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16. Abstract

Research into the value of pipelines to the transportation system of Texas has been undertaken to provide the Texas Department of Transportation (TxDOT) with a broad understanding of pipeline operations and their relationship to other modes of transportation. Knowledge of the location and interaction dynamics of pipelines with other forms of transportation (trucks, railroads, and ocean) is essential for TxDOT to be able to plan and execute transportation improvements in the 21st century.

One of the products of this research has been the development of recommendations regarding potential new roles and responsibilities for TxDOT and other state agencies relative to pipeline transportation. In development of these recommendations, consideration has been given to TxDOT's goal to provide safe, effective, and efficient movement of people and goods in general, existing federal and state regulatory structures and agency oversight roles, pipeline industry perspectives, business operating requirements, and public welfare and safety needs. This report documents recommendations regarding potential new roles and responsibilities for TxDOT and other state agencies relative to pipeline transportation.

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POTENTIAL NEW ROLES AND RESPONSIBILITIES FOR TXDOT AND OTHER TEXAS STATE AGENCIES RELATIVE TO PIPELINE TRANSPORTATION

A key question posed in the research for Project 0-1858 was, "What, if any, additional roles might there be for State of Texas agencies that would better capitalize on the strengths of pipeline transportation for the benefit of Texas?" The State's other transportation modes, highways, waterways, and railroads each have strong points and serve the transportation sector in a unique way. However, as transportation expenditures are stretched to meet the ever-growing needs of Texas, greater demands are placed on every mode. From a public policy perspective, the balance and optimization of each mode becomes increasingly important, as does the efficient interconnection between modes.

Two key questions that speak to this issue are:

1. Is there a role for State of Texas agencies beyond that role already defined in the safety/regulatory arena?
2. Would greater coordination between state transportation planners and pipeline companies result in transportation benefits?

PIPELINE INDUSTRY PERSPECTIVE ON STATE AGENCY PARTICIPATION

During the course of this research, the Texas Transportation Institute (TTI) developed contacts with an array of pipeline industry experts and resources. These included officials with the U.S. Department of Transportation's Office of Pipeline Safety (OPS), pipeline industry suppliers, pipeline company employees, and consultants. Based on interviews and discussions with industry experts, the following observations can be made relative to the question of an increased role for Texas State Agencies in pipeline transportation.

As a private, regulated industry, pipeline operators must attune to the prescriptive safety guidelines established by state and federal authorities to avoid penalties for noncompliance. Although safety regulations establish the context and define the limits of construction, operating, and maintenance practices for pipeline operations, they do not alter a fundamental priority found within most companies – profit maximization. Profit maximization naturally creates the conditions that emphasize cost control and reduction measures, and, unless otherwise provided for by internal or external forces, these measures may unintentionally compromise safety.

In most industries that require the monitoring and control of working conditions and operations to ensure public and employee safety, there is a regulatory role for government through regulatory agencies. This is true of aviation and rail transportation, and it is certainly true of the pipeline industry. Given the hazardous nature of the commodities transported in the nation's pipeline network and the increasingly common proximity of pipelines to highly populated areas, public safety requires scrutiny and oversight. This regulatory role often places the public sector in juxtaposition to the industry it oversees. Any time fines or penalties are levied for

noncompliance, there develops a natural contention between the parties. This is true even when the industry concedes that it is in their best interest to operate as safely as possible.

Pipeline systems operate in a competitive marketplace, seeking to maximize profit for the transportation service they provide. This profit-maximization motive includes an implicit drive to minimize the costs associated with construction, operation, and maintenance of the system. The profit motive (and cost minimization) has the effect of optimizing the use of a pipeline network by focusing employees on the detail of the operation and eliminating unnecessary elements, procedures, or practices. Given this reality, there seems to be very little room for an active role by state agencies in day-to-day pipeline operations.

University-Based Pipeline Safety and Operations Research Consortium

It is the pipeline industry's consensus that ample oversight is provided under the current regulatory environment and additional interaction with government is not particularly desirable. However, discussions with industry principals indicates there would be industry support for a publicly funded university-based consortium dedicated to research pertaining to pipeline safety and operations. Such a consortium could serve to accelerate the rate at which technological innovation is introduced to the pipeline transportation industry by directly engaging top researchers and scientists from a variety of engineering disciplines in pipeline safety issues. It could catalog and communicate key industry needs and goals to researchers who would then seek to apply the latest advances in safety technologies to pipeline's needs to enhance system integrity, improve system reliability, and elevate system safety.

ROLES FOR STATE OF TEXAS AGENCIES

Current Situation

Currently, the Railroad Commission of Texas (RRC) has state-level jurisdiction over pipeline safety and operations in Texas. In cases where federal regulations do apply to intrastate pipelines but allow a certified state agency to enforce the regulations, RRC is also the certified state entity in Texas. Certain aspects of new pipeline construction, existing pipeline operation, or pipeline upgrade and change-of-use plans may be regulated by other agencies, such as the Texas General Land Office or Texas Natural Resource Conservation Commission.

As previously described, TxDOT does not currently participate significantly in the state regulation of petroleum pipelines. Although TxDOT's mission statement refers to the desire to provide safe, effective, and efficient movement of people and goods in general, the precedent for pipeline regulation in Texas lies with the RRC.

State Agencies Other Than TxDOT

Although some aspects of pipeline safety and operations are currently unregulated in Texas, this under regulation is probably not due to a lack of a well-evolved, relatively complete regulatory scheme. Although it could be argued that aspects of existing regulations have problems and need revision, over regulation can interfere with efficiency and even harm the public well-being. Also, regulation by multiple agencies can unduly complicate matters. With regard to maintaining safety and effective operations of Texas' pipelines, those agencies with industry expertise and regulatory authority over pipelines and pipeline companies should be sure that adequate resources are allocated to allow for consistent and comprehensive regulatory enforcement as defined by state and federal rules and legislation.

Potential Roles and Responsibilities for TxDOT

It is possible that TxDOT could successfully assert a broader role in pipeline regulation, particularly with regard to coordinating pipelines' interactions with other transportation modes in the state of Texas. In doing so, TxDOT may be able to address some of the impacts of pipelines on transportation infrastructure in conjunction with the Texas RRC or other agencies. For example, intermodal truck-pipeline facilities and operations might be regulated in some fashion regarding operational times or reporting requirements.

Given the potential to affect the private business of pipeline companies and at the same time the public and environmental well-being, any pipeline regulatory or agency oversight role for TxDOT should be very carefully considered. The following have been identified as areas for potential involvement by TxDOT in pipeline transportation of natural gas and petroleum commodities.

Monitor the Impact of Trucks on State Roadways at Wells and Terminals

Truck traffic on rural Texas highways increases damage to those highways. In areas with many operational crude-oil wells, the crude is often removed from the wellhead storage tanks by tanker truck. Significant damage may take place over a short period of time to roadways and highways that lead to heavily producing wellheads, resulting in direct impact to TxDOT's roadway maintenance budget. Because of the nature of oil drilling operations, these wellheads may produce at varying rates for unspecified lengths of time. Transportation planners may have difficulty accounting for the cost and scheduling of maintenance activities required as a result of such traffic.

Currently, transporters are required to report pick up and delivery information on a monthly basis to the RRC using T-1 forms. This public information includes field, operator and lease identification, and volumes received and delivered. The lease identification information could be cross-referenced against publicly available lease location information to determine the location and monthly throughput of leases have access to Texas roadways and highways.

The reporting requirements do not include provisions for reporting detailed travel log information such as exact routes taken. Although an "optimal routing analysis" might be performed to describe the route that would likely be used by drivers between pickup and delivery of wellhead crude, many drivers do not travel directly between wellhead and the delivery locations except for the largest producing wells. A driver might visit a number of different wellheads before making delivery.

Modifications to existing reporting requirements to detail routes taken might provide additional detail regarding which locations are visited, how often, and what state roads are utilized by trucks. While this might meet with resistance from truck drivers because it would add to their record keeping requirements, it would not have to be overly burdensome to be of value.

Alternately, TxDOT may wish to consider additional study pertaining to the economic operating radius of petroleum product distribution trucks around pipeline terminals. Local truck traffic shifts due to changing terminal pricing shifts should be available so that TxDOT planners can act in a predictive mode rather than a reactive state. Information from wellhead servicing vehicles or development of a terminal economic radius model could be used as follows:

- assist in scheduling repairs and assessing infrastructure lifetime with knowledge of the extent of wellhead truck traffic,
- help in determining what costs result from operation of wellheads that have access to the state highway system, and
- provide a measurement system useful for recovering costs associated with wellhead operation (i.e., as a fee for certain classes of tanker trucks that operate at wellheads or in a cost per volume fee).

Assess Modification of Private Well Systems to Mitigate Truck Traffic

As mentioned, truck traffic for servicing crude-oil wellhead storage tanks results in damage to Texas roads and highways. One method to reduce this traffic is to require that wellheads and storage tanks that are within a certain proximity to one another all be linked by pipeline to a central storage site. This would result in reduced tanker truck traffic to a larger number of wellheads and confine the traffic to certain corridors. This would reduce costs by mitigating damage to roadways over a large area and confine the damage to certain corridors and assist in roadway maintenance planning activities.

Continue Development of an Accurate GIS-Based Pipeline and Facilities Location Database

The current Geographical Information System (GIS) database of the Texas pipeline network, initially provided by the Texas Railroad Commission, has been integrated with other surface transportation networks. The location of facilities with pipeline connections to other transportation modes also been added to the database.

TxDOT engineers and planners have expressed interest in an accurate GIS database of the Texas pipeline network. In its current form, the accuracy of the database is limited to +/-50 feet in some areas and is no greater than +/- 500 feet in most areas. However, TxDOT can work with the RRC to maintain the GIS database and continue to update it regarding pipeline locations found during maintenance or construction activities. The agency can also coordinate with the RRC to integrate the most up-to-date information regarding location of new pipeline alignments or updates to locations of existing alignments or through any survey efforts undertaken by TxDOT. In addition, TxDOT can continue the effort to document the location of pipeline interconnection facilities.

Further Assess Potential for Commodities Shift

Report 1858-1 discusses that commodity transfer to pipelines from other transportation modes faces operational and infrastructure limitations. Pipelines are designed to accomplish a specific transportation mission with respect to a specific commodity and market. The range of substances transported through a particular system is therefore limited to a generally related class of materials that has close physical and chemical similarities.

Although the confidentiality of pipeline throughput data restricts the ability for evaluating the potential for commodity transfer, both technical issues and an intensely competitive business environment dictate that pipeline companies are likely utilizing available infrastructure and capacity to the extent that is economically practical. While this leads to the conclusion that the competitive business practices of pipelines results in little excess capacity for commodity shift, there may be some limited potential for commodity transfer in certain aspects of the pipeline industry. This has been identified as a potential area for future study should there be significant changes in pipeline technology or business practices.

Plan for Pipeline Integration with Multiuse Freight Transportation Corridors

TxDOT can facilitate pipeline transportation to a limited but important extent by planning the inclusion of new transmission lines within the right-of-way of multiuse freight corridors. The inclusion of pipeline transportation in multiuse freight corridors offers the opportunity to provide significantly higher security to the pipeline that ultimately reduces risk of accidents involving the pipeline.