

Twin Boilers Installed After Single Unit Fails

By PATRICIA RAFFAELE

ELLWOOD CITY, PA -Despite the fact that it would have cost \$7,000 less to replace an old damaged boilers with a similar new one, the board of trustees at a Baptist church here opted to convert their single boiler system to a computer controlled, modular two-boiler, four-zone system.

They have saved nearly \$3,000 since the project was completed in August of last year. Payback is anticipated in another three years, according to a church official.

The cost of the project at the First Baptist Church was \$17,109. It involved the removal of a failed 15-year old, 1,119,000 BTU/HR gas fired, sectional cast iron boiler, model MGB-8 manufactured by Weil-McLain.

According to Harry Gahagan, a member of the board of trustees, at the time of the boiler failure in April of last year, it was decided to accept the design of a new two boilers system supplying steam to four independent zones, submitted by Energy Savers, Pittsburgh, PA.

First Baptist also had Energy Savers, Inc. present the church with the option of simply replacing the boiler with a similarly sized unit, but "we decided to accept the higher priced system because we wanted to realize some energy savings", he said.

The work was completed in August, 1986, he said, and this past winter was the first heating season for the boilers. In January, 1986, the building used 2,563 ccf of gas at a cost of \$1,490.13. In January, 1987, under similar weather conditions, the building used 1,519 ccf of gas for a cost of \$883.15

The church pays approximately 58.14 cents per ccf of natural gas from its utility, Columbia Gas of Pennsylvania, he said.

Jim Behr, vice-president of Energy Savers, Inc. said "the original boiler failed due to inadequate pipe supports at the discharge piping, causing excessive stress on the boiler sections." This results in "irreparable" cracks throughout three of the boiler's eight sections.

The distribution piping, said Behr, must have a support every 21 feet throughout its length, with "sliding" supports at all elbows. In the case of this church, there was only one pipe support for the first 65 feet of the discharge system nearest the boiler, and that support had broken some time ago.

Gradually, stress on the boiler mounted both from the weight of the sagging pipe and from mud that had built up on the floor of the boiler, due to lack of adequate maintenance, causing additional thermal stress. This combined buildup of stress caused three sections to fail, rendering the unit inoperable.

Once he determined the cause of the failure and presented his plan for a multi-zone system to the board of trustees, Behr said he made a presentation to the 240-member congregation on June 26, and a contract was signed the following day.

The system Behr designed uses two smaller "Weil-McLain" boilers to heat four zones, as opposed to the original monolithic configuration that heated the entire building at one. By dividing the church into zones, only the area in use needs to be heated.

The entire system is controlled by a micro-processor based controller. One outdoor temperature sensor and four indoor sensors relay information to the controller, which is programmed to maintain temperature in occupied zones at 72 degrees F. and in vacant zones at 55 degrees F. Building heat loss is calculated by the control system and boiler output is regulated based on the outdoor conditions. Additionally, each boiler is equipped with a "Thermiser" flue control device to control boiler draft, manufactured by "Thermiser Ltd", Chicago, IL.

The four sections of the 1890s stone church include the sanctuary, an office area with classrooms, a fellowship hall with a kitchen, and parlor area. Gahagan said the building contains two floors, except for the sanctuary with its 21 foot cathedral ceiling, and overall is approximately 120 feet wide and 200 feet deep, the office is the only area used every weekday. The sanctuary is used only on Sunday.

Each boiler heats two zones, said Behr. When outside temperatures fall below 62 degrees F., he continued, the boilers are informed, and depending on the schedule programmed into the microprocessor, may turn on. The computer is programmed with the weekly church schedule.

The system is programmed to pre-heat the zones before occupancy, Behr said. For example, he said, if the office is open at 9:30 a.m., the computer calculates the exact time to start the boilers, based on actual weather conditions during the preceding 24 hours, the building will then be heated to 72 degrees by 9:30. The remaining unoccupied zones will remain at 55 degrees.

Maintaining boilers, particularly steam systems is extremely difficult for most religious organizations, Behr said, routine maintenance is almost never performed, he continued, in most cases the boiler is started at the beginning of the heating season and shut-down when warm weather returns. A local residential heating contractor is usually called when the system refuses to operate. Most smaller heating contractors have little or no experience with these large systems and only compound the problem. Churches, such as First Baptist, frequently experience premature failures simply because their systems are not maintained. With proper maintenance this system could possibly have survived another 20 years, retrofitting with zone valves and our control system would have provided similar savings at considerably lower cost.

"There have been no problems," Gahagan said. "The church and the congregation are very satisfied with the entire system."

FOR ADDITIONAL INFORMATION CONTACT ENERGY SAVERS, INC. (412) 364-6468