[Schneider Electric Case Study]

Leading Medical Center

United States

Electrical maintenance project improves safety and reliability of leading medical center

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In Brief

Challenge

This major medical center receives a high level of patient traffic on a daily basis. The medical center's management team has a significant responsibility to ensure that its electrical equipment, power functions, and efficiency are as modern and safe as possible. They proactively set out to have a site-wide Power System Assessment performed to provide an independent and documented overview of the entire electrical infrastructure.

Solution

Square D™ Services and Schneider Electric™ Engineering Services conducted an in-depth evaluation of every system and component throughout the center's multibuilding campus to gain a deeper understanding of the electrical power system. The goal of site assessment was to identify and prioritize issues detrimental to the power system, including environmental conditions that could cause future equipment failure.

Results

Schneider Electric power system engineers evaluated every electrical system and component throughout the medical center and provided comprehensive recommendations surrounding specific equipment that needed to be replaced or updated. Estimated costs were also provided to help management develop a plan to execute each of the recommendations. The upgrades will be carried out building by building until completion to help ensure that power flows reliably to all parts of the medical center.

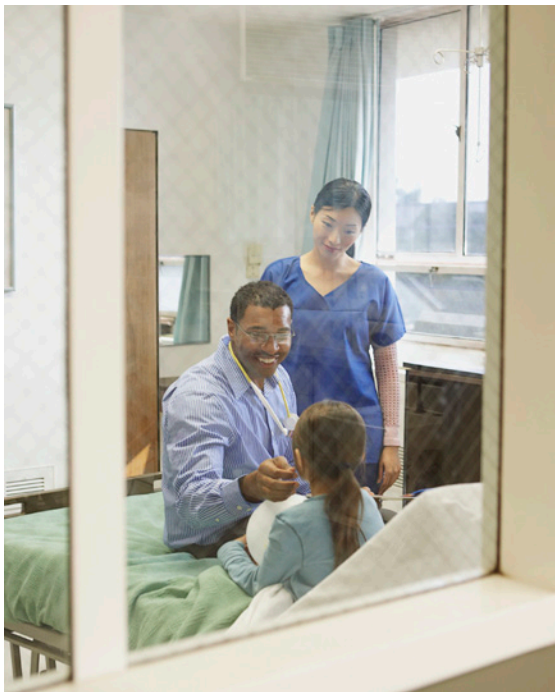
Problem

Since 1950, this government-owned medical center has played a vital role serving one of America's largest metropolitan areas. As the primary health care center for more than 90,000 patients, the center consists of a multibuilding campus that serves as a major regional medical hub for health care, medical research, health professional training, and as a national crisis/emergency response center.

The medical center continuously receives a high level of patient traffic on a daily basis. As such, management has a significant responsibility to ensure that its electrical equipment, power functions and efficiency are as modern and safe as possible. Throughout the years, excellent maintenance practices have been in place and much of its electrical equipment and systems – such as switchgear and panels – were in well-kept shape. However, due to the age of many of the buildings, minor problems (such as improper grounding) had sprung up over the years. These problems, while unnoticeable and unproblematic over the course of regular maintenance, needed to be addressed in an in-depth inspection to prevent more serious problems that could develop over time.

To ensure the best possible reliability and safety of its facilities, the medical center's management proactively set out to have a site-wide Power System Assessment performed to provide an independent and documented overview of the entire electrical infrastructure.

The electrical systems in place at the medical center featured many Square D brand products. In addition, the center's management had an existing strong relationship with Square D Services. From previous experiences, they found representatives and consultants from Square D Services and Schneider Electric very knowledgeable and experienced, and were impressed with the level of service they provided. The medical center also took advantage of the GSA Contract offered by Schneider Electric, which helped streamline the procurement process through prenegotiated pricing. This made the selection of Square D Services and Schneider Electric Engineering Services a natural choice for the site-wide Power System Assessment.



Project

Square D Services and Schneider Electric Engineering Services conducted an in-depth evaluation of every system and component throughout the center's campus to gain a deeper understanding of the electrical power system. The goal of site assessment was to identify and prioritize issues detrimental to the power system, including environmental conditions that could cause future equipment failure.

Several buildings were involved in the assessment and included the main medical center, outpatient clinics, and administrative and research facilities. Also included in the assessment were buildings that housed the campus's infrastructure. These included the boiler plant, emergency generator, and electrical substation buildings as well as the chiller plant. The age of the buildings, most of which have undergone renovation, ranges from 1950 to the early 1990s.

Power system engineers and qualified field services representatives set about the extensive task of collecting equipment nameplate data to be able to perform engineering analyses. Specific engineering studies performed included:

1. Short-circuit coordination studies to determine the adequacy of the equipment to withstand or interrupt a short-circuit current
2. Load flow analyses to examine the level of voltage drop at each point in the system as compared to that allowed by the National Electrical Code
3. Overcurrent/time-current coordination studies to provide settings for protective devices
4. Flash hazard analyses to establish the flash protection boundary around electrical equipment and identify personal protective equipment (PPE) requirements for workers

Upon completion of this phase of the work, the medical center received updated system documentation relative to single-line drawings, system configuration, and flash hazard boundaries for each piece of electrical equipment. This helped the center meet requirements of the Joint Commission® and NFPA 70E® standards for workplace safety.

After reviewing the updated drawings, Schneider Electric power system engineers physically walked-down the campus, from the utility service entrance to major distribution centers. System configurations, operating parameters, and equipment conditions were visually inspected and reviewed. In addition, they addressed the condition and maintenance requirements of the electrical equipment, including grounding requirements and backup power systems. Further, the on-site assessment identified and prioritized issues detrimental to the power system, including environmental conditions that may cause equipment failure in the short or long term.

The following types of equipment or systems were involved in the power system assessment:

- Automatic transfer switches
- Current limiters
- Generators
- Key interlocks
- Main distribution panels
- Motor control centers
- MV motor starters
- MV switchgear (4160 V)
- Substations
- Switchboards
- Transformers
- Circuit breakers
- Emergency distribution system
- Grounding
- Labeling
- Monitoring
- MV distribution system
- MV switches (15 kV)
- Panelboards
- Surge protectors
- Transfer switches
- Undervoltage protection

The issues identified for corrective action were entered into a Hazard Vulnerability Analysis spreadsheet. Each line item was color-coded to indicate the suggested priority based upon the potential impact to reliability and safety. The spreadsheet delivered to the medical center contained more than 200 color-coded line items. Examples of the types of deficiencies found in each category and recommended corrective actions are shown below.

Red (24) – Items with critical deficiencies that should be addressed with the highest priority. These have life-safety-equipment or personnel safety implications. An example of a red-tagged deficiency would be missing a ground conductor or incorrect overcurrent device settings.

Item	Priority	Photo	Equipment	Bldg	Deficiency	Action	Budgetary estimates ($)			Pricing is for:
							Matl's	Labor*	Budget	
1	Red	10	Panel S	1	Standing water in front of panelboard	Provide drainage for water				Engineering solution required
2		3 4	T-room grounding		Not bonded to building grounding system	Bond to building grounding system		2,000	2,000	4/0 ground conductor from T-room to sub-basement main ground bus
4		8	Panel 1D (Rm A158)		Install approved panelboard	Replace panelboard	1,200	1,600	2,800	New 120/208 V 100 A MLP panel with (20) 20 A 1 P
7		1 2	Sub A10		Egress path is blocked	Provide egress path				Engineering solution required

* Includes design

Orange (107) – Items or situations that require action (e.g., code violations, equipment condition, etc.) but are not believed to present an immediate threat to personnel safety or equipment reliability.

Item	Priority	Photo	Equipment	Bldg	Deficiency	Action	Budgetary estimates ($)			Pricing is for:
							Matl's	Labor*	Budget	
60	Orange		ATS-23	1	Overdutied ATS	Replace ATS	6,000	2,000	8,000	New 120/208 V, 260 A, 3 pole ATS
63			ECP7		Overdutied panelboard	Replace panelboard	1,400	1,852	3,252	New 1208/120 V, 100 A MCB panel w/ (20) 20 A circuit breakers
64		33	Sub-basement receptacle and box		Not supported; not GFCI	Support and replace		400	400	Labor to perform task
64		34	XFMR H containment		Oil could leak into Room A10	Build transformer containment				Engineering solution required

Yellow (63) – Items or important deficiencies that have equipment or reliability implications.

Item	Priority	Photo	Equipment	Bldg	Deficiency	Action	Budgetary estimates ($)			Pricing is for:
							Matl's	Labor*	Budget	
148	Yellow	49	Panel BP204	6	Equipment age and obsolescence	Replace panelboard	900	1,852	2,752	New 120V, 60 A, (8) 20 A load center
149		50	Unit sub B6		Equipment age and obsolescence	Replace substation	14,000	12,600	26,600	Double-ended MTM 13.2/208/120 V xfmrs, 600 A gear, (4) 400 A Frame FRDs
150		62	Panel BP209		Circuit breaker spacers missing	Install spacer cover		200	200	Labor to perform task
151			MV Sw'gear		No under voltage protection	Install under voltage relays	10,000	10,000	20,000	New under voltage relays

* Includes design

Blue (31) – Minor deficiencies (e.g., surge suppression, power monitoring, lightning protection).

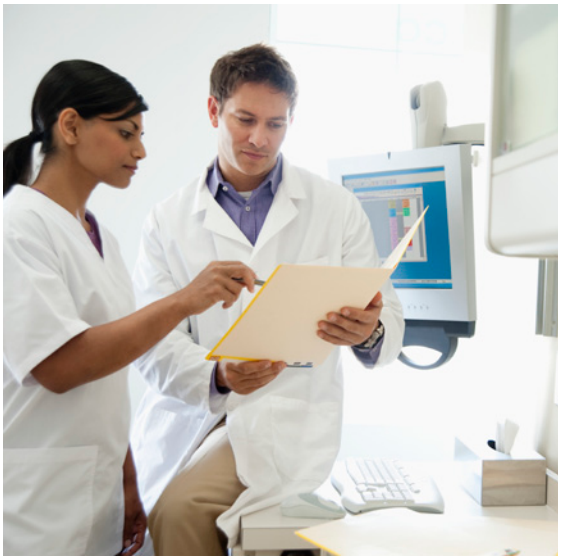
Item	Priority	Photo	Equipment	Bldg	Deficiency	Action	Budgetary estimates ($)			Pricing is for:
							Matl's	Labor*	Budget	
222	Blue	101	13.2 kV / 480 V transformer	31	Transformer cooling clearance	Create space for transformer cooling				Engineering solution required
223		102	Safety switch EUH-1		Working space around equipment	Relocate safety switch				Engineering solution required
224		77	MV Sw'gear		No under voltage protection	Install under voltage relays	6,000	7,500	13,500	New under voltage relays
225			Equipment labeling		Equipment labeling inconsistent	Create a labeling plan and relabel facility	3,750	4,000	7,750	Design, layout and create approx. 750 phenolic labels

Green (4) – Items where deficiencies may limit the facility's ability to optimize.

Item	Priority	Photo	Equipment	Bldg	Deficiency	Action	Budgetary estimates ($)			Pricing is for:
							Matl's	Labor*	Budget	
226	Green	103 104	Lightning protection		No lightning protection on Bldg-1; Bldg-2 lightning protection needs maintenance	Perform lightning protection study		10,000	10,000	Labor to perform lightning protection study and inspection
227		105	4160 V Switchgear	31	4160 V chiller motor kW meters broken	Install new power monitoring	30,000	10,000	40,000	Install 5 new power monitor circuits
229			TVSS		Lack of switchboard-level TVSS	Install TVSS at each switchboard	40,000	50,000	90,000	Install 10 TVSS units at 10 switchboards
230			Campus power monitoring		Lack of facility-wide monitoring system	Install PowerLogic network	121,000	100,000	221,000	Install 16 circuit monitors, software and PC, including start-up and training

In addition to the engineering studies and hazard vulnerability analysis, the comprehensive report also included over 100 on-site photos.

* Includes design



Results

Schneider Electric power system engineers conducted an in-depth evaluation of every system and component throughout the medical center and provided comprehensive recommendations surrounding specific equipment that needed to be replaced or updated. This included the identification of several critical potential electrical hazards and dangers that needed to be addressed and corrected, such as missing box covers and incorrectly sized wire feeding circuits in breakers. It was also recommended to install separate ground systems for certain components of the medical center's electrical system, to better protect its facilities from outages and other electrical failures.

Estimated costs were also provided to help management develop a plan to execute each of the recommended upgrades and replacements. The upgrades will be carried out building by building until completion in the fall of 2012 to help assure that power flows reliably to all parts of the medical center.

Why Choose Schneider Electric Engineering Services?

Our registered professional engineers, safety-trained and equipped, will design, specify, install and commission your upgrade project. We have over 100 strategically located professional engineers who are collectively registered in every state of the United States. Recognized as industry experts in power system analysis, design, and codes and standards, many of our engineers are leaders in IEEE, NFPA and other power system standard-making organizations.

Make the most of your energy[SM]

Schneider Electric provides inspired and comprehensive energy solutions that transform the way businesses manage their environment, efficiency, and costs.

As a global specialist in energy management with operations in more than 100 countries, Schneider Electric offers integrated solutions in energy and infrastructure, industrial processes, building automation, and data centers/networks, as well as residential applications. Schneider Electric is dedicated to making individuals' and organizations' energy safe, reliable, efficient, productive, and green from Plant to Plug.

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