PURPOSE
The purpose of the Utilities Management plan is to establish, maintain and continually provide a reliable utility systems management program to promote a safe, controlled and comfortable environment of care for patients, visitors, and personnel of the facility by the assessment and minimization of risks of utility failures and to ensure the operational reliability of the utility systems.
- Ensures operational reliability of utility systems.
- Reduces the potential for organization-acquired illness to be transmitted through the utility systems.
- Addresses the reliability and minimizes potential risks of utility system failures.

SCOPE
The Utilities Management plan at FirstHealth of the Carolinas (FHC) is designed to develop, implement, and maintain a Utilities Management Program that assures the operational reliability through routine inspection, testing and maintenance of all utility systems, assesses special risks and/or applications, and responds to system failures in a rapid and effective manner. The Utilities Management Plan contains elements of education, training, and user knowledge associated with organization-wide responsibilities and requirements.

Criteria for identifying, evaluating, and taking inventory of critical operating components of systems to be included in the utility management program are established based on risk criteria that assess and minimize risks of utility failures and ensure operational reliability of utility systems.

All critical elements of the utility systems used for life support, infection control, environmental support, equipment support and communications will be included in the program. The Utilities Management Program addresses the safe operation, maintenance and emergency response procedures for these critical operating systems and evaluation, assessment, and improvement in operational costs without compromise to service or quality. Utilities include systems for electrical distribution, emergency power, elevators, heating, ventilating, and air conditioning, plumbing, boiler and steam, medical gas, medical/surgical vacuum, and communication systems.

The Utilities Management Program applies to all departments at FHC.

Facilities Management staff is available to service the utilities systems during all hours of operation of each facility on campus.

AUTHORITY/REPORTING RELATIONSHIPS
The Utilities Management Program has been established, supported and maintained as part of Facilities Management.
The Facilities Director/designee manages the Utility Management Plan and reports to the President/COO. Facilities Management is empowered with the authority and resources to provide utility systems that are safe, reliable and capable of providing for the safety and comfort of the patient environment.

The Facilities Director/designee is responsible for the day-to-day utility systems management function. The Safety Committee monitors the utility equipment management function and recommends corrective actions on identified problems. The managers are responsible for providing training to their employees on the proper procedure to follow in the event of a utility failure.

Authority for emergency shutdowns of main utility systems (affecting entire hospital) including power, water, gas, fuel, main oxygen supply and other main medical gas lines, is vested with the hospital’s incidence commander or his / her designee.

Authority for emergency shutdowns of oxygen on the patient care floors is vested as follows:

- **Montgomery Memorial Hospital** – Director of Nursing/Administrative Supervisor in areas except OR (which will be shut off by OR staff). Cardiopulmonary Tech on duty will control the main O2 supply.
- **Moore Regional Hospital** – Respiratory Care personnel except in OR and ED.
- **Richmond Campus** - Cardiopulmonary Dept.; all areas except OR and OPS.

**OBJECTIVES**
The objectives of the Utilities Management Plan include:

- Assurance of the operational reliability of the utility systems.
- Reduce the potential for hospital-acquired illness.
- Assessment of the special risks of the utility systems.
- Response to utility systems failures.
- Provision of a safe, controlled and comfortable environment for patients, staff, physicians, visitors, and volunteers.
- Effect essential coordination for scheduled utility systems interruptions.
- Establishment and maintenance of program policies and procedures consistent with the organization’s mission, vision, and values.
- Enhancement of maintenance of the utility systems to reduce and minimize system failures and/or interruptions.
- Achieve completion of 90% or higher scheduled preventative maintenance completions on non-critical equipment.
- Achieve completion of 100% scheduled preventive maintenance for Life Support and Infection Control components and systems.

**PERFORMANCE ELEMENTS:**

**EC.01.01.01**
The hospital develops and maintains a written management plan describing the processes it implements to manage the effective, safe, and reliable operation of utility systems.

The Utilities Management Plan provides an environment of care for patients, visitors, and staff that are functional and safe. This will be accomplished with a comprehensive program of identifying, monitoring,
and maintaining key components of the many utility systems in the facility in a manner designed to reduce or eliminate failures in a pro-active fashion. The objective of FHC’s Utility Management Plan is designed to provide a safe patient care and treatment environment by managing the risks associated with safe operation and the functional reliability of the hospital’s utility system.

**EC.02.05.01**
The hospital designs and installs utility systems that meet the patient care and operational needs.

The hospital references appropriate NFPA standards and American Institute of Architects guidelines when designing and installing utility systems to assure the hospital meets the patient care and operational needs of the services in the hospital’s building and applicable Building Codes and AHJ.

**EC.02.05.01**
The hospital maintains a written inventory of all operating components of the utility systems or 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 safety systems). The hospital evaluates new types of utility components before initial use to determine whether they should be included in the inventory.

The Utilities Management Program shall include equipment that meets the following criteria:

- Equipment maintains the climatic environment in patient care areas;
- Equipment that constitutes a risk to patient life support upon failure;
- Equipment is a part of a building system, which is used for infection control;
- Equipment that is part of the communication system, which may affect the patient or the patient care environment;
- Equipment is an auxiliary or ancillary part of a system control or interface to patient care environment, life support or infection control.

The Utilities Management Plan includes provisions for the inspection, testing, maintenance and repair for the following systems:

A. **Life Support Systems** – Systems that are used to support life or are critical in the care of patients:
   1. Oxygen
   2. Medical Air
   3. Medical Surgical Vacuum Systems
   4. Electrical Distribution System
   5. Emergency Power Distribution Systems
   6. Nurse Call Systems

B. **Infection Control Systems** – Systems that are used to prevent the spread of infection, either directly or indirectly:
   1. Exhaust air (isolation rooms)
   2. Boilers and steam delivery systems
   3. Hot water

C. **Support of the Environment** – Systems that control the environment or provide for the daily needs of patients and staff:
   1. HVAC (Heating, Ventilation, and Air Conditioning)
   2. Elevators
3. Domestic Water System  
4. Sanitary and Storm Sewers  

D. Equipment Support Systems – Systems that support or control the operation of equipment:  
1. Control Air  
2. Natural Gas System  

E. Communications Systems – Systems that provide means for patients, visitors, and staff to communicate.

EC.02.05.01  
The hospital identifies, in writing, inspection and maintenance activities for all operating components of the utility systems on the inventory.

Maintenance strategies are identified for all components included in the utility systems management program. Different strategies may be utilized as appropriate for different systems including: predictive maintenance, interval-based inspections, corrective maintenance, metered maintenance, etc.

There is a comprehensive preventative maintenance program, which includes a written testing and maintenance program for all utility components included in the program. It is the responsibility of the Facilities Director/designee to keep the preventative maintenance program accurate and ongoing.

EC.02.05.01  
The hospital identifies, in writing, the intervals for inspecting, testing, and maintaining all operating components of the utility systems equipment on the inventory that are based upon criteria such as manufacturers’ recommendations, risk levels, and current hospital experience.

The utility systems components that are included in the inventory that would benefit from scheduled maintenance activities to minimize clinical and physical risks are based on the following criteria:

- Manufacturer’s recommendations  
- Risk levels  
- Current hospital experience

Incident history is documented and maintained in the Facilities Management office. Critical components displaying unusual repair history or unusual incidence of injury to patients or staff will be evaluated for necessary changes/replacement.

A maintenance strategy will be developed for all utility systems critical components in the hospital. Maintenance procedures will be developed and maintained by the Facilities Director/designee, using the manufacturer’s maintenance recommendations, NFPA and ANSI standards.

Through a program of preventative and corrective maintenance, the incidence of unplanned outages of utility systems is reduced or eliminated. By reducing unplanned outages and increasing reliability, patient safety is increased. In order to respond to unplanned outages, plans will be developed to reduce the impact, provide temporary support, and correct the problem as soon as possible. All outages are monitored with utility failure reporting forms and steps taken to prevent further outages of the same nature (if possible). The status of these measures will be reported at the Safety Committee meetings and the effectiveness of corrective measures reported annually.
The program includes the following:

Preventative Maintenance – A program for scheduled inspection, testing and general upkeep of the utility systems is accomplished using a computer software program to print scheduled work orders on a weekly basis.

Corrective Maintenance – A program for correcting problems documented during a utility system failure and scheduled the repair in-house or by using an outside contracting firm.

Emergency Maintenance – Unplanned system failures can occur for numerous reasons which cannot be prevented within the confines of a facility wide maintenance program. For this reason, plans are in place for unplanned failures of utility systems or components of systems that are part of the utility management program. Plans are in place for planned outages and the steps to take are outlined in order to minimize their impact.

**EC.02.05.01**
The hospital has written procedures for responding to utility system disruptions.

a. What to do if utility systems malfunction.
b. Identification of an alternative source of organization defined essential utilities.
c. Shutting off of the malfunctioning systems and notifying staff in affected areas.
d. How and when to perform emergency clinical interventions when utilities fail.
e. Obtaining repair services.

The Facilities Director/designee is responsible for coordinating activities and ensuring procedures are developed that specify the action to be taken during the failure of major utility services. Emergency procedures include: procedures to follow when a utility system malfunctions; alternate sources of essential utilities; shutoff procedures and controls of malfunctioning system; procedures for notifying personnel in the affected areas; how to obtain repair services; and procedures to perform emergency clinical interventions. The written procedures include a call system for summoning essential personnel and outside assistance when required.

**EC.02.05.01**
The hospital’s procedures address performing emergency clinical interventions during utility system disruptions.

All clinical department directors are responsible for developing and maintaining emergency procedures of the utility systems as it relates to their use and application in patient care or treatment areas where a failure, interruption or malfunction could result in a negative patient outcome including serious injury or death. The departmental emergency procedures will provide personnel with the essential information needed to perform during an emergency. The emergency procedures will include:

Alternate sources of utilities or back-up protection provided;

- When alternate sources are not available procedures to follow until the utility system can be restored to normal function;
- Location of emergency shutoff controls;
- Conditions in which the utility may be shutoff;
- Assign authority to use the shutoff controls;
- How to report a failure or interruption;
- Obtaining emergency repair services;
- Specific information on emergency clinical interventions.

EC.02.05.01
The hospital maps the distribution of utility systems

There are drawings mapping the distribution of utility systems located in the Facilities Management Department.

EC.02.05.01
The hospital labels controls for a partial or complete emergency shutdown

The drawings mapping the distribution of utility systems indicate the controls for partial or complete shutdown of each utility system in Facilities Management. All emergency shutoff controls for the utility systems components shall be labeled clearly, visibly and permanently throughout the facility.

EC.02.05.01
The hospital minimizes pathogenic biological agents in cooling towers, domestic hot/cold water systems, and other aerosolizing water systems.

The Facilities Director/designee, in conjunction with the Infection Control will develop policies and procedures for the inspection, testing and maintenance of all aerosolizing water systems to ensure optimal use of pathogenic biological agents. Water towers will be tested on an annual basis.

EC.02.05.01
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.

The Facilities Director/designee conjunction with Infection Control has developed policies and procedures for the inspection, testing and maintenance of all ventilation systems serving areas specifically designed to control airborne contaminants such as biological agents, gases, fumes and dust. These areas include, but may not be limited to:

- Operating rooms
- Special procedure rooms
- Laboratories
- Sterile supply rooms
- Pharmacies
- Airborne communicable disease rooms, and negative pressure rooms

The facilities management staff will maintain a log for all negative air pressure rooms used for patients requiring respiratory isolation.

The Facilities Director/designee will follow AIA guidelines for filter efficiencies, air pressure relationships etc. Facilities Management will check all isolation rooms for proper ventilation.
EC.02.06.01
The hospital maintains ventilation, temperature, and humidity levels suitable for the care, treatment, and services provided.

FHC will maintain the ventilation, temperature, and humidity levels as defined by the state, and American Institute of Architects guidelines 2001.

EC.02.05.03
The hospital provides emergency power for the following:

FHC provides emergency power to at least the following:

- (1) *Alarm Systems* as required by LSC
- (2) *Exit Route and exit sign Illumination*
- (3) *Emergency Communication Systems*
- (4) *Elevators*

**Montgomery Memorial Hospital – Emergency Powered Elevators** - Both Elevators (2) are on Emergency Power

**Moore Regional Hospital – Emergency Powered Elevators** - (2) Blue Elevators, (2) Gold Elevators, (2) Purple Elevators, (2) Pink Elevators, 1928 Building Elevator, Parking Deck Elevator

**Richmond Campus – Emergency Powered Elevators** - Six (6) out of seven (7) Elevators are on Emergency Power (Not elevator near Laundry in the 1952 Building)

- (5) *Equipment* that cause harm when it fails; including Life Support systems; blood, bone, and tissue storage systems; medical air compressors; and medical and surgical vacuum systems.
- (6) *Areas* in which loss of power could result in patient harm, including operating rooms, recovery rooms, obstetrical delivery rooms, nurseries, and urgent care areas.

EC.02.05.05
The hospital tests utility system components on the inventory before initial use. The completion date of the test is documented.

FHC will test all utility system components before initial use and will document the date of initial testing.

EC.02.05.05
Life support utility system components on the inventory. These activities are documented.

Facilities Management maintains books and files with all life support utility system components testing and modifications located in the Facilities Management Office. An inventory list of life support utility system components is kept in the facilities management office.

EC.02.05.05
Infection control utility system components on the inventory. These activities are documented.

Facilities Management maintains books and files with all infection control utility system components testing and modifications located in the Facilities Management Office.
All negative pressure rooms, isolation rooms and soiled utility rooms are tested on a regular basis. An inventory list of infection control utility system components is kept in the facilities management office.

**EC.02.05.05**  
Non-life support utility system components on the inventory. These activities are documented.

All documentation of non-life support components is filed in the Facilities Management office.

**EC.02.05.07**  
Twelve times a year, at intervals of not less than 20 days and not more than 40 days, the hospital tests each generator for at least 30 continuous minutes.

The hospital conducts weekly run times, monthly load tests and an annual EPSS load test.

**EC.02.05.07**  
The emergency generator test is conducted with a dynamic load that is at least 30% of the nameplate rating of the generator. If the hospital does not meet the 30% or the recommended prime movers’ exhaust gas temperature during any test in EC.02.05.07, EP 4, then each emergency generator must be tested once every 12 months using supplemental loads of 25% of nameplate rating for 30 minutes, followed by 50% of nameplate rating for 30 minutes, followed by 75% of nameplate rating for 60 minutes for a total of 2 continuous hours.

The hospital will test each generator in accordance with NFPA 110 and will provide supplemental loads if required on an annual basis as determine by Facilities Management.

**EC.02.05.07**  
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. The completion date of these test are documented.

All tests are conducted and documented during the monthly generator load tests.

**EC.02.05.07**  
The hospital tests all battery powered lights required for egress. Testing includes:

A function test at monthly intervals for a minimum of 30 seconds is completed by Facilities Management.

**EC.02.05.07**  
Every 12 months, the hospital either performs a functional test of battery-powered lights required for egress for a duration of 1 ½ hours; or the hospital replaces all batteries every 12 months and, during replacement, performs a random test of 10% of all batteries for 11/2 hours. The completion date of the test is documented.

An annual test for duration of 1.5 hours is completed by Facilities Management.

**EC.02.05.07**  
Facilities that have a generator providing emergency power for the services listed in Standard EC.02.05.03 EPs 5 & 6 tests each emergency generator at least once every 36 months for a minimum of four continuous hours. This test shall be conducted under a load (dynamic or static) that is at least 30% of the nameplate rating of the generator. The completion date of the test is documented.
FHC will conduct the every 36 month 4 hour test above 30% of the nameplate rating for each generator and document findings and date.

**EC.02.05.07**
If a required emergency power system fails, the hospital implements measures to protect patients, visitors, and staff until necessary repairs or corrections are completed.

If any required emergency power system tests fail the hospital will implement appropriate measures.

**EC.02.05.07**
If a required emergency power system test fails, the organization performs a retest after making the necessary repairs or corrections.

If any required emergency power system test fails the hospital will perform a retest after making the necessary repairs or corrections. This test will be documented.

**EC.02.05.09**
In time frames defined by the hospital the hospital inspects, tests, and maintains critical components of piped medical gas systems including master signal panels, area alarms, automatic pressure switches, shutoff valves, flexible connectors, and outlets. These activities are documented.

Facilities Management documents Medical Gas Certification with all testing and modifications. The medical gas system will be inspected/tested every 12 months.

**EC.02.05.09**
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. The completion date of the tests is documented.

Facilities Management documents Medical Gas Repairs, with all testing and modifications.

**EC.02.05.09**
The hospital maintains the main supply valve and area shut-off valves of piped medical gases and vacuum systems to be accessible and clearly labeled.

Facilities Management works with hospital departments to keep supply valves for piped medical gas systems accessible and clearly identifies which valve controls which area/rooms.

**ORIENTATION AND EDUCATION**

Orientation and education for individuals who use and/or maintain utility systems is managed and documented through department education. This training includes, but is not limited to:

- System capabilities, limitations, and special applications
- Emergency procedures for system failure
- Maintenance procedures as appropriate
- Location and use of emergency shut off controls
- Processes for reporting problems, failures, and user errors
Annual continuing education is primarily based on the organization’s ongoing experience. It addresses utilities and operating procedures that are new, have changed significantly during the year, or have had a series of problems, failures, or user errors that have or may have an adverse effect on patient safety and/or the quality of care.

Training takes place at the monthly Facilities Management Departmental Meeting. The effectiveness of education will be monitored as part of the organization’s continuous improvement activities.

Information and skill levels required for maintaining utility systems and components will also be provided through the Orientation and Education programs. Training shall occur prior to initial use. Training programs may include technical manuals, diagrams, or specific training.

PERFORMANCE IMPROVEMENT

- There is a planned, systematic, interdisciplinary approach to process design and performance measurement, analysis and improvement related to organization-wide safety. The organizational Safety Committee will develop and establish performance measures and related outcomes, in a collaborative fashion, based on those priority issues known to be associated with healthcare environment. Performance measures and outcomes will be prioritized based upon high risk; high volume, problem prone situations and potential or actual sentinel event related occurrences. Criteria for performance improvement measurement and outcome indicator selection will be based on the following:
  - The measure can identify the events it was intended to identify:
    - The measure has a documented numerator and a denominator statement or description of the population to which the measure is applicable;
    - The measure has defined data elements and allowable values;
    - The measure can detect changes in performance over time;
    - The measure allows for comparison over time within the organization or between the organization and other entities;
    - The data intended for collection are available and results can be reported in a way that is useful to the organization and other interested stakeholders.
  - The Safety Committee on an ongoing basis monitors performance regarding actual or potential risk related to one or more of the following:
    - Staff knowledge and skills;
    - Level of staff participation
    - Monitoring and inspection activities;
    - Emergency and incident reporting;
    - Inspection, preventative maintenance, and testing of safety equipment
  - Other performance measures and outcomes will be established by the Safety Committee, based on the criterion listed above. Data sources, frequency of data collection, individual(s) responsible for data collection and aggregation, reporting will be determined by the Safety Committee.
  - Should the Safety Committee feel a team approach (other than the Safety Committee) is necessary for performance and process improvement to occur, the Safety Committee will formulate a team. Determination of team necessity will be based on those priority issues listed (high risk, volume and problem prone situations and sentinel event occurrences). The Safety Committee will review the necessity of team development, requesting team participation only in those instances where it is felt
the Safety Committee’s contributions toward improvement would be limited (due to specialty, limited scope and/or knowledge of the subject matter). Should team development be deemed necessary, primarily, team members will be selected on the basis of their knowledge of the subject identified for improvement, and those individuals who are “closest” to the subject identified. The team will be interdisciplinary, as appropriate to the subject to be improved.

- Performance improvement monitoring and outcome activities will be presented to the Safety Committee by the Facilities Director/designee Management at least on a quarterly basis, with a report of performance outcome forwarded to the Performance Improvement/Risk Management Committee.

The following performance measures are for 2009:

**Performance Measures:**

- Utility System Failures—Monitor the number of utility system failures

  Numerator = Number of utility systems
  Denominator = Number of monthly failures

**Quality Measures**

- PM’s on Utilities: maintain a PM completion rate of 100%. Number of PM’s completed divided by the number of PM’s scheduled during the month.
- Total Utility Failures – We will monitor the number of power outages as well as the effects on vital equipment.
- Electrical failures causing equipment interruption;
- Generators – One full load test for each generator will be done each month.

**EFFECTIVENESS:**

The annual evaluation of the Utility Systems Management Program will include a review of the scope according to the current TJC standards to evaluate the degree in which the program meets accreditation standards and the current risk assessment of the hospital. A comparison of the expectations and actual results of the program will be evaluated to determine if the goals and objectives of the program were met. The overall performance of the program will be reviewed by evaluating the results of performance improvement outcomes. The overall effectiveness of the program will be evaluated by determining the degree that expectations where met.

The performance and effectiveness of the Utility Systems Management Program shall be reviewed by the Safety Committee, and the Performance Improvement/Risk Management Committee.

**EC.04.01.01**

The Facilities Director/designee will complete an evaluation of the Utilities Management Plan annually in terms of its objectives, scope, performance, and Effectiveness. The Safety Committee (EOC) will review the annual evaluation and standards or performance to determine new measures and/how to make improvement in any standard falling below expectation.
A final report of the findings is reported to the Environment of Care Safety Committee.

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Approved FHC Safety Committee 6/10/09
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