

## ELECTRICAL POWER SYSTEMS

### A.C. SOURCES

#### OPERATING

#### SURVEILLANCE REQUIREMENTS

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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, indicated power availability, and
- b. Demonstrated OPERABLE at least once per 18 months by transferring (manually and automatically) unit power supply from the normal circuit to the alternate circuit.\*

4.8.1.1.2 Each diesel generator shall be demonstrated OPERABLE.\*\*

- a. At least once per 31 days 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 tank;
  - 4) Verifying the lubricating oil inventory in storage;
  - 5) Verifying the diesel starts from standby conditions and attains a steady-state generator voltage and frequency of  $4160 \pm 420$  volts and  $60 \pm 1.2$  Hz.\*\*\*

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\* This surveillance requirement shall not be performed in Mode 1 or 2.

\*\* All planned starts for the purpose of these surveillances may be preceded by an engine prelube period.

\*\*\* A modified start involving idling and gradual acceleration to synchronous speed may be used for this surveillance. When modified start procedures are not used, the time, voltage, and frequency tolerances of Specification 4.8.1.1.2e must be met.

## ELECTRICAL POWER SYSTEMS

### BASES

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#### 3/4.8.1 AC SOURCES (Continued)

##### **SURVEILLANCE REQUIREMENTS (SR) (continued)**

**SR 4.8.1.1.2a.3)** demonstrates that each required fuel oil transfer pump operates and transfers fuel oil from its associated storage tank to its associated day tank. This is required to support continuous operation of standby power sources. This Surveillance provides assurance that the fuel oil transfer pump is OPERABLE, the fuel oil piping system is intact, the fuel delivery piping is not obstructed, and the controls and control systems for automatic fuel transfer systems are OPERABLE. The 31-day frequency is appropriate since proper operation of fuel transfer systems is an inherent part of EDG OPERABILITY.

**SR 4.8.1.1.2a.4)** ensures that sufficient lube oil inventory is available to support at least 7 days of operation for each EDG. The 275 gal minimum requirement is based on the EDG manufacturer consumption values for the run time of the EDG. Implicit in this SR is the requirement to verify the capability to transfer the lube oil from its storage location to the EDG, when the EDG lube oil sump does not hold adequate inventory for 7 days of operation without the level reaching the manufacturer recommended minimum level. A 31-day frequency is adequate to ensure that a sufficient lube oil supply is onsite, since EDG starts and run time are closely monitored by the unit staff.

**SR 4.8.1.1.2a.5)** ensures that the EDG is capable of starting from standby conditions and attaining rated voltage and frequency. Footnote \*\*\* allows a modified start procedure to be used in lieu of the 10-12 seconds "fast start" for the EDG. In order to reduce stress and wear on diesel engines, the manufacturer recommends a modified start in which the starting speed of the EDG is limited, warmup is limited to this lower speed, and the EDG is gradually accelerated to synchronous speed prior to loading. Use of the modified start method requires the diesel governor system to be capable of engine idling and gradual acceleration to synchronous speed. When the modified start is not used footnote \*\*\* requires that the time, voltage, and frequency tolerances of SR 4.8.1.1.2e) (10 second start) be met. The 31-day frequency for SR 4.8.1.1.2a.5) is consistent with Regulatory Guide 1.9 (Ref. 3), though Seabrook Station is not committed to Regulatory Guide 1.9.

**SR 4.8.1.1.2a.6)** verifies that the EDG is capable of synchronizing with the offsite electrical system and accepting loads greater than or equal to the equivalent of the maximum expected accident loads. A minimum run time of 60 minutes is required to stabilize engine temperatures, while minimizing the time that the EDG is connected to the offsite source.

To minimize mechanical stress and wear on the diesel engine SR 4.8.1.1.2a.6) is modified by footnote \*\*\*\* that allows EDG loading per the manufacturers recommendations, including a warmup period. In addition, footnote \*\*\*\* states that momentary transients outside the load range, due to changing bus conditions do not invalidate the test. Footnote \*\*\*\* also stipulates a prerequisite requirement for performance of this SR whereby this SR must be preceded by and immediately follow a successful EDG start per SR 4.8.1.1.2a.5) or SR 4.8.1.1.2e) to credit satisfactory performance.

Note that although no power factor requirements are established by SR 4.8.1.1.2a.6), the EDG is normally operated at a power factor between 0.8 lagging and 1.0. The 0.8 value is the design rating of the machine, while the 1.0 is an operational limitation to ensure circulating currents are minimized. The load band is provided to avoid routine overloading of the EDG. Routine overloading may result in more frequent tear down inspections in accordance with vendor recommendations in order to maintain EDG OPERABILITY. Similarly, though not stated in footnote \*\*\*\*, momentary kvar transients above the limit do not invalidate the test.

The 31-day frequency for SR 4.8.1.1.2a.6) is consistent with Regulatory Guide 1.9 (Ref. 3).