

Design EWT Valve with Cavitrol® Trim Eliminates Cavitation



RESULTS

- Met demanding requirements in boiler feedwater service and eliminated cavitation.
- Saved a power plant \$10,000/year on valve trim-replacement costs.
- Adding a FIELDVUE® digital valve controller to a competitor's valve in deaerator level control extended the service life of that valve by three years.



APPLICATION

Deaerator level control

CUSTOMER

We Energies' Valley Power Plant in Wisconsin

CHALLENGE

The Valley Power Plant, the largest co-generation facility in the USA, has an unusual need for reliability. If a generating unit elsewhere goes down, power can be obtained from the grid. If this plant loses its steam system, however, the citizens of downtown Milwaukee will be without heat.

In order to remove corrosive gases entrained in boiler feedwater, a feedwater heater called a deaerator is incorporated into the power cycle. The deaerator heats incoming feedwater to the saturation point in order to reduce the solubility of any entrained gases.

Deaerator level control is a demanding control valve application. Service conditions vary with plant load. During initial startup, the condensate pumps operate at high pressures and minimal flows. (Downstream pressure is low because the deaerator has not built up any pressure.) As the unit load increases, the inlet pressure to the valve decreases. The control valve, therefore, must handle high flows, significant pressure drops (165 psid), and any resulting cavitation.

A Neles-Jamesbury Q-ball valve was installed in 1995 in this facility's deaerator level control lines. For the next six years, the valve experienced control and performance problems resulting from damaging cavitation. (Cavitation, the formation and subsequent collapse of vapor in liquid fluids, is a major source of valve damage and vibration.) Because of cavitation damage, plant maintenance personnel replaced the valve's trim at least once a year and at a cost of about \$10,000 USD.

"I called Emerson (Novaspect) personnel on a Saturday, and they not only called me back but also provided exceptional, technical support – regarding a competitor's valve application."

Todd Gordon

Instrument Technician Leader
We Energies



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POWER GENERATION

In 2000, an Instrument & Controls technician on site added a Fisher FIELDVUE® DVC5000 digital valve controller with Advanced Diagnostics (AD tier) to this valve. Though the FIELDVUE instrument improved valve performance and extended its service life, the trim continued to suffer from cavitation. On occasion, the trim was so chewed up that the valve would not stroke.

In 2003, a Neles representative recommended replacing the valve with a stainless-steel body. Though that valve lasted longer, the SST valve, too, was ultimately destroyed by cavitation after about two years.

Finally, in 2005, the end-user called Emerson and its Fisher® valve team for an engineered and long-term solution.

SOLUTION

Emerson engineers at the valve headquarters in Marshalltown, Iowa, with support from the Local Business Partner (Novaspect) in Wisconsin, studied the application, the control problems, and the trim options available. They ultimately recommended a 8x6 Design EWT sliding stem valve with a 585C actuator, two-stage Cavitrol® III trim, a FIELDVUE DVC6020 digital valve controller with Performance Diagnostic (PD) capabilities, and ENVIRO-SEAL® packing.

Characterized Cavitrol trim eliminates damaging cavitation by staging the pressure drop and ensuring that it never drops below vapor pressure. Designed with a lower metal piston ring around the plug, the trim eliminates clearance flow problems between the plug and cage as well as the erosion of the seat and plug.

The Fisher valve assembly also included a FIELDVUE DVC6020-PD tier instrument. When used in combination with an AMS ValveLink® mux system, the device enables operators to monitor valve performance on-line – while the valve remains in service. Performance diagnostics capabilities also enable operators to collect and trend valve performance data over time and thereby improve their ability to predict or plan maintenance as needed.

With built-in protection against cavitation and on-board monitoring capabilities, this high-capacity valve has reduced the facility's annual maintenance costs and improved plant operations by offering a long-term Fisher solution.

“The Fisher valve went in (deaerator inlet service) without a hitch and since then, nobody has said a word about it. That’s the way we like them – invisible.”

Todd Gordon

Instrument Technician Leader

We Energies

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