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Case Study – Sprint World Headquarters

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

Largest Construction Project In Kansas City History Uses Carrier Evergreen® Chillers

Project Objectives

Staying ahead of the amazing growth within the telecommunications industry, Sprint recognized the need to consolidate their corporate and departmental operations into a single, unified campus. Because of the campus' scale, Sprint needed a central chilled water plant that was both efficient and reliable to economically cool over 4 million sq. ft. of office space that is divided between 20 new low-rise buildings. Although the six-year project will not be completed until 2002, work on the central chilled water system began in 1997 when Sprint turned to Carrier for water chillers before the plant was designed.

Solution

Using a forecasted load profile supplied by Sprint's engineers, Carrier was able to optimize chiller selections into a total package that met stringent evaluation criteria for life-cycle cost, overall system efficiency, first cost, reliability and service. After Sprint selected Carrier, engineers designed the plant around seven efficient, environmentally-responsible, centrifugal chillers using the non-ozone-depleting refrigerant HFC-134a. Five 2,000-ton chillers, installed with a primary-secondary pumping system, are the backbone of plant capacity. Two 1,000-ton model 19XRV Evergreen® variable-speed centrifugal chillers are the low-load workhorses that ensure efficient plant operation year round. The 1,000-ton chillers are installed in series with each other and in parallel with the five larger machines.

The use of chlorine-free HFC-134a was an important consideration in Sprint's selection of Carrier Evergreen chillers.

Case Study – Sprint World Headquarters *continued*

"We conducted factory tours of all the major manufacturers to evaluate things such as: quality programs, cleanliness and testing during manufacturing. Carrier was the best."

David Lovetere, project manager, Sprint World Headquarters Campus

Project Synopsis

Sprint selected Overland Park, Kansas, a suburb of Kansas City, Missouri, as the site of its new headquarters campus. It is the largest construction project in Kansas City history, and one of the largest commercial construction projects in the United States. Twenty new buildings on the 200-acre site will be home to more than 14,500 employees when the project is complete in 2002.

Working with R. G. Vanderweil Engineers of Princeton, New Jersey, Sprint decided to purchase the chillers before the central chilled water plant was completely designed. The project team concluded that the plant scale was too large and the design complexities too numerous to achieve otherwise. The plant has an initial installed capacity of 12,000 tons and can be expanded to 14,000 tons by the addition of another 2,000-ton chiller.

When Sprint issued the chiller procurement specifications, Carrier formed a proposal team to meet the project's challenges. "It was a true team effort," said Gary Hodson, Carrier's local account executive. "We assembled Carrier staff from the local sales and service organization, strategic accounts, application engineers and corporate management." The proposal team looked closely at the engineer's projected campus load profile that was dominated by over 5,000 operating hours at 800 tons or less. In addition, the specifications called for non-standard evaporator and condenser conditions: a temperature drop of 16°F in the cooler (56°F to 40°F) and a 14°F temperature rise in the condenser (84°F to 98°F). "More than anyone, Carrier's team showed that they wanted to do things right," said David Lovetere, Sprint's project manager for the World Headquarters Campus. "Their professionalism made the decision easier."

The system is designed with the two 1,000-ton chillers installed in series. Returning chilled water enters the first chiller at 56°F and is cooled approximately eight degrees. The water passes directly to the second chiller and is cooled an additional eight degrees to 40°F. Condenser water is piped in the reverse direction so that the low-temperature chiller is working with the colder condenser water and the high-temperature chiller is working with the warmer condenser water. "Putting the two 1,000-ton units in series made a lot of sense for low-load operation," said Hodson. "Our computer models showed that we could obtain very good efficiencies with the condenser water piped in a counter-flow manner. At low loads, with only one 1,000-ton chiller operating, we have four gpm of condenser water per ton rather than the usual three."

Project Summary

Location: Overland Park, KS

Project Type:
New construction

Building Type/Size:
20 low-rise buildings; cast-in-place concrete and brick, 4,000,000 sq. ft. total

Building Usage: Corporate headquarters, offices, services

Objectives: Install efficient, reliable system to serve campus

Major Decision Drivers:
Life cycle cost, overall system efficiency, first cost, reliability and service

Design Considerations:
Chillers optimized for load profile; refrigerant type

Total Cooling (tons): 12,000

HVAC Equipment:
Two 1,000-ton model 19XRV Evergreen chillers and five 2,000-ton chillers, all with HFC-134a refrigerant

Unique Features:
Two 1,000-ton model 19XRV chillers installed in series

Project Cost Range:
$700 million US

Installation Date:
May 1998 to November 1999

Consulting Engineer:
R. G. Vanderweil

Contractor: J. E. Dunn Construction Co. (CM); A. D. Jacobsen, Mechanical

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

