

Ellis Hospital saves time and money with Siemens APACS+ modernization

When Ellis Hospital in Schenectady, NY, modernized its boiler plant, engineers not only wanted to ensure steam production reliability, but save money along the way. By modernizing the existing HMI with Siemens SIMATIC® PCS 7/APACS+ OS HMI, the plant retained its existing APACS controllers, including I/O. Coupled with new efficiencies, the modernization cut hundreds of thousands of dollars in hospital operating costs and paid for itself after only three months of operation.

Visualize Humphrey Bogart kicking the antiquated boiler of “The African Queen” to prevent it from exploding, while navigating the boat between rocks, bullets, and river rapids.

A similar picture comes to mind talking with John Hickey who was hired in 2005 to upgrade the 30-year-old boiler plant at the 368-bed Ellis Hospital in Schenectady, NY. Although he will not admit to kicking the three massive boilers that produce 35,000 pounds of steam per hour, an engineering study determined that the plant’s control system was in dire need of an upgrade.

“Our previous control system produced multiple nuisance alarms every day,” Hickey recalls. “We couldn’t ignore the alarms because if we stop making steam for one hour the operating room shuts down.

The engineering study concluded that the boilers were in good shape, but safety repairs were the first priority, including repairing low water cutoff safety valves. After the safety issues were addressed, Hickey turned his attention to the plant’s control system, which was running APACS+ Controllers and Moore ProcessSuite HMI software on personal computers (PCs) with a 1998 Windows NT operating system.

With only 64 megabytes of memory in the PCs, the control system’s Human Machine Interface (HMI) would often freeze in alarm situations causing Hickey and his technicians to constantly reboot the PCs. Technicians often had to be called back in after hours to address situations. The boiler plant accounted for up to 90 percent of the hospital engineering department’s attention.

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Ellis Hospital Director of Engineering, James Dean, says the SIMATIC PCS 7/APACS+ OS HMI system allowed him to transition both the second and weekend shifts into a day shift working Monday through Friday.

Justifying an Upgrade

Because Ellis Hospital is a non-profit facility, Hickey's options to upgrade the system were limited because of cost constraints. Additionally, the engineering study determined that the plant had only a 10-year lifespan remaining.

"We had Windows NT with a 98 version of Moore ProcessSuite running over the APACS controllers," Hickey said. "We just couldn't get any real, good data out of it, so we were looking to upgrade or replace the system."

About that time, Hickey attended a distributed control system training session presented by Siemens Energy & Automation, Inc. He learned that by modernizing the existing HMI with Siemens SIMATIC® PCS 7/APACS+ OS, he could retain the existing APACS controllers, including I/O. He also discovered that the implementation of a new HMI could help cut hundreds of thousands of dollars in hospital operating costs.

After reviewing numerous proposals from various control system vendors, the decision to upgrade to PCS 7/APACS+ OS was made. However, Hickey and Ellis Hospital Director of Engineering, James Dean, now had to make the case for the new capital expenditure to hospital management.

"We made the presentation, explaining that we would save about \$250,000 by keeping the APACS+ controllers," Dean said. "The life of the plant was 10-12 years and the APACS+ controllers had everything we needed, but we did not have the computer power to bring the information out of the controllers and manipulate it."

Fast Startup

Solution Partner Steam Plant Systems installed the new redundant HMI system at the hospital boiler room in December 2007 without interrupting the flow of steam. Steam Plant Systems started by adding one new computer loaded with PCS 7/APACS+ OS. After the computer was online, it

added a second computer also loaded with the HMI software. Steam Plant Systems used the built-in Database Automation (DBA) Tool that automatically added the appropriate symbols to the new HMI graphic hierarchy – making it easy to migrate graphics from ProcessSuite to the new HMI.

"We did not lose fire, shut down, or have any other issues during the installation," Hickey said. "Once Steam Plant had one side up and running they connected the next HMI to the controllers. Within an hour everything was running at 100 percent."

Reduced, Refocused Staffing

Before the upgrade, the entire hospital engineering staff was on constant call to respond to alarms from the boiler plant. Because the old HMI was not optimally configured, nuisance alarms happened multiple times a day – especially in the winter when temperatures are consistently below freezing.

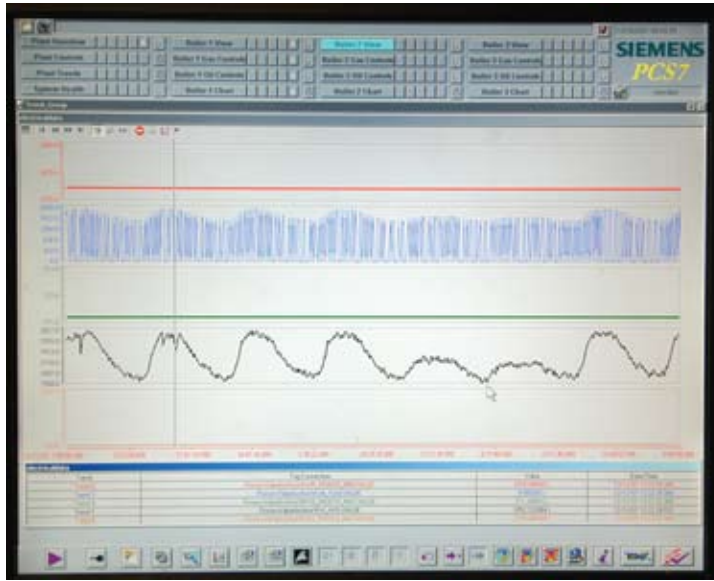
"It was like crying wolf," Hickey said. "The technicians would have to leave what they were doing multiple times a day. Now our stationary engineers cover the whole hospital, serving as plumber, electrician, HVAC tech, and elevator man."

Dean says by implementing the improved alarming capabilities provided by PCS 7 OS, they were able to eliminate the nuisance alarms, and the hospital is saving four hours per day, 365 days a year, in employee time responding to non-existent events.

"By upgrading to the enhanced alarming capabilities provided by PCS 7 OS, we were able to send a second shift and a weekend person home, freeing them up to do other work and gaining 56 hours a week of labor on day shift," Dean said. "Those working off shift were put on days, and we became 56 hours more productive per week."

Additionally, Dean says the PCS 7/APACS+ OS system enabled the hospital to train the boiler room operators on the rest of the hospital systems, including the mechanical room.

"This allowed me to transition both the second and weekend shifts into a day shift working Monday through Friday. At 3:30 p.m. on Friday, John's staff take over until Monday morning. In all, we gained about 3,000 hours last year by working more efficiently," Dean said.



Ellis Hospital now has a wealth of trending data available at the click of a mouse in the boiler plant's new dual monitor and engineering station.

Better Data

Hickey said another cost saving benefit from the upgrade comes from a wealth of trending data now available to him at the click of a mouse in the boiler plant's new dual monitor and engineering station. He said in the past, the hospital paid an operator \$25 an hour to enter data into a spread sheet to generate plant reports. Today, the PCS 7/APACS+ OS system automatically generates reports hourly, shift-by-shift, daily, weekly, monthly, and yearly. It also identifies the last 1,000 alarms generated by the system.

"I cannot imagine how much money the hospital paid over the past 10 years for somebody to put that information into a spread sheet," Hickey said.

"We take data from PCS 7 through an Excel reporter that takes the data out and gives me everything I monitor."

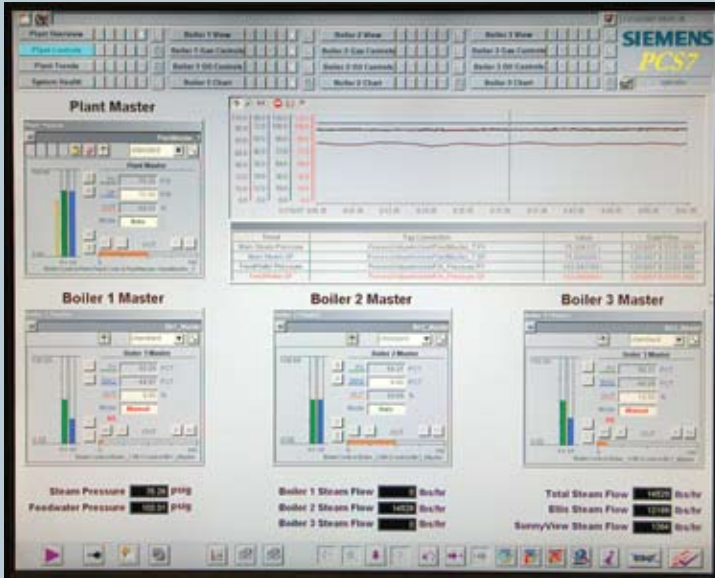
Hickey can instantaneously obtain as much information as he needs about the system, including totals, maximums, minimums, and averages for all boiler functions – information important to conform to strict New York State codes.

The system's diagnostic functions – that can be accessed remotely via modem – also determine any deviation in the plant for gas, water, total maximum steam, total average steam, and total steam produced. With this information, Ellis Hospital can accurately calculate how much steam is available to sell to other area hospitals.

Hickey said the five operators stationed at the boiler plant find the PCS 7/APACS+ OS graphics easy to use. "The plant overview shows in a glance if the plant is out of tune," Hickey said. "We have the process variable, the setpoint, and the output all at once. You can tell if something is going out of tune and fix it before it becomes an issue."



Overhead view of the three boilers at Ellis Hospital.



The improved alarming capabilities of SIMATIC PCS 7/APACS+ OS HMI helped eliminate nuisance alarms and reduced Ellis Hospital employee time responding to non-existent events.

John Hickey says Ellis Hospital, Schenectady, New York is approximately 20 percent more energy efficient today since installing SIMATIC® PCS 7/APACS+ OS HMI. He says the system paid for itself in just three months of operation.

Energy Savings a Bonus

Another benefit from the upgrade is a decrease in energy usage throughout the hospital. Hickey, who is now also responsible for the power plant and HVAC systems at the plant, uses the new trending information to lower utility bills.

"I can see where and when energy is being used," Hickey said. "PCS 7/APACS+ OS gives us the ability to know when and how long we are peaking. We immediately found that we could shut off three general ventilation units and 500 lights we did not need. We literally watched the meter go down."

Before the modernization, the hospital electric usage would not go below 1,750 kW. Today, even though 40,000 square feet was recently added to the facility, electric consumption has been reduced to a low load of 1,350 kW.

"We have also saved more energy by effectively tuning the boilers," Hickey said. "We have reduced the amount of steam we are making by make about five to eight million pounds per year. By specifically targeting trends and stopping deviations we have reduced steam production for some months by up to 30 percent. We have also reduced fuel costs by up to 18 percent. That makes a difference over time."

"We are about 20 percent more energy efficient today than when I walked in the door," Hickey continued. "We have gotten a lot more out of the PCS 7/APACS+ OS than I expected. It is a powerful tool that has paid for itself in just three months of operation."

Siemens Energy & Automation, Inc.
Industry Sector
3333 Old Milton Parkway
Alpharetta, GA 30005
1-800-964-4114

info.sea@siemens.com

www.sea.siemens.com/process

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