Utility Management Risk Assessment

Larry Barlow, CHSP
CMS Memo

DEPARTMENT OF HEALTH & HUMAN SERVICES
Centers for Medicare & Medicaid Services
7500 Security Boulevard, Mail Stop C2-21-16
Baltimore, Maryland 21244-1850

Office of Clinical Standards and Quality/Survey & Certification Group

Ref: S&C: 12-07-Hospital

DATE: December 2, 2011

TO: State Survey Agency Directors

FROM: Director
Survey and Certification Group

SUBJECT: Clarification of Hospital Equipment Maintenance Requirements
And in case you are wondering

**Effective Date:** Immediately. Please ensure that all appropriate staff are fully informed within 30 days of the date of this memorandum.
CMS COPs

• 42 CFR 482.41
  – Hospital must maintain adequate facilities for its services

• 42 CFR 482.41(c)(2)
  – Facilities, supplies and equipment must be maintained to ensure an acceptable level of safety and quality.
  – The CMS Interpretive Guideline states “the hospital must monitor, test, calibrate and maintain equipment periodically in accordance with the manufacturer’s recommendation and Fed and State law.”
CMS Response to TJC

I am happy to inform you that the Joint Commission’s approach of utilizing a preventive maintenance schedule has been approved. Thank you for your cooperation and collaboration.

CMS Deputy Director
July 26, 2010
So what is the “approved” TJC approach to scheduling maintenance?
EC 01.01.01

EC 01.01.01:
  o The hospital has a written plan for managing the following:
    • EP 8  - Utility systems.

Utility Management  EC 02.05.01:
  o The organization manages risks associated with its utility systems.
EC 02.05.01

EP 1:
• The hospital designs and installs utility systems that meet patient care and operational needs.
EP 2 requires:

• Measure of Success and Documentation,
  o For hospitals that use Joint Commission accreditation for deemed status purposes: The hospital maintains a written inventory of all operating components of utility systems.
  o For hospitals that do not use Joint Commission accreditation for deemed status purposes: The Hospital maintains a written inventory of selected operating components of utility systems based on risks for infection, occupant needs, and systems critical to patient care (including all life support systems). The hospital evaluates new types of utility components before initial use to determine whether they should be included in the inventory.
EC 02.05.01

EP 3 requires:

• Measure of Success and Documentation,
  o The hospital identifies **high-risk** operating components of utility systems on the inventory for which there is a risk of serious harm or death to a patient or staff member should the component fail.
  o Note: High-risk utility system components include life-support equipment.
EP 4 requires:

- Documentation,
  - The hospital identifies the activities and associated frequencies, in writing, for inspecting, testing and maintaining all operating components of utility systems on the inventory. These activities and associated frequencies are in accordance with manufacturers’ recommendations or with strategies of an alternative equipment maintenance (AEM) program.
• Note 1: The strategies of an AEM program must not reduce
the safety of equipment and must be based on accepted
standards of practice. *
• Note 2: For guidance on maintenance and testing activities for
Essential Electric Systems (Type I), see NFPA 99, 1999 edition
(Section 3-4.4).
• * An example of guidelines for physical plant equipment maintenance is
the American Society for Healthcare Engineering (ASHE) book
Maintenance Management for Health Care Facilities.
EC 02.05.01

EP 5:

• For hospitals that use Joint Commission accreditation for deemed status purposes: The hospital’s activities and frequencies for inspecting, testing, and maintaining the following items must be in accordance with manufacturers’ recommendations:
• Equipment subject to federal or state law or Medicare Conditions of Participation in which inspecting, testing, and maintaining be in accordance with the manufacturers’ recommendations, or otherwise establishes more stringent maintenance requirements

• New operating components with insufficient maintenance history to support the use of alternative maintenance strategies

  Note: Maintenance history includes any of the following documented evidence:
  • Records provided by the hospital’s contractors
  • Information made public by nationally recognized sources
  • Records of the hospital’s experience over time
EC 02.05.01

EP 6:

• For hospitals that use Joint Commission accreditation for deemed status purposes: A qualified individual(s) uses written criteria to support the determination whether it is safe to permit operating components of utility systems to be maintained in an alternate manner that includes the following:
  • How the equipment is used, including the seriousness and prevalence of harm during normal use
  • Likely consequences of equipment failure or malfunction, including seriousness of and prevalence of harm
  • Availability of alternative or back-up equipment in the event the equipment fails or malfunctions
  • Incident history of identical or similar equipment
  • Maintenance requirements of the equipment
EC 02.05.01

EP 7: Documentation

For hospitals that use Joint Commission accreditation for deemed status purposes: The hospital identifies operating components of utility systems on its inventory that is included in an alternative equipment maintenance program.
EC.02.05.01

- EP 8: The hospital labels utility system controls to facilitate partial or complete emergency shutdowns.
- EP 9: The hospital has written procedures for responding to utility system disruptions.
EP 12:
• The hospital’s procedures address the following:
  o How to obtain emergency repair services.

EP 13:
• The hospital responds to utility system disruptions as described in its procedures.
  o DIRECT IMPACT EP!
EC.02.05.01

• EP 14:
  The hospital minimizes pathogenic biological agents in cooling towers, domestic hot- and cold-water systems, and other aerosolizing water systems.

DIRECT IMPACT EP!
EC.02.05.01

- EP 15

In areas designed to control airborne contaminants (such as biological agents, gases, fumes, dust), the ventilation system provides appropriate pressure relationships, air-exchange rates, and filtration efficiencies. (See also EC.02.06.01, EP 13)

Note: Areas designed for control of airborne contaminants include spaces such as operating rooms, special procedure rooms, delivery rooms for patients diagnosed with or suspected of having airborne communicable diseases (for example, pulmonary or laryngeal tuberculosis), patients in "protective environment" rooms (for example, those receiving bone marrow transplants), laboratories, pharmacies, and sterile supply rooms. For further information, see Guidelines for Design and Construction of Health Care Facilities, 2010 edition, administered by the Facility Guidelines Institute and published by the American Society for Healthcare Engineering (ASHE).
EC.02.05.01

• EP 16:
The hospital maps the distribution of its utility systems.
Summary

- Written plan for utilities (EC 1.01.01 EP 8).
- Designed and installed to meet patient care and operational needs.
- Organization maintains inventory of all operational components of utility systems and maintains an inventory of selected operating components of utility systems, (including all life support) based on risk.
- Identified inspection and maintenance activities for **ALL** operating components of utility systems.
Summary

• The organization defines in writing the intervals for testing, inspecting, and maintaining all operating components of the utility systems on the inventory.

• Minimize pathogenic biological agents in cooling towers and domestic water systems.

• Provide appropriate pressure relationships, exchange rates, and filtration efficiencies in areas designed to control air borne contaminants. Includes operating rooms, special procedures rooms, delivery rooms patients in protective environment rooms, laboratories, pharmacies, and sterile supply rooms.
Summary

- Map the distribution of utility systems throughout the building.
- Label utility system controls to prepare for a shutdown.
- Procedures for responding to utility system disruptions.
- Procedures addressing shut-off and notification of staff in affected areas.
- Written procedures on how and when to perform emergency clinical interventions.
- Written procedures on how to obtain emergency repair services.
- Implementation of procedures for responding to utility system disruptions.
Summary

- A qualified individual determines what utility system components are to be considered for an alternative equipment program (AEP).
- The utility management program’s inventory identifies which items are on an AEP.
- The program defines:
  - Equipment use
  - Seriousness and prevalence of harm during normal use
  - Consequences of equipment failure or malfunction, including seriousness of and prevalence of harm
  - Availability of alternative or back-up equipment
  - Incident history of identical or similar equipment
  - Maintenance requirements of the equipment
The hospital inspects, test, and maintains utility systems

**EP 1:** Measure of Success and, Documentation,
- The hospital tests utility system components on the inventory before initial use and after major repairs or upgrades. The completion date of the tests is documented.

The hospital inspects, tests, and maintains the following:

**EP 3 (Note there is no EP 2):** Documentation,
- High-risk utility system components on the inventory. These activities are documented.

*DIRECT IMPACT EP!*
EC.02.05.05 EP2

• High Risk Utility Systems may include:
  – Egress components
  – Emergency Generators
  – Medical gas system
  – Fire alarm system
  – Sprinkler system
EC 02.05.05

EP 4:

• Documentation,
  
  o The hospital documents the inspection, testing, and maintenance of: components of infection control utility systems on the inventory.

  o **DIRECT IMPACT EP!**

EP 5:

• Documentation,
  
  o The hospital documents the inspection, testing, and maintenance of non-high-risk utility systems on the inventory.
• Infection Control Utility Systems include:
  – Isolation room air handlers and exhaust systems
  – Operating room air handlers and exhaust systems
  – Others?
Why Consider A Risk Assessment?

• Without a Utility Risk Assessment you could be asked to provide proof of compliance with 02.05.01 EP 1-13 for all of the equipment or systems in your Preventive Maintenance Program.

• Without a Utility Risk Assessment you could be asked to provide proof of 02.05.05 EP 1-5 for all of the equipment or systems in your Preventive Maintenance Program.
What is a Utility?

So far we know Utilities:

- Meet patient care, occupant and operational needs;
- Support Infection Control;
- Are critical to patient care;
- Include all life support systems (on the inventory);
- Address pathogenic biological agents in cooling towers, domestic hot and cold water systems, and other aerosolizing water systems;
What is a Utility?

• HVAC: Include ventilation systems to control air-borne contaminants such as biological agents, gases, fumes, and dust; (TJC & CMS)

• Emergency Distribution & EPSS: Include emergency power for equipment that could cause patient harm when it fails including life support, blood, bone, and tissue storage; air compressors; and vacuum systems, operating rooms, recovery rooms, obstetrical delivery rooms, nurseries, and urgent care areas; (TJC & CMS)

• Piped Gases & Vacuum: Include medical gas and vacuum systems. (TJC & CMS)
What is a Utility

- Vertical & Horizontal Transportation (TJC & CMS)
- Plumbing (TJC)
- Boilers and steam (TJC)
- Air conditioning (TJC)
- Communication Systems & Data Exchange (TJC)
- Life Safety (fire alarm & egress lighting) (TJC)
- Fire protection (sprinklers & fire pump) (TJC)
- Infection Control (TJC)
Utility Systems / Components

• To accurately identify Utility Systems and components it is necessary to perform a “Risk Assessment”.
• Before you can evaluate which components are essential you must first identify which systems are essential.
• This can be accomplished by performing a facility-wide Utility System Risk Assessment.
• Think of it as a Hazard Vulnerability Assessment (HVA) for Utility Systems.
## Hospital-wide Risk Assessment for Utility Systems

**Conducted by:**

**Date:**

<table>
<thead>
<tr>
<th>Departments/ List of Areas</th>
<th>Risk Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Life Support</td>
</tr>
<tr>
<td>---------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>3rd Surgical</td>
<td></td>
</tr>
<tr>
<td>8th Medical</td>
<td></td>
</tr>
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<td>Ultrasound</td>
<td></td>
</tr>
<tr>
<td>Wound Care/ OP Specialty</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Risk Value</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No risk or not applicable</td>
</tr>
<tr>
<td>1</td>
<td>Minimal risk of patient injury or exposure from utility failure</td>
</tr>
<tr>
<td>2</td>
<td>Moderate risk of patient injury or exposure from utility failure</td>
</tr>
<tr>
<td>3</td>
<td>Significant risk without history of patient injury or exposure from utility failure</td>
</tr>
<tr>
<td>4</td>
<td>Significant risk with history of patient injury or exposure from utility failure</td>
</tr>
</tbody>
</table>

Tsig Consulting
Start At The Top

• This assessment identifies the “systems” that are essential to the Environment of Care at your facility. In other words systems that should be included in your Utility Management Inventory.

• Once you have identified the systems then you can identify the components.
Utility Management

The following Utility Management Risk Assessment can be applied at the system, item type, or component level.
Utility Management

Utility Function:

• Life Support (not life safety),
• Infection Control,
• Environmental Support (heating, air conditioning and etc),
• Equipment Support.
Utility Function (Table 1):

- **10 Life Support:**
  o System or component equipment is responsible for direct life support, and failure would cause immediate impact on patient care.

- **9 Infection Control:**
  o System or component equipment is involved in maintenance of infection control, and failure would cause medium or long term impact on patient care.
Utility Function

Utility Function (Table 1):

• **7 Environmental Support:**
  - System or component equipment is involved in maintaining a safe and comfortable environment for patient care, and for staff services. Failure would cause significant inconvenience to patients or staff, or cause specific types of care to be compromised.

• **5 Equipment Support:**
  - System or component failure would impact on, or adversely affect equipment in the above categories.
Physical Risk

Physical Risk:

- Patient or Staff Death or Serious Injury
- Patient or Staff Injury
- Minor Injury
- Slight Inconvenience
- No Risk or Inconvenience
Physical Risk (Table 2):

A device malfunction (when used as designed/intended) could result in:

- **5 Patient or Staff Death or Serious Injury:**
  - A malfunction of the system, or a component could cause immediate and/or serious harm to a patient, visitor or staff person.

- **4 Patient or Staff Injury:**
  - Malfunction of the system or a component of the system could cause a reversible harm to a patient, visitor or staff person.
Physical Risk (Table 2):

- **3 Minor Injury:**
  - Malfunction of the system or component could cause minor injury or serious inconvenience to patients, visitors or staff.

- **2 Slight Inconvenience:**
  - Malfunction of the system or component could cause inconvenience to patients, visitors or staff.

- **1 No risk or Inconvenience:**
  - Failure or malfunction is believed to cause little or no risk or inconvenience to patients, visitors or staff.
Maintenance Requirements:

- Extensive (daily or weekly)
- Average (quarterly, semiannual)
- Minimal (annual or longer)
Maintenance Requirements (Table 3):

• **3 Extensive (Daily or Weekly):**
  o Maintenance will be required frequently to maintain the system or component at the appropriate functional level;

• **2 Average: (Quarterly, Semiannual):**
  o Maintenance requirements are average to maintain the system or component in an appropriate functional level.

• **1 Minimal (Annual or Longer):**
  o Maintenance requirements are minimal to maintain an effective functional level.
Incident History:

- Extensive Problems – Recent
- Some Problem, or Problems in the past
- Minimal Problems
Incident History (Table 4):

- 3 The component or system has had extensive problems in its history, or has had recent problems (within the past quarter).

- 2 The component or system has had some problems in its history (in the past 1-3 years).

- 1 The system or component has had minimal problems.
Calculating The Score

Utility Management Priority Score:

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utility Function Score</td>
<td></td>
</tr>
<tr>
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Sample Scenario:

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<td>Maintenance Requirement Score</td>
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</tr>
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<td>Incident History Score</td>
<td>3</td>
</tr>
<tr>
<td>Total Score (UM Number)</td>
<td></td>
</tr>
</tbody>
</table>
Inclusion Score

Calculating the UM Number:

- The values for each characteristic are added to arrive at the utility management (UM) number. The UM number is the sum of the Utility Function, Risk, and Required Maintenance, and Failure History. Only those devices calculated to have an UM number equal to or greater than eleven [\(>11\)] are included in the program.
# Calculating The Score

## Sample Scenario:

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</tr>
<tr>
<td>Maintenance Requirement Score</td>
<td>3</td>
</tr>
<tr>
<td>Incident History Score</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Score (UM Number)</strong></td>
<td><strong>21</strong></td>
</tr>
</tbody>
</table>
Generators

- The previous exercise was just that; an exercise. 02.05.01 requires all life support systems to be included in the inventory.
  - Utility Risk Assessments help you identify your life support systems.
- Infection control systems, or components thereof, are also identified by a risk assessment.
- Non-life support utility systems are identified and:
- Non-utility systems can be removed from the inventory. HOW DOES THAT HELP?
Utility Inventory Requirements

Included Devices:

• System elements or equipment included in the utility program are assigned an individual control number to which all work orders and preventive maintenance forms are referenced. Preventive maintenance inspections are handled in one of the following ways:
  o Depending on maintenance requirements and rating, devices will receive a Preventive Maintenance (PM) inspection weekly, monthly, bi-monthly, quarterly or annually.
Included Devices Continued:

- Devices which a manufacturer recommended PM interval based on hours of use are scheduled and given preventive maintenance accordingly.
Non-Utility Inventory Requirements

Devices not included in Utility inventory:

• If the device does not meet the threshold for inclusion in the Utility Management Inventory it should be assessed for requirements of other management elements (security, hazmat, emergency management, medical equipment, safety, or life safety).

• If prescriptive maintenance or management is not required by other programs, the system/device would be managed in a Planned Maintenance, Corrective Maintenance, or other program.
Non-Utility Inventory Requirements

Devices not included in Utility inventory:

• Requirements for record keeping and documentation would be for equipment monitoring and asset management purposes only. These records would not be required for regulatory compliance.
PM Completion Rates

• Industry expectation is that 100% of Life Support systems are maintained as scheduled.

• With the current trends in Institutionally Acquired Illnesses at record highs it is strongly recommended that Infection Control components / systems be maintained at 100%.
PM Completion Rates

• Non-Life Support / Infection Control Utility System components would still need to be maintained at 95% as scheduled.

• Items that are not in the utility management inventory are not REQUIRED to be maintained unless they are in another required program. (i.e. Fire Safety, Medical etc.)
PM Completion Rates

- Life Support 100% (first priority)
- Infection Control (second priority)
- Non-Life Support Utility Systems/Components (third priority)
- NON-Utility systems / components (fourth priority)
Achieving 95% PM Completion

• Removing an item / component / system from the Utility Inventory does not mean removing it from the Planned Maintenance Program. It just assigns it a lower priority and does not require “written” inspection, testing, and maintenance plans and intervals. It allows the Facility Manager to make decisions on how best to allocate their labor resources.
Achieving 95% PM Completion

• Generally, system elements or items of equipment determined not to be in the utility management program [UM number less than eleven (<11)] will have this noted in the "other" section of the device record. Control numbers may be assigned to non included devices for tracking, maintenance history, or other service information whenever appropriate.
Achieving 95% PM Completion

- It is easier to hit 95% PM completion ration on 100 pieces of equipment than it is to perform that well on 600 pieces.

- If performed correctly the risk assessment reduces your exposure to findings in Utility Management and now CMS, and State Licensure Inspections.
Calculating The Score

Sample Scenario:

<table>
<thead>
<tr>
<th>AHU / Critical (Surgery)</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utility Function Score</td>
<td>9</td>
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<tr>
<td>Physical Risk Score</td>
<td>4/5</td>
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<td>Maintenance Requirement Score</td>
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<td>Incident History Score</td>
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<tr>
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</table>
Calculating The Score

Sample Scenario:

<table>
<thead>
<tr>
<th>AHU / Non-Critical (Administration)</th>
<th>Score</th>
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</thead>
<tbody>
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<tr>
<td>Total Score (UM Number)</td>
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</table>
Threshold For Inclusion

- The threshold for inclusion can be adjusted if it allows for too much non-critical equipment to be classified as “Utility Inventory”.

- It is your Risk Assessment
Inventory

- Computerized Maintenance Program OR PM Program
  - Medical Equipment Management Program
  - Utility Management Program
# Utility Inventory

## Utility System Risk Analysis

<table>
<thead>
<tr>
<th>Category Description</th>
<th>Category ID</th>
<th>Category Class</th>
<th>Scoring Grid</th>
<th>Included</th>
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<tbody>
<tr>
<td></td>
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<td><strong>Utility Function</strong></td>
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<td><strong>Physical Risk</strong></td>
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<td><strong>Maintenance Requirements</strong></td>
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<td><strong>Incident History</strong></td>
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<td></td>
<td><strong>Total Score</strong></td>
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<td></td>
<td></td>
<td><strong>Included</strong></td>
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<tr>
<td>Air Handler Non-Patient Care Unit</td>
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Infection Control

• There is a renewed interest in Infection Control because we are killing people with institutionally Acquired Illnesses

• We are not killing them with fires
Thank You!

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