

ELECTRICAL POWER SYSTEMSSURVEILLANCE REQUIREMENTS

4.8.1.1.1 Each of the above required physically independent circuits between the offsite transmission network and the onsite Class 1E distribution system shall be:

- a. Determined OPERABLE at least once per 7 days by verifying correct breaker alignment indicating power availability.
- b. Demonstrated OPERABLE at least once per 18 months during shutdown by manually transferring the onsite Class 1E power supply from the normal circuit to the alternate circuit.

4.8.1.1.2 Each emergency diesel generator (EDG) shall be demonstrated OPERABLE:

- a. In accordance with the frequency specified in Table 4.8.2 on a STAGGERED TEST BASIS by:
  1. Verifying the fuel level in the day tank.
  2. Verifying the fuel level in the fuel storage tank.
  3. Verifying the fuel transfer pump can be started and transfers fuel from the storage system to the day tank.
  4. Verifying the EDG can start\*\* and gradually accelerate to synchronous speed (900 rpm) with generator voltage and frequency at 4160 ± 420 volts and 60 ± 0.5 Hz. Subsequently, verifying the generator is synchronized, gradually loaded\*\* to an indicated 2500-2600 kw\*\*\* and operates for at least 60 minutes.
  5. Verifying the EDG is aligned to provide standby power to the associated emergency busses.
- b. At least once per 92 days by verifying that a sample of diesel fuel from the fuel storage tank is within the acceptable limits specified in Table 1 of ASTM D975-74 when checked for viscosity, water and sediment.

\*\* This test shall be conducted in accordance with the manufacturer's recommendations regarding engine prelube and warmup procedures, and as applicable regarding loading recommendations.

\*\*\* This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band for special testing under direct monitoring of the manufacturer or momentary variations due to changing bus loads shall not invalidate the test.

## ELECTRICAL POWER SYSTEMS

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## 4.8.1.1.2 (Continued)

- c. (L) At least once per 184 days, the EDG shall be started\*\* and accelerated to at least ~~900 rpm~~ in less than or equal to 10 seconds. The generator voltage and frequency shall be  $4160 \pm 420$  volts and  $60 \pm 0.5$  Hz within 10 seconds after the start signal. The EDG shall be manually synchronized to its appropriate emergency bus, gradually loaded\*\* to an indicated 2500 to 2600 kw\*\*\*, and operated for at least 60 minutes. The EDG shall be started for this test by using one of the following signals on a rotating test basis:

- Simulated loss of offsite power by itself.
- Simulated loss of offsite power in conjunction with an ESF actuation test signal.
- An ESF actuation test signal by itself.

This test, if it is performed so it coincides with the testing required by Surveillance Requirement 4.8.1.1.2.a.4, may also serve to concurrently meet those requirements as well.

- d. At least once per 18 months during shutdown by:
- Verifying ~~that~~ on rejection of a load of greater than or equal to 610 kw, the voltage and frequency are maintained with  $4160 \pm 420$  volts and  $60 \pm 0.5$  Hz.   
 (L) the frequency remains less than or equal to 66 Hz, and within 3 seconds
  - Verifying that the load sequencing timers are OPERABLE with times within the tolerances shown in Table 4.8-1.

\*\* This test shall be conducted in accordance with the manufacturer's recommendations regarding engine prelube and warmup procedures, and as applicable regarding loading recommendations.

\*\*\* This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band for special testing under direct monitoring of the manufacturer or momentary variations due to changing bus loads shall not invalidate the test.

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## 4.8.1.1.2 (Continued)

3. Simulating a loss of offsite power by itself, and:
- Verifying de-energization of the emergency busses and load shedding from the emergency busses.
  - Verifying the EDG starts\*\* on the auto-start signal, energizes the emergency busses with permanently connected loads within 10 seconds, energizes the auto-connected shutdown loads through the sequencing timers and operates for greater than or equal to 5 minutes while its generator is loaded with the shutdown loads. After energization of these loads, the steady state voltage and frequency shall be maintained at  $4160 \pm 420$  volts and  $60 \pm 0.5$  Hz.
4. Verifying that on an ESF actuation test signal (without loss of offsite power) the EDG starts\*\* on the auto-start signal and operates on standby for greater than or equal to 5 minutes. *With a Steady State Voltage of 4160 ± 420 volts and a Steady State Frequency of 60 ± 0.5 Hz. Achieves Voltage greater than or equal to 3960 volts and frequency greater than or equal to 59.5 Hz within 10 seconds and*
5. Simulating a loss of offsite power in conjunction with an ESF actuation test signal, and:
- Verifying de-energization of the emergency busses and load shedding from the emergency busses.
  - Verifying the EDG starts\*\* on the auto-start signal, energizes the emergency busses with permanently connected loads within 10 seconds, energizes the auto-connected emergency (accident) loads through the sequencing timers and operates for greater than or equal to 5 minutes and maintains the steady state voltage and frequency at  $4160 \pm 420$  volts and  $60 \pm 0.5$  Hz.
  - Verifying that all EDG trips, except engine overspeed, generator differential and breaker overcurrent are automatically bypassed upon loss of voltage on the emergency bus and/or a safety injection actuation signal.
6. Verifying the EDG operates\*\* for at least 24 hours. During the first 2 hours of this test, the EDG shall be loaded to an indicated target value of 2950 kw (between 2900-3000 kw)\*\*\* and during the remaining 22 hours of this test, the EDG shall be loaded to an indicated 2500-2600 kw\*\*\*.

\*\* This test shall be conducted in accordance with the manufacturer's recommendations regarding engine prelube and warmup procedures, and as applicable regarding loading recommendations.

\*\*\* This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band for special testing under direct monitoring of the manufacturer or momentary variations due to changing bus loads shall not invalidate the test.

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## 4.8.1.1.2 (Continued)

7. Verifying that the auto-connected loads to each EDG do not exceed the 2000 hour rating of 3000 kw.
8. Verifying the EDG's capability to:
  - a) Synchronize with the offsite power source while the EDG is loaded with its emergency loads upon a simulated restoration of offsite power,
  - b) Transfer its loads to the offsite power source, and
  - c) Proceed through its shutdown sequence.
9. Verifying that the following EDG lockout features prevent EDG starting only when required:
  - a) Remote Local Selection Switch
  - b) Emergency Stop Switch
10. Verifying the EDG's hot restart capability by:

a) Operating the EDG\*\* loaded to an indicated 2500 to 2600 kw\*\*\* for 2 hours or until operating temperatures have stabilized, and

b) Within 5 minutes of shutdown verify the EDG can be started\*\* and accelerated to at least 900 rpm in less than or equal to 10 seconds. The

generator voltage and frequency shall be 4160 ± 420 volts and 60 ± 0.5 Hz within 10 seconds after the start signal

(L) of the start signal with voltage greater than or equal to 3960 volts and frequency greater than or equal to 59.5 Hz.

- e. At least once per 10 years or after any modifications which could affect EDG interdependence by starting\*\* both EDGs simultaneously, during shutdown, and verifying that both EDGs accelerate to at least 900 rpm in less than or equal to 10 seconds of the start signal and achieve a voltage of greater than or equal to 3960 volts and a frequency of greater than or equal to 59.5 Hz.
- f. At least once per 24 months during any mode of operation, by subjecting each EDG to a preventive maintenance inspection in accordance with maintenance procedures appropriate for diesels used for this class of standby service.

\*\* This test shall be conducted in accordance with the manufacturer's recommendations regarding engine prelube and warmup procedures, and as applicable regarding loading recommendations.

\*\*\* This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band for special testing under direct monitoring of the manufacturer or momentary variations due to changing bus loads shall not invalidate the test.

**Unit 2**  
**North Anna Power Station**

ELECTRICAL POWER SYSTEMSSURVEILLANCE REQUIREMENTS

4.8.1.1.1 Each of the above required physically independent circuits between the offsite transmission network and the onsite Class 1E distribution system shall be:

- a. Determined OPERABLE at least once per 7 days by verifying correct breaker alignment indicating power availability.
- b. Demonstrated OPERABLE at least once per 18 months during shutdown by manually transferring the onsite Class 1E power supply from the normal circuit to the alternate circuit.

4.8.1.1.2 Each emergency diesel generator (EDG) shall be demonstrated OPERABLE:

- a. In accordance with the frequency specified in Table 4.8.2 on a STAGGERED TEST BASIS by:

1. Verifying the fuel level in the day tank.
2. Verifying the fuel level in the fuel storage tank.
3. Verifying the fuel transfer pump can be started and transfers fuel from the storage system to the day tank.
4. Verifying the EDG can start\*\* and gradually accelerate to synchronous speed (900 rpm) with generator voltage and frequency at  $4160 \pm 420$  volts and  $60 \pm 1.2$  Hz. Subsequently, verifying the generator is synchronized, gradually loaded\*\* to an indicated 2500-2600 kw\*\*\* and operates for at least 60 minutes.
5. Verifying the EDG is aligned to provide standby power to the associated emergency busses.

- b. At least once per 92 days by verifying that a sample of diesel fuel from the fuel storage tank obtained as a DRAIN sample in accordance with ASTM-D270-65, is within the acceptable limits specified in Table 1 of ASTM D975-74 when checked for viscosity, water and sediment.

- c. At least once per 184 days, the EDG shall be started\*\* (and accelerated to at least 900 rpm) in less than or equal to 10 seconds. The generator voltage and frequency shall be  $4160 \pm 420$  volts and  $60 \pm 1.2$  Hz (within 10 seconds after the start signal)

\*\* This test shall be conducted in accordance with the manufacturer's recommendations regarding engine prelube and warmup procedures, and as applicable regarding loading recommendations.

\*\*\* This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band for special testing under direct monitoring of the manufacturer or momentary variations due to changing bus loads shall not invalidate the test.

ELECTRICAL POWER SYSTEMSSURVEILLANCE REQUIREMENTS

## 4.8.1.1.2 (Continued)

The EDG shall be manually synchronized to its appropriate emergency bus, gradually loaded\*\* to an indicated 2500 to 2600 kw\*\*\*, and operated for at least 60 minutes. The EDG shall be started for this test by using one of the following signals on a rotating test basis:

- a) Simulated loss of offsite power by itself.
- b) Simulated loss of offsite power in conjunction with an ESF actuation test signal.
- c) An ESF actuation test signal by itself.

This test, if it is performed so it coincides with the testing required by Surveillance Requirement 4.8.1.1.2.a.4, may also serve to concurrently meet those requirements as well.

- d. At least once per 18 months during shutdown by:
1. Verifying that on rejection of a load of greater than or equal to 610 kw, the voltage and frequency are maintained with  $4160 \pm 420$  volts and  $60 \pm 1.2$  Hz.   
L 0.5 M

the frequency remains less than or equal to 66 Hz, and within 3 seconds
  2. Verifying that the load sequencing timers are OPERABLE with times within the tolerances shown in Table 4.8-1.
  3. Simulating a loss of offsite power by itself, and:
    - a) Verifying de-energization of the emergency busses and load shedding from the emergency busses.
    - b) Verifying the EDG starts\*\* on the auto-start signal, energizes the emergency busses with permanently connected loads within 10 seconds, energizes the auto-connected shutdown loads through the sequencing timers and operates for greater than or equal to 5 minutes while its generator is loaded with the shutdown loads. After energization of these loads, the steady state voltage and frequency shall be maintained at  $4160 \pm 420$  volts and  $60 \pm 1.2$  Hz.   
0.5 M

\*\* This test shall be conducted in accordance with the manufacturer's recommendations regarding engine prelude and warmup procedures, and as applicable regarding loading recommendations.

\*\*\* This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band for special testing under direct monitoring of the manufacturer or momentary variations due to changing bus loads shall not invalidate the test.

ELECTRICAL POWER SYSTEMS  
SURVEILLANCE REQUIREMENTS

## 4.8.1.1.2 (Continued)

- (M) 4. Verifying that on an ESF actuation test signal (without loss of offsite power) the EDG starts\*\* on the auto-start signal and operates on standby for greater than or equal to 5 minutes. *With a steady state voltage of 4160 ± 420 Volts and a steady state frequency of 60 ± 0.5 Hz. achieves voltage greater than or equal to 3960 volts and frequency greater than or equal to 59.5 Hz within 10 seconds and*
- Simulating a loss of offsite power in conjunction with an ESF actuation test signal, and
- a) Verifying de-energization of the emergency busses and load shedding from the emergency busses.
  - b) Verifying the EDG starts\*\* on the auto-start signal, energizes the emergency busses with permanently connected loads within 10 seconds, energizes the auto-connected emergency (accident) loads through the sequencing timers and operates for greater than or equal to 5 minutes and maintains the steady state voltage and frequency at 4160 ± 420 volts and 60 ± 0.5 Hz.
  - c) Verifying that all EDG trips, except engine overspeed, generator differential and breaker overcurrent are automatically bypassed upon loss of voltage on the emergency bus and/or a safety injection actuation signal.
6. Verifying the EDG operates\*\* for at least 24 hours. During the first 2 hours of this test, the EDG shall be loaded to an indicated target value of 2950 kw (between 2900-3000 kw)\*\*\* and during the remaining 22 hours of this test, the EDG shall be loaded to an indicated 2500-2600 kw\*\*\*.
  7. Verifying that the auto-connected loads to each EDG do not exceed the 2000 hour rating of 3000 kw.
  8. Verifying the EDG's capability to:
    - a) Synchronize with the offsite power source while the EDG is loaded with its emergency loads upon a simulated restoration of offsite power,
    - b) Transfer its loads to the offsite power source, and
    - c) Proceed through its shutdown sequence.

\*\* This test shall be conducted in accordance with the manufacturer's recommendations regarding engine pre-lube and warmup procedures, and as applicable regarding loading recommendations.

\*\*\* This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band for special testing under direct monitoring of the manufacturer or momentary variations due to changing bus loads shall not invalidate the test.



ELECTRICAL POWER SYSTEMS  
SURVEILLANCE REQUIREMENTS

## 4.8.1.1.2 (Continued)

9. Verifying that the following EDG lockout features prevent EDG starting only when required:
- Remote Local Selection Switch
  - Emergency Stop Switch
10. Verifying the EDG's hot restart capability by:
- Operating the EDG\*\* loaded to an indicated 2500 to 2600 kw\*\*\* for 2 hours or until operating temperatures have stabilized, and
  - Within 5 minutes of shutdown verify the EDG can be started\*\* ~~accelerated to at least 900 rpm~~ in less than or equal to 10 seconds. The generator voltage and frequency shall be  $4160 \pm 420$  volts and  $60 \pm 1.2$  Hz ~~within 10 seconds after the start signal~~.
 

(L) of the start signal with voltage greater than or equal to 3960 volts and frequency greater than or equal to 59.5 Hz.

(M) 0.5
- e. At least once per 10 years or after any modifications which could affect EDG interdependence by starting\*\* ~~both~~ EDGs simultaneously, during shutdown, and verifying that both EDGs ~~accelerate to at least 900 rpm~~ in less than or equal to 10 seconds.
 

(L) of the start signal and achieve a voltage of greater than or equal to 3960 volts and a frequency of greater than or equal to 59.5 Hz.
- f. At least once per 24 months during any mode of operation, by subjecting each EDG to a preventive maintenance inspection in accordance with maintenance procedures appropriate for diesels used for this class of standby service.

4.8.1.1.3 Each emergency diesel generator 125-volt battery bank and charger shall be demonstrated OPERABLE:

- At least once per 7 days by verifying that:
  - The parameters in Table 4.8-3 meet Category A limits and
  - The total battery terminal voltage is  $\geq 129$  volts on a float charge.

\*\* This test shall be conducted in accordance with the manufacturer's recommendations regarding engine prelube and warmup procedures, and as applicable regarding loading recommendations.

\*\*\* This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band for special testing under direct monitoring of the manufacturer or momentary variations due to changing bus loads shall not invalidate the test.

**Attachment 2**

**Proposed Technical Specifications Changes**

2

**North Anna Power Station  
Units 1 and 2  
Virginia Electric and Power Company**

**Attachment 2**

**Unit 1**  
**North Anna Power Station**

## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS

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4.8.1.1.1 Each of the above required physically independent circuits between the offsite transmission network and the onsite Class 1E distribution system shall be:

- a. Determined OPERABLE at least once per 7 days by verifying correct breaker alignment indicating power availability.
- b. Demonstrated OPERABLE at least once per 18 months during shutdown by manually transferring the onsite Class 1E power supply from the normal circuit to the alternate circuit.

4.8.1.1.2 Each emergency diesel generator (EDG) shall be demonstrated OPERABLE:

- a. In accordance with the frequency specified in Table 4.8.2 on a STAGGERED TEST BASIS by:
  1. Verifying the fuel level in the day tank.
  2. Verifying the fuel level in the fuel storage tank.
  3. Verifying the fuel transfer pump can be started and transfers fuel from the storage system to the day tank.
  4. Verifying the EDG can start\*\* and gradually accelerate to a steady state voltage and frequency of  $4160 \pm 420$  volts and  $60 \pm 0.5$  Hz. Subsequently, verifying the generator is synchronized, gradually loaded\*\* to an indicated 2500-2600 kw\*\*\* and operates for at least 60 minutes.
  5. Verifying the EDG is aligned to provide standby power to the associated emergency busses.
- b. At least once per 92 days by verifying that a sample of diesel fuel from the fuel storage tank is within the acceptable limits specified in Table 1 of ASTM D975-74 when checked for viscosity, water and sediment.

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\*\* This test shall be conducted in accordance with the manufacturer's recommendations regarding engine prelube and warmup procedures, and as applicable regarding loading recommendations.

\*\*\* This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band for special testing under direct monitoring of the manufacturer or momentary variations due to changing bus loads shall not invalidate the test.

## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS

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#### 4.8.1.1.2 (Continued)

- c. At least once per 184 days, the EDG shall be started\*\* in less than or equal to 10 seconds after the start signal and achieve voltage greater than or equal to 3960 volts and frequency greater than or equal to 59.5 Hz. The generator steady state voltage and frequency shall be  $4160 \pm 420$  volts and  $60 \pm 0.5$  Hz. The EDG shall be manually synchronized to its appropriate emergency bus, gradually loaded\*\* to an indicated 2500 to 2600 kw\*\*\*, and operated for at least 60 minutes. The EDG shall be started for this test by using one of the following signals on a rotating test basis:
- a) Simulated loss of offsite power by itself.
  - b) Simulated loss of offsite power in conjunction with an ESF actuation test signal.
  - c) An ESF actuation test signal by itself.

This test, if it is performed so it coincides with the testing required by Surveillance Requirement 4.8.1.1.2.a.4, may also serve to concurrently meet those requirements as well.

- d. At least once per 18 months during shutdown by:
1. Verifying, on rejection of a load of greater than or equal to 610 kw, the frequency remains less than or equal to 66 Hz, and within 3 seconds, the voltage and frequency are  $4160 \pm 420$  volts and  $60 \pm 0.5$  Hz.
  2. Verifying that the load sequencing timers are OPERABLE with times within the tolerances shown in Table 4.8-1.

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\*\* This test shall be conducted in accordance with the manufacturer's recommendations regarding engine prelude and warmup procedures, and as applicable regarding loading recommendations.

\*\*\* This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band for special testing under direct monitoring of the manufacturer or momentary variations due to changing bus loads shall not invalidate the test.

## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS

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#### 4.8.1.1.2 (Continued)

3. Simulating a loss of offsite power by itself, and:
  - a. Verifying de-energization of the emergency busses and load shedding from the emergency busses.
  - b. Verifying the EDG starts\*\* on the auto-start signal, energizes the emergency busses with permanently connected loads within 10 seconds, energizes the auto-connected shutdown loads through the sequencing timers and operates for greater than or equal to 5 minutes while its generator is loaded with the shutdown loads. After energization of these loads, the steady state voltage and frequency shall be maintained at  $4160 \pm 420$  volts and  $60 \pm 0.5$  Hz.
4. Verifying that on an ESF actuation test signal (without loss of offsite power) the EDG starts\*\* on the auto-start signal and achieves voltage greater than or equal to 3960 volts and frequency greater than or equal to 59.5 Hz within 10 seconds and operates on standby for greater than or equal to 5 minutes with a steady state voltage of  $4160 \pm 420$  volts and a steady state frequency of  $60 \pm 0.5$  Hz.
5. Simulating a loss of offsite power in conjunction with an ESF actuation test signal, and
  - a. Verifying de-energization of the emergency busses and load shedding from the emergency busses.
  - b. Verifying the EDG starts\*\* on the auto-start signal, energizes the emergency busses with permanently connected loads within 10 seconds, energizes the auto-connected emergency (accident) loads through the sequencing timers and operates for greater than or equal to 5 minutes and maintains the steady state voltage and frequency at  $4160 \pm 420$  volts and  $60 \pm 0.5$  Hz.
  - c. Verifying that all EDG trips, except engine overspeed, generator differential and breaker overcurrent are automatically bypassed upon loss of voltage on the emergency bus and/or a safety injection actuation signal.
6. Verifying the EDG operates\*\* for at least 24 hours. During the first 2 hours of this test, the EDG shall be loaded to an indicated target value of 2950 kw (between 2900-3000 kw)\*\*\* and during the remaining 22 hours of this test, the EDG shall be loaded to an indicated 2500-2600 kw\*\*\*.

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\*\* This test shall be conducted in accordance with the manufacturer's recommendations regarding engine prelude and warmup procedures, and as applicable regarding loading recommendations.

\*\*\* This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band for special testing under direct monitoring of the manufacturer or momentary variations due to changing bus loads shall not invalidate the test.

## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS

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#### 4.8.1.1.2 (Continued)

7. Verifying that the auto-connected loads to each EDG do not exceed the 2000 hour rating of 3000 kw.
  8. Verifying the EDG's capability to:
    - a) Synchronize with the offsite power source while the EDG is loaded with its emergency loads upon a simulated restoration of offsite power,
    - b) Transfer its loads to the offsite power source, and
    - c) Proceed through its shutdown sequence.
  9. Verifying that the following EDG lockout features prevent EDG starting only when required:
    - a) Remote Local Selection Switch
    - b) Emergency Stop Switch
  10. Verifying the EDG's hot restart capability by:
    - a) Operating the EDG\*\* loaded to an indicated 2500 to 2600 kw\*\*\* for 2 hours or until operating temperatures have stabilized, and
    - b) Within 5 minutes of shutdown verify the EDG can be started\*\* in less than or equal to 10 seconds of the start signal with voltage greater than or equal to 3960 volts and frequency greater than or equal to 59.5 Hz. The generator steady state voltage and frequency shall be  $4160 \pm 420$  volts and  $60 \pm 0.5$  Hz.
- e. At least once per 10 years or after any modifications which could affect EDG interdependence by starting\*\* both EDGs simultaneously, during shutdown, and verifying that both EDGs start in less than or equal to 10 seconds of the start signal and achieve a voltage of greater than or equal to 3960 volts and a frequency of greater than or equal to 59.5 Hz.
- f. At least once per 24 months during any mode of operation, by subjecting each EDG to a preventive maintenance inspection in accordance with maintenance procedures appropriate for diesels used for this class of standby service.

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\*\* This test shall be conducted in accordance with the manufacturer's recommendations regarding engine prelube and warmup procedures, and as applicable regarding loading recommendations.

\*\*\* This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band for special testing under direct monitoring of the manufacturer or momentary variations due to changing bus loads shall not invalidate the test.

**Unit 2**  
**North Anna Power Station**



## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS

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4.8.1.1.1 Each of the above required physically independent circuits between the offsite transmission network and the onsite Class 1E distribution system shall be:

- a. Determined OPERABLE at least once per 7 days by verifying correct breaker alignment indicating power availability.
- b. Demonstrated OPERABLE at least once per 18 months during shutdown by manually transferring the onsite Class 1E power supply from the normal circuit to the alternate circuit.

4.8.1.2 Each emergency diesel generator (EDG) shall be demonstrated OPERABLE:

- a. In accordance with the frequency specified in Table 4.8.2 on a STAGGERED TEST BASIS by:
  1. Verifying the fuel level in the day tank.
  2. Verifying the fuel level in the fuel storage tank.
  3. Verifying the fuel transfer pump can be started and transfers fuel from the storage system to the day tank.
  4. Verifying the EDG can start\*\* and gradually accelerate to a steady state voltage and frequency of  $4160 \pm 420$  volts and  $60 \pm 0.5$  Hz. Subsequently, verifying the generator is synchronized, gradually loaded\*\* to an indicated 2500-2600 kw\*\*\* and operates for at least 60 minutes.
  5. Verifying the EDG is aligned to provide standby power to the associated emergency busses.
- b. At least once per 92 days by verifying that a sample of diesel fuel from the fuel storage tank obtained as a DRAIN sample in accordance with ASTM-D270-65, is within the acceptable limits specified in Table 1 of ASTM D975-74 when checked for viscosity, water and sediment.
- c. At least once per 184 days, the EDG shall be started\*\* in less than or equal to 10 seconds after the start signal and achieve voltage greater than or equal to 3960 volts and frequency greater than or equal to 59.5 Hz. The generator steady state voltage and frequency shall be  $4160 \pm 420$  volts and  $60 \pm 0.5$  Hz.

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\*\* This test shall be conducted in accordance with the manufacturer's recommendations regarding engine prelube and warmup procedures, and as applicable regarding loading recommendations.

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## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS

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#### 4.8.1.1.2 (Continued)

The EDG shall be manually synchronized to its appropriate emergency bus, gradually loaded\*\* to an indicated 2500 to 2600 kw\*\*\*, and operated for at least 60 minutes. The EDG shall be started for this test by using one of the following signals on a rotating test basis:

- a) Simulated loss of offsite power by itself.
- b) Simulated loss of offsite power in conjunction with an ESF actuation test signal.
- c) An ESF actuation test signal by itself.

This test, if it is performed so it coincides with the testing required by Surveillance Requirement 4.8.1.1.2.a.4, may also serve to concurrently meet those requirements as well.

- d. At least once per 18 months during shutdown by:
  1. Verifying, on rejection of a load of greater than or equal to 610 kw, the frequency remains less than or equal to 66 Hz, and within 3 seconds, the voltage and frequency are  $4160 \pm 420$  volts and  $60 \pm 0.5$  Hz.
  2. Verifying that the load sequencing timers are OPERABLE with times within the tolerances shown in Table 4.8-1.
  3. Simulating a loss of offsite power by itself, and:
    - a) Verifying de-energization of the emergency busses and load shedding from the emergency busses.
    - b) Verifying the EDG starts\*\* on the auto-start signal, energizes the emergency busses with permanently connected loads within 10 seconds, energizes the auto-connected shutdown loads through the sequencing timers and operates for greater than or equal to 5 minutes while its generator is loaded with the shutdown loads. After energization of these loads, the steady state voltage and frequency shall be maintained at  $4160 \pm 420$  volts and  $60 \pm 0.5$  Hz.

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\*\* This test shall be conducted in accordance with the manufacturer's recommendations regarding engine prelude and warmup procedures, and as applicable regarding loading recommendations.

\*\*\* This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band for special testing under direct monitoring of the manufacturer or momentary variations due to changing bus loads shall not invalidate the test.

## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS

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#### 4.8.1.1.2 (Continued)

4. Verifying that on an ESF actuation test signal (without loss of offsite power) the EDG starts\*\* on the auto-start signal and achieves voltage greater than or equal to 3960 volts and frequency greater than or equal to 59.5 Hz within 10 seconds and operates on standby for greater than or equal to 5 minutes with a steady state voltage of  $4160 \pm 420$  volts and a steady state frequency of  $60 \pm 0.5$  Hz.
5. Simulating a loss of offsite power in conjunction with an ESF actuation test signal, and
  - a) Verifying de-energization of the emergency busses and load shedding from the emergency busses.
  - b) Verifying the EDG starts\*\* on the auto-start signal, energizes the emergency busses with permanently connected loads within 10 seconds, energizes the auto-connected emergency (accident) loads through the sequencing timers and operates for greater than or equal to 5 minutes and maintains the steady state voltage and frequency at  $4160 \pm 420$  volts and  $60 \pm 0.5$  Hz.
  - c) Verifying that all EDG trips, except engine overspeed, generator differential and breaker overcurrent are automatically bypassed upon loss of voltage on the emergency bus and/or a safety injection actuation signal.
6. Verifying the EDG operates\*\* for at least 24 hours. During the first 2 hours of this test, the EDG shall be loaded to an indicated target value of 2950 kw (between 2900-3000 kw)\*\*\* and during the remaining 22 hours of this test, the EDG shall be loaded to an indicated 2500-2600 kw\*\*\*.
7. Verifying that the auto-connected loads to each EDG do not exceed the 2000 hour rating of 3000 kw.
8. Verifying the EDG's capability to:
  - a) Synchronize with the offsite power source while the EDG is loaded with its emergency loads upon a simulated restoration of offsite power,
  - b) Transfer its loads to the offsite power source, and
  - c) Proceed through its shutdown sequence.

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\*\* This test shall be conducted in accordance with the manufacturer's recommendations regarding engine pre-lube and warmup procedures, and as applicable regarding loading recommendations.

\*\*\* This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band for special testing under direct monitoring of the manufacturer or momentary variations due to changing bus loads shall not invalidate the test.

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4.8.1.1.2 (Continued)

9. Verifying that the following EDG lockout features prevent EDG starting only when required:
  - a) Remote Local Selection Switch
  - b) Emergency Stop Switch
10. Verifying the EDG's hot restart capability by:
  - a) Operating the EDG\*\* loaded to an indicated 2500 to 2600 kw\*\*\* for 2 hours or until operating temperatures have stabilized, and
  - b) Within 5 minutes of shutdown verify the EDG can be started\*\* in less than or equal to 10 seconds of the start signal with voltage greater than or equal to 3960 volts and frequency greater than or equal to 59.5 Hz. The generator steady state voltage and frequency shall be  $4160 \pm 420$  volts and  $60 \pm 0.5$  Hz.
- e. At least once per 10 years or after any modifications which could affect EDG interdependence by starting\*\* both EDGs simultaneously, during shutdown, and verifying that both EDGs start in less than or equal to 10 seconds of the start signal and achieve a voltage of greater than or equal to 3960 volts and a frequency of greater than or equal to 59.5 Hz.
- f. At least once per 24 months during any mode of operation, by subjecting each EDG to a preventive maintenance inspection in accordance with maintenance procedures appropriate for diesels used for this class of standby service.

4.8.1.1.3 Each emergency diesel generator 125-volt battery bank and charger shall be demonstrated OPERABLE:

- a. At least once per 7 days by verifying that:
  1. The parameters in Table 4.8-3 meet Category A limits and
  2. The total battery terminal voltage is  $\geq 129$  volts on a float charge.

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\*\* This test shall be conducted in accordance with the manufacturer's recommendations regarding engine prelude and warmup procedures, and as applicable regarding loading recommendations.

\*\*\* This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band for special testing under direct monitoring of the manufacturer or momentary variations due to changing bus loads shall not invalidate the test.