Chiller Plant Replacement Case Study

FACILITY
A four-diamond 16 floor luxury hotel located in the heart of Jacksonville built in the late 1980s.

PROBLEM
Original 26 year old penthouse chiller plant was in need of replacing with more efficient equipment. Also the chillers contained CFC ozone depleting refrigerant and were loud and hindered the rental of penthouse suites.

ANALYSIS
Based on the survey and analysis performed by ThermaServe, we were able to specify the equipment necessary to replace the existing equipment for an energy saving modernization. This included variable speed drives incorporated with a new cooling tower and new secondary chilled water pumps, along with two new quieter variable speed drive chillers.

RECOMMENDED SOLUTIONS
Our solution is based around providing two 500-ton variable speed centrifugal chillers with ozone friendly refrigerant, also including one new three cell stainless steel cooling tower with a greatly improved physical footprint over the existing three cooling towers and six new pumps with variable speed drive motors for an efficient operation. The mechanical modernization also included new butterfly valves and piping reconfiguration for the new equipment.

The solution also included connection of all new equipment to the Delta Controls DDC building automation system with a condenser water outdoor wet bulb reset control program for optimized cooling tower fan operation.
INSTALLATION CONSTRAINTS / OPPORTUNITIES | The chiller plant replacement had to be undertaken with an occupied and running hotel. The majority of the work was performed during the cooler months of the year to reduce the impact on the hotel, furthermore preparation and smaller equipment replacements were performed before the week of demolition and heavy equipment crane lifting. We disassembled and removed the existing cooling tower system and one chiller, installed and brought a new chiller on-line, then disassembled and removed the other chiller and still kept the hotel running. The cooling tower replacement was the critical element to maintaining cooling for the entire new system cut over. We allotted 24 hours of full down time for the hotel for the cooling tower installation and only took a remarkable 16 hours to complete the 5 day install.

RESULTS | In addition to the greatly improved hotel guest comfort cooling, the projected chiller plant energy savings is 29%, or nearly a third of the annual cost per operating year. This is in addition to the (one time) JEA utility rebate is projecting a less than 10 year payback for this nearly 1 million dollar chiller plant modernization project.