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FLORIDA POWER PLANTS OPT FOR LATEST IN TURBINE BYPASS VALVE TECHNOLOGY

Two Florida combined cycle power plants recently installed five new turbine bypass valves at their respective sites. The valves incorporate the latest available technologies for turbine bypass applications, including superior noise attenuation, long-lasting tight shutoff, an optimized actuation system for tight control and effective control of flow and temperature. All of these enhanced capabilities prove critical to proper operation of the bypass system.

Figure 1: Turbine Bypass Valve Assembly

The bypass valve's flow-up design is optimal for noise attenuation. Coupled with the proven Whisper Trim® noise abatement technology that provides as much as 15 dB greater noise attenuation than what other quiet valve designs offer, the system is best suited to meet stringent noise requirements.

Thermal expansion effects and tight shutoff are addressed by utilizing Bore-seal technology. The trim is suspended within the valve body to accommodate thermal expansion and enable smooth, continuous operation. The patented shutoff feature eliminates the need for pilot or pressurized seat designs that are prone to operational instabilities. The truly balanced trim construction simplifies maintenance and trim removal.

Since valve operation is critical during startup and emergency events, the actuation systems have been designed for optimal performance. The non-linear components have been removed making setup and tuning simple while dramatically improving performance of the actuation system. Tuning of a typical turbine bypass valve can take nearly 12 hours. With the optimized actuation system, tuning time is reduced to less than 15 minutes.

The system also includes online diagnostics that allow plant operators to monitor performance online in real time. The automatic diagnostics capability spots emerging performance problems and provides a problem description, possible causes and a recommended corrective action.

For efficient temperature control, the valve utilizes variable geometry spray nozzles to inject a fine mist into the downstream flow pattern. The nozzles are placed strategically around the valve's outlet to ensure a complete mixing and rapid vaporization of spraywater for efficient and effective temperature control.

Combining all of these features provides an optimal solution for this difficult application, ensuring that the valves will perform as required long after installation.

FISHER WINS ANTISURGE VALVE ORDER FOR PROPYLENE/ETHYLENE PLANT

A new high capacity propylene and ethylene production facility in South Africa has chosen Fisher's antisurge solution. The order calls for 11 specially designed antisurge valves to be utilized within the 250,000 metric tons per year facility.

The order includes 2" through 24" valves (Figure 2) that incorporate WhisperFlo™ noise abatement trim that is custom designed to the requirements of each specific application. WhisperFlo trim is a multi-path, multi-stage noise abatement technology that can reduce noise by up to 40 dBA, surpassing conventional noise trims by 10 dBA.

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Figure 2: 16" Compressor Antisurge Valve

The ability to custom-characterize WhisperFlo trim optimizes the valve size, thus minimizing the required downstream pipe size. The WhisperFlo trim also incorporates a spoked valve plug design that eliminates the potential for axial and radial vibration common to large valves equipped with traditional, balanced trim constructions

The Fisher antisurge system with its high-speed actuation and extremely accurate positioning capability offers an extensive lineup of operating advantages, including:

- Improved Dynamic Response & Robustness – Antisurge valves must open in less than two seconds, and they must also be accurate to provide closed loop control. With the patented feedback technology, the valves can respond quickly to large and small amplitude signals without overshoot.
- Reduced Commissioning Time – With traditional antisurge systems, one can expect to spend at least 12 hours in tuning one valve in the field. With the Fisher antisurge system, field-tuning time is reduced to less than 15 minutes per valve.
- Online Performance Diagnostics – Being critical pieces of equipment, antisurge valves should be monitored to ensure that they are operating within designed specifications. With the Fisher antisurge system, diagnostic information can be collected, viewed and analyzed without shutting down the valve or disturbing the process. A red, yellow or green light indicator in the valve's digital controller identifies potential problems. If an alert is triggered, the problem, its potential causes and recommended corrective actions are displayed.

All of these factors simplified the decision for the facility designers as they looked for a long-lasting solution for these critical applications.

RETROFIT TRIM INCREASES LIFE OF FEEDPUMP RECIRCULATION VALVES

A Florida power plant was having repeated leakage trouble with eight feedpump recirculation valves. The valves would leak after only several months of operation causing the plant to come offline for repairs. After looking at several options, the plant chose to utilize the proven Cavitrol IV technology as a retrofit trim in the existing valve bodies.

Cavitrol IV trim is designed specifically for feedpump recirculation applications. This solution incorporates four stages of anti-cavitation protection, a technique that prevents the formation of damaging cavitation at pressure drops up to 6000 psid.

The Cavitrol IV solution eliminates cavitation and the resultant noise and vibration by passing flow through successively larger flow areas, with each causing a reduction in pressure. This "staging" of the overall pressure drop results in more than 90 percent of the total drop being taken in the first three stages where there is little danger of bubble formation. The last stage experiences a relatively low inlet pressure, and there is minimal fluid energy exiting the trim.

The pressure staging together with the separation of shutoff and throttling locations within the Cavitrol IV trim prevent clearance-flow erosion. The trim design does not allow any significant pressure drop to be taken until the fluid is downstream of the seating surface. All clearance flow is subjected to a staged pressure drop. Unlike linear, cage-style anti-cavitation trim sets, there are no flowing conditions where pressure can go directly from P_1 to P_2. This last feature is critical to maintaining long-lasting tight shutoff in this critical application.

After installation of the Cavitrol IV trim, the plant has not experienced any leakage-related issues. The improved performance has allowed the plant to maintain operations while also improving the efficiency of the facility.