The power principle

Healthcare experts discuss increasing loads for emergency systems, unique solutions and the Joint Commission influence

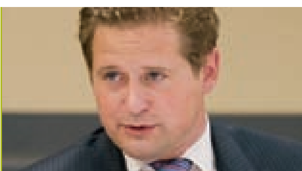
>> Reliable emergency power — and more of it for healthcare facilities — is becoming increasingly important. Three trends are driving the move toward larger, more sophisticated on-site power systems.

One is that managing and storing patient information electronically demands 24/7 power availability. Next, more and more equipment, especially revenue-producing MRI and CAT systems, is being added to emergency power systems. Finally, none other than the Joint Commission encourages healthcare managements to go beyond minimum requirements.

A national roundtable of consulting engineers who design and build emergency power systems for healthcare facilities was recently assembled by ASCO Power Technologies. During the conversation, James Brownrigg of Turner Logistics, Scott Kesler of OWP/P, Jerry Petric of Korda/Nemeth Engineering, and David L. Stymiest of Smith Seckman Reid, Inc. described innovative approaches that have solved healthcare facilities' power requirements. They also suggested that the Joint Commission encouragement for adding more than the minimum life safety loads to emergency power also might affect the move to larger, more sophisticated systems. One result is higher demand for seamless power transfer during tests to protect sensitive electronic equipment.

Finally, they addressed the growing role of connectivity — specifically, the ability to monitor and control emergency power remotely, and to interface it with energy management systems.

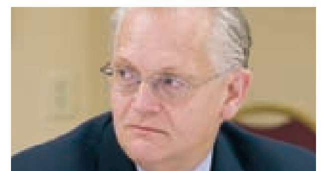
ROUNDTABLE PANELISTS



James Brownrigg is the vice president of healthcare and research products for Turner Logistics. His project resume includes Swedish American Hospital in Rockford, Ill. and Provena Saint Joseph Hospital, in Elgin, Ill.

Scott Kesler, PE, is director of electrical engineering at OWP/P. He has been in the engineering field for more than 19 years focusing on healthcare. Kesler is a registered professional engineer with a Bachelor of Science degree in Electrical and Computer Engineering from Marquette University.

Jerry Petric, PE, is a partner with Korda/Nemeth Engineering, Inc. He has 36 years of experience in the electrical engineering and the healthcare field. Petric is a graduate of the University of Dayton (Ohio) with a degree in electrical engineering.



David L. Stymiest, PE, CHFM, SASHE, CEM, GBE, is a senior consultant-compliance and facilities management person with Smith Seckman Reid, Inc. He has 34 years of experience in all facets of electrical engineering for healthcare facilities.

James Brownrigg
Turner Logistics

Unique approaches to healthcare power reliability

“There is some interest developing in shorter backup periods as the capacity and redundancy of emergency power supplies grow,” said James Brownrigg, vice president of Healthcare and Research Projects of Turner Logistics, LLC.

He said that although a 20-minute standard was customary in the past, generator power is now required to be online in 10 seconds, so more sophisticated owners are beginning to consider reducing the UPS requirements to less than one minute. This has opened the door for different forms of UPS power supplies.

“In certain geographical areas, utility incentives have been used to transfer the responsibility for maintenance and fuel to local utilities in exchange for the right to operate the plant to backup utility reserves during periods of peak demand,” Brownrigg said.

Scott Kesler, director of Electrical Engineering of OWP/P, added, “Where we’ve seen the bigger changes in healthcare is the growing importance of computers and data centers. Hospitals are operating not much differently than any other business does that relies heavily on computers. Data centers need to be robust and reliable because they are ever expanding and necessary for everyday patient care needs.

David L. Stymiest, senior consultant for Compliance and Facilities Management with Smith Seckman Reid, Inc., described another approach. “I’ve seen more interest in co-generation, or combined heat and power applications. There is also increasing use of bi-fuel generator sets and UPSs, including flywheel based systems. I also expect to see more use of bi-fuel generator sets for optional backup systems.”

Going beyond code and loading-up on emergency power

All the executives saw a strong desire among a growing number of hospitals to include more loads on their facilities’ emergency power systems. Whether at the urging of JCAHO, or because of experiences with more frequent and longer power outages, expanding emergency power capacity is considered a good investment.

Jerry Petric, a partner with Korda/Nemeth Engineering, Inc., said, “It’s about time that this is being addressed. The National Electrical Code identifies systems and equipment that are required to be connected to emergency power, such as medical gases systems, heating equipment and air handling units serving patient care areas.”

Code does not require air conditioning equipment to be connected to emergency power, but to do so is prudent.

“However, facilities are going to need these systems to be operational if there is an extended utility outage,” said Petric. Chillers can be connected to emergency power and could be manually transferred to emergency, if necessary.

“Healthcare facilities need to carefully consider what additional loads they want connected to the emergency power system so that the system can be properly sized,” Petric emphasized. “If there is a catastrophic event or if there is a utility outage, you would more likely visit a hospital that is going to be up and running at 90 to 100 percent than one that is functioning minimally.” This can be a great marketing tool for the facility.

Petric said he believes the NEC code will be revised to require additional loads to be served by emergency power.

Brownrigg added, “There’s more and more seamless transfer and more UPS systems in the line-ups. Reasons for adding more loads to emergency power systems include importance of electronic medical records, HIPAA and data security, as well as a demand to provide more functional program during a utility power outage.”

Kesler reported, “Hospitals are always concerned about the interruption of power and the impact it has on operations. This includes any required testing and ongoing maintenance. Even small irregularities in the power supply can shutdown sensitive equipment for hours while the system is reset. Hospitals are looking more at using UPS systems and other means to protect highly sensitive loads. This includes using closed transition transfer switches.”

Scott Kesler
OWP/P

Jerry Petric
Korda/Nemeth Engineering

Most hospitals will plan normal power shutdowns, to some degree, for construction and renovation projects. They all also need to have planned normal power shutdowns for maintenance of normal power systems, and sometimes these two activities can coincide.

Hospitals don't usually move patients when they have planned shutdowns. They engineer the shutdowns so patients will remain safe while the maintenance takes place. There's really no effective difference in the impact of a planned shutdown and an unplanned normal power outage except for lack of planning, timing, and the surprise factor.

"There are two schools of thought to testing seamlessly," Stymiest explained. "One school says that you don't want the clinical function to see the monthly power transfers, and the other is concerned about making sure the clinical functions know what to expect, and train for the eventuality when normal power does fail.

"On a true loss of power, unless you have a UPS system that is online all of the time, which most facilities do not have, then there's going to be a short outage." All of the equipment patient care areas will see that outage. The equipment with working battery backup will ride through the short outage and should not have to be reset.

Shutting the facility down is necessary for adequate testing

The other systems that do not have internal batteries, or whose internal batteries haven't been maintained, will probably have to be reset. If the clinical staffs never see any power outages during monthly testing, how does the hospital assure itself that they know what to expect in the event of an unplanned power outage?

Petric added, "The blackout of 2003 made healthcare facilities concerned about being able to maintain normal hospital operations in the event of a sustained utility power outage. When one hospital had an outage and both the preferred and alternate utility sources were out, they needed to rely on generators for several hours."

They found they couldn't function the way they wanted because needed departments and hospital services, such as the kitchen and food service, were without power. In some cases, a hospital might have to experience such power interruptions and inconveniences several times before it's ready to take remedial action.

One facility was inconvenienced each time power transferred and re-transferred from its preferred to alternate service. The generators would start, sometimes transfer, and then re-transfer back to normal power, thereby resulting in numerous interruptions of service. It turned out that the long time delay for utility transfer between preferred and alternate service was the problem.

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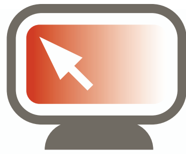

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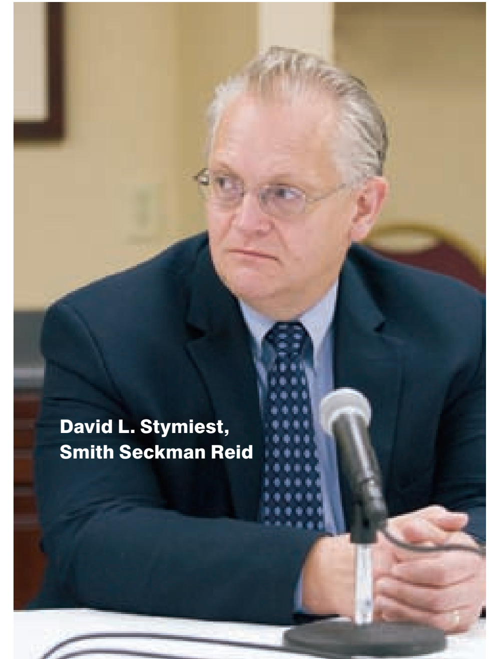
Recognizing the value of monitoring



David L. Stymiest, Smith Seckman Reid

>> As emergency power systems for healthcare facilities become larger and more sophisticated, it also is more important to better monitor system status and operation. That requires getting more information, getting it more quickly, and getting it in a way that can be easily assimilated and acted on, if required.

Kesler said, "It's absolutely important. In the past three to five years, everyone has shown an increased desire to know where they're consuming power and how much they're consuming."

Accurate, real time information helps them better understand and manage the system, to determine where they can conserve. Most facilities are using more electronic metering to track power consumption — not just at the main feed, but also for specific equipment.

Brownrigg agreed. "There's no question that it's important. But, healthcare is experiencing escalation of material costs, labor and energy. Capital construction costs are in the 10-percent range. Hospital certificates of need and budgets, approved by boards of directors three to five years ago, are a real issue now."

"There's a crunch to afford the programs that they're trying to build. The cost of capital programs can exceed what the board approved, so remote monitoring may not always be included. Many projects start with lofty expectations for this feature and forego implementation to meet the financial targets of the project."

Petric added, "I'm seeing remote system monitoring occurring more and more. What's useful on the emergency side is all the data that can be collected from the system, as well as being able to remotely control the emergency power system through the building automation system."

Stymiest said, "I think we're going to see more remote monitoring and control-of-power systems, both emergency and normal. Anything that provides the facility manager with more information about his or her systems is a good thing."

These can provide greater control, better awareness of system condition, and better documentation of system operation.

And, more electrical distribution system components are being manufactured with built-in microprocessors. Circuit breakers, motors and controllers, transfer switches and generator sets all have them, and built-in microprocessors offer the ability to send information to some electrical power management systems. ■