

The Requirements for Medical Gas Systems

An overview of the Joint Commission Standards for the Environment of Care (EC), Emergency Management (EM), and the specific Elements of Performance (EP) requirements with a focus on Operation and Management Programs.



About the Presenter

Jonathan C. Willard, Medical Gas Systems Consultant

- ▶ Experience in Medical & Laboratory Gas and Vacuum Systems and Involved in Healthcare Construction for over 20 Years
- ▶ ASSE 6010, 6015, 6020, 6030, 6035, 6040, 6050, & 6055 Certified
- ▶ MGPHO Credentialed Medical Gas Verifier (V-0135)
- ▶ Serves on the Medical Gas Professional Healthcare Organization (MGPHO) Board of Directors as Vice President of Credentials
- ▶ Principal Member of Technical Committee on Medical Gas and Vacuum Piping Systems (NFPA 99) & Principal Member of Technical Committee on Industrial and Medical Gases (NFPA 55)
- ▶ Certified in Plumbing Design (CPD), Certified Healthcare Constructor (CHC), LEED AP, & Project Management Professional (PMP) with a Master's Degree in Education



Presentation Outline

- ▶ Regulatory Overview
 - ▶ The CMS / Joint Commission Standards
 - ▶ Relevant Environment of Care (EC) and Emergency Management (EM) Requirements
 - ▶ NFPA 99 Requirements
 - ▶ Operation and Management Requirements
- ▶ Medical Gas Management Programs
 - ▶ Survey of the Existing Programs and the Medical Gas Systems
 - ▶ Maintenance and Inspection Programs
 - ▶ Policies and Procedures
 - ▶ Personnel Qualifications, Training, and Continuing Education
 - ▶ Emergency Management and Preparedness
 - ▶ Record Keeping and Documentation



Accreditation Overview

- ▶ Why is accreditation necessary?
 - ▶ **Short Answer:** It's not!
 - ▶ **BUT:** If an organization wishes to be paid for Medicare or Medicaid services that are provided, some form of accreditation is required.
 - ▶ The status of being accredited means, the organization has achieved "**deemed status**", which indicates the organization and the health care facility have met the CMS standards.
 - ▶ Therefore, they can get reimbursed for these services.



Deemed Status

CMS and TJC Definition:

Status conferred by the Centers for Medicare & Medicaid Services (CMS) on an organization whose standards and survey process are determined by CMS to be equivalent to those of the Medicare program or other federal laws. Accreditation is voluntary and seeking deemed status through accreditation is an option, not a requirement.



Accreditation Overview

- ▶ Is Joint Commission the the only accreditation agency?
 - ▶ Negative...There are a couple others (DNV, State Agencies, Ambulatory Surgery, etc.).
 - ▶ BUT all have to accredit hospitals based the CMS standards.
- ▶ Is this presentation useful if our organization is not under TJC?
 - ▶ Medical Gas Management Programs that meet one of these agency standards are likely to meet the requirements of the others, but this should be verified.



TJC Accreditation Introduction

- ▶ A review of the requirements for medical gas and vacuum systems that are necessary to achieve and maintain CMS / Joint Commission (and most other accrediting agencies) accreditation.
- ▶ Standards (Requirements) are statements that define performance expectations and/or structures or processes to ensure the hospital is providing safe, quality care, treatment, and services.
- ▶ Elements of Performance (EPs) are specific requirements and are scored to determine overall compliance with the accreditation standard.
- ▶ The scoring, documentation, and risk assessment changes in the current standard are significant.
 - ▶ No longer using categories (A or C), “measures of success”, or patient care impact scoring.
- ▶ Requirement for Improvements (RFI) must be completed within 60 days. Extensions may be granted by CMS based on extenuating circumstances.



Demonstrating Compliance

- ▶ Most of the EC Standards and EPs are demonstrated with either documentation or a risk assessment.



(D) = Documentation is required to demonstrate compliance with a specific EP. This is for data collection and documentation requirements that are beyond information required the “clinical record.” Examples include a policy, written plan, bylaws, meeting minutes, evidence of testing, data, reports, etc.

(R) = Risk assessment is required. Probability of harm, severity of harm, and number of patients at risk.



Task Completion

Time Frame Definitions:

- ▶ Every 36 Months: 36 Months from the last event +/- 45 Days
- ▶ Every 12 Months / Annual: 12 Months from last event +/- 30 Days
- ▶ Every 6 Months: 6 Months from last event +/- 20 Days
- ▶ Every 3 Months / Quarterly: Every 3 Months +/- 10 Days
- ▶ Every 30 Days / Monthly: 12 Times a year, once / month
- ▶ Every week: Once per calendar week.



Environment of Care Requirements

Environment of Care Risks, Utility System Risks, Medical Gas and Vacuum Systems Operation & Management, and Other Applicable EC Requirements.



Environment of Care Risks

- ▶ EC 01.01.01: Plans activities to minimize risks in the environment of care.
 - ▶ EP 2: Written plans for managing the following.
 - ▶ The safety of patients and visitors (D)
 - ▶ The security of everyone in the hospital (D)
 - ▶ Hazardous materials and waste (D)
 - ▶ Fire safety (D)
 - ▶ Medical equipment (D)
 - ▶ **Utility systems (D)**



Utility System Risks

- ▶ EC 02.05.01: Manages risks associated with its utility systems.
 - ▶ EP 1: Designs and installs utility systems that meet patient care and hospital needs.
 - ▶ EP 2: Maintains a written inventory of all operating components of utility systems. (D)(R)
 - ▶ EP 3: Identifies high-risk operating components on the inventory for which there is a risk of serious harm or death to a patient or staff member should the component fail. (D)
 - ▶ EP 4: Identifies activities and associated frequencies for inspection, testing, and maintaining all operating components on the inventory. The activities and associated frequencies are in accordance with the manufacturer's recommendations or with an alternative equipment maintenance (AEM) program. (D)(R)



Utility System Risks

- ▶ EP 8: Labels utility system controls to facilitate partial or complete emergency shutdowns.
Examples: Source Valves, Emergency Shutoff Valves, etc.
- ▶ EP 9: Written procedures for responding to utility system disruptions. (D)(R)
- ▶ EP 10: The procedures address shutting off the malfunctioning system and notifying staff in affected areas.
- ▶ EP 11: The procedures address performing emergency clinical interventions during utility system disruptions.
- ▶ EP 13: Responds to utility system disruption as described in its procedures.



Utility System Risks

- ▶ EP 16: In non-critical areas, the ventilation system provides the required pressure relationships, temperature, and humidity.
- ▶ EP 17: The hospital maps the distribution of its utility systems. (D)
Examples: Record / As-built Drawings, Single-Line Drawings, etc.
- ▶ EP 18: Medical gas storage rooms, transfer rooms, and manifold rooms comply with NFPA 99-2012.
- ▶ See Chapter 5 for Manifold Rooms (Storage?)
- ▶ See Chapter 9 for Ventilation Requirements.
- ▶ See Chapter 11 for Transfilling Requirements and Other Cylinder Storage Requirements.



Utility System Operation and Management

- ▶ EC 02.05.05 & 04.01.01: Inspects, tests, and maintains utility systems.
 - ▶ EP 1: When performing repairs or maintenance activities, the hospital has a process to manage risks associated with hazards that affect care, treatment, or services for patients, staff, and visitors.
 - ▶ EP 2: Tests utility system components on the inventory before initial use and after major repairs or upgrades. The completion date and the results of the tests are documented. (D)
 - ▶ EP 3: Inspects, tests, and maintains the utility system components on the inventory. The completion date and the results of the activities are documented. (D)(R)
 - ▶ EP 4: Establishes processes for continually monitoring, internally reporting, and investigating utility system management problems, failures, or use errors. (R)
 - ▶ EP 15: Every 12 months the hospital evaluates each management plan, including a review of the plans objectives, scope, performance, and effectiveness. (D)



Medical Gas System Operation and Management

- ▶ EC 02.05.09: Inspects, tests, and maintains medical gas and vacuum systems.
 - ▶ EP 1: In time frames defined by the hospital, inspects, tests, and maintains critical components of piped medical gas and vacuum systems, including the source, distribution, inlets/outlets, and alarms that protect the piped medical gas systems. The activities and results are documented. (D)(R)
 - ▶ EP 2: When the hospital has bulk oxygen systems, they are in a locked enclosures (such as a fence) at least 10 feet from vehicles and sidewalks. There is permanent signage stating "OXYGEN - NO SMOKING - NO OPEN FLAMES." FYI...There are MANY More!
 - ▶ EP 3: The emergency oxygen supply connection (EOSC) is installed in a manner that allows a temporary auxiliary source to connect to it.
 - ▶ EP 4: The hospital tests piped medical gas and vacuum systems for purity, correct gas, and proper pressure when these systems are installed, modified, or repaired. The test results and completion dates are documented . (D)
 - ▶ EP 5: The hospital makes main supply valves and area shutoff valves for piped medical gas and vacuum systems accessible and clearly identifies what the valve controls.



Medical Gas System Operation and Management

- ▶ EP 6: The hospital implements a policy on all cylinders within the hospital that includes the following:
 - ▶ Proper handling and transportation
 - ▶ Physically segregating full and empty cylinders from each other
 - ▶ Additional designation (Partial / In-Use) allowed.
 - ▶ Labeling empty cylinders
 - ▶ Prohibiting transfilling in any compartment with patient care rooms.
- ▶ EP 7: Meets ALL other Health Care Facility Code requirements as related to NFPA 99 - 2012: Chapters 5 & 11.
 - ▶ Existing Facilities Requirements (See TIA 12-4). Significant Changes.
 - ▶ These are required regardless of when facility of the facility was constructed.



Other EC Standards

- ▶ EC 02.01.01: Manages Safety and Security Risks.
 - ▶ EP 8: Controls access to and from areas identified as security sensitive. (R)
 - ▶ Medical Gas Cylinder Storage Locations
 - ▶ Bulk Oxygen System Site
 - ▶ Medical Gas Source Equipment Locations
- ▶ EC 02.02.01: Manages Risks Related to Hazardous Materials and Waste.
 - ▶ EP 1: Maintains a written, current inventory of hazardous materials and waste that it uses, stores, or generates. The only materials that need to be included on the inventory are those whose handling, use, and storage are address by law and regulation. (D)(R)
 - ▶ EP 10: Monitors levels of hazardous gases and vapors to determine that they are in a safe range. (Anesthesia waste gases, nitrous oxide administration areas, storage rooms, etc.)
 - ▶ Follow OSHA / NIOSH Guidelines
 - ▶ EP 11: Has the permits, licenses, manifests, and safety data sheets, required by law and regulation. (D)(R)



Other EC Standards

- ▶ EC 02.03.01 & 02.03.03: Manages Fire Risks and Conducts Fire Drills.
 - ▶ EP 9: Written fire response plan describing the specific roles of staff. (D)
 - ▶ Who's authorized to operate emergency shutoff valves? Emergency Response Procedure!
 - ▶ EP 5: Critiques fire drills to evaluate staff response to fire. The evaluation is documented. (D)(R)
- ▶ EC 02.04.01 & 02.04.03: Manages Medical Equipment.
 - ▶ EP 2: Maintains a written inventory of all medical equipment. (D)(R)
 - ▶ EP 4: Identifies the activities and associated frequencies for maintaining, inspecting, and testing all medical equipment on the inventory. These activities and associated frequencies are in accordance with the manufacturer's recommendations or an AEM program. (D)
 - ▶ The hospital inspects, tests, and maintains all high-risk equipment. These activities are documented. (D)(R)
 - ▶ EP 9: Has written procedures to follow when medical equipment fails, including using emergency clinical interventions and back up equipment. (D)



Emergency Management Requirements

Emergency Operations Plan, Hazard Vulnerability Analyses,
Emergency Preparedness, and Testing & Evaluation of the EOP.



Emergency Management

An Introduction:

- ▶ The EM Chapter is organized to allow hospitals to plan to respond to the effects of potential emergencies that fall on a continuum from disruptive to disastrous.
- ▶ Planning involves the activities required for a comprehensive Emergency Operations Plan (EOP).
- ▶ After the EOP is in place, it must be tested in order to evaluate its effectiveness.
- ▶ Hospitals should identify potential hazards, threats, and adverse events with a Hazard Vulnerability Analysis (HVA).



Emergency Management

- ▶ EM 01.01.01: Engages in planning activities prior to developing its written EOP.
 - ▶ EP 2: Conducts an HVA to identify potential emergencies that could affect demand for the hospital's services or its ability to provide those services, the likelihood of those events occurring, and the consequences of those events. (D)(R)
 - ▶ EP 3: Together with its community partners, prioritizes the potential emergencies identified in its HVA and documents these priorities. (D)
 - ▶ EP 5: The hospital uses its HVA as a basis for defining mitigation activities.

Note: Mitigation, Preparedness, Response, and Recovery are the four phases of emergency management. They occur over time: Mitigation and preparedness occur before the emergency, and response and recovery occur during and after an emergency.
 - ▶ EP 8: The hospital keeps a documented inventory of the resources and assets it has onsite that may be needed during an emergency. (D)(R)

Examples: Back Feed Equipment, Portable Vacuum Pumps, Backup Systems. Also, may consider Memorandums of Understanding, Vendor/Supplier Agreements, Shared Assets, etc.



Emergency Management

- ▶ EM 02.01.01: Has an Emergency Operations Plan.
 - ▶ EP 2: Develops and maintains an EOP that describes the response procedures to follow when emergencies occur.
(D)(R)
 - ▶ EP 3: The EOP identifies capabilities and establishes response procedures for when the hospital cannot be supported by the local community in its efforts to provide services for at least 96 hours.
 - ▶ EP 5: The EOP describes the recovery strategies and actions designed to help restore the systems after an emergency.



Emergency Management

- ▶ EM 02.02.07: Prepares for how it will manage staff during an emergency.
 - ▶ The EOP describes the following:
 - ▶ EP 2: Roles and responsibilities of staff for communications, resources and assets, safety and security, utilities, and patient management during an emergency.
 - ▶ EP 3: Process for assigning staff to all essential staff functions.
 - ▶ EP 7: Trains staff for their assigned response roles.



Emergency Management

- ▶ EM 02.02.09: Prepares for how it will manage utilities during an emergency.
 - ▶ Identifies alternative means of providing the following:
 - ▶ EP 6: Medical Gas and Vacuum Systems.
 - ▶ EP 7: Other Utility Systems the hospital defines as essential.
- Note: Need to determine which systems are needed in an emergency and how they will be used.



Emergency Management

- ▶ EM 03.01.01: Evaluates the effectiveness of its emergency management planning activities.
 - ▶ EP 1: The hospital conducts an annual review of its risks, hazards, and potential emergencies as defined in its HVA. (D)(R)
 - ▶ EP 2: The hospital conducts an annual review of the objectives and scope of its EOP. (D)(R)
 - ▶ EP 3: The hospital conducts an annual review of its inventory. (D)(R)



Emergency Management

- ▶ **EM 03.01.03:** Evaluates the effectiveness of its Emergency Operations Plan.
 - ▶ **EP 1:** As an emergency response exercise, the hospital activates its EOP twice a year at each site included in the plan. (R)
 - ▶ **EP 2:** During the exercise, the hospital monitors its management of the utility systems.
 - ▶ **EP 3:** Evaluation of exercises or actual responses includes the identification of deficiencies and opportunities for improvement. (D)

Note: If the hospital activates its plan due to an actual emergency, this can serve as an “exercise.” Tabletop sessions are not acceptable substitutes for these exercises.



NFPA 99 Management Requirements

Synopsis of the Operation and Management Requirements described in the *NFPA 99: Health Care Facilities Code*.



NFPA 99 - O&M Programs

- ▶ Category 1 - Operation and Management Requirements
 - ▶ **General.** Health care facilities shall develop and document periodic maintenance programs for these systems and their subcomponents as appropriate to the equipment installed.
 - ▶ Maintenance, Inspection, and Testing Programs
 - ▶ **Inventories.** Inventories shall include at least all source subsystems, control valves, alarms, manufactured assemblies containing patient gases, and outlets.
 - ▶ **Inspection and Maintenance Schedules.** Scheduled inspections and maintenance for equipment and procedures shall be established through the risk assessment of the facility and developed with consideration of the original equipment manufacturer recommendations and other recommendations as required by the authority having jurisdiction.
 - ▶ **Inspection and Maintenance Procedures.** The facility shall be permitted to use any inspection and maintenance procedure(s) or testing methods established through its own risk assessment.



NFPA 99 - O&M Programs

- ▶ Personnel Qualifications
 - ▶ Any systems and subcomponents that will have a maintenance or inspection task or activity.
 - ▶ Persons maintaining these systems shall be qualified to perform these operations.
 - ▶ Appropriate qualification shall be demonstrated by any of the following:
 - ▶ (1) A documented training program acceptable to the health care facility by which such persons are employed or contracted to work with specific equipment as installed in that facility.
 - ▶ (2) Credentialing to the requirements of ASSE 6040, Professional Qualification Standard for **Medical Gas Maintenance Personnel**, and technically competent on the specific equipment as installed in that facility.
 - ▶ (3) Credentialing to the requirements of ASSE 6030, Professional Qualification Standard for **Medical Gas Systems Verifiers**, and technically competent on the specific equipment as installed in that facility.



NFPA 99 - O&M Programs

- ▶ Inspection and Testing Operations
 - ▶ Nonstationary booms and articulating assemblies shall be tested **every 18 months** or at a duration as determined by a risk assessment.
 - ▶ Central supply systems for medical gases shall be inspected **annually** and be maintained by a qualified representative of the equipment owner.
 - ▶ A **periodic testing program** for medical gas and vacuum systems and the related alarm warning systems shall be implemented.
 - ▶ The maintenance program for the medical gas supply systems shall be in accordance with the manufacturer's recommendations.



NFPA 99 - O&M Programs

- ▶ Inspection and Testing Operations
 - ▶ A testing and calibration procedure that ensures carbon monoxide monitors are calibrated **at least annually**.
 - ▶ Audible and visual alarm indicators shall be **periodically** tested to determine that they are functioning properly.
 - ▶ Medical-surgical vacuum station inlet performance shall be on a regular preventive maintenance schedule as determined by the facility maintenance staff.
 - ▶ Records of these tests shall be maintained until the next test is performed.



Utility System Risks

- ▶ NFPA 99 Sidebar: Storage Rooms
 - ▶ Chapter 11 (NFPA 99) must be used for guidance.
 - ▶ Less than 300 cubic feet (12 E-cylinders)
 - ▶ Greater than 300 cubic feet, but less than 3,000 cubic feet (120 E-cylinders or about 12 H-cylinders)
 - ▶ Greater than 3,000 cubic feet
 - ▶ In-use cylinders for immediate patient use (on wheelchairs, gurneys, etc.) do not count against you.
 - ▶ Full / Empty Signage Required
- ▶ NFPA 99 Sidebar: Manifold Rooms (and storage within)
 - ▶ Chapter 5 (NFPA 99) must be used for guidance.



Medical Gas Management Programs

Developing and Maintaining a Comprehensive O&M Program is the Key to Complying with all of the Code, Regulatory, and Accreditation Requirements for Medical Gas and Vacuum Systems.



Why do we need a Management Program?

- ▶ Improves Patient, Personnel, and Public Safety.
- ▶ Assists in complying with the regulatory and accreditation requirements for hospitals.
- ▶ Increases the life of the medical gas and vacuum systems operating at the facility.
- ▶ Medical Gases are considered prescription drugs that are regulated by the FDA.
- ▶ Medical air is unique in that it is the ONLY regulated drug that is “manufactured” onsite.
- ▶ Protects the organization from liability.



Where do we start?

- ▶ **Me:** Do you already have a plan?
- ▶ If YES, a survey of current management plans and the systems that are currently operating at the facility is a good place to start.
 - ▶ Review the current program to make sure you have all of the following items are addressed.
- ▶ If NO, You're going to have a long year! 😊
- ▶ Let's get everyone on board!
- ▶ Organization's Vision, Mission, and Guiding Principles (Executive Level)
 - ▶ Provides for the organization's commitment to the management program and the overall direction of the operation and management of these systems.



What's Next?

- ▶ Survey of Existing Systems, Policies, Procedures, and Personnel Qualifications
 - ▶ Regulatory Compliance Review (Are the hospital's medical gas and vacuum systems, their personnel, and required procedures compliant?)
 - ▶ Document everything that is not compliant and/or items not addressed in the current program. This will be your Roadmap!
- ▶ Develop / Update Inventories
- ▶ Develop / Update Maintenance and Inspection Programs
- ▶ Develop / Update Policies and Procedures
- ▶ Implement / Refine Record Keeping and Documentation
- ▶ Develop / Update Qualifications Standard for Medical Gas Personnel
- ▶ Provide Staff Training and Develop a Plan for Continuing Education
- ▶ Develop / Update Emergency Operations Program and Preparedness



Survey of Existing Systems

- ▶ Regulatory Compliance Review
 - ▶ Identify Compliance Findings (Deficiencies). Annual Inspection Reports is a source for this information...IF you have a vendor that is competent!
 - ▶ Correct or Repair the Deficiencies OR Conduct and Document a Risk Assessment
 - ▶ Must complete within 60 days. This is a bit subjective!
 - ▶ Existing Facilities must meet some NFPA 99 requirements regardless of when they were constructed. Cannot be risk assessed. See 5.1.1.5 for these mandatory requirements.



Survey Existing Systems



NFPA 99 States:

“Existing Systems Clause”

An existing system that is not in strict compliance with the provisions of this standard shall be permitted to be continued in use as long as the authority having jurisdiction has determined that such use does not constitute a distinct hazard to life.



Inventories

- ▶ Create and Document ALL Required Inventories
 - ▶ Any operating components on systems and subsystems that will have a maintenance or inspection task or activity.
 - ▶ Update current lists! TJC looks for deviations in inventories from year to year.
 - ▶ What is Considered Life Support Equipment? Needed in an Emergency?
 - ▶ Labeling for all medical gas controls to facilitate partial or complete emergency shutdowns.
 - ▶ It is encouraged that you develop an inventory of the following items:
 - ▶ Medical gas cylinders and medical devices used w/ systems (i.e. flow meters, and suction regulators - biomed?)
 - ▶ Develop activity schedules based on code requirements and manufacturer recommendations.
 - ▶ **Note:** You may need to come back to this for EM inventories (if needed).



Maintenance and Inspection Programs

- ▶ Segregate inspection tasks from maintenance tasks
 - ▶ Inspection tasks are generally considered to be observation / checklist type activities
 - ▶ Maintenance tasks are generally hands-on, require technical training, and may require partial shutdowns of equipment.
 - ▶ Qualifications and competencies for each can be vastly different.
 - ▶ Don't forget about the odd-ball tasks like room temperatures, ventilation, and
- ▶ Document the frequencies of all activities and tasks.
 - ▶ Best to use the time frame guidance used by TJC
- ▶ Maintenance Strategies should be provided as well for each activity.
 - ▶ Interval Based, Predictive Maintenance, Run-to-Fail, etc.



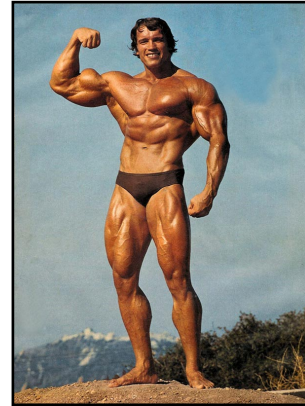
Policies & Procedures

- ▶ Document all inspection and maintenance procedures.
 - ▶ There are industry accepted procedures available in some of the publications to follow.
 - ▶ These should be provided by vendors if not self performing.
- ▶ General Work Requirements
 - ▶ Responsible Facility Authority - Discuss Concept
 - ▶ Permit-to-Work System
 - ▶ Covers all shutdowns (including for maintenance), breaching of the systems (NFPA 99 definition), and any other "invasive" activity.
- ▶ Planned Shutdown Procedures
- ▶ Temporary Back Feeding
- ▶ Cylinder Storage and Management Procedures
- ▶ New Equipment Selection
- ▶ Emergency Shutdown Procedure
 - ▶ Who is Authorized?
- ▶ Hazardous Materials and Waste Gas (Nitrous Oxide and WAGD)



Medical Gas Personnel

- ▶ Do you have the Guns?
 - ▶ Determine In-House Capabilities
 - ▶ What are the qualifications of in-house facility personnel?
 - ▶ What is their comfort level with the medical gas systems? I have a 6040, BUT!
 - ▶ What qualifications must personnel possess?
 - ▶ Are you in-house training programs available and are they adequate?
- ▶ Outsourcing may be an approach to consider.
 - ▶ Vendors must meet these requirements as well.
 - ▶ It is up to the organization to validate and document these qualifications.



Emergency Operations Plan

- ▶ Emergency Management
 - ▶ Mitigate: Plan for items that are known. Try to be flexible for ones that are unknown.
 - ▶ Which systems are needed? Oxygen, Medical Air, Vacuum (Suction).
 - ▶ Hazard Vulnerability Analysis: What risks are there to my central supply systems?
 - ▶ Any redundancies or duplications that would be appropriate?
 - ▶ What are our intended procedures for both a partial and a full scale failure of our systems? **Some options to consider.**
 - ▶ The goal is to understand the needs and assets required to keep these systems active through an all hazards approach when there is an unplanned system disruption.



Emergency Operations Plan

- ▶ Emergency Management
 - ▶ Prepare: Acquire assets, train staff, and acquire venter agreements.
 - ▶ Secure assets that will be needed during the emergency.
 - ▶ Temporary back feed equipment
 - ▶ Back up systems. Two medical air compressors onsite? Connect through a bypass! Are there enough portable suction units?
 - ▶ Train staff on how to back feed and monitor systems, how to shut down systems in an emergency, how to perform any other tasks required in an emergency.
 - ▶ Vender Agreements
 - ▶ Confirm your assumptions. Can they deliver according to your plan?
 - ▶ Memorandums of Understanding, shared assets with other facilities.
 - ▶ Train staff on how to back feed and monitor systems, how to shut down systems in an emergency, how to perform any other tasks required in an emergency.



Emergency Operations Plan

- ▶ Emergency Management
 - ▶ Response: Execute Plan. Initiate backup procedures/systems as needed, manage staff, monitor supplies, order supplies as needed.
 - ▶ This is where preparation and training are important.
 - ▶ Evaluate: This should be ONGOING, Not just one time event.
 - ▶ **Recovery.** Restore systems after an emergency
 - ▶ Test plan and specific procedures once developed. **Some options.**
 - ▶ Evaluate effectiveness and modify plan as needed.
 - ▶ Its always easier to find breakdowns during a test, than during a live event!
 - ▶ Manage EC Program and Conduct an Annual Review.



Emergency Operations Plan

- ▶ Emergency Management
 - ▶ Plan: Mitigate, understand the needs and assets required to keep these systems active through an all hazards approach.
 - ▶ Prepare: Acquire assets, train staff, and sign vendor agreements.
 - ▶ Training: How to back feed systems, how to shut down systems in an emergency, how to perform any other tasks required in an emergency.
 - ▶ Execute And Manage: Manage staff, monitor supplies, order supplies as needed.
 - ▶ Evaluate (This should be ONGOING, Not just one time event): Restore systems, test procedures and plans, and evaluate effectiveness.
 - ▶ Its always easier to find breakdowns during a test, than a live event!
 - ▶ Manage EC Program and Conduct an Annual Review
- ▶ Unplanned Utility System Disruptions



Documentation and Record Keeping

- ▶ All documentation should be kept for review by the Authority Having Jurisdiction upon request.
- ▶ What needs to be documented? That's an easy one! EVERYTHING!!!
- ▶ All of the programs, plans, and procedures discussed
- ▶ All inventories that are required
- ▶ The completion of all activities and tasks
- ▶ The completion of all repairs, corrections, and maintenance
- ▶ Qualifications for ALL personnel working on the medical gas systems
- ▶ Medical gas system mapping, unplanned disruptions, and equipment needed in an emergency

DID I MISS ANYTHING?



Ensuring Patient Safety!

REMEMBER:

- ✦ Patients rely on health care organizations to ensure that their *safety* and *well-being* are continuously protected.
- ✦ This is an *ongoing process*, not a one time procedure.
- ✦ Developing a comprehensive **Medical Gas Systems Management Program** is the best way to ensure these systems remain safe and reliable.



Thank You Questions or Comments?

Phone: 603.396.3878
Web: www.AcuteMedGas.com
Email: jon@acutemedgas.com



Resource Documents

- ▶ NFPA 99: Health Care Facilities Code
- ▶ NFPA 55: Compressed Gases and Cryogenic Fluids Code
- ▶ ASSE 6000 Professional Qualifications Standard for Medical Gas Systems Personnel
- ▶ The Joint Commission - Hospital Accreditation Standards
- ▶ Compressed Gas Association
 - ▶ CGA E-10: Maintenance of Medical Gas and Vacuum Supply Systems at Health Care Facilities
 - ▶ CGA M-1: Standard for Bulk Medical Gas Supply Systems at Health Care Facilities
 - ▶ CGA P-18: Standard for Bulk Inert Gas Supply Systems
- ▶ Equipment Manufacturer's Operation and Maintenance Manuals



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