

## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS

4.8.1.1.1 Each of the above required 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 alignments and indicated power availability, and.
- b. Demonstrated OPERABLE at least once per 18 months during shutdown by transferring, manually and automatically, unit power supply from the normal circuit to the alternate circuit.

4.8.1.1.2 Each of the above required diesel generators shall be demonstrated OPERABLE:

- a. In accordance with the frequency specified in Table 4.8.1.1.2-1 on a STAGGERED TEST BASIS by:

1. Verifying the fuel level in the day fuel tank.
2. Verifying the fuel level in the fuel storage tank.
3. Verifying the fuel transfer pump starts and transfers fuel from the storage system to the day fuel tank.
4. Verifying the diesel starts from ambient condition and accelerates to at least 900 rpm (60 Hz) in less than or equal to 10 seconds\* for DG-1 and DG-2 and 13 seconds\* for DG-3. The generator voltage and frequency shall be 4160 ~~± 420~~ volts and  $60 \pm 3.0$  Hz within 10 seconds\* for DG-1 and DG-2 and 13 seconds\* for DG-3 after the start signal. The diesel generator shall be started for this test by using one of the following signals:
  - a) Manual.
  - b) Simulated loss-of-offsite power by itself.
  - c) Simulated loss-of-offsite power in conjunction with an ESF actuation test signal.
  - d) An ESF actuation test signal by itself.
5. Verifying the diesel generator is synchronized, loaded to greater than or equal to 4400 kW for DG-1 and DG-2 and 2600 kW for DG-3 in less than or equal to 60 seconds\*, and operates with these loads for at least 60 minutes.
6. Verifying the diesel generator is aligned to provide standby power to the associated emergency busses.
7. Verifying the pressure in all diesel generator air start receivers to be greater than or equal to 230 psig for DG-1 and DG-2 and 200 psig for DG-3.

- b. At least once per 31 days and after each operation of the diesel where the period of operation was greater than or equal to 1 hour by checking for and removing accumulated water from the day fuel tanks.

\*These diesel generator starts from ambient conditions shall be performed at least once per 184 days in these surveillance tests and all other engine starts for the purpose of this surveillance testing shall be preceded by an engine prelube period and/or other warmup procedures recommended by the manufacturer so that mechanical stress and wear on the diesel engine is minimized.

## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

#### 4. Simulating a loss-of-offsite power by itself, and:

##### a) For divisions 1 and 2:

- 1) Verifying deenergization of the emergency busses and load shedding from the emergency busses.
- 2) Verifying the diesel generator starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 10 seconds, energizes the autoconnected shutdown loads through the load sequencer and operates for greater than or equal to 5 minutes while its generator is loaded with the shutdown loads. After energization, the steady state voltage and frequency of the emergency busses shall be maintained at  $4160 \pm 420$  volts and  $60 \pm 3.0$  Hz during this test.

##### b) For division 3:

- 1) Verifying deenergization of the emergency bus.
- 2) Verifying the diesel generator starts on the auto-start signal, energizes the emergency bus with the permanently connected loads within 13 seconds and operates for greater than or equal to 5 minutes while its generator is loaded with the shutdown loads. After energization, the steady-state voltage and frequency of the emergency bus shall be maintained at  $4160 \pm 420$  volts and  $60 \pm 3.0$  Hz during this test.

#### 5. Verifying that on an ECCS actuation test signal, without loss-of-offsite power, the diesel generator starts on the auto-start signal and operates on standby for greater than or equal to 5 minutes. The generator voltage and frequency shall be $4160 \pm 420$ volts and $60 \pm 3.0$ Hz within 10 seconds after the auto-start signal; the steady-state generator voltage and frequency shall be maintained within these limits during this test.

for DG-1 and DG-2,  
and  $4160 \pm 420$  volts  
and  $60 \pm 3.0$  Hz for  
DG-3

#### 6. Simulating a loss-of-offsite power in conjunction with an ECCS actuation test signal, and:

##### a) For divisions 1 and 2:

- 1) Verifying deenergization of the emergency busses and loads shedding from the emergency busses.
- 2) Verifying the diesel generator starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 10 seconds, energizes the auto-connected loads through the load sequencer and operates



## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

for greater than or equal to 5 minutes while its generator is loaded with the emergency loads. After energization, the steady state voltage and frequency of the emergency busses shall be maintained at  $4160 \pm 420$  volts and  $60 \pm 3.0$  Hz during this test.

b) For division 3:

- 1) Verifying deenergization of the emergency bus.
- 2) Verifying the diesel generator starts on the auto-start signal, energizes the emergency bus with the permanently connected loads and the auto-connected emergency loads within 30 seconds and operates for greater than or equal to 5 minutes while its generator is loaded with the emergency loads. After energization, the steady state voltage and frequency of the emergency bus shall be maintained at  $4160 \pm 420$  volts and  $60 \pm 3.0$  Hz during this test.

7. Verifying that all automatic diesel generator trips are automatically bypassed upon loss of voltage on the emergency bus concurrent with an ECCS actuation signal except:

- a) For divisions 1 and 2, engine overspeed and generator differential current, incomplete starting sequence and emergency manual stop.
- b) For division 3, engine overspeed, generator differential current and emergency manual stop.

8. Verifying the diesel generator operates for at least 24 hours. During the first 2 hours of this test, the diesel generator shall be loaded to greater than or equal to 4650 kW for DG-1 and DG-2 and 2850 kW for DG-3. During the remaining 22 hours of this test, the diesel generator shall be loaded to 4400 kW for DG-1 and DG-2 and 2600 kW for DG-3. The generator voltage and frequency shall be  $4160 \pm 420$  volts and  $60 \pm 3.0$  Hz within 10 seconds for DG-1 and DG-2 and 13 seconds for DG-3 after the start signal; the steady-state generator voltage and frequency shall be maintained within these limits during this test.

$4160 \pm 420$  volts and  
 $60 \pm 3.0$  Hz within

$4160 \pm 420$  volts and  $60 \pm 3.0$  Hz  
Within 5 minutes after completing this 24-hour test, perform Surveillance Requirement 4.8.1.1.2.e.4.a)2) and b)2).\*

\*If Surveillance Requirements 4.8.1.1.2.e.4.a)2) and/or b)2) are not satisfactorily completed, it is not necessary to repeat the preceding 24-hour test. Instead, the diesel generator may be operated at 4400 kW for DG-1 or DG-2 or 2600 kW for DG-3 for 1 hour or until operating temperature has stabilized.

