

3/4.8 ELECTRICAL POWER SYSTEMS

3/4.8.1 A.C. SOURCES

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. Four separate and independent diesel generators, each with:
 1. A separate fuel oil day tank containing a minimum of 360 gallons of fuel,
 2. A separate fuel storage system consisting of two storage tanks containing a minimum of 44,800 gallons of fuel, and
 3. A separate fuel transfer pump for each storage tank.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, and 3.

ACTION:

- a. With one offsite circuit of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter. Restore the inoperable offsite circuit to OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- b. With one diesel generator of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the above required A.C. offsite sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter. If the diesel generator became inoperable due to any cause other than an inoperable support system, an independently testable component, or preplanned preventive maintenance or testing, demonstrate the OPERABILITY of the remaining diesel generators by performing Surveillance Requirement 4.8.1.1.2.a.4 and 4.8.1.1.2.a.5 separately for each diesel generator within 16 hours* unless the absence of any potential common mode failure for the remaining diesel generators is demonstrated. Restore the inoperable diesel generator to OPERABLE status within 72 hours for diesel generators A or B, or within 14 days for diesel generators C or D, or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

~~c. With one offsite circuit of the above required A.C. sources and one diesel generator of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and~~

* This test is required to be completed regardless of when the inoperable diesel generator is restored to OPERABILITY.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

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 325 psig.
 8. Verifying the lube oil pressure, temperature and differential pressure across the lube oil filters to be within manufacturer's specifications.
- b. At least once per 31 days by visually examining a sample of lube oil from the diesel engine to verify absence of water.
 - c. 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 fuel oil day tank.
 - d. At least once per 92 days by removing accumulated water from the fuel oil storage tanks.
 - e. At least once per 31 days by performing a functional test on the emergency load sequencer to verify operability.
 - f. In accordance with the surveillance interval specified in the Diesel Fuel Oil Testing Program and prior to the addition of new fuel oil to the storage tank, samples shall be taken to verify fuel oil quality. Sampling and testing of new and stored fuel oil shall be in accordance with the Diesel Fuel Oil Testing Program ~~to maintain fuel oil properties within established limits.~~

contained in Specification 6.8.4.e.

ADMINISTRATIVE CONTROLS

d. Explosive Gas Monitoring

This program provides controls for potentially explosive gas mixtures contained in the Main Condenser Offgas Treatment System. The program shall include the limit for hydrogen concentration in the Main Condenser Offgas Treatment System and a surveillance program to ensure the limit is maintained. This limit shall be appropriate to the system's design criteria (i.e., whether or not the system is designed to withstand a hydrogen explosion).

The provisions of Surveillance Requirements 4.0.2 and 4.0.3 are applicable to the Explosive Gas Monitoring Program surveillance frequencies.

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INSERT (New administrative requirement)

6.8.4.e Diesel Fuel Oil Testing Program

A diesel fuel oil testing program to implement required testing of both new fuel and stored fuel oil shall be established. The program shall include sampling and testing requirements, and acceptance criteria, all in accordance with applicable ASTM Standards. The purpose of the program is to establish the following:

- a. Acceptability of new fuel oil for use prior to addition to storage tanks by determining that the fuel oil has:
 1. an API gravity or absolute specific gravity within limits for ASTM 2D fuel oil,
 2. a flash point and kinematic viscosity within limits for ASTM 2D fuel oil, and
 3. bulk water and sediment within limits for ASTM 2D fuel oil;
- b. Other properties for new ASTM 2D fuel oil are within limits within 31 days following sampling and addition to storage tanks; and
- c. Total particulate concentration of the stored fuel oil is ≤ 10 mg/l when tested every 92 days in accordance with ASTM D-2276, modified as follows: The 0.8 micron membrane filters specified in ASTM D-2276 may be replaced with membrane filters up to 3.0 microns.

BASES

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3/4 8.1 3/4 8.2 and 3/4 8.3 A.C. SOURCES, D.C. SOURCES and ONSITE POWER

DISTRIBUTION SYSTEMS

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 Criteria 17 of Appendix "A" to 10 CFR 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 of the onsite A.C. and the corresponding 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. or D.C. source.

The A.C. and D.C. source allowable out-of-service times are based on Regulatory Guide 1.93, "Availability of Electrical Power Sources", December 1974 as modified by plant specific analysis and diesel generator manufacturer recommendations. When two diesel generators are 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 generators as a source of emergency power, are also 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 two or more of the diesel generators are 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 primary intent of the extended AOT is that the extended EDG AOT from 72 hours to 14 days may be needed to perform preplanned EDG maintenance such as tear-downs and modifications that would otherwise extend beyond the original 72 hour AOT.

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 is available for monitoring and maintaining the unit status.

The surveillance requirements for demonstrating the OPERABILITY of the diesel generators are in accordance with the recommendations of Regulatory Guide 1.9, "Selection of Diesel Generator Set Capacity for Standby Power Supplies", March 10, 1971, Regulatory Guide 1.108, "Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants", Revision 1, August 1977 and Regulatory Guide 1.137 "Fuel-Oil Systems for Standby Diesel Generators", Revision 1, October 1979 as modified by plant specific analysis, diesel generator manufacturer's recommendations, and Amendment 59, to the Facility Operating License, issued November 22, 1993.

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For proper operation of the standby EDGs, it is necessary to ensure the proper quality of the fuel oil. USNRC Regulatory Guide 1.137 addresses the recommended fuel oil practices as supplemented by ANSI N195-1976. The fuel oil properties governed by these surveillance requirements are the water and sediment content, the kinematic viscosity, specific gravity (or API gravity) and impurity level.

The initial conditions of Design Basis Accident (DBA) and transient analyses in the UFSAR, Chapter 6 and Chapter 15, assume Engineered Safety Feature (ESF) systems are operable. The EDGs are designed to provide sufficient capacity, capability, redundancy and reliability to ensure the availability of necessary power to ESF systems so that fuel, reactor coolant system and containment design limits are not exceeded.

Stored diesel fuel oil is required to have sufficient supply for 7 days of full load operation. It is also required to meet specific standards for quality. Additionally, sufficient lube oil supply must be available to ensure the capability to operate at full load for 7 days. This requirement, in conjunction with an ability to obtain replacement supplies within 7 days, supports the availability of EDGs required to shut down the reactor and to maintain it in a safe condition for an anticipated operational occurrence (AOO) or a postulated DBA with loss of offsite power. EDG day tank fuel oil requirements, as well as transfer capability from the storage tanks to the day tank, are addressed in LCO 3.8.1, "AC Sources - Operating", and LCO 3.8.2, "AC Sources - Shutdown."

The AC sources (LCO 3.8.1 and LCO 3.8.2) are required to ensure the availability of the required power to shut down the reactor and maintain it in a safe shutdown condition after an AOO or a postulated DBA. Because stored diesel fuel oil supports LCO 3.8.1 and LCO 3.8.2, the stored diesel fuel oil is required to be within limits when the associated EDG is required to be operable.

For Specification 6.8.4.e, the tests listed are a means of determining whether new fuel oil is of the appropriate grade and has not been contaminated with substances that would have an immediate detrimental impact on diesel engine combustion. If results from these tests are within acceptable limits, the fuel oil may be added to the storage tanks without concern for contaminating the entire volume of fuel oil in the storage tanks. These tests are to be conducted prior to adding the new fuel to the storage tanks. The tests, limits and applicable ASTM standards are as follows:

- a. Sample the new fuel oil in accordance with ASTM D4057-81;

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- b. Verify in accordance with the tests specified in ASTM D975, that the sample has an absolute specific gravity at 60/60°F of ≥ 0.83 and ≤ 0.89 or an API gravity at 60°F of $\geq 27^\circ$ and $\leq 39^\circ$, a kinematic viscosity of 40°C of ≥ 1.9 centistokes and ≤ 4.1 centistokes, and a flash point of $\geq 125^\circ\text{F}$; and
- c. Verify that the new fuel oil bulk water and sediment are within limits for ASTM 2D fuel oil.

Failure to meet any of the above limits is cause for rejecting the new fuel oil, but does not represent a failure to meet the LCO concern since the fuel oil is not added to the storage tanks.

Within 31 days following the initial new fuel oil sample, the fuel oil is analyzed to establish that the other properties specified in Table 1 of ASTM D975-94 are met for the new fuel oil when tested in accordance with ASTM D975-94, except that the analysis for sulfur may be performed in accordance with ASTM D1552-64. The 31 day period is acceptable because the fuel oil properties of interest, even if they were not within stated limits, would not have an immediate effect on EDG operation. This surveillance ensures the availability of high quality fuel oil for the EDGs.

Fuel oil degradation during long term storage shows up as an increase in particulate, mostly due to oxidation. The presence of particulate does not mean that the fuel oil will not burn properly in a diesel engine. However, the particulate can cause fouling of filters and fuel oil injection equipment, which can cause engine failure.

Particulate concentration should be determined in accordance with ASTM D2276-94, Method A. This method involves a gravimetric determination of total particulate concentration in the fuel oil and has a limit of 10 mg/l. The 0.8 micron filters specified in ASTM D2276-94 may be replaced with membrane filters up to 3.0 microns. This is acceptable since the closest tolerance fuel filter in the HC EDGs is a five micron particle retention duplex filter on the engine driven fuel oil pump. It is acceptable to obtain a field sample for subsequent laboratory testing in lieu of field testing. The total volume of stored fuel oil contained in two or more interconnected tanks must be considered and tested separately. The frequency of this test takes into consideration fuel oil degradation trends that indicate that particulate concentration is unlikely to change significantly between frequency intervals.