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Severe Service Journal

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FISHER VALVES REPLACE COMPETITORS' VALVES, DELIVER PERFORMANCE AT GAS PROCESSING PLANT IN TEXAS

Four 25-year-old valves at a gas processing plant in LaPorte, Texas had become a serious maintenance problem. The valves, operating in high-temperature and high-pressure feedwater and steam service since 1978, were leaking, noisy, and oversized. Maintenance technicians at the site had repeatedly repaired them, but problems persisted.

Puffer-Sweiven personnel in the LaPorte, Texas office and the Severe Service group in Marshalltown, Iowa specified a Fisher-valve solution that was less costly than repairing the competitors' valves. Even with piping changes required, the customer decided that the Fisher solution was worth it! The four new Fisher valves included anti-cavitation, noise-abatement, and valve performance monitoring technology. Specifically:

- A four-inch HPT valve with a diffuser, Whisper® III (noise abatement) trim, and a FIELDVUE® Digital Valve Controller for performance monitoring replaced a larger valve.
- A three-inch Design ET replaced a "Tiger-Tooth" valve. The assembly included a DVC and Cavitrol® III (anti-cavitation) trim. This valve is already installed and the customer is very pleased with its performance.
- A single Fisher 1-1/2 inch Design ET valve replaced two competitor valves in a feedwater application. The ET with Cavitrol III trim controls low-flow and high-flow capacity requirements.
- A three-inch Design EAT "angle" valve made of WC-9 alloy featured a specially-designed, drilled-hole cage to handle the demands of flashing and cavitation.

All four valves shipped on-time and were installed during a turnaround in April 2004. All are performing well, with no maintenance problems.

POWER STATION IMPROVES HEAT RATE 4% BY REPLACING SUPERHEATER BYPASS VALVES

A Midwest generating station was looking for opportunities to improve plant performance. The investigation process led to four existing superheater bypass valves — three BW-202 valves and one BW-207 — that were leaking badly. The downstream flash tank pressure during normal plant operation was over 600 psig, when it was intended to operate in the 50 to 100 psig range. Plant managers estimated that they were losing 10 to 12 megawatts due to valve leakage alone.

The BW-202 and BW-207 valves experience some of the most severe operating conditions in a supercritical power plant. The valves are required to pass cold water initially, then hot water and eventually super-heated steam. During these operating phases, the valves may be exposed to damaging cavitation and flashing as well as extremely high temperatures. For optimal performance, each of these potentially harmful effects must be mitigated to avoid piping vibration, longer startup times, and reduced efficiency of the unit.

With a performance improvement plan in mind, the plant managers approached the Fisher Severe Service group to develop a solution. To address the cavitation issue and avoid subsequent damage, 8-inch Fisher® valves were provided and installed with a characterized Cavitrol® III trim solution. The three-stage trim minimizes damaging cavitation during initial operation, while also providing the necessary capacity required as flash tank pressure builds. The valves also possess enough capacity to bypass flow to the flash tank in the event of boiler over-pressurization.

To provide tight shutoff, the Cavitrol III trim was fitted with the proven C-seal™ construction. C-seal is a balanced trim construction designed specifically for applications where temperatures can approach 1100 degrees Fahrenheit.

After installation of the four Fisher valves, the flash tank pressure dropped from 600 psig to 75 psig; the feedwater pumping load reduced by 10 percent; and the plant reported estimated savings of $275,000 in excess pumping costs. In addition, the plant's capacity increased by 15 to 20 MW. These new valves, in combination with several other modifications, allowed the plant to reduce its overall heat rate by four percent — saving more than $4 million dollars each year.

C-Seal is a mark owned by Pressure Sciences, Inc.

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