20 11:00	
580-97459-5	AF71998	Water	09/10/20 13:30	09/15/20 11:00	
580-97459-6	AF71999	Water	09/10/20 10:45	09/15/20 11:00	

1

2

3

4

5

6

7

8

9

10

11

12

13

TestAmerica Seattle  
5755 8th Street East

# Chain of Custody Record

**TestAmerica**  
THE LEADER IN ENVIRONMENTAL TESTING

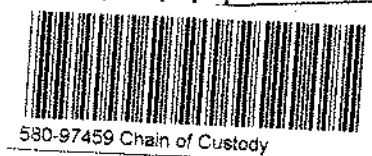
TestAmerica Laboratories, Inc.

Tacoma, WA 98424  
phone 253.922.2310 fax 253.922.5047

Regulatory Program:  DW  NPDES  RCRA  Other:

<b>Client Contact</b> Arctic Fox Environmental Pouch 348043 Prudhoe Bay, AK 99734 Phone 907-659-2145 FAX 907-659-2146 Project Name: Willow WQ Site: PO# 0920-4663		<b>Project Manager:</b> Tim Johnson / Lance Morrie Tel/Fax: 907-659-2145		<b>Site Contact:</b> Tim J. / Lance M. <b>Lab Contact:</b> Tim J. / Lance M.		<b>Date:</b> 9/10/20 <b>Carrier:</b>		<b>COC No:</b> 90087 1 of 1 COCs <b>Sampler:</b> DTK + SAO <b>For Lab Use Only:</b> Walk-in Client: <input type="checkbox"/> No Lab Sampling: <input type="checkbox"/> No Job / SDG No.:	
<b>Analysis Turnaround Time</b> <input checked="" type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS TAT if different from Below 2 weeks 1 week <u>standard</u> 3 days Rush 1 day		Loc: 580 <b>97459</b>		Filtered Sample (Y/N) Perform MS/MSD (Y/N) PROXRO DRUGRO Silica GR PFAS				Sample Specific Notes:	

Sample Identification	Sample Date	Sample Time	Sample Type (C-Comp, G-Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	PROXRO	DRUGRO Silica GR	PFAS
AF71994 - M0305 - PFAS	9/10/20	0930	G	L	2					X
AF71995 - MM1797 - PFAS	9/10/20	1210	G	L	2					X
AF71996 - M0305 - PFAS Dup	9/10/20	0932	G	L	2					X
AF71997 - M0305	9/10/20	1040	G	L	2		X	X		
AF71998 - MM1797	9/10/20	1330	G	L	2		X	X		
AF71999 - M0305 Dup	9/10/20	1045	G	L	2		X	X		



Therm. ID: A1 Cor: 0.1 Unc: 0.5  
Cooler Desc: L6  
Packing: Bubble  
Cust. Seal: Yes  No  
Blue Ice: Wet, Dry, None

FedEx: \_\_\_\_\_  
UPS: \_\_\_\_\_  
Lab Cour: X  
Other: \_\_\_\_\_

Preservation Used: 1=Ice, 2=HCl, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other

Possible Hazard Identification:  
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)  
 Return to Client  Disposal by Lab  Archive for \_\_\_\_\_ Months

Special Instructions/QC Requirements & Comments:

Cooler Temp. (°C): Obs'd: \_\_\_\_\_ Cor'd: \_\_\_\_\_ Therm ID No.: \_\_\_\_\_

Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No	Custody Seal No.:	Date/Time: 9/10/20 1200	Received by: [Signature]	Company: EPA SEA	Date/Time: 9/15/2020 1100
Relinquished by: [Signature]	Company: Arctic Fox Env.	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013



# Login Sample Receipt Checklist

Client: Arctic Fox Environmental, Inc

Job Number: 580-97459-1

**Login Number: 97459**

**List Source: Eurofins TestAmerica, Seattle**

**List Number: 1**

**Creator: Hobbs, Kenneth F**

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



## Login Sample Receipt Checklist

Client: Arctic Fox Environmental, Inc

Job Number: 580-97459-1

**Login Number: 97459**  
**List Number: 2**  
**Creator: Saephan, Kae C**

**List Source: Eurofins TestAmerica, Sacramento**  
**List Creation: 09/17/20 04:19 PM**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	1385961
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	ob: 1.0c corr: 1.4c
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



# Isotope Dilution Summary

Client: Arctic Fox Environmental, Inc  
 Project/Site: 0920-4663/Willow WQ

Job ID: 580-97459-1

## Method: EPA 537(Mod) - PFAS for QSM 5.1, Table B-15

Matrix: Water

Prep Type: Total/NA

### Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFBA (50-150)	PFPeA (50-150)	PFHxA (50-150)	C4PFHA (50-150)	PFOA (50-150)	PFNA (50-150)	PFDA (50-150)	PFUnA (50-150)
580-97459-1	AF71994	67	85	90	91	91	101	100	96
580-97459-2	AF71995	67	83	86	90	90	101	93	93
580-97459-3	AF71996	67	85	88	89	91	102	96	103
LCS 320-413369/2-A	Lab Control Sample	85	88	86	91	88	101	104	105
LCSD 320-413369/3-A	Lab Control Sample Dup	83	88	87	89	86	98	99	99
MB 320-413369/1-A	Method Blank	87	90	88	92	93	101	98	94

### Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFDaA (50-150)	PFTDA (50-150)	C3PFBS (50-150)	PFHxS (50-150)	PFOS (50-150)	PFOSA (50-150)	d3NMFOS (50-150)	d5NEFOS (50-150)
580-97459-1	AF71994	90	74	86	89	88	91	81	82
580-97459-2	AF71995	87	73	85	86	86	91	82	81
580-97459-3	AF71996	88	72	86	86	87	91	84	84
LCS 320-413369/2-A	Lab Control Sample	111	89	89	89	90	88	86	86
LCSD 320-413369/3-A	Lab Control Sample Dup	106	94	87	87	87	83	84	85
MB 320-413369/1-A	Method Blank	87	88	89	91	91	82	78	77

### Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	M262FTS (50-150)	M282FTS (50-150)	M242FTS (50-150)	HFPODA (50-150)
580-97459-1	AF71994	115	108	106	84
580-97459-2	AF71995	108	103	104	83
580-97459-3	AF71996	113	106	100	85
LCS 320-413369/2-A	Lab Control Sample	107	107	102	84
LCSD 320-413369/3-A	Lab Control Sample Dup	107	103	98	82
MB 320-413369/1-A	Method Blank	110	108	108	83

#### Surrogate Legend

- PFBA = 13C4 PFBA
- PFPeA = 13C5 PFPeA
- PFHxA = 13C2 PFHxA
- C4PFHA = 13C4 PFHpA
- PFOA = 13C4 PFOA
- PFNA = 13C5 PFNA
- PFDA = 13C2 PFDA
- PFUnA = 13C2 PFUnA
- PFDaA = 13C2 PFDaA
- PFTDA = 13C2 PFTeDA
- C3PFBS = 13C3 PFBS
- PFHxS = 18O2 PFHxS
- PFOS = 13C4 PFOS
- PFOSA = 13C8 FOSA
- d3NMFOS = d3-NMeFOSAA
- d5NEFOS = d5-NEtFOSAA
- M262FTS = M2-6:2 FTS
- M282FTS = M2-8:2 FTS
- M242FTS = M2-4:2 FTS
- HFPODA = 13C3 HFPO-DA

# Client Sample Results

Client: Arctic Fox Environmental, Inc  
Project/Site: 1020-4679/WILLOW ROAD

Job ID: 580-98030-1

**Client Sample ID: AF72105-M0305**

**Lab Sample ID: 580-98030-1**

Date Collected: 09/10/20 10:40

Matrix: Water

Date Received: 10/06/20 12:45

Method: 200.8 - Metals (ICP/MS)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Zinc	ND		0.0070		mg/L		10/12/20 15:52	10/13/20 21:46	1



# Client Sample Results

Client: Arctic Fox Environmental, Inc  
Project/Site: 1020-4679/WILLOW ROAD

Job ID: 580-98030-1

**Client Sample ID: AF72106-MM1707**

**Lab Sample ID: 580-98030-2**

Date Collected: 09/10/20 13:30

Matrix: Water

Date Received: 10/06/20 12:45

Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Zinc	ND		0.0070		mg/L		10/12/20 15:52	10/13/20 21:50	1

# Client Sample Results

Client: Arctic Fox Environmental, Inc  
Project/Site: 1020-4679/WILLOW ROAD

Job ID: 580-98030-1

**Client Sample ID: AF72107-M0305 DUP**

**Lab Sample ID: 580-98030-3**

Date Collected: 09/10/20 10:45

Matrix: Water

Date Received: 10/06/20 12:45

Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Zinc	ND		0.0070		mg/L		10/12/20 15:52	10/13/20 21:54	1