Summary

Alaska LNG Project, Preliminary Resource Report 1 (General Project Description)

Oct. 8, 2014
Prepared by the Office of the Federal Coordinator for Alaska Natural Gas Transportation Projects

The information in this memo is taken from the project's Oct. 1, 2014, filing with the Federal Energy Regulatory Commission. The full documents, including route maps, are available at: http://www.arcticgas.gov/alaska-lng-environmental-review-documents#pdrr1.

As noted in the filing, all of the information "is preliminary and subject to change as plans progress," according to Alaska LNG.

The applicant's general description refers to Alaska LNG as "one integrated project," including:

- A gas pipeline from Point Thomson to Prudhoe Bay.
- The gas treatment plant at Prudhoe Bay.
- A pipeline linking the gas treatment plant to the gas production facility at Prudhoe Bay.
- About 800 miles of gas pipeline from Prudhoe Bay to Nikiski, including eight compressor stations along the route.
- The liquefaction plant, storage tanks and marine terminal at Nikiski.

The reference to "one integrated LNG project" is an important distinction. The Natural Gas Act and FERC regulations define an LNG terminal as all facilities onshore and in state waters used to "receive, unload, load, store, transport, gasify, liquefy or process natural gas." In its filing, Alaska LNG acknowledges that the entire project is considered an "LNG terminal" as defined in statute and FERC regulations. As such, the entire project would be under FERC jurisdiction for environmental and safety assessment — which would mean a FERC-led environmental impact statement stretching from Point Thomson to Nikiski. (Note: The sponsors in their narrative describe the project as starting at Nikiski and heading north.)

PIPELINE ROUTING AND CONSTRUCTION

An approximately 2,000-foot-wide study corridor for the 42-inch-diameter mainline (operating pressure at 2,075 pounds per square inch) and the 30-inch-diameter Point Thomson line (1,130 pounds per square inch) is under study and will be refined as work proceeds.

The mainline would run through the following areas (distances are approximate):

- North Slope Borough, 175 miles
- Unincorporated area, 311 miles
- Fairbanks North Star Borough, 2.5 miles

- Denali Borough, 88 miles
- Matanuska-Susitna Borough, 178 miles
- Cook Inlet crossing, 28 miles
- Kenai Peninsula Borough, 21.5 miles

The entire 60-mile line from Point Thomson to Prudhoe Bay would be within the North Slope Borough, as would the gas treatment plant.

The project's current design shows more than 85 percent of the mainline routing would be on federal, state and borough lands, with the remainder on private lands.

Though most of the mainline would be buried, and the gas cooled to prevent harm to the permafrost, portions of the mainline would be built above ground "using a combination of vertical support members, horizontal support members and/or sleepers" at certain fault crossings and other terrain, including river and stream crossings.

The Point Thomson gas line would have a peak capacity of 1 billion cubic feet of gas per day. The line "will head east from the GTP (gas treatment plant), crossing the Putuligayuk, Sagavanirktok, Kadleroshilik, and Shaviovik Rivers before following east along the south side of the existing Badami pipeline, all the way to the PTU (Point Thomson Unit). The route is intended to avoid multiple crossings of existing oil pipelines. Pre-FEED studies will determine the best installation method (*i.e.*, buried or elevated) for the line."

Construction would occur in the winter for the Point Thomson line, the Prudhoe Bay connector line, the mainline north of the Brooks Range, and some of the mainline south of the Brooks Range, with other mainline work south of the Brooks Range occurring during the summer.

Approximately 24 potential temporary and 32 potential permanent helipad locations north of Livengood have been identified to date. The potential need to upgrade existing public airports and private airfields is under evaluation.

In general, Alaska LNG said in its filing, construction camps would range from 10 to 40 acres. Pipe storage yards would range from 20 to 25 acres and would be spaced about every 20 miles along or near the pipeline right of way.

Material sites, in general, would be required approximately every 20 miles along the pipeline right of way to support construction.

Pipeline camps would be designed to accommodate 750 to 1,600 people, with 250 to 500 portable modules. Smaller camps for construction of the compressor stations and other work would house 50 to 250 people. The project estimates up to 15,000 total construction jobs.

Each compressor station would require 25 to 50 acres.

GAS TREATMENT PLANT

The gas treatment plant, to be built at Prudhoe Bay, would remove carbon dioxide, hydrogen sulfide and other impurities from the produced gas. The plant would provide an average flow of 3.4 billion cubic feet per day of treated gas to the mainline pipe (3.7 bcf/d peak flow).

The plant would be built to handle up to 4.3 bcf/d of input "and will be able to accommodate varying compositions of gas relating to supply received" from Point Thomson and Prudhoe Bay.

The byproduct removed from the gas stream at the treatment plant would be moved through a 1-mile pipeline to the Prudhoe Bay unit for re-injection underground. That would include CO_2 and H_2S. The pipeline would be elevated.

Gas treatment plant construction would affect approximately 1,000 acres, with operations to impact 200 to 300 acres.

WEST DOCK

The project would require "improvements to the existing Prudhoe Bay West Dock loading/unloading facilities, including dredging to facilitate delivery of modules by vessels and widening of the access road from the West Dock."

Modifications to the West Dock's Dock Head 2 facilities would require gravel fill to increase the dock head by approximately 25 acres. The existing channel from Dock Head 2 would need to be widened and deepened.

COOK INLET CROSSING AND OTHER WATER CROSSINGS

Alaska LNG describes the mainline's Cook Inlet crossing (and an alternate) as:

> The Mainline corridor crosses Kenai Peninsula in a northerly direction to Boulder Point. From there it heads north crossing Cook Inlet to the vicinity of Shorty Creek on the northern shore of Cook Inlet. The corridor next heads in a north-northwesterly direction across the Beluga highway, around Viapan Lake. It then turns in a north-northeasterly direction across the Beluga highway to continue northerly on the west side of the Susitna River to the Deshka River crossing. From there, the pipeline corridor follows the Parks Highway (Alaska Highway 3) north-northeast to a point just north of the town of Trapper Creek. At that point, the Mainline corridor heads north-northeast to the vicinity of Livengood. From Livengood, the Mainline corridor follows the Dalton Highway and Trans-Alaska Pipeline System (TAPS) corridor north to the GTP. The corridor will cross the Beluga, Theodor, Lewis, Ivan, Yentna, Deshka, Tanana, and Yukon Rivers among others.
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> An alternative corridor from the Nikiski site to just north of the Deshka River is currently under investigation by the engineering team. This alternative follows the northern coast of the Kenai

Peninsula and crosses Cook Inlet between Boulder Point and Moose Point, coming ashore west of Point MacKenzie. From there the alternative corridor crosses the Little Susitna and Big Susitna Rivers and continues north (see Figure 1.1-1). This corridor (depicted on maps provided in Appendix A) follows a more northeasterly direction to a point just north of the Deshka River.

The current design calls for weighing down the pipeline on the Cook Inlet seabed floor. The applicant is considering options for landfalls on both ends of Cook Inlet and, based on agency guidance, the lines would "cross where there are bluffs along Cook Inlet and not across shallow mud flats."

Other proposed water crossings, such as rivers, would be "based on each water body's characteristics and site-specific conditions," including flow and fish habitat. Options include open-cut crossings, horizontal directional drilling beneath the water body, and elevated structures. Several different bridge designs are being considered.

LIQUEFACTION PLANT

The current design anticipates 400 to 800 acres would be affected during construction of the liquefaction facility at Nikiski. The site includes a mixture of private, commercial, Kenai Borough and state lands. The marine terminal would be located on state lands. The terminal would include three LNG storage tanks — 160,000 cubic meters each — and two ship-loading berths.

Major components of the liquefaction plant would be delivered to the site as modules. The potential need to dredge a channel for the marine terminal is under evaluation.

RELATED WORK

Additional work related to the project, but outside the scope of the project, "will likely need to be completed by other entities and/or the state of Alaska," according to Alaska LNG. These other projects may include:

- Further development at Point Thomson, including installation of up to 13 additional wells, a new gravel well pad and connecting road, expansion of the existing central pad and expansion of other existing facilities.
- Modifications / new facilities at Prudhoe Bay, including a new CO_2 receiving module, CO_2 injection module and possibly CO_2 injection wells.
- Relocation of the Kenai Spur Highway to allow for safety and security buffer zones at the LNG terminal.
- Pipelines and other infrastructure to move natural gas from the mainline off-take points to customers in Alaska.

The filing explains that Alaska LNG and FERC will determine whether the related work items are jurisdictional for the project's Resource Reports and FERC environmental impact statement.

IN-STATE OFF-TAKE POINTS

"The timing of construction, size and location" of the off-take points along the mainline for in-state gas distribution is not known at this time.

LANDS

The project's current design includes approximately 30,000 acres that construction would temporarily affect; of that, 15,000 acres would be permanently converted for operations.

PROJECT SCHEDULE

In its Sept. 5, 2014, pre-file request to FERC, the project applicants proposed the following schedule, subject to project data submissions and FERC actions:

- September 2016: The applicants would submit a complete project application to FERC, including final Resource Reports.
- October 2017: FERC would issue the draft environmental impact statement.
- March 2018: FERC would issue the final EIS.
- July 2018: FERC would issue its authorization for the project to proceed.
- September 2018: The applicants would file the project implementation plan.
- Construction would start between late 2018 and early 2019.
- Project in-service date: 2024-2025

The applicants estimate approximately seven years for construction and start-up of operations. Mainline construction is expected to take three years. Gas treatment plant construction would start in the winter of 2019. The major sealifts to Prudhoe Bay would occur 2022-2024. Dredging the channel to West Dock would occur one to two years before the first sealift.