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Pipeline Considerations for Ethanol

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Pipelines are generally viewed as the fastest and most economical mode of transporting liquid fuels. Currently, a substantial portion of gasoline and natural gas supplies are transported from refineries and other production centers to destinations via pipeline. The movement ethanol via pipeline, however is viewed as a limited option. There are three main reasons for this; ethanol absorbs water and impurities found in pipelines, logistical limitations of the existing pipelines and insufficient volumes of ethanol that need to be transported.

Absorption of Water

Ethanol absorbs water and impurities that normally reside in fuel pipelines. Because of this transportation and storage systems used for ethanol gasoline blends must be kept essentially free of water. Water can cause phase separation of the ethanol-gasoline blends, which can reduce engine performance. Water can collect in low spots of hydrocarbon-handling systems, such as pipelines and storage systems. This water typically contains rust and other particulates but normally does not cause a problem because the water remains in place when contacted by hydrocarbons and can be periodically drained. The "scouring" action of ethanol gasoline blends can incorporate this dirty water into the gasoline. Once the dirty water has been eliminated, the system remains clean as long as ethanol is present, but the periodic use of ethanol blends can result in a recurring problem.

To avoid potential problems with water, most refiners do not transport ethanol-gasoline blends by pipeline. Thus, considerable "splash blending" of ethanol takes place at distribution and storage terminals instead of at the refinery where gasoline is normally blended to final specifications. Ethanol blends are then shipped by truck from terminals to retail service stations. Transportation systems could be cleaned to permit the shipment of ethanol-gasoline blends from a refinery by pipeline, but most companies are reluctant to invest the funds for this system upgrade.

One company, Williams Energy Services, reports that it has successfully run tests where ethanol was transported through a pipeline. They did, however, find that it was necessary to first clean out the system. Their findings indicate that frequent dewatering of mainlines using pigs, use of closed floater storage tanks, a commitment to dry storage tanks, installation of inline corrosion monitoring, and the possible installation of a filtration system would be required if they were to

transport ethanol on regular basis. Further, they found that the greater the frequency of batches the fewer the quality problems. It is difficult to estimate the costs of keeping the pipeline system moisture free since it has never been done on a regular basis.

Pipeline Location

Another limitation is that of pipeline location, as most pipelines typically transmit product from the Gulf Coast to the East Coast and West Coast. For ethanol to be shipped by pipeline, it first would be necessary to transport it via barge down the Mississippi River to staging areas. Storage capacity would have to be built both in the Gulf to load into the pipelines and also at the destination markets. Because ethanol could not be mixed with other fuels and because of the problems associated with its water solubility it would need designated tanks for its storage.

Building a dedicated ethanol pipeline system from the Midwest to the coasts over such long distances would be prohibitively expensive.

Insufficient Volume

A final concern is that the volumes of ethanol that would be involved in an individual shipment are very small compared to the quantities of product that are normally shipped via pipeline. This might be overcome on a privately owned system since they could control the flow and sequencing of the product. However, on a common carrier system, it would be necessary to achieve volumes that are sufficient to warrant designation of shipping grade. While such a grade would still need special handling in the system, this would at least make it a fungible product from the standpoint of impact on shipping schedule and lifting product at destination terminals.

Conclusion

Because of these operational issues and additional cost factors, it is not believed that ethanol will be transported routinely over long distances via pipeline; rather, pipeline shipments of ethanol will make sense only in exceptional situations. The costs associated with the pipeline shipment of ethanol are difficult to project since no long-term program of ethanol shipments via pipeline has been undertaken. The shipping of ethanol would likely prove easier on specific segments of a private pipeline rather than on a common carrier. Even then, ethanol would be shipped as a segregated tight lined product and would require slightly more monitoring than other products.