



# Sorority Leads Its House into 21st Century with New Heat Pump

by Kathryn Jones

*Since its* formation at the University of Arkansas over a century ago, the Chi Omega sorority has provided its members with unique opportunities in scholarship, life-long friendship, and leadership. At Oklahoma State University (OSU), leadership roles were certainly needed as the women of Chi Omega led their house into the 21st century together with the innovative technology of geothermal.

August temperatures in Oklahoma, which were well over 100 degrees for weeks in a row, made sorority rush week unbearable for the recruits. Walking several blocks along Greek row between parties left the recruits sweaty,

sticky and hot - until they stepped into the refreshingly cool Chi Omega sorority house. This welcome change experienced by the recruits and Chi Omega members alike, was brought on by a new ground source heat pump, which consisted of a hybrid system with a closed circuit fluid cooler. However, the impetus for installing the technology was more than just making the house comfortable for members and their potential guests. It was about saving money, preserving the environment and replacing their old system with one that would sustain many more years of utilization.

## Researching the Technology

In December 2000, the house corporation board, a group of Chi Omega alumnae who manage house operations, hired SPARKS, a mechanical and electrical consulting engineering firm from Tulsa, Oklahoma, to evaluate the mechanical systems of the house. SPARKS concluded that the existing HVAC unit needed to be replaced.

“The old system had been patched, patched, patched for a long time,” Lois Mickle, treasurer on the board, said. “Many checks are written simply for maintenance, and we thought if we could get rid of writing so many checks for the old unit, we’d be sitting pretty.”

Photo courtesy of Adam Huffjer



*Belinda Hammergren, president of the Chi Omega House Corporation, and Dr. Jim Bose, executive director of IGSHPA, discuss the plans regarding the heat pump installation.*



*Mark Swift of Geo-Enterprises, Rick Dense of Dense Mechanical and David Carpenter of Geo-Enterprises finish a fusion project.*

After SPARKS' investigation, Lori Beth McDonald and Katrissa Riffel, two additional board members, decided to work on convincing their fellow sorority sisters and corporation board members to investigate the benefits of geothermal technology replacing their old HVAC unit. Ms. McDonald previously worked at OSU with Dr. James Bose, executive director of the International Ground Source Heat Pump Association (IGSHPA). She said she had learned a lot about ground source technology while working with Dr. Bose and wanted the Chi Omega house to experience the geothermal monetary and environmental benefits. Ms. Riffel, whose home has a geothermal system, worked together with Ms. McDonald to get the board's approval. "I have a heat pump in my house and it has been very efficient," Ms.

Riffel said. "The bills [with the old HVAC unit] were astronomical. We put in a geothermal system and the bills really dropped."

D.J. Pettit, corporation board member, said the decision to install this system would have been more difficult to make had it not been for Ms. McDonald and Ms. Riffel's input. "Personal experience means a lot, especially when you're dealing with something new like this," Ms. Pettit said.

Stillwater Power in Stillwater, Oklahoma, where the Chi Omega house and OSU are located, enticed the women to delve further into investigating such remarkable technology. The utility company offers a rebate program for geothermal customers in residential areas, which include the houses on OSU's Greek row. According to Mike Herron, director of Stillwater Power, once the heat pump is installed and operational, the residential customer is billed at the residential heat pump rate designed for ground source and air

source heat pump customers. The customers are then given a one-time rebate of \$200 per ton of energy used.

However, this rebate program was scheduled to expire in June 30, 2003. Since the system would not be operational until the next month, July 2003, Ms. McDonald said it seemed unfortunate they would be missing out on the rebate by one month. Therefore, the board asked for an extension for this rebate offer and Stillwater Power granted it to them. This savings proposed an extra incentive for the board to take on such a giant project.

"We based a lot of our decision on the fact that we would get this rebate. Of course, we were going to have to replace the old system anyway, so we were looking for alternative ways to save on our energy bills each

month while being environmentally friendly at the same time,” Ms. McDonald said.

The corporation board, which is headed by President Belinda Hammergren, Vice President Karen Stewart, Treasurer Lois Mickle and Secretary Julie Fernald, and also includes additional alumnae, needed no further explanation. They were ready to make their decision to have a ground source heat pump installed.

“Probably the greatest challenge for the house board was to weigh the additional up front costs of the geothermal system against future benefits,” said Ms. Hammergren. “We believe we have made a long-term investment in our house that will pay dividends for decades to come.”

### Working Under Pressure

Phil Schoen, President and CEO of Geo-Enterprises Inc., the company who assisted in the installation of the heat pump units, worked hand-in-hand with the Chi Omega board; SPARKS, who selected the system; C & S Heating and Air, who installed the loop; Dense Mechanical, who installed the system; and Heritage Construction, the general contractor of the project. This construction team, along with assistance from Dr. Bose, came up with a design system for the home that allowed for individual temperature controls in each of the 38 bedrooms instead of multiple rooms on the same thermostat. “It’s going to lower their utility bills. More importantly, it’s going to give them more comfort and individual room control at a lower operating cost,” Dr. Bose told the Stillwater NewsPress.

Mr. Schoen said the units that were selected were very quiet. Because of this, Dense Mechanical was able to hide the units in the areas above the closets in the women’s rooms. The common areas, such as

the foyer, living and dining rooms, had other units. A total of 55 units were installed.

The units, in addition to an Energy Recovery Ventilator (ERV), work together to heat and cool the house. The ERV pulls in air from outside and either heats and cools it as appropriate. As the air is either heated or cooled, it is blown into a 100 percent outdoor air heat pump, which preconditions the air to the temperature of the building inside.

Mr. Schoen said one of the biggest challenges was working with a house that had been added onto several times since the original building was constructed in 1928. As one crew removed the old ductwork throughout the house, Mr. Schoen said the other crew had to be patient with installing the new units. “No one could really do anything until everything was demolished,” he said.

And because the house had so many different additions, the crew kept finding some surprises. Hidden brick and additional sections of the house, which were not



Photo courtesy of Ken Helt

*Rick and Bob Dense with Dense Mechanical unpack the heat pump units.*



Photo courtesy of Ken Helt

*The units were installed in these spaces above the closets in the women's rooms.*

previously known about, seemed to appear from underneath the sheetrock and walls as the team installed the system. “[The installation] went smoothly, but keeping in mind, it was a retrofit, so it was a challenge,” Mr. Schoen said. “It was a work in progress and some [plans] changed as we went. Everyone did a great job coordinating things.”

Managing the team was not the problem for Heritage Construction; they were under pressure to complete the project in the 2002 and 2003 summers between school years. Construction was done in a phase-by-phase situation because no work could be done during the school year with 85 women still living in the house. Dr. Bose told the Stillwater NewsPress “the big challenge in a retrofit like that is to be able to get into it and get the work done without interrupting the normal schedule of the sorority.” The construction team was very flexible and worked around the university’s school calendar. “We were moving furniture out before school even ended for the summer,” Ms. Mickle said.

Phase one including drilling 30 305-foot boreholes and installing 1-inch diameter pipe under the Chi Omega parking lot, 100 feet from their back door. “Significant land surface was needed to accommodate the spacing for the number of wells needed for such a large project,” said Ms. Hammergren. “We were fortunate that one of

our parking lots is located adjacent to the house, which enabled us to gain the cooling capacity we needed.”

Phase two meant installing the rest of the system in 2003, and Mr. Schoen said this was the most time-constraining part of the project. “Anytime you try to cram a 6-month-long project into two months, you’re going to have some problems, but Heritage Construction certainly accommodated. They did a tremendous job.”

And accommodate they did. Hiring people to work under these conditions can be demanding, Mr.

Schoen said. “Nobody wants to work from five in the morning to midnight and then come in to work on the weekends, too. And working in 100 degree temperatures with no air conditioning is very difficult,” Mr. Schoen said.

## Positive Results

The construction and installation conditions may have been difficult, but results were certainly worth the sweat and toil. The Chi Omega women couldn’t be happier about their new system and the board has heard nothing but positive feedback from the current members. “Most of all, the [house] members like having their own thermostats in their rooms,” Ms. McDonald said. There are some limits to the controls, however. “There’s a 10 degree spread to adjust the temperature of the rooms. That way the girls can’t turn the air conditioning down to 50 degrees and then just let it run,” Ms. McDonald said.

Because the system allows for fresh air to enter the house, this eliminates the need for the members to open their windows for outside air. “The women were always complaining about being too hot in the summer and too cold in the winter. They’re comfortable for the first time in a long time,” Ms. Riffel said.

Replacing the old HVAC system was part of a renovation project that included alarms on the windows, a

sprinkler system throughout the house, and renovation of the basement. “It’s our job to make this house as safe and secure as possible for these women,” Ms. Mickle said.

Community service is one of the six purposes Chi Omega’s founders established over a century ago. Keeping with the founding purpose charged the sorority to be philanthropic in preserving their environment and the OSU campus for future community members. The women’s decision to install this modern machine will affect many more people as the Chi Omega’s ground source heat pump brings their house into the 21st century.



### ***Contributing Parties***

- Heritage Construction - General contractor  
[heritage@sprynet.com](mailto:heritage@sprynet.com)
- SPARKS - In-house engineer, selected systems  
[www.sparks-aei.com](http://www.sparks-aei.com)
- Dense Mechanical - Installed systems  
[www.densemecanical.com](http://www.densemecanical.com)
- Geo-Enterprises, Inc. - Assisted in installation  
[www.geo-enterprises.com/expfile.asp](http://www.geo-enterprises.com/expfile.asp)