

Fisher™ easy-e™ Control Valves and FIELDVUE™ DVC6200 Instrument in Generator Lubricating Oil Cooling Water System of Combined Cycle Power Plant Saves Customer Approximately \$120K USD in Maintenance and Energy Saving Cost

RESULTS

- Upgraded the control precision of the generator lubricating oil cooling water system by replacing the domestic butterfly valves, thereby elevating system efficiency and reliability
- Eradicated emergency shutdowns in generator lubricating oil cooling water system, which is estimated to save maintenance and energy saving costs of about \$120K USD per year
- Reduced power consumption of the closed-loop cooling water circulation pumps, resulting in a daily energy savings of 218 KW-h per year
- Prevented pipeline vibrations



APPLICATION

Closed-loop cooling water flow control for generator lubricating oil

In power plant operations, the cooling water flow control for generator lubricating oil holds a vital position. Its role extends beyond temperature regulation; it is crucial in preserving equipment health, performance, and longevity. This system ensures optimal oil temperature, efficient heat dissipation, minimized friction, and consistent operation, thereby upholding the generator's reliable and efficient functionality.

CUSTOMER

Dongguan Shenzhen Energy Zhangyang Power Co., Ltd, a combined cycle power plant located in China

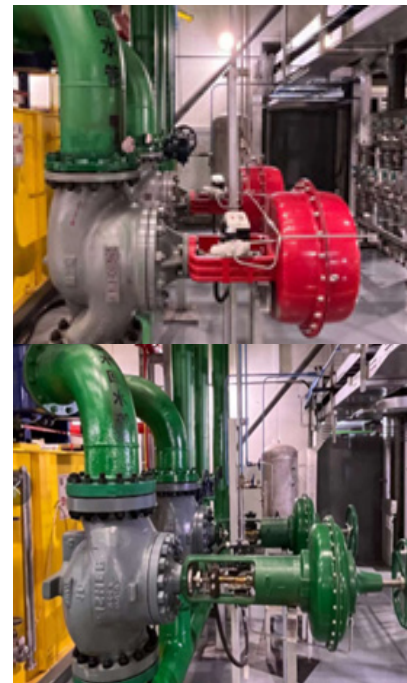
CHALLENGE

The initial challenge surfaced from underperforming domestic valves, attributing their shortcomings to poor control precision. These valves led to significant variations in the closed-loop cooling water flow control system, causing erratic water pump electric currents, valve openings, and cooling water flow rates. This instability triggered severe pipeline vibrations and water hammer effects, resulting in two emergency shutdowns. The maintenance and energy saving loss incurred is estimated to be \$120,000 USD.

In addition, heat exchange efficiency dropped due to the fluctuations in cooling water flow rate and fouling within the heat exchanger. This led to higher demand for cooling water, increasing customer energy costs, and ultimately affecting the overall system efficiency. Given the variations in flow control, the original domestic valves also could not guarantee the performance to meet the higher cooling water demand.

Incomplete process parameters and deviation between the flow parameters set by equipment manufacturers and actual flow conditions created a considerable hurdle. The absence of flow meters exacerbated the situation, complicating the selection of appropriate valves for the system.

The Fisher easy-e high-precision flow control valve provides excellent controllability and reliable field performance at a combined cycle power plant.



The Fisher easy-e valves installed within the closed-loop cooling water flow control for generator lubricating oil

SOLUTION

Although the closed-loop cooling water flow control for the generator was not traditionally considered a severe service, a detailed site walk conducted by Concord Controls Engineering Corporation Limited, Emerson's esteemed local business partner in China, revealed the challenges and concerns that the customer was encountering.

The Concord team conducted a meticulous evaluation of the actual process parameters. On-site, valve experts retrieved the historical valve opening curves, assessed heat exchanger efficiency, and quantified the impact of temperature variations on water flow. Using portable ultrasonic flow meters enabled precise measurement of pipeline flow rates. With accurate process data at hand, as a solution, Fisher easy-e valves with high accuracy and excellent controllability were proposed, paired with FIELDVUE DVC6200 digital valve controllers.

Fisher easy-e valves with high accuracy and excellent controllability ensure precise control even with a higher cooling water demand. This effectively reduces the variations in the closed-loop cooling water flow control, eliminating the pipeline vibrations. This, in turn, prevents unplanned shutdowns, thereby elevating system efficiency and reliability. FIELDVUE DVC6200 digital valve controllers were tuned before valve installation, to further improve control precision.

The customer agreed to implement the proposal on one control valve unit, and after more than a year in operation, the Fisher control valve system is still providing improved controllability to the plant's operations. With no leakage or noise concerns, the customer saved more than \$17,000 (600,000 THB) on yearly maintenance and operational costs.

With proven performance in operation, the customer intends to change the remaining two competitor units with the same Fisher solution proposed by Kanit Engineering Corporation Limited.

The valves are maintaining excellent field performance and 10 units of domestic valves have been progressively replaced. The solution has successfully reduced the pipeline vibrations, prevented emergency shutdowns, and reduced energy consumption in water pumps.

By embracing Emerson flow control technologies, the power plant achieved efficiency, reliability, and operational excellence in their generator cooling system.

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