ENERGY LIFT-OFF

Retrofitting the heating system for NASA's Space Shuttle engine test facility.

When it was time for the John C. Stennis Space Center to replace all of its absorption chillers during the 1990's, a more efficient, economical system became apparent. However, it was also clear that the cost to maintain and operate the existing boiler plants for these chillers exceeded the cost of complete chiller replacement.

The Stennis Space Center, built in the 1960's, is NASA*s second largest, occupying 13,480 acres on the Gulf Coast of Mississippi. Its principal mission is to support the Space Shuttle's main engine development and flight certification engine firing test program. Because of the critical nature of the center*s missions, precise instrumentation and comfortable personnel environments had to be constantly maintained. When the site was built nearly 30 years ago, two main boiler plants were installed, one in the base area, and the second in the test area. These boilers generated high-pressure water used for heating, reheating and absorption cooling. When the chillers were replaced, the need for the high-pressure, high temperature water dropped substantially, and the underground piping network was beginning to deteriorate.

The solution to this problem was to decentralize the boiler system by installing TRIAD modular gas-fired boilers throughout the site. These modular boilers could easily be installed in phases over several years, they provided inherent redundancy, and eliminated the need for the high maintenance underground piping system.

An area of concern was the danger of open flame boilers in combination with the potentially explosive liquid oxygen and liquid hydrogen fuels in the engine testing area. A previous engineering study had identified an existing water well that could produce large amounts of warm water. This warm water was the perfect candidate for use as source water in a geothermal heat pump application for the challenging test area.

The successful compatibility of TRIAD modular boilers working in league with geothermal heat pumps satisfied the requirements of providing precise, dependable temperature control for this vital facility, including the delicate conditions of the engine test area. Another measurement of the success of the project was the amount of energy saved. In the test area alone, heating costs were reduced from $122,200 to $30,700. The total incremental percentage reduction in BTU usage for the entire facility was 78%. This equated to an estimated savings of $3.0 million (1990 dollars) over the 20-year life expectancy of the equipment.

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