CHRISTOPHER M. FALLON
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June 20, 2012

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

Subject: Duke Energy Carolinas, LLC
William States Lee III Nuclear Station – Docket Nos. 52-018 and 52-019
AP1000 Combined License Application for the
William States Lee III Nuclear Station Units 1 and 2
Response to Request for Additional Information (eRAI 6528)
Ltr# WLG2012.06-09

Reference: Letter from Brian Hughes (NRC) to James Thornton (Duke Energy), Request for Additional Information Letter No. 107 Related to SRP Section 03.07.02 - Seismic System Analysis for William States Lee III Units 1 and 2 Combined License Application, dated May 23, 2012 (ML12144A056)

This letter provides the Duke Energy response to the Nuclear Regulatory Commission's request for additional information (RAI) 03.07.02-002, included in the referenced letter.

The response to the NRC information request described in the referenced letter is addressed in a separate enclosure, which also identifies associated changes, when appropriate, to be made in a future revision of the Final Safety Analysis Report for the Lee Nuclear Station.

If you have any questions or need any additional information, please contact James R. Thornton, Nuclear Plant Development Licensing Manager (Acting), at (704) 382-2612.

Sincerely,

Christopher M. Fallon

Christopher M. Fallon
Vice President
Nuclear Development (Acting)

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NRO

Enclosure:

1) Lee Nuclear Station Response to Request for Additional Information (RAI) Letter No. 107, RAI 03.07.02-002

xc (w/out enclosure):
Frederick Brown, Deputy Regional Administrator, Region II

xc (w/ enclosure):
Brian Hughes, Senior Project Manager, DNRL

AFFIDAVIT OF CHRISTOPHER M. FALLON

Christopher M. Fallon, being duly sworn, states that he is Vice President, Nuclear Development (Acting), 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 combined license application for the William States Lee III Nuclear Station, and that all the matter and facts set forth herein are true and correct to the best of his knowledge.

Christopher M. Fallon

Christopher M. Fallon, Vice President
Nuclear Development (Acting)

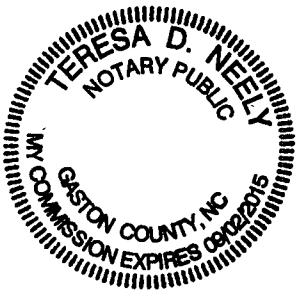
Subscribed and sworn to me on June 20, 2012

Teresa D. Neely

Notary Public

My commission expires: 9/2/2015

SEAL



Lee Nuclear Station Response to Request for Additional Information (RAI)

RAI Letter No. 107

NRC Technical Review Branch: **Structural Engineering Branch 1 (AP1000/EPR Projects) (SEB1)**

Reference NRC RAI Number(s): **03.07.02-002**

NRC RAI:

On April 9-11, 2012, NRC staff conducted an audit on site response and soil-structure interaction (SSI) calculations performed by Westinghouse Electric Corporation (WEC) in support of the COL application of the William Lee Nuclear Station (WLS), Unit 1 and 2 [ML 12137A203]. During the audit, the applicant indicated that a mechanical stabilized earth (MSE) retaining wall will be utilized to support backfill material adjacent to the nuclear island (NI) and may be located below adjacent seismic Category II structures. Staff review of FSAR section 3.7.2, notes that the applicant has incorporated by reference the analysis of adjacent seismic Category II structures from the approved AP1000 DCD, Rev 19, Subsection 3.7.2.8. Staff review finds that the referred analysis of adjacent structures did not consider the effects of an MSE wall located in the vicinity of either the Annex Building or 1st bay of the Turbine Building.

In addition, the applicant discussed the use of a heavy lift derrick (HLD) for performing construction of Units 1 and 2. Staff review of FSAR Section 3.7.2.8 finds that the effects of the HLD foundation(s) on the NI foundation structures are not described.

To address the above issues, staff requests the applicant to:

a) Describe the impact of the MSE wall design on the dynamic response of the adjacent seismic Category II structures.

b) Describe the impact of HLD foundation elements (potentially permanent) on the seismic response of the Units 1 and 2 nuclear islands.

Duke Energy Response:

a) Describe the impact of the MSE wall design on the dynamic response of the adjacent seismic Category II structures.

Reference 1 describes the MSE wall design being considered and explains that the MSE wall is constructed of the same granular material as the general granular fill beneath the seismic Category II structures. The facing of the MSE wall will consist of flexible material filled with the granular fill. Therefore, the MSE wall facing does not interfere with the transmission of vibrations through the granular fill. The side fill between the below grade

nuclear island walls and the face of the MSE wall is constructed of the same granular material as the MSE wall and the general granular fill. The general granular fill, the granular fill in the MSE wall, and the side fill are all compacted to the same specified degree of compaction; therefore, the maximum seismic modulus is similar for all. Thus, the MSE wall design does not impact the seismic response of the adjacent seismic Category II structures.

b) *Describe the impact of HLD foundation elements (potentially permanent) on the seismic response of the Units 1 and 2 nuclear islands.*

The location of the heavy lift derrick (HLD) for Lee Nuclear Station Units 1 and 2 has not been finalized at this time. Figure 1 shows the location that currently is proposed for the HLD (see Attachment 1). This location is the closest the HLD can be placed to the centerlines of the nuclear islands, because moving farther south encroaches on the location of the diesel generator building for Unit 2.

Figure 1 shows the "Top of Slope" of the granular fill adjacent to the nuclear islands which is its outline (edge) near the yard elevation. Figure 1 also shows that the HLD foundation is expected to be supported on granular fill, at least beneath the ring and potentially beneath the counterweight.

Figure 1 illustrates that the HLD will be located a significant distance from the outer walls of the safety-related nuclear islands. As indicated, the minimum horizontal distance between the outer edge of the HLD ring foundation and the exterior wall of the nuclear islands will be at least 180 ft.

The bottom portion of Figure 1 presents a section view showing the proposed location of the HLD foundation relative to the locations of the nuclear islands. The bottom of the HLD ring foundation is expected to be at approximately elevation 580 ft. The foundation support zone of this nonsafety-related structure, defined in accordance with FSAR Subsection 2.5.4.5.2, is illustrated by the lines sloping downward from the edge of the HLD ring foundation at 0.5 horizontal to 1 vertical. The lines intersect the top of rock at a depth of about 40 to 50 ft beneath the HLD ring foundation, or at distances of at least 155 ft to 160 ft from the basemats of the WLS nuclear islands.

Based on these observations, the HLD ring foundation and its support zone are remote from the locations of the nuclear island. The foundation support zone of the HLD does not overlap with the foundation supporting materials beneath the nuclear island basemats. Stresses from loading of the HLD ring foundation during construction will create negligible stress in the materials which support the nuclear island basemats.

Following completion of construction of both units, the HLD foundation elements, comprised of the approximately 30-ft-wide ring foundation and the counterweight, are expected to be left in-place, and covered by approximately one foot of fill material.

The concrete HLD foundation rings are only about 30 ft wide and approximately 3.5 ft thick, excluding the two 4-ft wide by approximately 2 ft high pedestals that support the rails. The

concrete counterweight is more massive; however, the counterweight is located farther from the nuclear islands. The HLD foundation will support no structure after construction; therefore, this foundation will not be subjected to significant soil structure interaction (SSI) effects to cause vibrations in the surrounding ground. Considering the thickness of the HLD foundation, it is reasonable to consider that the foundation does not present a significant barrier to the passing of vibratory waves. The granular fill forming the HLD foundation support zone will have properties similar to the granular fill materials closer to the nuclear islands, and should not present a barrier to the passing of vibratory waves.

Thus, the presence of the HLD foundation, left in-place, does not impact the seismic response of the Units 1 and 2 nuclear islands.

Note that, exclusive of the considerations discussed herein, DCD Section 3.7.2.4 states that SSI is not significant for a nuclear island founded on rock with a shear wave velocity greater the 8,000 ft per second. This is the case at the WLS site.

Reference:

1) Letter from Christopher Fallon (Duke Energy) to Document Control Desk, U.S. Nuclear Regulatory Commission (NRC), AP1000 Combined License Application for the William States Lee III Nuclear Station Units 1 and 2 Response to Request for Additional Information, (eRAI 6497), Ltr# WLG2012.06-07, dated June 18, 2012. (Response to Letter No. 106 RAI 02.05.04-17)

Associated Revision to the Lee Nuclear Station Final Safety Analysis Report:

None

Attachment:

1) Figure 1 – Conceptual Configuration of HLD Showing Locations of Nuclear Islands

Attachment 1

Lee Nuclear Station Response to Request for Additional Information (RAI)

RAI 03.07.02-002

Figure 1 – Conceptual Configuration of HLD

Showing Locations of Nuclear Islands

Figure 1

Conceptual Configuration of HLD Showing

Locations of Nuclear Islands