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Required Changes to Electric Fire Pump Controllers with Automatic Transfer Switches

Beginning in August of 2010, FM Global and Underwriters Laboratories mandated changes to electric fire pump controllers with automatic transfer switches. The major change to the controller resulted in removing the approval and listing of the units most commonly used with emergency generators. For many years, there were two types of fire pump controllers available with transfer switches. The standard fire pump controller with an automatic transfer switch was used without a disconnecting means in the automatic transfer switch emergency power side of the controller. This type unit was used when the electric fire pump was required to be connected to an emergency generator. The other type controller was a unit for use when the transfer switch was connected to a separate power service or second utility. This unit would include a disconnecting means on both the normal power and emergency power sides of the transfer switch.

In the past, if you requested a price for an electric fire pump controller with an automatic transfer switch that was to be used with an emergency generator, you were supplied a unit with only a circuit breaker in the normal power side of the unit and no breaker in the emergency side. The disconnect was supplied by others or along with the emergency generator. The electrical disconnects supplied by others were not sized properly and led to safety concerns. The biggest problem would be the undersized disconnect was not capable of handling the initial power in-rush currently experienced at startup of an electric fire pump. If the in-rush causes a trip of the circuit, the fire pump would fail to operate.

Due to these safety concerns, the automatic transfer switches for use with emergency generators that were supplied without a disconnecting means in the emergency side will no longer be supplied. Beginning in August of 2010, all fire pump controllers supplied with an automatic transfer switch, regardless of emergency power source, included a disconnecting means and circuit breaker in both the normal and emergency sides of the transfer switch. The disconnecting means will be service entrance rated and will provide the necessary disconnect protection. Adding these electrical components enhances the safety of the controller for service personnel and operators. This change will have a significant cost impact on the fire pump controller/automatic transfer switch price.

Cheshire Medical Center

Dartmouth Hitchcock Keene / Urology and Ophthalmology Center

Keene, New Hampshire

Architect: Lavallee Brensinger Architects

The scope of this project was to design the HVAC, plumbing, fire protection and electrical systems for the new Urology and Ophthalmology Center. The new facility, located on the ground floor of a two story building, consists of 18 exam rooms, nine offices, two treatment rooms, one optical shop, three nurse stations and associated support spaces. The mechanical/electrical and support spaces are integrated within the facility. The goal was to provide energy efficient mechanical, plumbing and electrical systems to support the demands of the healthcare environment.

The HVAC system consists of major pieces of equipment, including two condensing style gas-fired hot water boilers, variable volume hydronic hot water heating system, three packaged rooftop units with external final filtration, and one ductless split air conditioner system. These units, along with ductwork (supply & return), hydronic piping (supply & return), diffusers, exhaust fans, thermostats, etc., provided the heating, cooling and air changes needed to meet the requirements for the new facility.

The plumbing system design consisted of providing new plumbing fixtures, hot water system, cold water and sanitary sewer systems extension, and a new LP gas piping system with an exterior gas meter. Two condensing style gas-fired water heaters provide domestic hot water to the new fixtures. The plumbing fixtures are water conserving, including the tank-type water closets. The underground sanitary sewer piping layout is designed to minimize the amount of slab cutting required to connect piping from fixtures to the existing under slab sanitary sewer system. The fire suppression system is designed for light hazard occupancy in the common areas and ordinary hazard in the mechanical spaces. The existing system was reconfigured and provided with new sprinklers throughout to meet the requirements of the new occupancy.

Providing electrical services for this project presented a challenge. The existing electric service had the capacity to support the project load but there were no spare circuit breakers available. To further complicate matters, the existing electric room was totally filled with panels, meters and a switchboard. The resolution to this problem, with the cooperation of the electrical contractor, architect and the wiring inspector, was to tap the existing mains in the switchboard, stay within the NEC tap laws, and install a main circuit breaker within the space. In order to meter the energy used for the new facility, the local utility approved locating the new meter in the existing electric room. Once the service issue was resolved, the space was wired for the new facility's needs.



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**St. Joseph's Hospital
Surgery Center Renovation – Phases I & II
Nashua, New Hampshire
Architect: Lavalée Brensinger Architects**

The overall scope of this project included a complete renovation of a 21,000 sf existing Surgery Department. Phases I and II included a major upgrade to the existing air distribution systems and a 1,600 sf operating room fit-up at the ambulatory surgery section of the hospital.

The intent of Phases I and II was to provide the indispensable flexibility required to begin construction on the more extensive Phase III (scheduled for fall 2011 completion).

The design challenge of Phase I was to upgrade/replace the existing air handling systems serving the Surgery Center without affecting the hospital's day-to-day operations. Critical patient rooms, Post Anesthesia Care Unit (PACU) and operating rooms could not be offline during this phase. Timing of the installation was critical as the existing equipment was incapable of meeting the necessary cooling loads and the summer months were approaching.

Our Phase I solution included the installation of a new 36,000 CFM custom air handler. We were able to tie the new air handler supply mains into the existing supply ductwork during off hours, which enabled the hospital to operate with minimal interruption. The complexity of the existing return duct distribution and existing structure prevented return air back to the new air handler. Instead, we used the existing air handling system as a temporary exhaust until completion of Phase III.

Phase II once again posed the challenge of fitting out two new operating rooms within the ambulatory surgery department while minimizing impacts to existing adjacent operating rooms and sub sterile spaces. The design challenge was to incorporate existing mechanical, electrical and plumbing systems and provide state-of-the-art operating room integration systems. It was imperative that these two operating rooms were completed prior to the start of Phase III, as the Surgery Center and ambulatory surgery department would share operating rooms during the inpatient renovations.

The Phase II mechanical solution provided variable volume terminal units with hot water re-heat coils. Supply air, return air, and hot water were extended from the existing systems. The air distribution serving this portion of the hospital was retrofitted with a global duct mounted low pressure steam humidifier, which replaced the individual electric humidifiers serving the adjacent clean and sterile spaces.

Electrical design included new isolated power systems that incorporate load monitoring and new surgical grade lighting, which interfaced with the existing uninterrupted power supply system. Plumbing systems, including sanitary, venting, medical gases and domestic water services, were extended from existing systems. Connections were made during off hours to minimize the impact to hospital operations.

Commitment to frequent and timely project communication from the design and construction team played a major role in early completion of Phases I and II.



**Suffolk University Lab Classroom Renovations
Boston, Massachusetts
Architect: isgenuity**

The scope of work for this project included the renovation for a series of laboratories, classrooms, and office spaces during the summer break of 2010. New mechanical, electrical, and plumbing systems needed to be designed to accommodate the new layout and laboratory programs outlined by the end user.

The design challenge was to provide new mechanical, electrical, and plumbing systems to allow for installation of state-of-the-art research equipment and support new laboratory programs. In addition, construction was to be completed during the two month summer break period and renovated spaces needed to be ready for occupancy at the beginning of fall semester.

The solution included an extensive survey of existing infrastructure to ensure a clear understanding of the existing systems, their capabilities and limitations. This allowed the design team to provide solutions that ensured a cost effective renovation that could be completed during the summer break period.

Mechanical design included reconfiguration of ductwork and controls within the renovation spaces in order to accommodate the proposed floor plan layout. Existing mechanical equipment was utilized to serve renovated areas and re-balancing of the system was performed to ensure maximum efficiency. In addition, a new dedicated air conditioning system was installed to accommodate a new computer room.

Electrical design included new lighting and power systems, and modification of the existing fire alarm system. New high performance light fixtures and dual switching systems were implemented as part of the new lighting system. This ensured adequate light levels in lab areas and allowed the end user to control light levels to desired settings. The new power layout included electrical services to all laboratory equipment and work stations.

Plumbing design included new plumbing services to laboratory equipment and reconfiguration of existing systems to accommodate new fixture locations and laboratory programs.

