What to do when the lights go out

A guide to handling power outages in healthcare
# Table of contents

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>3</td>
</tr>
<tr>
<td>Despite exemptions, outages still a problem</td>
<td>4</td>
</tr>
<tr>
<td>Checklist for power failures</td>
<td>6</td>
</tr>
<tr>
<td>What to do when the lights go dim</td>
<td>7</td>
</tr>
<tr>
<td>Tips for your departments</td>
<td>9</td>
</tr>
<tr>
<td>Utilities program development and management</td>
<td>11</td>
</tr>
<tr>
<td>Here’s what the JCAHO requires for supplies</td>
<td>12</td>
</tr>
<tr>
<td>Evaluation form for utilities management program</td>
<td>14</td>
</tr>
<tr>
<td>Utility management plan checklist</td>
<td>15</td>
</tr>
<tr>
<td>Rentals and additional supplies</td>
<td>16</td>
</tr>
<tr>
<td>Save those old Y2K plans</td>
<td>19</td>
</tr>
<tr>
<td>Ensure that outages don’t zap your ventilators</td>
<td>20</td>
</tr>
</tbody>
</table>
Help is here when the power goes out

Rolling blackouts in California in early 2001 heightened awareness of how susceptible hospitals and other health care facilities are when there is a power failure.

Energy shortages, poor weather, earthquakes, accidents, and human error can all lead to a disruption in your power supply.

When that happens, not only are there concerns that emergency backup generators will kick in when needed, but there may also be a need for a disaster management plan if a widespread outage hits your site.

Such situations can be trying times for employees who have to adapt to work conditions with total or limited power failure, and patients can also be traumatized further if staff members are not well prepared to handle a blackout.

Don't be caught off-guard for an outage because you believe it won't happen to you. Health care facilities are compromised by a variety of emergency situations each week, and preparation is a key to successfully making it through an incident.

In this electronic book, we talk to facility managers who have been through power outages, offer advice on what you can do to be prepared, and provide checklists and forms to help you anticipate problems and better train your employees.

As always, we welcome any comments or suggestions. Please feel free to call or e-mail me at any time with your thoughts.

Sincerely,

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The headlines sent a shudder through the health care community in the early months of 2001. California, home to more than 500 hospitals and countless other medical facilities, would undergo unplanned and unannounced rolling blackouts through February and March.

As facility managers and safety engineers scrambled to ensure that back-up power generation systems were in place for the initial phase of blackouts, many hospital executives looked past the early months and wondered how their power resources would stand up to the midsummer heat. Would air conditioning and other high-powered systems drain the state’s power grid of resources?

Concern mounted as notice of the blackouts approached. The state Public Utilities Commission (PUC) put into effect a regulation stating that hospitals with more than 100 beds would be exempt from any power transmission interruption. Many thought the 100-bed limit would exempt all but a handful of medical facilities throughout the state. However, according to statistics provided by the California Department of Health Services, almost 40% of hospitals would fall under the 100-bed limit, causing major concern throughout the state.

Hospitals look at their plans
As the first series of blackouts approached, many hospitals under the 100-bed limit took a close look at their emergency plans and restructured them accordingly.

Most facilities already had blackout plans in accordance with their preparations for Y2K events. Some hospitals used varied plans for earthquakes and other natural disasters as a model for their electrical interruption plans.

Rural hospitals had more to fear. According to Richard Maddux, environmental health and safety manager for Catholic Healthcare West in Oakland, CA, some hospitals in rural areas had no choice but to prepare for the worst because their independent rural power providers believed they would be denied power from the grid.

Surgeries were rescheduled, and workers took other steps to ensure that patients would be safe and cared for during a blackout.

A blackout strikes a rural hospital
At Redbud Community Hospital in Clearlake, CA, the lights did go out, but only for a brief period of time. The facility experienced a power outage during the afternoon of March 19. Even though the hospital had received warnings in the previous weeks that a blackout might occur, there was no specific warning from the power company.

Redbud, part of the Adventist Health system, is a 32-bed hospital with a 24-hour emergency room, several medical/surgical rooms and an OB department. The facility supports a mostly rural community populated by vacationers and a large retiree population.

“The generator came on immediately,” said Lisa Hayden, a spokeswoman for Redbud. “There was no interruption of electricity to critical care.”

“Had we had a power failure, we would have reverted to disaster mode, at which time an incident command system would have been set up.”

—Lisa Hayden
operating. Inside the hospital, team leaders would report to the incident commander, who would then determine priorities based on the available resources. Hospital staff would coordinate efforts out of an on-site emergency center, with the emphasis put on patient care and safety.

Workers at Redbud were well prepared for a blackout. During the previous fall season, staff members had undergone training for an earthquake drill. Had the March 19 blackout been of long duration, medical staff would have had to revert to hand-driven mechanical methods such as hand pump equipment for intensive care patients.

The PUC takes another look

After the initial round of March power transmission interruptions, many in health care began to lobby the California PUC to expand the exemption from rolling blackouts to all hospitals within the state, regardless of size, and, on April 3, the statewide hospital exemption was passed.

The electric companies complied with this regulation by moving the hospitals from certain blocks on the power grid to other high-priority blocks. “Any time a request from the PUC comes in for a power interruption from a stage three type of alert, we always black out blocks one through 14,” said a spokesman from Pacific Gas & Electric, one of California’s major power suppliers.

Since the change in regulations, all hospitals have been moved to block 50, where they share power resources with police, fire, and other essential services. Officials from the power companies say that outside of natural disaster or an occurrence such as a drunk driver hitting a transmission pole, blackouts will not occur at any California hospital.

Could it happen to you?

Power outages are still prone to happen, however. And when they do, they can strike any type of facility. In August 1996, a power transmitter in Wyoming failed, causing a power interruption throughout the western part of the United States.

More often than not, power interruptions do not affect such large regions.

Recently, a faulty switch at the electricity’s entry point to the Ventura Medical Center in California caused a 20-minute power loss to the facility’s west wing.

Layers of backup generators the key to survival

For most facilities, the key to surviving a power interruption is to have a multilayered system of back-up generators in place. Earl Williams, safety coordinator for BroMenn Healthcare of Bloomington, IL, explains his multilayered plan for surviving a blackout:

“I have three generators: two on line and one to be connected as a backup. Additionally, each generator has the ability to power the whole house. I have a contingency plan with a local supplier to bring in another generator, and through a hook-up connection we can plug in an additional generator if needed.”

—Earl Williams

Since the blackouts began in California earlier this year, news reports have surfaced across the county regarding the susceptibility of certain regions and states to blackouts of power grids such as those that California suffered.

Most say that because the power grids are structured differently than California grids, rolling blackouts will not occur in their areas.

Hospital managers and safety engineers would be wise not to rest easy, however. Regardless of what region you live in, the threat of a blackout will rise as the summer progresses. —

What to do when the lights go out
Checklist: Steps to take in the event of power failure

This checklist provides immediate steps to take in the event of a power failure or emergency generator failure. Items should be checked off as they are completed.

This checklist is adapted from the health and safety manual of MacGregor Medical Association in Houston. It was reviewed by Laura Harrington, RN, CPHQ, practice director of external peer review for The Greeley Company in Marblehead, MA. Harrington is the former chief quality and safety officer at MacGregor Medical Association in Houston.

Electrical power system failure
The emergency generator starts and supplies power to essential areas. The head of facilities management or other designated individual ensures generators are running properly, then notifies the facility services director.

The head of facilities management or other designated individual checks all systems, including elevators and boilers. A designated individual from the facility services department determines whether loss of power is due to internal or external disruption.

If the loss of power is due to external disruption, the facility services department contacts the utility company that provides power to the building using the 24-hour outage number:

- Ask the utility company about the length of down time.
- Based on the length of down time, inform representatives from administration and clinical care as to the status of the outage and determine operational changes necessary to carry on business.

If the loss of power is due to internal disruption, the facility services department attempts to identify the problem:

- Identify the distribution panel serving the area affected by the power loss.
- Trace and correct the problem from the distribution panel.
- If the problem can't be immediately resolved, notify representatives from administration and clinical care.
- If repairs are beyond the scope of the facility services department, call a licensed electrical contractor.

Use emergency extension cords as necessary to get power from other areas if there is a critical need determined by the department director. Secure the cords when not in use to ensure safety.

When power is restored, reset or restart equipment in the power plant, mechanical room, and other affected parts of the building.

Emergency generator failure
Notify the facility services department or designee, and the chief operation officer, immediately that there has been a total power failure.

Check and secure all equipment. The facility services department calls the generator contractor for immediate service on the generators and/or portable backup generator delivery.

Initiate the emergency call plan to bring in additional personnel for support as necessary. Facility services department personnel on duty at the time ensure that battery-operated lights are functioning in the building.

Facility services department personnel assist in distributing spare flashlights to other employees. The facility services department attempts to determine a reason for the generator failure.

Note: This rundown is not all inclusive. Health care facilities may have specific areas to address.

Sources: Laura Harrington, RN, CPHQ, The Greeley Company in Marblehead, MA; MacGregor Medical Association in Houston.
When the lights go dim, this is what you should do

Blackouts are not just an issue for California. Natural disasters in all regions of the United States could leave your facility in the dark and scrounging for resources.

“One of the first things you’d want to do is check your fuel supply and how much oil is in the tank of your diesel generators, as some hospitals still use gas,” says Ray Moughalian, president of RM Associates Inc., a health care facilities management company in Haverhill, MA.

After checking the fuel supply, Moughalian says your work has only just begun.

• Determine whether you need additional manpower to cover your shifts
• Make sure you have a backup generator.
• You may have difficulty getting enough generators to cover the whole area affected by the blackout, so you may need to call contractors to check the availability of backup generators in your region.

Share the power
Hospitals may have multiple generators hooked up simultaneously to share the load of powering an entire facility, says Moughalian. Other facilities, however, may have multiple generators, each one covering a separate area within the building.

“I think pooling is better because if one generator fails, the other can handle the load,” Moughalian says. “If you have it the other way and you lose a generator, you’re out completely. When you have to start getting backup generators from the outside, it could take a few hours up to several days to find one.”

Review your emergency distribution system to determine what lights, elevators, and equipment a generator will power if the lights go out. You’ll also need to install portable lighting in corridors and tunnels that are most likely not served by generators, Moughalian says.

“It’s a good time to document what is on emergency power and what is not,” he says. “You might be surprised. It doesn’t happen very often when you go to your administrator and say, ‘I want to run the hospital on emergency power.’ But it’s an excellent time to document what is on the generator, and [it gives you] enough time to start plugging into receptacles to see what is on emergency power.”

Make sure your generator provides power to the following areas, listed in descending order of importance:

1. Critical areas
2. Patient care areas
3. Nonpatient care areas

“I’ve seen critical pieces of equipment like a [Computer-Aided Tomography] scan not on a generator. I don’t know how that happens,” Moughalian says. “There are probably a lot of nonpatient care areas you can check ahead of time, but patient care areas are difficult.”

For patient care areas, the generator must start automatically within 10 seconds, according to the NFPA, but Moughalian says most hospital generators kick in within 6–8 seconds. “A lot of places have put in battery lighting in an operating room, so surgeons don’t have to be without lights for those 6–10 seconds until the generator starts.”

Test your generators regularly
Moughalian says about 50% of health care facility engineers test their generators according to the NFPA guidelines of once a month for 30 minutes. The other 50% test it twice a month or even once a week. “It makes them feel more comfortable and there’s less chance of error,” he says. “You should know everything is fine.”

According to Pati Aine Guzinski, an emergency management consultant with Russell Phillips & Associates/MedSafe in Rochester, continued on p. 8
NY, when the power goes out, these areas must have power:
1. Egress illumination
2. Exit and directional signs
3. Patient care areas
4. Operating rooms
5. Labor and delivery areas
6. Emergency room (ER) and intensive care unit
7. Clinical labs

Also, connect your computer to an uninterrupted power source, she says. “Sometimes, in our reliance on computers and generators, people in health information systems don’t always practice switching to a backup generator and battery power, but hard copy,” Guzinski says. “How would you function in an ER if five or six people came in at the same time and the computer was down. People forget we’re all at the mercy of nature.”

When the power goes out, Guzinski recommends that everyone know how outlets are identified and what services the generator covers. If you lose electricity during the day, you should open the curtains to maximize natural light, she says. Turn off unnecessary electrical equipment to reduce the load on the generator, and turn off any equipment running when you lost power. If you’re unsure of what to do, check with your engineering department.

Should your fire alarm or fire suppression system be out of service for more than four hours during a 24-hour period, Guzinski says to notify the fire department and insurance carrier, then establish a fire watch. The fire watch is composed of people who look for fire hazards, including smoking and trash, Guzinski says. “If you have a delay in notifying the fire department, you want to make sure you prevent a fire during that period,” she says.

Meanwhile, each department within the facility should be taking care of its own affairs, Guzinski says. (See accompanying story for a breakdown of each department’s duties, p. 9.)

Guzinski says you should have a mutual aid plan in place with other facilities both locally and regionally to find out which services can be provided by other hospitals. “It takes a lot of preplanning and a long time to do a good plan, since hospitals are more specialized and many are shutting down, but I think it’s extremely necessary to have it done,” she says.

Further, your failure plans should all be current, Moughalian says, with an updated emergency vendor list so when you make the phone call in the height of the storm, you won’t find a business that’s relocated or, worse, gone out of business.

The Joint Commission on Accreditation of Healthcare Organizations requires that all policies and procedures be reviewed at least once every three years. Don’t wait until the last minute, but instead, divide the policies up so you’re constantly revising your plans. “You have to bite off a little at a time, because if you wait until the three years are up, you’ll be overwhelmed,” Moughalian says.

When the power comes back
Engineering must let each department know what the procedure is for turning their equipment back on, says Guzinski. “Otherwise, you’ll have a massive power draw, and you’re right back where you started,” she says.

You should also do the following:
- Check all refrigerators, freezers, boilers, and pumps to make sure they are operating properly.
- Reset lights, clocks, and timers.
- Check fire alarm system, elevators, manual transfer switches, generators for proper fluid levels and that all circuits

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“One of the first things you’d want to do is check your fuel supply and how much oil is in the tank of your diesel generators, as some hospitals still use gas.”
—Ray Moughalian

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Lights go dim continued from p. 7
You’ve lost power, how does your department react?

When the lights go out, while your facility deals with the sudden loss of electricity, there are also individual concerns each department must face. This is a look at some of those unique responsibilities.

Nursing

If you have portable equipment such as suction machines, your nursing staff should place an extension cord with each machine to plug into an outlet served by the emergency generator. If medication refrigerators are not served by the emergency generator, you need to use extension cords to reach an outlet that is or to move the medications to a refrigerator that is connected, says Pati Aine Guzinski, an emergency management consultant with Russell Phillips & Associates/MedSafe in Rochester, NY.

Your facility management plan should list which refrigerators are connected to the generator or which ones should be connected, and your staff should be familiar with the plan, she says.

You should also
- remove ice from machines and put it into refrigerators served by generators.
- know ahead of time where your flashlights and batteries are located. “I feel it’s very difficult to use flashlights for patient care,” Guzinski says, recommending snake lights, or lights strapped to your head, which leaves both hands free.
- be aware that stairwell alarms may deactivate under emergency power. “Nursing should know ahead of time and not find out as patients tumble down the stairs.”
- conduct frequent room checks if the nurse call system is inoperable. “It can be frightening for patients who expect to get the best care, and then an outage scares them. Popping your head in reassures them and gives them some TLC,” Guzinski says. “In an emergency, staff tend to forget how important it is to communicate with patients. It really helps decrease the anxiety level and makes it easier to cope.”
- see whether extension cords

We recently sent readers of our e-mail newsletter Safety Connection an instant poll asking them questions on their level of preparedness if they were to experience a power outage in their facility. We received 258 responses. We would like to thank everyone who responded to the poll.

Here are the poll results (Note: not all respondents answered all questions):

1. Is your health care facility prepared if a rolling power blackout shuts down your electrical systems?

   ![Yes—92% (237)] ![No—8% (21)]

2. Do you have trouble meeting JCAHO standard EC.2.10.4.1 on maintaining, testing, and inspecting emergency power systems?

   ![Yes—6% (15)] ![No—94% (237)]

3. Are procedures to deal with power outages and rolling blackouts part of your safety manual?

   ![Yes—76% (193)] ![No—24% (61)]

4. Do you have written policies for power outages and rolling blackouts?

   ![Yes—78% (199)] ![No—22% (57)]

continued on p. 10
are needed to plug into outlets served by the generator if electric beds can't be raised or lowered by the hand crank.

- learn how to give an intravenous needle (IV) by gravity rather than a pump. "We've become so reliant on technology, I think we need to remember that nurses regulated IVs long before pumps, but if you don't do it every day, you need to remember how," Guzinski says. This can be accomplished through an inservice education program.

You should not
- plug one power strip into another one. "It's tempting, but the generator is only rated for so much power. You don't want to exceed it and cause another problem," Guzinski says.
- leave extension cords lying in puddles of water or in places where patients and staff might trip over them.

**Kitchen**
If the generator does not power your refrigerators, ice machines, and freezers, Guzinski recommends that you transfer the food to those that are connected. If they are not connected, you should keep the doors closed to keep the cold air in, she says.

"If staff think spoilage is an issue, cook what you can and throw out the rest," she says. "If it affects your ability to wash dishes, refer to your loss of water procedures. If it affects your ability to cook, check your loss of cooking procedures, but hopefully, you've prepared noncooking dishes."

**Laboratory**
"We hope that in a lab, folks have practiced before how to work without power," Guzinski says. "You need to know what tests you're still capable of running, what you would send somewhere else, and where you would send it. Make sure all contacts are for local vendors, but step outside the community also, because if the outage is widespread, you're sunk." Guzinski says you need to make sure your blood or blood products are plugged in to an emergency generator to keep it viable.

**Security**
Your security staff should, according to Guzinski, be aware if any type of alarm (door, stairs, burglar) is not functioning under emergency power. "They'll have to secure entrances and exits to the hospital," she says.

Security should also take a more active role in safety throughout the building, including working on the fire watch and checking on slippery floors. Extra staff should be added in more critical clinical areas, such as the nursery. "You want to make sure someone can't just walk in, take a child, and walk out," Guzinski says.

All employees should know the basics of your security plan and where to go for assistance, she says. "Be aware that nobody is walking off with equipment." Also, to protect against assault, escort employees to and from cars at night if the parking lot lights are out. "A lot of times, hospitals in rural areas think this doesn't happen here, and it is safe to walk to the car without worrying about someone coming into the building," Guzinski says. "You never know."

**Engineering**
The engineering department should try to find out how long the outage will last, says Guzinski. Check your automatic transfer switches to make sure power is successfully transferred to the generator and closed, so when the generator kicks on, the power is sent where it is supposed to go. Also, check the emergency generator throughout the outage to monitor the voltage, the fuel level, and temperature of the generator.

The facility engineer is usually the best source of what's powered in your building, says Ray Moughalian, president of RM Associates Inc., a health care facilities management company in Haverhill, MA. "When they lose power, most engineers have a good idea of what's on power and what isn't. If they need extension cords, it's just a matter of moving them to areas that need it."
Utilities program development and management
important considerations

(Editors note: This story was taken from the pages of the Health Care Facilities Guide. For more information on HCFG, call 800/650-6787.)

Utilities management is one of seven related components of JCAHO’s standards for the management of the environment of care, which in turn are part of a larger group of standards addressing organizational functions that support the patient care process.

The patient care process, including the supporting elements addressed in the EC standards, is the core process measured by JCAHO during its surveys. One focus of the survey is on the consistency with which all the elements of patient care are practiced in all services provided by an organization.

The other focus is on how the organization’s management tools are used to design, teach, implement, measure, and improve health services and business practices, including those related to EC issues.

The first key to dealing with the EC standards effectively is to recognize that the focus for examining utilities management is the patient care process rather than the role any individual or department plays.

Below is an excerpt from the Health Care Facilities Guide describing some recommendations for the development and implementation of utilities management programs prepared by Ode Keil, vice president, Safety Management Services Inc., Arlington Heights, IL.

Risk assessment
The first step in planning for the utilities management process is an analysis of risks presented by such systems in the patient care process, as well as to individual patients, staff, visitors, and the indoor and external environment.

Patient risks can range from general safety issues to life-threatening situations, while risks to the patient care process can include treatment delays caused by equipment failure or lack of capacity. Utility systems-related risks to people may range from potential discomfort to extreme danger to life or health. Risks to the indoor or external environment may be related to issues that range from maintaining clean, healthy space to generation of toxic air, water, and land pollution.

An effective risk analysis framework should address engineering aspects of equipment risk covered in the EC standards. These include function of infection control, equipment support, environmental support, and life support.

The impact of utility systems on people, including patients, staff, and surrounding community members affected by discharges from utility systems also should be considered.

A medical equipment risk analysis should:

- Identify the types of patient care involving utility systems that are provided by the organization, either by department or by system function.
- Define the engineering uncertainties associated with each utility system. This may include the need for preventive maintenance, calibration, or continuous evaluation to confirm reliability.
- Identify competence factors necessary for proper equipment operation. This includes staff knowledge of instructions for setting up and operating utility systems. It also may include the more complex area of knowledge required to interpret and use information generated from utility system operators and clinical staff who require utility system function for effective care.
- Identify the direct impact of utility system operation on patient health. Impacts of system malfunction, ranging from minor nuisance to life-threatening situations, should be addressed.

Inventory of needs
Once the risk assessment is completed, an inventory of utilities management program needs can be developed.

This inventory should address procedures necessary to address all of the factors covered continued on p. 13
Looking at the JCAHO’s requirements for emergency power supplies

When the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) surveys your health care facility, it wants to see that you regularly test your emergency generators and also have policies in place for utility failure.

The JCAHO requires facilities to prepare for blackouts both in terms of the utility system operating properly and emergency management of an internal disaster such as a power failure, says JCAHO spokeswoman Lynnette Rimkus.

Some environment of care (EC) standards you want to consider include the following:

- EC.1.4—The facility plans for emergencies by addressing four major areas: mitigation, preparedness, response, and recovery
- EC.1.7—The facility has a plan to manage its utilities, including emergency procedures for system disruption or failure
- EC.2.9.1—The facility conducts at least two emergency drills per year
- EC.2.10.4.1—The facility maintains, tests, and inspects its emergency power systems

(Note, these standard numbers are from the Comprehensive Accreditation Manual for Hospitals and were current as of May 2001. There may be differences depending on the accreditation manual you use.)

Testing requirements

Specifically, EC.2.10.4.1 wants hospitals to test generators 12 times a year with intervals between 20 and 40 days. These tests must be for at least 30 minutes under a dynamic load of at least 30% nameplate rating, which is critical for demonstrating the reliability of a diesel generator system.

Hospitals can also test to less than 30% of the nameplate rating. In such cases, you also then need to perform an annual exercise using supplemental loads in this order:

1. 25% of the nameplate rating for 30 minutes, followed by;
2. 50% of the nameplate rating for 30 minutes, followed by;
3. 75% of the nameplate rating for 60 minutes, for a total of two continuous hours.

Hospitals also need to test all automatic transfer switches 12 times a year with intervals between 20 and 40 days.

Testing for stored emergency power supply systems (SEPSS) would likely not apply to hospitals, according to the JCAHO’s March/April 2001 Environment of Care News. That’s because the National Fire Protection Association, which the Joint Commission references, does not permit hospitals to have SEPSS. Only certain areas are allowed to use SEPSS, such as an ambulatory center or an outpatient clinic.

Nonetheless, if your facility needs to perform SEPSS testing, the JCAHO wants you to test all battery-powered lights for egress with a functional test for a minimum of 30 seconds at 30-day intervals, and conduct an annual test for 1 1/2 hours. You must also test SEPSS systems

- quarterly for five minutes or as specified for its class, whichever is less;
- annually at full load for 60% of the full duration for its class.

Be aware that if a hospital installs an emergency lighting system in addition to its generator, the lighting system is not considered a SEPSS, according the Environment of Care News.

Generators can fail, too

You expect your emergency backup to power essential services should the electricity go out. Don’t assume emergency generators are problem-free.
Utilities program development

continued from p. 11

by the risk assessment. Specifically, the inventory will list utility systems equipment and related requirements for engineering support, educational support, and competence measurement, as appropriate. The inventory also should identify systems for which emergency clinical, administrative, and engineering procedures must be established to avoid patient injury and death.

Resources needed to carry out the utilities management program should be identified as well. All staff who may become involved in the utility system management process at any point should be included here.

The program should be set up to ensure that the patient care process is not disrupted by poorly selected and maintained systems or by poorly trained operators or clinical users of systems or derived information.

Basic program components

The utilities management program should consist of a management plan supported by operating procedures. The plan describes what is done to manage utilities and states who has the authority and responsibility for ensuring that the program is carried out successfully.

The procedures describe in detail which specific activities must be performed, and when, to manage risks associated with utility systems. The procedures need not be an exhaustive description of all system-related activities. Only activities potentially affecting risk must be included.

The management plan

The utilities management plan should be a brief document that clearly addresses the following:

- Purpose. The purpose is a short statement that defines the scope of the program. Generally it should address utility system evaluation and acquisition, education of operators and users, maintenance and testing, and performance measurement.
- Activities. The plan also should describe in some detail, but not exhaustively, the activities that are part of the program. This includes management activities such as policy and procedure development; training and education; equipment acquisition, maintenance, and repair; and performance.

Emergency requirements

In September 1999, a tropical storm knocked out power to a hospital in Providence, RI. The backup system should have started after the outage, but relay problems overloaded the hospital’s generators and they stopped working, according to a hospital study reported on by the Associated Press.

Then, a diesel generator failed to supply power to another backup system. The outage allegedly led to a patient’s death when there was no power for a ventilator.

Similarly, a Massachusetts hospital’s emergency generator died out after briefly operating during a blackout about a month after the incident at the Rhode Island hospital. Fortunately, no patients were injured.

Experts say you should look at three common areas that lead to generator problems in health care facilities:

1. The transfer switch fails
2. The generator’s batteries don’t work
3. The generator’s fuel pump malfunctions

These scenarios point to the importance of testing emergency generators.
Annual evaluation of the utilities management program

Here are some questions to consider as part of an annual evaluation of the effectiveness of your facility’s utilities management program.

Are there current, accurate, and unique inventories of utilities included in the program?

List all deletions or additions to the program over the past year:

Do you maintain all utility and equipment failure/user error reports and do you report them to the safety committee when appropriate?

When there are problems with the program, do you take actions, document those actions, and evaluate them for their effectiveness?

Does preventive maintenance meet applicable laws and regulations?

Have there been any user error/accidents over the past year?

Were the actions taken effective in preventing recurrence? What future actions do you plan?

Do you consistently follow policies and procedures for utilities management?

What future actions do you plan to ensure compliance?

Do you orient and train staff members who use and maintain utilities in accordance with standards from the Joint Commission on Accreditation of Healthcare Organizations?

Do you evaluate staff members for competency in all areas specific to their job descriptions?

Is there a current and complete set of documents that indicate the distribution of each utility system, including controls for partial or complete shutdown?

Have you identified strengths and weaknesses in the program?

Have you identified any opportunities for improvement?

What goals have you set for the program for the upcoming year?

What financial resources have you allocated for these goals?

What program changes will you initiate in response to this evaluation?

Sources: Laura Harrington, RN, CPHQ, The Greeley Company in Marblehead, MA; MacGregor Medical Association in Houston.
### Utility Management Plan

<table>
<thead>
<tr>
<th>Standard</th>
<th>Assessment Point</th>
<th>Yes</th>
<th>No</th>
<th>Example of Compliance</th>
<th>Notes</th>
</tr>
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<tbody>
<tr>
<td><strong>1.</strong> Do you have a utility management plan that describes how you will</td>
<td>• lessen the risk of utility failures?</td>
<td>☐</td>
<td>☐</td>
<td>The hospital teaches employees the emergency procedures for shutting off a utility and reporting a utility problem or failure.</td>
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<td></td>
<td>• lessen the risk of nosocomial (hospital acquired) infections?</td>
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<td>• determine which utilities and utility components should be included in your management program?</td>
<td>☐</td>
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<td>• manage all of your utility systems?</td>
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<td></td>
<td>• evaluate and maintain your equipment?</td>
<td>☐</td>
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<td>• evaluate and maintain piped medical gas systems?</td>
<td>☐</td>
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<td>• handle emergency system failures?</td>
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<td>• determine the layout of each utility and the location of its control panels?</td>
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<td>• handle any problems with a utility?</td>
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<td>• provide an emergency power source that can maintain all of the hospital's essential functions, if needed?</td>
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<td></td>
<td>• teach staff how to manage the hospital's utilities as applicable to their jobs?</td>
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<td>• monitor performance in at least one of the following:</td>
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<td></td>
<td>- education and training of employees</td>
<td>☐</td>
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<td>- incident reporting and management</td>
<td>☐</td>
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<td>- preventative maintenance</td>
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<td></td>
<td>- surveillance and inspection</td>
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<td>• the process for performing and annual review of the utilities management plan?</td>
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This chart was excerpted from the JCAHO Mock Survey Made Simple, 2001 Edition. For more information, call 800/639-6787.
Sample forms: Rentals and additional supplies

If a blackout hits your health care facility, you may need to quickly rent equipment or bring in additional materials to help keep your day-to-day operations moving along as best they can. In such cases it may be helpful to keep specific track of these items.

The following two charts on pp. 17–18 come from the Federal Emergency Management Association and are referenced in the North Dakota Division of Emergency Management’s Disaster Procedures Handbook (available to download at [www.state.nd.us/dem/op.html](http://www.state.nd.us/dem/op.html)).

While the handbook addresses steps that local government will take in an emergency response, health care facilities can use or adapt these forms to fit their own needs.

**Rented equipment recordkeeping**
You should have documentation for rented equipment that includes the following information:

- Type of equipment
- Description
- Date of use
- Total hours of use
- Payment rate per hour
- Total cost for each rented item
- Total cost for all rented items
- Amount actually paid
- Check number or receipt of cash payment

You should place the form in job folders immediately upon starting work. You should record daily the use of any rented equipment.

The Disaster Procedures Handbook recommends that the rental agreement specifically state who will pay for repairs to the equipment.

**Materials recordkeeping**
If you bring in additional materials and supplies in response to an outage, you should have a materials summary record that includes the following information:

- Unit price of each item
- Total price
- Quantity of items
- Description of items
- Date of purchase
- Date you used the item
- Job site where you used the item
- Check number or receipt of cash payment

You should place the form in job folders immediately upon starting work.

If the invoices for materials have not yet arrived, confirm the necessary information with the vendor, the Disaster Procedures Handbook suggests.

---

**Lights go dim**  
*continued from p. 8*

- Check the fuel tank.
- Make sure the bioengineering equipment is up and running, and find out whether batteries need to be replaced if they have been used for a long time.
- Dispose of perishable food items exposed to unsafe storage temperatures.
- If you can’t get blood bank products into a refrigerator running on an emergency generator, you need to know how long it will hold its temperature. “Check on a regular basis, as blood is highly perishable,” Guzinski warns.

In the end, if your facility is not prepared, Moughalian says you’re not alone. “Very few hospitals have everything documented. The only way to really know what’s what is to lose the power.”
<table>
<thead>
<tr>
<th>TYPE OF EQUIPMENT</th>
<th>DATES AND HOURS USED</th>
<th>RATE PER HOUR</th>
<th>TOTAL COST</th>
<th>VENDOR</th>
<th>INVOICE NO.</th>
<th>DATE AND AMOUNT PAID</th>
<th>CHECK NO.</th>
<th>W/O PR</th>
<th>W/OUT OPR</th>
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I CERTIFY THAT THE ABOVE INFORMATION WAS OBTAINED FROM PAYROLL RECORDS, INVOICES, OR OTHER DOCUMENTS THAT ARE AVAILABLE FOR AUDIT.

CERTIFIED

TITLE

DATE
What to do when the lights go out

FEDERAL EMERGENCY MANAGEMENT AGENCY
MATERIALS SUMMARY RECORD

<table>
<thead>
<tr>
<th>VENDOR</th>
<th>DESCRIPTION</th>
<th>QUAN.</th>
<th>UNIT PRICE</th>
<th>TOTAL PRICE</th>
<th>DATE PURCHASED</th>
<th>DATE USED</th>
<th>INFO FROM (CHECK ONE)</th>
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GRAND TOTAL

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CERTIFIED

TITLE

DATE
Look to old Y2K plans for help with power outages

A lot of planning for blackouts and other power outages is similar to preparations health care facilities made for potential year 2000 (Y2K) problems.

Y2K contingency plans looked at how computer problems related to the date change on January 1, 2000, could have affected the following vital systems in a facility:

- Normal power
- Emergency power
- Communications, such as telephones, beepers, and overhead paging
- Exhaust ventilation
- Air handling
- Sewer and waste disposal
- Fire alarms
- Fire sprinklers
- Elevators

Health care sites should look to their old Y2K plans for tips and advice on how to prepare for electricity losses, says disaster planning consultant Russell Phillips, president of Russell Phillips & Associates/MedSafe in Rochester, NY.

In that spirit, we reviewed recommendations in our past stories about Y2K and pass them along to you as possible things to consider for power outages.

Repairing fire alarm systems
Though it will be relatively easy to tell whether there’s a problem with the fire alarm system, getting someone to fix it may be trickier. In some regions, qualified programmers who can repair the alarm setup will be in short supply, particularly if several customers need work on their alarms following a blackout. Contact your vendor ahead of time to see what assistance they can provide in an emergency.

Think broadly about impact
You’ve probably got a good idea of the major systems a power outage would knock down in your facility. However, the following areas might not top your list, but could turn into a headache if they’re not available: Nurse call systems, computerized maintenance programs, television systems, master clocks, physician registers, central dictation systems, pneumatic tubes, payroll accounts, and sound systems.

Anticipate outages
If you see on the news that there could be an energy shortage, or even hear directly about an upcoming problem from your power supply company or regulator, get some things settled before any electricity goes out. To start, make sure your backup generator’s fuel tanks are full, and while you’re at it, gas up any vehicles in case the pumps aren’t working during the outage. Also, make sure your staff members can start the boiler manually if possible, without the electric starting system to help them.

Lawyers may be waiting
Another way to look at utilities management is from the legal end. Don’t just rely on regulator standards; rather, ask yourself what a lawyer would look at if something went wrong because of a power outage. To avoid a court appearance, you may want to do additional testing beyond expected intervals if that will help you better determine that a generator works properly, for example. Also, have you considered any legal aftershocks if you don’t have a documented utilities failure plan in place? You should consult your facility’s attorney for more assistance.

Go beyond the initial blackout
The moment power goes out, it will start a hectic period while your employees realize what has happened and then adjust their duties accordingly. But in planning for this moment, you should extend the time frame to consider indirect effects from even a short outage. Here is an example: Let’s say a phlebotomy team gets stuck in an elevator when the power fails. The scope of the problem will not only affect lab work, but also patient care and building operations. The direct impact is that blood samples might not get tested, but indirect consequences include the accounting office perhaps filing a patient bill for a test that isn’t done.
During the 10 or 15 seconds after the electricity fails and the emergency backup kicks in, ventilators come to a halt. For some patients, that’s 15 seconds too long, says director of respiratory care Bob Wall, RRT, at Mississippi Baptist Medical Center in Jackson. To alleviate complications during unexpected outages and monthly tests of the backup system, Mississippi Baptist installed an uninterruptible power supply, or UPS. The UPS is wired to specially marked outlets at 28 beds in the adult intensive care unit, coronary care unit, and long-term acute care facility.

“Now, whenever we plug a ventilator in, we use a UPS outlet,” explains Wall.

The UPS consists of a bank of lead-acid batteries. The facility’s main power source runs through the UPS, keeping the batteries charged, and out into the hospital through its normal circuitry. “If the main power source is interrupted for any reason, the UPS batteries automatically take over—in nanoseconds,” says Wall. The power lasts 10 to 15 minutes, depending on the number of ventilators in use—time enough for the emergency backup system to take over in all but the most unusual circumstances.

Wall says the benefits of the system go beyond patient care. He no longer needs to cancel tests of the emergency system when patients sensitive to an outage are on ventilators. What’s more, he says, the “clean” power supplied by the UPS eliminates power spikes. The result? Ventilator circuitry problems have virtually disappeared.

Before he presented the idea to hospital administrators, Wall documented a year’s worth of patient problems and engineering hassles caused by power interruptions. The cost of the UPS—about $40,000—wasn’t prohibitive, says Wall.

Two hints: “Be sure to tell engineering exactly where you want the outlet installed,” advises Wall. (Some of Mississippi Baptist’s ended up on the wrong walls and at the wrong ends of beds.) Finally, monitor the staff’s compliance with the new procedures. “It took us awhile to get into the habit of plugging the ventilators into the UPS outlets.”

“If it saves just one malpractice claim, it’s paid for itself. I didn’t get any argument from administration.” Indeed, the hospital planned to expand the UPS to other units, including the cardiovascular recovery room.