

POWER ENGINEERING

FIELD NOTES

Bellows seal valve retrofits cut maintenance time, costs

A program of valve replacement reduced valve maintenance needs "dramatically" at Consolidated Edison's Astoria station, according to Jay Koch, operations superintendent. Conventional packed globe and gate valves were replaced with bellows seal valves.

The upgrade program, begun about 10 years ago, had two goals: to improve availability by incorporating state-of-the-art advances in hardware, and to create a safer, more pleasant working environment in the 1600-MW plant's five oil- and natural gas-fired units.

Leaking glands were a problem in the packed globe and gate valves used throughout the station. Gland leaks resulted in the escape of steam and repeated accumulations of water on the floor and around major equipment. Despite intensive efforts, the maintenance crew was losing ground, says Koch. "We'd pack, tighten and repack glands. Then, after a relatively short length of time, we'd have to repack and tighten again, until stuffing boxes became wire-drawn or eroded and failed to hold the packing. Then, we'd replace the valves and the cycle would begin all over again."

At first, it was believed that this condition could be corrected by

the use of live loading, accomplished by installing a series of Belleville washer nuts under the packing to supply constant pressure against the gland followers and automatically compensate for the effects of cycling pressures. However, this approach was soon rejected and a more permanent solution was sought.

Bellows seal valves were then investigated and chosen, although at the time they were generally considered only for N-stamp applications in nuclear plants.


Critical areas were taken first, such as steam trap lines and instrumentation offtakes for boilers, including drum level and steam pressure indication. Leaking packing glands in valves on the water side of drum level indication posed serious problems. Water at 650 F flashing to steam as it leaked into the atmosphere resulted in a lower differential reading than actually existed. Consequently, the false drum level signal could trigger feedwater flow to raise the water level to the automatic trip point, thus causing a false trip and shutdown of the unit.

Valve replacements began with the installation of an Eagle Class 600 lb bellows seal globe valve from **EG&G Sealol Eagle** on a 250-1b steam trap drain line, and Class 1500 lb bellows seal globe valves on offtakes for boiler gage glasses on steam drums.

Results were "dramatic," according to Koch. The new valves required virtually no maintenance. Before the replacements, Astoria station had several unscheduled outages over a three-year period as a result of valve gland leakage, and outage work lists for each of the station's five units repeatedly showed 30 to 50% of the jobs were packing and valve maintenance items. Since the conversion, this figure has been reduced to less than 1%.

Koch reports that the first bellows seal valve installed (on a 250-1b trap drain line) ten years ago has required no attention since it went into service.

Conversion to bellows seal valves continues at Astoria station. The valves are being installed on some remaining pressurized systems, as well as on vacuum systems, condensate systems, hydrogen gas pressure reducing station, distribution manifolds and CO₂ supplies for purging the generator.



Replacement of packed seal valves with bellows seal valves has cut maintenance significantly at Consolidated Edison's Astoria station.

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