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42 CFR 482 Condition of Participation – Emergency Preparedness (Final Rule Effective November 16, 2016)

Emergency Power Supply Systems (EPSS) -
CMS and NFPA 110 Compliance

MGI Advisory Services

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Notes

- Probably won't have time to get through the entire paper, but....
- Final Rule 42 CFR 482.15 is attached
- Same presentation has been given to states
- EPOs and Remote Annunciators are being targeted
- Water Companies, Fuel Depots and Cell Towers become a Level 1 installation during emergencies and therefore must be brought into your emergency plan.
- Oil changes can be extended with proper lab analysis

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The “Final Rule” Applicable to the EPSS

- 482.15(d) - Training
- 482.15(d)(2)(iii) – Documentation
- 482.15(e) – Protocols
- 482.15(e)(1) – Location
- 482.15(e)(2) – Testing
- 482.15(e)(3) – Fuel

Nothing more than a repeat of NFPA 110, Chapter 8....but with additional maneuvering room – subjective in some cases

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42 CFR 482.15(d) Training and testing

The hospital must develop and maintain an emergency preparedness training and testing program that is based on the emergency plan set forth in paragraph (a) of this section, risk assessment at paragraph (a)(1) of this section, policies and procedures at paragraph (b) of this section, and the communication plan at paragraph (c) of this section. The training and testing program must be reviewed and updated at least annually.

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482.15(d)(1) Training and Testing (continued)

Training program. The hospital must do all of the following:

- (i) Initial training in emergency preparedness policies and procedures to all new and existing staff, individuals providing services under arrangement, and volunteers, consistent with their expected role.
- (ii) Provide emergency preparedness training at least annually.
- (iii) Maintain documentation of the training.
- (iv) Demonstrate staff knowledge of emergency procedures.

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NFPA 110, 8.4.8 (2010)

The routine maintenance and operational testing programs shall be overseen by a properly instructed individual.

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NFPA 110, 8.4.8 (2016)

EPSS components shall be maintained and tested by **qualified person(s)**.

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Personal Injury Attorney's Protocol

"I would ask for their protocols and then I would depose everyone I could find looking for examples where the **protocols were not followed**. Then I'd hire an expert to pick apart their protocols for any deficiencies. I only need one point of failure if I'm the plaintiff's attorney; either bad protocols or failure to follow those protocols are enough. **[Latest editions]**

Keep in mind that the equipment manufacturer can also be sued, so inevitably there will be cross claims between the hospital and the equipment manufacturer. If the hospital's protocols result in a use or maintenance schedule that goes against the manufacturer's recommendations, then that's another point of potential liability."

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482.15(d)(2) Testing (continued)

Testing. The hospital must conduct exercises to test the emergency plan at least annually. The hospital must do all of the following:

(i) Participate in a full-scale exercise that is community-based or when a community-based exercise is not accessible, an individual, facility-based. If the hospital experiences an actual natural or man-made emergency that requires activation of the emergency plan, the hospital is exempt from engaging in a community-based or individual, facility-based full-scale exercise for 1 year following the onset of the actual event.

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The Ten Second Requirement

NFPA 99, 6.4.4.1.1.2 (2012 ed.) The 10-second criterion shall not apply during the monthly testing of an essential electrical system. If the 10-second criterion is not met during the monthly test, a process shall be provided to annually confirm the capability of the life safety and critical branches to comply with 6.4.3.1.

NFPA 110, 8.4.6.2 (2010 ed.) The criteria set forth in Section 4.3 and in Table 4.1(b) shall not be required during the monthly testing of the EPSS. If the criteria are not met during the monthly test, a process shall be provided to annually confirm the capability of the system to comply with Section 4.3.

NFPA 110, 8.4.3.1 (2016 ed.) Where multiple ATSS are used as part of an EPSS, the monthly test initiating ATSS shall be rotated to verify the starting function on each ATSS.

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Special Attention

There is no requirement in any standard requiring a monthly "proof" of a <10 second transfer time. Recording the TDT is not required during 11 of the monthly tests. It is only required one time, annually.

EPOs can be located on the generator control panel, but a duplicated EPO must be installed at a remote location outside of the generator room or outdoor enclosure. Exact location is optional.

Remote annunciators for all generators must be placed at a location where they can be viewed and are accessible by qualified personnel. The remote annunciators can be powered from sources other than the generator starting batteries.

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NFPA 110, 8.1.1

The routine maintenance and operational testing program shall be based on all of the following:

- (1) Manufacturer's recommendations [AEM plans included by default]
- (2) Instruction manuals
- (3) Minimum requirements of this chapter
- (4) The authority having jurisdiction

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482.15(d)(2)(ii)

(ii) Conduct an additional exercise that may include, but is not limited to the following:

(A) A second full-scale exercise that is community-based or individual, facility-based.

(B) A tabletop exercise that includes a group discussion led by a facilitator, using a narrated, clinically-relevant emergency scenario, and a set of problem statements, directed messages, or prepared questions designed to challenge an emergency plan.

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482.15(d)(2)(iii)

Analyze the hospital's response to and maintain documentation of all drills, tabletop exercises, and emergency events, and revise the hospital's emergency plan, as needed.

Bring 3rd parties into the plan – do they have generators, how are they maintained, and are the records available?

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NFPA 110, 8.2.1


At least two sets of instruction manuals for all major components of the EPSS shall be supplied by the manufacturer(s) of the EPSS and shall contain the following: **[Electronic files can be utilized in most cases]**

- (1) A detailed explanation of the operation of the system
- (2) Instructions for routine maintenance
- (3) Detailed instructions for repair of the EPS and other major components of the EPSS
- (4) An illustrated parts list and part numbers
- (5) Illustrated and schematic drawings of electrical wiring systems, including operating and safety devices, control panels, instrumentation, and annunciators

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Alarms



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NFPA 110, 8.2.2

For Level 1 systems, instruction manuals shall be kept in a secure, convenient location, one set near the equipment, and the other set in a separate location.

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NFPA 110, 8.3.4.1 (2010)

The permanent record shall include the following:

- (1) The date of the maintenance report
- (2) Identification of the servicing personnel
- (3) Notation of any unsatisfactory condition and the corrective action taken, including parts replaced
- (4) Testing of any repair for the time as recommended by the manufacturer

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NFPA 110, 8.3.3

A written schedule for routine maintenance and operational testing of the EPSS shall be established.

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NFPA 110, 8.3.4 (2010)

A permanent record of the EPSS inspections, tests, exercising, operation, and repairs shall be maintained and readily available.

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NFPA 110, 8.5.1 (2016)

Records shall be created and maintained for all EPSS inspections, operational tests, exercising, repairs, and modifications.

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NFPA 110, 8.5.3 (2016)

The **permanent** record shall include the following:

- (1) The date of the maintenance report
- (2) Identification of the servicing personnel
- (3) Notation of any unsatisfactory condition and the corrective action taken, including parts replaced
- (4) Testing of any repair for the time as recommended by the manufacturer

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NFPA 110, 8.5.2 (2016)

Records required in 8.5.1 shall be made available to the authority having jurisdiction on request.

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NFPA 110, 8.5.4 (2016)

Records shall be retained for a period of time defined by the facility management or by the authority having jurisdiction.

Automated Monitoring Can Make Sense, IF, It's Affordable

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NFPA 110, 8.2.3

Special tools and testing devices necessary for routine maintenance shall be available for use when needed.

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NFPA 110, 8.2.4

Replacement for parts identified by experience as high mortality items shall be maintained in a secure location(s) on the premises. **[Any single points of failure should be addressed even if it means just stocking a spare feed breaker that powers important stuff.]**

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NFPA 110, 8.2.4.1

Consideration shall be given to stocking spare parts as recommended by the manufacturer. **[If it takes a month to get a critical part, stock it.]**

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42 CFR 482.15(e)

Emergency and standby power systems. The hospital must implement emergency and standby power systems based on the emergency plan set forth in paragraph (a) [Emergency Plan] of this section and in the policies and procedures plan set forth in paragraphs (b)(1)(i) and (ii) [Policies and Procedures] of this section.

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NFPA 110, 8.3.1

The EPSS shall be maintained to ensure to a reasonable degree that the system is capable of supplying service within the time specified for the type and for the time duration specified for the class.

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482.15 (e)(1) Emergency generator location

Open season on all EPSS protocols

The generator must be located in accordance with the location requirements found in the Health Care Facilities Code (NFPA 99 and Tentative Interim Amendments TIA 12-2, TIA 12-3, TIA 12-4, TIA 12-5, and TIA 12-6), Life Safety Code (NFPA 101 and Tentative Interim Amendments TIA 12-1, TIA 12-2, TIA 12-3, and TIA 12-4), and NFPA 110, when a new structure is built or when an existing structure or building is renovated.

Grandfather has been shot

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NFPA 110, 8.1.2 (2010)

Consideration shall be given to temporarily providing a portable or alternate source whenever the emergency generator is out of service.

[This really doesn't say much so we changed it.] [Stand alone sets during oil changes – a risk]

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NFPA 110, 8.1.2 (2016)

Consideration shall be given to temporarily providing a portable or alternate source whenever the emergency generator is out of service and the criteria set forth in Section 4.3 cannot be met. [110, 4.3 addresses levels, classes and types. A critical care hospital is a Level 1, Class X, Type 10]

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482.15(e)(2) Emergency Generator Inspection and Testing

The hospital must implement the emergency power system inspection, testing, and maintenance requirements found in the Health Care Facilities Code, NFPA 110, and Life Safety Code. [Which editions? If you follow an earlier edition of 110 (2010 version) and there are improved methods adopted in later editions, what then?]

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NFPA 110, 8.3.2

A routine maintenance and operational testing program shall be initiated immediately after the EPSS has passed acceptance tests or after completion of repairs that impact the operational reliability of the system.

A Reacceptance Plan

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NFPA 110, 8.3.2.1

The operational test shall be initiated at an ATS and shall include testing of each EPSS component on which maintenance or repair has been performed, including the transfer of each automatic and manual transfer switch to the alternate power source, for a period of not less than 30 minutes under operating temperature.

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NFPA 110, 8.3.5

Transfer switches shall be subjected to a maintenance and testing program that includes all of the following operations:

- (1) Checking of connections
- (2) Inspection or testing for evidence of overheating and excessive contact erosion
- (3) Removal of dust and dirt
- (4) Replacement of contacts when required

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NFPA 110, 8.3.6

Paralleling gear shall be subject to an inspection, testing, and maintenance program that includes all of the following operations:

- (1) Checking of connections
- (2) Inspection or testing for evidence of overheating and excessive contact erosion
- (3) Removal of dust and dirt
- (4) Replacement of contacts when required

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NFPA 110, 8.3.7

Storage batteries, including electrolyte levels or battery voltage, used in connection with systems shall be inspected weekly and maintained in full compliance with manufacturer's specifications.

Sealed batteries are acceptable – ever since 2005

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NFPA 110, 8.3.7.1

Maintenance of lead-acid batteries shall include the monthly testing and recording of electrolyte specific gravity. Battery conductance testing shall be permitted in lieu of the testing of specific gravity when applicable or warranted.

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NFPA 110, 8.3.7.2

Defective batteries shall be replaced immediately upon discovery of defects.

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NFPA 110, 8.4.1

EPSSs, including all appurtenant components, shall be **inspected** weekly and exercised under load at least monthly.

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NFPA 110, 8.4.1.1

If the generator set is used for standby power or for peak load shaving, such use shall be recorded and shall be permitted to be substituted for scheduled operations and testing of the generator set, providing the same record as required by 8.3.4.

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NFPA 110, 8.4.2

Diesel generator sets in service shall be exercised at least once monthly, for a minimum of 30 minutes, using one of the following methods:

- (1) Loading that maintains the minimum exhaust gas temperatures as recommended by the manufacturer
- (2) Under operating temperature conditions and at not less than 30 percent of the EPS nameplate kW rating

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NFPA 110, 8.4.2.1

The date and time of day for required testing shall be decided by the owner, based on facility operations.

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NFPA 110, 8.4.2.2

Equivalent loads used for testing shall be automatically replaced with the emergency loads in case of failure of the primary source. **[Load bank procedures]**

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NFPA 110, 8.4.2.3

Diesel-powered EPS installations that do not meet the requirements of 8.4.2 shall be exercised monthly with the available EPSS load and shall be exercised annually with supplemental loads at not less than 50 percent of the EPS nameplate kW rating for 30 continuous minutes and at not less than 75 percent of the EPS nameplate kW rating for 1 continuous hour for a total test duration of not less than **1.5** continuous hours.

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NFPA 110, 8.4.2.4

Spark-ignited generator sets shall be exercised at least once a month with the available EPSS load for 30 minutes or until the water temperature and the oil pressure have stabilized.

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NFPA 110, 8.4.3

The EPS test shall be initiated by simulating a power outage using the test switch(es) on the ATs or by opening a normal breaker. **Opening a normal breaker shall not be required.**

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NFPA 110, 8.4.4

Load tests of generator sets shall include complete cold starts.

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NFPA 110, 8.4.5

Time delays shall be set as follows:

- (1) Time delay on start:
 - (a) 1 **second** minimum
 - (b) 0.5 second minimum for gas turbine units
- (2) Time delay on transfer to emergency: **no minimum** required
- (3) Time delay on restoration to normal: **5 minutes minimum**
- (4) Time delay on shutdown: **5 minutes minimum**

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NFPA 110, 8.4.6

Transfer switches shall be operated monthly.

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NFPA 110, 8.4.6.1 (2010)

The monthly test of a transfer switch shall consist of electrically operating the transfer switch from the standard position to the alternate position and then a return to the standard position.

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NFPA 110, 8.4.6.1 (2016)

The monthly test of a transfer switch shall consist of electrically operating the transfer switch from the primary position to the alternate position and then a return to the primary position.

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NFPA 110, 8.4.6.2 (2016)

The criteria set forth in Section 4.3 and in Table 4.1(b) shall not be required during the monthly testing of the EPSS. If the criteria are not met during the monthly test, a process shall be provided to annually confirm the capability of the system to comply with Section 4.3.

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NFPA 110, 8.4.7

EPSS circuit breakers for Level 1 system usage, including main and feed breakers between the EPS and the transfer switch load terminals, shall be exercised annually with the EPS in the "off" position.

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NFPA 110, 8.4.7.1

Circuit breakers rated in excess of 600 volts for Level 1 system usage shall be exercised every 6 months and shall be tested under simulated overload conditions every 2 years.

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NFPA 110, 8.4.9

Level 1 EPSS shall be tested at least once within every 36 months. [Can be completed in conjunction with a monthly test and load bank if needed.] [A 4 hour power outage can restart the clock.]

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NFPA 110, 8.4.9.1

Level 1 EPSS shall be tested continuously for the duration of its assigned class (see Section 4.2).

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NFPA 110, 8.4.9.2

Where the assigned class is greater than 4 hours, it shall be permitted to terminate the test after 4 continuous hours.

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NFPA 110, 8.4.9.3

The test shall be initiated by operating at least one transfer switch test function and then by operating the test function of all remaining ATs, or initiated by opening all switches or breakers supplying normal power to all ATs that are part of the EPSS being tested.

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NFPA 110, 8.4.9.4

A power interruption to non-EPSS loads shall not be required.

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NFPA 110, 8.4.9.5

The minimum load for this test shall be as specified in 8.4.9.5.1, 8.4.9.5.2, or 8.4.9.5.3.

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NFPA 110, 8.4.9.5.1

For a diesel-powered EPS, loading shall be not less than 30 percent of the nameplate kW rating of the EPS. A supplemental load bank shall be permitted to be used to meet or exceed the 30 percent requirement.

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NFPA 110, 8.4.9.5.2

For a diesel-powered EPS, loading shall be that which maintains the minimum exhaust gas temperatures as recommended by the manufacturer.

NFPA 110, 8.4.9.5.3

For spark-ignited EPSSs, loading shall be the available EPSS load.

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NFPA 110, 8.4.9.6

The test required in 8.4.9 shall be permitted to be combined with one of the monthly tests required by 8.4.2 and one of the annual tests required by 8.4.2.3 as a single test. **[Summary test sheet available]**

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NFPA 110, 8.4.9.7

Where the test required in 8.4.9 is combined with the annual load bank test, the first 3 hours shall be at not less than the minimum loading required by 8.4.9.5 and the remaining hour shall be at not less than 75 percent of the nameplate kW rating of the EPS.

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482.15(e)(3) Emergency Generator Fuel

Hospitals that maintain an onsite fuel source to power emergency generators must have a plan for how it will keep emergency power systems operational during the emergency, unless it evacuates. **[On-site fuel filtration] [Tankers]**

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NFPA 110, 8.3.8

A **fuel quality test** shall be performed at least annually using tests approved by ASTM standards. **[ASTM D975 is not a requirement]**

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