



## UGL Services' HVAC Upgrade Increases Orthopedic Hospital Operating Room Productivity

### *Chronic issue forced operating room shutdowns...*

The operations of a nationally recognized orthopedic surgical hospital that was the site of one of the first artificial hip replacements in the country and continues to lead the way in new methods to diagnose and treat all forms of musculoskeletal disorders and disease were threatened by the condition of its facilities.

Administrators recognized that their preeminent status was being affected by building infrastructure issues that impaired their ability to deliver services. The medical campus suffered from deferred maintenance of building systems. The challenge was to identify and address the issues that would have the highest payback in the shortest timeframe.

Of particular concern was the Heating, Ventilation and Air Conditioning (HVAC) equipment for the 11 operating rooms, which were frequently unusable during the summer due to heat and humidity issues. It was quite common to experience days every summer when the temperature and humidity levels became so high that rooms needed to be closed and operations cancelled. As an orthopedic specialty hospital this affected the patient census and dramatically impacted revenue.

### **FCA Identifies Equipment Issues**

The administration brought in a consulting firm to evaluate the site and recommend changes. The Facilities Condition Assessment (FCA) that was commissioned inventoried the building's physical equipment and assessed its current condition. It did not evaluate system controls and operating procedures. The consultants made immediate recommendations and projected expected equipment life so that the hospital could develop a long-range budget plan.

They determined that the equipment was adequate, yet they identified specific equipment that needed to be serviced more regularly.

After conducting the FCA, the consultants recommended bringing in an outside company to manage facilities and implement a preventive maintenance program. UGL Services was selected to undertake this challenge.

### **PROJECT SUMMARY**

**Project:** *Monitor and control heat and humidity in operating rooms*

**Customer:** *Orthopedic hospital*

**Situation:** *Operating rooms had to be closed on many days during the summer due to excessive heat or humidity.*

**UGL Services response:** *UGL Services took a systematic approach and replaced local controls with remote monitoring and control systems.*

**Results:** *Operating rooms are closely controlled, staff and patients are comfortable and rooms are available on even the hottest days.*

## **Zeroing in on the ORs**

UGL Services Account Manager Wesley Warren and his team started by reviewing the condition assessment reports and ranking the top priorities. The situation in the operating rooms quickly rose to the top of the list. "We looked at the facilities condition index and said, 'well, it's not the equipment.' If the air handlers and the chillers are adequate, it had to be on the control side," said Warren.

The problem was well-known but not well-understood. Each operating room had its own controls and there were no established standards for heat or humidity. The surgeons worked under hot lights and were able to have the room set to their preferences; operating room staff and physicians adjusted the thermostats as they saw fit. The next operating team may have had other preferences and would dramatically adjust the controls to try to quickly bring the room temperature to their preference.

Five complicating factors added to the problem:

- The systems were pneumatic, so if the temperature was adjusted more than just a few degrees the system would go beyond the set point making the room too hot or cold;
- Radical temperature changes affected humidity;
- HVAC technicians could not enter the operating rooms during procedures;
- Three independent air handling units served the operating suites;
- Air handling units and other equipment had not been well maintained.

## **Designing a Solution**

Once the issues had been clearly defined, Warren turned to UGL Services corporate HVAC controls experts for a solution. He explained, "We brought in our corporate HVAC controls experts and together we brainstormed to come up with a design that would give us control and allow us to know what the temperature and the humidity would be in the rooms in real time. We also designed it so we could maintain control without having to go to the rooms." The hospital administration approved the changes and the work was completed by UGL Services Mobile Maintenance Group in just a few months – well before the summer.

A Siemens Apogee system was installed that enables the UGL Services staff to monitor and control each operating suite. Temperature and humidity ranges were set within the controls system based on standards established with medical staff and administrators. UGL Services brought the chillers and air handling units back to original operation specifications. They also replaced the thermostats in the operating suites with the Apogee system so that the temperature and humidity could be controlled and monitored remotely.

Perhaps as important, the new controls and reporting system enables UGL Services staff to print out status reports to show that the rooms are within the limits should a question arise. The surgical staffs have learned that the new controls system operates within the agreed upon settings, which dramatically reduces complaints and requests for adjustments.

The new system also includes a Remote Notification Option (RENO) that has set alarm points that page UGL Services facilities HVAC personnel, the shift maintenance person and the Facility Manager if conditions approach the set point. The alarm points are set slightly tighter than the desired limits so the facilities staff is notified of a potential problem prior to the temperature or humidity reaching a critical level.

The new system is coupled with aggressive preventive and predictive maintenance programs to sustain optimal equipment performance.

### **Systematic Approach Solves Problem**

Since the controls upgrade, the hospital has not had to cancel any procedures due to excessive temperature or humidity in its expanded suite of 16 operating rooms making scheduling more predictable and the rooms more productive. The UGL Services facilities staff continues to receive a few calls per day about operating rooms that are thought to be too hot or too humid, but with the current configuration it is a simple matter to print out the temperature and humidity levels in all of the operating rooms and provide that to the operating room desk. Technicians seldom have to enter operating suites and scheduled maintenance is performed during idle times.

The nurses are thrilled because they were the ones who would have to deal with the surgeons' complaints. And the doctors are happy, too. "I actually had one physician who, after we did this and went through one full summer, would come up to me every time he saw me and say, 'I can't believe after all of those years of suffering you guys actually solved that problem,'" said Warren. "That's a happy customer."