ELECTRICAL POWER SYSTEMS

D.C. DISTRIBUTION - OPERATING

LIMITING CONDITION FOR OPERATION

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

TRAIN "A" consisting of 125-volt D.C. bus No. 1, 125-volt D.C. battery bank No. 1 and a full capacity charger.

TRAIN "B" consisting of 125-volt D.C. bus No. 2, 125-volt D.C. battery bank No. 2 and a full capacity charger.

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

ACTION:

a. With one of the required battery banks inoperable, restore the inoperable battery bank 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 of the required full capacity chargers inoperable, demonstrate the OPERABILITY of its associated battery bank by performing Surveillance Requirement 4.8.2.3.1.a.1 within one hour and at least once per 8 hours thereafter. If any Category A limit in Table 4.8-2 is not met, declare the battery inoperable.

SURVEILLANCE REQUIREMENTS

4.8.2.3.1 Each 125-volt battery bank and 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 124.7 volts on float charge for a 58 cell battery bank.

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 150 volts, by verifying that:

1. The parameters in Table 4.8-2 meet the Category B LIMITS,

* For the purpose of measuring battery charging current in lieu of specific gravity, the battery disconnect switch may be opened for a period of time not to exceed 10 minutes without declaring the battery inoperable. This exemption only applies within 30 days of either a battery service or discharge performance test. Only one disconnect switch may be opened at ary time.

TABLE 4.8-2

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	>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 (c)	>2.07 volts
Specific Gravity (a)	≥1.200 (b)	(d) ≥1.195 Average of all connected cells >1.205	Not more than .020 below the average of all connected cells Average of all connected cells ≥1.190 (d)

(a) Corrected for electrolyte temperature and level.
(b) Or battery charging current is less than 2 amps when on charge.
(c) Corrected for average electrolyte temperature, if necessary.
(d) Or within 30 days of either a service or performance discharge test, the battery charging current is less than 2 amps when on charge.
(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 restored to within LIMITS within 7 days.
(3) Any Category B parameter not within its ALLOWABLE VALUE indicates an inoperable battery.

ELECTICAL POWER SYSTEMS

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 - 125-volt D.C. bus, and

1 - 125-volt battery bank and charger supplying 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 125-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 125-volt battery bank and charger shall be demonstrated OPERABLE per Surveillance Requirement 4.8.2.3.1.a

* For the purpose of measuring battery charging current in lieu of specific gravity, the battery disconnect switch may be opened for a period of time not to exceed 10 minutes without declaring the battery inoperable. This exemption only applies within 30 days of either a battery service or discharge performance test.

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" of 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 unit status.

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

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

The Surveillance Requirements for demonstrating the OPERABILITY of the D.C. electrical sources are in accordance with the recommendations of IEEE 450-1980 and the battery manufacturer. The Surveillance Requirements consist of battery maintenance, battery service and performance discharge tests, and battery charger performance test. The limits of Table 4.8-2 establish the minimum surveillance results of the particular parameters for demonstrating OPERABILITY. Exceptions to the specific gravity requirements are taken to allow for the normal deviations experienced after a battery discharge and subsequent recharge associated with a service and performance discharge test. The specific gravity deviations are recognized and discussed by both IEEE 450 and the battery manufacturer.

The metering system is provided for accurately measuring the battery charging current associated with a fully charged battery. This current is allowed to be used in lieu of specific gravity as defined by Table 4.8-2. In order to take battery current measurements, the metering system is placed in service and the main battery disconnect switch is opened. The time required to take the current measurement and return the system to normal condition is less than ten minutes. Although the normal operation of the D.C. system is maintained during this time (i.e., the battery continues to charge and the charger provides power to the D.C. loads), the battery main disconnect switch is open and the battery cannot perform an emergency duty cycle discharge through the metering circuit. Due to the inherent requirement for the battery disconnect switch to be open when using the metering system to measure the battery current, an allowance will be made for the battery to be out of service without entering Technical Specification Action statements for a period not to exceed 10 minutes when charging current is being measured. During plant conditions where both battery banks are required to be operable, opening of the disconnect switch is restricted to one battery at a time.

IEEE 450 allows a correction of cell voltage when a temperature differential exists between cells. The temperature differential causes a lower resistance and subsequently, a lower voltage in the higher temperature cells. The cell voltage correction for temperature should only be applied to a cell which has both a cell voltage below the "LIMITS" value and a temperature higher than the average of the bank.