



Federal Energy Regulatory Commission

FERC/EIS-0296D

June 2019

Federal Energy Regulatory Commission
Office of Energy Projects
888 First Street NE, Washington, DC 20426

FERC Docket No. CP17-178-000

Alaska LNG Project

Draft Environmental Impact Statement



Cooperating Agencies:



Bureau of
Land
Management



National
Marine
Fisheries
Service



National
Park
Service



U.S. Army
Corps of
Engineers



U.S.
Coast
Guard



U.S.
Department
of Energy



U.S.
Department
of
Transportation



U.S.
Environmental
Protection
Agency



U.S. Fish
and Wildlife
Service

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426

OFFICE OF ENERGY PROJECTS

In Reply Refer To:
OEP/DG2E/Gas Branch 3
Alaska LNG Project
Alaska Gasline Development Corporation
Docket No. CP17-178-000
FERC/EIS-0296D

TO THE INTERESTED PARTIES:

The staff of the Federal Energy Regulatory Commission (FERC or Commission) with the participation of the cooperating agencies listed below, has prepared a draft environmental impact statement (EIS) for the Alaska LNG Project (Project) proposed by the Alaska Gasline Development Corporation (AGDC). AGDC requests authorization to construct and operate new gas treatment facilities, an 806.6-mile-long natural gas pipeline and associated aboveground facilities, and a 20 million-metric-ton per annum liquefaction facility to commercialize the natural gas resources of Alaska's North Slope. The Project would have an annual average inlet design capacity of up to 3.7 billion standard cubic feet per day and a 3.9 billion standard cubic feet per day peak capacity.

The draft EIS assesses the potential environmental effects of Project construction and operation in accordance with the requirements of the National Environmental Policy Act (NEPA). As described in the EIS, the FERC staff concludes that approval of the Project would result in a number of significant environmental impacts; however, the majority of impacts would be less than significant based on the impact avoidance, minimization, and mitigation measures proposed by AGDC and those recommended by staff in the draft EIS. However, some of the adverse impacts would be significant even after the implementation of mitigation measures.

The United States (U.S.) Department of Transportation Pipeline and Hazardous Materials Safety Administration, U.S. Environmental Protection Agency, U.S. Army Corps of Engineers, U.S. Coast Guard, Bureau of Land Management (BLM), U.S. Fish and Wildlife Service, National Park Service, U.S. Department of Energy, and National Marine Fisheries Service participated as cooperating agencies in the preparation of this EIS. Cooperating agencies have jurisdiction by law or special expertise with respect to resources potentially affected by the proposal and participate in the NEPA analysis. Although the cooperating agencies provided input to the conclusions and recommendations presented in the draft EIS, the agencies will present their own conclusions and recommendations in their respective Records of Decision for the Project.

The BLM will adopt and use the EIS to consider issuing a right-of-way grant for the portion of the Project on BLM-managed lands. Other cooperating agencies will use this EIS in their regulatory process, and to satisfy compliance with NEPA and other related federal environmental laws (e.g., the National Historic Preservation Act).

Section 810(a) of the Alaska National Interest Lands Conservation Act, 16 United States Code 3120(a), also requires the BLM to evaluate the effects of the alternatives presented in the draft EIS on subsistence activities, and to hold public hearings if it finds that any alternative may significantly restrict subsistence uses. The preliminary evaluation of subsistence impacts indicates that the cumulative case analyzed in the draft EIS may significantly restrict subsistence uses for the communities of Nuiqsut, Kaktovik, Utqiagvik, and Anaktuvuk Pass. Therefore, the BLM will hold public hearings and solicit public testimony in these potentially affected communities.

The Commission mailed a copy of the draft EIS to federal, state, and local government representatives and agencies; elected officials; Alaska Native tribal governments and Alaska Native Claims Settlement Act Corporations; and local libraries and newspapers in the area of the Alaska LNG Project. The draft EIS was also mailed to property owners that could be affected by Project facilities, individuals requesting intervenor status in FERC's proceedings, and other interested parties (i.e., individuals and environmental and public interest groups who provided scoping comments or asked to remain on the mailing list). Paper copy versions of this EIS were mailed to subsistence communities, libraries, and those specifically requesting them; all others received a CD version.

The draft EIS is also available in electronic format. It may be viewed and downloaded from FERC's website (www.ferc.gov) on the Environmental Documents page (<http://www.ferc.gov/industries/gas/enviro/eis.asp>). In addition, the draft EIS may be accessed by using the eLibrary link on FERC's website. Click on the eLibrary link (<https://www.ferc.gov/docs-filing/elibrary.asp>), then click on General Search and enter the docket number in the "Docket Number" field, excluding the last three digits (i.e., CP17-178). Be sure you have selected an appropriate date range. For assistance, please contact FERC Online Support at FercOnlineSupport@ferc.gov or toll free at (866) 208-3676, or for TTY, contact (202) 502-8659.

Any person wishing to comment on the draft EIS may do so. Your comments should focus on the draft EIS's disclosure and discussion of potential environmental effects, reasonable alternatives, and measures to avoid or lessen environmental impacts. To ensure consideration of your comments on the proposal in the final EIS, it is important that the Commission receive your comments on or before 5:00 p.m. Eastern Time on **October 3, 2019**.

For your convenience, there are four methods you can use to submit your comments to the Commission. In all instances, please reference the Project docket number (CP17-178-000) with your submission. The Commission encourages electronic filing of comments and has staff available to assist you at (866) 208-3676 or FercOnlineSupport@ferc.gov. Please carefully follow these instructions so that your comments are properly recorded.

- 1) You can file your comments electronically using the [eComment](#) feature on the Commission's website (www.ferc.gov) under the link to [Documents and Filings](#). This is an easy method for submitting brief, text-only comments on the Project.
- 2) You can file your comments electronically by using the [eFiling](#) feature on the Commission's website (www.ferc.gov) under the link to [Documents and Filings](#). With eFiling, you can provide comments in a variety of formats by attaching them as a file with your submission. New eFiling users must first create an account by clicking on "[eRegister](#)." If you are filing a comment on a particular project, please select "Comment on a Filing" as the filing type.
- 3) You can file a paper copy of your comments by mailing them to the following address. Be sure to reference the Project docket number (CP17-178-000) with your submission: Kimberly D. Bose, Secretary, Federal Energy Regulatory Commission, 888 First Street NE, Room 1A, Washington, DC 20426.
- 4) In lieu of sending written or electronic comments, the Commission invites you to attend one of the public comment meetings held in the Project area to receive comments on the draft EIS. The dates, locations, and times of these meetings, along with the BLM public hearings, will be provided in a supplemental notice.

Any person seeking to become a party to the proceeding must file a motion to intervene pursuant to Rule 214 of the Commission's Rules of Practice and Procedures (18 Code of Federal Regulations Part 385.214). Motions to intervene are more fully described at <http://www.ferc.gov/resources/guides/how-to/intervene.asp>. Only intervenors have the right to seek rehearing of the Commission's decision. The Commission grants affected landowners and others with environmental concerns intervenor status upon showing good cause by stating that they have a clear and direct interest in this proceeding that no other party can adequately represent. **Simply filing environmental comments will not give you intervenor status, but you do not need intervenor status to have your comments considered.** Subsequent decisions, determination, permits, and authorization by the cooperating agencies are subject to the administrative procedures of each respective agency.

Questions?

Additional information about the Project is available from the Commission's Office of External Affairs, at **(866) 208-FERC**, or on the FERC website (www.ferc.gov) using the eLibrary link. The eLibrary link also provides access to the texts of formal documents issued by the Commission, such as orders, notices, and rulemakings.

In addition, the Commission offers a free service called eSubscription that allows you to keep track of all formal issuances and submittals in specific dockets. This can reduce the amount of time you spend researching proceedings by automatically providing you with notification of these filings, document summaries, and direct links to the documents. Go to www.ferc.gov/docs-filing/esubscription.asp.

Kimberly D. Bose
Secretary

EXECUTIVE SUMMARY

INTRODUCTION AND BACKGROUND

The staff of the Federal Energy Regulatory Commission (FERC or Commission) has prepared this draft environmental impact statement (EIS) to assess the impacts of constructing and operating the Alaska LNG Project (Project) proposed by the Alaska Gasline Development Corporation (AGDC). The purpose and need of the Project is to commercialize the natural gas resources of Alaska's North Slope (North Slope), by converting the existing natural gas supply to liquefied natural gas (LNG) for export and providing gas for users within the State of Alaska.

The purpose of this draft EIS is to inform the FERC decision-makers, the public, and permitting agencies about the potential adverse and beneficial environmental impacts of the proposed Project and recommend mitigation measures that would reduce adverse impacts to the extent practicable. We¹ prepared this EIS based on information provided by AGDC; our independent review of this information; and consultation with federal cooperating agencies (see below); and in consideration of comments provided by federal, state, and local agencies; Alaska Native communities; and individual members of the public. This draft EIS was prepared in accordance with the requirements of the National Environmental Policy Act of 1969 and the Commission's implementing regulations under Title 18 of the Code of Federal Regulations (CFR), Part 380.

FERC is the federal agency responsible for authorizing onshore LNG facilities used for exportation of natural gas. FERC is the lead federal agency responsible for the preparation of the draft EIS. The U.S. Department of Transportation's (DOT) Pipeline and Hazardous Materials Safety Administration, U.S. Environmental Protection Agency, U.S. Army Corps of Engineers, U.S. Coast Guard (Coast Guard), Bureau of Land Management (BLM), U.S. Fish and Wildlife Service, National Park Service, U.S. Department of Energy, and National Marine Fisheries Service are cooperating agencies because they have jurisdiction by law or special expertise with respect to environmental resources and impacts associated with the Project. The cooperating agencies provided input to the conclusions and recommendations presented in the draft EIS. Following issuance of the final EIS, the cooperating agencies will issue subsequent decisions, determinations, permits, or authorizations for the Project in accordance with each individual agency's regulatory requirements.

PROPOSED ACTION

On April 17, 2017, AGDC filed an application with FERC in Docket No. CP17-178-000, pursuant to Section 3 of the Natural Gas Act and Part 153 of the Commission's regulations, seeking authorization to construct and operate the following facilities in Alaska: a new Gas Treatment Plant (GTP); a 1.0-mile-long, 60-inch-diameter Prudhoe Bay Unit Gas Transmission Line (PBTL); a 62.5-mile-long, 32-inch-diameter Point Thomson Unit Gas Transmission Line (PTTL); a 806.6-mile-long, 42-inch-diameter natural gas pipeline (Mainline Pipeline) and associated aboveground facilities, including eight compressor stations and a heater station; and a 20 million metric-ton per annum liquefaction facility (Liquefaction Facilities), including an LNG Plant and Marine Terminal.

The Gas Treatment Facilities (GTP, PBTL, and PTTL) would be on state land designated for oil and natural gas development within the North Slope Borough. The Mainline Pipeline would start at the GTP and generally follow the existing Trans Alaska Pipeline System crude oil pipeline and adjacent highways south to Livengood, Alaska. From Livengood, the Mainline Pipeline would head south-southwest to Trapper Creek following the Parks and Beluga Highways, then turn south-southeast around

¹ "We," "us," and "our" refer to the environmental and engineering staff of FERC's Office of Energy Projects.

Viapan Lake. It would then cross Cook Inlet entering near Beluga Landing and exiting at a landing near Suneva Lake on the northern part of the Kenai Peninsula. The Mainline Pipeline would terminate at the Liquefaction Facilities, which would be sited on the eastern shore of Cook Inlet in the Nikiski area of the Kenai Peninsula.

The Project would have an annual average inlet design capacity of up to 3.7 billion standard cubic feet per day and a peak capacity of 3.9 billion standard cubic feet per day. During operation, AGDC expects that between 204 and 360 LNG carriers would call at the Marine Terminal each year.

FERC considers all factors bearing on the public interest as part of its decision to authorize natural gas export facilities. Occasionally, projects reviewed by FERC have associated facilities that do not fall under the jurisdiction of the Commission. For the Project, non-jurisdictional activities would include modifications/new facilities at the Point Thomas Unit, modifications/new facilities at the Prudhoe Bay Unit, relocation of the Kenai Spur Highway, upgrades to the City of Kenai water system, in-state gas interconnections, and LNG carrier transits to and from the Liquefaction Facilities during Project operation. We discuss these facilities and activities in our cumulative impacts analysis in section 4.19.

PUBLIC INVOLVEMENT

AGDC² began participating in the Commission's pre-filing process in September 2014 (Docket No. PF14-21-000). FERC's pre-filing process encourages the early involvement of interested stakeholders and regulatory agencies to identify and resolve environmental issues before an application is filed with FERC. During the pre-filing process, AGDC held 14 open houses in Nikiski, Tyonek, Anchorage, Healy, Nenana, Minto, Barrow, Fairbanks, Trapper Creek, Wasilla, Houston, Nuiqsut, Kaktovik, and Anaktuvuk Pass, Alaska, from October 2014 through January 2015. The purpose of the open houses was to provide the public with information about the Project and to solicit comments.

In March 2015, FERC issued a *Notice of Intent to Prepare an Environmental Impact Statement for the Planned Alaska LNG Project and Request for Comments on Environmental Issues* (NOI). The NOI was sent to over 1,850 interested parties, including federal, state, and local officials; agency representatives; conservation organizations; Native Alaskan communities; local libraries; newspapers; and property owners along the pipeline route and within 0.5 mile of the planned compressor stations and LNG Plant. The NOI established a 9-month public scoping period for the submission of comments, concerns, and issues related to environmental aspects of the Project. The extended 9-month scoping period was in recognition of subsistence harvesting windows observed by communities potentially affected by the Project. During the scoping period, FERC held 12 public scoping meetings to receive comments about the Project. The meetings were attended by about 310 people, including stakeholders, representatives from FERC, cooperating agencies, and AGDC. During scoping, FERC staff gathered feedback from local communities, including residents, elected officials, tribal leaders, community leaders, and other interested stakeholders.

On July 27, 2016, FERC issued a *Supplemental Notice Requesting Comments on the Denali National Park and Preserve Alternative for the Planned Alaska LNG Project*. The Notice was issued to solicit feedback from the public and agencies regarding the Denali Alternative, an alternative route that would pass directly through the Denali National Park and Preserve (DNPP) entrance area and be closely aligned with the George Parks Highway. On August 23, 2016, FERC held a public forum within the DNPP

² AGDC, BP Alaska LNG LLC, ConocoPhillips Alaska LNG Company, ExxonMobil Alaska LNG LLC, and TransCanada Alaska Midstream LLP filed a *Request to Commence Pre-Filing Process* on September 5, 2014. On January 4, 2017, AGDC informed the Commission that it had taken over sole ownership of the Project. Because AGDC assumed full control of the Project and was part of the previous applicant team, AGDC is referred to as the Project applicant throughout the document regardless of the timeframe of the activity.

to discuss the Denali Alternative. About 16 people attended, including DNPP staff. The comment period for the supplemental notice closed on September 25, 2016.

To date, FERC has received 248 written comment letters and form letters on the Project. Numerous comments expressed concern regarding the proximity of the Project facilities to residential properties in the Nikiski area. Comments from the Kenai community included concerns about increased traffic and strains on housing and the public school system due to population increases associated with construction workers; other concerns included noise, lighting, recreation impacts, and safety. Landowners and stakeholders from the Nikiski area expressed concern regarding AGDC's plans to move the Kenai Spur Highway and the associated impact on the community. Construction camps and increased crime rates due to construction workers were also raised as concerns. Multiple comments were received in support of an alternative LNG terminal site in Valdez and at Port Mackenzie.

FERC received numerous comments on the Project's potential impact on surrounding wildlife—more specifically the caribou population and its migration routes, the endangered Cook Inlet beluga whale population, and Cook Inlet fish habitat—and on how the Project could affect local subsistence on the North Slope. Other concerns included potential impacts on the local fishing industry, beach access, wetland ecosystems, nature reserves or parks, and safety. Commenters voiced concern regarding pipeline leak detection, offshore pipeline maintenance under sea ice during winter, and climate change. Commenters from Fairbanks noted the air quality benefits of natural gas relative to other fossil fuels.

All comments received before issuance of this draft EIS were considered and addressed as appropriate in our analysis.

PROJECT IMPACTS

Project construction and operation would affect geological resources, soils and sediments, water resources, wetlands, vegetation, wildlife, aquatic resources, threatened and endangered species, other species of concern, land use, recreation, special use areas, visual resources, socioeconomics, transportation, cultural resources, subsistence resources, air quality, noise, health, and public safety. Our analysis also evaluated the potential for cumulative impacts on these resources.

Project construction would require the use of about 35,548 acres of land. While AGDC would maintain about 8,504 acres for Project operation, a total of approximately 16,479 acres would be permanently affected. Construction impacts are those that would occur during Project construction. Operational impacts are those that are associated with the operation of the Project facilities (e.g., the operational right-of-way for a pipeline facility or an aboveground facility). If a facility or an area used during construction would not be used to operate the Project, then no operational impacts are included. Permanent surface alterations are those that could extend beyond the life of the Project, including material sites and areas where granular fill was placed during construction. The Project would result in significant long-term to permanent impacts on thaw sensitive permafrost (about 6,377 acres), thaw stable permafrost (about 3,415 acres), and forest (about 12,474 acres); and convert about 4,162 acres of wetland to upland.

The Mainline Pipeline would require 523 waterbody crossings, and the PTTL would require 105 waterbody crossings. Five rivers (the Middle Fork Koyukuk, Yukon, Tanana, Chulitna, and Deshka Rivers) would be crossed using the directional micro-tunneling method, which would avoid direct disturbance of these waterbodies. Surface flow patterns in the Project area would be affected by clearing and ground disturbing activities and the permanent placement of granular fill material in construction areas. AGDC would restore surface flow and contour granular fill material to maintain drainage and hydrologic connectivity.

Impacts on wildlife, including terrestrial wildlife, avian resources, marine mammals, fisheries, and federally listed threatened and endangered species, would result from the loss, alteration, or isolation of habitat; changes in migration patterns; direct injury or mortality; impediment to movement; noise; artificial lighting; and turbidity and sedimentation. With the implementation of various best management practices and our recommendations, most impacts on wildlife would be less than significant, but adverse impacts on some species, including caribou (*Rangifer tarandus*) (Central Arctic Herds) and federally listed threatened and endangered species, would occur.

The Project would cross or pass near several recreation areas, including the Arctic National Wildlife Refuge, DNPP, George Parks Highway National Scenic Byway, Iditarod National Historic Trail, Dalton Highway Scenic Byway, and Denali State Park. Most impacts on recreation areas during construction would be temporary and minor. AGDC would provide alternate access to affected sites, schedule activities outside peak tourist seasons to the extent practicable, and comply with applicable crossing permits to minimize impacts. The main impact of the Project operation on recreation areas would be long-term to permanent changes in the landscape due to maintenance of the pipeline right-of-way or installation of aboveground facilities. These impacts similarly would result in visual impacts, particularly in rugged terrain, due to elevated views. While Project effects on visual resources overall would be less than significant, visual impacts at key observation points near the DNPP would be high, so any additional impacts on these same areas from other projects would contribute to cumulative visual effects, which could be significant.

Construction and maintenance of offshore facilities in Cook Inlet and Prudhoe Bay would temporarily increase turbidity and sedimentation, while Project operation would result in the permanent loss of some open marine habitat. Increases in marine vessel traffic would occur in Cook Inlet and Prudhoe Bay during construction and in Cook Inlet during operation.

Emissions from vehicles and equipment, marine and air traffic, waste incinerators, open burning, and fugitive dust would affect air quality during Project construction. Emissions from operation of the GTP, Mainline compressor stations and heater station, and Liquefaction Facilities would not cause or contribute to exceedances of National or Alaska Ambient Air Quality Standards under normal operating conditions. However, exceedances could occur at the Liquefaction Facilities during Years 7 and 8 when construction, start-up, and operational activities are simultaneous. Operational emissions from the aboveground facilities could exceed nitrogen and sulfur deposition thresholds and visibility thresholds at nearby Class I and II nationally designated protected areas. Noise impacts on noise sensitive areas during construction would mostly be temporary and minor, but could be moderate to significant at some locations. For example, noise associated with the Liquefaction Facilities at the two nearest noise sensitive areas would likely double due to facility operation.

Project construction would increase population due to worker influx, but impacts would be minor due to the use of closed construction camps. Population growth in urban areas would result from indirect and induced economic impacts, which would increase demand for housing and public services in these areas. Project construction and operation would result in economic benefits from worker spending, purchases of materials and services, and taxes. The Project could disproportionately affect some environmental justice populations due to impacts on subsistence practices and public health effects.

Project construction and operation have the potential to affect the subsistence practices of Native Alaska communities due to reductions in resource abundance and availability, reduced access to harvest areas, and increased competition from non-local harvesters. Impacts would result from the loss or alteration of habitat and loss or displacement of wildlife. The extent of impacts would vary by community, but overall, the impacts would be less than significant. The BLM prepared an analysis under Section 810 of the Alaska National Interest Lands Conservation Act because a portion of Project construction and

operation would occur on BLM lands. The EIS incorporates traditional knowledge regarding various characteristics of Alaskan natural resources and management practices as passed down from generation to generation in Alaska Native communities. Traditional knowledge was collected through community workshops, questionnaires, and review of ethnographic research. Traditional knowledge was used to supplement our descriptions of the affected environment and inform our resource impact analyses and conclusions.

A Health Impact Assessment for the Project rated construction impacts as “low adverse” for all health effects categories except social determinants of health and infectious diseases, which were rated “medium adverse” and “high adverse,” respectively, due to worker influx. Operational impacts were rated as “low adverse” for all health effects categories except social determinants of health, which were rated “medium adverse” due to concerns about natural gas incidents, and infectious diseases, which were rated “medium adverse” due to worker influx.

FERC staff conducted a preliminary engineering and technical review of AGDC’s proposed design for its Gas Treatment and Liquefaction Facilities. With the incorporation of the identified mitigation measures, the designs provide acceptable layers of protection or safeguards that would reduce the risk of a potentially hazardous scenario from developing into an event that could affect the off-site public. The DOT assists FERC by determining whether AGDC’s proposed design would meet the DOT’s 49 CFR 193 Subpart B siting requirements. The DOT will provide a Letter of Determination on the Project’s compliance with 49 CFR 193 Subpart B. The Letter of Determination will serve as one of the considerations for the Commission to deliberate in its decision to authorize or deny the Project. The Coast Guard also assisted FERC staff by reviewing the proposed Liquefaction Facilities and the associated LNG marine vessel traffic. On August 17, 2016, the Coast Guard issued a Letter of Recommendation to FERC staff indicating Cook Inlet would be considered suitable for accommodating the type and frequency of LNG marine traffic associated with the Project.

The Mainline Pipeline and associated aboveground facilities would be designed, constructed, operated, and maintained to meet the DOT’s *Minimum Federal Safety Standards* in 49 CFR 192 and other applicable federal and state regulations. AGDC has applied for Special Permits from the DOT for strain-based design, multi-layer coating, mainline valve spacing, and crack arrestor coating for the Mainline Pipeline facilities. After a public notice and comment period, the DOT will determine if the Special Permit applications comply with the requirements of 49 CFR 190.341 and whether waivers of the relevant regulations or standards are not inconsistent with pipeline safety.

ALTERNATIVES CONSIDERED

As required by the National Environmental Policy Act of 1969, and in consultation with the cooperating agencies, we identified and considered reasonable alternatives to the Project to determine if the implementation of an alternative would be preferable to the proposed action. An alternative is considered reasonable if it meets the stated purpose of the Project and is technically and economically feasible and practical. A preferable alternative would offer a significant environmental advantage over the proposed action. In our alternatives analysis, we considered the no action alternative, system alternatives, site alternatives, alternative delivery systems and docking stations, and alternative pipeline routes and design. The EIS evaluates alternatives developed by FERC staff, developed by AGDC, or suggested by stakeholders.

Under the no action alternative, the impacts described in this EIS would not occur, but the purpose of the Project would not be met. In response, AGDC or other applicants would likely develop a new project to transport gas from the North Slope for export and in-state delivery. Given the infrastructure needed to transport the same gas volumes, environmental impacts would likely be comparable to those of the Project.

Therefore, we concluded that the no action alternative provides no significant environmental advantage over the Project.

We assessed the potential use of existing, proposed, or modified natural gas infrastructure to meet the same objectives as the Project. We evaluated expansion of the existing Kenai LNG terminal, proposed Alaska Stand Alone Pipeline Project, and existing and proposed LNG export terminals in the United States and Canada. These alternatives would require design changes or new infrastructure that would result in similar or greater impacts than the Project. We concluded that none of the system alternatives would be preferable to the Project.

We examined four alternative sites for the GTP, but found that none would reduce impacts or provide significant environmental advantages relative to the Project. We also considered if the GTP work pad footprint could be modified to reduce impacts, but no technically feasible alternative configurations were identified.

We evaluated five alternative docking stations for module delivery to the proposed GTP. Each would increase the length of access roads, require more dredging, or be farther from the GTP than the Project. We also analyzed alternative sites at the West Dock Causeway associated with the Gas Treatment Facilities that require less marine habitat disturbance, but each would require dredging or infrastructure upgrades. We concluded that none of the alternative docking stations or sites would provide a significant environmental advantage over the Project.

We evaluated several alternative routes for the Mainline Pipeline, including routes in and around Cook Inlet and near Fairbanks. We found that none of these alternatives would provide a significant environmental advantage over the Project. We evaluated an alternative route through the DNPP—the Denali Alternative—and found that both the proposed route and this alternative would be acceptable, with neither having a significant advantage over the other. We also found that the small reduction in permafrost impacts from an aboveground pipeline would not provide a significant environmental advantage over the Project.

Finally, we evaluated alternative sites, with their associated pipeline routes, for the Liquefaction Facilities in the Port of Valdez, Resurrection Bay, and Cook Inlet. We also considered alternative sites for dredged material disposal and the Mainline Pipeline material offloading facility in Cook Inlet. We found that none of the alternatives would provide a significant environmental advantage over the Project.

CONCLUSIONS

We conclude that Project construction and operation would result in temporary, long-term, and permanent impacts on the environment. Most impacts would not be significant or would be reduced to less than significant levels with the implementation of proposed or recommended avoidance, minimization, and mitigation measures, but some impacts would be adverse and significant.

We conclude that constructing the Project would have significant impacts on permafrost due to granular fill placement, particularly for the Mainline Pipeline facilities. The Project would have significant adverse impacts on wetlands from granular fill placement resulting in substantial conversions of wetlands to uplands. Significant adverse impacts on forest would result from permanent losses or conversions from installation of aboveground facilities, granular fill placement, and vegetation maintenance in the Mainline Pipeline right-of-way. For caribou, the impacts on the Central Arctic Herds would likely be significant due to the timing of impacts during sensitive periods, permanent impacts on sensitive habitats, and the Project location at the center of the herds' range. During the years of simultaneous construction, startup, and operational activities at the Liquefaction Facilities, as well as during flaring events, impacts on air quality

could be significant. Impacts on air quality could also be significant during operation of the aboveground facilities when exceedances of nitrogen and sulfur deposition thresholds and visibility thresholds at nearby Class I and II nationally designated protected areas could occur. Operational noise associated with the Liquefaction Facilities at the two nearest noise sensitive areas would likely double due to facility operation, which would be considered a significant increase.

The Project would result in positive impacts on the state and local economies, but adverse impacts on housing, population, and public services could occur in some areas. The Project could disproportionately affect some environmental justice populations due to impacts on subsistence practices and public health effects based on a Health Impact Assessment prepared by AGDC. However, these impacts are not expected to be high and adverse.

Project construction and operation is *likely to adversely affect* six federally listed species (spectacled eider, polar bear, bearded seal, Cook Inlet beluga whale, humpback whale, and ringed seal) and designated critical habitat for two species (polar bear and Cook Inlet beluga whale).). With the issuance of the draft EIS, we are requesting to initiate formal consultation with the U.S. Fish and Wildlife Service and National Marine Fisheries Service regarding Project effects on federally listed species.

The Project would result in substantial impacts on permafrost, wetlands, forest, and caribou (Central Arctic Herds). Because the other current or reasonably foreseeable projects in the study area would similarly affect these resources, we found that cumulative impacts on these resources would or could be significant. Visual effects from the Project near the DNPP would be high, so any additional effects in this area from other projects would contribute to cumulative visual impacts, which could also be significant.

Our conclusions in the EIS are based wholly or in part on the following factors:

- the Project would be constructed in compliance with all applicable federal laws, regulations, permits, and authorizations;
- AGDC would implement all best management practices and the measures described in the Project *Upland Erosion Control, Revegetation, and Maintenance Plan* and Project *Wetland and Waterbody Construction and Mitigation Procedures*;
- AGDC has committed to following impact minimization measures contained in plans it has prepared for resources, such as a Blasting Plan; Fugitive Dust Control Plan; Gravel Sourcing Plan and Reclamation Measures; Migratory Bird Conservation Plan; Noxious/Invasive Plant and Animal Control Plan; Paleontological Resources Management Plan; Polar Bear and Pacific Walrus Avoidance and Interaction Plan; Plan for Unanticipated Discovery of Cultural Resources and Human Remains; Revegetation Plan; Spill Prevention, Control, and Countermeasures Plan; and Winter and Permafrost Construction Plan, among others;
- AGDC would be required to satisfy the U.S. Army Corps of Engineers' regulatory requirements to mitigate unavoidable impacts on waters of the United States, including wetlands;
- compliance with the Endangered Species Act and the National Historic Preservation Act would be complete prior to construction;
- the Project would include protections and safeguards that ensure facility integrity and public safety;

- the Coast Guard determined that Cook Inlet is suitable for accommodating LNG carrier activity associated with the Project; and
- FERC's environmental and LNG engineering construction inspection programs would ensure compliance with AGDC's commitments and the conditions of any FERC Authorization.

In addition, we recommend that the Project-specific impact avoidance, minimization, and mitigation measures we have developed (included in this EIS as recommendations) be attached as conditions to any Authorization issued by the Commission for the Project.