Hilcorp Alaska, LLC

Beluga River Unit Site Characterization and Groundwater Sampling Work Plan

June 2021

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ACRONYMS AND ABBREVIATIONS

°C	degrees Centigrade
µg/L	micrograms per liter
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
ARCO	Atlantic Richfield Company
AST	aboveground storage tank
bgs	below ground surface
BRU	Beluga River Unit
BTEX	benzene, toluene, ethylbenzene, and total xylenes
CoC	chain-of-custody
DRO	diesel-range organics
ENSR	ENSR Consulting Engineers, Inc.
EPH	extractable petroleum hydrocarbons
GRO	gasoline-range organics
HCl	hydrochloric acid
Hilcorp	Hilcorp Alaska, LLC
HOS	Heated Oil Storage
L	liters
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mL	milliliters
PAH	polycyclic aromatic hydrocarbon
PID	photoionization detector
PPE	personal protective equipment
QC	quality control
QEP	Qualified Environmental Professional
RCRA	Resource Conservation Recovery Act
RRO	residual-range organics
SIM	selective ion monitoring
TPH	total petroleum hydrocarbons
VOC	volatile organic compounds
Weston	Weston Solutions, Inc.

1.0 INTRODUCTION AND BACKGROUND

This work plan is presented on behalf of Hilcorp Alaska, LLC (Hilcorp) to detail environmental services that will be conducted to delineate contamination at the Beluga River Unit (BRU). This plan was prepared at the request of the Alaska Department of Environmental Conservation (ADEC) Contaminated Sites Program in a letter to Hilcorp dated April 21, 2021.

The work described herein will be conducted in accordance with ADEC site cleanup rules promulgated in Alaska Administrative Code (AAC) Title 18, Chapter 75 (18 AAC 75), §§325-390. This work plan is the primary planning document prepared to ensure that the project goals and objectives are met for the sites. Supporting documents are presented in the following appendices:

- Appendix A – Figures
- Appendix B – Well survey information
- Appendix C – Photograph Log

1.1 PROGRAM ORGANIZATION AND RESPONSIBILITIES

The contractor will provide all project management, safety oversight, field implementation, quality control (QC) management, and document preparation necessary to perform this project. Contractor personnel will coordinate field activities with Hilcorp personnel and will assist Hilcorp personnel, as directed, with communications to ADEC.

1.2 WORK PLAN RATIONALE

The objectives of this work plan are to guide investigation activities at BRU sites during the 2021 field season, delineating and documenting the nature and extent of contamination in soil and groundwater at multiple sites, and developing remedial alternatives, as appropriate. In general, these objectives will be achieved by advancing soil borings, installing groundwater monitoring wells, and collecting soil and groundwater samples.

Field activities will be conducted in two separate mobilizations. The first mobilization will be initiated to conduct groundwater monitoring activities. Existing monitoring wells will be redeveloped and sampled as outlined in this plan. Samples will be submitted to SGS, Anchorage, an ADEC-approved laboratory for analysis. Once sample results are received and

reviewed, a meeting with ADEC will be arranged to discuss findings and propose additional drilling or monitoring well installation activities. The second mobilization will include field scientists and a drill rig with crew to advance soil borings, and install monitoring wells, as necessary. Newly installed wells will be developed and sampled during this mobilization.

2.0 SITE DESCRIPTIONS AND PREVIOUS SITE ACTIVITIES

BRU is located on the northwestern shore of Cook Inlet, approximately 35 nautical miles west of Anchorage, Alaska. (Figure A-1). Proposed BRU activities include performing work at five active contaminated sites: a site characterization of Beluga River 221-23 and additional groundwater sampling for Beluga River 224-13, Beluga River Abandoned Diesel Tank Farm, Beluga River Pump Area Assessment, and the Beluga River Tank Farm (Figure A-2). Previous site activities at each of these sites are described below and proposed field activities are described in Section 3.2.

2.1 BELUGA RIVER 221-23 FORMER NORTH STOCKPILE SITE

ADEC Hazard ID: 656 | ADEC File Number: 2337.38.026 | Status: Active

The Former North Stockpile Site was the location for stockpiling impacted material from a nearby spill. Well Beluga River 221-23 is located on L Pad (Figure A-3), 2.6 miles northeast of the airstrip and 2.5 miles west of Beluga River at latitude 61°12'31.60" N and longitude 151°01'22.28" W. Currently, the well is out-of-production and the gravel pad is used for materials storage/materials stockpiles to support activities throughout the Beluga River Unit.

In June of 1989, diesel fuel was identified seeping from the toe of the gravel pad along the east side of the pad near the dehydrator building contactor sump (Spill No. 1989-23-01-180-02). The sump was removed in July 1989; in June 1990, approximately 650 cubic yards of impacted soil was excavated and placed into a lined and bermed containment area on the pad (Former North Stockpile Site, File # 2337.38.026).

In 1991, in-situ bioremediation was implemented to treat impacted soils under the contactor building. Based on a sampling and analysis report, it appeared that the system successfully remediated soils under the contactor building and the system was shut off (ADEC 2013a). *Beluga River Field, Atlantic Richfield Company (ARCO) Alaska, Inc. #90-23-01-151-01 Approval of Clean Closure for Former Contactor Sump BRU 221-23* was issued by ADEC on June 2, 1992 (ADEC 1992).

Contaminated soils stockpiled on pad from the Beluga River 221-23 Contactor sump spill were approved for land spreading with the stipulation that an assessment of the soils below the stockpiles be conducted to ensure that diesel contamination did not contaminate the underlying and adjacent soils due to the extended time that the stockpiles were staged (ADEC 2013a).

Samples collected from the north stockpile footprint in 1992 identified diesel-range organics (DRO) concentrations up to 725 milligrams per kilogram (mg/kg), and total petroleum hydrocarbons (TPH) concentration from 6.0 to 1,100 mg/kg between 0 and 2 feet below ground surface (bgs). In 1993, confirmation samples collected from the former north stockpile location detected DRO in soil from 4 to 5 feet bgs at concentrations between 161 and 3,500 mg/kg and DRO in groundwater between 0.4 and 2.5 milligrams per liter (mg/L). Soil and groundwater sample results indicated that contamination is not a result of the stored stockpile but is likely associated with historical field activities.

On 28 December 1995, ADEC issued *Beluga River 221-23 Contactor Sump Spill # 90-23-01-151-01 Site Closure*; however, this closure did not include the contamination encountered beneath the soil stockpiling area (ADEC 1995).

DRO contamination in soil and groundwater may remain at the site in the vicinity of the former north stockpile. ADEC requires further environmental site characterization work to be conducted to determine the nature and extent of contamination in this area before evaluating if the site meets current ADEC site closure requirements.

2.2 BELUGA RIVER 224-13

ADEC Hazard ID: 989 | ADEC File Number: 2337.38.021 | Status: Active

Beluga River 224-13 is located on M pad (Figure A-4), approximately 3.25 miles northeast of the airstrip and west of Beluga River at latitude 61°21’26.03” N and longitude 150°99’18.70” W.

In 1990, hydrocarbon contamination was identified in soil as a result of a dehydration building contactor sump spill and unrelated diesel spills on site. Multiple samples exceeded ADEC cleanup levels for DRO and yielded total petroleum hydrocarbon readings as high as 2,200 mg/kg. An unknown quantity of contaminated sand and gravel was excavated and stockpiled

for remediation (ARCO 1991). A closure request was submitted to ADEC in 1995; however, closure was dependent on long-term groundwater monitoring. ADEC has no record that groundwater monitoring sampling was conducted. Available records indicate that two monitoring wells were installed at the site: one in the northwest portion of the pad near the contactor building and another at the central southern portion of the pad west of the wellhead building. Groundwater results from these monitoring wells are not included in the available documentation; however, the soil concentrations indicate two separate areas of soil contamination with petroleum hydrocarbon concentrations greater than 1,000 mg/kg.

2.3 BELUGA RIVER ABANDONED DIESEL TANK FARM

ADEC Hazard ID: 1000 | ADEC File Number: 2337.38.015 | Status: Active

Beluga River Abandoned Diesel Tank Farm is located on A Pad (Figure A-5), 1 mile southwest of the airstrip at latitude 61°15’83.28” N and longitude 151°05’51.27” W. The site comprised two 44,000-gallon aboveground storage tanks (ASTs), located within a bermed impoundment area measuring approximately 50 by 80 feet (Weston Solution, Inc. [Weston] 2013a). These tanks were taken out of service in 1988; however, it is not clear when the tanks were removed from the site.

In 1991, ARCO contracted ENSR Consulting Engineers, Inc. (ENSR) to conduct an initial subsurface assessment of the area. The assessment consisted of the installation of 18 soil borings to a maximum depth of 16 feet bgs. Groundwater was encountered at a depth of approximately 13 feet bgs. Soil samples were analyzed for extractable petroleum hydrocarbons (EPH) and benzene, toluene, ethylbenzene, and total xylenes (BTEX) (Weston 2013a).

Analytical results from this investigation indicated there may have been two sources of diesel impact to subsurface soils. One source appears to have been the dispenser lines immediately east of the tanks. The second, which occurred roughly 30 feet north of the former tank farm impoundment, does not have a known source. The extent of the above releases appears to cover approximately 6,000 square feet. EPH concentrations in soil collected at the water table, just east of the north tank, were detected at 2,000 and 1,300 mg/kg at the southeast corner of the south tank. Hydrocarbon impacts were detected in all soil borings collected within the tank

impoundment area. EPH values at the water table ranged from 690 to 2,000 mg/kg within the impoundment and 90 mg/kg at the eastern impoundment dike. EPH contamination of 270 mg/kg was found north of the tank impoundment (Weston 2013a).

In 1993, ARCO submitted a work plan to verify previous site assessment data, complete delineation of impacted soil and groundwater at the site and collect the data necessary to evaluate the feasibility of in situ bioremediation for future treatment of the area. ARCO proposed three rounds of sampling and analysis, including installing 12 monitoring wells. Soil and groundwater collected from these wells were to be analyzed for gasoline-range organics (GRO), DRO, and BTEX. In addition, three of the soil samples were to be analyzed for total organic carbon, sieve analysis, microbial populations, total phosphate and ammonium, and pH. The results from these analyses were to be used to evaluate the feasibility of air sparging vapor extraction and bioremediation for in situ treatment of soil and groundwater. It is not known when these work plan activities were conducted. However, a letter dated 5 October 1994 from ARCO to ADEC's Mr. Don Fritz indicated that lower concentrations of DRO impact to subsurface soil than reported by ENSR. Impact to groundwater by hydrocarbons in both the diesel and gasoline ranges were encountered. A letter dated 21 June 1994 in the ConocoPhillips Alaska, Inc. file indicates DRO was detected up to 13 mg/L in groundwater below the tank farm. GRO and BTEX impacts were evident but below cleanup criteria in place at the time (Weston 2013a).

2.4 BELUGA RIVER PUMP AREA ASSESSMENT

ADEC Hazard ID: 990 | ADEC File Number: 2337.38.031 | Status: Active

The Beluga River Pump Area Assessment Site (also known as the Former Beluga River Fuel Pump Area) is located on E Pad (Figure A-6), along the eastern side of Beluga Airstrip runway 18-36, at the BRU Office Building Pad and entrance to E Pad (Drill Site 212-35). The site is located at approximately 61°10'38.14" N latitude and 151°2'13.12" W longitude (Weston 2013b). The Beluga River Pump Area Assessment Site is a former set of fuel (gasoline and diesel) dispenser pumps connected by pipelines to the former Fuel Tank Farm (the current location of the Heated Oil Storage [HOS] Building) (Weston 2013b).

In 1991, the fuel lines were removed, and a limited excavation was conducted along with soil and groundwater characterization in October 1991 and January 1992. Groundwater was encountered at approximately 7.5 feet bgs (Weston 2013b).

In 1992, an air sparging and vapor extraction system was installed, comprised of 66 sparge wells, 32 vapor extraction wells, and 24 groundwater monitoring wells (FG- 01 through FG-24). The system was operated until 1998. Routine groundwater monitoring was conducted until 1999 (Weston 2013b).

In 2005, groundwater samples were collected at 10 existing wells, and one newly installed well (FG-25). DRO and benzene impact to groundwater was defined by groundwater monitoring wells FG-03 and FG-08. A second DRO plume was undefined by groundwater monitoring wells FG-24 and FG-25 (Weston 2013b).

2.5 BELUGA RIVER TANK FARM

ADEC Hazard ID: 991 | ADEC File Number: 2337.38.029 | Status: Active

Beluga River Tank Farm is located on the P&S Yard (Figure A-7) at the HOS building site, immediately northeast of the Beluga airstrip. The site is located at approximately 61°10’31.10” N latitude and 151°2’17.85” W longitude. Prior to 1987, a tank farm with an impoundment dike was located at the site of the current HOS building. The tank farm was comprised of two 10,000-gallon diesel ASTs, two 6,000-gallon diesel aboveground storage tanks (ASTs), and a 10,000-gallon gasoline AST (Weston 2013c). In 1988, the tank farm was reportedly removed, and the impoundment dike was leveled for construction of the 30- by 40-foot HOS building (Weston 2013c).

In 1991, 12 soil borings were installed to a depth of 9 to 11.5 feet bgs; groundwater was encountered between 4.5 and 8 feet bgs. Only soil samples were collected and sampled for EPH and DRO. Impact to soil was fully delineated (Weston 2013c).

In 1993, contamination in groundwater was delineated during the installation of 12 groundwater monitoring wells (HOS-1 through HOS-12). DRO and benzene were detected at concentrations above the current ADEC Table C groundwater cleanup levels (ADEC 2020a).

DRO was identified in two monitoring wells (HOS-1 and HOS-3), and benzene was identified in three wells (HOS-2, HOS-5, and HOS-6) (Weston 2013c).

In 2000, groundwater samples were collected at eight groundwater monitoring wells. Benzene was detected in groundwater above the current ADEC Table C groundwater cleanup level in monitoring wells HOS-1 and HOS-5. Monitoring well HOS-2 had been abandoned by the time of the 2000 sampling event.

3.0 DATA QUALITY OBJECTIVES

3.1 ANALYTICAL SAMPLING PROCEDURES

Soil borings, groundwater samples, and surface water samples will be used at BRU sites to delineate the nature and extent of contamination. An ADEC Qualified Environmental Professional (QEP) will be responsible for the collection of field screening and analytical samples, generation of field measurement data according to the methods specified in this work plan, and documentation of borehole properties including soil type and physical properties. The analytical laboratory will analyze the samples, review sample information (e.g., chain-of-custody [CoC] forms) and generate the data packages. All analytical samples will be collected in accordance with ADEC *Field Sampling Guidance* (ADEC 2019) and contractor standard operating procedures.

3.1.1 Soil Sampling

Up to three soil samples may be collected at each soil boring and will target the upper limit of contamination (i.e., the depth where contaminated soil is first suspected based on observations and photoionization detector [PID] readings), the highest PID reading, and the soil/water interface. At a minimum one analytical sample will be collected from each soil boring at the depth of highest PID reading or soil/water interface. Soil samples will be submitted to the analytical laboratory for one or more of following list of analytes and methods as needed for site-specific requirements:

- GRO by AK101
- DRO by AK102
- Residual-range organics (RRO) by AK103
- Petroleum-related volatile organic compounds (VOCs) by SW8260C
- Polycyclic aromatic hydrocarbons (PAHs) by SW8270D-selective ion monitoring (SIM)
- Resource Conservation Recovery Act (RCRA) Metals by SW6020A

Soil sample results will be compared to the most stringent values from ADEC Tables B1 and B2, Method Two Under 40-Inch Zone migration to groundwater and Human Health cleanup levels (ADEC 2020a). Table 1 presents the analyte list and corresponding ADEC Method Two soil cleanup levels.

Table 1 Soil Analyte List and ADEC Cleanup Levels

Analyte	ADEC Cleanup Level[1] (mg/kg)
Petroleum, Oil, and Lubricants	
GRO	300
DRO	250
RRO	10,000
Petroleum-Related VOCs (including BTEX)	
Benzene	0.022
Toluene	6.7
Ethylbenzene	0.13
Total xylenes	1.5
n-Butylbenzene	20
sec-Butylbenzene	28
tert-Butylbenzene	11
Isopropylbenzene (cumene)	5.6
1,2,4-Trimethylbenzene	0.61
1,3,5-Trimethylbenzene	0.66
PAHs	
1-Methylnaphthalene	0.41
2-Methylnaphthalene	1.3
Acenaphthene	37
Acenaphthylene	18
Anthracene	390
Benzo[a]anthracene	0.70
Benzo[a]pyrene	1.5
Benzo[b]fluoranthene	15
Benzo[g,h,i]perylene	2,300
Benzo[k]fluoranthene	150
Chrysene	600
Dibenzo[a,h]anthracene	1.5
Fluoranthene	590
Fluorene	36
Indeno[1,2,3-cd]pyrene	15
Naphthalene	0.038
Phenanthrene	39
Pyrene	87
RCRA Metals	
Arsenic	0.20
Barium	2,100
Cadmium	9.1
Chromium	100,000
Lead	400
Mercury	0.36
Selenium	6.9
Silver	11

Notes:
For definitions, see the Acronyms and Abbreviations section.
[1] ADEC Cleanup Level = Most stringent between the Method Two, under 40-inch zone, Tables B1 and B2 human health and migration to groundwater cleanup levels (ADEC 2020a).

It is anticipated that soil borings and associated soil samples will be collected as part of the Beluga River 221-23 site characterization only, as soil contamination at Beluga River 221-23 was only partially delineated in the early 1990's. The objectives of the soil borings described in this work plan are to determine the current nature of soil contamination remaining onsite and the current extent.

Soil contamination at the Beluga River 224-13 Well Site, Abandoned Diesel Tank Farm, Pump Area, and the Tank Farm has been delineated and the only remaining data gap is the current nature and extent of groundwater contamination.

3.1.2 Groundwater Sampling

Groundwater monitoring wells and temporary well points will be installed, developed, and sampled according to the *Monitoring Well Guidance* (ADEC 2013b) and relevant standard operating procedures. One primary groundwater sample will be collected from each monitoring well or temporary well point. Well sampling will be conducted using a submersible pump or a peristaltic pump following purging of at least three well casing volumes. Water quality parameters (temperature, pH, conductivity, redox potential, dissolved oxygen) will be measured using a water quality meter and a turbidimeter. The water level in the well will be monitored using an oil/water interface probe or water-level indicator. All purging and sampling of monitoring wells will be conducted in accordance with the ADEC *Field Sampling Guidance* (ADEC 2019). The depth of the sample will be dependent on the depth to groundwater at the time of sampling. Groundwater samples will be analyzed according to the site-specific list of analytes and methods as needed:

- GRO by AK101
- DRO by AK102
- RRO by AK103
- Petroleum-related VOCs by SW8260C
- PAHs by SW8270D-SIM
- RCRA Metals by SW6020A

Groundwater sample results will be compared to ADEC Table C, Groundwater Human Health cleanup levels (ADEC 2020a). Table 1 presents the analyte list and the corresponding ADEC Table C cleanup levels.

Table 2 Groundwater Analyte List and ADEC Cleanup Levels

Analyte	ADEC Cleanup Level[1] (µg/L)
Petroleum, Oil, and Lubricants	
GRO	2,200
DRO	1,500
RRO	1,100
Petroleum-Related VOCs (including BTEX)	
Benzene	4.6
Toluene	1,100
Ethylbenzene	15
Total xylenes	190
n-Butylbenzene	1,000
sec-Butylbenzene	2,000
tert-Butylbenzene	690
Isopropylbenzene (cumene)	450
1,2,4-Trimethylbenzene	56
1,3,5-Trimethylbenzene	60
PAHs	
1-Methylnaphthalene	11
2-Methylnaphthalene	36
Acenaphthene	530
Acenaphthylene	260
Anthracene	43
Benzo[a]anthracene	0.30
Benzo[a]pyrene	0.25
Benzo[b]fluoranthene	2.5
Benzo[g,h,i]perylene	0.26
Benzo[k]fluoranthene	0.80
Chrysene	2.0
Dibenzo[a,h]anthracene	0.25
Fluoranthene	260
Fluorene	290
Indeno[1,2,3-cd]pyrene	0.19
Naphthalene	1.7
Phenanthrene	170
Pyrene	120
RCRA Metals	
Arsenic	0.52
Barium	3,800
Cadmium	9.2
Chromium	22,000
Lead	15
Mercury	0.52
Selenium	100
Silver	94

Notes:
For definitions, see the Acronyms and Abbreviations section.
[1] ADEC Cleanup Level = ADEC Table C Groundwater Human Health Cleanup Levels (ADEC 2020a).

Samples will consist of the appropriate containers as listed in Table 3. Samples will be labelled with the following details:

- Project code or number
- Sampling date and time
- Sample number
- Sample depth below top of casing
- Sampler's initials
- Analyses requested

Table 3
Sample Containers

Parameter	Potential Analytical Method	Containers (number, size, and type)	Preservation Requirements	Maximum Holding Time
GRO	AK101	(3)) 40 mL glass vials, no headspace	0 to 6 ºC HCl, pH < 2	14 days
DRO/RRO	AK102/103	(2) 1 L glass	0 to 6 ºC HCl, pH < 2	14 days to extraction, 40 days to analysis of extraction
VOCs	SW8260	(3) 40 mL glass vials, no headspace	0 to 6 ºC HCl, pH < 2	14 days
PAHs	SW8270-SIM	(2) 1 L glass	0 to 6 °C	7 days to extraction/40 days to analysis

Note:
For definitions, refer to the Acronyms and Abbreviations section.

3.1.3 Sample Quality Assurance and Quality Control

Applicable sample custody and collection protocols and analytical methods will be used as specified in the *Field Sampling Guidance* (ADEC 2019). Soil sampling protocol requires the following QC samples:

- One field duplicate QC sample for every 10 or fewer primary samples. If sampling occurs over multiple days, a minimum of one field duplicate will be collected per day, if possible.
- Methanol trip blanks for each batch of 20 soil samples or one per cooler for GRO and VOC analyses and a deionized water trip blank for each batch of 20 water samples or one per cooler for GRO and VOC analyses. Each trip blank will be documented on the CoC form and submitted to the laboratory for analysis.

3.2 WELL SURVEY AND SAMPLING PLAN

On 16 October 2019, Jacobs performed a well survey at Beluga River to identify all existing monitoring wells and to collect data on well condition, construction, accessibility, and usability. These data were used to develop a sampling plan for BRU sites described below and to determine where additional monitoring well and soil boring installation may be necessary to fully delineate the nature and extent of remaining contamination with the goal of reaching site closure for each active contaminated site. The Beluga River Monitoring Well Survey is provided in Appendix B.

3.2.1 Beluga River 221-23

The source of contamination near the former north stockpile area has not been determined. Historically, DRO contamination in soil ranged from 161 to 3,500 mg/kg and in groundwater ranged from 0.4 to 2.5 mg/L (including silica gel cleanup results). The purpose of this site characterization will be to determine the current nature and extent of contamination, if any, and assess the potential source of the release.

Two soil borings are proposed to investigate the DRO contamination identified in soil and groundwater during the 1992 and 1993 investigation activities. The former north stockpile was located between the wellhead building and the closed reserve pit (Figure A-3). The soil boring/monitoring well locations will be placed within the former footprint of the stockpile.

Soil samples will be collected from each proposed soil boring with the higher PID readings as described in Section 3.1.1 and analyzed for GRO, DRO/RRO, petroleum-VOCs, PAHs, and RCRA Metals. Based on field observations and PID results, the soil boring with the highest PID results will be completed as a temporary monitoring well and sampled as outlined in Section 3.1.2.

Site activities will be conducted during the second mobilization.

3.2.2 Beluga River 224-13

During the October 2019 survey, only one of the two monitoring wells was located in usable condition (well 224-13-2, located in the northwest portion of the pad – see Figure A-4). The other monitoring well (224-13-1) was positioned west of the wellhead building but was not located during the October 2019 survey.

The existing monitoring well (224-13-2) will be redeveloped and sampled to determine if contamination remains in the northwest corner of the pad. Samples will be analyzed for GRO, DRO/RRO, petroleum-VOCs and PAHs.

3.2.3 Beluga River Abandoned Diesel Tank Farm

The October 2019 survey located three of the four monitoring wells in usable condition (ATF3, ATF8, and ATF10 – see Figure A-5) that were within the previous contaminated groundwater plume or downgradient of the plume. Historically, monitoring well ATF3 had the highest DRO concentration and will be used to determine the current status of groundwater contamination. Monitoring wells ATF8 and AFT10 are downgradient of the release area and could be used to determine the current extent of contamination. Monitoring well ATF1, which was not located during the October 2019 survey, was positioned cross-gradient of the abandoned tank farm and historically had a DRO concentration approximately half that of monitoring well ATF3.

The three monitoring wells ATF3, ATF8, and ATF10 will be redeveloped and sampled as outlined in Section 3.1.2 to determine the current nature and extent of groundwater contamination. Samples will be analyzed for DRO, GRO, BTEX, and PAHs. The field team will also attempt to relocate well ATF1 for redevelopment and sampling.

3.2.4 Beluga River Pump Area Assessment

Initially, 25 monitoring wells were installed onsite (FG-01 through FG-25). Two groundwater plumes were previously identified at the site, one beginning near monitoring well FG-03 along the eastern edge of the runway and another in the vicinity of monitoring wells FG-24 and FG-25.

During the October 2019 survey, the following wells were found to be in potentially usable condition as described below:

- FG-03 – Good condition, no obstruction
- FG-08 – Located but monument was knocked over and the top of well is crushed
- FG-14 – Good condition, no obstruction
- FG-15 – Good condition with no obstruction but no water was present in the well, possibly due to the dry summer
- FG-20 – Good condition, no obstruction
- FG-21 – Good condition, no obstruction but slightly sunken
- FG-23 – Good condition, no obstruction
- FG-24 – Located but unable to open cap
- FG-25 – Located but unable to open cap

Monitoring well FG-08 historically had the highest DRO and benzene concentrations from the western plume but found to be damaged during the 2019 survey. Two downgradient monitoring wells (FG-14 and FG-21) were located (Figure A-6), but a third (FG-11) could not be located. Monitoring wells FG-24 and FG-25, within the eastern plume, could not be fully assessed due to stuck caps. FG-25 historically had the highest DRO concentration from the eastern plume. The upgradient monitoring wells FG-20 and FG-23 were both located and usable.

Monitoring wells FG-03, FG-14, and FG-21 will be sampled from the western plume. Additionally, the field team will attempt to repair and sample FG-08 and find and sample FG-10. If successful, each well will be redeveloped and then sampled. Monitoring wells FG-20, FG-23, FG-24, and FG-25 will be redeveloped and sampled from the eastern plume. All samples will be analyzed for DRO, GRO, and BTEX. The field team will attempt to find and sample wells FG-01 and FG-02 and determine the location and sampling protocol for the current potable water well serving camp.

3.2.5 Beluga River Tank Farm

Prior to the October 2019 survey, the following eight wells were identified as priorities for sampling based on the previous sample results and suspected areas of groundwater contamination: HOS-1, HOS-3, HOS-4, HOS-5, HOS-6, HOS-9, HOS-10, and HOS-13. During

the survey, only one of the priority monitoring wells (HOS-5) was located and found to be in potentially usable condition. This well did not have a cap in place and had a petroleum odor. Accumulation of dirt/debris in this well is possible, which could impact the ability to properly redevelop and collect a groundwater sample from this well. Historically this monitoring well had the highest benzene concentration at the site and, if usable, shall be used to assess the potential for contamination remaining onsite. Monitoring well HOS-11 is not a priority well and was located cross gradient to HOS-05. This well was not assessed during the 2019 survey and its current condition is unknown. The field team will attempt to locate the HOS-11 and if found will collect a groundwater sample at this location as well.

If contaminated groundwater is found in monitoring well HOS-5, then an additional well located further downgradient (Figure A-7) will be installed, developed, and sampled to determine the extent of groundwater contamination since the last round of sampling. Samples will be analyzed for DRO, GRO, and BTEX. The location(s) of any additional monitoring wells will be based on the results of the initial groundwater sampling. Additional monitoring well installation will be conducted during a second mobilization to the site.

3.3 HEALTH AND SAFETY

Personnel will comply with all Hilcorp and contractor safety policies. Hilcorp will provide access to the site and will provide the site-specific safety briefing, as needed. The contractor will provide level D personal protective equipment (PPE) consisting of hardhats, high-visibility safety vests, safety toed boots, safety glasses, and gloves appropriate to the task. Fire-resistant clothing is also required. When handling sample containers, disposable nitrile gloves will be worn to prevent exposure to sample preservatives and prevent cross-contamination between samples. Prior to sampling and upon the completion of all samples at each well, all reusable sampling equipment and PPE exposed to contamination will be decontaminated to minimize cross-contamination.

3.3.1 Utility Locates

Utility locates will be conducted prior to any drilling or excavation activities to prevent damage to utilities. Buried utilities, including buried pipelines, will be located by Hilcorp. If a proposed soil boring is within 15 feet of an active utility or pipeline that cannot be locked out/tagged out,

the soil boring will be moved to a distance greater than 15 feet. If the soil boring cannot be moved, hand excavation or a hydro-vacuum will be utilized to clear the boring location or to verify the location of the buried infrastructure. The locations of some of the buried pipelines may not be accurately known. If refusal is encountered during drilling activities, drilling will immediately cease at that location and an alternate drilling location will be determined. A magnetic locator (Schonstedt or similar) should be available onsite to screen drilling locations for potential utility conflicts.

At the Beluga River 221-23 site, the soil borings proposed near the former north stockpile area is adjacent to the closed reserve pit. The drilling crew will coordinate closely with Hilcorp personnel to verify that no soil boring is advanced into the closed reserve pit. During drilling the crew will watch for any evidence that the reserve pit materials have been encountered, and if observed will cease drilling immediately and alter the soil boring location.

3.3.2 Site Control

Work zones will be designated at the daily site safety meetings. Site control will be maintained by establishing fencing and barricades to indicate restricted and/or closed areas, if warranted. These areas will be coordinated with the onsite Hilcorp personnel to verify that no conflicting work activities are planned and to mitigate safety issues related to these conflicts. Hilcorp personnel's operations and maintenance activities will take precedence over investigation and remediation activities.

3.4 INVESTIGATION-DERIVED WASTE

Water produced during the decontamination, cleaning, purging, and sampling of monitoring wells will be containerized in 55-gallon drums at each site. If the laboratory results indicate the groundwater is non-hazardous, Hilcorp will inject the water into the Class I Well located at BRU. If the groundwater is determined to be hazardous, it will be transported to U.S. Ecology in Anchorage for disposal.

Soil cuttings resulting from soil borings will be containerized in Super Sacks or other appropriate waste containers. If the laboratory results indicate the soil is non-hazardous, Hilcorp will inject the soil into the Class I Well located at BRU. If the soil is determined to be

hazardous, it will be transported to Alaska Soil Recycling in Anchorage for thermal treatment. Prior to offsite shipment of contaminated soil or groundwater, an ADEC *Transport, Treatment, & Disposal Approval Form for Contaminated Media* will be completed and submitted to ADEC for review and approval.

Disposable sample collection equipment and gloves will be placed in plastic bags and disposed of in the general waste stream at BRU.

3.5 FIELD LOGBOOKS AND FIELD FORMS

All logbooks and field form entries shall be printed legibly using a waterproof pen. All field forms shall be completed daily. The following information shall be recorded at the beginning of each daily entry:

- Project name/site location/client
- Date
- Weather, site conditions, and other observations
- Full name of onsite personnel and visitors with their affiliation and project title (e.g., team leader)
- Daily objectives
- Time and location of activity
- Field observations and comments

For investigation activities, daily entries will contain a complete record of activities including, but not limited to, the following information, unless the data are recorded on a field form:

- Deviations from the work plan
- Photographic log
- Site sketches with reference (e.g., north arrow)
- Survey and location (e.g., samples or debris) providing global positioning system coordinates when possible
- Field measurements
- Equipment calibrations and maintenance
- Sample records including the following:
  - Sample identification numbers
  - Date, time, sampler

  - Media container(s), preservations including the lot number
  - QC samples
  - Analysis
  - CoC form numbers
  - Sample shipments (when, what, destination, shipment air bill numbers)
  - Decontamination procedures used
  - Waste tracking (when, how much, destination)
- Daily summary of activities (e.g., number of samples collected)
- Time of departure from the site

3.6 REPORTING

A report shall be prepared by a QEP and submitted to the ADEC to summarize work performed as part of the 2021 site characterization and groundwater sampling activities. The contents of this report will include a summary of field activities and results of sampling and analysis, as well as figures and a photographic log representative of project activities. This report will demonstrate that the inspections, sampling, and analyses performed at the sites adequately characterize the nature and extent of contamination in the media being investigated. The report will include recommendations for each site. The report will also include an assessment of the analytical data quality, including ADEC Laboratory Data Review Checklists. The analytical laboratory data packages will be provided as an appendix to the report.

4.0 REFERENCES

ADEC (Alaska Department of Environmental Conservation). 1992 (2 June). *Beluga River Field, ARCO Alaska, Inc. #90-23-01-151-01 Approval of Clean Closure for Former Contactor Sump BRU 221-23.* Letter from ADEC Contaminated Sites to ARCO Alaska, Inc.

ADEC. 1995 (28 December). *Beluga River 221-23, Contactor Sump Spill # 90-23-01-151-01 Site Closure.* Letter from ADEC Contaminated Sites to ARCO Alaska, Inc.

ADEC. 2013a (6 May). *Beluga River Pad 221-23, Requirement for Additional Site Characterization.* Letter from ADEC Contaminated Sites to ConocoPhillips.

ADEC. 2013b (September). *Monitoring Well Guidance*. Division of Spill Prevention and Response, Contaminated Sites Program. 18 AAC 75.

ADEC. 2019 (22 October). *Field Sampling Guidance*. Division of Spill Prevention and Response, Contaminated Sites Program. October.

ADEC. 2020a (7 November). *Oil and Other Hazardous Substances Pollution Control*. Division of Spill Prevention and Response, Contaminated Sites Program. 18 AAC 75.

ADEC. 2020b (5 March). *Water Quality Standards*. 18 AAC 70.

ARCO (Atlantic Richfield Company). 1991. “Spill Remediation Programs, Beluga River Unit.” Letter to Mike Franger, Land Manager, Cook Inlet Region Inc.

Weston (Weston Solutions, Inc.). 2013a (29 April). *Memorandum for Beluga River Abandoned Diesel Tank Farm; Beluga River Unit; ADEC File No. 2337.38.015; Hazard ID: 1000.*

Weston. 2013b (29 April). *Memorandum for Beluga River Pump Area Assessment Site, Beluga River Unit; ADEC File No. 2337.38.031; Hazard ID: 990.*

Weston. 2013c (29 April). *Memorandum for Former Beluga River Tank Farm Site; Beluga River Unit; ADEC File No. 2337.38.029; Hazard ID: 991.*

APPENDIX A
Figures

Beluga River Unit
Area of Interest

GRANITE POINT TANK FARM (GPTF)
TYONEK
North Foreland
Fire Island
ANCHORAGE
Knik Arm
Possession, Point
Turnagain Arm
TRADING BAY PRODUCTION FACILITY (TBPF)
Trading Bay
West Foreland
MGS
East Foreland
KPL JCT
Kenai Spur Rd
NIKISKI
Swanson River Rd
DRIFT RIVER TERMINAL
Redoubt Bay
Christy Lee Loading Platform
Kalgin Island
KENAI
Kenai Spur Rd
Sterling Hwy
STERLING
SOLDOTNA
COOPER LANDING
Skilak Lake
Cook Inlet
Sterling Highway
Tustumena Lake
State Waters
Federal Waters
NINILCHIK
Oilwell Rd
ANCHOR POINT
East End Rd
HOMER
Kachemak Bay
Copyright:(c) 2014 Esri

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Hilcorp Alaska, LLC

3800 Centerpoint Drive, Suite 1400
Anchorage, AK 99503

Legend

- Onshore Facilities
- Offshore Platforms
- State/Federal Boundary (3 Mile Limit)
- Oil and Gas Units Operated by HAK
- Oil and Gas Units - Other
- Major Roads

Alaska State Plane Zone 4 NAD 1983 (feet)

0 10 20 Kilometers

0 10 20 Miles

N

Date Prepared: 5/25/2021	Company Name: Hilcorp Alaska, LLC.	Drawn By: HAK - MRA

LOCATION AND VICINITY

BELUGA RIVER UNIT, COOK INLET, ALASKA

Scale: @ 11x17 map size	Figure No:
1 in = 10 miles	A-1

Beluga River

BRWD-1 (DW-2)

Grants Beacon

N PAD

Beluga River 224-13 (M Pad)

Beluga River 221-23 (L Pad)

K PAD

J PAD

S013N010W

S013N009W

Beluga River

BELUGA RIVER UNIT

ENSTAR

I PAD

CEA

ALASKA PIPELINE COMPANY

H PAD

G PAD

Cottonwood Beach

F PAD

Beluga River Pump Area Assessment (E Pad)

Beluga River Tank Farm (P&S Yard)

Beluga Airport

BELUGA AIRSTRIP

D PAD

C PAD

KENAI PENINSULA BOROUGH

MATANUSKA SUSITNA BOROUGH

S013N010W
S012N010W

S013N009W
S012N010W

Beluga River Abandoned Diesel Tank Farm (A Pad)

B PAD

CENTRAL WASTE FACILITY

DW-1

Threemile Creek

Threemile Creek

Beluga

Viapan Lake

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Legend

- Well Pads
- Regional_NAD83
- Beluga River Contaminated Sites
- Oil and Gas Units Operated by HAK

Alaska State Plane Zone 4 NAD 1983 (feet)

0 0.5 1 Kilometers

0 0.5 1 Miles

N

Hilcorp Alaska, LLC

3800 Centerpoint Drive, Suite 1400
Anchorage, AK 99503

Date Prepared:	Company Name:	Drawn By:
5/25/2021	Hilcorp Alaska, LLC.	HAK - MRA

SITE LOCATIONS

BELUGA RIVER UNIT, COOK INLET, ALASKA

Scale: @ 11x17 map size	Figure No:
1 in = 3,000 feet	A-2

151°1'32"W 151°1'30"W 151°1'28"W 151°1'26"W 151°1'24"W 151°1'22"W 151°1'20"W 151°1'18"W 151°1'16"W

61°12'34"N
61°12'33"N
61°12'32"N
61°12'31"N

Closed Reserve Pit
Former North Stockpile
Proposed Boring
Proposed Boring
BELUGA RIVER 221-23
Wellhead Building
Beluga River L PAD
Contactor Building

Imagery Source: QSI 2017

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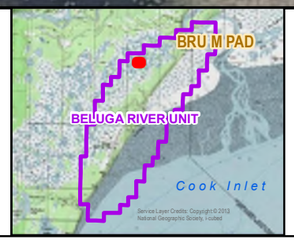

Legend
- Proposed Boring
- Oil-Gas Surface Hole Location

Alaska State Plane Zone 4 NAD 1983 (feet)

0 10 20 Meters

0 50 100 Feet

N

Date Prepared: 6/14/2021	Company Name: Hilcorp Alaska, LLC.	Drawn By: HAK - MRA
Proposed Boring Locations Beluga River 221-23 (L Pad)		
BELUGA RIVER UNIT, COOK INLET, ALASKA		
Scale: @ 11x17 map size 1 in = 50 feet	Figure No: A-3	

150°59'38"W 150°59'36"W 150°59'34"W 150°59'32"W 150°59'30"W 150°59'28"W 150°59'26"W 150°59'24"W

61°12'46"N 61°12'45"N 61°12'44"N 61°12'43"N

Monitoring Well Located and Usable 224-13-2

BELUGA RIVER 224-13

Beluga River M PAD

Imagery Source: QSI 2017

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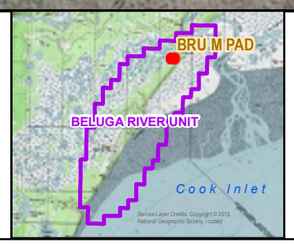

Legend

- Oil-Gas Surface Hole Location
- Water Supply Well Location
- Monitoring Well Located and Usable

Alaska State Plane Zone 4 NAD 1983 (feet)

0 10 20 Meters

0 50 100 Feet

N

Date Prepared: 6/2/2021	Company Name: Hilcorp Alaska, LLC.	Drawn By: HAK - MRA
Monitoring Well Locations Beluga River 224-13 (M Pad)		
BELUGA RIVER UNIT, COOK INLET, ALASKA		
Scale: @ 11x17 map size 1 in = 50 feet	Figure No: A-4	

151°3'42"W 151°3'40"W 151°3'38"W 151°3'36"W 151°3'34"W 151°3'32"W 151°3'30"W 151°3'28"W 151°3'26"W 151°3'24"W 151°3'22"W 151°3'20"W

61°9'26"N 61°9'25"N 61°9'24"N 61°9'23"N 61°9'22"N 61°9'21"N

BELUGA RIVER 244-4

Beluga River A PAD

Approximate Former Location of Diesel Tank Farm

Attempt to Find and Sample ATF1

Monitoring Well Located and Usable ATF8

Monitoring Well Located and Usable ATF10

Monitoring Well Located and Usable ATF3

Imagery Source: QSI 2017

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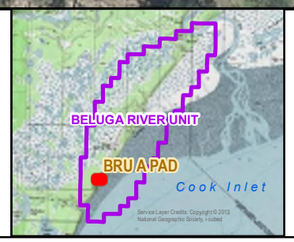

Legend

- Oil-Gas Surface Hole Location
- Monitoring Well Located and Usable
- Monitoring Well Attempt to Find and Sample

Alaska State Plane Zone 4 NAD 1983 (feet)

0 10 20 Meters

0 75 150 Feet

N

Date Prepared: 6/14/2021	Company Name: Hilcorp Alaska, LLC.	Drawn By: HAK - MRA

Monitoring Well Locations
Beluga River Abandoned Diesel Tank Farm (A Pad)

BELUGA RIVER UNIT, COOK INLET, ALASKA

Scale: @ 11x17 map size	Figure No:
1 in = 75 feet	A-5

151°2'16"W 151°2'14"W 151°2'12"W 151°2'10"W 151°2'8"W 151°2'6"W 151°2'4"W 151°2'2"W 151°2'0"W 151°1'58"W 151°1'56"W 151°1'54"W 151°1'52"W 151°1'50"W 151°1'48"W 151°1'46"W 151°1'44"W

61°10'39"N
61°10'36"N
61°10'37"N
61°10'36"N
61°10'35"N
61°10'34"N
61°10'33"N
61°10'32"N
61°10'31"N

Attempt to Find and Sample FG-2

Monitoring Well Located and Usable FG-3

Attempt to Find and Sample FG-1

Monitoring Well Located and Potentially Usable FG-8

Monitoring Well Located and Usable FG-14

Attempt to Find and Sample FG-10

Monitoring Well Located and Usable FG-21

BELUGA RIVER 212-35T

Beluga River E PAD

BELUGA RIVER 212-35

Monitoring Well Located and Potentially Usable FG-20

Monitoring Well Located and Potentially Usable FG-24

Monitoring Well Located and Usable FG-23

Monitoring Well Located and Potentially Usable FG-25

Imagery Source: QSI 2017

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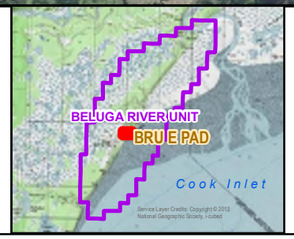

Legend

- Oil-Gas Surface Hole Location
- Water Supply Well Location
- Monitoring Well Located and Usable
- Monitoring Well Located and Potentially Usable
- Monitoring Well Attempt to Find and Sample

Alaska State Plane Zone 4 NAD 1983 (feet)

0 25 50 Meters

0 100 200 Feet

N

Date Prepared: 6/8/2021	Company Name: Hilcorp Alaska, LLC.	Drawn By: HAK - MRA

Monitoring Well Locations
Beluga River Pump Area Assessment (E Pad)

BELUGA RIVER UNIT, COOK INLET, ALASKA

Scale: @ 11x17 map size 1 in = 103 feet	Figure No: A-6

151°2'32"W 151°2'30"W 151°2'28"W 151°2'26"W 151°2'24"W 151°2'22"W 151°2'20"W 151°2'18"W 151°2'16"W 151°2'14"W 151°2'12"W 151°2'10"W 151°2'8"W 151°2'6"W 151°2'4"W 151°2'2"W

61°10'36"N
61°10'35"N
61°10'34"N
61°10'33"N
61°10'32"N
61°10'31"N
61°10'30"N
61°10'29"N
61°10'28"N

Former Diesel Pump

Approximate Location-
Former Tank Farm Facility

Heated Oil
Storage
Building

Monitoring Well Located
and Usable HOS-5

Attempt to Find and
Sample HOS-11

Runway

Beluga River Tank Farm
(P&S Yard)

Imagery Source: QSI 2017

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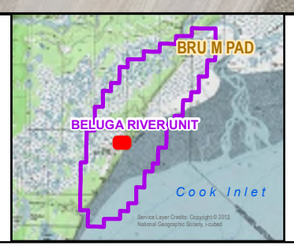
Anchorage, AK 99503



Legend

- Monitoring Well Located and Usable
- Attempt to Find and Sample

Alaska State Plane Zone 4 NAD 1983 (feet)

0 25 50 Meters

0 100 200 Feet

N

Date Prepared: 6/15/2021	Company Name: Hilcorp Alaska, LLC.	Drawn By: HAK - MRA

Monitoring Well Locations
Beluga River Tank Farm
(P&S Yard)

BELUGA RIVER UNIT, COOK INLET, ALASKA

Scale: @ 11x17 map size	Figure No:
1 in = 100 feet	A-7

APPENDIX B
Beluga River Monitoring Well Survey

Table B-1
Beluga River Monitoring Well Survey

Well ID	Site	Located?	Well Completion	Well ID Displayed?	Well Locked?	Well Cap in Place?	Well Condition at Surface	Well Condition Downhole	Water Level (ft btoc)	Stick-Up Height (ft)	Total Depth (ft btoc)	Notes:
224-13-S	Beluga River 224-13 (M Pad)	no	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Surface water sample
224-13-1	Beluga River 224-13 (M Pad)	no	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Likely covered by gravel pad
224-13-2	Beluga River 224-13 (M Pad)	yes	stick up	no	no	yes	No outer casing, otherwise good	No obstruction	7.7	2.7	17.3	
224-13-N	Beluga River 224-13 (M Pad)	no	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Surface water sample
ATF1	Beluga River Abandoned Diesel Tank Farm (A Pad)	no	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Likely covered by gravel pad, other wells at site were located
ATF3	Beluga River Abandoned Diesel Tank Farm (A Pad)	yes	stick up	no	no	no	No outer casing, may have been cut down since installation	No obstruction	20.06	0.8	24.95	
ATF8	Beluga River Abandoned Diesel Tank Farm (A Pad)	yes	stick up	no	no	no	No outer casing, may have been cut down since installation	No obstruction	16.93	1	19.42	
ATF10	Beluga River Abandoned Diesel Tank Farm (A Pad)	yes	stick up	no	no	yes	No outer casing, otherwise good	No obstruction	19.38	2.65	20.15	
FG-03	Beluga River Pump Area Assessment (E Pad)	yes	stick up	no	no	yes	Good, no outer casing, bollards present	No obstruction	10.95	1.8	19.1	
FG-08	Beluga River Pump Area Assessment (E Pad)	yes	N/A	no	no	no	Knocked over/crushed	N/A	N/A	N/A	N/A	Crushed top of well still visible
FG-11	Beluga River Pump Area Assessment (E Pad)	no	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
FG-14	Beluga River Pump Area Assessment (E Pad)	yes	stick up	no	no	yes	No outer casing	No obstruction	11.6	3.2	18.4	
FG-15	Beluga River Pump Area Assessment (E Pad)	yes	stick up	yes	no	yes	Protective culvert crushed, but well undamaged	No obstruction	N/A	4	12.25	No water in well
FG-20	Beluga River Pump Area Assessment (E Pad)	yes	stick up	yes	no	yes	Good	No obstruction	16.37	2	24.55	
FG-21	Beluga River Pump Area Assessment (E Pad)	yes	stick up	yes	no	yes	A little sunken	No obstruction	10.37	1.8	22.6	
FG-23	Beluga River Pump Area Assessment (E Pad)	yes	stick up	yes	no	yes	No outer casing, otherwise good	No obstruction	19	3.75	25.15	
FG-24	Beluga River Pump Area Assessment (E Pad)	yes	stick up	no	no	yes	No outer casing, otherwise good	Cap stuck, unable to open	N/A	3.2	N/A	Cap rusted into place
FG-25	Beluga River Pump Area Assessment (E Pad)	yes	stick up	no	no	yes	Good	Cap stuck, unable to open	N/A	2.1	N/A	Cap would require pipe wrench to remove
HOS-1	Former Beluga River Tank Farm (P&S Yard)	no	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
HOS-3	Former Beluga River Tank Farm (P&S Yard)	no	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
HOS-4	Former Beluga River Tank Farm (P&S Yard)	yes	stick up	N/A	N/A	N/A	Pulled out/knocked over	N/A	N/A	N/A	N/A	Well casing still present on site
HOS-5	Former Beluga River Tank Farm (P&S Yard)	yes	stick up	no	no	no	No outer casing, crooked (frost jacked/pushed)	No obstruction	12.85	2.05	18.2	Odor present
HOS-6	Former Beluga River Tank Farm (P&S Yard)	no	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
HOS-9	Former Beluga River Tank Farm (P&S Yard)	no	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
HOS-10	Former Beluga River Tank Farm (P&S Yard)	no	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
HOS-13	Former Beluga River Tank Farm (P&S Yard)	no	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

APPENDIX C
Monitoring Well Survey Photograph Log

Beluga River Monitoring Well Survey – Pad 224-13

Assumed location of missing well 224-13-1
Facing West

Well 224-13-2 to the right of green facility
Facing West

Closeup of well 224-13-2
Facing West

Beluga River Monitoring Well Survey – Abandoned Diesel Tank Farm

Closeup/overhead of ATF3

Well ATF3 Surroundings
Facing North

Closeup of ATF 8
Facing North

ATF8 surroundings
Facing North

ATF10 surroundings
Facing North

ATF10 OVerhead

Assumed former location of ATF1

Beluga River Monitoring Well Survey – Former Tank Farm Site

Assumed former location of HOS-1
Facing North

Assumed former location of HOS-3
Facing East

Assumed former location/remains of HOS-5
Facing East

Assumed former location of HOS-6
Facing North

 HOS-5 surrounds Facing North	 Closeup/overhead of HOS-5

Beluga River Monitoring Well Survey – Pump Area Assessment Site

FG-03 surroundings
Facing North

FG-03 closeup/overhead

Crushed remnants of FG-08
Overhead shot

Assumed former location of FG-11
Facing North

FG-14 surrounding
Facing North

FG-14 closeup
Facing East

FG-15 surroundings
Facing North

FG-15 overhead shot – note crushed protective culvert, well undamaged

FG-20 surroundings
Facing North

FG-20 closeup

FG-21 surroundings
Facing roughly North

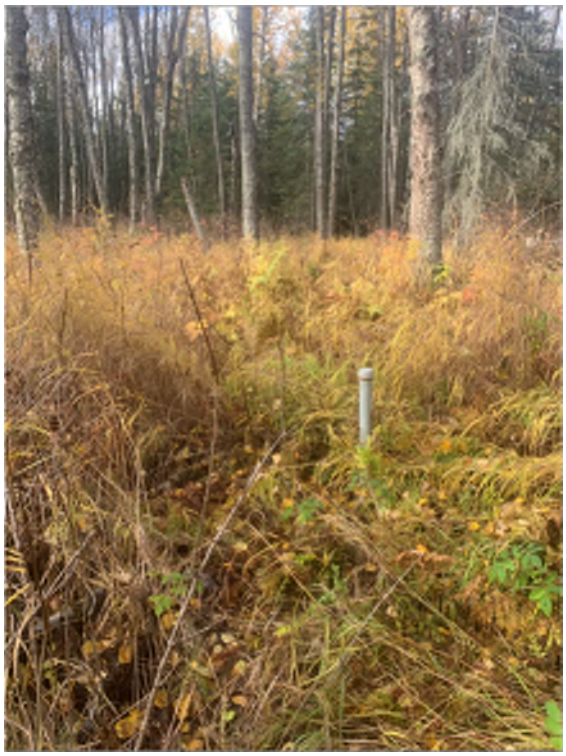
FG-21 closeup

FG-23 surroundings – post has well ID
Facing North

FG-23 overhead

FG-24 surroundings
Facing South

FG-24 closeup
Facing South



FG-25 surroundings
Facing roughly North

FG-25 Closeup