

# Single-Line Bypass Solution Reduces Risk of Failure for a Critical Pressure Control Station

## RESULTS

- Reduced risk of downtime, saving up to \$3M USD per year
- Improved the stability and accuracy of pressure control and valve performance over a wide range of seasonal flows
- Reduced valve noise to near background levels
- Provided overpressure protection and ensured sustained operation in the event of a failure by using a main-monitor configuration
- Completed the project on time and on budget



## APPLICATION

Single-line bypass valves in a pressure-reducing station for a gas transmission pipeline supplying a distribution system

## CUSTOMER

A pressure control station on the border between Canada and the USA

## CHALLENGE

The supply of gas to more than 600,000 residential customers in the Pacific Northwest depends on the reliability of one large pressure control station – which represents a single point of failure. Potential risks identified include a lack of redundancy, piping corrosion, or weld defects in critical piping.

These and other factors were considered during a risk assessment of the pressure control station which was based on the probability of failure multiplied by its consequences. (1) As a choke-point in the pipeline system, the station's shutdown could trigger outages in the downstream distribution system. (2) The station is located in a seismic area and flood plain. (3) Unlike electricity, a natural gas outage requires building-to-building restarts or, in this case, a potential for over 600,000 individual customer restarts. (4) An outage would have serious financial and social impacts on the gas utility and its customers.

The risk assessment made it easy to justify an upgrade to enhance the reliability and availability of the station. Operation, Engineering, and Management leaders met to discuss their options. Ensuring the safe and reliable supply to customers was their top priority.

After weighing the costs and benefits of various options, they decided on an internal station bypass. Then, they contacted Emerson's local business partner, Spartan Controls, for help with project design and execution.

*A shutdown at this pressure control station would have a serious impact on the gas utility and its customers. Addressing peak flow conditions and providing overpressure protection, Emerson's upgrade helped station managers improve reliability.*

### SOLUTION

Engineers from Emerson and Spartan Controls knew the application and its control valves needed to perform over a wide range of seasonal flows and inlet pressures, while meeting noise and emission standards for the safety and comfort of local residents and wildlife. In addition to this, overpressure protection and sustained operation was paramount for the safety and integrity of the pipeline and distribution system.

After analyzing various failure modes and 30-year projected flow rates, the Emerson team developed a solution that would not only provide accurate control but also reduce the differential pressure in the wide-open position across the system during peak flow conditions. Because there was limited space around the station to expand, they recommended a single valve train with overpressure protection.

In their proposal included:

- Two NPS 24 Fisher™ V260 valves with Bettis™ actuators, installed in a main-monitor configuration, would serve as a single-line bypass to the main pressure station. The configuration ensures overpressure protection and sustained operation in the event of a failure.
- A low-bleed valve positioner and I/P transducer would reduce emissions, enhance performance, and ensure accurate control.
- A low-bleed pneumatic pressure controller was used as the failsafe controller, in the event that the station lost air or power.
- A pneumatic positioner and control panel would allow operators to manually control the valve locally as an emergency back-up.

Their automation solution was tested, installed, and commissioned on time and on budget. The control station leaders are confident they have a safe and reliable bypass system to ensure a constant supply of gas.

### RESOURCES

#### Product Webpage: Fisher V260 Valve

[Emerson.com/catalog/en-us/fisher-v260](http://Emerson.com/catalog/en-us/fisher-v260)

 <http://www.Facebook.com/FisherValves>

 <http://www.YouTube.com/user/FisherControlValve>

 <http://www.Twitter.com/FisherValves>

 <http://www.Linkedin.com/groups/Fisher-3941826>

#### Emerson Automation Solutions Flow Controls

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[www.Fisher.com](http://www.Fisher.com)

*The Emerson team on this project identified all of the failure methods for components including loss of instrument air, power, PLC and RTU, as well as main valve failure. Their upgrade at the pressure control station enables operators to manually load the system and control it without any electronics.*



*Fisher V260 control valve assembly*

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