

# NFPA 99 changes 2005 to 2012 editions

Jim Lucas – Tri-Tech Medical

# Who can propose changes?

- Anybody



# How do I propose changes?

- Use the “Form for proposals on NFPA Technical committee documents” found in the back of the NFPA 99 booklet

FORM FOR PROPOSALS ON NFPA TECHNICAL COMMITTEE DOCUMENTS

Mail to: Secretary, Standards Council  
National Fire Protection Association, 1 Batterymarch Park, Quincy, Massachusetts 02269-9101  
Fax No. 617-770-3500

Note: All proposals must be received by 5:00 p.m. EST/EDST on the published proposal-closing date.

If you need further information on the standards-making process, please contact the Standards Administration Department at 617-994-7249.  
For technical assistance, please call NFPA at 617-770-3000.

Please indicate in which format you wish to receive your RO/PROC:  paper  electronic  download  
(Note: In choosing the download option you intend to view the RO/PROC from our website, no copy will be sent to you.)

Date \_\_\_\_\_ Name \_\_\_\_\_ Tel. No. \_\_\_\_\_

Company \_\_\_\_\_

Street Address \_\_\_\_\_

Please Indicate Organization Represented (if any) \_\_\_\_\_

1. a) NFPA Document Title \_\_\_\_\_ NFPA No. & Year \_\_\_\_\_

b) Section/Paragraph \_\_\_\_\_

2. Proposal Recommends: (Check one)  new text  revised text  deleted text

**FOR OFFICE USE ONLY**  
Log # \_\_\_\_\_  
Date Rec'd \_\_\_\_\_

3. Proposal (include proposed new or revised wording, or identification of wording to be deleted): (Note: Proposed text should be in legislative format: i.e., use underscore to denote wording to be inserted (inserted wording) and strike-through to denote wording to be deleted (deleted wording).)

4. Statement of Problem and Substantiation for Proposal: (Note: State the problem that will be resolved by your recommendation, give the specific reason for your proposal including copies of tests, research papers, fire experience, etc. If more than 200 words, it may be abstracted for publication.)

5.  This Proposal is original material. (Note: Original material is considered to be the submitter's own idea based on or as a result of his/her own experience, thoughts, or research and, to the best of his/her knowledge, is not copied from another source.)  
 This Proposal is not original material; its source (if known) is as follows: \_\_\_\_\_

Note 1: Type or print legibly in black ink.  
Note 2: If supplementary material (photographs, diagrams, reports, etc.) is included, you may be required to submit sufficient copies for all members and alternates of the technical committee.  
I hereby grant the NFPA all and full rights in copyright, in this proposal, and I understand that I acquire no rights in any publication of NFPA in which this proposal in this or another similar or analogous form is used.

\_\_\_\_\_  
Signature (Required)

PLEASE USE SEPARATE FORM FOR EACH PROPOSAL 9/99C

# Sequence of events leading to publication of an NFPA committee document

- Call goes out for proposals to amend existing document or for recommendations on new document
- Committee meets to act on proposals, to develop its own proposals, and to prepare its report
- Committee votes on proposals by letter ballot. If 2/3rds approve, report goes forward. Lacking 2/3rds approval, report returns to committee.
- Report on proposals (ROP) is published for public review & comment.
- Committee meets to act on each public comment received.
- Committee votes on comments by letter ballot. If 2/3rds approve, supplementary report goes forward. Lacking 2/3rds approval, supplementary report returns to committee.

# Sequence of events leading to publication of an NFPA committee document

- Report on comments (ROC) is published for public review
- NFPA membership meets (annual or fall meeting) and acts on committee report (ROP or ROC)
- Committee votes on any amendments to report approved at NFPA annual or fall meeting
- Appeals to standards council on association action must be filed within 20 days of the NFPA annual or fall meeting.
- Standards council decides, based on all evidence, whether or not to issue standard or to take other action, including upholding any appeals.

# What is the NFPA 99 Technical Piping Committee?

- A diverse group of appointed volunteer professionals .
- This committee shall have primary responsibility for documents or portions of documents covering the performance, maintenance, installation, and testing of medical and dental related gas piping systems and medical and dental related piping systems.

# NFPA 99 Committee Membership Classifications

- M = Manufacturer
- U = User
- I/M = Installer/Maintainer
- L = Labor representative
- R/T = Applied research/testing laboratory
- E = Enforcing authority
- I = Insurance
- C = Consumer
- SE = Special expert

# Who are the principle members of the NFPA 99 Technical Piping Committee?

- **Richard Bielen – NFPA Staff Liaison**
- **Dave Mohile – Chairman - Medical Eng Services - SE**
- **Mark Allen – Beacon Medaes - M**
- **Grant Anderson – Bard, Rao & Athanas Consulting Eng - SE**
- **Dave Brittain – Pro Vac - M**
- **Jan Ehrenwerth – Yale University - C**
- **P. L.Fan – American Dental Association – U**
- **Keith Ferrari – Praxair – M**
- **William Fettes – Airgas - M**
- **Michael Frankel – Utility Systems Consultants - SE**
- **Ed Golla – TRI/Air Testing - RT**

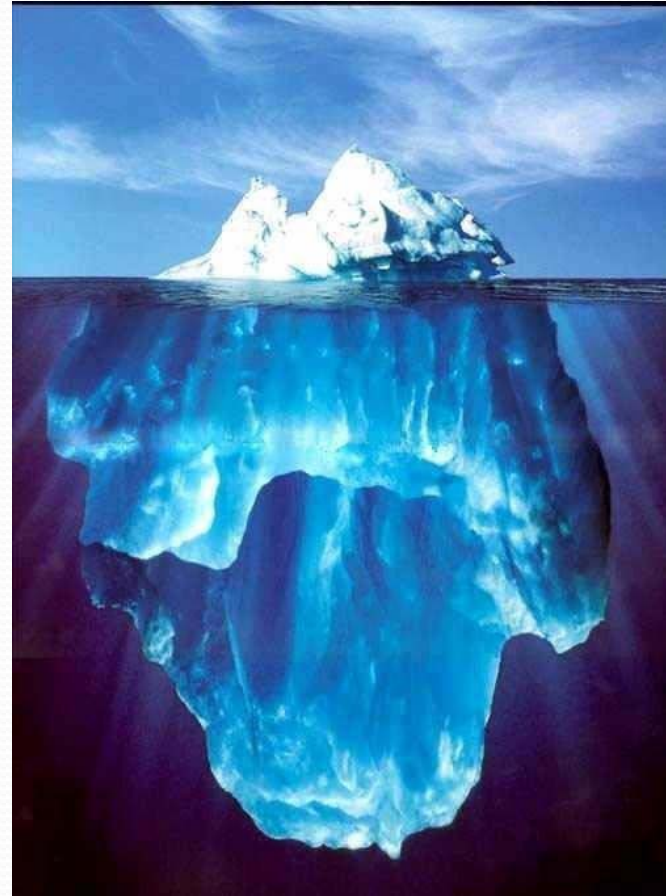


# Who are the principle members of the NFPA 99 Technical Piping Committee?

- **Jim Lucas – Tri-Tech Medical - M**
- **Ed Lyczko – The Cleveland Clinic - U**
- **Jeff McBride – Red Lion Medgas - SE**
- **Don McIlroy – Providence Health System - U**
- **Jerry McManus – National ITC – L**
- **Thomas Mraulak – Plbg Indus Training Ctr - L**
- **Olen Pruitt – Univ of Alabama at Birmingham - U**
- **E. Daniel Shoemaker – Midmark Corporation - M**
- **Ronald Smidt – Carolinas HealthCare System – U**
- **Russell Thomason – U S Army Corp of Eng - U**
- **J. Richard Wagner – Poole & Kent Co - IM**
- **Jonathan Willard – Certified Medical Gas Services - SE**

# Proposed NFPA 99 Chapters 4 & 5 changes 2005 vs 2012 editions

- Hundreds of changes were proposed many are minor corrections – we will cover less than 100 in this presentation



# This is the legal mumbo jumbo disclaimer page

- Any opinions expressed verbally by the speaker before you and all **red** text in this presentation should be considered the speakers opinion. These statements are NOT official views or opinions of the NFPA or of the Technical Piping Committee. Statements in **blue** text are paraphrased NFPA text. Black = NFPA 99 2012 text.
- It is also worth pointing out that annex material in the NFPA Code, material in the NFPA Installation Guidebook and the comments/clarifications provided in the NFPA Handbook ARE NOT CODE and should be considered unofficial opinions as well.

# Health Care Facilities Code

- NFPA 99 is now a “Code” – no longer just a “Standard”. As such it is on an equal level with – i.e. NFPA 70, National Electric Code (NEC), NFPA 1 Fire Code and NFPA 101 Life Safety Code.
- As a code, it may be incorporated into law by itself (it will no longer need to be de facto law due to being referenced in NFPA 101) and it may accelerate being incorporated into law since NFPA 101 is typically referencing one edition behind

# Changes to Chapter 4 Fundamentals

- **4.1 Building System Categories.** Building systems in health care facilities shall be designed to meet system Categories 1 through 4 requirements as detailed in this code.
- **4.1.1 Category 1** Facility systems in which failure of such equipment or system is likely to cause major injury or death of patients or caregivers...
- **4.1.2 Category 2** Facility systems in which failure of such equipment is likely to cause minor injury to patients or caregivers...
- **4.1.3 Category 3** Facility systems in which failure of such equipment is not likely to cause injury to patients or caregivers, but can cause patient discomfort...
- **4.1.4 Category 4** Facility systems in which failure of such equipment would have no impact on patient care...

# Changes to Chapter 4 Fundamentals

- **4.2 Risk Assessment.** Categories shall be determined by following and documenting a defined risk assessment procedure.
- **4.3 Application.** The Category definitions in Chapter 4 shall apply to Chapters 5 through 11.

# Changes to Chapter 4 Fundamentals

## *Whoa –*

- When & why did it change from Levels to Categories?
- How is “the facility” for the purposes of the medical gas pipeline equipment required defined?
- Who makes the decision as to which Category applies and how?
- How do the Architect/Engineer and the Certifiers know what to design and certify to?

# NFPA 99 Chapter 5 Changes

- 5.1, 5.2 and 5.3 Change of terms (as a result of the Chapter 4 Fundamentals changes) are now all changed through out from Levels to Categories



# NFPA 99 Chapter 5 Changes

- 5.1.1.5 Subsection 5.1.2 through 5.1.12.3.14.5 and 5.1.14.4.2 shall apply to new health care facilities or facilities making changes that alter the piping.
- 5.1.1.6 Paragraph 5.1.14.4.3 through 5.1.14.4.9 and 5.1.13 through 5.1.15 shall apply to existing health care facilities.
- 5.1.1.7 Paragraph 5.1.14.3 and 5.1.14.4.1 shall apply to new and existing health care facilities.

# NFPA 99 Chapter 5 Changes

5.1.3.3.1.8 Central supply systems for nitrous oxide and carbon dioxide using cylinders or portable containers shall be prevented from reaching temperatures lower than the recommendations of the central supply system's manufacturer, but shall never be lower than  $-29^{\circ}\text{C}$  ( $-20^{\circ}\text{F}$ ) or greater than  $51.6^{\circ}\text{C}$  ( $125^{\circ}\text{F}$ ). (Was  $+20^{\circ}\text{F}$ )

- This will greatly increase the number of cylinders required to achieve a given flow requirement as the withdrawal rate of gas from the cylinders decreases as the ambient temperature decreases.
- This will also decrease the cylinder pressure. The manifold must be able to function properly at the lower cylinder pressure.

# NFPA 99 Chapter 5 Changes

5.1.3.3.1.13 Central supply systems for bulk inert gases systems with a total capacity connected and in storage of 20,000 ft<sup>3</sup> or more of compressed gas or cryogenic fluid at standard temperature and pressure, shall comply with CGA P-18, *Standard for Bulk Inert Gas Systems at Consumer Sites*.

It was felt this clarification was needed to clearly defined when a system is to be treated as a bulk system.

# NFPA 99 Chapter 5 Changes

5.1.3.3.2 Design and Construction. Locations for central supply systems and the storage of positive-pressure gases shall meet the following requirements:

- 5.1.3.3.2 (3) If outdoors, they shall be provided with an enclosure (wall or fencing) constructed of noncombustible material with a minimum of two entry/exits. (New)
- 5.1.3.3.2 (5) They shall be compliant with NFPA 70, *National Electric Code* for ordinary locations
- 5.1.3.3.2 (10) They shall protect electrical devices from physical damage (no longer 5 feet AFF)

# NFPA 99 Chapter 5 Changes

- **5.1.3.4 Control equipment. (New)** Controls for central supply systems shall be permitted to be installed remotely as long as it is in a secure location, the enclosure provides enough space to perform maintenance and repair and for all sources except medical air does not communicate with combustible or flammable materials.
- **I.E. – this allows the supply line from the bulk oxygen to be operated at a higher pressure (125 psig) and branched to the hyperbaric area where it is then regulated to operating pressure (80 psig) and then goes on to the facility where it again is regulated (55 psig)**

# NFPA 99 Chapter 5 Changes

- **5.1.3.5 Central Supply Systems.** Central supply systems shall be permitted to consist of the following:
- 5.1.3.5 (8) Proportioning systems for medical air USP per 5.1.3.6.3.4 (**new**)

# NFPA 99 Chapter 5 Changes

- **5.1.3.5.2 Permitted Locations for Medical Gases.** This paragraph has been re-written to require that patient medical gases may only be piped into areas where their use would be under the supervision of licensed clinicians for patient treatment:

## NFPA 99 Chapter 5 Changes

- 5.1.3.5.4 (1) **Materials.** In those portions of systems intended to handle oxygen at gauge pressures greater than 2413 kPa (350 psi), interconnecting hose shall contain no polymeric materials. **Was 300 psi – technically this prohibited the use of portable bulk vessels with 350 psig relief valves**



# NFPA 99 Chapter 5 Changes

- 5.1.3.5.10 (1) If located outdoors, be installed in an enclosure used only for this purpose and sited to comply with minimum distance requirements in **NFPA 55. Was per NFPA 5.1.3.4.10.1**
- 5.1.3.5.11 (1) If located outdoors, be installed in an enclosure used only for this purpose and sited to comply with minimum distance requirements in **NFPA 55. Was per NFPA 5.1.3.4.10.1**

# NFPA 99 Chapter 5 Changes

- 5.1.3.4.12.10 A variant on the cryogenic liquid container manifold shall be permitted having three headers of cylinders. **Deleted**
- 5.1.3.5.12 Bulk Cryogenic Liquid Systems...shall be in accordance with NFPA 55 (**New**)
- 5.1.3.5.12.2 (6) Have a minimum clearance of 3 ft around the storage container, vaporizer(s), and pressure regulating manifold for system maintenance and operation. (**New**)
- 5.1.3.5.13.2 (7) A minimum of 3 ft of clearance around the EOSC for connection of temporary auxiliary source. (**New**)

# NFPA 99 Chapter 5 Changes

- 5.1.3.6.3.4 (c) Liquid ring compressors shall comply with the following:
- (2) Reserve medical air standby headers or a backup compressor shall be installed. (**New**)

# NFPA 99 Chapter 5 Changes

- 5.1.3.6.3.12 Compressor Intake
- (A) The medical air compressors shall draw their air from a source of clean air.
- (B) The medical air intake shall be located a minimum of 25 ft from ventilating system exhausts, fuel storage vents, combustion vents, plumbing vents, vacuum & WAGD discharges, or areas that can collect vehicular exhausts or other noxious fumes.
- (c) The medical air intake shall be located a minimum of 20 ft above ground level.
- (d) The medical air intake shall be located a minimum of 10 ft from any door, window, or other opening in the building. (New)

# NFPA 99 Chapter 5 Changes

- 5.1.3.5.14.4 (4) Liquid hydrocarbons shall be monitored on a continuous basis by pigment indicator or other type of instrument permanently installed downstream of each compressor and shall be inspected & documented daily. **DELETED – consensus was this was a meaningless test**

# NFPA 99 Chapter 5 Changes

- 5.1.3.6.3.14 Medical Air Quality Monitoring
- (1) Dew point shall be monitored and shall activate a local alarm and all master alarms when the dew point at system delivery pressure exceeds + 2 degrees C (+35 degreeed F). **Was +4 C / +39 F**

# NFPA 99 Chapter 5 Changes

- 5.1.3.6.3.15 Category 1 Medical Air Proportioning System (**New**)
- 5.1.4.8 Zone Valve – **Mostly re-written in attempt to define acceptable location. Zone valves may not be in the same room as the outlet/inlet they control.**

# NFPA 99 Chapter 5 Changes

- 5.1.6 Manufactured Assemblies – Requirement to be DISS has been dropped. Still required to be gas specific / non-interchangeable. This is to help resolve flow problems.
- 5.1.9 Category 1 Warning Systems – Most references to “wired” have been changed to “communicate” (to allow advancements in technology – i.e. ethernet, fiber optics, wireless)
- 5.1.9.1 (11) – Methods for protecting the wiring for alarms are listed and clarified.



# NFPA 99 Chapter 5 Changes

- 5.1.9.2.3 - **Wiring for master alarms has been detailed.**  
5.1.9.2.3.3 clarifies that the wire does not need to be a continuous single strand (splicing at junction boxes is acceptable). 5.1.9.2.3.2 has been added to prohibit “common” conductors (**safety improvement**)
- 5.1.9.2.3.6 – (**New**) – The standard now permits a single pair of wires per signal when run underground to a junction box where it first enters the building. From that junction on it must be redundant (same as for all other alarm signal wiring).

# NFPA 99 Chapter 5 Changes

- 5.1.10.11.10.1 – The installation of medical gas and vacuum systems shall be made by qualified, competent technicians who are experienced in performing such installations, including all personnel who actually install the piping system.
- The stipulation that this include *all personnel* who actually install the piping system has been added.

# NFPA 99 Chapter 5 Changes

- 5.1.12.2.3.4 – The initial pressure test for vacuum systems has been changed from 60 psig to 150 psig (the same as for pressure gases)
- 5.1.12.2.3.5 & 5.1.12.3.9.2 – Leak test solutions used may not contain ammonia (**it will make brass crack**)
- 5.1.12.2.6.7 and 7.6 (**New**) The AHJ or its designee must now witness the 24 hour standing pressure test. A form indicating that this test has been performed & witnessed shall be provided to the verifier at the start of the 5.1.12.3 System Verification testing.

## NFPA 99 Chapter 5 Changes

- 5.1.12.3.14.3 (E), (F) & G – The testing of the medical air compressor systems has been clarified. Now to be performed after 12 elapsed hours @ 25% duty cycle. (so the pumps could have as little as 3 hours on them)

# NFPA 99 Chapter 5 Changes

- 5.1.13.2 (**New**) & 5.1.13.1.4 These paragraphs deal with maintenance, periodic testing and qualifications or maintenance personnel. Both a facility designed qualification process or through ASSE 6040 are acceptable. 5.1.13.2.3 provides a basic list of a maintenance program – manufacturer’s preventative maintenance requirements would be layered on top of the basic list. 5.1.13.2.3.2 regarding equipment with internal flexible hoses establishes a minimum 18 month interval.

# NFPA 99 Chapter 5 Changes

- 5.1.13.2.3.2 (**New**) Booms & articulating assemblies, other than headwalls, utilizing flexible connectors shall be inspected for leaks at a minimum of once every 12 months.

# NFPA 99 Chapter 5 Changes

- 5.1.9.1 (15) (**New**) Alarm switches/sensors shall be installed so as to be removable.



# E Z Find™ vs Hard to Find

Is this how you want to look for and test your transducers ?

Wouldn't it make more sense to install them in the zone valve box ?





# NFPA 99 Chapter 5 Changes

- 5.1.9.3.5 (**New**) Area alarm panels for medical gas systems shall provide visual & audible indication in the event a mismatch occurs between transducer(s) and its associated circuit board(s).

# NFPA 99 Chapter 5 Changes

- 5.1.4.11 (**New**) New or replacement in-line check valves shall be as follows: (1) brass or bronze construction (2) have brazed extensions (3) permit inline serviceability (4) shall not have threaded connections (5) have threaded purge points of 1/8 NPT



# NFPA 99 Chapter 5 Changes

- 5.2.- Overall Category two has been rewritten to mirror Category 1. Also, Medical gas/vacuum systems maintenance & record keeping – was under NFPA chapter 9 – now has been brought under chapter 5
- 5.3 – Level 3 systems has been completely re-written - some of the noteworthy changes are: verification is required by a 6030, ventilation requirements same as for Level 1 & 2, requirements for: shut-off valves, labeling of the medical gas supply system, cylinder storage & handling, pipe support, underground piping, verification tests.

# Thank You

