ELECTRICAL POWER SYSTEMS

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. 1 AB, and a full capacity charger.

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

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION

a. With 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 the 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,

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 ≥ 1.200,

3. The pilot cell voltage is ≥ 2.10 volts, and

4. The overall battery voltage is ≥ 250 volts.

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

1. The voltage of each connected cell is ≥ 2.10 volts under float charge and has not decreased more than 0.05 volts from the value observed during the original acceptance test, and

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 ≥ 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 minimum and maximum level indication marks.

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 ≥ 250 volts for at least 4 hours.

d. At least once per 18 months, during shutdown (MODES 5 or 6), by verifying that the battery capacity is adequate to supply and maintain in OPERABLE status the emergency loads for the times specified in Table 4.8-1A with the battery charger disconnected. The battery terminal voltage shall be maintained ≥ 210 volts throughout the battery service test.

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

SURVEILLANCE REQUIREMENTS (Continued)

TABLE 4.8-1A
BATTERY EMERGENCY LOADS

AB Battery Loads	Minimum Time
1. Channel III static inverter	3 hrs
2. Channel IV static inverter	3 hrs
3. Computer static inverter*	3 hrs
4. Feed pump turbine 1E oil pump	1 hr
5. Control room emergency lighting	8 hrs
6. Main turbine backup oil pump	3 hrs
7. Isolation valve control	8 hrs
8. All control circuits	8 hrs

CD Battery Loads	
1. Channel I static inverter	3 hrs
2. Channel II static inverter	3 hrs
3. BOP static inverter*	3 hrs
4. Feed pump turbine 1W oil pump	1 hr
5. Generator seal oil pump	8 hrs
6. Turbine emergency oil pump	3 hrs
7. Isolation valves	8 hrs
8. Annunciators	8 hrs
9. All control circuits	8 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 specific time interval. Inverters may be left in this operating mode for the duration of the discharge test.

SURVEILLANCE REQUIREMENTS (Continued)

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ELECTRICAL POWER SYSTEMS

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 No. 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,

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 ≥ 1.200.

3. The pilot cell voltage is ≥ 2.10 volts, and

4. The overall battery voltage is ≥ 250 volts.

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

1. The voltage of each connected cell is ≥ 2.10 volts under float charge and has not decreased more than 0.05 volts from the value observed during the original acceptance test, and

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 ≥ 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 minimum and maximum level indication marks.

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 ≥ 250 volts for at least 4 hours.

d. At least once per 18 months, during shutdown (MODES 5 or 6), by verifying that the battery capacity is adequate to supply and maintain in OPERABLE status the emergency loads for the times specified in Table 4.8-2 with the battery charger disconnected. The battery terminal voltage shall be maintained ≥ 210 volts throughout the battery service test.

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

TABLE 4.3-1

REACTOR TRIP SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
1. Manual Reactor Trip				
A. Shunt Trip Function	N.A.	N.A.	S/U(1)	N.A.
B. Undervoltage Trip Function	N.A.	N.A.	S/U(1)	N.A.
2. Power Range, Neutron Flux	S	D(2), M(3) and Q(6)	M	1, 2
3. Power Range, Neutron Flux, High Positive Rate	N.A.	R	M	1, 2
4. Power Range, Neutron Flux, High Negative Rate	N.A.	R	M	1, 2
5. Intermediate Range, Neutron Flux	S	R(6)	S/U(1)	1, 2 and *
6. Source Range, Neutron Flux	N.A.	R(6)	M and S/U(1)	2(7), 3(7), 4 and
7. Overtemperature ΔT	S	R	M	1, 2
8. Overpower ΔT	S	R	M	1, 2
9. Pressurizer Pressure--Low	S	R	M	1, 2
10. Pressurizer Pressure--High	S	R	M	1, 2
11. Pressurizer Water Level--High	S	R	M	1, 2
12. Loss of Flow - Single Loop	S	R	M	1

TABLE 4.3-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
13. Loss of Flow - Two Loops	S	R	N.A.	1
14. Steam Generator Water Level--Low-Low	S	R	M	1, 2
15. Steam/Feedwater Flow Mismatch and Low Steam Generator Water Level	S	R	M	1, 2
16. Undervoltage - Reactor Coolant Pumps	N.A.	R	M	1
17. Underfrequency - Reactor Coolant Pumps	N.A.	R	M	1
18. Turbine Trip				
A. Low Fluid Oil Pressure	N.A.	N.A.	S/U(1)	1, 2
B. Turbine Stop Valve Closure	N.A.	N.A.	S/U(1)	1, 2
19. Safety Injection Input from ESF	N.A.	N.A.	M(4)	1, 2
20. Reactor Coolant Pump Breaker Position Trip	N.A.	N.A.	R	N.A.
21. Reactor Trip Breaker				
A. Shunt Trip Function	N.A.	N.A.	M(5) and S/U(1)	1, 2*
B. Undervoltage Trip Function	N.A.	N.A.	M(5) and S/U(1)	1, 2*
22. Automatic Trip Logic	N.A.	N.A.	M(5)	1, 2*

ELECTRICAL POWER SYSTEMS

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. 2 AB, and a full capacity charger.

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

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION

a. With 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 the 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,

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 ≥ 1.200.

3. The pilot cell voltage is ≥ 2.10 volts, and

4. The overall battery voltage is ≥ 250 volts.

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

1. The voltage of each connected cell is ≥ 2.10 volts under float charge and has not decreased more than 0.05 volts from the value observed during the original acceptance test, and

2. The specific gravity, corrected to 77°F and full electrolyle level (fluid at the bottom of the maximum level indication mark), of each connected cell is ≥ 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 minimum and maximum level indication marks.

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 ≥ 250 volts for at least 4 hours.

d. At least once per 18 months, during shutdown (MODES 5 or 6), by verifying that the battery capacity is adequate to supply and maintain in OPERABLE status the emergency loads for the times specified in Table 4.8-1A with the battery charger disconnected. The battery terminal voltage shall be maintained ≥ 210 volts throughout the battery service test.

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

TABLE 4.8-1A

BATTERY EMERGENCY LOADS

AB Battery Loads		Minimum Time
1.	Channel III static inverter	3 hrs
2.	Channel IV static inverter	3 hrs
3.	Computer static inverter*	3 hrs
4.	BOP static inverter*	3 hrs
5.	Feed pump turbine 2E oil pump	1 hr
6.	Control room emergency lighting	8 hrs
7.	Main turbine oil pump "E"	3 hrs
8.	Isolation valve control	8 hrs
9.	All control circuits	8 hrs
CD Battery Loads		
1.	Channel I static inverter	3 hrs
2.	Channel II static inverter	3 hrs
3.	Feed pump turbine 2W oil pump	1 hr
4.	Generator seal oil pump	5 hrs
5.	Main turbine oil pump "W"	3 hrs
6.	Isolation valves	8 hrs
7.	Annunciators	8 hrs
8.	All control circuits	8 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

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 No. N, 250 volt D.C. battery bank No. 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 as 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,

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 ≥ 1.200.

3. The pilot cell voltage is ≥ 2.10 volts, and

4. The overall battery voltage is ≥ 250 volts.

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

1. The voltage of each connected cell is ≥ 2.10 volts under float charge and has not decreased more than 0.05 volts from the value observed during the original acceptance test, and

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 ≥ 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 minimum and maximum level indication marks.

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 ≥ 250 volts for at least 4 hours.

d. At least once per 18 months, during shutdown (MODES 5 or 6), by verifying that the battery capacity is adequate to supply and maintain in OPERABLE status the emergency loads for the times specified in the following Table with the battery charger disconnected. The battery terminal voltage shall be maintained ≥ 210 volts throughout the battery service test.

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

TABLE 4.3-1

REACTOR TRIP SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
1. Manual Reactor Trip**				
A. Shunt Trip Function	N.A.	N.A.	S/U(1)	N.A.
B. Undervoltage Trip Function	N.A.	N.A.	S/U(1)	N.A.
2. Power Range, Neutron Flux	S	D(2), M(3) and Q(6)	M	1, 2
3. Power Range, Neutron Flux, High Positive Rate	N.A.	R	M	1, 2
4. Power Range, Neutron Flux, High Negative Rate	N.A.	R	M	1, 2
5. Intermediate Range, Neutron Flux	S	R(6)	S/U(1)	1, 2 and *
6. Source Range, Neutron Flux	N.A.	R(6)	M and S/U(1)	2(7), 3(7), 4 and
7. Overtemperature ΔT	S	R	M	1, 2
8. Overpower ΔT	S	R	M	1, 2
9. Pressurizer Pressure--Low	S	R	M	1, 2
10. Pressurizer Pressure--High	S	R	M	1, 2
11. Pressurizer Water Level--High	S	R	M	1, 2
12. Loss of Flow - Single Loop	S	R	M	1

TABLE 4.3-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
13. Loss of Flow - Two Loops	S	R	N.A.	1
14. Steam Generator Water Level--Low-Low	S	R	M	1, 2
15. Steam/Feedwater Flow Mismatch and Low Steam Generator Water Level	S	R	M	1, 2
16. Undervoltage - Reactor Coolant Pumps	N.A.	R	M	1
17. Underfrequency - Reactor Coolant Pumps	N.A.	R	M	1
18. Turbine Trip				
A. Low Fluid Oil Pressure	N.A.	N.A.	S/U(1)	1, 2
B. Turbine Stop Valve Closure	N.A.	N.A.	S/U(1)	1, 2
19. Safety Injection Input from ESF	N.A.	N.A.	M(4)	1, 2
20. Reactor Coolant Pump Breaker Position Trip	N.A.	N.A.	R	N.A.
21. Reactor Trip Breaker**				
A. Shunt Trip Function	N.A.	N.A.	M(5) and S/U(1)	1, 2*
B. Undervoltage Trip Function	N.A.	N.A.	M(5) and S/U(1)	1, 2*
22. Automatic Trip Logic	N.A.	N.A.	M(5)	1, 2*

** This surveillance does not become effective until after the 1985 Unit 2 refueling outage.