

# Severe Service Journal

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## **Turbine Bypass Technical Solution**

A waste burning power plant in the United Kingdom was experiencing repeated issues with a turbine bypass valve. The valve would fail to open during a station trip, which resulted in the entire plant shutting down. It would take the plant up to six hours to start back up again. Plant managers estimated that it cost them \$10,000 every time this happened, and the existing valve, therefore, had cost them well over \$170,000 due to repeated plant shutdowns and startups.

Turbine bypass applications are critical for a number of reasons. First off, tight shutoff is critical to overall plant performance. With high-pressure steam leaking directly to the condenser, the heat rate and overall output of the unit can be affected. The ability to operate at a moment's notice and to open quickly is also important. Because of the high-pressure drop taken through the valve during operation, noise and subsequent downstream vibration is possible.

In order to address these application issues, the Fisher Severe Service Team supplied a 6-inch Type EWD valve, fitted with WhisperFlo® and C-seal trim for tight shutoff. WhisperFlo is a multi-path, multi-stage noise-abatement technology that can reduce noise by up to 40 dBA, surpassing conventional noise trims by five to ten dBA. The C-seal trim is designed to provide ANSI Class V shutoff at temperatures up to 1100-degrees F.

A week after installation, the valve was called into service when the plant was disconnected from the grid. The valve worked perfectly, allowing steam to go to the condenser. In half an hour, the plant was reconnected to the grid. The valve was gradually closed, and the unit was put back on full power.



**WhisperFlo® Trim**

After several few weeks, plant managers realized that they had gained an additional two MW of output due to the improved shutoff in the bypass valve. This provided the plant with at least \$150,000 in additional revenue.

As a result of this success, the utility began to replace valves in its boiler feedwater system that also had issues with leakage and operability. The replacement of the drum level valves reduced the startup time necessary to bring the unit to full load. The plant has standardized on the Fisher solution to handle its most critical, severe applications.

### **Cavitation Technical Solution**

For several years, an Alberta, Canada power plant was having repeated issues with its boiler feedpump recirculation valves. The valves required trim replacement every three months due to cavitation and erosion damage. In order to ensure

that parts were available for the eight valves, the plant rotated nearly 30 trim sets through the valves. Once a valve was brought down for maintenance, the trim was removed, sent out for weld repair, and then placed on the shelf to be used again in one of the recirculation valves.

After reviewing the application and the valve selection, it was determined the valves did not possess any means of staged pressure control, thus exposing them to the effects of damaging cavitation. Because of the damage caused by cavitation, the valves were also prone to excessive leakage. Since these valves are normally closed, the leakage led to increased boiler feedpump horsepower demand.

In order to address the issues with damaging cavitation, the plant purchased two NotchFlo™ DST (dirty service trim) valves. The NotchFlo DST is a multi-stage anti-cavitation trim that utilizes a series of notched flow restrictions and expansions to control pressure drop and thereby prevent cavitation problems.

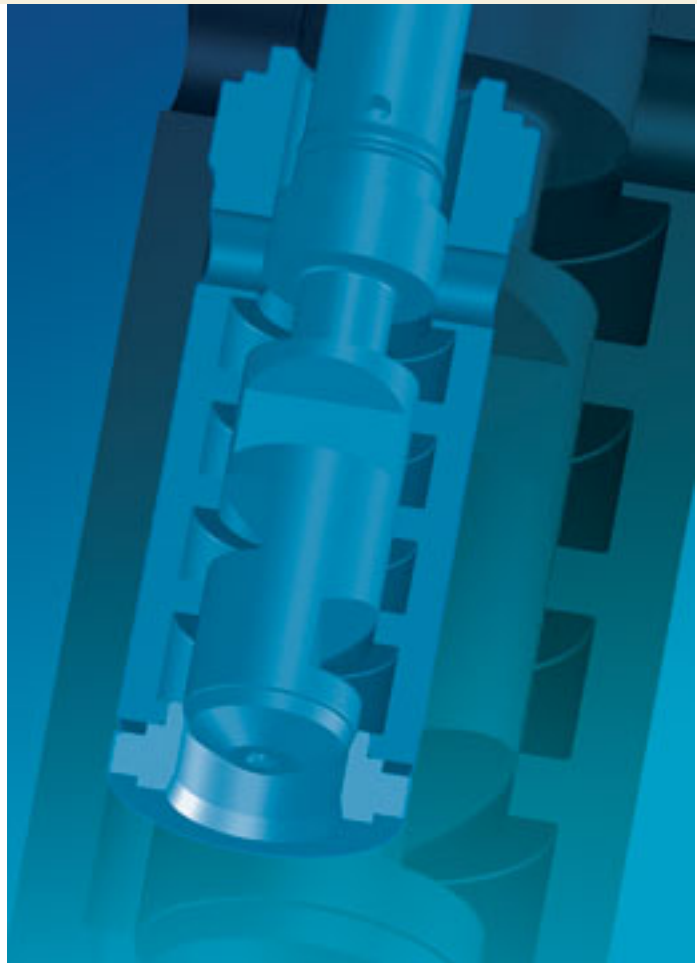
The valves also incorporate a protected seating feature to provide long lasting, tight shutoff. Unlike linear style anti-cavitation trims, no pressure drop occurs across the seating surface thus protecting against low flow and high velocity erosion

effects. The trim is also designed to pass entrained particulate, which eliminates issues with reduced capacity and potential erosion effects.

Based upon the success of these valves, the plant will replace an additional six problem valves. Just by replacing these two valves, the plant is saving over 50 hours of maintenance and trim repair activities each year. This alone justified the cost of replacement.

Past issues of the Severe Service Journal and additional information can be found at <http://www.fishersevereservice.com>.

Contact your local representative for any of your needs.



**NotchFlo™ DST**

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