

ATTACHMENT 1 TO AEP:NRG:0896U  
EXISTING TECHNICAL SPECIFICATION PAGES  
MARKED TO REFLECT PROPOSED CHANGES

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## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

2. The pilot cell specific gravity, corrected to 77°F, and full electrolyte level (fluid at the bottom of the maximum level indication mark), is greater than or equal to 1.200,
  3. The pilot cell voltage is greater than or equal to 2.13 volts, and
  4. The overall battery voltage is greater than or equal to 250 volts.
- b. At least once per 92 days by verifying that:
1. The voltage of each connected cell is greater than or equal to 2.13 volts under float charge.
  2. The specific gravity, corrected to 77°F, and full electrolyte level (fluid at the bottom of the maximum level indication mark), of each connected cell is greater than or equal to 1.200 and has not decreased more than 0.03 from the value observed during the previous test, and
  3. The electrolyte level of each connected cell is between the top of the minimum level indication mark and the bottom of the maximum level indication mark.
- c. At least once per 18 months by verifying that:
1. The cells, cell plates and battery racks show no visual indication of physical damage or abnormal deterioration,
  2. The cell-to-cell and terminal connections are clean, tight, free of corrosion and coated with anti-corrosion material,
  3. The battery charger will supply at least 140 amperes at greater than or equal to 250 volts for at least 4 hours.
- d. At least once per 18 months, perform a battery service test during shutdown (MODES 5 or 6), by verifying that the battery capacity is adequate to supply and maintain in OPERABLE status the actual or simulated emergency loads for the times specified in Table 4.8-2 ~~with the battery charger disconnected~~. The battery terminal voltage shall be maintained greater than or equal to 210 volts throughout this test.
- insert* design duty cycle which is based on the composite load profile. The composite load profile envelopes both the LOCA/LOOP and Station Blackout profiles and provides the basis for the times listed in Table 4.8-2. The battery charger will be disconnected throughout the test.

## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

- e. ~~At least once per 60 months, perform a battery discharge test during shutdown (MODES 5 or 6), by verifying that the battery capacity is at least 80% of the manufacturer's rating. This performance discharge test shall be performed in place of the battery service test.~~

At least once per 60 months, conduct a performance test of battery capacity during shutdown (MODES 5 or 6), by verifying that the battery capacity is at least 80% of the manufacturer's rating. When this test is performed in place of a battery service test, a modified performance test shall be conducted.

Annual performance tests of battery capacity shall be given to any battery that shows signs of degradation or has reached 85% of the service life expected for the application. Degradation is indicated when the battery capacity drops more than 10% from its capacity on the previous performance test, or is below 90% of the manufacturer's rating. If the battery has reached 85% of service life, delivers a capacity of 100% or greater of the manufacturer's rated capacity, and has shown no signs of degradation, performance testing at two year intervals is acceptable until the battery shows signs of degradation.

TABLE 4.8-2

BATTERY EMERGENCY LOADS

<u>AB Battery Loads</u>		<u>Minimum Time</u>
1.	Channel III static inverter	4 <del>8</del> hrs
2.	Channel IV static inverter	4 <del>8</del> hrs
<del>3.</del>	<del>Computer static inverter*</del>	<del>3 hrs</del>
3 <del>4</del> .	Feed pump turbine <sup>EMERGENCY</sup> oil pump	1 hr
4 <del>8</del> .	Control room emergency lighting	4 <del>8</del> hrs
5 <del>8</del> .	Main turbine backup oil pump	1 <del>8</del> hrs
6 <del>7</del> .	Isolation valve control	4 <del>8</del> hrs
7 <del>8</del> .	All control circuits	4 <del>8</del> hrs
<u>CD Battery Loads</u>		
1.	Channel I static inverter	4 <del>8</del> hrs
2.	Channel II static inverter	4 <del>8</del> hrs
3.	BOP static inverter*	4 <del>8</del> hrs
4.	Feed pump turbine <sup>EMERGENCY</sup> oil pump	1 hr
5.	Generator <sup>HYDROGEN EMERGENCY</sup> seal oil pump	4 <del>8</del> hrs
6.	Turbine emergency oil pump	1 <del>8</del> hrs
7.	Isolation valves	4 <del>8</del> hrs
8.	Annunciators	4 <del>8</del> hrs
9.	All control circuits	4 <del>8</del> hrs

\* AC power sources to the inverters shall be turned off at the start of the test and may be turned on at the end of the specified time interval. Inverters may be left in this operating mode for the duration of the discharge test.

## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

3. The pilot cell voltage is greater than or equal to 2.13 volts, and
  4. The overall battery voltage is greater than or equal to 250 volts.
- b. At least once per 92 days by verifying that:
1. The voltage of each connected cell is greater than or equal to 2.13 volts under float charge.
  2. The specific gravity, corrected to 77°F and full electrolyte level (fluid at the bottom of the maximum level indication mark), of each connected cell is greater than or equal to 1.200 and has not decreased more than 0.03 from the value observed during the previous test, and
  3. The electrolyte level of each connected cell is between the top of the minimum level indication mark and the bottom of the maximum level indication mark.
- c. At least once per 18 months by verifying that:
1. The cells, cell plates and battery racks show no visual indication of physical damage or abnormal deterioration.
  2. The cell-to-cell and terminal connections are clean, tight, free of corrosion and coated with anti-corrosion material.
  3. The battery charger will supply at least 10 amperes at greater than or equal to 250 volts for at least 4 hours.
- d. At least once per 18 months perform a battery service test, during shutdown (MODES 5 or 6), by verifying that the battery capacity is adequate to supply and maintain in OPERABLE status the actual or simulated emergency loads for the times specified of Table 4.8-3 with the battery charger disconnected. The battery terminal voltage shall be maintained greater than or equal to 210 volts throughout the battery service test.
- e. ~~At least once per 60 months perform a battery discharge test during shutdown (MODES 5 or 6), by verifying that the battery capacity is at least 80% of the manufacturer's rating. This performance discharge test shall be performed in place of the battery service test.~~

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At least once per 60 months, conduct a performance test of battery capacity during shutdown (MODES 5 or 6), by verifying that the battery capacity is at least 80% of the manufacturer's rating. When this test is performed in place of a battery service test, a modified performance test shall be conducted.

Annual performance tests of battery capacity shall be given to any battery that shows signs of degradation or has reached 85% of the service life expected for the application. Degradation is indicated when the battery capacity drops more than 10% from its capacity on the previous performance test, or is below 90% of the manufacturer's rating. If the battery has reached 85% of service life, delivers a capacity of 100% or greater of the manufacturer's rated capacity, and has shown no signs of degradation, performance testing at two year intervals is acceptable until the battery shows signs of degradation.

TABLE 4.8-3

BATTERY EMERGENCY LOADS"N" Battery LoadsMinimum Time

Auxiliary feedwater turbine control bus	4 hours
FMO-211 valve	4 <del>hours</del>
FMO-221 valve	4 <del>hours</del>
FMO-231 valve	4 <del>hours</del>
FMO-241 valve	4 <del>hours</del>
TDTV valve	4 <del>hours</del>

\*Valves will be operated through the following sequence:

1. Beginning of test: open valves
2. Five minutes after the beginning of the test: close the valves.
3. Ten minutes after the beginning of the test: reopen the valves.
4. Four hours after the beginning of the test: close the valves.

End of the test.





### 3/4.8 ELECTRICAL POWER SYSTEMS

#### BASES

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 one of each 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 the other onsite A.C. source.

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 facility status.

\* The train N station battery system provides an independent 250 volt DC power supply for power and control of the turbine driven auxiliary feedwater pump train. The limiting conditions of operation for the train N battery are consistent with the requirements of the auxiliary feedwater system. The surveillance requirements for the train N battery system are consistent with the requirements of the AB and CD station batteries. The train N battery loads are derived from equipment in the turbine driven auxiliary feedwater pump train and battery sizing is consistent with the functional requirements of these components. Simulated loads for battery tests are loads equivalent to measured actual loads.

*insert* { The AB and CD station battery systems provide a reliable source of continuous power for supply and control of plant loads such as switchgear & annunciator control circuits, static inverters, valve control centers, emergency lighting and motor control centers. The design duty cycles of these batteries are composite load profiles resulting from the combination of the three hour Loss Of Coolant Accident/Loss Of Offsite Power battery load profiles and the four hour Station Blackout battery load profiles.

## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

2. The pilot cell specific gravity, corrected to 77 °F, and full electrolyte level (fluid at the bottom of the maximum level indication mark), is greater than or equal to 1.200,
  3. The pilot cell voltage is greater than or equal to 2.13 volts, and
  4. The overall battery voltage is greater than or equal to 250 volts.
- b. At least once per 92 days by verifying that:
1. The voltage of each connected cell is greater than or equal to 2.13 volts under float charge.
  2. The specific gravity, corrected to 77 °F, and full electrolyte level (fluid at the bottom of the maximum level indication mark), of each connected cell is greater than or equal to 1.200 and has not decreased more than 0.03 from the value observed during the previous test, and
  3. The electrolyte level of each connected cell is between the top of the minimum level indication mark and the bottom of the maximum level indication mark.
- c. At least once per 18 months by verifying that:
1. The cells, cell plates and battery racks show no visual indication of physical damage or abnormal deterioration,
  2. The cell-to-cell and terminal connections are clean, tight, free of corrosion and coated with anti-corrosion material,
  3. The battery charger will supply at least 140 amperes at greater than or equal to 250 volts for at least 4 hours.\*
- d. At least once per 18 months, perform a battery service test during shutdown (MODES 5 or 6), by verifying that the battery capacity is adequate to supply and maintain in OPERABLE status the actual or simulated emergency loads for the times specified in Table 4.8-2 with the battery charger disconnected. The battery terminal voltage shall be maintained greater than or equal to 210 volts throughout this test.\*

*insert* \_\_\_\_\_ design duty cycle which is based on the composite load profile. The composite load profile envelopes both the LOCA/LOOP and Station Blackout profiles and provides the basis for the times listed in Table 4.8-2. The battery charger will be disconnected throughout the test.

\*The provisions of Specification 4.0.9 are applicable to the 2-CD battery and charger.



## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

- e. ~~At least once per 60 months, perform a battery discharge test during shutdown (MODES 5 or 6), by verifying that the battery capacity is at least 80% of the manufacturer's rating. This performance discharge test shall be performed in place of the battery service test.~~

At least once per 60 months, conduct a performance test of battery capacity during shutdown (MODES 5 or 6), by verifying that the battery capacity is at least 80% of the manufacturer's rating. When this test is performed in place of a battery service test, a modified performance test shall be conducted.

Annual performance tests of battery capacity shall be given to any battery that shows signs of degradation or has reached 85% of the service life expected for the application. Degradation is indicated when the battery capacity drops more than 10% from its capacity on the previous performance test, or is below 90% of the manufacturer's rating. If the battery has reached 85% of service life, delivers a capacity of 100% or greater of the manufacturer's rated capacity, and has shown no signs of degradation, performance testing at two year intervals is acceptable until the battery shows signs of degradation.



TABLE 4.8-2

BATTERY EMERGENCY LOADS

<u>AB Battery Loads</u>	<u>Minimum Time</u>
1. Channel III static inverter	4 <del>8</del> hrs
2. Channel IV static inverter	4 <del>8</del> hrs
<del>3. Computer static inverter*</del>	<del>3 hrs</del>
3 <del>4</del> . Bop static inverter*	4 <del>8</del> hrs
4 <del>5</del> . <sup>EAST</sup> Feed pump turbine <sup>EMERGENCY</sup> oil pump	1 hr
5 <del>6</del> . Control room emergency lighting	4 <del>8</del> hrs
6 <del>7</del> . Main turbine <sup>EAST</sup> emergency oil pump	1 <del>8</del> hrs
7 <del>8</del> . Isolation valve control	4 <del>8</del> hrs
8 <del>9</del> . All control circuits	4 <del>8</del> hrs

CD Battery Loads

1. Channel I static inverter	4 <del>8</del> hr's
2. Channel II static inverter	4 <del>8</del> hrs
3. <sup>WEST</sup> Feed pump turbine <sup>EMERGENCY</sup> oil pump	1 hr
4. Generator <sup>HYDROGEN EMERGENCY</sup> seal oil pump	4 <del>8</del> hrs
5. Main turbine <sup>WEST</sup> emergency oil pump	1 <del>8</del> hrs
6. Isolation valves	4 <del>8</del> hrs
7. Annunciators	4 <del>8</del> hrs
8. All control circuits	4 <del>8</del> hrs

\* AC power sources to the inverters shall be turned off at the start of the test and may be turned on at the end of the specified time interval. Inverters may be left in this operating mode for the duration of the discharge test.





## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

3. The pilot cell voltage is greater than or equal to 2.13 volts, and
  4. The overall battery voltage is greater than or equal to 250 volts.
- b. At least once per 92 days by verifying that:
1. The voltage of each connected cell is greater than or equal to 2.13 volts under float charge.
  2. The specific gravity, corrected to 77°F and full electrolyte level (fluid at the bottom of the maximum level indication mark), of each connected cell is greater than or equal to 1.200 and has not decreased more than 0.03 from the value observed during the previous test, and
  3. The electrolyte level of each connected cell is between the top of the minimum level indication mark and the bottom of the maximum level indication mark.
- c. At least once per 18 months by verifying that:
1. The cells, cell plates and battery racks show no visual indication of physical damage or abnormal deterioration.
  2. The cell-to-cell and terminal connections are clean, tight, free of corrosion and coated with anti-corrosion material.
  3. The battery charger will supply at least 10 amperes at greater than or equal to 250 volts for at least 4 hours.
- d. At least once per 18 months perform a battery service test, during shutdown (MODES 5 or 6), by verifying that the battery capacity is adequate to supply and maintain in OPERABLE status the actual or simulated emergency loads for the times specified of Table 4.8-3 with the battery charger disconnected. The battery terminal voltage shall be maintained greater than or equal to 210 volts throughout the battery service test.
- e. ~~At least once per 60 months perform a battery discharge test during shutdown (MODES 5 or 6), by verifying that the battery capacity is at least 80% of the manufacturer's rating. This performance discharge test shall be performed in place of the battery service test.~~

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At least once per 60 months, conduct a performance test of battery capacity during shutdown (MODES 5 or 6), by verifying that the battery capacity is at least 80% of the manufacturer's rating. When this test is performed in place of a battery service test, a modified performance test shall be conducted.

Annual performance tests of battery capacity shall be given to any battery that shows signs of degradation or has reached 85% of the service life expected for the application. Degradation is indicated when the battery capacity drops more than 10% from its capacity on the previous performance test, or is below 90% of the manufacturer's rating. If the battery has reached 85% of service life, delivers a capacity of 100% or greater of the manufacturer's rated capacity, and has shown no signs of degradation, performance testing at two year intervals is acceptable until the battery shows signs of degradation.



TABLE 4.8-3

BATTERY EMERGENCY LOADS

<u>"N" Battery Loads</u>	<u>Minimum Time</u>
Auxiliary feedwater turbine control bus	4 hours
FMO-211 valve	4 <del>x</del> hours
FMO-221 valve	4 <del>x</del> hours
FMO-231 valve	4 <del>x</del> hours
FMO-241 valve	4 <del>x</del> hours
TDTV valve	4 <del>x</del> hours

\*Valves will be operated through the following sequence:

1. Beginning of test: open valves
2. Five minutes after the beginning of the test: close the valves.
3. Ten minutes after the beginning of the test: reopen the valves.
4. Four hours after the beginning of the test: close the valves.

End of the test.



### 3/4.8 ELECTRICAL POWER SYSTEMS

#### BASES

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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 one redundant set of onsite A.C. and D.C. power sources and associated distribution systems OPERABLE during accident conditions coincident with an assumed loss of offsite power and single failure of the other onsite A.C. source.

The 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 facility status.

\* The train N station battery system provides an independent 250 volt DC power supply for power and control of the turbine driven auxiliary feedwater pump train. The limiting conditions of operation for the train N battery are consistent with the requirements of the auxiliary feedwater system. The surveillance requirements for the train N battery system are consistent with the requirements of the AB and CD station batteries. The train N battery loads are derived from equipment in the turbine driven auxiliary feedwater pump train and battery sizing is consistent with the functional requirements of these components. Simulated loads for battery tests are loads equivalent to measured actual loads.

*insert* \* The AB and CD station battery systems provide a reliable source of continuous power for supply and control of plant loads such as switchgear & annunciator control circuits, static inverters, valve control centers, emergency lighting and motor control centers. The design duty cycles of these batteries are composite load profiles resulting from the combination of the three hour Loss Of Coolant Accident/Loss Of Offsite Power battery load profiles and the four hour Station Blackout battery load profiles.

ATTACHMENT 2 TO AEP:NRC:0896U  
PROPOSED REVISED TECHNICAL SPECIFICATION PAGES





**3/4.0 LIMITING CONDITION FOR OPERATION AND SURVEILLANCE REQUIREMENTS**  
**3/4.8 ELECTRICAL POWER SYSTEMS**

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**D.C. DISTRIBUTION - OPERATING**

**LIMITING CONDITION FOR OPERATION**

**3.8.2.3**        The following D.C. bus trains shall be energized and OPERABLE with tie breakers between bus trains open:

TRAIN AB        consisting of 250-volt D.C. bus AB, 250-volt D.C. battery bank No. 1AB, and a full capacity charger, and

TRAIN CD        consisting of 250-volt D.C. bus CD, 250-volt D.C. battery bank No. 1CD, and a full capacity charger.

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

**ACTION**

- a.        With one 250-volt D.C. bus inoperable, restore the inoperable bus to OPERABLE status within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- b.        With one 250-volt D.C. battery and/or its charger inoperable, restore the inoperable battery and/or charger to OPERABLE status within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

**SURVEILLANCE REQUIREMENTS**

**4.8.2.3.1**        Each D.C. bus train shall be determined OPERABLE and energized with tie breakers open at least once per 7 days by verifying correct breaker alignment and indicated power availability.

**4.8.2.3.2**        Each 250-volt battery bank and charger shall be demonstrated OPERABLE

- a.        At least once per 7 days by verifying that:
  1.        The electrolyte level of each pilot cell is between the minimum and maximum level indication marks,
  2.        The pilot cell specific gravity, corrected to 77°F, and full electrolyte level (fluid at the bottom of the maximum level indication mark), is greater than or equal to 1.200,
  3.        The pilot cell voltage is greater than or equal to 2.13 volts, and
  4.        The overall battery voltage is greater than or equal to 250 volts.

SURVEILLANCE REQUIREMENTS (Continued)

- b. At least once per 92 days by verifying that:
  - 1. The voltage of each connected cell is greater than or equal to 2.13 volts under float charge.
  - 2. The specific gravity, corrected to 77°F, and full electrolyte level (fluid at the bottom of the maximum level indication mark), of each connected cell is greater than or equal to 1.200 and has not decreased more than 0.03 from the value observed during the previous test, and
  - 3. The electrolyte level of each connected cell is between the top of the minimum level indication mark and the bottom of the maximum level indication mark.
- c. At least once per 18 months by verifying that:
  - 1. The cells, cell plates and battery racks show no visual indication of physical damage or abnormal deterioration,
  - 2. The cell-to-cell and terminal connections are clean, tight, free of corrosion and coated with anti-corrosion material,
  - 3. The battery charger will supply at least 140 amperes at greater than or equal to 250 volts for at least 4 hours.
- d. At least once per 18 months, perform a battery service test during shutdown (MODES 5 or 6), by verifying that the battery capacity is adequate to supply and maintain in OPERABLE status the actual or simulated emergency loads for the design duty cycle which is based on the composite load profile. The composite load profile envelopes both the LOCA/LOOP and Station Blackout profiles and provides that basis for the times listed in Table 4.8-2. The battery charger will be disconnected throughout the test. The battery terminal voltage shall be maintained greater than or equal to 210 volts throughout this test.
- e. At least once per 60 months, conduct a performance test of battery capacity during shutdown (MODES 5 or 6), by verifying that the battery capacity is at least 80% of the manufacturer's rating. When this test is performed in place of a battery service test, a modified performance test shall be conducted.

Annual performance tests of battery capacity shall be given to any battery that shows signs of degradation or has reached 85% of the service life expected for the application. Degradation is indicated when the battery capacity drops more than 10% from its capacity on the previous performance test, or is below 90% of the manufacturer's rating. If the battery has reached 85% of service life, delivers a capacity of 100% or greater of the manufacturer's rated capacity, and has shown no signs of degradation, performance testing at two year intervals is acceptable until the battery shows signs of degradation.

TABLE 4.8-2

BATTERY EMERGENCY LOADS

<u>AB Battery Loads</u>		<u>Minimum Time</u>
1.	Channel III static inverter	4 hrs
2.	Channel IV static inverter	4 hrs
3.	East feed pump turbine emergency oil pump	1 hr
4.	Control room emergency lighting	4 hrs
5.	Main turbine backup oil pump	1 hr
6.	Isolation valve control	4 hrs
7.	All control circuits	4 hrs

  

<u>CD Battery Loads</u>		
1.	Channel I static inverter	4 hrs
2.	Channel II static inverter	4 hrs
3.	BOP static inverter*	4 hrs
4.	West feed pump turbine emergency oil pump	1 hr
5.	Generator hydrogen emergency seal oil pump	4 hrs
6.	Main turbine emergency oil pump	1 hr
7.	Isolation valves	4 hrs
8.	Annunciators	4 hrs
9.	All control circuits	4 hrs

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\*AC power sources to the inverters shall be turned off at the start of the test and may be turned on at the end of the specified time interval. Inverters may be left in this operating mode for the duration of the discharge test.



3/4.0 LIMITING CONDITION FOR OPERATION AND SURVEILLANCE REQUIREMENTS  
3/4.8 ELECTRICAL POWER SYSTEMS

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D.C. DISTRIBUTION - SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.8.2.4 As a minimum, the following D.C. electrical equipment and bus shall be energized and OPERABLE:

1 - 250-volt D.C. bus, and

1 - 250-volt battery bank and charger associated with the above D.C. bus.

APPLICABILITY: MODES 5 and 6.

ACTION:

With less than the above complement of D.C. equipment and bus OPERABLE, establish CONTAINMENT INTEGRITY within 8 hours.

SURVEILLANCE REQUIREMENTS

4.8.2.4.1 The above required 250-volt D.C. bus shall be determined OPERABLE and energized at least once per 7 days by verifying correct breaker alignment and indicated power availability.

4.8.2.4.2 The above required 250-volt battery bank and charger shall be demonstrated OPERABLE per Surveillance Requirement 4.8.2.3.2.

3/4.0 LIMITING CONDITION FOR OPERATION AND SURVEILLANCE REQUIREMENTS  
3/4.8 ELECTRICAL POWER SYSTEMS

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D.C. DISTRIBUTION - OPERATING - TRAIN N BATTERY SYSTEM

LIMITING CONDITION FOR OPERATION

3.8.2.5 The following D.C. bus train shall be energized and OPERABLE:

TRAIN N consisting of 250-volt D.C. bus N, 250-volt D.C. battery bank N, and a full capacity charger.

APPLICABILITY: MODES 1, 2 and 3.

ACTION

With the Train N battery system inoperable, declare the turbine driven Auxiliary Feedwater Pump inoperable and follow the ACTION statement of Specification 3.7.1.2.

SURVEILLANCE REQUIREMENTS

4.8.2.5.1 The D.C. bus train N shall be determined OPERABLE and energized at least once per 7 days by verifying correct breaker alignment and indicated power availability.

4.8.2.5.2 The 250-volt battery bank and charger shall be demonstrated OPERABLE:

a. At least once per 7 days by verifying that:

1. The electrolyte level of each pilot cell is between the minimum and maximum level indication marks,
2. The pilot cell specific gravity, corrected to 77°F and full electrolyte level (fluid at bottom of the maximum level indication mark), is greater than or equal to 1.200,
3. The pilot cell voltage is greater than or equal to 2.13 volts, and
4. The overall battery voltage is greater than or equal to 250 volts.

b. At least once per 92 days by verifying that:

1. The voltage of each connected cell is greater than or equal to 2.13 volts under float charge.
2. The specific gravity, corrected to 77°F and full electrolyte level (fluid at the bottom of the maximum level indication mark), of each connected cell is greater than or equal to 1.200 and has not decreased more than 0.03 from the value observed during the previous test, and
3. The electrolyte level of each connected cell is between the top of the minimum level indication mark and the bottom of the maximum level indication mark.

**3/4.0 LIMITING CONDITION FOR OPERATION AND SURVEILLANCE REQUIREMENTS**  
**3/4.8 ELECTRICAL POWER SYSTEMS**

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**SURVEILLANCE REQUIREMENTS (Continued)**

- c. At least once per 18 months by verifying that:
  - 1. The cells, cell plates and battery racks show no visual indication of physical damage or abnormal deterioration.
  - 2. The cell-to-cell and terminal connections are clean, tight, free of corrosion and coated with anti-corrosion material.
  - 3. The battery charger will supply at least 10 amperes at greater than or equal to 250 volts for at least 4 hours.
- d. At least once per 18 months perform a battery service test, during shutdown (MODES 5 or 6), by verifying that the battery capacity is adequate to supply and maintain in OPERABLE status the actual or simulated emergency loads for the times specified of Table 4.8-3 with the battery charger disconnected. The battery terminal voltage shall be maintained greater than or equal to 210 volts throughout the battery service test.
- e. At least once per 60 months, conduct a performance test of battery capacity during shutdown (MODES 5 or 6), by verifying that the battery capacity is at least 80% of the manufacturer's rating. When this test is performed in place of a battery service test, a modified performance test shall be conducted.

Annual performance tests of battery capacity shall be given to any battery that shows signs of degradation or has reached 85% of the service life expected for the application. Degradation is indicated when the battery capacity drops more than 10% from its capacity on the previous performance test, or is below 90% of the manufacturer's rating. If the battery has reached 85% of service life, delivers a capacity of 100% or greater of the manufacturer's rated capacity, and has shown no signs of degradation, performance testing at two year intervals is acceptable until the battery shows signs of degradation.

TABLE 4.8-3

BATTERY EMERGENCY LOADS

<u>"N" Battery Loads</u>	<u>Minimum Time</u>
Auxiliary feedwater turbine control bus	4 hours
FMO-211 valve	4 hours
FMO-221 valve	4 hours
FMO-231 valve	4 hours
FMO-241 valve	4 hours
TDTV valve	4 hours





3/4.0 LIMITING CONDITION FOR OPERATION AND SURVEILLANCE REQUIREMENTS  
3/4.8 ELECTRICAL POWER SYSTEMS

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3/4.8.3 Alternative A.C. Power Sources

LIMITING CONDITION FOR OPERATION

3.8.3.1 The steady state bus voltage for the manual alternate reserve source\*\* shall be greater than or equal to 90% of the nominal bus voltage.

APPLICABILITY: Whenever the manual alternate reserve source (69 kV) is connected to more than two buses.

ACTION: With bus voltage less than 90% nominal, adjust load on the remaining buses to maintain steady state bus voltage greater than or equal to 90% limit.

SURVEILLANCE REQUIREMENTS

4.8.3.1 No additional surveillance requirements other than those required by Specifications 4.8.1.1.1 and 4.8.1.2.

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\*\*Shared with D.C. Cook Unit 2.

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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 one of each 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 the other onsite A.C. source.

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 facility status.

The AB and CD station battery systems provide a reliable source of continuous power for supply and control of plant loads such as switchgear and annunciator control circuits, static inverters, valve control centers, emergency lighting and motor control centers. The design duty cycles of these batteries are composite load profiles resulting from the combination of the three hour Loss Of Coolant Accident/Loss Of Offsite Power battery load profiles and the four hour Station Blackout battery load profiles.

The train N station battery system provides an independent 250 volt DC power supply for power and control of the turbine driven auxiliary feedwater pump train. The limiting conditions of operation for the train N battery are consistent with the requirements of the auxiliary feedwater system. The surveillance requirements for the train N battery system are consistent with the requirements of the AB and CD station batteries. The train N battery loads are derived from equipment in the turbine driven auxiliary feedwater pump train and battery sizing is consistent with the functional requirements of these components. Simulated loads for battery tests are loads equivalent to measured actual loads.

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3/4.8 ELECTRICAL POWER SYSTEMS

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Removal of accumulated water as required by 4.8.1.1.2.b.2 is performed by drawing the contents off the bottom of the tank until acceptable results are obtained for either a tape test or a water and sediment test. An acceptable result for the water and sediment content is a measured value less than 0.05 percent volume.

The sample specified in 4.8.1.1.2.c.4 is sent offsite for testing. A serious attempt will be made to meet the 31-day limit on the offsite tests; however, if for some reason this limit is not met (e.g., if the sample is lost or broken or if the results are not received in 31 days), the diesel generators should not be considered inoperable. If the sample is lost, broken, or fails the offsite tests and the new oil has already been put into the storage tank, the offsite tests will be performed on a sample taken from the storage tank. If the results on the subsequent storage tank sample are not within specified limits, the diesel generators should be considered OPERABLE and the out-of-spec properties should be returned to within specification as soon as possible.

If the monthly storage tank sample taken in accordance with Specification 4.8.1.1.2.d fails the particulate contamination test, the diesel generators should be considered OPERABLE and the contamination level should be restored to below 10 mg/liter as soon as possible.

The precision leak-detection test described in Surveillance Requirement 4.8.1.1.2.f.2 should be performed as described in NFPA (National Fire Protection Association) -329. As NFPA-329 is revised, the precision leak-detection test may be modified to incorporate changes to the test as described in the revisions to NFPA-329.

The minimum required diesel fuel oil volume is 43,240 gallons. This volume is consistent with operation of one diesel generator continuously for 7 days at rated load, as recommended in Regulatory Guide 1.137, entitled "Fuel Oil System for Standby Diesel Generators." The Technical Specifications require a minimum of 46,000 gallons of fuel. The 46,000 gallons is an indicated volume. This amount includes margin for characteristics such as location of the tank discharge pipes and slope of the tanks.

3/4.0 LIMITING CONDITION FOR OPERATION AND SURVEILLANCE REQUIREMENTS  
3/4.8 ELECTRICAL POWER SYSTEMS

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D.C. DISTRIBUTION - OPERATING

LIMITING CONDITION FOR OPERATION

3.8.2.3 The following D.C. bus trains shall be energized and OPERABLE with tie breakers between bus trains open:

TRAIN AB consisting of 250-volt D.C. bus AB, 250-volt D.C. battery bank No. 2AB, and a full capacity charger, and

TRAIN CD consisting of 250-volt D.C. bus CD, 250-volt D.C. battery bank No. 2CD, and a full capacity charger.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION

- a. With one 250-volt D.C. bus inoperable, restore the inoperable bus to OPERABLE status within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- b. With one 250-volt D.C. battery and/or its charger inoperable, restore the inoperable battery and/or charger to OPERABLE status within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.8.2.3.1 Each D.C. bus train shall be determined OPERABLE and energized with tie breakers open at least once per 7 days by verifying correct breaker alignment and indicated power availability.

4.8.2.3.2 Each 250-volt battery bank and charger shall be demonstrated OPERABLE

- a. At least once per 7 days by verifying that:
  1. The electrolyte level of each pilot cell is between the minimum and maximum level indication marks,
  2. The pilot cell specific gravity, corrected to 77°F, and full electrolyte level (fluid at the bottom of the maximum level indication mark), is greater than or equal to 1.200,
  3. The pilot cell voltage is greater than or equal to 2.13 volts, and
  4. The overall battery voltage is greater than or equal to 250 volts.



**3/4.0 LIMITING CONDITION FOR OPERATION AND SURVEILLANCE REQUIREMENTS**  
**3/4.8 ELECTRICAL POWER SYSTEMS**

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**SURVEILLANCE REQUIREMENTS (Continued)**

- b. At least once per 92 days by verifying that:
  - 1. The voltage of each connected cell is greater than or equal to 2.13 volts under float charge.
  - 2. The specific gravity, corrected to 77°F, and full electrolyte level (fluid at the bottom of the maximum level indication mark), of each connected cell is greater than or equal to 1.200 and has not decreased more than 0.03 from the value observed during the previous test, and
  - 3. The electrolyte level of each connected cell is between the top of the minimum level indication mark and the bottom of the maximum level indication mark.
- c. At least once per 18 months by verifying that:
  - 1. The cells, cell plates and battery racks show no visual indication of physical damage or abnormal deterioration,
  - 2. The cell-to-cell and terminal connections are clean, tight, free of corrosion and coated with anti-corrosion material,
  - 3. The battery charger will supply at least 140 amperes at greater than or equal to 250 volts for at least 4 hours.
- d. At least once per 18 months, perform a battery service test during shutdown (MODES 5 or 6), by verifying that the battery capacity is adequate to supply and maintain in OPERABLE status the actual or simulated emergency loads for the design duty cycle which is based on the composite load profile. The composite load profile envelopes both the LOCA/LOOP and Station Blackout profiles and provides that basis for the times listed in Table 4.8-2. The battery charger will be disconnected throughout the test. The battery terminal voltage shall be maintained greater than or equal to 210 volts throughout this test.\*
- e. At least once per 60 months, conduct a performance test of battery capacity during shutdown (MODES 5 or 6), by verifying that the battery capacity is at least 80% of the manufacturer's rating. When this test is performed in place of a battery service test, a modified performance test shall be conducted.

Annual performance tests of battery capacity shall be given to any battery that shows signs of degradation or has reached 85% of the service life expected for the application. Degradation is indicated when the battery capacity drops more than 10% from its capacity on the previous performance test, or is below 90% of the manufacturer's rating. If the battery has reached 85% of service life, delivers a capacity of 100% or greater of the manufacturer's rated capacity, and has shown no signs of degradation, performance testing at two year intervals is acceptable until the battery shows signs of degradation.

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\*The provisions of Specification 4.0.9 are applicable to the 2-CD battery and charger.





TABLE 4.8-2

BATTERY EMERGENCY LOADS

<u>AB Battery Loads</u>		<u>Minimum Time</u>
1.	Channel III static inverter	4 hrs
2.	Channel IV static inverter	4 hrs
3.	BOP static inverter*	4 hrs
4.	East feed pump turbine emergency oil pump	1 hr
5.	Control room emergency lighting	4 hrs
6.	Main turbine east emergency oil pump	1 hr
7.	Isolation valve control	4 hrs
8.	All control circuits	4 hrs

  

<u>CD Battery Loads</u>		
1.	Channel I static inverter	4 hrs
2.	Channel II static inverter	4 hrs
3.	West feed pump turbine emergency oil pump	1 hr
4.	Generator hydrogen emergency seal air-oil pump	4 hrs
5.	Main turbine west emergency oil pump	1 hr
6.	Isolation valves	4 hrs
7.	Annunciators	4 hrs
8.	All control circuits	4 hrs

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\*AC power sources to the inverters shall be turned off at the start of the test and may be turned on at the end of the specified time interval. Inverters may be left in this operating mode for the duration of the discharge test.

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D.C. DISTRIBUTION - SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.8.2.4 As a minimum, the following D.C. electrical equipment and bus shall be energized and OPERABLE:

1 - 250-volt D.C. bus, and

1 - 250-volt battery bank and charger associated with the above D.C. bus.

APPLICABILITY: MODES 5 and 6.

ACTION:

With less than the above complement of D.C. equipment and bus OPERABLE, establish CONTAINMENT INTEGRITY within 8 hours.

SURVEILLANCE REQUIREMENTS

4.8.2.4.1 The above required 250-volt D.C. bus shall be determined OPERABLE and energized at least once per 7 days by verifying correct breaker alignment and indicated power availability.

4.8.2.4.2 The above required 250-volt battery bank and charger shall be demonstrated OPERABLE per Surveillance Requirement 4.8.2.3.2.\*

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\*The provisions of Specification 4.0.9 are applicable to the Surveillance Requirements 4.8.2.3.2.c.3 and 4.8.2.3.2.d for the 2-CD battery and charger.

3/4.0 LIMITING CONDITION FOR OPERATION AND SURVEILLANCE REQUIREMENTS  
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D.C. DISTRIBUTION - OPERATING - TRAIN N BATTERY SYSTEM

LIMITING CONDITION FOR OPERATION

3.8.2.5 The following D.C. bus train shall be energized and OPERABLE:

TRAIN N consisting of 250-volt D.C. bus N, 250-volt D.C. battery bank N, and a full capacity charger.

APPLICABILITY: MODES 1, 2 and 3.

ACTION

With the Train N battery system inoperable, declare the turbine driven Auxiliary Feedwater Pump inoperable and follow the ACTION statement of Specification 3.7.1.2.

SURVEILLANCE REQUIREMENTS

4.8.2.5.1 The D.C. bus train N shall be determined OPERABLE and energized at least once per 7 days by verifying correct breaker alignment and indicated power availability.

4.8.2.5.2 The 250-volt battery bank and charger shall be demonstrated OPERABLE:

a. At least once per 7 days by verifying that:

1. The electrolyte level of each pilot cell is between the minimum and maximum level indication marks,
2. The pilot cell specific gravity, corrected to 77°F and full electrolyte level (fluid at bottom of the maximum level indication mark), is greater than or equal to 1.200,
3. The pilot cell voltage is greater than or equal to 2.13 volts, and
4. The overall battery voltage is greater than or equal to 250 volts.

b. At least once per 92 days by verifying that:

1. The voltage of each connected cell is greater than or equal to 2.13 volts under float charge.
2. The specific gravity, corrected to 77°F and full electrolyte level (fluid at the bottom of the maximum level indication mark), of each connected cell is greater than or equal to 1.200 and has not decreased more than 0.03 from the value observed during the previous test, and
3. The electrolyte level of each connected cell is between the top of the minimum level indication mark and the bottom of the maximum level indication mark.



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3/4.8 ELECTRICAL POWER SYSTEMS

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SURVEILLANCE REQUIREMENTS (Continued)

- c. At least once per 18 months by verifying that:
  - 1. The cells, cell plates and battery racks show no visual indication of physical damage or abnormal deterioration.
  - 2. The cell-to-cell and terminal connections are clean, tight, free of corrosion and coated with anti-corrosion material.
  - 3. The battery charger will supply at least 10 amperes at greater than or equal to 250 volts for at least 4 hours.
- d. At least once per 18 months perform a battery service test, during shutdown (MODES 5 or 6), by verifying that the battery capacity is adequate to supply and maintain in OPERABLE status the actual or simulated emergency loads for the times specified of Table 4.8-3 with the battery charger disconnected. The battery terminal voltage shall be maintained greater than or equal to 210 volts throughout the battery service test.
- e. At least once per 60 months, conduct a performance test of battery capacity during shutdown (MODES 5 or 6), by verifying that the battery capacity is at least 80% of the manufacturer's rating. When this test is performed in place of a battery service test, a modified performance test shall be conducted.

Annual performance tests of battery capacity shall be given to any battery that shows signs of degradation or has reached 85% of the service life expected for the application. Degradation is indicated when the battery capacity drops more than 10% from its capacity on the previous performance test, or is below 90% of the manufacturer's rating. If the battery has reached 85% of service life, delivers a capacity of 100% or greater of the manufacturer's rated capacity, and has shown no signs of degradation, performance testing at two year intervals is acceptable until the battery shows signs of degradation.

TABLE 4.8-3

BATTERY EMERGENCY LOADS

<u>"N" Battery Loads</u>	<u>Minimum Time</u>
Auxiliary feedwater turbine control bus	4 hours
FMO-211 valve	4 hours
FMO-221 valve	4 hours
FMO-231 valve	4 hours
FMO-241 valve	4 hours
TDTV valve	4 hours



3/4.0 LIMITING CONDITION FOR OPERATION AND SURVEILLANCE REQUIREMENTS  
3/4.8 ELECTRICAL POWER SYSTEMS

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3/4.8.3 Alternative A.C. Power Sources

LIMITING CONDITION FOR OPERATION

3.8.3.1 The steady state bus voltage for the manual alternate reserve source\* shall be greater than or equal to 90% of the nominal bus voltage.

APPLICABILITY: Whenever the manual alternate reserve source (69 kV) is connected to more than two buses.

ACTION: With bus voltage less than 90% nominal, adjust load on the remaining buses to maintain steady state bus voltage greater than or equal to 90% limit.

SURVEILLANCE REQUIREMENTS

4.8.3.1 No additional surveillance requirements other than those required by Specifications 4.8.1.1.1 and 4.8.1.2.

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\*Shared with Cook Nuclear Plant Unit 1.



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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 one of each 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 the other onsite A.C. source.

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 facility status.

The AB and CD station battery systems provide a reliable source of continuous power for supply and control of plant loads such as switchgear and annunciator control circuits, static inverters, valve control centers, emergency lighting and motor control centers. The design duty cycles of these batteries are composite load profiles resulting from the combination of the three hour Loss Of Coolant Accident/Loss Of Offsite Power battery load profiles and the four hour Station Blackout battery load profiles.

The train N station battery system provides an independent 250 volt DC power supply for power and control of the turbine driven auxiliary feedwater pump train. The limiting conditions of operation for the train N battery are consistent with the requirements of the auxiliary feedwater system. The surveillance requirements for the train N battery system are consistent with the requirements of the AB and CD station batteries. The train N battery loads are derived from equipment in the turbine driven auxiliary feedwater pump train and battery sizing is consistent with the functional requirements of these components. Simulated loads for battery tests are loads equivalent to measured actual loads.



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Removal of accumulated water as required by 4.8.1.1.2.b.2 is performed by drawing the contents off the bottom of the tank until acceptable results are obtained for either a tape test or a water and sediment test. An acceptable result for the water and sediment content is a measured value less than 0.05 percent volume.

The sample specified in 4.8.1.1.2.c.4 is sent offsite for testing. A serious attempt will be made to meet the 31-day limit on the offsite tests; however, if for some reason this limit is not met (e.g., if the sample is lost or broken or if the results are not received in 31 days), the diesel generators should not be considered inoperable. If the sample is lost, broken, or fails the offsite tests and the new oil has already been put into the storage tank, the offsite tests will be performed on a sample taken from the storage tank. If the results on the subsequent storage tank sample are not within specified limits, the diesel generators should be considered OPERABLE and the out-of-spec properties should be returned to within specification as soon as possible.

If the monthly storage tank sample taken in accordance with Specification 4.8.1.1.2.d fails the particulate contamination test, the diesel generators should be considered OPERABLE and the contamination level should be restored to below 10 mg/liter as soon as possible.

The precision leak-detection test described in Surveillance Requirement 4.8.1.1.2.f.2 should be performed as described in NFPA (National Fire Protection Association) -329. As NFPA-329 is revised, the precision leak-detection test may be modified to incorporate changes to the test as described in the revisions to NFPA-329.

The minimum required diesel fuel oil volume is 43,240 gallons. This volume is consistent with operation of one diesel generator continuously for 7 days at rated load, as recommended in Regulatory Guide 1.137, entitled "Fuel Oil System for Standby Diesel Generators." The Technical Specifications require a minimum of 46,000 gallons of fuel. The 46,000 gallons is an indicated volume. This amount includes margin for characteristics such as location of the tank discharge pipes and slope of the tanks.



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