US Army Corps
of Engineer
Alaska District

Draft Environmental Impact Statement
Alaska Stand Alone Gas Pipeline

January 2012

Executive Summary




United States Army Corps of Engineers
Alaska District

Draft Environmental Impact Statement

Alaska Stand Alone Gas Pipeline

January 2012

In cooperation with:

Alaska Department of Natural Resources, State Pipeline Coordinator's Office (ADNR, SPCO)

U.S. Coast Guard (USGS)

U.S. Department of the Interior, Bureau of Land Management (BLM)

U.S. Department of the Interior, National Park Service (NPS)

U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration (USDOT, PHMSA)

U.S. Environmental Protection Agency (EPA)

Executive Summary

Photo credits (cover): Michael Baker Corp. (top left and middle); Ryan Hagerty (top right); and Carl Johnson (bottom).

INTRODUCTION

The U.S. Army Corps of Engineers (USACE), Alaska District and six cooperating agencies have prepared a Draft Environmental Impact Statement (DEIS) for the proposed Alaska Stand Alone Gas Pipeline (ASAP) Project. The DEIS describes the proposed Project and evaluates the potential direct, indirect and cumulative environmental impacts associated with the proposed action and alternatives, including the No Action Alternative. Measures to mitigate adverse impacts are identified and described. The DEIS has been prepared to address issues and alternatives raised during the scoping process. The USACE will give full consideration to all public comments received on the DEIS. A summary of the public meetings, written comment letters, and responses will be incorporated into the Final EIS, as appropriate.

The EIS process is being conducted to comply with the National Environmental Policy Act (NEPA). The steps of the EIS process are described in Figure ES-1

This Executive Summary of the DEIS provides an overview of the proposed ASAP Project, the purpose of and need for the Project, the public involvement process including areas of concern raised during the scoping process, the alternatives to the proposed Project considered, and the conclusions drawn regarding potential environmental impacts. More detailed information on these aspects is presented in the DEIS (also provided in the attached CD on the back page of Volume 1).

BACKGROUND

The ASAP Project is being planned as an in-state natural gas pipeline designed to provide long-term, stable supplies of natural gas from the North Slope to the Fairbanks, Anchorage and the Cook Inlet area of Alaska.

In March 2010, the Alaska legislature mandated that the State prepare a project plan for an in-state natural gas pipeline. This mandate also established a joint in-state gasline development team to prepare the project plan. The development team is led by the Alaska Housing Finance Corporation, which created a subsidiary corporation called the Alaska Gasline Development Corporation (AGDC). The AGDC was established in July 2010 and became the applicant for the proposed ASAP Project.

ASAP PROJECT COMPONENTS

Pipelines:

- 737 miles of 24-inch-diameter pipeline extending from near Prudhoe Bay to Point MacKenzie, Alaska
- 34 miles of 12-inchdiameter lateral pipeline extending from Dunbar to Fairbanks, Alaska

Aboveground Facilities:

- A North Slope gas conditioning facility (GCF)
- A straddle and gas off-take facility near Dunbar
- A Cook Inlet NGL extraction plant (NGLEP) facility
- 1 or 2 compressor stations
- 3 meter stations
- 37 mainline valves at intervals not greater than 20 miles

Support Facilities:

- Operations and maintenance buildings
- Construction camps and pipeline yards; and material sites

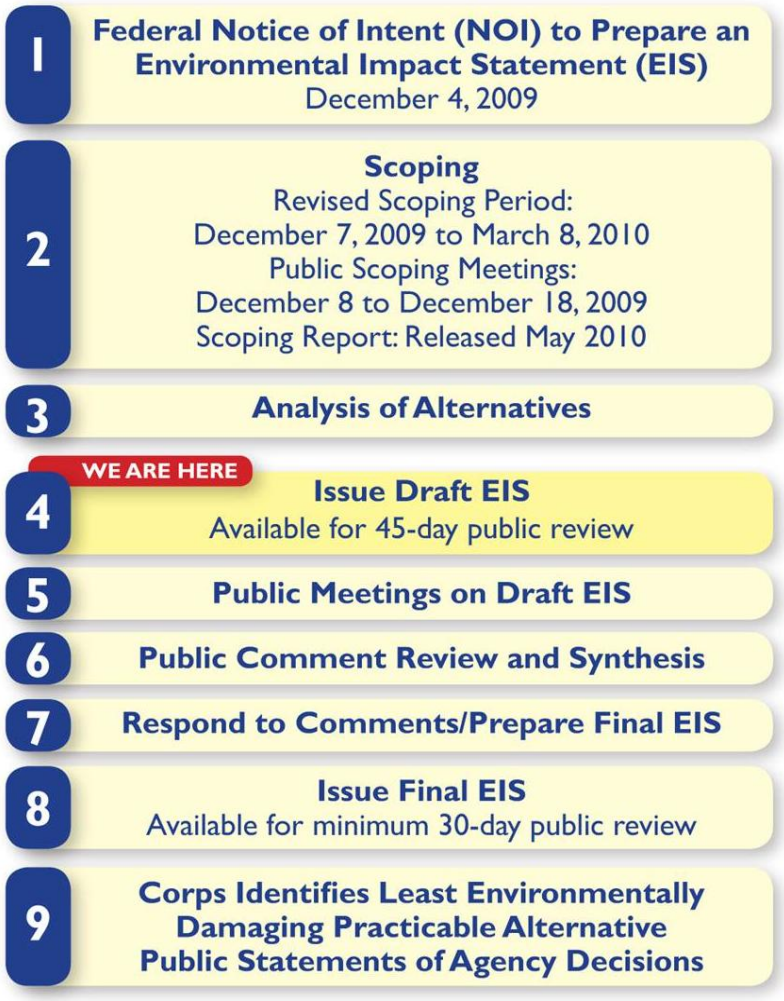
PROPOSED ACTION

The AGDC proposes to construct, operate, and maintain approximately 737 miles of new 24-inch-diameter pipeline. A map of the proposed Project area can be viewed in Figure ES-2. The proposed Project would transport up to 500 million standard cubic feet per day (MMscfd) of natural gas and natural gas liquids (NGLs) from North Slope gas fields to markets in the Fairbanks, Anchorage and the Cook Inlet area by 2019. The pipeline would have an operating pressure of 2,500 pounds per square inch. Additionally, a new 12-inch-diameter lateral pipeline would extend approximately 34 miles from Dunbar east to Fairbanks. The general location of the proposed Project facilities is shown in Figure ES-2. The AGDC anticipates that initial Project natural gas flow would be less than 250 MMscfd, but a peak capacity of 500 MMscfd has been proposed to meet anticipated future demands.

The proposed Project would connect with the central gas facility (CGF) near Prudhoe Bay, provide for connection to a Fairbanks natural gas distribution system, and connect to ENSTAR Natural Gas Company's (ENSTAR) pipeline system located in Southcentral Alaska (Anchorage and the Cook Inlet area).

The proposed Project would be the first pipeline system available to transport natural gas from the North Slope. The gas and NGLs would be used to heat homes, business and institutions, to generate electrical power, and for potential industrial uses. Further Information regarding the proposed Project is presented in Section 2.0 of the DEIS.

Figure ES-1: Steps in the Environmental Impact Statement Process



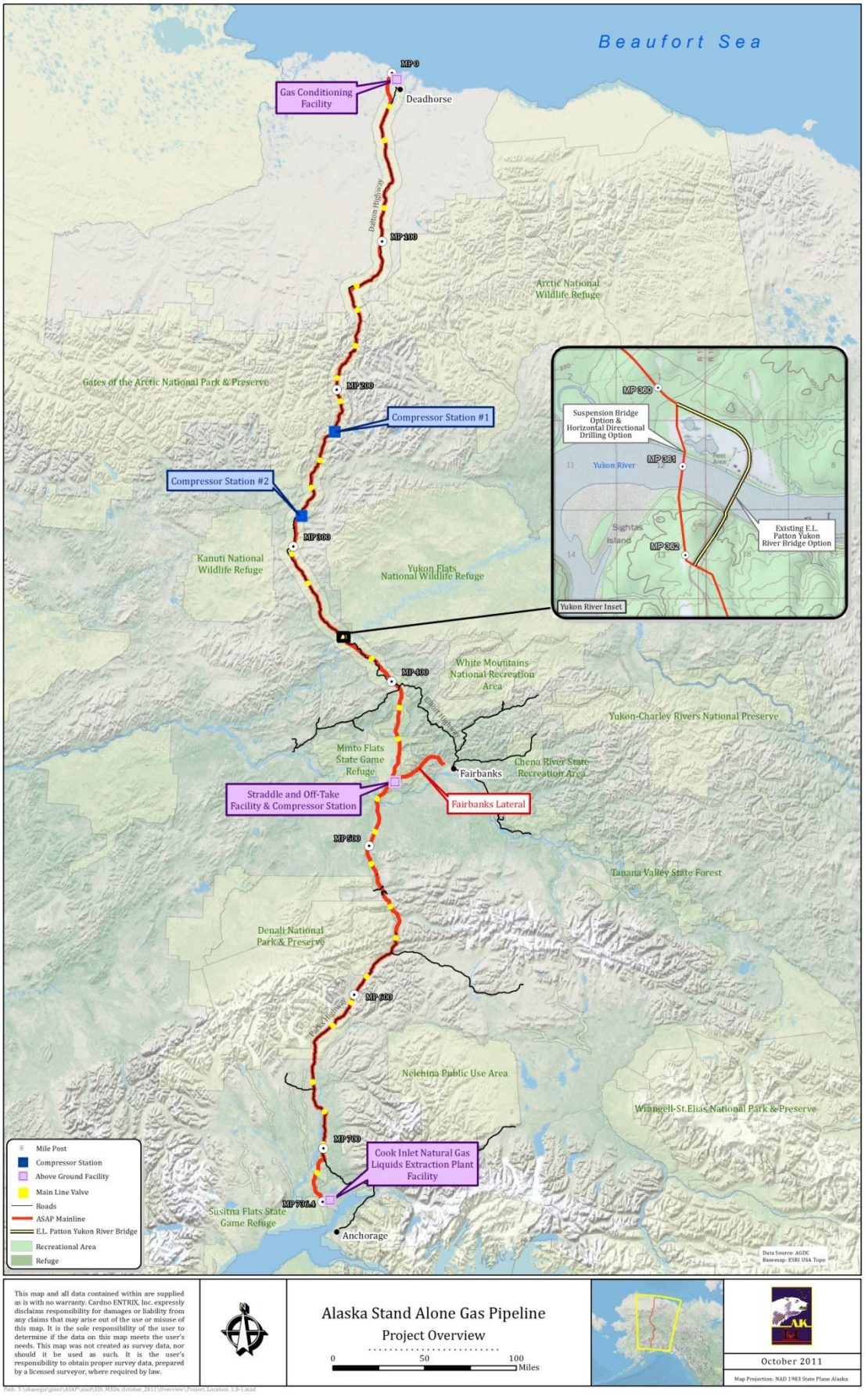
CONNECTED ACTIONS

Several connected actions would be required for the proposed Project to operate as planned. These connected actions are not proposed by the AGDC and would be completed by others:

- Construction and operation of four aboveground pipelines that would connect the Prudhoe Bay CGF to the gas conditioning facility (GCF) for supply of natural gas and NGLs and return of bi-products. The aboveground pipelines would be less than 1 mile in length.
- Processing and distribution of 60 MMscfd of NGLs from the Cook Inlet natural gas liquid extraction plant (NGLEP) facility located at the southern terminus of the mainline could be accomplished by pipeline, fractionation facility, and storage and tanker vehicles. A facility at Nikiski would require installation of an 80-mile-long pipeline to transport NGLs from the Cook Inlet NGLEP facility to Nikiski for fractionation, storage and subsequent in-state and export distribution by ship. Transport of NGLs from Nikiski for in-state use by tanker trucks would also be possible.

Further information regarding connected actions is presented in Section 3.0 of the DEIS.

Figure ES-2: Project Overview Map



PURPOSE AND NEED FOR THE PROPOSED ACTION

The primary purpose of the proposed Project is to provide a long-term, stable supply of up to 500 MMscfd of natural gas and NGLs from existing reserves within North Slope gas fields to markets in the Fairbanks, Anchorage and the Cook Inlet area by 2019. A secondary purpose is to utilize proven gas supplies that are readily available on the North Slope to provide economic benefit to the State of Alaska through royalties and taxes.

As identified by State legislature, a long-term, affordable energy source is needed for Fairbanks and Southcentral Alaska. Residential, community, commercial, and industrial entities would benefit from a reliable supply of natural gas. Existing and future energy users need access to reliable cost-effective energy. The proposed Project would fulfill the following needs:

- Relieve a shortfall of natural gas supply in the Cook Inlet area, which is the primary fuel source for heating and electrical power generation, projected in the near future (2013-2015);
- Provide for conversion from existing heating sources to natural gas in Fairbanks in order to reduce harmful air emissions. This would in turn assist in achieving attainment status. Fairbanks currently is in air pollution non-attainment area status due to particulate matter. Use of oil and wood for heating are major contributors to the problem of air pollution in winter;
- Provide a stable and reliable supply of natural gas and NGLs to meet current and future demand of up to 500 MMscfd;
- Provide a stable and reliable supply of natural gas needed to spur economic development of commercial and industrial enterprises in Fairbanks and the Cook Inlet area; and
- Provide economic benefit to the State of Alaska through royalties and taxes. Approximately 82 percent of Alaska's estimated state revenues for 2010 were from oil taxes, royalties, and fees.

Further Information regarding the purpose and need for the proposed Project is presented in Section 1.0 of the DEIS.

PUBLIC INVOLVEMENT PROCESS

On December 4, 2009, the USACE published the Notice of Intent (NOI) to prepare an EIS in the *Federal Register*. On the same date, the USACE sent a public notice to affected parties regarding the EIS public scoping meetings and how to obtain more information on the Project. The NOI initiated the scoping period, which was originally scheduled to begin December 7, 2009 and close on February 5, 2010. In response to public request, the scoping period was extended to March 8, 2010. This extension was announced through a Public Notice distributed to interested parties on February 5, 2010.

Public Scoping Meeting at the Anchorage Senior Activity Center

Photo: NRG

Public Scoping Meetings

The USACE hosted eight public meetings in the vicinity of the proposed ASAP Project corridor in December 2009. The purpose of these meetings was to disseminate Project information, solicit public input, and identify issues and concerns that the public believed should be addressed in the EIS. The scoping meetings were minimally attended with a few public comments received in some locations. Three scoping meetings did not receive any attendees. Much of the discussion by those in attendance focused on details regarding design, alignment, and the relationship of the proposed Project to other gas pipeline projects.

An agency scoping meeting was held on December 18, 2009 at the Bureau of Land Management (BLM) office in Anchorage. This meeting provided a specific opportunity for agencies to hear the scoping meeting presentation and to ask questions of clarification regarding the Project. The presentation and discussion served as a common foundation for identification of issues and concerns by federal and state agencies with jurisdiction and responsibility for resources potentially affected by the proposed Project.

Comments Received and Issues Identified during Scoping

Seventeen unique comment submissions were received during the scoping period, including four from state or federal agencies, one from local government, one from a state representative, and eleven from non-profit organizations, businesses and the general public. In addition, oral comments were provided and recorded at all meetings, with the exception of the agency meeting in Anchorage and the scoping meetings with no attendance (Glennallen, Delta Junction, and Wasilla). All scoping submissions and comments from members of the public can be seen in their entirety in Appendix E of the Scoping Report (Appendix B of this DEIS).

ALTERNATIVES CONSIDERED

Implementation of NEPA through the EIS process requires consideration of reasonable alternatives to the proposed Project that could minimize impacts to the natural and human environment. Consideration of the No Action Alternative is also required.

Alternatives to the proposed Project are described in detail in Section 4.0 of the DEIS. Several types of potential alternatives to the proposed Project have been considered:

- No Action Alternative – the proposed Project would not be constructed and would not operate;
- Energy Source Alternatives – energy alternatives and energy conservation measures that could reduce or replace the North Slope natural gas and NGLs that would be transported by the proposed Project;
- Natural Gas Transport System Alternatives – other systems that could transport the North Slope natural gas and NGLs that would be transported by the proposed Project;
- Pipeline Route Alternatives – alternative pipeline routes and route segment variations; and
- Aboveground Facility Alternatives – alternative aboveground facility sites.

The potential alternatives that were identified are evaluated for:

- Consistency with the purpose and need for the proposed Project as stated in Section 1.2 of the DEIS;
- Technical and logistical feasibility, and reasonableness; and
- Environmental advantages over the proposed Project.

No Action Alternative

The No Action Alternative is defined as the proposed action not being undertaken. The short-term and long-term environmental impacts identified in this EIS would not occur, as the proposed pipeline and associated aboveground facilities would not be constructed and 500 MMscfd of North Slope natural gas and NGLs would not be transported and made available to Fairbanks, Anchorage, and the Cook Inlet area. As a result of no action, the unrealized benefits would include: a reliable long-term natural gas supply for Fairbanks and Southcentral Alaska; improved air quality in the Fairbanks area; revenues to the State of Alaska from gas sales, taxes and royalties; and jobs related to construction and operation of the proposed Project.

Yet the current annual demand for Cook Inlet natural gas would remain at approximately 200 MMscfd, and future demand would grow to approximately 250 MMscfd by 2030. In Fairbanks, current and future demand of 60 MMscfd would not be met.

Energy conservation programs and new facilities that generate electricity and heat from sources other than natural gas could reduce, but not fully provide for the current and future demand for natural gas as the existing Cook Inlet supply would continue to diminish. As described in Section 1.2.2 of the DEIS, the natural gas shortage is projected to become acute by 2015.

Energy Source Alternatives

The Alaska North Slope gas fields are a proven, stable and reliable source of natural gas and could be developed to provide a supply of natural gas and NGLs for the proposed Project by the scheduled 2019 start of pipeline operations. According to a 2009 report by the Department of Energy, discovered technically recoverable natural gas resources on the North Slope are estimated to be about 35 trillion cubic feet. Energy sources other than North Slope natural gas were examined as potential alternatives to the proposed Project that could reduce or replace the need for natural gas and NGLs that would be transported by the proposed Project. Several alternative energy resources in the Project area are currently being developed or are in the planning and feasibility analysis process.

Studies indicate that energy sources other than North Slope natural gas and NGLs could reduce but not replace the volume of gas or the electrical power-

generating capacity of the gas that would be transported by the proposed Project. None of the identified energy alternatives would meet all objectives of the Project purpose and need. Although some projects would provide alternative means for generating electrical power, they would only individually and collectively partially replace the electrical power generating capacity of the gas that would be transported by the proposed Project; they would also not provide the natural gas needed for home and institutional heating and industrial purposes. Energy alternatives, including major new supplies of Cook Inlet natural gas, are unproven or could not be realized by 2019, the planned in-service date for the proposed Project. Additionally, the economic benefits of utilizing an in-state gas source would not be realized by several of the alternatives. Therefore, alternative energy projects are likely to be developed independently of the proposed Project.

Natural Gas Transport System Alternatives

Past experience indicates that pipelines are cost-effective means of transporting large volumes of natural gas over long distances for sustained periods of time. As part of the DEIS assessment, alternatives to the proposed 24-inch-diameter ASAP pipeline were examined that may have the potential to meet the purpose and need of the Project and minimize environmental effects. In comparison to the proposed Project, transportation system alternatives would make use of existing, modified, or proposed natural gas delivery systems to meet the stated objectives of the proposed Project.

Alternative natural gas transportation systems considered and assessed were as follows:

- **A dry gas pipeline**. However, the purpose and need of the proposed Project would not be met because a dry gas line would not provide NGLs at the pipeline terminus.
- **A smaller diameter pipeline with additional compression**. This was examined to evaluate if a reduction in project construction and permanent Right of Way (ROW) footprint and corresponding reduction in impacts to associated environmental resources could be achieved. A benefit of increased compression (maintaining higher operating pressure) is that the required diameter of the pipeline may be decreased. However, the ROW footprint would not be reduced. Crucially, to increase and maintain compression across the length of the over 737-mile-long pipeline, more compressor stations would be required, bringing with them attendant costs and environmental impacts.
- **Spur pipelines from a large North Slope-to-Lower 48 or Valdez Pipeline**. The Alaska Pipeline Project (APP) has been proposed by TransCanada Alaska Company, LLC and ExxonMobil Corporation. The APP would be a 48-inch-diameter natural gas pipeline beginning at a new gas treatment plant to be constructed near existing Prudhoe Bay facilities. Two alternative routes have been proposed for the APP: the Alberta option and the Valdez LNG option. Regardless of the selected pipeline option, a minimum of five off-take connections would be built into the pipeline to allow local natural gas suppliers to obtain product to meet local community needs. These connections could be used to construct spur pipelines to serve the Fairbanks and Southcentral Alaska. The APP is in the planning process although the first gas is currently estimated for mid-2020, well behind the proposed Project timeline. Furthermore, implementation of the APP is uncertain. Therefore, spur pipelines from a North Slope-to-Lower 48 or Valdez Pipeline would not meet the purpose and need of the proposed Project and would not be a reasonable alternative.
- **A pipeline from the North Slope to Fairbanks, and transport by rail car to Southcentral Alaska**. This would involve the Project terminating at a new LNG conversion/production facility near Fairbanks, located near the northern reach of the Alaska Railroad (ARR). After conversion, the LNG would be transported by ARR rail car to new LNG storage and gasification facilities near Anchorage, which would have access to the existing Southcentral Alaska natural gas distribution system. Significantly, this alternative would not be a cost efficient or logistically practicable means of moving large volumes of LNG from Fairbanks to Southcentral Alaska for 30 or more years. Therefore, the pipeline and rail alternative would not be a reasonable alternative.

  Transport by truck/trailer would involve conversion of natural gas to LNG at a new production facility on the North Slope and subsequent transport of LNG by truck/trailer via the Dalton, Elliott, and Parks highways to new LNG storage and gasification facilities in Fairbanks and Southcentral Alaska. Transshipping LNG by truck/trailer has been accomplished by use of 44-

foot-long, 13,000 gallon gross capacity trailers. Each trailer has the capacity to carry LNG that when gasified would amount to approximately 1 MMscf of natural gas. Therefore approximately 500 trailers per day would be required to transport 500 MMscfd. This would require one loaded trailer leaving a North Slope LNG facility approximately every 3 minutes around the clock. Thus, this alternative would not be logistically practical or reasonable.

Pipeline Route Alternatives

Approximately 82 percent of the proposed Project route would be co-located with or would closely parallel existing pipeline or highway ROW. Co-location is desirable as a means of concentrating development within established corridors and minimizing environmental impacts. A major route alternative is defined as a generally longer segment of ROW that would follow a route different from the proposed pipeline. Major route alternatives and route variations that would be co-located with other established corridors were examined as potential alternatives to the proposed Project route. Major route alternatives and route variations identified and analyzed in the DEIS are depicted in Figure ES-3.

Major Route Alternatives: Because only one established corridor exists in the Project area, only one reasonable major route alternative would be possible. A Richardson Highway route alternative would be co-located with an established highway corridor and provide for transport of natural gas to Fairbanks and Southcentral Alaska. A Parks Highway route alternative and a Richardson Highway route alternative were examined and compared in the 2009 Stand Alone Pipeline Alternatives Analysis conducted by the State of Alaska. The 753-mile-long Parks Highway Route considered in the analysis was subsequently refined to the 737-mile-long proposed Project route. The State of Alaska found that constructing a pipeline along the Richardson Highway Route would cost approximately 10 percent more than along the Parks Highway Route. The Richardson Highway Route Alternative would be longer by 92 miles (845 miles long vs. 753 miles) and would cross a greater number of streams, and two mountain ranges. As a result of the increased length, the Richardson Highway Route Alternative would impact 23 percent more wetland features (730 features vs. 593 features), 35 percent more wetland habitat (1,735 wetland acres vs. 1,288 acres), and a greater number of wetland acres of each wetland type than the Parks Highway Route Alternative that was studied in the Alternatives Analysis conducted by the State of Alaska. Under the Richardson Highway Route Alternative, the lateral pipeline from south of Eielson Air Force Base to Fairbanks would be 3 miles shorter than the Fairbanks Lateral associated with the proposed Project (32 miles long vs. 35 miles).

The route of the proposed Project is a refinement of the Parks Highway Route that was the subject of the Alternatives Analysis conducted by the State of Alaska in 2009. For the proposed Project, the Parks Highway Route was refined and shortened by an additional 16 miles, indicating further reduction in overall impacts. Based upon this analysis, the Richardson Highway Route Alternative does not appear to include features that would result in fewer environmental impacts when compared to the Parks Highway Route. Therefore, the Richardson Highway Route Alternative would not in fact present environmental advantages over the Project as proposed.

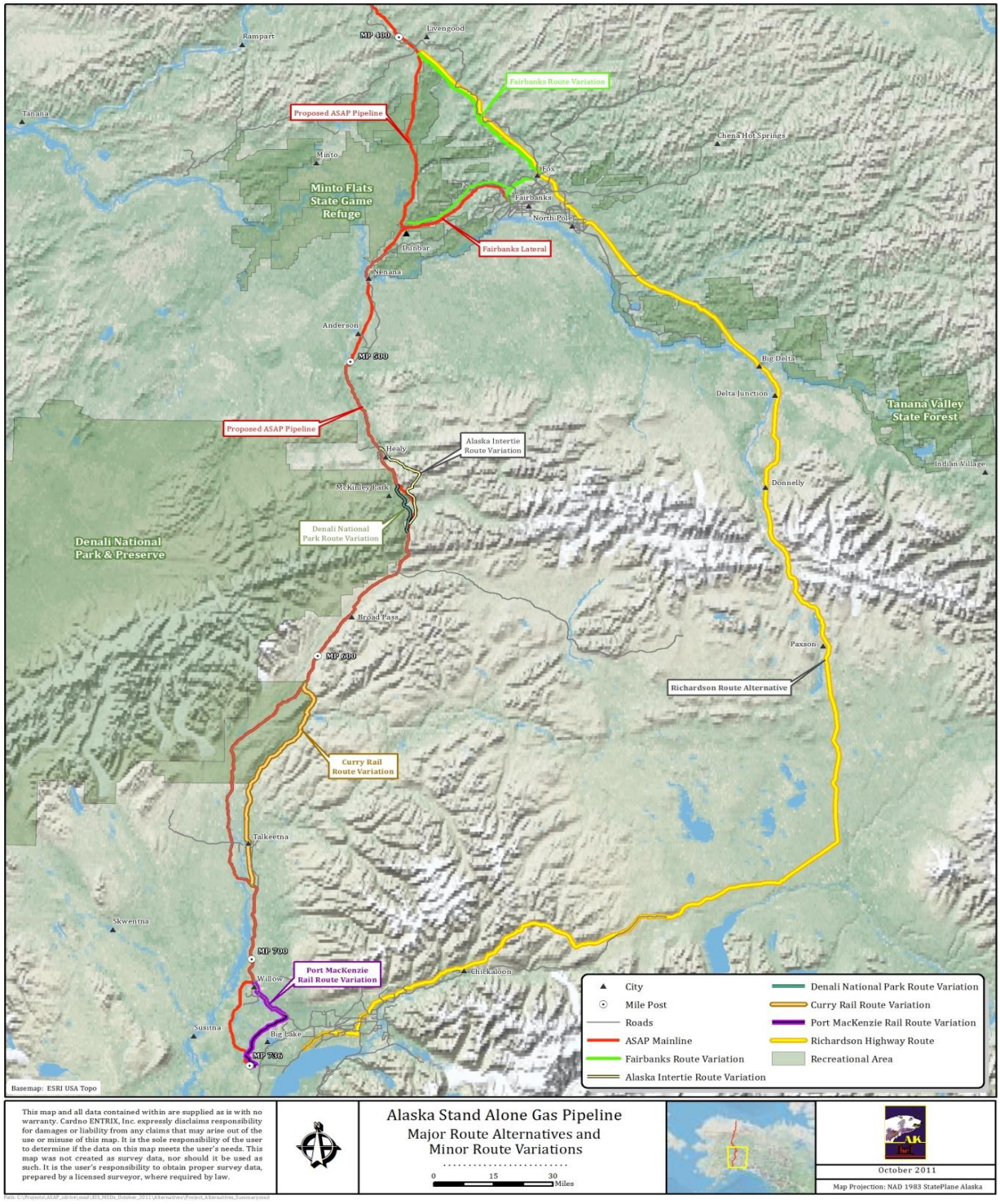
Route Variations: Route variations differ from major route alternatives in that they are identified to resolve or reduce construction impacts to localized, specific resources such as cultural resources sites, wetlands, streams, recreational lands, residences, or terrain conditions. Several route variations were screened but only the Denali National Park and Preserve (NPP) Route Variation is considered a reasonable alternative.

The Denali NPP Route Variation would be approximately 15.3 miles long, and would be within Denali NPP for approximately 7 miles, but would stay in the Parks Highway ROW. None of the Denali NPP lands that would be crossed are designated wilderness areas.

Currently, federal laws would not allow construction of this route variation within Denali NPP. Federal legislation that would allow the route variation has been introduced by the Alaska delegation, and is currently being considered by the U.S. Congress. If such legislation is passed into law, the National Park Service (NPS) would have authority to issue a ROW permit for a pipeline route which would result in the fewest impacts or be the least environmentally damaging practicable alternative (LEDPA). For this reason, the description of the Denali NPP Route Variation includes the provision that the AGDC would work with the NPS to adjust and refine the proposed route variation through Denali NPP to assure that the route or mode would be the LEDPA.

The Denali NPP Route Variation would be of similar length and would be co-located with the Parks Highway. Should Federal legislation allow within the time constraints of the Project, the Denali National Park Route Variation is a reasonable alternative that could minimize visual impacts in the area of Denali NPP.

Figure ES-3: Major Route Alternatives and Minor Route Variations



Aboveground Facility Site Alternatives

Aboveground facilities that would be components of the proposed Project include: a North Slope GCF; a Fairbanks gas straddle and off-take facility; one or two compressor stations; a NGL extraction facility; access roads; valves; pigging facilities; maintenance facilities; and pipe yards and camps. The general locations of these facilities are constrained by proximity, technical and logistical issues related to Project construction and operations. Considering these constraints, the AGDC applied other siting criteria to determine the specific locations of the proposed aboveground facilities. These included: topography; waters, wetlands and habitats; visual resources; cultural resources; and people and communities. Based on the siting process, it is reasonable to assume that environmental impacts could be more effectively reduced by the implementation of site specific mitigation measures rather than by alternative facility sites. Mitigation measures have been identified in Section 5 of the DEIS (Environmental Analysis). Accordingly, specific alternative aboveground facility sites have not been identified.

Pipeline Facility Construction

Photo: Courtesy of Michael Baker, Inc.

ENVIRONMENTAL ANALYSIS

The environmental analysis of the proposed Project describes the affected environment, direct, indirect and cumulative impacts that would result from construction and operations, and mitigation measures that could reduce impacts to each affected resource. The environmental analysis is organized by physical, biological and human environmental resources in Sections 5.1 through 5.20 of the DEIS.

Soils and Geology

The following geomorphic processes and features would be encountered in the proposed Project area: mass wasting (gravity-driven actions such as avalanches, rock falls, slides, and slumps, as well as solifluction in cold regions); permafrost degradation/ aggradation and frost action; and seismicity. Geomorphic processes such as these must be considered in pipeline engineering, design, siting and construction due to the fact that these processes have the potential to impact pipeline stability and operations.

Permafrost and Soil Considerations: Permafrost can occur in both soils and bedrock, and is encountered in all nine ecoregions traversed by the proposed Project.

Winter construction activities are planned as a method to decrease the impact on permafrost soils in the warmer months. Temporary ice roads and ice pads would be constructed to stage, construct and transport the work force, equipment and materials along the proposed route. The depth of frozen soil would be closely inspected to prevent a breakthrough below the vegetation. When low-pressure vehicles are used, winter travel does not appear to adversely affect soil or permafrost.

As designed, the pipeline would operate at below freezing temperatures in predominately permafrost terrains to protect the thermal stability of the surrounding ground. Similarly, the pipeline would operate at above freezing temperatures in predominately thawed settings so as not to create frost bulbs around the pipe that could lead to frost heave displacement of the pipeline or adverse hydraulic impacts on drainages crossed by the pipeline. Pipeline design would use engineering controls such as insulation and strategic use of non-frost-susceptible fill to control the thermal signature of the pipeline in discontinuous permafrost.

In areas bermed because of pipe installation, 6-inches minimum of bedding thickness would be required when working in areas of frost susceptible soils. Pipe insulation would be utilized to prevent unacceptable heave or maintain frozen soils based on geothermal analysis.

Brooks Range

Photo: U.S. Fish & Wildlife Service

Seismic Zones and Fault Considerations: South of the Yukon River, the proposed Project would cross two seismic zones that trend northeast in the Ray Mountains: the Minto Flats and Fairbanks seismic zones. The Intermontane region includes the Kobuk Ridges and Valleys, Ray Mountains, Yukon-Tanana Uplands, and the Tanana-Kuskokwim Lowlands ecoregions and has experienced 23 earthquakes greater than magnitude 5, within 50 miles of the Project area. The Alaska Range Transition, with 88 earthquakes greater than magnitude 5, within 50 miles of the Project area, has seen the most seismic activity since 1960, and includes the Alaska Range and Cook Inlet Basin ecoregions.

The following design approaches are currently being considered for areas of high seismic activity and/or fault zones:

- Placing the pipeline on aboveground sliding supports;
- Placing the pipeline in an aboveground berm constructed of low-strength soil;
- Placing the pipeline in an oversized ditch surrounded by low-strength crushable material or loose granular fill.

Paleontology: Fossils occur throughout Alaska and range from single-celled organisms to large vertebrates, including Mesozoic dinosaurs, marine reptiles, and Pleistocene megafauna. Paleontological evidence in Alaska varies, and with respect to the Project area, can be characterized broadly. Fossilized plants of marine and terrestrial origin, as well as invertebrate and vertebrate animal specimens, have been found in the area of the proposed Project.

Alaska's Historic Preservation Act protects paleontological resources that may be encountered along the ROW. If any known or previously undiscovered paleontological resources are encountered during construction or operation related activities, the Alaska State Historic Preservation Officer and an archeologist would be contacted to determine appropriate methods for planning.

Water Resources

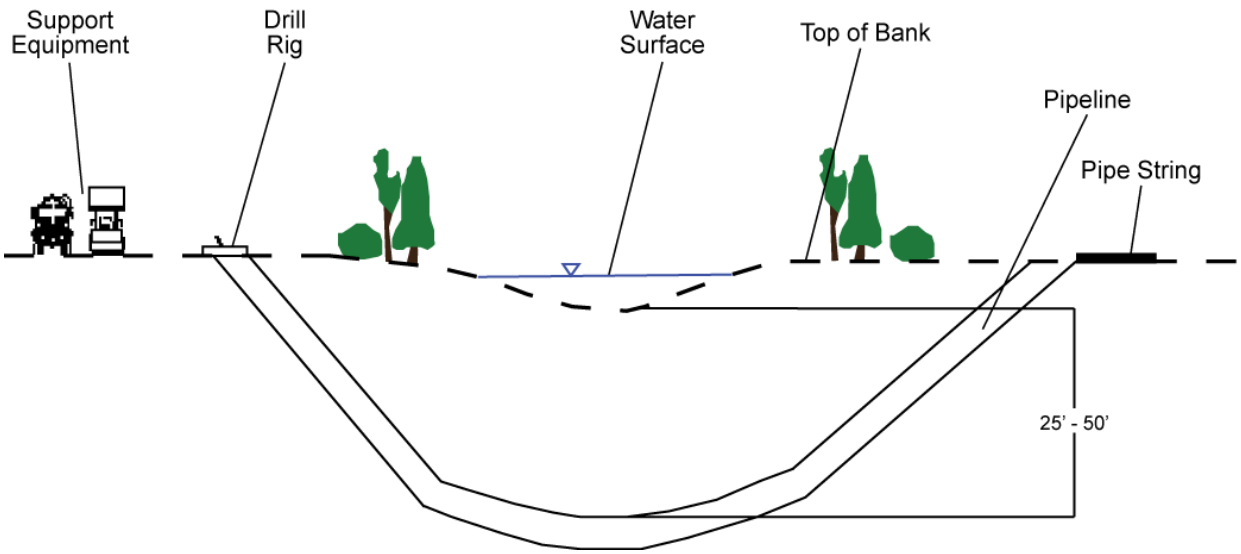
Water resources are defined by three sub regions for the proposed Project: Arctic, Interior-Yukon, and Southcentral. The total drainage area of all the watersheds in the proposed Project area is 47,983.26 square miles.

Surface Water: Surface water bodies found throughout the Project area include numerous streams, rivers, ponds, and lakes. Water uses for the proposed Project include water from permitted lakes and reservoirs for ice roads and pad construction and for temporary work camps. Impacts to water resources would include temporary altered water quality from water withdrawals including decreased oxygen concentrations, increased organic matter, turbidity and changes to pH. Proper ice road development would not adversely affect surrounding water resources. Ice bridges may form and persist across rivers and streams where ice roads were developed. Ice bridges would melt slower than surrounding ice and snow, which could cause flooding during spring break-up and result in increased sedimentation loads which would be temporary and localized.

The ROW would cross approximately 495 waterways and drainages. Construction activities for the ROW would include clearing vegetation, grading over the centerline, and excavating a trench for pipeline installation across streams. Three stream crossing methods would be used: open-cut, open-cut isolation, and horizontal directional drilling (HDD) methods. The HDD method is detailed in Figure ES-4. Up to four existing bridges would be used throughout the Project ROW and one new pipeline suspension bridge could be constructed across the Yukon River. The open-cut method would be the most common stream crossing method used, and would potentially impact instream features by temporarily reducing water quality downstream due to increased sedimentation and turbidity from excavating within the streambed and streambanks. Permanent impacts could include changes to the stream profile and structure (bed and hyporheic zone) at crossing locations, and loss of forested riparian vegetation from construction activities and subsequent maintenance of the ROW. Impacts would be

minimized by performing the majority of open-cut trench crossings in the winter, and minimizing duration of in-stream construction in the summer. Streambanks would be revegetated and stabilized with native seed for non-forested vegetation establishment. Streambed scour is not expected to occur due to burial of the pipeline five feet below the surface of streambeds. The chilled pipeline could cause ice damming in the streambed if the pipeline temperature is colder than the stream ambient temperature. Impacts from Project construction at stream crossing locations would primarily be temporary and local.

Figure ES-4: Cross Section of Horizontal Directional Drilling Method



Groundwater: Groundwater is found throughout most of Alaska, but is limited in the northern area of the proposed Project due to continuous permafrost. Groundwater is primarily derived from glaciers, rivers and streams, and the depth of the water table can be as shallow as a few feet to as deep as 400 feet below the surface of the ground. Groundwater is the primary source of Alaska's public drinking water systems and is suitable for agricultural, aquaculture, commercial and industrial uses with moderate to minimal treatment. Arsenic has been found to occur in groundwater within the Project footprint. Contaminated sites also occur within the Project area along the existing ROW of the Parks Highway. Groundwater uses would primarily occur at permanent aboveground facilities and the Project would not be expected to adversely impact existing groundwater availability or quality.

Floodplains: Floodplains provide important ecological and hydrological functions and would be avoided to the extent most practicable for development of the Project. Floodplains would be recontoured to preconstruction state as much as possible, and revegetated with native plant seeds for vegetation establishment. Impacts from Project development would not be expected to adversely impact floodplains.

Vegetation Resources

The proposed Project would cross a diverse array of vegetation communities extending from the Arctic Coastal Plain to the Cook Inlet Basin in Southcentral Alaska. Nine ecoregions would be crossed by the proposed Project. Approximately 4,063 acres of land would be retained as permanent easement and grant ROWs and would be maintained to a non-forested vegetation cover.

Construction activities could cause temporary erosion and sedimentation impacts from vegetation removal along the construction ROW. Grading and topsoil stripping would likely destroy the plant root stock, which would delay vegetation recovery substantially. Non-native and invasive plant establishment and dust deposition could alter vegetation composition. Areas that are constructed in the winter on ice pads would have considerably less impact due to grading not occurring in those areas. Impacts to vegetation would be reduced substantially from associating the Project

ROW with existing ROWs and existing infrastructure. Disturbed areas for construction activities would be recontoured to preexisting conditions and reseeded with native plant seed, and sedimentation structures would be installed as needed in erosion prone areas. Operations of the proposed Project would include mowing the vegetation to a non-forested state. Forested vegetation would be removed permanently within the permanent and grant ROW; however, other vegetation types would recover over time. Project operations should not create additional impacts to vegetation communities beyond the potential for non-native and invasive plants to establish. Additional mitigation measures have been identified to address erosion control, sedimentation, rehabilitation and non-native plant invasion impacts.

Wetland Resources

Wetland resources are found throughout the Project corridor from the Beaufort Sea Coastal Plain southbound to the Cook Inlet Basin. Wetland classes transected by the proposed Project corridor are grouped into four major classifications using the National Wetlands Identification classification system. These include forested wetlands, scrub/shrub, emergent and other wetlands. Quantities and types of wetland resources were identified from results of a multiyear preliminary jurisdictional determination and field investigations verifying wetlands and uplands at field target locations throughout the length of the proposed pipeline ROW.

Yukon Flats

Photo: David Spencer

The proposed Project would affect approximately 5,387 acres of wetlands throughout its length. Three main methods would be employed when constructing in wetlands: open cut with matting, open cut without matting and open cut push/pull. Where possible, grading would occur directly over the center line (trench line) of the pipeline to minimize disturbance to wetlands. The vegetative mat would also be separated from the subsoil to improve rehabilitation success of the vegetative cover.

Wetlands would be contoured to preconstruction state as closely as possible and seeded with native plant species. To reduce impacts to soils, water quality, vegetation and wildlife use, wetland construction would occur during the winter months whenever possible. Impacts would include temporary and permanent disturbance to vegetation from construction activities. If original soil strata are maintained during backfill, subsurface soil, topsoil, and surface hydrology would likely be temporarily impacted. The potential for non-native and invasive plant species to establish could occur; however, this would be mitigated through a robust Non-native Invasive Plant Control Plan developed in collaboration with appropriate state and federal agencies. Erosion control structures would be placed where needed in areas prone to this process.

Operation of the Project would impact vegetation by mowing to maintain the permanent ROW in a non-forested vegetation state. Forest vegetation would be permanently lost, but other wetlands types would persist over the ROW. Project impacts would be reduced substantially by co-locating the ROW with existing utility corridors.

Wildlife Resources

Wildlife resources that could occur within or near the proposed Project area include big game, small game, waterfowl and game bird species, and other common nongame species. The proposed Project ROW crosses seven Game Management Units from the Arctic coast near the Beaufort Sea to the Cook Inlet in Southcentral Alaska. Moose and caribou are the primary big game animals within the Project area, with numerous species of waterfowl and land birds utilizing the area in the summer for breeding, nesting, molting, and rearing young.

The primary impacts to wildlife from construction of the ROW would include temporary construction-related disturbances and permanent operations and maintenance-related disturbances to habitat. Noise produced from construction activities could also affect wildlife adjacent to the ROW. Other impacts could include increased mortality from vehicle and train collisions with wildlife due to additional activity related to Project construction. Whenever possible, construction activities would be timed to occur outside of sensitive time periods for wildlife. Habitat loss would impact tree nesting birds (eagles, owls, hawks)

that utilize forested vegetation within the ROW. Forest vegetation would reestablish over time outside the permanent ROW, although it would take years to decades to reach maturity, resulting in long-term forest habitat impacts.

Forests would not be allowed to reestablish over the permanent ROW. Therefore, the loss of forested habitats would be a permanent impact. Fragmentation of wildlife habitat would result from Project development and establishment of the maintained permanent ROW. Operational impacts to wildlife would be negligible in the Project area with the exception of increased road use and development that could increase vehicle collisions with wildlife. The Project would be co-located with existing ROWs as much as practicable to reduce additional impacts to wildlife from Project development.

Caribou

Photo: Bauer, Erwin & Peggy

Fisheries Resources

The proposed Project area extends from a point near Prudhoe Bay in the North Slope Borough south to the Matanuska-Susitna Borough near the Cook Inlet crossing through three major hydrologic regions: the Arctic Slope region, Interior Alaska region, and Southcentral Alaska region. Three main types of fish are found in the waters transected by the Project area, namely anadromous, resident and amphidromous fish species. The proposed Project would cross 516 streams throughout these regions. Eighty-two of the stream crossings have been confirmed to provide habitat for anadromous fish. Many of the streams that would be crossed have not been have not been studied for fish species presence.

Water withdrawn from permitted lakes and reservoirs would be used for ice road construction and for temporary work camps. Impacts to fish include: stress or mortality from low dissolved oxygen concentrations; altered fish behavior, distribution and growth resulting from water fluctuations; and reduced invertebrate productivity. Ice roads constructed across streams can cause ice bridges which can dam surface flow altering fish passage and habitat use. However, ice slotting would be implemented after construction in areas at these ice road crossings before spring break-up to prevent flooding or damming.

Installation of the buried pipeline across fish-bearing streams during construction is likely to have the greatest potential effect to fishery resources in the Project area. Stream crossings would be constructed using one of four methods: open-cut, open-cut isolation, trenchless technology using HDD, or bridge crossings. The degree of construction-related impacts to fish would depend on the type of crossing method used, the timing of construction, duration of in-stream activity, life stage and type of fish present and the mitigation measures implemented. Open-cut methods would likely cause the greatest temporary impacts to fisheries resources due to excavation within the streambed. Stream locations that are known to not have overwintering fish would be constructed in the winter, reducing impacts to fish.

Potential temporary impacts to fishery resources that would occur during construction include in-stream habitat alteration (changes to substrate composition, water depth, flow, sedimentation and turbidity), and channel profile. Permanent impacts would include riparian vegetation loss and stream morphology alteration to the hyporheic zone. Each subsurface stream crossing would be permitted and constructed in a manner and during a time period that would avoid or minimize potential impacts to fish. In-stream pipeline construction within each waterway crossing is anticipated to be completed in one to three days. The proposed Project includes the construction of one potential pipeline suspension bridge across the Yukon River as an option. No other pipeline bridge construction is proposed.

Fisheries impacts from Project operations are not expected to occur beyond maintaining riparian areas of the permanent ROW in a non-forested vegetation state and the potential for a chilled pipeline to affect instream conditions. The loss of riparian vegetation on stream banks may contribute to increased erosion and instability resulting in reduced fish habitat and water quality. A chilled buried pipeline could alter the environment for fisheries resources affecting fish behavior, survival and productivity. Additional impacts would occur to fisheries resources from access road development. New access roads would

require bridges or culverts to cross streams, which could result in long-term alteration of fish habitat. Long term impacts would include a loss of riparian vegetation at stream crossings, and sedimentation from road use. Dust and gravel would be deposited in the stream channel on either side of crossing. Run-off could potentially transport contaminants from the road affecting water quality in the stream. To mitigate potential impacts to fish and their habitats, additional erosion control plans, sedimentation and rehabilitation plans would be developed and approved by agency staff with associated permits for construction activities.

Yukon River Suspension Bridge Simulation

Photo: The AGDC

Marine Mammals

Eight species of marine mammals that are not listed under the Endangered Species Act (ESA) could potentially occur near or within the proposed Project area. These include gray whale, beluga whale, killer whale, harbor seal, minke whale, harbor porpoise, Dall's porpoise and Pacific white-sided dolphin.

The Port of Seward (POS) would receive the majority of the shipments for equipment and pipeline material needed for Project construction. The Port of Anchorage (POA) may be utilized to supplement shipments to the POS; however, that has not been determined. West Dock Port is located in the Beaufort Sea, which would receive shipments for materials to construct the pipeline and facilities at the northern end of the Project footprint.

Vessel activity would be the only Project-related activity that would occur in the marine environment. Project-related vessel activity would occur prior to or during the construction phase. Disturbance to marine mammals from vessel activity could be in the form of vessel noise, vessel movement, or a potential collision with a marine mammal. Noise produced from the additional vessel activity along existing transportation routes would be considered relatively minimal, temporary, and localized. Vessel activity proposed for the Project would not significantly increase the volume of marine traffic in the Project area or along existing transportation routes. Current information indicates that vessel collisions with whales are not a significant source of injury or mortality. Marine mammals could be displaced temporarily if they were located in the vicinity of vessel activity. However, they would likely be habituated to regular vessel noise and movement. Also, masking could occur temporarily to species that communicate at low frequency sounds similar to vessel noise produced, although this would be a rare occurrence. Finally, routine vessel operations could result in small fuel leaks and lubricants that are toxic to marine mammals. Still, this would be unlikely to adversely impact marine mammals due to the relatively minimal vessel activity expected for the Project. As a result, marine mammals are not expected to be adversely impacted by vessel activity from the proposed Project.

Killer Whale Pod

Photo: Hosking

Threatened and Endangered Species

Species listed under the ESA as endangered, threatened, proposed for listing, and candidates for listing that could occur in the Project area include 10 marine mammals, one terrestrial mammal, and four bird species. Critical habitat for three ESA-listed species occurs within or near the Project area, namely the Cook Inlet beluga whale, polar bear and sea otter. Endangered species include the bowhead whale, Cook Inlet beluga whale, fin whale, humpback whale, Steller sea lion, Wood bison and Eskimo Curlew. Threatened species include the polar bear, Spectacled and Steller's eiders, and sea otter. Species proposed for listing as threatened are the bearded seal and ringed seal.

Vessel activity would be required to deliver materials

and supplies to the POS, West Dock and potentially the POA. These are the only Project activities expected in the marine environment, and would occur over a 2-year construction period. Potential impacts include disturbance to seals, sea otters and whales from vessel noise and movement. Temporary displacement of natural behavior could occur in the vicinity of vessels. However, natural behavior would be expected to resume quickly. Masking effects from vessel noise also could occur temporarily, making it difficult for marine mammals to communicate in their environment. Vessel activity is common at these port locations and shipping lanes, and marine mammals would likely be habituated. The potential for an oil spill could occur if a vessel went aground; a spill however, would be unlikely. Impacts from vessel activity for Project construction would be unlikely to adversely affect ESA and candidate species.

The polar bear and its critical habitat are likely to be adversely affected during Project construction. Although no terrestrial bear dens have been located within this area in the past, the proposed Project area does contain suitable macrohabitat characteristics. Construction and operation of the GCF and the portions of the pipeline on the North Slope may cause disturbance to a few polar bears. No polar bear dens are likely to be disturbed during construction or operation of the GCF or the pipeline. Compliance with regulations pertaining to polar bears for North Slope oil and gas operations would minimize potential impacts to the polar bear and its critical habitat.

The spectacled eider could be adversely affected by construction and operations of the proposed Project due to the potential loss of nesting and breeding habitat. Additional impacts to spectacled eiders could include collisions with structures, increasing mortality, noise disturbance and increased predation on nests. The timing of construction activities during winter and coordination with the U.S. Fish and Wildlife Service (USFWS) regarding lighting of vessels and structures would minimize impacts to spectacled eiders substantially as they use the area only in the summer. Steller's eiders are not likely to be adversely affected from the proposed Project activities because their breeding areas are primarily west of the proposed Project area. Similar impacts to spectacled eiders could occur to nesting Yellow-billed loons due to the overlap of nesting areas with Project development. However, the Project would be unlikely to adversely affect Yellow-billed loons.

Land Use

The Project ROW would impact lands owned by the federal government and managed by the BLM, Department of Defense (DoD), NPS, and USFWS. The State of Alaska, University of Alaska, AHTNA, Inc. and the Toghotthele Corporation have selected federally-owned lands within the Project ROW for their future ownership. The State of Alaska owns the greatest number of parcels within the proposed ROW. Lands owned by the State of Alaska are managed by the Alaska Department of Natural Resources (ADNR). With the exception of the Denali NPP and 6(f) lands, all other lands have applicable land use plans or documents that provide for utility crossings. As a result, the proposed Project would be compatible with these plans. The proposed Project ROW would cross railroads, utilities (including the Trans-Alaska Pipeline System [TAPS]), trails, driveways, and local and arterial roads. Potential effects include disruption to traffic flow and utility service. Effects to agricultural lands would be minimal, with only 0.1 percent of the construction area affected by the proposed Project ROW utilized for agriculture. The Project has the potential to affect developed land by exposing residences or commercial/industrial buildings located near the Project ROW and aboveground facilities to dust and noise primarily during Project construction.

Temporary effects could occur to established trails (R.S. 2477 trails and 17(b) easements) during Project construction and maintenance. These effects should be minimized by ensuring the connectivity of the trails and easements at all times. This could be achieved by connecting the trails or easements via a bypass, or by placing wooden ramps over ditches temporarily created during pipeline construction and maintenance.

Coldfoot, Alaska Airstrip (community along proposed pipeline route)

Photo: Courtesy of Michael Baker, Inc.

Recreation

Although the proposed pipeline alignment was designed to avoid to the greatest extent practicable recreation areas, the mainline pipeline would either cross or be located near (i.e., within less than 1 mile) a number of key recreation features. These include the East Fork Chulitna River Campground, Denali State Park, Montana Creek State Recreation Area, Arctic National Wildlife Refuge, Denali NPP, Nancy Lakes State Recreation Area, Tanana Valley State Forest, Susitna Flats State Game Refuge, Minto Flats State Game Refuge, Willow Creek State Recreation Area, and the Little Susitna Recreation River. In addition, both public and private lands along the mainline route but outside designated recreation areas are commonly subject to dispersed recreation activities.

Project operations including the mowing and maintenance of vegetation resources along the ROW would likely not affect recreation activities or the quality of recreation opportunities in proximity to the pipeline route. However, while the pipeline would be located underground, there would be restrictions to access in some areas along the proposed ROW, accomplished by the use of large boulders, berms, and/or fencing. Consequently, there could be an adverse impact on general recreation access along the pipeline corridor over the long term, although all existing public access points would be retained. While no new public vehicular access routes are required for Project operations, there could be opportunities to include multi-use paths in the Project design to address issues raised during public scoping; this would be a recreation benefit to the region. As a self-contained underground facility, there also would be no effects from pipeline operations that would compromise the recreational quality of the region. Overall, there would be minor long-term adverse effects on tourism or recreation once construction is completed.

Visual Resources

Short-term visual impacts associated with construction would occur from clearing and removal of existing vegetation in the ROW, exposure of bare soils, earthwork, trenching, and machinery and pipe storage. Long-term impacts during operations would be associated with the following: maintenance of access along the ROW; various landform changes including earthwork and rock formation alteration; pipeline markers; and new aboveground structures located along the route such as compressor stations, mainline valves, pig launchers/receivers, and a straddle and off-take facility. Short-term visual impacts would be greater during construction and until re-vegetation occurs than during operations and maintenance.

Visual impacts from construction of the Denali NPP Route Variation are expected to be in the short-term moderate to high due to the sensitivity of viewers, particularly during the visitor season from May to mid-September. Construction of the pipeline would be visible from the Parks Highway, eastern Park lands, and tourist facilities near the Park entrance, and an above-ground segment of the pipeline would be located near the Park entrance on the pedestrian/bicycle bridge over the Nenana River. During operations, the majority of the pipeline route would be located underground within the Parks Highway travel corridor, in which disturbed ground would appear similar to existing conditions following re-vegetation, resulting in low long-term impacts. The segment of the pipeline at the northern Nenana River crossing would be beneath the pedestrian/bicycle bridge and would only be visible to travelers on the Nenana River, not those on the Parks Highway or on the pedestrian/bicycle bridge.

Typical Pipeline Worker Camp

Photo: Courtesy of Michael Baker, Inc.

Socioeconomics

The proposed Project could create up to 9,500 temporary jobs in Alaska over the 2016–2019 period, while the highest number of workers to be on site at any given time during this period is 6,400 temporary employees. Permanent employment would total between 50 and 75 jobs each year over the life of the Project. Non-resident construction workers would temporarily increase the population in the Project area, which may be particularly noticeable in low population areas of the Yukon Koyukuk Census Area, Denali and North Slope boroughs. Given the

remoteness of the areas traversed by the proposed Project, it is anticipated that most of the construction workers would live in work camps and mobilize and demobilize to these camps primarily using air transportation. It is estimated that the GCF and Prudhoe Bay Operations and Maintenance (O&M) facility would employ a total of 10 people that would be housed in Prudhoe Bay on a rotation basis. Ten additional Wasilla O&M facility employees would be required. The AGDC has not yet determined the personnel requirements for the compressor stations or straddle and off-take facility.

Environmental Justice

It is expected that minority and low-income communities would be positively affected by the Project through the creation of jobs, as well as income- and tax-effects. Some adverse quality of life effects are anticipated on communities adjacent to the Project during the construction phase due to increased traffic and noise, but those adverse effects would be expected to be minor to moderate, of a temporary nature, and not concentrated in low income or minority areas. Overall, environmental justice effects on low-income and minority populations that would result from the proposed Project would be negligible or minor.

Cultural Resources

The pipeline ROW would encounter 37 Alaska Heritage Resource Survey sites and 705 sites are within 1 mile of the ROW. Direct effects to cultural resources within the ROW from ongoing or proposed activities could include physical destruction of or damage to all or part of the resource, removal of the resource from its original location, change of the character of the resource's use or of physical features within the resource's setting that contribute to its historic significance, change in access to traditional use sites by traditional users, or loss of cultural identity with a resource. Indirect effects could be characterized within a 1-mile radius of the ROW and include: vibration, noise, or atmospheric elements; neglect of a property that causes its deterioration; transfer, lease, or sale out of Federal ownership without proper restrictions; vulnerability to erosion; and increased access to and proximity of Project components to culturally sensitive areas.

Subsistence

Subsistence use impacts common to the proposed Project would include direct and indirect effects on subsistence use areas, user access, resource availability, and competition in those areas. The magnitude of impacts to subsistence would vary, however. Communities that are located along the proposed ROW or whose use areas are bisected by the Project would likely experience greater impacts vs. those communities located further away or which only have a small portion of their use areas intersected by the Project. Construction related activities resulting from the development of the proposed Project would have both direct and indirect effects on subsistence resources, use areas, and subsistence users in terms of availability, access, and competition, as well as hunter responses and effects on culturally significant activities. Where increased employment and workforce development are concerned, subsistence users might have less time available for subsistence activities due to employment commitments and might travel less to traditional places. Furthermore, a decline in the consumption of traditional foods would result in increased cost for obtaining substitute foods. Employment would however provide the benefit of increased income which residents can in turn use to purchase equipment and supplies needed to participate in subsistence activities.

Public Health

Several public health impacts could occur during both the 2.5-year construction and 30+-year operations phases. Impacts could occur to water and sanitation, health infrastructure and delivery, food, nutrition and subsistence, and social determinants of health. Other negative impacts could entail accidents/injuries, an unhealthy degree of exposure to hazardous materials, outbreak of infectious diseases (perhaps transmitted by pipeline construction workers), and an increase in non-communicable and chronic diseases. Using the rating system described in the State of Alaska Health Impact Assessment Toolkit (http://www.epi.alaska.gov/hia/), nearly all of the potential impacts would be described as "low". The possibility of fatal and nonfatal injuries to members of the general public from incremental road and railroad traffic associated with pipeline construction and operation are scored "medium" using the established rating scheme. Although the health effects could be severe for those impacted by injury associated with the proposed Project, quantitative estimates of the number of persons likely to be injured are quite low. Adverse impacts on social determinants of health could arise from anxieties/concerns related to possible loss or lowering of lifestyle quality and fears about accidents/fires/explosions that could occur as a result of leaks from the pipeline during the operations

phase.

Assuming that a gas distribution network in Fairbanks would be established, the largest potential health impact attributable to the Project would occur during the operations phase. Natural gas emits fewer pounds of pollutants, particularly fine particulates, than wood or other fossil fuels that are currently being utilized for heating (e.g., coal and oil). Substitution of natural gas for other fuels presently used for heating would reduce fine particulate emissions in Fairbanks substantially, particularly in winter months when heaters are used extensively and air inversions are frequent. Existing concentrations of fine particulates, even at levels below air quality standards, have been proven to result in increased morbidity and mortality. Fairbanks is presently a non-attainment area for fine particulates. Thus, the potential public health benefits of readily available natural gas for heating in Fairbanks would be substantial. Natural gas supplied by the pipeline is estimated to be less expensive than other fuels, so there would be positive economic benefits as well. The analysis presented in the DEIS did not address the possibility of substitution of natural gas for gasoline or diesel motor fuel, which if realized would add to the stated benefits.

Various mitigation measures are included in State ROW lease stipulations and the Project plan of development would minimize effects on public health. Additionally, an active health outreach program for pipeline construction workers, including free vaccinations for influenza and hepatitis A and B, is recommended.

Air Quality

Air quality effects associated with construction of the proposed Project would include emissions from fossil-fuel powered construction equipment, fugitive dust, and open burning. The proposed Project would be constructed in four construction spreads or completed lengths. Simultaneous activity would occur on all four spreads. Total worst-case emissions that would occur from construction and operations are estimated at 1,059,100 tpy for CO2, 21,740 tpy for NOx, 8,008 for CO, 2,304 for VOC, and 165,075 tpy for PM-10. Emissions from the pipeline would be non-existent. Preliminary emission estimates for the GCF would trigger the requirement for a PSD permit for NOx, CO, VOC, PM-10, PM-2.5, and GHGs. For the compressor stations and straddle off-take facility, preliminary estimates would trigger the requirement for a PSD permit for NOx.

Noise

Construction noise levels would fluctuate depending on the number and type of equipment in use at any given time. There would be times when no large equipment is operating and noise would be at or near ambient levels. In addition, construction-related sound levels experienced by a noise sensitive receptor in the vicinity of construction activity would vary by distance. Ground-borne vibration would also occur in the immediate vicinity of construction activities, particularly if rock drilling, pile driving, or blasting is required. Noise levels from the industrial equipment at the proposed gas conditioning facility and compressor stations would be approximately 85 to 95 dBA at 50 feet.

Navigation Resources

The proposed pipeline would be underground at stream crossings except for four bridge crossings. Three bridge crossings would use existing bridges and one new pipeline bridge could be built across the Yukon River as an option. Stream crossings employing open cut methods would be completed in one to three days and would be expected to result in short-term disturbances to navigability. No impacts to navigation would be expected from operation and maintenance of the proposed Project. The pipeline would meet or exceed DOT standards (49 CFR 192.327) and would be buried below the ground surface at the depth required for safe crossing of waterbodies or installed on bridges designed and constructed in compliance with Federal and state regulations, standards, and specifications for crossings of navigable waterways.

Reliability and Safety

The U.S. Department of Transportation (USDOT) pipeline standards published in 49 CFR 190 to 199 specifically address natural gas pipeline safety issues and are intended to ensure adequate protection for the public and to prevent natural gas facility accidents and failures. The pipeline and aboveground facilities associated with the proposed Project must be designed, constructed, operated, and maintained in accordance with USDOT pipeline standards.

Furthermore, the State ROW lease for the proposed Project not only grants the AGDC a gas pipeline corridor for construction of the proposed Project, but also contains a comprehensive sequence of stipulations that will direct all aspects of the pipeline design, construction, and operation in conjunction with applicable USDOT pipeline regulations.

The Pipeline Safety Improvement Act of 2002 requires operators to develop and follow a written integrity management program that addresses the risks on each transmission pipeline segment which applies to all high consequence areas (HCA). The Federal Pipeline Safety Improvement Act of 2002 requires operators to develop and follow a written integrity management program that addresses the risks on each transmission pipeline segment. Specifically, the law establishes an integrity management program which applies to all HCA – locations where a gas pipeline accident could do considerable harm to people and their property. The proposed Project contains 15 miles of identified HCAs.

In addition, USDOT regulations require that each pipeline operator establishes an emergency plan that includes procedures to: minimize hazards in a natural gas pipeline emergency; establish and maintain liaison with appropriate fire, police, and public officials to learn the resources and responsibilities of each organization that may respond to a natural gas pipeline emergency; and coordinate mutual assistance.

The AGDC would also develop a safety plan and an O&M) plan that would outline safety measures to be implemented during normal and abnormal Project operation. The AGDC would conduct a public education program that would include information on the "One-Call" program (which provides preconstruction information to contractors or other maintenance workers on the underground location of pipes, cables, and culverts), hazards associated with the unintended release of natural gas, unintended release indicators, and reporting procedures.

The number of significant incidents over the more than 300,000 miles of natural gas transmission lines that exists nationwide indicates the risk is low for an incident at any given location. The operation of the proposed Project would represent only a slight increase in risk to the nearby public.

Design, construction and operations elements that would be integrated into the Project would provide a level of security from terrorism threats. These elements would include buried construction of the pipeline, locked security fencing surrounding aboveground facilities, regular air and ground inspection of the pipeline route, and regular visitation to aboveground facilities by operations and maintenance crews.

Additionally, all practicable steps would be taken to protect the pipeline from washouts, floods, unstable soil, landslides, or other hazards that may cause the pipeline to move or to sustain abnormal loads. During the design phase, the AGDC would address specific details such as pipe wall thicknesses as well as grade and design factors for road crossings, river crossings, bridge crossings, railroad crossings, TAPS crossings, populated areas, and major geologic fault locations. The integrity of this design approach is ensured through the Project quality assurance plans and operational safety and integrity management plans.

In the event of a pipeline rupture, the leak detection system would close the pipeline isolation valves and the escaping gas would contain the equivalent of approximately 1,745 barrels (bbls) of propane and 164 bbls of butane 80 percent / pentane 20 percent. Any release would be almost entirely NGL vapor. Winter temperatures could cause the butane and pentane components to initially remain in a liquid state. However, if any liquids formed, much of the volume would quickly evaporate due to the volatile nature of NGLs. The consequences of an accidental spill of NGLs as a result of a pipeline rupture could include fire and/or explosion of NGL vapors. Potential spill impacts are likely to be short-term and low magnitude due to the volatility of NGL components. However, a small portion of the NGLs may not easily vaporize but may instead remain to potentially migrate through the soils and enter the groundwater if spill cleanup procedures were not implemented.

Trench Placement with Sideboom Installation

Photo: Courtesy of Michael Baker, Inc.

Cumulative Effects

The analysis of cumulative effects considers the potential impacts of the proposed Project and connected actions combined with the impacts of past, present, and reasonably foreseeable future actions in the vicinity of the ASAP Project area. This assessment includes consideration of the existing

pipelines, electrical transmission lines, and roadways, as well as other linear projects that are under construction, planned, proposed, or reasonably foreseeable in the vicinity of the proposed route. The analysis also includes existing and likely energy development projects.

Existing and Proposed Projects

Existing and proposed oil and gas and energy generation projects include the existing TAPS constructed in 1977, the proposed Point Thomson Gas Pipeline – an exploration, production and pipeline system on the North Slope, and the proposed APP – a natural gas pipeline that would extend from the North Slope to northern Alberta, Canada or to Valdez, Alaska.

Existing and proposed North Slope facilities include the Prudhoe Bay GCF, and the possible construction of a facility to produce LNG for delivery to Fairbanks by truck.

The proposed Project would provide utility-grade natural gas to the existing ENSTAR pipeline distribution system, replacing or supplementing natural gas supplies currently obtained from Cook Inlet gas fields. The ENSTAR distribution system is approximately 3,650 miles long and serves 350,000 direct customers.

The Project would be located in close proximity to an extensive transportation and utility system. Highways are continually being repaired, replaced, or upgraded, and these projects are also considered in Section 5.20. Improvements to existing public roads would not be required in association with the proposed ASAP Project. As a result of the anticipated increase in use, airports that would be used to support construction of the ASAP Project may require upgrades to improve runways, lighting, communications, or navigational aids. The Project would not require improvements to the ARR or to exiting port and dock facilities.

In addition, existing high voltage transmission lines would be periodically upgraded and additional parallel lines constructed to enhance the long-term reliability of the entire electrical system.

Finally, Fort Wainwright, Joint Base Elmendorf-Richardson, and Clear Air Force Base are currently proposing to perform infrastructure improvements and base upkeep activities that could coincide with construction of the Project.

Regarding energy, renewable energy generation projects and new discoveries of economic natural gas resources in the Cook Inlet area could have a cumulative effect on energy supply in the region. Future renewable energy projects include wind power (e.g., the Eva Creek Wind Farm near Healy, the Fire Island Wind Farm at Anchorage, and a wind farm at Nikiski) and hydropower (e.g., Susitna, Chakachamna, and Glacier Fork projects). In addition, if operable, the Healy Clean Coal Project could contribute electrical energy to the utilities connected to the Railbelt transmission system. Renewable energy projects as well as energy conservation measures would likely occur in the future regardless of the ASAP Project.

A long-term, stable supply of natural gas provided to Fairbanks by the proposed ASAP Project would likely result in development of a Fairbanks natural gas distribution system. This would include local distribution pipelines and possibly new facilities that would compress natural gas for distribution by storage tanks. Conversion or retrofit of power generation and heating facilities to allow for burning of natural gas could also take place. Also reasonably forseeable are future commercial and industrial projects that could utilize the 130 MMscfd of natural gas that the proposed ASAP Project would provide.

The proposed Accelergy/Tyonek Coal to Liquids (CTL) project would produce aviation fuel, gasoline, and diesel for military and industrial use, and would generate electricity with waste heat. A 12-inch-diameter 58-mile long buried steel pipeline from the end of the Beluga Pipeline to the Tyonek area would be required in order to transport natural gas from the ASAP Project to Tyonek for use in the CTL process.

Another potential use scenario for use of the 130 MMscfd of natural gas that the proposed ASAP Project would provide is conveying natural gas from the southern terminus of the Project to Nikiski for conversion to LNG and subsequent export by ship. Other potential future industrial gas users include the Donlin Creek Mine project, which plans to draw an additional 25 MMscfd of natural gas from unspecified sources at Cook Inlet by 2017, and a natural gas to liquids facility in the Cook Inlet area that would produce synthetic diesel and gasoline fuels from natural gas.

Cumulative Effects to Resources

Soils and Geology

ASAP Project-related effects to soils and geology would be mitigated with measures identified during the Project's final design phase such as the implementation of construction BMPs..The effects

from connected actions and other reasonably foreseeable projects would also be identified to reduce cumulative effects. Except for competition for scarce gravel resources, the potential for substantial negative cumulative effects is low. There could be a potential cumulative effect to paleontological resources, but standard permit provisions should avoid damage to these resources associated with the Project, connected actions, and other reasonably foreseeable actions.

Water Resources and Wetlands

Cumulative effects to waterbodies would be small due to the existing processes for issuing temporary use permits for construction and for water rights needed for permanent facilities.

Approximately 4,575 acres of wetlands would be impacted by the proposed ASAP Project between the North Slope and the Cook Inlet area. An additional unquantified disturbance for the conceptual development and operation of a pipeline, fractionating facility, tank farm and marine terminal at Nikiski would be disturbed during construction of this connected action. Except for wetlands within the footprint of permanent facilities, most disturbed wetlands would be expected to retain their functions after construction is completed. New disturbances to wetlands from maintenance of highways, TAPS, and ARR would not be expected. Construction of the APP between the North Slope and MP 405 could double the cumulative effect to wetlands.

Biological Resources

Negative long-term cumulative effects on vegetation or wildlife habitats would be minimal due to the largely temporary site-specific nature of the direct and indirect effects of the proposed Project on vegetation and wildlife and fish habitats.

If activities associated with reasonably foreseeable projects were to occur during a similar time period as the proposed Project, there may be a cumulative mortality of aquatic- and terrestrial- species individuals, but overall, a negative cumulative population-level effect would be minimal.

Increased vessel traffic could cause a cumulative effect of marine activity. Most of this impact would affect aquatic and marine resources – including mammals – due to marine activities during construction and operation of the Project and connected action combined with other reasonably foreseeable actions. However, cumulative negative effects to federal- or state- listed species would not be expected.

Land Use

Reasonably foreseeable future projects that would be constructed within existing transportation and utility corridors generally would be consistent with existing land use planning and would therefore be assumed to have minimal effects on land use.

Anchorage, Alaska (city near the terminus of the proposed pipeline route)

Photo: Courtesy of Alaska Division of Community and Regional Affairs

For example, there would be a short-term negative cumulative effect on recreational opportunity and activity in the Project area due to both construction activity and increased competition for recreation resources from construction workers assigned to the reasonably foreseeable projects associated with the proposed Project.

New roads and the cleared ROW through forested areas could increase unauthorized off-road vehicle use and result in ground disturbance, damage to vegetation, and greater potential for soil erosion. However, overall roadway improvement and maintenance projects are not expected to result in an adverse effect even when combined with the proposed Project. It is unlikely but possible that coinciding construction or maintenance schedules could prevent traffic flow on the Parks or Dalton Highways.

Visual Resources

Since it would be located within an existing transportation and utility corridor, the overall cumulative effect of the Project on the visual resources in the Project area when combined with TAPS, APP, highways, and ARR would be minimal.

Socioeconomics

Potential beneficial effects as result of the proposed Project and connected actions could be expanded

when coupled with reasonably foreseeable future actions. These benefits include jobs, tax revenues, and a long-term stable supply of natural gas for electrical generation, home heating and industrial activities. As the mix of energy sources in the Railbelt and rural Alaska alters, there could be incremental change in the overall cost of energy. Because of the small size of the Alaska population, in-state demand is correspondingly small. This also leaves only a small base to cover the initial investment and operating costs for each new energy source. The addition of new non-oil and gas energy sources to the Railbelt area would increase the quantity of natural gas available for in-state industrial use and for export.

Potential adverse effects to quality of life from noise, traffic delay, and increased competition from construction workers are expected to be short-term in duration.

Cultural and Historic Resources

Because of co-location with existing disturbed ROWs for substantial distances along the proposed Project ROW, as well as avoidance of potentially eligible properties wherever possible, the incremental contribution to cumulative effects from the proposed Project to cultural resources in the Project area would be expected to be minimal.

Subsistence

In conjunction with other reasonably foreseeable and future projects within subsistence areas, the proposed Project would result in cumulative temporary and permanent disruption of subsistence activities. Associated with this impact would be the potential decrease in available harvest resulting from temporary disturbance to wildlife, fisheries, and their habitat. The scale of this disruption would depend on the scale of the other projects.

Public Health

Measured against all cumulative health effects from state and federal programs, other oil and gas activities, and other industrial developments, the incremental impacts of the proposed Project on public health would not likely be large. Put another way, whether or not the proposed Project goes forward would not materially affect the cumulative impacts of all other state, federal, and industrial developments. Furthermore, Residents of Fairbanks would benefit in health terms as a result of improved air quality resulting from the proposed Project and a Fairbanks gas distribution system. These benefits were described in the summary of Public Health effects for the proposed Project, and are described in detail in Section 5.15 of the DEIS.

Air Resources

Even with mitigation, the proposed Project would generate GHG emissions and incrementally contribute to climate change. However, when proposed Project emissions are viewed in combination with global emissions levels that are contributing to the existing cumulative impact on global climate change, the incremental contribution of GHG emissions would be collectively small.

Noise

Due to the short term nature of proposed Project construction and the absence of sensitive noise receptors near work areas, only short-term and transitory cumulative noise effects on humans and wildlife would occur.

Navigation

Disruption of existing vessel traffic at the POS or at West Dock would be unlikely. There would be a long-term increase in vessel traffic in Cook Inlet associated with NGL processing and distribution, and LNG export from Nikiski. When combined with current Cook Inlet vessel traffic and future port improvement activities, fishing, and marine scientific research, Project navigation activity could result in a cumulative increase in vessel congestion and modification to traffic patterns.

Reliability and Safety

There would be potential cumulative effects to safety and reliability with the convergence of the proposed Project, TAPS, highway use and maintenance, and the ARR. It would be expected that final design for the proposed Project would include written agreements that the proposed construction activities, operating conditions, and maintenance requirements would not cause undue risk to existing transportation and utility systems. Accordingly, no negative cumulative effects to TAPS, highways, or the ARR would be expected.