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WhisperFlo® REPLACES TORTUROUS-PATH TRIM, REDUCES NOISE, AND ELIMINATES VIBRATION AT A GAS PLANT IN SAUDI ARABIA

Back in 1996, gas plant personnel in Saudi Arabia were searching for the cause of a 12-inch crack in their 54-inch Acid Flare Header. The header pipe was nickel alloy and very costly to replace. The Header's equipment included solenoid-operated (on/off) valves and competitor control valves with torturous-path trim. Operators conducted vibration tests and made recommended changes in the valves' piping design and schematic. Damaging vibration continued, however, and more cracks developed in the piping and supports.

In early 2000, the gas plant team conducted another more comprehensive vibration test and used CFD (Computational Fluid Dynamics) software to simulate the overall process conditions. These tests revealed that the existing control valves—10X10, six-stage, balanced plug design— were inadequately sized for the application.

The customer invited the supplier to check the valve conditions and perform their own calculations. They also invited Fisher® personnel from the office of Saudi Fal's Control Division in Dubai to work on the problem. Two Fisher engineers studied the process conditions and concluded that the existing (competitor's) valves were contributing to the excessive vibration and noise. The valves were actually generating velocities close to sonic— 0.7 mach—noise levels within the valve and at its outlet. As a retrofit, the competitor wanted to add more stages, but calculations showed that that change alone would not improve performance.

After several visits to this remote site and consultations with members of the Severe Service group in Marshalltown (USA), Team Fisher recommended a larger replacement valve with WhisperFlo® trim that would meet all of the process conditions. (Calculations showed that velocities with WhisperFlo noise-abatement trim were 0.3 mach or less, when compared against the competitor's calculations.) The local service, technical expertise, and timely response provided by Fisher personnel enhanced the end-user's confidence in the Fisher package.

Ultimately, the customer's engineering team placed an order with Fisher for two 16-inch, Design EUT-2 control valves with WhisperFlo, Level Z Trim. They also wrote “Fisher only” on their standard Specification Sheets. (The competitor was given an equal chance to justify their product, but couldn't make it work.) Thus, Fisher displaced two competitor valves at this site.

DIRTY SERVICE TRIM PROVIDES ADDITIONAL CAPACITY AND CAVITATION CONTROL FOR NUCLEAR POWER PLANT

While going through a unit uprate, a nuclear power plant in New England had difficulty getting the necessary capacity from its condensate recirculation valves. These valves recirculate a minimum amount of flow through the condensate pumps and back to the condenser hot well. Thus, they help keep the pump from overheating. Because the downstream pressure from these valves is at a vacuum, however, the potential for damaging cavitation and flashing remains.

At first glance, plant operators thought the three eight-inch valves would have to be replaced with larger ones in order to achieve the desired capacity. Instead, Fisher® engineers from the Severe Service team proposed a trim retrofit that would not only meet capacity objectives but also protect against cavitation and flashing. The Fisher solution consisted of three- and four-stage dirty service trim (DST) packages.

The DST solution is a patented multi-stage, anti-cavitation trim used in applications where the fluid may have entrained particulate that could plug the flow passages common in conventional trims. The DST design, on the other hand, incorporates wide open flow passages that can pass particulate up to 3/4-inch in diameter.

Though this application did not involve entrained particulate, the wide open flow passages in the DST trim provided more capacity and a protected seating feature to promote long-lasting, tight shutoff. Because these valves are normally closed, the tight shutoff capability eliminates excessive pumping requirements and the potential for subsequent trim damage.

By retrofitting the trim, rather than replacing the valves, the Fisher team saved this plant an estimated $150,000 USD. The retrofit also eliminated a fair amount of labor and paperwork that would have been involved in removing old valves and installing new ones.

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