

3/4.8 ELECTRICAL POWER SYSTEMS3/4.8.1 A.C. SOURCESA.C. SOURCES - OPERATINGLIMITING CONDITION FOR OPERATION

Replace With  
New Page

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. Separate and independent diesel generators\* 0, 1A, 2A and 1B with:
  1. For diesel generator 0, 1A and 2A:
    - a) A separate day fuel tank containing a minimum of 250 gallons of fuel.
    - b) A separate fuel storage system containing a minimum of 31,000 gallons of fuel.
  2. For diesel generator 1B, a separate fuel storage tank/day tank containing a minimum of 29,750 gallons of fuel.
  3. A separate fuel transfer pump.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, and 3.

ACTION:

- a. With either one offsite circuit or diesel generator 0 or 1A of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirements 4.8.1.1.1a within 1 hour, and 4.8.1.1.2a.4, for one diesel generator at a time, within eight hours, and at least once per 8 hours thereafter; restore at least two offsite circuits and diesel generators 0 and 1A to OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- b. With one offsite circuit and diesel generator 0 or 1A of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirements 4.8.1.1.1a within 1 hour, and 4.8.1.1.2a.4, for one diesel generator at a time, within six hours, and at least once per 8 hours thereafter; restore at least one of the inoperable A.C. sources to OPERABLE status within 12 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. Restore at least two offsite circuits and diesel generators 0 and 1A to OPERABLE status within 72 hours from the time of initial loss or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

\*See page 3/4 8-1(a)

ELECTRICAL POWER SYSTEMS

10-20-64  
Replace with  
New Page

LIMITING CONDITION FOR OPERATION (Continued)

ACTION (Continued)

- c. With both of the above required offsite circuits inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.2a.4, for one diesel generator at a time, within eight hours, and at least once per 8 hours thereafter, unless the diesel generators are already operating; restore at least one of the inoperable offsite circuits to OPERABLE status within 24 hours or be in at least HOT SHUTDOWN within the next 12 hours. With only one offsite circuit restored to OPERABLE status, restore at least two offsite circuits to OPERABLE status within 72 hours from time of initial loss or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- d. With diesel generators 0 and 1A of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirements 4.8.1.1.1a within 1 hour and 4.8.1.1.2a.4, for one diesel generator at a time, within four hours and at least once per 8 hours thereafter; restore at least one of the inoperable diesel generators 0 and 1A to OPERABLE status within 2 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. Restore both diesel generators 0 and 1A to OPERABLE status within 72 hours from time of initial loss or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- e. With diesel generator 1B of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirements 4.8.1.1.1a within 1 hour, and 4.8.1.1.2a.4, for one diesel generator at a time, within six hours, and at least once per 8 hours thereafter; restore the inoperable diesel generator 1B to OPERABLE status within 72 hours or declare the HPCS system inoperable and take the ACTION required by Specification 3.5.1.
- f. With diesel generator 2A of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirements 4.8.1.1.1a and 4.8.1.1.2a.4, for diesel generator 1A, within one hour, and at least once per 8 hours thereafter; restore the inoperable diesel generator 2A to OPERABLE status within 72 hours or declare standby gas treatment system subsystem B, Unit 2 drywell and suppression chamber hydrogen recombiner system, and control room and auxiliary electric equipment room emergency filtration system train B inoperable and take the ACTION required by Specifications 3.6.5.3, 3.6.6.1., and 3.7.2; continued performance of Surveillance Requirements 4.8.1.1.1a. and 4.8.1.1.2a.4 for diesel generator 1A is not required provided the above systems are declared inoperable and the ACTION of their respective specifications is taken.

3/4.8 ELECTRICAL POWER SYSTEMS

3/4.8.1 A.C. SOURCES

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. Separate and independent diesel generators\* 0, 1A, 2A and 1B with:
  - 1. For diesel generator 0, 1A and 2A:
    - a) A separate day fuel tank containing a minimum of 250 gallons of fuel.
    - b) A separate fuel storage system containing a minimum of 31,000 gallons of fuel.
  - 2. For diesel generator 1B, a separate fuel storage tank and a day tank containing a combined minimum of 29,750 gallons of fuel.
  - 3. A separate fuel transfer pump.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, and 3.

ACTION:

- a. With one offsite circuit of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter. If any of the diesel generators have not been successfully tested within the past 24 hours, demonstrate their OPERABILITY by performing Surveillance Requirement 4.8.1.1.2.a.4 for each such diesel generator, separately, within 24 hours. Restore the offsite circuit to OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- b. With either the 0 or 1A diesel generator inoperable, demonstrate the OPERABILITY of the above required A.C. offsite sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter. If the diesel generator became inoperable due to any cause other than preplanned preventive maintenance or testing, demonstrate the OPERABILITY of the remaining OPERABLE

\* See page 3/4 8-1a.

ELECTRICAL POWER SYSTEMS

LIMITING CONDITION FOR OPERATION (Continued)

\*For the purpose of completing technical specification surveillance requirements 4.8.1.1.2d.1 and 4.8.1.1.2f.1, as part of a pre-planned preventive maintenance program, on the 0 diesel generator the requirements of action statement a are modified to:

1. Eliminate the requirement for performing technical specification surveillance requirements 4.8.1.1.1a and 4.8.1.1.2a.4, on each operable AC source, immediately and once per 8 hours thereafter, when the 0 diesel generator is declared inoperable.
2. Allow an additional 96 hours in excess of the 72 hours allowed in action statement a for the 0 diesel generator to be inoperable.

Provided that the following conditions are met:

- A. Unit 2 is in operational condition 4 or 5 or defueled prior to taking the 0 diesel generator out of service:
- B. Surveillance requirements 4.8.1.1.1a and 4.8.1.1.2a.4 are successfully completed, for the offsite power sources and the 1A and 2A diesel generators, within 48 hours prior to removal of the 0 diesel generator from service.
- C. No maintenance is performed on the offsite circuits or the 1A or 2A diesel generators, while the 0 diesel generator is inoperable.
- D. Technical specification requirement 4.8.1.1.1a is performed daily, while the 0 diesel generator is inoperable.
- E. The control circuit for the unit cross-tie circuit breakers between buses 142Y and 242Y are temporarily modified to allow the breakers to be closed with a diesel generator feeding the bus, while the 0 diesel generator is inoperable.

The provisions of technical specification 3.0.4 are not applicable.

10-26-89  
10-26-89  
10-26-89

## 3/4.8 ELECTRICAL POWER SYSTEMS

## 3/4.8.1 A.C. SOURCES

## A.C. SOURCES - OPERATING

## LIMITING CONDITIONS FOR OPERATION

diesel generators, separately, by performing Surveillance Requirement 4.8.1.1.2.a.4 within 24 hours\*. Restore the diesel generator to OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

- c. With one offsite circuit of the above-required A.C. sources and diesel generator 0 or 1A of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter. If the diesel generator became inoperable due to any cause other than preplanned preventive maintenance or testing, demonstrate the OPERABILITY of the remaining OPERABLE diesel generators, separately, by performing Surveillance Requirement 4.8.1.1.2.a.4 within 8 hours\*. Restore at least one of the inoperable A.C. sources to OPERABLE status within 12 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. Restore at least two offsite circuits and diesel generators 0 and 1A to OPERABLE status within 72 hours from the time of initial loss or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- d. With diesel generator 1B of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the offsite A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter. If the diesel generator became inoperable due to any cause other than preplanned preventive maintenance or testing, demonstrate the OPERABILITY of the remaining OPERABLE diesel generators, separately, by performing Surveillance Requirement 4.8.1.1.2.a.4 within 24 hours\*. Restore diesel generator 1B to OPERABLE status within 72 hours or declare the HPCS system inoperable and take the ACTION required by specification 3.5.1.
- e. With both of the above required offsite circuits inoperable, demonstrate the OPERABILITY of the remaining A.C. sources, separately, by performing Surveillance Requirement 4.8.1.1.2.a.4 within 8 hours unless the diesel generators are already operating. Restore at least one offsite circuit to OPERABLE status within 24 hours, or be in at least HOT SHUTDOWN within the next 12 hours. With only one offsite circuit restored to OPERABLE status, restore

\* This test is required to be completed regardless of when the inoperable diesel generator is restored to OPERABILITY. The provisions of Specification 3.0.2 are not applicable.

ELECTRICAL POWER SYSTEMS

LIMITING CONDITIONS FOR OPERATION (Continued)

ACTION (Continued)

at least two offsite circuits to OPERABLE status within 72 hours from the time of initial loss or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. A successful test(s) of diesel generator OPERABILITY per Surveillance Requirement 4.8.1.1.2.a.4, performed under this ACTION statement for the OPERABLE diesel generators, satisfies the diesel generator test requirements of ACTION statement a.

- f. With diesel generators 0 and 1A of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter, and Surveillance Requirement 4.8.1.1.2.a.4 for the 1B and 2A diesel generators, separately, within 8 hours\*. Restore at least one of the inoperable diesel generators 0 or 1A to OPERABLE status within 2 hours, or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. Restore both diesel generators 0 and 1A to OPERABLE status within 72 hours, from the time of initial loss, or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- g. With diesel generator 2A of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter. If the 2A diesel generator became inoperable due to any cause other than preplanned preventive maintenance or testing, demonstrate the OPERABILITY of the 1A diesel generator by performing Surveillance Requirement 4.8.1.1.2.a.4, within 24 hours\*. Restore the inoperable diesel generator 2A to OPERABLE status within 72 hours or declare standby gas treatment system subsystem B, Unit 2 drywell and suppression chamber hydrogen recombiner system, and control room and auxiliary electric equipment room emergency filtration system train B inoperable, and take the ACTION required by specifications 3.6.5.3, 3.6.6.1, and 3.7.2. Continued performance of Surveillance Requirement 4.8.1.1.1.a is not required provided the above systems are declared inoperable and the action of their respective specifications is taken.

\* This test is required to be completed regardless of when the inoperable diesel generator is restored to OPERABILITY. The provisions of Specification 3.0.2 are not applicable.

## ELECTRICAL POWER SYSTEMS

## LIMITING CONDITIONS FOR OPERATION (Continued)

## ACTION (Continued)

- h. With one offsite circuit of the above required A.C. electrical power sources and diesel generator 1B inoperable, apply the requirements of ACTION a and d specified above.
- i. With either diesel generators 0 or 1A inoperable and diesel generator 1B inoperable, apply the requirements of ACTION b and d specified above.
- j. With one offsite circuit of the above required A.C. electrical power sources and diesel generator 2A inoperable, apply the requirements of ACTION a and g specified above.
- k. With diesel generator 1B and diesel generator 2A inoperable, apply the requirements of ACTION d and g specified above.
- l. With diesel generator 0 and diesel generator 2A inoperable, apply the requirements of ACTION b and g specified above.

ELECTRICAL POWER SYSTEMS

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, and
- b. Demonstrated OPERABLE at least once per 18 months during shutdown by manually transferring unit power supply from the normal circuit to the alternate circuit.

4.8.1.1.2 Each of the above required diesel generators shall be demonstrated OPERABLE: \*

11/2/88

a. In accordance with the frequency specified in Table 4.8.1.1.2-1 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 starts and transfers fuel from the storage system to the day fuel tank.
4. Verifying the diesel starts from ambient condition and accelerates to 900 rpm  $\pm$  5%,  $\pm$  2% in less than or equal to 13 seconds. The generator voltage and frequency shall be  $4160 \pm 150$  volts and  $60 \pm 3.0, \pm 1.2$  Hz within 13 seconds after the start signal.
5. Verifying the diesel generator is synchronized, loaded to greater than or equal to 2500 kw within 60 seconds and operates with this load for at least 60 minutes.
6. Verifying the diesel generator is aligned to provide standby power to the associated emergency busses.
7. Verifying the pressure in all diesel generator air start receivers to be greater than or equal to 200 psig.

11/2/88  
7/3/89  
7/28/89

- 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 fuel tanks.
- 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-0270-1975 has a water and sediment content of less than or equal to 0.05 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-0975-77, and an impurity level of less than 2 mg. of insolubles per 100 ml. when tested in accordance with ASTM-G2274-70.

\*These diesel generator starts from ambient conditions shall be performed at least once per 184 days in these surveillance tests. All other engine starts for the purpose of this surveillance testing shall be preceded by an engine prelube period and/or other warmup procedures recommended by the manufacturer so that mechanical stress and wear on the diesel engine is minimized.

11/2/88  
7/3/89

LA SALLE - UNIT 1

3/4 8-3

Amendment No. 15

Insert C

\*\*\*

2400 Kw

and then

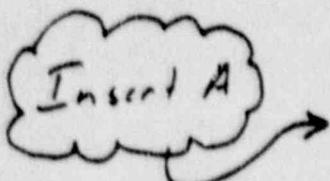
\*\*\*

Insert A  
Insert B

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- 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 diesel generator capability to reject a load of greater than or equal to 1190 kW for diesel generator 0, greater than or equal to 638 kW for diesel generators 1A and 2A, and greater than or equal to 2381 kW for diesel generator 1B while maintaining engine speed less than or equal to 75% of the difference between nominal speed and the overspeed trip setpoint or 15% above nominal, whichever is less. | 7/3/89
  3. Verifying the diesel generator capability to reject a load of 2600 kW without tripping. The generator voltage shall not exceed 5000 volts during and following the load rejection. | 7/3/89
  4. Simulating a loss of offsite power by itself, and: | 7/3/89
    - a) For Divisions 1 and 2 and for Unit 2 Division 2:
      - 1) Verifying de-energization of the emergency busses and load shedding from the emergency busses.
      - 2) Verifying the diesel generator starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 13 seconds, energizes the auto-connected loads and operates for greater than or equal to 5 minutes while its generator is so loaded. After energization, the steady state voltage and frequency of the emergency busses shall be maintained at  $4160 \pm 150$  volts and  $60 \pm 1.2$  Hz during this test.
    - b) For Division 3:
      - 1) Verifying de-energization of the emergency bus.
      - 2) Verifying the diesel generator starts on the auto-start signal, energizes the emergency bus with its loads within 13 seconds and operates for greater than or equal to 5 minutes while its generator is so loaded. After energization, the steady state voltage and frequency of the emergency bus shall be maintained at  $4160 \pm 150$  volts and  $60 \pm 1.2$  Hz during this test. 
  5. Verifying that on an ECCS actuation test signal, without loss of offsite power, diesel generators 0, 1A and 1B start on the auto-start signal and operate on standby for greater than or equal to 5 minutes. The generator voltage and frequency shall be  $4160 + 416, -150$  volts and  $60 + 3.0, -1.2$  Hz within 13 seconds after the auto-start signal; the steady state generator voltage and frequency shall be maintained within these limits during this test. | 7/3/89

  
Insert A

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

6. Simulating a loss of offsite power in conjunction with an ECCS actuation test signal and:

7/3/89

a) For Divisions 1 and 2:

- 1) Verifying de-energization of the emergency busses and load shedding from the emergency busses.
- 2) Verifying the diesel generator starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 13 seconds, energizes the auto-connected emergency 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  $4160 \pm 416$  volts and  $60 \pm 1.2$  Hz during this test.

b) For Division 3:

- 1) Verifying de-energization of the emergency bus.
- 2) Verifying the diesel generator starts on the auto-start signal, energizes the emergency bus with its loads within 13 seconds 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 bus shall be maintained at  $4160 \pm 416$  volts and  $60 \pm 1.2$  Hz during this test.

7. Verifying that all diesel generator 0, 1A and 1B automatic trips except the following are automatically bypassed on an ECCS actuation signal:

- a) For Divisions 1 and 2 - engine overspeed, generator differential current, and emergency manual stop.
- b) For Division 3 - engine overspeed, generator differential or overcurrent, and emergency manual stop.

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 2860 kw and during the remaining 22 hours of this test, the diesel generator shall be loaded to 2600 kw. The generator voltage and frequency shall be  $4160 \pm 420, -150$  volts and  $60 \pm 3.0, -1.2$  Hz within 13 seconds after the start signal; the steady state generator voltage and frequency shall be maintained within these limits during this test. Within 5 minutes after completing this 24 hour test, perform Surveillance Requirement 4.8.1.1.2.d.4.a).2) and b).2).

7/3/89

7/3/89

7/3/89

\*\*\*

2400 KW  
±0

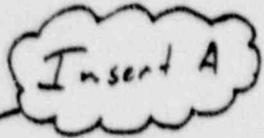
Insert A  
LAISALLE - UNIT 1

Insert C

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- 
- 9. Verifying that the auto-connected loads to each diesel generator do not exceed the 2000 hour rating of 2860 kw. | 7/3/89
  - 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, | 7/3/89
    - b) Transfer its loads to the offsite power source, and
    - c) Be restored to its standby status.
  - 11. Verifying that with diesel generator 0, 1A and 1B operating in a test mode and connected to its bus:
    - a) For Divisions 1 and 2, that a simulated ECCS actuation signal overrides the test mode by returning the diesel generator to standby operation. | 7/3/89
    - b) For Division 3, that a simulated trip of the diesel generator overcurrent relay trips the SAT feed breaker to bus 143 and that the diesel generator continues to supply normal bus loads.
  - 12. Verifying that the automatic load sequence timer is OPERABLE with the interval between each load block within  $\pm 10\%$  of its design interval for diesel generators 0 and 1A. |
  - 13. Verifying that the following diesel generator lockout features prevent diesel generator operation only when required: |
    - a) Generator underfrequency.
    - b) Low lube oil pressure.
    - c) High jacket cooling temperature
    - d) Generator reverse power.
    - e) Generator overcurrent.
    - f) Generator loss of field.
    - g) Engine cranking lockout.



Surveillance Requirement 4.8.1.1.2.d.4a)2) and/or b)2) are not satisfactorily completed, it is not necessary to repeat the preceding 24 hour test. Instead, the diesel generator may be operated at 2500 kw for 1 hour or until operating temperature has stabilized. | 7/3/89

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- e. At least once per 10 years or after any modifications which could affect diesel generator interdependence by starting diesel generators 0, 1A and 1B simultaneously, during shutdown, and verifying that all three diesel generators accelerate to 900 rpm + 5, -2% in less than or equal to 13 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 or equivalent solution, 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 in accordance with ASME Code Section II, Article IWD-5000.

7/3/89

4.8.1.1.3 Reports - All diesel generator failures, valid or non-valid, shall be reported to the Commission pursuant to Specification 6.6.C within 30 days. 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.

Insert New Page 7a

TABLE 4.8.1.1.2-1

DIESEL GENERATOR TEST SCHEDULE

<u>Number of Failures in Last 100 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. With the exception of the semi-annual fast start, no starting time requirements are required to meet the valid test requirements of Regulatory Guide 1.108.

3/16/89

7/3/89

Insert A

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

TABLE 4.8.1.1.2-1  
DIESEL GENERATOR TEST SCHEDULE

NUMBER OF FAILURES IN LAST 20 VALID TESTS*	NUMBER OF FAILURES IN LAST 100 VALID TESTS*	TEST FREQUENCY
≤ 1	≤ 4	At least once per 31 days
≥ 2 **	≥ 5	At least once per 7 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, but determined on a per diesel generator basis. With the exception of the semi-annual fast start, no starting time requirements are required to meet the valid test requirements of Regulatory Guide 1.108.

For the purposes of determining the required test frequency, the previous test failure count may be reduced to zero if:

- 1) a complete diesel overhaul to like-new condition is completed (provided that the overhaul, including appropriate post-maintenance operation and testing, is specifically approved by the manufacturer), and
- 2) if acceptable reliability has been demonstrated. The reliability criterion shall include the successful completion of 14 consecutive tests in a single series structured as follows:
  - a) ten of these tests shall be performed in accordance with the routine Surveillance Requirements 4.8.1.1.2.a.4 and 4.8.1.1.2.a.5, and
  - b) four tests shall be performed in accordance with the 184-day testing requirement of Surveillance Requirements 4.8.1.1.2.a.4 and 4.8.1.1.2.a.5. If this criterion is not satisfied during the first series of tests, any alternate criterion to be used to reset the failure count to zero requires NRC approval.

\*\* The associated test frequency shall be maintained until 7 consecutive failure free demands have been performed AND the number of failures in the last 20 valid demands has been reduced to one.

## 3/4.8 ELECTRICAL-POWER SYSTEMS

### BASES

#### 3/4.8.1 and 3/4.8.2 A.C. SOURCES and ONSITE POWER DISTRIBUTION SYSTEMS

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

The ACTION requirements specified for the levels of degradation of the power sources provide restriction upon continued facility operation commensurate with the level of degradation. The OPERABILITY of the power sources are consistent with the initial condition assumptions of the accident analyses and are based upon maintaining at least Division I or II of the 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 one of the two onsite A.C. sources. Division III supplies the high pressure core spray (HPCS) system only.

The OPERABILITY of the minimum specified A.C. and D.C. power sources and associated distribution systems during shutdown and refueling ensures that (1) the facility can be maintained in the shutdown or refueling condition for extended time periods and (2) sufficient instrumentation and control capability is available for monitoring and maintaining the unit status.

The surveillance requirements for demonstrating the OPERABILITY of the diesel generators are in accordance with the recommendations of Regulatory Guide 1.9, "Selection of Diesel Generator Set Capacity for Standby Power Supplies," March 10, 1971, with the exception noted in Appendix B to the FSAR, and Regulatory Guide 1.108, "Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants," Revision 1, August 1977.

The diesel generator fast start surveillance requirements, based on a PRA study, are sufficient to demonstrate the onsite A.C. power system capability to mitigate the consequences of the design basis event for the plant, i.e., large LOCA coincident with a loss-of-offsite power, while minimizing the mechanical stress and wear on the diesel engine.

The surveillance requirements for demonstrating the OPERABILITY of the unit batteries are in accordance with 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 Station and Substations."

Verifying average electrolyte temperature above the minimum for which the battery was sized, total battery terminal 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.

Insert E

10/26/89

Insert D

7/8/89

Replace with  
New Page

### 3/4.8 ELECTRICAL POWER SYSTEMS

#### 3/4.8.1 A.C. SOURCES

##### A.C. SOURCES - OPERATING

##### LIMITING CONDITION FOR OPERATION

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

- a. Two physically independent circuits between the offsite transmission network and the onsite Class 1E distribution system, and
- b. Separate and independent diesel generators\* 0, 1A, 2A and 2B with:
  1. For diesel generator 0, 1A and 2A:
    - a) A separate day fuel tank containing a minimum of 250 gallons of fuel.
    - b) A separate fuel storage system containing a minimum of 31,000 gallons of fuel.
  2. For diesel generator 2B, a separate fuel storage tank/day tank containing a minimum of 29,750 gallons of fuel.
  3. A separate fuel transfer pump.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, and 3.

##### ACTION:

- a. With either one offsite circuit or diesel generator 0 or 2A of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirements 4.8.1.1.1a. within 1 hour, and 4.8.1.1.2a.4., for one diesel generator at a time, within 8 hours, and at least once per 8 hours thereafter; restore at least two offsite circuits and diesel generators 0 and 2A to OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- b. With one offsite circuit and diesel generator 0 or 2A of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirements 4.8.1.1.1a. within 1 hour, and 4.8.1.1.2a.4., for one diesel generator at a time, within 8 hours, and at least once per 8 hours thereafter; restore at least one of the inoperable A.C. sources to OPERABLE status within 12 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. Restore at least two offsite circuits and diesel generators 0 and 2A to OPERABLE status within 72 hours from the time of initial loss or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

\*See page 3/4 8-1(a).

10/26/89

Replace With  
New Page

ELECTRICAL POWER SYSTEMS

LIMITING CONDITION FOR OPERATION (Continued)

ACTION: (Continued)

- c. With both of the above required offsite circuits inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.2a.4., for one diesel generator at a time, within 8 hours, and at least once per 8 hours thereafter, unless the diesel generators are already operating; restore at least one of the inoperable offsite circuits to OPERABLE status within 24 hours or be in at least HOT SHUTDOWN within the next 12 hours. With only one offsite circuit restored to OPERABLE status, restore at least two offsite circuits to OPERABLE status within 72 hours from time of initial loss or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- d. With diesel generators 0 and 2A of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirements 4.8.1.1.1a. within 1 hour and 4.8.1.1.2a.4., for one diesel generator at a time, within 4 hours and at least once per 8 hours thereafter; restore at least one of the inoperable diesel generators 0 and 2A to OPERABLE status within 2 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. Restore both diesel generators 0 and 2A to OPERABLE status within 72 hours from time of initial loss or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- e. With diesel generator 2B of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirements 4.8.1.1.1a. within 1 hour, and 4.8.1.1.2a.4., for one diesel generator at a time, within 6 hours, and at least once per 8 hours thereafter; restore the inoperable diesel generator 2B to OPERABLE status within 72 hours or declare the HPCS system inoperable and take the ACTION required by Specification 3.5.1.
- f. With diesel generator 1A of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirements 4.8.1.1.1a. within 1 hour, and 4.8.1.1.2a.4. for diesel generator 2A, within 2 hours, and at least once per 8 hours thereafter; restore the inoperable diesel generator 1A to OPERABLE status within 72 hours or declare standby gas treatment system subsystem A, Unit 1 drywell and suppression chamber hydrogen recombiner system, and control room and auxiliary electric equipment room emergency filtration system train A inoperable and take the ACTION required by Specifications 3.6.5.3, 3.6.6.1, and 3.7.2; continued performance of Surveillance Requirements 4.8.1.1.1a. and 4.8.1.1.2a.4. for diesel generator 2A is not required provided the above systems are declared inoperable and the ACTION of their respective specifications is taken.

## 3/4.8 ELECTRICAL POWER SYSTEMS

## 3/4.8.1 A.C. SOURCES

## 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. Separate and independent diesel generators\* 0, 1A, 2A and 2B with:
  1. For diesel generator 0, 1A and 2A:
    - a) A separate day fuel tank containing a minimum of 250 gallons of fuel.
    - b) A separate fuel storage system containing a minimum of 31,000 gallons of fuel.
  2. For diesel generator 2B, a separate fuel storage tank and a day tank containing a combined minimum of 29,750 gallons of fuel.
  3. A separate fuel transfer pump.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, and 3.

ACTION:

- a. With one offsite circuit of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter. If any of the diesel generators have not been successfully tested within the past 24 hours, demonstrate their OPERABILITY by performing Surveillance Requirement 4.8.1.1.2.a.4 for each such diesel generator, separately, within 24 hours. Restore the offsite circuit to OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- b. With either the 0 or 2A diesel generator inoperable, demonstrate the OPERABILITY of the above required A.C. offsite sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter. If the diesel generator became inoperable due to any cause other than preplanned preventive maintenance or testing, demonstrate the OPERABILITY of the remaining OPERABLE

\* See page 3/4 8-1a.

ELECTRICAL POWER SYSTEMS

LIMITING CONDITION FOR OPERATION (Continued)

\*For the purposes of completing technical specification surveillance requirements 4.8.1.1.2d.1 and 4.8.1.1.2f.1, as part of a pre-planned preventative maintenance program, on the 0 diesel generator the requirements of action statements <sup>g</sup> are modified to:

- 1. Eliminate the requirement for performing technical specification surveillance requirements 4.8.1.1.1a and 4.8.1.1.2a.4, on each operable AC source, immediately and once per 8 hours thereafter, when the 0 diesel generator is declared inoperable.
- 2. Allow an additional <sup>b</sup> 96 hours in excess of the 72 hours allowed in action statement <sup>a</sup> for the 0 diesel generator to be inoperable.

Provided that the following conditions are met:

- A. Unit 1 is in operational condition 4 or 5 or defueled prior to taking the 0 diesel generator out of service.
- B. Surveillance requirements 4.8.1.1.1a and 4.8.1.1.2a.4 are successfully completed, for the offsite power sources and the 1A and 2A diesel generators, within 48 hours prior to removal of the 0 diesel generator from service.
- C. No maintenance is performed on the offsite circuits or the 1A or 2A diesel generators, while the 0 diesel generator is inoperable.
- D. Technical specification requirements 4.8.1.1.1a is performed daily, while the 0 diesel generator is inoperable.
- E. The control circuit for the unit cross-tie circuit breakers between buses 142Y and 242Y are temporarily modified to allow the breakers to be closed with a diesel generator feeding the bus, while the 0 diesel generator is inoperable.

The provisions of technical specification 3.0.4 are not applicable.

10/26/89

10/26/89

10/26/89

and

3/4.8 ELECTRICAL POWER SYSTEMS

3/4.8.1 A.C. SOURCES

A.C. SOURCES - OPERATING

LIMITING CONDITIONS FOR OPERATION

diesel generators, separately, by performing Surveillance Requirement 4.8.1.1.2.a.4 within 24 hours\*. Restore the diesel generator to OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

- c. With one offsite circuit of the above-required A.C. sources and diesel generator 0 or 2A of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter. If the diesel generator became inoperable due to any cause other than preplanned preventive maintenance or testing, demonstrate the OPERABILITY of the remaining OPERABLE diesel generators, separately, by performing Surveillance Requirement 4.8.1.1.2.a.4 within 8 hours\*. Restore at least one of the inoperable A.C. sources to OPERABLE status within 12 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. Restore at least two offsite circuits and diesel generators 0 and 2A to OPERABLE status within 72 hours from the time of initial loss or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- d. With diesel generator 2B of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the offsite A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter. If the diesel generator became inoperable due to any cause other than preplanned preventive maintenance or testing, demonstrate the OPERABILITY of the remaining OPERABLE diesel generators, separately, by performing Surveillance Requirement 4.8.1.1.2.a.4 within 24 hours\*. Restore diesel generator 2B to OPERABLE status within 72 hours or declare the HPCS system inoperable and take the ACTION required by specification 3.5.1.
- e. With both of the above required offsite circuits inoperable, demonstrate the OPERABILITY of the remaining A.C. sources, separately, by performing Surveillance Requirement 4.8.1.1.2.a.4 within 8 hours unless the diesel generators are already operating. Restore at least one offsite circuit to OPERABLE status within 24 hours, or be in at least HOT SHUTDOWN within the next 12 hours. With only one offsite circuit restored to OPERABLE status, restore

\* This test is required to be completed regardless of when the inoperable diesel generator is restored to OPERABILITY. The provisions of Specification 3.0.2 are not applicable.

## ELECTRICAL POWER SYSTEMS

## LIMITING CONDITIONS FOR OPERATION (Continued)

## ACTION (Continued)

at least two offsite circuits to OPERABLE status within 72 hours from the time of initial loss or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. A successful test(s) of diesel generator OPERABILITY per Surveillance Requirement 4.8.1.1.2.a.4, performed under this ACTION statement for the OPERABLE diesel generators, satisfies the diesel generator test requirements of ACTION statement a.

- f. With diesel generators 0 and 2A of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter, and Surveillance Requirement 4.8.1.1.2.a.4 for the 2B and 1A diesel generators, separately, within 8 hours\*. Restore at least one of the inoperable diesel generators 0 or 2A to OPERABLE status within 2 hours, or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. Restore both diesel generators 0 and 2A to OPERABLE status within 72 hours, from the time of initial loss, or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- g. With diesel generator 1A of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter. If the 1A diesel generator became inoperable due to any cause other than preplanned preventive maintenance or testing, demonstrate the OPERABILITY of the 2A diesel generator by performing Surveillance Requirement 4.8.1.1.2.a.4, within 24 hours\*. Restore the inoperable diesel generator 1A to OPERABLE status within 72 hours or declare standby gas treatment system subsystem A, Unit 1 drywell and suppression chamber hydrogen recombiner system, and control room and auxiliary electric equipment room emergency filtration system train A inoperable, and take the ACTION required by specifications 3.6.5.3, 3.6.6.1, and 3.7.2. Continued performance of Surveillance Requirement 4.8.1.1.1.a is not required provided the above systems are declared inoperable and the action of their respective specifications is taken.

\* This test is required to be completed regardless of when the inoperable diesel generator is restored to OPERABILITY. The provisions of Specification 3.0.2 are not applicable.

## ELECTRICAL POWER SYSTEMS

## LIMITING CONDITIONS FOR OPERATION (Continued)

## ACTION (Continued)

- h. With one offsite circuit of the above required A.C. electrical power sources and diesel generator 2B inoperable, apply the requirements of ACTION a and d specified above.
- i. With either diesel generators 0 or 2A inoperable and diesel generator 2B inoperable, apply the requirements of ACTION b and d specified above.
- j. With one offsite circuit of the above required A.C. electrical power sources and diesel generator 1A inoperable, apply the requirements of ACTION a and g specified above.
- k. With diesel generator 2B and diesel generator 1A inoperable, apply the requirements of ACTION d and g specified above.
- l. With diesel generator 0 and diesel generator 1A inoperable, apply the requirements of ACTION b and g specified above.

ELECTRICAL POWER SYSTEMS

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, and
- b. Demonstrated OPERABLE at least once per 18 months during shutdown by manually transferring unit power supply from the normal circuit to the alternate circuit.

4.8.1.1.2 Each of the above required diesel generators shall be demonstrated OPERABLE:

11/2/88

a. In accordance with the frequency specified in Table 4.8.1.1.2-1 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 starts and transfers fuel from the storage system to the day fuel tank.
- 4. Verifying the diesel starts from ambient condition and accelerates to 900 rpm + 5%, -2% in less than or equal to 13 seconds. The generator voltage and frequency shall be 4160 ± 150 volts and 60 ± 3.0, -1.2 Hz within 13 seconds after the start signal.
- 5. Verifying the diesel generator is synchronized, loaded to greater than or equal to 2600 kW within 60 seconds and operates with this load for at least 60 minutes.
- 6. Verifying the diesel generator is aligned to provide standby power to the associated emergency busses.
- 7. Verifying the pressure in all diesel generator air start receivers to be greater than or equal to 200 psig.

11/2/88

7/3/88

7/28/87

2400 kW

and then

\*\*\*

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 fuel tanks.

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 0.05 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.

Insert A  
Insert B  
Insert C

These diesel generator starts from ambient conditions shall be performed only once per 184 days in these surveillance tests and all other engine starts for the purpose of this surveillance testing shall be preceded by an engine prelube period and/or other warmup procedures recommended by the manufacturer so that mechanical stress and wear on the diesel engine is minimized.

11/2/88

7/3/89

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

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. 7/3/89
2. Verifying the diesel generator capability to reject a load of greater than or equal to 1190 kW for diesel generator 0, greater than or equal to 638 kW for diesel generators 1A and 2A, and greater than or equal to 2381 kW for diesel generator 2B while maintaining engine speed less than or equal to 75% of the difference between nominal speed and the overspeed trip setpoint or 15% above nominal, whichever is less. 7/3/89
3. Verifying the diesel generator capability to reject a load of 2600 kW without tripping. The generator voltage shall not exceed 5000 volts during and following the load rejection. 7/3/89
4. Simulating a loss-of-offsite power by itself, and:
  - a) For Divisions 1 and 2 and for Unit 1 Division 2:
    - 1) Verifying deenergization of the emergency busses and load shedding from the emergency busses.
    - 2) Verifying the diesel generator starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 13 seconds, energizes the auto-connected loads and operates for greater than or equal to 5 minutes while its generator is so loaded. After energization, the steady-state voltage and frequency of the emergency busses shall be maintained at 4160 ± 150 volts and 60 ± 1.2 Hz during this test.
  - b) For Division 3:
    - 1) Verifying deenergization of the emergency bus.
    - 2) Verifying the diesel generator starts on the auto-start signal, energizes the emergency bus with its loads within 13 seconds and operates for greater than or equal to 5 minutes while its generator is so loaded. After energization, the steady-state voltage and frequency of the emergency bus shall be maintained at 4160 ± 150 volts and 60 ± 1.2 Hz during this test. 7/3/89
5. Verifying that on an ECCS actuation test signal, without loss-of-offsite power, diesel generators 0, 2A, and 2B start on the auto-start signal and operate on standby for greater than or equal to 5 minutes. The generator voltage and frequency shall be 4160 + 416, -150 volts and 60 + 3.0, -1.2 Hz within 13 seconds after the auto-start signal; the steady-state generator voltage and frequency shall be maintained within these limits during this test. 7/3/89

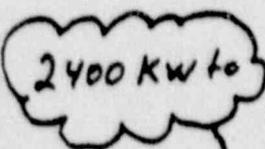
Insert A

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

6. Simulating a loss-of-offsite power in conjunction with an ECCS actuation test signal, and:
- a) For Divisions 1 and 2:
    - 1) Verifying deenergization of the emergency busses and load shedding from the emergency busses.
    - 2) Verifying the diesel generator starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 13 seconds, energizes the auto-connected emergency 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  $4160 \pm 416$  volts and  $60 \pm 1.2$  Hz during this test.
  - b) For Division 3:
    - 1) Verifying deenergization of the emergency bus.
    - 2) Verifying the diesel generator starts on the auto-start signal, energizes the emergency bus with its loads within 13 seconds 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 bus shall be maintained at  $4160 \pm 416$  volts and  $60 \pm 1.2$  Hz during this test.
7. Verifying that all diesel generator 0, 2A, and 2B automatic trips except the following are automatically bypassed on an ECCS actuation signal:
- a) For Divisions 1 and 2 - engine overspeed, generator differential current, and emergency manual stop.
  - b) For Division 3 - engine overspeed, generator differential or overcurrent, and emergency manual stop.
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 2860 kW and during the remaining 22 hours of this test, the diesel generator shall be loaded to 2600 kW. The generator voltage and frequency shall be  $4160 \pm 420, -150$  volts and  $60 \pm 3.0, -1.2$  Hz within 13 seconds after the start signal; the steady-state generator voltage and frequency shall be maintained within these limits during this test. Within 5 minutes after completing this 24 hour test, perform Surveillance Requirement 4.8.1.1.2.d.4.a).2) and b).2).

7/3/89



7/3/89

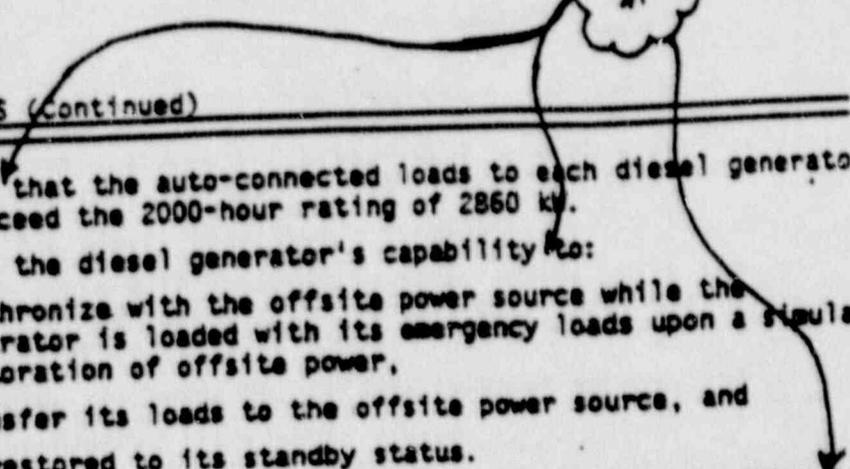
7/3/89

7/3/89

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- 9. Verifying that the auto-connected loads to each diesel generator do not exceed the 2000-hour rating of 2860 kW. | 7/3/89
- 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 diesel generator 0, 2A, and 2B operating in a test mode and connected to its bus:
  - a) For Divisions 1 and 2, that a simulated ECCS actuation signal overrides the test mode by returning the diesel generator to standby operation.
  - b) For Division 3, that a simulated trip of the diesel generator overcurrent relay trips the SAT feed breaker to bus 243 and that the diesel generator continues to supply normal bus loads.
- 12. Verifying that the automatic load sequence timer is OPERABLE with the interval between each load block within  $\pm 10\%$  of its design interval for diesel generators 0 and 2A.
- 13. Verifying that the following diesel generator lockout features prevent diesel generator operation only when required:
  - a) Generator underfrequency.
  - b) Low lube oil pressure.
  - c) High jacket cooling temperature.
  - d) Generator reverse power.
  - e) Generator overcurrent.
  - f) Generator loss of field.
  - g) Engine cranking lockout.

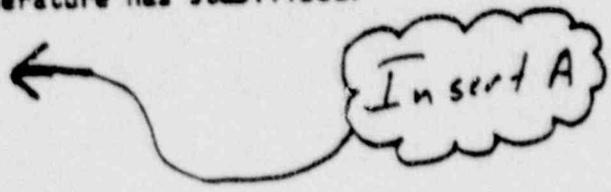


| 7/3/89  
| 7/3/89

| 7/3/89



If Surveillance Requirements 4.8.1.1.2.d.4.a)2) and/or b)2) are not satisfactorily completed, it is not necessary to repeat the preceding 24 hour test. Instead, the diesel generator may be operated at 2600 kW for 1 hour or until operating temperature has stabilized. | 7/3/89



| 7/3/89

ELECTRICAL POWER SYSTEMS



SURVEILLANCE REQUIREMENTS (Continued)

- e. At least once per 10 years or after any modifications which could affect diesel generator interdependence by starting diesel generators 0, 2A, and 2B simultaneously during shutdown, and verifying that all three diesel generators accelerate to 900 rpm  $\pm$  5, -2% in less than or equal to 13 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 or equivalent solution, 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 in accordance with ASME Code Section II, Article IWD-5000.

7/3/89

4.8.1.1.3 Reports - All diesel generator failures, valid or non-valid, shall be reported to the Commission pursuant to Specification 6.6.C within 30 days. 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 4.8.1.1.2-1

DIESEL GENERATOR TEST SCHEDULE

<u>Number of Failures in Last 100 Valid Tests*</u>	<u>Test Frequency</u>
$\leq 1$	At least once per 31 days
2	At least once per 14 days
3	At least once per 7 days
$\geq 4$	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. With the exception of the semiannual fast start, no starting time requirements are required to meet the valid test requirements of Regulatory Guide 1.108.

Insert New Page 7a

3/16/89

Insert A

7/3/89

## ELECTRICAL POWER SYSTEMS

## SURVEILLANCE REQUIREMENTS (Continued)

TABLE 4.8.1.1.2-1  
DIESEL GENERATOR TEST SCHEDULE

NUMBER OF FAILURES IN LAST 20 VALID TESTS*	NUMBER OF FAILURES IN LAST 100 VALID TESTS*	TEST FREQUENCY
1 1	1 4	At least once per 31 days
2 2 **	2 5	At least once per 7 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, but determined on a per diesel generator basis. With the exception of the semi-annual fast start, no starting time requirements are required to meet the valid test requirements of Regulatory Guide 1.108.

For the purposes of determining the required test frequency, the previous test failure count may be reduced to zero if:

- 1) a complete diesel overhaul to like-new condition is completed (provided that the overhaul, including appropriate post-maintenance operation and testing, is specifically approved by the manufacturer), and
- 2) if acceptable reliability has been demonstrated. The reliability criterion shall include the successful completion of 14 consecutive tests in a single series structured as follows:
  - a) ten of these tests shall be performed in accordance with the routine Surveillance Requirements 4.8.1.1.2.a.4 and 4.8.1.1.2.a.5, and
  - b) four tests shall be performed in accordance with the 184-day testing requirement of Surveillance Requirements 4.8.1.1.2.a.4 and 4.8.1.1.2.a.5.

If this criterion is not satisfied during the first series of tests, any alternate criterion to be used to reset the failure count to zero requires NRC approval.

- \*\* The associated test frequency shall be maintained until 7 consecutive failure free demands have been performed AND the number of failures in the last 20 valid demands has been reduced to one.

### 3/4.8 ELECTRICAL POWER SYSTEMS

#### BASES

#### 3/4.8.1 and 3/4.8.2 A.C. SOURCES and ONSITE POWER DISTRIBUTION SYSTEMS

The OPERABILITY of the A.C. and D.C. power sources and associated distribution systems during operation ensures that sufficient power will be available to supply the safety-related equipment required for (1) the safe shutdown of the facility and (2) the mitigation and control of accident conditions within the facility. The minimum specified independent and redundant A.C. and D.C. power sources and distribution systems satisfy the requirements of General Design 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 accident analyses and are based upon maintaining at least Division I or II of the 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 one of the two onsite A.C. sources. Division III supplies the high pressure core spray (HPCS) system only.

The OPERABILITY of the minimum specified A.C. and D.C. power sources and associated distribution systems during shutdown and refueling ensures that (1) the facility can be maintained in the shutdown or refueling condition for extended time periods and (2) sufficient instrumentation and control capability is available for monitoring and maintaining the unit status.

The surveillance requirements for demonstrating the OPERABILITY of the diesel generators are in accordance with the recommendations of Regulatory Guide 1.9, "Selection of Diesel Generator Set Capacity for Standby Power Supplies," March 10, 1971, with the exception noted in Appendix B to the FSAR, and Regulatory Guide 1.108, "Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants," Revision 1, August 1977.

The diesel generator fast start surveillance requirements, based on a PRA study, are sufficient to demonstrate the onsite A.C. power system capability to mitigate the consequences of the design basis event for the plant, i.e., large LOCA coincident with a loss-of-offsite power, while minimizing the mechanical stress and wear on the diesel engine.

The surveillance requirements for demonstrating the OPERABILITY of the unit batteries are in accordance with 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 Station and Substations."

Verifying average electrolyte temperature above the minimum for which the battery was sized, total battery terminal 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.

Insert E

10/26/89

Insert D

7/3/89

INSERT A

- \* All planned diesel generator starts performed for the purpose of meeting these surveillance requirements may be preceded by an engine prelube period, as recommended by the manufacturer.

INSERT B

- \*\* Surveillance testing to verify the diesel generator start (13 second) and load (60 second) times from ambient conditions shall be performed at least once per 184 days. All other engine starts performed for the purpose of meeting these surveillance requirements may be conducted in accordance with warmup and loading procedures, as recommended by the manufacturer, in order to minimize mechanical stress and wear on the diesel generator caused by fast starting and loading of the diesel generator.

INSERT C

- \*\*\* Transients, outside of this load band, do not invalidate the surveillance tests.

INSERT D

The diesel generators are equipped with a pre-lubrication system which maintains a continuous flow of oil to the diesel engine moving parts while the engine is shutdown. The purpose of this system is to increase long term diesel generator reliability by reducing the stress and wear caused by frequent dry starting of the diesel generator. The diesel generator pre-lube may be accomplished either through, normal operation of the installed pre-lubrication system, or by manual pre-lubrication of the diesel generator in accordance with manufacturers instructions. Performance of a idle start of the diesel generator is not considered to be a means of pre-lubrication.

Analysis has shown that testing, which includes a semi-annual fast start of the diesel generators, is sufficient to demonstrate the capability of the On-Site A.C. power systems to mitigate the consequences of the design basis event for the plant (i.e., large LOCA coincident with a loss-of-offsite-power). All other engine starts, for the purpose of meeting the diesel generator surveillance requirements, may be preceded by a warm-up period of low speed operation (idle start), and gradual loading procedures, as recommended by the manufacturer, so that the mechanical stress and wear on the diesel generators is minimized. The load band of 2400kw to 2600kw is provided only to avoid routine overloading of the diesel generators. Momentary transients, outside the load band, due to changing bus loads do not invalidate the surveillance tests.

10/26/89

INSERT  $\rightarrow$  E

Action statements have been included in the specification to cover all situations where either one AC source or a combination of two AC sources are inoperable. Action statements c, e, and f are intended to be followed to completion once entered and should not be exited until both AC sources are restored.

### 3/4.8 ELECTRICAL POWER SYSTEMS

#### 3/4.8.1 A.C. SOURCES

##### 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. Separate and independent diesel generators\* 0, 1A, 2A and 1B with:
  1. For diesel generator 0, 1A and 2A:
    - a) A separate day fuel tank containing a minimum of 250 gallons of fuel.
    - b) A separate fuel storage system containing a minimum of 31,000 gallons of fuel.
  2. For diesel generator 1B, a separate fuel storage tank and a day tank containing a combined minimum of 29,750 gallons of fuel.
  3. A separate fuel transfer pump.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, and 3.

ACTION:

- a. With one offsite circuit of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter. If any of the diesel generators have not been successfully tested within the past 24 hours, demonstrate their OPERABILITY by performing Surveillance Requirement 4.8.1.1.2.a.4 for each such diesel generator, separately, within 24 hours. Restore the offsite circuit to OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- b. With either the 0 or 1A diesel generator inoperable, demonstrate the OPERABILITY of the above required A.C. offsite sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter. If the diesel generator became inoperable due to any cause other than preplanned preventive maintenance or testing, demonstrate the OPERABILITY of the remaining OPERABLE

---

\* See page 3/4 8-2.

ELECTRICAL POWER SYSTEMS

LIMITING CONDITION FOR OPERATION (Continued)

---

---

\*For the purpose of completing technical specification surveillance requirements 4.8.1.1.2d.1 and 4.8.1.1.2f.1, as part of a pre-planned preventive maintenance program, on the 0 diesel generator the requirements of action statement b are modified to:

1. Eliminate the requirement for performing technical specification surveillance requirements 4.8.1.1.1a on each operable AC source, immediately and once per 8 hours thereafter, when the 0 diesel generator is declared inoperable.
2. Allow an additional 96 hours in excess of the 72 hours allowed in action statement b for the 0 diesel generator to be inoperable.

Provided that the following conditions are met:

- A. Unit 2 is in operational condition 4 or 5 or defueled prior to taking the 0 diesel generator out of service:
- B. Surveillance requirements 4.8.1.1.1a and 4.8.1.1.2a.4 are successfully completed, for the offsite power sources and the 1A and 2A diesel generators, within 48 hours prior to removal of the 0 diesel generator from service.
- C. No maintenance is performed on the offsite circuits or the 1A or 2A diesel generators, while the 0 diesel generator is inoperable.
- D. Technical specification requirement 4.8.1.1.1a is performed daily, while the 0 diesel generator is inoperable.
- E. The control circuit for the unit cross-tie circuit breakers between buses 142Y and 242Y are temporarily modified to allow the breakers to be closed with a diesel generator feeding the bus, while the 0 diesel generator is inoperable.

The provisions of technical specification 3.0.4 are not applicable.

## ELECTRICAL POWER SYSTEMS

### LIMITING CONDITION FOR OPERATION (Continued)

---

diesel generators, separately, by performing Surveillance Requirement 4.8.1.1.2.a.4 within 24 hours\*. Restore the diesel generator to OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

- c. With one offsite circuit of the above-required A.C. sources and diesel generator 0 or 1A of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter. If the diesel generator became inoperable due to any cause other than preplanned preventive maintenance or testing, demonstrate the OPERABILITY of the remaining OPERABLE diesel generators, separately, by performing Surveillance Requirement 4.8.1.1.2.a.4 within 8 hours\*. Restore at least one of the inoperable A.C. sources to OPERABLE status within 12 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. Restore at least two offsite circuits and diesel generators 0 and 1A to OPERABLE status within 72 hours from the time of initial loss or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- d. With diesel generator 1B of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the offsite A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter. If the diesel generator became inoperable due to any cause other than preplanned preventive maintenance or testing, demonstrate the OPERABILITY of the remaining OPERABLE diesel generators, separately, by performing Surveillance Requirement 4.8.1.1.2.a.4 within 24 hours\*. Restore diesel generator 1B to OPERABLE status within 72 hours or declare the HPCS system inoperable and take the ACTION required by specification 3.5.1.
- e. With both of the above required offsite circuits inoperable, demonstrate the OPERABILITY of the remaining A.C. sources, separately, by performing Surveillance Requirement 4.8.1.1.2.a.4 within 8 hours unless the diesel generators are already operating. Restore at least one offsite circuit to OPERABLE status within 24 hours, or be in at least HOT SHUTDOWN within the next 12 hours. With only one offsite circuit restored to OPERABLE status, restore

---

\* This test is required to be completed regardless of when the inoperable diesel generator is restored to OPERABILITY. The provisions of Specification 3.0.2 are not applicable.

## ELECTRICAL POWER SYSTEMS

### LIMITING CONDITION FOR OPERATION (Continued)

---

#### ACTION (Continued)

at least two offsite circuits to OPERABLE status within 72 hours from the time of initial loss or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. A successful test(s) of diesel generator OPERABILITY per Surveillance Requirement 4.8.1.1.2.a.4, performed under this ACTION statement for the OPERABLE diesel generators, satisfies the diesel generator test requirements of ACTION statement a.

- f. With diesel generators 0 and 1A of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter, and Surveillance Requirement 4.8.1.1.2.a.4 for the 1B and 2A diesel generators, separately, within 8 hours\*. Restore at least one of the inoperable diesel generators 0 or 1A to OPERABLE status within 2 hours, or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. Restore both diesel generators 0 and 1A to OPERABLE status within 72 hours, from the time of initial loss, or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- g. With diesel generator 2A of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter. If the 2A diesel generator became inoperable due to any cause other than preplanned preventive maintenance or testing, demonstrate the OPERABILITY of the 1A diesel generator by performing Surveillance Requirement 4.8.1.1.2.a.4, within 24 hours\*. Restore the inoperable diesel generator 2A to OPERABLE status within 72 hours or declare standby gas treatment system subsystem B, Unit 2 drywell and suppression chamber hydrogen recombiner system, and control room and auxiliary electric equipment room emergency filtration system train B inoperable, and take the ACTION required by specifications 3.6.5.3, 3.6.6.1, and 3.7.2. Continued performance of Surveillance Requirement 4.8.1.1.1.a is not required provided the above systems are declared inoperable and the action of their respective specifications is taken.

---

\* This test is required to be completed regardless of when the inoperable diesel generator is restored to OPERABILITY. The provisions of Specification 3.0.2 are not applicable.

## ELECTRICAL POWER SYSTEMS

### LIMITING CONDITION FOR OPERATION (Continued)

---

#### ACTION (Continued)

- h. With one offsite circuit of the above required A.C. electrical power sources and diesel generator 1B inoperable, apply the requirements of ACTION a and d specified above.
- i. With either diesel generators 0 or 1A inoperable and diesel generator 1B inoperable, apply the requirements of ACTION b and d specified above.
- j. With one offsite circuit of the above required A.C. electrical power sources and diesel generator 2A inoperable, apply the requirements of ACTION a and g specified above.
- k. With diesel generator 1B and diesel generator 2A inoperable, apply the requirements of ACTION d and g specified above.
- l. With diesel generator 0 and diesel generator 2A inoperable, apply the requirements of ACTION b and g specified above.

## ELECTRICAL POWER SYSTEMS

### 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, and
  - b. Demonstrated OPERABLE at least once per 18 months during shutdown by manually transferring unit power supply from the normal circuit to the alternate circuit.
- 4.8.1.1.2 Each of the above required diesel generators shall be demonstrated OPERABLE:\*
- a. In accordance with the frequency specified in Table 4.8.1.1.2-1 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 starts and transfers fuel from the storage system to the day fuel tank.
    4. Verifying the diesel starts from ambient condition and accelerates to 900 rpm + 5%, -2% in less than or equal to 13 seconds\*\*. The generator voltage and frequency shall be 4160 ± 150 volts and 60 + 3.0, -1.2 Hz within 13 seconds\*\* after the start signal.
    5. Verifying the diesel generator is synchronized, and then loaded to 2400 kw to 2600 kw\*\*\* within 60 seconds\*\*, and operates with this load for at least 60 minutes.

\* All planned diesel generator starts performed for the purpose of meeting these surveillance requirements may be preceded by an engine prelube period, as recommended by the manufacturer.

\*\* Surveillance testing to verify the diesel generator start (13 second) and load (60 second) times from ambient conditions shall be performed at least once per 184 days. All other engine starts performed for the purpose of meeting these surveillance requirements may be conducted in accordance with warmup and loading procedures, as recommended by the manufacturer, in order to minimize mechanical stress and wear on the diesel generator caused by fast starting and loading of the diesel generator.

\*\*\* Transients, outside of this load band, do not invalidate the surveillance tests.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

---

6. Verifying the diesel generator is aligned to provide standby power to the associated emergency busses.
7. Verifying the pressure in all diesel generator air start receivers to be greater than or equal to 200 psig.
- b. At least once per 31 days and after each operation of the diesel generator where the period of operation was greater than or equal to 1 hour by checking for and removing accumulated water from the day fuel tanks.
- 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-0270-1975 has a water and sediment content of less than or equal to 0.05 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-0975-77, and an impurity level of less than 2 mg. of insolubles per 100 ml. when tested in accordance with ASTM-02274-70.
- 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 diesel generator capability\* to reject a load of greater than or equal to 1190 kw for diesel generator 0, greater than or equal to 638 kw for diesel generators 1A and 2A, and greater than or equal to 2381 kw for diesel generator 1B while maintaining engine speed less than or equal to 75% of the difference between nominal speed and the overspeed trip setpoint or 15% above nominal, whichever is less.
  3. Verifying the diesel generator capability\* to reject a load of 2600 kw without tripping. The generator voltage shall not exceed 5000 volts during and following the load rejection.
  4. Simulating a loss of offsite power\* by itself, and:
    - a) For Divisions 1 and 2 and for Unit 2 Division 2:
      - 1) Verifying de-energization of the emergency busses and load shedding from the emergency busses.

---

\* All planned diesel generator starts performed for the purpose of meeting these surveillance requirements may be preceded by an engine prelube period, as recommended by the manufacturer.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

---

- 2) Verifying the diesel generator starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 13 seconds, energizes the auto-connected load and operates for greater than or equal to 5 minutes while its generator is so loaded. After energization, the steady state voltage and frequency of the emergency busses shall be maintained at  $4160 \pm 150$  volts and  $60 \pm 1.2$  Hz during this test.
- b) For Division 3:
- 1) Verifying de-energization of the emergency bus.
  - 2) Verifying the diesel generator starts on the auto-start signal, energizes the emergency bus with its loads within 13 seconds and operates for greater than or equal to 5 minutes while its generator is so loaded. After energization, the steady state voltage and frequency of the emergency bus shall be maintained at  $4160 \pm 150$  volts and  $60 \pm 1.2$  Hz during this test.
5. Verifying that on an ECCS actuation test signal, without loss of offsite power, diesel generators 0, 1A and 1B start\* on the auto-start signal and operate on standby for greater than or equal to 5 minutes. The generator voltage and frequency shall be  $4160 + 416, -150$  volts and  $60 + 3.0, -1.2$  Hz within 13 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 ECCS actuation test signal\*, and:
- a) For Divisions 1 and 2:
- 1) Verifying de-energization of the emergency busses and load shedding from the emergency busses.

---

\* All planned diesel generator starts performed for the purpose of meeting these surveillance requirements may be preceded by an engine prelube period, as recommended by the manufacturer.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

---

- 2) Verifying the diesel generator starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 13 seconds, energizes the auto-connected emergency 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  $4160 \pm 416$  volts and  $60 \pm 1.2$  Hz during this test.
  - b) For Division 3:
    - 1) Verifying de-energization of the emergency bus.
    - 2) Verifying the diesel generator starts on the auto-start signal, energizes the emergency bus with its loads within 13 seconds 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 bus shall be maintained at  $4160 \pm 416$  volts and  $60 \pm 1.2$  Hz during this test.
7. Verifying that all diesel generator 0, 1A and 1B automatic trips except the following are automatically bypassed on an ECCS actuation signal:
  - a) For Divisions 1 and 2 - engine overspeed, generator differential current, and emergency manual stop.
  - b) For Division 3 - engine overspeed, generator differential or overcurrent, and emergency manual stop.
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 2860 kw and during the remaining 22 hours of this test, the diesel generator shall be loaded to 2400 kw to 2600 kw\*\*\*. The generator voltage and

---

\* All planned diesel generator starts performed for the purpose of meeting these surveillance requirements may be preceded by an engine prelube period, as recommended by the manufacturer.

\*\*\* Transients, outside of this load band, do not invalidate the surveillance tests.

## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

---

frequency shall be  $4160 \pm 420$ ,  $-150$  volts and  $60 \pm 3.0$ ,  $-1.2$  Hz within 13 seconds after the start signal; the steady state generator voltage and frequency shall be maintained within these limits during this test. Within 5 minutes after completing this 24 hour test, perform Surveillance Requirement 4.8.1.1.2.d.4.a).2) and b).2).#

9. Verifying\* that the auto-connected loads to each diesel generator do not exceed the 2000 hour rating of 2860 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 load to the offsite power source, and
  - c) Be restored to its standby status.
11. Verifying that with diesel generator 0, 1A and 1B operating\* in a test mode and connected to its bus:
  - a) For Divisions 1 and 2, that a simulated ECCS actuation signal overrides the test mode by returning the diesel generator to standby-operation.
  - b) For Division 3, that a simulated trip of the diesel generator overcurrent relay trips the SAT feed breaker to bus 143 and that the diesel generator continues to supply normal bus loads.
12. Verifying that the automatic load sequence timer is OPERABLE with the interval between each load block within  $\pm 10\%$  of its design interval for diesel generators 0 and 1A.
13. Verifying that the following diesel generator lockout features prevent diesel generator operation only when required:

---

# If Surveillance Requirement 4.8.1.1.2.d.4a)2) and/or b)2) are not satisfactorily completed, it is not necessary to repeat the preceding 24 hour test. Instead, the diesel generator may be operated at 2600 kw for 1 hour or until operating temperature has stabilized.

\* All planned diesel generator starts performed for the purpose of meeting these surveillance requirements may be preceded by an engine prelube period, as recommended by the manufacturer.

## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

---

- a) Generator underfrequency.
  - b) Low lube oil pressure.
  - c) High jacket cooling temperature.
  - d) Generator reverse power.
  - e) Generator overcurrent.
  - f) Generator loss of field.
  - g) Engine cranking lockout.
- e. At least once per 10 years or after any modifications which could affect diesel generator interdependence by starting diesel generators 0, 1A and 1B simultaneously\*, during shutdown, and verifying that all three diesel generators accelerate to 900 rpm + 5, -2% in less than or equal to 13 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 or equivalent solution, 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 in accordance with ASME Code Section 11, Article IWD-5000.

4.8.1.1.3 Reports - All diesel generator failures, valid or non-valid, shall be reported to the Commission pursuant to Specification 6.6.C within 30 days. 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.

---

\* All planned diesel generator starts performed for the purpose of meeting these surveillance requirements may be preceded by an engine prelube period, as recommended by the manufacturer.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

Table 4.8.1.1.2-1

DIESEL GENERATOR TEST SCHEDULE

<u>NUMBER OF FAILURES IN LAST 20 VALID TESTS*</u>	<u>NUMBER OF FAILURES IN LAST 100 VALID TESTS*</u>	<u>TEST FREQUENCY</u>
≤ 1	≤ 4	At least once per 31 days
≥ 2 **	≥ 5	At least once per 7 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, but determined on a per diesel generator basis. With the exception of the semi-annual fast start, no starting time requirements are required to meet the valid test requirements of Regulatory Guide 1.108.

For the purposes of determining the required test frequency, the previous test failure count may be reduced to zero if:

- 1) a complete diesel overhaul to like-new condition is completed (provided that the overhaul, including appropriate post-maintenance operation and testing, is specifically approved by the manufacturer), and
- 2) if acceptable reliability has been demonstrated. The reliability criterion shall include the successful completion of 14 consecutive tests in a single series structured as follows:
  - a) ten of these tests shall be performed in accordance with the routine Surveillance Requirements 4.8.1.1.2.a.4 and 4.8.1.1.2.a.5, and
  - b) four tests shall be performed in accordance with the 184-day testing requirement of Surveillance Requirements 4.8.1.1.2.a.4 and 4.8.1.1.2.a.5.

If this criterion is not satisfied during the first series of tests, any alternate criterion to be used to reset the failure count to zero requires NRC approval.

\*\* The associated test frequency shall be maintained until 7 consecutive failure free demands have been performed AND the number of failures in the last 20 valid demands has been reduced to one.

BASES

---

3/4.8.1 and 3/4.8.2 A.C. SOURCES and ONSITE POWER DISTRIBUTION SYSTEMS

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

The ACTION requirements specified for the levels of degradation of the power sources provide restriction upon continued facility operation commensurate with the level of degradation. ACTION statements have been included in the specification to cover all situations where either one AC source or a combination of two AC sources are inoperable. ACTION statements c, e, and f are intended to be followed to completion once entered and should not be exited until both AC sources are restored. The OPERABILITY of the power sources are consistent with the initial condition assumptions of the accident analyses and are based upon maintaining at least Division I or II of the 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 one of the two onsite A.C. sources. Division III supplies the high pressure core spray (HPCS) system only.

The OPERABILITY of the minimum specified A.C. and D.C. power sources and associated distribution systems during shutdown and refueling ensures that (1) the facility can be maintained in the shutdown or refueling condition for extended time periods and (2) sufficient instrumentation and control capability is available for monitoring and maintaining the unit status.

The surveillance requirements for demonstrating the OPERABILITY of the diesel generators are in accordance with the recommendations of Regulatory Guide 1.9, "Selection of Diesel Generator Set Capacity for Standby Power Supplies," March 10, 1971, with the exception noted in Appendix B to the FSAR, and Regulatory Guide 1.108, "Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants," Revision 1, August 1977.

The diesel generators are equipped with a pre-lubrication system which maintains a continuous flow of oil to the diesel engine moving parts while the engine is shutdown. The purpose of this system is to increase long term diesel generator reliability by reducing the stress and wear caused by frequent dry starting of the diesel generator. The diesel generator pre-lube may be accomplished either through, normal operation of the installed pre-lubrication system, or by manual pre-lubrication of the diesel generator in accordance with manufacturers instructions. Performance of an idle start of the diesel generator is not considered to be a means of pre-lubrication.

## ELECTRICAL POWER SYSTEMS

### BASES

---

#### A.C. SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS (Continued)

Analysis has shown that testing, which includes a semi-annual fast start of the diesel generators, is sufficient to demonstrate the capability of the On-Site A.C. power systems to mitigate the consequences of the design basis event for the plant (i.e., large LOCA coincident with a loss-of-offsite-power). All other engine starts, for the purpose of meeting the diesel generator surveillance requirements, may be preceded by a warm-up period of low speed operation (idle start), and gradual loading procedures, as recommended by the manufacturer, so that the mechanical stress and wear on the diesel generators is minimized. The load band of 2400 kw to 2600 kw is provided only to avoid routine overloading of the diesel generators. Momentary transients, outside the load band, due to changing bus loads do not invalidate the surveillance tests.

The surveillance requirements for demonstrating the OPERABILITY of the unit batteries are in accordance with 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 Station and Substations."

Verifying average electrolyte temperature above the minimum for which the battery was sized, total battery terminal voltage on float charge, connection resistance values and the performance of battery service and discharge tests ensure 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.

Table 4.8.2.3.2-1 specifies the normal limits for each designated pilot cell and each connected cell for electrolyte level, float voltage and specific gravity. The limits for the designated pilot cells float voltage and specific gravity, greater than 2.13 volts and 0.015 below the manufacturer's full charge specific gravity or a battery charger current that had stabilized at a low value, is characteristic of a charged cell with adequate capacity. The normal limits for each connected cell for float voltage and specific gravity, greater than 2.13 volts and not more than 0.020 below the manufacturer's full charge specific gravity with an average specific gravity of all the connected cells not more than 0.010 below the manufacturer's full charge specific gravity, ensures the OPERABILITY and capability of the battery.

Operation with a battery cell's parameter outside the normal limit but within the allowable value specified in Table 4.8.2.3.2-1 is permitted for up to 7 days. During this 7 day period: (1) the allowable values for electrolyte level ensures no physical damage to the plates with an adequate electron transfer capability; (2) the allowable value for the average specific gravity of all the cells, not more than 0.020 below the manufacturer's

## ELECTRICAL POWER SYSTEMS

### BASES

---

#### A.C. SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS (Continued)

recommended full charge specific gravity, ensures that the decrease in rating will be less than the safety margin provided in sizing; (3) the allowable value for an individual cell's specific gravity ensures that an individual cell's specific gravity will not be more than 0.040 below the manufacturer's full charge specific gravity and that the overall capability of the battery will be maintained within an acceptable limit; and (4) the allowable value for an individual cell's float voltage, greater than 2.07 volts, ensures the battery's capability to perform its design function.

#### 3/4.8.3 ELECTRICAL EQUIPMENT PROTECTIVE DEVICES

Primary containment electrical penetrations and penetration conductors are protected by either de-energizing circuits not required during reactor operation or demonstrating the OPERABILITY of primary and backup overcurrent protection circuit breakers by periodic surveillance.

The surveillance requirements applicable to lower voltage circuit breakers and fuses provides assurance of breaker and fuse reliability by testing at least one representative sample of each manufacturers brand of circuit breaker and/or fuse. Each manufacturer's molded case and metal case circuit breakers and/or fuses are grouped into representative samples which are then tested on a rotating basis to ensure that all breakers and/or fuses are tested. If a wide variety exists within any manufacturer's brand of molded case circuit breakers and/or fuses, it is necessary to divide that manufacturer's breakers and/or fuses into groups and treat each group as a separate type of breaker or fuses for surveillance purposes.

The bypassing of the motor operated valves thermal overload protection continuously or during accident conditions by integral bypass devices ensures that the thermal overload protection will not prevent safety related valves from performing their function. The Surveillance Requirements for demonstrating the bypassing of the thermal overload protection continuously and during accident conditions are in accordance with Regulatory Guide 1.106 "Thermal Overload Protection for Electric Motors on Motor Operated Valves", Revision 1, March 1977.

### 3/4.8 ELECTRICAL POWER SYSTEMS

#### 3/4.8.1 A.C. SOURCES

##### 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. Separate and independent diesel generators\* 0, 1A, 2A and 2B with:
  1. For diesel generator 0, 1A and 2A:
    - a) A separate day fuel tank containing a minimum of 250 gallons of fuel.
    - b) A separate fuel storage system containing a minimum of 31,000 gallons of fuel.
  2. For diesel generator 2B, a separate fuel storage tank and a day tank containing a combined minimum of 29,750 gallons of fuel.
  3. A separate fuel transfer pump.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, and 3.

ACTION:

- a. With one offsite circuit of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter. If any of the diesel generators have not been successfully tested within the past 24 hours, demonstrate their OPERABILITY by performing Surveillance Requirement 4.8.1.1.2.a.4 for each such diesel generator, separately, within 24 hours. Restore the offsite circuit to OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- b. With either the 0 or 2A diesel generator inoperable, demonstrate the OPERABILITY of the above required A.C. offsite sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter. If the diesel generator became inoperable due to any cause other than preplanned preventive maintenance or testing, demonstrate the OPERABILITY of the remaining OPERABLE

---

\* See page 3/4 8-2.

ELECTRICAL POWER SYSTEMS

LIMITING CONDITION FOR OPERATION (Continued)

---

\*For the purpose of completing technical specification surveillance requirements 4.8.1.1.2d.1 and 4.8.1.1.2f.1, as part of a pre-planned preventive maintenance program, on the 0 diesel generator the requirements of action statement b are modified to:

1. Eliminate the requirement for performing technical specification surveillance requirements 4.8.1.1.1a on each operable AC source, immediately and once per 8 hours thereafter, when the 0 diesel generator is declared inoperable.
2. Allow an additional 96 hours in excess of the 72 hours allowed in action statement b for the 0 diesel generator to be inoperable.

Provided that the following conditions are met:

- A. Unit 1 is in operational condition 4 or 5 or defueled prior to taking the 0 diesel generator out of service:
- B. Surveillance requirements 4.8.1.1.1a and 4.8.1.1.2a.4 are successfully completed, for the offsite power sources and the 1A and 2A diesel generators, within 48 hours prior to removal of the 0 diesel generator from service.
- C. No maintenance is performed on the offsite circuits or the 1A or 2A diesel generators, while the 0 diesel generator is inoperable.
- D. Technical specification requirement 4.8.1.1.1a is performed daily, while the 0 diesel generator is inoperable.
- E. The control circuit for the unit cross-tie circuit breakers between buses 142Y and 242Y are temporarily modified to allow the breakers to be closed with a diesel generator feeding the bus, while the 0 diesel generator is inoperable.

The provisions of technical specification 3.0.4 are not applicable.

## ELECTRICAL POWER SYSTEMS

### LIMITING CONDITION FOR OPERATION (Continued)

---

- diesel generators, separately, by performing Surveillance Requirement 4.8.1.1.2.a.4 within 24 hours\*. Restore the diesel generator to OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- c. With one offsite circuit of the above-required A.C. sources and diesel generator 0 or 2A of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter. If the diesel generator became inoperable due to any cause other than preplanned preventive maintenance or testing, demonstrate the OPERABILITY of the remaining OPERABLE diesel generators, separately, by performing Surveillance Requirement 4.8.1.1.2.a.4 within 8 hours\*. Restore at least one of the inoperable A.C. sources to OPERABLE status within 12 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. Restore at least two offsite circuits and diesel generators 0 and 2A to OPERABLE status within 72 hours from the time of initial loss or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- d. With diesel generator 2B of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the offsite A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter. If the diesel generator became inoperable due to any cause other than preplanned preventive maintenance or testing, demonstrate the OPERABILITY of the remaining OPERABLE diesel generators, separately, by performing Surveillance Requirement 4.8.1.1.2.a.4 within 24 hours\*. Restore diesel generator 2B to OPERABLE status within 72 hours or declare the HPCS system inoperable and take the ACTION required by specification 3.5.1.
- e. With both of the above required offsite circuits inoperable, demonstrate the OPERABILITY of the remaining A.C. sources, separately, by performing Surveillance Requirement 4.8.1.1.2.a.4 within 8 hours unless the diesel generators are already operating. Restore at least one offsite circuit to OPERABLE status within 24 hours, or be in at least HOT SHUTDOWN within the next 12 hours. With only one offsite circuit restored to OPERABLE status, restore

---

\* This test is required to be completed regardless of when the inoperable diesel generator is restored to OPERABILITY. The provisions of Specification 3.0.2 are not applicable.

## ELECTRICAL POWER SYSTEMS

### LIMITING CONDITION FOR OPERATION (Continued)

---

#### ACTION (Continued)

at least two offsite circuits to OPERABLE status within 72 hours from the time of initial loss or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. A successful test(s) of diesel generator OPERABILITY per Surveillance Requirement 4.8.1.1.2.a.4, performed under this ACTION statement for the OPERABLE diesel generators, satisfies the diesel generator test requirements of ACTION statement a.

- f. With diesel generators 0 and 2A of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter, and Surveillance Requirement 4.8.1.1.2.a.4 for the 2B and 1A diesel generators, separately, within 8 hours\*. Restore at least one of the inoperable diesel generators 0 or 2A to OPERABLE status within 2 hours, or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. Restore both diesel generators 0 and 2A to OPERABLE status within 72 hours, from the time of initial loss, or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- g. With diesel generator 1A of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter. If the 1A diesel generator became inoperable due to any cause other than preplanned preventive maintenance or testing, demonstrate the OPERABILITY of the 2A diesel generator by performing Surveillance Requirement 4.8.1.1.2.a.4, within 24 hours\*. Restore the inoperable diesel generator 1A to OPERABLE status within 72 hours or declare standby gas treatment system subsystem A, Unit 1 drywell and suppression chamber hydrogen recombiner system, and control room and auxiliary electric equipment room emergency filtration system train A inoperable, and take the ACTION required by specifications 3.6.5.3, 3.6.6.1, and 3.7.2. Continued performance of Surveillance Requirement 4.8.1.1.1.a is not required provided the above systems are declared inoperable and the action of their respective specifications is taken.

---

\* This test is required to be completed regardless of when the inoperable diesel generator is restored to OPERABILITY. The provisions of Specification 3.0.2 are not applicable.

ELECTRICAL POWER SYSTEMS

LIMITING CONDITION FOR OPERATION (Continued)

---

ACTION (Continued)

- h. With one offsite circuit of the above required A.C. electrical power sources and diesel generator 2B inoperable, apply the requirements of ACTION a and d specified above.
- i. With either diesel generators 0 or 2A inoperable and diesel generator 2B inoperable, apply the requirements of ACTION b and d specified above.
- j. With one offsite circuit of the above required A.C. electrical power sources and diesel generator 1A inoperable, apply the requirements of ACTION a and g specified above.
- k. With diesel generator 2B and diesel generator 1A inoperable, apply the requirements of ACTION d and g specified above.
- l. With diesel generator 0 and diesel generator 1A inoperable, apply the requirements of ACTION b and g specified above.

## ELECTRICAL POWER SYSTEMS

### 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, and
  - b. Demonstrated OPERABLE at least once per 18 months during shutdown by manually transferring unit power supply from the normal circuit to the alternate circuit.
- 4.8.1.1.2 Each of the above required diesel generators shall be demonstrated OPERABLE:\*
- a. In accordance with the frequency specified in Table 4.8.1.1.2-1 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 starts and transfers fuel from the storage system to the day fuel tank.
    4. Verifying the diesel starts from ambient condition and accelerates to 900 rpm + 5%, -2% in less than or equal to 13 seconds\*\*. The generator voltage and frequency shall be 4160 ± 150 volts and 60 + 3.0, -1.2 Hz within 13 seconds\*\* after the start signal.
    5. Verifying the diesel generator is synchronized, and then loaded to 2400 kw to 2600 kw\*\*\* within 60 seconds\*\*, and operates with this load for at least 60 minutes.

\* All planned diesel generator starts performed for the purpose of meeting these surveillance requirements may be preceded by an engine prelude period, as recommended by the manufacturer.

\*\* Surveillance testing to verify the diesel generator start (13 second) and load (60 second) times from ambient conditions shall be performed at least once per 184 days. All other engine starts performed for the purpose of meeting these surveillance requirements may be conducted in accordance with warmup and loading procedures, as recommended by the manufacturer, in order to minimize mechanical stress and wear on the diesel generator caused by fast starting and loading of the diesel generator.

\*\*\* Transients, outside of this load band, do not invalidate the surveillance tests.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

---

6. Verifying the diesel generator is aligned to provide standby power to the associated emergency busses.
7. Verifying the pressure in all diesel generator air start receivers to be greater than or equal to 200 psig.
- 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 fuel tanks.
- 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-0270-1975 has a water and sediment content of less than or equal to 0.05 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-0975-77, and an impurity level of less than 2 mg. of insolubles per 100 ml. when tested in accordance with ASTM-02274-70.
- 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 diesel generator capability\* to reject a load of greater than or equal to 1190 kw for diesel generator 0, greater than or equal to 638 kw for diesel generators 1A and 2A, and greater than or equal to 2381 kw for diesel generator 2B while maintaining engine speed less than or equal to 75% of the difference between nominal speed and the overspeed trip setpoint or 15% above nominal, whichever is less.
  3. Verifying the diesel generator capability\* to reject a load of 2600 kw without tripping. The generator voltage shall not exceed 5000 volts during and following the load rejection.
  4. Simulating a loss of offsite power\* by itself, and:
    - a) For Divisions 1 and 2 and for Unit 1 Division 2:
      - 1) Verifying de-energization of the emergency busses and load shedding from the emergency busses.

---

\* All planned diesel generator starts performed for the purpose of meeting these surveillance requirements may be preceded by an engine prelube period, as recommended by the manufacturer.

## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

---

- 2) Verifying the diesel generator starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 13 seconds, energizes the auto-connected load and operates for greater than or equal to 5 minutes while its generator is so loaded. After energization, the steady state voltage and frequency of the emergency busses shall be maintained at  $4160 \pm 150$  volts and  $60 \pm 1.2$  Hz during this test.
- b) For Division 3:
- 1) Verifying de-energization of the emergency bus.
  - 2) Verifying the diesel generator starts on the auto-start signal, energizes the emergency bus with its loads within 13 seconds and operates for greater than or equal to 5 minutes while its generator is so loaded. After energization, the steady state voltage and frequency of the emergency bus shall be maintained at  $4160 \pm 150$  volts and  $60 \pm 1.2$  Hz during this test.
5. Verifying that on an ECCS actuation test signal, without loss of offsite power, diesel generators 0, 2A and 2B start\* on the auto-start signal and operate on standby for greater than or equal to 5 minutes. The generator voltage and frequency shall be  $4160 + 416, -150$  volts and  $60 + 3.0, -1.2$  Hz within 13 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 ECCS actuation test signal\*, and:
- a) For Divisions 1 and 2:
- 1) Verifying de-energization of the emergency busses and load shedding from the emergency busses.

---

\* All planned diesel generator starts performed for the purpose of meeting these surveillance requirements may be preceded by an engine prelube period, as recommended by the manufacturer.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

---

- 2) Verifying the diesel generator starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 13 seconds, energizes the auto-connected emergency 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  $4160 \pm 416$  volts and  $60 \pm 1.2$  Hz during this test.
  - b) For Division 3:
    - 1) Verifying de-energization of the emergency bus.
    - 2) Verifying the diesel generator starts on the auto-start signal, energizes the emergency bus with its loads within 13 seconds 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 bus shall be maintained at  $4160 \pm 416$  volts and  $60 \pm 1.2$  Hz during this test.
7. Verifying that all diesel generator 0, 2A and 2B automatic trips except the following are automatically bypassed on an ECCS actuation signal:
  - a) For Divisions 1 and 2 - engine overspeed, generator differential current, and emergency manual stop.
  - b) For Division 3 - engine overspeed, generator differential or overcurrent, and emergency manual stop.
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 2860 kw and during the remaining 22 hours of this test, the diesel generator shall be loaded to 2400 kw to 2600 kw\*\*\*. The generator voltage and

---

\* All planned diesel generator starts performed for the purpose of meeting these surveillance requirements may be preceded by an engine prelube period, as recommended by the manufacturer.

\*\*\* Transients, outside of this load band, do not invalidate the surveillance tests.

## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

---

frequency shall be  $4160 \pm 420$ ,  $-150$  volts and  $60 \pm 3.0$ ,  $-1.2$  Hz within 13 seconds after the start signal; the steady state generator voltage and frequency shall be maintained within these limits during this test. Within 5 minutes after completing this 24 hour test, perform Surveillance Requirement 4.8.1.1.2.d.4.a).2) and b).2).#

9. Verifying\* that the auto-connected loads to each diesel generator do not exceed the 2000 hour rating of 2860 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 load to the offsite power source, and
  - c) Be restored to its standby status.
11. Verifying that with diesel generator 0, 2A and 2B operating\* in a test mode and connected to its bus:
  - a) For Divisions 1 and 2, that a simulated ECCS actuation signal overrides the test mode by returning the diesel generator to standby operation.
  - b) For Division 3, that a simulated trip of the diesel generator overcurrent relay trips the SAT feed breaker to bus 243 and that the diesel generator continues to supply normal bus loads.
12. Verifying that the automatic load sequence timer is OPERABLE with the interval between each load block within  $\pm 10\%$  of its design interval for diesel generators 0 and 2A.
13. Verifying that the following diesel generator lockout features prevent diesel generator operation only when required:

---

# If Surveillance Requirement 4.8.1.1.2.d.4a)2) and/or b)2) are not satisfactorily completed, it is not necessary to repeat the preceding 24 hour test. Instead, the diesel generator may be operated at 2600 kw for 1 hour or until operating temperature has stabilized.

\* All planned diesel generator starts performed for the purpose of meeting these surveillance requirements may be preceded by an engine prelube period, as recommended by the manufacturer.

## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

---

- a) Generator underfrequency.
  - b) Low lube oil pressure.
  - c) High jacket cooling temperature.
  - d) Generator reverse power.
  - e) Generator overcurrent.
  - f) Generator loss of field.
  - g) Engine cranking lockout.
- e. At least once per 10 years or after any modifications which could affect diesel generator interdependence by starting diesel generators 0, 2A and 2B simultaneously\*, during shutdown, and verifying that all three diesel generators accelerate to 900 rpm + 5, -2% in less than or equal to 13 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 or equivalent solution, 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 in accordance with ASME Code Section 11, Article IWD-5000.

4.8.1.1.3 Reports - All diesel generator failures, valid or non-valid, shall be reported to the Commission pursuant to Specification 6.6.C within 30 days. 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.

---

\* All planned diesel generator starts performed for the purpose of meeting these surveillance requirements may be preceded by an engine prelube period, as recommended by the manufacturer.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

Table 4.8.1.1.2-1

DIESEL GENERATOR TEST SCHEDULE

NUMBER OF FAILURES IN LAST 20 VALID TESTS*	NUMBER OF FAILURES IN LAST 100 VALID TESTS*	TEST FREQUENCY
≤ 1	≤ 4	At least once per 31 days
≥ 2 **	≥ 5	At least once per 7 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, but determined on a per diesel generator basis. With the exception of the semi-annual fast start, no starting time requirements are required to meet the valid test requirements of Regulatory Guide 1.108.

For the purposes of determining the required test frequency, the previous test failure count may be reduced to zero if:

- 1) a complete diesel overhaul to like-new condition is completed (provided that the overhaul, including appropriate post-maintenance operation and testing, is specifically approved by the manufacturer), and
- 2) if acceptable reliability has been demonstrated. The reliability criterion shall include the successful completion of 14 consecutive tests in a single series structured as follows:
  - a) ten of these tests shall be performed in accordance with the routine Surveillance Requirements 4.8.1.1.2.a.4 and 4.8.1.1.2.a.5, and
  - b) four tests shall be performed in accordance with the 184-day testing requirement of Surveillance Requirements 4.8.1.1.2.a.4 and 4.8.1.1.2.a.5.

If this criterion is not satisfied during the first series of tests, any alternate criterion to be used to reset the failure count to zero requires NRC approval.

\*\* The associated test frequency shall be maintained until 7 consecutive failure free demands have been performed AND the number of failures in the last 20 valid demands has been reduced to one.

## 3/4.8 ELECTRICAL POWER SYSTEMS

### BASES

---

#### 3/4.8.1 and 3/4.8.2 A.C. SOURCES and ONSITE POWER DISTRIBUTION SYSTEMS

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

The ACTION requirements specified for the levels of degradation of the power sources provide restriction upon continued facility operation commensurate with the level of degradation. ACTION statements have been included in the specification to cover all situations where either one AC source or a combination of two AC sources are inoperable. ACTION statements c, e, and f are intended to be followed to completion once entered and should not be exited until both AC sources are restored. The OPERABILITY of the power sources are consistent with the initial condition assumptions of the accident analyses and are based upon maintaining at least Division I or II of the 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 one of the two onsite A.C. sources. Division III supplies the high pressure core spray (HPCS) system only.

The OPERABILITY of the minimum specified A.C. and D.C. power sources and associated distribution systems during shutdown and refueling ensures that (1) the facility can be maintained in the shutdown or refueling condition for extended time periods and (2) sufficient instrumentation and control capability is available for monitoring and maintaining the unit status.

The surveillance requirements for demonstrating the OPERABILITY of the diesel generators are in accordance with the recommendations of Regulatory Guide 1.9, "Selection of Diesel Generator Set Capacity for Standby Power Supplies," March 10, 1971, with the exception noted in Appendix B to the FSAR, and Regulatory Guide 1.108, "Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants," Revision 1, August 1977.

The diesel generators are equipped with a pre-lubrication system which maintains a continuous flow of oil to the diesel engine moving parts while the engine is shutdown. The purpose of this system is to increase long term diesel generator reliability by reducing the stress and wear caused by frequent dry starting of the diesel generator. The diesel generator pre-lube may be accomplished either through, normal operation of the installed pre-lubrication system, or by manual pre-lubrication of the diesel generator in accordance with manufacturers instructions. Performance of an idle start of the diesel generator is not considered to be a means of pre-lubrication.

BASESA.C. SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS (Continued)

Analysis has shown that testing, which includes a semi-annual fast start of the diesel generators, is sufficient to demonstrate the capability of the On-Site A.C. power systems to mitigate the consequences of the design basis event for the plant (i.e., large LOCA coincident with a loss-of-offsite-power). All other engine starts, for the purpose of meeting the diesel generator surveillance requirements, may be preceded by a warm-up period of low speed operation (idle start), and gradual loading procedures, as recommended by the manufacturer, so that the mechanical stress and wear on the diesel generators is minimized. The load band of 2400 kw to 2600 kw is provided only to avoid routine overloading of the diesel generators. Momentary transients, outside the load band, due to changing bus loads do not invalidate the surveillance tests.

The surveillance requirements for demonstrating the OPERABILITY of the unit batteries are in accordance with 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 Station and Substations."

Verifying average electrolyte temperature above the minimum for which the battery was sized, total battery terminal voltage on float charge, connection resistance values and the performance of battery service and discharge tests ensure 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.

Table 4.8.2.3.2-1 specifies the normal limits for each designated pilot cell and each connected cell for electrolyte level, float voltage and specific gravity. The limits for the designated pilot cells float voltage and specific gravity, greater than 2.13 volts and 0.015 below the manufacturer's full charge specific gravity or a battery charger current that had stabilized at a low value, is characteristic of a charged cell with adequate capacity. The normal limits for each connected cell for float voltage and specific gravity, greater than 2.13 volts and not more than 0.020 below the manufacturer's full charge specific gravity with an average specific gravity of all the connected cells not more than 0.010 below the manufacturer's full charge specific gravity, ensures the OPERABILITY and capability of the battery.

Operation with a battery cell's parameter outside the normal limit but within the allowable value specified in Table 4.8.2.3.2-1 is permitted for up to 7 days. During this 7 day period: (1) the allowable values for electrolyte level ensures no physical damage to the plates with an adequate electron transfer capability; (2) the allowable value for the average specific gravity of all the cells, not more than 0.020 below the manufacturer's

BASES

---

A.C. SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS (Continued)

recommended full charge specific gravity, ensures that the decrease in rating will be less than the safety margin provided in sizing; (3) the allowable value for an individual cell's specific gravity ensures that an individual cell's specific gravity will not be more than 0.040 below the manufacturer's full charge specific gravity and that the overall capability of the battery will be maintained within an acceptable limit; and (4) the allowable value for an individual cell's float voltage, greater than 2.07 volts, ensures the battery's capability to perform its design function.

3/4.8.3 ELECTRICAL EQUIPMENT PROTECTIVE DEVICES

Primary containment electrical penetrations and penetration conductors are protected by either de-energizing circuits not required during reactor operation or demonstrating the OPERABILITY of primary and backup overcurrent protection circuit breakers by periodic surveillance.

The surveillance requirements applicable to lower voltage circuit breakers and fuses provides assurance of breaker and fuse reliability by testing at least one representative sample of each manufacturers brand of circuit breaker and/or fuse. Each manufacturer's molded case and metal case circuit breakers and/or fuses are grouped into representative samples which are then tested on a rotating basis to ensure that all breakers and/or fuses are tested. If a wide variety exists within any manufacturer's brand of molded case circuit breakers and/or fuses, it is necessary to divide that manufacturer's breakers and/or fuses into groups and treat each group as a separate type of breaker or fuses for surveillance purposes.

The bypassing of the motor operated valves thermal overload protection continuously or during accident conditions by integral bypass devices ensures that the thermal overload protection will not prevent safety related valves from performing their function. The Surveillance Requirements for demonstrating the bypassing of the thermal overload protection continuously and during accident conditions are in accordance with Regulatory Guide 1.106 "Thermal Overload Protection for Electric Motors on Motor Operated Valves", Revision 1, March 1977.