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10 CFR 50.90

RS-07-120
December 21, 2007

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Quad Cities Nuclear Power Station, Units 1 and 2
Renewed Facility Operating License Nos. DPR-29 and DPR-30
NRC Docket Nos. 50-254 and 50-265

Subject: Request for License Amendment to Establish Total Battery Connector Resistance Acceptance Criteria in Technical Specifications Surveillance Requirements 3.8.4.2 and 3.8.4.5

Reference: Letter from A. M. Stone (U. S. NRC) to C. M. Crane (Exelon Generation Company, LLC), "Quad Cities Nuclear Power Station, Units 1 and 2, NRC Component Design Bases Inspection (CDBI), Inspection report 05000254/2006003(DRS), 05000265/2006003(DRS)," dated November 28, 2006

In accordance with 10 CFR 50.90, "Application for amendment of license or construction permit," Exelon Generation Company, LLC (EGC) requests the following amendment to Renewed Facility Operating License Nos. DPR-29 and DPR-30 for Quad Cities Nuclear Power Station (QCNPS), Units 1 and 2, respectively. The proposed amendment revises the battery acceptance criteria in Technical Specification (TS) Surveillance Requirements (SR) 3.8.4.2 and SR 3.8.4.5. In response to a Non-Cited Violation that was documented in the above referenced NRC Component Design Bases Inspection (CDBI) report, EGC is requesting to revise SR 3.8.4.2 and SR 3.8.4.5 to add an additional acceptance criterion to verify that total battery connector resistance is within pre-established limits that ensure the batteries can perform their design functions.

The attached amendment request is subdivided as follows.

- Attachment 1 provides an evaluation supporting the proposed change.
- Attachment 2 provides the marked-up TS page, with the proposed change indicated.
- Attachment 3 provides the marked-up Bases TS pages, with the proposed changes indicated for information only.

The proposed change has been reviewed and approved by the QCNPS Plant Operations Review Committee and Nuclear Safety Review Board in accordance with the requirements of the EGC Quality Assurance Program.

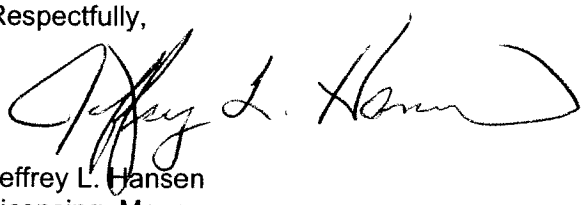
There are no regulatory commitments contained within this letter. EGC requests approval of the proposed change by December 21, 2008, with the amendment being implemented within 90 days of issuance.

In accordance with 10 CFR 50.91, "Notice for public comment; State consultation," EGC is notifying the State of Illinois of this application for changes to the TS by transmitting a copy of this letter and its attachments to the designated State Official.

Should you have any questions concerning this letter, please contact Ms. Michelle Yun at (630) 657-2818.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 21st day of December 2007.

Respectfully,



Jeffrey L. Hansen
Licensing, Manager

Attachment 1: Evaluation of Proposed Change
Attachment 2: Markup of Proposed Technical Specifications Page
Attachment 3: Markup of Proposed Technical Specifications Bases Pages

ATTACHMENT 1
Evaluation of Proposed Change

ATTACHMENT 1
Evaluation of Proposed Change

1.0 DESCRIPTION

In accordance with 10 CFR 50.90, "Application for amendment of license or construction permit," Exelon Generation Company, LLC (EGC) requests an amendment to Facility Operating License Nos. DPR-29 and DPR-30 for Quad Cities Nuclear Power Station (QCNPS), Units 1 and 2, respectively. The proposed amendment revises the acceptance criteria in Technical Specifications (TS) Surveillance Requirements (SR) 3.8.4.2 and SR 3.8.4.5. Specifically, EGC is requesting to revise SR 3.8.4.2 and SR 3.8.4.5 to add an additional acceptance criterion to verify that the total battery connector resistance is within the pre-established limits that ensure the QCNPS safety-related batteries can perform their intended design function.

2.0 PROPOSED CHANGE

The proposed change revises SR 3.8.4.2 and SR 3.8.4.5 to add an additional acceptance criterion to verify that total battery connector resistance is within pre-established limits that ensure the batteries can perform their design function. The proposed change is a corrective action associated with a Non-Cited Violation (NCV) that was documented in Reference 1, NRC Component Design Bases Inspection (CDBI) report. The proposed revisions to SR 3.8.4.2 and SR 3.8.4.5 are underlined below with revisions bars.

SR 3.8.4.2	Verify no visible corrosion at battery terminals and connectors. OR Verify battery connection resistance is ≤ 1.5E-4 ohm for inter-cell connections and ≤ 1.5E-4 ohm for terminal connections. AND Verify total battery connector resistance is less than limits established to ensure performance of design function.	92 days
SR 3.8.4.5	Verify battery connection resistance is ≤ 1.5E-4 ohm for inter-cell connections and ≤ 1.5E-4 ohm for terminal connections. AND Verify total battery connector resistance is less than limits established to ensure performance of design function.	24 months

3.0 BACKGROUND

The safety-related direct current (DC) electrical power systems include the 125 volt DC (VDC) and 250 VDC systems, which provide a source of DC power for certain vital loads and control

power. As required by Section 8.3.2 of the QCNPS Updated Final Safety Analysis Report (UFSAR), the DC electrical power system is designed to have sufficient independence, redundancy, and testability to perform its design function, assuming a single failure.

The 250 VDC system provides motive power to large DC loads such as DC motor-driven pumps and valves. Each QCNPS unit includes a 250 VDC source consisting of a 250 VDC battery and an associated 250 VDC full capacity battery charger. An additional 250 VDC full capacity charger is available for use between the units. Each 250 VDC battery and charger supplies power to both Unit 1 and Unit 2 loads. The minimum required battery terminal voltage for the QCNPS 250 VDC batteries is required, as stated in Section 8.3.2.1 of the QCNPS UFSAR, to be at least 210 VDC.

The 125 VDC electrical power system provides control power to selected safety-related equipment as well as circuit breaker control power for certain 4160 VAC and 480 VAC circuit breakers, and power to certain control relays and alarm annunciators. Each QCNPS unit includes a 125 VDC source consisting of a 125 VDC battery and two 125 VDC full capacity chargers (i.e., normal and alternate). Each 125 VDC unit source (i.e., 125 VDC battery and associated charger) supplies power to the associated unit Division 1 125 VDC electrical power distribution subsystem and the opposite unit Division 2 125 VDC electrical power distribution subsystem. The design also includes a safety-related alternate 125 VDC battery (one for each unit), which can be used when the normal 125 VDC battery is out-of-service for maintenance. The minimum required battery terminal voltage for the QCNPS 125 VDC batteries is required, as stated in Section 8.3.2.2 of the QCNPS UFSAR, to be at least 105 VDC.

Normally, the 250 VDC and 125 VDC battery chargers carry the DC loads, while maintaining their associated battery's terminal voltage. In the event of a loss of normal power to the battery charger, the DC loads are automatically powered from their associated battery. Each battery has adequate storage capacity to carry the required normal loads plus all loads required for safe shutdown on one unit and operations required to limit the consequences of a design basis event on the other unit for a period of four hours.

The safety-related batteries at QCNPS are formed by strings of battery cells. These strings are comprised of a series connection of the positive and negative terminal posts of adjacent cells as shown in Figure 1. The inter-cell and terminal connections between the cells contribute to the total battery connector resistance, which reduces the overall battery terminal voltage. During

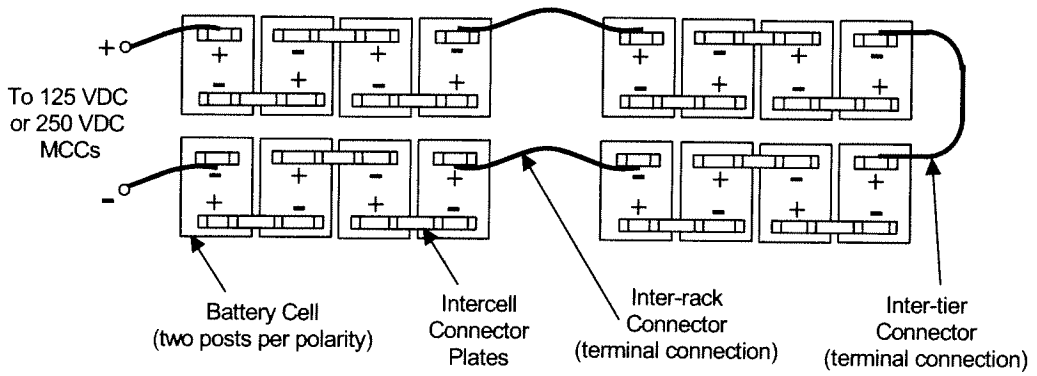


Figure 1: Typical Battery Configuration

normal operation of the battery, corrosion can occur on the battery posts, which can also increase the inter-cell and terminal connection resistance and further reduce battery terminal voltage. If the battery is not properly maintained, this condition could eventually reduce the affected battery's terminal voltage to a point where the minimum required voltages (i.e., 105 VDC for the 125 VDC battery and 210 VDC for the 250 VDC battery) cannot be met.

The total battery connector resistance is a combination of the elevated inter-cell connector resistance due to corrosion, resistance from the inter-rack jumper cable and associated terminal connections, resistance from the inter-cell cable and associated terminal connections, and resistance from the cable lug to post connection at the battery terminals.

In September 2006, the NRC completed a CDBI at QCNPS (Reference 1). The inspection team identified a NCV for the failure to verify that the 125 VDC safety-related batteries would remain operable if all the inter-cell and terminal connections were at the maximum resistance value allowed by TS SR 3.8.4.2 and SR 3.8.4.5 (i.e., 150 micro-ohms). In response to the non-conservative TS value, EGC initiated a compensatory measure to ensure safety-related battery operability by declaring the 125 and 250 VDC batteries inoperable if any inter-cell resistance exceeded 70 micro-ohms. This battery connector resistance limit is dependent on battery age as well as the loads on the DC system. Therefore, development of an acceptance criterion utilizing this value was not conducive for inclusion in TS.

As part of the corrective action associated with this NCV, EGC is requesting to revise SR 3.8.4.2 and SR 3.8.4.5 to add an additional acceptance criterion to verify that the total battery connector resistance is within pre-established limits, thus ensuring that the batteries can perform their intended design function by maintaining required battery terminal voltage under design-basis load conditions.

4.0 TECHNICAL ANALYSIS

Visual inspection to detect corrosion of the battery cells and connections, or measurement of the resistance of each inter-cell and terminal connection, provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance. The frequency for these inspections, which can detect conditions that can cause power losses due to resistance heating, is 92 days. Every two years, the visual inspection is confirmed by verifying battery connection resistances are within limits to ensure the batteries are not degraded. This frequency is considered acceptable based on operating experience related to detecting corrosion trends.

In Reference 1, the NRC identified a NCV which concluded that the maximum TS inter-cell resistance value of $\leq$ 150 micro-ohms specified in SR 3.8.4.2 and SR 3.8.4.5 was non-conservative. Specifically, if all the inter-cell connection resistances were allowed to reach their 150 micro-ohm limit, the voltage drop produced by the worst case battery loading would result in a battery terminal voltage reduction below the minimum requirement of 105 VDC and 210 VDC for the 125 VDC and 250 VDC batteries, respectively. In response to the NCV, EGC is proposing to incorporate an additional acceptance criterion in SR 3.8.4.2 and SR 3.8.4.5 that requires verification that the total battery connector resistance is within pre-established limits. The 150 micro-ohm limit was initially established based on the battery manufacturer's recommendations and is also indicative of industry operating experience. The additional restriction on total battery connector resistance will ensure each battery will be able to maintain required terminal voltage in order to perform its design function. The acceptance criteria for

total battery connector resistance will be maintained in the TS Bases under their associated SR Bases.

As stated above, the 125 VDC and 250 VDC battery terminal voltages must remain above 105 VDC and 210 VDC, respectively, during worst-case accident conditions. While the design basis load calculations include the manufacturer's total connection resistance, an increase in battery cell connection resistance due to corrosion would produce voltage drops along the battery string, which if large enough, could drop the battery terminal voltages below their minimum requirements. To account for these small increases in resistance, the remaining capacity in the batteries will be used as a compensation measure to determine the additional resistance the battery can withstand (from corrosion effects), while still meeting the 105 VDC and 210 VDC minimum voltage requirements. A calculation was performed to determine the maximum total allowable connector resistance for each of the safety-related batteries.

The safety-related batteries are sized per Reference 2. Using the minimum allowable battery voltage from the UFSAR (e.g., 105 VDC, 210 VDC), this sizing methodology produces the remaining capacity of the battery for a given load profile. This remaining capacity represents the amount of energy that would be left in the battery following its four-hour duty cycle. By raising the minimum allowable voltage until the remaining capacity approaches 0%, a voltage delta is obtained.

Using Ohm's Law and the maximum load current that would be supplied by the battery, this voltage delta can be converted to a resistance. This resistance is the value that is used to compensate for any increase in resistance due to corrosion. Using the accident load profiles for each battery, the new calculation determined maximum allowable resistances for each of the safety-related batteries. This calculation also accounts for the resistance from the conductive components such as inter-cell connectors and terminal lugs. Table 1 lists the acceptance criteria for total safety-related battery connector resistance.

Table 1: Individual Battery Total Connector Resistance Acceptance Criteria

Battery	$R_{Accept\text{-}Criteria}$
U1 125 VDC (Normal)	2650 μΩ
U1 125 VDC (Alternate)	2650 μΩ
U1 250 VDC	4000 μΩ
U2 125 VDC (Normal)	2500 μΩ
U2 125 VDC (Alternate)	2500 μΩ
U2 250 VDC	5000 μΩ

Locating these acceptance criteria in the TS Bases provides adequate assurance of design functionality, commensurate with the safety significance of the surveillance, since any changes will be evaluated in accordance with 10 CFR 50.59. Additionally, the intent of the surveillance requirement is to establish criteria for the performance of preventive maintenance. In summary, the proposed change revises SR 3.8.4.2 and SR 3.8.4.5 to establish an additional acceptance criterion to verify that total battery connector resistance is within the pre-established limits that ensure the batteries can perform their design function. This request is a corrective action associated with a NCV that was documented in Reference 1, NRC CDBI report.

5.0 REGULATORY ANALYSIS

5.1 No Significant Hazards Consideration

Exelon Generation Company, LLC (EGC) requests an amendment to Facility Operating License Nos. DPR-29 and DPR-30 for Quad Cities Nuclear Power Station (QCNPS), Units 1 and 2. The proposed change revises Technical Specifications (TS) Surveillance Requirement (SR) 3.8.4.2 and SR 3.8.4.5 to add an acceptance criterion to verify that total battery connector resistances for the 125 volts Direct Current (VDC) and 250 VDC batteries are within pre-established limits that ensure the batteries can perform their design function. The proposed incorporation of the acceptance criterion in SR 3.8.4.2 and SR 3.8.4.5 is conservative, as it adds a restriction on total battery connector resistance which will ensure design functions are achievable. SR 3.8.4.2 and SR 3.8.4.5 will continue to be performed as previously completed and will not change in the manner and frequency of execution.

According to 10 CFR 50.92, "Issuance of amendment," paragraph (c), a proposed amendment to an operating license involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not:

(1) Involve a significant increase in the probability or consequence 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.

EGC has evaluated the proposed change to the TS for QCNPS, Units 1 and 2, using the criteria in 10 CFR 50.92, and has determined that the proposed change does not involve a significant hazards consideration. The following information is provided to support a finding of no significant hazards consideration.

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No

   The revisions of SR 3.8.4.2 and SR 3.8.4.5 to add a battery connector resistance acceptance criterion will not challenge the ability of the safety-related batteries to perform their safety function. Appropriate monitoring and maintenance will continue to be performed on the safety-related batteries. In addition, the safety-related batteries are within the scope of 10 CFR 50.65, "Requirements for monitoring the effectiveness of maintenance at nuclear power plants," which will ensure the control of maintenance activities associated with this equipment.

   Current TS requirements will not be altered and will continue to require that the equipment be regularly monitored and tested. Since the proposed change does

not alter the manner in which the batteries are operated, there is no significant impact on reactor operation.

The proposed change does not involve a physical change to the batteries, nor does it change the safety function of the batteries. The proposed TS revision involves no significant changes to the operation of any systems or components in normal or accident operating conditions and no changes to existing structures, systems, or components.

Therefore, these changes will not increase the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

   Response: No

   The proposed changes revising SR 3.8.4.2 and SR 3.8.4.5 to add an additional acceptance criterion for battery connector resistance is an increase in conservatism, without a change in system testing methods, operation, or control. Safety-related batteries installed in the plant will be required to meet criteria more restrictive and conservative than current acceptance criteria and standards. The proposed change does not affect the manner in which the batteries are tested and maintained; therefore, there are no new failure mechanisms for the system.

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

3. Does the proposed change involve a significant reduction in a margin of safety?

   Response: No

   The margin of safety is established through the design of the plant structures, systems, and components, the parameters within which the plant is operated, and the setpoints for the actuation of equipment relied upon to respond to an event. The proposed change does not modify the safety limits or setpoints at which protective actions are initiated. The change is conservatism and further ensures the availability and operability of safety-related battery operability and availability. As such, sufficient DC capacity to support operation of mitigation equipment is enhanced, which results in an increase in the margin of safety.

   Therefore, the proposed change does not involve a significant reduction in the margin of safety.

Based upon the above, EGC concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of no significant hazards consideration is justified.

5.2 Applicable Regulatory Requirements and Criteria

10 CFR 50.36 provides the regulatory requirements for the content required in a licensee's SR. This regulation requires surveillance requirements relating to test, calibration, and inspection to assure that the necessary quality of systems and components is maintained, that facility operations will be within safety limits, and that the limiting conditions for operations will be met. The DC sources satisfy 10 CFR 50.36(c)(3), "Surveillance requirements."

The proposed changes:

(a) do not alter the design or function of any DC electrical power system;
(b) do not result in any change in the qualifications of any component; and
(c) do not result in the reclassification of any component's status in the areas of shared, safety-related, independent, redundant, or physical or electrical separation.

In conclusion, based on the considerations discussed above, (1) there is a reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the NRC's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

6.0 ENVIRONMENTAL CONSIDERATION

EGC has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, "Standards for Protection Against Radiation." However, the proposed amendment does not involve: (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22, "Criterion for categorical exclusion; identification of licensing and regulatory actions eligible for categorical exclusion or otherwise not requiring environmental review," Paragraph (c)(9). Therefore, in accordance with 10 CFR 51.22, Paragraph (b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

7.0 IMPACT ON PREVIOUS SUBMITTALS

This amendment request does not seek to execute changes on TS that currently have pending license amendment requests.

8.0 REFERENCES

(1) Letter from A. M. Stone (U. S. NRC) to C. M. Crane (Exelon Generation Company, LLC), "Quad Cities Nuclear Power Station, Units 1 and 2, NRC Component Design Bases Inspection (CDBI), Inspection report 05000254/2006003(DRS), 05000265/2006003(DRS)," dated November 28, 2006

(2) Institute of Electrical and Electronic Engineers (IEEE) Standard 485-1983, "IEEE Recommended Practice for Sizing Large Lead Storage Batteries for Generating Stations and Substations," dated June 23, 1983

ATTACHMENT 2

Markup of Proposed Technical Specifications Page

TS 3.8.4 -4
TS 3.8.4 -5

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.8.4.1	Verify battery terminal voltage on float charge is: a. ≥ 260.4 VDC for each 250 VDC subsystem; and b. ≥ 125.9 VDC for each 125 VDC subsystem.	7 days
SR 3.8.4.2	Verify no visible corrosion at battery terminals and connectors. OR Verify battery connection resistance is ≤ 1.5E-4 ohm for inter-cell connections and ≤ 1.5E-4 ohm for terminal connections. AND Verify total battery connector resistance is less than limits established to ensure performance of design function.	92 days
SR 3.8.4.3	Verify battery cells, cell plates, and racks show no visual indication of physical damage or abnormal deterioration that could degrade battery performance.	24 months
SR 3.8.4.4	Remove visible corrosion and verify battery cell to cell and terminal connections are coated with anti-corrosion material.	24 months
~~SR 3.8.4.5~~	~~Verify battery connection resistance is ≤ 1.5E-4 ohm for inter-cell connections and ≤ 1.5E-4 ohm for terminal connections.~~	~~24 months~~

(continued)

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.8.4.5	Verify battery connection resistance is ≤ 1.5E-4 ohm for inter-cell connections and ≤ 1.5E-4 ohm for terminal connections. AND Verify total battery connector resistance is less than limits established to ensure performance of design function.	24 months
SR 3.8.4.6	Verify each required battery charger supplies: a. ≥ 250 amps at ≥ 250 VDC for ≥ 4 hours for the 250 VDC subsystems; and b. ≥ 200 amps at ≥ 125 VDC for ≥ 4 hours for the 125 VDC subsystems.	24 months
SR 3.8.4.7	----------NOTE---------- The modified performance discharge test in SR 3.8.4.8 may be performed in lieu of the service test in SR 3.8.4.7 provided the modified performance discharge test completely envelopes the service test. ---------- Verify battery capacity is adequate to supply, and maintain in OPERABLE status, the required emergency loads for the design duty cycle when subjected to a battery service test.	24 months

(continued)

ATTACHMENT 3

Markup of Proposed Technical Specifications Bases Pages

TS B 3.8.4 -10
TS B 3.8.4 -12
TS B 3.8.4 -15

BASES

ACTIONS (continued)

F.1 and F.2

If the DC electrical power subsystem cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems. The Completion Time to bring the unit to MODE 4 is consistent with the time required in Regulatory Guide 1.93 (Ref. 6).

SURVEILLANCE REQUIREMENTS

SR 3.8.4.1

Verifying battery terminal voltage while on float charge for the batteries helps to ensure the effectiveness of the charging system and the ability of the batteries to perform their intended function. Float charge is the condition in which the charger is supplying the continuous charge required to overcome the internal losses of a battery and maintain the battery in a fully charged state. The voltage requirements are based on the nominal design voltage of the battery and are consistent with the initial voltages assumed in the battery sizing calculations. The 7 day Frequency is conservative when compared with manufacturers recommendations and IEEE-450 (Ref. 7).

SR 3.8.4.2

Visual inspection to detect corrosion of the battery cells and connections, or measurement of the resistance of each ~~intercell and terminal~~ connection or sum of connections, provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance.

~~The connection resistance limits established for this SR are within the values established by industry practice. The connection resistance limits of this SR are related to the resistance of individual bolted connections and do not include the resistance of conductive components (e.g., cables or conductors located between cells, racks, or tiers).~~

See Bases Insert

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.4.4 and SR 3.8.4.5 (continued)

See Bases Insert →

~~The connection resistance limits established for this SR are within the values established by industry practice. The connection resistance limits of this SR are related to the resistance of individual bolted connections and do not include the resistance of conductive components (e.g., cables or conductors located between cells, racks, or tiers).~~

The 24 month Frequency for the Surveillance is based on engineering judgement. Operating experience has shown that these components usually pass the SR when performed at the 24 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.8.4.6

Battery charger capability requirements are based on the design capacity of the chargers (Ref. 1). According to Regulatory Guide 1.32 (Ref. 8), the battery charger supply is required to be based on the largest combined demands of the various steady state loads and the charging capacity to restore the battery from the design minimum charge state to the fully charged state, irrespective of the status of the unit during these demand occurrences. The minimum required amperes and duration ensures that these requirements can be satisfied.

The Frequency is acceptable given the administrative controls existing to ensure adequate charger performance during these 24 month intervals. In addition, this Frequency is intended to be consistent with expected fuel cycle lengths.

SR 3.8.4.7

A battery service test is a special test of the battery's capability, as found, to satisfy the design requirements (battery duty cycle) of the DC electrical power system. The test can be performed using simulated or actual loads. The discharge rate and test length corresponds to the design duty cycle requirements as specified in Reference 1.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.4.8 (continued)

≥ 10% below the manufacturer's rating. The 12 month and 60 month Frequencies are consistent with the recommendations in IEEE-450 (Ref. 7). The 24 month Frequency is derived from the recommendations of IEEE-450 (Ref. 7).

REFERENCES

1. UFSAR, Section 8.3.2.

2. Safety Guide 6, March 10, 1971.

3. IEEE Standard 308, 1978.

4. UFSAR, Chapter 6.

5. UFSAR, Chapter 15.

6. Regulatory Guide 1.93, Revision 0, December 1974.

7. IEEE Standard 450, 1987.

8. Regulatory Guide 1.32, Revision 2, February 1977.

9. IEEE Standard 485, 1978.

10. Calculation QDC-8300-E-1587, Rev. 0.

Bases Insert

The connection resistance limits established for this SR consist of two separate verifications:

1) The battery connection resistance for each inter-cell, inter-tier, inter-rack, and terminal connection must be ≤ 1.5E-4 ohm. This value was established by industry practice as a means of identifying connections which could adversely affect the battery's ability to perform its design function if allowed to increase.

2) The total sum of battery connection resistances must also not exceed the values shown in Table B 3.8.4-1. These connection resistances include the sum of each measured inter-cell, inter-tier, inter-rack, and terminal connections. The values from Table B 3.8.4-1 were obtained from Reference 10. Maintaining the resistance limits in Table B 3.8.4-1 ensures that the minimum required voltages of 105 VDC and 210 VDC for the 125 VDC and 250 VDC safety-related batteries, respectively, will not be exceeded under worst case accident conditions.

Table B 3.8.4-1

Battery	$R_{Accept-Criteria}$
U1 125 VDC (Normal)	2650 μΩ
U1 125 VDC (Alternate)	2650 μΩ
U1 250 VDC	4000 μΩ
U2 125 VDC (Normal)	2500 μΩ
U2 125 VDC (Alternate)	2500 μΩ
U2 250 VDC	5000 μΩ