

Recommendation on the Anchor Point Energy Pipeline

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General

The Anchor Point Energy (APE) pipeline is a proposed natural gas transmission pipeline that will transport natural gas from the Armstrong Cook Inlet, LLC production pad to an Enstar Natural Gas Company pipeline. The Enstar line transports natural gas north into the Kenai Peninsula and the Railbelt service areas. The pipeline route covers approximately 8 miles. The pipe is buried over nearly all of its length. It has a nominal diameter of 4.5 inches.

The proposed route first follows a Kenai Peninsula Borough (KPB) ROW through a large section of ADNR and CIRI lands. The pipeline then follows an Alaska Department of Transportation and Public Facilities (ADOT/PF) ROW along the North Fork Road, terminating at a point near the community of Anchor Point. It will not enter the more populated areas of the community. However, the downstream Enstar pipeline, built of high-yield steel, will be built through Anchor Point.

The pipeline will be designed and built to Class Location 2 requirements in accordance with 49 CFR Part 192. The route of the North Fork Pipeline lies in Class 1 or 2 locations, as defined in 49 CFR 192. A “class location unit” is based upon an onshore area that extends 220 yards on either side of the centerline of a continuous 1-mile length of pipeline. For onshore pipelines, Class 1 locations have 10 or fewer buildings intended for human occupancy. Class 2 requirements are stricter because of higher population density. Class 2 locations have more than 10 but fewer than 46 buildings intended for human occupancy.

No chemical analysis of the natural gas produced from the existing Kenai Peninsula productions sites is available. However, wells in this area have proved to be uniform. Their gas is composed almost completely of methane. The heating value of the natural gas produced in this area has a heat content of approximately 981 BTU/standard cubic foot (scf). Sales specifications allow for up to 1 grain/100 scf of hydrogen sulfide (H₂S) and 4 lbs/mmscf of water. Therefore, the gas can be classified as having a low potential for corrosion, oxidation, or other similar types of chemical reactivity. Gas dehydration and conditioning facilities, located upstream of the lease on the production pad, are designed to protect the pipeline from excessive pressure and to properly condition the natural gas.

The route includes five stream crossings: one unnamed tributary to an unnamed tributary of the Anchor River, three unnamed tributaries to the North Fork of the Anchor River, and the North Fork of the Anchor River. All of these crossings are classified as minor. Four of the crossings are to be trenched and one probably will be installed using horizontal directional drilling.

The internal design pressure of the pipeline is 1347 psi. This is based on the maximum allowable pressure for Fiberspar FS LPJ 4-1/2” 2,250 (E) Plastic LinePipe and a proposed PHMSA (US DOT) special permit. This permit is in the evaluation process. It requests changes to 49 CFR 192.121, Design of Plastic Pipe, and 192.123, Design Limitations for Plastic Pipe, Fiberspar DOT Petition PHMSA-2010-0003. All pipe and components are to be hydrostatically tested to a pressure not less than 1.5 times the MAOP. This exceeds the requirements for steel pipe

(1.25 x MAOP) found in B31.8 and 49 CFR 192. Block valves are provided per 49 CFR 192 requirements.

The pipeline's most atypical feature is that (with minor exceptions) it is composed of composite, multilayer, thermoset plastic. This is unlike other transmission pipelines, which are almost universally composed of high-yield strength steel. The advantages and disadvantages of this material are discussed in later sections, and are part of the PHMSA special permitting process. A few minor sections will be composed of steel.

This pipeline will be installed from long spools. These will reduce the number connections from those used for a standard pipeline by approximately 90%. The spools will be coupled using special mechanical connectors made from a high grade of stainless steel. These features should reduce the risks from corrosion down to extremely low levels. They should also reduce risks associated with coating failures and weld failures. However, the design probably has higher risks from mechanical damage due to point impact. It should also be noted that the mechanical connectors do not have a history of operation longer than a few years, although they have been through extensive testing and engineering evaluation. UV protection for the plastic composite pipeline is considered a negligible risk, as all of it will be buried or out of direct sunlight.

Design Basis

Much of the basis of this opinion is founded upon the preliminary version of the SPCO Design Basis: North Fork Pipeline Project Design Basis and Criteria, March 16, 2010. At the point of this writing, this document has been through one review cycle and the SPCO requested changes have been agreed upon (with the possible exception of the name of one channel stream)

The design basis establishes minimum design requirements for a safe and environmentally sound installation. It describes the codes, regulations and standards under which the pipeline is to be constructed. The major reference documents are listed below:

- API 5L, Specification for Line Pipe
- API 6D, Specifications for Pipeline Valves
- API 15HR – 01 High Pressure Fiberglass Line Pipe
- API 15S, Qualification of Spoolable Reinforced Plastic Line, 2006 Edition
- API RP1102, Steel Pipelines Crossing Railroads and Highways, 1993 Edition
- API 1104, Standard for Welding Pipelines and Related Facilities, 1999 Edition
- ASME B16.5, Pipe Flanges and Flanged Fittings, 1998 Edition
- ASME B31.8, Gas Transmission and Distribution Piping Systems
- Title 49, Part 192, Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards, January 26, 2010
- Fiberspar DOT Petition – PHMSA-2010-0003, Fiberspar Petition to Amend Title 49 Code of Federal Regulations Section 192.121

The other major document supporting this opinion is the Fiberspar DOT Petition – PHMSA-2010-0003, Fiberspar Petition to Amend Title 49 Code of Federal Regulations Section 192.121. This is a waiver request filed by the manufacturer of the proposed pipe, Fiberspar. The efficacy and risks of using this material is being separately evaluated by PHMSA. The

safety evaluation of this material is delegated solely to PHMSA, part of the US Dept. of Transportation, under US Code 60104 (c). US DOT pre-emption is further defined under 49 US Codes 5101 – 5128.

Conditions

The following conditions are required because the Lease is needed prior to some of the technical work being completed, such as issuance of the PHMSA Special Permit, issuance of construction drawings, and completion of the final version of the SPCO design basis.

- The PHMSA special permit must be issued prior to startup.
- The Certificate of Compliance or similar must be resubmitted to the SPCO, amended for a 30-year design life. This is commensurate with the duration of the lease.
- Prior to startup, the pipeline leaseholder (or his agent, the pipeline operator) must complete operations and maintenance processes and procedures. Anchor Point Energy, or its parent company, Armstrong Oil & Gas, Inc., do not have currently operating gas pipelines, and need to develop the infrastructure to support operations and maintenance. These process and procedures should be reviewed and agreed upon as acceptable to the SPCO.
- The stress analysis matrix (originally to be part of the final SPCO design basis) is to be completed showing that all stresses under all loading conditions in the matrix are under code allowable values. This is to be submitted under a separate transmittal.

These items have been discussed with the lease applicant. There is a high probability that these deliverables will be successfully completed and the results submitted to the SPCO. If they are not, I may revise the following recommendation.

Recommendation

Subject to the conditions listed above, I believe that the applicant has met the technical requirements for issuance of a lease. The applicant has demonstrated the capability to construct, operate and maintain a pipeline under AS38.35 technical requirements or to develop the processes, procedures, methods, and techniques to do so in the future.



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