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October 30, 2007

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555-0001

Subject: Duke Power Company LLC d/b/a Duke Energy Carolinas, LLC
Oconee Nuclear Site, Units 1, 2, and 3
Docket Numbers 50-269, 50-270, and 50-287
Duke Response to NRC Request for Additional Information in regard to License
Amendment Request to Incorporate Use of Fiber-Reinforced Polymer System to
Strengthen Existing Auxiliary Building Masonry Walls for Tornado Loadings
License Amendment Request No. 2006-006

References:

1. Letter from Duke Power Company LLC d/b/a Duke Energy Carolinas, LLC to U. S. Nuclear Regulatory Commission (NRC), "Oconee Nuclear Docket Numbers 50-269, 50-270, and 50-287 – License Amendment Request to Incorporate Use of Fiber-Reinforced Polymer System to Strengthen Existing Auxiliary Building Masonry Walls for Tornado Loadings – License Amendment Request No. 2006-006," dated June 1, 2006.
2. Email from the NRC (Mr. Leonard Olshan) containing a Request for Additional Information (RAI) dated July 26, 2006.
3. Duke Response to NRC Request for Additional Information in regard to License Amendment Request to Incorporate Use of Fiber-Reinforced Polymer System to Strengthen Existing Auxiliary Building Masonry Walls for Tornado Loadings, dated March 14, 2007.
4. Email from Duke to the NRC containing supplemental RAI information to the March 14, 2007, RAI submittal (Ref. 3, above).
5. Email from the NRC (Mr. Leonard Olshan) containing a Request for Additional Information (RAI) dated September 11, 2007.
6. Duke Response to NRC Request for Additional Information in regard to License Amendment Request to Incorporate Use of Fiber-Reinforced Polymer System to Strengthen Existing Auxiliary Building Masonry Walls for Tornado Loadings, dated October 8, 2007.

In accordance with 10 CFR 50.90, Duke Power Company LLC d/b/a Duke Energy Carolinas, LLC (Duke), submitted an amendment to Docket Nos. 50-269, 50-270, and 50-287 on June 1, 2006 (Ref.: 1). If granted, this amendment request will revise the Updated Final Safety Analysis Report (UFSAR) to incorporate the use of a fiber-reinforced polymer (FRP) system to strengthen certain existing masonry walls for uniform pressure loads resulting from a tornado event. The

specific masonry walls to be strengthened using an FRP system are located within the Units 1, 2, and 3 Auxiliary Buildings.

By email dated July 26, 2006, Mr. Leonard Olshan of the NRC communicated to Duke a Request for Additional Information (RAI). This RAI consisted of three (3) questions (Ref.: 2). The Duke response to this RAI was submitted on March 14, 2007 (Ref.: 3). Following a May 14, 2007, meeting held in Rockville, MD, to discuss this RAI submittal, Duke agreed to submit additional FRP testing information (Ref.: 4) beyond that included in the March 14, 2007, RAI response.

Subsequently, by email dated September 11, 2007, Mr. Leonard Olshan of the NRC communicated to Duke an additional RAI (Ref.: 5). This RAI consisted of ten (10) questions. Responses to the latter RAI as well as the RAI following the May 14, 2007, Rockville, MD meeting (Ref.: 4), were collectively submitted to the NRC on October 8, 2007 (Ref.: 6).

On October 16, 2007, NRC requested additional information relative to the October 8, 2007, submittal. Duke's response to the latest RAI is given in Enclosure 2.

There are no regulatory commitments contained in this letter. Inquiries on this amendment request should be directed to Stephen C. Newman of the Oconee Regulatory Compliance Group at (864) 885-4388.

Very sincerely yours,



B. H. Hamilton, Vice President
Oconee Nuclear Site

Enclosures:

1. Notarized Affidavit.
2. Supplemental Information to Duke's October 8, 2007, RAI Response.

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ENCLOSURE 1

Notarized Affidavit

AFFIDAVIT

B. H. Hamilton, being duly sworn, states that he is Vice President, Oconee Nuclear Site, Duke Energy Carolinas, LLC, that he is authorized on the part of said Company to sign and file with the U. S. Nuclear Regulatory Commission this revision to the Renewed Facility Operating License Nos. DPR-38, DPR-47, and DPR-55; and that all statements and matters set forth herein are true and correct to the best of his knowledge.

Bruce Hamilton

B. H. Hamilton, Vice President
Oconee Nuclear Site

Subscribed and sworn to before me this 30 day of October, 2007

Sheld A Smith

Notary Public

My Commission Expires:

6/12/2013
Date

SEAL

ENCLOSURE 2

Supplemental Information to Duke's October 8, 2007, RAI Response

The following information is provided to supplement Duke's RAI response dated October 8, 2007, and was previously discussed with the NRC, via conference call, on October 18, 2007.

NRC consideration 1:

*Duke should consider limiting the masonry allowable flexural compressive stress (F_m) to $0.7 f_m'$ (as opposed to $2.5 * 0.33 f_m' = 0.825 f_m'$).*

Duke response:

Duke agrees to limit the masonry allowable flexural compressive stress (F_m) to $0.7 f_m'$. In addition, from a follow-up discussion with the NRC, this limitation will be expressed as:

$$F_m \leq 2.12 * 0.33 f_m' = 0.7 f_m'$$

In this manner, it will remain clear that this limitation represents an increase in allowable flexural compressive stress for load conditions which represent extreme environmental, abnormal, abnormal/severe environmental and abnormal/extreme environmental conditions.

NRC consideration 2:

Duke should consider including a reinforcement index (ω_f) with an upper limit of 0.7 as an additional criterion for FRP system design intended to preclude masonry shear failure of the FRP-strengthened masonry wall.

Duke response:

Duke agrees to include the reinforcement index (ω_f) with an upper limit of 0.7 as an additional criterion for FRP system design to preclude masonry shear failure of the FRP-strengthened masonry wall. The reinforcement index will be computed as follows:

$$\omega_f = \rho_f E_f / (f_m' (h / t))$$

$E_f \equiv$ tensile modulus of elasticity of FRP (psi)

$f_m' \equiv$ specified compressive strength of masonry expressed as force per unit of net cross-sectional area

$h \equiv$ effective height of masonry wall (in)

$t \equiv$ nominal thickness of masonry wall (in)

$\rho_f \equiv$ FRP reinforcement ratio

NRC consideration 3:

Duke should consider limiting the masonry allowable shear stress to 37 psi.

Duke response:

From a follow-up discussion with the NRC, the masonry allowable shear stress will be limited to 50 psi rather than 37 psi based on the following:

Both American Concrete Institute (ACI) 531-79, *Building Code Requirements for Concrete Masonry Structures* (Table 10.1) and ACI 530-05, *Building Code Requirements for Masonry Structures* (Section 2.3.5.2.2) indicate an upper limit of 50 psi for masonry allowable shear stress (v_m) for flexural members without shear reinforcement. The limit on masonry allowable shear stress would be expressed as follows:

$$v_m = 1.3 * 1.1 \sqrt{f_m'} \leq 50 \text{ psi}$$

As per Table 10.1 of ACI 531-79, the normal allowable shear stress for masonry with a compressive strength of 1800 psi, such as Oconee's, is:

$$v_m = 1.1 \sqrt{f'_m} = 46.7 \text{ psi}$$

Therefore, the 50 psi limitation reflects a 7% increase in the normal allowable masonry shear stress for load conditions which represent extreme environmental, abnormal, abnormal/severe environmental and abnormal/extreme environmental conditions.