

Providing Reliable Shutoff for Gas Pipeline Valves

We would have had to route commercial power to the site at a huge cost. Emerson's solution operates on solar power. It also lets us check site status from our control room hundreds of miles from the site. We are saving money and time.

Design Engineer with Pipeline Company

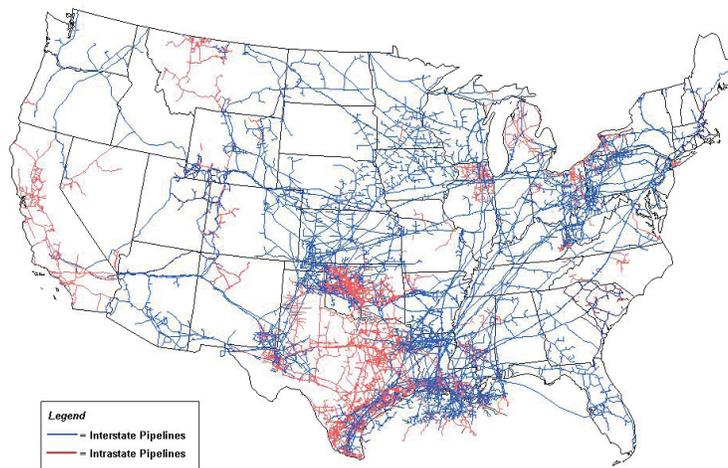
What if...

- Power could be obtained at the valve site locally without routing local power lines?
- The valve solution could be complete and unailing?
- Operators could monitor and control the valve from a control room far away?

No doubt. Shale gas fields hold vast untapped stores of natural gas. As drilling in these fields has become increasingly important, sites have become more plentiful — producing gas and oil under high pressure.

Traditionally, drilling sites and pipelines have been in remote locations. Recently, however, population centers have moved into closer contact with the industry. As a result, regulations have changed to assure safety for the population.

In the event of an emergency, the application calls for rapid-closing emergency shutdown valves. To effectively provide emergency shutdown, challenges can include lack of power at the site, uncertain reliability, and difficulty getting personnel to the valve site.



Source: Energy Information Administration, Office of Oil & Gas, Natural Gas Division, Gas Transportation Information System

As the map shows, many busy highways cross pipelines carrying natural gas. Shutoff valves must be present to isolate dangerous issues and protect people.

LACK OF EXTERNAL POWER

The remoteness of a valve site often means that no commercial power is available locally, and the expense of routing power for the electric motor actuator can be prohibitive. Normally, engineers would choose to use a gas/hydraulic actuator and power it with the pipeline gas, but that will not work if the pipeline has a high H₂S gas content.

UNSURE OF RELIABILITY AND SPEED

When pipelines cross highways or pass through communities, safeguarding people and property becomes top priority. The resulting focus on safety means the valve solution must operate without fail — even if the valves are operated infrequently or only during annual testing. In many cases, actuators absolutely must close in less than 12 seconds after signal input, and the solution has no allowance for inadvertent or false closures.

PERSONNEL NOT AT THE VALVE SITE

In pipeline applications, facility personnel often must travel long distances to reach the valve site; quickly closing the valve locally using a manual pump is not possible. In addition, the possible presence of H₂S gas prohibits personnel from investigating a potential leak at a site. Instead, the actuator must close the valves remotely and/or automatically. If the control system is part of the solution, the system must monitor the pipeline pressure, react if it detects linebreak conditions, and signal the actuator to close the line valves. Overall, the system must be reliable with minimal maintenance.

EMERGENCY SHUTDOWN

LOCAL POWER

To obtain power for remote valve sites, some Emerson solutions take advantage of solar power — readily available. A battery-powered electrohydraulic system provides the hydraulic power to charge the hydraulic accumulators which provide pressure for two complete strokes of the actuator. A solar panel bank keeps the batteries for the electrohydraulic system charged.

RELIABILITY AND SPEED

Emerson brings decades of experience and high performance to challenging valve applications where reliability is crucial. Part of the reliable solution can be Emerson's Shafer rotary vane type actuator — its constant torque output ensures that the specified safety factor will not diminish at various positions during the valve stroke. The hydraulic valve actuator operates the valve smoothly and hydraulic fluid protects the internal components from the harsh environments. The Shafer system control valves are engineered to deliver the hydraulic fluid from the accumulators to meet specified speed requirements.

REMOTE CONTROL

Emerson can design a system solution that monitors for linebreak conditions and reacts if setpoints are exceeded. A trial setting feature allows the customer to determine normal pressure variations and compensate before putting the system into full service. In addition, if the accumulator pressure or battery power falls below operational levels, the system can issue an alarm to the operator — many miles away. Status can be communicated and the valve closed remotely via cell phone, radio, or phone line.

“The solution supplied by Emerson is doing what it is supposed to do. There has not been any field issues since the installation months ago and it is sending us the data we need. We were able to operate the system, establish comfortable set points, and avoid inadvertent closures. This is what we like since we have limited resources and a busy schedules. We intend to use the same system on other critical installations in our pipeline systems.”

**Coordinator - Facilities
Engineer for large
midstream pipeline in Texas**

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