UTILITY SYSTEM MANAGEMENT PLAN
ADMINISTRATION

Effective date: 01/95
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Review date:

Policy:

Scope: The utility system management plan defines processes for providing the environment of care for patients, visitors and staff.
Purpose: The Utility Systems Management Plan includes processes to minimize risks and outlines appropriate response to failures and ensures operational reliability and effectiveness of all utility systems.

Prevailing Codes and Standards:
PHYSICAL PLANT POLICY, and TJC EC02.05.01, EC02.05.05

Procedure:

I. Objectives:

A. A risk criteria is in place for identifying, evaluating, and taking a current, accurate and separate inventory of critical operating components of systems to be included in the utility management plan (see organization role of responsibility).
B. Critical operating components are inspected, tested, and maintained, prior to use and consistent with maintenance strategies identified in the Utility Systems Management Plan.
C. Critical operating components of the medical gas piping system are inspected, tested, and maintained, including but not limited to the master alarm panel, automatic pressure switches, shut off valves, and station outlets in accordance with NFPA 99.
D. The hospital tests piped medical gas and vacuum systems when the systems are installed, modified, or repaired including cross-connection testing, piping purity testing, and pressure testing in accordance with NFPA 99. The hospital maintains the main supply valve and area shutoff valves of piped medical gas and vacuum systems, assuring they are both accessible and clearly labeled.
E. A plan is in place to reduce the potential for organizational acquired illness, i.e. waterborne pathogens (legionella) found in domestic hot water, cooling tower and other aerosolizing water systems.

F. Pressure relationships, air exchange rates, and filtration efficiencies are inspected, tested and maintained for ventilation systems serving areas specifically designed to control airborne contaminants. This includes spaces such as operating rooms, special procedure rooms, delivery rooms, and rooms for patients diagnosed or suspected of having airborne communicable diseases (e.g., pulmonary or laryngeal tuberculosis), rooms for patients in "protective isolation"(e.g., those receiving bone marrow transplants), laboratories and sterile supply rooms.

G. Infection control guidelines are in place to minimize the risk of patient infection (e.g., aspergillus) and to reduce staff and visitor discomfort and inconvenience as a result of various types of construction projects. Implementation of an "Above the Ceiling Policy" enforces the infection control issues in addition to life safety requirements.

H. A utility system operational plan is in place to ensure reliability, minimize risks and reduce failures.

I. Layouts and operational plans of the distribution and utility systems are maintained in the Physical Plant Engineering Department. All controls, valves, and electric circuits, etc. are documented and tagged for partial or complete emergency shut down.

J. The hospital provides an emergency electrical power source, as required by the Life Safety Code/ Life Safety Branch that supplies electricity to the following areas when normal electricity is interrupted:
   1. Alarm systems (Fire & Med Gas)
   2. Exit route illuminations
   3. Emergency communication systems
   4. Exit signs illumination
   5. Generator set location charger, lights, and receptacles
   6. Elevator cab, controls, and signal system
   7. Building egress auto doors
   8. Auxiliary functions of fire alarm combination systems

The hospital provides a reliable emergency power source, as required by the Life Safety Code Critical Branch and patients that supplies electricity to the following areas when normal electricity is interrupted:

- Critical care areas that utilize anesthetizing gases, tank illumination, selected receptacles, and fixed equipment
- The isolated power systems in special environments
- Task illumination and selected receptacles in the following:
  - Patient care areas including infant nurseries, selected acute nursing areas, and ward treatment rooms
  - Medication preparation areas
  - Pharmacy dispensing areas
  - Nurses' stations (unless adequately lighted by corridor luminaries)
- Additional specialized patient care task illumination and receptacles, where needed
- Nurse call system
- Blood, bone, and tissue banks
- Telephone equipment rooms and closets
- Task illumination, selected receptacles, and selected power circuits for the following areas:
  - General care beds with at least one duplex receptacle per patient bedroom
  - Angiographic labs
  - Cardiac catheterization labs
  - Coronary care units
  - Hemodialysis rooms or areas
  - Emergency room treatment areas (selected)
  - Human physiology labs
  - Intensive care units
  - Postoperative recover rooms (selected)
- Additional task illumination, receptacles, and selected power circuits needed for effective facility operation
- Medical air & medical and surgical vacuum systems

The hospital tests each generator 12 times a year with testing intervals not less than 20 days and not more

than 40 days apart. These tests shall be conducted for at least 30 continuous minutes under a dynamic load that is at least 30% of the name plate rating of the generator. In addition, each generator is tested under load for four (4) continuous hours. This test is performed at least once every 36 months.

The hospital tests all automatic transfer switches 12 times a year with testing intervals not less than 20 days and not more than 40 days apart.

K. Controls for partial and complete emergency power shutdowns are labeled.

II. Management Overview:

The university hospital Physical Plant has designed and implemented processes for minimizing utility system risks including: redundant or back-up systems, removal or replacement of antiquated equipment and mechanical and electrical devices, a building inspection management plan to correct life safety deficiencies, a P.M. program to ensure proper inspection and operation of equipment, and training and instruction of employees.

III. Organization Role of Responsibility:

The department of Physical Plant and Facility Planning is responsible for identifying, evaluating and taking inventory of the critical operating components of the systems of the utility management program and evaluates the impact of utility systems on life support, infection control, environmental support, equipment support and communication systems.

A preventative maintenance program equipment evaluation criteria procedure identifies the critical operating systems and equipment. This evaluation criteria is to establish the classification of equipment for its level of inclusion in the inventory and maintenance frequency. This criteria establishes a priority rating scale based on the following outline.

A. **Life Support Systems** are assigned the highest value of importance. These are any system(s) that provide patient care and environment so as to sustain life. There are systems in which written procedures and back-up systems are in place to assure reliability and continuity of service.

B. **Infection Control Systems** are assigned the second highest value of importance. These are any system or equipment that provides a role in containing or controlling infectious contaminates that may adversely affect patients, staff and visitors. These systems are held in compliance through monitoring and preventative maintenance.

C. **Environmental Systems** provide a role in maintaining a comfortable environment for patients, staff and visitors. These systems are maintained to provide the highest degree of stability and reliability. This is accomplished through inspections, monitoring operations and performance & preventative maintenance. Some of this equipment is not on emergency power due to the load factor. Back-up systems are in place for much of this equipment.

D. **Equipment Support Systems** provide a supporting role in the hospital without direct patient exposure or involvement. The performance of these systems are measured by inspection, testing, operational plans and routine assessments as direct indicators of equipment performance and needs.

E. **Communication Systems** provide patient service (nurse call), paging, transmitting code and alarm conditions, and reliability. These systems are on emergency power and back-up procedures are in place to further reduce risk or loss.

All systems evaluated and included in the Preventative Maintenance Program are identified in the computerized Maintenance Management System (P.M.) Inventory. The P.M. procedure includes the schedule, task service history and frequency. When new equipment is installed, it is included in the utility system distribution scheme by addition to the existing facilities drawings.

The assessment of utility systems performance is through consistency of uninterrupted service. Each piece of equipment or system, after inclusion into the utility management program is monitored and assessed to evaluate and identify the components and systems that need improvement, which may include increased frequency of maintenance, planned component replacement or needed repairs.

Maintenance strategies for all critical components are on the inventory.

Note: Organizations may use different maintenance strategies as appropriate (for example predictive maintenance, interval-based inspections, corrective maintenance, metered maintenance, etc.).

Intervals for inspecting, testing, and maintaining appropriate critical components on the inventory (i.e., those pieces of components of the inventory benefiting from scheduled activities to minimize the clinical and physical risk) are based upon criteria such as manufacturers' recommendations, risk levels, and current organizational experience.

IV. Standard of Performance:

Physical Plant staff assigned to the maintenance of utility systems is required to have a good working knowledge of the system, monitor, inspect and test utilities using the preventative maintenance program, making repairs and reporting incidents.

All critical components are inspected, maintained and tested in accordance with their respective codes:

A. Electrical Emergency Power – NFPA 70, 99, & 100
   1. Each Emergency Generator, Quantity 6
      No load test – Weekly
      Load test at 30% name plate rating – 12 times per year
      Load test at four (4) continuous hours – once every three (3) years (Last test done in 2010, next test scheduled 2013.)
   2. Automatic Transfer Switch tests, Quantity 14 – 12 times per year
   3. Stored Emergency Power Supply Systems (SEPSS)
      UPS battery back up for fire alarm panel:
         Functional test – Four (4) times per year
         Full toad test – Four (4) times per year
   4. Battery powered lights required for egress:
         Hospital – none
         Clinics – tested 12 times per year

B. Fire Suppression Systems NFPA 13, 17, 12, 12A:
   1. Fire Pumps (no flow) tested – weekly
   2. Main Drain tested – once per year
   3. Fire Department connections inspected – four (4) times per year
   4. Fire Pumps (under flow) tested – once per year

5. Supervisory Devices tested – four (4) times per year
6. Valve Tamper Switches and Water Flow Device Tested – four (4) times per year
7. Kitchen Automatic Fire Extinguishing Systems Tested – two (2) times per year (Discharge not required.)
8. Carbon Dioxide & other gaseous Automatic Fire Extinguishing Systems tested – once per year (Discharge not required.)

C. Fire Alarm System NFPA 72
1. Off – premises emergency forces notification tested – four (4) times per year
2. All duct detectors, electro-mechanical releasing devices, heat detectors, smoke detectors, manual fire alarm boxes tested – four (4) times per year
3. Occupant alarm notification devices including all alarm devices, speakers, and visible devices tested – once per year
4. All fire and smoke dampers tested – once every six (6) years
5. Air handling automatic smoke detection devices tested – once per year
6. All horizontal and vertical sliding, and rolling fire doors tested – once per year

D. Medical Gases NFPA 99
1. Medical vacuum, air, oxygen, nitrogen, and nitrous oxide inspections – daily
2. Medical alarm inspections – weekly
3. Automatic changeover devices tested –
   Monthly (Using test button)
   Annually (By valving off primary source valve)
4. Bulk oxygen, nitrogen, nitrous oxide test system alarm – once per year
5. Medical outlets, zone valves, pressure in use, reserve supply low tested – once per year
6. Cross connect test, pressure test, piping purity test, piping purge tests, performed after each modification, installation or repair.

The standards and performance indicators used to measure the Utility Systems Management Plan at LSUHSC-S are indicated in the Environment of Care Performance Improvement Action Plan. These standards and performance project examples have been identified, measured and accessed, with improvements currently in progress or to be made in the near future.

V. Information Collection and Evaluation System:

A. Data and information is routinely collected and evaluated on utility systems.
B. Foreman and maintenance staff collects data to evaluate system operation or to ascertain the effectiveness of a repair. Should the data indicate system performance is below expectations, a report is made and corrective action taken.
C. Outstanding utility work orders and P.M.'s are processed weekly and reviewed by the Facility Maintenance Managers.
D. Unscheduled utility outages are reported to the Director of Physical Plant and in turn to the Campus Safety Committee.
E. Scheduled outages are generated by Physical Plant and processed through the Safety Office and approved by Hospital Administration.

VI. Orientation:

Physical Plant employees that are responsible for maintaining and testing utility systems are in-serviced in departmental orientation and annually receive education addressing: emergency shut offs, whom to contact in case of emergency, processes for reporting management problems, failures and user errors and knowledge of and skills to perform maintenance. Utility system users should have knowledge of capabilities, limitations, special applications and emergency procedures in the event of utility systems failures.

Additional employee training includes: CED, lock out - tag out, work place violence, MSDS (Right-To-Know), fire safety, infection control and personal protective equipment.

Additional staff training is provided through In-Service by shop foremen to reinforce the importance of quality and efficient work performance and standards.

VII. Policy & Procedures:

A. **Emergency Procedures for Utility System Disruptions** – The Power Plant Directive and its associated manuals provide specific procedures in the event of a utility system malfunction, identifies alternative sources of

essential utilities, location and shut off procedures, emergency numbers and notification procedure, repair services and emergency clinical interventions when utility systems fail.

B. **Support Documents**-
Utility system policy and procedures defined in this plan are contained in the following:
1. University Hospital Safety Manual
2. Physical Plant Policy & Procedure Manual
3. Power Plant Directive Manual (and associated documents)

C. Reference Documents -
1. CDC - Guidelines for Environmental Infection Control in Health Care
2. AIA - Guidelines for Design and Construction of Hospitals and Health Care 2001,2006 and 2010
3. ASHRAE - Hospitals and Clinics HVAC System Design III,Manual
4. APIC - Infection Control and Applied Epidemiology, Principles and Practice
5. NFPA – Codes
6. Universal Building Code
7. State and Local Codes
8. Standards or Guidelines that provide equivalent design criteria
9. Manufacturer’s guidelines for maintenance and Testing equipment

When planning demolition, construction or renovation work, the organization conducts a proactive risk assessment using risk criteria to identify hazards that could potentially compromise patient care in occupied areas of the organization’s buildings. The scope and nature of the activities should determine the extent of risk assessment required. The risk criteria should address the impact of demolition, renovation, or new construction activities have on air quality requirements,infection control, utility requirements, noise, vibration, and emergency procedure. As required, the organization selects and implements proper controls to reduce risk and minimize the impact of these activities.

The Utility System Management Plan is updated annually as policy and procedures are changed as a result of code changes, construction additions and new methods are implemented.

Annually, the Campus Safety Committee will evaluate the Environment of Care Management Plans.

The evaluation will be on the following:

- Determine if the Environment of Care Management Plans are meeting the needs of the institution.
- Problem identified.
- Resolutions to problem identified.
- Performance improvement standards.
- Performance standards.
- Staff knowledge. Is staff knowledgeable of their role as it relates to the Environment of Care policies?

VIII. Hazard Vulnerability Analysis for Utilities:

A. Evaluation of possible utility failures, which could pose as a potential threat.

1. Central Medical Vacuum – Redundant systems.
2. Central Medical Waste Gas – Evacuation systems.
3. Central Oxygen – Redundant systems.
4. Electrical (normal power) – The power company provides dual feeds to the campus.
5. Emergency generator – Full redundancy for Life Safety, Critical Care and Equipment branches, with the addition of the medical school generator.
6. Fire suppression – The city water department provides dual feeds to the campus. Redundancy of fire pumps (partial flow). Internal failure results in a fire watch.
7. Fire alarm system – On normal and emergency power and battery backup, policy written for system failure resulting in a fire watch.
8. Heating, ventilation, and air conditioning – Redundant systems (major components) minor components are repairable.
9. Information systems and computers – On normal power, emergency power, and UPS. Data backed up daily, no redundancy in computer system.
10. Natural Gas – The gas company provides dual feeds to the campus. Boilers can convert to diesel.
11. Overhead paging – Redundant systems (fire alarm system is secondary system).

12. Sewage – City main failure, procedures include removal of manhole covers to allow flow into storm sewer.
13. Telephone / Telecommunications – Several direct lines are in place (i.e. hospital board room) if the main hospital system fails. Ham radio and cell phones are back up.
14. Water main break – The city water department has dual feeds to the campus. The hospital has well water for equipment and lists water and truck sources in the emergency preparedness plan if a city wide failure occurs. Water tanks on roof provide 2 to 4 hours supply depending on consumption control.
15. The hospital power plant has added water connections on the supply side of the domestic water main for emergency tanker truck supply tie in.