Bryan J. Dolan
VP, Nuclear Plant Development

Duke Energy
EC09D/ 526 South Church Street
Charlotte, NC 28201-1006

Mailing Address:
P.O. Box 1006 – EC09D
Charlotte, NC 28201-1006

704-382-0605

Bryan.Dolan@duke-energy.com

January 26, 2011

Document Control Desk
U.S. Nuclear Regulatory Commission
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
Responses to Request for Additional Information
Ltr# WLG2011.01-03

Reference: Letter from Sarah Lopas (NRC) to Bryan Dolan (Duke Energy), Request for Additional Information Regarding the Supplement to the Environmental Report for the William States Lee III Nuclear Station, Units 1 and 2 Combined License Application, dated June 22, 2010 (ML101370398)

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

RAI 128 Supplement, Alternatives

The response to the NRC information request described in the referenced letter is addressed as a separate enclosure, which also identifies associated changes to the Combined License Application for the Lee Nuclear Station, when appropriate.

If you have any questions or need any additional information, please contact Peter S. Hastings, Nuclear Plant Development Licensing Manager, at 980-373-7820.

Bryan J. Dolan
Vice President
Nuclear Plant Development

D093
NRO

Enclosure:

1) RAI 128 Supplement, Alternatives

AFFIDAVIT OF BRYAN J. DOLAN

Bryan J. Dolan, being duly sworn, states that he is Vice President, Nuclear Plant Development, 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 supplement to the 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.

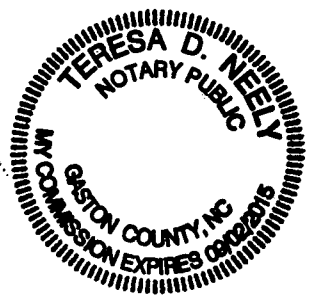
Bryan J. Dolan

Subscribed and sworn to me on _____

Teresa D. Neely
Notary Public

My commission expires: 9/2/2015

SEAL



xc (w/o enclosure):

Loren Plisco, Deputy Regional Administrator, Region II
Robert Schaaf, Branch Chief, DSER

xc (w/ enclosure):

Sarah Lopas, Project Manager, DSER
Brian Hughes, Senior Project Manager, DNRL
Mickie Chamness, PNNL

Lee Nuclear Station Response to Request for Additional Information (RAI)
RAI Letter Dated: June 22, 2010
Reference NRC RAI Number: ER RAI 128 Supplement - Alternatives

NRC RAI:

Provide details of the quantitative analyses used to evaluate hybrid wet-dry tower options for cooling of the proposed Lee Nuclear Plant during periods of low river flow. Include alternatives considered for cooling water sources and cooling system technologies. Include in the metrics of the analyses foregone net power due to parasitic energy losses, reduced generation efficiency, and frequency of outages due to loss of water supply.

During follow-up conference calls held on November 17, 2010 and December 1, 2010, the NRC requested additional information pertaining to the hybrid cooling system sizing and control strategy described in Figure 3 – *Control Philosophy for Hybrid Cooling System to Maximize Water Savings*, Attachment 128-10 of Duke Energy's Response to Request for Additional Information (RAI) 128 (Reference 1).

Duke Energy Response:

Figure 3, as submitted with Duke Energy's response to ER RAI 128 (Reference 1), reflects a constant 100% relative humidity condition. While this condition allows the illustration of integrated operation of the dry and wet cooling towers to be displayed on a single temperature axis, this assumption and associated figure does not represent credible conditions for the Lee Nuclear site.

As part of this supplemental response, Figure 3 has been revised to display cooling tower operation under humidity and temperature conditions that are more representative of the site. Revision 1 of Figure 3 (Attachment 128S-01) reflects a constant 47.8% relative humidity (RH) that corresponds to a coincident 92°F dry bulb and 76°F wet bulb temperature (1% exceedance condition). These conditions were assumed during sizing of the hybrid cooling system. The requirements used in sizing the wet cooling towers for sequential operation as part of the hybrid cooling system are explained below.

When the hybrid cooling system is in maximum "water savings" mode, the dry cooling towers reject 100% of the heat load until the ambient dry bulb temperature exceeds 69°F. As dry bulb temperature increases, heat rejection from the dry cooling towers decreases and the wet cooling towers are sequentially started to ensure circulating water temperature is maintained below the

design temperature of 91°F. As the dry bulb temperature approaches 92°F, the dry cooling towers reject only 50% of the heat load.

The rationale for sizing the wet cooling towers for 100% heat rejection is apparent when the conditions for sequentially starting the first and second wet cooling towers on an increasing temperature trend are considered. Figure 3 (Attachment 128S-01) shows that when the site dry bulb temperature reaches 88°F, two of the 33-1/3% wet cooling towers are operating at full heat rejection capacity and the third must be started, even though the dry cooling towers are removing greater than 50% of the heat load. This seeming decrease in heat removal capability of the wet cooling towers is caused by the demands of sequential operation. When the first wet cooling tower is started, the temperature of the hot water it receives is lower than its design condition and the tower is only cooling one-third of the circulating water flow. However, the cool water exiting the tower must be cooled to a temperature that, when mixed with the remaining two-thirds, maintains a bulk water temperature below the 91°F design limit. As wet bulb temperature for the site increases with the dry bulb temperature and constant humidity, it limits the lowest cool water temperature that can be achieved by the first wet cooling tower. When the cool water temperature is reached and the first wet cooling tower can no longer maintain a bulk circulating water temperature below 91°F, the second wet cooling tower must be started. In summary, maintaining the bulk circulating water temperature below the 91°F design limit through sequential wet cooling operation results in the first and second wet cooling towers operating below their design heat rejection capacities. As a consequence, the sequential starting of the third wet cooling tower is anticipated during the hottest weather conditions (i.e., greater than 88°F dry bulb).

When in maximum "water savings" mode, the 100% wet cooling tower design allows the circulating water system (CWS) temperature to be maintained below the 91°F design limit during most weather conditions via operation of the dry cooling towers and the sequential operation of the first and second wet cooling towers. The wet cooling tower sizing also allows the hybrid cooling system to be operated in the "power savings" mode with dry cooling towers removed from service.

There are no other changes to the information provided in Reference 1 as a result of these updates.

Reference:

1. Letter from Bryan J. Dolan (Duke Energy) to Document Control Desk, U.S. Nuclear Regulatory Commission, Response to Request for Additional Information, Ltr# WLG2010.10-09 dated October 29, 2010 (ML103070311).

Associated Revisions to the Lee Nuclear Station Combined License Application:

None

Attachment:

Attachment 128S-01 Figure 3 – Control Philosophy for Hybrid Cooling System to Maximize Water Savings

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

Attachment 128S-01

Control Philosophy for Hybrid Cooling System to Maximize Water Savings

Figure 3 - Control Philosophy for Hybrid Cooling System to Maximize Water Savings