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Case Study – Halifax Regional Medical Center

EDUCATION / HEALTH CARE / LODGING / MANUFACTURING / OFFICE BUILDING / RETAIL / SPECIAL



Hospital Keeps Its Cool During Replacement of Chilled Water Plant

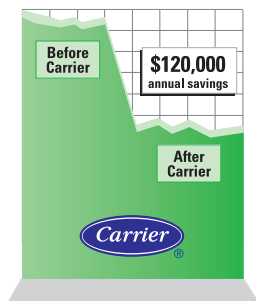
Project Objectives

The chilled water plant at Halifax Regional Medical Center, in Roanoke Rapids, NC, has been serving the needs of the 206-bed facility for 32 years, utilizing the refrigerant R-11, which contains chlorine and is being phased out through the federal Clean Air Act. In addition, the demands on the chilled water plant increased as the facility expanded to a building footprint of 244,000 sq. ft. The Center needed to build a new plant — independent of the original system — that allowed the existing system to meet the hospital's cooling needs during construction of a new technologically advanced and environmentally sound plant that significantly reduced operating costs.

Solution

Carrier Commercial Service was awarded a unique single project management and implementation contract worth more than \$2 million to provide a new independent central chilled water plant. The plan involved building the new plant and ensuring correct operation; completing the commissioning process; conducting performance tests; and meeting the hospital's cooling needs by opening previously installed system water piping and valves connected to the original chilled water loop. All of these tasks were completed while maintaining 100% operation of the existing system throughout the project.

Energy-Related Cost Reductions



By incorporating Carrier's industry-leading Variable Speed Drives, Centrifugal Chillers and Variable Volume Pumping, Halifax Medical Center reduced its energy-related operating costs by \$120,000 annually.



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continued

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“Although this was a large-scale project and had to be accomplished without any disruption to the 24-hour demands of our facility, Carrier’s team exceeded all our expectations.”

Edward M. Kinzer,
CHE, CPE, CFM
Chief Engineer,
Halifax Regional
Medical Center

Project Synopsis

Halifax Regional Medical Center was built in 1972 to serve Halifax and Northampton counties in North Carolina. Over the years, the facility grew from a 151-bed hospital to one that can accommodate 206 patients. The expansion was putting a strain on the aging chilled water plant, and the R-11 refrigerant that was used in the original equipment was being phased out through the federal Clean Air Act. So, in 2003, the Chief Engineer at the hospital, Ed Kinzer, awarded Carrier Commercial Service a unique single project management and implementation contract to provide a new independent central chilled water plant that would adequately cool the facility, utilize an environmentally sound refrigerant and reduce operating costs. This had to be done without disruption to the round-the-clock cooling provided to patients, physicians and hospital staff.

The contract, worth over \$2 million, focused on building a new plant independent of the current system, allowing the existing chilled water system to meet the hospital’s cooling needs during construction. The existing system utilized 3-way cooling control valves resulting in a bypass pumping system, while the new project design incorporates the application of industry leading **Variable Speed Drive (VSD) Centrifugal Chillers with Variable Volume Pumping**. This new system design matches refrigeration capacity with the hospital’s cooling system needs and is estimated to reduce operating costs by approximately \$120,000 annually.

Even months before the new plant was operational, an energy efficient 2-way control valve system was installed and an immediate operational cost savings was seen within the existing chilled water plant. And while replacing an additional 40-ton chiller in the old system, the Carrier Project Manager discovered the original installer had reversed the piping. With new piping, the replacement chiller is operating more efficiently and reducing operating costs, as well.

The new remote chilled water plant has two new Carrier 420-ton 19XRV Evergreen Chillers in addition to cooling towers, pumps, and miscellaneous mechanical and electrical equipment. Chillers and pumps are equipped with VSDs, and air handlers have been modified with 2-way control valves to accommodate variable volume pumping instead of the less efficient constant volume pumping of the original 3-way control valve system.

Replacing the R-11 with chlorine-free HFC-134a solved the refrigerant issue. HFC-134a meets federal Clean Air Act standards and has no future phase out date. Additionally, it has a zero Ozone Depletion Factor and warrants an A1 safety classification for the mechanical room as determined by the ASHRAE Safety Code for Mechanical Refrigeration which is consistent with the original building classification.

In addition to the technical aspects of this project, Carrier provided alternative financing options and is contracted to provide continuing maintenance and service support to Halifax Regional Medical Center.

Project Summary

Location: Roanoke Rapids, NC

Project Type: Replacement of water chiller plant without loss of cooling during project

Building Age: 32 years

Building Type/Size: Concrete & block 244,000 sq. ft.

Building Usage: Hospital

Objectives: Replace R-11 chiller system with more efficient plant utilizing approved refrigerant (HFC-134a) while maintaining 100% cooling operation throughout project

Major Decision Drivers: Maintain round the clock cooling while replacing old system with one that meets the cooling demands, is more efficient and environmentally sound.

Design Considerations: Connect to existing chilled water loop

HVAC Equipment: Two 420-ton 19XRV Evergreen VSD Centrifugal Chillers with Variable Volume Pumping, including 2-way cooling control valve system, cooling towers, pumps, miscellaneous mechanical and electrical equipment

Consulting Engineer: RMF Engineering, Inc.

Project Cost Range: More than \$2 million

Installation Date: August 2004

For more information, contact your nearest Carrier Representative, call 1.800.CARRIER or visit our web site at www.commercialhvacservic.carrier.com