

ELECTRICAL POWER SYSTEMS

LIMITING CONDITION FOR OPERATION

ACTION (Continued)

2. When in MODE 1, 2, or 3 with a steam pressure greater than 900 psig, the steam-driven auxiliary feedwater pump is OPERABLE.

If these conditions are not satisfied within 2 hours be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

- d. With two of the above required offsite A.C. circuits inoperable, demonstrate the OPERABILITY of two diesel generators by performing Specification 4.8.1.1.2a.4) within 1 hour and at least once per 8 hours thereafter, unless the diesel generators are already operating; restore at least one of the inoperable offsite sources to OPERABLE status within 24 hours or be in at least HOT STANDBY within the next 6 hours. With only one offsite source restored, restore at least two offsite circuits to OPERABLE status within 72 hours from time of initial loss or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- e. With two of the above required diesel generators inoperable, demonstrate the OPERABILITY of two offsite A.C. circuits by performing Specification 4.8.1.1.1a. within 1 hour and at least once per 8 hours thereafter; restore at least one of the inoperable diesel generators to OPERABLE status within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. Restore at least two diesel generators to OPERABLE status within 72 hours from time of initial loss or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

f. With a diesel generator operating at greater than 5750 kW, within 1 hour reduce the diesel generator output to less than or equal to 5750 kW.

SURVEILLANCE REQUIREMENTS

4.8.1.1.1 Each of the above required independent circuits between the offsite transmission network and the Onsite Essential Auxiliary Power 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 during shutdown 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. 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,

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SURVEILLANCE REQUIREMENTS (Continued)

- 2) Verifying the fuel level in the fuel storage tank,
- 3) Verifying the fuel transfer valve can be operated to allow fuel to be transferred from the storage system to the day tank,
- 4) Verifying the diesel starts from ambient condition and accelerates to at least 441 rpm in less than or equal to 11 seconds. The generator voltage and frequency shall be 4160 ± 420 volts and 60 ± 1.2 Hz within 11 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) Simulated loss of offsite power in conjunction with an ESF Actuation test signal, or
 - d) An ESF Actuation test signal by itself.
- 5) Verifying the generator is synchronized, loaded to greater than or equal to ~~75%~~ in less than or equal to 60 seconds, and operates 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 tank;
 - c. At least once per 31 days by checking for and removing accumulated water from the fuel oil storage tanks;
 - d. By verifying that the Cathodic Protection System is OPERABLE by verifying:
 - 1) At least once per 60 days that cathodic protection rectifiers are OPERABLE and have been inspected in accordance with the manufacturer's inspection procedures, and
 - 2) At least once per 12 months that adequate protection from corrosion is provided in accordance with manufacturer's inspection procedures.
 - e. By sampling new fuel oil in accordance with ASTM-D4057 prior to addition to storage tanks and:

5600 kW but less than or equal to 5750 kW

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SURVEILLANCE REQUIREMENTS (Continued)

- 1) By verifying in accordance with the tests specified in ASTM-D975-81 prior to addition to the storage tanks that the sample has:
 - a) An API Gravity of within 0.3 degrees at 60°F, or a specific gravity of within 0.0016 at 60/60°F, when compared to the supplier's certificate, or an absolute specific gravity at 60/60°F of greater than or equal to 0.83 but less than or equal to 0.89, or an API gravity of greater than or equal to 27 degrees but less than or equal to 39 degrees;
 - b) A kinematic viscosity at 40°C of greater than or equal to 1.9 centistokes, but less than or equal to 4.1 centistokes (alternatively, Saybolt viscosity, SUS at 100°F of greater than or equal to 32.6, but less than or equal to 40.1), if gravity was not determined by comparison with the supplier's certification;
 - c) A flash point equal to or greater than 125°F; and
 - d) A clear and bright appearance with proper color when tested in accordance with ASTM-D4176-82.
- 2) By verifying within 30 days of obtaining the sample that the other properties specified in Table 1 of ASTM-D975-81 are met when tested in accordance with ASTM-D975-81 except that the analysis for sulfur may be performed in accordance with ASTM-D1552-79 or ASTM-D2622-82.
- f. At least once every 31 days by obtaining a sample of fuel oil in accordance with ASTM-D2276-78, and verifying that total particulate contamination is less than 10 mg/liter when checked in accordance with ASTM-D2276-78, Method A;
- g. At least once per 18 months, during shutdown, by:
 - 1) Subjecting the diesel to an inspection in accordance with procedures prepared in conjunction with its manufacturer's recommendations for this class of standby service;
 - 2) Verifying the generator capability to reject a load of greater than or equal to 825 kW while maintaining voltage at 4160 ± 420 volts and frequency at 60 ± 1.2 Hz;
 - 3) Verifying the generator capability to reject a load of ~~7000 kW~~ without tripping. The generator speed shall not exceed 500 rpm during and following the load rejection;
 - 4) Simulating a loss-of-offsite power by itself, and:
 - a) Verifying deenergization of the emergency busses and load shedding from the emergency busses, and

greater than or equal
to 5600 kW but less
than or equal to
5750 kW

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SURVEILLANCE REQUIREMENTS (Continued)

- b) Verifying the diesel starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 11 seconds, energizes the auto-connected emergency (accident) loads through the load sequencer 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 busses shall be maintained at 4160 ± 420 volts and 60 ± 1.2 Hz during this test.
- 5) Verifying that on an ESF 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 at 4160 ± 420 volts and 60 ± 1.2 Hz within 11 seconds after the auto-start signal; the steady-state generator voltage and frequency shall be maintained within these limits during this test;
- 6) Simulating a loss-of-offsite power in conjunction with an ESF Actuation test signal, and
- a) Verifying deenergization of the emergency busses and load shedding from the emergency busses;
- b) Verifying the diesel starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 11 seconds, energizes the auto-connected emergency (accident) loads through the load sequencer 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 busses shall be maintained at 4160 ± 420 volts and 60 ± 1.2 Hz during this test; and
- c) Verifying that all automatic diesel generator trips, except engine overspeed, low-low lube oil pressure, generator differential, and the 2 out of 3 voltage controlled overcurrent relay scheme, are automatically bypassed upon loss of voltage on the emergency bus concurrent with a Safety Injection Actuation signal.
- 7) 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 7700 kW and during the remaining 22 hours of this test, the diesel generator shall be loaded to greater than or equal to 7000 kW.~~ The diesel generator shall be loaded to greater than or equal to 7000 kW. The generator voltage and frequency shall be 4160 ± 420 volts and 60 ± 1.2 Hz within 11 seconds after the start signal; the steady-state generator voltage and frequency shall be maintained within these

5600 kW but less than or equal to 5750 kW.

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SURVEILLANCE REQUIREMENTS (Continued)

- limits during this test. Within 5 minutes after completing this 24-hour test, perform Specification 4.8.1.1.2g.6b);*
- 8) Verifying that the auto-connected loads to each diesel generator do not exceed ~~the 2-hour rating of 7700 kW;~~
5750 kW
 - 9) Verifying the diesel generator's capability to:
 - a) Synchronize with the offsite power source while the generator is loaded with its emergency loads upon a simulated restoration of offsite power,
 - b) Transfer its loads to the offsite power source, and
 - c) Be restored to its standby status.
 - 10) Verifying that with the diesel generator operating in a test mode, connected to its bus, a simulated Safety Injection signal overrides the test mode by: (1) returning the diesel generator to standby operation, and (2) automatically energizing the emergency loads with offsite power;
 - 11) Verifying that the fuel transfer valve transfers fuel from each fuel storage tank to the day tank of each diesel via the installed cross-connection lines;
 - 12) Verifying that the automatic load sequence timer is OPERABLE with the interval between each load block within the tolerances given in Table 4.8-2;
 - 13) Verifying that the voltage and diesel speed tolerances for the accelerated sequencer permissives are $92.5 \pm 1\%$ and $98 \pm 1\%$, respectively, with a minimum time delay of 2 ± 0.2 s; and
 - 14) Verifying that the following diesel generator lockout features prevent diesel generator starting only when required:
 - a) Turning gear engaged, or
 - b) Maintenance mode.

*If Specification 4.8.1.1.2g.6b) is not satisfactorily completed, it is not necessary to repeat the preceding 24-hour test. Instead, the diesel generator may be operated at ~~7000 kW~~ for 1 hour or until operating temperature has stabilized.

greater than or equal to 5600 kW but less than or equal to 5750 kW

3/4.8 ELECTRICAL POWER SYSTEMS

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. 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 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 Guides 1.9, "Selection of Diesel Generator Set Capacity for Standby Power Supplies," March 10, 1971, 1.108, "Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants," Revision 1, August 1977, ~~and~~ 1.137, "Fuel-Oil Systems for Standby Diesel Generators," Revision 1, October 1979. If any other metallic structures (building, new or modified piping systems, conduits) are placed in the ground near the Fuel Oil Storage System or if the original system is modified, the adequacy and frequency of inspections for the Cathodic Protection System shall be re-evaluated and adjusted in accordance with the manufacturer's recommendations.

CATAWBA - UNIT 1

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and the NRC Staff Safety Evaluation Report concerning the Reliability of Diesel Generators at Catawba, August 14, 1984.

JUSTIFICATION AND ANALYSIS OF SIGNIFICANT HAZARDS CONSIDERATIONS

This proposed amendment would reduce the required loading, during testing, for Catawba emergency diesel generators. It is proposed that the present 7000 KW and 7700 KW loading requirements in the Technical Specifications be revised to greater than or equal to 5600 KW but less than or equal to 5750 KW to the diesel generators during the required surveillance testing. This change also would limit the auto-connected loads on the diesel generators.

The NRC has expressed a concern regarding the reliability of the TDI diesels at Catawba and requested in the Staff's Safety Evaluation Report, dated August 14, 1984 that Duke propose changes to the Technical Specifications. It was requested that the changes specify that the monthly and the 18 month surveillance testing be conducted at an engine load corresponding to 185 psig Brake Mean Effective Pressure (BMEP). The Staff has determined that a generator load of approximately 5750 KW corresponds to 185 psig BMEP.

In complying with the NRC request, Duke has determined that the test values for the diesel generator loading should be specified as at least 5600 KW, but not to exceed 5750 KW.

The lower value of 5600 KW is 80% of the continuous rating of the diesels and is greater than the auto-connected loads required for the loss of offsite power and post-LOCA conditions. The loss of offsite power loads and LOCA loads required to shutdown the plant and maintain it in a safe condition which were given to the Staff in previous meetings (i.e. 5714 KW) contained a significant conservatism. The loadings in the FSAR table are conservative in many cases in that actual brake horsepower requirements are not reflected. In addition, efficiency values of 0.9 were assumed, whereas they are considerably above that in many cases, especially for the 4KV motors. These loads have been reevaluated and it has been determined that 5600 KW is more than adequate to meet the power requirement needs in the case of a station blackout or a LOCA. In addition, during the diesel generator functional test the actual blackout loads encountered were well below 5600 KW. There exists sufficient capacity and capability in the onsite power supplies to assure that (1) the fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded and (2) the core is cooled and containment integrity and other vital functions are maintained in the event of postulated accidents as required by GDC-17. The upper limit of 5750 KW will ensure that the NRC requested value is not exceeded during testing. These limits (5600 and 5750 KW) establish a reasonable, achievable test band that will permit verification of operability while ensuring that the requested load limit is not exceeded.

Requiring verification that the auto-connected loads do not exceed the reduced value will ensure that the sequential loading of the diesels during emergency operations will not exceed 5750 KW.

Testing at this reduced load would still demonstrate that the diesel generators are capable of providing the required electrical power necessary to supply the loads required for a loss of offsite power of LOCA event.

The proposed change limits the load at which the diesel generators are tested at during the surveillance testing. This limit has been established per NRC request.

This change is considered to be temporary pending completion, to the NRC Staff's satisfaction of the requirements outlined in the SER. Upon completion and Staff review and acceptance of the appropriate SER conditions, Duke will seek to reinstate the 7000 KW rating of the emergency diesel generators at Catawba.

This change in the diesel generator loading during testing does not increase the probability of different accidents or equipment malfunctions from those currently evaluated in the FSAR. This change does not reduce the margin of safety as the design continuous load rating of the diesel generators has not been affected. Thus no significant hazards considerations are associated with this change.

It is the Duke position that such limits are not required; however, these limits will decrease the working stresses and wear in the diesel engine components.