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Aerco Boilers Help Clayton College & State University OVERCOME CHALLENGES of Major Renovation

It's not unusual for time, space, efficiency, *or* operational matters to dictate an equipment selection. It's more unusual for *all* of these to be given high priority. This was the case at Clayton College & State University in Morrow, Georgia, when the funds became available in summer of 2002 for a Central Plant upgrade.

With hydronic equipment dating back to 1968, the Plant was overdue for multiple replacements and upgrades. For years, facility personnel had dealt with complaints from students and faculty regarding comfort levels in various buildings served by the underground hot water heating system. Outdated pneumatic controls added to the problems of overheating or lack of adequate heating in certain buildings, while constant speed pumps and aging boilers and chillers all added to the inefficiency of the system. Needless to say, the university was eager to take advantage of the funding. The catch was that there were only a few months to complete the renovation and start-up of the new Plant to meet the criteria set forth by the University and the Georgia Board of Regents. As a result, the project was approached in a very unique way—one that would facilitate the upgrade without compromising quality.

The process began with the Board of Regents soliciting proposals from various engineering firms. Johnson, Spellman & Associates, Inc. was selected as the engineer of record and was responsible for coming up with a set of qualifications for the contractor, as well as lengthy pre-qualification instructions. Among other things, the contractor was required to provide references of at least 3 other projects of similar size and scope as the Clayton College & State University project.

The reason for this approach was primarily twofold:

1. To facilitate the upgrade and allow the project team to meet the stated deadline for start-up of the Plant and to take full advantage of the available monies by selection of various scope of work items as priced by the on-board contractor. (A typical bid process, preceded by detailed drawings and specifications, would have taken much longer and would not have allowed the college to meet their deadline.)

2. To give the engineer, owner, and contractor an opportunity to provide input to the specification and selection of the equipment. In other words, this would allow for maximum expertise and experience at the equipment selection level.

Technololgy Building at Clayton College & State University, one of seven campus building served by the central plant's Aerco boilers.

Mann Mechanical Company, Inc. of Avondale Estates, Georgia was selected from the short list of contractors who met the qualifications for the project, and immediately began working with the engineer and University to select the major equipment, including replacements for two very old, inefficient cast iron sectional boilers. Five 2 MBtuh capacity Aerco Benchmark™ boilers were selected for the job based on numerous factors.

"We had an unusual requirement," said Mark Rood, project engineer with Johnson, Spellman & Associates. "We had an overriding need to give the University the capability to operate the boiler plant at unusually low supply water temperatures of 110 to 130 degrees."

Clayton College, *continued*

Based on this fact, the design team knew they needed a boiler that could operate at low return water temperatures—in short, a boiler that was *designed* to condense. Aerco was the ideal choice because it is designed for low return water temperatures and becomes more efficient as return water temperatures drop.

In addition, the Aerco boilers provided the flexibility required by the new variable primary flow design that was taking shape during this process. The Benchmarks can be used at low flow rates, too, so they could be fully integrated into an extremely efficient, variable flow primary loop. At the same time, keeping with this design allowed the University to avoid the cost of an additional set of constant speed primary pumps.

Although two cast iron boilers would be removed and replaced, space was still a critical issue in the Central Plant. The long overdue renovation involved quite a bit of new equipment, including variable speed drives. There was also consideration given to a possible future expansion of the campus that would add demand for extra boiler capacity in a few years. Given the small footprint of the Benchmark, the design team knew they would have the sufficient space to add two more boilers in the future.

Working Around Control Limitations

A less than perfect control system had long contributed to the lack of desired comfort levels and to the inefficiency of the underground heating loop, which served seven buildings on the campus. Outdated pneumatic controls often failed to provide the appropriate flow in several buildings, making a lack of appropriate heating a problem. The University was well aware that a major overhaul of the control system was needed—but replacement of the major equipment was a higher priority. So the decision was to update the Central Plant with new chillers, new boilers, pumps, etc., and wait to convert the remaining pneumatics to direct digital control (DDC). The selection of the condensing boilers played an important role in this trade-off.

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>
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> *Johnson, Spellman & Associates, Inc.*

Five 2 MBtuh capacity Aerco Benchmark™ boilers at CC&SU central plant

"The fully condensing boilers addressed the need for the old boilers to be replaced, and allowed us to work around some of the extensive controls related issues," said Mark Rood, referring to the fact that the boilers could operate at very low temperatures. "Plus, we gained all of the great efficiency of this type of boiler and the flexibility the University needed in operating the boilers."

Teamwork Pays

"Our idea was to make this the most energy efficient campus in the state," said Billy Barnes, Project Manager of Mann Mechanical. "I think we about did it."

Barnes, who has worked on numerous school and university retrofits, credits much of the success of the project to the teamwork that took place between Mann Mechanical, Johnson, Spellman & Associates, and the University. This particular design approach made the most of the knowledge and experience of all involved parties. The end result is a system that is efficient by any standards. It also demonstrates how quality can be maintained even on a super fast track project.

Every large project comes with certain compromises, but smart equipment selection and excellent teamwork between owner, contractor, and engineer can have a major impact on the outcome. This was certainly the case at Clayton College and State University, as time constraints necessitated that the specification be borne out of the knowledge and expertise of all three.