

Chiller Plant Optimization Case Study



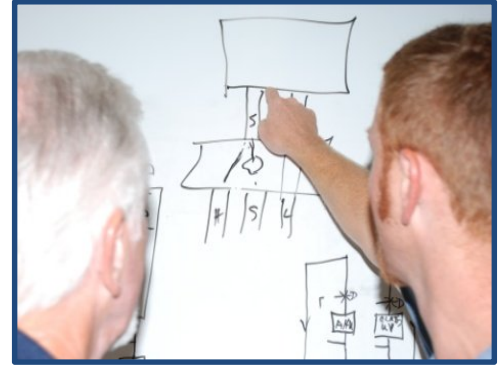
Mechanical Systems Services

Facility:

Hospital Facility

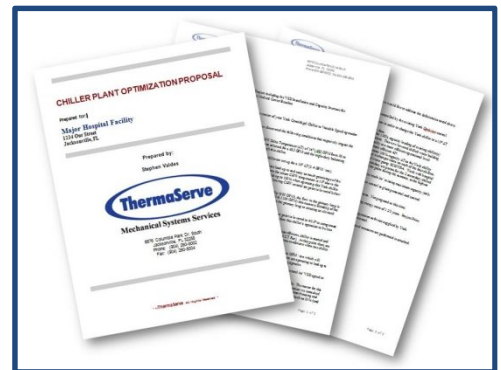
Issues / Concerns:

Their 400-ton constant speed centrifugal chiller #4 operates at considerably less design capacity than the 750 ton chiller #5 when these two are operating together. The low load operating condition of the 400-ton chiller causes loud and unstable conditions, and a surge condition. The Hospital wants to correct the chiller plant problems and increase energy efficiency.



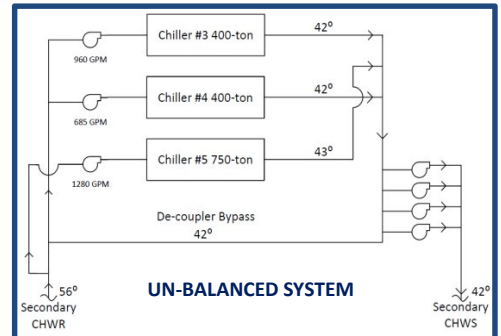
Analysis:

When both centrifugal chillers are operating, the 750-ton chiller return temperature is the same as the return secondary water temperature, but at the same time the return water temperature to the 400-ton chiller is at a lower mixed water temperature. This condition causes the 400-ton chiller to operate at a much lower percent of design load than the 750-ton chiller. The York 400-ton constant speed centrifugal chiller runs inefficiently at low loads. If this chiller was variable speed it would operate very efficiently at low loads.



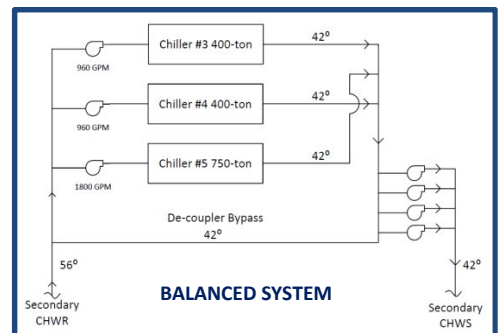
Solution:

Relocate the 750-ton chiller chilled water return pipe connection from the secondary loop chilled water return to the primary loop chilled water return. Reconfigure the primary chilled water pumps to provide 2.4 gallons per minute per ton. Replace the solid state starter for the 400-ton Chiller with a variable speed drive. Supervise building automation personnel in reprogramming the chiller plant control system for optimal chiller staging and condenser water temperature control.



Results:

The customer was extremely pleased with the results. The estimated energy savings from the project represents a 1.23 year payback. Money well spent to extend the life of the 400-ton chiller and reduce the plant energy consumption.



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