Severe Service Journal
A Publication of the Severe Service Team at Fisher
Applications • Research • Products • News
Volume 4 Issue 4 | January 2006
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DIRTY SERVICE TRIM MINIMIZES THE INFLUENCE OF OUTGASSING AND EROSION IN A REFINERY'S HYDROPROCESSING AREA

A Midwest refinery chose to utilize Dirty Service Trim (DST) from the Fisher Valve Division in its clean fuels upgrade. The DST solution will be used in several applications in the unit's hydroprocessing area. The process removes sulfur-containing compounds and heavy metals and separates heavy and light hydrocarbons from oil, creating cleaner-burning fuel. Controlling the level of hydrocarbons within several high-pressure separators is critical to the unit's performance.

The valves involved in the process must withstand high-pressure drops as well as the potentially damaging effects of cavitation, flashing, outgassing, and corrosion. The possibility of entrained catalyst makes the fluid flow more erosive. Staging the pressure drop can reduce the potential for valve damage and vibration. Normal pressure staging devices rely on small passages that are prone to plugging. In applications where outgassing occurs, smaller passages are exposed to high internal velocities that can cause severe erosion.

For the Hot High Pressure Separator, the valves are exposed to a great deal of outgassing. Outgassing can damage equipment because the high velocity jets coming out of the solution carry small liquid particles. The liquid particles impinge on internal surfaces of the valve and its trim, causing extensive erosion.

Fisher designed its DST products to address all of these application challenges. DST utilizes a staged pressure reduction and a large outlet chamber to reduce the velocities of the fluid coming out of solution. The large outlet chamber prevents high velocity jets from impinging on the valve body and contributing to erosion and vibration. The four-inch DST-G solution specifically was utilized to combat outgassing effects. Its optimized design allowed the facility to utilize a smaller valve than the one previously used.

DST and NotchFlo® DST solutions, ranging from 1- to 4-inches, were utilized in the Cold High Pressure Separator system. Each of these designs combat damaging cavitation and flashing while allowing particulate up to 1/2-inch in diameter to pass without plugging the trim.

All of the DST solutions incorporate a protected seating design that separates the shutoff and throttling functions of the valve. This design ensures that no pressure drop is taken across the seating surface, protecting the valve from high velocity impingement and erosion while improving shutoff.

Because of DST technology, the facility will not have to go offline for maintenance due to plugged or damaged control valves. Fisher® DST solutions are approved for UOP licensed processes and withstand the test of time.

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TURBINE OEM REPLACES FAILED FEEDWATER VALVES WITH A FISHER-ENGINEERED SOLUTION AND AVOIDS PENALTIES

A large, turbine manufacturer had purchased two feedwater control valves to be used in parallel to control drum level in a combined-cycle power plant. One valve was designated to operate during startup and then transition to a main operating valve. The startup valve utilized anti-cavitation trim while the main operating valve had standard trim installed.

Early in the operation cycle, the valves consistently had issues controlling level in the high-pressure steam drum. Not only was control an issue, there were also problems with trim damage, stem rotation, and severe vibration to the piping system. The operational issues with this valve caused the end user to lose four days of operation on their 260MW steam turbine, leading to an estimated $390,000 in lost revenue.

For two years, the original valve supplier attempted to solve the problem. After changing the internal components three times at a cost of approximately $60,000 for parts and labor, with no improvement in performance, the turbine OEM approached the Fisher Severe Service group for a solution.

After reviewing the application, Fisher engineers determined that one 4-inch valve utilizing a characterized Cavitrol® III type trim could perform the duties of both the startup and main valves. This solution also minimized the possibility of operating the wrong valve during unit startup.

Since the Fisher valve installation, the plant has experienced no issues relating to trim damage, shutoff or piping vibration. Most importantly, the installation of this valve eliminated the possibility that the turbine OEM could face availability penalties.

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