

Ethanol and Pipeline Transportation Policy Paper

Ethanol has been used extensively as a fuel additive in the U.S. for over 30 years. The pipeline industry has experimented with transporting ethanol but has found problems ranging from difficulty maintaining the quality of the fuel to facility material failures due primarily to stress corrosion cracking. The current practice is for ethanol to be transported from production facilities via barge, railcar or truck to fuel terminals where it is blended with gasoline for retail delivery by truck. Pending further R&D to address the fuel quality and pipeline integrity problems, the potential environmental and public safety risks limit transportation of ethanol in the existing U.S. product pipeline system.

Fuel Quality: Ethanol has an affinity for water which can be picked up as the product flows through the pipeline network. In current multi-product pipelines, small amounts of water enter the pipeline system through fuels as well as terminals and tank roofs. While not a problem for other refined products, as the water separates in a tank and can be drained off, the water contaminates the ethanol and makes it unusable as a fuel. Fuel ethanol marketed in the U.S. must be denatured (made undrinkable) and dehydrated so that it contains no more than 1% water. A 2000 report from the Oak Ridge National Laboratory states that when an ethanol blend phase-separates it is extremely difficult if not impossible to re-blend thereby requiring disposal in accordance with hazardous waste regulations.

The pipeline industry's limited experience has also revealed that transportation of ethanol in multi-product pipelines produces a scouring effect on the internal pipeline surface that may lead to additional fuel quality issues.

Stress Corrosion Cracking: There is evidence that the presence of ethanol in pipelines has led to stress corrosion cracking (SCC). In some cases the problem has developed rather rapidly once ethanol has been introduced. This damage may be accelerated at weld joints or "hard spots" where the steel metallurgy has been altered. The causes and potential solutions for the SCC problem are the subject of extensive, ongoing technical studies under the auspices of the Petroleum Research Council International (PRCI).

Dedicated Ethanol Pipelines: Dedicated ethanol pipelines may be another transportation option if the SCC issues can be addressed. While there is growing interest in the possibility of such pipelines, the economics may be more problematic. Ethanol production facilities are relatively small and spread out, requiring a gathering network to aggregate sufficient throughput for a pipeline. The assurance supplies would be available over a long period of time and the development of robust markets would also be required to finance such a project. Siting would be another important consideration. These facilities would be competing in the fuels markets and would have to be subject to the same regulatory frameworks for rates and operations as the existing pipeline system.