

Cook Inlet pipeline crossing is about making the best choices

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(This update, provided by the Kenai Peninsula Borough mayor's office, is part of an ongoing effort to help keep the public informed about the Alaska LNG project.)

Crossing Cook Inlet is about deciding the best route and the best construction methods, while acknowledging that although the shortest distance between two points is a straight line, it's not necessarily the best line.

Beluga whale critical habitat, salmon fisheries, 40-foot boulders, 15-foot-tall sand waves along the ocean bottom, strong currents, shallow water close to shore, ice scouring that could expose or damage a pipeline — each one presenting its own problems best avoided as much as possible as Alaska LNG teams continue refining the preferred route for the natural gas pipeline to cross Cook Inlet on its way to shore in Nikiski, site of the proposed liquefied natural gas plant.

That route, which covers almost 30 miles across Cook Inlet to reach Nikiski, on the Kenai Peninsula, was the subject of a workshop Aug. 19 in Anchorage presented by Alaska LNG project teams and attended by more than 20 federal and state regulatory agency staff.

Other workshops have been held or are planned regarding the project's gas treatment plant that would be built on the North Slope and the 765-mile pipeline route and construction methods from Prudhoe Bay to reach the shore of Cook Inlet.

"Cook Inlet is a very, very unique place in the world," a project team member said. "There is a lot going on here." That includes currents that move at 4 to 6 knots and a tidal range that can vary up to 25 feet between high and low water in the main body of the inlet.

Not that a pipeline can't be safely built in Cook Inlet. The first was built more than 50 years ago, and many oil and gas lines have been added since. But this one would be bigger and heavier and carry more natural gas than any other pipeline sitting on the ocean floor in the extensively developed area.

The 40-foot-long sections of 42-inch-diameter, inch-thick steel pipe for the Alaska LNG project's Cook Inlet crossing would be coated with as much as 6 inches of concrete to protect the pipe and weight it down on the seafloor against the currents. Each section would weigh as much as 33 tons, the equivalent of 15 pickup trucks, a team member told the workshop audience.

FIELD WORK CONTINUES

Summer field work for the project continues, with crews sampling soils, measuring currents and judging the options for where best to enter the water on the west side of Cook Inlet, how to install the pipe across the inlet, and where to come up at Nikiski for the final miles to the plant site.

Alaska LNG currently plans to submit more detailed maps and environmental data to the Federal Energy Regulatory Commission in perhaps February, producing the second draft of the project's "resource reports" — 13 volumes of engineering, construction, environmental and other data that will go into the environmental impact statement. The project teams told regulatory agency personnel Aug. 19 that their comments would be considered and addressed in that second round of draft reports.

The project sponsors currently plan to submit final reports to FERC next fall, along with their full application for federal authority to construct and operate the pipeline and LNG plant — assuming commercial negotiations between the partners and the state of Alaska proceed on schedule, and that the marketplace cooperates for the investment estimated at \$45 billion to \$65 billion.

The FERC-led EIS process could take two years. Construction, if all goes well, could start late 2018 or early 2019, and last five years.

WEST ROUTE PREFERRED

The project teams have looked at multiple options for crossing Cook Inlet and are now focused on what they call the West Route. That comes down the west side of the inlet and enters the water just south of the small community of Beluga, an area of gas wells, a few industry-support jobs, some retirees and beach setnet fisheries, some rudimentary roads, a modest collection of homes surrounded by public lands — and a gas-fired power station serving Southcentral Alaska.

The teams earlier this year dropped active consideration of the East Route, which would have steered the pipeline at the southern end of its trek from Prudhoe Bay on an eastward course toward Point MacKenzie (across Knik Arm from Anchorage) and then into the inlet for its undersea run to the Kenai Peninsula. At the Aug. 19 workshop, project teams repeated many of the same disadvantages with the East Route that Alaska LNG Project Manager Steve Butt described for Alaska state legislators at a hearing in June.

The East Route has significantly more hazards, hurdles and handicaps, including undersea power cables, an onshore military gunnery range, Area 1 critical habitat for endangered beluga whales, additional ice load close to shore, an actively dredged shipping channel, and a much longer run from shore to reach water deep enough for a pipe-laying barge to gain access. "We're trying to stay out of other people's way," a team member said at the workshop.

For example, the teams explained, entering the water near Point MacKenzie would require burying the pipe in shallow water as much as 2 miles out to reach 20 feet of water, more than 3

miles to reach water 35-feet deep and more than 5 miles to get out to 40 feet of water. Distances to deep water with the preferred West Route are half as far.

The shorter the pipeline run to deep water, the sooner a pipe-laying barge can start its work, saving money and environmental impact to the shore and seabed.

SEAFLOOR, CURRENTS and SAND WAVES

The East Route would pass through an area of upper Cook Inlet with a “migrating seabed,” the team reported, noting that the height of some areas of the seafloor have changed 40 feet in a seven-year period. “Those are massive changes ... not a good thing when you’re looking for a stable seafloor to put pipe on.” The West Route crosses a more stable seabed.

The East Route would measure about the same distance beneath Cook Inlet waters as the West Route but would come to shore on the Kenai Peninsula farther away from the proposed LNG plant site, adding 13 more miles to onshore pipeline construction at a significant cost to the project.

The West Route also presents the advantage that the pipe-laying barge would run closer to parallel to Cook Inlet’s strong currents for more of the crossing, while the East Route finds itself more perpendicular to the currents much of the time — not impossible, but increasing the difficulty on the job.

And there are the sand waves in the path of the East Route. “Some of the biggest ones we saw were 15 feet tall trough to peak, with a wave length of 100 to 200 feet,” an LNG project team member said. Undersea sand waves and strong currents could risk exposing or even moving the pipe, despite all the concrete to hold it in place.

BLUFFS and BOULDERS

The West Route is not without its problems, too. The project teams are looking at two possible entry points on the West Side of the inlet: Beluga Landing (just north of Viapan Lake), and Shorty Creek just a little south of there. The shortest distance to deep water is one of the considerations as the teams work to decide the best option. The height of shoreline bluffs is another consideration; the 100-foot bluffs at Shorty Creek are steeper than the shoreline at Beluga Landing.

The teams are looking at two options for landfall on the Kenai Peninsula: Boulder Point, aptly named for its cabin-sized boulders; and a couple of miles northeast near Suneva Lake. In addition to big rocks, Boulder Point has a steep bluff — 200 feet, at some points. The boulders and bluffs are not ideal.

Both sites would require about 12 miles of buried onshore pipeline to reach the LNG plant site.

Alaska LNG will address all of its route options in its second round of draft resource reports early in 2016.

The onshore entrance and exit in Cook Inlet would involve either trenching and covering the pipe, tunneling the line to reach deep water, or a combination, team members said.

Burying the pipe close to shore protects against damage from ice scouring and keeps the line out of harm's way from fishing vessels and other marine traffic in shallow water. That's less of a problem in the deeper waters, where the pipe would sit on the bottom.

Tunneling to reach deeper water could involve one or both of two options:

- "Direct pipe," similar to horizontal directional drilling — but different. A boring machine head is attached to the front end of the pipe and pushed through the earth as it grinds and churns its way to its deep-water destination. The speed and direction of the boring head is controlled by cables running through the pipe. The cuttings are pumped through hoses strung inside the pipeline for proper disposal at the back end. Sections of pipe are added to the string as it is pushed through the soils behind the drill head.
- In horizontal directional drilling, the crew would drill a pilot hole the length of the pipeline route to deep water, then use successively larger drill heads in multiple runs to ream out the tunnel to accommodate the 42-inch pipe. For the Cook Inlet job, a small jack-up rig likely would be positioned at the water end of the pipeline from shore to aid in pulling the heavy pipe through the hole.

The direct-pipe method requires less drilling but is limited in how far it can reach. An LNG team member reported the method has been used as far as 4,000 feet in "benign soils," but probably would not go that far in Cook Inlet's conditions. Directional drilling can reach farther.

Horizontal directional drilling has been used by the industry almost 40 years, while the direct-pipe method is about 5 years old, a team member explained, and both methods would avoid or limit open-cut trenching along the shorelines. Team members told agency officials that Alaska LNG is still reviewing the benefits — and the disadvantages and costs — of all the options, and would provide more information in next year's reports.

HOLD THAT BARGE STEADY

Once the route is into deeper water, a pipe-laying barge would handle the work. Team members explained the 40-foot sections of pipe would be welded together aboard the vessel and then lowered off the stern of the barge in a continuous stream — gently and precisely — for positioning on the seabed.

The size of the barge will be determined by several factors, but it could be 400- to 500-feet long, up to 200-feet wide, with a draft of 20 to 35 feet — perhaps twice the size of any pipe-laying barge that's ever been used in the inlet, a team member said.

The crew onboard could total as many 400 workers.

Anchor-handling tugs, perhaps three, would assist in positioning the pipe-laying barge. Keeping the barge in position will require multiple, massive anchors and chains, each extending as much as a mile from the barge.

Safety and exclusion zones would be established around the barge, with the project coordinating with the U.S. Coast Guard and local authorities.

Alaska LNG is planning on two construction seasons for the Cook Inlet water crossing, working April through September, or thereabouts, to avoid any ice. The West Route runs generally due south cross Cook Inlet to Nikiski, staying east of offshore oil and gas platforms.