Duke Energy®

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10 CFR 50.90

U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

ATTENTION: Document Control Desk

Subject: Duke Energy Carolinas, LLC (Duke Energy)
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

Response to Request for Additional Information Related to the License Amendment Request Applicable to Technical Specification (TS) 3.8.4, "DC Sources-Operating" (TAC Nos. ME2934, ME2935, ME2936, ME2937)

This letter provides the response to an additional request for additional information (RAI) regarding the McGuire and Catawba License Amendment Request (LAR) dated December 14, 2009 applicable to Technical Specification 3.8.4 Surveillance changes. This RAI is a follow-up question to the initial RAIs dated June 24, 2010 and the Duke Energy responses dated September 8, 2010. The request was conveyed by the NRC staff via electronic mail from Jon Thompson on October 21, 2010. The NRC staff's question and Duke Energy's response are provided in Enclosure 1.

The conclusions reached in the original determination that the LAR contains No Significant Hazards Considerations and the basis for the categorical exclusion from performing an Environmental/Impact Statement have not changed as a result of this request for additional information.

Please contact Lee A. Hentz at 980-875-4187 if additional questions arise regarding this LAR.

Sincerely,

Regis T. Repko

Enclosure

A001
NRR

cc: w/enclosure

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OATH AND AFFIRMATION

Regis T. Repko 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.

Regis T. Repko, Site Vice President

Subscribed and sworn to me: October 28, 2010

Date

Notary Public

My commission expires: July 1, 2012

Date

ENCLOSURE 1

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION BY THE OFFICE OF NUCLEAR REGULATION REGARDING LICENSE AMENDMENT RELATED TO REVISION OF THE BATTERY CONNECTION RESISTANCE ACCEPTANCE CRITERIA IN THE TECHNICAL SPECIFICATIONS

NRC Question

The following Request for Information (RAI) from the Nuclear Regulatory Commission (NRC) staff pertains to the proposed 125 volt direct current battery connection resistance acceptance values in the TS for Catawba 1 and 2 and McGuire 1 and 2 as described in the license amendment request (LAR) sent by letter dated December 14, 2009 (Agency wide Documents Access and Management System (ADAMS), Accession No. ML093500597), as supplemented by letter dated September 8, 2010 (ADAMS Accession No. ML102560066), submitted by Duke Energy Carolinas, LLC (the licensee):

> Attachment 1 of both Enclosure 1 (for McGuire 1 and 2) and Enclosure 2 (for Catawba 1 and 2) of the licensee's letter dated September 8, 2010, responded to an NRC staff RAI pertaining to the battery resistance TS LAR. This letter included two recommendations from the battery manufacturer for each station. One of the battery manufacturer's recommendations was to add one ¼-inch inter-cell connector on each side of the battery post (NCN-27 for McGuire 1 and 2 or NCN-21 for Catawba 1 and 2) for a total of 2 x ¼-inch connectors on each side of each battery post.
>
> a) Describe how the licensee addressed the battery manufacturer's recommendation; and
>
> b) Explain how the maximum allowable voltage drop of 0.050V relates to this recommendation.

Duke Energy Response to NRC Question

In late 2006 when McGuire and Catawba became aware of the non-conservative Technical Specification Surveillance value of 150.0 micro-ohms and entered the operability evaluation process, a comprehensive review of all 1E Vital Battery connection resistance values since battery installation was conducted. This review included an evaluation of all connection resistance surveillance values for adverse trends and abnormalities.

In addition, IEEE Std. 450-2002 (Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications) was reviewed to ensure industry recommended maintenance practices were also being considered for the battery maintenance program. In reviewing this standard, it was noted that the Informative Annex D of the standard stated that strap connections are typically designed for a 20-30 milli-volt drop by the battery manufacturers. Note that McGuire and Catawba are committed to the 1980 revision of IEEE Std. 450, not the 2002 revision.

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RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION BY THE OFFICE OF NUCLEAR REGULATION REGARDING LICENSE AMENDMENT RELATED TO REVISION OF THE BATTERY CONNECTION RESISTANCE ACCEPTANCE CRITERIA IN THE TECHNICAL SPECIFICATIONS

Considering this connector voltage drop guidance in IEEE Std. 450-2002 Informative Annex D and the known baseline resistance readings documented during battery installation, it was determined that based on the worst case battery duty cycle load current, the sites did not meet the typical 20-30 milli-volt guidance in IEEE Std. 450-2002, Informative Annex D. Since battery connection resistance directly impacts the voltage drop across the battery when under load, all battery load test empirical data was analyzed for each battery service and performance test since installation. It was noted on all occasions that conservative battery voltage margin still existed even at present resistance values, which were higher than the initial baseline connection resistance values.

As a result of this analysis, McGuire and Catawba Engineering contacted the Exide Battery 3rd Party Qualifier, Nuclear Logistics, Inc., to discuss the differences between the guidance in IEEE Std. 450-2002 and actual field measurement results over a 10-year period. Engineering provided NLI battery service test field test data and also discussed the substantial margins that exist with respect to overall battery voltage drop. Since significant margins were available, the battery manufacturer stated the following in letters to McGuire and Catawba (Attachment 1 of Enclosures 1 and 2 to RAI response):

1. The increased intercell connection resistances are only a possible concern during the high first 1- minute discharge rate. The higher resistances may cause a slight increase in the temperature of the connectors, but it is not significant. The heat would be dissipated by the air and volume of electrolyte in the flooded cell.

2. Duke Power has performed a service test or a modified performance test on the battery. The battery demonstrated that the plant load profile can be met with the higher intercell connection resistances. A connector voltage drop of 50mV is acceptable, provided the battery passed the service or modified performance test.

3. Batteries are sized with significant margin (25% aging margin + plant specified design margin). If the battery capacity is still well above 80%, the added voltage drop from the higher intercell connection resistance is not significant.

4. There is no risk of damage to the battery, overheating, or fire.

The following NLI recommendations were proposed:

1. **Review the previously collected data on the intercell connection resistances. If the resistances have increased significantly, the connections should be cleaned.**

This action was taken in reviewing all the test and surveillance data from initial installation to present. No adverse trends were identified on any connection. In addition,

maintenance procedures were updated following completion of the initial operability evaluation in 2006 that established conservative administrative resistance limits where action was directed by the procedure. Battery connection inspection and resistance measurements are conducted on a routine periodicity in accordance with applicable Technical Specifications and IEEE Std. 450-2002 recommendations.

2. **Add one 1/4" intercell connector to each side of the battery posts for a total of 2 x 1/4" thick connectors on each side.**

Duke Energy considered this option, to add additional intercell connectors, to be offered as an available means to achieve additional margin. Duke Energy found that the batteries already have conservative margins and a decision was made not to pursue modifications to the batteries. This option can be reconsidered at any time if there are margin issues in the future. The following points were considered in making the decision:

a. NLI provided justification in the Evaluation section of their letter that 50 mV is acceptable. It was not contingent on modifying the battery.

b. Conservative voltage margins exist on all vital batteries.

c. The likelihood of a possible error (e.g. damage a battery cell post) occurring during the disassembly and subsequent re-assembly of 56 connections on each battery had to be taken into consideration, especially when this work would have to be conducted within a specified Technical Specification limited period. This additional risk of such a significant maintenance activity had to be evaluated in relation to the benefit of gaining margin beyond what is required.

d. The battery vendor stated that a 50mV drop was acceptable - no concerns as long as the battery testing results continue to be favorable. Battery testing is conducted and evaluated routinely in accordance with applicable Technical Specifications.

e. Battery procedures are tightly controlled with conservative administrative resistance limits that would quickly identify any adverse trends in connection resistance and/or physical appearance such as corrosion.

f. Batteries are inspected on a weekly, quarterly, and yearly basis.