

3/4.8 ELECTRICAL POWER SYSTEMS

3/4.8.1 A. C. SOURCES

OPERATING

LIMITING CONDITION FOR OPERATION

3.8.1.1 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

- a. Two physically independent circuits between the offsite transmission network and the Onsite Class 1E Distribution System, and
- b. Two separate and independent diesel generators, each with:
 - 1) A separate day tank ~~containing a minimum volume of 510 gallons of fuel with a minimum fuel oil free surface elevation of 86 inches from the bottom (outside diameter) of the tank,~~
 - 2) A separate fuel Oil Storage System containing a minimum volume of 85,300 gallons of fuel, and
 - 3) A separate fuel transfer pump.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

- a. With an offsite circuit of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining off-site A.C. source by performing Specification 4.8.1.1.1 within 1 hour and at least once per 8 hours thereafter. If either diesel generator of the above required A.C. electrical power sources has not been successfully tested within the past 24 hours, demonstrate OPERABILITY by performing Specification 4.8.1.1.2a.4* separately for that diesel generator within 24 hours. Restore at least two offsite circuits to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- b. With one diesel generator of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the offsite A.C. sources by performing Specification 4.8.1.1.1 within 1 hour and at least once per 8 hours thereafter. Demonstrate the OPERABILITY of the remaining OPERABLE diesel generator by performing Specification 4.8.1.1.2a.4 within 24 hours**; restore the inoperable diesel generator to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

*The automatic start and sequence loading of a diesel generator satisfies the testing requirements of Specification 4.8.1.1.2a.4 for this Action Statement.

**This test is required to be completed regardless of when the inoperable diesel generator is restored to OPERABLE status unless the diesel was declared inoperable to do preplanned preventative maintenance, testing, or maintenance to correct a condition which, if left uncorrected, would not affect the operability of the diesel generator.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

4.8.1.1.2 Each diesel generator shall be demonstrated OPERABLE:

- a. In accordance with the frequency specified in Table 4.8-1 on a STAGGERED TEST BASIS by:
 - 1) Verifying the ~~fuel level in the day tank~~ fuel oil transfer pump starts on low level in the day tank standpipe,
 - 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 diesel starts and accelerates to at least 514 rpm in less than or equal to 12 seconds.** The generator voltage and frequency shall be 4160 + 160 - 420 volts and 60 ± 1.2 Hz within 12 seconds** after the start signal. The diesel generator shall be started for this test by using one of the following signals:
 - a) Manual, or
 - b) Simulated loss-of-offsite power by itself, or
 - c) Safety Injection test signal.
 - 5) Verifying the generator is synchronized, gradually loaded to an indicated 6000 to 6201 kW*** for at least 60 minutes, and
 - 6) Verifying the diesel generator is aligned to provide standby power to the associated emergency busses.
- 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 tanks;
- c. At least once per 31 days by checking for and removing accumulated water from the fuel oil storage tanks;

**This test shall be preceded by an engine prelube period and/or other warmup procedures recommended by the manufacturer so that the mechanical stress and wear on the diesel engine is minimized.

***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 or momentary variations due to changing bus loads shall not invalidate this test.

ELECTRICAL POWER SYSTEMS

A.C. SOURCES

SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.8.1.2 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

- a. One circuit between the offsite transmission network and the Onsite Class 1E Distribution System, and
- b. One diesel generator with:
 - 1) A day tank ~~containing a minimum volume of 510 gallons of fuel~~ with a minimum fuel oil free surface elevation of 86 inches from the bottom (outside diameter) of the tank,
 - 2) A fuel storage system containing a minimum volume of 85,300 gallons of fuel, and
 - 3) A fuel transfer pump.

APPLICABILITY: MODES 5 and 6.

ACTION:

With less than the above minimum required A.C. electrical power sources OPERABLE, immediately suspend all operations involving CORE ALTERATIONS, positive reactivity changes, movement of irradiated fuel, or crane operation with loads over the spent fuel pool. In addition, when in MODE 5 with the reactor coolant loops not filled, or in MODE 6 with the water level less than 23 feet above the reactor vessel flange immediately initiate corrective action to restore the required sources to OPERABLE status as soon as possible.

SURVEILLANCE REQUIREMENTS

4.8.1.2 The above required A.C. electrical power sources shall be demonstrated OPERABLE by the performance of each of the requirements of Specifications 4.8.1.1.1, 4.8.1.1.2 (except for Specification 4.8.1.1.2a.5)), and 4.8.1.1.3.

BASES

3/4.8.1, 3/4.8.2, and 3/4.8.3 A.C. SOURCES, D.C. SOURCES AND ONSITE POWER DISTRIBUTION

The OPERABILITY of the A.C. and D.C power sources and associated distribution systems during operation ensures that sufficient power will be available to supply the safety-related equipment required for: (1) the safe shutdown of the facility, and (2) the mitigation and control of accident conditions within the facility. The minimum specified independent and redundant A.C. and D.C. power sources and distribution systems satisfy the requirements of General Design Criterion 17 of Appendix A to 10 CFR Part 50.

The ACTION requirements specified for the levels of degradation of the power sources provide restriction upon continued facility operation commensurate with the level of degradation. The OPERABILITY of the power sources are consistent with the initial condition assumptions of the safety analyses and are based upon maintaining at least one redundant set of onsite A.C. and D.C. power sources and associated distribution systems OPERABLE during accident conditions coincident with an assumed loss-of-offsite power and single failure of the other onsite A.C. source. The A.C. source and D.C. source allowable out-of-service times are based on Regulatory Guide 1.93, "Availability of Electrical Power Sources", December 1974. When one diesel generator is inoperable, there is an additional ACTION requirement to verify that all required systems, subsystems, trains, components and devices, that depend on the remaining OPERABLE diesel generator as a source of emergency power, are also OPERABLE, and that the steam-driven auxiliary feedwater pump is OPERABLE. This requirement is intended to provide assurance that a loss-of-offsite power event will not result in a complete loss of safety function of critical systems during the period one of the diesel generators is inoperable. The term verify as used in this context means to administratively check by examining logs or other information to determine if certain components are out-of-service for maintenance or other reasons. It does not mean to perform the Surveillance Requirements needed to demonstrate the OPERABILITY of the component.

The OPERABILITY of the minimum specified A.C. and D.C. power sources and associated distribution systems during shutdown and refueling ensures that: (1) the facility can be maintained in the shutdown or refueling condition for extended time periods, and (2) sufficient instrumentation and control capability are available for monitoring and maintaining the unit status. When determining compliance with action statement requirements, addition to the RCS of boric acid with a concentration greater than or equal to the minimum required RWST concentration shall not be considered to be a positive reactivity change.

The Surveillance Requirements for demonstrating the OPERABILITY of the diesel generators are in accordance with the recommendations of Regulatory Guides 1.9, "Selection of Diesel Generator Set Capacity for Standby Power Supplies," Revision 1, November 1978, 1.108, "Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants," Revision 1, August 1977 as modified by Amendment No. 8 issued on May 29, 1987, and 1.137, "Fuel-Oil Systems for Standby Diesel Generators," Revision 1, October 1979.

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The design of the diesel generator fuel oil system is unique in that the day tanks include a standpipe mounted on the top of each tank. The day tanks are sized to supply a minimum of one hour's worth of fuel for the diesel generators while running at their continuous rating plus a 10 percent margin (per ANSI N195-1976, "Fuel Oil Systems for Standby Diesel-Generators"). However, early in the design phase it was discovered that the diesel generators injection headers were located at an elevation above that of the day tanks. This would have caused the headers to drain back to the day tank, instead of remaining full, while in the standby mode. The diesel generators are required to start and load within 12 seconds of receiving the start signal. The diesel generators can be depended upon to meet this operability requirement as long as the supply piping to the injector pumps remains full at all times. Maintaining the day tank fuel oil level above the highest component in the engine fuel oil system will result in a positive pressure being applied throughout the system. This will assure the entire fuel oil system will be maintained full at all times. Thus, the standpipes were added to the day tanks, allowing the day tank level to be raised above the elevation of the injection headers. Since this required level of fuel oil is elevation-dependent, instead of volume-dependent, LCOs 3.8.1.1b.1) and 3.8.1.2b.1) reflect the required elevation of fuel oil (i.e., oil level) from the bottom of the tank, instead of specifying a volume amount (i.e., gallons) of fuel oil. Performing Surveillance Requirement 4.8.1.1.2a.1) causes the transfer pump to start on low tank level and refill the day tank to the pump shutoff setpoint. Pump start and stop setpoints are set to ensure the oil level remains in the standpipe, thus verifying that the oil level has been maintained above the minimum required oil level since the last surveillance of diesel generator run.