

Report to America on Pipeline Safety Determining Natural Gas Distribution Fitness for Service

Background:

The natural gas distribution infrastructure includes a network of approximately 2.1 million miles of main and 65 million service lines. The typical age of the pipeline system ranges from brand new to more than 100 years old, with pipe sizes typically ranging from ½” to 12” or larger in diameter. The natural gas industry has an excellent record of providing safe, reliable and efficient delivery of natural gas to our customers. The performance metrics over the past 20 years show a decreasing trend of serious pipeline safety incidents, and the industry is committed to further improvements of its safety performance. The distribution infrastructure has been constructed over time using a diverse range of materials including cast iron, bare steel, coated and cathodically protected steel, various plastics such as polyvinyl chloride (PVC) and polyethylene (PE), copper and others. Each of the pipe materials has relative strengths and weaknesses; for example, PE pipe is the current material of choice for natural gas distribution systems due to its non-corrosive properties, but it is susceptible to excavation damage. Some early vintage plastic pipe is fit for service, but requires more attention than more recent PE pipe because the vintage plastic materials are potentially more susceptible to brittle cracking. Cast iron is more corrosion resistant than bare steel, but is susceptible to cracking from earth movement. A variety of these materials may continue to be fit for service for decades to come and will remain part of the nation’s distribution system.

When natural gas distribution operators build or replace distribution mains and services, they design, construct, operate and maintain the pipelines in accordance with federal and state regulations with the expectation that the facilities will provide safe and reliable service to customers for many decades. After construction, distribution operators maintain and operate both new and existing pipelines to ensure the pipelines continue to provide safe and reliable delivery of natural gas. Operators often voluntarily exceed regulations when they determine additional actions that can improve pipeline safety and reliability. Examples of ongoing operations and maintenance activities performed on all pipelines after the initial installation include gas leakage detection surveys, corrosion mitigation surveys, pipeline patrolling and marking the location of pipelines prior to excavation activities to prevent excavation damage, which has historically been the primary cause of distribution pipeline incidents.

Fitness for Service:

“Fitness for service” for the distribution infrastructure is determined based on the ability of different types of facilities or individual components to satisfactorily perform their intended function, which is to safely and reliably deliver natural gas to customers. Operators have historically had programs to manage the safety of their distribution systems. The recent Distribution Integrity Management Program (DIMP) regulation requires operators to formalize their distribution pipeline safety programs. Under DIMP, operators will track and trend the safety performance of various groups of materials in their distribution systems, for example, coated and cathodically protected steel mains or polyethylene service lines. Based on analysis of the performance measures, operators may take additional or accelerated actions to ensure the

continued safety of specific groups of materials. Typical trending metrics would be leaks per mile of main and leaks per thousand services, by type and classification (mains or services) of material. Newly installed mains and services would be expected to demonstrate a very low leakage rate while older ones might be expected to demonstrate a higher rate. Age alone is not the determining factor. In some cases, a 40 year old facility may no longer be fit for service while in other instances a facility more than twice as old may continue to be fit for service based on condition and performance.

Under the DIMP regulation, operators are required to develop and monitor performance measures to evaluate the effectiveness of their programs. This allows operators to track the safety performance of distribution pipe facilities. As a requirement of federal regulations, operators conduct instrumented leakage detection surveys on their distribution facilities on a periodic basis ranging from 12 to 60 months, depending on the type and location of the facility. This requirement is rigidly enforced. The vast majority of leaks identified on distribution systems do not present a threat to public safety. All leaks are effectively managed and eliminated as necessary by "Repair, Rehabilitation or Replacement."

Specific facilities or groups of facilities with similar traits, whose performance begins to significantly deteriorate as demonstrated by an increasing frequency of leaks over time, may no longer be considered fit for service and should be considered for "smart modernization." Smart modernization is the targeted, risk-based rehabilitation or replacement of specific facilities or groups of facilities based on the condition and performance of those facilities. Rehabilitation or replacement of large groups of facilities may take many years to complete. Operators will continue to effectively manage such assets through additional or accelerated mitigation actions under their DIMP Programs until the rehabilitation or replacement is complete. It should be noted that some types of leaks, such as those resulting from excavation or other damages, are not material dependent and cause the majority of serious incidents. These types of leaks may be more effectively addressed by an operator's other pipeline safety programs such as excavation damage prevention programs and public safety awareness communications programs or by effective state damage prevention laws.

The DIMP rule provides a regulatory structure for leak management and guidance on repair, rehabilitation or replacement of facilities and groups of facilities for which performance is no longer acceptable. All operators and their regulators are striving towards increased safety in their distribution pipeline systems using a combination of smart modernization and enhanced operating, maintenance and communications processes. If large groups of facilities in the distribution system are identified for replacement, gas utilities manage this through a multi-year program that is agreed upon in a rate case or under a rate treatment agreement with the state public utility commission and public advocates. Approximately 22 states have infrastructure replacement cost recovery mechanisms. Public Utility Commissions use smart modernization to coordinate pipeline infrastructure improvements with other portions of the utility infrastructure. Broad mandates to rehabilitate or replace a vintage or specific type of distribution material may be counter-productive to pipeline safety because they are not risk-based. By mandating scarce resources to replace facilities that are performing well, it effectively limits the availability of resources to rehabilitate or replace higher risk facilities that demonstrate poor condition or performance.