3/4.8.2 D.C. SOURCES

OPERATING

LIMITING CONDITION FOR OPERATION

3.8.2.1 As a minimum the following D.C. electrical sources shall be OPERABLE:

a. 125-Volt D.C. Bus 111 fed from Battery 111 for Unit 1 (Bus 211 fed from Battery 211 for Unit 2) and its associated full capacity charger, and with one of its associated crosstie breakers in the open position, and

b. 125-Volt D.C. Bus 112 fed from Battery 112 for Unit 1 (Bus 212 fed from Battery 212 for Unit 2) and its associated full capacity charger, and with one of its associated crosstie breakers in the open position.

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

ACTION:

a. With one of the required 125-Volt D.C. buses inoperable due to its normal associated full capacity charger being inoperable, operations may continue provided that within 2 hours the inoperable bus and its associated battery are energized by the opposite unit's 125-Volt D.C. bus and its OPERABLE charger via the crosstie breakers and that within 24 hours the inoperable bus and its charger are restored to OPERABLE status. Otherwise be in at least HOT STANDBY within the next 6 hours and COLD SHUTDOWN within the following 30 hours.

b. With both of the crosstie breakers closed for a 125-Volt D.C. bus that is required to be OPERABLE and with both units operating (Modes 1, 2, 3, or 4), the 125-Volt D.C. bus may energize the opposite unit's inoperable 125-Volt D.C. bus having an inoperable charger without a load restriction.

c. With both of the crosstie breakers closed for a 125-Volt D.C. bus that is required to be OPERABLE and with the opposite unit shutdown (Modes 5, 6, or defueled), the crosstie breakers may remain closed for up to 7 days provided items 1 and 2 below are satisfied. Otherwise open one of the crosstie breakers.

(1) The shutdown unit's bus load is restricted to:

Shutdown Unit Battery Status	Operating Unit Battery Type	Load Restriction
Inoperable	~~AT&T~~ C&D	200 ~~100~~ Amps
Inoperable	Gould	63 Amps
OPERABLE	Either	None —

(2) If a load restriction applies, then once per 12 hours verify that the shutdown unit's bus loading will not exceed the load restriction.

d. With one of the required 125-Volt D.C. buses inoperable, except for the allowances of ACTIONS (a), (b), or (c) above, 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.

SURVEILLANCE REQUIREMENTS

4.8.2.1.1 Each D.C. bus shall be determined OPERABLE and energized from its battery at least once per 7 days by verifying correct breaker alignment.

4.8.2.1.2 Each 125-volt battery bank and its associated charger shall be demonstrated OPERABLE:

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

1) The parameters in Table 4.8-2 meet the Category A limits, and

2) The total battery terminal voltage is greater than or equal to ~~130.5~~ volts (~~AT&T~~) 126 volts (Gould) on float charge.

C 127.6 C Ck D

b. At least once per 92 days and within 7 days after a battery discharge with battery terminal voltage below 110 volts, or battery overcharge with battery terminal voltage above 145 volts, by verifying that:

1) The parameters in Table 4.8-2 meet the Category B limits,

2) There is no visible corrosion at either terminals or connectors, or the connection resistance of these items is less than 150×10^{-6} ohm*, and

3) The average electrolyte temperature of all connected cells is above 60°F.

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, and coated with anticorrosion material,

3) The resistance of each cell-to-cell and terminal connection is less than or equal to 150×10^{-6} ohm*, and

4) The battery charger will supply a load equal to the manufacturer's rating for at least 8 hours.

d. At least once per 18 months, during shutdown, by verifying that the battery capacity is adequate to supply and maintain in OPERABLE status all of the actual or simulated emergency loads for the design duty cycle when the battery is subject to a battery service test;

*Obtained by subtracting the normal resistance of: 1) the cross room rack connector (~~Gould only:~~ 400×10^{-6} ohm, typical) and 2) the bi-level rack connector (~~both AT&T and Gould:~~ 50×10^{-6} ohm, typical); from the measured cell-to-cell connection resistance.

SURVEILLANCE REQUIREMENTS (Continued)

e. At least once per 60 months, during shutdown, by verifying that the battery capacity is at least ~~95% (AT&T)~~ 80% ~~(Gould)~~ of the manufacturer's rating when subjected to a performance discharge test or a modified performance discharge test. The modified performance discharge test ~~(AT&T)~~ and the performance discharge test (Gould) may be performed in lieu of the battery service test required by Specification 4.8.2.1.2d.; (C&D)

f. At least once per 18 months during shutdown, by giving performance discharge tests or modified performance discharge tests of battery capacity 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 ~~5% (AT&T)~~ 10% ~~(Gould)~~ of rated capacity from its capacity on the previous performance test or modified performance test, or is below ~~100% (AT&T)~~ 90% ~~(Gould)~~ of the manufacturer's rating.

TABLE 4.8-2 (AT&T)

BATTERY SURVEILLANCE REQUIREMENTS

	CATEGORY A[1]	CATEGORY B[2]	
PARAMETER	LIMITS FOR EACH DESIGNATED PILOT CELL	LIMITS FOR EACH CONNECTED CELL	ALLOWABLE[3] VALUE FOR EACH CONNECTED CELL
Electrolyte Level	>Minimum level indication mark, and ≤ ¼" above maximum level indication mark	>Minimum level indication mark, and ≤ ¼" above maximum level indication mark	Above top of plates, and not overflowing
Float Voltage	≥ 2.18 volts	≥ 2.18 volts[6]	> 2.14 volts
Specific Gravity[4]	≥ 1.285[5]	≥ 1.280	Not more than 0.020 below the average of all connected cells
		Average of all connected cells	Average of all connected cells
		> 1.290	≥ 1.280[5]

TABLE NOTATIONS

(1) For any Category A parameter(s) outside the limit(s) shown, the battery may be considered OPERABLE provided that within 24 hours all the Category B measurements are taken and found to be within their allowable values, and provided all Category A and B parameter(s) are restored to within limits within the next 6 days.

(2) For any Category B parameter(s) outside the limit(s) shown, the battery may be considered OPERABLE provided that the Category B parameters are within their allowable values and provided the Category B parameter(s) are restored to within limits within 7 days.

(3) Any Category B parameter not within its allowable value indicates an inoperable battery.

(4) Corrected for electrolyte temperature and level.

(5) Or battery charging current is less than 2 amps when on charge.

(6) Corrected for average electrolyte temperature.

delete page

TABLE 4.8-2 ~~(GOULD)~~

BATTERY SURVEILLANCE REQUIREMENTS

PARAMETER	CATEGORY A[1] LIMITS FOR EACH DESIGNATED PILOT CELL	CATEGORY B[2] LIMITS FOR EACH CONNECTED CELL	CATEGORY B[2] ALLOWABLE[3] VALUE FOR EACH CONNECTED CELL
Electrolyte Level	>Minimum level indication mark, and ≤ ¼" above maximum level indication mark	>Minimum level indication mark, and ≤ ¼" above maximum level indication mark	Above top of plates, and not overflowing
Float Voltage	≥ 2.13 volts	≥ 2.13 volts[6]	> 2.07 volts
Specific Gravity[4]	≥ 1.200[5]	≥ 1.195	Not more than 0.020 below the average of all connected cells
		Average of all connected cells	Average of all connected cells
		> 1.205	≥ 1.195[5]

TABLE NOTATIONS

(1) For any Category A parameter(s) outside the limit(s) shown, the battery may be considered OPERABLE provided that within 24 hours all the Category B measurements are taken and found to be within their allowable values, and provided all Category A and B parameter(s) are restored to within limits within the next 6 days.

(2) For any Category B parameter(s) outside the limit(s) shown, the battery may be considered OPERABLE provided that the Category B parameters are within their allowable values and provided the Category B parameter(s) are restored to within limits within 7 days.

(3) Any Category B parameter not within its allowable value indicates an inoperable battery.

(4) Corrected for electrolyte temperature and level.

(5) Or battery charging current is less than 2 amps when on charge.

(6) Corrected for average electrolyte temperature.

(Gould) 3 amps (C&D)

for Gould. Corrected for electrolyte temperature for C&D

ELECTRICAL POWER SYSTEMS

D.C. SOURCES

SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.8.2.2 As a minimum, one 125-volt D.C. bus fed from its battery and its associated full-capacity charger and with one of its associated crosstie breakers in the open position shall be OPERABLE.

APPLICABILITY: MODES 5 and 6.

ACTION:

a. With both of the crosstie breakers closed for the 125-Volt D.C. bus that is required to be OPERABLE and with the opposite unit operating (Modes 1, 2, 3, or 4), the shutdown unit's operable 125-Volt D.C. bus may energize the operating unit's inoperable 125-Volt D.C. bus having an inoperable charger without a load restriction.

b. With both of the crosstie breakers closed for the 125-Volt D.C. bus that is required to be OPERABLE and with both units shutdown (Modes 5, 6, or defueled), the 125-Volt D.C. bus may energize the opposite unit's 125-Volt D.C. bus for up to 7 days provided items 1 and 2 below are satisfied. Otherwise open one of the crosstie breakers.

(1) The opposite unit's bus load is restricted to:

Opposite ~~Bus~~ Unit Battery Status	Operable Bus Battery Type	Load Restriction
Inoperable	~~AT&T~~ C&D	200 ~~100~~ Amps
Inoperable	Gould	63 Amps
OPERABLE	Either	None

(2) If a load restriction applies, then once per 12 hours verify that the opposite shutdown unit's bus loading will not exceed the load restriction.

c. With the required 125-Volt D.C. bus inoperable, except for the allowances of ACTIONS (a) or (b) above, immediately suspend all operations involving CORE ALTERATIONS, positive reactivity additions, or movement of irradiated fuel; initiate corrective action to restore the required bus to OPERABLE status as soon as possible; and within 8 hours, depressurize and vent the Reactor Coolant System through at least a 2 square inch vent.

SURVEILLANCE REQUIREMENTS

4.8.2.2 The above required 125-volt D.C. bus fed from its battery and its associated charger shall be demonstrated OPERABLE per Specifications 4.8.2.1.1 and 4.8.2.1.2.

A.C. SOURCES, D.C. SOURCES, AND ONSITE POWER DISTRIBUTION (Continued)

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

The modified performance discharge test is described in ~~the April 24, 1992 Draft Revision to~~ IEEE Std 450-1995, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications." It is permissible to perform a modified performance discharge test on the ~~AT&T~~ battery in lieu of a service test and a performance discharge test as required by Regulatory Guide 1.129, Regulatory Position C.1, because the test discharge rate envelopes the load cycle of the service test. (C&D)

Verification of the crosstie loading limits in Specifications 3.8.2.1 and 3.8.2.2 ensures that the OPERABLE battery will have sufficient capacity to energize the design basis loads of its DC bus while maintaining the limited DC loads of the inoperable DC bus on a shutdown unit.

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

The battery service test is a special test of battery capability, as-found, to satisfy the design requirements (battery duty cycle) of the D.C. electrical power system. The discharge rate and length of the battery service test corresponds to the design duty cycle requirements as specified in UFSAR Subsection 8.3.2.1.1.

Table 4.8-2 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 ~~2.16 volts (AT&T)~~ 2.13 volts ~~(Gould)~~ 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 ~~2.16 volts (AT&T)~~ 2.13 volts ~~(Gould)~~ 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 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 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 ~~2.14 volts (AT&T)~~ 2.07 volts ~~(Gould)~~, ensures the battery's capability to perform its design function.

ATTACHMENT B-2

MARKED UP PAGES FOR
PROPOSED CHANGES TO

DRAFT IMPROVED TECHNICAL SPECIFICATIONS

REVISED PAGES:

3.8-20
3.8-21
3.8-22
3.8-25
3.8-27
3.8-28

B3.8-48
B3.8-49
B3.8-52
B3.8-56
B3.8-57
B3.8-58
B3.8-63
B3.8-68
B3.8-70
B3.8-72

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. One DC electrical power division crosstied to opposite-unit DC electrical power subsystem with an inoperable source, while opposite unit is in MODE 5, 6, or defueled.	C.1	---------NOTE-------- Only required when opposite unit has an inoperable battery. ----------	
		Verify opposite-unit DC bus load ≤ 63 amps, (Gould) or ≤ 200 amps (C&D).	Once per 12 hours
	AND		
	C.2	Open at least one crosstie breaker between the crosstied divisions.	7 days
D. One DC electrical power subsystem inoperable for reasons other than Condition A, B, or C.	D.1	Restore DC electrical power subsystem to OPERABLE status.	2 hours
E. Required Action and Associated Completion Time not met.	E.1	Be in MODE 3.	6 hours
	AND		
	E.2	Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.8.4.1	Verify battery terminal voltage is ≥ 126 V on float charge. (Gould) or ≥ 127.6 V (C&D)	31 days
SR 3.8.4.2	Verify each battery charger supplies a load equal to the manufacturer's rating for ≥ 8 hours.	18 months
SR 3.8.4.3	----------NOTES---------- 1. The performance discharge test in SR 3.8.4.4 may be performed in lieu of the service test in SR 3.8.4.3. 2. This Surveillance shall not be performed in MODE 1, 2, 3, or 4. ---------- Verify battery capacity is adequate to supply, and maintain OPERABLE status, the required emergency loads for the design duty cycle when subjected to a battery service test.	18 months

(continued)

(Gould) or the modified performance discharge test (C&D)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.4.4	----------NOTE---------- This Surveillance shall not be performed in MODE 1, 2, 3, or 4. ----------	
	Verify battery capacity is ≥ 80% of the manufacturer's rating when subjected to a performance discharge test, (Gould) or a modified performance discharge test (C&D).	60 months AND 18 months when battery shows degradation or has reached 85% of expected life

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One DC electrical power division crosstied to opposite-unit DC electrical power subsystem with an inoperable source, while opposite unit is in MODE 5, 6, or defueled.	B.1 ---------NOTE-------- Only required when opposite unit has an inoperable battery. ---------- Verify opposite-unit DC bus load is ≤ 63 amps, (Gould) or ≤ 200 amps (C&D).	Once per 12 hours
	AND	
	B.2 Open at least one crosstie breaker between the crosstied divisions.	7 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.5.1	-- ----------NOTE---------- The following SRs are not required to be performed: SR 3.8.4.2, SR 3.8.4.3, and SR 3.8.4.4. ----------	
	For DC sources required to be OPERABLE, the following SRs are applicable: SR 3.8.4.1, SR 3.8.4.2, SR 3.8.4.3, SR 3.8.4.4.	In accordance with applicable SRs

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.1 Perform SR 3.8.6.2, SR 3.8.6.5, and SR 3.8.6.6.	24 hours AND Once per 7 days thereafter
	OR	
	A.2.2 Perform SR 3.8.6.5, SR 3.8.6.6, SR 3.8.6.7, and SR 3.8.6.8.	24 hours AND Once per 7 days thereafter
	AND	
	A.3 Restore battery parameters to within limits of the Battery Inspection Program.	31 days
B. One battery with required float current ≥ 2 amps, but < 10 amps.	B.1 Restore battery float current to < 2 amps. (Gould) 3 amps (C&D).	24 hours

(continued)

(Gould) 3 amps (C&D)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time of Condition A or B not met. OR One or more batteries with one or more battery parameters not within limits for reasons other than Condition A or B.	C.1 Declare associated battery inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.6.1	Verify battery parameters are within Battery Inspection Program limits.	In accordance with the Battery Inspection Program
SR 3.8.6.2	----------NOTE---------- Not required to be met if SR 3.8.6.3 SR 3.8.6.7, and SR 3.8.6.8 are met. ---------- Verify battery float current is < 2 amps on float charge.	31 days

(Gould) 3 amps (CED)

(continued)

BASES

BACKGROUND (continued)

The Division 11 (21) and Division 12 (22) DC electrical power subsystems provide the control power for its associated Class 1E AC power load group, 4.16 kV switchgear, and 480 V load centers. The DC electrical power subsystems also provide DC electrical power to the inverters, which in turn power the AC instrument buses. Additionally, the Class 1E 125 VDC electrical power subsystems provide power to the 6.9 kV Reactor Coolant Pump (RCP) breakers and the non-Class 1E 125 VDC buses. The connection between the Class 1E and non-Class 1E 125 VDC buses contains fuses to ensure that a fault on the non-Class 1E bus does not cause a loss of the Class 1E bus.

The DC power distribution system is described in more detail in Bases for LCO 3.8.9, "Distribution System – Operating," and LCO 3.8.10, "Distribution Systems – Shutdown."

Each battery was sized based upon supplying the design duty cycle in the event of a loss of offsite AC power concurrent with a Loss Of Coolant Accident (LOCA) and a single failure of a Diesel Generator (DG). Each Gould battery has a ~~guaranteed~~ nominal rating of 1200 ampere-hours, ~~and was~~ sized based upon continuously carrying the various estimated loads. The batteries were sized in accordance with IEEE-485-1978 (Ref. 5). The C&D batteries were sized in accordance with IEEE-485-1983 (Ref. 12).

Gould

Each 125 VDC battery is separately housed in a ventilated room apart from its charger and distribution centers. Each subsystem is located in an area separated physically and electrically from the other subsystem to ensure that a single failure in one subsystem does not cause a failure in a redundant subsystem. There is no sharing between redundant Class 1E subsystems, such as batteries, battery chargers, or distribution panels. While it is possible to interconnect the Unit 1 and Unit 2 DC electrical power subsystems, they normally remain disconnected, except when a DC source must be taken out of service for the purposes of maintenance and/or testing, or in the event of a failure of a DC source.

Each C&D battery has a nominal rating of 2320 ampere-hours at the 8-hour rate to an end voltage of 1.75 volts per cell. Each Gould and C&D battery was

(continued)

BASES

BACKGROUND (continued)

The crosstie between 125 VDC ESF buses 111 and 211 and the crosstie between 125 VDC ESF buses 112 and 212 are each provided with two normally locked open, manually operated circuit breakers. No interlocks are provided since the interconnected buses are not redundant. However, if one battery is inoperable, procedural and administrative controls are used to limit the connected load ~~to 63 amps~~ based on not exceeding the OPERABLE battery capacity. These controls ensure that combinations of maintenance and test operations will not preclude the system capabilities to supply power to the ESF DC loads. The provisions of administratively controlled, manually actuated, interconnections between the non-redundant Class 1E DC buses increases the overall reliability and availability of the DC systems for each unit in that it provides a means for manually providing power to a DC bus at a time when it would otherwise have to be out-of-service (e.g., to perform a battery discharge test during an outage, to replace a damaged cell, etc.). Crosstie breaker closed alarms are also provided to alert the operator when the units are crosstied.

Each Division 11 (21) and Division 12 (22) DC electrical power subsystem battery charger has ample power output capacity for the steady state operation of connected loads required during normal operation, while at the same time maintaining its battery bank fully charged. Each battery charger also has sufficient capacity to restore the battery from the design minimum charge to its fully charged state while supplying normal steady state loads discussed in the UFSAR, Chapter 8 (Ref. 4).

The load limit for Gould batteries is 63 amps; the load limit for C&D batteries is 200 amps.

(continued)

BASES

ACTIONS (continued)

C.1 and C.2

Condition C addresses an operating unit's DC bus that is crosstied to the opposite unit's associated DC bus, which has an inoperable source, when the opposite unit is shutdown. This provision is included to accommodate maintenance and/or testing of the shutdown unit's DC subsystems.

With the shutdown unit's battery inoperable, the operating unit will be required to supply all loads on the shutdown unit's crosstied bus should an event occur on the shutdown unit. Therefore, Required Action C.1 specifies that the possible loading on the shutdown unit's DC bus be verified to be ≤ 63 amps once per 12 hours. Limiting the load ~~to 63 amps~~ ensures that the operating unit's DC subsystem will not be overloaded in the event of a concurrent event on the operating unit. Required Action C.1 is modified by a Note only requiring Required Action C.1 when the opposite unit has an inoperable battery.

(Gould) or 200 amps (C&D)

shutdown unit's DC bus

Required Action C.2 requires the associated crosstie breaker to be opened within 7 days ensures that measures are being taken to restore the inoperable battery and reestablish independence of the DC subsystems.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.4.3

A battery service test is a special test of battery capability, as found, to satisfy the design requirements (battery duty cycle) of the DC electrical power system. The discharge rate and test length should correspond to the design duty cycle requirements as specified in Reference 4.

The Surveillance Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.32 (Ref. 10) and Regulatory Guide 1.129 (Ref. 11), which state that the battery service test should be performed during refueling operations or at some other outage, with intervals between tests, not to exceed 18 months.

This SR is modified by two Notes. Note 1 allows the performance of a performance discharge test in lieu of a service test.

Insert new paragraph →

The reason for Note 2 is that performing the Surveillance would perturb the electrical distribution system and challenge safety systems.

or a modified performance discharge test

(continued)

Insert for page B 3.8-56

The modified performance discharge test is a simulated duty cycle consisting of just two rates - the one-minute rate published for the battery or the largest current load of the duty cycle, followed by the test rate employed for the performance test, both of which envelope the duty cycle of the service test. Since the ampere-hours removed by a rated one-minute discharge represents a very small portion of the battery capacity, the test rate can be changed to that for the performance test without compromising the results of the performance discharge test. The battery terminal voltage for the modified performance discharge test should remain above the minimum battery terminal voltage specified in the battery service test for the duration of time equal to that of the service test.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.4.4

A battery performance discharge test is a test of constant current capacity of a battery after having been in service, to detect any change in the capacity determined by the acceptance test. The test is intended to determine overall battery degradation due to age and usage.

Insert new paragraph →

The acceptance criteria for this Surveillance are consistent with IEEE-450 (Ref. 9) and IEEE-485 (Ref. 5). These references recommend that the battery be replaced if its capacity is below 80% of the manufacturer's rating. A capacity of 80% shows that the battery rate of deterioration is increasing, even if there is ample capacity to meet the load requirements.

The Surveillance Frequency for this test is normally 60 months. If the battery shows degradation, or if the battery has reached 85% of its expected life, the Surveillance Frequency is reduced to 18 months. Degradation is indicated, according to IEEE-450 (Ref. 9), when the battery capacity drops by more than 10% relative to its capacity on the previous performance test or when it is ≥ 10% below the manufacturer's rating. These Frequencies are consistent with the recommendations in IEEE-450 (Ref. 9).

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would perturb the electrical distribution system and challenge safety systems.

(continued)

Insert for page B 3.8-57

The modified performance discharge test is described in the Bases for SR 3.8.4.3. Either the battery performance discharge test or the modified performance discharge test is acceptable for satisfying SR 3.8.4.4; however, only the modified performance discharge test may be used to satisfy SR 3.8.4.4 while satisfying the requirements of 3.8.4.3 at the same time.

BASES (continued)

REFERENCES

1. 10 CFR 50, Appendix A, GDC 17.
2. Regulatory Guide 1.6, March 10, 1971.
3. IEEE-308-1978.
4. UFSAR, Section 8.3.2.1.
5. IEEE-485-1978, November 1979.
6. UFSAR, Chapter 6.
7. UFSAR, Chapter 15.
8. Regulatory Guide 1.93, December 1974.
9. IEEE-450-1995.
10. Regulatory Guide 1.32, February 1977.
11. Regulatory Guide 1.129, December 1974.
12. IEEE-485-1983.

BASES

ACTIONS (continued)

B.1 and B.2

Condition B addresses a shutdown unit's DC bus that is crosstied to the opposite unit's associated DC bus, which has an inoperable source, when the opposite unit is also shutdown. This provision is included to accommodate maintenance and/or testing of the opposite unit's DC subsystems.

With the opposite unit's battery inoperable, the unit-specific DC subsystem will be required to supply all loads on the opposite unit's crosstied bus should an event occur on the opposite unit. Therefore, Required Action B.1 specifies that the possible loading on the opposite unit's DC bus be verified to be ≤ 63 amps once per 12 hours. Limiting the load ~~to 63 amps.~~ ensures that the unit-specific DC subsystem will not be overloaded in the event of a concurrent event on the unit. Required Action B.1 is modified by a Note requiring Required Action B.1 when the opposite unit has an inoperable battery.

(Gould) or 200 amps (C&D)

shutdown unit's DC bus

Required Action B.2 requires the associated crosstie breaker to be opened within 7 days ensures that measures are being taken to reestablish independence of the DC subsystems.

SURVEILLANCE REQUIREMENTS

SR 3.8.5.1

SR 3.8.5.1 requires application of all Surveillances required by SR 3.8.4.1 through SR 3.8.4.4. Therefore, see the corresponding Bases for LCO 3.8.4 for a discussion of each SR.

This SR is modified by a Note. The reason for the Note is to preclude requiring the OPERABLE DC sources from being discharged below their capability to provide the required power supply or otherwise rendered inoperable during the performance of SRs. It is the intent that these SRs must still be capable of being met, but actual performance is not required.

(continued)

BASES

ACTIONS (continued)

B.1

(Could) 3 amps (C&D)

A float (charging) current ≥ 2 amps is indicative of a battery which has been at least partially discharged. However, if the float current remains, < 10 amps, this is indicative of a battery performing as expected when returning to a full state of charge. The completion time of 24 hours is based on the period necessary for a normally recharging battery to reach a state of full charge from the point at which it is capable of performing at ≥ 80% of the manufacturer's rating.

C.1

With one or more batteries with one or more battery parameters outside the limits (excluding the battery parameter limits covered by Conditions A and B) sufficient capacity to supply the maximum expected load requirement is not assured and the corresponding DC electrical power subsystem must be declared inoperable. Additionally, other potentially extreme conditions, such as not completing the Required Actions of Condition A within the required Completion Time, are also cause for immediately declaring the associated DC electrical power subsystem inoperable.

SURVEILLANCE REQUIREMENTS

SR 3.8.6.1

This SR verifies required battery parameter testing is performed in accordance with the Battery Inspection Program. The required parameters include the condition of the battery terminals and connectors, the battery connection resistance, the condition of the battery cells, cell plates, and racks, the electrolyte level, float voltage, and specific gravity. The term "connected battery cell" excludes any battery cell that may be jumpered out.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.6.1 (continued)

The BIP limits specified for electrolyte level are based on manufacturer recommendations and are consistent with the guidance in IEEE-450 (Ref. 3), with an extra 1/4 inch allowance above the high water level indication for operating margin to account for temperatures and charge effects. In addition to this allowance, the electrolyte level is permitted to be above the specified maximum level during equalizing charge, provided it is not overflowing. These limits ensure that the plates suffer no physical damage and that adequate electron transfer capability is maintained in the event of transient conditions. IEEE-450 (Ref. 3) recommends that electrolyte level readings should be made only after the battery has been at float charge for at least 72 hours.

The BIP limit specified for float voltage is ≥ 2.13 V for each individual cell. This value is based on a recommendation of IEEE-450 (Ref. 3), which states that prolonged operation of cells < 2.13 V can reduce the life expectancy of the cell.

The BIP limit specified for specific gravity for each pilot cell is ≥ 1.200 (0.015 below the manufacturer fully charged nominal specific gravity). This value is characteristic of a charged cell with adequate capacity. According to IEEE-450 (Ref. 3), the specific gravity readings are based on a temperature of 77°F (25°C). The specific gravity readings are corrected for actual electrolyte temperature and level. For each 3°F (1.67°C) above 77°F (25°C), 1 point (0.001) is added to the reading; 1 point is subtracted for each 3°F below 77°F. The specific gravity of the electrolyte in a cell increases with a loss of water due to electrolysis or evaporation. However, correction for level is not required when battery charging current is < 2 amps when on float charge.

for each Gould battery. The specific gravity readings for each C&D battery are corrected for actual electrolyte temperature, but not for level, which is in accordance with the battery manufacturer's recommendations.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.6.3

This SR verifies specific gravity for each pilot cell is within the limit specified in the BIP, ≥ 1.200 (0.015 below the manufacturer fully charged nominal specific gravity). This value is characteristic of a charged cell with adequate capacity. According to IEEE-450 (Ref. 3), the specific gravity readings are based on a temperature of 77°F (25°C). The specific gravity readings are corrected for actual electrolyte temperature and level. For each 3°F (1.67°C) above 77°F (25°C), 1 point (0.001) is added to the reading; 1 point is subtracted for each 3°F below 77°F. The specific gravity of the electrolyte in a cell increases with a loss of water due to electrolysis or evaporation. However, correction for level is not required when battery charging current is < 2 amps when on float charge.

insert new text here

This SR is modified by a Note which allows either float current or specific gravity to be used to determine the state of charge of the battery. If float current is used, the specific gravity SRs (SR 3.8.6.3, SR 3.8.6.7, and SR 3.8.6.8) are not required to be met. If specific gravity is used, the float current requirement (SR 3.8.6.2) is not required to be met. Because of specific gravity gradients that are produced during the recharging process, delays of several days may occur while waiting for the specific gravity to stabilize. A stabilized charger current is an acceptable alternative to specific gravity measurement for determining the state of charge. This phenomenon is discussed in IEEE-450 (Ref. 3).

SR 3.8.6.4

This Surveillance verification that the average temperature of representative cells is ≥ 60°F, is consistent with a recommendation of IEEE-450 (Ref. 3), that states that the temperature of electrolytes in representative cells should be determined on a quarterly basis.

Lower than normal temperatures act to inhibit or reduce battery capacity. This SR ensures that the operating temperatures remain within an acceptable operating range. This limit is based on manufacturer recommendations.

(continued)

Insert for page B 3.8-72

for each Gould battery. The specific gravity readings for each C&D battery are corrected for actual electrolyte temperature, but not for level, which is in accordance with the battery manufacturer's recommendations.

ATTACHMENT C

EVALUATION OF SIGNIFICANT HAZARDS CONSIDERATIONS FOR
PROPOSED CHANGES TO APPENDIX A
TECHNICAL SPECIFICATIONS OF
FACILITY OPERATING LICENSES
NPF-37 AND NPF-66

Commonwealth Edison has evaluated the proposed amendment and determined that it involves no significant hazards considerations. According to 10 CFR 50.92(c), a proposed amendment to an operating license involves no significant hazards considerations if operation of the facility in accordance with the proposed amendment would not:

1. Involve a significant increase in the probability or consequences of an accident previously evaluated; or

2. Create the possibility of a new or different kind of accident from any accident previously evaluated; or

3. Involve a significant reduction in a margin of safety.

The proposed changes allow for the replacement of the 125 volt dc Gould batteries with new 125 volt dc C&D batteries and revise the crosstie loading limitation.

A. The proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

The replacement C&D battery has been selected to meet or exceed the design, functional, and operational requirements of those of the present Gould battery, including crosstie load limitations. The C&D batteries are similar in design to the installed Gould batteries (e.g., electrolyte specific gravity and construction of the plates) except for capacity. The replacement C&D batteries have a significantly larger capacity than the Gould batteries, which can provide additional margin for future use. Also, the C&D batteries are qualified for a 20 year life and meet the latest applicable standards. The short circuit current provided by the C&D batteries is well within the interrupting capability of the existing DC system circuit breakers.

Additionally, the crosstie limit is increased to take advantage of the larger C&D battery capacity. The C&D batteries were sized based on having sufficient capacity to energize the design basis DC loads for an operating unit with the IEEE-485 design margin while maintaining the desired limited DC load of 200 amps for a shutdown unit. This proposed change allows use of the C&D batteries' larger capacity.

The overall design, function, and operation of the DC system and equipment has not been altered by these changes. The proposed changes do not affect any accident initiators or precursors and do not alter the design assumptions for the systems or components used to mitigate the consequences of an accident as analyzed in UFSAR Chapter 15. Therefore, there is no increase in the probability or consequences of an accident previously evaluated.

B. The proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

The replacement C&D batteries will provide the same functions as those of the installed Gould batteries and will be operated with the same types of operational controls. These limits include battery float terminal voltage, individual cell voltage and electrolyte specific gravity, and crosstie loading. Crosstie conditions are allowed under the present Technical Specifications. The crosstie limit is increased to take advantage of the larger C&D battery capacity. The remaining changes are administrative in nature or provide clarification to maintain consistency with other Technical Specifications.

The DC system and its equipment will continue to perform the same functions and be operated in the same fashion. The proposed change does not create any new or common failure modes. The proposed changes do not introduce any new accident initiators or precursors, or any new design assumptions for the systems or components used to mitigate the consequences of an accident. Therefore, the possibility of a new or different kind of accident from any accident previously evaluated has not been created.

C. The proposed change does not involve a significant reduction in a margin of safety.

The replacement C&D batteries will meet or exceed the design, functional, and qualification requirements those of the installed Gould batteries. The proposed Technical Specification limitations for the C&D batteries are derived from the same methodology as the Gould batteries with applied margins in accordance with IEEE 485. Increasing the crosstie loading limit takes advantage of the larger C&D battery capacity with its increased design margin. The proposed change to the crosstie loading limit will continue to conservatively envelope the postulated design requirements. The remaining changes are administrative in nature or provide clarification to maintain consistency with other Technical Specifications.

The inherent design conservatism of the DC system and its equipment has not been altered. The DC system and its equipment will continue to be operated with the same degree of conservatism. Therefore, there is no reduction in the margin of safety.

Therefore, based upon the above evaluation, Commonwealth Edison has concluded that these changes involve no significant hazards considerations.

ATTACHMENT D

ENVIRONMENTAL ASSESSMENT FOR
PROPOSED CHANGES TO APPENDIX A
TECHNICAL SPECIFICATIONS OF
FACILITY OPERATING LICENSES
NPF-37 AND NPF-66

Commonwealth Edison has evaluated the proposed amendment and determined that it meets the criteria for a categorical exclusion set forth in 10 CFR 51.22(c)(9). This determination is based upon the following: The proposed amendment changes requirements regarding the installation and use of facility components located within the restricted area (as defined in 10 CFR 20) and surveillance requirements; and the proposed amendment involves no significant hazards considerations, no change in the amount or type of any effluent that may be released offsite, and no increase in individual or cumulative occupational radiation exposure. Pursuant to 10 CFR 51.22(b), neither an environmental impact statement nor an environmental assessment is necessary for the proposed amendment.