The Crestview facility is now a high-efficiency apartment complex with condensing boilers in the basement and ductless systems on the roof.

Retirement facility retrofit work remains in motion

CRESTVIEW RETROFIT SPANS ALL MECHANICAL SYSTEMS

SPECIAL to CONTRACTOR

During the next decade, nearly 80 million baby boomers will move into their retirement years. It's an enormous cultural shift for a nation that once had so many young people. Among the advantages in a down economy: more jobs for the younger set, and plenty of construction activity in the building of new retirement facilities.

A pair of 750 MBH Laars NeoTherm condensing boilers now supplies heat to the building's extensive baseboard system.

The sluggish economy has affected the construction of senior facilities. Though, in the commercial market, retirement facility retrofit work remains in motion. In the heart of America's bread basket, Iowa, business in this sector is moving apace.

"Our recent Crestview building project in Des Moines was a unique job," says Larry Sherer, project manager at Proctor Mechanical Inc., West Des Moines, Iowa.

Community Housing Initiatives is Iowa's largest non-profit affordable housing organization and development group. When its 55,000-sq.ft., adult community Crestview facility renovations began in July 2010, Proctor Mechanical was hired to rejuvenate the heating and cooling systems. The key motivation for the retrofit was the lack of energy efficiency. Each year, Crestview managers watched as maintenance and energy costs increased while operational efficiency fell.

"We've got between 70 and 100 employees, depending on the projects we're involved with," says Mike Proctor, president of Proctor Mechanical. The lion's share of their work is commercial HVAC. The company tackles projects, large and small, throughout the state and also has a residential branch.

Proctor Mechanical worked with Twin Rivers Engineering, in Des Moines, to bring the system to life on paper.

"The hydronic system is a modification of the existing system," says Dave Losen, PE and principal of the engineering firm. "Ductless split-systems were used to provide a cooling option that could be easily retrofitted into the existing building with high operating efficiencies."

"We did a boiler replacement, changed out the zone pumps, and repiped the apartments to provide individual unit control," continues Losen. "The original dining space was served by gas-fired roof top units. Although that system remains, the rooftop equipment was replaced."

Save those window panes

"The building, originally constructed in 1963, had 100 small apartments. It now has 55 units with kitchens and laundry areas," says Kris Vodraska, director of construction for Community Housing Initiatives. Unit sizes range from 500-sq. ft. to 800-sq.ft. Air conditioning was delivered by window units.

While making dust and creating some disruption, the facility's comfort and energy efficiency issues were also addressed. So, it was out with the old window rattlers and atmospheric boilers.

The existing heating system delivered warmth via hydronic baseboard, so there weren't any duct runs to work with. Rather than attempting to hang and conceal ductwork for a central AC system, ductless split-systems were installed. Proctor Mechanical planted 61 condensing units on the building's flat roof.

The entire Crestview facility was updated, pictured here is the common area freshly painted. Proctor's project superintendent checks gas pressure on a Laars NeoTherm boiler.

Single and multi-zone Fujitsu HFI heat pumps were used to replace the old window units. Offering far greater efficiency, ultra-quiet operation and unobtrusive installations, it wasn't a hard decision. "They were happy to see the window units leave, from an aesthetic standpoint, if nothing else," says Sherer.

Four different models were installed. Most of the capacity is provided by 41, single-zone units, at 9,000 BTUs each, and eight, 12,000 BTU models, all offering 20 to 26 SEER operational efficiency. Each of the nine, 16.5 SEER dual-zone heat pumps, sized at 24,000 BTUs, serve two wall-mounted evaporators.

"The multi-zone approach allowed for zoning within the apartments and common spaces without the need for individual condensing units, reducing the number of units that needed to be installed on the roof," says Losen. Three tri-zone units finish off the system. The 36,000 Btuh three-zone units each pump R-410A to three indoor units.

For the Proctor crew, there were few challenges along the way. A three story building with condensing units on the roof calls for lengthy line-sets. Channeling through the old walls was required to protect the coolant lines. The longest run was 60-ft.

"Installations went smoothly, especially considering that none of the guys had ever installed a Fujitsu system before," says Sherer. "Plumb Supply Co. is the area's Fujitsu distributor. They offered design help initially and helped briefly with the installation procedures. When they visited on the first day of installations, our guys grasped the procedure quickly."

Scot Walston , head service technician for Proctor Mechanical Inc., adjusts the water flow through a TACO balancing valve.

The wide variety of head requirements in Crestview's primary-secondary piping system calls for several different models of Taco in-line pumps.

Hydronic update

In addition to high-efficiency cooling, the Fujitsu units also handle the heating demand during the swing seasons. But when the mercury really drops, new Laars Heating Systems boilers respond to the call for heat. And, as many Midwesterners know, Iowa winters can be brutal. At Crestview, the existing baseboard system serves as the primary source of heat through the coldest months.

According to Losen, Crestview's heat loss at the winter design temperature of -5°F is calculated at 1,425 MBH. The hydronic system is designed to handle that load without supplemental use of the mini-splits.

Nearly 1,700 lineal feet of existing 1 ¼-in. fin-tube baseboard heats the building. The baseboard originally distributed heat from two antique gas boilers in the basement. For 48 years, the system served the building well. With efficiency in mind, it was time for a boiler swap-out.

"Proctor Mechanical [which got its start in 1932] installed the hydronic system when the building was new, so of course it was still in good operating condition," Sherer chuckles. The baseboard wasn't changed, but there wasn't any question about the need for a new heating system. Two 750 MBH Laars NeoTherm condensing boilers were chosen, and a new piping strategy was used to modernize the hydronic system.

"We have a great relationship with our rep firm, Hydronic Energy, in

Proctor Mechanical Inc. installed 61 condensing units on the roof.

Des Moines," says Sherer. "They've carried the Laars line for many years and we've only had good experiences with the product. The equipment is affordable, efficient and dependable."

Covering one-fifth of the footprint as their predecessors, the gas-fired NeoTherm boilers were installed early-on during the facility's mechanical makeover. The new boilers are more than 95% efficient and modulate at a five-to-one turndown. Not far away, two 90-gal. gas-fired water heaters supply a heavily-insulated, 500-gal. domestic hot water storage tank.

"Following the primary-secondary design provided by the Laars applications group made the new piping simple," says Sherer. The two 6-in. primary risers are each pressurized by a Taco 1919 in-line pump. The secondary loops range from 2-in. to 5-in. lines, all served by Taco pumps of varying size.

According to Sherer, in-line pumps were installed for most of the secondary loops, each sized according to head requirements. Two 1919s, a 1911, and the 1995 and 1941 pumps provided a good range to work with. From the secondary loop, each apartment is individually served by a control valve.

"Taco has been our choice for hydronic components for over 40 years," says Sherer. "I remember when Hydronic Energy first opened their doors. They've handled Taco equipment since then, and we've been more than satisfied with their products and the truly unique services that Hydronic Energy provides. They're been a great partner through good times and bad."

The hydronic system also includes a 6-in. Taco 4900 Series air and dirt separator and 41-gal. expansion tank. Backflow assemblies on the job are manufactured by Watts.

"The Crestview project went off without a hitch," says Sherer. "It was in a great location too. The building is only four blocks from the shop. That never happens!"

According to Vodraska, the work finished up in July 2011, but it took a while to get the residents moved back in.

"We're overcoming a bit of a learning curve," says Vodraska. "Most of the residents are elderly, and the mini-splits are still a relatively new technology. Combining the use of two heating systems was a bit confusing for some of them initially, but we haven't had a single comfort complaint." C

Service tech Scot Waltson (left) checks electrical circuits on a single-zone Fujitsu ductless system, and Project Superintendent John Rist checks the refrigerant.