

CASE STUDY

ensuring environmental integrity

Phoenix Controls Helps St. Luke's Achieve its Goal of A High Performance Hospital

At more than 700,000 square feet, St. Luke's Hospital is the pinnacle of what a modern healthcare facility should be and is considered the most advanced in the state of Idaho at the time of its completion. Essentially the sole healthcare facility in the area, St. Luke's found its existing hospital unable to meet the growing needs of the community it served. A near \$200 million investment was made for a new facility, with the ultimate goal to create a high performance building that would "promote maximum patient comfort and quality patient care."

Within the 16 acre footprint are 186 patient beds with private rooms, a large emergency department and cardiac catheterization lab, the 34,000 square foot Mountain States Tumor Institute (MSTI) Cancer Clinic, a new heart care unit, and a Women's and Children's Center.

From the beginning, the design team set out with an open mind. As Jeff Hull, Director of Architecture, Construction and Real Estate Services, said, "When you start from scratch you have the opportunity to make things right." The overarching theme of the project was environment and the creation of a high performance building. The design team initially came together in a meeting known as an Eco-Charrette. An Eco-Charrette occurs in the concept stage of a new building and members of the project/design team brainstorm with a focus on how to make the idea of a truly high performance building a reality. This was an opportunity for St. Luke's to start fresh to create a safe and healing environment, a high performance building, and a layout designed for optimal working conditions and effectiveness. To achieve this, flexibility was a key factor in the design considerations. The team wanted the right technology in place to create a versatile building that could adapt to changes as determined by needs for safety, business or future expansion.

Engineering, Inc. was selected as the mechanical engineer for the project. As a trusted partner from Boise, Idaho and serving the Treasure Valley and Pacific Northwest, their close relationship with St. Luke's gave the owner the confidence to trust they would provide the best solution to meet their needs of safety, flexibility, and high performance. Michael Wisdom, Rodger Albers, and Michael Grefenson were the lead engineers on the project. In their pursuit for the best, they wanted Phoenix Controls as the building's airflow control system. Engineering, Inc. only knew Phoenix Controls as a

highly sophisticated reliable solution for the wet chemistry industry. The indoor air quality (IAQ) and ventilation standards in healthcare warranted the controllability and reliability of the Phoenix Controls venturi valves, but the simpler tracking pair application did not warrant the price tag associated with the complicated laboratory design.

Local manufacturer's representative the Norbryhn Equipment Company, based out of Nampa, Idaho was quick to educate Engineering, Inc. on the Phoenix Controls Theris® product line. Theris, which was officially released by Phoenix Controls in 2006, was specifically designed to meet the needs of the healthcare market at a cost that is competitive with VAV terminal boxes. Engineering Inc. had traditionally used terminal boxes in their design, but like most, they were unhappy with the performance of these devices in the healthcare setting. Maintenance and lack of repeatability were two issues they wanted to overcome. As Michael Wisdom said "The most important thing for us when designing airflow control in a healthcare facility is repeatability and accountability. With Phoenix we knew we would have that."

Afterwards, Engineering, Inc. was on board with using Phoenix Controls throughout the entire St. Luke's facility. They needed to convince the owner that it was the best airflow solution to help achieve the goals they had set forth. To do this, Engineering, Inc. proposed a number of solutions that would only be achievable with the use of a true venturi valve.

Safety

A big concern for patient safety is the ability to truly know the condition of a room. All too often the airflow in a space is misrepresented on the front-end of the building

St. Luke's Hospital



management system (BMS). Since Phoenix Controls valves do not require airflow measurement, there are no flow sensors that could clog. The flow sensors required in other ventilation solutions are prone to dust build-up, caused by frequent changes of bed linens, towels and garments in the room. Clogged sensors, if not cleaned frequently, send false readings to the ventilation control system, which then command changes in airflow, contributing to a lack of controllability in the space. With a Phoenix Controls venturi valve, the position equals flow concept provided the confidence needed to feel assured that patient safety would not be compromised.

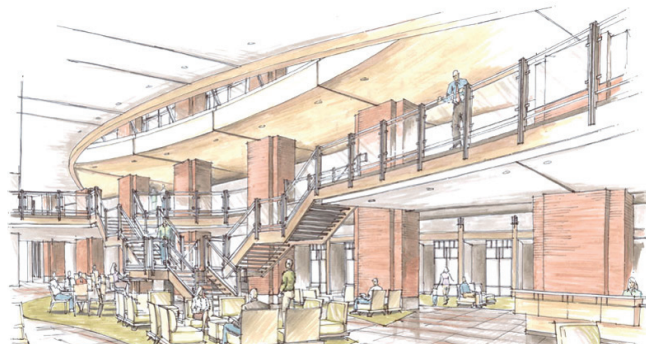
Flexibility/Pandemic Ready Floor

The ability of the venturi valve to easily adapt to changes within the HVAC system allows the device to be extremely adept in altering the condition of a room according to demand. Theris allows St. Luke's to switch pressure relationships for decontamination, construction (ICRA reasons), or simply to reduce airflow and use an unoccupied Infectious Isolation Room (IIR) as a patient room. An example of truly embracing the Theris valve flexibility, Engineering, Inc. designed the 4th floor to be a pandemic-ready wing capable of converting the patient rooms to infectious isolation rooms in less than ninety seconds. A control scheme was used in conjunction with the Theris pandemic mode to break the floor into quadrants. The four zones allowed the facility even greater flexibility, only needing to convert the minimal amount of rooms required. The incorporation of pandemic ready floors was requested by the infectious nursing staff and is consistent with Jeff Hull's philosophy of starting from scratch and making advances that are appropriate and smart using the right technology.

High Performance Building

To help achieve this goal, Engineering, Inc. was able to propose a number of efficiency measures due to the use of reliable VAV systems.

One problem encountered was that the patient towers had windows facing both east and west. Depending on the time of day, higher than usual cooling requirements would be needed to adequately condition the rooms. They determined max cooling required 12 ACH were as the minimum required ventilation only called for 6 ACH. With the desire to save considerable energy and money with a VAV system, they also needed to feel assured they had the reliability to reduce airflow by 50% and still always be able to adhere to code with a minimum of 6 ACH. The alternative was a constant volume space set at maximum cooling and providing reheat for the majority of the day. The engineers only felt confident using VAV by utilizing a Theris tracking pair because of its



St. Luke's Hospital Lobby

repeatability and ability to maintain +/-5% accuracy at both high and low airflows.

In addition, VAV systems were designed into spaces throughout the facility, including lobbies, kitchens, CTs, MRIs, ORs, as well as the MSTI Cancer Institute. In total, 1,289 Theris valves were used on the project. Unoccupied airflow setbacks are also used in these spaces at 30 to 50 percent of occupied airflows for maximum energy savings. The Operating Rooms have three modes (occupied, unoccupied, and maintenance) and are controlled by the OR nursing staff.

The Phoenix Theris VAV systems not only allowed for safe energy savings, but also allowed the engineering team to downsize the required HVAC equipment needed to save on the project's initial cost and reduce the start-up cost/time necessary to balance the building. In comparison to the adjoining medical office building, which used terminal boxes, the Theris specified hospital was able to be balanced in a considerably less amount of time.

Conclusion

The use of a Phoenix Controls system throughout an entire healthcare facility would be considered fairly unconventional to most; however, once the benefits of the system are understood, the long term benefits and energy savings make an excellent case against the traditional objections.

Engineering, Inc. recognized Phoenix Controls' efforts to make the Theris line competitive, and with open protocols, it integrates easily with the (BMS). From their perspective, as well as the owner's, Theris was able to fall within the required payback periods for the owner's acceptance because of the following:

- Competitive price point
- Reduction in start-up time/cost
- Reduction in HVAC equipment sizing
- Energy savings and associated rebates.

In the end, the benefits that Phoenix Controls was able to provide made it an easy decision for St. Luke's to select Phoenix as the best method for airflow control in the industry.