

UNIVERSITY OF TOLEDO HEALTH SCIENCE CAMPUS

SUBJECT: UTILITY MANAGEMENT PLAN

Procedure No: US-08-000

PROCEDURE

Utilities system provide essential service that are required by the University of Toledo Health Science Campus to support its mission to improve the human condition by improving patient centered University quality care. The following Essential or critical utilities include systems for electrical distribution; emergency power; vertical transport; HVAC; plumbing and steam boilers; medical gas; medical/surgical vacuum; and network or communication systems. The university maintains written SOPs for maintaining critical utilities in case of failure.

PURPOSE

The Procedures intent is to meet the mandates of the Joint Commission (TJC) Environment of Care (EOC) standards and to identify and ensure that the general objectives are achieved for the physical environment. This statement's objective is to also prescribe a means for attaining those objectives in the event that such a review indicates a deficiency in a utility's performance.

SCOPE

The utility management plan describes how the organization will manage risks associated with its utility systems. The Management Plan applies to the UT Medical Center and all associated facilities and clinics. These facilities have inherent safety risks associated with providing services for patients, the performance of daily activities by staff, and the physical environment in which services occur. The Utility Management Plan has been designed to work in concert with the other Environment of Care Management Plans (i.e. Safety Management Plan, Hazardous Materials, Medical Equipment, Security Plan and Fire Safety Plan). The plans are reviewed and accessed annually to determine their effectiveness and ensure that they function as unit to allow for continued improvement and functioning within the Environment of Care.

RESPONSIBILITY

The Utility Management Plan has been assigned a leader with the appropriate background and skill set to allow for continuous satisfaction for the assigned elements of performance. This individual is required to sign after reviewing the plan on an annual basis. Staff from Facility Maintenance Services is assigned responsibilities to complete elements of the plan and ensure its continued implementation. Reports on the plan's implementation are reported to the Safety and Health Committee on a regular basis. A representative from hospital administration sits on the Safety and Health Committee. On an annual basis the assessment of the effectiveness of each individual management plan is presented to the Board of Trustees of the University of Toledo.

PROCESSES AND PROCEDURE

The hospital identifies how it will develop and maintain a written management plan describing the processes it implements to manage the effective safe and reliable operation of the health science campus utility systems.

The hospital manages risks associated with its utility systems.

- The hospital designs and installs utility systems according to NFPA codes that meet the patient care and operational needs of the services in the hospital's buildings: A continuing review and assessment will be made on each utility servicing the institution, including their performance as a whole and in terms of each

utility's identifiable sub-components, on a regular basis.

- New Building systems and modifications to existing building systems are designed to meet the NFPA categories 1-4 requirements.

The two main methods of data collection within the utilities management program are the computerized Asset essentials maintenance management system and the centralized building automation system. Each system is capable of generating reports from a compiled database.

Corrective and preventive maintenance work orders are generated through the computerized maintenance management system based on manufacturers recommendations of the facilities assessment overtime of PM need.

Reports of outstanding corrective work orders or preventive maintenance routines are available at any time.

All work assigned to be performed on utilities within the program are documented through the computerized maintenance management system. Special codes have been assigned to specific systems or functions, which greatly facilitate the organization of data for monitoring and evaluation. Reports on outstanding work orders are generated weekly for review by the appropriate supervisory and management staff.

Summaries of alarms which have occurred are reported on each shift through the generation of an alarm summary report within the centralized building automation system. All alarms received are reviewed by the appropriate supervisory or management staff on a daily basis.

- The hospital maintains a written inventory of all operating components of utility systems.

THRESHOLDS FOR EVALUATION

All indicators of a utility's performance, which are included in the utilities management program, are evaluated on a regular basis. The thresholds for implementing an evaluation and/or thorough investigation of a utility are listed below:

Critical indicators of a utility's structure are reviewed and evaluated whenever a major sub-component of the utility source or distribution network are removed, replaced or modified. In addition, a thorough review is made regarding applicable building code compliance, whenever such codes are updated. Therefore, a 100% threshold for evaluation exists on each utility's structural indicators whenever an alteration is made to the utility.

Critical utility process indicators are monitored constantly through the centralized building automation system. Whenever an alarm is received through this system, it is indicative of a potential problem and the problem is immediately evaluated by a member of Facilities & Construction. An alarm summary is generated during each work shift, which ensures that all alarms are responded to. All alarm points are construed to be an indicator of a potential problem. In addition, all critical utility sub-components are visually checked during each shift.

Since all alarms received are responded to, a 100% threshold for evaluation exists on all indicators established through the centralized building automation system.

Corrective and preventive maintenance work orders are generated through the computerized maintenance Asset essentials management system based on manufacturer's recommendations of the facilities assessment over time of PM need. Reports of outstanding corrective work orders or preventive maintenance routines are available at any time.

The quality of the utilities distributed is evaluated whenever a complaint is received or when an unusual amount of contamination is indicative of a problem, i.e., a filter is uncommonly dirty. All unusual surges or lags in pressure, temperature or electrical current are evaluated immediately and corrective action is taken as needed to resolve any

problems.

Whenever an incident report is filed, an immediate investigation is made to determine and correct any concerns, which are related to a utility's performance. Information is solicited by the end-users that benefit from the utility's performance and evaluated by Facilities & Construction. Should an alarm occur which may lead to a potential failure of an entire utility system, a thorough investigation is made to ensure that additional indicators are developed and/or a back-up or secondary source for the utility is secured.

UTILITY PERFORMANCE EVALUATION

Summaries of all data collected are evaluated by the management staff on a monthly basis and addressed through the work order system. Concerns that may have a direct effect on the output of a utility are reviewed immediately and a plan of action developed accordingly.

If a problem is discovered regarding a utility which may affect another department, Facilities & Construction will provide any available information to the Department Head, Administrator or Chairman, as required to ensure that the condition of the utility is adequately communicated.

The Chairman of the safety committee is also informed of the status of the utility and if needed. An emergency meeting will be called to implement any contingency or emergency procedures as outlined in the policy.

Concerns that are identified as reoccurring, which in turn may compromise the reliability of and efficiency of a utility, are brought to the attention of the safety committee by the member of the committee who represents Facilities & Construction. A comprehensive review is made of the problem or potential problem and an open dialogue is established in an effort to try to resolve the problem as it is presented on the table in an orderly fashion.

Summaries of any concerns expressed to the safety committees are documented within the minutes of the meeting.

- 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. Note: High-risk utility systems components include life-support equipment.
- 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 manufacturer's recommendations.

The activities and associated frequencies are in accordance with the manufacturer's recommendations or American Society for Healthcare Engineering (ASHE).

Provide a current accurate inventory of systems and/or components of the utility systems that support the physical environment and that require regular observation and/or maintenance.

Provide a preventive maintenance program in order to assure the ongoing performance and reliability of utility systems.

Provide a record keeping system in order to evaluate and monitor the utilities systems for prompt, effective resolution of concerns or issues.

Provide failure contingency plans for prompt repair or replacement and for providing substitute support so that little or no increase in risk to patients, visitors, students, or staff occurs during failure.

Provide for the Safety Committee a summary of issues and problems.

- The hospital labels controls for a partial or complete emergency shutdown. Tags, listing whether the specific switch or valve is a partial or complete emergency shutdown have been installed on every necessary control device, that when closed, constitutes a partial or complete shutdown. Each tag is marked as to whether it is a

partial or complete emergency shutdown of that specific utility service.

- The hospital has written procedure for responding to utility disruptions, shutting off malfunctioning systems, notifying staff in affected areas, performance of emergency clinical interventions when utility systems fail and obtaining repair services. The hospital responds to utility disruptions as described in the procedures. Refer to the Code Copper EP-08-014.

CORRECTIVE ACTION

Any corrective action to be taken on a sub-component of a utility and/or change regarding a utility's particular indicators must be approved by the established hierarchy within the management staff of Facilities & Construction. Executive administrative approval will be solicited on any changes in policy or if emergency contingency funding is required to resolve the problem.

If user error is found to be the cause of the utility failure, the process of correcting the problem will be directed through the safety committee. Clinical interventions during utility systems disruptions will be addressed and responded to as described by the Safety in Areas of Construction and Renovation/Interim Life Safety Measures LS-08-008 procedure. The Emergency Operations Plan will be implemented as required. Facilities and Construction retains emergency repair services as needed.

ASSESSMENT OF ACTION TAKEN AND COMMUNICATION WITH SAFETY COMMITTEES

Any corrective action taken to enhance a utility's performance will be evaluated and documented for effectiveness.

The facilities staff member who is a member of the safety and health committee will keep the membership abreast of the status of any changes through input. The documentation of the discussions will be reflected in the minutes of the meetings.

In the regularly scheduled meetings mentioned above, an open forum for discussion will be provided to let all members express their concerns over any corrective actions taken to enhance a utility's performance. Input will be solicited by the Chairman to facilitate an in-depth discussion of the issue as it is presented.

The University of Toledo Health Science Campus is committed to providing safe and adequate utility service throughout all areas of the campus. An integral part of this service is providing an avenue for communication to allow end-users and those who benefit from a utility's performance the opportunity to participate and access the actions taken to keep the reliability of the utility systems at the expected level of performance.

- In critical care areas designed to control airborne contaminants (such as biological agents, gases, fumes, dust), the ventilation system provides appropriate pressure relationships, air exchange rates, filtration efficiencies, temperature, and humidity. The design/installation/maintenance of ventilation systems is in accord with UTMC's Airborne Pathogens Control, Procedure US-08-002. This procedure references the current guidelines for HVAC systems by; TJC, ASHRAE, AIA, and the CDC. The hospital's "Construction Bid Package Boilerplate" issued to all A&E's for upcoming construction/renovations, contains verbiage pointing to expected standards. The hospital's computerized "Preventative Maintenance System" issues "PM work orders" to perform specific maintenance on the Air Handling Units, to include the filtering material, air flow testing of "Critical Infection Control" spaces, and general maintenance on a quarterly, semi-annual, and annual basis.

In conclusion the utility management plan represents a well-rounded, effective program for providing reliable service to the campus community given the following: Multiple systems provide redundancy in the event of a utility failure such as steam, electrical feeding the campus at the substation and main water lines that represent

the main distribution systems. These three systems are totally redundant with two separate feeds to campus on each system. The School dude preventive maintenance program also insures we are keeping our equipment in optimal condition which provides an increased reliability factor over the service life of the equipment. The utility and School dude maintenance systems in place are reviewed and updated as needed to keep a reliable inventory and maintenance records of Facilities equipment.

- In non-critical care areas, the ventilation system provides required pressure relationships, temperature, and humidity.
- The hospital maps the distribution of utility systems.

Identification and Inventory of Key Utility Sub-Components is located in procedure ADM-65.

- Medical Gas storage rooms and transfer and manifold rooms comply with NFPA 99-2012: 9.3.7.
- The emergency power supply system's equipment and environment are maintained per manufacturers' recommendations, including ambient temperature of at least 40°F; ventilation supply and exhaust; and water jacket temperature (when required).
- All operating rooms are considered wet locations
- Electrical distribution in the hospital is based on three categories (Critical, General, Basic)
- Hospital grade receptacles at patient bed locations and where deep sedation anesthesia is administered are tested after initial installation, replacement, or servicing.
- All power strips used in patient vicinities are UL 1363a listed. See S-08-037
- We do not allow use of extension cords for permanent use
- Areas designated for general anesthesia comply with NFPA 101-2012 and tentative interim amendments

The hospital has a water management program that addresses Legionella and other waterborne pathogens.

Note: The water management plan is in accordance with law and regulation. See US-08-003

- The water management program has an individual or a team responsible for oversight and implementation of the program, including but not limited to development, management, and maintenance activities.

Representatives from Facilities, Infection Prevention and Control, and EHRS meet annually to review the water management program and complete a risk assessment. The risk assessment is facilitated by Infection Prevention and Control.

- The individual or team responsible for the water management program develops the following:
 - A basic diagram that maps all water supply sources, treatment systems, processing steps, control measures, and end use points.
 - A water risk management plan based on the diagram that includes and evaluation of the physical and chemical conditions of each step of the water flow diagram to identify any areas where potentially

hazardous conditions may occur (these conditions are most likely to occur in areas with slow or stagnant water).

- A plan for addressing the use of water in areas of buildings where water may have been stagnant for a period of time (for example, unoccupied or temporarily closed areas).
- An evaluation of the patient population served to identify patients who are immunocompromised.
- Monitoring protocols and acceptable ranges for control measures.

The hospital contracts with Veolia, Inc. to conduct a microbiological study annually on every cooling tower during periods of operation. The study consists of a bacterial count reading, and a fungal count reading. A Facilities technician works with the Veolia representative to adjust tower chemical treatments. Annually, the preventative maintenance system issues a PM to perform the following work on the cooling towers; They are drained, scrubbed clean, and filled with water at the start of the cooling season. A contracted technician takes bi-weekly water samples, checks and adjusts the treatment, then records them in an on-site logbook. The domestic cold water has had the aerators removed on all the sinks to ensure that no bacterial growth will present itself. The domestic hot water is kept hot enough to keep bacteria from growing, yet cool enough to be scald- proof. The system is monitored through the B.A.S. and the building operators make rounds daily, and record the domestic hot water temperatures and pressures in the mechanical rooms.

- The individual or team responsible for the water management program manages the following:
 - Documenting results of all monitoring activities
 - Corrective actions and procedures to follow if a test result outside of acceptable limits is obtained, including when a problem or confirmed waterborne pathogen (s) indicates action is necessary.
 - Documenting corrective actions taken when control limits are not maintained.
- The individual or team responsible for the water management program reviews the program annually and when the following occurs:
 - Changes have been made to the water system that would add additional risk
 - New equipment or an at-risk water system(s) has been added that could generate aerosols or be a potential source for Legionella.

The hospital has a reliable emergency electrical power source.

The Facilities Maintenance Department is responsible for the inspection, testing, and maintenance of all utility system components. This process is managed through the work order and preventative maintenance system. All records are maintained in the Facilities Support Building including all outside service contract documentation.

- The hospital provides emergency power within 10 seconds for the following:
 - Alarm Systems, exit routes, exit sign illumination, emergency communication systems, elevators.
 - Equipment that could cause patient harm when it fails, including life support systems; blood, bone, and tissue storage systems; medical air compressors; and medical and surgical vacuum systems,
 - Areas in which loss of power could result in patient harm, including emergency rooms, intensive care, operating rooms, recovery rooms, and urgent care areas, as required by the Life Safety Code.
 - Emergency lighting at generator locations. The hospital's emergency power system (EPS) has a remote manual stop station (with identifying label) to prevent inadvertent or unintentional operation. A remote annunciator (powered by storage battery) is located outside the EPS location.
- The hospital implements a policy to provide emergency backup for essential medication dispensing equipment identified by the hospital, such as automatic dispensing cabinets, medication carousels, and central medications robots See Medication Storage Policy #3364-133-34

- The hospital implements a policy to provide emergency backup for essential refrigeration for medications identified by the hospital, such as designated refrigerators and freezers. See Medication Storage Policy #3364-133-34

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The hospital inspects, tests, and maintains utility systems.

The Facilities Maintenance Department is responsible for the inspection, testing, and maintenance of all utility system components. This process is managed through the School wide work order and preventative maintenance system. All records are maintained in the Facilities Support Building including all outside service contract documentation.

- When performing repairs or maintenance activities, the hospital has a process to manage risks associated with air-quality requirements; infection control; utility requirements; noise; odor; dust; vibration; and other hazards that affect care, treatment, or services for patients, staff and visitors.

This process is outlined in LS-08-008 Interim Life Safety Measures and Infection Control in Areas of Construction and Renovation.

- 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 tests monthly Line Isolation Monitor's visual and audible alarms.
- The hospital inspects, tests, and maintains the following:
 - High Risk Utility Systems (Life-support) utility system components on the inventory.
 - Infection Control utility system components on the inventory.
 - Non-High Risk (Non-life support) utility system components on the inventory.
- The hospital meets all other HealthCare Facilities Code Requirements for electrical distribution, HVAC, as related to NFPA-99-2012: Chapter 6 and 9.

The hospital inspects, tests, and maintains emergency power systems.

UTMC tests emergency power systems for sufficient lengths of time at regular frequencies in order to detect reliability problems and reduce risk of losing critical resources during an emergency. Inspection, testing, and maintenance processes are conducted per NFPA and EC standards, using the preventative maintenance program. Documentation is located in Facilities Support Building. If a failure occurs, the hospital implements measures to protect patients, visitors, and staff until necessary repairs occur. Retesting will occur after making necessary repairs.

The hospital inspects, tests, and maintains medical gas vacuum systems.

UTMC inspects, tests, and maintains critical components of piped medical gas systems. When these systems are installed, modified, or repaired they are checked for purity, correct gas, and proper pressure. Documentation is kept in Facilities Support Building. All main supply valves and shutoff valves for piped medical gas and vacuum systems are accessible and clearly identified. All rooms containing Medical gas or other gases are labeled accordingly with proper signage.

The hospital establishes and maintains a safe, functional environment.

UTMC provides a physical space that creates a safe and suitable surrounding to support patient dignity and all for ease of interaction. The space meets the needs of the population including suitable lighting, ventilation, temperature, and humidity in critical areas. The area is kept clean and free of offensive odors through our Environmental Services staff

and maintains furnishings and equipment is safe and good repair. All spaces provide emergency access to all occupied spaces.

The hospital manages its environment during demolition, renovation, or new construction to reduce risk to those in the organization.

All demolition, renovation, or new construction is completed per state and local rules and regulations as well as American Society for Healthcare Engineering (ASHE). Preconstruction risk assessments are completed in Areas Construction and Renovation/Interim Life Safety Measures procedure #LS-08-008. Actions taken are based on the assessment to minimize risks.

For computed tomography (CT), positron emission tomography (PET), or nuclear medicine (NM) services: prior to installation of new imaging equipment, replacement of existing imaging equipment, or modification to rooms where ionizing radiation will be emitted or radioactive materials will be stored (scan rooms and hot labs), a medical physicist or health physicist conducts a structural shielding design. After installation, a medical physicist or health physicist conducts a radiation protection survey to verify the adequacy of installed shielding prior to clinical use.

ANNUAL REPORT

The objectives, scope, performance and effectiveness of the utility management program/plan will be evaluated in an annual report to Administration. Evaluation will include all areas of utility management.


SUPPORTING DOCUMENTATION AND PERFORMANCE MEASURES

Other written procedures that support this management plan can be found at <http://www.utoledo.edu/depts/safety/UT%20Procedures%20and%20Plans.html>. Performance measures for the utility management program include the following:

- Preventative Maintenance Completion Rates
- Humidity Monitoring Reports

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Facilities Compliance Officer
Title

Signature
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Date

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