

Severe Service Journal

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FISHER VALVE REPLACES WORLD'S MOST EXPENSIVE 'FLOWER POT'

A gas storage facility in Texas experienced repeated noise and control issues with a number of cavern-storage valves. The valves controlled the first blast of high-pressure gas, up to 3275 psid, coming from a mile-deep, gas storage dome carved out of salt. (They inject high-pressure gas into the dome in the summer when gas prices are low, and then withdraw the gas to fill winter demand.)

One of the high-pressure valves, an eight-inch valve equipped with a piston actuator and trip-valve assembly, had the capacity to flow eight million standard cubic feet per hour. It was performing poorly; the salt is corrosive, and according to one technician, "the valve sounded like a freight train."

Gas-plant personnel considered retrofitting the valve, but opted to replace it with a ten-foot-tall, 2500# SST valve with "tortuous-path" noise-abatement trim. This was an expensive commitment, involving more than 40 feet of piping and an estimated \$50,000 associated with labor, transportation, and installation downtime. Plus, the valve's substantial size and weight required a poured-concrete pad for support.

Unfortunately, in spite of all that extra cost, the new valve and actuation package never did work properly. Once installed, it experienced the same noise and shutoff issues as its predecessor. Each failure caused the plant to shutdown, isolate the valve for repair, and add the cost of maintenance and lost-time production to its initial purchase price.

After repeated and frustrating attempts to get the valve to perform, plant managers turned to Emerson Process, Fisher Valve Division and its Severe Service team for help. After carefully reviewing the application, Fisher engineers determined that the plant was operating its cavern-storage valves at very low lifts, which contributed to plugging, seat erosion, and poor shutoff. This was a critical piece of information, overlooked by the previous valve supplier.

Gas-plant personnel ultimately ordered three high pressure Design EHT valves with Whisper® III noise-abatement trim to replace the two-ton behemoth and two other high-pressure valves. The Fisher® valves and their simple actuation packages have eliminated set-up problems and low lift erosion while providing a 210:1 turndown and tight shutoff, even at 3275 psi inlet!



Two years later, the Fisher valves are still operating without any problems. Pleased with their performance, the plant manager said, "I'm going to put the old, two-ton valve in front of the office and use it as flower pot . . . That is all it appears it is good for."

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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 is 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 relatively low inlet pressure, and there is minimal fluid energy exiting the trim.

The pressure staging together with the separation of shutoff and throttling locations within the CAV4 trim prevent clearance-flow erosion. The trim design does not allow any 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. Unlike linear, cage-style anti-cavitation trim sets, there are no flowing conditions where pressure can go directly from P1 to P2.

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.

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