2020

REPORT

Alpine Satellite Development Project
Water Quality Monitoring

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PREPARED FOR:
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MSA Contract No. 2969377

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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
FID	Flame ionization detector
GC	Gas chromatography
ICP	Inductively coupled plasma
MS	Mass spectrometry
µS/cm	Microsiemens per centimeter
mS/cm	MilliSiemens per centimeter
mg/L	Milligrams per liter
Michael Baker	Michael Baker International
NTU	Nephelometric Turbidity Units
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 Alpine Satellite Development Plan (ASDP) Water Quality Monitoring Report presents the results of lake monitoring conducted in September 2020 for ConocoPhillips Alaska, Inc. (COPA). This report includes monitoring results of lakes L9323, L9324, and M9313 which have been monitored annually since 2007. An overview of the study lakes relative to Alpine facilities is presented in Figure 1.

During the winter of 1998/1999, COPA initiated construction of the Alpine Facility, CD1 and CD2, in the Colville River Delta. Alpine operations expanded with the implementation of the ASDP during the 2004/2005 winter season. Construction included placement of gravel facilities for two satellite drill sites, CD3 and CD4. The CD3 development included an airstrip and pad/airstrip access road, apron, and taxiway adjacent to the south side of Lake M9313. The CD4 development included a gravel pad, access road connected to the CD2 access road, and pipeline parallel to the access road connecting to the existing Alpine Pipeline. The CD4 pad is located between Lake L9323 to the north and Lake L9324 to the south. Alpine operations expanded again with the construction of CD5, which included a gravel pad, access road connected to the CD4 access road, and pipeline parallel to the access road connecting to the existing Alpine Pipeline.

The 2020 water quality monitoring program led by Michael Baker International (Michael Baker) included in-situ field sampling and laboratory water samples. The in-situ measurements were temperature, conductivity/specific conductance, dissolved oxygen (DO), salinity, turbidity, and pH. Laboratory analyses consisted of dissolved hydrocarbons: diesel range organics (DRO), residual range organics (RRO), and Resource Conservation and Recovery Act (RCRA) metals.

ConocoPhillips Alaska

Miles
0 0.5 1 2

Date:	10/30/2020	Scale:	1 in = 2 miles
Drawn:	JEM	Project:	179852
Checked:	DTR	File:	2020 ASDP Overview

Sample Lake
Facility
Pipeline
Road

Imagery from CPAI 2019 and Maxar 2019

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2020 ASDP Monitoring Locations Overview Map

FIGURE 1

2. METHODS

Field investigations were conducted by a two-person team at lakes L9323, L9324, and M9313. Soloy Helicopters, LLC provided helicopter access to Lake M9313. A pickup truck was used to access lakes L9323 and L9324. The team used inflatable kayaks with a tethered support raft for transporting the sampling equipment to the sample locations (Photo 1 and Photo 2).

In-situ water quality data measurements and laboratory samples were collected at all three lakes on September 17, 2020. In-situ water quality instruments were provided by TTT Environmental. Laboratory analyses and sample collection bottles were provided by Arctic Fox Environmental, Inc. (Arctic Fox). Prior to sampling, aerial reconnaissance was conducted to identify possible inflow and outflow sources, and to determine if lakes were hydraulically connected to other nearby surface water sources. It was also confirmed that each lake was well-mixed and lacked definable stratums prior to analytic sample collection. 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.

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). Michael Baker employees worked in groups of two. Employees checked in with Alpine security before and after field work. Personnel were equipped with dry suits and U.S. Coast Guard-approved Type III personal floatation devices during lake access.

Photo 1: Equipment used to collect water quality data and samples; September 17, 2020

Photo 2: Support raft towing sampling equipment; September 17, 2020

2.1. Sampling Locations

For this project, it is assumed data collected at specific locations are representative of conditions throughout the well-mixed water body and thus, water samples collected at a single location are representative of the lake. Selection of the appropriate location for samples was based on maximum lake depth and relative proximity to gravel facilities. The bathymetry of each lake was used to identify the deepest part of the water body, and a single representative sampling location was selected.

Sampling locations were identified in the field using a handheld global positioning system Garmin Oregon 650t referenced to the World Geodetic System of 1984 coordinate system. The sampling locations for lakes L9323 and L9324 are shown in Figure 2, and Lake M9313 is shown in Figure 3.

ConocoPhillips Alaska

Feet
0 1,000 2,000

Date: 10/30/2020	Project: 179852
Drawn: JEM	File: ASDP_L9323_L9324.mxd
Checked: DTR	Scale: 1 inch = 2,000 feet

Water Quality Sampling Point
Sample Lake
Pipeline
Road
Facility

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2020 ASDP
Monitoring Locations
Lake L9323 & L9324

FIGURE 2

ConocoPhillips Alaska

Feet
0 1,000 2,000

Date: 10/30/2020	Project: 179852
Drawn: JEM	File: ASDP_M9313.mxd
Checked: DTR	Scale: 1 inch = 2,000 feet

Water Quality Sampling Point
Sample Lake
Pipeline
Road
Facility

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2020 ASDP
Monitoring Locations
Lake M9313

FIGURE 3

2.2. In-Situ Measurements

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

Table 1: 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 amount of particulates. A Nephelometer is equipped with a detector next to the light beam and is used to measure turbidity. When using a calibrated Nephelometer, the units of turbidity are Nephelometric Turbidity Units (NTU).

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). The recharge of lakes from the Colville River flood waters during spring break-up justifies using the same correction coefficient for the lake measurements.

INSTRUMENT CALIBRATION

A YSI 650 handheld unit with YSI 6920V2 sensor was calibrated by TTT Environmental according to the manufacturer's specifications. The morning of sampling, the YSI 650/6920V2 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 was thoroughly rinsed with lake water.

INSTRUMENT ACCURACY

The accuracies of the YSI 650/6920V2 sensors are presented in Table 2 (YSI 2012).

Table 2: 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

Samples were collected from lakes using a 1.6" x 12" disposable polyethylene 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 bottles provided by Arctic Fox were stored in the provided cooler before, during, and after sample collection to maintain adequate storage temperature and ensure chain of custody procedures were followed. Field samples were transported to Artic Fox within 24 hours of initial sample collection.

LABORATORY ANALYSES

The laboratory analyses performed for each water sample included RCRA metals, DRO, and RRO.

SW6020 (RCRA METALS)

The RCRA metals laboratory analysis method SW6020, developed by the U.S. Environmental Protection Agency 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.

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 residual's 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.

3. RESULTS

3.1. Sampling Locations (September 17, 2020)

LAKE L9323

Lake L9323 is located east of the Nigliq Channel. The lake has the CD5 road is to the north and the CD4 road is to the east. This lake can become hydraulically connected to the Nigliq and/or Sakoonang Channels during flooding, as was the case during the 2020 spring breakup flood (Photo 4). A bridge in the CD5 road allows for the passage of overbank flow out of the lake. At the time of sampling, the lake was not hydraulically connected to adjacent rivers based on aerial visual inspection. No odor or film was observed while sampling the lake (Photo 3).

Photo 3: Preparing for sampling at lake L9323; September 17, 2020

Photo 4: Lake L9323 during spring breakup, hydraulically connected to Lake 9324; looking Southwest; May 29,2020

LAKE L9324

Lake L9324 is located east of the Nigilq Channel. The CD4 pad is to the north of the lake. This lake can become hydraulically connected to the Nigliq and Sakoonang channels during flooding, as was the case during the 2020 spring breakup flood (Photo 6). At the time of sampling, Lake L9324 was hydraulically connected to the Sakoonang Channel to the east via a paleolake. The Alpine Sales pipeline crosses the connection between Lake L9324 and the south paleo lake. No odor or film was observed while sampling the lake (Photo 5).

Photo 5: Kayaking to sample location at Lake L9324; September 17, 2020

Photo 6: Lake L9324 during spring breakup hydraulically connected to the Sakoonang Channel; looking South; May 29, 2020

LAKE M9313

Lake M9313 is located north of the CD3 pad and runway and east of the Ulamnigiaq Channel. This lake can become hydraulically connected to the Ulamnigiaq Channel during flooding. During the 2020 spring breakup flood, there was no visible evidence that Lake M9313 was hydraulically connected to the Ulamnigiaq Channel (Photo 8). At the time of sampling it was not, based on aerial visual inspection, hydraulically connected to any streams or distinct water bodies. No odor or film was observed while sampling the lake (Photo 7).

Photo 7: Crew just after collecting in-situ measurements and samples for laboratory analysis on Lake M9313; September 17, 2020

Photo 8: Flow confined within the banks of the West Ulamnigiaq Channel next to Lake M9313; looking South; May 29, 2020

3.2. In-Situ Measurements

In-situ measurements were collected throughout the water column at the deepest part of each lake. The in-situ measurements for the water quality results are in Table 3.

Average turbidity for lakes L9323, L9324, and M9313 was 0.1 NTU, 5.7 NTU, and 0.2 NTU, respectively. According to the meter manufacturer, a used instrument can contaminate a zero standard to almost 1.0 NTU. The higher NTU value for Lake L9324 has been observed in previous years of sampling and is likely the result of the hydraulic connection to the South Paleo Lake and Sakoonang Channel during sampling.

Temperatures in all lakes ranged from a maximum of 4.5°C in Lake L9323 to a minimum of 3.9°C in Lake M9313. The temperature in all three 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 100 µS/cm in Lake L9323, and 145 µS/cm in Lake L9324. The highest specific conductance value was measured in Lake M9313, located nearest to the coast, at 642 µS/cm. Measured specific conductance values exceeding 500 µS/cm are indicative of saline environments which are regularly observed in lakes near the coast (ADF&G 2008).

Concentrations of DO were relatively homogenous throughout the water column at all sample locations. The average DO in Lake L9323 was 13.31 mg/L, in Lake L9324 was 13.26 mg/L, and in Lake M9313 was 13.26 mg/L. A 100% saturation level is based on standard temperature and pressure conditions. The average percent-saturation in Lake L9323 was 102.9%, in Lake L9324 was 102.2%, and in Lake M9313 was 101.1%.

Salinity remained consistent with water column depth at all sampling locations. The greatest concentration was measured in Lake M9313 at 0.31 ppt, likely due to its coastal proximity. Lakes L9323 and L9324 had concentrations of 0.05 and 0.07, respectively.

Average pH was 7.8 in Lake L9323, 7.5 in Lake L9324, and 7.6 in Lake M9313. PH was relatively consistent with depth at all sampling locations.

Table 3: In-Situ Water Quality Results Summary

Lake, Location & Time	Total Depth (ft)	Turbidity (NTU)	Depth (ft)	Temp (°C)	Conductivity (µS/cm)	Specific Conductance (µS/cm)	DO (mg/L)	DO (% Saturation)	Salinity (ppt)	pH SU
L9323 N70.2960° W150.9887° 14:30	12.0	0.1	2	4.5	60	100	13.30	102.8	0.05	7.8
			3	4.5	60	100	13.30	102.8	0.05	7.8
			4	4.5	60	100	13.30	102.8	0.05	7.8
			5	4.5	60	100	13.30	102.8	0.05	7.8
			6	4.5	60	100	13.31	102.8	0.05	7.8
			7	4.5	60	100	13.31	102.8	0.05	7.8
			8	4.5	60	100	13.31	102.9	0.05	7.8
			9	4.5	60	100	13.32	102.9	0.05	7.8
			10	4.5	60	100	13.32	103.0	0.05	7.7
			11	4.5	60	100	13.32	102.9	0.05	7.8
L9324 N70.2902° W150.9827° 13:25	7.0	5.7	2	4.4	87	145	13.24	102.1	0.07	7.5
			3	4.4	87	145	13.25	102.1	0.07	7.5
			4	4.4	87	145	13.26	102.3	0.07	7.5
			5	4.4	87	145	13.28	102.4	0.07	7.5
			6	4.4	87	145	13.28	102.3	0.07	7.5
M9313 N70.4217° W150.8999° 10:10	12.5	0.2	2	3.9	376	642	13.28	101.1	0.31	7.6
			3	3.9	376	641	13.27	101.2	0.31	7.6
			4	3.9	376	642	13.27	101.1	0.31	7.6
			5	3.9	377	642	13.26	101.2	0.31	7.6
			6	3.9	377	642	13.26	101.1	0.31	7.6
			7	3.9	377	642	13.25	101.1	0.31	7.6
			8	3.9	377	642	13.26	101.1	0.31	7.6
			9	3.9	377	642	13.25	101.1	0.31	7.6
			10	3.9	377	642	13.25	101.1	0.31	7.6
			11	3.9	377	642	13.25	101.1	0.31	7.6
			12	4.0	377	642	13.24	101.1	0.31	7.5

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.

3.3. Laboratory Analysis

Lakes L9323, L9324, and M9313 were sampled on September 17, 2020. All samples were analyzed using standard methods.

With the exception of barium, analytical results from sampling event show that RCRA targeted metals were not detected above the laboratory detection limit. Barium was detected in all lakes at concentrations below the ADEC cleanup level of 3800 µg/L. The highest measured concentration of barium was 203 µg/L in Lake M9313. Barium is not uncommon in arctic waters at concentrations similar to those measured at the three lakes (Guay and Falkner 1998).

The DRO and RRO were not detected above the laboratory detection limit in lakes L9323, L9324 and M9313.

The ADEC updated the cleanup levels in 2019. Most of the threshold levels have increased in sensitivity as the units have changed from mg/L to µg/L, but some remain unchanged or decreased in sensitivity. Laboratory analytical results and changes in ADEC cleanup level are presented in Table 4 and are provided in Appendix A.

Table 4: Laboratory Analytical Results Summary

Parameter	2009 ADEC Cleanup Level[3]	2019 ADEC Cleanup Level[1]	Lake L9323	Lake L9323 Duplicate	Lake L9324	Lake M9313
	(µg/L)					
Arsenic	10	0.52	ND	ND	ND	ND
Barium	2,000	3,800	46	38	63	203
Cadmium	5	9.2	ND	ND	ND	ND
Chromium	100	22,000 (III) 0.35 (VI)	ND	ND	ND	ND
Lead	15	15	ND	ND	ND	ND
Mercury	2	0.52	ND	ND	ND	ND
Selenium	50	100	ND	ND	ND	ND
Silver	100	94	ND	ND	ND	ND
DRO (water)	1,500	1,500	ND	ND	ND	ND
RRO (water)	1,100	1,100	ND	ND	ND	ND
DRO (silica gel)	1,500	1,500	ND	ND	ND	ND
RRO (silica gel)	1,100	1,100	ND	ND	ND	ND

Notes:

1. ADEC Water Quality Standards 18 AAC 75.345 Table C Groundwater Cleanup Levels (ADEC 2019)
2. ND indicates analyte was not detected above the laboratory detection limit
3. ADEC Water Quality Standards from 2009

4. REFERENCES

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Appendix A. LABORATORY ANALYTICAL RESULTS

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
90085

0920-4669

Client Name and Address: MBI 3900 C St. Anchorage, AK 99515

Contact Person: Kieran D Braun

Phone Number: 907 575-8562 Fax Number: Get w/ times!

E-mail: Kieran.Braun@mbakerintl.com

Project Name: 2020 ASDP WQ

Data Deliverables: Level I ❑ Level II ❑ Level III ❑ EDD/Format:

Account Number:

P.O. or Contract Number:

Authorization Number:

Sampled By: SAO

PWS Number:

Send Results to ADEC: ❑ YES ❑ No

Requested Turnaround Time and Special Instructions:

Client Sample ID	Date Sampled	Time Sampled	Matrix	AF Sample ID	Number of Containers	DRO	RRO	DRO silica gel	RRO silica gel	Total RCRA metals			Preservative / Remarks
8 X 1 L bottles &	9/												
4 X 250mL bottles													
L9323	9/17/20	1430	L	AF72037	3	x	x	x	x	x			
L9323-D.P		1440		AF72038	3	x	x	x	x	x			
L9324		1325		AF72039	3	x	x	x	x	x			
M9313		1010		AF72040	3	x	x	x	x	x			

Relinquished By (1)	Date	Time	Received By
Kieran Braun	9/17/2020	0930	
Relinquished By (2):	Date:	Time:	Received By:
Relinquished By (3):	Date: 9/19/20	Time: 0850	Received for lab by:

TO BE COMPLETED BY LABORATORY

Location Received/ Temp on Arrival: ANC ❑ _____ °C FBK ❑ _____ °C PB ❑ 1,1 °C 1116458 70

Chain of Custody Seal ☒ INTACT ❑ BROKEN ❑ 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

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

Email: Devon.Roe@mbakerintl.com
Haley.Runa@mbakerintl.com
Kieran.Brawn@mbakerintl.com

AF Lab #:	AF72037
Client Sample ID:	L9323
Location/Project:	2020 ASDP WQ
COC#:	90085
Sample Matrix:	Liquid

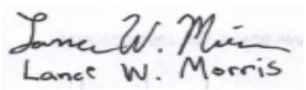
Report Date:	10/10/2020
Date Arrived:	9/19/2020
Date Sampled:	9/17/2020
Time Sampled:	1430
Collected By:	SAO

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: L9323
Analyses Requested: DRO RRO with Silica Gel cleanup
Arctic Fox ID: AF72037
Time Sampled: 1430
Matrix: Liquid
Eurofins Lab ID: 580-97631-1

Parameter	Result	Units	RL	RCRA Limits	Flag	Analysis Method	Analysis Date
6020A Total Metals							9/26/2020
Arsenic	<MRL	mg/l	0.010	**5.0**		6020A	
Barium	0.046	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	



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
Haley.Runa@mbakerintl.com
Kieran.Brawn@mbakerintl.com

AF Lab #:	AF72038
Client Sample ID:	L9323-Dup
Location/Project:	2020 ASDP WQ
COC#:	90085
Sample Matrix:	Liquid

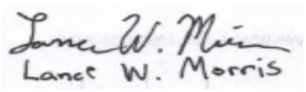
Report Date:	10/10/2020
Date Arrived:	9/19/2020
Date Sampled:	9/17/2020
Time Sampled:	1440
Collected By:	SAO

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: L9323-Dup
Analyses Requested: DRO RRO with Silica Gel cleanup
Arctic Fox ID: AF72038
Time Sampled: 1440
Matrix: Liquid
Eurofins Lab ID: 580-97631-2

Parameter	Result	Units	RL	RCRA Limits	Flag	Analysis Method	Analysis Date
6020A Total Metals							9/26/2020
Arsenic	<MRL	mg/l	0.010	**5.0**		6020A	
Barium	0.038	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	



Reported by: Ralph E. Allphin / Timothy D. Johnson / Lance W. Morris / Sky Allphin
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AF Lab #:	AF72039
Client Sample ID:	L9324
Location/Project:	2020 ASDP WQ
COC#:	90085
Sample Matrix:	Liquid

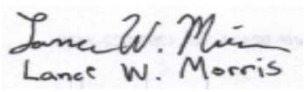
Report Date:	10/10/2020
Date Arrived:	9/19/2020
Date Sampled:	9/17/2020
Time Sampled:	1325
Collected By:	SAO

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: L9324
Analyses Requested: DRO RRO with Silica Gel cleanup
Arctic Fox ID: AF72039
Time Sampled: 1325
Matrix: Liquid
Eurofins Lab ID: 580-97631-3

Parameter	Result	Units	RL	RCRA Limits	Flag	Analysis Method	Analysis Date
6020A Total Metals							9/26/2020
Arsenic	<MRL	mg/l	0.010	**5.0**		6020A	
Barium	0.063	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	



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AF Lab #:	AF72040
Client Sample ID:	M9313
Location/Project:	2020 ASDP WQ
COC#:	90085
Sample Matrix:	Liquid

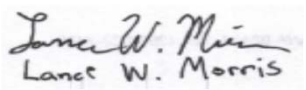
Report Date:	10/10/2020
Date Arrived:	9/19/2020
Date Sampled:	9/17/2020
Time Sampled:	1010
Collected By:	SAO

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: M9313
Analyses Requested: DRO RRO with Silica Gel cleanup
Arctic Fox ID: AF72040
Time Sampled: 1010
Matrix: Liquid
Eurofins Lab ID: 580-97631-4

Parameter	Result	Units	RL	RCRA Limits	Flag	Analysis Method	Analysis Date
6020A Total Metals							9/26/2020
Arsenic	<MRL	mg/l	0.010	**5.0**		6020A	
Barium	0.203	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	



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

eurofins | Environment Testing America

ANALYTICAL REPORT

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

Laboratory Job ID: 580-97631-1
Client Project/Site: 0920-4669/2020 ASDPWQ

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

Attn: Arctic Fox

Authorized for release by:
10/8/2020 2:15:22 PM

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

Table of Contents

Job ID: 580-97631-1

Laboratory: Eurofins TestAmerica, Seattle

Narrative

Job Narrative
580-97631-1

Comments
No additional comments.

Receipt
The samples were received on 9/22/2020 2:30 PM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 3.6º C.

GC Semi VOA
Method AK102 & 103: The RPD of the laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for preparation batch 580-338918 and analytical batch 580-340091 recovered outside control limits for the following analyte: RRO (nC25-nC36).

Method AK102 & 103: The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for preparation batch 580-338918 and 580-338989 and analytical batch 580-339212 recovered outside control limits for the following analytes: DRO (nC10-<nC25). The associated samples were re-prepared and re-analyzed within holding time. Both sets of data have been reported.

Method AK102 & 103: The laboratory control sample duplicate (LCSD) associated with preparation batch 580-338918 and analytical batch 580-340091 recovered below control limits for DRO (nC10-<nC25). The re-extraction of associated samples AF72037 (580-97631-1), AF72038 (580-97631-2), AF72039 (580-97631-3), AF72040 (580-97631-4), (LCS 580-338918/2-A), (LCSD 580-338918/3-A) and (MB 580-338918/1-A) was silica-gel cleaned during prep, but not split before cleaning. Therefore, the re-extraction for these samples was not able to be analyzed without cleanup. Silica gel cleaned data is reported for both extraction batches and non silica gel is reported in AB 340091 and prep batch of 338918

Method AK102 & 103: Surrogate recovery for the following sample was outside control limits: AF72039 (580-97631-3). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method AK102 & 103: The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) associated with preparation batch 580-339767 and 580-339832 and analytical batch 580-340091 recovered outside control limits for the following analytes: DRO (nC10-<nC25). This batch was a re-extraction for DRO below control limits in the LCS/LCSD of the original extraction, therefore both data sets are reported.

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 3510C: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP) associated with preparation batch 580-339767.

Method 3510C: The emulsions were broken up using sodium sulfate and rinsed with solvent.

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: 0920-4669/2020 ASDPWQ

Job ID: 580-97631-1

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
*1	LCS/LCSD RPD exceeds control limits.
X	Surrogate recovery exceeds control limits

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: Arctic Fox Environmental, Inc
Project/Site: 0920-4669/2020 ASDPWQ

Job ID: 580-97631-1

Client Sample ID: AF72037
Date Collected: 09/17/20 14:30
Date Received: 09/22/20 14:30

Lab Sample ID: 580-97631-1
Matrix: Water

Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
RRO (nC25-nC36)	ND	*1	0.28		mg/L		09/23/20 12:00	10/06/20 12:16	1
DRO (nC10-<nC25)	ND	* *1	0.12		mg/L		09/23/20 12:00	10/06/20 12:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*70*		*50 - 150*	*09/23/20 12:00*	*10/06/20 12:16*	*1*
n-Triacontane-d62	*88*		*50 - 150*	*09/23/20 12:00*	*10/06/20 12:16*	*1*

Method: AK102/103 - Diesel Range Organics & Residual Range Organics with Silica Gel Clean-Up

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (nC10-<nC25)	ND	*	0.12		mg/L		09/23/20 12:00	09/26/20 15:08	1
RRO (nC25-nC36)	ND		0.28		mg/L		09/23/20 12:00	09/26/20 15:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*69*		*50 - 150*	*09/23/20 12:00*	*09/26/20 15:08*	*1*
n-Triacontane-d62	*83*		*50 - 150*	*09/23/20 12:00*	*09/26/20 15:08*	*1*

Method: AK102/103 - Diesel Range Organics & Residual Range Organics with Silica Gel Clean-Up - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (nC10-<nC25)	ND	*	0.12		mg/L		10/01/20 13:14	10/06/20 09:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*85*		*50 - 150*	*10/01/20 13:14*	*10/06/20 09:36*	*1*
n-Triacontane-d62	*92*		*50 - 150*	*10/01/20 13:14*	*10/06/20 09:36*	*1*

Client: Arctic Fox Environmental, Inc
Project/Site: 0920-4669/2020 ASDPWQ

Job ID: 580-97631-1

Client Sample ID: AF72038

Date Collected: 09/17/20 14:40
Date Received: 09/22/20 14:30

Lab Sample ID: 580-97631-2

Matrix: Water

Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
RRO (nC25-nC36)	ND	*1	0.26		mg/L		09/23/20 12:00	10/06/20 12:36	1
DRO (nC10-<nC25)	ND	* *1	0.11		mg/L		09/23/20 12:00	10/06/20 12:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*75*		*50 - 150*	*09/23/20 12:00*	*10/06/20 12:36*	*1*
n-Triacontane-d62	*92*		*50 - 150*	*09/23/20 12:00*	*10/06/20 12:36*	*1*

Method: AK102/103 - Diesel Range Organics & Residual Range Organics with Silica Gel Clean-Up

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (nC10-<nC25)	ND	*	0.11		mg/L		09/23/20 12:00	09/26/20 15:29	1
RRO (nC25-nC36)	ND		0.26		mg/L		09/23/20 12:00	09/26/20 15:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*70*		*50 - 150*	*09/23/20 12:00*	*09/26/20 15:29*	*1*
n-Triacontane-d62	*82*		*50 - 150*	*09/23/20 12:00*	*09/26/20 15:29*	*1*

Method: AK102/103 - Diesel Range Organics & Residual Range Organics with Silica Gel Clean-Up - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (nC10-<nC25)	ND	*	0.12		mg/L		10/01/20 13:14	10/06/20 09:56	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*84*		*50 - 150*	*10/01/20 13:14*	*10/06/20 09:56*	*1*
n-Triacontane-d62	*94*		*50 - 150*	*10/01/20 13:14*	*10/06/20 09:56*	*1*

Client: Arctic Fox Environmental, Inc
Project/Site: 0920-4669/2020 ASDPWQ

Job ID: 580-97631-1

Client Sample ID: AF72039

Date Collected: 09/17/20 13:25
Date Received: 09/22/20 14:30

Lab Sample ID: 580-97631-3

Matrix: Water

Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
RRO (nC25-nC36)	ND	*1	0.28		mg/L		09/23/20 12:00	10/06/20 12:56	1
DRO (nC10-<nC25)	ND	* *1	0.12		mg/L		09/23/20 12:00	10/06/20 12:56	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*73*		*50 - 150*	*09/23/20 12:00*	*10/06/20 12:56*	*1*
n-Triacontane-d62	*89*		*50 - 150*	*09/23/20 12:00*	*10/06/20 12:56*	*1*

Method: AK102/103 - Diesel Range Organics & Residual Range Organics with Silica Gel Clean-Up

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (nC10-<nC25)	ND	*	0.12		mg/L		09/23/20 12:00	09/26/20 15:49	1
RRO (nC25-nC36)	ND		0.28		mg/L		09/23/20 12:00	09/26/20 15:49	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*75*		*50 - 150*	*09/23/20 12:00*	*09/26/20 15:49*	*1*
n-Triacontane-d62	*87*		*50 - 150*	*09/23/20 12:00*	*09/26/20 15:49*	*1*

Method: AK102/103 - Diesel Range Organics & Residual Range Organics with Silica Gel Clean-Up - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (nC10-<nC25)	ND	*	0.12		mg/L		10/01/20 13:14	10/06/20 10:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*36*	*X*	*50 - 150*	*10/01/20 13:14*	*10/06/20 10:16*	*1*
n-Triacontane-d62	*41*	*X*	*50 - 150*	*10/01/20 13:14*	*10/06/20 10:16*	*1*

Client: Arctic Fox Environmental, Inc
Project/Site: 0920-4669/2020 ASDPWQ

Job ID: 580-97631-1

Client Sample ID: AF72040

Date Collected: 09/17/20 10:10
Date Received: 09/22/20 14:30

Lab Sample ID: 580-97631-4

Matrix: Water

Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
RRO (nC25-nC36)	ND	*1	0.28		mg/L		09/23/20 12:00	10/06/20 13:16	1
DRO (nC10-<nC25)	ND	* *1	0.12		mg/L		09/23/20 12:00	10/06/20 13:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*71*		*50 - 150*	*09/23/20 12:00*	*10/06/20 13:16*	*1*
n-Triacontane-d62	*87*		*50 - 150*	*09/23/20 12:00*	*10/06/20 13:16*	*1*

Method: AK102/103 - Diesel Range Organics & Residual Range Organics with Silica Gel Clean-Up

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (nC10-<nC25)	ND	*	0.12		mg/L		09/23/20 12:00	09/26/20 16:09	1
RRO (nC25-nC36)	ND		0.28		mg/L		09/23/20 12:00	09/26/20 16:09	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*69*		*50 - 150*	*09/23/20 12:00*	*09/26/20 16:09*	*1*
n-Triacontane-d62	*80*		*50 - 150*	*09/23/20 12:00*	*09/26/20 16:09*	*1*

Method: AK102/103 - Diesel Range Organics & Residual Range Organics with Silica Gel Clean-Up - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (nC10-<nC25)	ND	*	0.13		mg/L		10/01/20 13:14	10/06/20 10:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*83*		*50 - 150*	*10/01/20 13:14*	*10/06/20 10:36*	*1*
n-Triacontane-d62	*94*		*50 - 150*	*10/01/20 13:14*	*10/06/20 10:36*	*1*

Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC)

Lab Sample ID: MB 580-338918/1-A
Matrix: Water
Analysis Batch: 340091

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 338918

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
RRO (nC25-nC36)	ND		0.25		mg/L		09/23/20 12:00	10/06/20 10:55	1
DRO (nC10-<nC25)	ND		0.11		mg/L		09/23/20 12:00	10/06/20 10:55	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*97*		*50 - 150*	*09/23/20 12:00*	*10/06/20 10:55*	*1*
n-Triacontane-d62	*127*		*50 - 150*	*09/23/20 12:00*	*10/06/20 10:55*	*1*

Lab Sample ID: LCS 580-338918/2-A
Matrix: Water
Analysis Batch: 340091

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 338918

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
RRO (nC25-nC36)	0.500	0.590		mg/L		118	60 - 120
DRO (nC10-<nC25)	0.500	0.386		mg/L		77	75 - 125

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
o-Terphenyl	*95*		*50 - 150*
n-Triacontane-d62	*100*		*50 - 150*

Lab Sample ID: LCSD 580-338918/3-A
Matrix: Water
Analysis Batch: 340091

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 338918

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
RRO (nC25-nC36)	0.500	0.466	*1	mg/L		93	60 - 120	24	20
DRO (nC10-<nC25)	0.500	0.304	* *1	mg/L		61	75 - 125	24	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
o-Terphenyl	*82*		*50 - 150*
n-Triacontane-d62	*87*		*50 - 150*

Method: AK102/103 - Diesel Range Organics & Residual Range Organics with Silica Gel Clean-Up

Lab Sample ID: MB 580-338918/1-B
Matrix: Water
Analysis Batch: 339212

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 338918

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
RRO (nC25-nC36)	ND		0.25		mg/L		09/23/20 12:00	09/26/20 14:08	1
DRO (nC10-<nC25)	ND		0.11		mg/L		09/23/20 12:00	09/26/20 14:08	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*65*		*50 - 150*	*09/23/20 12:00*	*09/26/20 14:08*	*1*
n-Triacontane-d62	*83*		*50 - 150*	*09/23/20 12:00*	*09/26/20 14:08*	*1*

Method: AK102/103 - Diesel Range Organics & Residual Range Organics with Silica Gel Clean-Up (Continued)

Lab Sample ID: LCS 580-338918/2-B
Matrix: Water
Analysis Batch: 339212

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 338918

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
RRO (nC25-nC36)			0.500	0.541		mg/L		108	60 - 120		
DRO (nC10-<nC25)			0.500	0.355	*	mg/L		71	75 - 125		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
o-Terphenyl	*91*		*50 - 150*
n-Triacontane-d62	*87*		*50 - 150*

Lab Sample ID: LCSD 580-338918/3-B
Matrix: Water
Analysis Batch: 339212

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 338918

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
RRO (nC25-nC36)			0.500	0.449		mg/L		90	60 - 120	19	20
DRO (nC10-<nC25)			0.500	0.289	*	mg/L		58	75 - 125	20	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
o-Terphenyl	*78*		*50 - 150*
n-Triacontane-d62	*74*		*50 - 150*

Method: AK102/103 - Diesel Range Organics & Residual Range Organics with Silica Gel Clean-Up - RE

Lab Sample ID: MB 580-339767/1-B
Matrix: Water
Analysis Batch: 340091

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 339767

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
RRO (nC25-nC36) - RE	ND		0.25		mg/L		10/01/20 13:14	10/06/20 08:37	1
DRO (nC10-<nC25) - RE	ND		0.11		mg/L		10/01/20 13:14	10/06/20 08:37	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl - RE	*78*		*50 - 150*	*10/01/20 13:14*	*10/06/20 08:37*	*1*
n-Triacontane-d62 - RE	*91*		*50 - 150*	*10/01/20 13:14*	*10/06/20 08:37*	*1*

Lab Sample ID: LCS 580-339767/2-B
Matrix: Water
Analysis Batch: 340091

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 339767

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
RRO (nC25-nC36) - RE			0.500	0.427		mg/L		85	60 - 120		
DRO (nC10-<nC25) - RE			0.500	0.327	*	mg/L		65	75 - 125		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
o-Terphenyl - RE	*81*		*50 - 150*
n-Triacontane-d62 - RE	*89*		*50 - 150*

Method: AK102/103 - Diesel Range Organics & Residual Range Organics with Silica Gel Clean-Up - RE (Continued)

Lab Sample ID: LCSD 580-339767/3-B
Matrix: Water
Analysis Batch: 340091

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 339767

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
RRO (nC25-nC36) - RE			0.500	0.449		mg/L		90	60 - 120	5	20
DRO (nC10-<nC25) - RE			0.500	0.357	*	mg/L		71	75 - 125	9	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
o-Terphenyl - RE	*88*		*50 - 150*
n-Triacontane-d62 - RE	*89*		*50 - 150*

Lab Chronicle

Client: Arctic Fox Environmental, Inc
Project/Site: 0920-4669/2020 ASDPWQ

Job ID: 580-97631-1

Client Sample ID: AF72037
Date Collected: 09/17/20 14:30
Date Received: 09/22/20 14:30

Lab Sample ID: 580-97631-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			338918	09/23/20 12:00	JBT	TAL SEA
Total/NA	Analysis	AK102 & 103		1	340091	10/06/20 12:16	T1W	TAL SEA
Total/NA	Prep	3510C	RE		339767	10/01/20 13:14	S1S	TAL SEA
Total/NA	Cleanup	3630C	RE		339832	10/01/20 13:14	S1S	TAL SEA
Total/NA	Analysis	AK102/103	RE	1	340091	10/06/20 09:36	T1W	TAL SEA
Total/NA	Prep	3510C			338918	09/23/20 12:00	JBT	TAL SEA
Total/NA	Cleanup	3630C			338989	09/23/20 18:36	RJL	TAL SEA
Total/NA	Analysis	AK102/103		1	339212	09/26/20 15:08	TL1	TAL SEA

Client Sample ID: AF72038
Date Collected: 09/17/20 14:40
Date Received: 09/22/20 14:30

Lab Sample ID: 580-97631-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			338918	09/23/20 12:00	JBT	TAL SEA
Total/NA	Analysis	AK102 & 103		1	340091	10/06/20 12:36	T1W	TAL SEA
Total/NA	Prep	3510C	RE		339767	10/01/20 13:14	S1S	TAL SEA
Total/NA	Cleanup	3630C	RE		339832	10/01/20 13:14	S1S	TAL SEA
Total/NA	Analysis	AK102/103	RE	1	340091	10/06/20 09:56	T1W	TAL SEA
Total/NA	Prep	3510C			338918	09/23/20 12:00	JBT	TAL SEA
Total/NA	Cleanup	3630C			338989	09/23/20 18:36	RJL	TAL SEA
Total/NA	Analysis	AK102/103		1	339212	09/26/20 15:29	TL1	TAL SEA

Client Sample ID: AF72039
Date Collected: 09/17/20 13:25
Date Received: 09/22/20 14:30

Lab Sample ID: 580-97631-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			338918	09/23/20 12:00	JBT	TAL SEA
Total/NA	Analysis	AK102 & 103		1	340091	10/06/20 12:56	T1W	TAL SEA
Total/NA	Prep	3510C	RE		339767	10/01/20 13:14	S1S	TAL SEA
Total/NA	Cleanup	3630C	RE		339832	10/01/20 13:14	S1S	TAL SEA
Total/NA	Analysis	AK102/103	RE	1	340091	10/06/20 10:16	T1W	TAL SEA
Total/NA	Prep	3510C			338918	09/23/20 12:00	JBT	TAL SEA
Total/NA	Cleanup	3630C			338989	09/23/20 18:36	RJL	TAL SEA
Total/NA	Analysis	AK102/103		1	339212	09/26/20 15:49	TL1	TAL SEA

Client Sample ID: AF72040
Date Collected: 09/17/20 10:10
Date Received: 09/22/20 14:30

Lab Sample ID: 580-97631-4
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			338918	09/23/20 12:00	JBT	TAL SEA
Total/NA	Analysis	AK102 & 103		1	340091	10/06/20 13:16	T1W	TAL SEA

Lab Chronicle

Client: Arctic Fox Environmental, Inc
Project/Site: 0920-4669/2020 ASDPWQ

Job ID: 580-97631-1

Client Sample ID: AF72040

Date Collected: 09/17/20 10:10
Date Received: 09/22/20 14:30

Lab Sample ID: 580-97631-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C	RE		339767	10/01/20 13:14	S1S	TAL SEA
Total/NA	Cleanup	3630C	RE		339832	10/01/20 13:14	S1S	TAL SEA
Total/NA	Analysis	AK102/103	RE	1	340091	10/06/20 10:36	T1W	TAL SEA
Total/NA	Prep	3510C			338918	09/23/20 12:00	JBT	TAL SEA
Total/NA	Cleanup	3630C			338989	09/23/20 18:36	RJL	TAL SEA
Total/NA	Analysis	AK102/103		1	339212	09/26/20 16:09	TL1	TAL SEA

Laboratory References:

TAL SEA = Eurofins TestAmerica, Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

Accreditation/Certification Summary

Client: Arctic Fox Environmental, Inc
Job ID: 580-97631-1
Project/Site: 0920-4669/2020 ASDPWQ

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
AK102 & 103	3510C	Water	DRO (nC10-<nC25)
AK102 & 103	3510C	Water	RRO (nC25-nC36)
AK102/103	3510C	Water	DRO (nC10-<nC25)
AK102/103	3510C	Water	RRO (nC25-nC36)

Sample Summary

Client: Arctic Fox Environmental, Inc
Project/Site: 0920-4669/2020 ASDPWQ

Job ID: 580-97631-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
580-97631-1	AF72037	Water	09/17/20 14:30	09/22/20 14:30	
580-97631-2	AF72038	Water	09/17/20 14:40	09/22/20 14:30	
580-97631-3	AF72039	Water	09/17/20 13:25	09/22/20 14:30	
580-97631-4	AF72040	Water	09/17/20 10:10	09/22/20 14:30	

TestAmerica Seattle
5755 8th Street East

Tacoma, WA 98424
phone 253.922.2310 fax 253.922.5047

Chain of Custody Record

97631

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Tim Johnson/Lance Morris	rSite Contact: Tim J /Lance M.	Date: 9/21/20	COC No: 90085
Arctic Fox Environmental	Tel/Fax: 907-659-2145	Lab Contact: Tim J. /Lance M.	Carrier:	1 of 1 COCs
Pouch 340043	**Analysis Turnaround Time**			Sampler: SAO
Prudhoe Bay, AK 99734	☑ CALENDAR DAYS ☐ WORKING DAYS			**For Lab Use Only:**
Phone 907-659-2145	TAT if different from Below _____			Walk-in Client: No
FAX 907-659-2146	☑ 2 weeks			Lab Sampling: No
Project Name: 2020 ASDP WQ	☐ 1 week (Standard)			
Site:	☐ 3 days Rush			Job / SDG No.:
PO # 0920 · 4669	☐ 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)	DRO	RRO	DRO Silica gel	RRO Silica gel	Sample Specific Notes:
AF72037 L9323	9/19/20	1430		L	2			X	X	X	X	
AF72038 L9323 Dup		1440			2			X	X	X	X	
AF72039 L9321		1325			2			X	X	X	X	
AF72040 L9313		1010			2			X	X	X	X	

Therm. ID: A2 Cor: 3.6 ° Unc: 3.7 °
Cooler Dsc: L.R
Packing: Cooler
Cust. Seal: Yes X No ____
Blue Ice, Wet, Dry, None
FedEx: ____
UPS: ____
Lab Cour: X
Other: ____

580-97631 Chain of Custody

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:

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

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Tim Johnson	Arctic Fox Env.	9/21/20 0900	Josh Shaw	EPA SEA	9/22/2020 1430
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Received at Lab JLS 9/22/2020

Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

10/8/2020

Login Sample Receipt Checklist

Client: Arctic Fox Environmental, Inc

Job Number: 580-97631-1

Login Number: 97631
List Number: 1
Creator: Blankinship, Tom X

List Source: Eurofins TestAmerica, Seattle

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?	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 <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Arctic Fox Environmental, Inc.
PO Box 340043 | Prudhoe Bay, AK 99734 | PHONE: (907) 659-2145 | arcticfox@astacalaska.com | www.arcticfoxenv.com

DOC 3.2.1-02 Sample Receiving Checklist

Client Name: Michael Baker Int Date and Time: 9/19/20 @ 0850

Project: 2020 ASDP WCA

AF# 72037-72040 Initials: ~~TOJ~~ SAO

Cooler #(s) 1

Temp. 1.1 I.R. Gun: 8178 Traceable Thermometer: 111898870

DW Temp > 6° C NA Env Waste Sample Y

Other Temp >10° C N Within 4 hrs of sample time N

N/A	Yes	No	
	X		1. Were temp blanks received?
	X		2. Cooler Seals intact? (N/A if hand delivered.)
	X		3. Chain of Custody present?
	X		4. Did C.O.C. agree with samples received?
	X		5. Was C.O.C completely filled out by client?
	X		6. Bottles received intact?
	X		7. Proper Container and preservatives used?
	X		8. Sufficient volume provided for analysis?
	X		9. Sample is not multiphasic?
X			10. Were VOA samples without headspace?
X			11. Were VOA vials preserved? Preservative _____
		X	12. Did samples require preservation with sodium thiosulfate?
X			13. If "Yes" for # 12, is was there a residual chlorine recorded?
	X		14. Are samples with short holding times for analysis received within hold?
	X		15. Was standard turn around (TAT) requested? TAT _____

Record Discrepancies: