Natural Gas Emergency Generators Oct. 2, 2009

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What will we cover?

- Essential Electrical Systems (EES), NFPA 99 *Standard for Health Care Facilities*
- Emergency Power Supply Systems, NFPA 110 *Standard for Emergency and Standby Power Systems*
- Alternate Power Source Requirements
- Fuel Source Requirements
- Generator Assessment on Surveys
- June 2009 HITF Meeting

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Applicable Standards

- The installation must meet the applicable standard(s) from when the EES was installed:
  - NFPA 76, *Essential Electrical Systems for Hospitals* 1962, 65, and 67 Editions
  - NFPA 76A, *Essential Electrical Systems for Hospitals* 1970 Edition
  - NFPA 76A, *Essential Electrical Systems for Health Care Facilities* 1973, 77 Edition
  - NFPA 99, *Health Care Facilities* 1982, 84, 87, and 99 Editions
  - NFPA 110, *Emergency and Standby Power Systems* 1985, 88, 93, 96, and 99 Editions

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What is an Essential Electrical System?

- Essential Electrical System – A system comprised of alternate sources of power and all connected distribution systems and ancillary equipment, designed to ensure continuity of electrical power to designated areas and functions of a health care facility during disruption of normal power sources, and also to minimize disruption within the internal wiring system. (NFPA 99 Section 2-2)

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What are EES Types?

- EESs are broken down into three categories in NFPA 99, known as Types. The three Types have different levels of requirements for health care facilities based on level of care.
  - EESs have to be designed as complete systems. They are not simply generators and transfer switches appended to normal distribution wiring. The overall goal when designing the system should be to provide reliable power for fire protection, life safety, and medical functions. (NFPA 99 Handbook Section 3-4.1.1.1.)

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What Type of EES is needed?

- NFPA 99 Section 12-3.3.2 – The EES shall conform to a Type 1 system, as described in Chapter 3. (Hospitals and Nursing Homes with electrical life support equipment)
- NFPA 99 Section 16-3.3.2 – The EES shall conform to the Type 2 systems as described in Chapter 3. (Nursing Homes)

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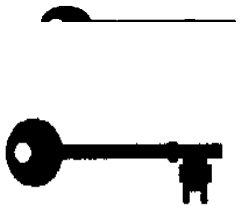
CMS Basic LSC Training – June 13-17, 2005



Emergency power requirements vary depending on the facility

Emergency Power

The most extensive and critical type of emergency power is required for healthcare facilities with life support. This would apply to hospitals, which by their very nature are required to have Type 1 essential electrical systems. The least complicated emergency power system is used by facilities such as free-standing buildings with medical and dental offices. These facilities generally have a Type 3 electrical system. Most nursing homes are required to have a Type 2 electrical system. For "other healthcare facilities," the type of essential electrical system will depend on activities taking place (see NFPA 99).

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Types of essential electrical systems

Types of Essential Electrical Systems

As noted above, essential electrical systems (EES) are of three types:

Type 1: Most sophisticated; used in hospitals and some nursing homes because of life support activities.
Type 2: Used in most nursing homes and limited-care facilities.
Type 3: Least complicated; used in ambulatory clinics and medical/dental offices unless activities require a more sophisticated system; can be supplied by a battery system or generator system.

NFPA 99, chapters 12 to 17, lists the type of essential electrical system required in various healthcare facilities.

One of the major differences between the three systems is in the wiring requirements. As might be expected, the more stringent wiring

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What about the Exception to NFPA 99 Section 16-3.3.2?

- Exception: Any freestanding nursing home that:
  - (a) Maintains admitting and discharge policy regarding residents that require life support equipment, and
  - (b) No surgical treatment requiring general anesthesia, and
  - (c) An automatic battery-powered system or equipment that will be effective for at least 90min and is in accordance with the LSC and NFPA 70, provide at least minimum required illumination, and power to alarm systems.

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NFPA 99 Section 16-3.3.2 Exception Pt. (c)

- The third component does not state a Type III EES can be used if the exception is met. Instead it says that batteries can be used if they supply power to all systems and areas that require backup power in the LSC and National Electrical Code.
- The handbook narrative and Formal Interpretation 87-1 state that a generator set can be used to meet 16-3.3.2 and if it is used it must meet the applicable requirements for generator sets in Chapter 3 (Type II).
- NFPA 99 Section 16-3.4.3 and 16-3.4.5 clearly state that Level 3 piped gas and vacuum systems are permissible when the resident population is not on critical life support equipment.
- This shows that the code writers would have stated a Type III EES is permissible when life support is not present if that was their intent.

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Emergency Power Supply System (EPSS) - Generator

- Emergency Power Supply System – A complete functioning system of an emergency power supply coupled to a system that can consist of conductors, disconnecting means, and overcurrent protective devices, transfer switches, and all control, supervisory, and support devices up to and including the load terminals of the transfer equipment needed for the system to operate as a safe and reliable source of electric power. (NFPA 110 Section 2-1)

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What are EPSS Levels?

- NFPA 110 Section 2-2.4 Level - It is recognized that EPSSs are utilized in many different locations and for many different purposes. The requirement for one application might not be appropriate for other applications. Therefore, this standard recognized two levels of equipment installation, performance, maintenance, and testing.

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What are EPSS Levels?

- NFPA 110 Section 2-2.4.1 – Level 1 defines the most stringent equipment performance requirements for applications where failure of the equipment to perform could result in loss of human life or serious injuries.
- NFPA 110 Section 2-2.4.2 – Level 2 defines equipment performance requirements for applications where failure of the EPSS to perform is less critical to human life and safety and where it is expected that the authority having jurisdiction will exercise its option to allow a higher degree of flexibility than provided by Level 1.

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How do the Requirements of NFPA 99 and NFPA 110 Fit Together?

- The EPSS as defined in NFPA 110 is a component of the EES as defined in NFPA 99.
- NFPA 99 specifies the minimum EPSS Level required for the different EES Types.
- While many of the requirements for general-purpose generator sets are set forth in NFPA 110, utility or general-purpose generators are not acceptable in health care facilities if they do not also meet the requirements of this chapter. These criteria were originally developed for the generator portion of the EES to ensure the generators are reliable enough for the special needs of health care facilities. (NFPA 99 Section 3-4.1.1.4 Handbook Narrative)

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What Level EPSS is required in a nursing home?

- Earlier it was established that most nursing homes require a Type 2 EES in accordance with NFPA 99 Section 16-3.3.2.
- NFPA 99 Section 3-4.1.1.4 – Generator sets installed as an alternate source of power for EESs shall be designed to meet the requirements of such service.
  - (a) Type I and Type II EES power sources shall be classified as Type 10, Class X, **Level 1** generator sets per NFPA 110.

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Alternate Power Source

- Nursing homes are required to have two power sources, a primary and a backup. One of the power sources must be completely controlled by the facility on facility grounds. If their primary power source is off-site from an electric company then the backup power source for the equipment and systems that require backup power must be on-site.

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Alternate Power Source Cont'd

- NFPA 99 Section 3-5.1 (Type 2) refers to Section 3-4.1 (Type 1)
- NPFA 99 Section 3-4.1.1.2
  - EESs shall have a minimum of two independent sources of power: a normal source generally supplying the entire electrical system and one or more alternate sources for use when the normal source is interrupted.
    - Handbook narrative: It is not the intent of the committee responsible for this chapter that dual sources of normal power be used in lieu of an alternate power source. At least one source of power has to be on-site.

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Alternate Power Source Cont'd

- NFPA 99 Section 3-4.1.1.3
  - The alternate source of power shall be a generator(s) driven by some form of prime mover(s) and located on the premises
    - Handbook narrative: Even with the exception, it should be noted that at least one source of power (normal or alternate) must be on-site.

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Fuel Supply

- NFPA 99 Section 3-4.1.1.13 Fuel Supply
  - The fuel supply for the generator set shall comply with 3-1.1 and 3-4.2 of NFPA 110.
- NFPA 110 Section 3-1.1 – The following energy sources shall be permitted for use for the emergency power supply
  - (a) Liquid petroleum products at atmospheric pressure
  - (b) Liquefied petroleum gas (liquid or vapor withdrawal)
  - (c) Natural or synthetic gas

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Fuel Supply Cont'd

- NFPA 110 Section 3-1.1 Exception – For Level 1 installations in locations where the probability of interruption of off-site fuel supplies is high (e.g., due to earthquake, flood damage, or a demonstrated utility unreliability), on-site storage of an alternate energy source sufficient to allow full output of the EPSS to be delivered for the class specified shall be required, with provisions for automatic transfer from the primary energy source to the alternate energy source.

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Fuel Supply Cont'd

- Determination of low probability as noted in the exception in 3-1.1 of NFPA 110 should be made by technical personnel in consultation with such groups as local utility companies and state energy authorities. **Documentation needs to be prepared for the authority having jurisdiction in order to utilize this exception.** (NFPA 99 Section 3-4.1.1.13 Handbook Narrative)

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Code Retroactivity

- Are we enforcing a new requirement on old generators?
  - No. NFPA 76A 1970 Edition Section 212: The alternate source of power shall be a generator set(s) driven by some form of prime mover, and located on the hospital premises.
- NFPA 99 Section 3-4.1.1.3
  - The alternate source of power shall be a generator(s) driven by some form of prime mover(s) and located on the premises

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Assessing Generators on Surveys

- During a survey, a facility will be asked if they have any electrical life support beds. If so, their facility will be assessed for compliance with a Type 1 EES in accordance with NFPA 99.
- When life support beds are present an emergency generator is required in accordance with 42 CFR Subpart 483.70(b)(2).

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Assessing Generators on Surveys Cont'd

- If the facility does not have life support and the generator does not supply backup power to LSC required systems then the facility will be assessed for compliance with the exception to NFPA 99 Section 16-3.3.2.
  - Admission and discharge policy regarding residents that require life support equipment, and
  - No surgical treatment requiring general anesthesia, and
  - An automatic battery-powered system or equipment that will be effective for at least 90min and is in accordance with the LSC and NFPA 70, provide at least minimum required illumination, and power to alarm systems.

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Assessing Generators on Surveys Cont'd

- If a facility does not have life support beds, but has an emergency generator, the facility will be asked if the generator is the sole source of backup power for LSC required systems (emergency lights, exit lights, fire alarm system, etc.).
- If the generator provides backup power to LSC required systems then the facility will be assessed for compliance with a Type 2 EES in accordance with NFPA 99.

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Assessing Generators on Surveys Cont'd

- Reminder: A Type 2 EES requires a Level 1 generator. A Level 1 generator can use natural gas if there is a low probability of interruption to the off-site fuel.
- CMS requires the facility to demonstrate the low probability of interruption of the off-site fuel by supplying a letter from the natural gas vendor.
- Prior to May 29, 2009: CMS required the letter to state the fuel source was reliable with no stipulations for interruptions.
- After May 29, 2009: CMS required the letter to state the fuel source was reasonably reliable.

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Assessing Generators on Surveys Cont'd

- Citations are issued if a facility lacks a complete on-site backup power source due to the lack of an on-site fuel source and the lack of a letter demonstrating the reliability of the off-site fuel source.
- RO V accepted POCs that stated a facility would install an on-site backup fuel source for their natural gas generator in lieu of obtaining an acceptable reliability letter.
- RO V never required the conversion away from natural gas or the addition of on-site fuel to a natural gas generator.

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Why did the Requirements for an Acceptable Reliability Letter Change?

- RO V surveyors informed CO that approximately 30% of nursing homes in RO V use natural gas generators to provide backup power to LSC required systems. RO V also informed CO that few nursing homes, if any, possess a letter that states the fuel source is as reliable as an on-site fuel source.
- RO V surveyors asked CO to poll the other nine regions to see if natural gas generators were as prevalent in other regions and how they enforce the requirements.

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Estimated Number of Natural Gas Generators in Nursing Homes

Region	Est. % of NHs with NG Generators	# of NHs in Region	Est.
I	1%-2%	991	10-20
II	<10%	1021	<102
III	10%-15%	1420	142-213
IV	<5%	2681	<134
V	30%	3475	1043
VI	<10%	2068	<207
VII	30%	1547	464
VIII	<10%	627	<63
IX	1%	1488	15
X	<10%	470	<47

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Why did the Requirements for an Acceptable Reliability Letter Change? Cont'd

- RO V continued to hear questions regarding this deficiency and the validity of it.
- CO heard similar issues.
- RO V and CO consulted to find an acceptable solution.
- RO V developed and submitted a number of possible solutions to CO to allow natural gas generators to remain in service in nursing homes.

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Natural Gas Generator Reliability Letter Requirements

- After considering all of RO V's proposals, CO decided the best course of action would be to modify the expected language for an acceptable reliability letter for natural gas to state there is a reasonable level of reliability.
- A conference call between RO V and CO developed guidelines that RO V used to develop the requirements for an acceptable natural gas reliability letter.
- CO reviewed the five criteria and stated that it should work to achieve our objectives (ensure reliability of the backup power source and prevent nursing homes from replacing generators).
- The five criteria are CMS requirements for an acceptable letter. They were not developed for RO V only.
- RO V released the five criteria for an acceptable reliability letter to providers and SAs via the RO V Weekly Notes on 5/29/09. The item included an introduction that explained the five criteria resulted from consultation between RO V and CO.

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Natural Gas Generator Reliability Letter Requirements

- 1. A statement of reasonable reliability of the natural gas delivery.
- 2. A brief description that supports the statement regarding the reliability.
- 3. A statement that there is a low probability of interruption of the natural gas.
- 4. A brief description that supports the statement regarding the low probability of interruption.
- 5. The signature of technical personnel from the natural gas vendor.

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Natural Gas Generator Reliability Letter Requirements

- Criterion 2 - A description regarding the natural gas vendors infrastructure and/or preventative maintenance are examples of ways to support the reliability statement.
- Criterion 4 - We are aware that earthquakes do not affect most areas of RO V, so stating this will not demonstrate there is a low probability of interruption. Instead, weather concerns that do affect RO V could be addressed (floods, cold weather, etc.)
- Criterion 5 – An engineer is an acceptable example. An attorney, account specialist, or customer service specialist are unacceptable examples. A manager may or may not be acceptable depending on the department they manage and their qualifications.

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HITF Meeting – June 9, 2009

- Question No. 1: Do all off-site fuel supplies to essential electrical systems require on-site back up fuel supplies?
- Answer No. 1: NO. New installations in accordance with NFPA 99, 1999 Edition only require an alternate fuel source for Level 1 or Level 2 systems if there is a high probability of interruption of the source.
- Question No. 2: Do new nursing homes that have life support equipment require a Level 1 Emergency Power System?
- Answer No. 2: YES. See NFPA 99, 1999 Edition, Section 16-3.3.2.

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Summary

- Based on the requirements in NFPA 99 and NFPA 110, RO V, in conjunction with CO, developed specific criteria for a letter provided by a natural gas vendor to demonstrate reasonable reliability of the fuel supply for the natural gas generator.

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Questions

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