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December 14, 2009

U.S. Nuclear Regulatory Commission
Washington, DC 20555-001

ATTENTION: Document Control Desk

Subject: Duke Energy Carolinas, LLC
McGuire Nuclear Station, Units 1 and 2
Docket Nos. 50-369 and 50-370
Catawba Nuclear Station, Units 1 and 2
Docket Nos. 50-413 and 50-414

License Amendment Request Applicable to Technical Specification 3.8.4, "DC Sources-Operating"

In accordance with the provisions of 10 CFR 50.90, Duke Energy Carolinas, LLC (Duke) proposes a license amendment request (LAR) for the Renewed Facility Operating Licenses (FOL) and Technical Specifications (TS) for the McGuire and Catawba Nuclear Stations, Units 1 and 2.

The proposed LAR would revise the McGuire TS Surveillance Requirements (SRs) 3.8.4.2 and 3.8.4.5 and the Catawba TS SRs 3.8.4.3 and 3.8.4.6 that have been determined to be non-conservative. The TS Bases associated with McGuire TS SRs 3.8.4.2 and 3.8.4.5 and Catawba TS SRs 3.8.4.3 and 3.8.4.6 are also being revised accordingly. Non-conservative battery resistance SR values were identified by the NRC during the Quad Cities Component Design basis Inspection on November 28, 2006 as discussed in NRC Inspection Report 2006-003.

The SRs verify that battery connection resistance is less than specified limits for the individual parts of the battery. However, the total resistance of the battery, as determined by summing the individual values of resistance, could exceed the value of total battery resistance reflected in the load and voltage study calculations. Site procedures have been revised with conservative administrative limits to preclude battery resistance values exceeding design calculation limits.

This LAR replaces the LAR withdrawn on July 28, 2009 that proposed to move these SRs to a battery maintenance program per TSTF-360-A.

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Attachment 1 provides Duke's evaluation of the LAR which contains a description of the proposed changes, the technical evaluation, the regulatory analysis, the determination that this LAR contains No Significant Hazards Considerations, the basis for the categorical exclusion from performing an Environmental Assessment/Impact Statement, and precedent.

Attachment 2 provides existing Technical Specification pages for McGuire Units 1 and 2, marked-up to show the proposed changes. The associated Bases changes are included for information.

Attachment 3 provides existing Technical Specification pages for Catawba Units 1 and 2, marked-up to show the proposed changes. The associated Bases changes are included for information.

Reprinted McGuire and Catawba Technical Specification and Bases pages will be provided to the NRC upon issuance of the approved amendments.

This LAR contains no regulatory commitments for McGuire or Catawba.

Duke requests NRC review and approval of this LAR within one year of submittal in order to provide for the resolution of the Operable But Degraded Nonconforming condition regarding the TS SR non-conservative battery connection resistance values as documented in Duke's Corrective Action Program (PIP). Duke has determined that a 60 day implementation grace period will be sufficient to implement this LAR.

Necessary revisions to the McGuire and Catawba UFSARs will be made in accordance with 10CFR50.71(e).

In accordance with Duke internal procedures and the Quality Assurance Topical Report, the proposed amendment has been reviewed and approved by the McGuire and Catawba Plant Operations Review Committees and the Duke Corporate Nuclear Safety Review Board.

Pursuant to 10CFR50.91, a copy of this LAR has been forwarded to the appropriate North Carolina and South Carolina state officials.

Please direct any questions you may have in this matter to Lee A. Hentz at (980) 875-4187.

Sincerely,

Bruce Hamilton

B. H. Hamilton

Attachments:

1. Evaluation of Proposed Amendment
2. Marked-Up McGuire Technical Specification and Bases Pages
3. Marked-Up Catawba Technical Specification and Bases Pages

cc w/ Attachments:

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Bruce H. Hamilton affirms that he is the person who subscribed his name to the foregoing statement, and that all the matters and facts set forth herein are true and correct to the best of his knowledge.

Bruce Hamilton

Bruce H. Hamilton, Site Vice President, McGuire Nuclear Station

Subscribed and sworn to me: 12-14-2009
Date

Kay L Crane, Notary Public

KAY L. CRANE NOTARY PUBLIC LINCOLN COUNTY, N.C.

My commission expires: 4-1-2012
Date

ATTACHMENT 1

EVALUATION OF PROPOSED AMENDMENT

1.0 SUMMARY DESCRIPTION

2.0 DETAILED DESCRIPTION

3.0 TECHNICAL EVALUATION

4.0 REGULATORY SAFETY ANALYSIS

4.1 Applicable Regulatory Requirements/Criteria

4.2 Precedent

4.3 Significant Hazards Consideration

4.4 Conclusions

5.0 ENVIRONMENTAL CONSIDERATIONS

1.0 SUMMARY DESCRIPTION

Pursuant to 10 CFR 50.90, Duke Energy Carolinas, LLC (Duke) proposes a license amendment request (LAR) for the Renewed Facility Operating License (FOL) and Technical Specifications for McGuire and Catawba Nuclear Stations, Units 1 and 2.

The proposed LAR would revise the McGuire Technical Specification (TS) Surveillance Requirements (SRs) 3.8.4.2 and 3.8.4.5 and the Catawba TS SRs 3.8.4.3 and 3.8.4.6 that have been determined to be non-conservative. The TS Bases associated with the McGuire TS SRs 3.8.4.2 and 3.8.4.5 and the Catawba TS SRs 3.8.4.3 and 3.8.4.6 are also being revised accordingly.

Approval of this LAR will provide for the resolution of an Operable But Degraded Nonconforming condition regarding non-conservative battery connection resistance values in the McGuire and Catawba SRs as documented in Duke's Corrective Action Program (PIP). This issue is similar to that identified at the Quad Cities Station during the NRC's Component Design Basis Inspection on November 28, 2006 as discussed in NRC Inspection Report 2006-003.

The SRs verify that battery connection resistance is less than specified limits for the individual parts of the battery. However, the total resistance of the battery, as determined by summing the individual values of resistance, could exceed the value of total battery resistance reflected in the load and voltage study calculations. Site procedures have been revised with conservative administrative limits to preclude battery resistance values exceeding design calculation limits.

2.0 DETAILED DESCRIPTION

The proposed LAR would revise the McGuire SRs 3.8.4.2 and 3.8.4.5 and the Catawba SRs 3.8.4.3 and 3.8.4.6 that have been determined to be non-conservative.

The following changes are specifically requested for McGuire:

- TS SR 3.8.4.2 is revised by removing the connection resistance limit and referring to new Table 3.8.4-1 for the battery connection resistance limits.

- TS SR 3.8.4.5 is also revised by removing the connection resistance limits and referring to new Table 3.8.4-1 for the battery connection resistance limits.

- New TS Table 3.8.4-1 (below) was added to compile the calculated resistance limits for an intercell connection, interrack connection, intertier connection, terminal connection, and the new overall average intercell connection resistance.

New McGuire TS Table 3.8.4-1
Battery Connection Resistance Limits

PARAMETER	LIMIT (micro-ohms)
Single intercell connection	≤ 81.1
Single interrack connection	≤ 170.0
Single intertier connection	≤ 170.0
Single terminal connection	≤ 187.6
Average intercell connection	≤ 46.9

The marked-up TS Bases pages are being provided to the NRC for information. The TS Bases revisions will be made in accordance with TS Program 5.5.14, "TS Bases Control Program" following issuance of this amendment.

The following changes are specifically requested for Catawba:

- TS SR 3.8.4.3 is revised by removing the connection resistance limit and referring to new Table 3.8.4-1 for the DC Channel and DG battery connection resistance limits.

- TS SR 3.8.4.6 is also revised by removing the connection resistance limits and referring to new Table 3.8.4-1 for the DC Channel and DG battery connection resistance limits.

- New TS Table 3.8.4-1 (below) was added to compile the calculated resistance limits for an intercell connection, interrack connection, intertier connection, terminal connection, and the new overall average intercell connection resistance.

New Catawba TS Table 3.8.4-1
Battery Connection Resistance Limits

PARAMETER	DC CHANNEL LIMIT (micro-ohms)	DG BATTERY LIMIT (micro-ohms)
Single intercell connection	≤ 120.5	≤ 102.1
Single interrack connection	≤ 200.0	≤ 200.0
Single intertier connection	≤ 200.0	≤ 200.0
Single terminal connection	≤ 206.9	≤ 194.4
Average intercell connection	≤ 103.4	≤ 97.2

The marked-up TS Bases pages are being provided to the NRC for information. The TS Bases revisions will be made in accordance with TS Program 5.5.14, "TS Bases Control Program" following issuance of this amendment.

3.0 TECHNICAL EVALUATION

3.1 System Descriptions

The station DC electrical power system provides the AC emergency power system with control power. It also provides both motive and control power to selected safety related equipment and preferred AC vital bus power (via inverters). As required by 10 CFR 50, Appendix A, GDC 17, the DC electrical power system is designed to have sufficient independence, redundancy, and testability to perform its safety functions, assuming a single failure. The DC electrical power system also conforms to the recommendations of Regulatory Guide 1.6 and IEEE-308.

The McGuire station's 125 VDC electrical power system consists of two independent and redundant safety related Class 1E DC electrical power subsystems (Train A and Train B) which are shared by Units 1 and 2. Each subsystem (train) consists of two channels of 125 VDC batteries, the associated battery charger(s) for each battery, and all the associated control equipment and interconnecting cabling.

At Catawba, each Unit's 125 VDC Vital Instrumentation and Control Power System consists of four independent and redundant safety related Class 1E DC electrical power subsystems (Channels A, B, C, and D). Channels A and C provide power for Train A; Channels B and D provide power for Train B. Each 125 VDC system is not shared between Units. Each channel consists of one 125 VDC battery (each battery is capable of supplying 2 channels of DC loads for a train), the associated battery charger(s) for each battery, and all the associated control equipment and interconnecting cabling.

Catawba's 125 VDC Essential Diesel Auxiliary Power System is comprised of 125 VDC Diesel Auxiliary Power Batteries 1DGBA, 1DGBB, 2DGBA, and 2DGBB and 125 VDC Diesel Auxiliary Power Battery Chargers 1DGCA, 1DGCB, 2DGCA, and 2DGCB. Each 125 VDC battery is sized to carry its duty cycle load without its battery charger for two hours during a LOOP/LOCA and four hours during a Station Blackout.

There is one spare battery charger at McGuire and two spare battery chargers (one per Unit) at Catawba for the 125 VDC Vital Instrumentation and Control Power System which provides backup service in the event that the preferred battery charger is out of service. If the spare battery charger is substituted for one of the preferred battery chargers, the requirements of independence and redundancy between subsystems are maintained. Catawba's 125 VDC Essential Diesel Generator Auxiliary Power System does not include a spare battery charger.

During normal operation, the 125 VDC load is powered from the battery chargers with the batteries floating on the system. In case of loss of normal power to the battery charger, the DC load is automatically powered from the station batteries.

At McGuire, Train A and Train B DC electrical power subsystems provide the control power for its associated Class 1E AC power load group, 4.16 kV switchgear, and 600 V load centers. The DC electrical power subsystems also provide DC electrical power to the inverters, which in turn power the AC vital buses.

At Catawba, Channels A and D of DC electrical power subsystems or the Diesel Generator (DG) DC electrical power subsystems provide power through auctioneering diode assemblies to A train bus EDE and B train bus EDF to supply the control power for its associated Class 1E AC power load group, 4.16 kV switchgear, and 600 V load centers. The DC electrical power subsystems also provide DC electrical power to the inverters, which in turn power the AC vital buses.

At McGuire, each battery (EVCA, EVCB, EVCC, EVCD) has adequate storage capacity to carry the required duty cycle for one hour after the loss of the battery charger output. In addition, the battery is capable of supplying power for the operation of anticipated momentary loads during the one hour period.

At Catawba, each 125 V vital DC battery (EBA, EBB, EBC, EBD) has adequate storage capacity to carry the required duty cycle of its own load group and the loads of another load group for a period of two hours. Each 125 V vital DC battery is also capable of supplying the anticipated momentary loads during this two hour period. The 125 V DC DG batteries have adequate storage capacity to carry the required duty cycle for 2 hours.

Each McGuire and Catawba 125 VDC Vital battery is separately housed in a ventilated room apart from its charger and distribution centers. Each channel is located in an area separated physically and electrically from the other channel to ensure that a single failure in one subsystem does not cause a failure in a redundant subsystem.

The batteries for the channels of vital DC are sized to produce the required capacity at 80 percent of nameplate rating, corresponding to warranted capacity at end of life cycles and the 100 percent design demand (i.e., a 1.25 aging factor is used to size the battery). The battery cells are of flooded lead acid construction with a nominal specific gravity of 1.215. Optimal long term performance is obtained by maintaining a float voltage of 2.17 to 2.25 Volts per cell (Vpc), which corresponds to a float voltage range of 130.2 to 135.0 VDC for a 60 cell battery. This provides adequate over-potential, which limits the formation of lead sulfate and self discharge.

At McGuire and Catawba, the battery charger for each channel of DC 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 within 8 hours while supplying normal steady state loads discussed in the UFSAR, Chapter 8.

3.2 Summary of Battery Connection Resistance Calculations

Based on current loading conditions, McGuire and Catawba have established a maximum battery bank average intercell connection resistance and individual connection resistance values for intercell, interrack, intertier, and terminal connections based on manufacturer technical bulletins, applicable IEEE standards, and industry recommendations.

McGuire and Catawba class 1E batteries are made by the GNB division of Exide Corporation under strict quality assurance program controls of third party qualifier Nuclear Logistics Inc. (NLI). NLI has evaluated McGuire's 125 VDC Vital Instrumentation and Control Power System and Catawba's 125 VDC Diesel Essential Auxiliary Power and 125 VDC Vital Instrumentation and Control Power Systems duty cycle load requirements and determined that a voltage drop of 0.05 VDC per connection is acceptable. Additionally, NLI has determined that a reasonable resistance value for battery intertier and interrack cable connections is somewhere between 2-5 times the resistance value of an actual intercell connection.

Based purely on battery terminal voltage, the most limiting portion of the duty cycle is the 1 minute discharge rate. It is during this period that battery terminal voltage reaches its lowest value throughout the duty cycle. Applying an additional factor for future load growth, a maximum duty cycle load current can be calculated. Using Ohm's Law E=IR, a voltage of 0.05V and the maximum current that bounds the duty cycle, a maximum average intercell connection resistance can be calculated.

In addition to intercell connection voltage drop, the connector must also be able to safely dissipate the generated heat, or I^2R losses (Power). A single intercell connection maximum resistance value can be calculated based on the manufacturer's 1-minute discharge rate and the relationships that P=IE and $P=I^2R$. Since the 1-minute battery discharge rate is the highest amperage value used in the manufacturer's literature, this discharge current will define the maximum power for a specified connection voltage drop using the relationship P = IE. Using the maximum I^2R losses (Power) calculated from the allowable voltage drop, a maximum intercell connection resistance can be calculated based on the highest site specific battery duty cycle load requirement.

The battery limits in proposed McGuire and Catawba TS Table 3.8.4-1, which are based on site calculations, will be incorporated into site specific procedures as Technical Specification Acceptance Criteria.

3.3 Conclusion

Revising the TS SRs by specifying a maximum battery bank average intercell connection resistance and individual connection resistance values, based on the values specified in the applicable calculations, restores the required conservatism to the TS and ensures assumptions in the UFSAR accident analyses remain valid.

4.0 REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

10 CFR 50, Appendix A, General Design Criterion (GDC) 17, "Electric Power Systems," requires, in part, that "An onsite electric power system and an offsite electric power system shall be provided to permit functioning of structures, systems, and components important to safety ... The onsite electric power supplies, including the batteries, and the onsite electric distribution system, shall have sufficient independence, redundancy, and testability to perform their safety functions assuming a single failure. Provisions shall be included to minimize the probability of losing electric power from any of the remaining supplies as a result of, or coincident with, the loss of power generated by the nuclear power unit, the loss of power from the transmission network, or the loss of power from the onsite electric power supplies."

10 CFR 50, Appendix A, GDC 18, "Inspection and Testing of Electric Power Systems," requires, in part, that "Electric power systems important to safety shall be designed to permit appropriate periodic inspection and testing of important areas and features ... "

10 CFR 50.63, "Loss of All Alternating Current Power," requires, in part, that "Each light-water-cooled nuclear power plant licensed to operate must be able to withstand for a specified duration and recover from a station blackout as defined in 10CFR50.2 ..."

Revising the battery resistance values in the TS SRs, that are supported by McGuire and Catawba Battery Connection Resistance Calculations, will not affect compliance with the above regulations.

4.2 Precedent

Similar License Amendment Requests that revise these TS 3.8.4 SR values have been submitted by:

- Callaway Plant LAR dated December 29, 2008. NRC ADAMS Accession No. ML 090090371.
- Cooper Nuclear Station LAR dated March 11, 2009. NRC ADAMS Accession No. ML 090750599.

4.3 Significant Hazards Consideration

Pursuant to 10 CFR 50.90, Duke Energy Carolinas, LLC (Duke) proposes a license amendment request (LAR) for the Renewed Facility Operating License (FOL) and Technical Specifications for McGuire and Catawba Nuclear Stations, Units 1 and 2.

The proposed LAR would revise the McGuire Technical Specification (TS) Surveillance Requirements (SRs) 3.8.4.2 and 3.8.4.5 and the Catawba TS SRs 3.8.4.3 and 3.8.4.6 that have been determined to be non-conservative. Site procedures have been revised with conservative administrative limits to preclude battery resistance values exceeding design calculation limits.

Approval of this LAR will provide for the resolution of an Operable But Degraded Nonconforming condition regarding non-conservative battery connection resistance values in the McGuire and Catawba TS SRs as documented in Duke's Corrective Action Program (PIP). This issue is similar to that identified at the Quad Cities Station during the NRC's Component Design Basis Inspection on November 28, 2006 as discussed in NRC Inspection Report 2006-003.

Duke has concluded that operation of the McGuire and Catawba Nuclear Station Units 1 & 2, in accordance with the proposed changes to the Technical Specifications (TS) does not involve a significant hazards consideration. Duke's conclusion is based on its evaluation, in accordance with 10CFR50.91(a)(1), of the three standards set forth in 10CFR50.59(c) as discussed below:

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

   Response: No.

   Performing the battery Surveillances is not an initiator to any accident sequence previously evaluated in the Updated Final Safety Analysis Report. The Batteries are still required to be operable, meet the

Surveillance Requirements, and be capable of performing any mitigation function as designed. Revising the battery Surveillance resistance values and adding the total average resistance limit, as supported by calculations, will help ensure that the voltage and capacity of the Batteries remain within the design basis.

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

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

   Response: No.

   This amendment does not involve a modification to the plant or a change in how the plant is operated. No new accident causal mechanisms are created as a result of this proposed amendment. No changes are being made to any structure, system, or component which will introduce any new accident causal mechanisms. This amendment request does not impact any plant systems that are accident initiators and does not impact any safety analysis.

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

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

   Response: No.

   Margin of safety is related to the confidence in the ability of the fission product barriers to perform their design functions during and following an accident situation. These barriers include the fuel cladding, the reactor coolant system, and the containment system. The performance of the fuel cladding, reactor coolant and containment systems will not be impacted by the proposed change.

   The proposed McGuire and Catawba battery connection resistance limits ensure the continued availability and operability of the Batteries. As such, sufficient DC capacity to support operation of mitigation equipment remains within the design basis.

   Therefore, it is concluded that the proposed changes do not involve a significant reduction in the margin of safety.

4.4 Conclusions

Based upon the above evaluation, Duke 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.

5.0 ENVIRONMENTAL CONSIDERATIONS

Duke has evaluated the proposed amendment and has determined that this change does not involve a significant hazards consideration, a significant change in the types of or significant increase in the amounts of any effluents that may be released offsite, or a significant increase in individual or cumulative occupational radiation exposure. Therefore, the proposed change meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9).

Pursuant to 10 CFR 51.22(b), an environmental assessment of the proposed change is not required.

ATTACHMENT 2

Marked-Up McGuire Technical Specification and Bases

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.4.1	Verify battery terminal voltage is ≥ 125 V on float charge.	7 days
SR 3.8.4.2	Verify no visible corrosion at battery terminals and connectors. OR Verify connection resistance of ~~these items is ≤ 1.5 E-4 ohm.~~ specific connection(s) meets Table 3.8.4-1 limit.	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.	18 months
SR 3.8.4.4	Remove visible terminal corrosion, verify battery cell to cell and terminal connections are clean and tight, and are coated with anti-corrosion material.	18 months
SR 3.8.4.5	Verify all battery connection resistance ~~is ≤ 1.5 E-4 ohm for inter-cell connections, and ≤ 1.5 E-4 ohm for terminal connections.~~ values meet Table 3.8.4-1 limits.	18 months
SR 3.8.4.6	Verify each battery charger supplies ≥ 400 amps at ≥ 125 V for ≥ 1 hour.	18 months

(continued)

NEW TABLE

Table 3.8.4-1 (page 1 of 1)

Battery Connection Resistance Limits

PARAMETER	LIMIT (micro-ohms)
Single intercell connection	≤ 81.1
Single interrack connection	≤ 170.0
Single intertier connection	≤ 170.0
Single terminal connection	≤ 187.6
Average intercell connection	≤ 46.9

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.4.2

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

INSERT 1

The Surveillance Frequency for these inspections, which can detect conditions that can cause power losses due to resistance heating, is 92 days. This Frequency is considered acceptable based on operating experience related to detecting corrosion trends.

SR 3.8.4.3

Visual inspection of the battery cells, cell plates, and battery racks provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance. The presence of physical damage or deterioration does not necessarily represent a failure of this SR, provided an evaluation determines that the physical damage or deterioration does not affect the OPERABILITY of the battery (its ability to perform its design function). Operating experience has shown that these components usually pass the SR when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.8.4.4 and SR 3.8.4.5

Visual inspection and resistance measurements of intercell, interrack, intertier, ~~and~~ terminal connections, and the average intercell connection resistance provide an indication of physical damage or abnormal deterioration that could indicate degraded battery condition. INSERT 2 The anticorrosion material is used to help ensure good electrical connections and to reduce terminal deterioration. The visual inspection for corrosion is not intended to require removal of and inspection under each terminal connection. The removal of visible corrosion is a preventive maintenance SR. The presence of visible corrosion does not necessarily represent a failure of this SR provided visible corrosion is removed during performance of SR 3.8.4.4. Operating experience has shown that these components usually pass the SR when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

INSERT 1 (SR 3.8.4.2)

For any connection that shows corrosion, the resistance shall be measured at that connection to verify acceptable connection resistance (Ref. 10). The limits for battery connection resistance are specified in Table 3.8.4-1.

The plant safety analyses do not assume a specific battery connection resistance value, but typically assume that the batteries will supply adequate power for a specified period of time. The resistance of each battery connection varies independently from all the others. Some of these individual connection resistance values may be higher or lower than the others, and the battery will still be able to perform its design function. Overall connection resistance, which is the sum total of all connection resistances, has a direct impact on battery operability. The values listed in Table 3.8.4-1 are based on the battery manufacturers recommended connection voltage drop. As long as battery connection resistance values are at or below the values listed in Table 3.8.4-1, battery operability will not be in question based on intercell, interrack, intertier, and terminal connection resistance.

INSERT 2 (SR 3.8.4.4 and SR 3.8.4.5)

The limits for battery connection resistance are specified in Table 3.8.4-1.

The plant safety analyses do not assume a specific battery connection resistance value, but typically assume that the batteries will supply adequate power for a specified period of time. The resistance of each battery connection varies independently from all the others. Some of these individual connection resistance values may be higher or lower than the others, and the battery will still be able to perform its design function. Overall connection resistance, which is the sum total of all connection resistances, has a direct impact on battery operability. The values listed in Table 3.8.4-1 are based on the battery manufacturers recommended connection voltage drop. As long as battery connection resistance values are at or below the values listed in Table 3.8.4-1, battery operability will not be in question based on intercell, interrack, intertier, and terminal connection resistance.

ATTACHMENT 3

Marked-Up Catawba Technical Specification and Bases

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. A and/or D channel of DC electrical power subsystem inoperable. AND Associated train of DG DC electrical power subsystem inoperable.	D.1 Enter applicable Condition(s) and Required Action(s) of LCO 3.8.9, "Distribution Systems-Operating", for the associated train of DC electrical power distribution subsystem made inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.4.1	Verify DC channel and DG battery terminal voltage is ≥ 125 V on float charge.	7 days
SR 3.8.4.2	Not used.	
SR 3.8.4.3	Verify no visible corrosion at the DC channel and DG battery terminals and connectors. OR Verify battery connection resistance ~~of these items is ≤ 1.5 E-4 ohm.~~ of specific connection(s) meets Table 3.8.4-1 limit.	92 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.4.4	Verify DC channel and DG battery cells, cell plates, and racks show no visual indication of physical damage or abnormal deterioration that could degrade battery performance.	18 months
SR 3.8.4.5	Remove visible terminal corrosion, verify DC channel and DG battery cell to cell and terminal connections are clean and tight, and are coated with anti-corrosion material.	18 months
SR 3.8.4.6	Verify all DC channel and DG battery connection resistance ~~is $\leq$ 1.5 E-4 ohm.~~ values meet Table 3.8.4-1 limits	18 months
SR 3.8.4.7	Verify each DC channel battery charger supplies $\geq$ 200 amps and the DG battery charger supplies $\geq$ 75 amps with each charger at $\geq$ 125 V for $\geq$ 8 hours.	18 months
SR 3.8.4.8	-----NOTES----- 1. The modified performance discharge test in SR 3.8.4.9 may be performed in lieu of the service test in SR 3.8.4.8. 2. This Surveillance shall not be performed for the DG batteries in MODE 1, 2, 3, or 4. ---------- Verify DC channel and DG 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.	18 months

(continued)

NEW TABLE

Table 3.8.4-1 (page 1 of 1)

Battery Connection Resistance Limits

PARAMETER	DC CHANNEL LIMIT (micro-ohms)	DG BATTERY LIMIT (micro-ohms)
Single intercell connection	≤ 120.5	≤ 102.1
Single interrack connection	≤ 200.0	≤ 200.0
Single intertier connection	≤ 200.0	≤ 200.0
Single terminal connection	≤ 206.9	≤ 194.4
Average intercell connection	≤ 103.4	≤ 97.2

ACTIONS (continued)

the loss of the channel DC power and the associated DG DC power, the load center power for the train is inoperable and the Condition(s) and Required Action(s) for the Distribution Systems must be entered immediately.

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 (or battery cell) and maintain the battery (or a battery cell) 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 consistent with manufacturer recommendations and IEEE-450 (Ref. 9).

SR 3.8.4.2

Not used.

SR 3.8.4.3

For the DC channel and DG batteries, visual inspection to detect corrosion of the battery terminals and connections, or measurement of the resistance of each intercell, interrack, intertier, and terminal connection, provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance. The presence of visible corrosion does not necessarily represent a failure of this SR, provided an evaluation determines that the visible corrosion does not affect the OPERABILITY of the battery.

INSERT 1

The Surveillance Frequency for these inspections, which can detect conditions that can cause power losses due to resistance heating, is 92 days. This Frequency is considered acceptable based on operating experience related to detecting corrosion trends.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.4.4

For the DC channel and DG batteries, visual inspection of the battery cells, cell plates, and battery racks provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance. The presence of physical damage or deterioration does not necessarily represent a failure of this SR, provided an evaluation determines that the physical damage or deterioration does not affect the OPERABILITY of the battery (its ability to perform its design function).

Operating experience has shown that these components usually pass the SR when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

, and the average intercell Connection resistance

SR 3.8.4.5 and SR 3.8.4.6

Visual inspection and resistance measurements of intercell, interrack, intertier, ~~and~~ terminal ~~connections~~ provide an indication of physical damage or abnormal deterioration that could indicate degraded battery condition. INSERT 2 The anticorrosion material, as recommended by the manufacturer for the batteries, is used to help ensure good electrical connections and to reduce terminal deterioration. The visual inspection for corrosion is not intended to require removal of and inspection under each terminal connection. The removal of visible corrosion is a preventive maintenance SR. The presence of visible corrosion does not necessarily represent a failure of this SR provided visible corrosion is removed during performance of SR 3.8.4.5.

Operating experience has shown that these components usually pass the SR when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.8.4.7

This SR requires that each battery charger for the DC channel be capable of supplying at least 200 amps and at least 75 amps for the DG chargers. All chargers shall be tested at a voltage of at least 125 V for ≥ 8 hours. These requirements are based on the design capacity of the chargers (Ref. 4). According to Regulatory Guide 1.32 (Ref. 10), 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

INSERT 1 (SR 3.8.4.3)

For any connection that shows corrosion, the resistance shall be measured at that connection to verify acceptable connection resistance (Ref. 11). The limits for battery connection resistance are specified in Table 3.8.4-1.

The plant safety analyses do not assume a specific battery connection resistance value, but typically assume that the batteries will supply adequate power for a specified period of time. The resistance of each battery connection varies independently from all the others. Some of these individual connection resistance values may be higher or lower than the others, and the battery will still be able to perform its design function. Overall connection resistance, which is the sum total of all connection resistances, has a direct impact on battery operability. The values listed in Table 3.8.4-1 are based on the battery manufacturers recommended connection voltage drop. As long as battery connection resistance values are at or below the values listed in Table 3.8.4-1, battery operability will not be in question based on intercell, interrack, intertier, and terminal connection resistance.

INSERT 2 (SR 3.8.4.5 and SR 3.8.4.6)

The limits for battery connection resistance are specified in Table 3.8.4-1.

The plant safety analyses do not assume a specific battery connection resistance value, but typically assume that the batteries will supply adequate power for a specified period of time. The resistance of each battery connection varies independently from all the others. Some of these individual connection resistance values may be higher or lower than the others, and the battery will still be able to perform its design function. Overall connection resistance, which is the sum total of all connection resistances, has a direct impact on battery operability. The values listed in Table 3.8.4-1 are based on the battery manufacturers recommended connection voltage drop. As long as battery connection resistance values are at or below the values listed in Table 3.8.4-1, battery operability will not be in question based on intercell, interrack, intertier, and terminal connection resistance.

BASES

SURVEILLANCE REQUIREMENTS (continued)

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 and capacity is < 100% of the manufacturer's rating, the Surveillance Frequency is reduced to 18 months. However (for DC vital batteries only), if the battery shows no degradation but has reached 85% of its expected life, the Surveillance Frequency is only reduced to 24 months for batteries that retain capacity ≥ 100% of the manufacturer's rating. Degradation is indicated, according to IEEE-450 (Ref. 9), when the battery capacity drops by more than 10% relative to its average capacity on the previous performance tests 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 which is applicable to the DG batteries only. The reason for the Note is that performing the Surveillance would perturb the associated electrical distribution system and challenge safety systems.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 17.
2. Regulatory Guide 1.6, March 10, 1971.
3. IEEE-308-1971 and 1974.
4. UFSAR, Chapter 8.
5. IEEE-485-1983, June 1983.
6. UFSAR, Chapter 6.
7. UFSAR, Chapter 15.
8. 10 CFR 50.36, Technical Specifications, (c)(2)(ii).
9. IEEE-450-1975 and/or 1980.
10. Regulatory Guide 1.32, February 1977.
11. IEEE-450-1995