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Gaining a Clear Picture of Pump Operation

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When a piping system problem is found, the first response often is to add a pump. Using a piping system analysis tool can be a better solution. In this paper we discuss what a clear picture of piping system operation can provide for the pump system trouble-shooter.

Gaining a Clear Picture of Pump Operation

Often things are not as they first seem, especially when one is trying to determine how a pump system is operating. That's why it is often difficult to troubleshoot a fluid piping system that is experiencing problems and to arrive at a plan to correct the trouble. The best way to identify problems within a system and to make the corrections is first to have a clear picture of how the system operates.

Developing an educated guess is one option to solving system problems, but that ability comes only with years of experience. Simple trial and error may be another option. Either way one thing is certain when a piping system is required for continued operation in a power plant: system failure is not an option.

Fluid piping analysis software makes it possible to simulate the operation of the total piping system. Once the computer simulation reflects the piping system's actual operation, plant personnel can try various options on the piping system model without fear of failure.

Personnel at a cogeneration plant discovered just how helpful such software can be. They used commercially available fluid piping software to gain a clear picture of the plant's auxiliary cooling water system operation. The auxiliary cooling water system supplies cooling water to lube oil coolers, fan cooling coils, air compressors and generator coolers, along with a variety of other equipment needed for plant operation.

Auxiliary cooling water systems are found in virtually every commercial power plant, as well as in other types of process plants. This particular cogeneration plant's experience is common in auxiliary cooling water systems at many power plants. The system requirements changed over time as the plants' cooling requirements changed and as the piping system components wore and corroded. Such changes sometimes require a system rebalance, modifications to existing pumps or possibly even addition of new pumps to meet the cooling water system's new conditions.

When this power plant was initially designed, the auxiliary cooling water requirements for the various loads were determined and the cooling water system was designed to meet the system's cooling loads. Each pipeline in the system was sized to achieve the desired flow rate. The auxiliary cooling water pumps and motors were selected and sized to meet the total system flow requirement. Balancing valves were inserted into each circuit to limit each individual load's flow to the set value for that load. At the time the system was initially started, the auxiliary cooling water system provided sufficient cooling water load for full plant operation with only two auxiliary cooling pumps operating. A third, 100 percent capacity pump was installed as a backup for the two operating pumps.

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