Southern California Gas Company
A Sempra Energy utility®

IN-LINE INSPECTION OF PIPELINES

In-line inspection is a technique used to assess the integrity of natural gas transmission pipelines from the inside of the pipe and is used by Southern California Gas Company (SoCalGas) as part of its ongoing pipeline integrity program.

Following the 2010 natural gas pipeline rupture in San Bruno, a city just south of San Francisco, the California Public Utilities Commission (CPUC) launched a pipeline safety rulemaking proceeding. The intent of the proceeding is to adopt new safety and reliability regulations for natural gas pipelines, based upon lessons learned.

As part of the proceeding, the CPUC ordered the state's four natural gas transmission pipeline operators – Pacific Gas & Electric, Southwest Gas and San Diego Gas & Electric, as well as Southern California Gas Company -- to develop plans to replace or pressure test all natural gas transmission pipelines that have not been tested to modern standards.

In response, SoCalGas has submitted to the CPUC a Pipeline Safety Enhancement Plan in which we propose to conduct, over the next several years, pressure testing on approximately 360 miles of our 3,640-mile transmission pipeline system. This will further enhance SoCalGas' pipeline system safety.

For those pipelines that will be pressure tested, if the pipeline can reasonably accommodate in-line inspection tools we plan to perform an internal inspection of the pipeline first using an in-line inspection tool with Transverse Field Inspection (TFI) technology. The inspection will provide the opportunity to address any anomalies before the line is pressure tested. Additionally, data gathered during the inspection will be used to validate in-line inspection and support the use of the technology as a possible future alternative to a pressure test. The use of this tool can provide savings over the long run, as well as provide an enhanced platform for future integrity testing without the cost and disruption associated with pressure testing.

What is a "Smart Pig?"

In-line inspection involves the use of technologically advanced equipment, often referred to as "smart pigs" or in-line inspection tools, which are deployed inside the pipeline. Smart pigs were originally named for the squealing sound they make while travelling through a pipeline. Originally, smart pigs were used to clean out debris and remove water from a line after a hydrotest. Now, they are more commonly used to to carry sophisticated technology that can internally inspect a pipeline for anomalies.

Conventional in-line inspection tools use natural gas pressure to push the smart pig through the line without having to shut the line down or interrupt service to customers. The smart pig travels at about five miles per hour and is typically used for inspecting natural gas pipelines that operate at higher pressures The tool records condition data (such as the wall thickness, corrosion, dents, etc.) as it moves through the pipeline, and after inspection the data is analyzed and any necessaary repairs are made. To use this method, some natural gas pipelines must be retrofitted to accommodate the internal inspection equipment and remove obstacles that may cause the smart pig to get stuck or damaged.

How do "Smart Pigs" work?

There are a number of types of in-line inspection tools, each designed for a unique task. The most common type of smart pig utilizes a method called magnetic flux leakage (MFL). MFL pigs use strong magnets to detect disturbances in the magnetic field that are caused by defects. The relative size, shape, and location of the defects can then be determined and used for repair planning.

Among MFL tools, two common types exist: 1) axial field MFL which magnetizes the pipeline along its length, and 2) TFI which magnetizes the pipeline around its circumference. Each tool is sensitive to different types of flaws. Axial MFL smart pigs are suited to detect wall loss anomalies such as corrosion. TFI technology is more sensitive to defects that are oriented in the same direction as the pipe length, such as seam-related anomalies, a focal point of the CPUC's pipeline safety rulemaking proceeding.

Unpiggable Pipelines

There are a number of reasons why a pipeline may not be piggable. These include sharp bends in the pipe, excessive dirt or debris, valves in the line that do not fully open, changing pipeline diameters and insuffcient flow or pressure. All newly constructed pipelines installed as part of SoCalGas' pipeline safety implementation plan will be designed to accommodate in-line inspection tools. Within the natural gas industry, these lines are often referred to as "piggable" pipelines. SoCalGas is striving to increase the piggability of its approximately 3,640 miles of transmission lines through a program of continuous retrofitting work, and support of newly emerging inspection technologies.

In-line inspection technology advancements have produced a new, robotic tool that is self-propelled and capable of travelling with or against the gas flow. This tool can inspect some previously unpiggable pipelines without shutting down the pipeline or disrupting service to customers. The tool's flexible structure allows it to navigate through previously prohibitive bends and other restrictive pipeline features.