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MIDWESTERN POWER PLANT USES CAV4 TRIM TO AVOID RECIRCULATION VALVE LEAKAGE PROBLEMS

A 525 MW power plant in the Midwest experienced repeated issues with leakage in two of its boiler feedpump recirculation valves. The leakage led to continual valve maintenance needs and created excessive feedpump horsepower requirements. Both situations had a negative impact on the power plant's output.

Plant personnel contacted their local Fisher business partner, NOVAspect, and asked them to take a look at the recirculation valve problem. After a thorough review of the installation, NOVAspect engineers proposed a solution that included field-proven CAV4 anti-cavitation trim from the Fisher Valve Division.

The CAV4 trim was 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.

A properly sized CAV4 valve prevents cavitation, and therefore the noise and vibration it causes, by directing 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 low inlet pressure and pressure drop.

The pressure staging together with the separation of shutoff and throttling locations within the CAV4 trim prevent seat erosion. The trim design does not allow 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.

Since the installation of these valves, the plant has not experienced any issues with leakage through these valves or any need for maintenance. Based on the success of this solution, plant engineers are currently looking for other problematic valves to replace.

DESIGN EHAZ VALVES WITH CARBIDE LINERS DELIVER RELIABILITY

In early 2001, maintenance mangers at a California plant manufacturing long-chain fatty acids had two, critical crude oil feed valves failing every few months. The existing angle-style valves (made by a Fisher competitor) were operating at about 20% open and experiencing problems with out-gassing, erosion, proper control, and cavitation. Applied to a proprietary process involving erosive slurry with entrained particles, the valves' trim deteriorated every three to six months, and the valve bodies were also showing signs of wear. The valves' failure would shut down a portion of the plant, costing this chemical customer thousands per day.

Tired of this routine maintenance, plant personnel asked their local Fisher business partner for a long-term solution; new valves that would provide better control, be easier to maintain, and prove more reliable and durable. To avoid costly re-piping, the new valves also had to be an "exact fit" to their predecessors.

The Fisher engineers developed a hybrid valve, combining elements of the existing EH and HP designs, but with an angle body and post-guided trim. The result was an ANSI Class 1500, 1.5-inch Design EHAZ valve with F22 forged body, a 3/8-inch port, a WC9 bonnet, and a 2500# RF inlet and 150# RF outlet flange.

The stainless steel trim with a max Cv of 1.4 is one of the unusual elements of the design. A custom MicroForm tip on the plug controls flow as the plug moves up and down. The contoured tip, seat ring, and liner are made of tungsten carbide to protect the valve from erosion. The bottom of the liner was supplied with a COCR-A overlay.

The EHAZ valve assemblies included size 40, Type 667 actuators and FIELDVUE Digital Valve Controllers. Two identical valves were produced by Fisher and shipped to the chemical facility in 2001.

The Design EHAZ valves proved a good match for this critical, severe service application. After one year in service, the Fisher valves showed no visible signs of wear to the trim or the valve body.

Through this project, the customer came to value the local Fisher business partner's responsiveness, technical know-how, and after-sale support as much as Fisher's high-quality, custom-engineered product.