Healthcare Power System Installations and Case Studies

PowerHour webinar series for consulting engineers

Experts you trust. Excellence you count on.

October 15th, 2020
Start Time: 1:00 PM CT / 11:00 AM PST

(1PDH issued by Cummins)

Welcome!

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- Keep up to date on products, technology, and codes and standards development
- Interact with Cummins experts and gain access to ongoing technical support
- Participate at your convenience, live or on-demand
- Earn Professional Development Hours (PDH)

Technical tips:

- Audio is available through teleconference or Zoom application.
- Attendees are in “listen only” mode throughout the event.
- Use the Zoom Q&A Panel to submit questions, comments, and feedback throughout the event. Time is allotted at the end of the PowerHour to address Q&A.
- If the audio connection is lost, disconnected or experiences intermittent connectivity issues, please check your audio connection through the "Join Audio" or "Audio Connectivity" button at the bottom left of the Zoom application.
- Report technical issues using the Zoom Q&A Panel.

Meet your panelists

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Senior Sales Application Engineer
Cummins Inc.

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Disclaimer

The views and opinions expressed in this course shall not be considered the official position of any regulatory organization and shall not be considered to be, nor be relied upon as, a Formal Interpretation.

Participants are encouraged to refer to the entire text of all referenced documents. In addition, when it doubt, reach out to the Authority Having Jurisdiction.

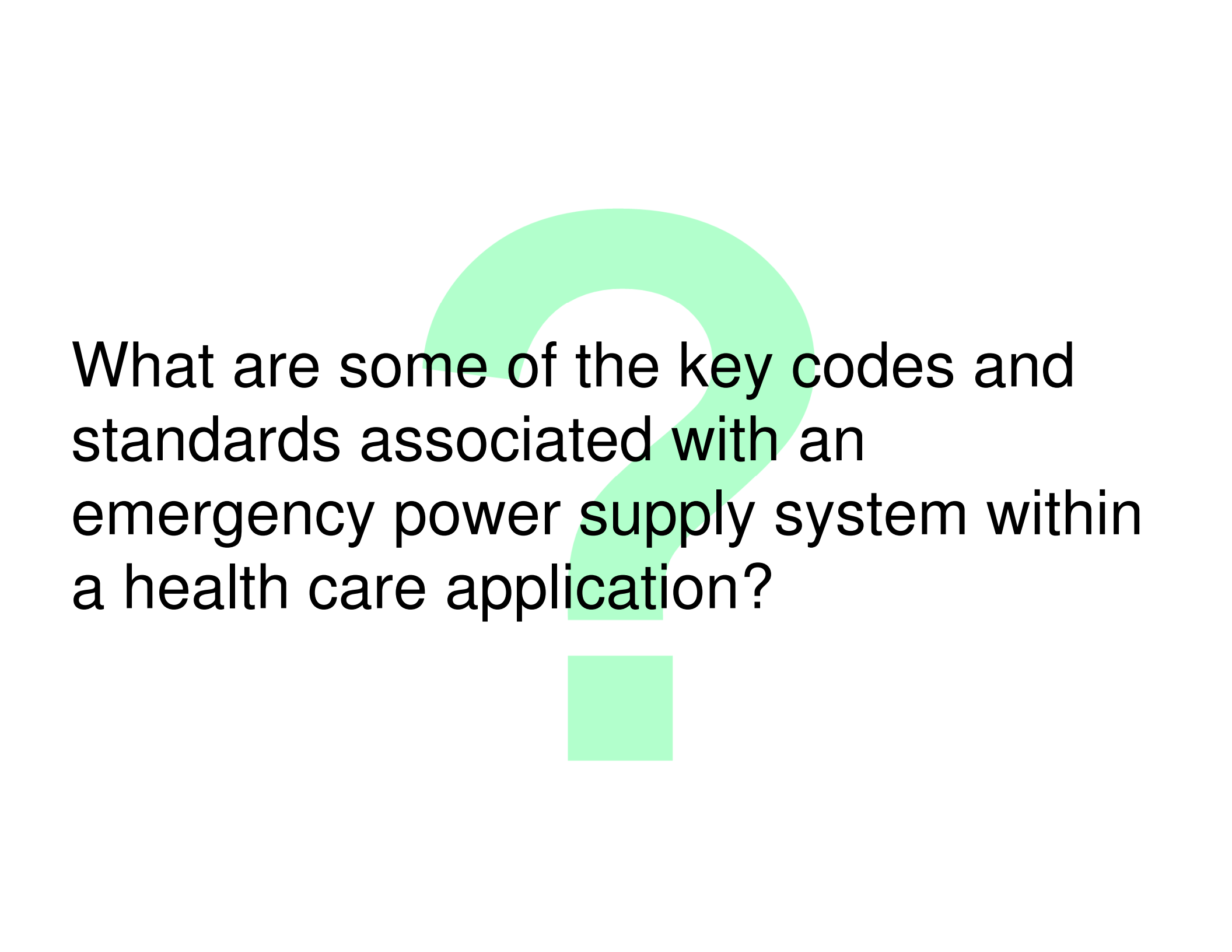
Course Objectives

Healthcare Power System Installations and Case Studies:

As the number of healthcare facilities in North America continue to grow, so does the need for emergency power supply systems to back up those facilities. Further, the wide variety of healthcare facilities can make for a seemingly dauting task of requirements management. This presentation will cover those key installation requirements and common codes and standards while also discussing several unique healthcare application installations.

After completing this course, participants will be able to:

- Describe the common codes and standards associated with healthcare applications
- Identify key design attributes along with the service and maintenance requirements for a healthcare power system.
- Recognize the challenges impacting healthcare power systems and find solutions via case studies.


What are some of the key codes and standards associated with an emergency power supply system within a health care application?

Key Considerations

Codes and Standards – NFPA 110

- Requirements covering the performance of emergency and standby power systems providing an alternate source of electrical power to loads in buildings and facilities in the event that the primary power source fails.

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- Covers installation, maintenance, operation, and testing requirements as they pertain to the performance of the emergency power supply system (EPSS).

Key Considerations

Codes and Standards – NFPA 110

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- Covers installation, maintenance, operation, and testing requirements as they pertain to the performance of the emergency power supply system (EPSS)

- Intent of standard is to achieve maximum system reliability

Key Considerations

Codes and Standards – NFPA 110 – Type 10

Type:

Maximum time, in seconds, that the EPSS will permit the load terminals of the transfer switch to be without acceptable electrical power *(***NFPA** *4.3)* Time generator has to operate after a power failure.

- The emergency power supply system provides acceptable power to the load side of the transfer switch within 10 seconds after an outage

- This 10 second includes all intentional and unintentional delays associated with transfer.

Related Content

NFPA 110 Time to Readiness
White Paper
PowerHour Recording

Key Considerations

Codes and Standards – NFPA 99

- Requirements covering the performance of emergency and standby power systems providing an alternate source of electrical power to loads in buildings and facilities in the event that the primary power source fails.

- Covers installation, maintenance, operation, and testing requirements as they pertain to the performance of the emergency power supply system (EPSS)

- Intent of standard is to achieve maximum system reliability

Key Considerations

Codes and Standards – NFPA 99

- Requirements covering the performance of emergency and standby power systems providing an alternate source of electrical power to loads in buildings and facilities in the event that the primary power source fails.

- Covers installation, maintenance, operation, and testing requirements as they pertain to the performance of the emergency power supply system (EPSS)

- Intent of standard is to achieve maximum system reliability

- Divides the essential electrical system into three branches: life safety, critical, and equipment

Key Considerations

Codes and Standards – NEC 700.3

single alternate source of power which will be disabled for maintenance or repair, the emergency system shall include permanent switching means to connect a portable or temporary alternate source of power

N **(F) Temporary Source of Power for Maintenance or Repair of the Alternate Source of Power.** If the emergency system relies on a single alternate source of power, which will be disabled for maintenance or repair, the emergency system shall include permanent switching means to connect a portable or temporary alternate source of power, which shall be available for the duration of the maintenance or repair. The permanent switching means to connect a portable or temporary alternate source of power shall comply with the following:

Key Considerations

Codes and Standards – NEC 700.3

- Connection to the portable or temporary alternator source of power shall not require modification to the permanent system wiring.

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Codes and Standards – NEC 700.3

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- The connection point for the portable or temporary alternate source shall be marked with the phase rotation and system bonding requirements.

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- Mechanical or electrical interlocking shall prevent inadvertent interconnection of power sources.

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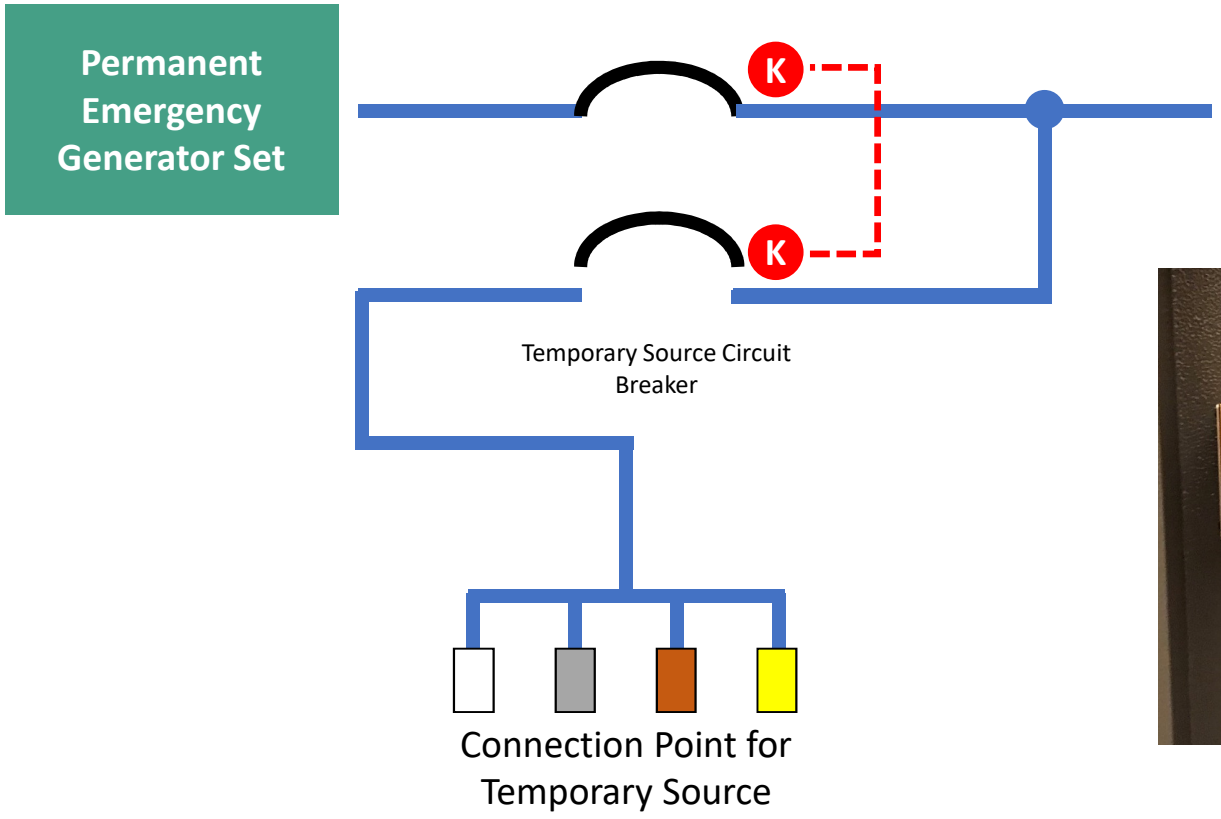
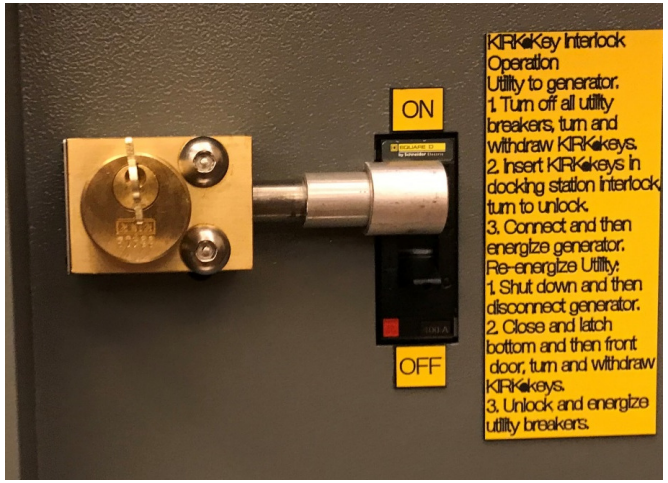
- The connection point for the portable or temporary alternate source shall be marked with the phase rotation and system bonding requirements.
- Mechanical or electrical interlocking shall prevent inadvertent interconnection of power sources.
- The switching means shall include a contact point which shall annunciate at a location remote from the generator or at another facility monitoring system to indicate that the permanent emergency source is disconnected from the emergency system.

Key Considerations

Codes and Standards – NEC 700.3





Key Considerations

Joint Commission - Environment of Care Standard

- Tested 12 times a year at intervals no less than 20 days and no more than 40 days

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- Test each emergency generator for at least 30 continuous minutes and test dates must be documented

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Joint Commission - Environment of Care Standard

- Tested 12 times a year at intervals no less than 20 days and no more than 40 days
- Test each emergency generator for at least 30 continuous minutes and test dates must be documented
- The emergency generator tests are conducted with a dynamic load that is at least 30% of the nameplate rating of the generator or meets the manufacturer's recommended prime movers' exhaust gas temperature
- Joint Commission - jointcommission.org

Recommendation: For additional guidance, see NFPA 110, Standard for Emergency & Standby Power Systems.

Key Considerations

Canadian Standards Association

CSA C282:19

- Emergency electrical power supply for buildings

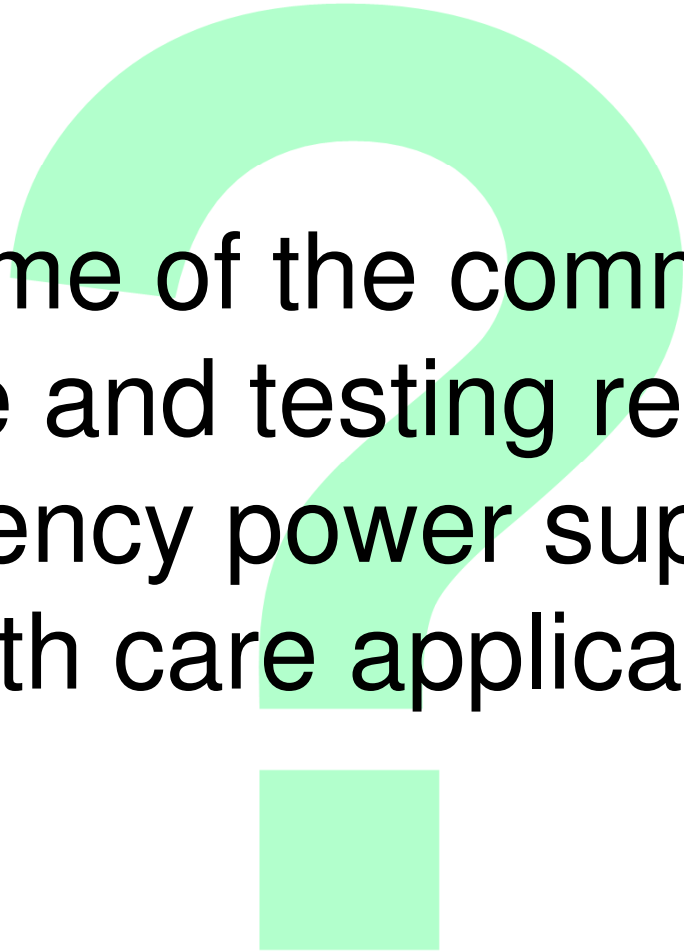
CSA-Z32

- Electrical safety and essential electrical systems in healthcare facilities

Related Content

PowerHour
Canadian Healthcare – Late November

What are some of the common maintenance and testing requirements of an emergency power supply system within a health care application?



Key Considerations

Testing – Monthly NFPA 110

- **8.4.2** Generator sets in service shall be exercised at least once monthly, for a minimum of 30 minutes, using one of the following methods:

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  - (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 standby nameplate kW rating

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Related Content

Specifying Testing for Reliable Power Systems
PowerHour

Recommendation Test emergency generator sets at least monthly for at least 30 minutes with a load bank at no less than 30% of the generator set rating.

Key Considerations

Testing – 36 Months NFPA 110

- **8.4.9** Level 1 EPSS shall be tested at least once within every 36 months.

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Testing – 36 Months NFPA 110

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- **8.4.9.1** Level 1 EPSS shall be tested continuously for the duration of its assigned class.
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- **8.4.9.1** Level 1 EPSS shall be tested continuously for the duration of its assigned class.
- **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.
- **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.
- **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.

Related Content

NFPA 110 Time to Readiness
White Paper
PowerHour Recording

Recommendation Specify a permanent load bank to the system to allow for proper loading during weekly testing

Key Considerations

Maintenance – Manufacturer Requirements

Routine Maintenance and Operational Testing

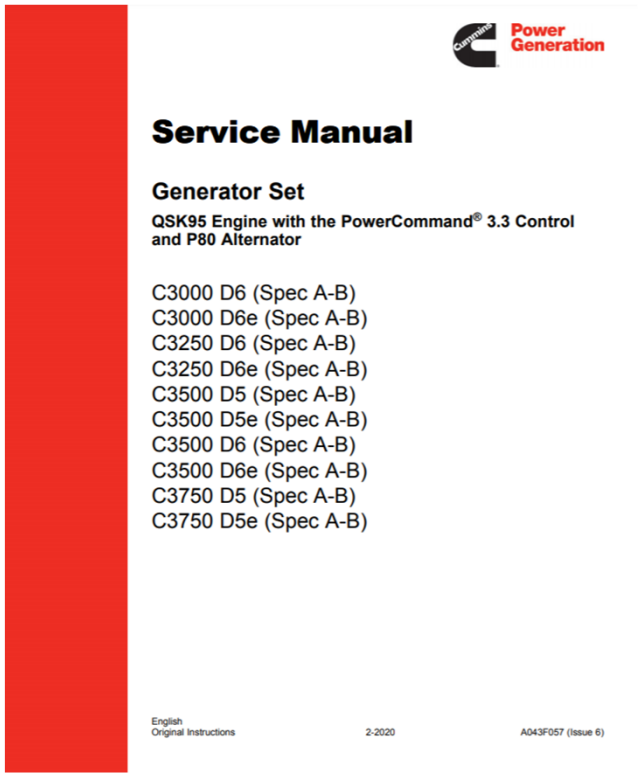
8.1.1 The routine maintenance and operational testing program shall be based on all of the following:

(1) Manufacturer's recommendations

(2) Instruction manuals

(3) Minimum requirements of this chapter

(4) The authority having jurisdiction



Key Considerations

Maintenance – Legal Compliance

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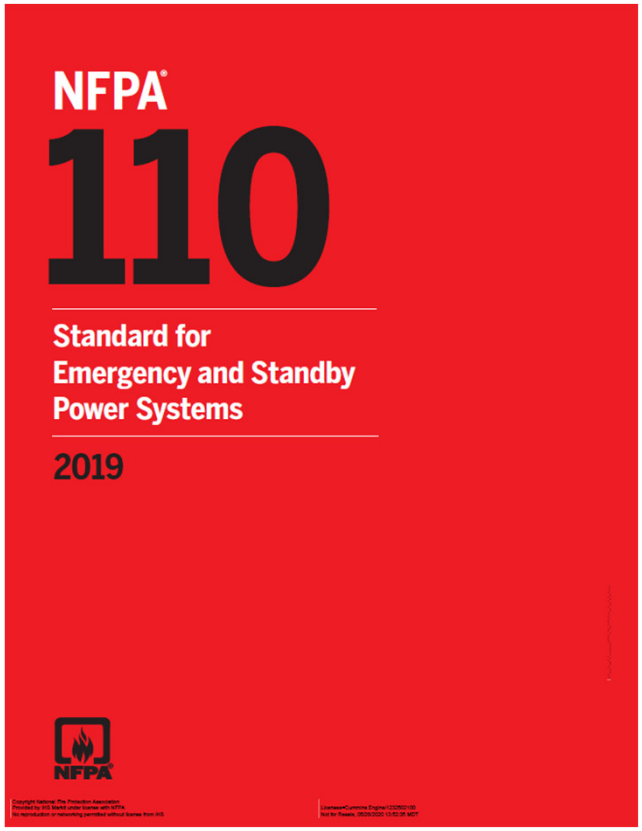

Key Considerations

Maintenance – AHJ Requirements

Routine Maintenance and Operational Testing

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Related Content

EPA Emissions Regulations
PowerHour
White Paper

Key Considerations

Maintenance – Fuel Testing

- **8.3.7** A fuel quality test shall be performed at least annually usin appropriate ASTM standards or the manufacturer's recommendations.

Key Considerations

NFPA 110 Compliance Reporting

- Generators serve as reliable emergency supply in a multitude of mission critical applications

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NFPA 110 Compliance Reporting

- Generators serve as reliable emergency supply in a multitude of mission critical applications
- An established record of maintenance and operational testing is needed for emergency power supply systems
- Compliance agencies refer to NFPA 110 guidelines
  - Joint Commission on Accreditation of Healthcare Organizations
  - Centers for Medicare and Medicaid
  - Internal Audits conducted by several mission critical organizations
  - Local Authority Having Jurisdiction

Key Considerations

NFPA 110 Compliance Reporting – Remote Monitoring

One-Click Reporting

- Provide quick access to pre-formatted, pre-approved NFPA 110 template
- Make a final “Pass or Fail” assessment, without having to print hard copies of the report
- Provide a single report per site avoiding need to download multiple asset-by-asset report

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Leverage regular Generator Start/Stops for Testing

- With manual reporting – the only alternative facilities had was to schedule a test and conduct ‘meter reading’ at the equipment
- Ability to use any actual outages or generator operations for test reporting purposes

Key Considerations

NFPA 110 Compliance Reporting – Remote Monitoring

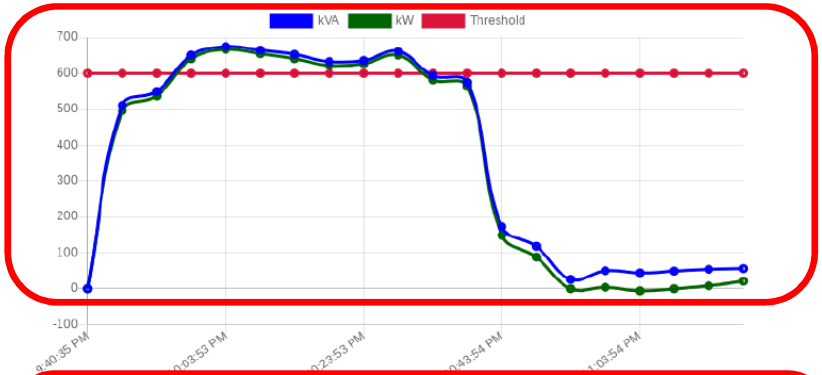
- Data graph summarizing the test results
- Data table summarizing the test results

PowerCommand Cloud™

Gen 3 - Test Summary

Nameplate: **2000 kW** Start Time: **5/27/2020, 9:40:32 PM CDT** Stop Time: **5/27/2020, 11:22:03 PM CDT**

Generator Runtime	Actual Runtime	Required Runtime	Rated kW	Threshold	Test Result
5/27/2020, 9:40:32 PM - 5/27/2020, 11:22:03 PM CDT	102 min	30 min	2000 kW	600 kW	PASS



Date/Time	Rated	Threshold	Actual					Generator Voltage (V)			Generator Amperage (A)			Engine Data			
CDT	kW	30% kW	kW	kVA	kVAR	pF	Hz	L1-L2	L2-L3	L3-L1	L1	L2	L3	Oil Press (psi)	Oil Temp. (F)	Coolant Temp. (F)	Battery Volt
5/27/2020, 9:40:35 PM	2000	600	0	0	0	-	62.10	4569	4561	4561	0	0	0	105	83.93	96.50	23.80
5/27/2020, 9:48:53 PM	2000	600	496	511	118	0.97	60	4138	4138	4139	71	68	70	72.50	141.53	154.10	27.30
5/27/2020, 9:53:53 PM	2000	600	537	550	116	0.98	60	4146	4150	4149	76	73	76	71.30	163.13	159.50	27.40

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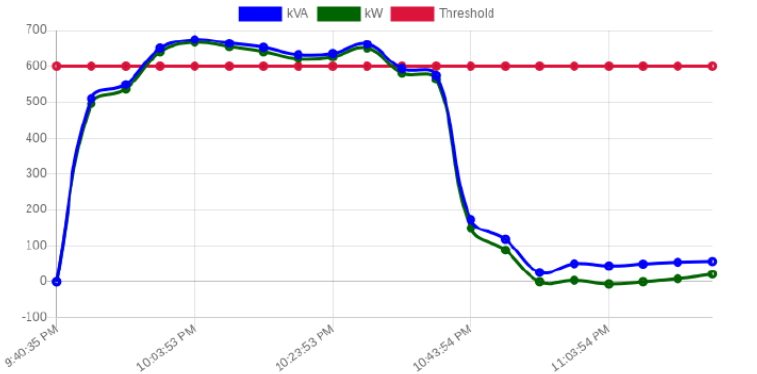

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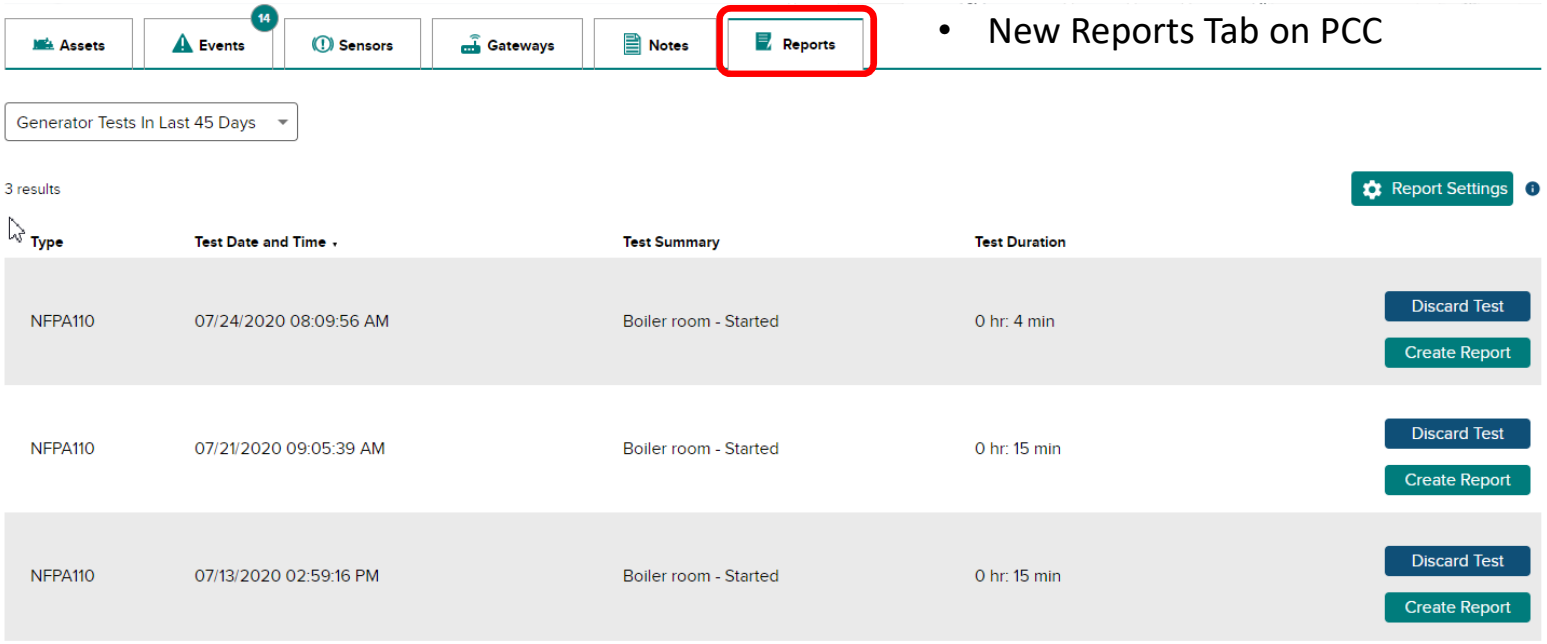
- Summary table, with editable field for test results

Key Considerations

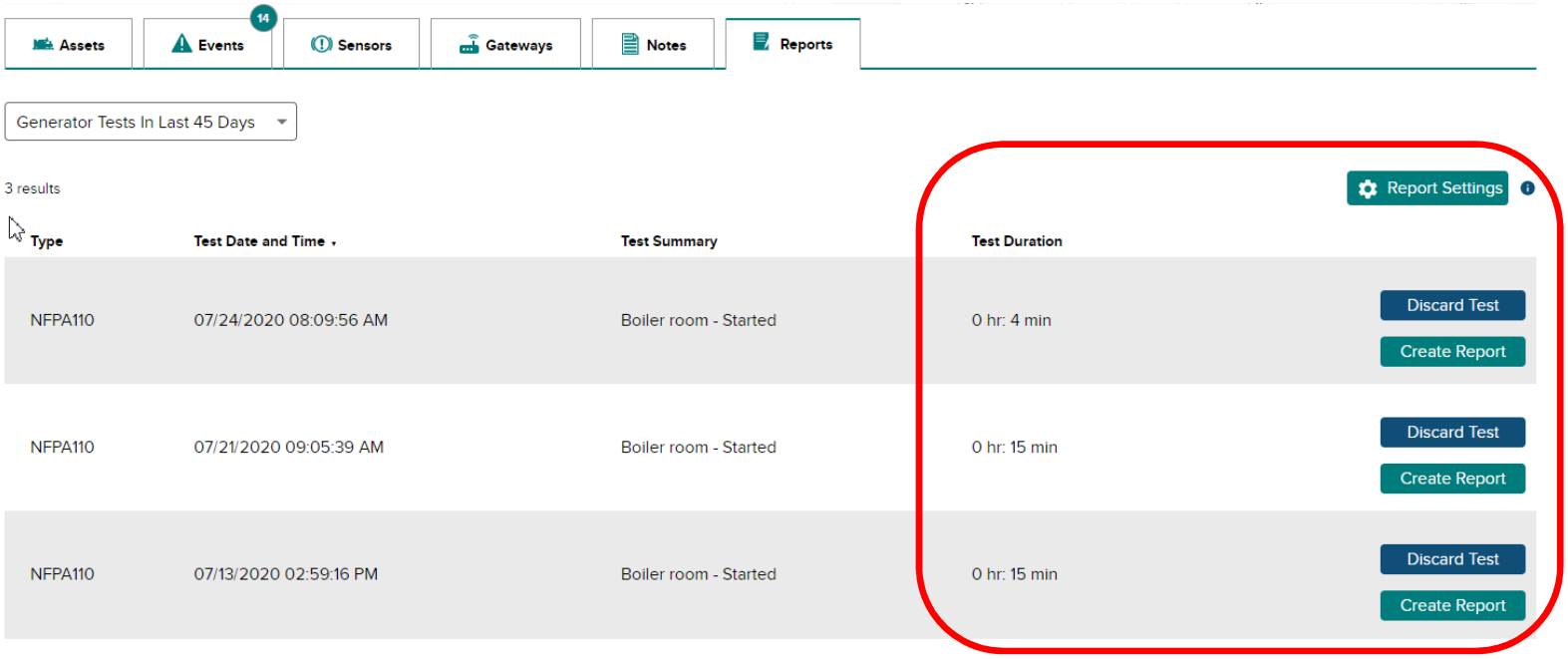
NFPA 110 Compliance Reporting – Remote Monitoring



- New Reports Tab on PCC

Key Considerations

NFPA 110 Compliance Reporting – Remote Monitoring

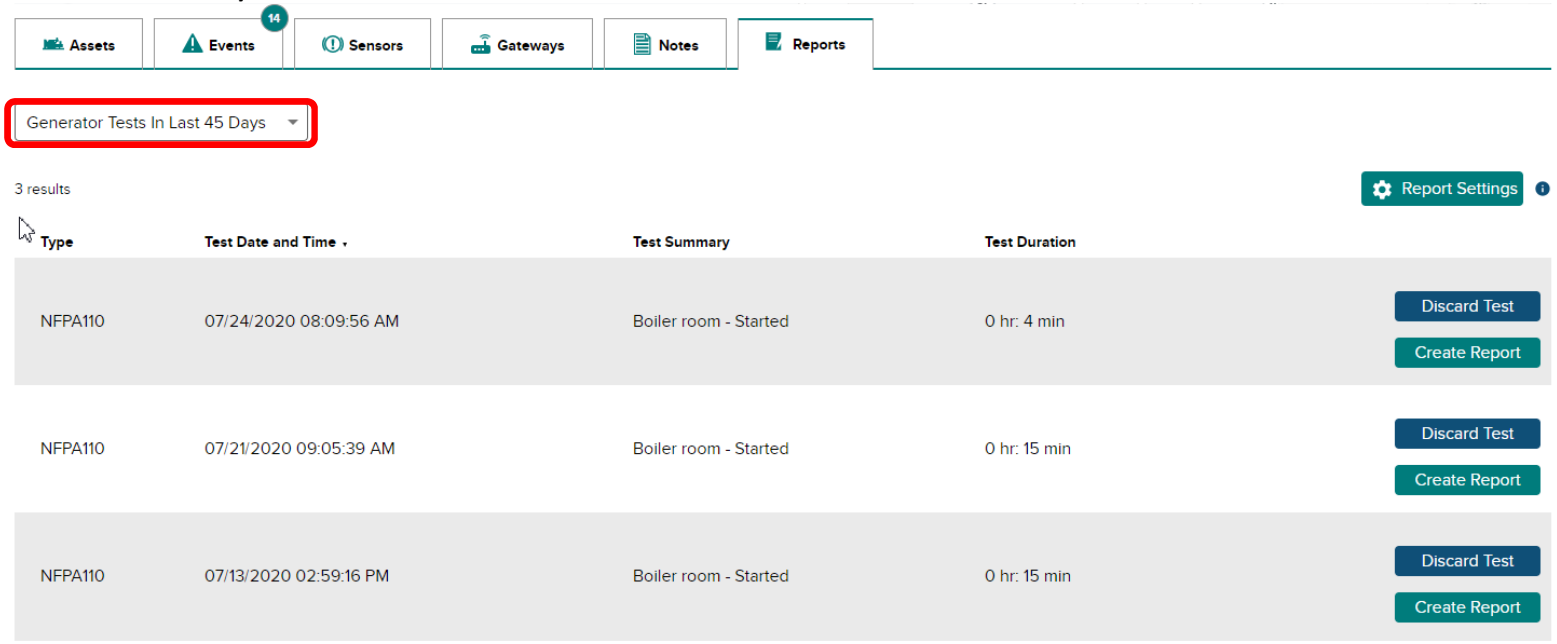


- Based on generator runtime duration, Facility manager can either create report or discard event

Key Considerations

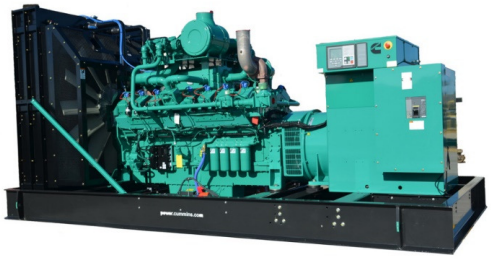
NFPA 110 Compliance Reporting – Remote Monitoring

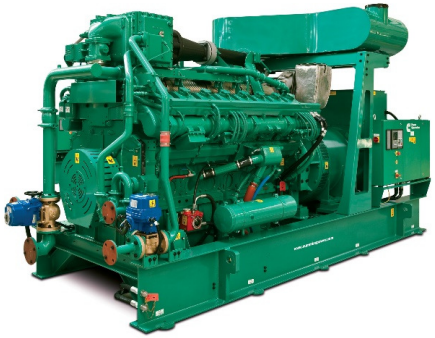
- Last 45 days stored

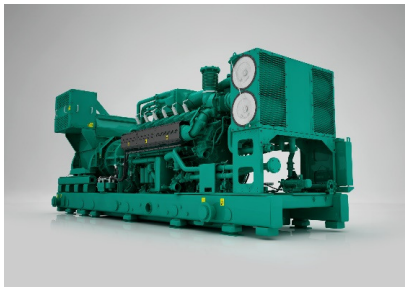


Healthcare Power Systems

Applications and Capability







Healthcare

Installation Review

Application: Standby and Hurricane Relief

Segment: Medical Center (763 Licensed Beds)

Location: Louisiana, US

Key Acceptance Criteria

- NFPA 110 Type 10 Starting for Life Safety Loads
- Extended Run Time (>24 Hours)
- Operational Flexibility

Related Content

Case Study

Healthcare

Installation Review

Application: Life Safety Standby with Demand Response

Segment: Hospital

Location: Salem, OR

Key Acceptance Criteria

- Complete system one source and one manufacturer
- Operational Flexibility
- System Design
- Stringent acoustical and footprint requirements

Related Content

Case Study

Healthcare

Installation Review

Application: Life Safety Standby

Segment: Hospital (133 Licensed Medical Beds)

Location: Calgary, Alberta, Canada

Key Acceptance Criteria

- Complete system one source and one manufacturer
- (3) 2000kW, Medium Voltage, Paralleled
- Remote Location

Related Content

Case Study

Course Summary

Healthcare Power System Installations and Case Studies:

- Describe the common codes and standards associated with healthcare applications
- Identify key design attributes along with the service and maintenance requirements for a healthcare power system.
- Recognize the challenges impacting healthcare power systems and find solutions via case studies.

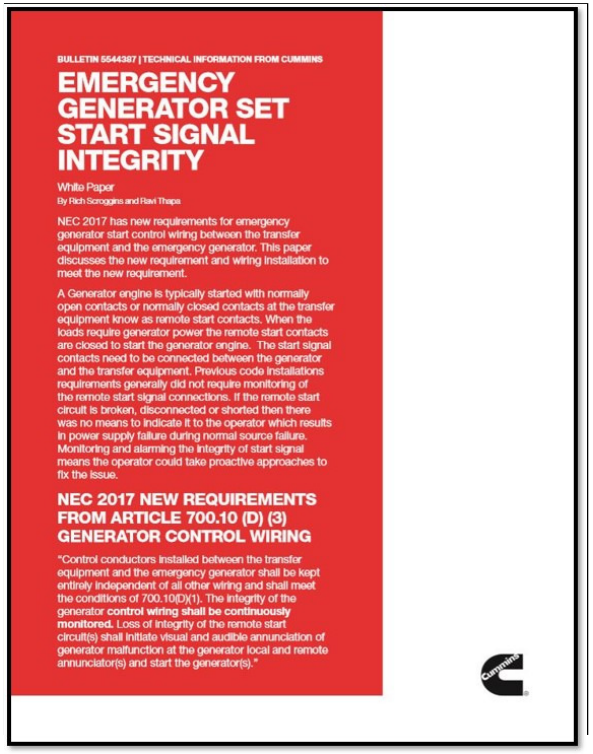
Additional Resources

Cummins White Papers

- NFPA 110 Type 10 Starting Requirements for Generator Set Applications
- Automatic Transfer Switch Applications for MRI Equipment
- Emergency Generator Set Start Signal Integrity
- Specifying And Validating Motor Starting Capability

Cummins PowerHour On-Demand Webinars

- NFPA 110 Time to Readiness
- NEC 2017 Code Changes for Emergency Power Systems
- Testing Requirements of Emergency Power Supply Systems in Critical Healthcare Facilities
- Ensuring Power System Reliability Through Service Specifications



Q&A

Please type your questions, comments and feedback in the **Zoom Q&A** window.

After the PowerHour, a complete list of questions and answers will be published on powersuite.cummins.com.

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Ian Lindquist
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- FL: Bob Kelly (robert.kelly@cummins.com)
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Q&A

Please type your questions, comments and feedback in the **Zoom Q&A** window.

After the PowerHour, a complete list of questions and answers will be published on powersuite.cummins.com.

Please complete the brief survey before exiting the webinar!

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Closing

Watch out for a follow-up email including:

- A link to the webinar recording and copy of the presentation
- A certificate issuing one professional development hour (1 PDH)

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Please contact Michael Sanford if you have any questions related to the PowerHour webinar (michael.sanford@cummins.com)

Upcoming PowerHour Webinars:

November: Overcurrent Protection for NEC Life Safety Emergency Power Systems

December: Standby Power Systems Service Requirements for Life-Safety Applications


Cummins

Healthcare Power System Installations and Case Studies

PowerHour webinar series for consulting engineers

Experts you trust. Excellence you count on.

October 15th, 2020
Start Time: 1:00 PM CT / 11:00 AM PST

(1PDH issued by Cummins)

Welcome!

Cummins PowerHour webinar series is designed to help our engineer partners to…

- Keep up to date on products, technology, and codes and standards development
- Interact with Cummins experts and gain access to ongoing technical support
- Participate at your convenience, live or on-demand
- Earn Professional Development Hours (PDH)

Technical tips:

- Audio is available through teleconference or Zoom application.
- Attendees are in “listen only” mode throughout the event.
- Use the Zoom Q&A Panel to submit questions, comments, and feedback throughout the event. Time is allotted at the end of the PowerHour to address Q&A.
- If the audio connection is lost, disconnected or experiences intermittent connectivity issues, please check your audio connection through the "Join Audio" or "Audio Connectivity" button at the bottom left of the Zoom application.
- Report technical issues using the Zoom Q&A Panel.

Meet your panelists

Cummins instructors:

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Senior Sales Application Engineer
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Ian Lindquist
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Disclaimer

The views and opinions expressed in this course shall not be considered the official position of any regulatory organization and shall not be considered to be, nor be relied upon as, a Formal Interpretation.

Participants are encouraged to refer to the entire text of all referenced documents. In addition, when it doubt, reach out to the Authority Having Jurisdiction.

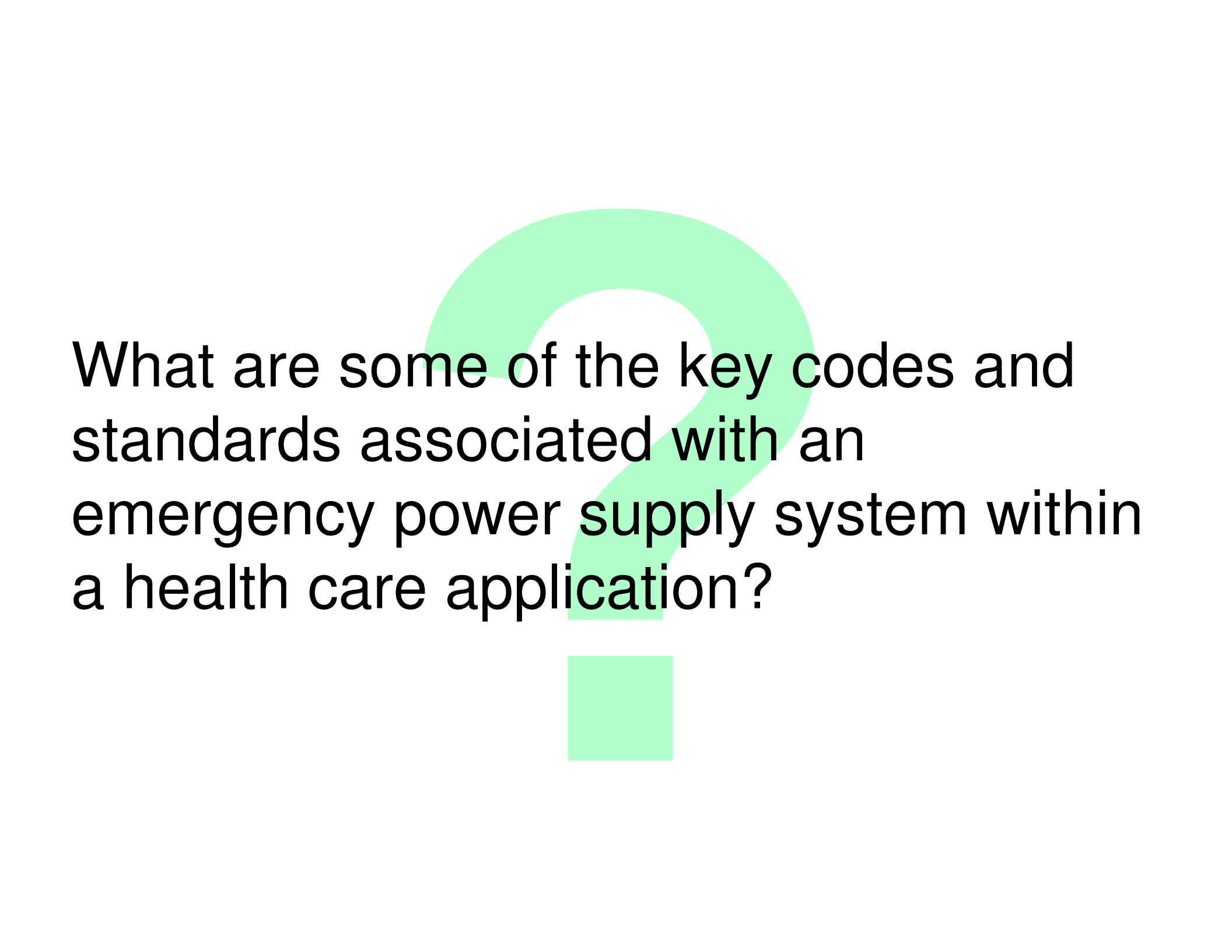
Course Objectives

Healthcare Power System Installations and Case Studies:

As the number of healthcare facilities in North America continue to grow, so does the need for emergency power supply systems to back up those facilities. Further, the wide variety of healthcare facilities can make for a seemingly dauting task of requirements management. This presentation will cover those key installation requirements and common codes and standards while also discussing several unique healthcare application installations.

After completing this course, participants will be able to:

- Describe the common codes and standards associated with healthcare applications
- Identify key design attributes along with the service and maintenance requirements for a healthcare power system.
- Recognize the challenges impacting healthcare power systems and find solutions via case studies.


What are some of the key codes and standards associated with an emergency power supply system within a health care application?

Key Considerations

Codes and Standards – NFPA 110

- Requirements covering the performance of emergency and standby power systems providing an alternate source of electrical power to loads in buildings and facilities in the event that the primary power source fails.

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Key Considerations

Codes and Standards – NFPA 110

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- Covers installation, maintenance, operation, and testing requirements as they pertain to the performance of the emergency power supply system (EPSS)

- Intent of standard is to achieve maximum system reliability

Key Considerations

Codes and Standards – NFPA 110 – Type 10

Type:

Maximum time, in seconds, that the EPSS will permit the load terminals of the transfer switch to be without acceptable electrical power *(***NFPA** *4.3)* Time generator has to operate after a power failure.

- The emergency power supply system provides acceptable power to the load side of the transfer switch within 10 seconds after an outage

- This 10 second includes all intentional and unintentional delays associated with transfer.

Related Content

NFPA 110 Time to Readiness
White Paper
PowerHour Recording

Key Considerations

Codes and Standards – NFPA 99

- Requirements covering the performance of emergency and standby power systems providing an alternate source of electrical power to loads in buildings and facilities in the event that the primary power source fails.

- Covers installation, maintenance, operation, and testing requirements as they pertain to the performance of the emergency power supply system (EPSS)

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Key Considerations

Codes and Standards – NFPA 99

- Requirements covering the performance of emergency and standby power systems providing an alternate source of electrical power to loads in buildings and facilities in the event that the primary power source fails.

- Covers installation, maintenance, operation, and testing requirements as they pertain to the performance of the emergency power supply system (EPSS)

- Intent of standard is to achieve maximum system reliability

- Divides the essential electrical system into three branches: life safety, critical, and equipment

Key Considerations

Codes and Standards – NEC 700.3

single alternate source of power which will be disabled for maintenance or repair, the emergency system shall include permanent switching means to connect a portable or temporary alternate source of power

N **(F) Temporary Source of Power for Maintenance or Repair of the Alternate Source of Power.** If the emergency system relies on a single alternate source of power, which will be disabled for maintenance or repair, the emergency system shall include permanent switching means to connect a portable or temporary alternate source of power, which shall be available for the duration of the maintenance or repair. The permanent switching means to connect a portable or temporary alternate source of power shall comply with the following:

Key Considerations

Codes and Standards – NEC 700.3

- Connection to the portable or temporary alternator source of power shall not require modification to the permanent system wiring.

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- Connection to the portable or temporary alternator source of power shall not require modification to the permanent system wiring.
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Key Considerations

Codes and Standards – NEC 700.3

- Connection to the portable or temporary alternator source of power shall not require modification to the permanent system wiring.
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Key Considerations

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- Mechanical or electrical interlocking shall prevent inadvertent interconnection of power sources.

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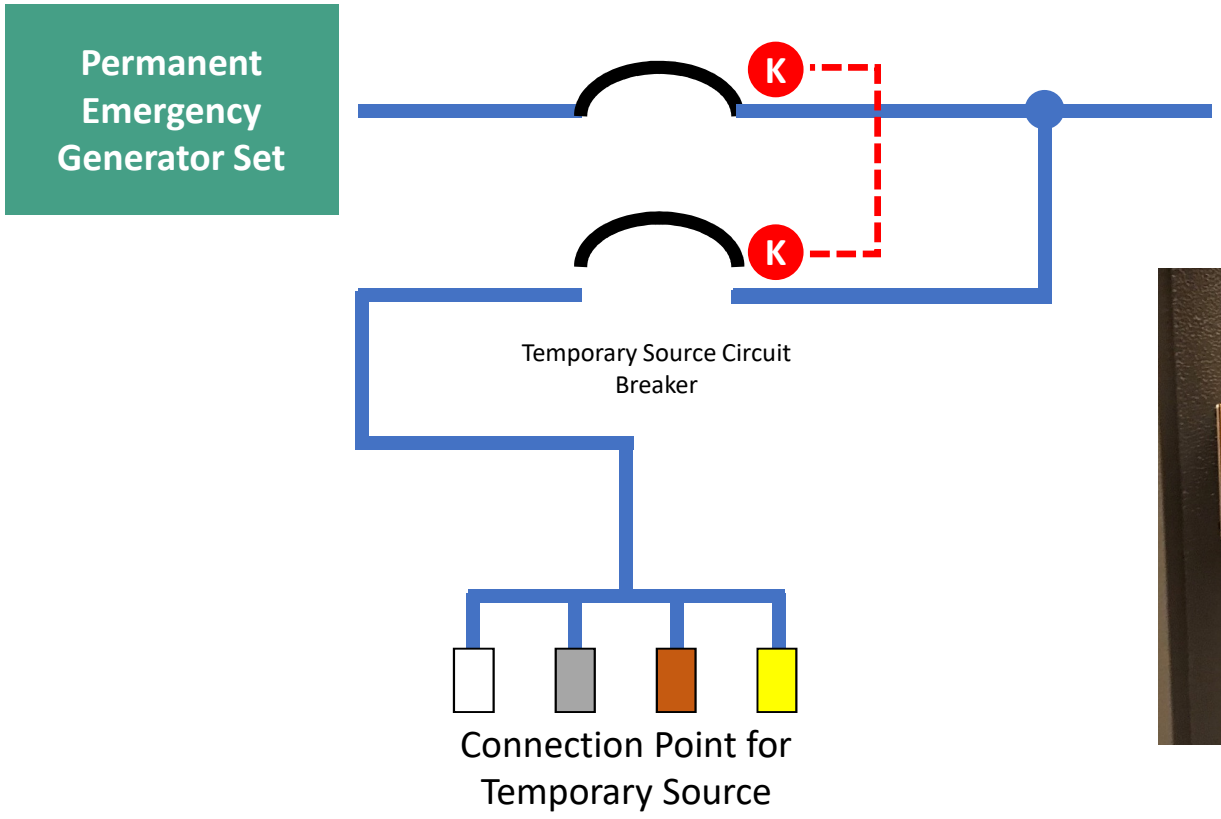
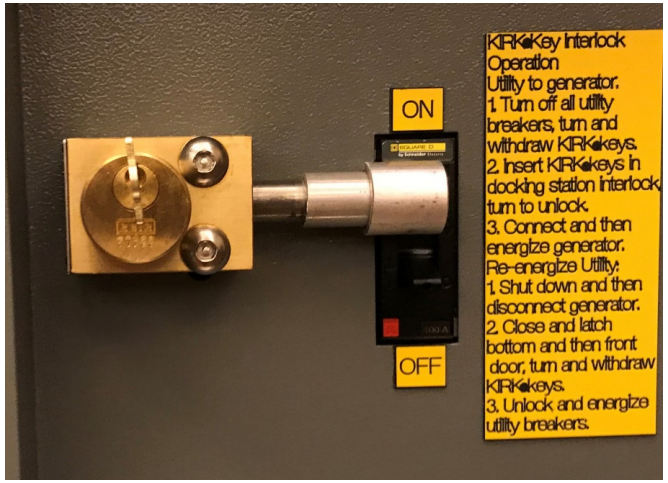
- The switching means shall include a contact point which shall annunciate at a location remote from the generator or at another facility monitoring system to indicate that the permanent emergency source is disconnected from the emergency system.

Key Considerations

Codes and Standards – NEC 700.3





Key Considerations

Joint Commission - Environment of Care Standard

- Tested 12 times a year at intervals no less than 20 days and no more than 40 days

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Key Considerations

Joint Commission - Environment of Care Standard

- Tested 12 times a year at intervals no less than 20 days and no more than 40 days
- Test each emergency generator for at least 30 continuous minutes and test dates must be documented
- The emergency generator tests are conducted with a dynamic load that is at least 30% of the nameplate rating of the generator or meets the manufacturer's recommended prime movers' exhaust gas temperature
- Joint Commission - jointcommission.org

Recommendation: For additional guidance, see NFPA 110, Standard for Emergency & Standby Power Systems.

Key Considerations

Canadian Standards Association

CSA C282:19

- Emergency electrical power supply for buildings

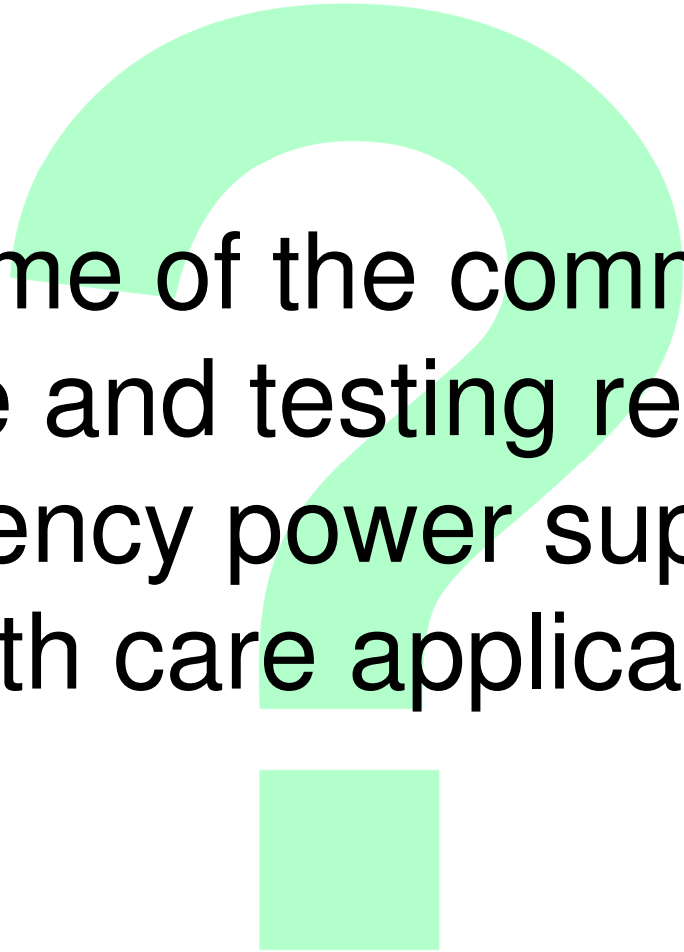
CSA-Z32

- Electrical safety and essential electrical systems in healthcare facilities

Related Content

PowerHour
Canadian Healthcare – Late November

What are some of the common maintenance and testing requirements of an emergency power supply system within a health care application?



Key Considerations

Testing – Monthly NFPA 110

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  (1) Loading that maintains the minimum exhaust gas temperatures as recommended by the manufacturer

Key Considerations

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  - (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 standby nameplate kW rating

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Related Content

Specifying Testing for Reliable Power Systems
PowerHour

Recommendation Test emergency generator sets at least monthly for at least 30 minutes with a load bank at no less than 30% of the generator set rating.

Key Considerations

Testing – 36 Months NFPA 110

- **8.4.9** Level 1 EPSS shall be tested at least once within every 36 months.

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Key Considerations

Testing – 36 Months NFPA 110

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Testing – 36 Months NFPA 110

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- **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.
- **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.

Related Content

NFPA 110 Time to Readiness
White Paper
PowerHour Recording

Recommendation Specify a permanent load bank to the system to allow for proper loading during weekly testing

Key Considerations

Maintenance – Manufacturer Requirements

Routine Maintenance and Operational Testing

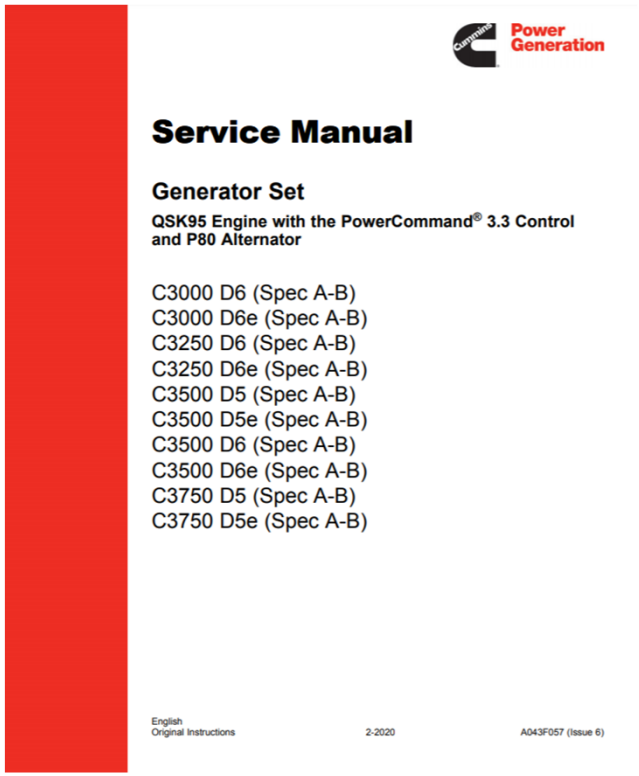
8.1.1 The routine maintenance and operational testing program shall be based on all of the following:

(1) Manufacturer's recommendations

(2) Instruction manuals

(3) Minimum requirements of this chapter

(4) The authority having jurisdiction



Key Considerations

Maintenance – Legal Compliance

Routine Maintenance and Operational Testing

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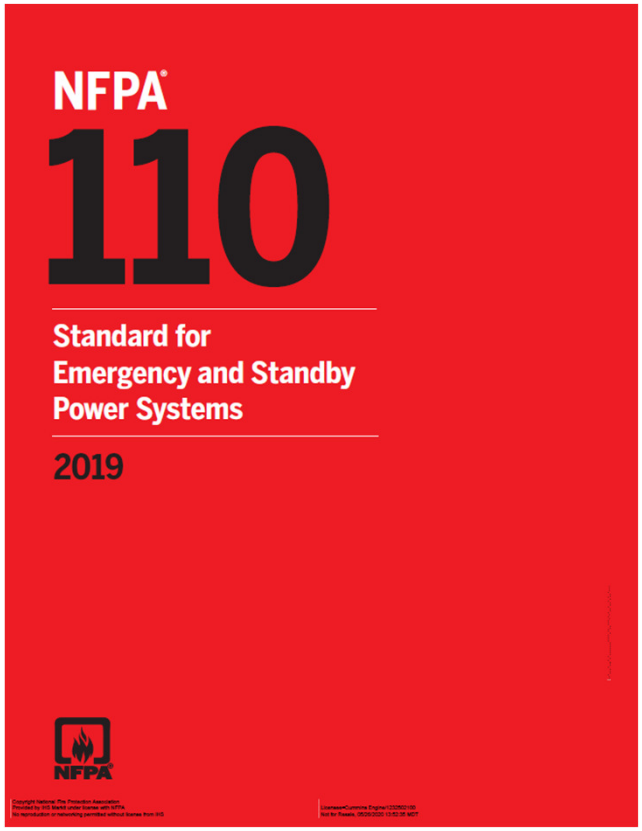

Key Considerations

Maintenance – AHJ Requirements

Routine Maintenance and Operational Testing

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Related Content

EPA Emissions Regulations
PowerHour
White Paper

Key Considerations

Maintenance – Fuel Testing

- **8.3.7** A fuel quality test shall be performed at least annually usin appropriate ASTM standards or the manufacturer's recommendations.

Key Considerations

NFPA 110 Compliance Reporting

- Generators serve as reliable emergency supply in a multitude of mission critical applications

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NFPA 110 Compliance Reporting

- Generators serve as reliable emergency supply in a multitude of mission critical applications
- An established record of maintenance and operational testing is needed for emergency power supply systems
- Compliance agencies refer to NFPA 110 guidelines
  - Joint Commission on Accreditation of Healthcare Organizations
  - Centers for Medicare and Medicaid
  - Internal Audits conducted by several mission critical organizations
  - Local Authority Having Jurisdiction

Key Considerations

NFPA 110 Compliance Reporting – Remote Monitoring

One-Click Reporting

- Provide quick access to pre-formatted, pre-approved NFPA 110 template
- Make a final “Pass or Fail” assessment, without having to print hard copies of the report
- Provide a single report per site avoiding need to download multiple asset-by-asset report

Key Considerations

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Leverage regular Generator Start/Stops for Testing

- With manual reporting – the only alternative facilities had was to schedule a test and conduct ‘meter reading’ at the equipment
- Ability to use any actual outages or generator operations for test reporting purposes

Key Considerations

NFPA 110 Compliance Reporting – Remote Monitoring

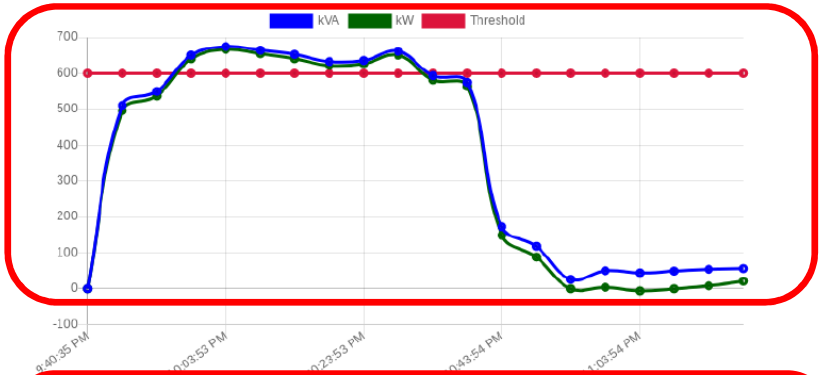
- Data graph summarizing the test results
- Data table summarizing the test results

PowerCommand Cloud™

Gen 3 - Test Summary

Nameplate: **2000 kW** Start Time: **5/27/2020, 9:40:32 PM CDT** Stop Time: **5/27/2020, 11:22:03 PM CDT**

Generator Runtime	Actual Runtime	Required Runtime	Rated kW	Threshold	Test Result
5/27/2020, 9:40:32 PM - 5/27/2020, 11:22:03 PM CDT	102 min	30 min	2000 kW	600 kW	PASS



Date/Time	Rated	Threshold	Actual					Generator Voltage (V)			Generator Amperage (A)			Engine Data			
CDT	kW	30% kW	kW	kVA	kVAR	pF	Hz	L1-L2	L2-L3	L3-L1	L1	L2	L3	Oil Press (psi)	Oil Temp. (F)	Coolant Temp. (F)	Battery Volt
5/27/2020, 9:40:35 PM	2000	600	0	0	0	-	62.10	4569	4561	4561	0	0	0	105	83.93	96.50	23.80
5/27/2020, 9:48:53 PM	2000	600	496	511	118	0.97	60	4138	4138	4139	71	68	70	72.50	141.53	154.10	27.30
5/27/2020, 9:53:53 PM	2000	600	537	550	116	0.98	60	4146	4150	4149	76	73	76	71.30	163.13	159.50	27.40

Key Considerations

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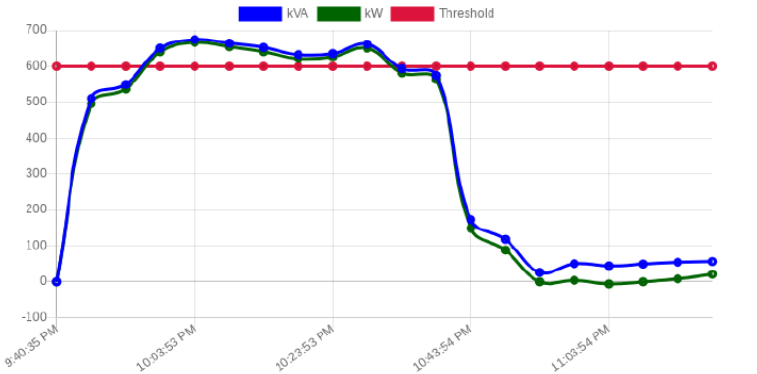

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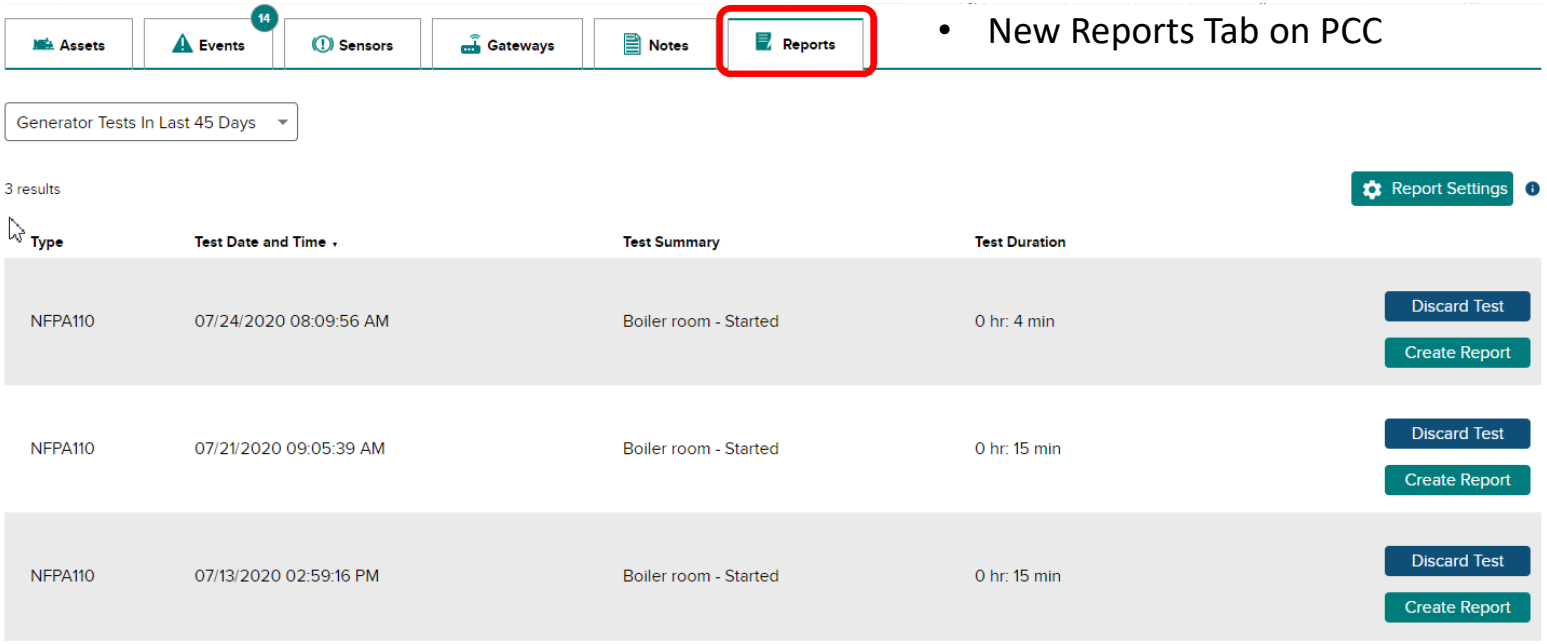
- Summary table, with editable field for test results

Key Considerations

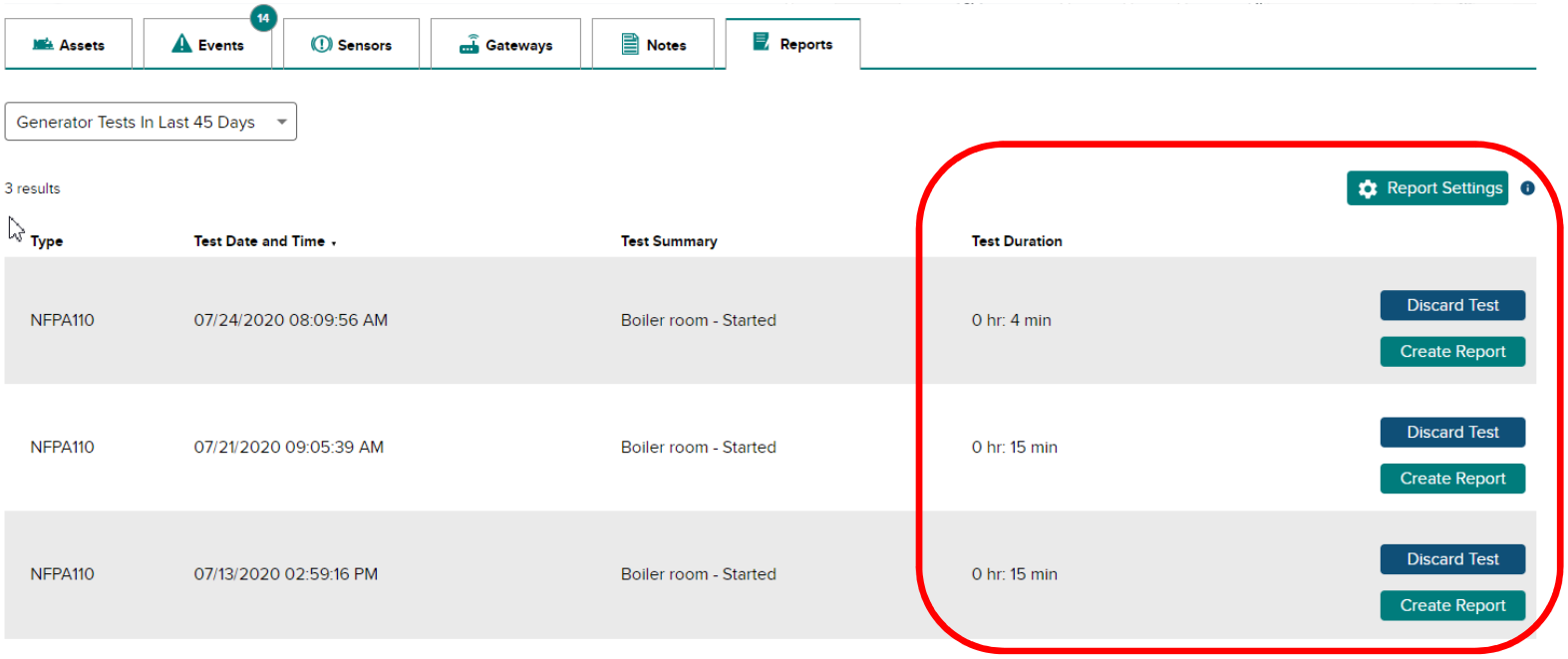
NFPA 110 Compliance Reporting – Remote Monitoring



- New Reports Tab on PCC

Key Considerations

NFPA 110 Compliance Reporting – Remote Monitoring

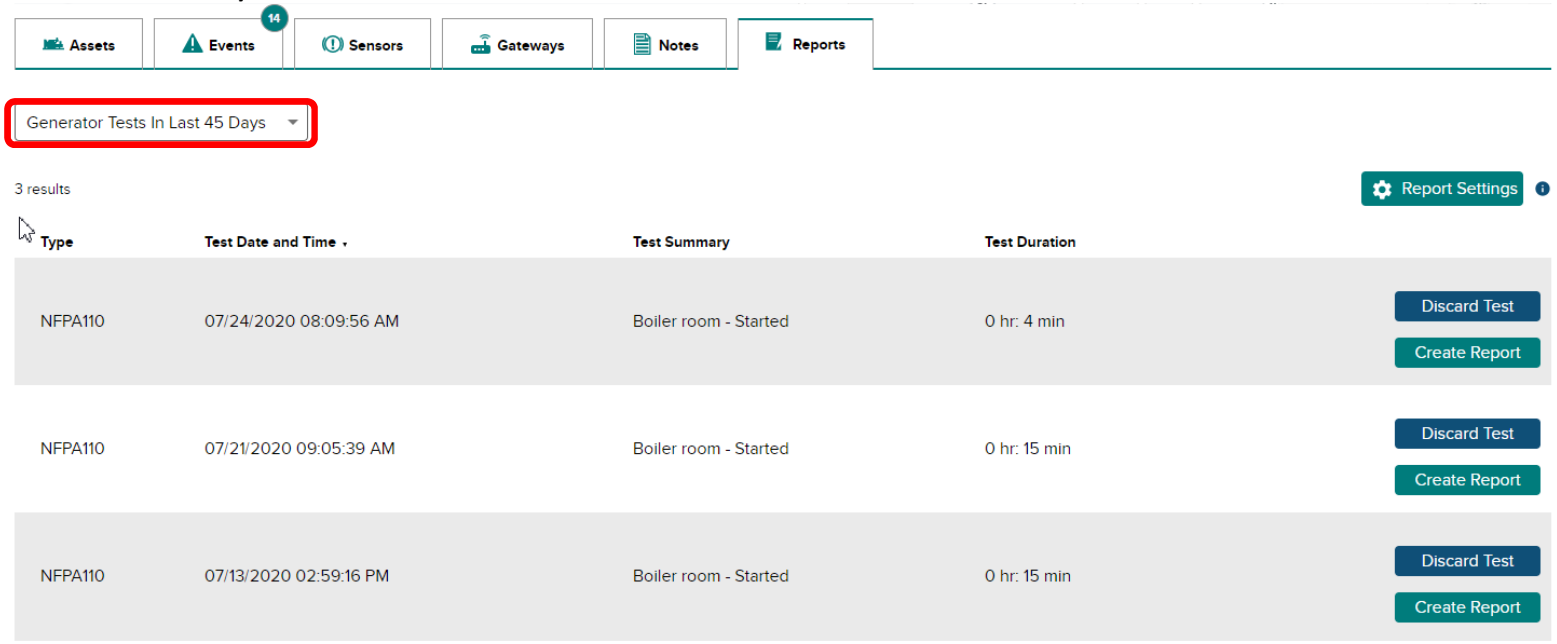


- Based on generator runtime duration, Facility manager can either create report or discard event

Key Considerations

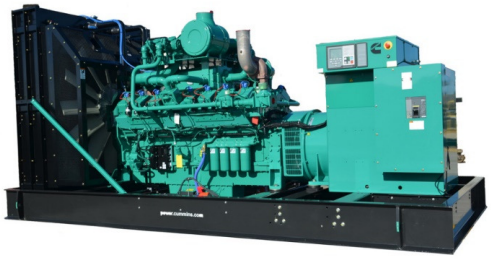
NFPA 110 Compliance Reporting – Remote Monitoring

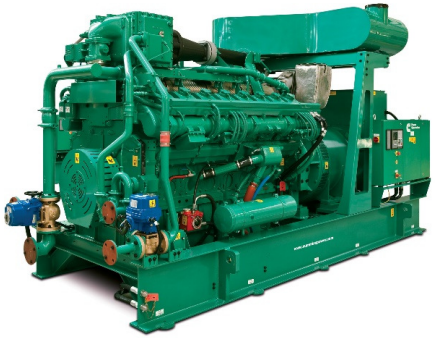
- Last 45 days stored

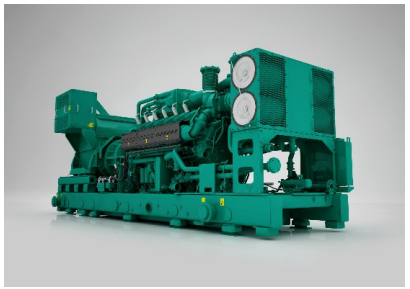


Healthcare Power Systems

Applications and Capability







Healthcare

Installation Review

Application: Standby and Hurricane Relief

Segment: Medical Center (763 Licensed Beds)

Location: Louisiana, US

Key Acceptance Criteria

- NFPA 110 Type 10 Starting for Life Safety Loads
- Extended Run Time (>24 Hours)
- Operational Flexibility

Related Content

Case Study

Healthcare

Installation Review

Application: Life Safety Standby with Demand Response

Segment: Hospital

Location: Salem, OR

Key Acceptance Criteria

- Complete system one source and one manufacturer
- Operational Flexibility
- System Design
- Stringent acoustical and footprint requirements

Related Content

Case Study

Healthcare

Installation Review

Application: Life Safety Standby

Segment: Hospital (133 Licensed Medical Beds)

Location: Calgary, Alberta, Canada

Key Acceptance Criteria

- Complete system one source and one manufacturer
- (3) 2000kW, Medium Voltage, Paralleled
- Remote Location

Related Content

Case Study

Course Summary

Healthcare Power System Installations and Case Studies:

- Describe the common codes and standards associated with healthcare applications
- Identify key design attributes along with the service and maintenance requirements for a healthcare power system.
- Recognize the challenges impacting healthcare power systems and find solutions via case studies.

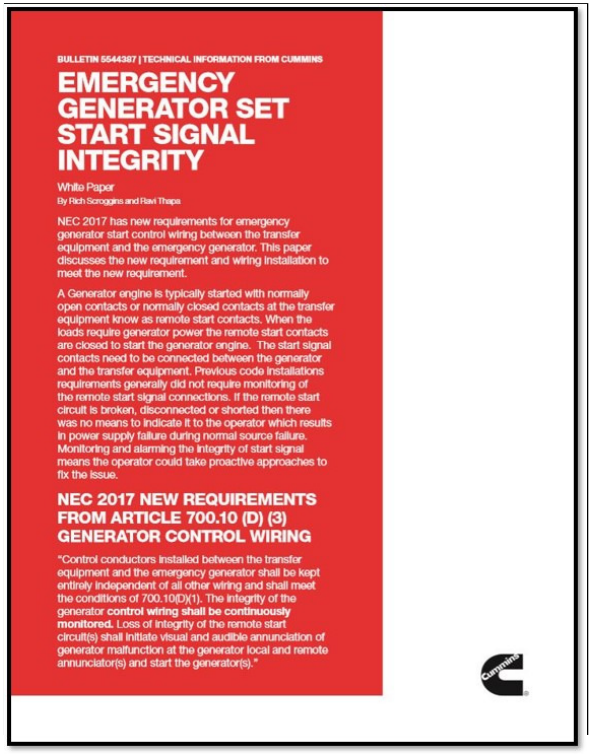
Additional Resources

Cummins White Papers

- NFPA 110 Type 10 Starting Requirements for Generator Set Applications
- Automatic Transfer Switch Applications for MRI Equipment
- Emergency Generator Set Start Signal Integrity
- Specifying And Validating Motor Starting Capability

Cummins PowerHour On-Demand Webinars

- NFPA 110 Time to Readiness
- NEC 2017 Code Changes for Emergency Power Systems
- Testing Requirements of Emergency Power Supply Systems in Critical Healthcare Facilities
- Ensuring Power System Reliability Through Service Specifications



Q&A

Please type your questions, comments and feedback in the **Zoom Q&A** window.

After the PowerHour, a complete list of questions and answers will be published on powersuite.cummins.com.

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Closing

Watch out for a follow-up email including:

- A link to the webinar recording and copy of the presentation
- A certificate issuing one professional development hour (1 PDH)

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Upcoming PowerHour Webinars:

November: Overcurrent Protection for NEC Life Safety Emergency Power Systems

December: Standby Power Systems Service Requirements for Life-Safety Applications


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