

# **CONSTRUCTING A SAFE PIPELINE**

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The federal government sets minimum standards, but companies can, and do exceed those.

## **THE STEEL**

Pipeline construction starts with high-strength carbon steel made to standards set by the American Petroleum Institute.

For pipelines larger than 24 inches in diameter, mills roll a sheet or coil of steel into cylinder that is welded along the seam. All welds must be inspected using ultrasound or X-rays and tested to a pressure greater than the pipeline's planned operating pressure.

Soil conditions, geography and population dictate the size, strength and thickness of the pipe used in a specific section of a pipeline.

In an email, Rover spokeswoman Vicki Granado said Energy Transfer inspects pipeline mills before placing an order and has an inspector on-site during production. The completed pipe is then inspected before it leaves the factory and after it arrives on the job site.

NEXUS Gas Transmission spokesman Arthur Diestel said in an email that project will use more stringent criteria than the API standard to ensure the pipe welds well and has sound mechanical properties.

## **THE WELDS**

Sections of pipe between 40 and 80 feet in length are welded together to make the larger pipeline. The welds joining the sections are inspected using X-rays or ultrasound to ensure they meet quality standards. A sample of welds in rural areas must be examined, but all welds must be tested in more populated areas, or where a pipeline is within a railroad or highway right-of-way or crosses a major river.

Rover and NEXUS representatives said all welds will be inspected by X-ray or ultrasound, regardless of class location.

## **CORROSION PROTECTION**

Fusion-bond epoxy or polyethylene heat-shrunked sleeves are the most common protective coatings for new pipelines. They are used to keep the pipe wall from corroding and failing.

Operators also install cathodic-protection equipment that runs an electric current along the pipeline to prevent corrosion.

## **THE TRENCH**

Federal regulations say a pipeline must be buried at least 30 inches below the surface in rural areas and even deeper in populated areas and where a pipeline crosses a road or a body of water. Construction crews must be careful not to dent or damage the pipeline with rocks when filling.

## **HYDROSTATIC TESTING**

After construction, a section of pipeline is filled with water and pressurized to a level greater than the pipeline's normal operating pressure and held for several hours.

## **VALVES**

Valves on the pipeline let operator shut sections for maintenance or in an emergency. Population determines how closely valves are spaced. Rural areas must have valves every 20 miles. The most populated areas must have valves every 5 miles.

There are three types of valve. Manual valves have to be turned by hand.

Automatic valves open or close at pre-set thresholds. Remote-controlled valves can be opened and closed from a control room miles away.

The Rover and NEXUS pipelines will use remote-controlled valves.

## **SCADA**

A Supervisory Control and Data Acquisition system lets a pipeline operator communicate with and control hundreds of miles of pipeline. SCADA systems relay flow volumes, pressure, operating status and gas temperature to a central control room.

## **‘SMART PIGS’**

Once a pipeline is built, operators can periodically send a “smart pig” through the pipeline to look for corrosion, dents and other anomalies that could cause the pipe to fail. Hydrostatic testing and direct inspection — or digging up part of a pipeline — can be used, too.

SOURCES: Pipeline and Hazardous Materials Safety Administration, Interstate Natural Gas Association of America, Pipeline Safety Trust, Code of Federal Regulations, American Petroleum Institute.

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