

## **OVERVIEW**

The Alaska Natural Gas Development Authority (ANGDA) proposes to construct a natural gas pipeline from Beluga to the Golden Valley Electric Company's (GVEA) power plant located between North Pole and Fairbanks. The pipeline is to provide gas from Cook Inlet and nearby gas fields to supply the energy needs of the Fairbanks area served by the GVEA, as well as for the Glennallen and Delta Junction areas. The pipeline would also serve as backup gas storage for Anchorage and nearby communities and could provide gas to potential electric utility associations from Palmer and Glennallen locations.

The proposed ANGDA pipeline, commonly abbreviated as the B2F pipeline, would be comprised of approximately 380 miles of 20- to 24-inch diameter steel pipeline from Beluga to the Delta Junction area and 80 miles of an 8- or 10-inch diameter reinforced high density polyethylene (HDPE) pipeline to the GVEA power plant. Approximately 90 percent of the pipeline route would be within existing non-exclusive rights-of-ways or easements. The pipeline would parallel a natural gas pipeline and parallel the Glenn Highway to Glennallen, and then parallel the Richardson Highway and the Trans-Alaska Pipeline System (TAPS) to Delta Junction, and the Golden Valley Electric Association (GVEA) easement to the electric power plant.

## **PROPOSED PROJECT**

ANGDA's proposed pipeline would generally be located within existing road, pipeline and utility corridors administered by the Bureau of Land Management (BLM), the Alaska Department of Natural Resources (DNR), and the Alaska Department of Transportation and Public Facilities (ADOT&PF). ANGDA's existing conditional right-of-way extending between Palmer and Glennallen would be amended to include a route that would parallel existing infrastructure that includes:

- an existing ENSTAR natural gas pipeline corridor from Beluga to Palmer (passing through the Susitna Flats State Game Refuge, Knik-Goose Bay, Wasilla, and Palmer),
- the Glenn Highway to Glennallen (except that the pipeline would diverge from the highway to pass through Chitna Pass),
- the Richardson Highway and the TAPS from Glennallen to Delta Junction, and
- the Golden Valley Electric Association (GVEA easement) from Delta Junction to the North Pole GVEA power plant.

The pipeline would pass near Ahtna, Inc.'s planned industrial park near Glennallen. Pipe would be delivered from the Valdez port by trucks for pipeline fabrication at the Ahtna, Inc. Industrial Park. Installation of sensing components, bonding, coating, and radiographic testing and other pipeline processing would be completed before shipping the 44-ft pipeline lengths by trucks west and north for construction.

The majority of the pipeline would cross Class 1 areas as defined by 49 CFR 192.5 Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards, October 1, 2004. Wasilla, Palmer, Glennallen, Delta Junction and North Pole are in Class 2 and 3 designated areas. In accordance with these regulations, valves would be located no more than 20 miles apart in Class 1 locations; 15 miles apart in Class 2, and 8 miles apart in Class 3 locations.

The 20- to 24-inch pipeline would be designed for an internal pressure of 2,500 psi and would be between 0.562 inch and 1.031 inch thick depending upon location. The HDPE pipeline would be designed for 1500 - 1000 psi that would comply with the appropriate sections of 49 CFR 192 for pipe wall thickness. All polyethylene pipe, tubing and fittings would conform to all applicable provisions and requirements of the latest revision of the US Department of Transportation Pipeline Safety Regulations (CFR) Title 49, Part 192, "Transportation of Natural or Other Gases by Pipeline: Minimum Federal Safety Standards, and, by inclusion, all appropriate standards."

Corrosion control would meet federal regulations at 49 CFR 192 and include cathodic protection system and an external protective coating. A state-of-the-art protective coating for field joints would be applied to the Beluga to Delta Junction pipeline. This coating would meet requirements to resist coating disbondment that could result in corrosion and cracking, and pass cathodic protection current if disbondment did occur. The HDPE pipeline, if that option is adopted between Delta Junction and the GVEA plant, would meet the requirements necessary to obtain a USDOT/PHMSA special permit. A sensing system integrated into the steel pipeline would detect corrosion and movement. The HDPE and steel tubing design is only for 8-10 years and a sensing system would not be integrated into either pipeline.

The pipeline would be buried approximately 36 inches (measured to the top of the pipeline in most locations depending on soils, permafrost, and seismic concerns along the route. The pipeline would be buried a minimum of 50 feet from other buried pipelines when paralleling such. A complete engineering design would be developed where the pipelines would cross.

Paved roads would be crossed using road-boring or horizontal directional drilling (HDD) without interruption to traffic. River and other waterbody crossing would be evaluated individually during pipeline design. Major rivers and other waterbody crossings would be directionally drilled if technically and economically feasible. Open cut crossings of major rivers or other waterbodies would be considered only when directional drilling is impractical, such as crossings greater than 5,000 feet, in areas of loose gravel or cobble sub-soils, or crossings of very narrow streams or drainages that can be crossed with conventional buried mode during normal pipe laying activities. New aerial crossings with the pipe attached to bridge structures are not part of the proposal because of potential vandalism. The proposed pipeline may be placed above ground on vertical support members (VSM) approximately 5 feet off the ground at the support members.

The pipeline height would vary based on specific locations and environmental concerns within each area.

About a billion cubic feet of natural gas could be stored in the pipeline at 2,500 psi. In addition to transporting this gas to the GVEA plant, in times of extreme winter demand in the Anchorage area, the flow could be reversed to meet the deliverability need there.

Compressor stations would be located at Palmer and Glennallen. The Palmer compressor location would be on approximately 1/3 acre on an existing gravel pad. The Glennallen compressor station would occupy approximately 1/3 acre. Power for the stations would be obtained from the local existing electrical power grid.

## **POTENTIAL ALTERNATIVES**

ANGDA has considered several alternatives to their proposed project. Except as noted in these alternative descriptions, the design, construction, and operation of the pipeline would be essentially the same as described for the Proposed Project.

### *Route Alternative 1—Chugach Electric Easement*

Instead of using the ENSTAR pipeline route between Beluga and Knik, the pipeline could be constructed using the Chugach Electric Easement. This route would deviate northeastwardly from the proposed route west of the Susitna River and would realign with the proposed route south of Knik.

### *Route Alternative 2—Glenn Highway Route from Sutton to Eureka*

An alignment along the Glenn Highway from Sutton to Eureka would be considered, rather than deviating through Chitna Pass north of Chickaloon. This route would deviate from the proposed route at Sutton and follow the Glenn Highway, realigning with the proposed route at approximately milepost 128 of the Glenn Highway, southwest of Nelchina.

### *Route Alternative 3—TAPS Corridor North of Delta Junction*

Instead of using GVEA easement between Delta Junction, the pipeline could be constructed adjoining the TAPS right-of-way.

### *Route Alternative 4—Gakona to Tazlina area of the Glenn Highway Cut-off*

Instead of following the Glenn and Richardson highways into Glennallen, this approximately 55-mile cross-country route would slant northeast from a point about forty miles west of Glennallen to a point about 10 miles north of Gakona Junction.

### *Design Alternative 1—Gakona to Glenn Highway Cut-off*

Instead of using the HDPE pipeline between Delta Junction and the GVEA plant, ANGDA would use an 8-10-inch steel tubing pipeline. The steel tubing, which is a common means of transporting gas in Alaska, would be designed for a pressure of 1250 psi. The HDPE and alternate steel tubing pipe and fittings will conform to all applicable provisions and requirements of the latest revision of the US Department of Transportation Pipeline Safety Regulations (CFR) Title 49, Part 192, "Transportation of Natural or Other Gases by Pipeline" appropriate standards for pipelines including corrosion and cathodic protection.

## **PROJECT CONSTRUCTION**

The ANGDA natural gas initial field survey work began in summer of 2008. The preliminary schedule includes geotechnical investigations of river and stream crossings and borings to determine the pipeline centerline would be conducted in 2009/2010. Procurement of long-lead materials, including pipe, would begin in late 2010. Clearing and grubbing would commence in late winter/spring 2010/2011. The construction right-of-way would be staked during late winter/spring 2011. Trenching and construction of the pipeline would begin in June 2011 and would be completed by 2013, (2 full winter construction seasons would be required). Hydro-testing of the pipeline is planned to be completed by 3Q 2014, and commission and start-up is projected to take place in early 2015.

Most construction activity would be confined to a 300-foot-wide or less temporary construction corridor right-of-way. The construction corridor would accommodate activities required to safely construct the pipeline, allowing room for a travel lane, extra storage space, and connecting access roads. In addition to the track adjacent to the trench needed for pipe laydown equipment and spoils, workspaces would include areas for camps, roads and railroad crossings, pipeline and other utility line crossings, stream and wetlands crossings, vehicle turnouts, hydrostatic withdrawal and discharge points, Points of Intersection (PIs) where a physical connection between two pipelines occurs, horizontal directional drill entry and exit sites, staging and fabrication sites, pipe storage yards, and access roads to material sites. The construction corridor commonly would be significantly wider than 300 feet at river crossings in Chitna Pass, across some wetlands such as Susitna Flats State Game Refuge, in difficult to construct areas such as Isabelle Pass and in close proximity to pinch points due to constrained geographic terrain and other pipelines.

Following staking of the right-of-way, ANGDA would clear and grub vegetation and grade the right-of-way to provide a relatively level working surface on which to lay the pipeline. In some areas a temporary work pad may be required to provide a stable surface. In all cases grading would ensure that normal surface drainage is maintained, that proper erosion control is provided, and that slope stability is controlled. Once the pipeline has been installed, ANGDA would remove temporary work pads to the extent possible. Restoration and revegetation would be in compliance with permitting conditions to prevent erosion and siltation.

Summer construction would be conducted from directly atop the graded right-of-way surface if soils are strong enough to support construction equipment. If such soils are not present, construction mats (typically steel frames with wood planks) or, where conditions require, a constructed gravel work pad would be used. Winter construction would be used along portions of the alignment that traverses wet or permafrost-rich soils. Winter construction would utilize snow or ice roads and work pads. ANGDA currently projects that winter construction would be undertaken in wetland areas, such as the Susitna River State Game Refuge and at some anadromous fish and other streams.

The trench for the pipeline would be at least four feet wide at the bottom and roughly five to six feet deep; its width will vary based on the stability of the soils, but will generally be about ten to twelve feet wide at the top. Spoils would be deposited to the side of the trench and used for backfill after the pipeline has been properly laid in the trench. Construction in any given area will vary from several weeks to several months.

There are special construction considerations for waterbodies; wetlands; steep and unstable terrain; fault lines; roads, railroads, and other pipelines and utilities; and trenching in high traffic area for humans and wildlife. Very narrow streams and drainages would be crossed with conventional trenching methods during normal pipeline laying activities. Winter conditions can allow this to occur without having to deal with running water. Generally, ANGDA plans on using directional drilling to cross major waterbodies if technically and economically feasible. Open cut crossings of major rivers or other waterbodies would be considered only when directional drilling is impractical. Directional drilling is not practical in areas of loose gravel or cobble sub-soils or crossings of more than 5,000 feet. Temporary bridges with culverts and timbers or on ice and snow may be used to cross some streams during construction. Field investigations would be used to determine scour and depth of pipeline burial under waterbodies.

Construction procedures would be adopted to protect waterbodies and water quality. Erosion control measures would be installed and maintained to minimize sediment transfer to the wetland or waterway. Water withdrawal would not involve excavation, alteration, or disturbance of streambeds or stream banks. Snow ramps or snow or ice bridges would be used to provide access to, off, or across streams to preclude degrading stream banks. Equipment would not be operated below the ordinary high water level. Refueling, servicing, or repairs of equipment would not take place within 100 feet of a waterway. Upon completion of construction the right-of-way will be restored and maintained.

In winter construction in wetlands ANGDA would not operate vehicles or equipment until there was sufficient snow and frost to protect the vegetative mat and soils. Ice at stream and wetland crossings would be of sufficient thickness to support weight bearing-load. To avoid entrainment, impingement, or trapping of fish, properly sized screen water intake structure would be used to obtain water from lakes and streams. At

the end of a winter construction season, ice roads would be scarified to speed up melting, snow and ice bridges would be removed, and flagging and pipeline construction-associated debris would be removed from the area.

ANGDA will avoid steep and unstable terrain as much as possible in the final design stage. Where steep or unstable terrain cannot be avoided, construction would require hillside cut of a work area wide enough to ensure safety and to accommodate equipment and soils placement.

As necessary based upon additional analysis, ANGDA would place the gas pipeline above ground at seismic fault lines using a special design similar to one used by TAPS. The pipeline would be designed to be flexible to withstand seismic events. The pipeline would be mounted on sliding shoes with a Teflon base. These bases would rest on sleepers and the pipe would zigzag over the fault area, thus allowing flexibility for the pipeline in its sliding shoes to slide on the sleepers.

Pipelines under major roads and railroads would be of a thickness in accordance with the requirements of ASME B31.8 and would be four feet (road) or six feet (railroad) below the ditch or toe of the road or railroad grade. Typically, pipelines under major roads and railroads would be installed by boring and traffic delays are not anticipated during the boring process. ANGDA would install the pipeline under most minor roads and driveways using the standard open trench method used for much of the pipeline route; in some exceptional cases boring may be used. Where the open cut method is used, access would temporarily be interrupted and the driving surface would be restored to an equal or better condition than original. All construction near roads or that could affect public road traffic would accommodate traffic. Traffic would be accommodated by scheduling activities during evening and non-peak traffic hours to the extent possible. When construction activities are necessary during peak traffic hours, lead cars and flaggers would be used to control traffic. Public notices would alert the public to potential traffic disruptions and detours.

Construction close to existing pipeline and utility line crossings will be in accordance with federal guidelines and in cooperation with the pipelines and utilities owners. The construction method will be limited to backhoe operations in which the soil is cleared out from around the existing pipeline or utility. Special precautions would ensure that there will be no damage from the pipeline construction. A quality assurance and quality control plan would be required specifically for construction in close proximity to other pipelines and utilities.

In addition to directional drilling and boring, the drag section and stove pipe methods of pipeline laying may be used to minimize the danger of humans or wildlife wandering into the trench at night or to minimize the time in which a trench would be open. In a typical drag section approach a trench is dug to accommodate only the distance that can be installed and backfilled in a single day. The stove pipe method allows one 44-foot segment of pipe trench to be dug at a time. This is the slowest method of conventional construction but is the safest in areas such as residential settings.

Compressor station construction would begin with staking the area for the pad and any necessary access road. Gravel for the pad and road would be laid down in winter. Grading of the pad and road would be completed in summer, as would construction of the compressor station.

Approximately 500 workers will be required to construct the pipeline during peak activities. Many workers will be able to return to their homes at the end of each work day. In remote areas worker accommodation would be established either in area housing or in temporary construction camps. Construction contractors may use buses to transport personnel to limit impacts on traffic and local communities.

## **PIPELINE OPERATION**

Following construction, the pipeline right-of-way will be reduced from its general construction width of 300 feet to the standard operations pipeline width of 50 to 150 feet plus the width of the pipe. The pipeline and the compressor stations would routinely be inspected and maintained to comply with federal regulations for natural gas pipeline safety. A remotely controlled electronic sensing system will report the pipeline condition to a monitoring location in Anchorage. During operations approximately twenty employees would be required to operate, inspect, and conduct routine maintenance on the gas pipeline.