

# Retrofitted Gate Station Handles Large Pressure Drop Safely By Using Reliable Regulators

## RESULTS:

- Fail-closed safety feature ensures shut-off of flow to protect system.
- Operations crew is able to switch to backup with minimal impact on gas supply.
- Improved safety feature allows response time in event of alarm situation.

## APPLICATION

Natural gas gate station pressure regulation.

## CUSTOMER

Public energy utility in Midwest.

## CHALLENGE

Since the 1950s, this natural gas gate station has taken a two-stage cut, first reducing pipeline pressure with a regulator and relief valve combination set at 350 psig, followed by another regulator and relief valve controlling the pressure at 100 psig for one of the two local distribution systems. Still another regulator and relief valve brought the pressure down further to 60 psig for the other existing distribution system.

Boot-style regulators have served well in this scenario, but in recent years they have required more maintenance with replacement parts becoming scarce. When it was decided to replace the regulators in the station, the customer chose to upgrade to state-of-the-art Emerson regulators. This meant dealing with a high differential pressure.

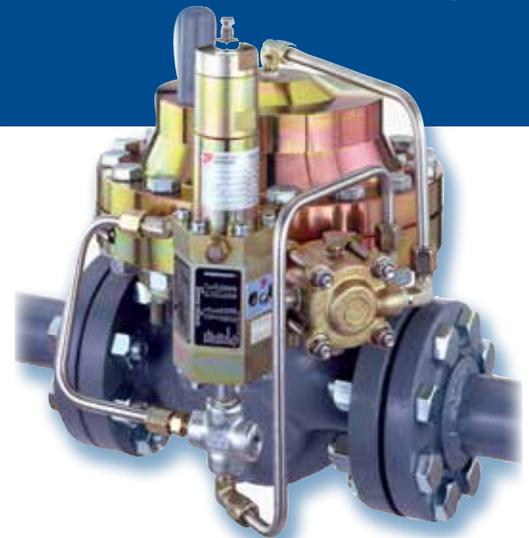
## SOLUTION

A basic single-cut design involves an operator / monitor setup for heated pipeline gas following custody metering to prevent pressure-drop freeze-ups by maintaining a 40°F outlet temperature. In this configuration, the operator accommodates the entire pressure drop to below 100 psig. The upstream inline monitor is set at a slightly higher pressure to maintain constant over-pressure safety on the downstream supply. A redundant, or parallel, operator/monitor pair is located adjacent to the primary regulators. This identical backup configuration will take over in

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The advantages of the EZH Series regulator design reduce the amount of time required for preventive maintenance – an additional cost-saving.



*The Emerson EZHSO Series Pressure Reducing Regulator design incorporates a unique spring cartridge that offers a fail-to-open alternative, ensuring gas delivery in the event of diaphragm failure or lack of supply pressure to the pilot. The failure action is the opposite of the EZH Series spring-to-close pressure reducing regulators.*



# NATURAL GAS PRODUCTION

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case of an operating failure. It is also used during maintenance periods.

In the main gas gate, an EZH regulator was installed as the monitor and the Fisher EZHSO Series was chosen for use as the operator due to the potential 900 psig differential. This model is designed to “fail open” with a positive spring action. If it should cease operating for any reason, there is a high probability it will remain wide open, allowing the monitor to continue controlling the downstream pressure.

This allows operations time to respond to an alarm by sending a repair crew to the station. Generally, the crew can switch to the backup system with minimal impact on the gas supply to our customers. In the worst case, if the monitor also fails, there is a high probability it will fail-closed, shutting off the flow entirely to protect the distribution system from over-pressurizing. (Note: this setup is depicted in the diagram below right.)

## ECONOMIC ANALYSIS

After about a month of operation, the gas flow was switched to the backup pair so that the operating regulators could be opened up and inspected. This was done once more following the first winter cold snap and has not require adjustment since. This system operated without incident through the winter. Annual lock-up and orifice/seat inspection are scheduled. The advantages of the EZH Series regulator design reduces the amount of time required for preventive maintenance – an additional cost-saving.

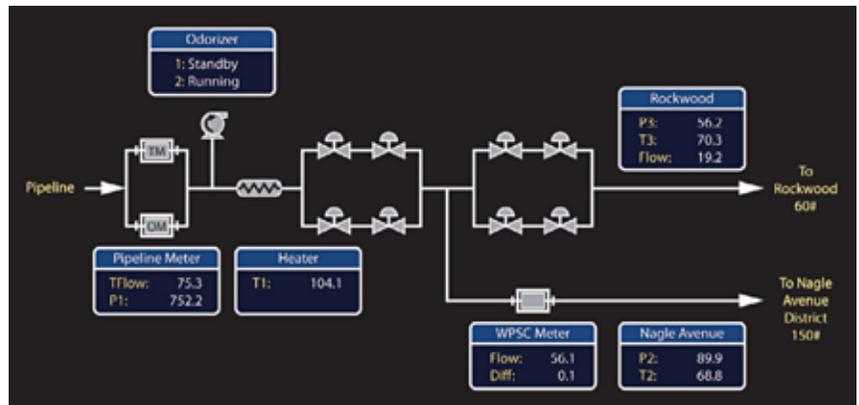
An additional gate station was built and is employing the same method of pressure reduction in recognition of the effectiveness of this approach for high pressure drop situations. The EZH and EZHSO Series regulators will be installed for pressure reduction to replace existing equipment in many instances, depending on the service conditions at each regulation station.

Either way, the customer is committed to a retrofit program that will provide long-term reliability and security for their commercial and residential customers while reducing maintenance costs.

**To learn more about how we can solve your challenging process application, contact Novaspect today.**



**To handle differential pressures higher than 800 psig the Fisher® EZH Series regulator was selected, rated for inlet pressures up to 1,500 psig. Contamination such as oil, dirt, or debris may also be present in the gas supply under those higher pipeline pressures. The rugged, spring-close EZH has hardened metal trim with a soft seat for reliable bubble-tight shutoff. It is built for severe service, able to withstand contaminants as well as pressures and velocities that are detrimental to rubber components.**



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