Official Publication of The Chief Engineers Association of Chicagoland for over 75 years

#### PRSRT STD U S Postage PAID Pontiac, IL Permit No. 592

IS NOT BEEFE

AC \*

At "Gardens" Apartment Complex

**Old-Syle Coal Plants Expanding** 

**OCTOBER**, 2010

Home Energy Audits: Doctor's Checkup For A House

Developers Look To The Mississippi As A Power Source



With the replacement of all original hydronic heating equipment, the Spring Creek Gardens complex (pictured above) was able to save 30 percent of the natural gas consumed by the residents.

# **Boiler Replacements Bloom At The "Gardens" Apartment Complex**

Ast winter was one of the worst in recorded history throughout New York metro area. Record cold and snow falls slammed a giant infrastructure, homes and facilities alike. Utility meters were spinning like an old 78 rpm Victrola.

But one facility that squeezed in under the wire was Spring Creek Gardens, built in 1986 and billed as one of the premier rental communities in East Brooklyn, NY. Managers of the development completed a top-to-bottom energy systems renovation, culminating in the replacement of all original hydronic heating equipment - actually, several independent heating systems - a measure that's saved 30 percent of the natural gas consumed by residents living there.

**CONTINUED ON PAGE 22** 

So when winter weather swept in, the new heating systems were ready for their inaugural performance.

"After years of service work by others attempting to apply bandaged solutions to multiple failing systems, we were given the approval to tackle the challenge with a comprehensive approach," reflected lke Beyer, president and co-owner of Integrated HVAC Systems & Services, Inc., a 25-person, Long Island-based contracting firm that quickly acquired notoriety as a hydronics powerhouse since its beginning in 2000.

The solution for "The Gardens" was a well-designed approach offered by Integrated HVAC through collaboration with Progressive Engineering PLLC. The plan included an optimized heating and domestic hot water plant with a focus on energy conservation and systems dependability.

Beyer explained that Integrated's focus, since the beginning, has been the design and installation of sustainable HVAC solutions, optimized through building controls. The firm has been committed to green building practices for several years, starting with geothermal, solar and building controls for their own business and more recently by adding LEED (USGBC) and CSBA (National Sustainable Building Advisor Program) accredited professionals to their team, a move that points to smart, early adoption as well as an effort to differentiate their business approach substantively.

"We won the big replacement job on our ability to convince the facility managers that we had a smart, well-engineered solution, complete with modulating-condensing boilers, all tied into building automation **CONTINUED ON PAGE 23** 





The equipment in the "old" boiler room proved to be very inefficient. Replacement of the boilers was included in the plan to focus on energy conservation.



22 existing boilers, each rated at 400,000 Btu, were approximately 20 years old and only 70-75% efficient.



Frank Zieris, Installer, (left), and Ike Beyer, President (right), check out the BMS control panel on the newly installed system.





This small neighborhood enclave is comprised of four- and five-stor buildings surrounding a secure courtyard, providing a safe, peaceful haven for children.



Steve Schneider, Vice President (left) and Frank Zieris, Senior Installer, (right) commission the new boiler system.

controls," added Laurie Courage, LEED AP, the firm's vice president of business development and sustainability.

"A specialty of ours is helping facility managers solve chronic energy problems," she continued. "These are often tied to unnecessary energy expenses and uncomfortable occupants."

Spring Creek Gardens fit that description well. The campus is located on seven acres near Kennedy Airport and was financed in part by a city program that sells tax abatements for luxury housing in Manhattan to build affordable housing.

The "Gardens," a low-rise, highdensity rental housing development, is home to 600 - some lowto moderate-income families in the East New York section of Brooklyn. Despite the low-rise topology, its high density is nearly double that of the surrounding public housing towers and it does so without elevators, interior corridors or fire stairs.

Today, community amenities including a new 2,000 square foot senior center, 2,500 s.f. youth center, basketball courts and outdoor recreation areas, secure indoor parking and full-time security. The development now has more than 8,000 square feet of convenience retail right on site and sits just across from a new 16-screen multiplex cinema.

The site is isolated, so developers created small neighborhood enclaves by grouping the development's three sprawling four- and five-story buildings around secure courtyards, each a peaceful haven for children.

But what resident didn't have, until CONTINUED ON PAGE 24

recently, was a source for reliable and efficient heat and domestic hot water. And that's where the story got interesting for the hydronic pros at Integrated HVAC.

"The apartment complex changed ownership," added Steve Schneider, the firm's co-owner and vice president of operations who oversaw this project. "They refurbished many of the interior and exterior spaces, but the last remaining task was to demolish and overhaul the existing heating and domestic hot water equipment."

Not the most glamorous of duties but - as they say - someone has to do it.

"We specialize in all aspects of HVAC through design and build, as well as plan-and-spec work with emphasis on building automation," added Beyer. "As the 'green' building industry develops and grows in sophistication, we find ourselves in the midst of it. A huge portion of our work today stems from energy efficient initiatives and remedies in the commercial sector . . . and now, our higher-end residential work is picking up, too. Our whole building approach and credentials in sustainable design along with our focus on energy-efficient building performance differentiates our results."

Integrated HVAC serves the greater New York metro, New Jersey and Long Island areas with business made up of commercial (70%) and residential (30%) work. Integrated is IGSHPA-certified, and this has increased their geothermal work. Photovoltaic, solar thermal and cogeneration solutions are also on the up-tick, so Beyer is driving his USGBC-member firm to add to the number of those knowledgeable in renewable and sustainable solutions.

**CONTINUED ON PAGE 25** 







(Top) Steve Schneider and Frank Zieris check the boilers during the commissioning process. (MIddle) Steve finishes the commissioning process by running checks to ensure that the system is operating correctly.



(L to R) Steve Schneider, Vice President, Frank Zieris, Senior Installer, and Ike Beyer, President, stand in the boiler room at the completion of another successful job.







Above are two views of the new boilers. Each of the six boiler rooms vary slightly in size. Each boiler plant services building heat and domestic hot water requirements. The new boiler plant utilizes TurboMax high efficiency instant indirect hot water heating.

All of this green activity played forcefully into the substantial mechanical retrofit at The Gardens, a job Beyer described as typical of the many commercial projects they do each year, including substantial mechanical work and building automation.

The Gardens retrofit required more than a few months of planning and six months of on-site work at a total cost of about \$2.5 million. Each of three buildings has two boiler rooms and, in each of these, several Laars Rheos+ boilers replace the old atmospheric systems that were, according to Beyer, doling out heat at 50 to 60 percent efficiency during their last few years of service.

"We've installed Laars equipment for a decade and have come to rely on their boilers extensively," said Beyer. "The Rheos+ system is the crown jewel of their high efficiency commercial boiler line. Though other boilers were initially spec'd by the engineering firm, with help from Don Rathe, Rathe Associates, we convinced the engineers and the building managers to go with our recommendation for 18 Rheos+ boilers, ranging in size from 1.2 million to 2.4 million BTUs."

Following the extensive demolition and months-long installation of new hydronic equipment, all common and living areas are heated by high-temp, copper fin tube baseboard radiators.

The Rheos+ systems chosen by Integrated are controlled by a building automation system (BAS) through a variable firing rate signal that is fed to each boiler as needed for both heating and domestic hot water. The systems are responsive to indoor-outdoor temperature reset control for heating and they maintain constant water dis-

**CONTINUED ON PAGE 26** 

charge temperature when needed for domestic hot water production. In lieu of operating each boiler independently, they implemented an integrated heating system that accepts remote signals to control multiple boilers to ensure the optimal staging and rotation of the entire boiler plant.

"We stage and modulate operation of all boilers using Automated Logic DDC controls," said Beyer. "Integrated also monitors and controls system operation remotely via our web services back at our home office. We custom-engineered the control system to integrate with Laars' onboard controls. Laars configures these boilers to integrate seamlessly with building system management."



"Integrated wrote the programs for this job not only to sequence all system operations, but also to send alarms to the customer, and to us, if there would be a need," added Beyer. "We also have the capability to track fuel usage data."

According to Beyer, the heating loop has its own secondary distribution pumps. Variable frequency drives were installed to modulate demand-based pump output.

To dispose of potentially harmful acidic condensate from the condensing boilers, each boiler is fitted with a neutralizer kit from Laars. The condensate is run through a marble chip bath that neutralizes it from an acidic pH range of from 5.2 to 5.6 and then disposes of it down a typical sanitary drain. The boilers have dedicated integral recirculating pumps. "Some other manufacturers require you to provide those pumps separately and, given our schedule, that was definitely a minus," says Beyer. A low loss header was used to properly separate the production and distribution sides of the system.

"The boilers' ability to maintain discharge temperatures ranging from domestic hot water, to peak heating requirements provided the best demand-to-output capacity match at the most efficient energy level," he added. "Maintaining the highest efficiency level provides an additional way of controlling emission levels, because the more efficiently we operate, the less gas we burn and the fewer oxides we emit, reducing our carbon footprint."

-----

## Loves football, fishing and family holidays. But chemistry is his real passion.

Ashland Hercules Water Technologies delivers a full portfolio of water treatment products and services to commercial and institutional facilities. But nothing we offer is as important as the knowledge and expertise of our sales and service representatives. These individuals are dedicated to ensuring reliable, cost-efficient HVAC operation within your facility so that your occupants are always safe and comfortable. Their dedication is the reason that eight of the top 10 facility management companies in North America utilize Ashland for their HVAC water treatment needs.

ashland.com

### HERCULES

PEOPLE MAKING GREAT CHEMISTRY HAPPEN





Domestic water for residents in all of the buildings is sourced through large indirect water heaters; the equipment also serves as a buffer tank by increasing the volume of the stored hot water which helps to eliminate short cycling during periods of low demand. Integrated also used an Exhausto Chimney venting system to maintain design draft across the full firing rate of the boilers.

The Rheos+ boilers chosen by Beyer provide these other features:

Modulation of firing rate from 25% to full fire to match required heat loads and maximize efficiency.
Self-adjusting combustion systems for handling ambient conditions from sea level to 10,000 feet.

• Built-in mixing system for low

temperature return water protection while maintaining proper flow rates through the heat exchangers.

• Visible front control panel for easy diagnostics and access to internal electronics.

• Flexible vent and piping options for ease of installation and maintenance.

• Hot water supply temperature optimization on both main heating and domestic hot water systems.

"We took the system improvements as far as we could so far," concluded Beyer. "We optimized heat plant operations for both space heat and domestic water, but hope to add indoor feedback sensors to further improve comfort and energy conservation, especially for the apartments." Let us feature your building or recent project in a future edition of The Chief Engineer.

Contact the office today for details.

708.293.1720



Making buildings more energy efficient, comfortable, safe and productive. Johnson Controls Service has worked with facility leaders for over 125 years to provide professional service to the key building equipment systems in your facilities. Specifically, we can help you to maintain, repair, and replace the following:

- Building automation systems
- Mechanical equipment and systems
- · Air handling units
- Automatic temperature controls
- Boilers
- York<sup>®</sup> centrifugal, absoption, screw, scroll and reciprocating chillers

York® is a registered trademark of Johnson Controls, Inc.

- Coils
- Cooling towers
- Fume hoods
- Pumps
- Roof top equipment
- Terminal equipment
- Lighting systems
- · Data facility systems
- Process systems
- Solar thermal water heating systems
- $\boldsymbol{\cdot}$  Security and fire systems services
- Centrifugal, absoption, screw, scroll and reciprocating chillers

For more information, please contact: Chicago Metro Branch 866-854-4768 3007 Malmo Drive Arlington Heights, IL 60005

THE CHIEF ENGINEER OCTOBER, 2010

Johnson

Controls

www.johnsoncontrols.com

27