HEAT-TIMER® CORPORATION

CASE NO. 20

FACILITY: St. Alphonsus Retreat Center

LOCATION: Esopus, NY

APPLICATION: Boiler system upgraded with duplex vacuum system and multiple boiler and reset controls.

MECHANICAL CONTRACTOR: Marlande Heating Corporation

New Controls & Vacuum Steam System Restore Peace, Quiet, and Comfort at St. Alphonsus Retreat Center

PROBLEM: Banging pipes and wildly fluctuating temperatures were undermining the meditative spirit at Mount Saint Alphonsus Retreat Center in Esopus, NY. Once a seminary, the castle-like stone structure overlooks the Hudson River and accommodates up to 136 overnight guests at a time. Interior spaces include bedrooms, conference rooms, offices, and a chapel. Heat demand fluctuates a great deal depending on the retreat's occupancy and activity schedule. This, combined with an assortment of poorly controlled steam and hydronic systems, was driving fuel costs up and comfort down.

Although the two primary Scotch Marine boilers were in good condition, they were controlled with an older style manual lead/lag control system. Given the large size of these boilers, the lack of efficient control, and the tangle of heating systems, St. Alphonsus was spending too much time and money on a system that offered little comfort. Spaces were constantly overheating with temperatures soaring up to 80 degrees causing the system to shut down and temperatures to plummet. Furthermore, there was no way to isolate unoccupied parts of the facility, so the system ran full throttle even when little heat was needed. Complaints were plentiful and resolving them fell exclusively on the shoulders of Plant Manager, Don O'Callaghan.

"Because the boilers were manually operated, if one failed on a mild day when no one was around, the building temperature might drop as low as the upper 50's before I got a call from the resident priest. It might take 5 hours for me to get the heat going again," said O'Callaghan, who contacted Marlande Heating Corporation for help.

SOLUTION: After a thorough examination of St. Alphonsus' mechanical systems, Marlande Heating Corp. made a series of recommendations to streamline control and improve operation of the fragmented system.These recommendations included both repair and removal of existing equipment, the addition of a new vacuum system to improve the operation and efficiency of the steam system, and several new heat controls including a new remote communications package.

Marlande Heating was able to find a single supplier for most of this equipment: Heat-Timer Corporation and its HT Pump Division. Three centrally controlled systems would now make up the framework for all of St. Alphonsus heating zones:

(1) A Steam Vacuum System – Marlande Heating suggested the installation of a new vacuum system to improve the operation of the main steam distribution serving the majority of the main building. HT Pump Specialties provided the duplex vacuum system, which helps to move steam throughout the system quickly and efficiently by creating a negative pressure. There are several advantages to this. First, heat arrives at the various zones more quickly. Second, less fuel is required to generate steam in a vacuum -because water boils at a lower temperature under reduced pressure. Finally, the vacuum system helps eliminate any residual condensate which can cause noisy water hammer issues.

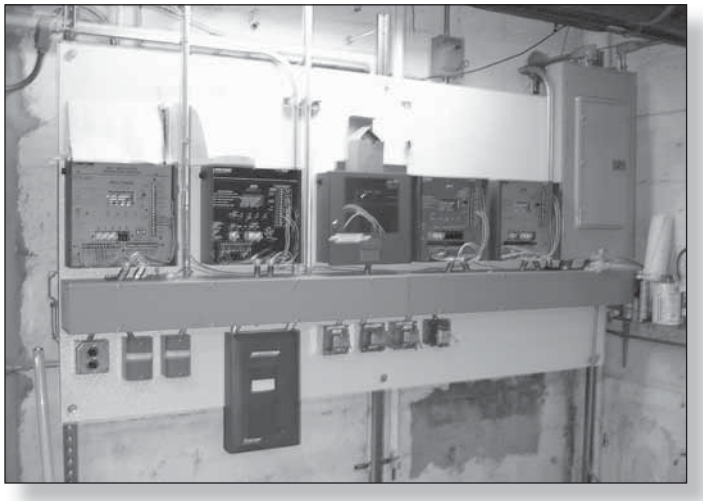
To optimize the performance of this system, Heat-Timer also provided a two-way packless motorized valve that is operated by a Steam Reset Control (SRC), also provided by Heat-Timer. The SRC control adjusts the position of the 2-way bellows based on outdoor air temperature, letting more steam into the radiation system only as needed.

(2) One-Pipe Steam System – This system provides heat to Alphonsus Hall and maintains it as a separate zone since this space is frequently occupied when others aren't. A Heat-Timer Steam Control (Model MPC) was installed to cycle steam on this non-vacuum loop by operating a 2-way control valve. Again, the control varies the duration of the steam supply in a cycle based on the outdoor temperature, improving comfort and keeping fuel costs down.

(3) Baseboard Hydronic System - Prior to the renovations, the office space on the first floor of the Retreat House was heated by five gas-fired modular boilers, three of which needed replacing. As a solution, Marlande advocated removing the boilers and installing a small steam-to-water heat exchanger which would be fed by the primary steam boilers. Heat-Timer provided the necessary 2-way steam valve required for the line supplying steam into the heat exchanger. A Heat-Timer Hot Water Reset Control (Model HWR) was selected to vary the temperature of the circulating water based on outside air temperature.

Putting It All Together

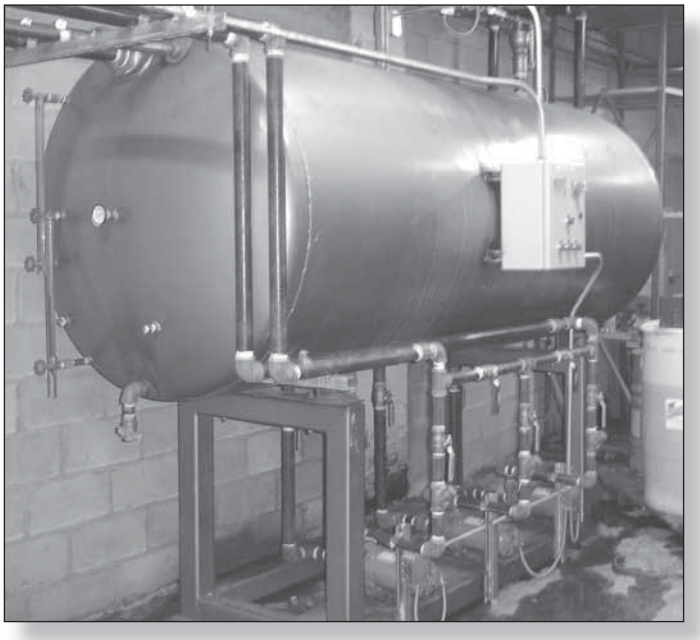
Central to the overall control solution, was the installation of a Heat-Timer Multi-Mod system to provide automatic lead/lag control and modulation of the existing primary steam boilers, both of which were found to be in very good condition—just lacking in any effective means of control. The Multi-Mod automatically adjusts the firing rate on one or both of the boilers using PID type logic to maintain a precise set point temperature, while preventing short cycling or overheating—



Each Heat-Timer control provides unique adjustment capability to maximize the efficiency of each invidual system. Remote communications allows for local and/or remote adjustments.

even if there is a call for heat from only one or two spaces. The control works off of a single sensor located in the common output header of the boilers to supply only the amount of boiler capacity required to meet a given load. It can be adjusted via an easy-to-follow display and menu system. It also rotates the lead boiler daily for even operation of both boilers.

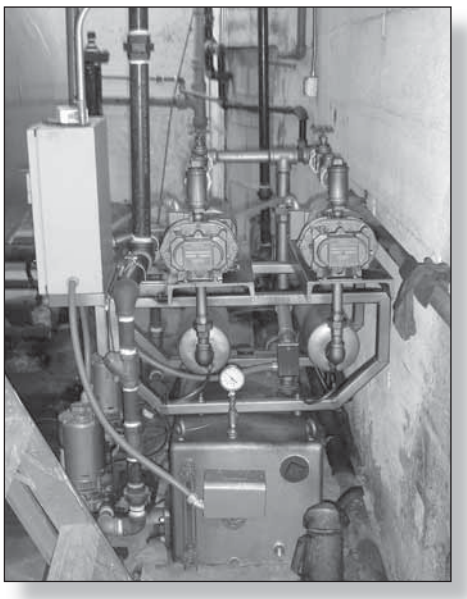
Even with all these new controls in place, St. Alphonsus, with its limited maintenance staff and fluctuating occupancy, still needed a way to effectively monitor and control the system. To this end, a Visual Gold Remote Communications Package was provided. This package allows the user to monitor and adjust all the Heat-Timer controls that are installed at the site, including the Multi-Mod, the SRC, the MPC and the HWR. With this microprocessor based control system, Don O'Callaghan can



All the condensate from each system returns back to the boiler feed system provided by HT Pump Specialties. A standby pump is also provided as a backup should either pump require maintenance.

monitor and adjust the entire system via laptop and modem. The remote communications package maintains an extensive operational history of the system which can be used to troubleshoot and to help isolate problems. Additionally, with various temperature sensors located throughout the building, Mr. O'Callaghan can monitor the heat throughout the property and continually "tweak" set points accordingly, further enhancing efficiency.

"It's actually been fun playing on the computer and changing set points," remarked O'Callaghan, who has found the remote communications system, as well as the controls themselves, extremely easy to master. "Now each zone is controlled properly, and I'm no longer getting complaints," said Callaghan, adding that if there *is* a problem, the control sends him a text message to alert him to the fact.



A vacuum condensate package helps distribute the steam for the primary building steam heat zone.