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July 19, 2004

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Subject: Duke Energy Corporation
Catawba Nuclear Station, Units 1 and 2
Docket Numbers 50-413 and 50-414
Proposed Technical Specifications Amendments
3.8.4, DC Sources - Operating
3.8.6, Battery Cell Parameters

In accordance with the provisions of 10 CFR 50.90, Duke Energy Corporation proposes to revise the Catawba Nuclear Station Facility Operating Licenses and Technical Specifications (TS) to permit changeout of the diesel generator (DG) batteries. The existing batteries are of the nickel cadmium type. In an effort to enhance the reliability of the batteries, Catawba plans to replace them with conventional lead acid batteries, similar to those presently utilized in the 125 Volt DC Vital Instrumentation and Control Power System.

The existing nickel cadmium DG batteries have shown signs of excessive capacity degradation, as measured during the last several capacity tests performed. The battery capacity test is performed for each battery once during each fuel cycle. The preferred solution to address this degradation is to replace the batteries with those of the lead acid type. Catawba presently plans to replace the Unit 1 DG batteries during the end-of-cycle 15 refueling outage, scheduled to commence in the spring of 2005. Therefore, Duke Energy Corporation is requesting NRC review and approval of these amendment requests no later than March 31, 2005.

The contents of this amendment request package are as follows:

Attachment 1 provides marked copies of the affected TS and Bases pages for Catawba, showing the proposed changes. Attachment 2 is a placeholder for reprinted pages of the affected TS and Bases pages for Catawba. The reprinted pages will be provided to the NRC following the completion of the technical review of these

proposed amendments. Attachment 3 provides a description of the proposed changes and technical justification. Pursuant to 10 CFR 50.92, Attachment 4 documents the determination that the amendments contain No Significant Hazards Considerations. Pursuant to 10 CFR 51.22(c)(9), Attachment 5 provides the basis for the categorical exclusion from performing an Environmental Assessment/Impact Statement.

Implementation of the battery modifications will impact the Catawba Updated Final Safety Analysis Report (UFSAR). Affected UFSAR sections include 8.1.5.2, "NRC Regulatory Guides," 8.3.2.1.2.2, "125VDC Diesel Essential Auxiliary Power System," and Figure 8-27, "125 VDC Diesel Auxiliary Power Battery Duty Cycle." Necessary UFSAR revisions will be submitted in accordance with 10 CFR 50.71(e).

Because each unit's DG batteries will be changed out during a refueling outage, the proposed TS changes have been structured so that they can be utilized for batteries of either the nickel cadmium or the lead acid type. This will be accomplished within 30 days of NRC issuance of the amendments. The actual modifications to change out the batteries will be implemented at a subsequent time during unit refueling outages.

On April 6, 2004, Duke Energy Corporation submitted proposed amendments for Catawba to modify one of the TS Surveillance Requirements (SR) for the DG batteries to allow one battery cell to be below the SR limit of 1.36 volts. NRC approval of the previously submitted amendments will affect the review and approval of the amendment requests submitted herein. Therefore, close coordination of the two requests will be necessary.

In accordance with Duke Energy Corporation administrative procedures and the Quality Assurance Program Topical Report, these proposed amendments have been previously reviewed and approved by the Catawba Plant Operations Review Committee and the Duke Energy Corporation Nuclear Safety Review Board.

There are no regulatory commitments contained in this letter or its attachments.

Pursuant to 10 CFR 50.91, a copy of these proposed amendments is being sent to the appropriate state official.

Inquiries on this matter should be directed to L.J. Rudy at (803) 831-3084.

Very truly yours,

Dhiaa M. Jamil

LJR/s

Attachments

Dhiaa M. Jamil 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.

Dhiaa M. Jamil, Vice President

Subscribed and sworn to me: 7-19-2004
Date

Notary Public

My commission expires: 7-10-2012
Date

SEAL

xc (with attachments):

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ATTACHMENT 1

MARKED-UP TS AND BASES PAGES FOR CATAWBA

INSERT 1

The DG batteries utilizing lead acid cells are tested to supply a current ≥ 228.0 amps for the first minute, then ≥ 37.75 amps for the next 10 minutes, then ≥ 127.1 amps for the next minute, then ≥ 37.75 amps for the remaining 108 minutes. Terminal voltage is required to remain ≥ 105 volts during this test.

INSERT 2

a. Battery cell parameters for the channels of DC batteries shall be within the limits of Table 3.8.6-1;

b. Battery cell parameters for the Diesel Generator (DG) Train A and Train B batteries utilizing lead acid cells shall be within the limits of Table 3.8.6-1; and

c. Battery cell parameters for the DG Train A and Train B batteries utilizing nickel cadmium cells shall be within the limits of temperature and level.

INSERT 3

In addition, Required Action B.2 mandates that the appropriate LCO(s) must then be entered for the DG supported by the inoperable DC subsystem. If the plant is in MODES 1 through 4, LCO 3.8.1, "AC Sources - Operating" is required to be entered. If the DG is required to support equipment during MODES 5 or 6 or movement of irradiated fuel assemblies, regardless of operating mode, LCO 3.8.2, "AC Sources - Shutdown," is the appropriate LCO.

Required Action B.2 is modified by a Note indicating that it is only applicable for inoperable DG batteries.

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	Verify DG battery cell voltage ≥ 1.36 V on float charge. nickel cadmium	7 days
SR 3.8.4.3	Verify no visible corrosion at the DC channel and DG battery terminals and connectors. OR (For the DC channel and DG batteries utilizing lead acid cells only) Verify battery connection resistance of these items is ≤ 1.5 E-4 ohm.	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 DC channel and DG lead acid battery connection resistance is ≤ 1.5 E-4 ohm.	18 months
SR 3.8.4.7	Verify each DC channel battery charger supplies ≥ 200 amps and the DG battery charger supplies ≥ 75 amps with each charger at ≥ 125 V for ≥ 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)

BASES

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

utilizing nickel cadmium cells

Verifying battery individual cell voltage while on float charge for the DG batteries ensures each cell is capable of supporting 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. For this surveillance two different cells shall be tested each month. The 7 day Frequency is consistent with manufacturer recommendations.

SR 3.8.4.3

and DG batteries utilizing lead acid cells

For the DC channel 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.

SURVEILLANCE REQUIREMENTS (continued)

utilizing nickel cadmium cells

For the DG batteries, visual inspection to detect corrosion of the battery terminals and connections 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.

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 3.8.4.4

For the DC channel 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).

nickel cadmium

For the 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. Since the DG battery cell jars are not transparent, a direct visual inspection of the cell plates cannot be performed. Instead, the cell plates are inspected for physical damage and abnormal deterioration by: 1) visually inspecting the jar sides of each cell for excessive bowing and/or deformation, and 2) visually inspecting the electrolyte of each cell for abnormal appearance.

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 3.8.4.5 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. The anticorrosion material, as recommended by the manufacturer for the DG batteries, is used to help ensure good electrical

SURVEILLANCE REQUIREMENTS (continued)

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.

utilizing nickel cadmium cells

For the DG batteries, the cell-to-cell terminal pole screws should be set from 14 to 15 foot-pounds of torque. 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 occurrences. The minimum required amperes and duration ensures that these requirements can be satisfied.

The Surveillance Frequency is acceptable, given the unit conditions required to perform the test and the other administrative controls existing to ensure adequate charger performance during these 18 month intervals. In addition, this Frequency is intended to be consistent with expected fuel cycle lengths.

SR 3.8.4.8

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 DC channel batteries are tested to supply a current ≥ 522.14 amps for the first minute, then ≥ 267.71 amps for the next 9 minutes, ≥ 376.15 amps for the next 10 minutes, and ≥ 281.94 amps for the next 100 minutes. Terminal voltage is required to remain ≥ 110.4 volts during this test. The

SURVEILLANCE REQUIREMENTS (continued)

utilizing nickel cadmium cells

DG batteries are tested to supply a current ≥ 218.5 amps for the first minute, then ≥ 42.5 amps for the next 10 minutes, then ≥ 121.8 amps for the next minute, then ≥ 42.5 amps for the remaining 108 minutes. Terminal voltage is required to remain ≥ 105 volts during this test.

INSERT 1

Except for performing SR 3.8.4.8 for the DC channel batteries with the unit on line, the Surveillance Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.32 (Ref. 10), which states 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 modified performance discharge test in lieu of a service test.

The modified performance discharge test is a performance discharge test that is augmented to include the high-rate, short duration discharge loads (during the first minute and 11-to-12 minute discharge periods) of the service test. The duty cycle of the modified performance test must fully envelope the duty cycle of the service test if the modified performance discharge test is to be used in lieu of the service test. Since the ampere-hours removed by the high-rate, short duration discharge periods of the service test represents a very small portion of the battery capacity, the test rate can be changed to that for the modified performance discharge 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.

A modified discharge test is a test of the battery capacity and its ability to provide a high rate, short duration load (usually the highest rates of the duty cycle). This will often confirm the battery's ability to meet the critical periods of the load duty cycle, in addition to determining its percentage of rated capacity. Initial conditions for the modified performance discharge test should be identical to those specified for a service test. The reason for Note 2 is that performing the Surveillance would perturb the electrical distribution system and challenge safety systems.

SR 3.8.4.9

A battery performance discharge test is a test of constant current capacity of a battery, normally done in the as found condition, after having been in service, to detect any change in the capacity determined

3.8 ELECTRICAL POWER SYSTEMS

3.8.6 Battery Cell Parameters

LCO 3.8.6 ~~Battery cell parameters for the channels of DC batteries shall be within the limits of Table 3.8.6-1 and the Diesel Generator (DG) Train A and Train B batteries shall be within the limits of temperature and level.~~

Replace with INSERT 2

APPLICABILITY: When associated DC electrical power subsystems are required to be OPERABLE.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each battery.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more channel(s) of DC batteries and/or one or more DG batteries utilizing lead acid cells with one or more battery cell parameters not within Category A or B limits.	A.1 Verify pilot cells electrolyte level and float voltage meet Table 3.8.6-1 Category C limits.	1 hour
	AND	
	A.2 Verify battery cell parameters meet Table 3.8.6-1 Category C limits.	24 hours AND Once per 7 days thereafter
	AND	
	A.3 Restore battery cell parameters to Category A and B limits of Table 3.8.6-1.	31 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met. OR and/or one or more DG batteries One or more channel(s) of DC batteries with average electrolyte temperature of the representative cells < 60°F. OR and/or one or more DG batteries utilizing lead acid cells One or more channel(s) of DC batteries with one or more battery cell parameters not within Category C values.	B.1 Declare associated battery inoperable. AND B.2 -----NOTE------- Only applicable for inoperable DG batteries. ---------- Enter applicable Condition(s) and Required Action(s) of LCO 3.8.1, "AC Sources - Operating", or LCO 3.8.2, "AC Sources - Shutdown" for the associated DG made inoperable.	Immediately Immediately
C. One or more DG batteries utilizing nickel cadmium cells with electrolyte level not at or above the low mark and not at or below the high mark. ~~OR~~ ~~One or more DG batteries with average electrolyte temperature of the representative cells < 60°F.~~	C.1 Enter applicable Condition(s) and Required Action(s) of LCO 3.8.1, "AC Sources - Operating", or LCO 3.8.2, "AC Sources - Shutdown" for the associated DG made inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.6.1	Verify battery cell parameters of the channels of DC batteries and DG batteries utilizing lead acid cells meet Table 3.8.6-1 Category A limits.	7 days
SR 3.8.6.2	Verify electrolyte level of DG batteries utilizing nickel cadmium cells is at or above low mark and at or below high mark.	7 days
SR 3.8.6.3	Verify battery cell parameters of the channels of DC batteries and DG batteries utilizing lead acid cells meet Table 3.8.6-1 Category B limits.	92 days AND Once within 7 days after a battery discharge < 110 V AND Once within 7 days after a battery overcharge > 150 V
SR 3.8.6.4	Verify average electrolyte temperature for the channels of DC and DG batteries of representative cells is ≥ 60°F.	92 days

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.6 Battery Cell Parameters

BASES

BACKGROUND

This LCO delineates the limits on electrolyte temperature, level, float voltage, and specific gravity for the channels DC power source batteries. The LCO also addresses the trains of DC for the Diesel Generator limits on temperature and level. A discussion of these batteries and their OPERABILITY requirements is provided in the Bases for LCO 3.8.4, "DC Sources—Operating," and LCO 3.8.5, "DC Sources—Shutdown."

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the UFSAR, Chapter 6 (Ref. 1) and Chapter 15 (Ref. 2), assume Engineered Safety Feature systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the diesel generators, emergency auxiliaries, and control and switching during all MODES of operation.

The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining at least one train of DC sources OPERABLE during accident conditions, in the event of:

a. An assumed loss of all offsite AC power or all onsite AC power; and

b. A worst case single failure.

Battery cell parameters satisfy Criterion 3 of 10 CFR 50.36 (Ref. 3).

LCO

Battery cell parameters must remain within acceptable limits to ensure availability of the required DC power to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence or a postulated DBA. Electrolyte limits are conservatively established, allowing continued DC electrical system function even with Category A and B limits not met.

BASES

APPLICABILITY

The battery cell parameters are required solely for the support of the associated DC electrical power subsystems. Therefore, battery electrolyte is only required when the DC power source is required to be OPERABLE. Refer to the Applicability discussion in Bases for LCO 3.8.4 and LCO 3.8.5.

ACTIONS

A.1, A.2, and A.3

DC batteries and/or DG batteries utilizing lead acid cells

With one or more cells in one or more batteries not within limits (i.e., Category A limits not met, Category B limits not met, or Category A and B limits not met) but within the Category C limits specified in Table 3.8.6-1 in the accompanying LCO, the battery is degraded but there is still sufficient capacity to perform the intended function. Therefore, the affected battery is not required to be considered inoperable solely as a result of Category A or B limits not met and operation is permitted for a limited period.

The pilot cell electrolyte level and float voltage are required to be verified to meet the Category C limits within 1 hour (Required Action A.1). This check will provide a quick indication of the status of the remainder of the battery cells. One hour provides time to inspect the electrolyte level and to confirm the float voltage of the pilot cells. One hour is considered a reasonable amount of time to perform the required verification.

Verification that the Category C limits are met (Required Action A.2) provides assurance that during the time needed to restore the parameters to the Category A and B limits, the battery is still capable of performing its intended function. A period of 24 hours is allowed to complete the initial verification because specific gravity measurements must be obtained for each connected cell. Taking into consideration both the time required to perform the required verification and the assurance that the battery cell parameters are not severely degraded, this time is considered reasonable. The verification is repeated at 7 day intervals until the parameters are restored to Category A or B limits. This periodic verification is consistent with the normal Frequency of pilot cell Surveillances.

Continued operation is only permitted for 31 days before battery cell parameters must be restored to within Category A and B limits. With the consideration that, while battery capacity is degraded, sufficient capacity exists to perform the intended function and to allow time to fully restore the battery cell parameters to normal limits, this time is acceptable prior to declaring the battery inoperable.

BASES

ACTIONS (continued)

B.1 and B.2

DC batteries and/or DG batteries utilizing lead acid cells

With one or more batteries with one or more battery cell parameters outside the Category C limit for any connected cell, 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 or average electrolyte temperature of representative cells (applicable to DC batteries and both types of DG batteries) falling below 60°F, are also cause for immediately declaring the associated DC electrical power subsystem inoperable per Required Action B.1.

INSERT 3

C.1

utilizing nickel cadmium cells

With one or more DG batteries with one or more battery cell(s) not within the limits of level or temperature, sufficient capacity to supply the required load for the DG is not assumed and the corresponding DC electrical power subsystem must be declared inoperable immediately. Appropriate LCO(s) must then be entered for the DG supported by the inoperable DC subsystem. If the plant is in MODES 1 through 4, LCO 3.8.1, "AC Sources—Operating" is required to be entered.

If the DG is required to support equipment during MODES 5 or 6 or movement of irradiated fuel assemblies, regardless of operating mode, LCO 3.8.2, "AC Sources—Shutdown," is the appropriate LCO.

SURVEILLANCE REQUIREMENTS

SR 3.8.6.1

This SR verifies that Category A battery cell parameters are consistent with IEEE-450 (Ref. 4), which recommends regular battery inspections (at least one per month) including voltage, specific gravity, and electrolyte temperature of pilot cells.

This SR is applicable to both DC batteries and DG batteries utilizing lead acid cells.

SR 3.8.6.2

nickel cadmium

This SR verifies the DG battery cell parameter of level via regular battery inspection (at least once every 7 days). The electrolyte level is monitored in order to maintain battery performance and effectiveness. The 7 day Frequency has been shown acceptable through operating experience.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.6.3

and DG batteries utilizing lead acid cells

The quarterly inspection of the channels of DC batteries for specific gravity and voltage is consistent with IEEE-450 (Ref. 4). In addition, within 24 hours of a battery discharge < 110 V or a battery overcharge > 150 V, the battery must be demonstrated to meet Category B limits. Transients, such as motor starting transients, which may momentarily cause battery voltage to drop to ≤ 110 V, do not constitute a battery discharge provided the battery terminal voltage and float current return to pre-transient values. This inspection is also consistent with IEEE-450 (Ref. 4), which recommends special inspections following a severe discharge or overcharge, to ensure that no significant degradation of the battery occurs as a consequence of such discharge or overcharge.

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. 4), 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.

The term "representative cells" replaces the fixed number of "six connected cells", consistent with the recommendations of IEEE-450 (Ref. 4) to provide a general guidance to the number of cells adequate to monitor the temperature of the battery cells as an indicator of satisfactory performance. For some cases, the number of cells may be less than six, in other conditions, the number may be more.

Table 3.8.6-1

This table delineates the limits on electrolyte level, float voltage, and specific gravity for three different categories. The meaning of each category is discussed below.

ATTACHMENT 2

REPRINTED TS AND BASES PAGES FOR CATAWBA (TO BE PROVIDED TO NRC FOLLOWING COMPLETION OF TECHNICAL REVIEW)

ATTACHMENT 3

DESCRIPTION OF PROPOSED CHANGES AND TECHNICAL JUSTIFICATION

Description of Proposed Changes

TS 3.8.4 and TS 3.8.6 are marked up to delineate requirements for the DG batteries utilizing lead acid cells such that the requirements for these batteries will be consistent with the requirements for the lead acid cells utilized in the DC channel batteries. The DG lead acid cells will be subjected to the requirements of Table 3.8.6-1, as currently are the DC channel lead acid cells. In addition, the TS are also marked up to preserve the existing requirements for the DG batteries that will continue to utilize nickel cadmium cells until their eventual replacement with lead acid cells. No changes to any existing technical requirements for the DG nickel cadmium cells are being proposed in these amendments. Refer to the marked-up TS pages for the specific changes. In addition, changes are also being proposed to the Bases for TS 3.8.4 and TS 3.8.6, consistent with the proposed changes to the TS themselves. Refer to the marked-up TS Bases pages for the specific changes.

The following summarizes the changes to TS 3.8.4 and TS 3.8.6 and their associated Bases resulting from these proposed amendments:

1. SR 3.8.4.2 is revised so that it is only applicable to DG nickel cadmium batteries.
2. The second option of SR 3.8.4.3 is revised to make it applicable to both DC channel batteries and DG lead acid batteries.
3. SR 3.8.4.6 is revised to make it applicable to both DC channel batteries and DG lead acid batteries.
4. LCO 3.8.6 is revised to split it into three parts; one for the DC channel batteries, one for the DG lead acid batteries, and one for the DG nickel cadmium batteries.
5. Condition A of TS 3.8.6 is revised to make it applicable to both the DC channel batteries and DG lead acid batteries.
6. Condition B of TS 3.8.6 is revised to: make the second portion of the Condition applicable to both DC channel batteries and DG batteries (both DG battery types); make the third portion of the Condition applicable to both DC channel batteries and DG lead acid batteries; and add Required Action B.2 to require cascading to the applicable TS for inoperable DG batteries (both DG battery types).
7. Condition C of TS 3.8.6 is revised to make the first portion of the Condition applicable to only DG nickel cadmium batteries. The second portion of the Condition is deleted in favor of moving this portion to the

second portion of Condition B.

8. SR 3.8.6.1 is revised to make it applicable to both DC channel batteries and DG lead acid batteries.
9. SR 3.8.6.2 is revised so that it is only applicable to DG nickel cadmium batteries.
10. SR 3.8.6.3 is revised to make it applicable to both DC channel batteries and DG lead acid batteries.
11. The Bases for TS 3.8.4 and TS 3.8.6 are revised consistent with the above changes.
12. The Bases for SR 3.8.4.8 are revised to reflect the duty cycle requirements for the replacement DG batteries.

Technical Justification

The DG battery cells have been showing signs of capacity degradation. There has been a history of capacity degradation which requires the batteries to be replaced every third refueling outage. The frequent replacement is primarily due to the continuous elevated temperature environment in the DG rooms. The rate of battery degradation is higher than expected and suggests that the service life of the DG batteries is closer to 4.5 to 5 years instead of the 8 to 10 years originally predicted. Modifications were implemented to add ventilation to the batteries; however, this effort was unsuccessful in extending battery life and improving battery reliability. The performance history of the DG batteries over the past 10 years has caused numerous equipment challenges.

Catawba's DG batteries are different from those at most plants in two respects:

1) In addition to their primary function of supplying DC power to the DG auxiliaries, the DG batteries also have the capability to serve as an alternate DC supply for certain safety related distribution centers that support plant shutdown capability. To assure high availability of power and to protect against the loss of DC power due to a fire in the control complex, the loads required for plant shutdown are supplied power from two sources through auctioneering diode assemblies. These loads include the auxiliary feedwater pump turbine controls, which are required to have power available for a minimum of 2 hours. The two 125 volt DC sources are the 125 Volt DC Vital Instrumentation and Control Power System (this system contains the DC channel batteries) and the 125 Volt DC Essential Diesel Auxiliary Power System (this system contains the DG batteries). The DG batteries therefore have the

capability to serve two different safety related functions. As such, it was necessary to include requirements for these batteries in the Catawba TS.

2) Catawba's DG batteries consist of nickel cadmium cells, unlike most plants' DG batteries which utilize lead acid cells.

Catawba evaluated a number of options for increasing the reliability of the DG batteries. The option chosen is to replace the existing nickel cadmium batteries with lead acid batteries. The replacement batteries will be enclosed and air conditioned in the DG rooms. The battery enclosure will be designed to allow easy access to the batteries for routine maintenance, testing, and inspection, and to allow for individual battery cell replacement if necessary. The cooling system will be designed to sufficiently and evenly cool the battery cells and to maintain the concentration of hydrogen normally generated by the batteries at a safe level.

The QA requirement of the DG batteries is QA-1 (nuclear safety related). The replacement lead acid batteries will remain QA-1 due to the safety related application they will serve. The DG batteries supply uninterrupted 125 volt DC power to the DG auxiliary loads necessary to support DG operability and serve as a backup source of DC power to certain critical loads in the 125 Volt DC Vital Instrumentation and Control Power System.

Considerations addressed in this discussion include design requirements (mechanical, civil, electrical), and TS requirements.

Design Requirements

The significant mechanical aspect associated with the changeout from nickel cadmium to lead acid DG batteries is having an adequate and reliable HVAC system for maximizing lead acid battery life. Batteries operated in high ambient temperatures will experience reduced life. The minimum average temperature limit for the new lead acid batteries is 60F, which was adopted from the TS SR 3.8.6.4 limit for the DC channel and DG batteries. The batteries will not be exposed to direct air flow, thereby minimizing temperature variations among the battery cells. While the lead acid batteries are in operation, hydrogen and oxygen gases are produced. The gases result from the electrolysis of the water portion of the electrolyte by the charging current. The HVAC system will be designed to prevent hydrogen

concentration from resulting in an explosive mixture. The HVAC design will ensure adequate ventilation and even distribution of air throughout the battery enclosure.

The significant civil aspects associated with the changeout from nickel cadmium to lead acid DG batteries are: 1) ensuring the new battery racks meet seismic requirements, and 2) designing suitable seismic enclosures for the batteries and providing a means for moving battery cells within the DG rooms and the new battery enclosures. The new batteries will be installed in the DG rooms in the general areas where the existing batteries are located. These areas are clean and dry. The construction of the new battery racks will conform to all applicable seismic requirements. The new batteries are considered direct replacements for the existing batteries. The replacement batteries will be housed in an air conditioned enclosure in order to operate safely, reliably, and to achieve the desired life expectancy. The new enclosures will be seismically qualified. Lifting means will be provided for moving battery cells within the DG rooms and the battery enclosures.

The significant electrical aspect associated with the changeout from nickel cadmium to lead acid DG batteries is ensuring that the batteries are sized properly for supplying the required loads during a design basis event. The design duty cycle requirement for the replacement batteries has been calculated and is being incorporated into the TS Bases, similar to that for the existing batteries. The duty cycle represents the total load used for battery sizing, including the temperature correction factor and design margin. Calculations resulted in a required section size of 3.65 positive plates. Therefore, the next larger available cell size of 4 positive plates is suitable. The overall end voltage is greater than the minimum required overall battery terminal voltage during discharge and will allow for at least one cell to be jumpered out and the battery to remain capable of powering its respective loads during a design basis accident for the required 2-hour duration.

The GNB NCN-9 lead acid battery (refer to attached figure) has been selected for replacement of the existing DG nickel cadmium batteries. The NCN-9 cell type has 4 positive plates with a 688 amp-hour capacity based on an 8-hour rate to 1.75 volts/cell end voltage at 77F. The capacity of the new cells is sufficient to power their respective loads during a design basis accident for the required 2-hour duration. Based on the above discussion, the selected battery is large enough to supply the duty cycle

requirements with sufficient margin to allow for at least one cell to be jumpered out if necessary. The replacement batteries will consist of 60 cells each.

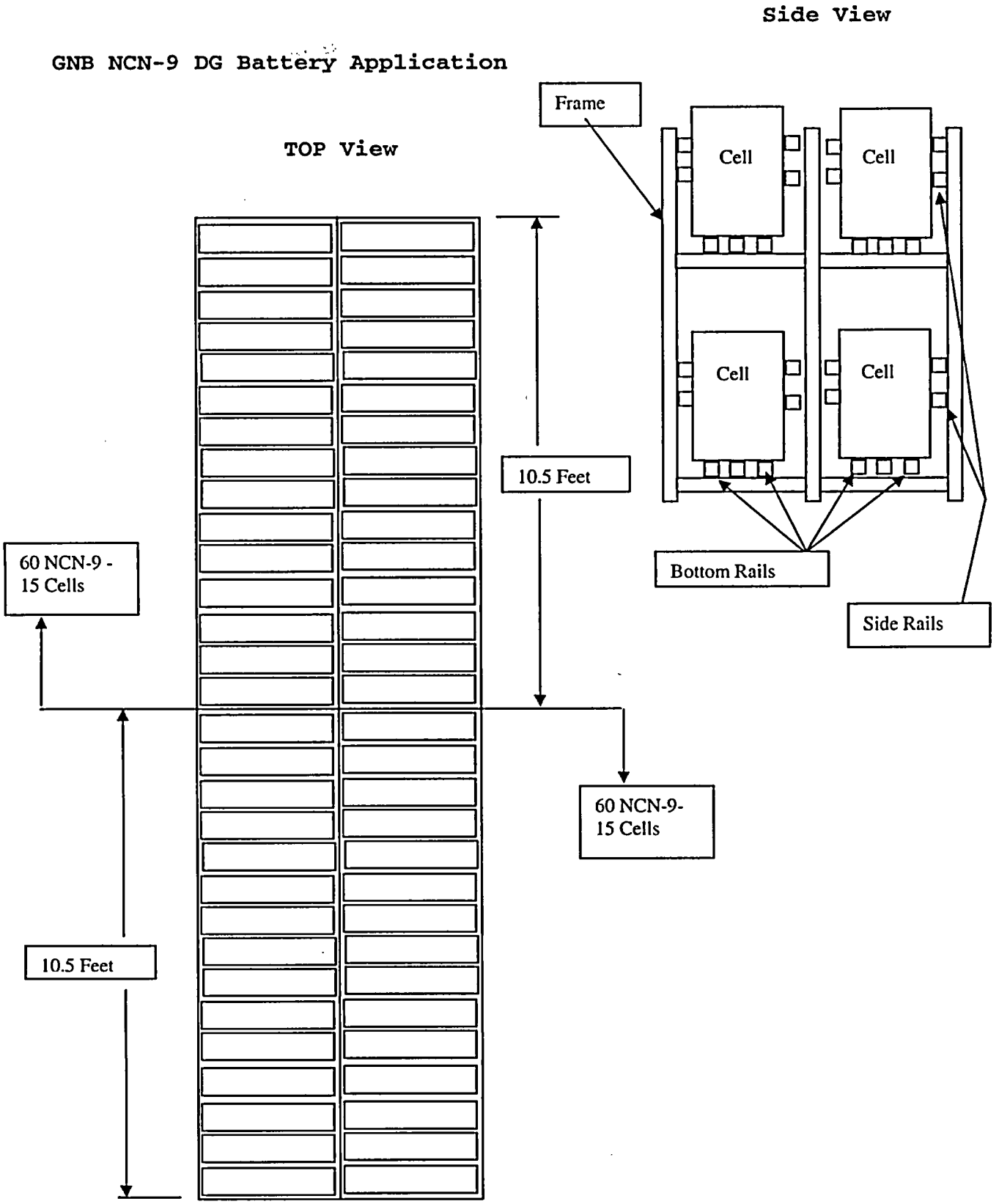
TS Requirements

The TS changes proposed in these amendment requests result in the requirements for the replacement DG lead acid batteries being made identical to those for the lead acid DC channel batteries. The requirements of TS Table 3.8.6-1 will be made applicable to the replacement DG batteries. In addition, the current requirements for the existing DG nickel cadmium batteries are preserved. Each Catawba unit will have both trains of its DG batteries replaced during a refueling outage. Therefore, the replacement of all four DG batteries for the station will span a time period of greater than one year. During this period, it will be necessary for the TS to reflect the use of both battery types, until all of the batteries are replaced. Following the replacement of all four DG batteries, Duke Energy Corporation will submit follow-up amendment requests to delete the requirements for the nickel cadmium batteries, which at that time will no longer apply.

Conclusions

The described lead acid DG batteries will be an acceptable replacement for the existing nickel cadmium DG batteries. Their overall performance will exceed that of the existing batteries, they will have a longer service life, they will resolve numerous equipment challenges, and they will bring Catawba's design into consistency with the nuclear industry relative to DG battery application.

GNB NCN-9 DG Battery Application



ATTACHMENT 4

NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

No Significant Hazards Consideration Determination

As required by 10 CFR 50.91(a)(1), this analysis is provided to demonstrate that the proposed license amendments to change out the DG batteries from the nickel cadmium type to the lead acid type involve no significant hazards consideration.

Conformance of the proposed amendments to the standards for a determination of no significant hazards as defined in 10 CFR 50.92 is shown in the following:

1) The proposed license amendments do not involve a significant increase in the probability or consequences of an accident previously evaluated.

   The DG batteries are not accident initiating equipment; they are accident mitigating equipment. As such, they cannot affect the probability of any accident being initiated. The performance of the replacement batteries will exceed that of the existing batteries. Therefore, no accident consequences will be adversely impacted.

2) The proposed license amendments do not create the possibility of a new or different kind of accident from any accident previously evaluated.

   The DG batteries are not capable by themselves of initiating any accident. Other than the replacement of the batteries themselves and the associated modification work (e.g., installation of the battery HVAC system), no physical changes to the overall plant are being proposed. No changes to the overall manner in which the plant is operated are being proposed. Therefore, no potential for new accident types is generated.

3) The proposed license amendments do not involve a significant reduction in a margin of safety.

   Margin of safety is related to the confidence in the ability of the fission product barriers to perform their intended functions. These barriers include the fuel cladding, the reactor coolant system, and the containment. The modification to replace the DG batteries will not have any impact on these barriers. In addition, no accident mitigating equipment will be adversely impacted as a result of the battery replacement. The replacement batteries will have

overall performance capabilities equal to or greater than those for the existing batteries. Therefore, existing safety margins will be preserved.

Based on the preceding discussion, it is concluded that the proposed license amendments do not involve a significant hazards consideration finding as defined in 10 CFR 50.92.

ATTACHMENT 5

ENVIRONMENTAL ANALYSIS

Environmental Analysis

Pursuant to 10 CFR 51.22(b), an evaluation of this license amendment request has been performed to determine whether or not it meets the criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9) of the regulations.

These amendments revise the TS to allow the changeout of the DG nickel cadmium batteries with batteries of the lead acid type.

Implementation of these amendments will have no adverse impact upon the Catawba units; neither will it contribute to any additional quantity or type of effluent being available for adverse environmental impact or personnel exposure.

It has been determined there is:

1. No significant hazards consideration,

2. No significant change in the types, or significant increase in the amounts, of any effluents that may be released offsite, and

3. No significant increase in individual or cumulative occupational radiation exposures involved.

Therefore, these amendments to the Catawba TS and associated Bases meet the criteria of 10 CFR 51.22(c)(9) for categorical exclusion from an environmental impact statement.