

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 day fuel tank containing a minimum volume of 325 gallons of fuel,
 2. A separate fuel storage system containing a minimum volume of 47,000 gallons of fuel, and
 3. A separate fuel transfer pump.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

- a. With either an offsite circuit or diesel generator of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirements 4.8.1.1.1.a and 4.8.1.1.2.a.4 within one hour and at least once per 8 hours thereafter; restore at least two offsite circuits and two diesel generators 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 offsite circuit 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 Requirements 4.8.1.1.1.a and 4.8.1.1.2.a.4 within one hour and at least once per 8 hours thereafter; restore at least one of the inoperable sources to OPERABLE status within 12 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 offsite circuits and two diesel generators to OPERABLE status within 72 hours from the 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.
- c. With one diesel generator inoperable in addition to ACTION a or b above, verify that:
 1. 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

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ACTION (Continued)

2. When in MODE 1, 2, or 3, the steam-driven auxiliary feed 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 Surveillance Requirement 4.8.1.1.2.a.4 within one 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 14 hours or be in at least HOT STANDBY within the next 6 hours. With only one offsite source following 30 hours.
- e. With two of the above required diesel generators inoperable, demonstrate the OPERABLE of two offsite A.C. circuits by performing Surveillance Requirement 4.8.1.1.1.a within one 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.

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.

If tie breakers 3A0416 or 3A0603 are used to provide the second source of power, the following busses are required.

for 3A0416
3A04
3B04
3D1

for 3A0603
3A06
3B06
3D2

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SURVEILLANCE REQUIREMENTS (Continued)

- 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 fuel tank,
 - 2. Verifying the fuel level in the fuel storage tank,
 - 3. Verifying the fuel transfer pump can be started and transfers fuel from the storage system to the day tank,
 - 4. Verifying the diesel starts from ambient condition and accelerates to at least 900 rpm in less than or equal to 10 seconds. The generator voltage and frequency shall be 4360 ± 436 volts and 60 ± 1.2 Hz within 10 seconds after the start signal. The diesel generator shall be started for this test by using the manual start signal.
 - 5. Verifying the generator is synchronized, loaded to greater than or equal to 4700 kw in less than or equal to 77 seconds, and operates with a load greater than or equal to 4700 kw for at least an additional 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 92 days and from new fuel oil prior to addition to the storage tanks by verifying that a sample obtained in accordance with ASTM-D270-1975 has a water and sediment content of less than or equal to .05 volume percent and a kinematic viscosity @40°C of greater than or equal to 1.9 but less than or equal to 4.1 when tested in accordance with ASTM-D975-77, and an impurity level of less than 2 mg of insolubles per 100 ml. when tested in accordance with ASTM-D2274-70.
- d. 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 655.7 kw while maintaining voltage at 4360 ± 436 volts and frequency at 60 ± 6.0 Hz.

SURVEILLANCE REQUIREMENTS (Continued)

3. Verifying the generator capability to reject a load of 4700 kW without tripping. The generator voltage shall not exceed 5450 volts during and following the load rejection.
4. Simulating a loss of offsite power by itself, and:
 - a) Verifying de-energization 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 10 seconds and operates for greater than or equal to 5 minutes while its generator is loaded with the permanently connected loads. After energization, the steady state voltage and frequency of the emergency busses shall be maintained at 4360 ± 436 volts and 60 ± 1.2 Hz during this test.
5. Verifying that on an ESF 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 steady state generator voltage and frequency shall be 4360 ± 436 volts and 60 ± 1.2 Hz within 10 seconds after the auto-start signal; the generator voltage and frequency shall be maintained within these limits during this test.
6. Deleted.
7. Simulating a loss of offsite power in conjunction with an ESF test signal, and
 - a) Verifying de-energization 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 10 seconds, energizes the auto connected emergency (accident) loads through the load sequence and operates for greater than or equal to 5 minutes while its generator is loaded with the emergency loads. After loading, the steady state voltage and frequency of the emergency busses shall be maintained at 4360 ± 436 volts and $60 \pm 1.2/-0.3$ Hz during this test.

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SURVEILLANCE REQUIREMENTS (Continued)

- c) Verifying that all automatic diesel generator trips, except engine overspeed, generator differential and low-low lube oil pressure, are automatically bypassed.
- 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 5170 kw and during the remaining 22 hours of this test, the diesel generator shall be loaded to greater than or equal to 4700 kw. The generator voltage and frequency shall be 4360 ± 436 volts and 60 ± 1.2 Hz within 10 seconds after the start signal; the steady state generator voltage and frequency shall be maintained at 4360 ± 436 volts and $60 \pm 1.2/-0.3$ Hz for the first two hours of this test and 4360 ± 436 volts and 60 ± 1.2 Hz during the remaining 22 hours of this test. Within 5 minutes after completing this 24 hour test, perform Surveillance Requirement 4.8.1.1.2.d.4b.
- 9. Verifying that the auto-connected loads to each diesel generator do not exceed 4700 kw.
- 10. 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.
- 11. 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 energizes the emergency loads with offsite power.
- 12. Verifying that each fuel transfer pump transfers fuel from each fuel storage tank to the day tank of each diesel via the installed cross connection lines.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

13. Verifying that the automatic load sequence timer is OPERABLE with the interval between each load block within $\pm 10\%$ of its design interval.
 14. Verifying that lockout relay K23 prevents diesel generator starting when the diesel generator is actuated.
- e. At least once per 10 years or after any modifications which could affect diesel generator interdependence by starting the diesel generators simultaneously, during shutdown, and verifying that the diesel generators accelerate to at least 900 rpm in less than or equal to 10 seconds.
- f. At least once per 10 years by:
1. Draining each fuel oil storage tank, removing the accumulated sediment and cleaning the tank using a sodium hypochlorite solution or the equivalent, and
 2. Performing a pressure test of those portions of the diesel fuel oil system designed to Section III, subsection ND of the ASME Code at a test pressure equal to 110 percent of the system design pressure.
- 4.8.1.1.3 Reports - All diesel generator failures, valid or non-valid, shall be reported to the Commission pursuant to Specification 6.9.1. Reports of diesel generator failures shall include the information recommended in Regulatory Position C.3.b of Regulatory Guide 1.108, Revision 1, August 1977. If the number of failures in the last 100 valid tests (on a per nuclear unit basis) is greater than or equal to 7, the report shall be supplemented to include the additional information recommended in Regulatory Position C.3.b of Regulatory Guide 1.108, Revision 1, August 1977.

TABLE 4.8-1

DIESEL GENERATOR TEST SCHEDULE

Number of Failures In
Last 100 Valid Tests.*

Test Frequency

≤ 1	At least once per 31 days
2	At least once per 14 days
3	At least once per 7 days
≥ 4	At least once per 3 days

* Criteria for determining number of failures and number of valid tests shall be in accordance with Regulatory Position C.2.e of Regulatory Guide 1.108, Revision 1, August 1977, where the last 100 tests are determined on a per nuclear unit basis. For the purposes of this test schedule, only valid tests conducted after the Operating License issuance date shall be included in the computation of the "last 100 valid tests". Entry into this test schedule shall be made at the 31 day test frequency.

AC SOURCESSHUTDOWNLIMITING CONDITION FOR OPERATION

3.8.1.2 As a minimum, the following AC 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. Day fuel tanks containing a minimum volume of 325 gallons of fuel,
 2. A fuel storage system containing a minimum volume of 37,600 gallons of fuel, and
 3. A fuel transfer pump.

APPLICABILITY: MODES 5 and 6.

ACTION:

With less than the above minimum AC electrical power sources OPERABLE, immediately suspend all operations involving CORE ALTERATIONS or positive reactivity changes and movement of irradiated fuel, or operation of the fuel handling machine with loads over the fuel storage 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

4.8.1.2.1 The above required circuit between the offsite transmission network and the onsite Class 1E distribution system shall be determined OPERABLE at

AC SOURCESSHUTDOWNSURVEILLANCE REQUIREMENTS (continued)

least once per 7 days by verifying correct breaker alignment and indicated power availability.

- a. If the above required offsite source is supplied through the Unit 3 4160 volt Emergency Bus #3A04, the following buses are required:

480 volt Emergency Bus #3B04

125 volt Emergency Bus #3D1.

- b. If the above required offsite source is supplied through the Unit 3 4160 volt Emergency Bus #3A06, the following buses are required:

480 volt Emergency Bus #3B06

125 volt Emergency Bus #3D2

4.8.1.2.2 The above required diesel generator shall be demonstrated OPERABLE by performing the Surveillance Requirements of 4.8.1.1.2 (except 4.8.1.1.2 a.5, d.5, d.7, d.9, d.10, d.11 and d.13) and 4.8.1.1.3.

BASESAC SOURCES, DC SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS (continued)

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, and 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. Reg. Guide 1.137 recommends testing of fuel oil samples in accordance with ASTM-D270-1975. However, ASTM-D270-1965 was reverified in 1975 rather than re-issued. The reverified 1965 standard is therefore the appropriate standard to be used.

Additionally, Regulatory Guide 1.9 allows loading of the diesel generator to its 2000 hour rating in an accident situation. The full load, continuous operation rating for each diesel generator is 4700 kW, while the calculated accident loading in Modes 1 through 4 is 4000 kW. The largest anticipated load (including loads which are required to mitigate the consequences of a design basis accident or facilitate plant operation and maintenance) in Modes 5 and 6 is calculated to be less than 80% of the full rated capacity. No 2000 hour loading has been specified by the diesel generator manufacturer and, as a result the full loading rating of 4700 kW is conservatively established as the 2000 hour rating. Diesel frequency droop restrictions are established due to HPSI flow rate considerations.

The Surveillance Requirement for demonstrating the OPERABILITY of the Station batteries are based on the recommendations of Regulatory Guide 1.129, "Maintenance Testing and Replacement of Large Lead Storage Batteries for Nuclear Power Plants," February 1978, and IEEE Std. 450-1980, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Generating Stations and Substations."

Verifying average electrolyte temperature above the minimum for which the battery was sized, total battery thermal voltage onfloat charge, connection resistance values and the performance of battery service and discharge tests ensures the effectiveness of the charging system, the ability to handle high discharge rates and compares the battery capacity at that time with the rated capacity.

NPF-10-215
NPF-15-215

ATTACHMENT B

3/4.8 ELECTRICAL POWER SYSTEMS

3/4.8.1 A.C. SOURCES

OPERATING

LIMITING CONDITIONS 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 day fuel tank containing a minimum volume of 325 gallons of fuel, and
 2. A separate fuel storage system containing a minimum volume of 47,000 gallons of fuel, and
 3. A separate fuel transfer pump.

One of the diesel generators may be in Unit 3 providing that the following conditions are met:

- a. The two OPERABLE diesel generators are on different trains.
- b. Both tie breakers are OPERABLE for the train that has the OPERABLE diesel in Unit 3.
- c. The transfer enable circuit selected is OPERABLE and the transfer enable switch is selected to AUTO on the train with the INOPERABLE diesel generator.
- d. The Unit 3 A.C. power sources are OPERABLE. (This requires both diesel generators in Unit 3 to be operable in Modes 1 through 4, or a single diesel generator to be operable if Unit 3 is in Mode 5 or 6.)
- e. No more than one of the four Unit-to-Unit transfer enable switches may be in "AUTO."

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

- a. With either an offsite circuit or a diesel generator of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirements 4.8.1.1.1.a and 4.8.1.1.2.a.4 within one hour and at least once per 8 hours thereafter; restore at least two

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ACTION (Continued)

offsite circuits and two diesel generators 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 offsite circuit 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 Requirements 4.8.1.1.1.a and 4.8.1.1.2.a.4 within one hour and at least once per 8 hours thereafter; restore at least one of the inoperable sources to OPERABLE status within 12 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 offsite circuits and two diesel generators to OPERABLE status within 72 hours from the 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.
- c. With one diesel generator inoperable in addition to ACTION a or b above, verify that:
 - 1. 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
 - 2. When in MODE 1, 2, or 3, the steam-driven auxiliary feed 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 Surveillance Requirement 4.8.1.1.2.a.4 within one 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 the 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.

ELECTRICAL POWER SYSTEM

ACTION (Continued)

- e. With two of the above required diesel generators inoperable, demonstrate the OPERABILITY of two offsite A.C. circuits by performing Surveillance Requirement 4.8.1.1.1.a within one 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 the 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.

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 alignment and indicated power availability.

If tie breakers 3A0416 or 3A0603 are used to provide a source of power, the following buses are required:

for 3A0416
3A04
3D1

for 3A0603
3A06
3D2

- 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. 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 fuel tank,
 - 2. Verifying the fuel level in the fuel storage tank,
 - 3. Verifying the fuel transfer pump can be started and transfers fuel from the storage system to the day tank,

#Values in parentheses "()" specify acceptance criteria for unit transfer enable circuit to be demonstrated OPERABLE.

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SURVEILLANCE REQUIREMENTS (Continued)

4. Verifying the diesel starts from ambient condition and accelerates to at least 900 rpm in less than or equal to 10 seconds. The generator voltage and frequency shall be 4360 ± 436 volts and 60 ± 1.2 Hz within 10 seconds after the start signal. The diesel generator shall be started for this test by using the manual start signal.
 5. Verifying the generator is synchronized, loaded to greater than or equal to 4700 (5170) kW in less than or equal to 77 seconds, and operates with a load greater than or equal to 4700 (5170) kW for at least an additional 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 92 days and from new fuel prior to addition to the storage tanks by verifying that a sample obtained in accordance with ASTM-D270-1975 has a water and sediment content of less than or equal to .05 volume percent and a kinematic viscosity @ 40°C of greater than or equal to 1.9 but less than or equal to 4.1 when tested in accordance with ASTM-D975-77, and an impurity level of less than 2 mg of insolubles per 100 ml. when tested in accordance with ASTM-D2274-70.
- d. At least once per 18 months 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 655.7 (2600) kw while maintaining voltage at 4360 ± 436 volts and frequency at 60 ± 6.0 Hz in the speed control mode.
 3. Verifying the generator capability to reject a load of 4700 (5170) kw without tripping. The generator voltage shall not exceed 5450 volts during and following the load rejection.
 4. Simulating a loss of offsite power by itself, and
 - a) Verifying de-energization of the emergency busses and load shedding from the emergency busses.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- b) Verifying the diesel starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 10 seconds and operates for greater than or equal to 5 minutes while its generator is loaded with the permanently connected loads. After energization, the steady state voltage and frequency of the emergency busses shall be maintained at 4360 ± 436 volts and 60 ± 1.2 Hz during this test.
- 5. Verifying that on an ESF 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 steady state generator voltage and frequency shall be 4360 ± 436 volts and 60 ± 1.2 Hz within 10 seconds after the auto-start signal; the generator voltage and frequency shall be maintained within these limits during this test.
- 6. Verifying the following for the Unit-to-Unit transfer Enable Circuit:
 - a) On an ESF test signal in Unit 2, without loss of offsite power, the Unit 3 diesel generator starts.
 - b) With a simulated loss of offsite power in both units in conjunction with an ESF test signal from either unit, and the Unit 2 Transfer Enable Switch in Auto:
 - 1) Verifying de-energization of the emergency busses and load shedding from the emergency busses.
 - 2) Verifying the Unit 3 diesel starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 10 seconds, energizes the auto connected emergency/accident loads from one unit and the safe shutdown loads from one unit through the load sequence and operates for greater than or equal to 5 minutes while its generator is loaded with the combined load. After loading, the steady state voltage and frequency of the emergency busses shall be maintained at 4360 ± 436 volts and $60 \pm 1.2/-0.3$ Hz during this test.
 - 3) Verifying that with the diesel generator operating in the cross-connect mode, with an ESF test signal present from one unit, an ESF test signal from the second unit opens the Unit 2 tie breaker.
 - 4) Verifying that with an ESF test signal present from both units, the Unit 2 tie breaker override will allow reclosure of the tie breaker.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

7. Simulating a loss of offsite power in conjunction with an ESF test signal, and
 - a) Verifying de-energization 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 10 seconds, energizes the auto-connected emergency/accident loads through the load sequence and operates for greater than or equal to 5 minutes while its generator is loaded with the emergency loads. After loading, the steady state voltage and frequency of the emergency busses shall be maintained at 4360 ± 436 volts and $60 \pm 1.2/-0.3$ Hz during this test.
 - c) Verifying that all automatic diesel generator trips, except engine overspeed, generator differential and low-low lube oil pressure, are automatically bypassed.
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 5170 kw and during the remaining 22 hours of this test, the diesel generator shall be loaded to greater than or equal to 4700 Kw. The generator voltage and frequency shall be 4360 ± 436 volts and 60 ± 1.2 Hz within 10 seconds after the start signal; the steady state generator voltage and frequency shall be maintained at 4360 ± 436 Volts and $60 \pm 1.2/-0.3$ Hz for the first two hours of this test and 4360 ± 436 Volts and 60 ± 1.2 Hz during the remaining 22 hours of this test. Within 5 minutes after completing this 24-hour test, perform Surveillance Requirement 4.8.1.1.2.d.4b.
9. Verifying that the auto-connected loads to each diesel generator do not exceed 4700 (5170) kw.
10. 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.

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SURVEILLANCE REQUIREMENTS (Continued)

11. Verifying that with the diesel generator operating in a test mode, connected to its bus, a simulated safety injection signal (from either unit, with the Unit 3 Transfer Enable Switch in Auto), overrides the test mode by returning the diesel generator to standby operation and automatically energizes the emergency loads with offsite power.
 12. Verifying that each fuel transfer pump transfers fuel from each fuel storage tank to the day tank of each diesel via the installed cross connection lines.
 13. Verifying that the automatic load sequence timer is OPERABLE with the interval between each load block within $\pm 10\%$ of its design interval.
 14. Verifying that lockout relay K23 prevents diesel generator starting when the diesel generator is actuated.
- e. At least once per 10 years or after any modifications which could affect diesel generator interdependence by starting the diesel generators simultaneously, during shutdown, and verifying that the diesel generators accelerate to at least 900 rpm in less than or equal to 10 seconds.
- f. At least once per 10 years by:
1. Draining each fuel oil storage tank, removing the accumulated sediment and cleaning the tank using a sodium hypochlorite solution or the equivalent, and
 2. Performing a pressure test of those portions of the diesel fuel oil system designed to Section III, subsection ND of the ASME Code at a test pressure equal to 110 percent of the system design pressure.

4.8.1.1.3 Reports - All diesel generator failures, valid or non-valid, shall be reported to the Commission pursuant to Specification 6.9.1. Reports of diesel generator failures shall include the information recommended in Regulatory Position C.3.b of Regulatory Guide 1.108, Revision 1, August 1977. If the number of failures in the last 100 valid tests (on a per nuclear unit basis) is greater than or equal to 7, the report shall be supplemented to include the additional information recommended in Regulatory Position C.3.b of Regulatory Guide 1.108, Revision 1, August 1977.

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Table 4.8.1

DIESEL GENERATOR TEST SCHEDULE

<u>Number of Failures in Last 20 Valid Tests*</u>	<u>Test Frequency</u>
≤ 1	At least once per 31 days
2	At least once per 14 days
3	At least once per 7 days
≥ 4	At least once per 3 days

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- * Criteria for determining number of failures and number of valid tests shall be in accordance with Regulatory Position C.2.e of Regulatory Guide 1.108, Revision 1, August 1977, where the last 100 tests are determined on a per nuclear unit basis. For the purpose of this test schedule, only valid tests conducted after the Operating License issuance date shall be included in the computation of the "last 100 valid tests." Entry into this test schedule shall be made at the 31 day test frequency.

ELECTRICAL POWER SYSTEMS

AC SOURCES

SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.8.1.2 As a minimum, the following AC electrical power sources shall be OPERABLE:

- a. One circuit between the offsite transmission network and one Class 1E 4 kV Bus, and
- b. One diesel generator with:
 1. Day fuel tanks containing a minimum volume of 325 gallons of fuel,
 2. A fuel storage system containing a minimum volume of 37,600 (47,000)# gallons of fuel, and
 3. A separate fuel transfer pump.

APPLICABILITY: MODES 5 and 6.

ACTION:

With less than the above minimum AC electrical power sources OPERABLE, immediately suspend all operations involving CORE ALTERATIONS or positive reactivity changes and movement of irradiated fuel, or operation of the fuel handling machine with loads over the fuel storage 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

4.8.1.2.1 The above required circuit between the offsite transmission network and the Class 1E 4 kV Bus shall be determined OPERABLE at least once per 7 days by verifying correct breaker alignment and indicated power availability.

Value in paranthesis specify criteria for unit transfer enable circuit to be operable.

ELECTRICAL POWER SYSTEMS

AC SOURCES

SHUTDOWN

SURVEILLANCE REQUIREMENTS (continued)

If tie breakers 3A0416 or 3A0603 are used to provide a source of power, the following buses are required:

for 3A0416
3A04
3D1

for 3A0603
3A06
3D2

4.8.1.2.2 The above required diesel generator shall be demonstrated OPERABLE by performing the Surveillance Requirements of 4.8.1.1.2 (except 4.8.1.1.2 a.5, d.5, d.6, d.7, d.9, d.10, d.11 and d.13) and 4.8.1.1.3.

ELECTRICAL POWER SYSTEMS

BASES

AC SOURCES, DC SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS (continued)

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, and 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. Reg. Guide 1.137 recommends testing of fuel oil samples in accordance with ASTM-D270-1975. However, ASTM-D270-1965 was reverified in 1975 rather than re-issued. The reverified 1965 standard is therefore the appropriate standard to be used.

The Limiting Conditions for Operation permit continued unit operation if standby AC power is available from the two dedicated emergency diesel generators or from one dedicated diesel generator and from one shared diesel generator in Unit 3. The design of the diesel generator aligned for shared duty conforms with Regulatory Guide 1.81 (revision 1, January 1977) and is capable of automatically supplying power to the designed ESF loads in both units. An evaluation was performed using data from actual surveillance testing which determined that one diesel generator has the capacity to automatically supply AC power to one unit with loss of offsite power and the design basis accident concurrent with loss of offsite power on the other unit. Calculations in accordance with ANSI-N-195, confirm that 47,000 gallons of fuel oil is sufficient to supply a diesel in the shared mode.

The Surveillance Requirement for demonstrating the OPERABILITY of the Station batteries are based on the recommendations of Regulatory Guide 1.129, "Maintenance Testing and Replacement of Large Lead Storage Batteries for Nuclear Power Plants," February 1978, and IEEE Std. 450-1980, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Generating Stations and Substations."

Verifying average electrolyte temperature above the minimum for which the battery was sized, total battery thermal voltage onfloat charge, connection resistance values and the performance of battery service and discharge tests ensures the effectiveness of the charging system, the ability to handle high discharge rates and compares the battery capacity at that time with the rated capacity.

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ATTACHMENT C

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 day fuel tank containing a minimum volume of 325 gallons of fuel,
 2. A separate fuel storage system containing a minimum volume of 47,000 gallons of fuel, and
 3. A separate fuel transfer pump.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

- a. With either an offsite circuit or diesel generator of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirements 4.8.1.1.1.a and 4.8.1.1.2.a.4 within one hour and at least once per 8 hours thereafter; restore at least two offsite circuits and two diesel generators 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 offsite circuit 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 Requirements 4.8.1.1.1.a and 4.8.1.1.2.a.4 within one hour and at least once per 8 hours thereafter; restore at least one of the inoperable sources to OPERABLE status within 12 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 offsite circuits and two diesel generators to OPERABLE status within 72 hours from the 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.
- c. With one diesel generator inoperable in addition to ACTION a or b above, verify that:
 1. 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

ELECTRICAL POWER SYSTEMS

LIMITING CONDITION FOR OPERATION (Continued)

ACTION (Continued)

2. When in MODE 1, 2, or 3, the steam-driven auxiliary feed 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 Surveillance Requirement 4.8.1.1.2.a.4 within one 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 Surveillance Requirement 4.8.1.1.1.a within one 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.

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.

If tie breakers 2A0417 or 2A0619 are used to provide the second source of power, the following busses are required.

for 2A0417
2A04
2B04
2D1

for 2A0619
2A06
2B06
2D2

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ELECTRICAL POWER SYSTEM

SURVEILLANCE REQUIREMENTS (Continued)

- 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 fuel tank,
 - 2. Verifying the fuel level in the fuel storage tank,
 - 3. Verifying the fuel transfer pump can be started and transfers fuel from the storage system to the day tank,
 - 4. Verifying the diesel starts from ambient condition and accelerates to at least 900 rpm in less than or equal to 10 seconds. The generator voltage and frequency shall be 4360 ± 436 volts and 60 ± 1.2 Hz within 10 seconds after the start signal. The diesel generator shall be started for this test by using the manual start signal.
 - 5. Verifying the generator is synchronized, loaded to greater than or equal to 4700 kw in less than or equal to 77 seconds, and operates with a load greater than or equal to 4700 kw for at least an additional 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 92 days and from new fuel oil prior to addition to the storage tanks by verifying that a sample obtained in accordance with ASTM-D270-1975 has a water and sediment content of less than or equal to .05 volume percent and a kinematic viscosity @40°C of greater than or equal to 1.9 but less than or equal to 4.1 when tested in accordance with ASTM-D975-77, and an impurity level of less than 2 mg of insolubles per 100 ml. when tested in accordance with ASTM-D2274-70.
- d. 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 655.7 kw while maintaining voltage at 4360 ± 436 volts and frequency at 60 ± 6.0 Hz.

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ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

3. Verifying the generator capability to reject a load of 4700 kW without tripping. The generator voltage shall not exceed 5450 volts during and following the load rejection.
4. Simulating a loss of offsite power by itself, and:
 - a) Verifying de-energization 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 10 seconds and operates for greater than or equal to 5 minutes while its generator is loaded with the permanently connected loads. After energization, the steady-state voltage and frequency of the emergency busses shall be maintained at 4360 ± 436 volts and 60 ± 1.2 Hz during this test.
5. Verifying that on an ESF 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 steady-state generator voltage and frequency shall be 4360 ± 436 volts and 60 ± 1.2 Hz within 10 seconds after the auto-start signal; the generator voltage and frequency shall be maintained within these limits during this test.
6. Deleted.
7. Simulating a loss of offsite power in conjunction with an ESF test signal, and
 - a) Verifying de-energization 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 10 seconds, energizes the auto connected emergency (accident) loads through the load sequence and operates for greater than or equal to 5 minutes while its generator is loaded with the emergency loads. After loading, the steady state voltage and frequency of the emergency busses shall be maintained at 4360 ± 436 volts and $60 \pm 1.2/-0.3$ Hz during this test.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- c) Verifying that all automatic diesel generator trips, except engine overspeed, generator differential and low-low lube oil pressure, are automatically bypassed.
- 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 5170 kw and during the remaining 22 hours of this test, the diesel generator shall be loaded to greater than or equal to 4700 kw. The generator voltage and frequency shall be 4360 ± 436 volts and 60 ± 1.2 Hz within 10 seconds after the start signal; the steady state generator voltage and frequency shall be maintained at 4360 ± 436 volts and $60 + 1.2/-0.3$ Hz for the first two hours of this test and 4360 ± 436 volts and 60 ± 1.2 Hz during the remaining 22 hours of this test. Within 5 minutes after completing this 24 hour test, perform Surveillance Requirement 4.8.1.1.2.d.4b.
- 9. Verifying that the auto-connected loads to each diesel generator do not exceed 4700 kw.
- 10. 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.
- 11. 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 energizes the emergency loads with offsite power.
- 12. Verifying that each fuel transfer pump transfers fuel from each fuel storage tank to the day tank of each diesel via the installed cross connection lines.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

13. Verifying that the automatic load sequence timer is OPERABLE with the interval between each load block within $\pm 10\%$ of its design interval.
 14. Verifying that lockout relay K23 prevents diesel generator starting when the diesel generator is actuated.
- e. At least once per 10 years or after any modifications which could affect diesel generator interdependence by starting the diesel generators simultaneously, during shutdown, and verifying that the diesel generators accelerate to at least 900 rpm in less than or equal to 10 seconds.
- f. At least once per 10 years by:
1. Draining each fuel oil storage tank, removing the accumulated sediment and cleaning the tank using a sodium hypochlorite solution or the equivalent, and
 2. Performing a pressure test of those portions of the diesel fuel oil system designed to Section III, subsection ND of the ASME Code at a test pressure equal to 110 percent of the system design pressure.

4.8.1.1.3 Reports - All diesel generator failures, valid or non-valid, shall be reported to the Commission pursuant to Specification 6.9.1. Reports of diesel generator failures shall include the information recommended in Regulatory Position C.3.b of Regulatory Guide 1.108, Revision 1, August 1977. If the number of failures in the last 100 valid tests (on a per nuclear unit basis) is greater than or equal to 7, the report shall be supplemented to include the additional information recommended in Regulatory Position C.3.b of Regulatory Guide 1.108, Revision 1, August 1977.

TABLE 4.8-1

DIESEL GENERATOR TEST SCHEDULE

Number of Failures In
Last 100 Valid Tests.*

Test Frequency

≤ 1	At least once per 31 days
2	At least once per 14 days
3	At least once per 7 days
≥ 4	At least once per 3 days

* Criteria for determining number of failures and number of valid tests shall be in accordance with Regulatory Position C.2.e of Regulatory Guide 1.108, Revision 1, August 1977, where the last 100 tests are determined on a per nuclear unit basis. For the purposes of this test schedule, only valid tests conducted after the Operating License issuance date shall be included in the computation of the "last 100 valid tests". Entry into this test schedule shall be made at the 31 day test frequency.

ELECTRICAL POWER SYSTEMSAC SOURCESSHUTDOWNLIMITING CONDITION FOR OPERATION

3.8.1.2 As a minimum, the following AC 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. Day fuel tanks containing a minimum volume of 325 gallons of fuel,
 2. A fuel storage system containing a minimum volume of 37,600 gallons of fuel, and
 3. A fuel transfer pump.

APPLICABILITY: MODES 5 and 6.

ACTION:

With less than the above minimum AC electrical power sources OPERABLE, immediately suspend all operations involving CORE ALTERATIONS or positive reactivity changes and movement of irradiated fuel, or operation of the fuel handling machine with loads over the fuel storage 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

4.8.1.2.1 The above required circuit between the offsite transmission network and the onsite Class 1E distribution system shall be determined OPERABLE at

AC SOURCESSHUTDOWNSURVEILLANCE REQUIREMENTS (continued)

least once per 7 days by verifying correct breaker alignment and indicated power availability.

- a. If the above required offsite source is supplied through the Unit 2 4160 volt Emergency Bus #2A04, the following buses are required:

480 volt Emergency Bus #2B04
125 volt Emergency Bus #2D1

- b. If the above required offsite source is supplied through the Unit 2 4160 volt Emergency Bus #2A06, the following buses are required:

480 volt Emergency Bus #2B06
125 volt Emergency Bus #2D2

4.8.1.2.2 The above required diesel generator shall be demonstrated OPERABLE by performing the Surveillance Requirements of 4.8.1.1.2 (except 4.8.1.1.2 a.5, d.5, d.7, d.9, d.10, d.11 and d.13) and 4.8.1.1.3.

BASESAC SOURCES, DC SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS (continued)

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, and 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. Reg. Guide 1.137 recommends testing of fuel oil samples in accordance with ASTM-D270-1975. However, ASTM-D270-1965 was reverified in 1975 rather than re-issued. The reverified 1965 standard is therefore the appropriate standard to be used.

Additionally, Regulatory Guide 1.9 allows loading of the diesel generator to its 2000 hour rating in an accident situation. The full load, continuous operation rating for each diesel generator is 4700 kW, while the calculated accident loading in Modes 1 through 4 is 4000 kW. The largest anticipated load (including loads which are required to mitigate the consequences of a design basis accident or facilitate plant operation and maintenance) in Modes 5 and 6 is calculated to be less than 80% of the full rated capacity. No 2000 hour loading has been specified by the diesel generator manufacturer and, as a result the full loading rating of 4700 kW is conservatively established as the 2000 hour rating. Diesel frequency droop restrictions are established due to HPSI flow rate considerations.

The Surveillance Requirement for demonstrating the OPERABILITY of the Station batteries are based on the recommendations of Regulatory Guide 1.129, "Maintenance Testing and Replacement of Large Lead Storage Batteries for Nuclear Power Plants," February 1978, and IEEE Std. 450-1980, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Generating Stations and Substations."

Verifying average electrolyte temperature above the minimum for which the battery was sized, total battery thermal voltage onfloat charge, connection resistance values and the performance of battery service and discharge tests ensures the effectiveness of the charging system, the ability to handle high discharge rates and compares the battery capacity at that time with the rated capacity.

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ATTACHMENT D

3/4.8 ELECTRICAL POWER SYSTEMS

3/4.8.1 A.C. SOURCES

OPERATING

LIMITING CONDITIONS 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 day fuel tank containing a minimum volume of 325 gallons of fuel, and
 2. A separate fuel storage system containing a minimum volume of 47,000 gallons of fuel, and
 3. A separate fuel transfer pump.

One of the diesel generators may be in Unit 2 providing that the following conditions are met:

- a. The two OPERABLE diesel generators are on different trains.
- b. Both tie breakers are OPERABLE for the train that has the OPERABLE diesel in Unit 2.
- c. The transfer enable circuit selected is OPERABLE and the transfer enable switch is selected to AUTO on the train with the INOPERABLE diesel generator.
- d. The Unit 2 A.C. power sources are OPERABLE. (This requires both diesel generators in Unit 2 to be operable in Modes 1 through 4, or a single diesel generator to be operable if Unit 2 is in Mode 5 or 6.)
- e. No more than one of the four Unit-to-Unit transfer enable switches may be in "AUTO."

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

- a. With either an offsite circuit or a diesel generator of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirements 4.8.1.1.1.a and 4.8.1.1.2.a.4 within one hour and at least once per 8 hours thereafter; restore at least two

ELECTRICAL POWER SYSTEM

ACTION (Continued)

offsite circuits and two diesel generators 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 offsite circuit 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 Requirements 4.8.1.1.1.a and 4.8.1.1.2.a.4 within one hour and at least once per 8 hours thereafter; restore at least one of the inoperable sources to OPERABLE status within 12 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 offsite circuits and two diesel generators to OPERABLE status within 72 hours from the 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.
- c. With one diesel generator inoperable in addition to ACTION a or b above, verify that:
 - 1. 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
 - 2. When in MODE 1, 2, or 3, the steam-driven auxiliary feed 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 Surveillance Requirement 4.8.1.1.2.a.4 within one 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 the 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.

ELECTRICAL POWER SYSTEM

ACTION (Continued)

- e. With two of the above required diesel generators inoperable, demonstrate the OPERABILITY of two offsite A.C. circuits by performing Surveillance Requirement 4.8.1.1.1.a within one 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 the 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.

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 alignment and indicated power availability.

If tie breakers 2A0417 or 2A0619 are used to provide a source of power, the following buses are required:

for <u>2A0417</u>	for <u>2A0619</u>
2A04	2A06
2D1	2D2

- 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. 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 fuel tank,
 - 2. Verifying the fuel level in the fuel storage tank,
 - 3. Verifying the fuel transfer pump can be started and transfers fuel from the storage system to the day tank,

#Values in parentheses "()" specify acceptance criteria for unit transfer enable circuit to be demonstrated OPERABLE.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

4. Verifying the diesel starts from ambient condition and accelerates to at least 900 rpm in less than or equal to 10 seconds. The generator voltage and frequency shall be 4360 ± 436 volts and 60 ± 1.2 Hz within 10 seconds after the start signal. The diesel generator shall be started for this test by using the manual start signal.
 5. Verifying the generator is synchronized, loaded to greater than or equal to 4700 (5170) kW in less than or equal to 77 seconds, and operates with a load greater than or equal to 4700 (5170) kW for at least an additional 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 92 days and from new fuel prior to addition to the storage tanks by verifying that a sample obtained in accordance with ASTM-D270-1975 has a water and sediment content of less than or equal to .05 volume percent and a kinematic viscosity @ 40°C of greater than or equal to 1.9 but less than or equal to 4.1 when tested in accordance with ASTM-D975-77, and an impurity level of less than 2 mg of insolubles per 100 ml. when tested in accordance with ASTM-D2274-70.
- d. At least once per 18 months 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 655.7 (2600) kw while maintaining voltage at 4360 ± 436 volts and frequency at 60 ± 6.0 Hz in the speed control mode.
 3. Verifying the generator capability to reject a load of 4700 (5170) kw without tripping. The generator voltage shall not exceed 5450 volts during and following the load rejection.
 4. Simulating a loss of offsite power by itself, and
 - a) Verifying de-energization of the emergency busses and load shedding from the emergency busses.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- b) Verifying the diesel starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 10 seconds and operates for greater than or equal to 5 minutes while its generator is loaded with the permanently connected loads. After energization, the steady state voltage and frequency of the emergency busses shall be maintained at 4360 ± 436 volts and 60 ± 1.2 Hz during this test.
- 5. Verifying that on an ESF 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 steady state generator voltage and frequency shall be 4360 ± 436 volts and 60 ± 1.2 Hz within 10 seconds after the auto-start signal; the generator voltage and frequency shall be maintained within these limits during this test.
- 6. Verifying the following for the Unit-to-Unit transfer Enable Circuit:
 - a) On an ESF test signal in Unit 3, without loss of offsite power, the Unit 2 diesel generator starts.
 - b) With a simulated loss of offsite power in both units in conjunction with an ESF test signal from either unit, and the Unit 3 Transfer Enable Switch in Auto:
 - 1) Verifying de-energization of the emergency busses and load shedding from the emergency busses.
 - 2) Verifying the Unit 2 diesel starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 10 seconds, energizes the auto connected emergency/accident loads from one unit and the safe shutdown loads from one unit through the load sequence and operates for greater than or equal to 5 minutes while its generator is loaded with the combined load. After loading, the steady state voltage and frequency of the emergency busses shall be maintained at 4360 ± 436 volts and $60 \pm 1.2/-0.3$ Hz during this test.
 - 3) Verifying that with the diesel generator operating in the cross-connect mode, with an ESF test signal present from one unit, an ESF test signal from the second unit opens the Unit 3 tie breaker.
 - 4) Verifying that with an ESF test signal present from both units, the Unit 3 tie breaker override will allow reclosure of the tie breaker.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

7. Simulating a loss of offsite power in conjunction with an ESF test signal, and
 - a) Verifying de-energization 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 10 seconds, energizes the auto-connected emergency/accident loads through the load sequence and operates for greater than or equal to 5 minutes while its generator is loaded with the emergency loads. After loading, the steady state voltage and frequency of the emergency busses shall be maintained at 4360 ± 436 volts and $60 \pm 1.2/-0.3$ Hz during this test.
 - c) Verifying that all automatic diesel generator trips, except engine overspeed, generator differential and low-low lube oil pressure, are automatically bypassed.
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 5170 kw and during the remaining 22 hours of this test, the diesel generator shall be loaded to greater than or equal to 4700 Kw. The generator voltage and frequency shall be 4360 ± 436 volts and 60 ± 1.2 Hz within 10 seconds after the start signal; the steady state generator voltage and frequency shall be maintained at 4360 ± 436 Volts and $60 \pm 1.2/-0.3$ Hz for the first two hours of this test and 4360 ± 436 Volts and 60 ± 1.2 Hz during the remaining 22 hours of this test. Within 5 minutes after completing this 24-hour test, perform Surveillance Requirement 4.8.1.1.2.d.4b.
9. Verifying that the auto-connected loads to each diesel generator do not exceed 4700 (5170) kw.
10. 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.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

11. Verifying that with the diesel generator operating in a test mode, connected to its bus, a simulated safety injection signal (from either unit, with the Unit 2 Transfer Enable Switch in Auto), overrides the test mode by returning the diesel generator to standby operation and automatically energizes the emergency loads with offsite power.
 12. Verifying that each fuel transfer pump transfers fuel from each fuel storage tank to the day tank of each diesel via the installed cross connection lines.
 13. Verifying that the automatic load sequence timer is OPERABLE with the interval between each load block within $\pm 10\%$ of its design interval.
 14. Verifying that lockout relay K23 prevents diesel generator starting when the diesel generator is actuated.
- e. At least once per 10 years or after any modifications which could affect diesel generator interdependence by starting the diesel generators simultaneously, during shutdown, and verifying that the diesel generators accelerate to at least 900 rpm in less than or equal to 10 seconds.
- f. At least once per 10 years by:
1. Draining each fuel oil storage tank, removing the accumulated sediment and cleaning the tank using a sodium hypochlorite solution or the equivalent, and
 2. Performing a pressure test of those portions of the diesel fuel oil system designed to Section III, subsection ND of the ASME Code at a test pressure equal to 110 percent of the system design pressure.

4.8.1.1.3 Reports - All diesel generator failures, valid or non-valid, shall be reported to the Commission pursuant to Specification 6.9.1. Reports of diesel generator failures shall include the information recommended in Regulatory Position C.3.b of Regulatory Guide 1.108, Revision 1, August 1977. If the number of failures in the last 100 valid tests (on a per nuclear unit basis) is greater than or equal to 7, the report shall be supplemented to include the additional information recommended in Regulatory Position C.3.b of Regulatory Guide 1.108, Revision 1, August 1977.

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ELECTRIC POWER SYSTEMS

Table 4.8.1

DIESEL GENERATOR TEST SCHEDULE

<u>Number of Failures in Last 20 Valid Tests*</u>	<u>Test Frequency</u>
≤ 1	At least once per 31 days
2	At least once per 14 days**
3	At least once per 7 days
≥ 4	At least once per 3 days

-
- * Criteria for determining number of failures and number of valid tests shall be in accordance with Regulatory Position C.2.e of Regulatory Guide 1.108, Revision 1, August 1977, where the last 100 tests are determined on a per nuclear unit basis. For the purpose of this test schedule, only valid tests conducted after the Operating License issuance date shall be included in the computation of the "last 100 valid tests." Entry into this test schedule shall be made at the 31 day test frequency.

ELECTRICAL POWER SYSTEMS

AC SOURCES

SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.8.1.2 As a minimum, the following AC electrical power sources shall be OPERABLE:

- a. One circuit between the offsite transmission network and one Class 1E 4 kV Bus, and
- b. One diesel generator with:
 1. Day fuel tanks containing a minimum volume of 325 gallons of fuel,
 2. A fuel storage system containing a minimum volume of 37,600 (47,000)# gallons of fuel, and
 3. A separate fuel transfer pump.

APPLICABILITY: MODES 5 and 6.

ACTION:

With less than the above minimum AC electrical power sources OPERABLE, immediately suspend all operations involving CORE ALTERATIONS or positive reactivity changes and movement of irradiated fuel, or operation of the fuel handling machine with loads over the fuel storage 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

4.8.1.2.1 The above required circuit between the offsite transmission network and the Class 1E 4 kV Bus shall be determined OPERABLE at least once per 7 days by verifying correct breaker alignment and indicated power availability.

Value in paranthesis specify criteria for unit transfer enable circuit to be operable.

ELECTRICAL POWER SYSTEMS

AC SOURCES

SHUTDOWN

SURVEILLANCE REQUIREMENTS (continued)

If tie breakers 2A0417 or 2A0619 are used to provide a source of power, the following buses are required:

for 2A0417
2A04
2D1

for 2A0619
2A06
2D2

4.8.1.2.2 The above required diesel generator shall be demonstrated OPERABLE by performing the Surveillance Requirements of 4.8.1.1.2 (except 4.8.1.1.2 a.5, d.5, d.6, d.7, d.9, d.10, d.11 and d.13) and 4.8.1.1.3.

ELECTRICAL POWER SYSTEMS

BASES

AC SOURCES, DC SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS (continued)

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, and 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. Reg. Guide 1.137 recommends testing of fuel oil samples in accordance with ASTM-D270-1975. However, ASTM-D270-1965 was reverified in 1975 rather than re-issued. The reverified 1965 standard is therefore the appropriate standard to be used.

The Limiting Conditions for Operation permit continued unit operation if standby AC power is available from the two dedicated emergency diesel generators or from one dedicated diesel generator and from one shared diesel generator in Unit 2. The design of the diesel generator aligned for shared duty conforms with Regulatory Guide 1.81 (revision 1, January 1977) and is capable of automatically supplying power to the designed ESF loads in both units. An evaluation was performed using data from actual surveillance testing which determined that one diesel generator has the capacity to automatically supply AC power to one unit with loss of offsite power and the design basis accident concurrent with loss of offsite power on the other unit. Calculations in accordance with ANSI-N-195, confirm that 47,000 gallons of fuel oil is sufficient to supply a diesel in the shared mode.

The Surveillance Requirement for demonstrating the OPERABILITY of the Station batteries are based on the recommendations of Regulatory Guide 1.129, "Maintenance Testing and Replacement of Large Lead Storage Batteries for Nuclear Power Plants," February 1978, and IEEE Std. 450-1980, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Generating Stations and Substations."

Verifying average electrolyte temperature above the minimum for which the battery was sized, total battery thermal voltage onfloat charge, connection resistance values and the performance of battery service and discharge tests ensures the effectiveness of the charging system, the ability to handle high discharge rates and compares the battery capacity at that time with the rated capacity.