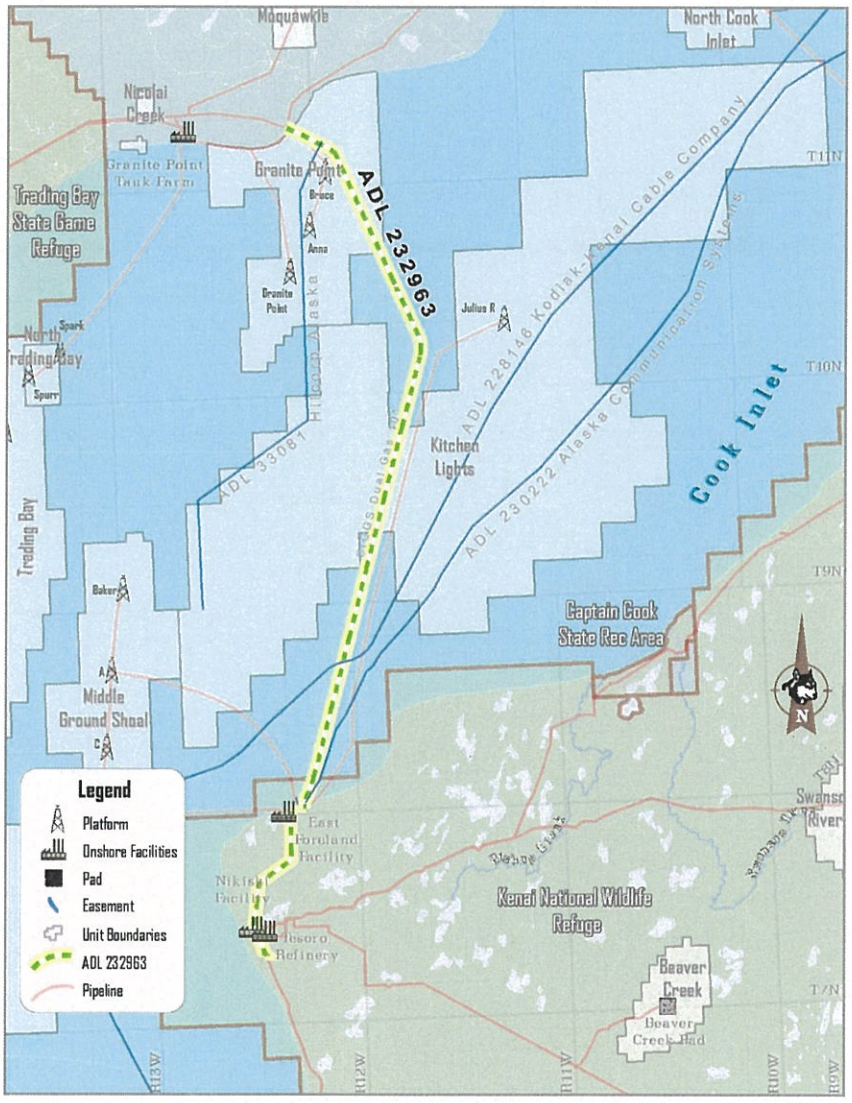
COMMISSIONER'S ANALYSIS AND PROPOSED DECISION
CROSS INLET PIPELINE EXTENSION PROJECT
RIGHT-OF-WAY LEASE FOR THE CIGGS PIPELINE
ADL 232963



Alaska Department of Natural Resources
Division of Oil and Gas
State Pipeline Coordinator's Section
3651 Penland Parkway
Anchorage, AK 99508

August 6, 2018

Purpose of Analysis and Proposed Decision

Harvest Alaska, LLC submitted two pipeline Right-of-Way (ROW) lease applications on September 1, 2017, for the CIPL Cross Inlet Pipeline Extension Project.

The Right-of-Way Leasing Act (Alaska Statute 38.35) governs an application for an oil or gas pipeline right-of-way across state lands. Under this Act, the Commissioner of the Department of Natural Resources (Commissioner) is granted all powers necessary to lease state land for pipeline right-of-way purposes. The Commissioner must make a written finding that the applicant is fit, willing, and able to perform the transportation or other acts proposed in a manner that will be required by the present or future public interest. Prior to granting a right-of-way lease, the Commissioner is required to prepare an analysis of the application.

This is the Commissioner's Analysis and Proposed Decision for the conversion of portions of the existing Cook Inlet Gas Gathering System (CIGGS) pipeline segments including:

- The approximately 21-mile subsea CIGGS-A Marine segment (CIGGS-A) that occupies State-owned tide and submerged lands within Cook Inlet, originating at Granite Point and terminating in Nikiski.

- The approximately 4.7-mile onshore Low Pressure CIGGS segment (CIGGS-LP) that originates near the Middle Ground Shoals Facility and will terminate at the Swanson River Oil Pipeline near the Andeavor Refinery; all within Nikiski. The segment is located on multiple privately-owned parcels and State-owned lands within highway rights-of-ways, and occupies State-managed section-line easements.

The public comment period for this Analysis and Proposed Decision expires at 5:00pm on September 5, 2018. Written comments may be emailed to: spco.records@alaska.gov, faxed to (907) 269-6880, or submitted by U.S. Mail (or in person) to:

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A public hearing for the CIGGS-A right-of-way lease application and the Tyonek Commissioner's Analysis and Proposed Decision was held in Nikiski on March 14, 2018.

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I. INTRODUCTION

Nature of the Request

On September 1, 2017, Harvest Alaska, LLC (Harvest) applied to the State of Alaska, Department of Natural Resources (DNR) for two non-exclusive Alaska Statute (AS) 38.35 Right-of-Way (ROW) leases for the purpose of converting an existing natural gas pipeline segment to oil and the construction of a new natural gas pipeline segment within the tide and submerged lands of Cook Inlet. These applications are part of the CIPL Cross Inlet Pipeline Extension (Cross Inlet) Project, which proposes to reorganize/re-purpose various Cook Inlet pipelines to:

1. Transport oil from the west side of the inlet to the east by connecting the Cook Inlet Pipeline (CIPL) to the CIGGS-A, thus eliminating the need for the Drift River Terminal. To accomplish this, the existing CIGGS-A natural gas pipeline segment must be converted to oil (ADL 232963).

2. Transport natural gas from the east side of the inlet to the west by reversing the flow of the Tyonek Pipeline System and building a new segment of pipe from the Tyonek Platform to the Kenai-Beluga Pipeline at Ladd Landing (ADL 232962). Natural gas that was transported by the CIGGS-A would be rerouted through this system. The decision for the new Tyonek segment was issued on February 7, 2018.

On June 12, 2018, Harvest submitted a supplement to the CIGGS-A application to include the existing CIGGS-LP. Originally, Harvest had planned to utilize an existing pipe owned by the Kenai Pipeline Company (and located on privately-owned lands) to transport the oil from the Middle Ground Shoals Facility to the Andeavor Refinery; however, engineering concerns about the connection of the pipelines lead to the decision to utilize the dormant CIGGS-LP.

This decision addresses the application for the conversion of the CIGGS pipeline under ADL 232963.

The Commissioner must determine in a written finding if applicants are fit, willing, and able to construct, operate, maintain, and terminate pipelines for hydrocarbon transportation in a manner consistent with present or future public interests. (AS 38.35.100). The Commissioner is required to prepare an analysis of the application and propose an action for it. (AS 38.35.080) This document satisfies both statutory requirements.

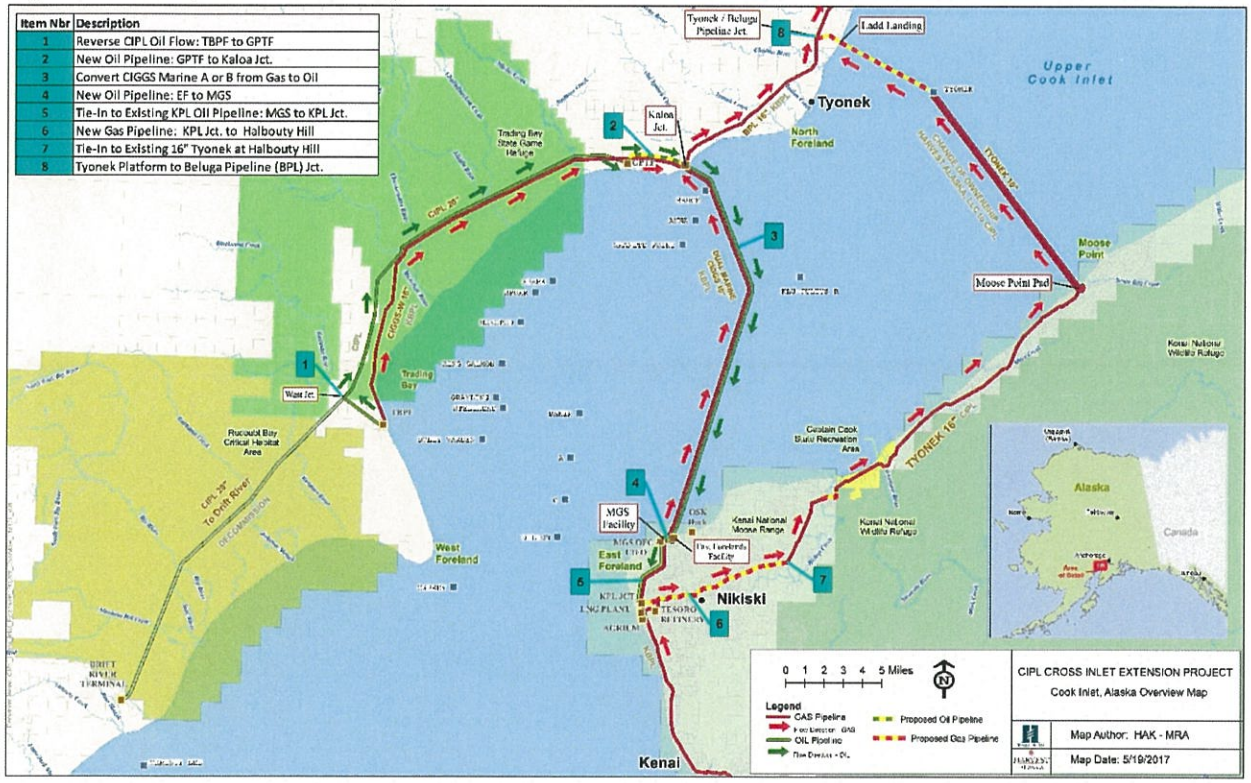
Applicant

Harvest Alaska, LLC, was incorporated in Delaware on May 13, 2014, and registered in Alaska on May 14, 2014, for the purpose of building, operating, and managing pipelines for the transportation of crude oil. Harvest is in good standing with the State of Alaska Department of Commerce, Community, and Economic Development. The applicant is a wholly-owned subsidiary of Hilcorp Alaska, LLC, which is a wholly-owned subsidiary of Hilcorp Energy I, LP, which is the main holding company for the Hilcorp Group.

Project Description

The Cross Inlet project is designed to reorganize/repurpose Cook Inlet pipelines to more efficiently transport Cook Inlet oil and natural gas to consumers and reduce the risk of oil spills by eliminating the need for the southern half of CIPL, the Drift River Oil Terminal, and the Christy Lee Platform.

Figure 1: Hilcorp's Cross Inlet Project Overview



Proposed CIGGS Change To Service

As part of the Cross Inlet project, Harvest has applied to DNR for permission to implement a Change To Service on the CIGGS-A and CIGGS-LP pipeline segments from natural gas to crude oil and reverse the primary direction of flow. Instead of transporting natural gas from the east side to the west, they would transport crude oil from the west side to the east.

The subsea portion of the CIGGS system was constructed in 1972 and consists of two 10-inch-diameter pipelines (Marine A and B) that lay weighted on the seabed of Cook Inlet. The pipelines are authorized under an AS 38.05.330 Right of Way Permit (ADL 56285) issued by the Division of Lands in December of 1971 for the transportation of natural gas from Nikiski to Granite Point.

The CIGGS-LP segment was also constructed in 1972, and consists of one 10-inch-diameter buried pipeline. The portion of the pipeline located within the Kenai Spur Highway is authorized under Alaska Department of Transportation and Public Facilities (ADOT&PF) Utility Permit A-490-1-72 for natural gas transportation within the highway ROW.

The Right-of-Way Leasing Act (AS 38.35) was adopted in May of 1972 and was intended to cover oil and gas pipelines not already authorized by an oil and gas lease, a gas only lease, or an oil and

gas or gas only unit agreement approved by the state. AS 38.05.330 is no longer a valid statute so amending the original land use authorization was not possible. A Miscellaneous Land Use Permit under AS 38.05.850 was not appropriate since this authorization is exclusively for a transportation of system for hydrocarbons from the field. AS 38.35 is the appropriate vehicle for changing the purpose of the CIGGS-A pipeline and bringing the permit up to date for those portions located on State-owned land. (The CIGGS-B Marine pipeline will remain authorized under ROW Permit ADL 56285.)

Proposed ROW Location

CIGGS-A: The existing CIGGS-A segment is located within the tide and submerged lands of Cook Inlet. The pipeline originates at Kaloa Junction (near Granite Point) and terminates at the East Forelands Facility in Nikiski. Most of the pipeline is located on state owned tide and submerged lands (approx. 21 miles). The short upland segments on both sides of the inlet are not located on State-owned lands and will not be included in the ROW lease.

The CIGGS-A segment transects State-owned land in the following locations:

Township 11N, Range 12W, SM, Section 25;
Township 11N, Range 11W, SM, Section 30, 31, and 32;
Township 10N, Range 11W, SM, Section 5, 8, 16, 17, 21, 28, and 33;
Township 09N, Range 11W, SM, Section 4, 9, 16, 17, 20, 29, 31, and 32;
Township 08N, Range 11W, SM, Section 6; and
Township 08N, Range 12W, SM, Section 1, 12, 13, 24, 25, 26, and 35.

Construction ROW: As no construction activities are needed on the sub-sea portion of the pipeline, no construction ROW is required.

Operation ROW: The requested width of the permanent subsea ROW on State lands is proposed at 50 feet; 25 feet on each side of the centerline. This would occupy approximately 128 acres.

CIGGS-LP: The existing CIGGS-LP segment is located on private and State-owned uplands in Nikiski. The pipeline originates near the Middle Ground Shoals Facility and will terminate at the Swanson River Oil Pipeline at the Andeavor Refinery. (*There is a short segment of new pipeline segment proposed to connect the East Forelands Facility to the CIGGS-LP referred to as the CIPL E 10 Pipeline. It will be located entirely on privately owned uplands, and is not included under this ROW lease.*)

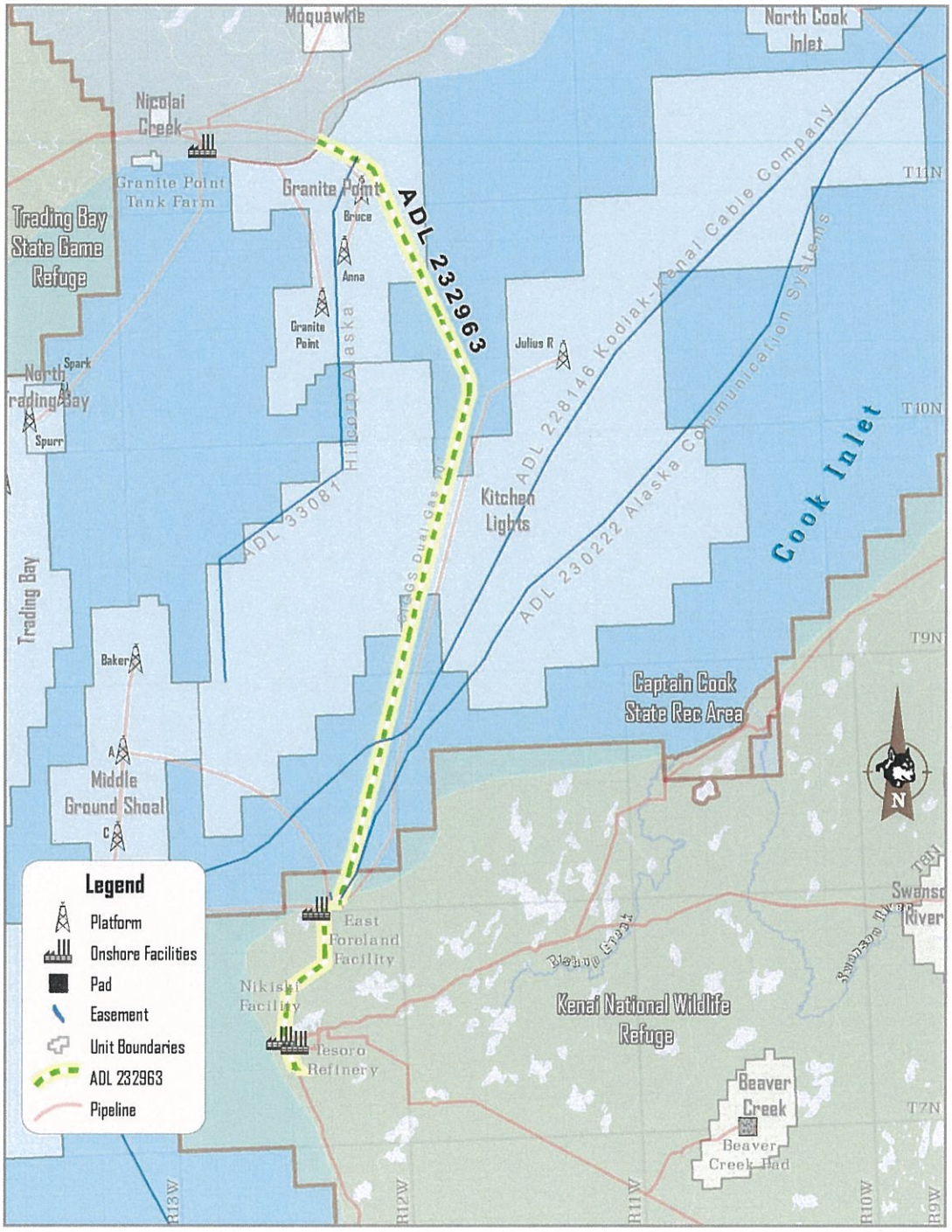
The CIGGS-LP occupies State-owned land in the following locations:
Township 7N, Range 12 W, SM, Sections 10, 15, 16, and 21.

The CIGGS-LP occupies State-managed section line easements located on privately owned lands in the following locations:
Township 8N, Range 12 W, SM, Section 35
Township 7N, Range 12 W, SM, Sections 2, 3, and 10

Construction ROW: As no construction activities will be conducted under the ROW lease, no construction ROW is required.

Operation ROW: The requested width of the permanent ROW on state lands is proposed at 50 feet; 25 feet on each side of the centerline. This would occupy approximately 29 acres.

Figure 2: Proposed CIGGS ROW Overview



Proposed Change To Service Schedule

Conversion of the CIGGS pipeline is proposed to commence in late summer of 2018 with start-up proposed for the following fall.

II. ADMINISTRATIVE ACTIONS

AS 38.35 ROW Leases and the Adjudication Process

AS 38.35 ROW leases are legal agreements that grant a revocable interest in State land for the construction and operation of common carrier or contract carrier hydrocarbon pipelines. As part of the adjudication process, the Division works closely with multiple agencies to ensure the lease facilitates safe development of state resources and protects the land for future generations.

AS 38.35 and 11 AAC 80 apply to pipeline ROW leases, specifying standards all applicants must meet before a lease may be offered. To initiate the process, applicants must complete Form DL-10-130 and answer a wide array of questions about the project and the applicant's capabilities. Until those questions are adequately addressed, the application will not be considered complete. Once an application is complete, public notice for the application is held. (AS 38.35.070)

During the public notice period, the Division coordinates with other governmental agencies, writes the Analysis and Proposed Decision, and develops the proposed lease. In making a determination, the factors listed in AS 38.35.100 must be considered along with a clearly stated proposed action (Section VII of this document). To determine if an applicant satisfies these standards, the Division examines the land status of the proposed ROW (Section III), what natural resources could be affected (Section IV), the technical capability of the applicant (Section V), and their financial capability to construct, operate, maintain, and terminate the proposed project (Section VI). AS 38.35 also includes a minimum of 14 covenants that all leases for pipelines valued at $1,000,000 or more must include (AS 38.35.120 or AS 38.35.121, as appropriate). Lease term length and the ability to renew are governed by AS 38.35.110. Other lease conditions and stipulations are negotiated with the applicant (AS 38.35.120(c) and (d)) and are tempered with the Division's technical knowledge of pipelines and experience managing State land.

Once the Analysis and Proposed Decision has been issued, a public notice of not less than 30 days for the decision is rquired. There is no appeal process for an AS 38.35 ROW lease decision, and only certain parties have standing to seek a judicial review: the applicant, a competing applicant, and a person with a direct financial interest who raised objections within 60 days of notice of the application. The only grounds for a judicial review are failure to follow the procedures of the AS 38.35, and abuse of discretion so capricious as to constitute a denial of due process.

If the Commissioner's Final Decision is to offer the applicant a ROW lease, the potential lessee has 30 days to return the signed lease to the Division for final execution along with the annual fee, insurance, bonding, and other project specific documents. (AS 38.35.100(c))

If a lease is issued, Harvest must obtain a Written Authorization (WA) for start-up of the pipeline from the Division before oil transport commences. To obtain the WA, Harvest must submit a

variety of documents for approval, including the finalized Change to Service plan, final engineering designs, and a Quality Management Plan. Attachment B of the draft lease contains further details about proposed requirements.

Administrative Record

Case file ADL 232963 constitutes the administrative record for this decision. DNR Division of Mining, Land and Water (DMLW) files ADL 56285 (CIGGS Marine) and ADL 33333 (CIPL) provided historical background information concerning existing pipelines. ADOT&PF provided historic background information concerning permit A-490-1-72 for the CIGGS-LP segment.

Public Notice of Application

The public notice for both Cross Inlet applications began on September 13, 2017, and expired on November 13, 2017. The notice was posted on the Division website and the State's public notice website, published in the Alaska Dispatch News and the Peninsula Clarion, and sent to post offices near the project area. Notices were also provided to third party interest holders, government agencies/entities, and Alaska Native Claims Settlement Act (ANCSA) Regional and Village Corporations within the vicinity of the project. Complete copies of the applications were sent to the Kenai, Soldotna, Homer, Anchor Point, and Ninilchik libraries and coordinating state agencies (as defined by AS 38.35.230).

One written public comment from Cook Inlet Keeper was submitted during the notice period with comments concerning both projects.

Cross Inlet Public Hearing

DNR provided public notice for the Cross Inlet public hearing concurrently with the notice for the Tyonek ROW lease decision. It was held in Nikiski at the Community Recreation Center on March 12, 2018.

III. LAND STATUS WITHIN THE PROPOSED ROW

Title

The State of Alaska holds title to the tide and submerged lands of the CIGGS-A project area under the Submerged Lands Act of 1953 and the Equal Footing Doctrine. The State of Alaska also holds fee title to the Kenai Spur Highway and Wik Road rights-of-way through the Omnibus Deed dated June 30, 1959, and retains an interest to the section line easements within the CIGGS-LP project area.

Third Party Interests

There are several existing authorizations granted by the State of Alaska within or adjacent to the proposed ROW. These include pipeline easements, utility easements, and oil and gas leases. Below is a list of identified third party interests that have the potential to be directly affected by the proposed ROW.

Table 1: Third Party Interests

File Number	Name	Authorization Type	Sub-type	Status	Project
ADL 228146	Kodiak-Kenai Cable Company, LLC	Private Easement	Tdld Fiber Optic Rwe	Interim	CIGGS A Marine
ADL 231758	Furie Operating Alaska, LLC	Private Easement	Non Exclusive Row	Interim	CIGGS A Marine
ADL 230222	Alaska Communications System Group (ACS)	Private Easement	Tdld Fiber Optic Rwe	Issued	CIGGS A Marine
ADL 33081	Hilcorp Alaska, LLC	Private Easement	TideInd Nonexc Rwe	Issued	CIGGS A Marine
ADL 56285	Kenai Beluga Pipeline, LLC	Private Easement	TideInd Nonexc Rwe	Issued	CIGGS A Marine
ADL 64352	Hilcorp Alaska, LLC	Private Easement	TideInd Nonexc Rwe	Issued	CIGGS A Marine
ADL 232307	Homer Electric Association	Dev w/in existing easement	SLE Secondary NonObj	Approved	LP CIGGS
ADL 17586	Hilcorp Alaska, LLC	Oil & Gas Lease Comp	Cook Inlet	Issued	CIGGS A Marine
ADL 17587	Hilcorp Alaska, LLC	Oil & Gas Lease Comp	Cook Inlet	Issued	CIGGS A Marine
ADL 18742	Hilcorp Alaska, LLC	Oil & Gas Lease Comp	Cook Inlet	Issued	CIGGS A Marine
ADL 389924	Cornucopia Oil & Gas Company, LLC	Oil & Gas Lease Comp	Cook Inlet	Issued	CIGGS A Marine
ADL 389925	Cornucopia Oil & Gas Company, LLC	Oil & Gas Lease Comp	Cook Inlet	Issued	CIGGS A Marine
ADL 391598	Cornucopia Oil & Gas Company, LLC	Oil & Gas Lease Comp	Cook Inlet	Issued	CIGGS A Marine
ADL 391599	Cornucopia Oil & Gas Company, LLC	Oil & Gas Lease Comp	Cook Inlet	Issued	CIGGS A Marine
ADL 391606	Cornucopia Oil & Gas Company, LLC	Oil & Gas Lease Comp	Cook Inlet	Issued	CIGGS A Marine
ADL 391607	Cornucopia Oil & Gas Company, LLC	Oil & Gas Lease Comp	Cook Inlet	Issued	CIGGS A Marine

Area Plans and Classifications

DNR is responsible for management of State-owned land. Area Plans are among the tools DNR uses to guide how State land will be used. These plans encompass large tracts of land and, through a public process, establish goals, policies, management intent, and guidelines for the use of State lands. These plans also classify lands for certain types of activities and determine if some types of activities should be restricted or prohibited.

The project area is subject to the Kenai Area Plan, Regions 5 and 11. The CIGGS-A crosses Units 506B and 514, which have the classification of Resource Management Land; and Units 511 and 567, which have the classification of Waterfront Development Land. The CIGGS-LP is located predominantly on private lands that are not subject to DNR land classifications. Where it is within State-owned Omnibus rights-of-way, the land will be managed in accordance with the purpose of the Omnibus Deed as a transportation corridor. The CIGGS-LP is also adjacent to Units 297 and 298, which have the classifications of Settlement and Resource Management Land, respectively. The classification of Resource Management Land indicates that there is no singular resource value that merits a primary designation; the classification of Waterfront Development Land indicates that the lands are suitable for commercial or industrial activities, and the classification of Settlement Land indicates that the lands are suitable for residential, recreational, or industrial development. Additionally, as the pipeline will allow for the transportation of hydrocarbons and not interfere with the primary use for vehicular traffic, it is in accordance with the Omnibus Deed. Furthermore, nothing in the Kenai Area Plan prohibits or restricts the use of these lands for pipelines and the project is consistent with the plan's goals, policies, management intent, and guidelines.

Mineral Order 1204

Pursuant to AS 38.05.185(a) and AS 38.05.300(a) the Commissioner may close lands to mineral entry or mining when those activities would be incompatible with significant surface uses. The lands within the proposed ROW are currently open to mineral entry. As mining activities are incompatible with oil and gas pipelines (a significant surface use) the Commissioner has approved the closure of lands under the CIGGS-A segment, plus 100 feet on either side, to mineral entry through Mineral Order 1204 if the proposed ROW lease is issued.

Mineral Order 1204 did not include the uplands under the constructed CIGGS-LP segment. An amendment to MO 1204 is proposed, concurrent with this decision, to add those State lands crossed by the CIGGS-LP and to allow MO 1204 to accommodate future related facilities that may be added to the CIGGS right-of-way lease (ADL 232963). The addition of the CIGGS-LP lands constitutes up to 66 acres of land.

Access To Public and Navigable Waters

Before the State may lease land adjacent to or inclusive of a waterbody or waterway, DNR shall determine if that waterbody or waterway is navigable or public waters and, if so, establish specific easements to and along them. (AS 38.05.127) The purpose of these easements is to guarantee free public access to waterbodies and waterways for transportation, recreation, fishing, and a variety of other purposes.

Cook Inlet is a navigable waterbody and as such is subject to AS 38.05.127 access easements. An easement of 50 feet seaward of the mean high tide line is reserved at both landfall locations of the CIGGS-A segment.

Public Trust Doctrine

All authorizations for this project will be subject to the principals of the Public Trust Doctrine; specifically, the right of the public to use navigable waterways and the land beneath them for navigation, commerce, fishing, hunting, protection of areas for ecological studies, and other purposes. These rights will be protected.

IV. NATURAL RESOURCES WITHIN THE PROPOSED ROWS

Introduction

The Commissioner's Analysis and Proposed Decision must consider existing resources within the right-of-way. (AS 38.35.100) Below are summaries of those resources found within or adjacent to the project area.

Oil and Gas Resources

The first significant oil discovery in the Cook Inlet area was made on July 23, 1957, by the Richfield Oil Corporation in the Swanson River area. This profitable development created a flurry of exploration, and by the late 1960's there were 14 offshore platforms in Cook Inlet. The fifteenth platform, Steelhead, was installed in 1986. Oil production in Cook Inlet peaked in 1970 at 83 million barrels annually and natural gas peaked in the late 1990s/early 2000s at 222 billion cubic feet of gas annually.

Recently, new drilling technologies and advancements in seismic surveying have revitalized the oil and gas industry in the Cook Inlet area. As the life expectancies of old fields are extended and new wells are brought online, new, updated, or repurposed infrastructure will be needed to transport the oil and natural gas to customers.

Mineral Resources

Generally, the seafloor of Cook Inlet has low potential for locatable minerals, and no marketable minerals are known to be in or near the CIGGS-A project area. The CIGGS-LP segment of the pipeline runs through developed transportation corridors where no marketable minerals are known to exist, and where pursuit of those minerals would likely be restricted due to the existing infrastructure.

Material Resources

Generally, the seafloor of Cook Inlet has low value for material (sand, gravel, and rock) extraction, and no marketable materials are known to be in or near the CIGGS-A project area. The CIGGS-LP segment of the pipeline runs through developed transportation corridors, where extraction of material resources would likely be restricted due to the existing infrastructure.

Cultural Resources

The National Historic Preservation Act (NHPA) established the State Historic Preservation Office (SHPO) and the Section 106 Review Process for preserving historical and archaeological sites. In Alaska, SHPO resides within DNR's Division of Parks and Outdoor Recreation. As part of the application review, SHPO was contacted and as no ground disturbing activities are proposed under the AS 38.35 ROW lease, no Section 106 review is required for this decision.

Fish, Wildlife, and Biotic Resources

The State of Alaska Department of Fish and Game (ADF&G) has primacy of management over all fish within freshwaters and fish in marine waters within three miles of shore. The ADF&G manages the commercial, sport, subsistence, personal use, and educational fisheries in Cook Inlet. ADF&G also manages sport hunting of wildlife in the Cook Inlet area in Game Management Units (GMUs) 9, 14, 15, and 16. Some marine mammals, groundfish species, and fish in waters from 3-200 miles offshore are managed by the National Marine Fisheries Services, a branch of the National Oceanic and Atmospheric Administration (NOAA).

Cook Inlet species, including Pacific salmon, beluga whales, and harbor seals, can be found within, adjacent to, or passing through the marine project area. For detailed information about these and other Cook Inlet species, see Section One of Attachment C.

Sport Fishing and Hunting

Major sport fisheries occur in many freshwater streams near the project area, such as the Chuit, Theodore, Lewis, and Beluga Rivers on the west side of Cook Inlet, and the Kenai, Kasilof, and Swanson Rivers on the east side. Additionally, some sport fish species are harvested along the coastline of Cook Inlet. Please see Section Two of Attachment C for more information about sport fishing near the project areas.

Large game species, such as moose or bear, and migratory birds may travel within the proposed project ROW, and could be harvested within the project area. Please see Section Two of Attachment C for more information about sport hunting near the project areas.

Personal Use

Personal use fisheries provide an important source of food for many urban and rural Alaskans. Personal use fishing methods, seasons, harvest limits, and locations are determined by ADF&G and include the mouth of the Kasilof and Kenai Rivers and the Beluga River, which are near the project areas. Please see Section Two of Attachment C for more information about the personal use fisheries near the project area.

Commercial Fishing

The commercial fishery for Cook Inlet is large and divided into two management areas by the ADF&G, the Upper Cook Inlet (UCI) and Lower Cook Inlet (LCI). The project area is located within the UCI, which has commercial fisheries for five species of Pacific salmon, Pacific herring, smelt, and razor clams. Pacific salmon and smelt commercial fishing takes place within or adjacent to the proposed CIGGS-A segment of the proposed ROW; however, the project is not expected to affect the Pacific herring and razor clam fisheries. Please see Section Three of Attachment C for more information about the commercial fisheries near the project area.

Subsistence Use

Alaska law defines subsistence as "noncommercial, customary and traditional uses." The communities of Tyonek, Beluga, and Nikiski harvest and utilize wild resources within and adjacent to the project areas. Please see Section Four of Attachment C for more information about these communities and their subsistence activities.

V. TECHNICAL CAPABILITY OF THE APPLICANT

Introduction

The Commissioner's Analysis and Proposed Decision must consider whether an applicant has the technical capability to transport oil in Alaska consistent with the present and future public interest. (AS 38.35.100) Harvest has submitted original design documents along with conversion to service plans to the Division for technical review. The purpose of the technical review is to:

1. evaluate a submitted design basis for the improvement to the State lease;
2. evaluate the applicant's technical ability to build, maintain and operate the improvements to the lease;
3. ensure the design addresses all areas of pipeline integrity, conforms to laws and regulations, protects the environment, protects the public safety, protects safety to construction, operations and maintenance personnel, and accommodates removal or remediation (if required) at lease termination; and
4. ensure that the design basis has been followed in the design documents and calculations.

Reviewed Documents

Attachment E, Reviewed Technical Documents, is the list of documents, reports, and data used during the technical review of the CIGGS application.

Background

CIGGS A: The dual CIGGS Marine A and B pipelines are approximately 21.9 miles in length, nominal 10-inch diameter, entirely in a Class 1 location and were originally designed for gas

service per 49 CFR 192. Both pipelines were constructed to transport natural gas from East Forelands to Kaloa Junction. Originally owned by Union-Marathon, they were commissioned in 1972 and configured to be bi-directional based on gas demand. Both pipelines have been operational since commissioning and no known leaks have been observed. Maximum Allowable Operating Pressure (MAOP) is 1,480 pounds per square inch (PSI). Numerous integrity studies have been performed and reports generated to describe the condition of both lines. Harvest purchased these gas transportation pipelines in 2011, and has operated them without any known adverse incidents. Harvest requests a Change to Service for the CIGGS-A pipeline to transport sales quality crude oil per 49 CFR 195.

CIGGS LP: The Low Pressure CIGGS pipeline is an existing 3.77-mile-long, 10-inch nominal diameter onshore pipeline that will be converted from natural gas service to crude oil service between Station O and the KPL oil facility. This pipeline was constructed in 1972 and there are no known records of any pipeline leaks. The MAOP is 1,480 PSI. After conversion to oil service, the CIGGS LP pipeline will become part of the CIPL E 10 pipeline.

Codes, Regulations, and Standards

Applicable codes governing the project include, but are not limited to:

- 49 CFR 195: Transportation of Hazardous Liquids by Pipeline
- ASME B 31.4: Pipeline Transportation Systems for Liquids and Slurries

Transported Product (Fluid and Flow)

The product transported by the CIGGS Pipeline System will be sales quality crude oil. It will be transported to the east from Granite Point Tank Farm, across Cook Inlet, to the Andeavor refinery in Nikiski. The pipelines are expected to have an average throughput of approximately 19,200 barrels per day (bpd). The pipeline would have the capacity to handle a larger throughput – up to 31,700 bpd – to handle increased supply from west Cook Inlet suppliers.

Pipeline Segment Description

The repurposing of the CIGGS pipeline for the Cross Inlet project includes four segments of pipes: CIPL West 10, CIGGS-A Marine, CIPL East 10, and CIGGS-LP. The CIPL W 10 and the CIPL E 10 are not located on State-owned land and will not be authorized under this lease; however, these segments are part of the technical review because they are part of the complete CIGGS pipeline system and are integral to understanding system integrity.

The CIPL West 10 is a new, buried, 3.4 mile-long 10-inch pipeline between the Granite Point Tank Farm (GPTF) and Kaloa Junction, where it will connect to the existing CIGGS A segment. New pumps are proposed at the Granite Point Tank Farm facility for this project.

The CIGGS-A Marine Pipeline was constructed in 1972 and will be connected to an existing buried pipeline at a block valve near Kaloa Junction on the west side of the Inlet. It lies in a general northwest to southeast orientation, is approximately 21.9 miles in length, and has a nominal pipe diameter of 10 inches. The pipeline was laid on the ocean floor and over time has been partially buried with sediment via current transport. Maximum water depth along the pipeline alignment is

approximately 125 feet. The pipeline segment terminates on the east side at a tie-in at the east Forelands Facility.

The CIPL E 10 is a new 0.6-mile-long, 10-inch nominal diameter pipeline that connects the CIGGS-A pipeline on the east side of Cook Inlet at East Forelands and connects to the CIGGS-LP pipeline at Station O.

The CIGGS-LP pipeline was constructed in 1972 and will be connected to the CIPL East 10 pipeline at the Middle Ground Shoals Facility block valve. It is buried and generally lies north to south along the edge of a subdivision until it connects with the Kenai Spur Highway, then lies parallel to the highway to the Andeavor refinery. The buried pipeline is co-located with other existing pipelines and utility infrastructure.

Pipe Physical Characteristics

CIGGS A: The American Petroleum Institute (API) specification for Line Pipe material is high strength carbon steel with a minimum yield strength of 52,000 PSI. The subsea portion has a nominal pipe size (NPS) of 10-inch diameter seamless line pipe with a 0.594-inch wall thickness.

The material test reports (MTRs) reflect the installed line pipe met or exceeded industry standards at the time, 18th Edition API Specification 5LX, April 1971, the edition in effect when the pipeline was installed. Charpy impact and hydrostatic pressure tests were performed and passed procurement requirements. The pipeline was coated with two types of external protective surfaces.

- Coal tar enamel mastic protective layer to 1/8-inch thickness
- Concrete weight-coat for pipeline stability with varying thicknesses: ranging from 1-inch, 2-inches and 3.5-inches

An impressed current cathodic protection system is currently in use.

CIGGS LP: The API specification for Line Pipe material is high strength carbon steel with a minimum yield strength of 52,000 PSI. The pipe has a NPS of 10-inch diameter double submerged arc welded line pipe with a 0.250-inch wall thickness.

The MTRs reflect the installed line pipe met or exceeded industry standards at the time, 18th Edition API Specification 5LX, April 1971, the edition in effect when the pipeline was installed. Charpy impact and hydrostatic pressure tests were performed and passed procurement requirements.

The pipeline was coated with enamel and a glass fiber wrap. Cathodic protection is provided by an impressed current cathodic protection system located at East Forelands.

Proposed Pipeline Design

The existing CIGGS A and CIGGS LP pipeline segments are made of high-yield carbon steel (API 5L-X52) with a MAOP of approximately 1,480 pounds per square inch. The nominal subsea pipeline wall thickness is 0.594 inches, and the onshore pipeline wall thickness is 0.365 inch with less than 20% wall loss due to pitting corrosion. An external coating of coal tar enamel and

concrete weight coat are installed on the CIGGS-A pipeline. The buried CIGGS-LP pipeline has a Polyken #980-20 tape coating. The CIGGS A and the CIGGS LP pipelines were built in 1972 to federal pipeline requirements in accordance with the U. S. Code of Federal Regulations (CFR), Title 49, Part 192.

CIGGS-A Marine is laid on the sea floor, with a concrete weight coating around the pipe, and is pinned in place by Sea-Crete bags as needed to stabilize the pipeline.

The pipeline system will include a pig launcher at the Granite Point Tank Farm and a pig receiver at the CIGGS-LP connection with the Swanson River Oil Pipeline (SROP) at the Kenai Pipeline Junction (KPL). These facilities allow the pipelines to be internally inspected by means of pigging.

Cathodic protection is provided to the CIGGS-A pipeline on land segments by impressed current cathodic protection system. The system rectifiers are located at East Forelands in Nikiski and at the Kaloa facility on the west side of Cook Inlet. Additional cathodic protection is provided to the subsea pipelines using numerous anode sleds. Cathodic protection is provided to the CIGGS-LP pipeline by a deep well anode.

The overall CIGGS pipeline length between shutdown valves is 113,239 feet (21.5 miles) and has a volume of 56,472 cubic feet (422,412 gallons; 10,057 barrels) at standard atmospheric pressure and temperature. Isolation valves for the subsea segment are located at Kaloa Junction and East Forelands.

No additional power or communication cables, housing, or access routes are proposed to be constructed for operation of these pipelines, as they are in developed areas with sufficient facilities available. The applicant plans to conduct maintenance, inspection, emergency response, and repairs using support facilities available in the Cook Inlet region.

Design Life

The design life of the pipeline is 20 years, which coincides with the length of the proposed lease. Should the applicant want to renew the lease, the pipeline will be evaluated for useful life.

A 20-year design life does not indicate that the pipeline and associated structures will be used up, failure-prone, or requiring replacement near the end or at the end of the lease. Engineering design life is established from a combination of technical, regulatory, economic, and commercial considerations. There are various definitions of design life however, for the purposes of this lease, it can be defined as the period over which the systems, components, and structure are required to perform their primary functions with acceptable safety, regulatory, and environmental performance, and with an acceptable probability that they will not experience large failures, require extensive replacements, or need significant repairs.

Geotechnical and Soils

CIGGS-A Marine: In general, seafloor sediments in the Cook Inlet vary from glacially-derived coarse grained sand and gravel in the north to fine-to-medium grained sand sculpted bedforms in the central and lower Cook Inlet (BOEM, 2016). During the melting season, fine-grained silt and clay particles are carried down from streams, rivers, and glaciers in the Susitna, Matanuska, and

Knik Valleys, into the Cook Inlet, and suspended in the water column. Because of the turbid nature of currents and tides, the fine-grained sediments are carried out of the Inlet, with some suspended sediments settling out in the winter. As a result, bottom sediments along the pipeline alignment are typically coarse grained: cobbles, pebbles, and sand, with only minor amounts of varved silt and clay and occasional erratic boulders. Average grain size distribution is expected to be in the range of sandy gravel to gravel (BOEM, 2016).

No portions of the pipeline alignment are known to be subject to differential displacement due to mass soil movements. It is assumed that there are no locations of landslides, liquefaction, or other situations where the pipeline could be damaged by minor movements of soil. Geological evidence demonstrates massive subsurface movements creating regional folding in subsea deposits, but the pipeline does not cross over active faults. The transition zones in the tidally influenced areas are susceptible to soil erosion by ice scour, wind, and dynamic water movement. The minimum depth of cover for the near shore transition zone is six feet. Once the pipe descends the bluff into the tidal zone, it remains buried until it reaches subsea conditions.

The relatively long and narrow geography and the shallow depths of Cook Inlet, the Coriolis effect (more significant at higher latitudes), and other factors combine to create one of the world's largest tides, in excess of 30 feet, in upper Cook Inlet. These tides are generally recognized as the third highest in the world and produce strong currents and turbulence. The Cook Inlet has high current velocities, but subsea pipelines have a successful 50-year history in this harsh environment. Much has been learned about restraining pipelines against currents. For the proposed conversion of service, Cook Inlet current measurements were used to gain an understanding of velocities and turbulence stresses on the subsea pipeline. Newly-acquired bathymetry was also used for the basis of design.

No geotechnical engineering work was done for the existing CIGGS LP pipeline. It has been buried adjacent to the Kenai Spur Highway since construction in 1972 with no known soil related issues.

Seismic Design

The most significant source of seismicity in southcentral Alaska is the plate-boundary subduction zone, known as the Alaska-Aleutian Megathrust. Spanning the width of the Aleutians to the Gulf of Alaska, this plate boundary accommodates oblique subduction of the Pacific Plate beneath the North American Plate and has the potential to generate the largest earthquakes in the world. In 1964, the second-largest (M_w9.2) instrumentally recorded earthquake occurred in the western Gulf of Alaska and affected much of southern Alaska, causing strong ground motion, a tectonic tsunami, liquefaction and lateral spread of soils, and many subaerial and submarine landslides that generated local tsunamis. Additionally, because sub-surface slip in megathrust earthquakes is so great (75+ ft), regions above the subduction zone experienced lasting uplift or subsidence (many tens of feet) after the 1964 event. Although the geologic activity of Alaska essentially guarantees that more damaging earthquakes will occur in the future, we cannot predict when. The proposed pipeline is located above this highly active plate interface.

Secondary to the Alaska-Aleutian Megathrust, there are many active structures in the upper crust of Cook Inlet that form in response to right-lateral transpression. These fault-cored anticlines, or ridge-shaped folds, are northeast-trending, discontinuous, and doubly plunging and have formed during the Plio-Pleistocene time and generate numerous small earthquakes. On April 26, 1933, a shallow M 6.9 earthquake occurred in northern Cook Inlet (most likely) on the 23 km-long North Cook Inlet anticline. Based on their sizes, these structures all have the potential to generate M6-7 earthquakes. Little is known about the recurrence of large earthquakes in this area and most of what we know is from proprietary seismic reflection data. Aside from strong ground motion, any permanent ground deformation from earthquakes on these structures would likely include broad warping of growing anticlines. While not totally impossible, we do not see evidence for discrete surface rupture in the Inlet.

There are no known surface-rupturing faults that intersect the proposed pipeline route. T he nearest known surface-rupturing fault is the Castle Mountain Fault, an east-northeast trending structure approximately 10 miles north of the banks of Cook Inlet (extending between the Talkeetna Mountains and the Susitna River). Two historic earthquakes have occurred on the Castle Mountain fault, a M5.7 in 1984 and a M4.6 in 1996. These were right-lateral events, but did not produce surface ruptures, as surface ruptures typically do not occur for earthquakes smaller than M 6.5. Given the length of the structure, its geomorphic expression, and regional tectonic activity, the Castle Mountain fault has potential to produce significant, surface rupturing earthquakes (M6.8+). A 2002 paleoseismic study determined the Castle Mountain fault has an average recurrence interval of ~700 years, with the last large earthquake occurring ~650 years ago.

Significant earthquakes from any of these sources have the potential to disturb the ground at sea level near the proposed CIGGS-A Marine pipeline. Strong ground shaking and regional uplift/subsidence could generate a tectonic tsunami, a local slope failure-derived tsunami, a seiche (sloshing), or a permanent change in regional coastline elevation. The burial of the pipeline near shore serves as a protective measure should a tsunami reach the area.

Onshore Hydrology and Waterways

No significant streams, rivers, or lakes bisect the pipeline route. Surface water exists in some wetland areas and typical construction techniques for mitigating surface runoff during pipeline construction have been employed.

Supervisory Control and Data Acquisition (SCADA)

All 10-inch-diameter pipelines will be monitored and controlled through Hilcorp's existing SCADA system. The primary control and operations center for the pipeline is located at the Kenai Gas Field facility. The backup control room is located at KPL Junction.

Leak Detection Systems

The leak detection system will include two separate leak detection technologies consisting of a statistical mass balance leak detection system and a wave rarefaction model leak detection system.

The Atmos Pipe mass balance leak detection system is a statistical volume balance leak detection system that provides a very accurate method of detecting smaller leaks over a longer period or

larger leaks over a short period of time. Operational experience at other Alaska oil pipelines using the Atmos Pipe system has verified it provides a highly reliable and accurate method of leak detection on crude oil pipelines in similar oil production service.

Flow meters carefully monitor inlet and outlet flows of the pipeline system for comparison of these values. Differences would indicate possible leaks. A statistical mass balance leak detection computer modeling system ties into the SCADA system that monitors the pipeline flow and generates predictable flow patterns over time. Disturbances such as those caused by temperature variations or varying flow or operating pressure are measured and masked out as "noise."

Atmos Wave is suited to identify larger leaks in a shorter period of time and is also able to identify the leak location. The Atmos Wave Leak Detection System is based on the detection of the negative pressure waves associated with the onset of a leak or theft. These rarefaction waves propagate from the location of the release in both directions and can be sensed by high performance pressure meters at the ends or along the pipeline. The basic principle is simple and it is used to detect and locate very large leaks using normal pressure meters. Unfortunately, when this principle is applied to very small leaks, the sensors detect not only the leak but also the large number of pressure changes that are part of normal pipeline operations and this causes many false alarms.

Atmos Wave is the result of several years of research and development directed at producing a pressure-based leak detection system that is based on state of the art hardware and telecommunication technology. A thorough review of the performance problems of the traditional systems leads to the decision to develop a completely new approach. This new approach is extremely successful. It examines all aspects of the negative pressure wave front and its propagation through the entire pipeline length. Three comprehensive algorithms filter out noise and arrange the analog pressure data into a detailed three-dimensional map that allows the system to differentiate true leak/theft events from the pressure changes caused by transient operation. Extensive performance evaluation and field trials have proven that Atmos Wave consistently differentiates opening and closing leak/theft signals during transients. These remarkable algorithms have been rigorously tested in operational pipelines with great success.

Atmos Pipe acts as the primary leak detection system aided by Atmos Wave. Both leak detection systems run independently of each other. If one system fails, the other system will continue leak detection. Atmos Wave provides the Atmos Pipe System with the ability to detect leaks more quickly and provide a more accurate leak location.

Integrity of Existing Pipeline Segments

CIGGS A: The CIGGS Marine dual pipelines are subject to environmental forces such as earthquakes, tidal and wave currents. Thirty-foot tides are common in upper Cook Inlet waters. The currents in this location are quite high owing to the Venturi effect, as seen from bathymetry data. Strong currents create a dynamic environment in which the pipelines reside and impart lift and drag forces upon those pipelines daily. Gradual grade changes occur over time along the mudline and pipeline interface, influenced by erosion and deposition of sand waves surrounding the pipelines. Separate analysis conducted by contracted pipeline integrity specialists

recommended Sea-Crete bags along the alignment to minimize free spanning and provide pipeline stability against tidal and wave currents. Over time, these stabilizing features may deteriorate and allow movements. Pipeline instability is a known threat to subsea pipelines. Harvest will conduct annual bathymetry surveys and mitigation measures will be employed to maintain free-span lengths to less than 50 feet.

Transition zones at both ends of the subsea segment have been direct buried to protect the pipeline from ice gouging and daily wave forces. These transition zones have received repeated special attention when integrity inspections found damaged protective coatings requiring repairs. Transition zones adequately protect the pipelines from near shore boating and fishing activities.

An unknown force, either intentional or accidental, has created a bend anomaly in the CIGGS Marine A and B pipelines. Multiple integrity studies have been conducted and, based on the geometry of the pipeline, the maximum recommended strain by ASME B 31.4 has been exceeded. Strain-based engineering methods have been employed to analyze the integrity of the pipeline. To confirm the engineering analysis, a portion of leftover pipe from the CIGGS construction was bent and burst tested. The burst tests were several orders of magnitude larger than the MAOP of the pipeline system. Through extensive analysis and study, including integrity assessment by a national pipe integrity specialist, Harvest has determined the pipeline can be operated in a safe manner and poses no additional risks than that of other Cook Inlet pipelines. As an added precaution, Harvest will limit the operating pressure of the CIGGS-A pipeline to a maximum of 600 PSI.

The "2017 Pipeline Integrity Review" performed on the CIGGS-A pipeline pipe found anomalies with suspected internal metal wall loss. A pipe section was removed onshore and replaced. Testing by destructive examination determined a manufacturing defect know as a scab. Recent in-line inspection (ILI) data suggests wall loss measurements of less than 20% from data collected by magnetic flux leakage (MFL) tool and are within current code and regulatory standards.

In 2018, an ILI was performed on the CIGGS LP pipeline. The integrity report did not identify any required repairs.

VI. FINANCIAL CAPABILITY OF THE APPLICANT

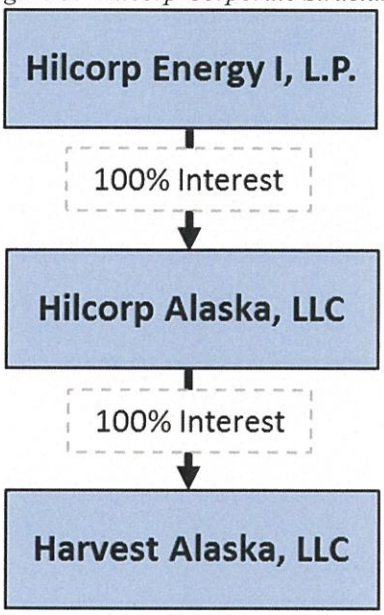
Introduction

The Commissioner's Analysis and Proposed Decision must consider whether an applicant has the financial capability to transport oil, natural gas, or other products in Alaska consistent with the present and future public interest. (AS 38.35.100) As part of its ROW lease application, Harvest submitted Hilcorp Alaska LLC's audited financial statements and requested they be held confidential under AS 38.05.035(a)(8)(D). DNR examined these financial statements, as well as other available information, to assess the applicant's financial capability to construct pipelines, operate and maintain pipelines, and restore, rehabilitate, and revegetate the ROW to the satisfaction of the Commissioner.

Background

Harvest is an Alaska limited liability company wholly owned by Hilcorp Alaska, LLC. Hilcorp Alaska, LLC, is a Delaware limited liability company wholly owned by Hilcorp Energy I, L.P., a Texas limited partnership. Harvest was formed in 2014 and has an ownership interest in several pipelines on the North Slope and within Cook Inlet. In 2014, Harvest acquired 68.46% interest in the Endicott Pipeline Company, 50% interest in Milne Point Pipeline, and 100% interest in the Northstar Pipeline Company. It also has 100% ownership interest in three Cook Inlet pipeline companies: Cook Inlet Pipeline Company, Kenai Beluga Pipeline, and Swanson River Oil Pipeline.

Figure 3: Hilcorp Corporate Structure



CIGGS Expenditures

Harvest expects that there will be no construction or installation costs required for converting the CIGGS A or the CIGGS LP segments from gas to oil service. The annual maintenance and operating cost for the CIGGS-A is expected to be $200,000 and the CIGGS-LP is estimated at $75,000.

Financial Review

Harvest submitted Hilcorp Alaska LLC's audited financial statements for 2014, 2015, and 2016. An independent auditor's statement confirmed they had been prepared in accordance with generally accepted accounting principles in the United States. Harvest requested these financial statements be held confidential under AS 38.05.035(a)(8)(D).

DNR reviewed Hilcorp Alaska LLC's financial statements, including its balance sheet, income statement, cash flow statement and notes to the financial statements. DNR calculated several common financial metrics to evaluate Hilcorp Alaska, LLC's overall financial capability and assess how its financial condition compares to other companies in the upstream oil and gas sector. The following financial metrics were considered:

- *Current Ratio* (Current assets/Current liabilities): measures a company's ability to convert assets into cash in the near term.
- *Cash Flow/Debt*: measures a company's capacity to meet financial obligations in the short term.
- *Debt/EBITDA and Debt/Equity:* measure a company's capability to meet financial obligations in the coming years. (EBITDA stands for earnings before interest, taxes, depreciation, and amortization.)
- Altman Z-Score: combines several financial ratios into a single score for a company's financial condition. Z-Scores fall within one of three zones: Safe Zone ($Z > 2.90$), Cautionary Zone ($1.23 \leq$ Z-Score ≤ 2.90), and Distress Zone (Z-Score < 1.23).

DNR reviewed announcements and rating actions by Moody's for Hilcorp Alaska LLC's parent company, Hilcorp Energy I, L.P. Moody's has recently stated positive factors helping Hilcorp Energy I, L.P.'s financial outlook, including the company's relatively modest debt levels, increased geographic diversity of its operations and consistency in maintaining a sound financial condition.

VII. ANALYSIS OF APPLICATION

Fit, Willing, and Able Standards

The Commissioner is required to determine whether an applicant is fit, willing, and able to construct and operate a pipeline in the State of Alaska. (AS 38.35.100) If a favorable determination is made, a ROW lease may be offered to an applicant. The Commissioner must consider existing uses of the land, technical and financial capability of the applicant to protect property interests, fish and wildlife and their habitat and the subsistence interests of individuals in the general area of the ROW.

Standard 1: Existing Uses

The Commissioner must consider whether the proposed ROW lease will unreasonably conflict with existing uses of the land involving a superior public interest.

Evaluation: Land uses along the proposed ROW include potential resource development, oil and gas leases, pipeline easements, utility easements and public access. General information about these land uses can be found in Section III and IV of this document. There are multiple shore fishery leases near the CIGGS-A landfall locations.

Oil and Gas Resources and Authorizations

The Cook Inlet area is well known for its proven and potential oil and gas resources. The CIGGS-A pipeline bisects the Kitchen Lights Unit (Cornucopia Oil and Gas Company LLC) and the Granite Point Unit (Hilcorp Alaska, LLC). The CIGGS-LP line transects several parcels where the subsurface estate is held by the Mental Health Land Trust and other third-party interests. To minimize potential conflicts between different users, lease Section 14 requires the lessee to promptly repair or reimburse for any damages caused by the project to infrastructure located on

State lands. Lease Stipulation 3.10.1 requires the lessee to protect existing third-party interests and to repair any damages the lessee may cause.

Utility Easements
There are two fiber optic cables crossing the CIGGS-A; one owned by the Kodiak-Kenai Cable Company, LLC, which provides telecommunication between mainland Alaska and Kodiak Island, and one owned by Alaska Communication System Group (ACS), which provides telecommunication between Alaska and the Lower 48. The CIGGS-LP shares a section line easement with Homer Electric Association and multiple other utilities within the Kenai Spur Highway right-of-way.

There are no known land use conflicts between the various user groups. However, to help protect third-party interests, lease Section 14 requires the lessee to promptly repair or reimburse for any damages caused by the project to infrastructure located on State lands and Lease Stipulation 3.10.1 requires the lessee to protect existing third-party interests and to repair any damages the lessee may cause.

Mineral Resources
There are no known marketable minerals or existing mining claims within or adjacent the project areas. DNR proposes to close the lands within the ROW, plus 100 feet on either side, to mineral entry during the life of the ROW lease under Mineral Order 1204. This Order is intended to eliminate all potential conflicts so no additional mitigation stipulations have been included in the lease.

Material Resources
There are no known marketable materials within or adjacent to the project areas. Should Harvest determine at some point during the life of the project that materials within the ROW could be used for pipeline purposes, they may apply for an AS 38.05.565(a)(3) material sale. If this situation arises, Lease Stipulation 3.15 provides a basic framework for that action.

Cultural Resources
No construction or other ground disturbing activities is planned within the proposed leasehold after lease issuance. Future maintenance activities could potentially disturb undiscovered archaeological sites. Lease Stipulation 3.7 requires the lessee to stop work immediately upon the discovery of possible artifacts and contact DNR's Office of History and Archaeology, the Division, and the Kenai Peninsula Borough for evaluation. SHPO may require a Cultural Resource Survey Permit with protective measures for newly discovered archaeological site(s).

Wildlife Protection
The project areas are home to several threatened or endangered species. To minimize conflicts between these protected species and the proposed ROW, Lease Stipulation 3.20 requires coordination with federal, state, and local government concerning protection of fish, wildlife and their habitat near the ROW. Agencies include, but are not limited to, the NOAA Fisheries Alaska Region Protected Resource Division, the U. S. Fish & Wildlife Service, the National Marine Fisheries Service, and ADF&G.

Hunting
This project is not expected to have a large impact on hunting activities as the CIGGS-A has a minimal upland footprint and the CIGGS-LP is in a developed highway corridor (hunting from constructed roads is prohibited). To minimize any potential conflicts between available animal populations and the project, Lease Stipulation 3.21 requires the lessee to adjust pipeline activities, with written notification, for unpredicted wildlife breeding, nesting, calving or migration behaviors. Lease Stipulation 3.13 prohibits project employees from hunting, trapping and shooting within the ROW.

Fishing
The Upper Cook Inlet is home to Pacific herring, capelin, eulachon, longfin smelt, Pacific sand lance, and five species of salmon. These fish are harvested for commercial, sport, personal use, subsistence and educational purposes. Lease Stipulation 3.22 requires the lessee to make reasonable provisions to prevent conflicts and to design and operate the pipeline in a manner that minimizes obstructions to fishing. Lease Stipulation 3.13 prohibits project employees from fishing within the ROW.

Shore Fishery Leases
There are multiple shore fishery lease sites near both CIGGS-A landfall locations. DNR is not aware of any land use conflicts between the two user groups; however, to help protect shore fishery interests during the life of the project, Lease Stipulation 3.10.2 requires the lessee to make reasonable provisions to avoid or minimize impacts to shore fishery leases.

Subsistence Use
ADF&G has documented the people of Tyonek, Beluga, and Nikiski use the general project areas for subsistence purposes. Lease Stipulations 3.20-3.22 support the protection of fish and wildlife and offers protection for all subsistence activities in the area.

Public Access
It is the policy of DNR that public access routes and the ROW will be open for the use and enjoyment of the public. To minimize conflicts between the public and pipeline activities, Lease Stipulation 3.9 allows the lessee to request restricted access to the ROW. The Commissioner may approve restricted access in any of the following situations:

1. The ROW is being used for construction or termination activities.

2. To facilitate operations and/or maintenance activities, or to protect workers, the public, wildlife or the environment from hazards associated with the project.

3. For the security of the pipeline.

To and Along Access
The CIGGS-A is buried within the tidelands at both landfall locations at Granite Point and Nikiski. Harvest has stated that the pipe is designed to withstand the transportation activities allowed under 11 AAC 96.020: Generally Allowed Uses. The ability of the public, and specifically the shore fishery lessees, to easily use the tidelands for access must be protected. To protect these interests,

Lease Stipulation 3.9.2 specifically prohibits Harvest from interfering with the public's access to the tidelands except for those specific exemptions listed above in Public Access.

Standard 1 Conclusion: The Commissioner is satisfied the proposed CIGGS pipeline complies with the standards of AS 38.35.100(a)(1) if the above listed mitigation measures and/or conditions are met.

Standard 2: Technical Capability

The Commissioner must consider whether the applicant has the technical capability to protect state and private property interests, prevent significant environmental impacts, undertake restoration and revegetation actions, and protect subsistence activities.

Evaluation: The most significant way Harvest can comply with this standard is through the design, construction, operation, and maintenance of a safe pipeline system. The Division has scrutinized the proposed conversion and has determined the CIGGS pipeline can perform safely and continue to withstand the conditions of Cook Inlet if the pipeline is properly monitored and maintained. Details about the engineering review of the conversion application is in Section V.

To ensure continuing compliance with AS 38.35.100 after, lease sections 13, 14, 27, 28, and 38, and Lease Stipulation sections 2 and 3 include conditions upholding technical standards for the life of the proposed project; including, but not limited to, the following lessee required documents, plans and programs:

- Change to Service Plan – Prior to Start-Up, Harvest shall submit any updates to the Change to Service plan for approval (Stipulation 3.1).

- Design Basis and Criteria – Prior to Start-Up, Harvest shall submit any updates to the Design Basis and Criteria for approval (Stipulation 2.4). After Start-Up, any modifications to the Design Basis and Criteria must be approved before those modifications are implemented. (Stipulation 1.4)

- Final Design – Prior to Start-Up, Harvest shall submit final design drawings and calculations for approval. If there is a significant change from the preliminary design documents, Harvest may be required to submit additional plans to address new components (Stipulation 2.5). After Start-Up, any modifications to the Final Design must also be approved before those modifications are implemented (Stipulation 1.4).

- Quality Management Program – Prior to Start-Up, Harvest shall submit a comprehensive safety and integrity program and describe how they will document compliance with all lease terms and conditions (Stipulation 3.2). After Start-Up, any modifications to the program must be approved before those modifications are implemented (Stipulation 1.4).

- Surveillance and Monitoring Program – Prior to Start-Up, Harvest shall submit a comprehensive health and safety program, demonstrating how they will detect, prevent, and abate situations that endanger people and the environment or the integrity of the

pipeline (Stipulation 3.3). After Start-Up, any modifications to the program must be approved before those modifications are implemented (Stipulation 1.4).

Standard 2 Conclusion: The Commissioner is satisfied Harvest has the capability to comply with the technical standards of AS 38.35.100(a)(2) - (3), if the above listed mitigation measures and/or conditions are met.

Standard 3: Financial Capability

The Commissioner must consider whether the applicant has the financial capability to protect state and private property interests, prevent significant environmental impacts, undertake restoration and revegetation actions, protect subsistence activities and pay reasonably foreseeable damages arising from the project.

Evaluation: DNR's review of Hilcorp Alaska, LLC (the parent company of Harvest), Harvest has sufficient financial capability and stability to undertake the proposed project.

The Commissioner requires agreement to the following lease conditions for Harvest, Hilcorp Alaska, LLC, and Hilcorp Energy I, LP:

1. **Parental Guarantee:** Hilcorp Alaska, LLC will provide DNR with a guarantee wherein Hilcorp Alaska, LLC irrevocably and unconditionally guarantees to the State the full performance, fulfillment and satisfaction of all the duties, obligations and liabilities of Harvest arising under or pursuant to the ROW lease. The proposed parental guarantee is Exhibit C of the lease.

2. **Dismantlement, Removal and Restoration (DR&R):** When Hilcorp Alaska, LLC acquired their first Alaskan oil and gas leases in 2011 a Financial Assurance Agreement (FAA) for DR&R obligations was entered between DNR, Hilcorp Alaska, LLC and Hilcorp Energy I, LP. The FAA governs Hilcorp's DR&R responsibilities in Alaska. Hilcorp Alaska, LLC and Hilcorp Energy I, LP will include the ROW lease DR&R obligations in the FAA's Attachment A at the next schedule update on December 31, 2018.

3. **Insurance:** Harvest will be required to obtain and furnish liability and property damage insurance from a company licensed to do business in the state, with the State of Alaska listed as an additionally insured.

To ensure continuing compliance, DNR will monitor Hilcorp Alaska, LLC's financial capability during the life of the project. Additional protection to property is required by lease Section 14, which requires the lessee to promptly repair or reimburse for damages caused by the project to infrastructure located on State lands.

Standard 3 Conclusion: The Commissioner is satisfied Harvest, through Hilcorp Alaska, LLC, has the financial capability to comply with the financial standards of AS 38.35.100(a)(2) - (4) if the above listed mitigation measures and/or conditions are met.

Standard 4: Hiring Alaska Residents

AS 38.35.100(a)(5) requires the applicant and its subcontractors to comply with all applicable laws regarding hiring Alaskan residents.

Evaluation: Section 33 of the lease requires the lessee to comply with all applicable laws and regulations regarding hiring state residents. Section 10 of the lease requires Lessee's subcontractors to abide by all terms of the lease. Harvest has agreed to this standard and the conditions established will be met upon the issuance of the lease.

Standard 4 Conclusion: The Commissioner is satisfied Harvest will comply with the standards of AS 38.35.100(a)(5), if the above listed mitigation measures and/or conditions are met.

Fit, Willing, and Able Determination

The Commissioner must determine an applicant is fit, willing, and able to construct, operate, maintain, and terminate a pipeline in Alaska.

Evaluation: Transportation of hydrocarbons results in significant contributions to the general welfare of the people of Alaska. It is the State's policy the development, use and control of a pipeline transportation system be directed to make the maximum contribution to the development of the human resources of the state, increase the standard of living for all its residents, advance existing and potential sectors of its economy, strengthen free competition in its private enterprise system and protect its incomparable natural environment.

The Cross Inlet Pipeline Extension Project reconfigures existing Cook Inlet oil and natural gas pipelines to increase system efficiency and to improve environmental safety. Transporting oil by pipeline across Cook Inlet eliminates the need for the Drift River Oil Terminal and the associated barge traffic across Cook Inlet, greatly reducing the risk of an oil spill. The conversion of the CIGGS pipeline is the key component of this project.

Harvest and their parent company Hilcorp Alaska, LLC, began acquiring oil and gas assets in Alaska approximately six years ago including multiple pipelines on the North Slope and in the Cook Inlet area. The Division acknowledges since the companies began operating in Alaska they have received several warning letters from the Pipeline and Hazardous Material Safety Administration (PHMSA) and Orders and Notices of Violations from the Alaska Oil and Gas Conservation Commission (AOGCC). A recent incident resulted in a Notice of Proposed Safety Order from PHMSA for a processed dry natural gas release from the Middle Ground Shoal Fuel Gas System in Cook Inlet early in 2017. That order contained Proposed Corrective Measures and resulted in a Consent Agreement with actionable corrective measures, which Hilcorp Alaska, LLC has been addressing to the satisfaction of PHMSA. The facts of these cases have been considered during the evaluation of this project.

Six of Hilcorp Alaska, LLC affiliated companies' assets are authorized under an AS 38.35 ROW lease: Kenai Kachemak Pipeline, Northstar Oil, Northstar Gas, Endicott Oil, Milne Point Oil and Milne Point Products. Division oversight of these ROW leases includes regular monitoring of pipeline integrity, maintenance, operations, safety and environmental programs. A major

component of this decision includes consideration of DNR's regulatory relationship and history with the Hilcorp companies, which include no unsatisfactory (non-compliance) findings. Hilcorp works closely with the Division and they have demonstrated they can operate regulated pipelines in a responsible manner and have been responsive and adaptive to concerns raised by regulatory agencies.

The Division has spent a considerable amount of effort reviewing multiple technical documents, reports and data concerning the integrity of the 46-year-old CIGGS pipeline system. Repeated inspections via side-scan SONAR and in-line inspection devices have revealed that while some wear has occurred on the pipeline, it is well within acceptable operating standards. The surveys revealed the CIGGS A segment has a bend anomaly. However, a strain-based report has concluded the pipeline may be safely operated. The Division considers the condition and status of the pipe as satisfactory to transport oil or natural gas safely. Regular inspections and maintenance will be required and DNR and USDOT/PHMSA will monitor the pipeline for the life of the project. As an added precaution, Harvest will limit the operating pressure of the CIGGS-A pipeline to a maximum of 600 PSI.

The Division will exercise its authority to monitor the construction, operations, maintenance and termination of the pipeline in accordance with all applicable statutes, regulations, the lease and lease stipulations. This includes regular inspections, monitoring and review of integrity management, maintenance, response and safety programs.

Conclusion: The Commissioner has reviewed and considered the applicant's proposal as described in their application and supporting documentation. This Right-of-Way lease is a benefit to the people of Alaska. All standards have been or will be met upon issuance of the lease. Continued compliance will be monitored by the Division throughout the life of the lease. The Commissioner has determined the applicant meets or exceeds the requirements of AS 38.35 and other applicable standards and is fit, willing and able for a ROW lease with the following modification:

- The operational ROW width of the CIGGS-A shall be 100 feet to maintain an adequate buffer zone around the pipeline.

- The operational ROW width of the CIGGS-LP within road rights-of-way and section line easements shall be 20 feet, which is consistent with the management of pipelines within existing Kenai Peninsula Borough road rights-of-way and easements.

COMMISSIONER'S PROPOSED DECISION AND ACTIONS

The Commissioner preliminarily concludes the applicant is fit, willing, and able to construct, operate, maintain, and terminate the proposed CIGGS-A and CIGGS-LP pipeline segments as presented and described in their application and supplemental information. This preliminary conclusion is subject to further consideration of all comments submitted during the public comment period for this lease application. The Commissioner directs the following actions:

1. DNR shall make copies of this Commissioner's Analysis and Proposed Decision available at cost to any member of the public requesting copies.

2. DNR shall solicit written comments about leasing State land for the CIGGS pipeline. DNR will place public notices on the State's public notice web site, the Division web site, in newspapers of general circulation and public libraries in Kenai, Soldotna, Homer, Anchor Point, and Ninilchik. The Kenai Peninsula Borough, local governments and local ANCSA corporations will be notified. Written comments must be received by the Division on or before 5:00 p.m. on September 5, 2018.

3. Following completion of the public comment period and consideration of all comments received, the Commissioner will make a final determination on the ROW lease application. If the Commissioner does not significantly alter this analysis following the public comment period and if the applicant meets all conditions preceding the lease offer, this Commissioner's Analysis and Proposed Decision shall constitute the Commissioner's Final Decision and the Commissioner will offer the applicant the ROW lease.

4. Should the ROW lease be issued, the Commissioner shall include those State lands adjacent to and included within the ROW lease to mineral entry under MO 1204.

5. Should the ROW lease be issued, Harvest will be required to obtain a Written Authorization from the Division before start-up of the CIGGS pipeline will be allowed.

Dep. Comm. for

Andrew T. Mack
Commissioner

8-6-18
Date

CIPL Cross Inlet Extension Project

Conversion of Service:

CIGGS A to CIPL Marine A 10

Basis of Design

Public Document

Hilcorp Alaska, LLC

HARVEST PIPELINE

Revision History

Rev	Date	Description	Author	Review	Approval
A	07/19/18	Issued for Review	W. Veelman	L. Bolling	T. SlatonBarker
B	07/26/18	Issued for Review	W. Veelman	L. Bolling	T. SlatonBarker
C	08/01/18	Issued for Review	W. Veelman	L. Bolling	T. SlatonBarker

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1.0 Abbreviations

AAC	Alaska Administrative Code
API	American Petroleum Institute
ARO	Abrasion Resistant Overlay
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
BBL	barrels
BPH	barrels per hour
CFR	Code of Federal Regulations
CIGGS	Cook Inlet Gas Gathering System
CIPL	Cross Inlet Pipeline
CP	Cathodic Protection
F	Fahrenheit
FBE	Fusion Bond Epoxy
lbs	pounds
MAOP	Maximum Allowable Operating Pressure
MOP	Maximum Operating Pressure
mil	one thousandth of an inch
mmscfd	Million Standard Cubic Feet Per Day
NACE	National Association of Corrosion Engineers
psi	pounds per square inch
psia	pounds per square inch atmospheric
psig	pounds per square inch gauge
SCADA	Supervisory Control and Data Acquisition
SDV	Shutdown Valve
USGS	United States Geological Survey

2.0 Project Overview

The CIGGS A pipeline is an existing 10" nominal marine pipeline that will be converted from natural gas service to crude oil service between Kaloa Junction and East Forelands. This work is part of an overall project, called the CIPL Cross Inlet Extension Project, that modifies the oil and gas pipeline systems in the Cook Inlet region in order to eliminate the need for Drift River Terminal and overwater transportation of crude oil.

The CIGGS A and CIGGS B pipelines are two parallel pipelines in what is commonly referred to as the Dual Marine CIGGS pipelines. The Dual Marine CIGGS are bi-directional, sub-sea 10-inch natural gas transmission pipelines.

As part of the CIPL Cross Inlet Extension Project, the existing CIGGS A pipeline, currently in natural gas service, will be converted to crude oil service and renamed the CIPL Marine A 10 pipeline.

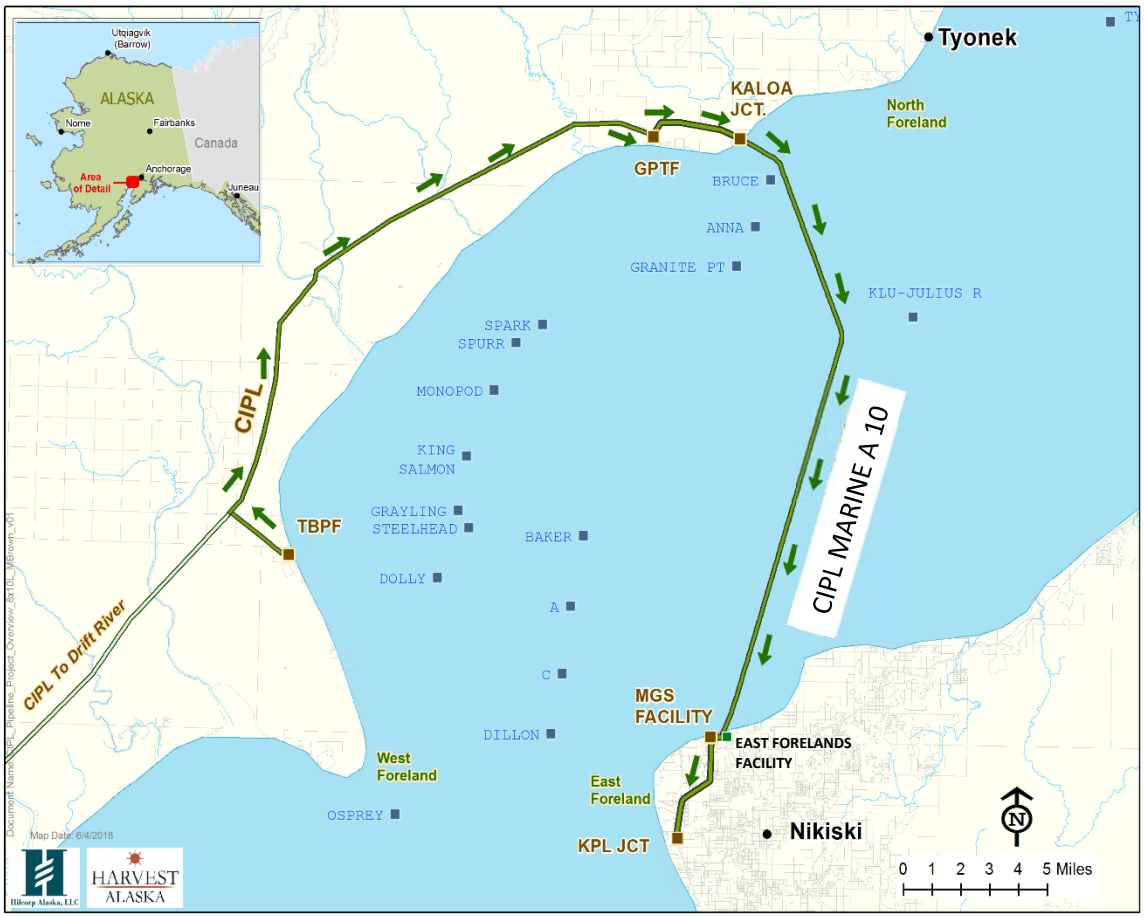

Figure 1: Location of CIPL Marine A 10 in Cook Inlet

2.1 System Design

The conversion of the CIGGS A to the CIPL Marine A 10 pipeline is required to provide a pipeline for crude oil produced on the West Side of Cook Inlet to be delivered to the Andeavor refinery without

the use of barges. The existing pipeline will be connected to new on-shore crude oil pipelines at both Kaloa Junction and East Forelands to complete the pipeline circuit for crude oil to flow from the west side production facilities to Andeavor.

The CIPL Marine A 10 pipeline is designed to flow crude oil from west (Kaloa Junction) to east (East Forelands). Surface facilities at Kaloa Junction and East Forelands include shutdown valves, pig traps, and connections for facilitating emergency evacuation of the pipeline contents.

2.2 Pipeline Length

The on-shore section of pipeline from Kaloa Junction to the western beach is 720 feet (0.14 miles). The off-shore section of the pipeline from the beach near Kaloa Junction to the beach near East Forelands is 111,354 feet (21.1 miles). The on-shore section of pipeline from the eastern beach to East Forelands is 1,165 feet (0.22 miles). The overall CIPL Marine A 10 pipeline length between shutdown valves is 113,239 feet (21.5 miles) and has a volume of 56,472 cubic feet (422,412 gallons; 10,057 bbls) at standard pressure.

2.3 Pipeline Construction

The CIGGS A pipeline was constructed in 1972. The pipeline materials purchase documents (MTR's, construction specifications) indicate the existing CIGGS A pipeline material is 10.75" OD, 0.594" wall Grade X-52 Seamless Line Pipe that conforms to API Specification for High Test Line Pipe, API Std 5LX 18th Edition, dated April 1971, with added customer supplements for chemical composition and toughness. Product Specification Levels (PSL) were not included in the API specifications in 1971 - they were added in the late 1990's and after the specification was changed from 5LX to API 5L Specification for Line Pipe.

The pipe was ordered with supplemental requirements that provided limits on carbon, manganese, silicon, phosphorus and sulfur. Additional requirements for maximum yield, toughness, joint end roundness and heat treatment were also included. A comparison to modern PSL values is tabulated in Table 1 below:

Criteria	Existing Pipe Spec	API 5L PSL-2	API 5L PSL-1
Carbon % max	0.19	0.18	0.28
Manganese % max	1.40	1.40	1.40
Silicon % max	0.40	0.45	na
Phosphorus	0.03	0.025	0.03
Sulfur % max	0.035	0.015	0.03
Max Yield	68,000 psi	76,900 psi	na
Toughness	15 ft-lbs at 10F	20 ft-lbs at design temp	na

Table 1: Existing Pipeline Material Specifications

The pipe was supplied by British Steel Corporation. A review of the mill test certificates indicates the pipe conforms to the pipe specification. Charpy tests results indicate the toughness exceeds both the specification and PSL-2. In addition, the tensile strength range meets PSL-2 requirements.

The subsea portion of the pipeline is weight coated with concrete. The weight coating thickness is 1", 2" or 3-1/2", depending on the location. The weight coating thickness was designed for the variable currents along the pipeline route.

2.4 Pressure Test

The CIGGS A and B pipelines were successfully hydrostatically tested after construction in 1972, and again in 1987. Both tests were performed for a period of 24 hours, and neither test experienced any failures. Test records indicate that both CIGGS A and CIGGS B pipelines were tested simultaneously.

The minimum test pressure recorded during the 1972 test was 2,400 psig. The minimum pressure during the 1987 test was 2,000 psig. The hydrostatic tests both support the established MAOP of 1,440 psig.

Prior to conversion to liquid service, the CIGGS A (CIPL Marine A 10) pipeline, from Kaloa Junction to East Forelands, will be hydrotested per CFR 195 and ASME B31.4 to at least 1,800 psig (1.25 x design pressure) for 8 hours to confirm mechanical integrity.

2.5 Pipeline Integrity History

There are no records of any pipeline leaks on either the CIGGS A or CIGGS B pipelines. There have been multiple integrity assessments performed on both pipelines, including hydrostatic testing and multiple in-line inspection (ILI) assessments. The following studies have been reviewed:

- Original engineering study outlining span criteria, baseline storm events, pipeline design criteria, and proposed span lengths.
- Additional engineering study based on developed pipeline plan. Includes analysis of final pipeline design criteria, final design currents.
- Re-assessment of span criteria based on 25-years of operating history.
- Detailed span and fatigue analysis for a specific span length of 132 feet.
- Multi-beam and sidescan survey data providing mapping for lateral displacement of CIGGS A and B pipelines.
- Analyses of the displaced pipelines using membrane and bending strain techniques as well a finite element analysis.
- Follow-up study including full scale pipeline model, testing, destructive testing, and finite element analysis.
- CIGGS ILI Data Review, based on the following ILI's that have been completed:
    - 1998 MFL
    - 2007 MFL
    - 2011 Caliper
    - 2014 Caliper/MFL

These studies have addressed known integrity threats and provided mitigation recommendations for continuing to operate these pipelines safely.

2.6 MAOP Verification

In August of 2017, the Hilcorp Alaska Integrity Group performed a review of the Maximum Allowable Operating Pressure (MAOP) for the CIGGS A and B pipelines. Based on a review of all available information, the established MAOP value of 1,440 psig was reasonably verified by comparing multiple,

complimentary records, most of which were developed for Harvest over the past year. Pipe specification data was consistently documented on numerous sources including hydrotest records and ILI reports. The established MAOP of the 10-inch CIGGS A and B pipelines was thus verified to be 1,440 psig, based on the limiting factor of the 1,440 psig fittings.

2.7 Normal Operating Pressure

The pressure source of the pipeline is the GPTF booster pumps, which will be normally operated between 300 psig and 600 psig. Due to hydraulic pressure losses in the pipeline system, the pipeline will experience pressures less than the booster pump pressure range. The normal operating pressure will not exceed 600 psig.

Based on the CIPL pipeline system hydraulic calculations, the typical operating pressure at the design high flow range will be about 400 psig at the Kaloa Junction end of the pipeline.

3.0 Jurisdiction and Criteria

The pipeline is used for transportation of crude oil, so falls under the Office of Public Safety regarding design criteria for evaluation of the existing pipeline for the new service condition.

The Office of Public Safety, references 49 CFR Part 195 – Transportation of Hazardous Liquids by Pipeline, revised as of October 1, 2011 for crude oil transmission pipelines.

In addition to pressure loads covered in the CFR, this pipeline is subject to external loads from ocean current and spans. CFR Part 195 references ASME B31.4 – Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids, October 2006, for design of pipelines subject to external loads. B31.4 has been updated since 2006, and this evaluation uses the 2012 Edition.

4.0 Pipe Properties

4.1 Offshore Segment

The offshore pipeline segment between the Mean High High Water (MHHW) at Kaloa Junction and MHHW at East Forelands is shop coated with 1/8" coal tar enamel and concrete weight coat varying from 1" to 3-1/2" thick. Pipeline joints are double random. Offshore pipeline properties are summarized in Table 2 below.

Grade	5L-X52 seamless	Charpy 15 ft-lb at 10F
Outside Diameter, Do	10.75"	
Inside Diameter, Di	9.562"	
Wall thickness, t	0.594"	
Area, A	18.95 in2	
Elastic Section Modulus, Z	45.62 in3	
Weight / foot (empty)	66.5 lb/ft	Includes 2.0 lb/ft coating
1" Weight Coat		
Weight / foot (empty)	116 lb/ft	Includes 49.7 lb/ft wt coat
Weight / foot (full of oil)	143 lb/ft	Includes 27.1 lb/ft oil
Weight / foot (full of water)	147 lb/ft	Includes 31 lb/ft water
Outside Diameter	13.0"	
Displacement (Buoyancy)	57.5 lb/ft	
2" Weight Coat		
Weight / foot (empty)	175 lb/ft	Includes 107.8 lb/ft wt coat
Weight / foot (full of oil)	202 lb/ft	Includes 27.1 lb/ft oil
Weight / foot (full of water)	206 lb/ft	Includes 31 lb/ft water
Outside Diameter	15.0"	
Displacement (Buoyancy)	76.6 lb/ft	
3-1/2" Weight Coat		
Weight / foot (empty)	277 lb/ft	Includes 210.4 lb/ft wt coat
Weight / foot (full of oil)	304 lb/ft	Includes 27.1 lb/ft oil
Weight / foot (full of water)	308 lb/ft	Includes 31 lb/ft water
Outside Diameter	18.0"	
Displacement (Buoyancy)	110.3 lb/ft	

Table 2: Offshore Pipeline Properties

4.2 Onshore Segment

The onshore pipeline segments between Kaloa Junction and MHHW and MHHW and East Forelands is shop coated with 1/8" coal tar epoxy. Pipeline joints are double random. Onshore pipeline properties are summarized in Table 3 below.

Grade	5L-X52 seamless	Charpy 15 ft-lb at 10F
Outside Diameter, Do	10.75"	
Inside Diameter, Di	9.562"	
Wall thickness, t	0.594"	
Area, A	18.95 in2	
Elastic Section Modulus, Z	45.62 in3	
Weight / foot (empty)	66.5 lb/ft	Includes 2.0 lb/ft coating
Weight / foot (full of oil)	93.6 lb/ft	Includes 27.1 lb/ft oil
Weight / foot (full of water)	97.6 lb/ft	Includes 31 lb/ft water
Outside Diameter (Coated)	11.0"	Includes coatings

Table 3: Onshore Pipeline Properties

5.0 Pipeline Design

5.1 Structural Pipeline Design

For conversion from natural gas to crude oil service, the existing CIGGS A (CIPL Marine A 10) pipeline has been evaluated using design criteria from 49 CFR 195 and ASME B31.4. The evaluation determined the existing pipeline will remain within allowable stress through the range of operating loads that are expected and prescribed by the codes. See Section 6.0 for the loading scenarios for the design of the pipeline.

5.2 Geotechnical

The documentation for the pipeline construction indicates the bottom conditions along the route range vary from gravel, cobbles, and boulders toward the west shoreline to primarily sand and gravel between Middle Ground Shoal and the east shoreline. The bottom conditions are typical of the Inlet and common to other pipelines.

5.3 Scour and Erosion Mitigation Measures

Scour and erosion from currents within the Cook Inlet can affect the subsea section of the pipeline by seafloor material being displaced across the pipeline surfaces and by movement of seafloor material resulting in loss of support under the pipeline. The movement of material can also be beneficial if it results in partial or complete burial of the pipeline as it provides additional stabilization.

The documentation for the pipeline construction indicates the entire subsea pipeline is concrete weight coated. In addition to stabilizing the pipeline, the concrete weight coat mitigates erosion of the pipeline from materials passing across the surface of the pipe. The coating is resistant to abrasion and is applied over the entire length of the pipeline, including the field welded joints.

The pipeline monitoring and maintenance program provides the mitigation for loss of material under the pipeline. Annual pipeline surveys are conducted to determine the pipeline position and support conditions, and if necessary support is reestablished through pinning if spans develop that exceed the maximum allowed.

5.4 Trenching Design and Ice Hazard Mitigation

To avoid the hazard of ice hitting the pipeline, the existing pipeline is installed below grade in the transition zone from onshore to offshore. The pipelines were installed to transition from buried to exposed at about 10 feet below mean low low water level, a distance of about 500 feet. Therefore, the existing pipeline has not experienced damage from ice movement.

5.5 Pinning of Subsea Pipeline

Hilcorp's sub-sea Integrity Program builds on the previous operator's practice to perform annual multi-beam surveys, identify spans over 50 feet in length, and to remediate by pinning the pipeline to the seafloor using concrete sacks. In addition to the subsea considerations, Hilcorp's integrity management plan includes risk assessments conducted after each ILI, wherein engineers and operators evaluate potential threats to the pipeline and then develop custom tailored mitigative considerations/actions to implement.

Remediated spans through the subsea integrity program, since Hilcorp began operation of the CIGGS A pipeline in 2013, is reflected below. Annual surveys and remediation will continue for the CIPL

Marine A 10 pipeline after the conversion of service from natural gas to crude oil.

Year of Remediation	# of Spans Identified over 50 ft	# of Spans Remediated
2017	11	11
2016	6	6
2015	11	11
2014	13	13
2013	0	0

Table 4: Subsea Pinning of Spans (Over 50ft)

5.6 SCADA, Communications and Control System

The CIPL Marine A 10 pipeline will be monitored and controlled through Hilcorp's existing SCADA system. The primary control and operations center for the pipeline is located at the Kenai Gas Field facility. The backup control room is located at KPL Junction.

The SCADA system will enable pipeline operators to efficiently and effectively supervise pipeline operations in real time. Data acquisition and storage will be provided, along with provision for report generation using historical data. Data retention and management will comply with applicable federal and state regulatory requirements. Additionally, some control functions will be provided through the system to allow for manual operational control and testing when necessary.

The SCADA system scan rate will be fast enough to minimize overpressure conditions, provide very responsive abnormal operation indications to controllers and detect small leaks within technology limitations.

The SCADA system will incorporate a real-time database and historian. The information on these databases will be used to generate operations reports and trends.

The SCADA system will send necessary information to a business database/historian. The information on this historian will be used to file reports to outside entities such as government regulators and provide information for business analysis.

The SCADA system will collect measurements and data along the pipeline, including flow rate through the pipeline, operational status, pressure, and temperature readings. This information may all be used to assess the status of the pipeline. The SCADA system will provide pipeline personnel with real-time information about equipment malfunctions, leaks, or any other unusual activity along the pipeline.

5.7 Operating Philosophy and Valve Configuration

Flow of crude oil is introduced into the CIPL Marine A 10 through the pipeline booster pumps located at Granite Point Tank Farm (GPTF). The pipeline pressure downstream of the pumps and pig trap at GPTF is monitored by pressure transmitters located at GPTF and Kaloa Junction that have high (500 psig), high high (800 psig), low (80 psig) and low low (50 psig) alarms. A high high pressure condition results in a shutdown of the pipeline by closing automated shutdown valves located at Kaloa Junction and East Forelands, which isolates the CIPL Marine A 10 pipeline segment.

5.8 Leak Detection Systems

The CIPL Marine A 10 leak detection system will include two separate leak detection technologies

consisting of a statistical mass balance leak detection system and a wave rarefaction model leak detection system.

5.8.1 Mass Balance

Atmos Pipe leak detection system is a statistical volume balance leak detection system that provides a very accurate method of detecting smaller leaks over a longer period of time or larger leaks over a short period of time. Operational experience at other Alaska oil pipelines using the Atmos Pipe system has verified it provides a highly reliable and accurate method of leak detection on crude oil pipelines in similar oil production service.

Flow Meters carefully monitor inlet and outlet flows of the pipeline system for comparison of these values. Differences would indicate possible leaks. A statistical mass balance leak detection computer modeling system ties into the SCADA system that monitors the pipeline flow and generates predictable flow patterns over time. Disturbances such as those caused by temperature variations or varying flow or operating pressure are measured and masked out as "noise."

5.8.2 Wave Refraction

Complementing this, Atmos Wave is suited to identify larger leaks in a shorter period of time and is also able to identify the leak location. The Atmos Wave Leak Detection System is based on the detection of the negative pressure waves associated with the onset of a leak or theft. These rarefaction waves propagate out from the location of the release in both directions and can be sensed by high performance pressure meters at the ends or along the pipeline. The basic principle is simple, and it is used to detect and locate very large leaks using normal pressure meters. Unfortunately, when this principle is applied to very small leaks, the sensors detect not only the leak but also the large number of pressure changes that are part of normal pipeline operations and this causes a large number of false alarms on this type of system.

Atmos Wave is the result of several years of research and development directed at producing pressure-based leak detection system that is based on state-of-the-art hardware and telecommunication technology. A thorough review of the performance problems of the traditional systems leads to the decision to develop a completely new approach. This new approach is extremely successful. It examines all aspects of the negative pressure wave front and its propagation through the entire pipeline length. Three comprehensive algorithms filter out noise, arrange the analog pressure data into a detailed 3-dimensional map that allows the system to differentiate true leak/theft events from the pressure changes caused by transient operation. Extensive performance evaluation and field trials have proven that Atmos Wave consistently differentiates opening and closing leak/theft signals during transients. These remarkable algorithms have been rigorously tested in operational pipelines with great success.

In combined mode, Atmos Pipe acts as the primary leak detection system aided by Atmos Wave. Both leak detection systems run independently of each other. If one system fails, the other system will continue leak detection. Atmos Wave provide the Atmos Pipe System with the ability to detect leaks more quickly and provide a more accurate leak location.

5.8.3 Control Room Monitoring

In addition, the Harvest Kenai Control Room is manned 24 hours per day and the operator on duty constantly monitors pipeline transfer operations via the SCADA system. In addition, the

controller takes readings to compare the accumulated totals for CIPL and compares with what has been received at MGS. These readings are recorded by the SCADA historian.

5.9 Corrosion Control and Monitoring

The CIPL Marine A 10 has a corrosion control system, provided by protective coatings and cathodic protection (CP). The pipeline coatings used are coal tar epoxy, as discussed in Section 4.0. Cathodic protection is provided to the CIPL Marine A pipeline by two impressed current cathodic protection systems. These systems are located at East Forelands in Nikiski, Alaska and at the Kaloa facility on the west side of Cook Inlet.

In June and July 2016, a CP survey was completed on the two 10-inch Dual Marine CIGGS pipelines. The cathodic protection survey consisted of field-testing, visual examinations, and minor repairs. The rectifiers were operating properly and no adjustments were made. Test results indicated that the existing cathodic protection systems were providing adequate levels of protection to the pipelines at the established test station locations, as defined by NACE International Standard: SP0169-2007 "Control of External Corrosion on Underground or Submerged Metallic Piping Systems." During the survey, all test stations were meeting NACE (National Association of Corrosion Engineers) criteria.

Alternating Current (AC) pipe-to-soil potential measurements were obtained in 2016 at all test point locations. The AC potentials that were obtained were minimal, and no concerns were identified.

6.0 Pipeline Loading Scenarios

Loads on the CIPL Marine A 10 pipeline include both pressure loading cases and other loading cases. Loads are combined as prescribed by code and sound engineering practice.

6.1 Pressure Load Scenarios

The pipeline stress evaluation was performed for various pressure loadings summarized as follows:

- Normal Operating Pressure: 400 psig (based on pipeline hydraulic calculations for design high flow range)
- Design Internal Pressure (Maximum Operating Pressure): 1,480 psig (based on existing fitting ratings the published MOP will be 1,440 psig, however calculations are accomplished using 1,480 psig which is ANSI Class 600)
- Hydrostatic Test Pressure: 1,850 psig (1.25 * Design Internal Pressure)

6.2 Offshore Pipeline Segment – Other Loading Scenarios

The offshore pipeline will be subject to non-pressure loading conditions, including:

6.2.1 Residual Load from Installation

The pipeline was installed by lay-barge and has been in service since 1972, and thus residual installation loads are considered inconsequential.

6.2.2 External Pressure:

14 psia to 80 psia (surface to 150 feet maximum water depth). External pressure loading is considered inconsequential, as the operating pressure of the pipeline is about 400 psig to 100 psig across its length. External pressure is ignored in the hoop stress calculations (conservative).

6.2.3 Thermal Loads (Operational Load):

These loads result from a change in temperature in the pipeline walls. This pipeline will be located in a temperature stable environment as it is exposed on the seafloor and Cook Inlet water temperature is relatively stable. Additionally, the oil in the pipeline is ground temperature as there is no heat added from process that effects the temperature of this pipeline. The installation method will result in the pipeline temperature equalizing with the water temperature before operating pressure is introduced. The pipeline that is exposed on the seafloor is treated as unrestrained.

6.2.4 Current Loads (Hydrotest Load and Operational Load):

The pipeline is located on the surface of the seafloor to the transition zones near shore at Kaloa Junction and East Forelands, then buried through the transition zone and onshore to the facilities. The subsea section is subject to water current loading from tides and wind events. Studies in Cook Inlet have been previously accomplished that establish the range of current velocities used for design of the exposed pipeline. The current velocity used for evaluation is 7 ft/sec at the seafloor.

6.2.5 Seismic Loads (Operational Load):

The pipeline is located in Cook Inlet, an area of high seismicity. The pipeline route does not cross any USGS mapped faults. The pipeline does cross the Granite Point fold about ½ mile from the shore. The pipe will be exposed on the seafloor in this area. No specific seismic loads are applied to the pipeline for design.

6.2.6 Accidental Loads (Operational Load):

The pipeline route does traverse the main transportation routes in Cook Inlet, but is not in a vessel mooring area, so anchor loads are not expected. There is a potential for personal watercraft anchors or set net tender vessel anchors to impact the pipeline. These loads are considered improbable and are not included in the stress analysis.

6.2.7 Dynamic Induced Soil Loads (Operational Load):

The pipeline has been in operation since 1972 and has not been subject to soil displacement events. The pipeline route does not traverse areas with slopes of steepness to be prone to soil displacement.

6.2.8 Ice Loads (Operational Load):

The pipeline is buried through the transition zone, so ice loading is not applied to the pipeline for design.

6.3 On-shore Pipeline Segment – Other Loading Scenarios

The onshore pipeline segments will be subject to non-pressure loading conditions, including:

6.3.1 Installation Load

Pipeline was installed by conventional trenching / cover methods. No unusual installation loads are included.

6.3.2 External Pressure Load (Operational Load)

14 psia to 22 psia (surface to 10 feet maximum soil cover). External pressure loading is considered inconsequential, as the operating pressure of the pipeline is about 400 psig to 100 psig, depending on location. External pressure is ignored in the hoop stress calculations.

6.3.3 Thermal Loads (Operational Load)

Thermal loads result from a change in temperature in the pipeline walls. This pipeline is buried and considered to be restrained. The stresses are evaluated for winter installation (0F) and summer installation (70F) and an operating temperature of 35F to cover the range of time allowed for construction. The oil in the pipeline is ground temperature as there is no heat added from process that effects the temperature of this pipeline.

6.3.4 Seismic Loads (Operational Load)

The pipeline is located in Cook Inlet, an area of high seismicity. The pipeline route onshore does not cross any USGS mapped faults or folds. No specific seismic loads are applied to the pipeline for design.

7.0 Design Results

The pipeline meets the 49 CFR 195 requirements for hoop stress, summarized in Table 5.

Location	P per CFR	$P_{Operating}$	P_{Design}	P_{Hydro}
All	4,137 psig	400 psig	1,480 psig	1,850 psig

Table 5: 49 CFR 195 Design Results

7.1 Offshore Segment

The offshore pipeline segment is evaluated using B31.4, Section 402. B31.4 calculations take into account hoop stress, longitudinal stress from pressure and bending loads, and torsion stress. Since the offshore pipeline is not buried, the pipeline is considered unrestrained.

Free Span Condition

The offshore pipeline has some areas of free spans. The pipeline is evaluated for pressure and longitudinal stress conditions due to internal pressure and bending load from maximum current and gravity at free spans. At free spans, the current sheds around the pipe so no torsion is created. The pipeline has been previously inspected and the free spans are limited through maintenance work to 50 feet maximum. Per Harvest, the 50 feet span limitation will be maintained in the future. The pipeline stresses for a 50 feet free span for each weight coat thickness are summarized in Table 6.

Pipeline Pressure Condition	Internal Pressure	Pressure (Hoop) Stress, S_H	Longitudinal Stress, S_L
1” Weight Coat			
Normal Operation	400 psig	3,420 psi	9,550 psi
Design (600# ANSI)	1,480 psig	12,652 psi	12,013 psi
Hydrotest (1.25 * Design)	1,850 psig	15,815 psi	13,651 psi
2” Weight Coat			
Normal Operation	400 psig	3,420 psi	12,683 psi
Design (600# ANSI)	1,480 psig	12,652 psi	14,534 psi
Hydrotest (1.25 * Design)	1,850 psig	15,815 psi	16,181 psi
3-1/2” Weight Coat			
Normal Operation	400 psig	3,420 psi	18,207 psi
Design (600# ANSI)	1,480 psig	12,652 psi	19,028 psi
Hydrotest (1.25 * Design)	1,850 psig	15,815 psi	20,682 psi
ASME Allowable Stresses		37,440 psi	39,000 psi

Table 6: 50 Feet Free Span Stress Summary

The hoop and longitudinal stresses are all well within allowable stresses for a 50 feet free span. Since the pipeline is unrestrained, thermal stress and combined stress are not considered.

Grounded Condition

The offshore pipeline is grounded on the seafloor for a majority of the corridor. The pipeline is designed to be stable on the seafloor through the use of weight coat. With the conversion from gas to oil, the pipeline operating weight increases further, resulting in increased stability. The grounded pipe is not subject to bending or torsion from current loading since it is self-stable.

The grounded sections of the pipeline are evaluated for pressure and longitudinal stress conditions due to internal pressure, with no added stress from bending or torsion.

Pipeline Pressure Condition	Internal Pressure	Pressure (Hoop) Stress, S_H	Longitudinal Stress, S_L
All Weight Coat Thicknesses			
Normal Operation	400 psig	3,420 psi	1,512 psi
Design (600# ANSI)	1,480 psig	12,652 psi	5,594 psi
Hydrotest (1.25 * Design)	1,850 psig	15,815 psi	6,992 psi
ASME Allowable Stresses		37,440 psi	39,000 psi

Table 7: Grounded Span Stress Summary

The hoop and longitudinal stresses are all well within allowable stresses for the grounded pipeline. Since the pipeline is unrestrained, thermal stress and combined stress are not considered.

7.2 Onshore Segments

The onshore (includes transition zone) pipeline segments (buried segments) are evaluated using B31.4, Section 402. B31.4 calculations take into account hoop stress, longitudinal stress from thermal, pressure and bending loads, and torsion stress. Since the onshore pipeline is buried, the pipeline is considered restrained.

As-Installed Stress Evaluation:

The onshore pipeline segments are fully supported and restrained by soil backfill. The onshore pipeline stress is summarized in Table 8 (winter install) and Table 9 (summer install).

Pipeline Pressure Condition	Internal Pressure	Hoop Stress	Thermal Stress	Longitudinal Stress	Combined Stress
Normal Operation	400 psig	3,420 psi	-7,540 psi	-6,024 psi	9,444 psi
Design (600# ANSI)	1,480 psig	12,652 psi	-7,540 psi	-1,932 psi	14,584 psi
Hydrotest (1.25*Design)	1,850 psig	15,815 psi	-7,540 psi	-530 psi	16,346 psi
ASME Allowable Stresses		37,440 psi	46,800 psi	46,800 psi	46,800 psi

Table 8: Onshore Stress Summary – 0F Install Temp, 40F Operating

Pipeline Pressure Condition	Internal Pressure	Hoop Stress	Thermal Stress	Longitudinal Stress	Combined Stress
Normal Operation	400 psig	3,420 psi	7,540 psi	9,056 psi	7,920 psi
Design (600# ANSI)	1,480 psig	12,652 psi	7,540 psi	13,148 psi	12,907 psi
Hydrotest (1.25*Design)	1,850 psig	15,815 psi	7,540 psi	14,550 psi	15,222 psi
ASME Allowable Stresses		37,440 psi	46,800 psi	46,800 psi	46,800 psi

Table 9: Onshore Stress Summary – 70F Install Temp, 30F Operating

The hoop, thermal, longitudinal, and combined stresses are all well within allowable stresses for the onshore and transition pipeline segments.

7.3 Minimum Wall Thickness Summary

The CIPL Marine A 10 pipeline onshore and subsea segments have wall thickness in excess of that required by code. A corrosion allowance is not required per CFR or ASME, however excess wall thickness provides some additional reservice strength to allow for some wall loss and still meet code. The exterior of the pipeline is coated and protected by cathodic protection, so external wall loss is risk is mitigated.

For the subsea portion, the minimum wall is based on the design pressure of 1,480 psig and a 50' free span condition with 3-1/2" of weight coat, which results in the highest longitudinal and combined stress loading.

For the onshore segment, the minimum wall is based on the hoop stress due to the design pressure of 1,480 psig since longitudinal stresses and combined stresses are comparatively insignificant for the buried condition.

Pipeline Segment	Nominal Wall Thickness	Minimum Wall Thickness
Subsea (50' free span)	0.594"	0.27"
Onshore and Subsea Grounded	0.594"	0.21"

Table 10: Minimum Wall Thickness Summary

7.4 Design Summary

After the conversion of service from natural gas to crude oil, the CIPL Marine A 10 Pipeline will remain within allowable stresses defined in 49 CFR 195 and ASME B31.4 through the range of loads that are expected and prescribed by code.

End of Document

CIPL Cross Inlet Extension Project

Conversion of Service:

LP CIGGS to CIPL E 10

Basis of Design

Public Document

Hilcorp Alaska, LLC

HARVEST PIPELINE

Revision History

Rev	Date	Description	Author	Review	Approval
A	08/02/18	Issued for Review	W. Veelman	L. Bolling	T. SlatonBarker

ATTACHMENT A2

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1.0 Abbreviations

AAC	Alaska Administrative Code
API	American Petroleum Institute
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
BBL	barrels
BPH	barrels per hour
CFR	Code of Federal Regulations
CIGGS	Cook Inlet Gas Gathering System
CIPL	Cross Inlet Pipeline
CP	Cathodic Protection
F	Fahrenheit
lbs	pounds
MAOP	Maximum Allowable Operating Pressure
MOP	Maximum Operating Pressure
mil	one thousandth of an inch
NACE	National Association of Corrosion Engineers
psi	pounds per square inch
psia	pounds per square inch atmospheric
psig	pounds per square inch gauge
SCADA	Supervisory Control and Data Acquisition
SDV	Shutdown Valve
USGS	United States Geological Survey

2.0 Project Overview

The Low Pressure (LP) CIGGS pipeline is an existing 10" nominal onshore pipeline that will be converted from natural gas service to crude oil service between Station O and the KPL Oil Facility (KPLO). This work is part of an overall project, called the CIPL Cross Inlet Extension Project, that modifies the oil and gas pipeline systems in the Cook Inlet region in order to eliminate the need for Drift River Terminal and overwater transportation of crude oil.

As part of the CIPL Cross Inlet Extension Project, the existing LP CIGGS pipeline between Station O and KPLO, currently in natural gas service, will be converted to crude oil service. After conversion to oil service, LP CIGGS segment will become part of the CIPL E 10 pipeline.

The CIPL E 10 pipeline will be composed of three sections in order to transport crude oil from the East Forelands facility to KPLO facility.

1. The first section is a new 10" buried pipeline that connects East Forelands facility to Station O facility. The basis of design for this new section is in a separate document for the CIPL E 10.
2. The second section is composed of the existing 10" LP CIGGS, converted from natural gas service to crude oil service, which connects Station O facility to the LP CIGGS/KPLO tie-in. This document is the basis of design for the conversion of service. Once it is converted to oil service, the LP CIGGS pipeline will be renamed the CIPL E 10.
3. The third section is a new 10" buried pipeline that connects the existing LP CIGGS to KPLO facility. The basis of design for this new section is in a separate document for the CIPL E 10.

Figure 1: Location of LP CIGGS in Nikiski, AK

2.1 System Design

The conversion of the existing LP CIGGS to the CIPL E 10 is required to provide a segment in the new pipeline system for crude oil produced on the West Side of Cook Inlet to be delivered to the Andeavor refinery without the use of barges. The existing LP CIGGS pipeline will be connected to new crude oil pipelines at Station O and at KPLO to complete the pipeline circuit for crude oil to flow from the west side production facilities to Andeavor.

The LP CIGGS pipeline is designed to flow crude oil from north (Station O) to south (KPLO). Surface facilities at Station O include a manual valve for isolation. Surface facilities at KPLO include shutdown valves, pig trap, metering and pressure control valves.

2.2 Pipeline Length

The section of existing LP CIGGS that will be converted to oil service from Station O to the KPLO/LP CIGGS Tie-in is 19,920 feet (3.77 mi) and has a volume of 11,383 cubic feet (85,457 gallons; 2,035 bbls) at standard pressure.

2.3 Pipeline Construction

The LP CIGGS pipeline was constructed in 1972 using 10-inch nominal, API 5L-X52, 0.250-inch wall, double submerged arc welded (ERW) pipe. The LP CIGGS was originally constructed to transport low pressure oil well gas from MGS and Granite Point Platforms to Collier Carbon and Chemical (now known as Agrium). The pipeline was used as a bi-directional gas transmission pipeline. The LP CIGGS pipeline is currently classified, per USDOT, as a Gas Transmission pipeline. The pipeline crosses Class 1, 2, and 3 locations, as defined by 49 CFR 192.5.

The pipeline materials purchase documents (MTR's, construction specifications) indicate the existing LP CIGGS pipeline material is 10.75" OD, 0.250" wall, Grade 5LX-52 ERW Line Pipe that conforms to API Specification for High Test Line Pipe, API Std 5LX 18th Edition, dated April 1971. Product Specification Levels (PSL) were not included in the API specifications in 1971 - they were added in the late 1990's after the specification was changed from 5LX to API 5L Specification for Line Pipe.

The pipe was supplied by Republic Steel. Table 1 compares the pipe MTR information to current PSL specifications.

Criteria	Existing Pipe MTR	API 5L PSL-2	API 5L PSL-1
Carbon % max	0.22	0.18	0.28
Manganese % max	0.96	1.40	1.40
Silicon % max	na	0.45	na
Phosphorus	0.011	0.025	0.03
Sulfur % max	0.040	0.015	0.03
Max Yield	70,360 psi	76,900 psi	na
Toughness	na	20 ft-lbs at design temp	na

Table 1: Existing Pipeline Material Specifications

Currently the LP CIGGS is not flowing gas, but does have approximately 20 psig of natural gas in the pipeline, and has been maintained to CFR 192 standards.

2.4 Pressure Test

The LP CIGGS pipeline was successfully hydrotested after construction on August 26, 1972. The test was performed for 24 hours with a minimum recorded pressure of approximately 2,200 psig.

The pipeline was pressure tested for an integrity assessment on October 16 and 17, 2015. The pipeline was pneumatically tested for 8 hours to a minimum pressure of 448 psig.

Prior to conversion to liquid service, the LP CIGGS (CIPL East 10) pipeline from Station O to the KPLO/LP CIGGS Tie-in will be hydrotested per CFR 195 and ASME B31.4 to at least 1,850 psig (1.25 x design pressure) for 8 hours to confirm mechanical integrity.

2.5 Pipeline Integrity History

There are no known records of any pipeline leaks on LP CIGGS pipeline. There are no known previous

repairs on the LP CIGGS.

2.6 MOP Verification

Pending confirmation by hydrostatic testing, a MOP of 1,480 psig will be established.

2.7 Normal Operating Pressure

The pressure source of the pipeline is the GPTF booster pumps, which will be normally operated between 300 psig and 600 psig. Due to hydraulic pressure losses in the pipeline system, the pipeline will experience pressures less than the booster pump pressure range. The normal operating pressure will not exceed 600 psig.

Based on the CIPL pipeline system hydraulic calculations, the typical operating pressure at the design high flow range will be about 400 psig.

3.0 Jurisdiction and Criteria

The pipeline is used for transportation of crude oil, so falls under the Office of Public Safety regarding design criteria for evaluation of the existing pipeline for the new service condition.

The Office of Public Safety, references 49 CFR Part 195 – Transportation of Hazardous Liquids by Pipeline, revised as of October 1, 2011 for crude oil transmission pipelines.

CFR Part 195 references ASME B31.4 – Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids, October 2006, for design of pipelines subject to external loads. B31.4 has been updated since 2006, and this evaluation uses the 2012 Edition.

4.0 Pipe Properties

The pipeline is coated with enamel and wrapped. Pipeline joints are triple random. Pipeline properties are summarized in Table 2 below.

Item	Value	Notes
Grade	5L-X52 ERW	
Outside Diameter, Do	10.75”	
Inside Diameter, Di	10.25”	
Wall thickness, t	0.250”	
Area, A	8.2 in2	
Elastic Section Modulus, Z	21.2 in3	
Weight / foot (empty)	30.1 lb/ft	Includes 2.0 lb/ft coating
Weight / foot (full of oil)	61.2 lb/ft	Includes 31.1 lb/ft oil
Weight / foot (full of water)	65.9 lb/ft	Includes 35.8 lb/ft water
Outside Diameter (Coated)	11.0”	Includes coatings

Table 2: Pipeline Properties

5.0 Pipeline Design

5.1 Structural Pipeline Design

For conversion from natural gas to crude oil service, the existing LP CIGGS (CIPL East 10) pipeline has been evaluated using design criteria from 49 CFR 195 and ASME B31.4. The evaluation determined the existing pipeline will remain within allowable stress through the range of operating loads that are expected and prescribed by the codes. See Section 6.0 for the loading scenarios for the design of the pipeline.

5.2 Geotechnical

The pipeline is buried between Station O and KPLO/LP CIGGS Tie-in. Soils along the pipeline route are typically glacial deposits consisting of gravelly sand.

5.3 SCADA, Communications and Control System

The LP CIGGS (CIPL E 10) pipeline will be monitored and controlled through Hilcorp's existing SCADA system. The primary control and operations center for the pipeline is located at the Kenai Gas Field facility. The backup control room is located at KPL Junction.

The SCADA system will enable pipeline operators to efficiently and effectively supervise pipeline operations in real time. Data acquisition and storage will be provided, along with provision for report generation using historical data. Data retention and management will comply with applicable federal and state regulatory requirements. Additionally, some control functions will be provided through the system to allow for manual operational control and testing when necessary.

The SCADA system scan rate will be fast enough to minimize overpressure conditions, provide very responsive abnormal operation indications to controllers and detect small leaks within technology limitations.

The SCADA system will incorporate a real-time database and historian. The information on these databases will be used to generate operations reports and trends.

The SCADA system will send necessary information to a business database/historian. The information on this historian will be used to file reports to outside entities such as government regulators and provide information for business analysis.

The SCADA system will collect measurements and data along the pipeline, including flow rate through the pipeline, operational status, pressure, and temperature readings. This information may all be used to assess the status of the pipeline. The SCADA system will provide pipeline personnel with real-time information about equipment malfunctions, leaks, or any other unusual activity along the pipeline.

5.4 Operating Philosophy and Valve Configuration

Flow of crude oil is introduced into the LP CIGGS (CIPL E 10) through the pipeline booster pumps located at Granite Point Tank Farm (GPTF). The pipeline pressure downstream of the pumps and pig trap at GPTF is monitored by pressure transmitters located at GPTF and Kaloa Junction that have high (500 psig), high high (800 psig), low (80 psig) and low low (50 psig) alarms. A high high pressure condition results in a shutdown of the pipeline by closing automated shutdown valves located at East Forelands and KPL Junction, which isolates the CIPL East 10 pipeline segment.

5.5 Leak Detection Systems

The CIPL pipeline leak detection system will include two separate leak detection technologies consisting of a statistical mass balance leak detection system and a wave rarefaction model leak detection system.

5.5.1 Mass Balance

Atmos Pipe leak detection system is a statistical volume balance leak detection system that provides a very accurate method of detecting smaller leaks over a longer period of time or larger leaks over a short period of time. Operational experience at other Alaska oil pipelines using the Atmos Pipe system has verified it provides a highly reliable and accurate method of leak detection on crude oil pipelines in similar oil production service.

Flow Meters carefully monitor inlet and outlet flows of the pipeline system for comparison of these values. Differences would indicate possible leaks. A statistical mass balance leak detection computer modeling system ties into the SCADA system that monitors the pipeline flow and generates predictable flow patterns over time. Disturbances such as those caused by temperature variations or varying flow or operating pressure are measured and masked out as "noise."

5.5.2 Wave Refraction

Complementing this, Atmos Wave is suited to identify larger leaks in a shorter period of time and is also able to identify the leak location. The Atmos Wave Leak Detection System is based on the detection of the negative pressure waves associated with the onset of a leak or theft. These rarefaction waves propagate out from the location of the release in both directions and can be sensed by high performance pressure meters at the ends or along the pipeline. The basic principle is simple, and it is used to detect and locate very large leaks using normal pressure meters. Unfortunately, when this principle is applied to very small leaks, the sensors detect not only the leak but also the large number of pressure changes that are part of normal pipeline operations and this causes a large number of false alarms on this type of system.

Atmos Wave is the result of several years of research and development directed at producing pressure-based leak detection system that is based on state-of-the-art hardware and telecommunication technology. A thorough review of the performance problems of the traditional systems leads to the decision to develop a completely new approach. This new approach is extremely successful. It examines all aspects of the negative pressure wave front and its propagation through the entire pipeline length. Three comprehensive algorithms filter out noise, arrange the analog pressure data into a detailed 3-dimensional map that allows the system to differentiate true leak/theft events from the pressure changes caused by transient operation. Extensive performance evaluation and field trials have proven that Atmos Wave consistently differentiates opening and closing leak/theft signals during transients. These remarkable algorithms have been rigorously tested in operational pipelines with great success.

In combined mode, Atmos Pipe acts as the primary leak detection system aided by Atmos Wave. Both leak detection systems run independently of each other. If one system fails, the other system will continue leak detection. Atmos Wave provide the Atmos Pipe System with the ability to detect leaks more quickly and provide a more accurate leak location.

5.5.3 Control Room Monitoring

In addition, the Harvest Kenai Control Room is manned 24 hours per day and the operator on duty constantly monitors pipeline transfer operations via the SCADA system. In addition, the controller takes readings to compare the accumulated totals for CIPL and compares with what has been received at KPLO. These readings are recorded by the SCADA historian.

5.6 Corrosion Control and Monitoring

The LP CIGGS has a corrosion control system, provided by protective coatings and cathodic protection (CP). The pipeline coatings used are enamel and felt or enamel and glass fiber wrap. Cathodic protection is provided to the LP CIGGS pipeline by an impressed current cathodic protection system located at East Forelands. CP surveys and system maintenance are performed annually.

6.0 Pipeline Loading Scenarios

Loads on the LP CIGGS pipeline include both pressure loading cases and other loading cases. Loads are combined as prescribed by code.

6.1 Pressure Load Scenarios

The pipeline will be subject to various pressure loading summarized as follows:

- Normal Operating Pressure: 400 psig (based on pipeline hydraulic calculations for design high flow range)
- Design Internal Pressure (Maximum Operating Pressure): 1,480 psig
- Hydrostatic Test Pressure: 1,850 psig (1.25 * Design Internal Pressure)

6.2 Other Loading Scenarios

The pipeline segments will be subject to non-pressure loading conditions, including:

6.2.1 Installation Load

Pipeline was installed by conventional trenching / cover methods. No unusual installation loads are included.

6.2.2 External Pressure Load

14 psia to 22 psia (surface to 10 feet maximum soil cover). External pressure loading is considered inconsequential, as the operating pressure of the pipeline is about 400 psig to 100 psig, depending on location. External pressure is ignored in the hoop stress calculations.

6.2.3 Thermal Loads

Thermal loads result from a change in temperature in the pipeline walls. This pipeline is buried and considered to be restrained. The stresses are evaluated for winter installation (0F) and summer installation (70F) and an operating temperature of 35F to cover the range of time allowed for construction. The oil in the pipeline is ground temperature as there is no heat added from process that effects the temperature of this pipeline.

6.2.4 Traffic Loads

Traffic Load (Operational Load): External pressure loading due to surface traffic over the pipeline. Pipeline is evaluated for traffic loading with no pavement and tandem axle configuration, based on API RP 1102, which is conservative. The pipeline has a minimum depth of bury of 4 ft.

6.2.5 Seismic Loads

The pipeline is located in Cook Inlet, an area of high seismicity. The pipeline route onshore does not cross any USGS mapped faults or folds. No specific seismic loads are applied to the pipeline for design.

7.0 Design Results

The pipeline meets the 49 CFR 195 requirements for hoop stress, summarized in Table 3.

Location	P per CFR	$P_{Operating}$	P_{Design}	P_{Hydro}
All	1,741 psig	400 psig	1,480 psig	1,850 psig

Table 3: 49 CFR 195 Design Results

It is acceptable for P_{Hydro} to exceed P_{CFR} as P_{Hydro} is a test condition and does not exceed the pressure required to yield the pipe.

7.1 Calculation Results

The pipeline is evaluated using B31.4, Section 402. B31.4 calculations take into account hoop stress, longitudinal stress from thermal, pressure and bending loads, and torsion stress. Since the pipeline is buried and fully supported, the pipeline is considered restrained, and is not subjected to bending or torsion loads.

As-Installed Stress Evaluation:

The pipeline is fully supported and restrained by soil backfill. The onshore pipeline stress is summarized in Table 4 (winter install) and Table 5 (summer install).

Pipeline Pressure Condition	Internal Pressure	Hoop Stress	Thermal Stress	Longitudinal Stress	Combined Stress
Normal Operation	400 psig	8,600 psi	-7,540 psi	-3,538 psi	12,138 psi
Design (600# ANSI)	1,480 psig	31,820 psi	-7,540 psi	7,269 psi	28,880 psi
Hydrotest (1.25*Design)	1,850 psig	39,775 psi	-7,540 psi	10,971 psi	35,581 psi
ASME Allowable Stresses		37,440 psi	46,800 psi	46,800 psi	46,800 psi

Table 4: Onshore Stress Summary – 0F Install Temp, 40F Operating

Pipeline Pressure Condition	Internal Pressure	Hoop Stress	Thermal Stress	Longitudinal Stress	Combined Stress
Normal Operation	400 psig	8,600 psi	7,540 psi	11,542 psi	10,389 psi
Design (600# ANSI)	1,480 psig	31,820 psi	7,540 psi	22,349 psi	28,299 psi
Hydrotest (1.25*Design)	1,850 psig	39,775 psi	7,540 psi	26,051 psi	34,993 psi
ASME Allowable Stresses		37,440 psi	46,800 psi	46,800 psi	46,800 psi

Table 5: Onshore Stress Summary – 70F Install Temp, 30F Operating

The hoop, thermal, longitudinal, and combined stresses for the normal operating and design conditions are all well within allowable stresses for the pipeline.

Traffic Load Evaluation:

The traffic loading on the LP CIGGS pipeline pass the stress requirements of the API RP 1102 calculation. Cyclical, internal pressure and total effective stresses are all within allowable stress requirements.

7.2 Minimum Wall Thickness Summary

The LP CIGGS pipeline has wall thickness in excess of that required by code. A corrosion allowance is not required per CFR or ASME, however excess wall thickness provides some additional reserve strength to allow for some wall loss and still meet code. The exterior of the pipeline is coated and

protected by cathodic protection, so external wall loss is risk is mitigated.

The minimum wall is based on the hoop stress due to the design pressure of 1,480 psig since longitudinal stresses and combined stresses are comparatively insignificant for the buried condition.

Pipeline Segment	Nominal Wall Thickness	Minimum Wall Thickness
LP CIGGS Pipeline	0.25”	0.21”

Table 6: Minimum Wall Thickness Summary

7.3 Design Summary

After the conversion of service from natural gas to crude oil, the LP CIGGS (CIPL E 10) pipeline will remain within allowable stresses defined in 49 CFR 195 and ASME B31.4 through the range of loads that are expected and prescribed by code.

End of Document

ADL 232963

RIGHT-OF-WAY LEASE
FOR THE
CIGGS PIPELINE

BY AND
BETWEEN
THE STATE OF ALASKA
AND
HARVEST ALASKA, LLC

ATTACHMENT B

ADL 232963
CIGGS PIPELINE
RIGHT-OF-WAY LEASE

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ATTACHMENT B

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ATTACHMENT B

ADL 232963
CIGGS PIPELINE
RIGHT-OF-WAY LEASE

This Right-of-Way Lease (hereinafter "Lease") is entered into this ____day of _____ 2018, (hereinafter "Effective Date"), by the State of Alaska (hereinafter "State"), acting through the Commissioner of the Alaska Department of Natural Resources (hereinafter "Commissioner"), and by Harvest Alaska, LLC (hereinafter "Lessee").

1. Lease of Right-of-Way

(a) Pursuant to the provisions of AS 38.35, the Alaska Right-of-Way Leasing Act, as amended, and for and in consideration of the annual rental fee described in Section 3 of this Lease and subject to the covenants and conditions contained herein and the Stipulations attached hereto in Exhibit A and incorporated by reference herein, the State hereby grants by Lease to the Lessee, for a limited duration described in Section 2, a non-exclusive Right-of-Way Lease, only for the purposes described in Subsection (b) of this section, across, through, and upon those State Lands, and those lands now owned or hereafter acquired (hereinafter "Leasehold"), as shown and described in the incorporated alignment and site locations attached hereto as Exhibit B. The width and total acreage of the Leasehold will vary over the term of this Lease as described in Exhibit B.

(b) This Lease is granted for the purpose of conducting Pipeline Activities in compliance with the terms of this Lease, and all applicable State laws and regulations. Lessee shall not use the Right-of-Way or the land subject thereto for any other purpose and shall not locate or construct any other pipelines or other improvements within the Right-of-Way without prior approval.

(c) Except as otherwise provided herein, the Lessee shall not allow or suffer any other Person or entity to use the Leasehold for carrying on activities which are not part of the Lessee's authorized operations pursuant to this Lease. Nothing in this subsection is intended to excuse or preclude the Lessee from complying with its obligations under this Lease, or employing agents, employees, or Contractors to effect Pipeline Activities. This Lease is subject to any valid existing rights including rights of third parties and of State entities with authority over the Leasehold.

2. Duration

(a) This Lease shall expire on the _____ day of _____, 2038 (20 years from the Effective date) at 12 noon (Alaska Time), unless prior thereto it is released, abandoned, or otherwise terminated pursuant to the provisions of this Lease or any applicable law or regulation.

(b) The Lessee shall give written notice to the Commissioner of its intent to seek renewal of this Lease no later than two (2) years before expiration. The Commissioner shall, upon request of the Lessee, renew the Lease for additional terms of up to thirty (30) years, but not less than ten (10) years each, so long as the Pipeline is in commercial operation and Lessee is in compliance with:

(1) all terms of the Lease;

(2) all State, Federal, and local laws, including but not limited to State law pertaining to regulation and taxation of the Pipeline; and

(3) any agreement(s) between the State and the Lessee pertaining to regulation and taxation of the Pipeline.

(c) The Lessee shall provide, at a minimum, one hundred eighty (180) days notice to the Commissioner prior to any relinquishment, abandonment, or other Termination of this Lease.

(d) Upon the expiration of the Lease term (including any renewal thereof), or upon its earlier forfeiture, relinquishment, abandonment, or other Termination, the provisions of this Lease, to the extent applicable, shall continue in effect and shall be binding on the Lessee, its successors, and assigns, until they have fully performed their respective obligations and liabilities under the Lease. Within 90 days of a request by Lessee following the expiration, forfeiture, relinquishment, abandonment, or other Termination of this Lease, upon a Decision that the State's best interest shall be served, the Commissioner shall release the Lessee from all or a portion of such continuing obligations and liabilities, with the exception of those contained in Section 8(m) and Section 9 herein.

3. Rental

(a) The Lessee shall pay to the State annual rental payments in the amount of **$12,820**. This rental amount shall be adjusted based on a formal appraisal conducted on or before one (1) year after the Effective Date of this Lease.

(b) The annual rental payment is subject to adjustment by the State five years from the Effective Date of the Lease, as set out in Section 4(a) of this Lease, and every fifth Lease Anniversary Date thereafter. The adjusted rental payment shall be based on the appraised fair market rental value of the Leasehold. The adjusted annual rental payment takes effect on the applicable Lease Anniversary Date, regardless of whether the adjustment determination occurs before or after the applicable Lease Anniversary Date.

(c) The initial formal appraisal, and all subsequent reappraisals, shall be carried out by an independent appraiser selected by the Lessee from a list of appraisers provided by the Department of Natural Resources. All costs of the initial formal appraisal, and of all subsequent reappraisals, shall be borne by the Lessee.

(d) To relinquish, abandon or terminate any right or interest in the Leasehold prior to expiration of this Lease the Lessee shall refer to Section 26 of this Lease. Upon receipt of the Commissioner's approval of all of the requirements under Section 26(e) of this Lease, and for the remainder of the term of this Lease and any subsequent renewals, Lessee shall pay to the State annual rental payments in the amount of the annual fair market rental of the Leasehold based on the appraised fair market rental value of the Leasehold.

(e) The Lessee's rental obligations described in this section shall survive the expiration, forfeiture, relinquishment, abandonment, or other Termination of this Lease, and shall continue until all of the Lessee's obligations described in Section 27 and Section 28 of this Lease, whichever is applicable, have been approved by the Commissioner.

(f) Any interest in land acquired under the provisions of AS 38.35.130 for the Pipeline shall become part of the Leasehold, and the costs for the acquisition thereof shall be borne by the Lessee. Rental shall not be charged for any land acquired under AS 38.35.130 and conveyed without cost to the State.

4. Payment

(a) The initial rental payment is due and shall be tendered on or before the Effective Date of the Lease. Subsequent rental payments shall be due annually on or before each Lease Anniversary Date.

(b) All payments to the State under this Lease shall be made payable to the State in the manner directed by the State, and unless otherwise specified, shall be tendered to the State at:

Alaska Department of Natural Resources
Attention: Financial Services
550 West 7th Avenue, Suite 1410
Anchorage, Alaska 99501-3561

or, to any other depository designated by the State. If the State changes the designated depository, it shall give at least sixty (60) days written notice to the Lessee in the manner provided in Section 29 herein.

(c) The Lessee shall pay the fee set forth in 11 AAC 05.030(a)(1) for any late payment or 11 AAC 05.030(a)(2) for any returned check issued by the Lessee. Interest at the rate set by AS 45.45.010(a) shall be assessed on all past due amounts until payment is tendered to the State.

5. Denial of Warranty

(a) The State makes no representations or warranties, express or implied, as to title to, access to, or quiet enjoyment of the Leasehold. The State is not liable to the Lessee for any deficiency of title to or difficulty in securing access to the Leasehold. The Lessee or any successor in interest to the Lessee is not entitled to any refund of prior rentals paid under this Lease due to deficiency of title.

(b) The State makes no warranty, express or implied, and assumes no liability whatsoever, regarding the social, economic, or environmental aspects of the Leasehold granted herein, including, without limitation, the soil conditions, water drainage, access, natural or artificial hazards that may exist, or the profitability or fitness of the Leasehold granted herein for any use. The Lessee represents that the Lessee has inspected the Leasehold granted herein and determined that the Leasehold is suitable for the use intended, or has voluntarily declined to do so, and accepts the State Lands included in the Leasehold granted herein "as is" and "where is".

6. Reservation of Certain Rights to the State

(a) The State reserves and shall have a continuing and reasonable right of access to any part of the Leasehold (including the subsurface of, and the air space above, such Leasehold) and a continuing and reasonable right of physical entry to any part of the Pipeline, including Federal and private lands, for inspection or monitoring purposes and for any other purpose or reason that is consistent with any right or obligation of the State.

(b) The right of access and entry reserved in Subsection (a) of this section shall extend to and be enjoyed by any Contractor of the State designated by the Commissioner in writing. Such written designation shall be provided to the Lessee. The Commissioner and the Lessee may mutually develop additional procedures to implement this subsection.

(c) The granting of this Lease is subject to the express condition that the exercise of the rights and privileges granted under this Lease will not unduly interfere with the management, administration, or disposal by the State of the land affected by this Lease. The Lessee agrees and consents to the occupancy and use by the State, its grantees, permittees, or other Lessees of any part of the Right-of-Way not actually occupied or required by the Pipeline for the full and safe utilization of the Pipeline, for necessary operations incident to land management, administration, or disposal.

(d) The State reserves the right to grant additional permits, leases, or easements for rights-of-way or other uses to third parties that include lands subject to the Leasehold; provided that such grant shall not unreasonably interfere with the Lessee's rights under this Lease.

(e) This Lease is subject to the reservations set forth in AS 38.05.125 as such statutes exist on the Effective Date of this Lease.

7. Access to Navigable and Public Waters

The State reserves a public access easement to and along all public or navigable water bodies or waterways that border on or are included in the State Lands included in the Leasehold. No public access easement may be obstructed or otherwise rendered incapable of reasonable use for the purposes for which it was reserved. The Lessee shall not petition to vacate, abandon, or extinguish any public access easement without the prior written approval of the Commissioner.

8. Covenants of Lessee

The Lessee expressly covenants, in consideration of the rights acquired by it pursuant to this Lease, that:

(a) Lessee shall assume the status of and will perform all of its functions undertaken under this Lease as a common carrier and will accept, convey, and transport without discrimination Oil delivered to it for transportation from fields in the vicinity of the Pipeline throughout its route on State Land obtained under this Lease and on other land; Lessee will accept, convey, and transport Oil without unjust or unreasonable discrimination in favor of one producer or Person, including itself, as against another but will take the Oil delivered or offered, without unreasonable discrimination, that the Regulatory Commission of Alaska or its successor with jurisdiction over common carrier pipelines shall, after a full hearing with due notice to the interested parties and a proper finding of facts, determine to be reasonable in the performance of its duties as a common carrier;

(b) Lessee will interchange Oil with each like common carrier and provide connections and facilities for the interchange of Oil at every locality reached by both pipelines when the necessity exists, subject to rates and regulations made by the appropriate State or Federal regulatory agency;

(c) Lessee will maintain and preserve books, accounts, and records and will make those reports that the State may prescribe by regulation or law as necessary and appropriate for the purposes of administering AS 38.35;

(d) Lessee will accord at all reasonable times and places to the State and its authorized agents and auditors the right of access to its property and records, of inspection of its property, and of examination and copying of records;

(e) Lessee will provide connections, as determined by the Regulatory Commission of Alaska or its successor with jurisdiction over common carrier pipelines, under AS 42.06.340, to facilities on the Pipeline subject to this Lease, both on State Lands and other land in the State, for the purpose of delivering Oil to Persons (including the State and its political subdivisions) contracting for the purchase at wholesale of Oil transported by the Pipeline when required by the public interest;

(f) Lessee shall, notwithstanding any other provision, provide connections and interchange facilities at State expense at such places the State considers necessary, if the State determines to take a portion of its royalty or taxes in Oil;

(g) Lessee will construct and operate the Pipeline in accordance with applicable State laws and lawful regulations and orders of the Regulatory Commission of Alaska or its successor with jurisdiction over common carrier pipelines;

(h) Lessee will, at its own expense, during the term of this Lease

(1) maintain the Leasehold and Pipeline in good repair;

(2) promptly repair or remedy any damage to the Leasehold;

(3) promptly compensate for any damage to or destruction of property for which the Lessee is liable resulting from damage to or destruction of the Leasehold or Pipeline;

(i) As more fully set out in Section 25 of this Lease, Lessee will not transfer, assign, or dispose of, in any manner, directly or indirectly, or by transfer of control of the Lessee, its interest in this Lease, or rights under this Lease or a Pipeline subject to this Lease to a Person other than another owner of the Pipeline (including subsidiaries, parents, and affiliates of the owners), except to the extent that the Commissioner, after consideration of the protection of the public interest (including whether the proposed transferee is fit, willing, and able to perform the transportation or other acts proposed in a manner that will reasonably protect the lives, property, and general welfare of the people of Alaska), authorizes; the Commissioner shall not unreasonably withhold consent to the transfer, assignment, or disposal;

(j) Lessee will file with the Commissioner a written appointment of a named permanent resident of the State of Alaska to be its registered agent in Alaska and to receive service of notices, regulations, Decisions, and Orders of the Commissioner; if it fails to appoint an agent for service, service may be made by posting a copy in the office of the Commissioner, filing a copy of it in the Office of the Lieutenant Governor, and by mailing a copy to the Lessee's last known address;

(k) The applicable law of the State of Alaska will be used in resolving questions of interpretation of this Lease;

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(l) The granting of this Lease is subject to the express condition that the exercise of the rights and privileges granted under this Lease will not unduly interfere with the management, administration, or disposal by the State of the land affected by this Lease, and that Lessee agrees and consents to the occupancy and use by the State, its grantees, permittees, or other Lessees of any part of the Leasehold not actually occupied or required by the Pipeline for the full and safe utilization of the Pipeline, for necessary operations incident to land management, administration, or disposal;

(m) As more fully set out in Section 9 of this Lease, Lessee will be liable to the State for damages or injury incurred by the State caused by the Construction, Operation, or Maintenance of the Pipeline and Lessee will indemnify the State for liabilities or damages;

(n) Lessee will procure and furnish liability and property damage insurance from a company licensed to do business in the State or furnish other security or undertaking upon the terms and conditions the Commissioner considers necessary if the Commissioner finds that the net assets of the Lessee are insufficient to protect the public from damage for which the Lessee may be liable arising out of the Construction or Operation of the Pipeline.

9. Indemnity

(a) The Lessee assumes all responsibility, risk, and liability for its Pipeline Activities and use of or contact with the Leasehold. The Lessee shall defend, indemnify, and hold harmless the State, its agents and employees, from and against any and all demands, causes of action (whether in the nature of an action for damages, indemnity, contribution, government cost recovery or otherwise), fines, judgments, suits, claims, actions, proceedings, losses, costs (including reasonable attorneys' fees and costs), expenses, charges, forfeitures, liens, liabilities, settlements, penalties, and damages of any kind or nature whatsoever, including, but not limited to those alleging personal injury, wrongful death, nuisance property damage, environmental contamination (including any disposal, release, spill or discharge or any threatened disposal, release, spill, or discharge of or contamination by Hazardous Materials), and environmental noncompliance (including the Lessee's failure to provide all information, make all submissions, and take all steps required by the authority under the environmental laws or any other law concerning any spill, discharge, or contamination), arising out of, in connection with, directly or indirectly from, or otherwise incident to, Lessee's Pipeline Activities or use of or contact with the Leasehold, except to the extent the sole legal cause of the injury or damage is the negligence or willful misconduct of the State or anyone acting on the State's behalf.

(b) The State shall tender, and the Lessee shall accept the tender by the State of any such cause of action, lawsuit, or other proceeding brought against the State which is covered by Subsection (a) of this section. Subject to the last sentence in this subsection, any reasonable attorneys' fees or costs incurred by the State prior to such tender of defense shall be the complete and sole responsibility of Lessee, so long as the tender is covered by Subsection (a) of this section. If the State tenders such cause of action, lawsuit, or other proceeding later than twenty (20) days after service on the State, and the Lessee informs the State that the delay in tendering shall require Lessee to incur additional costs in order to respond in a competent and timely manner, and the State is unable to obtain an extension of time sufficient to provide Lessee with at least one-half of the number of days which the State originally had to respond, then the State shall reimburse Lessee for documented, reasonable costs incurred by the Lessee that are directly related to the delay in tendering and the State shall bear its attorneys' fees and costs prior to the tender.

(c) The obligations of the Lessee to indemnify the State under the terms of this Lease shall survive the transfer, assignment, or other disposition of the Lessee's interest in this Lease as well as the

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expiration, forfeiture, relinquishment, abandonment or other Termination of this Lease to the extent the obligation(s) arose during that Lessee's tenure as the leaseholder.

10. Lessee's Contractors, Agents and Employees

(a) Lessee shall require that all of its Contractors conducting Pipeline Activities on the Leasehold:

(1) indemnify the State and extend all its Contractors' indemnities to include the State as an additional named indemnitee;

(2) name the State of Alaska as additional insured on all liability insurance policies maintained under their contracts with Lessee; and

(3) obtain an appropriate waiver of subrogation in favor of the State with respect to all other insurance policies.

(b) Unless clearly inapplicable, the requirements and prohibitions imposed upon the Lessee by this Lease are also imposed upon the company's agents, employees, and Contractors. The Lessee shall ensure compliance with this Lease by its agents, employees and Contractors.

(c) Any material failure or refusal of the Lessee's agents, employees, or Contractors to comply with the Lease or Stipulations shall be deemed to be the failure or refusal of the Lessee.

11. Guaranty and State as Additional Insured

(a) The Commissioner shall not issue a Written Authorization for the Lessee to initiate any Pipeline Activities under this Lease prior to the Commissioner's receipt from the Lessee of an unconditional guaranty, meeting all requirements of this section, guaranteeing the performance of all of Lessee's duties and obligations under and by virtue of this Lease.

(b) The guarantor's unconditional guaranty shall be in a form approved by the Commissioner, and shall be attached to this Lease as Exhibit C. If the Commissioner determines at any time that the guaranty is insufficient to satisfactorily guarantee the performance of all the Lessee's duties, obligations, and potential liabilities under and by virtue of this Lease, the Commissioner may require the substitution and delivery of a supplementary guaranty or other security from Lessee or from a substitute guarantor or insurer, with any provisions the Commissioner reasonably finds necessary.

(c) The Lessee may change the guarantor at any time, provided the Commissioner, in his or her sole discretion, approves the substitution.

(d) Lessee shall submit, on an annual basis, guarantor's annual financial statement and balance sheet, or such financial documentation of any required substitute guarantor, that the Commissioner requests. Lessee may submit such information on a confidential basis in accordance with applicable State Statutes.

(e) As set forth in Section 8(n) the Lessee, shall obtain commercially available insurance coverage for the Leasehold and the Lessee's activities in, on or related to the Leasehold. The Lessee shall

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cause the State to be named as an additional insured on all such insurance policies obtained and maintained by the Lessee, except that such insurance coverage shall not cover or apply where the proximate cause of the injury or damage is the gross negligence or reckless or willful misconduct of the State or anyone acting on behalf of the State. Any commercially available insurance purchased by Lessee under this section shall not be construed to limit in any way the Lessee's liabilities or responsibilities under this Lease.

12. Timely Operation

Lessee shall begin Operation of the Pipeline ~~System~~ as a common carrier within one (1) year of the effective date of this Lease unless otherwise approved through a Decision.

13. Conduct of Operations

(a) The Lessee shall perform all Pipeline Activities under this Lease in a lawful, prudent, and skillful manner in compliance with the terms and conditions of this Lease, its incorporated exhibits, and all required permits.

(b) The Lessee shall prevent or, if the procedure, activity, event or condition already exists or has occurred, shall abate, as completely as practicable, any physical or mechanical procedure, activity, event or condition:

(1) that is susceptible to prevention or abatement;

(2) that arises out of, or could adversely affect, Pipeline Activities; and

(3) that causes or threatens to cause

a) a hazard to the safety of workers or to the public health or safety (including but not limited to personal injury or loss of life with respect to any Person(s); or

b) immediate, serious, or irreparable harm or damage to the environment (including but not limited to water and air quality, areas of vegetation, fish or other wildlife populations or their habitats, or any other natural resource).

14. Protection of Private and Public Property Interests

The Lessee shall provide reasonable protection to public or private improvements on State Land, which may be adversely affected by Pipeline Activities. If the Commissioner determines that the Lessee has caused damage to such public or private improvements, and if the owner of such improvements so requires, then the Lessee shall promptly repair or reimburse the owner for reasonable costs in repairing such improvements to a condition which is reasonably satisfactory to the owner, but which does not exceed the improvements' condition prior to damage. This section does not limit in any way the legal or equitable remedies that may be available to a public or private owner of improvements on State Land.

15. Taxes and Liens on Leasehold

(a) During the term of this Lease, Lessee shall pay any and all real property taxes, assessments, and similar charges levied by the State, any municipality, or any other governmental entity upon the interest in the Leasehold granted to Lessee by this Lease, subject to any rights Lessee may have to appeal or protest such taxes, assessments or charges. In no event shall Lessee permit or allow its interest in the Leasehold granted by this Lease to be lost or the State's title to the Leasehold to be clouded or encumbered as a result of the nonpayment of any such taxes, assessments, or charges.

(b) During the term of this lease, Lessee shall pay for all labor and services performed upon or materials furnished to the Leasehold by, for, or at the request of Lessee. Lessee shall keep its interest in the Leasehold granted by this lease and the State's title to and interest in the Leasehold free and clear of any and all liens, including but not limited to, mechanic's, mining, labor, or materialmen's liens, arising out of or resulting from the performance of labor or services upon or the furnishing of materials to the Leasehold by, for, or at the request of the Lessee, except those liens arising by operation of law for which payment is not yet due. Lessee shall have the right to contest, in the courts or otherwise, the validity or amount of any such lien that may be filed. The Lessee shall post and record notices of nonresponsibility for the benefit of the State pursuant to AS 34.35.065 and AS 34.35.150 and any other similar applicable laws.

(c) During the term of this Lease, the Lessee shall not allow the State's title to or interest in the Leasehold to be encumbered by any judgments entered by a court of law against Lessee or Lessee's Contractors. If a lis pendens is filed arising from pending or actual litigation against Lessee or its Contractors that encumbers or purports to encumber the State's title to or interest in any lands within the Leasehold, Lessee shall diligently and with best efforts seek to effect immediate removal of that lis pendens.

16. Permits

The Lessee shall obtain all required Federal, State, and municipal permits and other authorizations for a particular activity prior to that activity taking place. The Lessee shall maintain those permits and authorizations in good standing for so long as they are required for activities conducted pursuant to rights granted under this Lease.

17. Orders by the Commissioner

(a) The Commissioner may issue any Order necessary to enforce or implement any provision of this Lease.

(b) All Orders of the Commissioner shall be in writing; however, if in the judgment of the Commissioner there is an emergency that necessitates the immediate issuance of an Order, such Order may be given orally with subsequent confirmation in writing as soon as possible thereafter, but not later than seventy-two (72) hours.

(c) The Lessee shall comply with all lawful Orders directed to the Lessee by the Commissioner or by any duly authorized representative.

18. Modification

The Commissioner may Order the Lessee to make such practicable modification to the design of the Pipeline as the Commissioner determines is necessary to:

(1) protect or maintain stability of the foundation and other earth materials;

(2) protect or maintain integrity of the Pipeline;

(3) control or prevent significant damage to the environment (including but not limited to water and air quality, areas of vegetation, fish or other wildlife populations or their habitats, or any other natural resource); or

(4) remove hazards to public health and safety, including the activities of Lessee's agents, employees, and Contractors.

19. Information

The Commissioner may Order the Lessee at any time to furnish information related to Pipeline Activities. If the Lessee desires that records submitted to the State be kept confidential, the Lessee shall submit a request for confidentiality in writing to the Commissioner along with the statutory basis for its claim of confidentiality. The Commissioner shall retain records as confidential to the extent consistent with the Commissioner's authority to do so under applicable State statutes.

20. Right of the State to Perform

(a) The Lessee shall carry out, at the Lessee's expense, all lawful and reasonable Orders and Decisions of the State relative to the Lessee's occupation and use of the Leasehold within a reasonable time period under the circumstances. If, after thirty (30) days following the making of a demand by the Commissioner in the manner that is provided in this Lease, the Lessee, or its respective agents, employees, or Contractors, shall fail or refuse to perform any action required by this Lease or by the Commissioner under this Lease, the State shall have the right, but not the obligation, to enter the Leasehold and at the Lessee's expense, consistent with all applicable State and Federal laws and regulations, perform any or all of the following:

(1) repair damage;

(2) prevent imminent harm to workers;

(3) protect public health or safety; and

(4) prevent immediate, serious or irreparable harm or damage to the environment.

(b) The Commissioner shall submit to the Lessee a statement of the expenses reasonably incurred by the State of any required action taken pursuant to this section. The Lessee shall pay the amount shown within thirty (30) days of receipt of the statement.

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21. Temporary Suspension

(a) The Commissioner may, consistent with applicable State and Federal law, Order the temporary suspension of any or all Pipeline Activities, if:

(1) an immediate temporary suspension of the activity or the activities is necessary to protect:

i) public health or safety (including but not limited to personal injury or loss of life with respect to any Person(s)); or

ii) the environment from immediate, serious or irreparable harm or damage (including, but not limited to harm or damage to soil, sediments, water and air quality, areas of vegetation, fish or other wildlife population or their habitats, or any other natural resource); or

(2) the Lessee, its agents, employees, or Contractors are failing or refusing, or have failed or refused to comply with or observe:

i) any provision of this Lease intended to protect public health, safety or the environment; or

ii) any Order of the Commissioner implementing any provision of this Lease or any Decision by the Commissioner in connection with all or any part of the Pipeline.

(b) A temporary suspension Order shall specify:

(1) the specific location and activities which shall be stopped;

(2) the reason for the issuance of the Order including a description of the immediate, serious, or irreparable harm that is pending or taking place;

(3) any Decision or other authorization affected by the Order;

(4) the name of the Person issuing the Order;

(5) the name of the Lessee's representative to whom the Order is issued; and

(6) the time and date of the Order.

(c) When a temporary suspension Order is issued by a delegate of the Commissioner, other than the Pipeline Coordinator, a copy of the written delegation of authority from the Commissioner shall accompany the Order. A copy of the temporary suspension Order shall be provided to the Lessee in a manner specified by Section 29 herein.

(d) A temporary suspension Order is effective as of the date and time given, unless it specifies otherwise and shall remain in full force and effect until modified or revoked through a subsequent Order or Decision, whichever is appropriate.

(e) If the Commissioner finds that an emergency exists, a temporary suspension Order may be given orally to the Lessee or a Field Representative of Lessee. If an oral temporary suspension order is given, a written Order consistent with the requirements of Subsection (b) shall be issued as soon as possible, but no later than seventy-two (72) hours, after the oral order is given. An oral temporary suspension order that is not confirmed with a written Order within the specified time is vacated.

(f) To the extent practicable, the Commissioner shall give the Lessee prior notice of any temporary suspension Order. If circumstances permit, the Commissioner shall discuss with the Lessee, before issuing the Order, measures that would:

(1) immediately abate or avoid the harm or threatened harm that is the reason for the issuance of the Order; or

(2) effect compliance with the provision or Order, whichever is applicable.

(g) After a temporary suspension Order has been given by the Commissioner, the Lessee shall promptly comply with all of the provisions of the Order and shall not resume any activity suspended or curtailed thereby except as provided in this Lease, a subsequent Order, or a court order.

(h) When the Commissioner is satisfied that:

(1) the harm or threatened harm has been abated or remedied,

(2) the Lessee has effected, or is ready, willing and able to effect, compliance with the provisions of the temporary suspension Order, or

(3) the Lessee has implemented, or is ready, willing and able to implement, mitigating, corrective, or alternative measures approved by the Commissioner, the Commissioner shall promptly authorize in writing the resumption of the suspended activity or activities. The Commissioner shall render a Decision within three (3) days of the date that the request from the Lessee to resume suspended activities is received by the Commissioner.

(i) Without limiting any other rights available under 11 AAC 02 or any other law, the Lessee may;

(1) appeal directly to the Commissioner for review of any temporary suspension Order issued by a Commissioner's delegate under this section; or

(2) request reconsideration from the Commissioner of:

i) any temporary suspension Order issued by the Commissioner; or

ii) any Decision by the Commissioner of a request for resumption of activities suspended under a temporary suspension Order.

(j) The Lessee shall file with the Commissioner a notice of appeal or a request for reconsideration brought pursuant to this subsection within ten (10) days after the effective date of the Order or Decision being appealed or being asked to be reconsidered. The notice must clearly state the Order or Decision being appealed or being asked to be reconsidered and must contain a statement of facts and points

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of law the Lessee wishes to present to justify modification or reversal of the Order or Decision. All statements of fact must be under oath.

(k) The Commissioner shall decide an appeal or a request for reconsideration within ten (10) days from the date the Commissioner received the notice of appeal or request for reconsideration from the Lessee. If the Commissioner does not render a Decision within that time, the appeal or request for reconsideration shall be considered to have been denied by the Commissioner, and that denial shall constitute a final decision appealable in accordance with the rules of the court, and to the extent permitted by applicable law.

22. Commissioner's Decisions

(a) Except as set forth in Subsection (b) of this section, any Decision of the Commissioner as to any matter arising out of this Lease shall constitute the final agency decision appealable in accordance with the law and rules of the court.

The absence of a Decision on any plan, design, specification, or other document that may be filed by the Lessee with the Commissioner shall not represent in any way whatsoever any assent to, approval of, or concurrence in such plan, design, specification, or other document, or any action proposed therein. A Decision will remain in effect unless, and until, a new Decision or Order is provided to Lessee on the same subject.

(b) Decisions of a Commissioner's delegate shall not constitute final agency decisions and are subject to the procedures for appeal and reconsideration as set forth in 11 AAC 02, except as otherwise provided in Section 21(i).

23. Reimbursement of State Expenses

(a) Lessee shall reimburse the State for all reasonable costs incurred by the State in the oversight of Pipeline Activities in compliance with AS 38.35.140. The Commissioner shall administer this Lease to reasonably assure that unnecessary employment of personnel and needless expenditure of funds by the State are avoided. The Commissioner shall provide Lessee with an annual estimate of the projected costs and scope of the work.

(b) Reimbursement provided for in this section shall be made for each quarter ending on the last day of March, June, September, and December. On or before the ninetieth (90^{th}) day after the close of each quarter, the Commissioner shall submit to the Lessee a written statement describing any reimbursable costs incurred by the State during that quarter. This statement may be supplemented within ninety (90) days after the end of a fiscal year for costs incurred in the State's fiscal year but which, because of reasonable mistake, inadvertence, or unavailability, were not previously submitted. The State shall submit invoices to Lessee in accordance with Section 29.

(c) The Lessee shall pay to the State the total amount shown on each statement submitted under Subsection (b), within thirty (30) days of receipt. If the Lessee disputes any item of a statement for reimbursement, the Lessee shall, on or before the date on which the statement is due and payable, deliver to the Commissioner written notice of each item that is disputed, accompanied by a detailed explanation of its objection. The Commissioner shall provide a Decision regarding the Lessee's objections within thirty

(30) days of receipt of the Lessee's objections, and any items determined by the Commissioner to have been in error, improper, unnecessary, or needless shall be reimbursed within thirty (30) days after the date of the Commissioner's Decision.

(d) The Lessee may conduct, at its own expense, and by auditors or accountants designated by the Lessee, reasonable audits of the books, records and documents of the State relating to a statement submitted under Subsection (b) of this section, at the places where such books, records and documents are usually maintained and at reasonable times. Written notice of intent to conduct an audit shall be given to the Commissioner:

(1) at least fifteen (15) days prior to the audit and

(2) not later than the one hundred eightieth (180^{th}) day after the date that the State submits the statement, or supplemental statement, as applicable, under Subsection (b) of this section.

(e) An audit under this subsection shall be completed within one hundred eighty (180) days after receipt by the Commissioner of the notice of intent to conduct an audit; provided, however, that if the Commissioner fails to provide the Lessee with reasonably timely access to the relevant books, records and documents necessary to complete the audit, such period shall be extended by an appropriate number of days to be mutually agreed to in writing by the Commissioner and the Lessee. The Lessee may present the results of an audit to the Commissioner in a written notice requesting a timely review by the Commissioner of errors, omissions, or discrepancies noted in the audit, including unnecessary employment of personnel or needless expenditures of funds. The Commissioner shall meet with the Lessee within thirty (30) days of receipt of the notice of results of the audit to discuss and attempt to resolve all items listed in the notice of results. The Commissioner shall promptly provide a Decision to the Lessee setting forth the results of the meeting between the Lessee and the Commissioner. Any items previously reimbursed to the State but found during the audit and concurred in by the Commissioner in the Decision setting forth the results of the meeting to have been in error, improper, unnecessary, or needless shall be reimbursed within thirty (30) days after the date of the Commissioner's Decision.

(f) Nothing herein requires the State to maintain books, records or documents other than those usually maintained by it, provided such books, records and documents reasonably segregate and identify the costs for which reimbursement is required by this section. Such books, records and documents shall be preserved for a period of at least two (2) years after the Commissioner submits a statement for reimbursement based on such books, records and documents. The Lessee and auditors or accountants designated by the Lessee shall be given reasonable access to, and the right to copy, at the Lessee's expense, all such books, records and documents.

24. Liability of the State

The Lessee agrees that neither the State nor any of its officials, employees, agents or Contractors shall be liable for money damages for any loss caused to the Lessee, its agents or Contractors, by reason of decisions made in respect to the application and administration of this Lease; provided, however, this section does not excuse the State, its officials, employees, agents or Contractors from liability for damages or injuries resulting from acts (or omissions) of the State officials, employees, agents or Contractors that are unlawful, negligent, grossly negligent, reckless or willful.

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25. Transfer, Assignment, or Other Disposition

(a) The State may convey all or a portion of its ownership of the Leasehold at any time to any entity allowed by law. Any conveyance, transfer or other disposition, subsequent to the execution of this Lease, of any right, title, or interest in any of the Leasehold shall be subject to this Lease and the Lessee's rights hereunder, including the Lessee's right to renew the Lease under Section 2(b) herein.

(b) As set forth in Section 8(i) herein, the Lessee may request to assign, sublease, or transfer this Lease, or any interest in or rights under this Lease to a Person other than another owner of the Pipeline. The Commissioner will consider the protection of the public interest and determine in an AS 38.35.100 finding if the potential assignee, sublessee, or transferee is fit, willing, and able to perform the transportation or other act(s) proposed by the Lessee.

(c) In making the determination whether the proposed transferee is fit, willing, and able, the Commissioner shall not consider the existence of the guaranty by the guarantor, unless specifically requested by the Lessee in the Lessee's request for transfer or assignment. If the Commissioner determines that a guaranty or other security is required to guarantee the performance of all of the duties, obligations, and potential liabilities under and by virtue of this Lease by the proposed assignee, transferee, or other receiving party, the proposed assignee, transferee, or other receiving party shall secure a guaranty or other security satisfactory to the Commissioner, in substantially such form as the Commissioner required from the Lessee under Section 11 of this Lease, as a condition to the Commissioner's approval of the transfer, assignment, or other disposal.

26. Release of Interests

(a) In connection with the relinquishment, abandonment or other Termination before the expiration of this Lease, of any right or interest in the Leasehold, or in the use of all or any part of the Leasehold, the Lessee shall promptly execute and deliver to the State, through the Commissioner, a valid instrument of release in recordable form, which must be executed and acknowledged with the same formalities as a deed. The instrument of release must contain, among other things, appropriate recitals, a description of the pertinent rights and interests, and for the benefit of the State and its grantees or assigns, express representations and warranties by the Lessee that it is the sole owner and holder of the Lease rights or interests described therein and that such Lease rights or interests are free and clear of all liens, equities or claims of any kind, except for such liens, equities or claims that arose before the Effective Date of this Lease. The form and substantive content of each instrument of release must be approved by the Commissioner, but except as otherwise provided for in this subsection; in no event shall any such instrument operate to increase the then-existing liabilities and obligations of the Lessee furnishing the release.

(b) A release under this section shall be accompanied by such resolutions and certifications as the Commissioner may require, including the power or the authority of the Lessee, or of any officer or agent acting on its behalf, to execute, acknowledge or deliver the release.

(c) Notwithstanding any language or provision in the release that operates or could operate to the contrary, neither the tender, nor approval and acceptance, of any such release shall operate as an estoppel or waiver of any claim or judgment against the Lessee or as a relief or discharge, in whole or in part, of the Lessee from any of its then existing liabilities or obligations which accrued during that Lessee's tenure as the leaseholder.

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(d) Lessee may request to relinquish to the State at any time any or all of the Leasehold that the Lessee determines is no longer necessary for the Lessee's Pipeline Activities by filing a release as provided for above. The release shall be effective as of the date the release is approved by the Commissioner, subject to the continued obligations of the Lessee to fulfill all obligations and resolve all liabilities that arose under this Lease during that Lessee's tenure as the leaseholder.

(e) No later than one year following the date that Oil is first transported through the Pipeline, or following any subsequent requests for release of interest, the Lessee shall:

(1) provide a final survey, approved by the Commissioner, showing the final As-Built location of the completed Leasehold pursuant to survey instructions issued by the Department of Natural Resources.

(2) execute and deliver to the State, for the Commissioner's approval, a release of interest for all of Lessee's interests in the Leasehold other than the Operation and Maintenance Right-of-Way as depicted in the final As-Built required under Subsection (e)(1) of this section.

(f) The State shall have ninety (90) calendar days after approval of a release of interest required by Subsection (e)(2) of this section to record the survey and reduce the rental amount as set forth in Section 3 for that year and all subsequent years by the same proportion as the released acreage bears to the original Lease acreage.

27. Default, Remedies, and Forfeiture

(a) Failure of the Lessee to substantially comply with the terms of this lease shall be grounds for forfeiture of the right-of-way interest of the Lessee in an action brought by the Commissioner in the Superior Court. Before the commencement of any action for forfeiture of an interest in the right-of-way under this section, the Commissioner shall give the Lessee notice in writing of the alleged default and shall not commence the proceeding unless the Lessee has failed to initiate good faith efforts to cure the default within sixty (60) days of the notice of the alleged default or fails to diligently continue the same until cured.

(b) No items on the Leasehold, including but not limited to, improvements, structures, machinery, equipment, tools, or materials, may be removed from it by the Lessee while the Lessee is in default except with the Commissioner's prior approval.

(c) Upon forfeiture of the interest of the Lessee in this lease by a court of competent jurisdiction:

(1) The State shall have an immediate right to possession of the Leasehold and to all items found thereon including but not limited to improvements, structures, machinery, equipment, tools, materials, and any possession by the Lessee shall be unlawful. Subject to the State's best interests, the Commissioner shall Order the disposition of all such improvements, structures, machinery, equipment, tools, materials, and any other item on the Leasehold. The Commissioner's options with respect to any disposition under this subsection include, but are not limited to: sale, transfer, lease, auction, destruction, repair and abandonment, and removal. The Commissioner may Order the Lessee to perform disposition work required under this subsection. The Lessee is responsible for all disposition costs incurred by the State under this subsection.

(2) The Lessee shall be obligated to restore, rehabilitate and revegetate the Leasehold to the condition Ordered by the Commissioner.

(d) The Commissioner shall have up to one year following entry of judgment of forfeiture by a court of competent jurisdiction to issue his or her disposition Order or Orders under Subsection (c).

(e) In the event of a forfeiture of this lease under Subsection (c), the Lessee shall be liable for any obligations due and payable and for all costs, expenses, and fees incurred by the State arising out of the State's efforts to grant a new right-of-way lease for this Leasehold.

(f) After forfeiture, any new right-of-way lease for the Leasehold will have no effect on the Lessee's continuing rights and obligations under this lease.

28. Lessee's Obligations Upon Termination Not Resulting From Forfeiture

(a) This section shall apply to all terminations of this Lease, whether from expiration, relinquishment, abandonment or otherwise, with the exception of a forfeiture under Section 27.

(b) The deadlines provided for in this section apply only when the Lessee has provided the one hundred and eighty (180) day notice required by Section 2(c) of this Lease. If the Lessee fails to provide the notice required by Section 2(c), the Commissioner may reasonably alter the deadlines in this section.

(c) Prior to the expiration, relinquishment, abandonment or Termination of this Lease, the Commissioner shall determine whether a public interest exists which requires that all or a portion of the Pipeline be left in place following the expiration, relinquishment, abandonment or Termination of this Lease. The Commissioner's Decision shall:

(1) describe which components of the Pipeline, if any, shall remain on the Leasehold following the expiration, relinquishment, abandonment or Termination of this Lease, and,

(2) resolve issues pertaining to title to such components of the Pipeline.

(d) No later than sixty (60) days after receipt of the Commissioner's Decision under Subsection (c), the Lessee shall submit the following to the Commissioner for the Commissioner's approval:

(1) A plan for the removal of all items found on the Leasehold, including but not limited to, improvements, structures, machinery, equipment, tools and materials, but excluding those components of the Pipeline described in the Commissioner's Decision under Subsection (c); and

(2) A plan to restore and revegetate the Leasehold.

(e) The Commissioner shall set a reasonable time, which may be extended, during which the Lessee shall implement the plans in Subsection (d). The Lessee shall be responsible for all costs of implementation of the plans required by this section.

(f) Following completion of the time period for plan implementation under Subsection (e) and any extensions, the Commissioner shall Order the disposition of all improvements, structures, machinery, equipment, tools, and materials, if any, that the Lessee failed to remove. The Commissioner's options with respect to any disposition under this subsection include, but are not limited to: sale, transfer, Lease, auction, destruction, repair and abandonment in place, retention in State ownership for a public or State use, and removal. The Commissioner may Order the Lessee to perform disposition work required under this subsection. The Lessee is responsible for all disposition costs incurred by the State under this subsection.

(g) If the Lessee fails to submit or fully implement the plans required by this section, the State's options include any of the following:

(1) The Commissioner may order the Lessee to submit and fully implement the plans required by this subsection.

(2) The Commissioner may develop the plans required under this section and order the Lessee to fully implement them. The Lessee shall be responsible for all costs incurred by the State in developing such plans.

(3) The State may complete the required work under such plans. The Lessee shall be responsible for all costs incurred by the State for such work.

(h) In the event the Commissioner makes a Decision under Subsection (c) that all or a portion of the Pipeline shall remain on the Leasehold following the expiration, relinquishment, abandonment or Termination of this Lease, then Lessee shall be released from all future obligation or liability for the portion of the Pipeline the Commissioner determined shall remain on the Leasehold, including but not limited to, abandonment or removal liability, and from any obligation to restore and revegetate the Leasehold after completion of the plan approved under Subsection (c) herein. Upon release, the State or its assignee shall immediately assume all responsibility and obligation for the Pipeline or any part thereof remaining on the State Lands formerly subject to this Lease. Such release shall not discharge Lessee from performance of obligations and other liabilities which arose during that Lessee's tenure as the leaseholder and which accrued prior to the expiration, relinquishment, abandonment or Termination of this Lease.

29. Correspondence

(a) Any notice or request by the Lessee to the State shall be made in writing and must be given by hand delivery, by email, or facsimile during normal business hours, or by registered or certified mail, postage paid, return receipt requested, addressed as follows:

State of Alaska
Department of Natural Resources
Division of Oil and Gas
State Pipeline Coordinator's Section
3651 Penland Parkway
Anchorage, Alaska 99508
Facsimile Number: (907) 269-6880
Email: SPCO.Records@alaska.gov

(b) Delivery to the State occurs:

(1) if by hand delivery, email, or facsimile when received by the addressee, or

(2) if by registered or certified mail, when the notice or request is signed for by the State or the State's agent.

(c) Except as provided for in Section 21 of this Lease, any Order, Decision, notice, or other document from the Commissioner to the Lessee shall be made in writing and shall be given by hand delivery, by email, or by facsimile during normal business hours with the original to follow in the mail, or by registered or certified mail, postage paid, return receipt requested, and addressed as follows:

Harvest Alaska, LLC
3800 Centerpoint Dr., Suite 1400
Anchorage, AK 99503

(d) Delivery to the Lessee occurs:

(1) if by hand delivery, email, or facsimile when received by the addressee, or

(2) if by registered or certified mail, when the notice or demand is signed for by the Lessee or Lessee's agent.

(e) Other correspondence may be made by email, mail, or by hand delivery or facsimile during normal business hours with original to follow in the mail.

(f) The Commissioner or Lessee, by written notice to the other, may change the office address to which written notices, orders, or other written communications may be addressed and delivered thereafter, subject to the provisions of this Lease.

30. Authorized Representatives

(a) The Pipeline Coordinator and the Person executing this Lease on behalf of the Lessee shall be the authorized representatives for their respective principals for the purposes of administering this Lease. This authorized representative is in addition to the registered agent required to be appointed pursuant to Section 8(j) herein. The State or the Lessee may change the designation of its authorized representative or the address to which notices to that representative are to be sent by a notice given in accordance with Section 29 of this Lease.

(b) The Lessee shall maintain a sufficient number of duly authorized Field Representatives to allow prompt delivery to the Lessee of all notices, Orders, and other communications, written or oral, of the Pipeline Coordinator. At least one Field Representative must be available at all times in the State. The Lessee shall notify the Pipeline Coordinator of each duly authorized Field Representative. The Lessee shall consult with the Pipeline Coordinator regarding the number and location of such representatives.

(c) No Order or notice given to the Lessee shall be effective unless prior written notice of the delegation of authority to issue such Order or notice has been given to the Lessee.

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31. Waiver not Continuing

The waiver by the State of any breach of any provision of this Lease, whether express or implied, shall not be construed to be a continuing waiver or a waiver of, or consent to, any subsequent or prior breach by the Lessee. The waiver by the Lessee of any breach of any provision of this Lease, whether express or implied, shall not be construed to be a continuing waiver or a waiver of, or consent to, any subsequent or prior breach by the State.

32. No Third Party Beneficiaries

The parties to this Lease do not intend to create any rights under this Lease that may be enforced by third parties for their own benefit or for the benefit of others.

33. Local Hire

The Lessee shall, during Pipeline Activities, comply with, and require its Contractors to comply with, applicable and valid laws and regulations regarding the hiring of residents of the State then in effect or that take effect subsequently.

Furthermore, the Lessee is encouraged to hire and employ local and Alaska residents and companies, to the extent they are available and qualified, for work performed on the Leasehold. Lessee shall submit a proposal detailing the means by which the Lessee will comply with this measure. The Lessee is encouraged to coordinate with employment services offered by the State of Alaska and local communities to employ apprentices to perform work in the Leasehold and to recruit employees from local communities.

34. Nondiscrimination

The Lessee and its Contractors may not discriminate against any employee or applicant for employment because of race, religion, marital status, pregnancy, parenthood, physical handicap, color, sex, age, or national origin as set out in AS 18.80.220. The Lessee and its Contractors, on beginning any Pipeline Activities, must post in a conspicuous place notices setting out this nondiscrimination provision.

35. Rights and Remedies Cumulative

No right or remedy conferred by this Lease upon or reserved to the State or the Lessee is intended to be exclusive of any other right or remedy provided for by this Lease or by law, and each and every right and remedy set forth herein shall be cumulative.

36. Authority to Enter into Lease

The Lessee represents and warrants to the State that:

(a) It is authorized and empowered under the applicable laws of the State and its jurisdiction of formation to enter into and perform this Lease in accordance with the Lease and its provisions;

(b) The Lessee has approved and authorized the execution, delivery and performance of this Lease insofar as it pertains to the obligations of the Lessee;

(c) All action that may be necessary to the approval, execution, and delivery of this Lease by the Lessee, has been taken; and

(d) All of the required and necessary approvals, authorizations, and actions are in effect at the time of the execution and delivery of the Lease.

37. Delegation of Authority

The Commissioner may make delegations of authority and changes to delegations of authority to administer all or a portion of the provisions of this Lease, consistent with AS 38.35.210, at any time. The Commissioner shall notify Lessee in writing of any such delegation of authority or change in delegation of authority that affects this Lease.

38. Interpretation of Lease

(a) Any interpretation of this Lease shall take into account the parties' intent and understanding that the protection and preservation of the Leasehold's environment are high priorities, and the nature of the environment, including permafrost and seismic areas, shall require special consideration and a high degree of care.

(b) The parties acknowledge that this Lease is an "arm's length" agreement, and that each party has had an adequate opportunity to consult with counsel, and has consulted with counsel with respect to this Lease. The parties agree that ambiguities in this Lease shall not be construed either for or against any party.

(c) The language of the terms and conditions of any other pipeline lease may not be used to assist in resolving any disputes arising from the interpretation of this Lease.

(d) This lease is to be interpreted in accordance with the rules applicable to the interpretation of contracts made in the State of Alaska. The state and the Lessee expressly agree that the law of the State of Alaska will apply in any judicial proceeding affecting this lease.

39. Compliance with Law and Regulation

This lease is subject to all applicable state and federal statutes and regulations in effect on the effective date of this lease, and insofar as is constitutionally permissible, to all statutes and regulations placed in effect after the effective date of this lease. A reference to a statute or regulation in this lease includes any change in that statute or regulation whether by amendment, repeal and replacement, or other means. This lease does not limit the power of the State of Alaska or the United States of America to enact and enforce legislation or to promulgate and enforce regulations affecting, directly or indirectly, the activities of the Lessee or its agents in connection with this lease or the value of the interest held under this lease. In case of conflicting provisions, statutes, and regulations take precedence over this lease.

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40. Venue

The venue for any appeal or civil action relating to this Lease shall be in the Third Judicial District, State of Alaska.

41. Recording

Upon execution, acknowledgment, and delivery of this Lease, the Lessee shall at its sole expense cause this Lease to be recorded in the Anchorage Recording District, State of Alaska.

42. Severability

If it is finally determined in any judicial proceeding that any provision of this lease is invalid, the state and the Lessee may jointly agree by a written amendment to this lease that, in consideration of the provisions in that written amendment, the invalid portion will be treated as severed from this lease and that the remainder of this lease, as amended, will remain in effect.

43. Amendments in Writing

No amendment to this Lease is effective until agreed to in writing by the parties.

44. Exhibits

The following exhibits are attached to this Lease and are, by this reference, incorporated into this Lease as if they were set out in their entirety:

(a) Stipulations for this Lease attached hereto as Exhibit A, pursuant to AS 38.35.120(c) and (d);

(b) A description of the land included in the Leasehold attached as Exhibit B;

(c) Parental Guarantee attached as Exhibit C; and

(d) Definitions attached as Exhibit D.

45. Merger Clause

This Lease, including all exhibits hereto, contains the entire agreement between the parties, and is binding upon the parties.

46. Section Headings

The section headings in this Lease are for convenience only and have no other significance.

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47. Definition of Terms

Terms having specific meaning in regards to this Lease and incorporated documents are indicated by capitalization. These definitions are incorporated into this Lease and can be found attached as Exhibit D. In the absence of a definition in Exhibit D terms shall be defined in accordance with definitions found in any applicable State statute or regulation, and otherwise in accordance with common usage.

IN WITNESS WHEREOF, the parties have executed this lease as of the date first above written.

STATE OF ALASKA	HARVEST ALASKA, LLC
By:_____	By: _____
Andrew T. Mack	Richard Novcaski
Commissioner	Vice President
Department of Natural Resources	Harvest Alaska, LLC

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STATE OF ALASKA)
) ss.
Third Judicial District)

THIS IS TO CERTIFY that on this _____ day of _____ 20____, before me personally appeared _____, the Vice President for Harvest Alaska, LLC who executed the foregoing on behalf of said corporation, and acknowledged voluntarily signing same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year above written.

_____
Notary Public in and for the State of Alaska
My Commission Expires: _____

STATE OF ALASKA)
) ss
Third Judicial District)

THIS IS TO CERTIFY that on this _____ day of _____ 20____, before me personally appeared _____, the Commissioner of the Department of Natural Resources of the State of Alaska, who executed the foregoing on behalf of the Department of Natural Resources of the State of Alaska and acknowledged voluntarily signing the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year above written.

_____
Notary Public in and for the State of Alaska
My Commission Expires: _____

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EXHIBIT A
STIPULATIONS

ADL 232963
CIGGS PIPELINE
RIGHT-OF-WAY LEASE

1. GENERAL RESPONSIBILITIES

1.1 Approvals

1.1.2 Except where the approval of the Commissioner is required before the Lessee may commence a particular operation, neither the State nor any of its agents or employees is in any way obligated to examine or review any plan, design, specification, or other document which may be filed with the Commissioner by the Lessee pursuant to these stipulations.

1.2 Lessee Support of State Oversight

1.2.1 During the design and Pipeline Activities the Lessee shall furnish, without cost, representatives of the State, including contractors involved in field surveillance of the Leasehold and/or the Pipeline, adequate meals, living quarters, office space, transportation, and use of the Lessee's communication systems. Whenever possible, the Commissioner shall give the Lessee advance written notice of the need for such services and facilities, including the number and names of Persons to be accommodated.

1.3 Required Plans

1.3.1 The Lessee shall submit the following plans, programs, and documents for review and approval by the Commissioner prior to Start-Up. Modifications or amendments must be approved by the Commissioner prior to implementation.

a) Change To Service Plan (Stipulation 3.1)

b) Design Basis and Criteria (Stipulation 2.4)

c) Quality Management Program (Stipulation 3.2)

d) Surveillance and Monitoring Program (Stipulation 3.3)

e) 2018 Hydrotest results (Stipulation 2.8)

f) Corrosion Integrity Reports (Stipulation 2.8)

1.4 Written Authorizations

1.4.1 A Written Authorization from the Commissioner is required prior to implementation of the following:

a) Start-Up
b) Modifications to the Design Basis and Criteria (Stipulation 2.4)
c) Modifications to the Final Design (Stipulation 2.5)
d) Modification to the Construction Plans (Stipulation 3.1)
e) Modifications to the Quality Management Program (Stipulation 3.2)
f) Modifications to the Surveillance and Monitoring Program (Stipulation 3.3)
g) Change of Service (Stipulation 3.6)
h) New construction
i) Other documents or programs as identified within the lease or at the request of the Commissioner

1.4.2 To obtain a Written Authorization the Lessee must submit a written request to the Commissioner for the specific action(s) no less than thirty days (30) before implementation of the requested actions. The request must include all supporting documents required by the lease and any other supporting documentation required by the Commissioner.

2. TECHNICAL

2.1 General

2.1.1 All methods employed in design or during Pipeline Activities shall be in accordance with sound engineering practice and shall meet or exceed applicable federal, State, and local regulations, standards, and codes.

2.1.2 Lessee shall employ best available technology reasonably achievable in the design standards that account for the risks associated with Cook Inlet geohazards, including, but not limited to, seismic events, tidal forces, ice flows, flooding, fire, volcanic eruptions, or tsunami.

2.1.3 Security for the Pipeline shall be maintained by Lessee for public safety. Electrical power required for the Pipeline shall have safeguards for public safety.

2.2 Pipeline Standards

2.2.1 All Pipeline design, including engineering, must reflect the application and supporting documents as approved by the Commissioner and meet or exceed industry standards and applicable U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration (PHMSA) regulations.

2.2.2 All Pipeline Activities shall be conducted to minimize disruption of the local region and environment. This shall include subsurface and surface hydrological runoff and slope stabilization.

2.3 Technical Record Keeping

2.3.1 Critical drawings and technical documents shall be kept up-to-date. Changes to the Pipeline will be documented by final drawings of record with engineering seals within one-hundred eighty (180) days of completion, unless otherwise authorized by the Commissioner, in accordance with State statutes, regulations, and administrative codes.

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2.4 Design Basis and Criteria

2.4.1 The Lessee shall submit a Design Basis and Criteria that specifies how the design and engineering of the Pipeline provides for and meets the performance, operational, and regulatory requirements of the project, maintains safety, protects the environment, and protects public interests. Additionally, the conditions listed in stipulations 2.4.2 through 2.4.5 must be incorporated into the document.

2.4.2 **Pipeline Corrosion:** The Lessee shall provide for early detection of corrosion and other anomalies in accordance with State requirements and 49 CFR. Mitigation of such anomalies will be prescribed by the Lessee to meet or exceed regulatory requirements.

2.4.3 **Seismic:** The Pipeline shall be seismically designed using appropriate application of the best practical technology, to prevent integrity issues from the effects of geohazards, including seismic accelerations, ground deformation, and earthquake-induced mass movements.

2.4.4 **Pipeline Integrity Management:** The Design Basis and Criteria shall include Pipeline integrity management strategies that consist of:

a) Measures that improve the Pipeline resistance to geohazards.

b) Measures that limit or control the severity of geohazards.

c) Operational programs to monitor ground displacement or Pipeline response, including Pipeline movement, and identify conditions that may warrant further engineering investigations or mitigation activities. Pipeline movement which exceeds the Design Basis and Criteria shall be reported to the Commissioner.

2.4.5 **Electronics and Communications:** The Pipeline shall have a fully functioning and reliable control and communications system that ensures the transmission of information required for safe Pipeline Activities. The Lessee shall screen, filter, or otherwise suppress any electronically operated devices installed as part of the Pipeline which are capable of producing interference with existing communication systems, navigational aids, or related systems.

2.5 Final Design

2.5.1 The Lessee shall submit the Final Design for approval by the Commissioner before Pipeline Activities may commence.

2.6 Conduct of Operations

2.6.1 The Lessee shall be required to maintain the Pipeline to the approved Design Criteria. Any changes from the approved Design Criteria must be approved by the Commissioner.

2.7 Geospatial Data

2.7.1 The Lessee shall submit the following geospatial data to the Commissioner:

a) final pipeline centerline data within one year of Operations, and

b) other Pipeline geospatial data as requested.

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2.7.2 All geospatial data shall contain metadata detailing, at a minimum, data quality information, the origins and method of data collection/creation, coordinate systems, dates of collection/creation, attribute information, and narrative description of data.

2.8 Other Data as Requested

2.8.1 The Lessee shall submit other data relevant to Pipeline Activities as may be reasonably requested by the Commissioner.

3. CONVERSION AND OPERATIONS

3.1 Change To Service Plan

3.1.1 The Lessee shall submit a Change To Service plan that includes all work schedules, Conversion sequencing, supporting calculations, engineering drawings, and other pertinent data in sufficient detail and scope to satisfy the Commissioner.

3.2 Quality Management Program

3.2.1 The Lessee shall submit a comprehensive Quality Management Program that is designed to ensure safety, integrity, and documents the Lessee's compliance with the Lease and stipulations.

3.2.2 The following components are to be included as part of the of the Quality Management Program:

a) Quality Manual, or similar document, which describes the Quality Management Program and includes the quality policy and objectives.

b) An outline, or similar document, of the Quality Management Program processes which describes the processes and activities required to implement the Quality Management Program

3.2.3 Any revisions to the documents approved under this section must be approved by the Commissioner before the revision is implemented. This does not include changes to detailed work instructions or processes, but does include changes to the hierarchical relationship of processes.

3.3 Surveillance and Monitoring Program

3.3.1 The Lessee shall submit a Surveillance and Monitoring Program that demonstrates how the Lessee will detect, prevent, and abate situations that endanger worker's and the public's health and safety, the environment, or the integrity of the Pipeline.

3.3.2 Any revisions to the program must be approved by the Commissioner before the revision is implemented.

3.3.3 Lessee will maintain complete and up-to-date records on Pipeline Activities performed in connection with the Pipeline. Records shall include but are not limited to: surveillance data, leak detection data, repairs, integrity records, necessary operational data, modification records, other data as required by 49 CFR, and other records as the Commissioner may require.

3.4 Changes in Condition

3.4.1 Unforeseen conditions arising during Pipeline Activities may make it necessary to revise or amend these stipulations to control or prevent damage to the environment or hazards to public health and safety. In that event, the Lessee and the Commissioner shall agree as to what revisions or amendments shall be made.

3.5 Temporary Abandonment, Reduction, or Impairment of Service

3.5.1 **Lessee Requested:** In accordance with AS 38.35.040 and 11 AAC 80.025, the Lessee may request to provide temporary service, or temporary abandonment, reduction, or impairment of services from the Commissioner for short term use changes involving the Pipeline. Such request must be made on form DL-10-131 (or its successor) and approval or denial of the action will be determined through a Decision made in accordance with 11 AAC 80.035.

3.5.2 **Emergency Actions:** In accordance with AS 38.35.040 nothing in this lease prevents or limits the Lessee from taking appropriate emergency actions to protect the health and safety of people and the environment. Should an emergency action require the abandonment, reduction, or impairment of service, the Lessee shall notify the Commissioner as soon as possible.

3.6 Change of Service

3.6.1 The Lessee may submit a written request to DNR to change the type of product transported through the Pipeline. The request must include a detailed project description, justification of action(s), and appropriate maps, if applicable. The Lessee may submit applicable plans, programs, and documents for approval prior to submitting a Change of Service request.

3.7 Protection of Cultural Resources

3.7.1 The Lessee shall take responsibility to require its agents, employees, and Contractors to protect cultural resources while conducting Pipeline Activities.

3.7.2 Should any sites or suspected sites be discovered during Pipeline Activities, the activities that may disturb or damage the site shall cease and the State of Alaska Office of History and Archaeology, the Commissioner's Section, and the Kenai Peninsula Borough shall be notified Immediately.

3.8 Protection of Survey Monuments

3.8.1 The Lessee shall mark and protect all survey monuments encountered during Pipeline Activities. These monuments are not to be disturbed; however, if a disturbance of a monument, or any of its accessories, becomes necessary, the Lessee shall contact the Department of Natural Resources Survey Unit for current information on the policies regulating the implementation of "Records of Monument" (AS 34.65.040). A written report to the Commissioner shall be made by the Lessee if any monuments or accessories are inadvertently disturbed or damaged.

3.9 Access

3.9.1 **Public Access:** The Lessee shall make provisions for suitable permanent crossings for the public where the Leasehold or access roads cross existing roads, foot trails, winter trails, easements or

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other rights-of-way, unless otherwise authorized by the Commissioner during all Pipeline Activities.

3.9.2 **To and Along:** In accordance with AS 38.05.127, Pipeline Activities shall not interfere with the public's free and unrestricted access to and along the tidelands within the Leasehold, except that, with the Commissioner's approval, the Lessee may regulate or limit access, including vehicular traffic, to and upon the Leasehold to the extent necessary to facilitate Pipeline Activities, maintain Pipeline integrity, or to protect the public, fisheries, and wildlife from hazards associated with Pipeline Activities. Areas of approved restricted access shall be easily identifiable on the ground.

3.9.3 **Public Trust Doctrine:** The Public Trust Doctrine guarantees public access to, and the public right to use, navigable and public waters and the land beneath them for navigation, commerce, fishing, and other purposes. This Lease is issued subject to the principles of the Public Trust Doctrine regarding navigable or public waters. The Department of Natural Resources reserves the right to grant other interests to the Leasehold consistent with the Public Trust Doctrine.

3.10 Third Party Interests

3.10.1 **Existing Infrastructure:** The Lessee shall protect existing utilities and other infrastructure co-located within or adjacent to the Leasehold during Pipeline Activities. Any damages caused by the Lessee to existing improvements shall be promptly repaired by the Lessee to a condition which is reasonably satisfactory to the Commissioner.

3.10.2 **Shore Fishery Leases:** The Lessee shall make reasonable provisions to avoid or minimize impacts to Shore Fishery lessees within, adjacent to, and near the Pipeline during all Pipeline Activities.

3.11 Fire Prevention and Suppression

3.11.1 The Lessee shall promptly notify the Commissioner of any fires on, or which may threaten any portion of, the Pipeline or Leasehold and shall take all measures necessary or appropriate for the prevention and suppression of fires in accordance with applicable law. The Lessee shall comply with the instructions and directions of the Commissioner concerning the use, prevention, and suppression of fires on State Land.

3.12 Health and Safety

3.12.1 The Lessee shall take all measures necessary to protect the health and safety of all Persons affected by Pipeline Activities and shall Immediately abate any health or safety hazards. The Lessee shall Immediately notify the Commissioner of all serious accidents which occur in connection with such activities.

3.13 Hunting, Fishing, Trapping, and Camping

3.13.1 With respect to Lessee's agents, employees, and contractors, the Lessee shall prohibit hunting, fishing, trapping, shooting, and camping while conducting Pipeline Activities.

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3.14 Off Right-of-Way Traffic

3.14.1 The Lessee shall not operate mobile ground equipment off the Leasehold, access roads, State highways, or authorized areas, unless approved by the Commissioner or when necessary to prevent harm to any Person.

3.15 Material Sites

3.15.1 If the Lessee requires materials from State Land, the Lessee shall make application to purchase such materials in accordance with appropriate State laws and regulations. No materials shall be removed from State Land by the Lessee without the approval of the Commissioner.

3.15.2 Insofar as possible, use of existing material sites shall be authorized in preference to new sites.

3.15.3 Gravel and other construction materials shall not be taken from the Leasehold unless approved by the Commissioner.

3.16 Pollution Control

3.16.1 The Lessee shall conduct all Pipeline Activities in a manner that shall avoid or minimize degradation of air, land, and water quality.

3.16.2 All waste generated in Pipeline Activities shall be removed or otherwise disposed of according to all local, State, and federal laws, and in a manner reasonably acceptable to the Commissioner.

3.16.3 The Lessee shall conduct all Pipeline Activities in a manner that shall avoid or minimize light and noise pollution for the safety and wellbeing of people and wildlife in and around the Leasehold. Whenever possible, the use of down shielded lights should be used to illuminate work areas.

3.17 Disturbance of Natural Waters

3.17.1 All activities of the Lessee in connection with the Pipeline that may permanently alter local hydrology are prohibited unless such activities and necessary mitigation measures are approved by the Commissioner.

3.18 Excavated Material

3.18.1 Excess excavated material shall be disposed of in accordance with approved plans.

3.18.2 Excavated materials shall not be stockpiled in waters of the State, including but not limited to, rivers, streams, floodplains, or wetlands unless approved by the Commissioner.

3.19 Restoration and Revegetation

3.19.1 Restoration and Revegetation of disturbed areas on State Land shall be conducted as soon as practicable until accepted in writing by the Commissioner.

3.19.2 Surface materials shall be stockpiled and used during Restoration unless otherwise approved by the Commissioner. Stabilization practices, as determined by the needs for specific sites, shall include but shall not be limited to the placement of mat binders, soil binders, rock, or gravel

ATTACHMENT B

blankets or structures that reduce erosion rates. In all cases, best management practices shall be employed.

3.19.3 All disturbed areas of State Land shall be left in such stabilized condition that erosion in excess of natural rates shall be minimized until practicable Restoration and Revegetation can be accomplished in a manner that is reasonably satisfactory to the Commissioner.

3.19.4 Revegetation shall be implemented in disturbed sites with native or non-invasive plant species. The Revegetation shall establish plant communities that are self-sustaining and ecologically compatible with the local climate, and assist in protecting water quality by controlling erosion.

3.20 Wildlife Protection

3.20.1 The Lessee shall coordinate with those federal, State and local agencies necessary to ensure protection of fish and wildlife and their habitat within the vicinity of the Pipeline during all Pipeline Activities. The Lessee shall maintain all required authorizations from these agencies during all Pipeline Activities.

3.21 Fish and Wildlife Zones of Restricted Activity

3.21.1 During periods of wildlife breeding, nesting, or calving activity, and during major migrations of wildlife, the Lessee's activities on State Land may be restricted by the Commissioner with written notice.

3.22 Fishing Protection

3.22.1 The Lessee shall make reasonable provisions to prevent conflicts between Pipeline Activities and subsistence, commercial, sport, personal use, and educational harvest activities.

3.22.2 Pipelines shall be designed, constructed, and located in such a manner as to prevent or minimize obstructions to fishing operations and fish habitat.

3.23 Use of Explosives

3.23.1 No blasting is allowed unless approved, in writing, by the Commissioner.

3.24 Vegetation

3.24.1 Pipeline Activities shall be conducted to minimize impacts to native vegetation.

4. REPORTING

4.1 Reporting and Documentation

4.1.1 **Annual Report**: The Lessee shall provide a comprehensive annual report by **March 1** of each year this Lease is in effect unless notified otherwise by the Commissioner. The Commissioner shall provide a written description of the annual reporting requirements.

4.1.2 **Spill and Discharge Reporting:** The Lessee shall give notice, in accordance with applicable law, of any spill, leakage, or discharge of Hazardous Materials or Substances in connection with Pipeline Activities to State officials who are required by law to be given such notice.

Additionally, the Commissioner shall be notified of the following amounts of spills and discharges associated with Pipeline Activity in accordance with the associated timeframes listed below.

a) Immediately - Any Hazardous Material spills or discharges associated with Pipeline Activities in excess of 55 gallons.

b) Within 48 Hours - Any Hazardous Material spills or discharges associated with Pipeline Activities between 10 to 55 gallons.

c) Within the Annual Report - Any Hazardous Material spills or discharges associated with Pipeline Activities up to 10 gallons, if requested.

4.1.3 **Pipeline Integrity Reporting:** The Lessee shall Immediately notify the Commissioner of any condition, problem, malfunction, or occurrence which threatens the integrity of the Pipeline system, regardless of land ownership, for the following situations:

a) Any condition, problem, malfunction, or other occurrence which poses a threat to or failure of Pipeline system integrity.

b) A verified uncontrolled release or leak from the Pipeline.

c) Any safety-related or Pipeline condition which causes a Pipeline shutdown expected to last longer than one hour.

d) Unintended movement or abnormal loading of the Pipeline by environmental causes, such as an earthquake, landslide, or flood that impairs its serviceability or imminently threatens to impair its serviceability.

e) A bomb threat or other credible threat of sabotage or vandalism.

f) Any safety-related or Pipeline condition that could lead to an imminent hazard and causes a 20% or more reduction in maximum allowable operating pressure.

g) Any malfunction or operation error that causes the pressure of the Pipeline to rise above 110% of its maximum allowable operating pressure.

h) Any condition that requires de-rating of the Pipeline from its original maximum allowable operating pressure.

ATTACHMENT B

EXHIBIT B
LEGAL DESCRIPTION OF RIGHT-OF-WAY

ADL 232963
CIGGS PIPELINE
RIGHT-OF-WAY LEASE

Operations Right-of-Way Legal Description

No later than one year following the date that Oil is first transported through the pipeline, the Lessee shall submit to the State a final survey defining the Operations ROW.

The Operations ROW for the CIGGS-A Marine segment of the pipeline shall be 100 feet; 50 feet on each side of control line. The ROW shall begin at mean high tide at Granite Point, and then continue within state-owned tidelands for approximately 21 miles in a southerly direction ending at mean high tide at Nikiski (S008N012W35), comprising approximately 254.56 acres. Please see Exhibit B1 for the location map. The Leasehold will cross the following lands:

Township 11N, Range 12W, SM, Section 25
Township 11N, Range 11W, SM, Sections 30, 31, and 32
Township 10N, Range 11W, SM, Sections 5, 8, 16, 17, 21, 28, and 33
Township 09N, Range 11W, SM, Sections 4, 9, 16, 17, 20, 29, 31, and 32
Township 08N, Range 11W, SM, Section 6
Township 08N, Range 12W, SM, Sections 1, 12, 13, 24, 25, 26, and 35.

The Operations right-of-way for the CIGGS-LP segment of the pipeline shall be 20 feet; approximately 10 feet on each side of the control line. CIGGS-LP is a constructed, 10-inch pipeline located on private property, within State-managed section line easements, and within State-owned land within the North Kenai Spur Highway right-of-way. The pipeline begins at the tie-in to the CIPL E-10 pipeline (S008N012W35) and continues approximately 4.7 miles southward to the tie-in with the Swanson River Oil Pipeline near the Andeavor (Tesoro) refinery in Nikiski. Please see Exhibit B2 for the location map. The CIGGS-LP portion of the ROW shall consist of the State lands within road rights-of-way, and within State-managed section line easements, across the following lands:

Township 8 North, Range 12 West, SM, Section 35
Township 7 North, Range 12 West, SM, Sections 2, 3, 10, 15, 16, and 21.

The requested CIGGS-LP alignment comprises approximately 11.39 acres of State land.

Exhibit B will be replaced with the final survey upon approval of the survey from the Department of Natural Resources. At that time, this Exhibit will be updated to include only those lands under State jurisdiction.

During Operations, the ROW will occupy approximately 265.95 acres of State owned lands, contained within the Anchorage and Kenai Recording Districts. All distances and acreages are approximations based on the Applicant's description of the ROW.

EXHIBIT C
GUARANTEE OF HILCORP ALASKA, LLC

ADL 232963
CIGGS PIPELINE
RIGHT-OF-WAY LEASE

Hilcorp Alaska, LLC ("Guarantor"), a Delaware corporation with an address of 3800 Centerpoint Drive, Suite 100, Anchorage AK, 99503-5826, for the benefit of the State of Alaska ("the State"), hereby irrevocably, absolutely, and unconditionally guarantees to the State the full performance, fulfillment, and satisfaction of all of the duties, obligations, and liabilities of Harvest Alaska, LLC arising under or pursuant to the Lease known as ADL 232963 between the State and Harvest Alaska, LLC as it may be amended or modified from time to time .

If for any reason any duty, obligation, or liability of Harvest Alaska, LLC under the Lease is not performed, fulfilled, or satisfied by Harvest Alaska, LLC within the time or in the manner required, Guarantor shall perform, fulfill, or satisfy (or cause to be performed, fulfilled, or satisfied) each of such duties, obligations, and liabilities; provided, however, that (1) the State must first make demand upon Harvest Alaska, LLC before making demand on Guarantor, (2) if Harvest Alaska, LLC in good faith denies that any such duty, obligation, or liability exists or has not been performed, fulfilled, or satisfied by Harvest Alaska, LLC within the time or in the manner required, but not through discharge in bankruptcy, Harvest Alaska, LLC may exhaust any and all appeal rights available under the Lease, 11 AAC 02, the applicable rules of court, and any applicable law before the State may demand performance, fulfillment, or satisfaction from Guarantor, provided, further, that Guarantor shall be entitled to the benefit of any stay obtained by Harvest Alaska, LLC under Alaska law, including but not limited to a stay obtained under 11 AAC 02 or any Alaska rule of court but specifically excluding a stay imposed under bankruptcy law, and (3) Guarantor shall be entitled to any and all benefits arising by virtue of any defense, set-off, counterclaim, or cross-claim available to Harvest Alaska, LLC except that Guarantor shall be bound by any prior judicial determination, if any, concerning any such defense asserted by Harvest Alaska, LLC and Guarantor shall not be entitled under any circumstances to claim failure of consideration, invalidity of the lease or any lease term, or any defense available to Harvest Alaska, LLC as a consequence of bankruptcy proceedings.

Guarantor agrees that this Guarantee shall not be discharged, limited, or reduced except by complete performance of the duties, obligations, and liabilities of Harvest Alaska, LLC guaranteed hereby or upon the full and complete replacement hereof with a Guarantee in substantially the same form executed by a guarantor accepted by the Commissioner of the Alaska Department of Natural Resources ("the Commissioner") pursuant to the terms of the Lease. The Guarantor shall not be discharged or released by reason of the discharge of any debt or obligation of Harvest Alaska, LLC in bankruptcy, receivership or other proceedings, a disaffirmation or rejection of the Lease by a trustee, custodian, or other representative in bankruptcy, a stay or other enforcement restriction, or any other reduction, modification, impairment or limitations of the liability of Harvest Alaska, LLC.

Guarantor shall provide the Commissioner 60 days' notice prior to any consolidation or merger of Guarantor with or into any other corporation or corporations (whether or not affiliated with the Guarantor), or successive consolidations or mergers in which the Guarantor, or its successor or successors shall be a party or parties, or any sale or conveyance of all or substantially all of the property of the Guarantor to any other corporation (whether or not affiliated with Guarantor). This Guarantee shall be binding upon the Guarantor and the successors and assigns of the Guarantor and shall inure to the benefit of the State and its successors and assigns. No assignment or delegation by the Guarantor shall release the Guarantor of its obligations under this Guarantee, except as provided by the Lease.

This Guarantee extends to any assignee, transferee or other party who receives an interest in the Lease, to any extensions or renewals of the Lease, and to any term established by reason of the holdover of Harvest Alaska, LLC, or its assignees, transferees, or other receiving party, unless the Commissioner determines under Section 11 of the Lease that another Guarantee or security sufficient to protect the public interest has been provided.

The provisions of the Lease and other state authorizations identified therein may be changed as allowed by law without the consent of or notice to Guarantor and this Guarantee shall guarantee the performance of the Lease as changed. Guarantor warrants that it is not relying upon the State to provide any information, now or in the future on any such changes, modifications, or amendments. Guarantor further waives any defense based on failure, by any person, to notify Guarantor of the content of the lease or any modifications thereto.

This Guarantee shall not be affected by the State's delay or failure to enforce any of its rights except to the extent such delay or failure gives rise to a successful defense asserted by Harvest Alaska, LLC.

If the Lease terminates and the State has any rights against Harvest Alaska, LLC with respect to any duty, obligation, or liability of Harvest Alaska, LLC arising under the Lease, the State can enforce those rights against Guarantor pursuant hereto.

Guarantor waives any right it may have to require the State to proceed against or exhaust any bond or other security that the State holds or may hold from Harvest Alaska, LLC or pursue any other remedy in the State's power. Until all of Harvest Alaska, LLC obligations under the Lease have been discharged in full, Guarantor has no right of subrogation against any bond or other security that the State may hold. Guarantor waives all presentments, notices of dishonor, notices of nonperformance, demands for performance except as specified herein, protests, notices of protest, and notices of acceptance of this Guarantee.

The Guarantor subordinates any and all claims which the Guarantor has or may have against Harvest Alaska, LLC by reason of subrogation for payments or performances under this Guarantee or claims for any other reason or cause. The Guarantor agrees not to assert any claim which it has or may have against Harvest Alaska, LLC, arising from the Lease, including claims by reason of subordination under this Guarantee, until such time as the payment and other obligations of Harvest Alaska, LLC to the State are fully satisfied and discharged.

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The Guarantor hereby waives any defense based upon any act or omission of the State, except to the extent such acts or omissions constitute negligence or bad faith, which materially increases the scope of the Guarantor's risk.

This Guarantee shall be interpreted, construed, and enforced in accordance with the laws of the State of Alaska. Venue for any civil action relating to this Guarantee shall be in the Third Judicial District, State of Alaska.

All notices required or permitted to be given pursuant to this Guarantee shall be in writing and shall be addressed respectively as follows:

Guarantor: Hilcorp Alaska, LLC
3800 Centerpoint Drive, Suite 100
Anchorage AK, 99503-5826
Attn: Secretary
Facsimile: (907) 777-8301
Telephone: (907) 777-8300

The State: State of Alaska
Department of Natural Resources
Division of Oil and Gas
State Pipeline Coordinator's Section
3651 Penland Parkway
Anchorage, Alaska 99508
Facsimile: 907-269-6880
Telephone: 907-269-6403

All notices shall be given (a) by personal delivery to the addressee, (b) by electronic communication, with a confirmation sent by registered or certified mail return receipt requested, or (c) by registered or certified mail return receipt requested. All notices shall be effective and shall be deemed delivered (a) if by personal delivery, on the date of delivery if delivered during normal business hours or on the next business day following delivery if not delivered during normal business hours, (b) if by electronic communication, on the next business day following the day of receipt (said day of receipt being the day of receipt at the office of the recipient) of the electronic communication, and (c) if solely by mail, on the next business day after actual receipt.

This writing is intended by the parties to be the final expression of this Guarantee, and is intended as a complete and exclusive statement of the terms of this Guarantee. There are no conditions to the full effectiveness of this Guarantee other than those contained herein.

ATTACHMENT B

EXECUTED this _____ day of _____, _____, but effective for all purposes as of the effective date of the Lease.

ATTEST

By:_____

Title:_____

Hilcorp Alaska, LLC

By:_____

Title:_____

STATE OF_____)
_____ Judicial District) ss.
(or) COUNTY OF _____ (or) Municipality of _____)

THIS CERTIFIES that on the ____ day of _____, _____, at _____ _____, the foregoing instrument was acknowledged before me by _____, _____ of_____, a _____ corporation, on behalf of said corporation.

GIVEN UNDER MY HAND and official seal the day and year last above written.

_____
Notary Public in and for:_____
My commission expires:_____

ATTACHMENT B

EXHIBIT D
DEFINITIONS

ADL 232963
CIGGS PIPELINE
RIGHT-OF-WAY LEASE

Terms having specific meaning in this Lease and incorporated documents are indicated by capitalization. In the absence of a definition in this Exhibit D, terms shall be defined in accordance with definitions found in any applicable State statute or regulation, and otherwise in accordance with common usage.

As-Built means (for surveying purposes only) a State-approved drawing and monumentation or other document showing centerline and operational rights-of-way, including information on the location of areas of water, topography, important geographical features, elevations and VSM locations, if applicable.

Commissioner means the Commissioner of the State of Alaska's Department of Natural Resources, and includes the Commissioner's delegates, when a delegation of power to administer all or a portion of the provisions of this Lease is made pursuant to AS 38.35.210.

Commissioner's Order see Order

Commissioner's Decision see Decision

Construction means all field activities by the Lessee or its Contractors located on the Leasehold which involve more than *de minimis* physical disturbance of the existing natural land features or conditions of the Leasehold.

Contractor means any contractor or subcontractor at any tier, and the employees, representatives, and agents of such a contractor.

Conversion means all activities necessary to change a pipeline from carrying one hydrocarbon to another.

Decision means any written decision, determination, approval, rejection, or consent issued by the Commissioner, or an authorized delegate, that is in response to a proposed action or request from the Lessee. All Decisions shall state whether the Lessee's proposed action or request is approved/granted or rejected/denied and the basis of that conclusion.

Design Criteria means approved project criteria (i.e., construction, including design and operational concepts) necessary to delineate the project to be constructed. At a minimum, it includes the following: criteria and commitments including appendices, recommendations, conclusions, and monitoring program discussions contained in the submitted "Detailed Engineering Plan" to be used for the final design and project concepts; evaluation of data used to establish the design criteria; drawings showing functional and technical requirements; reports of all test data compiled during the data collection and design criteria evaluation; standard drawings (if applicable) or drawings to support structural design concepts of each typical facility or structure; proposed construction modes; outline of project specifications; sample computations to support the design; and concepts and bases for project siting.

Field Representative means an employee, Contractor, agent, or representative of the Lessee, appointed in writing by the Lessee, with notice to the State, to receive notices and Orders from the Commissioner at any location not part of the Lessee's urban administrative offices.

Final Design means completed design documents suitable for construction including plans and specifications; proposed construction modes; operational requirements necessary to justify designs; design analysis; engineering criteria; and other considerations pertinent to design.

Hazardous Material or Hazardous Substance means any solid, liquid, or gas that is defined as hazardous under local, State, or federal laws or regulations. Specifically, any substance defined as hazardous under Alaska Department of Labor, Alaska Department of Environmental Conservation, U. S. Environmental Protection Agency (EPA), U. S. Occupational Safety and Health Administration (OSHA), U.S. Department of Transportation (USDOT), U. S. Pipeline and Hazardous Materials Safety Administration (PHMSA) and U. S. Food and Drug Administration (FDA) laws and regulations shall be considered hazardous under this Lease.

Immediately means as soon as practicable after an event has occurred.

Lease Anniversary Date means the same day and month as the date this Lease is effective, in each subsequent year that this Lease is in effect.

Leasehold means the State Lands subject to this Lease as those lands are identified in Exhibit B of this Lease and any amendments, modifications, and subsequent renewals.

Lessee means Harvest Alaska, LLC or its successors and/or assigns holding an undivided ownership interest in the right-of-way in accordance with the provisions of this Lease.

Maintenance means activities associated with ensuring that the Pipeline and Related Facilities meet their intended functions, keeping the pipeline and related facilities in good repair, and meet all regulatory requirements. This may involve repairs, fixes, replacement of parts and upgrades.

Natural Gas has the same meaning as given in AS 38.35.230(5).

Oil has the same meaning as given in AS 38.35.230(6).

Operation(s) means all activities connected with the transportation of Natural Gas through the Pipeline including Maintenance of the Pipeline.

Order means any written order, action, demand, direction, or requirement issued by the Commissioner to the Lessee which is needed to enforce or implement the provisions of this lease. Orders shall be in accordance with lease section 17.

Person(s) has the same meaning as given in AS 01.10.060(a)(8).

Pipeline has the same meaning as given in AS 38.35.230(7).

Pipeline Activities means activities involving and related to Construction, Operation, Maintenance, and Termination of the Pipeline or any part of the Pipeline.

ATTACHMENT B

Quality Management Program means the programmatic application of planned, systematic quality activities to ensure that the project will employ processes needed to satisfy the commitments and requirements to ensure the integrity of the Pipeline, meet lease and regulatory requirements, and required standards for health, safety, and the environment.

Restoration means the return of a disturbed site on the Leasehold upon completion of use by the Lessee to a physical and biological condition consistent with applicable State and federal law, regulations and policies at the time, and to the extent acceptable to the Commissioner. Restoration includes, where appropriate, erosion and sedimentation control, stabilization, habitat reconstruction, Revegetation, and visual amelioration.

Revegetation means the establishment of native plant cover, unless non-native plant cover is required as a temporary means to reduce erosion, and reestablishment of conditions suitable for native plants on disturbed lands in a manner consistent with applicable State and federal law and regulations and to the extent acceptable to the Commissioner. Methods or techniques to accomplish this include, but are not limited to, surface protection and preparation, fertilizing, seeding, planting, mulching and watering, and utilizing local growing conditions to dictate the timing for establishment of vegetative cover.

Start-Up means the process or action by which hydrocarbons are placed into the pipeline.

State Land(s) has the same meaning as given in AS 38.35.230(9).

Termination means all activities connected with the expiration, relinquishment, abandonment, or completion of use of the right-of-way or a portion of it.

Written Authorization(s) are a type of Decision authorizing or approving an action and may include associated mitigation measures or stipulations.

ATTACHMENT B

THE STATE of ALASKA
GOVERNOR BILL WALKER

Department of Fish and Game

DIVISION OF HABITAT
Central Region Office

333 Raspberry Road
Anchorage, Alaska 99518-1565
Main: 907.267.2342
Fax: 907.267.2499

December 20, 2017

Jennifer Murrell
Alaska Department of Natural Resources
State Pipeline Coordinator's Section
3651 Penland Parkway
Anchorage, Alaska 99508

Dear Ms. Murrell:

The Alaska Department of Natural Resources (ADNR) received applications from Harvest Alaska for two pipeline Right-of-Way (ROW) leases. The Tyonek W-10 Gas Pipeline (Tyonek Pipeline) application is for the construction of a new natural gas pipeline from the Tyonek platform to Ladd Landing. The Cook Inlet Gathering System-A Marine Pipeline (CIGGS-A Pipeline) application is for the conversion of the CIGGS-A Pipeline from gas to oil. In this document, both projects are collectively referred to as the Cross Inlet Pipeline Extension Project (Cross Inlet Project). ADNR requested input from the Alaska Department of Fish and Game (ADF&G) for these projects on the following topics:

1.) Description of the Fish, Wildlife, and Biotic resources in the area.
2.) Description of Sport Fishing in the vicinity.
3.) Description of the Commercial Fishery in the vicinity.
4.) Description of Subsistence Use in the vicinity.
5.) ADF&G proposed mitigation measures.

ADF&G has reviewed the ROW lease applications and would like to provide the attached comments and information on ADF&G-managed resources for these projects. ADNR's ROW lease authority for these projects is for areas below mean high tide. ADF&G comments, including recommended mitigation measures, are therefore focused on marine waters, anadromous fish, and intertidal areas, with a few exceptions, such as including information for species that primarily live above the high tide line but may go below it for periods of time (i.e., bald eagles to feed). Any questions about these comments can be directed to Habitat Biologist Jeanette Alas at 267-2805 or jeanette.alas@alaska.gov.

Sincerely,

Jeanette Alas
Habitat Biologist

ATTACHMENT C

Enc: ADF&G comments – Cross Inlet Project
Timing Concerns
Tyonek Harvest Use Table
Beluga Harvest Use Table
Nikiski Harvest Use Table
References Cited

Ecc: R. Benkert, ADF&G, Hab
K. Harper, ADF&G, Hab
B. Blossom, ADF&G, Hab
J. Rumble, ADF&G, CF
B. Marston, ADF&G, SF
B. Davis, ADF&G, Sub
S. Goodglick, ADF&G, WC
M. Marie, ADF&G, Hab
A. Ott, ADF&G, Hab
P. Shields, ADF&G, CF
L. Olsen, ADF&G, Sub
A. Wiita, ADF&G, Sub
M. Petrula, ADF&G, WC

1.) Description of the Fish, Wildlife, and Biotic resources in the area.

Fish

Cook Inlet supports an extensive diversity of both marine and freshwater fish species. Freshwater species in the streams near the Cross Inlet Project include Dolly Varden, lamprey, stickleback, longnose sucker, and rainbow trout. Marine species found in Cook Inlet include several species of forage fish and groundfish. Five species of Pacific salmon (Chinook, pink, coho, chum, and sockeye salmon) are found in marine and freshwaters of Cook Inlet (ADF&G 2017b; 2017j; 2017k).

Salmon

Reasonably large concentrations of the five species of adult Pacific salmon migrate through Cook Inlet beginning in early May through the summer into fall. All five species transit through the proposed Cross Inlet Project ROW migrating from south to north as they migrate to freshwater spawning areas north of the project sites. Juvenile Pacific salmon feed on drifting insects and other invertebrates in upper Cook Inlet during summer (Moulton 1997).

Most salmon spawn in freshwater with some pink salmon spawning in intertidal areas. Salmon spawning takes place between June and October, depending on the species. Eggs are typically deposited in the gravel of rivers where the eggs overwinter and then hatch in the spring. Pink and chum salmon emigrate to sea as fry soon after emerging from the gravel. Chinook, coho, and sockeye juvenile salmon spend one to four years rearing in freshwater before emigrating to sea (ADF&G 2017b; Moulton 1997). Smolts spend varying amounts of time in estuaries depending on the species and population. Sockeye, pink, and chum salmon then typically move offshore in the fall and little is known about their winter distribution, whereas coho and Chinook salmon tend to remain in more coastal environments along the continental shelf (Quinn 2005). Pacific salmon spend differing amounts of time in marine waters, typically one to four years, before returning to their natal streams to spawn (ADF&G 2017b; Quinn 2005). All salmon bound for their home waters in rivers of upper Cook Inlet pass through the project area, and outmigrating or rearing smolts may be found in nearshore waters throughout the year.

Marine Forage Fish

Many species of forage fish can be found in upper Cook Inlet waters, including Pacific herring, capelin, eulachon (candlefish or hooligan), longfin smelt, pond smelt, and Pacific sand lance (ADF&G 2017b). Forage fish are important prey species for birds, marine mammals, and commercially important fish and shellfish (5 AAC 39.212).

Groundfish

The saltwater groundfish are species that live on, in, or near the floor of Cook Inlet. These species include walleye pollock, Pacific cod, lingcod, sablefish (black cod), rockfish, and Pacific halibut. Sablefish, walleye pollock, and Pacific cod are schooling fish, and pollock and cod are important prey species for a variety of marine mammals (ADNR 2009; J. Rumble, Fishery Biologist, ADF&G Commercial Fisheries, Homer, October 26, 2017, personal communication).

Shellfish

Cook Inlet has four species of crab: Dungeness, golden king, red king, and at the mouth of the inlet, Tanner crab. These crab populations are distributed all along the southern coast of Alaska and the Bering Sea with annual migratory patterns. The coast of the inlet supports a large population of razor clams along sand beaches and mudflats along with an abundance of Sitka periwinkle and other

marine snails. Littleneck clams live on small beaches and prefer coarse sand or fine gravel mixed with mud, stones, or shells. Weathervane scallops can be found on mud, sand, or gravel substrate in water depths of 120 to 390 feet. Baltic macoma clams are widespread in intertidal areas of upper Cook Inlet and are a primary food source for migratory birds (ADF&G 2017f).

Amphibians/Reptiles

Alaska observes the occasional migration of four species of turtles, but the leatherback sea turtle is the only species whose range may include Cook Inlet. Leatherback turtle sightings in Alaska are uncommon, only 19 have been reported between 1960 and 2007. The wood frog is the only amphibian known to occur in the uplands and wetlands of Cook Inlet (ADF&G 2017h).

Wildlife

Terrestrial Mammals

Large terrestrial game mammals in the Cook Inlet area include moose, brown and black bear, caribou, wolf, mountain goat, and Dall sheep. Many small terrestrial mammals and furbearers are also found in the Cook Inlet area, including squirrels, voles, collared pika, snowshoe hare, shrews, little brown bats, hoary marmots, American mink, American marten, river otters, beavers, muskrats, porcupine, ermine, coyote, lynx, fox, and wolverine (ADF&G 1994; 2006; 2015; 2017d).

Marine Mammals

Beluga whales (*Delphinapterus leucas*) are managed by the National Marine Fisheries Service (NMFS). Cook Inlet beluga whales were listed as depleted under the Marine Mammal Protection Act of 1972 (MMPA) in 2000 (NOAA 2015a). NMFS issued a final determination to list the Distinct Population Segment (DPS) of beluga whales found in Cook Inlet as endangered under the Endangered Species Act (ESA), effective December 22, 2008 (NMFS 2008). In 2011, NMFS designated two areas in Cook Inlet as critical habitat for the ESA-listed population of Cook Inlet beluga whales, comprising 3,013 square miles of marine habitat (Figure 1). The offshore components of both proposed projects are within the boundary of Critical Habitat Area 2, which is used by belugas as dispersed fall and winter feeding and transit areas (NMFS 2011). The proposed new Tyonek Pipeline is also within the Susitna Delta Sensitive Area (Figure 2). This region is an area of high importance to Cook Inlet beluga whales, especially from mid-April to mid-October when large concentrations (sometimes >200 belugas) use this area for foraging, reproduction, and calving (CISCP 2017). Cook Inlet beluga whales are a high-priority Species of Greatest Conservation Concern for ADF&G (ADF&G 2015).

Cook Inlet beluga whales were an important part of subsistence diets for Alaska Natives, and unregulated hunts prior to 1999 likely contributed to the decline of this population. When hunting was regulated in 1999, NMFS expected the beluga population to increase.
While the rapid decline ceased, the population continued to decline. NMFS co-managed the subsistence use of Cook Inlet beluga whales with the Cook Inlet Marine Mammal Council for several years, but that council disbanded in 2012 and there are no current co-management agreements for this population (NMFS 2017a).

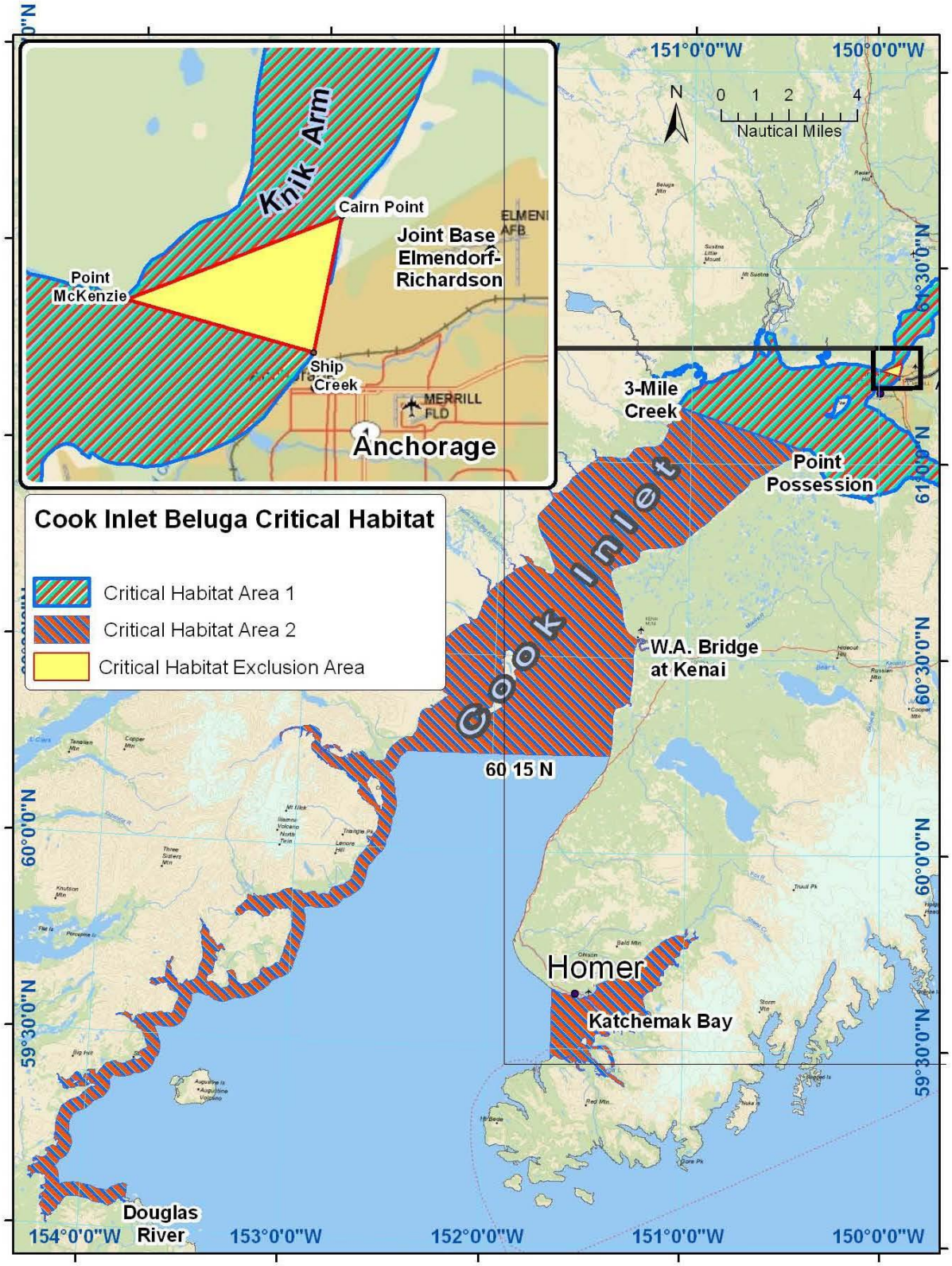

Figure 1. Designated Cook Inlet Beluga Whale Critical Habitat.

ATTACHMENT C

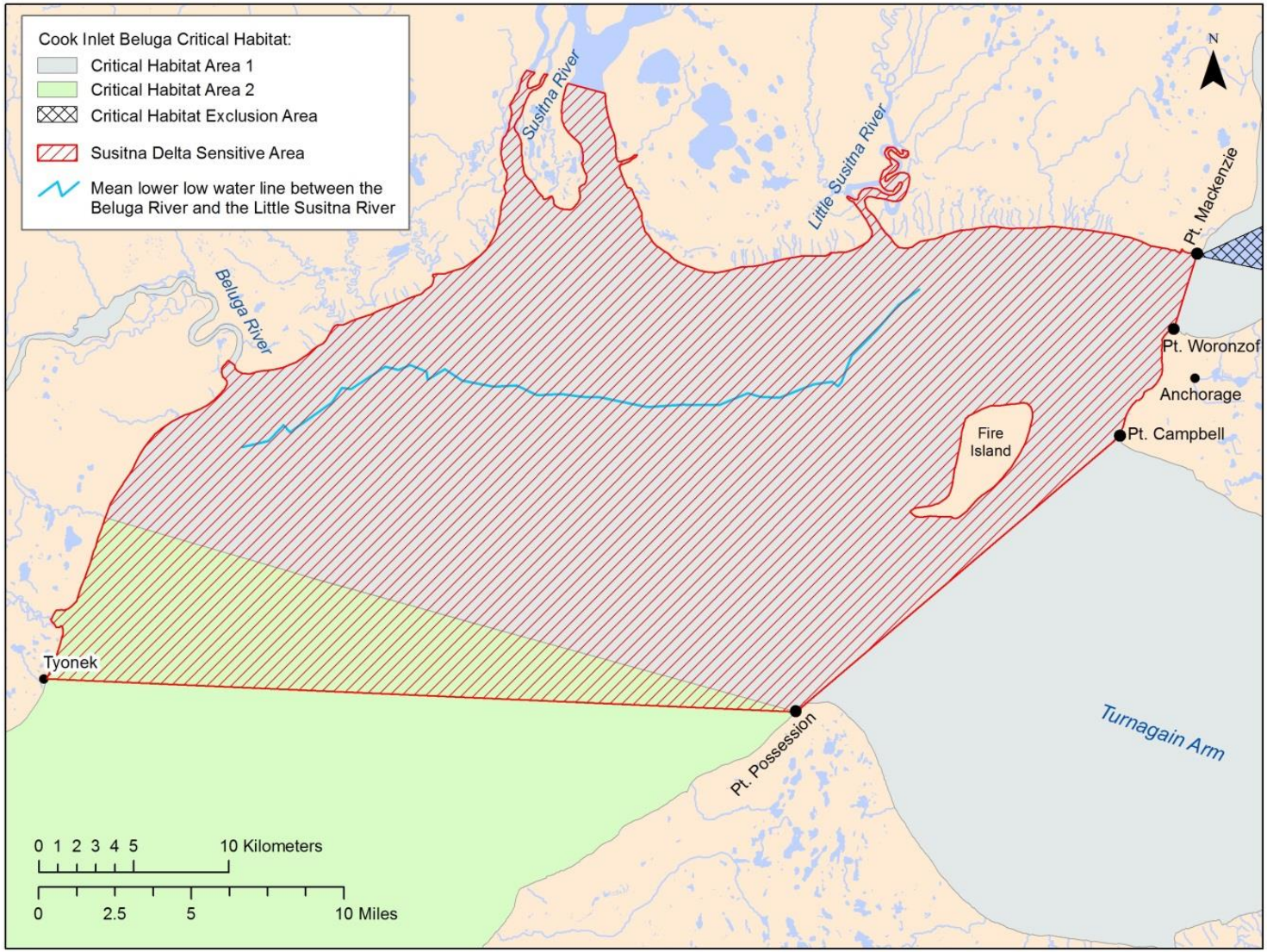

Figure 2. Map of Susitna Delta Sensitive Area for Cook Inlet beluga whales.

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Distribution of beluga whales varies by season and region, and is affected by a range of conditions such as temperature, ice cover, tides, prey availability, and human interactions (Muto et al. 2017); however they may be found throughout Cook Inlet at any time of the year (NMFS2016a). Cook Inlet belugas are often found in shallow, coastal waters, and river mouths in upper Cook Inlet, likely feeding on eulachon in the spring and Pacific salmon in the summer (NMFS 2016a; Shelden et al. 2017). Tagged whale studies confirm this population spends summer through late autumn in upper Cook Inlet waters north of East and West Foreland. In winter, belugas disperse into deeper waters in upper and mid Cook Inlet, but they do not leave Cook Inlet (Goetz et al. 2012; Hobbs et al. 2005; NMFS 2016a; Shelden et al. 2017).

Little is known about beluga mating behavior, but mating likely occurs in late winter or early spring. Shallow tidal flats with warmer water, such as the Susitna River Delta, may be used as calving grounds, and nursery areas are likely nearshore waters of upper Cook Inlet. Cook Inlet belugas have a slow reproductive cycle, usually giving birth to a single calf every two to three years (NMFS 2016a).

The 2016 biennial aerial survey for Cook Inlet beluga whale summer abundance showed 328 individuals. Population abundance estimates from 2006-2016 show a 10-year trend in rate of decline of -0.5% (Shelden et al. 2017). Aerial surveys since 1978 show a contraction in summer habitat range towards upper Cook Inlet (NMFS 2016a; Shelden et al. 2017).

Harbor seals (*Phoca vitulina*) are managed by NMFS and are protected by the MMPA. They are found in marine and estuarine waters throughout Cook Inlet (Figures 3 and 4), and occasionally seasonally in freshwater rivers and lakes (ADF&G 2017d; Muto et al. 2017). Beginning in 2010, harbor seals in Alaska were identified as 12 separate stocks. The Cook Inlet/Shelikof harbor seal stock was last surveyed in 2011 with an estimated abundance of 27,386 (Muto et al. 2017).

Harbor seals are generally non-migratory, but they make local movements related to tides, weather, season, food availability, and reproduction. Haul out areas include rocks, reefs, beaches, and drifting glacial ice (Muto et al. 2017). They use haul outs to rest, give birth, nurse their pups, and for thermal regulation, social interaction, and to avoid predators (ADF&G 2017d; NMFS 2017b). They have a strong tendency to return to the same haul out sites during the breeding season (Muto et al. 2017). Harbor seals become sexually mature between 3 to 7 years old, and their pups are born from May through mid-July. Common prey includes walleye pollock, Pacific cod, capelin, eulachon, Pacific herring, salmon, octopus, and squid (ADF&G 2017d).

Harbor seals occur regularly in the proposed project areas, both in the water and hauled-out on land (NOAA 2017b; Shelden et al. 2013). The choice of a haulout site is fundamental to survival and reproduction of harbor seals. The proposed Tyonek Pipeline is in NMFS survey unit IG19 and the western side of the CIGGS-A Pipeline is in survey unit IG20, both of which typically have an average of 1 to 9 seals hauled out (Figures 3 and 4). Survey units are defined as seals in an area that includes 10 to 15 km of coastline. See Figures 3 and 4 for harbor seal concentration location and abundance information. Counts were conducted by the National Marine Mammal Laboratory in August 1997-2011, noting that variability in numbers occurred throughout the year. Areas with high abundance indicate likely pupping and molting activities. Harbor seals are protected from disturbance under the MMPA. Harassment includes any act which disrupts

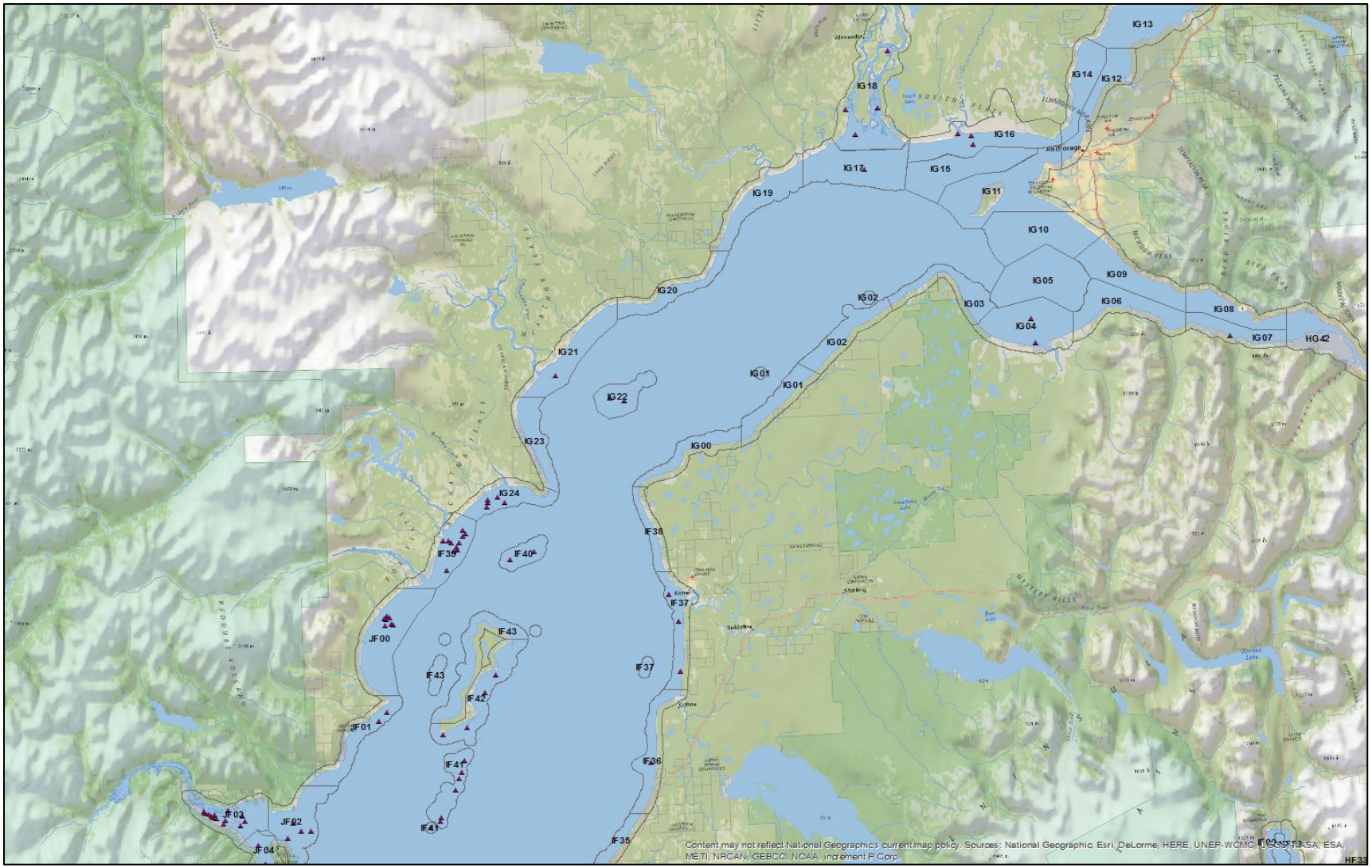

Figure 3. Harbor seal units in upper Cook Inlet. Survey units are defined as seals in an area that includes 10-15 km of coastline. Specific haulout locations within the survey units are indicated by triangles; specific locations can change during seasonal and annual shifts in location. Map provided by Erin Richmond, National Marine Mammal Laboratory, October 2017.

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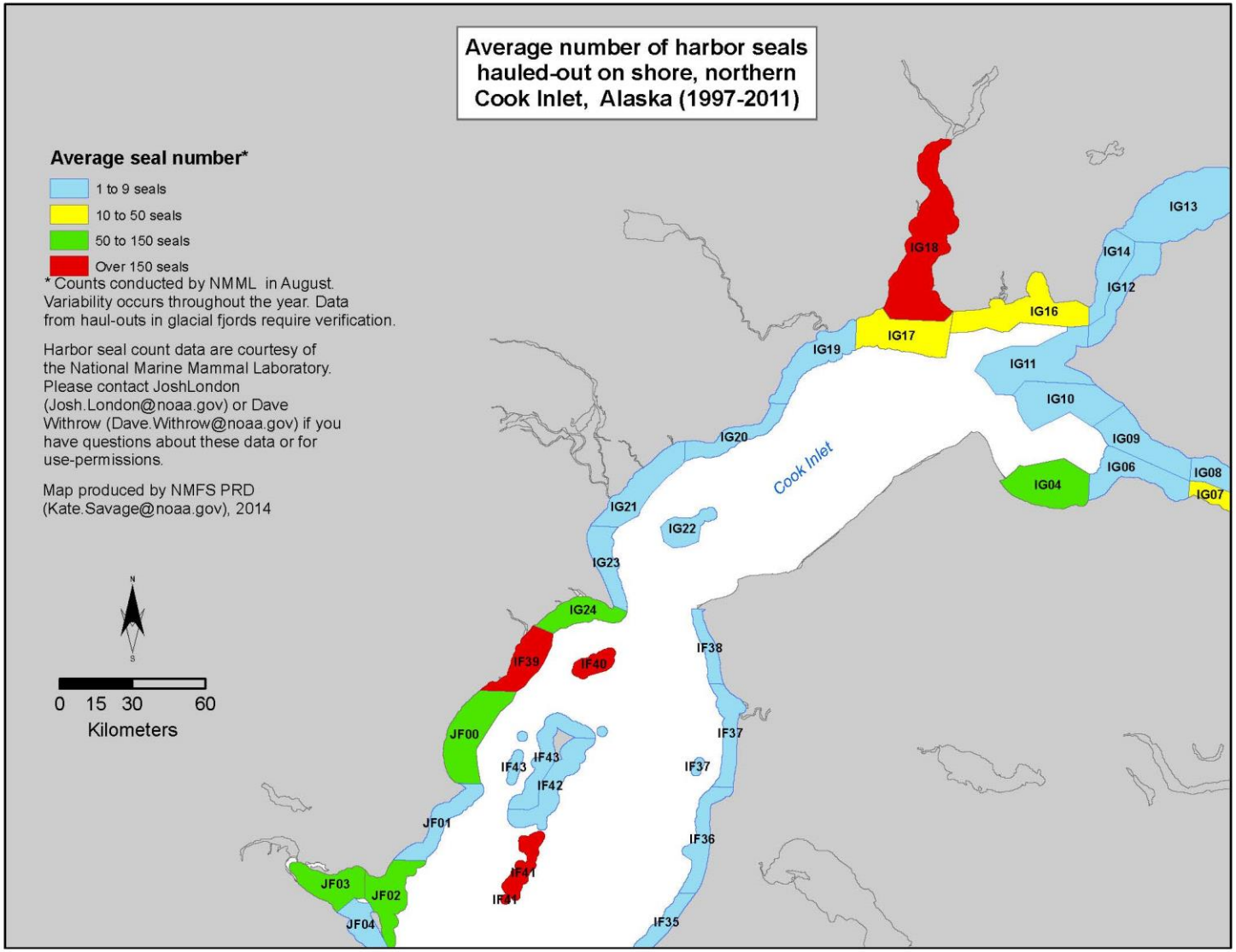

Figure 4. Average number of harbor seals hauled-out on shore, northern Cook Inlet, Alaska (1997-2011). Surveys conducted in August; variability occurs throughout the year. Survey units may include multiple haulouts. Map produced by NMFS PRD (Kate.Savage@noaa.gov), 2014.

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behavioral patterns, including but not limited to, migration, breathing, nursing, feeding, or sheltering (i.e., hauling out).

Steller sea lion *(Eumetopias jubatus)* populations that frequent the waters of Cook Inlet are part of both the western DPS, which is ESA-listed as endangered, and the eastern DPS, which was previously listed as threatened but has since recovered to the point that it has been delisted (NOAA 2017a). Steller sea lions are managed by NMFS and are protected under the MMPA. The western DPS is a high-priority Species of Greatest Conservation Concern for ADF&G (ADF&G 2015). Steller sea lions use rookeries and haulouts on land to rest and suckle their young. They do not migrate, but move their "central-place haulout," the center of their foraging activity, to track seasonal concentrations of their many types of prey. They breed on exposed, offshore rookeries during summer and generally move to more protected haulouts in winter, especially in southeastern Alaska (ADF&G 2017d). While sea lions will enter Cook Inlet waters to forage and for other purposes (often near river mouths during spring and summer periods to seek seasonal runs of eulachon and salmon), there are no recognized haulouts or rookeries near the proposed Cross Inlet Project, nor is it within designated critical habitat for this species.

Harbor porpoises *(Phocoena phocoena)* are managed by NMFS and receive protection under the MMPA. They are commonly found in bays, estuaries, large rivers, harbors, fjords less than 650 feet deep, and occasionally travel to deeper offshore waters in the winter (ADF&G 2017d). Females reach sexual maturity at 3 to 4 years and are able to give birth every year. Little is known of their reproductive biology although most mating occurs in summer with a gestation period of about 11 months; most births occur between May and July (NMFS 2017c). Harbor porpoises are wary and easily disturbed by boat traffic and are susceptible to fishery interactions and physical modifications of nearshore habitats resulting from urban and industrial development and other human activities (e.g., construction of docks and other over-water structures, filling of shallow areas, dredging, and noise) (Muto et al. 2017).

Harbor porpoise are found in upper and lower Cook Inlet (Dahlheim 2000) and have been observed in the areas of the Tyonek Pipeline (Shelden et al. 2014). Recent acoustic research in Cook Inlet by ADF&G indicates that harbor porpoises occur throughout Cook Inlet year-round. In the West Foreland area, reports by marine mammal observers during May – September 2012 recorded 137 sightings of 190 estimated individuals, similar to a spike of 129 between Granite Point and the Susitna River during 2006 and 2007 (NOAA 2015b). The increase of sightings in upper Cook Inlet may reflect more movement of harbor porpoise distribution than previously known (NMFS 2016b; Robert Small, Wildlife Biologist, ADF&G Wildlife Conservation, personal communication, December 2015). Harbor porpoise sightings in upper Cook Inlet appear to peak during April – May and September – October when smelt (eulachon) and longfin smelt are detected (Shelden et al. 2014).

Killer whales **(***Orcinus orca*) are managed by the NMFS and are protected by the MMPA**.** Seasonal and year-round occurrences of killer whales (orcas) have been observed throughout Alaska. Two different stocks of killer whales inhabit Cook Inlet: the Alaska Resident Stock and the Gulf of Alaska, Aleutian Islands, Bering Sea Transient Stock (also referred to as Bigg's killer whales). Genetically and behaviorally distinct, the resident stock feeds exclusively on fishes while the transient whales feed primarily on marine mammals.

Numbers of killer whales in Cook Inlet are small compared to the overall population and most are recorded in lower Cook Inlet. Killer whales are rare in upper Cook Inlet, where Bigg's killer whales feed on beluga whales and resident killer whales feed on anadromous fish (Lammers et al. 2013). The availability of these prey species largely determines the likeliest times for killer whales to be in the area. From 1982 through 2014, 29 killer whale sightings in upper Cook Inlet (north of East and West Foreland) were reported to NMFS. From 2011 through 2014, NMFS received no reports of killer whale sightings in upper Cook Inlet. Killer whales have no natural predators; however, sources of human-caused serious injury and mortality include ship strikes, fishery interactions, and gun-shot wounds (Muto et al. 2017).

Northern sea otters (*Enhydra lutris kenyoni*) are generally found in shallow coastal waters where they dive to prey on bottom dwelling invertebrates (ADF&G 2017d). The U.S. Fish and Wildlife Service (USFWS) is responsible for managing sea otters. The southwest Alaska DPS of Northern sea otters is ESA-listed as threatened by the USFWS. This population is found in southwest Cook Inlet (USFWS 2014) and the northern boundary of designated critical habitat in Cook Inlet is Redoubt Point (USFWS 2009), south of the Cross Inlet Project. All sea otters are protected under the MMPA which prohibits direct harvest of marine mammals with the exception of subsistence hunting (USFWS 2014) and federal take permits are required if disturbances to sea otters will occur. Sea otters (southcentral Alaska DPS) are common in Kachemak Bay, but their range does not include upper Cook Inlet (Muto et al. 2017). The known range of sea otters does not extend north of lower Cook Inlet and this species is not likely to be found in the proposed project area (USFWS 2014).

Humpback whales **(***Megaptera novaeangliae)* are managed by NMFS. In 2016, NMFS revised the listing status of humpback whales and divided the global population into 14 DPSs. Three DPSs of humpback whales occur in Alaska: the Western North Pacific DPS, ESA-listed as endangered, the Mexico DPS, ESA-listed as threatened, and the Hawaii DPS, which is not ESA-listed. The Western North Pacific DPS includes a portion that breeds near Okinawa and the Philippines and another portion whose breeding location is unknown. This population migrates to feeding grounds in the northern Pacific. The Mexico DPS of humpback whales breed along the Pacific coast of mainland Mexico and the Revillagigedos Islands. This population feeds in concentrations from California to the Aleutian Islands. The Hawaii DPS breeds in Hawaii, and migrates north to the Bering Sea, Gulf of Alaska, and northern British Columbia to feed. In Cook Inlet, the humpback whales most likely to be encountered are expected to be 89% Hawaii DPS, 10.5% Mexico DPS, and 0.5% Western North Pacific DPS (NOAA 2016a; 2016b). The DPSs are not distinguishable by sight. Humpback whales are also protected by the MMPA. Humpback whale sightings in Cook Inlet were rare historically but have increased in recent years. They occur in Cook Inlet in low numbers and in the offshore waters extending to the 200 nm EEZ in greater numbers (CISCP 2017). It is unlikely humpback whales will be in the project area.

Fin whales (*Balaenoptera physalus*) are ESA-listed as endangered and are protected under the MMPA. They are managed by NMFS. Fin whales can be found in the Gulf of Alaska during summer, and occasionally may enter Cook Inlet (CISCP 2017). Fin whales have also been observed in the Gulf of Alaska and around Kodiak during winter months, but it is still unknown if these individuals remain in the area year round or migrate (Mizroch et al. 2009). It is unlikely fin whales will be present in the project areas.

Birds

Five groups of migratory birds can be found in Cook Inlet in nearshore waters or adjacent uplands, including seabirds, waterfowl, shorebirds, diving birds, and raptors or birds of prey (RPI 1985; WPG 2012). Seabirds, such as puffins and murres, are typically only found on shore during nesting (ADF&G 1994). There are no known seabird colonies in the vicinity of the Cross Inlet Project ROW (USFWS 2011). Waterfowl, such as geese and ducks, use shorelines and bays. Shorebirds, such as sandpipers and turnstones, use tidal mudflats and rocks. Raptors, such as bald eagles, may prey on marine birds (WPG 2012). Common waterfowl in upper Cook Inlet include trumpeter swans, geese, dabbling ducks, and diving ducks (ADF&G 1994). Several bald eagle nests are located along the Chuit River about two miles south of the Tyonek Pipeline ROW at Ladd Landing. A bald eagle nest is located about three miles west of the CIGGS-A Pipeline western ROW (RPI 1985).

The western portion of the CIGGS-A Pipeline is less than two miles northeast of Audubon Alaska's Trading Bay Important Bird Area (IBA). This habitat includes intertidal mudflats and is an important migratory stop in the spring for shorebirds. The Tyonek Pipeline is about two miles south of the Susitna Flats IBA which includes vegetated and unvegetated tidal flats and supports large numbers of waterfowl during the spring migration, as well as a great diversity of shorebirds. Almost the entire population of the nominate race of the rock sandpiper (*Calidris ptilocnemis ptilocnemis*) overwinters in upper Cook Inlet feeding on clams in the intertidal mudflats from mid-October to mid-May, including Trading Bay and Susitna Flats (Audubon Alaska 2014; CISCP 2017). This population is a high-priority Species of Greatest Conservation Concern for ADF&G (ADF&G 2015).

Trading Bay State Game Refuge is located several miles southwest of the western portion of the CIGGS-A Pipeline, and is entirely encompassed within the Trading Bay IBA. ADF&G 2017l describes bird species in, and their use of, this habitat:

> Trading Bay wetlands provide critical spring feeding, summer nesting, and fall staging habitat for thousands of ducks, geese, swans, and cranes. The first habitat to be used in spring is a narrow band of ice-free coast where large concentrations of waterfowl rest and feed. Canada geese (including the lesser, cackling, and Taverner's sub-species), lesser snow geese, Pacific white-fronted geese, Tule white-fronted geese, and trumpeter and tundra swans use the area in large numbers. Small numbers of Pacific brant are also found. As spring break-up moves inland, waterfowl disperse throughout Trading Bay to nest. Particularly high concentrations of nesting trumpeter swans are found along the Kustatan River. Nesting ducks include mallard, pintail, green-winged teal, wigeon, shoveler, common eider, mergansers, scoters, scaup, and goldeneye. Loons, shorebirds, and bald eagles also nest on the refuge. Tule geese are known to nest in the McArthur River drainages and molt in the Middle River area. In the fall, waterfowl populations once again concentrate in flocks on the refuge in preparation for their southward migration.

The west side of the CIGGS-A Pipeline ROW is located in Beshta Bay, which is known to support waterfowl in the fall (RPI 1985, ADF&G 2000) (see Figure 5).

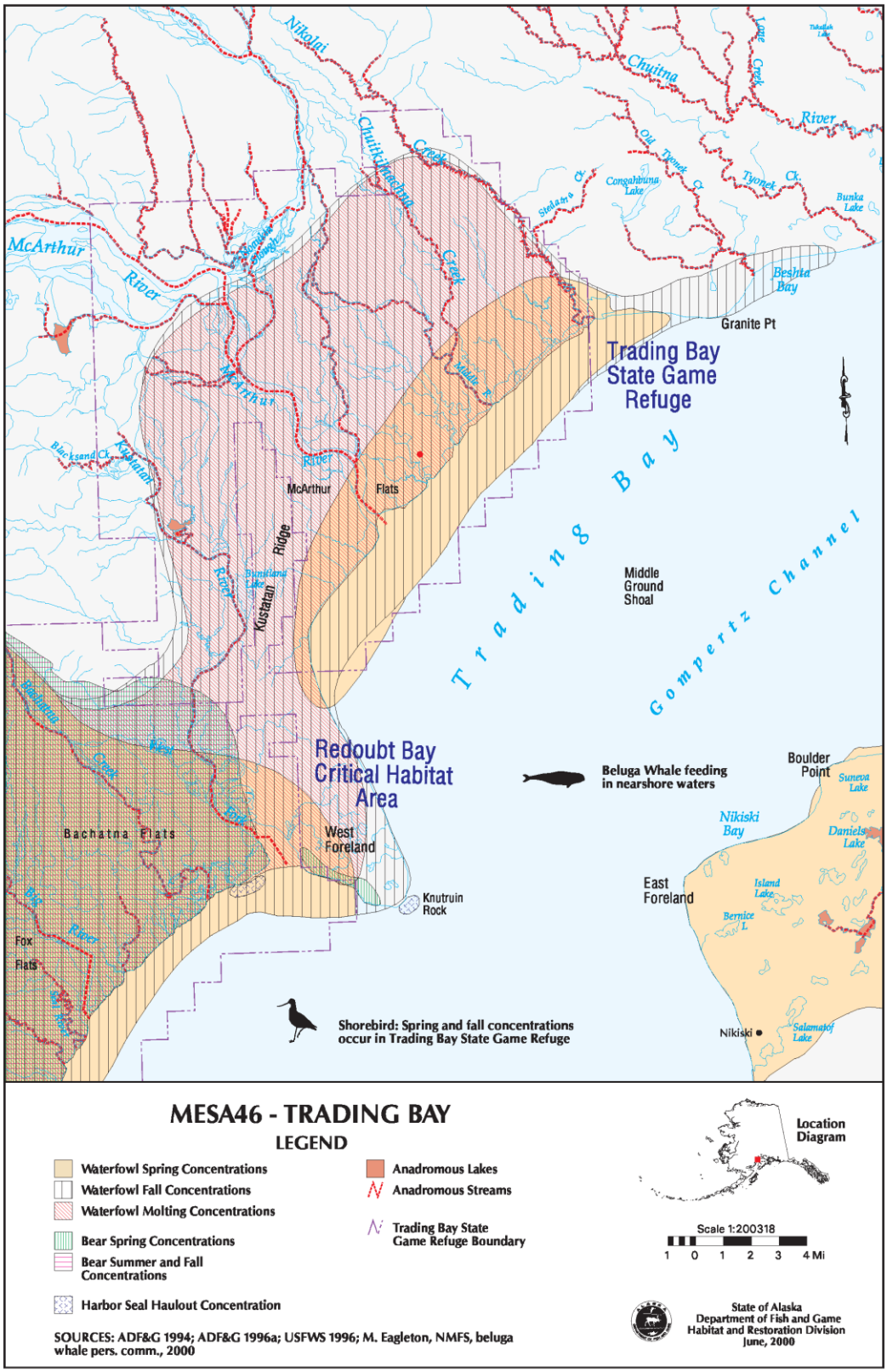

Figure 5. Wildlife concentrations in Trading Bay. Note fall waterfowl concentrations in Beshta Bay. *Source*: ADF&G 2000.

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Susitna Flats State Game Refuge is located several miles northeast of the Tyonek Pipeline, and is entirely encompassed within the Susitna Flats IBA. ADF&G 2017m describes bird species in, and their use of, this habitat:

> Perhaps the most spectacular feature of the Susitna Flats State Game Refuge - and certainly the prime reason for its refuge status - is the spring and fall concentration of migrating waterfowl and shorebirds. Usually by mid-April, mallards, pintails, and Canada geese are present in large numbers. Peak densities are reached in early May when as many as 100,000 waterfowl are using the refuge to feed, rest, and conduct their final courtship prior to nesting. The refuge also hosts several thousand lesser sandhill cranes and upwards of 8,000 swans. Northern phalaropes, dowitchers, godwits, whimbrels, snipe, yellowlegs, sandpipers, plovers, and dunlin are among the most abundant of shorebirds. Most of the ducks, geese, and shorebirds move north or west to nest in other areas of the state. About 10,000 ducks - mostly mallards, pintails, and green-winged teal, remain to nest in the coastal fringe of marsh ponds and sedge meadows found in the refuge. Recently, Tule geese, a subspecies of the greater white-fronted goose, have been discovered to nest and stage on Susitna Flats. In the fall, migrant waterfowl and shorebirds once again arrive in growing numbers to rest and feed on sedge meadows, marshes, and intertidal mud flats.

Although waterfowl and shorebirds will largely be concentrated in the nearby tidal flats and coastal wetlands of the IBAs and State Game Refuges, they, as well as seabirds, are likely to be present in nearshore waters of western Cook Inlet and the Cross Inlet Project.

Nikishka Bay, located less than two miles northeast of the eastern portion of the CIGGS-A Pipeline, and the uplands adjacent to the CIGGS-A Pipeline and Nikishka Bay are known to support nesting and staging waterfowl from April through August. Waterfowl, seabirds, and shorebirds are likely to be present in nearshore waters of the project area (RPI 1985).

More detailed descriptions of the birds, bird species, and distribution can be found in the Cook Inlet Areawide Oil and Gas Lease Sale, Final Finding, January 20, 2009, Chapter 4 - Habitat, Fish and Wildlife, pages 4-21 to 4-32; the Knik Arm Crossing Draft Environmental Impact Statement 2006; the Trading Bay State Game Refuge and Redoubt Bay Critical Habitat Area Management Plan, July 1994; and the Susitna Flats State Game Refuge Management Plan, March 1988. These documents are incorporated herein by reference.

2.) Description of Sport Fishing and Hunting in the vicinity.

Sport Fishing

The Cross Inlet Project is within the Southcentral Alaska Upper Cook Inlet Salt Waters regulatory boundary for sport fishing. On the west side of Cook Inlet, both proposed pipeline projects are within the West Cook Inlet Management Unit of the Northern Cook Inlet sport fish management area. Between 1977 and 2014, this unit accounted for 7% of the average harvest from the Northern Cook Inlet management area, with the majority being coho and sockeye salmon (Oslund et al. 2017). On the east side of Cook Inlet, the CIGGS-A Pipeline is in the Northern Kenai Peninsula Management Area (Begich et al. 2017). Recreational fishing within the ROW for the Cross Inlet Project is expected to be limited during summer from boats targeting Pacific halibut (B. Marston, Fishery Biologist, ADF&G Sport Fish, Soldotna, personal communication, October 24, 2017). Major sport fisheries occur in many freshwater streams, such

as the Chuit, Theodore, Lewis, and Beluga rivers in west Cook Inlet and the Kenai, Kasilof, and Swanson rivers in east Cook Inlet (Begich et al. 2017; Oslund et al. 2017). These streams are located near the project sites but are outside of the ROW.

Personal Use

There are four locations in upper Cook Inlet with personal use fisheries for salmon: with set gillnets and dip nets at the mouth of the Kasilof River, with dip nets at the mouth of the Kenai River, with dip nets in the Beluga River, and with dip nets in Fish Creek (5 AAC 77.540). None of these personal use salmon fisheries would likely be impacted by the Cross Inlet Project.

There is a personal use smelt (5 AAC 77.527) and personal use herring (5 AAC 77.531) fishery that occurs in the marine waters of Cook Inlet. Both fisheries are open in salt water from April 1 through May 31. Eulachon, or hooligan, personal use fisheries are also open in fresh waters of Cook Inlet from April 1 through June 15 (ADF&G 2017c). Most harvest from the smelt personal use fishery in UCI typically occurs in the Twentymile River area and Kenai River, with additional harvest coming from the Susitna River, Little Susitna River, Deshka River, Placer River, Yentna River, the Turnagain Arm area, and north of the Ninilchik River (Shields 2005).

There is a popular personal use fishery for razor clams in lower Cook Inlet south of East Foreland that has been closed since 2015 due to low abundance (ADF&G 2017g). This fishery is outside the CIGGS-A ROW and is not likely to be impacted by the Cross Inlet Project.

Educational Fisheries

Educational Fishery Permits are issued by the ADF&G Division of Sport Fish on an annual basis. Several permits were issued in 2017 for educational fisheries in upper Cook Inlet, but none were located within the Cross Inlet Project ROW. For several years the Native Village of Tyonek was issued an Educational Fishery Permit for waters of Cook Inlet between North Foreland and the Beluga airstrip, but this permit has not been issued since 2010.

Sport Hunting

ADF&G maintains harvest records for game species based on geographic units. All of the proposed Tyonek Pipeline and the western portion of the CIGGS-A Pipeline is within Game Management Unit (GMU) subunit16B. The eastern portion of the CIGGS-A Pipeline falls within GMU subunit 15A.

The brown bear population in GMU 16B is estimated to be between 625 and 1,250 individuals. Between regulatory year (RY) (begins July 1 and ends June 30) 2004 and 2014, annual brown bear harvest in GMU 16B has ranged from a low of 66 to a high of 146 (Peltier 2015). The black bear population in GMU 16B is estimated to be between 3,200 and 3,800 individuals. Between RY 2008 and 2012, annual black bear harvest in GMU 16B ranged from a low of 200 to a high of 551. On average, 114 black bears have also been harvested annually from legal bait stations during this time (Peltier and Rinaldi 2014a). The moose population in GMU 16B (excluding Kalgin Island) is estimated at 6,782 ± 1,562 individuals. Between RY 2003 and 2012, annual moose harvest in GMU 16B ranged from a low of 128 to a high of 232 (Peltier and Rinaldi 2014b).

The brown bear population on Kenai Peninsula (GMUs 7 and 15) is 582 individuals, based on USFWS mark-recapture data extrapolated to all brown bear habitat on the peninsula. Between RY 2009 and 2013, brown bear harvest in GMUs 7 and 15 ranged from a low of 5 to a high of 96 (Selinger 2015). The black bear population on Kenai Peninsula (GMUs 7 and 15) is estimated to be greater than 4,000 individuals. Between RY 2008 and 2012, black bear harvest in GMU 15A ranged from a low of 41 to a high of 89. Additional black bear harvest from bait stations during 2009 to 2013 includes an average of 28 individuals annually (Herreman 2014a). The moose population in GMU 15A is estimated at 1,569 individuals. Between RY 2008 and 2012, annual moose harvest in GMU 15A ranged from a low of 4 to a high of 119 (Herreman 2014b).

Large game species may travel within the Cross Inlet Project ROW (e.g., bears will dig for clams in mudflats). There is a chance bears could be harvested opportunistically below mean high tide.

ADF&G and the USFWS cooperatively manage migratory bird hunting through the Pacific Flyway Council (ADF&G 2017e; PFC 2017). Recommendations for subsistence spring/summer migratory bird harvests are developed through the Alaska Migratory Bird Co-Management Council, which includes the USFWS, ADF&G, and representatives of the Alaska Native population (AMBCC 2017). Migratory birds may travel within the Cross Inlet Project ROW and could be harvested below mean high tide.

3.) Description of the Commercial Fisheries in the vicinity.

The commercial fishery for Cook Inlet is large and divided into two management areas by the ADF&G, the UCI and LCI. The Cross Inlet Project is within the UCI management area, which is divided into the Central and Northern districts. Currently, there are commercial fisheries in UCI for all five species of Pacific salmon, Pacific herring, smelt, and razor clams (Shields and Dupuis 2017). Pacific salmon and smelt are the only species commercially fished in the vicinity of the Cross Inlet Project.

The Tyonek Pipeline and the western CIGGS-A Pipeline will transect the Northern District of the UCI commercial fishing area (5 AAC 21.200). The only gear allowed in all of the Northern District for salmon is set gillnets (5 AAC 21.330). This gear is fished very close to shore (less than 0.5 miles offshore from mean high tide), even though the gear may legally be deployed in all marine waters of the Northern District (P. Shields, Fishery Biologist, ADF&G Commercial Fisheries, Soldotna, October 16, 2017, personal communication). The Tyonek Pipeline and western CIGGS-A Pipeline ROW enters the marine waters in commercial fishing statistical area 247-20, which are those waters north of Granite Point and South of Three Mile Creek (Figure 6). In 2017, there were 14 limited entry permit holders that reported commercial salmon harvest on their permits in statistical area 247-20 (Table 1).

Commercial fishing with set gillnets in the Northern District has two general seasons. The first is the early Chinook salmon fishery, guided by provisions in 5AAC 21.366 Northern District King Salmon Management Plan. This fishery is open 7:00 a.m. to 7:00 p.m. on Mondays from May 25 through June 24. The second is the general salmon fishery which opens on June 25 until closed by emergency order (5 AAC 21.310), which typically occurs in late September. Fishing periods occur on Mondays and Thursdays from 7:00 a.m. to 7:00 p.m. Shore fishery lease ADL

24318 is within the proposed Tyonek Pipeline ROW near Ladd Landing, and several other shore fishery leases are located along the shoreline north of Ladd Landing (ADL 24873, 24356, and 24357). Shore fishery leases ADL 224902 and ADL 221827 are located about 1.5 to 2 miles southwest of the CIGGS-A Pipeline ROW in west Cook Inlet.

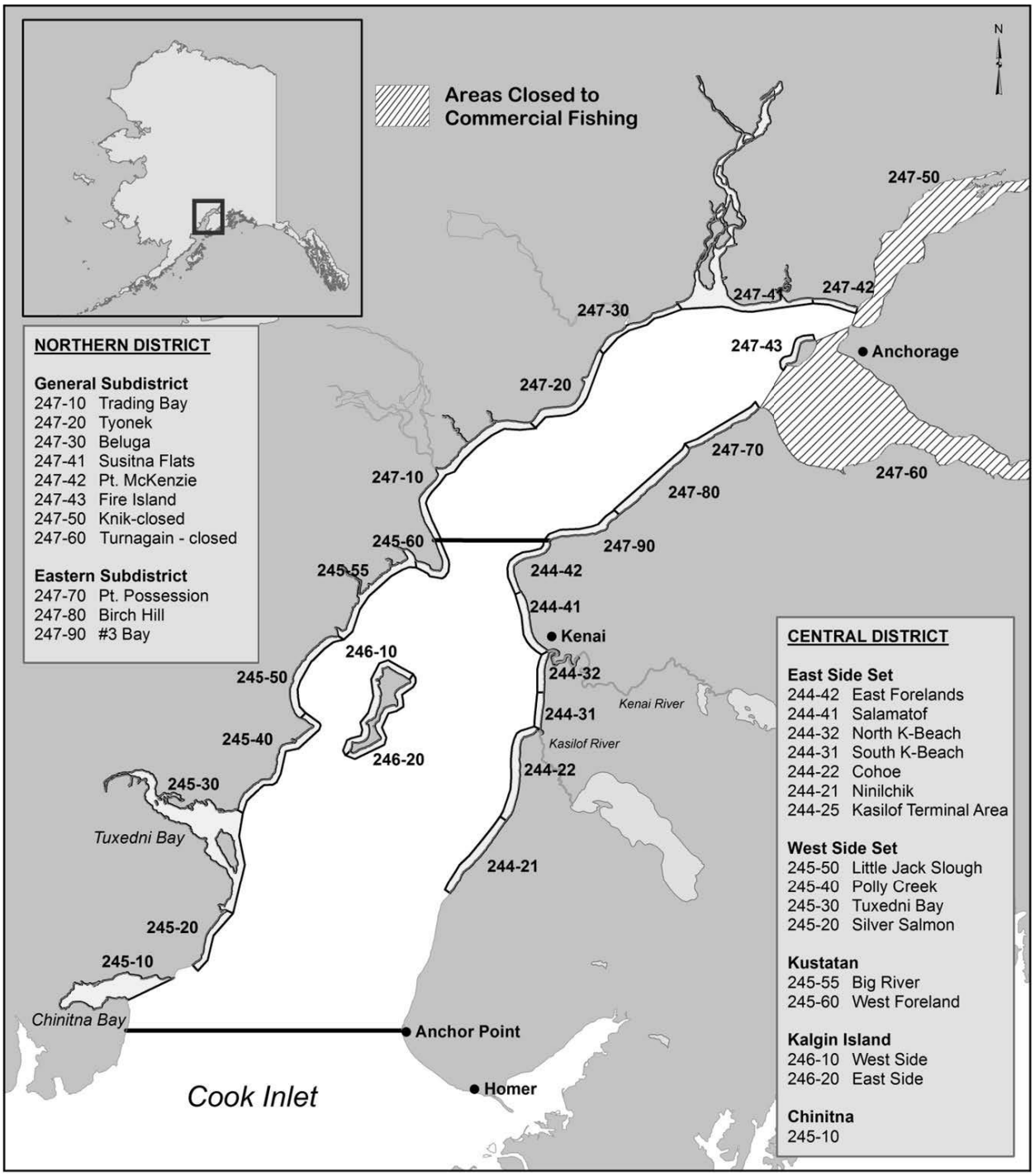

Figure 6. Upper Cook Inlet commercial set gillnet statistical areas. *Source*: Shields and Dupuis 2017.

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Table 1. No. of set gillnet commercial fishing permits reporting harvest by statistical area in the Northern District, 2017. *Source*: P. Shields, Fishery Biologist, ADF&G Commercial Fisheries, Soldotna, October 16, 2017, personal communication.

Statistical Area	Subdistrict	No. Permits Fished
247-10	Trading Bay	7
247-20	Tyonek	14
247-30	Beluga	6
247-41	Susitna Flats	8
247-42	Pt. McKenzie	7
247-43	Fire Island	6
247-70	Pt. Possession	13
247-80	Birch Hill	13
247-90	#3 Bay	9

The CIGGS-A Pipeline comes ashore on the east side of Cook Inlet in the waters of the Upper Subdistrict of the Central District (5 AAC 21.200) in the East Foreland Section (statistical area 244-42) (Figure 6). In these waters, both set and drift gillnetting gear is allowed. Set gillnetting on the east side of Cook Inlet, north of the Kenai River to Boulder Point, is limited to no further than one mile from the mean high tide mark on the Kenai Peninsula shoreline (5 AAC 21.200(b)(2)(B)). However, fishing with set gillnets in this area is largely confined to near-shore operations (within 0.5 miles of shore) due to strong tidal influence. The fishing season for set gillnets in this area is open from July 8 through August 15 (5 AAC 21.310). Regular fishing periods are from 7:00 a.m. to 7:00 p.m. on Mondays and Thursdays, but typically numerous emergency orders are issued providing more fishing opportunities in order to increase sockeye salmon harvest to meet existing escapement goals. In 2017, there were 28 set gillnet permit holders that reported harvest in statistical area 244-42 (Figure 6 and Table 2). Shore fishery lease ADL 225970 is located along the shoreline less than one mile west of the CIGGS-A Pipeline ROW as it reaches the eastern shore, and several other shore fishery leases are located along the East Foreland shoreline south of ADL 225970.

Table 2. No. of set gillnet commercial fishing permits reporting harvest by statistical area north of the Kenai River in 2017. *Source*: P. Shields, Fishery Biologist, ADF&G Commercial Fisheries, Soldotna, October 16, 2017, personal communication.

Statistical Area	Subdistrict	No. Permits Fished
244-41	Salamatof	60
244-42	East Forelands	28

The drift gillnet fishery in the Central District is open no earlier than June 19 and fishing closes in this area no later than August 15 (5 AAC 21.310). Nearly 500 vessels fish the marine waters of the Central District, although in the area where the CIGGS-A Pipeline comes ashore on the east side of Cook Inlet, fishing with drift gillnets is limited by geography and strong tidal currents.

A small commercial dip net fishery for smelt (hooligan) occurs in salt waters of the Northern District between the Chuit River and the Little Susitna River (5 AAC 21.505). This fishery is open from May 1 to June 30 and may not exceed 100 tons of smelt annually. In 2016, 4 permit holders reported a total harvest of 95.8 tons from this fishery (Shields and Dupuis 2017). During this fishery smelt is typically harvested from the Susitna River area. In 2017, the Board of Fisheries passed a proposal to increase allowed harvest in this fishery to a maximum of 200 tons (P. Shields, ADF&G Commercial Fisheries, Soldotna, October 27, 2017, personal communication).

The Pacific herring fishery in UCI is open in the Upper Subdistrict of the Central District where the CIGGS-A Pipeline ROW in eastern Cook Inlet. This fishery is not allowed closer than 600 ft of the mean high tide mark on the Kenai Peninsula and is generally concentrated in the Clam Gulch area (Shields and Dupuis 2017). Impacts by the CIGGS-A Pipeline ROW to this fishery are not anticipated. Razor clams are harvested commercially from UCI beaches on the west side of Cook Inlet, particularly from the Polly Creek/Crescent River area (Rumble et al. 2016). No commercial groundfish or shellfish fisheries occur in the vicinity of the Cross Inlet Project (J. Rumble, Fishery Biologist, ADF&G Commercial Fisheries, Homer, October 27, 2017, personal communication).

4.) Description of Subsistence Use in the vicinity.

Alaska law defines subsistence as "noncommercial, customary and traditional uses." Although most of the Cook Inlet area is designated as "nonsubsistence" (ADF&G 2017i), a subsistence set net fishery exists in the Tyonek Subdistrict, north of the project area, within the Northern District of the UCI Management Area (Shields and Dupuis 2017). A State-regulated Tier II subsistence game hunt also occurs in GMU 16B in the Beluga area, allowing the harvest of moose (ADF&G 2017a).

The MMPA allows for traditional harvest and use of marine mammals by coastal Alaska Natives. State and federal laws define subsistence uses as the "customary and traditional uses" of wild resources for food, clothing, fuel, transportation, construction, art, crafts, sharing, and customary trade. Subsistence uses are central to the customs and traditions of many cultural groups in Alaska.

Small whales traditionally hunted in Cook Inlet include the beluga whale. Since 1999, NMFS has worked cooperatively with the Cook Inlet Marine Mammal Council (CIMMC, disbanded in 2012), the Native village of Tyonek, Cook Inlet Treaty Tribes, Alaska Beluga Whale Committee, and Alaska Native beluga whale hunters to co-manage the subsistence use of beluga whales in Cook Inlet pursuant to Section 119 of the MMPA (Shelden 2011). To promote the long-term recovery of the whales while allowing for a subsistence hunt by Alaska Natives, the NMFS implemented a long-term harvest plan (NMFS 2017d). Harvest levels are established every 5 years based on the most recent 5-year average population abundance and a 10-year measure of the population growth rate (Muto et al. 2017).

The communities of Tyonek and Beluga are rural communities that utilize fish and game from the region for subsistence purposes on the west coast of Cook Inlet near the Cross Inlet Project ROW. Many residents, including the community of Nikiski, located near the CIGGS-A Pipeline ROW in eastern Cook Inlet, harvest and use wild resources.

Subsistence use by residents of Tyonek, Beluga, and Nikiski are presented below and more detailed information can be found on ADF&G's Community Subsistence Information System online database and mapper at http://www.adfg.alaska.gov/sb/CSIS/, and in the Timing Concerns, Tyonek Harvest Use Table, Beluga Harvest Use Table, and Nikiski Harvest Use Table enclosures. Information on subsistence use of a variety of resources and search areas has been included to show widespread subsistence activities in communities in the vicinity of the Cross Inlet Project. Access to harvest use areas and disturbances to wildlife during construction of the Tyonek Pipeline could impact subsistence harvest or attempted harvest activities.

Tyonek

Tyonek is a mostly Dena'ina Athabascan community with a broad array of environmental features that support a productive ecosystem and provides habitat for both marine and freshwater aquatic species as well as land mammals and birds (Jones et al. 2015).

ADF&G collected comprehensive data on the Tyonek community's 2013 subsistence harvest and use activities. Individual participation in the harvest of wild resources varied by activity: gathering plants and berries (81%), fishing activities (74%), hunting large land mammals (51%), hunting birds (15%), and hunting or trapping small land mammals (9%). The total harvest by Tyonek residents in 2013 was 24,249 pounds composed of a wide range of wild resources (Figure 7). The number of households using a resource is not always directly proportional to the top resources harvested by pounds usable weight. For instance, blueberries contributed about 3% to the overall harvest even though this species was used by 61% of households. This suggests that certain resources are important to households despite being harvested in relatively small quantities (Jones et al. 2015).

There is a subsistence setnet fishery in the Tyonek Subdistrict of the UCI Northern District, which includes those waters of the Northern District within mean lower low tide from a point one mile south of the southern edge of the Chuitna River south to the easternmost tip of Granite Point (5 AAC 01.555). Subsistence fishing for salmon in this subdistrict has occurred regularly for decades. Similar to the commercial salmon fishery in this area, there are two distinct time periods and both fisheries require a permit. The first is open from May 15 to June 15 on Tuesdays, Thursdays, and Fridays from 4 a.m. to 8 p.m. This fishery primarily targets Chinook salmon and is the more popular of the two seasons. The second is open on Saturdays from 6 a.m. to 6 p.m. between June 16 and October 15, but few permits are issued for this fishery (Shields and Dupuis 2017).

In 2015, 83 permits were issued for the Tyonek Subdistrict subsistence salmon fishery, including 60 permits issued to Tyonek residents (72%) and 23 permits issued to other Alaska residents (17%). Residents of Tyonek accounted for 84% of the estimated harvest total (2,165 salmon), including 82% of the reported Chinook salmon harvest (878 Chinook salmon) (Fall et al. *in prep*). Of the total reported subsistence salmon harvest in 2015, 744 were Chinook salmon, 331 were coho salmon, 237 were sockeye salmon, 41 were pink salmon, and 5 were chum salmon. In 2016, 60 permit

holders harvested 813 Chinook salmon, 206 coho salmon, 164 sockeye salmon, 9 pink salmon, and 4 chum salmon in the Tyonek Subdistrict subsistence salmon fisheries (Shields and Dupuis 2017).

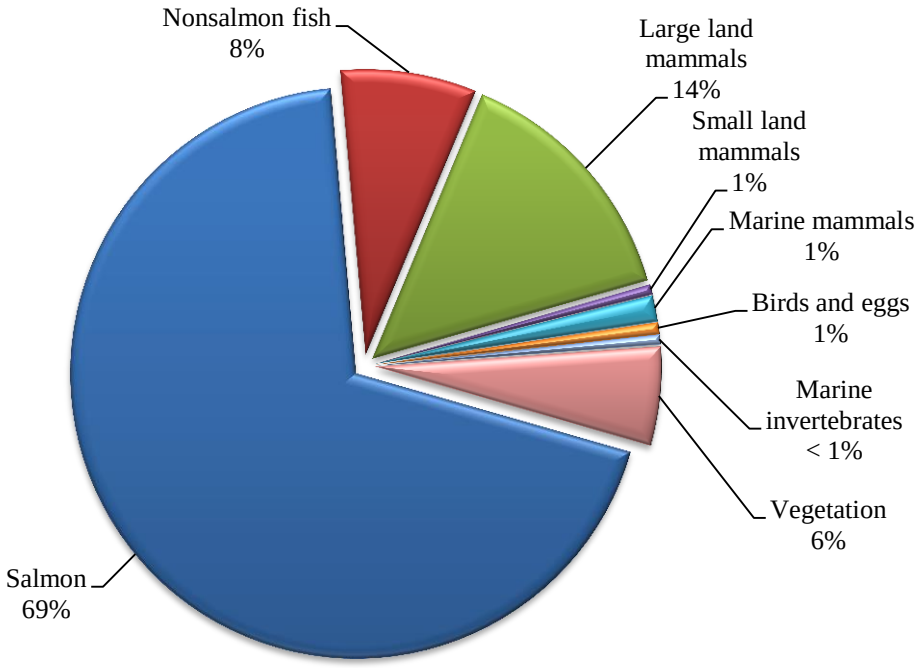

Figure 7. Composition of harvest by resource category in pounds usable weight, Tyonek, 2013 (Jones et al. 2015).

Nonsalmon fish made up 8% of the overall harvest of wild resources for the community of Tyonek in 2013 (Figure 7). About 1,863 pounds of nonsalmon fish harvested in 2013, composed of eulachon (79%), rainbow trout (12%), steelhead (3%), flounder (2%), Dolly Varden (1%), Pacific halibut (1%), northern pike (1%), unknown trout (<1%), and unknown nonsalmon fish (<1%). Although the majority of the eulachon search and harvest areas for Tyonek residents was within the Beluga River, they were also harvested using set gillnets on the beach near the community. The search and harvest areas for Dolly Varden in 2013 included several lakes and along the beach near the community. Pacific halibut were harvested in Cook Inlet from the beach near Beshta Bay, just north of Granite Point. Steelhead trout were harvested in Nikolai Creek just a few miles north of Trading Bay. Several of these harvest areas are within or in close proximity to the Cross Inlet Project ROW (Jones et al. 2015).

Hunting opportunities near Tyonek include those available in GMU 16, with opportunities for harvesting black and brown bears, caribou, Dall sheep, moose, gray wolves, and wolverines, as well as hunting and trapping for small game and furbearers. There is also a Tier II hunt for bull moose within GMU 16B from December 15 through March 31 available to Alaska residents only. Moose made up the entirety of Tyonek's large land mammal harvest in 2013, with a total harvest of 3,471 pounds. Moose are an important species for subsistence in Tyonek, and in 2013 an estimated 74% of households used moose. In 2013, moose search areas were along the roadways near the

community and extended north of the Beluga River and south to the Trading Bay mud flats and along the McArthur River (Jones et al. 2015).

Small land mammals were not frequently used or harvested by Tyonek households in 2013. Harvest included beavers, snowshoe hares, and porcupines, all of which were harvested between August and November. The search and harvest areas for small land mammals occurred close to the community (Jones et al. 2015).

A total of 360 pounds of marine mammals were harvested by Tyonek community members in 2013, all of which were harbor seals. Seals were harvested in several areas near the community of Tyonek. Search areas included about 20 miles along the Cook Inlet coast from the McArthur Flats north to the Beluga River (Jones et al. 2015). Steller sea lions do not regularly occur in upper Cook Inlet and no Steller sea lions were harvested in 2008 by Tyonek residents (Wolfe et al. 2009).

In 2013, harvest of birds and eggs totaled 166 pounds. The majority of birds (129) were harvested during the fall months; 21 birds were harvested in winter, 27 in summer, and 22 in spring. For spruce grouse, the timing of harvests was predominantly during the summer (22 birds) and fall (26 birds). Bird eggs were gathered on the beach located along the west side of the mouth of the Chuitna River. Primary search and harvest areas for upland game birds were near the center of the community and along the Tyonek road system. Tyonek residents searched for upland game birds as far north as the Beluga River. Primary hunting areas for migratory waterfowl included the beach near Granite Point, the mud flats in Trading Bay, and the area just north of the mouth of the McArthur River. Some migratory waterfowl were sought on the beach at the mouth of the Chuitna River. Besides state migratory bird hunting opportunities, residents of Tyonek are also able to participate in federal subsistence hunting regulations, including a season from April 2 to May 31 and from August 1 to 31 (Jones et al. 2015).

In 2013, marine invertebrates harvested by Tyonek households included razor clams (89%) and king crab (11%). Harvest areas were on beaches south of Tyonek, including near Clam Gulch (Jones et al. 2015).

Vegetation was used by 90% of Tyonek households in 2013, with a total of 1,352 pounds of edible plants and berries were harvested. The vast majority of the vegetation harvest was composed of berries (95%). Plants and greens made up the remaining 5% of the harvest for this resource category. Vegetation was harvested from several areas near Tyonek. Both plants and berries were harvested within the immediate area near the community and along the Chuitna River. In 2013, total estimated 789 cords of wood were harvested by the community and used by 80% of Tyonek households. Wood is considered an important resource and is part of the seasonal round of harvest of wild resources by Tyonek residents. In 2013, 58% of Tyonek households reported that a majority (76–99%) of their home heating source came from firewood and 31% said that more than one-half (51–75%) of their home heat came from firewood. Firewood was harvested near the community and also along the Tyonek roadways (Jones et al. 2015).

All wild resource search and harvest areas from the past three comprehensive surveys conducted in Tyonek, 1983–1984 , 2005–2006, and 2013, are show in Figure 8. The map data depict Tyonek residents' harvest and use areas over a 30-year span. Comparing the historical and contemporary

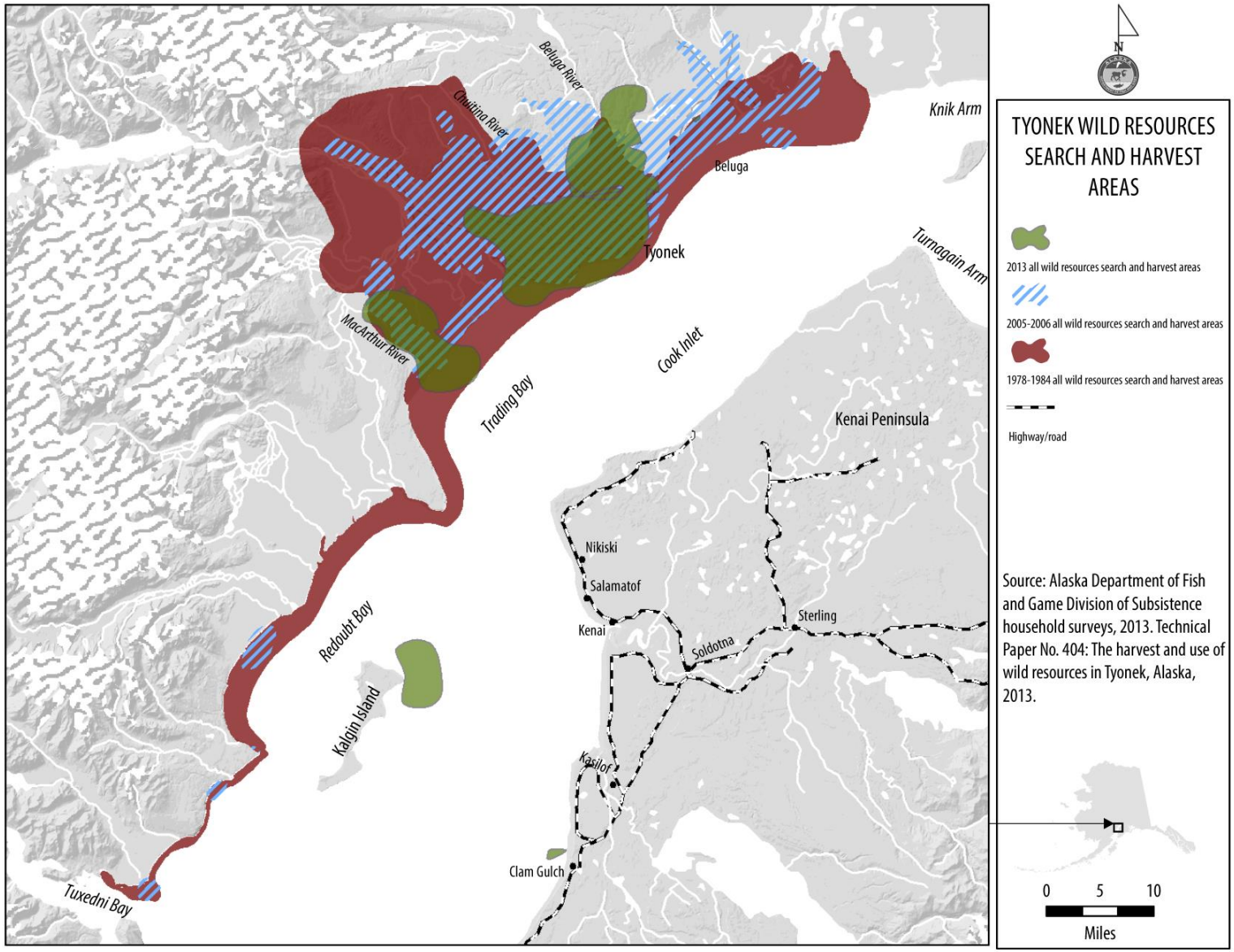

Figure 8. Tyonek wild resource search and harvest areas over a 30-year span (Jones et al. 2015).

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map data demonstrates the continuity in Tyonek residents' search and harvest areas over the past 3 decades. The harvest locations of salmon and nonsalmon fish have remained constant over time. Similarly, search and harvest areas for birds, plants, berries, and wood encompass the same geographic area in all three study years (Jones et al. 2015).

Beluga

The present-day community of Beluga lies within the traditional territory of the Upper Inlet Dena'ina. In 2006, Beluga was a dispersed, primarily non-Alaska Native community located 12 miles north of Tyonek. A systematic household harvest survey of Beluga residents was conducted by ADF&G for the 2005-2006 study year. During this time, Beluga residents used and harvested a variety of wild resources, most of which were available close to the community (Stanek et al. 2007).

During the 2005-2006 study year, 100% of Beluga households used, attempted to harvest, and harvested at least one type of fish, wildlife, or wild plant resource. On the individual level, almost every Beluga resident (95%) participated in at least one resource harvest activity. Harvest activities most commonly pursued by Beluga residents were fishing (89%), gathering plants (76%), hunting game birds and mammals (68%), and trapping or hunting furbearers (32%). The significance of wild resources in the annual food supply of Beluga residents was demonstrated by the estimated percentages of meat, fish, and birds used annually that originated from wild sources. Almost half (49%) of households estimated that more than 50% of their annual meat, fish, and bird supply came from wild sources, and 14% more said that between 26% and 50% did so. Of all interviewed households in Beluga, 21% said that all their meat, fish, and birds came from harvests of fish and wildlife. In 2005-2006, harvest by Beluga residents totaled 8,086 pounds of usable weight, varying in composition by resource category (Figure 9) (Stanek et al. 2007).

Beluga residents harvested all five species of Pacific salmon in 2005-2006, the majority of which were coho and Chinook salmon. Subsistence salmon fishing took place beginning in May on inlet beaches near Tyonek and Beluga and continued into June. A few Beluga residents obtained subsistence salmon set net permits and fished in the Tyonek Subdistrict. Summer months, beginning in mid-June and extending through August, were busy with salmon fishing. Residents fished in local streams and rivers including the Chuitna, Threemile, Theodore, Lewis, and Beluga rivers and Lone Creek, among others (Stanek et al. 2007).

Non-salmon fish harvested by Beluga residents in 2005-06 were primarily freshwater species. Freshwater fishing includes the taking of pike and rainbow trout. In 2005-2006, Beluga residents traveled to Threemile Creek, located about two miles north of the Tyonek Pipeline ROW, to harvest pike. Other lakes outside the Threemile Creek system remain popular for the harvest of trout. Although marine species occur in the immediate vicinity of Beluga, they are usually only taken incidentally in set nets. Harvest of non-salmon fish in this study year included eulachon, rainbow trout, Dolly Varden, steelhead trout, Northern pike, and Pacific halibut. Eulachon were harvested in late spring by dip net in the rivers and set nets on inlet beaches (Stanek et al. 2007).

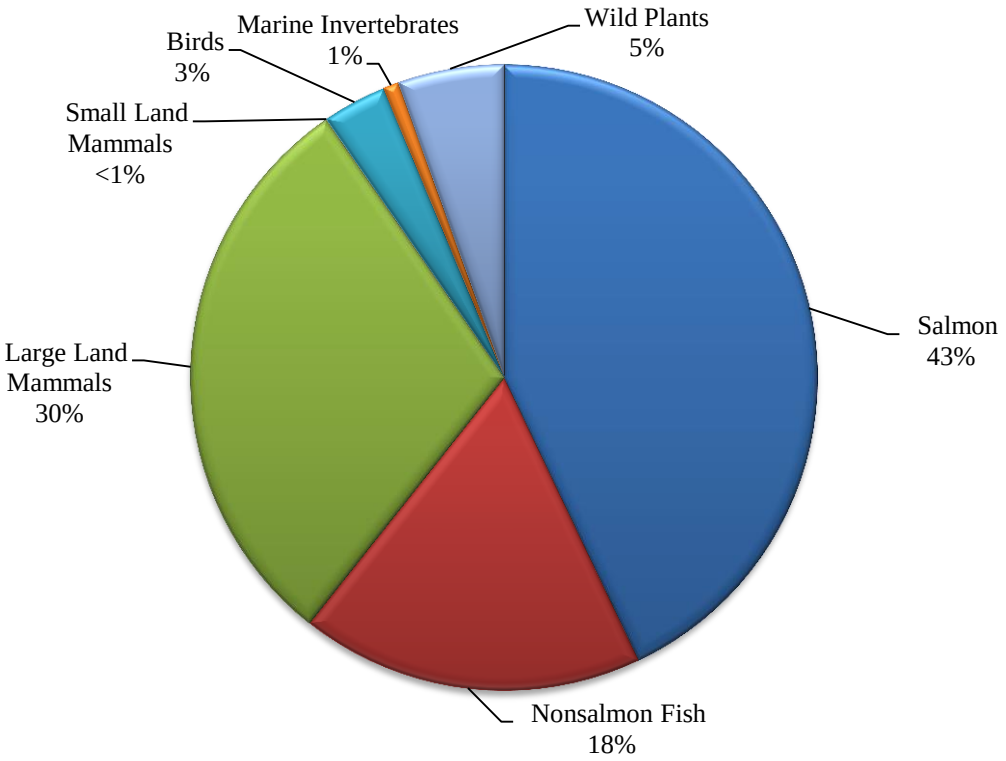

Figure 9. Wild resource harvests by category, Beluga residents, 2005-2006 (Stanek et al. 2007).

Hunting opportunities near Beluga include those available in GMU 16, with opportunities for harvesting black and brown bears, caribou, Dall sheep, moose, gray wolves, and wolverines, as well as hunting and trapping for small game and furbearers. There is also a Tier II hunt for bull moose within GMU 16B from December 15 through March 31 available to Alaska residents only. Beluga households used five species of large land mammals totaling 2,403 pounds of food in 2005/2006, including black bear, caribou, moose, muskox, and Dall sheep. All Beluga households used moose meat, which made up the largest amount of the total pounds harvested (1,736). Brown and black bear hunting took place in the spring months. Harvest areas for large land mammals were typically located within a five to ten mile radius of Beluga, expanding to a broader area in the fall and winter of the study year. In 2005-2006, small land mammals were a relatively small portion of Beluga residents' total harvest. Furbearers were important for the sale of fur, which is also used in the manufacture of crafts. Harvest included 126 marten, 38 beavers, 49 red squirrels, 12 weasels, 11 red foxes, 10 coyotes, 10 muskrats, 6 wolves, 4 land otters, and 3 mink. Spring beaver and muskrat trapping and hunting began in late winter (Stanek et al. 2007).

The hunting of abundant populations of both upland game birds and migratory waterfowl ordinarily occurs on the tidal flats, within forests, and tundra areas around Beluga during specific seasons. Upland game bird hunting for grouse and ptarmigan occurs by regulated season from August 10 through March 31. Grouse were the main species taken in early fall. Ptarmigan were taken after freeze-up and throughout the winter months. Waterfowl, including ducks, geese, cranes, and shorebirds can be legally taken by Beluga residents during the September 1 to December 16 season. Most waterfowl hunting ends by mid-October and occurs on the flats of the

Susitna Flats State Game Refuge and wetland areas near the community. Hunting of upland game birds was important to Beluga households, with 79% hunting grouse and ptarmigan (Stanek et al. 2007).

Saltwater clams were not harvested by residents in the vicinity of Beluga, but freshwater clams were harvested in sandy bottomed lakes around Beluga. Beluga households did not hunt or use marine mammals in the 2005-06 study year, and generally have not used these resources in the past (Stanek et al. 2007).

The harvest and use of wild plants and wood were significant features of the wild resource patterns among Beluga households, with 93% of households harvesting these resources in 2005-2006. During the study year, plant, berry, and wood harvest areas were located primarily along the road and trail systems around Beluga (Stanek et al. 2007).

Nikiski

The area now known as Nikiski was the traditional homeland of the Dena'ina (Tanaina) Indians and is located in proximity to many marine and terrestrial resources. ADF&G collected comprehensive data on the Nikiski community's 2014 subsistence harvest and use activities. Approximately 77% of individuals harvested at least one resource in 2014. Individual participation in the harvest or hunting of wild resources varied by resource category: vegetation (61%), fish (56%), large land mammals (19%), birds and eggs (12%), small land mammals (9%), and marine mammals (less than 1%). Total harvest of wild foods by the community was about 292,421 pounds in 2014 composed of a wide range of wild resource categories (Figure 10). Salmon is the most harvested of all the subsistence resource categories used by Nikiski households, followed by large land mammals, nonsalmon fish, and vegetation. About 95% of Nikiski households used one or more, 88% attempted to harvest, and 79% successfully harvested a wild resource (Jones and Kostick 2016).

The community of Nikiski harvested approximately 135,315 pounds of salmon in 2014, including sockeye salmon (68%), coho salmon (22%), Chinook salmon (4%), pink salmon (4%), chum salmon (4%), and unknown salmon (including landlocked salmon and harvests not specified by species) (<1%). A variety of gear types were used, including home use commercial harvest, subsistence or personal use fishing gear, and rod and reel. Nikiski residents primarily fished for salmon along the western coast of the Kenai Peninsula as well as in several river drainages emptying into Cook Inlet, including the Swanson River and Kenai River located, respectively, about 12 miles north and 18 miles south of the CIGGS-A Pipeline ROW. Some households fished for salmon in saltwater near Nikiski, in Kachemak Bay, and in offshore waters in lower Cook Inlet (Jones and Kostick 2016).

The total harvest of nonsalmon fish in Nikiski in 2014 was approximately 53,278 pounds composed of Pacific halibut (70%), rainbow trout (10%), eulachon (4%), Dolly Varden (3%), and smaller percentages of many other species. Fishing for nonsalmon fish primarily occurred in the same locations that were used to harvest salmon. Ice fishing occurs in winter and early spring when local lakes are frozen, and switches to rod and reel fishing after breakup. Some households harvested Pacific halibut from shore on the beaches near Nikiski (Jones and Kostick 2016), and harvest may occur within the CIGGS-A Pipeline ROW.

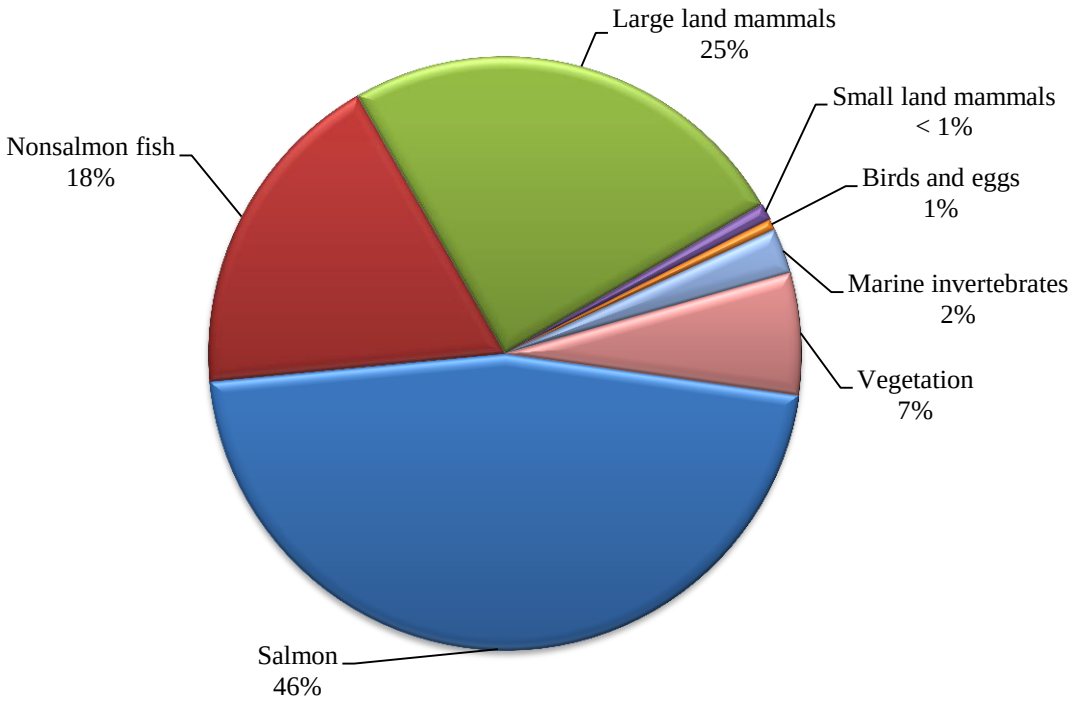

Figure 10. Composition of harvest by resource category in pounds usable weight, Nikiski, 2014 (Jones and Kostick 2016). *Note*: Categories having zero pounds of usable weight are not included.

The community of Nikiski harvested approximately 72,854 lb of large land mammals in 2014, including about 108 moose, 70 black bears, and 70 caribou. All large land mammals were harvested between May and September. Moose and caribou were harvested in August and September during the regulatory season. Black bears were harvested throughout the spring and summer. Search and harvest areas for large land mammals were primarily in proximity to the community of Nikiski in the northwestern quadrant of the Kenai Peninsula (Jones and Kostick 2016).

Small land mammal harvest by Nikiski households in 2014 included snowshoe hares, beavers, martens, muskrats, porcupines, lynx, North American river (land) otters, red (tree) squirrels, and others. The most harvested species by individual animals were snowshoe hares (502), beavers (139), and martens (139). Small land mammals were harvested throughout the year with most being harvested in the winter months. Harvests in December, January, and February accounted for 60% of the small land mammal harvest. Snowshoe hares were harvested primarily in late winter, but some harvests occurred in August and October. Porcupines and red squirrels were harvested primarily in the summer. All river otters and muskrats were harvested in November and December. Nikiski residents sought small land mammals primarily in proximity to their community on the Kenai Peninsula. In 2014, no household attempted to harvest these marine mammals in the community (Jones and Kostick 2016).

An estimated 1,782 lb of birds and eggs were harvested by the community, species included grouse, ptarmigan, waterfowl, and gulls. Birds were harvested throughout the year in Nikiski,

though about 57% of the harvests were during the fall. All waterfowl were harvested during the summer and fall. Grouses and ptarmigan were harvested throughout the year. The search and harvest areas for birds and eggs were quite diverse for Nikiski in 2014. Many households sought birds in the immediate vicinity of the community (Jones and Kostick 2016).

A large variety of marine invertebrates was harvested by the community in 2014, such as clams, shrimp, and crab. These were harvested from a variety of locations in Cook Inlet outside of the CIGGS-A Pipeline ROW (Jones and Kostick 2016).

Vegetation was used by a greater percentage of Nikiski households (81%) in 2014 than any other resource category, and a total of approximately 19,229 pounds were harvested. The vast majority of this harvest was composed of berries (83%), followed by plants and greens (12%), mushrooms (4%), and seaweeds (1%). Approximately 55% of Nikiski households used wood in 2014. Berries and greens were harvested primarily in proximity to the road system on the Kenai Peninsula, with the majority of harvests occurring near the community of Nikiski (Jones and Kostick 2016).

In Nikiski, most residents harvested wild foods in proximity to the community or in other parts of southcentral Alaska (Figure 11). The 2014 ADF&G study was the first to record comprehensive wild resource search and harvest areas for the community of Nikiski (Jones and Kostick 2016).

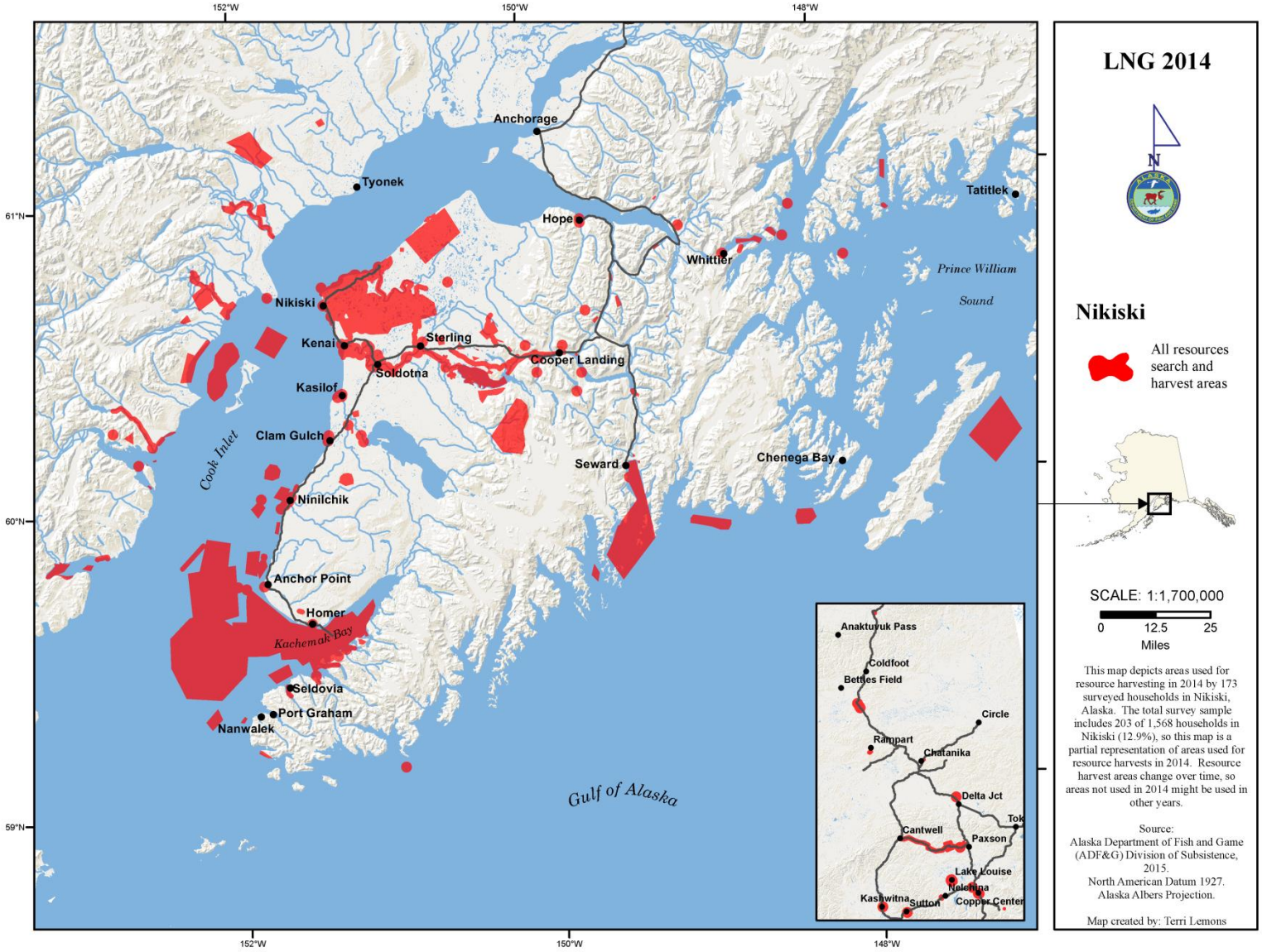

Figure 11. Wild resource search and harvest areas, Nikiski, 2014 (Jones and Kostick 2016).

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5.) ADF&G proposed mitigation measures.

Many of the proposed mitigation measures below were modified from Chapter Nine of ADNR's Cook Inlet Areawide Oil and Gas Lease Sale Final Finding of the Director, January 20, 2009, accessed at http://dog.dnr.alaska.gov/Information/DocumentLibrary. ADF&G supports the use of these mitigation measures in the Cross Inlet Pipeline ROW leases, or other similar conditions that maintain their intent. Some of the proposed mitigation measures below include comments in italics with further justification for their inclusion.

Pipelines that must cross marine intertidal waters will be constructed beneath the marine waters of the intertidal area using directional drilling techniques, unless the Pipeline Coordinator, in consultation with ADF&G and the local borough, approves an alternative method based on technical, environmental, and economic justification. Pipelines must be located and constructed to prevent obstruction to marine navigation and fishing operations.
Comment: Set and drift gillnets may legally be set to a depth of about 23 feet (maximum of 45 meshes equal to or less than 6-inches). Horizontal direction drilling is recommended to avoid impacts to commercial fishing activities at the shore fishery lease site in the ROW near Ladd Landing (ADL 24318).

Pipeline construction and maintenance activities will be restricted when necessary to prevent unreasonable conflicts between these activities and subsistence, commercial, sport, personal use, or educational harvest activities. In order to avoid conflicts with subsistence, commercial, sport and educational harvest activities, restrictions may include alternative site selection, requiring directional drilling, seasonal drilling or construction restrictions, and other technologies deemed appropriate by the Pipeline Coordinator.
Comment: see Timing Concerns (enclosed). Pipeline activities that may have far reaching impacts to subsistence activities beyond the immediate ROW should be considered and minimized to ensure subsistence activities are not disrupted at any time throughout the year.

Public access to, or use of, the lease area may not be restricted except within the immediate vicinity of the work site during construction. Areas of restricted access must be identified. The pipeline shall not be located so as to block access to or along navigable or public waters as defined in AS 38.05.965.
Comment: Public lands and waters in Alaska provide tremendous opportunities to experience our fish, wildlife, and other public resources. ADF&G works to ensure that the public's right to access publicly owned resources is protected. The public may access coastal waters of Cook Inlet for hunting, fishing, subsistence, or recreational uses, such as wildlife viewing and photography.

Traditional and customary access to subsistence or personal use harvest areas will be maintained unless reasonable alternative access is provided to subsistence or personal users. "Reasonable access" means generally available to users. Lessees will consult nearby communities, and native organizations for assistance in identifying and contacting local subsistence users.

Wildlife

Pipeline construction within Cook Inlet beluga whale critical habitat should occur from mid-August to October, or whatever time period is recommended by NMFS, to reduce disturbances to beluga whales.

Comment: Cook Inlet beluga whales were monitored from passive acoustic recorders deployed in Trading Bay and offshore of the mouth of Beluga River (i.e., on both sides of the western portion of the Cross Inlet Project location). At Beluga River, belugas were consistently detected from November through July with very minimal detections August through October. However, a mid-August start date is recommended to allow a buffer for a change is salmon run timing, which belugas are in the area feeding on at this time of year. At Trading Bay, belugas were consistently detected from December through April.

To avoid disturbance to beluga whales and other marine mammals, minimize or terminate construction and maintenance activities when belugas are present in the area of operation. Dedicated marine mammal observers are recommended to be present so that construction activities can be temporarily stopped or reduced when marine mammals are present.

Harbor seal pupping occurs May/June (peak) and molting activity occurs May – September (peaking in August). Activities that may disturb hauled-out seals in nearby harbor seal concentration areas should be avoided during these critical seasons, especially during pupping.

To minimize disturbances to harbor porpoises, construction and associated activities which may cause animals to leave the areas should be avoided during peak times when smelt (eulachon) or longfin smelt are detected (April – May and September – October) (Shelden et al. 2014).

To avoid disturbance to harbor seals hauled-out on land (Figure 3) ensure construction crews do not go onto shore in these areas and keep vessels offshore by 500 m (546 yards).

Comment: Jansen et al. (2010) noted that harbor seals were disturbed by vessels at distances up to 500 m (546 yards/1640 feet); NMFS recognizes the current guideline of 100 yards may be inadequate.

When aerial support is used, pilots should be advised to maintain a 1,500-foot minimum altitude when flying over marine mammals (including animals hauled-out on land). Buzzing, hovering, landing, taking off, and taxiing near marine mammals on land or in the water is likely to cause disturbances.

The use of lights should be limited to areas where work is occurring; all other lights should be extinguished. Lights should be downshielded to illuminate the work area to minimize impacts to wildlife.

Operations involving excessively noisy equipment should "ramp-up" sound sources, allowing marine mammals a chance to leave the area before sounds reach maximum levels.

Marine mammal comments: Pipeline construction, maintenance activities, and associated activities (e.g. vessel and helicopter use) may adversely affect marine mammals in the water or hauled out on land, through noise, vibration, and disruption of movements. These elevated sound levels may cause some species to temporarily disperse from or avoid construction areas. Marine mammals most likely to be present and therefore impacted include the critically

endangered Cook Inlet beluga whale, harbor porpoise, and harbor seal in the water and possibly to harbor seals hauled-out on land in concentration areas recognized by the NMFS.

Belugas rely on the use of sound to communicate, navigate, and find prey as do harbor porpoises. High levels of human-generated noise may interfere with the ability to carry out these functions in beluga whales (ADF&G 2017d). Harbor porpoise have an apparent sensitivity to anthropogenic sounds of various types which has resulted in avoidance behaviors (Forney et al. 2017). Anthropogenic noise can impact communication, breeding and other life functions of marine mammals (Firestone and Jarvis 2007).

Construction of the new pipeline will likely affect marine mammal habitat in several ways: seafloor disturbance, increased turbidity, and generation of additional underwater sound in the area. Marine mammals also could be indirectly affected if benthic prey species were displaced or destroyed by construction activities.

Permits and authorizations are required under the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA) to conduct activities that may result in the "take" of a protected species. All marine mammals are protected under the Marine Mammals Protection Act (MMPA) of 1972. The MMPA prohibits the "take" of marine mammals in U.S. waters. Take is defined as hunting, harassing, capturing, and killing marine mammals. Exceptions include incidental harassment and take authorizations for certain activities such as Alaska Native subsistence harvest, commercial fishing operations, and scientific research.

As such, a federal government Special 'take' Permit may be required for harbor seals, harbor porpoises, beluga whales and species that may occur in the project area. 'Take' is defined as "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture or kill." Harassment includes any act which disrupts behavioral patterns, including but not limited to, migration, breathing, nursing, feeding, or sheltering (i.e. hauling out). A 'take' that results in disruption of behavioral patterns includes a disturbance that causes hauled out pinnipeds to enter the water.

Questions about the MMPA and authorized activities should be directed to NOAA Fisheries Alaska Region Protected Resources Division at 907-586-7235 or NOAA Fisheries Small Take Program at 301-713-2322.

Timing Concerns

Use/Timing Concern	General Timing	Notes
Activity/Sensitive Life Stage		
UCI Northern District Chinook salmon set gillnets	May 25–June 24	0700-1900 Mondays
UCI Northern District Salmon set gillnets	June 25–EO (usually late Sept)	0700-1900 Mondays and Thursdays
CI Beluga Susitna Delta Sensitive Area	Mid-April–mid-Oct	
CI beluga whales – feeding in shallow, coastal waters and river mouths	spring–summer	
Harbor seal pupping	May/June–peak	
Harbor seal molting	May–Sept	Peaks in Aug
Harbor porpoise feeding	Apr–May	
Harbor porpoise feeding	Sept–Oct	
UCI Central District salmon set gillnets	July 8–Aug 15	0700-1900 Mondays and Thursdays, usually additional openings by EO
UCI Central District salmon drift gillnets	~June 19–EO (no later than Aug 15)	
Tyonek Subsistence Seasonal Use/Activity		
Eulachon fishing	April–May	Depends on weather and tidal conditions
Spring federal subsistence waterfowl season	Apr 2–May 31	
Tyonek Subdistrict Chinook salmon fishing	May 15–June 15	0400-2000 Tuesdays, Thursdays, and Fridays
Tyonek Subdistrict Subsistence salmon	June 16–Oct 15	0600-1800 Saturdays
Rainbow trout and Dolly Varden rod and reel fishing	July	In nearby rivers and lakes
Berry picking	late July–weather permitting	
GMU 16B moose hunt	Aug 20–Sept 25	
Moose, beaver, and porcupine hunting	Aug 20–Sept 25	Travel by boat to McAurthur River
Upland game bird season (spruce grouse, ptarmigan)	Aug 10–Mar 31	Grouse are usually taken in the fall and ptarmigan after freeze-up and throughout winter
Federal subsistence waterfowl season	Aug 1–31	
General waterfowl season	Sept 1–Dec 16	Most waterfowl hunting is over by mid to late Oct
Tier II moose hunting	Dec 15–Mar 31	
Harvesting fresh greens	spring–weather permitting	

ATTACHMENT C

Digging for clams	spring	
Harvest firewood	winter	
Ice fishing (trout and Dolly Varden)	winter–lake thaw	
Beaver trapping	late winter	
Beluga Subsistence Seasonal Use/Activity		
Eulachon fishing	late spring	
Brown and black bear hunting	spring	
Ice fishing (rainbow trout and Northern pike)	winter–lake thaw	
Beaver and muskrat trapping and hunting	late winter–spring	
Spring subsistence salmon fishing	May–June	On inlet beaches near Tyonek and Beluga
Tyonek Subdistrict Chinook salmon fishing	May 15–June 15	0400-2000 Tuesdays, Thursdays, and Fridays
Salmon fishing	mid-June–Aug	
Plant and berry gathering	mid-June–weather permitting	
GMU 16B moose hunt	Aug 20–Sept 25	
Upland game bird season (spruce grouse, ptarmigan)	Aug 10–Mar 31	Grouse are usually taken in the fall and ptarmigan after freeze-up and throughout winter
General waterfowl season	Sept 1–Dec 16	Most waterfowl hunting is over by mid to late Oct
Tier II moose hunting	Nov 15–Feb 28	
Nikiski Subsistence Seasonal Use/Activity		
Moose and caribou hunting	August–late Sept	
Ice fishing; hunting and trapping small mammals	winter/early spring–lake thaw	
Rod and reel fishing	spring/post-breakup–weather permitting	
Harvest of vegetation and mushrooms	spring/post-breakup–weather permitting	
Harvest of salmon and nonsalmon	throughout summer	
Berry picking	late summer–weather permitting	
Upland game bird harvest	Aug–Mar	
Firewood harvest	winter	
Brown and black bear hunting	spring–summer	

Note: This table is a general reference for timing concerns, not a definitive listing of strict timing windows (i.e., regulatory season may change, subsistence activities may be modified depending on weather and wildlife, etc.). UCI=upper Cook Inlet; CI=Cook Inlet; EO=emergency order; GMU=Game Management Unit.

ATTACHMENT C

	Percentage of households					Harvest weight (lb)			Harvest amount[a]			confidence
Resource	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	limit (±) harvest
All resources	**100.0**	**100.0**	**100.0**	**85.7**	**77.6**	**24,248.9**	**384.9**	**169.9**				**14.4**
Salmon	**89.8**	**85.7**	**81.6**	**49.0**	**59.2**	**16,765.5**	**266.1**	**117.5**				**17.5**
Chum salmon	8.2	8.2	8.2	0.0	2.0	101.5	1.6	0.7	18.0	ind	0.3	53.9
Coho salmon	65.3	63.3	59.2	32.7	40.8	3,169.4	50.3	22.2	691.6	ind	11.0	20.8
Chinook salmon	85.7	77.6	75.5	40.8	55.1	10,246.9	162.6	71.8	1,096.4	ind	17.4	15.5
Pink salmon	12.2	12.2	12.2	0.0	8.2	150.8	2.4	1.1	66.6	ind	1.1	73.7
Sockeye salmon	46.9	42.9	42.9	22.4	26.5	3,088.3	49.0	21.6	667.7	ind	10.6	55.0
Landlocked salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Spawning sockeye salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown salmon	2.0	2.0	2.0	0.0	0.0	8.5	0.1	0.1	1.3	ind	0.0	94.8
Nonsalmon fish	**53.1**	**40.8**	**40.8**	**34.7**	**22.4**	**1,863.2**	**29.6**	**13.1**				**64.3**
Pacific herring	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Pacific herring roe/unspecified	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Pacific herring sac roe	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Pacific herring spawn on kelp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Eulachon (hooligan, candlefish)	30.6	18.4	18.4	20.4	16.7	1,468.1	23.3	10.3	451.4	gal	7.2	81.9
Unknown smelt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Pacific (gray) cod	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown cod	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown flounder	2.0	2.0	2.0	0.0	0.0	38.6	0.6	0.3	12.9	ind	0.2	94.8
Lingcod	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown greenling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Pacific halibut	14.3	6.1	4.1	10.2	0.0	25.6	0.4	0.2	25.6	lb	0.4	90.0
Black rockfish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Red rockfish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown rockfish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Sablefish (black cod)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown sculpin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown shark	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown sole	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Stickleback (needlefish)	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0

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Resource	Percentage of households: Use %	Attempt %	Harvest %	Receive %	Give %	Harvest weight (lb): Total	Mean per household	Per capita	Harvest amount[a]: Total	Unit	Mean per household	confidence limit (±) harvest
Nonsalmon fish, continued												
Wolffish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Alaska blackfish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Burbot	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Arctic char	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Dolly Varden	8.2	8.2	8.2	0.0	0.0	27.8	0.4	0.2	30.9	ind	0.5	48.3
Arctic grayling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Northern pike	4.1	2.0	2.0	4.1	0.0	14.4	0.2	0.1	5.1	ind	0.1	94.8
Sheefish	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Longnose sucker	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Rainbow trout	28.6	24.5	24.5	10.2	10.2	230.4	3.7	1.6	164.6	ind	2.6	30.3
Steelhead	2.0	2.0	2.0	0.0	2.0	54.0	0.9	0.4	12.9	ind	0.2	94.8
Unknown trout	2.0	2.0	2.0	0.0	0.0	1.8	0.0	0.0	1.3	ind	0.0	94.8
Unknown whitefishes	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown nonsalmon fish	2.0	2.0	2.0	0.0	0.0	2.6	0.0	0.0	2.6	ind	0.0	94.8
Large land mammals	**73.5**	**61.2**	**12.2**	**67.3**	**24.5**	**3,471.4**	**55.1**	**24.3**				**36.6**
Black bear	0.0	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Brown bear	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Caribou	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Moose	73.5	59.2	12.2	67.3	24.5	3,471.4	55.1	24.3	7.7	ind	0.1	36.6
Dall sheep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Small land mammals	**12.2**	**10.2**	**6.1**	**6.1**	**4.1**	**139.5**	**2.2**	**1.0**				**53.6**
Beaver	8.2	6.1	4.1	4.1	0.0	77.1	1.2	0.5	5.1	ind	0.1	66.3
Coyote	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Red fox	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Snowshoe hare	2.0	2.0	2.0	0.0	0.0	10.3	0.2	0.1	5.1	ind	0.1	94.8
North American river (land) otter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Lynx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Marmot	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Marten	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Mink	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Muskrat	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Porcupine	6.1	6.1	4.1	2.0	4.1	52.1	0.8	0.4	11.6	ind	0.2	84.7

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Resource	Percentage of households: Use %	Attempt %	Harvest %	Receive %	Give %	Harvest weight (lb): Total	Mean per household	Per capita	Harvest amount[a]: Total	Unit	Mean per household	confidence limit (±) harvest
Small land mammals, continued												
Arctic ground (parka) squirrel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Red (tree) squirrel	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Least weasel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Gray wolf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Wolverine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Marine mammals	**14.3**	**10.2**	**6.1**	**14.3**	**6.1**	**360.0**	**5.7**	**2.5**				**55.8**
Harbor seal	6.1	8.2	6.1	2.0	6.1	360.0	5.7	2.5	6.4	ind	0.1	55.8
Unknown seal	2.0	2.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Sea otter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Steller sea lion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Beluga whale	10.2	2.0	0.0	10.2	2.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Birds and eggs	**32.7**	**30.6**	**28.6**	**8.2**	**16.3**	**165.9**	**2.6**	**1.2**				**40.4**
Bufflehead	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Canvasback	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Gadwall	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Goldeneye	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Mallard	8.2	6.1	6.1	4.1	2.0	34.7	0.6	0.2	34.7	ind	0.6	72.9
Common merganser	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Red-breasted merganser	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Northern pintail	12.2	10.2	10.2	2.0	6.1	22.6	0.4	0.2	28.3	ind	0.4	52.3
Unknown scaup	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown scoter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Northern shoveler	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Green-winged teal	2.0	2.0	2.0	0.0	2.0	7.7	0.1	0.1	25.7	ind	0.4	94.8
American wigeon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown ducks	4.1	4.1	2.0	2.0	0.0	5.4	0.1	0.0	7.7	ind	0.1	94.8
Canada goose	4.1	4.1	4.1	0.0	2.0	7.7	0.1	0.1	6.4	ind	0.1	77.8
Snow goose	2.0	2.0	2.0	0.0	0.0	7.7	0.1	0.1	2.6	ind	0.0	94.8
White-fronted goose	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown goose	2.0	4.1	2.0	0.0	2.0	25.7	0.4	0.2	5.1	ind	0.1	94.8
Unknown swan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Sandhill crane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0

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	Percentage of households					Harvest weight (lb)			Harvest amount[a]			confidence
Resource	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	limit (±) harvest
Birds and eggs, continued												
Common snipe	2.0	2.0	2.0	0.0	0.0	1.3	0.0	0.0	12.9	ind	0.2	94.8
Unknown loon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Spruce grouse	14.3	16.3	14.3	2.0	6.1	35.1	0.6	0.2	50.1	ind	0.8	39.0
Ruffed grouse	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown grouse	4.1	4.1	4.1	0.0	2.0	4.5	0.1	0.0	9.0	ind	0.1	72.4
Unknown ptarmigan	4.1	4.1	4.1	0.0	4.1	12.6	0.2	0.1	18.0	ind	0.3	82.1
Unknown duck eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown gull eggs	2.0	2.0	2.0	0.0	2.0	0.8	0.0	0.0	2.6	ind	0.0	94.8
Unknown tern eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Marine invertebrates	**16.3**	**12.2**	**10.2**	**8.2**	**4.1**	**131.9**	**2.1**	**0.9**				**67.7**
Butter clams	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Freshwater clams	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Horse clams	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
(steamers)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Pinkneck clams	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Razor clams	14.3	10.2	8.2	6.1	4.1	117.1	1.9	0.8	39.0	gal	0.6	75.6
Unknown clams	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Unknown cockles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Dungeness crab	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown king crab	4.1	2.0	2.0	2.0	0.0	14.8	0.2	0.1	6.4	ind	0.1	94.8
Tanner crab, bairdi	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown Tanner crab	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown crab	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown mussels	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Octopus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown scallops	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Shrimp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	lb	0.0	0.0
Vegetation	**89.8**	**89.8**	**83.7**	**46.9**	**44.9**	**1,351.5**	**21.5**	**9.5**				**33.7**
Blueberry	61.2	73.5	59.2	18.4	24.5	617.9	9.8	4.3	154.5	gal	2.5	40.4
Lowbush cranberry	16.3	16.3	14.3	6.1	8.2	63.6	1.0	0.4	15.9	gal	0.3	48.3
Highbush cranberry	49.0	44.9	44.9	14.3	22.4	536.5	8.5	3.8	134.1	gal	2.1	35.4
Crowberry	4.1	4.1	4.1	2.0	0.0	5.5	0.1	0.0	1.4	gal	0.0	89.3

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ATTACHMENT C

Resource	Percentage of households: Use %	Attempt %	Harvest %	Receive %	Give %	Harvest weight (lb): Total	Mean per household	Per capita	Harvest amount[a]: Total	Unit	Mean per household	confidence limit (±) harvest
Vegetation, continued												
Currants	14.3	16.3	14.3	2.0	2.0	21.7	0.3	0.2	5.4	gal	0.1	44.2
Raspberry	12.2	12.2	12.2	2.0	6.1	14.7	0.2	0.1	3.7	gal	0.1	67.6
Salmonberry	0.0	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Strawberry	12.2	12.2	12.2	4.1	2.0	20.6	0.3	0.1	4.8	gal	0.1	53.5
Twisted stalk berry (watermelon berry)	2.0	2.0	2.0	0.0	0.0	0.4	0.0	0.0	0.1	gal	0.0	94.8
Other wild berry	2.0	2.0	2.0	0.0	0.0	0.5	0.0	0.0	0.1	gal	0.0	94.8
Devil's club	2.0	2.0	2.0	0.0	0.0	2.6	0.0	0.0	2.6	gal	0.0	94.8
Fiddlehead ferns	2.0	2.0	2.0	0.0	0.0	1.3	0.0	0.0	1.3	gal	0.0	94.8
Hudson's Bay (Labrador) tea	14.3	16.3	14.3	2.0	6.1	27.6	0.4	0.2	27.6	gal	0.4	58.9
Wild celery	10.2	10.2	10.2	0.0	4.1	17.4	0.3	0.1	17.4	gal	0.3	46.3
Yarrow	2.0	2.0	2.0	0.0	0.0	1.3	0.0	0.0	1.3	gal	0.0	94.8
Other wild greens	6.1	6.1	6.1	0.0	2.0	20.1	0.3	0.1	20.1	gal	0.3	92.8
Unknown mushrooms	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Other wood	79.6	71.4	71.4	30.6	10.4	0.0	0.0	0.0	788.8	cord	12.5	38.4

Source ADF&G Division of Subsistence household surveys, 2014.

Note Where the percentage of households using a resource is greater than the combined receiving and harvesting households indicates use from resources obtained during a previous year.

Note For small land mammals, species that are not typically eaten show a non-zero harvest amount with a zero harvest weight. Harvest weight is not calculated for species harvested but not eaten.

a. Summary rows that include incompatible units of measure have been left blank.

Beluga Harvest Use Table. Estimated harvest and use of fish, game, and plant resources, Beluga, 2005-2006

Resource Name	Percentage of Households					Pounds Harvested			Amount Harvested*		95% Conf Limit (+/-)
	Use	Att	Harv	Recv	Give	Total	Mean HH	Per capita	Total	Mean HH	Harvest
All Resources	100.0%	100.0%	100.0%	100.0%	85.7%	8085.8	539.1	204.0			13.5%
Fish	92.9%	92.9%	85.7%	85.7%	85.7%	4905.7	327.0	123.7			13.3%
Salmon	92.9%	92.9%	85.7%	64.3%	85.7%	3471.8	231.5	87.6	583.0 Ind	38.9	14.2%
Chum Salmon	7.1%	7.1%	7.1%	0%	7.1%	112.5	7.5	2.8	21.4 Ind	1.4	58%
Coho Salmon	92.9%	78.6%	78.6%	42.9%	71.4%	1534.1	102.3	38.7	325.7 Ind	21.7	11.5%
Chinook Salmon	92.9%	92.9%	85.7%	42.9%	71.4%	1271.6	84.8	32.1	106.2 Ind	7.1	22.1%
Pink Salmon	21.4%	21.4%	21.4%	0%	0%	62.1	4.1	1.6	24.6 Ind	1.6	49.9%
Sockeye Salmon	57.1%	42.9%	35.7%	21.4%	35.7%	491.4	32.8	12.4	105.0 Ind	7.0	26.3%
Landlocked Salmon	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Spawnouts	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Spawning Sockeye	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Nonsalmon fish	85.7%	71.4%	71.4%	64.3%	42.9%	1433.9	95.6	36.2			22.1%
Herring	0%	0%	0%	0%	0%	0	0	0	0 Gal	0	0%
Herring Roe	0%	0%	0%	0%	0%	0	0	0	0 Gal	0	0%
Herring Sac Roe	0%	0%	0%	0%	0%	0	0	0	0 Gal	0	0%
Herring Spawn on Kelp	0%	0%	0%	0%	0%	0	0	0	0 Gal	0	0%
Eulachon (hooligan, candlefish)	57.1%	50.0%	50.0%	14.3%	35.7%	160.2	10.7	4.0	49.3 Gal	3.3	24.3%
Cod	7.1%	0%	0%	7.1%	0%	0	0	0	0 Ind	0	0%
Pacific Cod (gray)	7.1%	0%	0%	7.1%	0%	0	0	0	0 Ind	0	0%
Pacific Tom Cod	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Walleye Pollock (whiting)	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Flounder	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Greenling	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Lingcod	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Halibut	57.1%	7.1%	7.1%	57.1%	7.1%	53.6	3.6	1.4	53.6 Lbs	3.6	58%
Rockfish	7.1%	0%	0%	7.1%	0%	0	0	0	0 Ind	0	0%
Sablefish (black cod)	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Sculpin	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Shark	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Sole	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Stickleback (needlefish)	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Wolffish	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Blackfish	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Burbot	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
[continued]											
Char	35.7%	35.7%	35.7%	0%	7.1%	73.5	4.9	1.9	52.5 Ind	3.5	27.4%
Dolly Varden	28.6%	28.6%	28.6%	0%	7.1%	70.5	4.7	1.8	50.4 Ind	3.4	28.8%
Dolly Varden-saltwater	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Grayling	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%

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Beluga Harvest Use Table. Estimated harvest and use of fish, game, and plant resources, Beluga, 2005-2006

Resource Name	Percentage of Households					Pounds Harvested			Amount Harvested*		95% Conf Limit (+/-)
	Use	Att	Harv	Recv	Give	Total	Mean HH	Per capita	Total	Mean HH	Harvest
Northern Pike	71.4%	57.1%	57.1%	21.4%	21.4%	549.6	36.6	13.9	183.2 Ind	12.2	20.5%
Sucker	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Trout	71.4%	57.1%	57.1%	14.3%	21.4%	597.0	39.8	15.1	426.4 Ind	28.4	30.5%
Rainbow Trout	71.4%	57.1%	57.1%	14.3%	21.4%	594.0	39.6	15.0	424.3 Ind	28.3	30.7%
Steelhead	7.1%	7.1%	7.1%	0%	0%	3.0	0.2	0.1	2.1 Ind	0.1	58%
Unknown Trout	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Whitefish	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Land Mammals	100.0%	64.3%	42.9%	92.9%	57.1%	2409	161	61			27.7%
Large Land Mammals	100.0%	64.3%	35.7%	92.9%	50.0%	2403.2	160.2	60.6			27.7%
Black Bear	42.9%	28.6%	28.6%	28.6%	28.6%	372.9	24.9	9.4	6.4 Ind	0.4	27.2%
Brown Bear	0%	21.4%	0%	0%	0%	0	0	0	0 Ind	0	0%
Caribou	29%	0%	0%	29%	0%	0	0	0	0 Ind	0	0%
Moose	100.0%	64%	21%	85.7%	43%	1735.7	115.7	43.8	3.2 Ind	0.2	30.7%
Muskox	14.3%	7.1%	7.1%	7.1%	7.1%	295	20	7	1.1 Ind	0.1	22%
Dall Sheep	7.1%	7.1%	0%	7.1%	0%	0	0	0	0 Ind	0	0%
Small Land Mammals	42.9%	42.9%	35.7%	7.1%	14.3%	5.4	0.4	0.1			57.7%
Beaver	28.6%	28.6%	21.4%	7.1%	0%	0.0	0.0	0.0	37.5 Ind	2.5	49.2%
Coyote	21.4%	21.4%	21.4%	0%	0%	0	0	0	9.6 Ind	0.6	36.0%
Fox	28.6%	28.6%	28.6%	0%	7%	0	0	0	10.7 Ind	0.7	26.0%
Red Fox	28.6%	28.6%	28.6%	0%	7.1%	0	0	0	10.7 Ind	0.7	26.0%
Hare	7.1%	7.1%	7.1%	0%	0%	4.3	0	0	2.1 Ind	0.1	58%
Snowshoe Hare	7.1%	7.1%	7.1%	0%	0%	4.3	0.3	0.1	2.1 Ind	0.1	58%
Land Otter	14.3%	14.3%	7.1%	0%	0%	0	0	0	4.3 Ind	0.3	57.7%
Lynx	0%	7.1%	0%	0%	0%	0	0	0	0 Ind	0	0%
Marmot	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Marten	35.7%	35.7%	28.6%	7.1%	0%	0	0	0	126.4 Ind	8.4	42.9%
Mink	7.1%	7.1%	7.1%	0%	0%	0	0	0	3.2 Ind	0.2	58%
Muskrat	7.1%	7.1%	7.1%	0%	0%	0	0	0	10.7 Ind	0.7	58%
Porcupine	7.1%	7.1%	7.1%	0%	0%	0	0	0	6.4 Ind	0.4	58%
Squirrel	21.4%	21.4%	21.4%	0%	0%	1.1	0.1	0.0	49.3 Ind	3.3	57.7%
Parka Squirrel (ground)	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
[continued]											
Tree Squirrel	21.4%	21.4%	21.4%	0%	0%	1.1	0.1	0.0	49.3 Ind	3.3	57.7%
Weasel	14.3%	14.3%	14.3%	0%	0%	0	0	0	11.8 Ind	0.8	52.3%
Wolf	28.6%	35.7%	28.6%	0%	7.1%	0	0	0	6.4 Ind	0.4	27.2%
Wolverine	7.1%	21.4%	0%	7.1%	0%	0	0	0	0 Ind	0	0%
Marine Mammals	0%	0%	0%	0%	0%	0	0	0			0%
Seal	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Harbor Seal (saltwater)	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Sea Otter	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%

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Beluga Harvest Use Table. Estimated harvest and use of fish, game, and plant resources, Beluga, 2005-2006

Resource Name	Percentage of Households					Pounds Harvested			Amount Harvested*		95% Conf Limit (+/-)
	Use	Att	Harv	Recv	Give	Total	Mean HH	Per capita	Total	Mean HH	Harvest
Steller Sea Lion	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Whale	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Belukha	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Birds and Eggs	78.6%	78.6%	78.6%	14.3%	21.4%	266.7	17.8	6.7			21.4%
Migratory Birds	35.7%	35.7%	35.7%	7.1%	7.1%	82.2	5.5	2.1	58.9 Ind	3.9	27.9%
Ducks	28.6%	28.6%	28.6%	7.1%	0%	35.9	2.4	0.9	40.7 Ind	2.7	32.1%
Bufflehead	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Canvasback	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Gadwall	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Goldeneye	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Mallard	28.6%	28.6%	28.6%	7.1%	0%	24.6	1.6	0.6	24.6 Ind	1.6	31.2%
Merganser	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Northern Pintail	14.3%	14.3%	14.3%	0%	0%	6.9	0	0	8.6 Ind	0.6	40.6%
Scaup	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Scoter	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Northern Shoveler	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Teal	7.1%	7.1%	7.1%	7.1%	0%	0.6	0	0	2.1 Ind	0.1	58%
Green Winged Teal	7.1%	7.1%	7.1%	7.1%	0%	0.6	0	0	2.1 Ind	0.1	58%
Wigeon	7.1%	7.1%	7.1%	0%	0%	3.8	0	0	5.4 Ind	0.4	58%
American Wigeon	7.1%	7.1%	7.1%	0%	0%	3.8	0.3	0.1	5.4 Ind	0.4	58%
Unknown Ducks	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Geese	28.6%	35.7%	28.6%	0%	7.1%	28.3	1.9	0.7	16.1 Ind	1.1	33.7%
Canada Geese	21.4%	35.7%	21.4%	0%	0%	10.3	0.7	0.3	8.6 Ind	0.6	33.0%
Lesser Canada Geese (taverner/parvipes)	21.4%	35.7%	21.4%	0%	0%	10.3	0.7	0.3	8.6 Ind	0.6	33.0%
Unknown Canada Geese	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Snow Geese	0%	7%	0%	0%	0%	0	0	0	0 Ind	0	0%
White-fronted Geese	14.3%	14.3%	14.3%	0%	7.1%	18.0	1.2	0.5	7.5 Ind	0.5	39.7%
[continued]											
Swan	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Crane	7.1%	29%	7.1%	0%	0%	18.0	1.2	0.5	2.1 Ind	0.1	57.7%
Sandhill Crane	7.1%	28.6%	7.1%	0%	0%	18.0	1.2	0.5	2.1 Ind	0.1	57.7%
Shorebirds	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Common Snipe	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Seabirds & Loons	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Other Birds	78.6%	78.6%	78.6%	7.1%	21.4%	184.5	12.3	4.7	263.6 Ind	17.6	23.3%
Upland Game Birds	78.6%	78.6%	78.6%	7.1%	21.4%	184.5	12.3	4.7	263.6 Ind	17.6	23.3%
Grouse	78.6%	78.6%	78.6%	0%	21.4%	158.3	10.6	4.0	226.1 Ind	15.1	26.6%
Spruce Grouse	78.6%	78.6%	78.6%	0%	21.4%	156.0	10.4	3.9	222.9 Ind	14.9	26.5%
Ruffed Grouse	14.3%	21.4%	14.3%	0%	0%	2	0	0	3.2 Ind	0.2	41.7%
Unknown Grouse	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%

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Beluga Harvest Use Table. Estimated harvest and use of fish, game, and plant resources, Beluga, 2005-2006

Resource Name	Percentage of Households					Pounds Harvested			Amount Harvested*		95% Conf Limit (+/-)
	Use	Att	Harv	Recv	Give	Total	Mean HH	Per capita	Total	Mean HH	Harvest
Ptarmigan	42.9%	50.0%	35.7%	7.1%	0%	26.3	1.8	0.7	37.5 Ind	2.5	27.0%
Bird Eggs	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Marine Invertebrates	50.0%	35.7%	35.7%	21.4%	21.4%	65.6	4.4	1.7			42.0%
Clams	50.0%	35.7%	35.7%	21.4%	21.4%	64.3	4.3	1.6	150.0 Gal	10.0	42.9%
Butter Clams	0%	0%	0%	0%	0%	0	0	0	0 Gal	0	0%
Freshwater Clams	7.1%	7.1%	7.1%	0%	0%	3	0	0	1.1 Gal	0.1	58%
Horse Clams (Gaper)	0%	0%	0%	0%	0%	0	0	0	0 Gal	0	0%
Pacific Littleneck Clams (Steamers)	0%	0%	0%	0%	0%	0	0	0	0 Gal	0	0%
Pinkneck Clams	0%	0%	0%	0%	0%	0	0	0	0 Gal	0	0%
Razor Clams	50.0%	28.6%	28.6%	21.4%	21.4%	61.1	4.1	1.5	148.9 Gal	9.9	45.4%
Unknown Clams	0%	0%	0%	0%	0%	0	0	0	0 Gal	0	0%
Cockles	7.1%	7.1%	7.1%	0%	0%	1.3	0.1	< 0.1	0.4 Gal	0.0	58%
Crabs	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Mussels	0%	0%	0%	0%	0%	0	0	0	0 Gal	0	0%
Octopus	0%	0%	0%	0%	0%	0	0	0	0 Ind	0	0%
Scallops	0%	0%	0%	0%	0%	0	0	0	0 Gal	0	0%
Shrimp	0%	0%	0%	0%	0%	0	0	0	0 Gal	0	0%
Vegetation	92.9%	92.9%	92.9%	35.7%	50.0%	439.3	29.3	11.1			11.4%
Berries	92.9%	92.9%	92.9%	35.7%	50.0%	325.7	21.7	8.2	81.4 Gal	5.4	11.7%
Plants/Greens/Mushrooms	42.9%	42.9%	42.9%	7.1%	21.4%	113.6	7.6	2.9	28.4 Gal	1.9	29.2%
Wood	78.6%	78.6%	78.6%	7.1%	28.6%	0	0	0	66.4 Crd	4.4	13.6%

* Amount of resource harvested is individual units (Ind), unless otherwise specified. Wood is estimated in cords (crd).
SOURCE: Alaska Department of Fish and Game, Division of Subsistence Household Surveys, 2006.

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	Percentage of households					Harvest weight (lb)			Harvest amount			95% confidence limit (±) harvest
Resource	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	
All resources	**95.0**	**88.1**	**78.7**	**64.4**	**51.0**	**292,421.1**	**186.5**	**68.6**	**292,421.1**	**lb**	**186.5**	**22.9**
Salmon	**80.2**	**60.4**	**55.4**	**40.1**	**27.7**	**135,314.5**	**86.3**	**31.7**	**135,314.5**	**lb**	**86.3**	**21.1**
Chum salmon	4.5	4.5	4.5	0.5	2.0	2,241.8	1.4	0.5	409.4	ind	0.3	67.7
Coho salmon	34.2	31.2	27.2	7.9	8.4	29,348.6	18.7	6.9	6,373.2	ind	4.1	37.2
Chinook salmon	10.9	10.4	7.4	4.5	1.0	5,639.3	3.6	1.3	510.3	ind	0.3	83.7
Pink salmon	12.4	11.4	10.9	1.5	2.5	5,419.8	3.5	1.3	2,062.3	ind	1.3	49.6
Sockeye salmon	72.8	52.5	49.5	32.7	24.3	91,901.9	58.6	21.6	20,493.7	ind	13.1	20.8
Landlocked salmon	1.0	1.0	1.0	0.0	0.5	486.6	0.3	0.1	324.4	ind	0.2	167.7
Unknown salmon	4.0	1.5	1.0	2.5	1.0	276.5	0.2	0.1	61.8	ind	0.0	161.4
Nonsalmon fish	**55.0**	**42.6**	**39.1**	**24.3**	**16.3**	**53,278.3**	**34.0**	**12.5**	**53,278.3**	**lb**	**34.0**	**31.7**
Pacific herring	1.0	1.0	1.0	0.0	0.5	1,183.3	0.8	0.3	197.2	gal	0.1	180.6
Pacific herring roe (unspecified)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Pacific herring sac roe	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Pacific herring spawn on kelp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Eulachon (hooligan, candlefish)	4.5	4.0	4.0	1.0	2.5	2,133.8	1.4	0.5	656.6	gal	0.4	83.9
Unknown smelt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Sea bass	1.5	1.5	1.5	0.0	0.0	92.7	0.1	0.0	92.7	ind	0.1	112.5
Pacific (gray) cod	3.0	3.0	3.0	0.0	0.0	939.3	0.6	0.2	293.5	ind	0.2	103.3
Pacific tomcod	0.5	0.5	0.5	0.0	0.0	11.6	0.0	0.0	23.2	ind	0.0	184.4
Walleye pollock (whiting)	1.0	1.0	1.0	0.0	0.0	216.3	0.1	0.1	154.5	ind	0.1	145.6
Eel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Starry flounder	1.5	1.0	1.0	0.5	0.0	185.4	0.1	0.0	61.8	ind	0.0	145.6
Unknown flounder	0.5	0.5	0.5	0.0	0.0	46.3	0.0	0.0	15.4	ind	0.0	184.4
Lingcod	3.5	4.5	3.0	1.0	0.0	741.5	0.5	0.2	185.4	ind	0.1	94.7
Unknown greenling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Pacific halibut	43.1	30.2	26.7	21.8	11.4	37,278.2	23.8	8.7	37,278.2	lb	23.8	36.2
Black rockfish	2.0	2.0	1.5	0.5	0.0	301.2	0.2	0.1	200.8	ind	0.1	113.9
Red rockfish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Yelloweye rockfish	1.0	1.0	1.0	0.0	0.0	69.5	0.0	0.0	23.2	ind	0.0	137.2

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ATTACHMENT C

	Percentage of households					Harvest weight (lb)			Harvest amount			95% confidence limit (±) harvest
Resource	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	
Nonsalmon fish, continued												
China rockfish	0.5	0.5	0.5	0.0	0.0	46.3	0.0	0.0	15.4	ind	0.0	184.4
Unknown rockfish	1.5	1.5	1.5	0.0	0.5	347.6	0.2	0.1	115.9	ind	0.1	130.4
Sablefish (black cod)	1.5	1.5	1.5	0.0	0.5	455.0	0.3	0.1	146.8	ind	0.1	125.8
Unknown Irish lord	0.5	0.5	0.5	0.0	0.5	46.3	0.0	0.0	92.7	ind	0.1	184.4
Unknown sculpin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown shark	1.0	1.0	1.0	0.0	1.0	625.7	0.4	0.1	69.5	ind	0.0	137.2
Skates	1.0	1.0	1.0	0.0	0.0	193.1	0.1	0.0	38.6	ind	0.0	151.9
Unknown sole	1.0	1.0	1.0	0.0	0.0	231.7	0.1	0.1	231.7	ind	0.1	151.9
Wolffish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Arctic char	0.5	0.5	0.5	0.0	0.0	7.0	0.0	0.0	7.7	ind	0.0	184.4
Dolly Varden	6.9	6.4	5.9	1.0	2.0	1,881.6	1.2	0.4	1,344.0	ind	0.9	86.5
Lake trout	4.5	5.0	4.5	0.5	0.0	832.7	0.5	0.2	594.8	ind	0.4	86.8
Unknown char	0.5	0.5	0.5	0.0	0.0	21.6	0.0	0.0	15.4	ind	0.0	184.4
Arctic grayling	2.5	2.0	2.0	0.5	0.5	119.0	0.1	0.0	169.9	ind	0.1	118.7
Northern pike	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown sturgeon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Cutthroat trout	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Rainbow trout	18.8	18.3	17.3	2.0	3.5	5,244.7	3.3	1.2	3,746.2	ind	2.4	44.0
Steelhead	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown whitefishes	1.0	0.5	0.5	0.5	0.0	27.0	0.0	0.0	15.4	ind	0.0	184.4
Large land mammals	**32.7**	**28.2**	**10.9**	**21.8**	**9.9**	**72,854.1**	**46.5**	**17.1**	**72,854.1**	**lb**	**46.5**	**43.9**
Black bear	4.5	7.9	3.5	1.5	1.5	4,032.0	2.6	0.9	69.5	ind	0.0	72.9
Caribou	5.9	5.0	4.0	2.5	2.0	10,427.6	6.7	2.4	69.5	ind	0.0	66.9
Deer	1.0	0.5	0.0	1.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Mountain goat	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Moose	28.7	24.8	6.4	19.8	7.4	58,394.5	37.2	13.7	108.1	ind	0.1	51.2
Dall sheep	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Small land mammals	**7.9**	**9.4**	**6.4**	**2.0**	**2.0**	**2,705.4**	**1.7**	**0.6**	**2,705.4**	**lb**	**1.7**	**74.8**
Beaver	2.0	1.5	1.0	1.0	0.5	1,149.0	0.7	0.3	139.0	ind	0.1	130.3
Coyote	1.0	2.5	1.0	0.0	0.0	0.0	0.0	0.0	23.2	ind	0.0	137.2
Red fox	0.5	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0

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ATTACHMENT C

	Percentage of households					Harvest weight (lb)			Harvest amount			95% confidence limit (±) harvest
Resource	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	
Small land mammals, continued												
Snowshoe hare	5.0	5.4	4.5	0.5	1.0	1,004.1	0.6	0.2	502.1	ind	0.3	92.2
North American river (land) otter	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	38.6	ind	0.0	184.4
Lynx	1.0	1.0	1.0	0.0	0.0	92.7	0.1	0.0	46.3	ind	0.0	184.4
Marten	1.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	139.0	ind	0.1	156.6
Mink	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Muskrat	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	77.2	ind	0.0	184.4
Porcupine	0.5	1.0	0.5	0.5	0.5	432.6	0.3	0.1	54.1	ind	0.0	184.4
Arctic ground (parka) squirrel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Red (tree) squirrel	0.5	0.5	0.5	0.0	0.0	19.3	0.0	0.0	38.6	ind	0.0	184.4
Unknown squirrel	0.5	0.5	0.5	0.0	0.0	7.7	0.0	0.0	15.4	ind	0.0	184.4
Weasel	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	7.7	ind	0.0	184.4
Gray wolf	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Wolverine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Marine mammals	**2.5**	**0.0**	**0.0**	**2.5**	**0.5**	**0.0**	**0.0**	**0.0**	**0.0**	**lb**	**0.0**	**0.0**
Harbor seal	2.0	0.0	0.0	2.0	0.5	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown seal	0.5	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Sea otter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Steller sea lion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Bowhead whale	1.0	0.0	0.0	1.0	0.5	0.0	0.0	0.0	0.0	ind	0.0	0.0
Birds and eggs	**16.3**	**18.3**	**14.4**	**2.0**	**1.5**	**1,782.0**	**1.1**	**0.4**	**1,782.0**	**lb**	**1.1**	**59.7**
Bufflehead	0.5	0.5	0.5	0.0	0.0	15.4	0.0	0.0	38.6	ind	0.0	184.4
Unknown eider	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Goldeneye	1.0	1.0	1.0	0.0	0.0	43.3	0.0	0.0	54.1	ind	0.0	160.1
Harlequin duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Mallard	2.0	3.0	2.0	0.0	0.0	152.9	0.1	0.0	169.9	ind	0.1	115.1
Unknown merganser	0.5	0.5	0.5	0.0	0.0	13.9	0.0	0.0	15.4	ind	0.0	184.4
Long-tailed duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Northern pintail	0.5	0.5	0.5	0.0	0.0	37.1	0.0	0.0	46.3	ind	0.0	184.4
Unknown scaup	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0

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	Percentage of households					Harvest weight (lb)			Harvest amount			95% confidence limit (±) harvest
Resource	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	
Birds and eggs, continued												
Black scoter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Surf scoter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
White-winged scoter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Northern shoveler	0.5	0.5	0.5	0.0	0.0	23.2	0.0	0.0	38.6	ind	0.0	184.4
Unknown teal	1.0	1.5	1.0	0.0	0.0	46.3	0.0	0.0	154.5	ind	0.1	132.7
Unknown wigeon	1.0	1.0	1.0	0.0	0.0	18.5	0.0	0.0	61.8	ind	0.0	145.6
Unknown ducks	1.5	0.5	0.5	1.0	0.0	13.2	0.0	0.0	15.4	ind	0.0	184.4
Unknown Canada/ cackling geese	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
White-fronted goose	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown geese	0.5	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Sandhill crane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown cormorant	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown gull	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Black-legged kittiwake	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown murre	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown puffin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Spruce grouse	5.4	5.9	5.4	0.0	0.5	600.2	0.4	0.1	857.4	ind	0.5	92.5
Ruffed grouse	1.5	1.5	1.5	0.0	0.0	37.8	0.0	0.0	54.1	ind	0.0	114.4
Unknown grouse	7.4	8.9	6.4	1.0	0.0	373.1	0.2	0.1	533.0	ind	0.3	89.2
Unknown ptarmigan	2.5	3.0	2.5	0.0	1.0	351.4	0.2	0.1	502.1	ind	0.3	113.2
Unknown duck eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown goose eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Black oystercatcher eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown gull eggs	1.0	0.5	0.5	0.5	0.0	55.6	0.0	0.0	185.4	ind	0.1	184.4
Unknown tern eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0

-continued-

	Percentage of households					Harvest weight (lb)			Harvest amount			95% confidence limit (±) harvest
Resource	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	
Marine invertebrates	**19.3**	**14.9**	**13.9**	**5.9**	**3.5**	**7,258.2**	**4.6**	**1.7**	**7,258.2**	**lb**	**4.6**	**59.8**
Red (large) chitons	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Black (small) chitons	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Butter clams	6.4	5.4	5.4	1.0	0.0	945.0	0.6	0.2	315.0	gal	0.2	80.1
Horse clams	0.5	0.5	0.5	0.0	0.0	69.5	0.0	0.0	23.2	gal	0.0	184.4
Pacific littleneck clams (steamers)	2.0	2.0	2.0	0.0	0.0	208.6	0.1	0.0	69.5	gal	0.0	113.6
Pinkneck clams	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Razor clams	10.9	8.4	7.4	3.0	2.5	3,470.1	2.2	0.8	1,156.7	gal	0.7	79.5
Unknown clams	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Unknown cockles	0.5	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Dungeness crab	0.5	0.5	0.5	0.0	0.0	135.2	0.1	0.0	193.1	ind	0.1	184.4
Unknown king crab	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unknown Tanner crab	1.5	1.0	1.0	0.5	0.0	667.4	0.4	0.2	417.1	ind	0.3	135.7
Unknown crab	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Limpets	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Unknown mussels	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Octopus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Weathervane scallops	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Unknown sea cucumber	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Unknown sea urchin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Shrimp	4.5	2.5	2.5	2.0	1.0	1,762.5	1.1	0.4	881.3	lb	0.6	151.8
Snails	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Whelk	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Vegetation	**80.7**	**78.7**	**78.7**	**24.3**	**27.2**	**19,228.6**	**12.3**	**4.5**	**19,228.6**	**lb**	**12.3**	**34.2**
Blueberry	44.6	43.6	42.1	8.4	7.4	5,849.1	3.7	1.4	1,462.3	gal	0.9	45.8
Lowbush cranberry	20.3	18.8	18.3	2.5	3.5	2,386.8	1.5	0.6	596.7	gal	0.4	72.5
Highbush cranberry	15.8	15.8	15.8	1.0	1.5	1,736.5	1.1	0.4	434.1	gal	0.3	63.6
Crowberry	6.9	5.9	5.9	1.0	1.5	297.9	0.2	0.1	74.5	gal	0.0	70.7
Gooseberry	2.0	2.0	2.0	0.0	0.5	115.9	0.1	0.0	29.0	gal	0.0	112.9
Currants	6.4	6.4	6.4	0.0	1.0	390.6	0.2	0.1	97.7	gal	0.1	96.0
Cloudberry	0.5	0.5	0.5	0.0	0.0	3.9	0.0	0.0	1.0	gal	0.0	184.4

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ATTACHMENT C

	Percentage of households					Harvest weight (lb)			Harvest amount			95% confidence limit (±) harvest
Resource	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	
Vegetation, continued												
Nagoonberry	1.0	0.5	0.5	0.5	0.5	3.9	0.0	0.0	1.0	gal	0.0	184.4
Raspberry	23.3	20.8	20.8	4.0	2.5	1,919.4	1.2	0.5	479.9	gal	0.3	47.1
Salmonberry	10.9	9.4	9.4	2.0	1.0	1,260.0	0.8	0.3	315.0	gal	0.2	95.9
Strawberry	13.4	12.9	12.9	2.0	2.5	1,110.0	0.7	0.3	277.5	gal	0.2	63.0
Twisted stalk berry (watermelon berry)	5.9	5.9	5.9	0.5	1.5	764.7	0.5	0.2	191.2	gal	0.1	88.5
Other wild berry	0.5	0.5	0.5	0.0	0.0	23.2	0.0	0.0	5.8	gal	0.0	184.4
Beach asparagus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Wild rhubarb	0.5	0.0	0.0	0.5	0.5	0.0	0.0	0.0	0.0	gal	0.0	0.0
Devil's club	1.5	1.0	1.0	0.5	0.5	38.6	0.0	0.0	38.6	gal	0.0	132.7
Fiddlehead ferns	8.4	7.9	7.9	1.5	1.5	415.8	0.3	0.1	415.8	gal	0.3	73.5
Nettle	1.5	1.5	1.5	0.0	0.5	34.8	0.0	0.0	34.8	gal	0.0	117.3
Hudson's Bay (Labrador) tea	1.0	1.0	1.0	0.0	1.0	77.2	0.0	0.0	77.2	gal	0.0	151.9
Dandelion greens	2.5	2.5	2.5	0.0	0.0	50.2	0.0	0.0	50.2	gal	0.0	111.7
Sourdock	0.5	0.5	0.5	0.0	0.5	30.9	0.0	0.0	30.9	gal	0.0	184.4
Spruce tips	2.0	2.0	2.0	0.0	0.5	115.9	0.1	0.0	115.9	gal	0.1	128.0
Wild celery	1.0	1.0	1.0	0.0	0.0	13.5	0.0	0.0	54.1	gal	0.0	131.4
Wild parsley	0.5	0.5	0.5	0.0	0.5	7.7	0.0	0.0	7.7	gal	0.0	184.4
Wild rose hips	11.4	11.4	11.4	0.0	3.0	1,004.7	0.6	0.2	251.2	gal	0.2	61.7
Yarrow	1.0	1.0	1.0	0.0	0.0	23.2	0.0	0.0	23.2	gal	0.0	137.2
Other wild greens	3.5	3.5	3.5	0.0	0.5	378.0	0.2	0.1	378.0	gal	0.2	152.0
Unknown mushrooms	10.9	10.9	10.4	1.5	0.5	739.2	0.5	0.2	739.2	gal	0.5	94.1
Fireweed	4.0	2.5	2.5	1.5	0.5	85.1	0.1	0.0	85.1	gal	0.1	108.6
Plantain	1.0	1.0	1.0	0.0	0.0	31.4	0.0	0.0	31.4	gal	0.0	181.6
Stinkweed	1.0	1.0	1.0	0.0	0.0	23.2	0.0	0.0	23.2	gal	0.0	137.2
Puffballs	1.0	1.0	1.0	0.0	0.0	15.4	0.0	0.0	15.4	gal	0.0	130.1
Chaga	0.5	0.5	0.5	0.0	0.5	7.7	0.0	0.0	7.7	gal	0.0	0.0
Sea chickweed	0.5	0.5	0.5	0.0	0.0	23.2	0.0	0.0	23.2	gal	0.0	184.4
Bull kelp	0.5	0.5	0.5	0.0	0.0	61.8	0.0	0.0	15.4	gal	0.0	184.4
Unknown seaweed	0.5	0.5	0.5	0.0	0.5	146.8	0.1	0.0	36.7	gal	0.0	184.4

-continued-

ATTACHMENT C

	Percentage of households					Harvest weight (lb)			Harvest amount			95% confidence limit (±) harvest
Resource	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	
Wood	54.5	52.5	52.0	8.4	14.9	–	–	–	–		–	–
Roots	0.5	0.5	0.5	0.0	0.0	–	–	–	–		–	–
Spruce pitch	0.5	0.5	0.5	0.0	0.0	–	–	–	–		–	–
Alder	0.5	0.5	0.5	0.0	0.0	–	–	–	–		–	–
Birch sap	1.5	1.5	1.5	0.0	0.0	42.5	0.0	0.0	347.6	gal	0.2	130.9

Source ADF&G Division of Subsistence household surveys, 2015.

Note Resources where the percentage using is greater than the combined received and harvest indicate use from resources obtained during a previous year.

Note For small land mammals, species that are not typically eaten show a non-zero harvest amount with a zero harvest wight. Harvest weight is not calculated for species harvested but not eaten.

Note "–" indicates the harvest amount for the resource was not collected during the survey.

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STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
STATE PIPELINE COORDIANTOR'S SECTION

MINERAL ORDER (MO) NO. 1204
Closing Lands to Mineral Entry

__X__ Closing Lands to Mineral Entry _____ Opening Lands to Mineral Entry

I. Name: Cross Inlet Pipeline Extension Project (ADL 232962 and ADL 232963)

II. Reason for Mineral Order: This MO is based on the attached Commissioner's Administrative Finding.

III. Authority: AS 38.05.185 - 38.05.275 compliant with AS 38.05.300

IV. Location and Legal Description: This order affects the lands within the AS 38.35 ROW leases ADL 232962 and ADL 232963, in addition to 100 feet on either side of the corridor. During pipeline construction, this affects approximately 1,230 acres which will be reduced to approximately 964 acres upon the acceptance of the operational ROW survey, within portions of the following sections:

Tyonek W 10 Pipeline (ADL 232962)
Township 11N, Range 09W, SM, Section 6;
Township 11N, Range 10W, SM, Section 1;
Township 12N, Range 10W, SM, Section 20, 27, 28, 29, 34, 35, and 36.

CIGGS Marine A Pipeline (ADL 232963)
Township 11N, Range 12W, SM, Section 25;
Township 11N, Range 11W, SM, Section 30, 31, and 32;
Township 10N, Range 11W, SM, Section 5, 8, 16, 17, 21, 28, and 33;
Township 09N, Range 11W, SM, Section 4, 9, 16, 17, 20, 29, 31, and 32;
Township 08N, Range 11W, SM, Section 6;
Township 08N, Range 12W, SM, Section 1, 12, 13, 24, 25, 26, and 35.

See the attached maps for reference.

V. Mineral Closing: This mineral order is subject to valid existing rights and is issued under the authority granted by AS 38.05.185 - 38.05.275 and AS 38.05.300 to the Department of Natural Resources. In accordance with AS 38.05.185(a), I find that the best interests of the State of Alaska and its residents are served by closing the land described in this mineral closing order to entry under the mineral location and mining laws of the State of Alaska. Thereby, the above-described lands are hereby closed to entry under the locatable mineral and mining laws of the State of Alaska.

Concur: _____ 5 APR 2018
Brent Goodrum, Director — Date
Division of Mining, Land, and Water

Approved: Andrew Mack 4/26/2018
Andrew T. Mack, Commissioner — Date
Department of Natural Resources

ATTACHMENT D1

STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINING, LAND, AND WATER

COMMISSIONER'S ADMINISTRATIVE FINDING
MINERAL ORDER NO. 1204
Closing Lands to Mineral Entry

CROSS INLET PIPELINE EXTENSION PROJECT
AS 38.35 PIPELINES
(ADL 232962 AND ADL 232963)

This proposed action involves the closure of state lands to mineral entry within the Cook Inlet area that coincide with the proposed sub-sea Cross Inlet Pipeline Extension Project (Cross Inlet) Right-of-Way (ROW) leases plus a buffer zone. The purpose of the Cross Inlet project is to re-route and re-purpose existing Cook Inlet oil and gas pipelines to increase transportation efficiency within the railbelt area and to eliminate the need for the Drift River Oil Terminal near the base of Mt. Redoubt (an active volcano). Two pipelines of the Cross Inlet project require AS 38.35 ROW leases:

1. the construction of a new 10" pipeline segment to the Tyonek Transportation System connecting the Tyonek Platform to the Kenai-Beluga Pipeline at Ladd Landing for natural gas (ADL 232962)
2. the conversion of one of the existing CIGGS 10" marine pipelines from natural gas to oil (ADL 232963)

The lands subject to this Mineral Order would encompass the two proposed ROW lease corridors, as may be renewed and amended, plus 100 feet on each side of the ROW. Graphic representation of the ROWs is provided in the attached maps. Should the ROW leases not be offered, the MO will not be issued. Once issued, this MO will remain effective until the administrative need is met, and will be rescinded upon the closure, termination, or expiration of the related ROW leases. During the construction phase the total amount of state land affected by this order will be approximately 1,230 acres and during the operational phase the total amount of state land affected by this order will be approximately 964 acres.

Consistent with AS 38.05.300, the Commissioner of the Department of Natural Resources can approve a mineral closing order in excess of 640 acres if the closure is related to infrastructure or transportation corridors in which mineral entry is an incompatible use.

The reliable and safe transportation of oil and natural gas in the Cook Inlet area is essential to railbelt communities, the health of the inlet, and those who rely on the inlet for their livelihood. Mining operations have the potential to adversely impact pipeline operations and as such are incompatible uses.

For these reasons, I find:

1. The requirements for closure under AS 38.05.185-38.05.275 and AS 38.05.300 have been met.
2. It is appropriate to close to mineral entry state lands associated with the pipeline corridors as mining is an incompatible use that would adversely affect the proposed use of the surface estate.
3. The proposed Mineral Order will not be issued if the ROW leases are not issued.
4. The proposed Mineral Order will have a sunset clause. The Mineral Order will automatically be rescinded upon the termination, expiration, or closure of both ROW leases. Should one ROW lease be closed before the other, this Mineral Order will automatically be reduced in acreage accordingly.

Concur: _____ 5 APR 2018

Brent Goodrum, Director
Division of Mining, Land, and Water

Date

Approved: _____ 4/25/2018

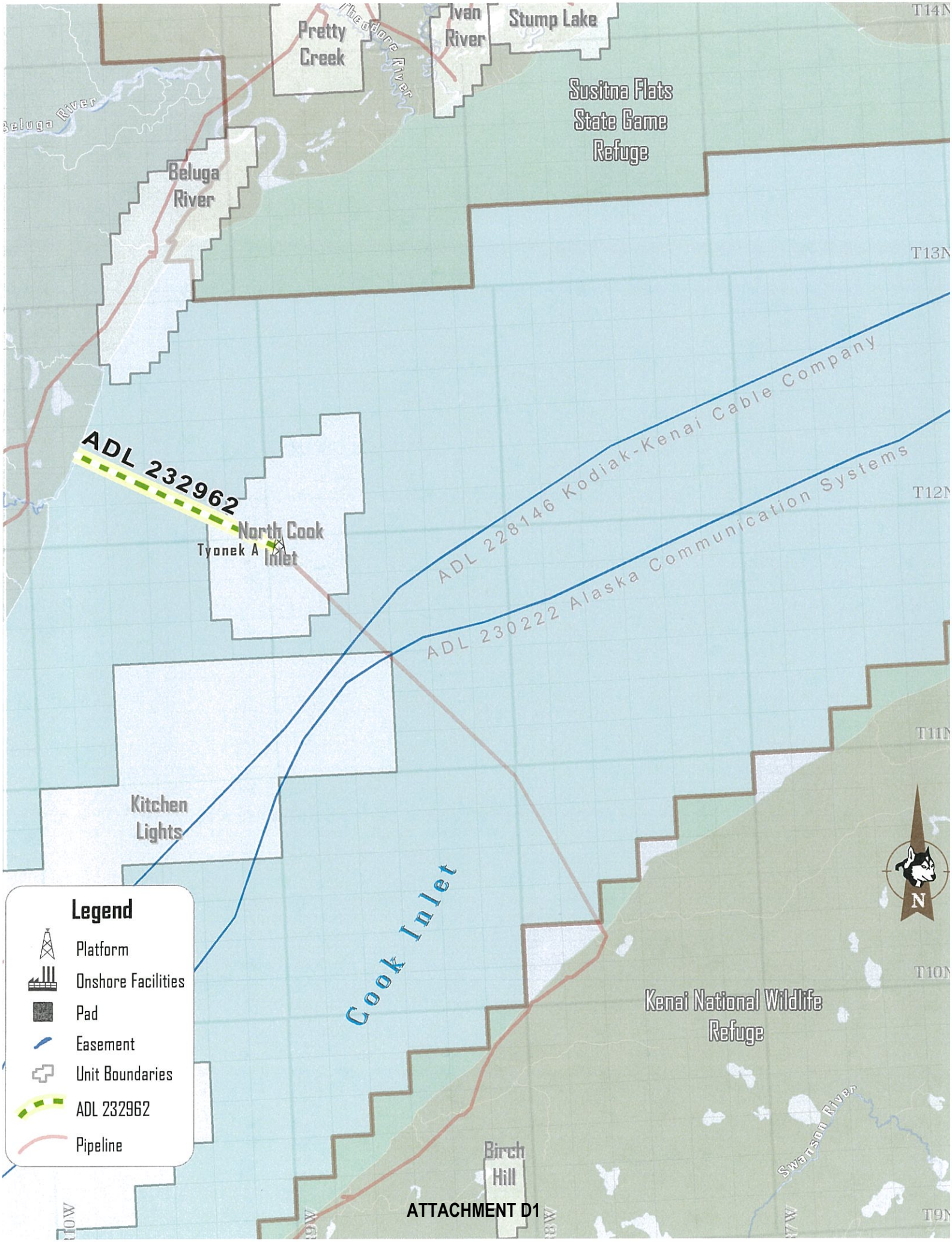
Andrew T. Mack, Commissioner
Department of Natural Resources

Date

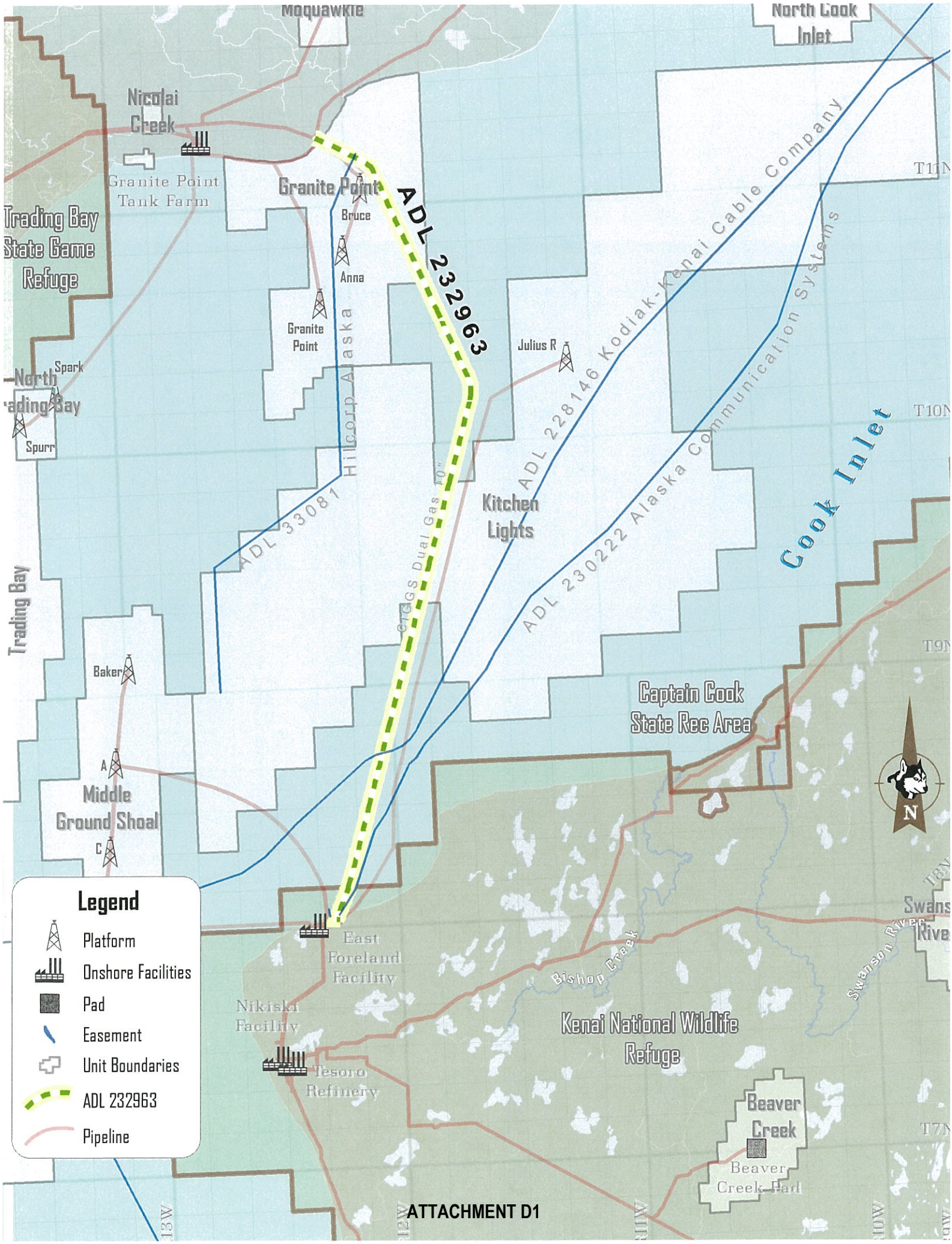
REQUEST FOR RECONSIDERATION PROCEDURES

A person affected by this decision who provided timely written comment or public hearing testimony on this decision may request reconsideration, in accordance with 11 AAC 02. Any reconsideration request must be received in writing within 20 calendar days after the date of "issuance" of this decision, as defined in 11 AAC 02.040(c) and (d), and may be mailed or delivered to Andrew T. Mack, Commissioner, Department of Natural Resources, 550 W. 7th Avenue, Suite 1400, Anchorage, Alaska 99501; faxed to 1-907-269-8918; or sent by electronic mail to dnr.appeals@alaska.gov.

If reconsideration is not requested by that date or if the Commissioner within the time allowed does not order reconsideration on his own motion, this decision goes into effect as a final order and decision on the 31st day after the date of issuance. Failure of the Commissioner to act on a request for reconsideration within 30 days after issuance of this decision is automatic denial of the request for reconsideration and is a final administrative order and decision for purposes of an appeal to Superior Court. (AS 44.37.011 (c): 11 AAC 02.020(c)) The decision may then be appealed to Superior Court within a further 30 days in accordance with the rules of the court, and to the extent permitted by applicable law. An eligible person must first request reconsideration of this decision in accordance with 11 AAC 02 before appealing this decision to Superior Court. A copy of 11 AAC 02 may be obtained from any regional information office of the Department of Natural Resources.



ATTACHMENT D1



ATTACHMENT D1

STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
STATE PIPELINE COORDINATOR'S SECTION

MINERAL ORDER NO. 1204 A01
Closing Lands to Mineral Entry

__X__ Closing Lands to Mineral Entry _____ Opening Lands to Mineral Entry

I. Name: Cross Inlet Pipeline Extension Project (ADL 232962 and ADL 232963); adding CIGGS-LP

II. Reason for Mineral Order: This Mineral Order is based on the attached Commissioner's Administrative Finding and applicable statutes.

III. Authority: AS 38.05.185 - 38.05.275 and AS 38.05.300.

IV. Location and Legal Description: Lands to be closed under this Mineral Order include all lands previously closed by MO 1204 (April 2018), plus approximately 2.44 miles of the CIGGS-LP pipeline located in the Nikiski area being added to ADL 232963 with an additional 100 feet on either side of the 20 foot ROW corridor. This amendment addresses the addition of the CIGGS-LP pipeline to the ADL 232963 pipeline right-of-way (ROW). CIGGS-LP is a constructed 4.7-mile natural gas pipeline being converted to service as an oil line, and is located on private lands, in section line easements, and in State-owned road rights-of-ways including the North Kenai Spur Highway.

During pipeline construction, MO 1204 affects approximately 1,230 acres, which will be reduced to approximately 964 acres upon the acceptance of the operational ROW survey. MO 1204A01 affects up to 66 additional acres, which will be reduced to accurately reflect just those lands under State jurisdiction upon the acceptance of the operational ROW survey. The rights-of-way fall within portions of the following sections:

Mineral Order 1204

Tyonek W 10 Pipeline (ADL 232962)

Township 11N, Range 09W, SM, Section 6;
Township 11N, Range 10W, SM, Section 1;
Township 12N, Range 10W, SM, Section 20, 27, 28, 29, 34, 35, and 36.

CIGGS Marine A Pipeline (ADL 232963)

Township 11N, Range 12W, SM, Section 25;
Township 11N, Range 11W, SM, Section 30, 31, and 32;
Township 10N, Range 11W, SM, Section 5, 8, 16, 17, 21, 28, and 33;
Township 09N, Range 11W, SM, Section 4, 9, 16, 17, 20, 29, 31, and 32;
Township 08N, Range 11W, SM, Section 6;
Township 08N, Range 12W, SM, Section 1, 12, 13, 24, 25, 26, and 35.

Total – approx. 1,230 acres during construction; approx. 964 acres upon acceptance of ROW survey

Mineral Order 1204A01 (amendment)

LP CIGGS (ADL 232963)

Township 07N, Range 12W, SM, Sections 10, 15, 16, and 21.

Total – approx. 66 acres upon acceptance of final ROW survey

See the attached maps for reference.

V. This amendment supersedes the prior version of Mineral Order 1204 (April 2018). This amendment will become effective 30 days after the adoption of the order.

VI. **Mineral Closing:** This mineral order is subject to valid existing rights and is issued under the authority granted by AS 38.05.185 - 38.05.275 and AS 38.05.300 to the Department of Natural Resources. In accordance with AS 38.05.185(a), I find that the best interests of the State of Alaska and its residents are served by closing the land described in this mineral closing order to entry under the mineral location and mining laws of the State of Alaska. Thereby, the above-described lands are hereby closed to entry under the locatable mineral and mining laws of the State of Alaska.

Concur: _____ _____

Brent W. Goodrum, Director — Date
Division of Mining, Land, and Water

Approved: _____ _____

Andrew T. Mack, Commissioner — Date
Department of Natural Resources

STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
STATE PIPELINE COORDINATOR'S SECTION

COMMISSIONER'S ADMINISTRATIVE FINDING
MINERAL ORDER NO. 1204A01 (AMENDMENT)
Closing Lands to Mineral Entry

CROSS INLET PIPELINE EXTENSION PROJECT
CIGGS-A /CIGGS-LP
AS 38.35 PIPELINES
(ADL 232962 and ADL 232963)

The proposed action calls for an Amendment to Mineral Order 1204, to expand the closure of state land and subsurface to mineral entry to include those lands that coincide with the CIGGS-LP pipeline within the Nikiski area, including a 100' buffer zone. The CIGGS-LP pipeline will be included with the CIGGS-A pipeline under Right-Of-Way (ROW) lease ADL 232963. These pipelines are a component of the Cross Inlet Pipeline Extension Project (Cross Inlet), which aims to re-route and re-purpose existing Cook Inlet oil and gas pipelines to increase transportation efficiency within the railbelt area and to eliminate the need for the Drift River Oil Terminal near the base of Mt. Redoubt, an active volcano.

The conversion of the existing LP CIGGS 10" on-shore pipeline from natural gas to oil service requires an AS 38.35 ROW lease; it will connect with the CIGGS-A Pipeline so will be included in the same ROW authorization (ADL 232963). The CIGGS-LP pipeline will connect from the tie-in at the new CIPL E 10 on-shore pipeline to the tie-in at the Swanson River Oil Pipeline near the Andeavor (Tesoro) refinery.

The lands subject to this Amendment to Mineral Order 1204 (MO 1204 A01) would encompass the ROW lease corridor, as may be renewed and amended, plus 100 feet on each side of the corridor. Graphic representation of the corridor is provided in the attached maps. Once issued, this MO will remain effective until the administrative need is met, and will be rescinded upon the closure, termination, or expiration of the related ROW leases. Existing mineral rights will not be affected by this mineral order. The proposed amendment to Mineral Order 1204 (MO 1204 A01) seeks to close up to an additional 66 acres of land.

The proposed CIPL Cross Inlet Extension Project has the intent to ensure reliable and safe transportation of oil and natural gas in the Cook Inlet area, and is essential to railbelt communities, the health of the inlet, and those who rely on the inlet for their livelihood. Mining activities and operations would have the potential to adversely impact the final location, construction, and operation of the pipeline and as such are incompatible uses. Consistent with AS 38.05.300, the Commissioner of the Department of Natural Resources can approve a mineral closing order in excess of 640 acres if the closure is related to infrastructure or transportation corridors in which mineral entry is an incompatible use. I therefore find that the standards for the closure to mineral entry and development under AS 38.05.185 - 38.05.275 and AS 38.05.300 have been met and that the area of the pipeline corridor should be closed to mineral entry and development.

For these reasons, I find:

1. The requirements for closure under AS 38.05.185-38.05.275 and AS 38.05.300 have been met.

2. It is appropriate to amend Mineral Order 1204 and close to mineral entry through MO 1204A01, up to an additional 66 acres of land associated with the pipeline corridor or a similar pipeline project of comparable alignment. Mining is an incompatible use that would adversely affect the proposed use of the surface estate.

3. The proposed Mineral Order will not be issued if this ROW lease or the ROW leases associated with MO 1204 or MO 1204A01 are not issued.

4. The proposed Mineral Order will have a sunset clause. The Mineral Order will automatically be rescinded upon the termination, expiration, or closure of this ROW lease or the ROW leases associated with MO 1204 or MO 1204A01. Should one ROW lease be closed before the other, this Mineral Order will be reduced accordingly.

Concur: _____ _____
Brent Goodrum, Director — Date
Division of Mining, Land, and Water

Approved: _____ _____
Andrew T. Mack, Commissioner — Date
Department of Natural Resources

Reviewed Technical Documents for the CIGGS Pipeline

The documents listed below were reviewed as part of the CIGGS ROW lease application and used to help form the basis of this decision.

- CIPL Basis of Design-Rev B
- CIPL Scope of Work-Rev C
- CIPL Cross Inlet Extension Project Scope of Work - SPCS Review
- CIPL Cross Inlet Extension Project Request for Quote Pipe Procurement Specification
- Cook Inlet Gas Gathering System 10" Pipeline A (CIGGS-A) Basis of Design
- CIGGS-A P&ID Tie Ins
- 2017 Pipeline Integrity Review, Cook Inlet Gas Gathering System 10" Pipeline A (CIGGS-A), December 1, 2017, Hilcorp Alaska Integrity Group
- Investigation of an Anomaly on the NPS 10 Dual Marine CIGGS – B Pipeline, 2016, Kiefner & Associates, Inc.
- 2016 Hilcorp Dual Marine Cook Inlet Gas Gathering System Cathodic Protection Survey Report, Coffman Engineers
- 2016 Dual Marine CIGGS Annual Survey Close Out, 12/28/2016, Hilcorp Alaska
- 2017 Dual Marine CIGGS Annual Survey and CIS Close Out
- 2017 Hilcorp Dual Marine Cook Inlet Gas Gathering System Cathodic Protection Survey Report, Coffman Engineers
- 1972 10-in CIGGS-A-B Mill Test Reports, British Steel Corporation for Union Oil
- Pipeline Integrity Review, Cook Inlet Gas Gathering System 10" Pipeline A (CIGGS-A) Revision 1, 06/06/2018, Harvest Pipeline
- 2014 CIGGS Sonar Report, eTrac
- 2015 CIGGS Sonar Report, eTrac
- 2016 CIGGS Sonar Report, eTrac
- 2017 CIGGS Sonar Report, eTrac
- 2018 CIGGS Sonar Report (preliminary), eTrac
- 2018 Hilcorp Alaska, LLC & Harvest Alaska, LCC CIGGS A Bend Hi Res Survey A2, eTrac
- Hilcorp 2015 Cook Inlet Subsea Pipelines Report A1, 9/11/2015, eTrac
- Hilcorp 2016 Cook Inlet Subsea Pipelines Final Report_A1, 5/20/2016, eTrac
- 2018 Bending Study Summary
- Summary of CIGGS A Bending Analysis (Confidential), 6/29/2018, Harvest Alaska
- CIGGS-A Bending Anomaly: 2011 and 2014 Unprocessed ILI Features (map), 6/29/2018, Harvest Alaska
- 2014 CIGGS A ILI
- SAI CIPL EXT
- CIGGS-A Plan and Profile
- 2018 Pipeline Conversion to Service Plan, Cook Inlet Gas Gathering System (CIGGS), 10" CIGGS-A Pipeline and 10" CIGGS-LP Pipeline, March 30, 2018
- Conversion to Service: CIGGS-A to CIPL Marine A 10 Structural Calculation Package, 3/20/2017, Coffman Engineers

- Minimum Wall Thickness (App G)
- CIPL Cross Inlet Oil Expansion Project - Liquid HCA Analysis Assignment sheet - Harvest Alaska
- CIGGS P&ID
- CIGGS PFD
- 2018 CIGGS LP MAOP
- 1972 Construction Specs - Marathon Oil Company Part II Specifications for Construction West Foreland to Granite Point 16" O.D. Pipeline
- 1972 Agreement and Spec for Construction
- CIGGS LP Basis of Design
- LP CIGGS MAOP Calculation Worksheet - 2015
- Updated CIGGS LP MAOP worksheet
- Pressure Relief Valve Data Sheet and reference drawing (13 CP-NO-PSV-0001 DWG and 14-CP-NO-PSV-0001)
- CIGGS-LP 10 2018 Class Location and HCA Determination
- E-CIGGS LP-CIGGS As Built 1972
- Pressure Test Schematic
- Low Pressure CIGGS - Process Flow Diagram LP CIGGS Pipeline Pressure Test Schematic
- CIGGS LP Tee Removal 7/18/18
- KPLO Pipeline package 7/5/18
- CIGGS LP P&ID
- CIGGS LP PFD
- 10" CIGGS-LP Mil Certs 1972 - Confidential
- Hilcorp LP CIGGS Pipeline Pressure Test
- 10" CIGGS Hydrotest 1972
- 1972 Procedure
- 10 inch CIGGS Mil Certs 1972
- 10 inch CIGGS Hydrotest 1972
- Preliminary Report, LP CIGGS Inspection Survey, June 14, 2018
- Final LP CIGGS Report Inspection Survey
- Piping & Instrument Diagram 10" CIGGS Pig Launcher and Meter Building, Station "0" - F-F-0111-001_07
- Piping & Instrument Diagram 10" CIGGS Pig Launcher and Meter Building, Station "0" - F-F-0111-001_09
- 2018 Maximum Allowable Operating Pressure Calculation CIPL E 10 Pipeline, Hilcorp
- CIPL E & W 10 Calc Package
- CIPL E 10 Work Package
- CIPL W 10 Work package
- CIPL E 10 IFC
- CIPL W 10 IFC
- Harvest responses to SPCS concerning the Cook Inlet Keeper public notice comments