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November 22, 2011

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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
Supplemental Response to Request for Additional Information
Ltr# WLG2011.11-06

Reference: Letter from Bryan J. Dolan (Duke Energy) to NRC Document Control Desk, RAI Response to Letter No. 090 Related to SRP Section 02.03.02 for the William States Lee III Nuclear Station Units 1 and 2, dated September 16, 2010, WLG2010.09-02 (ML102640040)

This letter provides supplemental information to the Duke Energy response to the Nuclear Regulatory Commission's request for additional information (RAI 02.03.02-012) included in the reference document. Subsequent to this submittal Duke Energy identified a discrepancy in the methodology for the determination of the site parameter for normal air temperature as described in the Westinghouse Table 2-1 of the AP1000 DCD.

Supplemental information for the response is addressed in the attached enclosure, which also identifies associated changes, when appropriate, that will 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,

Ronald A. Jones
Senior Vice President
Nuclear Development

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NRO

Enclosure:

1. Lee Nuclear Station Supplemental Response to Request for Additional Information (RAI), Letter No. 090, RAI 02.03.02-012

AFFIDAVIT OF RONALD A. JONES

Ronald A. Jones, being duly sworn, states that he is Senior Vice President, Nuclear 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 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.



Ronald A. Jones, Senior Vice President
Nuclear Development

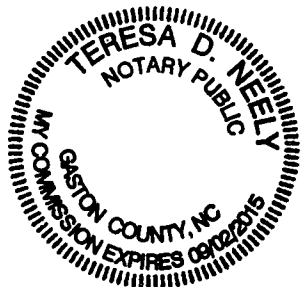
Subscribed and sworn to me on November 22, 2011

Teresa D. Neely

Notary Public

My commission expires: 9/2/2015

SEAL



xc (w/o enclosure):

Charles Casto, Deputy Regional Administrator, Region II

xc (w/enclosure):

Brian Hughes, Senior Project Manager, DNRL

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

RAI Letter No. 090

NRC Technical Review Branch: Siting and Accident Consequence Branch (RSAC)

Reference NRC RAI Number(s): 02.03.02-012

NRC Request for Additional Information:

The Staff considered the Applicant's response to RAI Question No. 02.03.02-11 for the William States Lee III Nuclear Station (WLS), Units 1&2 combined license (COL) Final Safety Analysis Report (FSAR) ("RAI Response"), submitted on March 23, 2010 (ML100850543). RAI No. 02.03.02-11 was issued as a follow-up to the Applicant's response to earlier RAI Question No. 02.03.02-4 (see ML083360557).

RAI Question No. 02.03.02-11 addressed issues relating to the selection of the higher of either the 100-year return period design-basis dry- and/or wet-bulb temperatures or the historic (i.e., 0 percent exceedance) value(s) as site characteristics for comparison to the corresponding maximum safety and minimum safety site parameter values in COL FSAR Table 2.0-201. The Staff considers this approach consistent with the intent of 10 CFR 52.79(a)(1)(iii) to provide sufficient margin for the limited accuracy, quantity, and period of time in which the historical data have been accumulated. The RAI question also requested the Applicant to reconsider its determination of the 100-year return period coincident wetbulb temperature, which was considerably lower than the Staff's value, or to provide a justification and explanation of their analysis.

In its RAI Response, the Applicant provided:

- A re-analysis of the 100-year return period and 0 percent exceedance dry- and/or wet-bulb temperatures based on a 45-year period of record (POR) from 1963 through 2007 as opposed to the original 31-year POR from 1977 through 2007;
- A revised methodology for determining the 100-year return period coincident wet-bulb temperature and the corresponding result; and
- Revisions to related text in COL FSAR Sections 2.3.2.2 and 2.3.7, an updated tabular summary of design-basis temperatures in COL FSAR Table 2.3-293, and the corresponding updates to the site characteristic values in COL FSAR Table 2.0-201.

After reviewing this information, the Staff identified several discrepancies and omissions that require correction and/or clarification. Therefore, the Applicant should address the following technical issues to resolve the Staff's concerns regarding the revised material:

(a) The proposed revision to the last paragraph of COL FSAR Section 2.3.2.2 retains the third sentence from the original text, which states "[t]he controlling meteorological parameters required for the analysis of cooling tower performance are the wet bulb temperature and the coincident dry bulb temperature". Reconcile this statement with the WLS Ambient Design Temperatures for wet-bulb presented on Page 2 of 10 of Enclosure No. 1 to the RAI Response,

with the corresponding site characteristic wet-bulb temperatures listed on revised COL FSAR Table 2.0-201 (Page 4 of 10 of Enclosure No. 1), and with the corresponding wet-bulb temperature values listed on revised COL FSAR Table 2.3-293 (Page 8 of 10 of Enclosure No. 1).

No such site characteristics (i.e., wet-bulb and coincident dry-bulb temperatures) are provided in COL FSAR Section 2.3 nor do any such site parameters appear to be included in the Design Control Document.

- If the statement in the last paragraph of revised Section 2.3.2.2 is intended to refer to only the non-coincident wet-bulb temperature values referenced above, then: (1) confirm whether the non-coincident wet-bulb values can be accommodated at any dry-bulb temperature; and (2) revise the statement and text accordingly.
- On the other hand, if the statement in the last paragraph of revised Section 2.3.2.2 is correct, then: (1) specify the corresponding coincident dry-bulb temperatures; (2) update the site characteristic and/or site parameter values in COL FSAR Tables 2.0-201 and 2.3-293 accordingly; and (3) update Subsection 2.3.2.2 as necessary.

(b) The Staff recognizes that the ambient temperature and humidity statistics called for in NUREG-0800, Standard Review Plan (SRP) Section 2.3.1, Section I (Areas of Review), Item 6(e), and in Reg Guide 1.206, Part III, Section C.I.2.3.1.2, Paragraph 2 (Fifth Bulleted Item), have been addressed by the Applicant in COL FSAR Section 2.3.2.2. The Staff also recognizes that SRP Section 2.3.1 does not, at present, prescribe methodologies to be used in determining these temperature and humidity statistics, thus allowing applicant flexibility in analyzing the data.

Nevertheless, consistent with SRP Section 2.3.1, Section III (Review Procedures), Item 4(c), Paragraph 1, in regards to "ensuring that sufficient information is presented" in the application "to demonstrate that the characteristics of the site fall within the site parameters", update COL FSAR Section 2.3.2.2 (or other appropriate section(s) under COL FSAR Section 2.3) to explain the methodologies used to determine the 0 percent exceedance, 100-year return period, and 1 percent exceedance design-basis dry- and/or wet-bulb temperatures. The Staff notes that Pages 1, 2, and 3 of 12 of the Applicant's response to RAI Question No. 2.3.2-4 (see ML083360557), as supplemented by the revised approach for determining the 100-year return period coincident wet-bulb temperature and the updated POR in the RAI Response, provide a reasonably acceptable level of detail for the methodologies used.

(c) Confirm whether the 1 percent exceedance (or Maximum and Minimum Normal) dry- and/or wet-bulb temperatures listed on Pages 2, 4, and 8 of 10 of the RAI Response have been updated to reflect the 45-year meteorological data set (from 1963 through 2007) from the Greer, South Carolina, National Weather Service station, as opposed to still being based on the original 31-year POR. The Staff notes the change of the 1 percent exceedance Maximum Normal dry-bulb temperature from 92°F to 91°F in COL FSAR Tables 2.0-201 and 2.3-293 although the basis of this change is not clear (Paragraph 1 on Page 1 of 10 of the RAI Response does not suggest this to be the case).

Therefore, confirm whether different PORs are used to determine the various dry- and/or wet-bulb site characteristic temperatures. In either case, clarify COL FSAR Section 2.3.2.2, and/or COL FSAR Tables 2.0-201 and 2.3-293 to clearly and consistently indicate the POR(s) used in the design temperature data analyses.

Duke Energy Supplemental Response:

Duke Energy provided a response to the subject RAI in Reference 1. Subsequent to this submittal Duke Energy identified a discrepancy in the methodology for the determination of the site parameter for normal air temperature. Duke Energy has updated the analysis for this parameter to be consistent with the Westinghouse methodology described in Table 2-1 of the AP1000 DCD.

Reference

1. Letter from Bryan J. Dolan (Duke Energy) to Document Control Desk, U.S. Nuclear Regulatory Commission, Response to Request for Additional Information (RAI No. 4959), Ltr# WLG2010.09-02, dated September 16, 2010 (ML102640040)

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

1. FSAR Table 2.0-201 (Sheet 1 of 8)
2. FSAR Subsection 2.3.2.2
3. FSAR Table 2.3-293

Attachments:

1. Attachment 1 to Supplemental Response to RAI 02.03.02-12, Revision to FSAR Chapter 2 Text and Tables

Lee Nuclear Station
Attachment 1 to Supplemental Response to
Request for Additional Information
RAI 02.03.02-012
FSAR Chapter 2 Text and Table Revisions:
FSAR Table 2.0-201 (Sheet 1 of 8)
FSAR Subsection 2.3.2.2
FSAR Table 2.3-293

COLA Part 2, FSAR Chapter 2, Table 2.0-201 is revised as follows:

WLS SUP 2.0-1

TABLE 2.0-201 (Sheet 1 of 8)
 COMPARISON OF AP1000 DCD SITE PARAMETERS AND LEE NUCLEAR STATION UNITS 1 & 2 SITE CHARACTERISTICS

	AP 1000 DCD Site Parameters	WLS Site Characteristic	WLS FSAR Reference	WLS Within Site Parameter
Air Temperature				
Maximum Safety	115°F dry bulb / 86.1°F coincident wet bulb ^{(a), (h)}	107°F dry bulb / 84°F coincident wet bulb (100-year maximum)	Table 2.3-293	Yes
	86.1°F wet bulb (noncoincident)	85°F (100-year maximum)	Table 2.3-293	Yes
Minimum Safety	-40°F ^(a)	-5°F (100-year minimum)	Table 2.3-293	Yes
Maximum Normal	101°F dry bulb / 80.1°F coincident wet bulb ^(b)	9194 °F dry bulb / 7677 °F coincident wet bulb (40.4 % <u>annual</u> exceedance)	Table 2.3-293	Yes
	80.1°F wet bulb (noncoincident) ^(c)	7677 °F wet bulb (40.4 % <u>annual</u> exceedance)	Table 2.3-293	Yes
Minimum Normal	-10°F ^(b)	2420 °F (499.6 % <u>annual</u> exceedance)	Table 2.3-293	Yes
Wind Speed				
Operating Basis	145 mph (3 second gust); importance factor 1.15 (safety), 1.0 (nonsafety); exposure C; topographic factor 1.0	96 mph (3 second gust) (110 mph with 1.15 importance factor); exposure C; topographic factor 1.0	Subsection 2.3.1.2.8	Yes

COLA Part 2, FSAR Chapter 2, Subsection 2.3.2.2 is revised under the sub-heading "1% Exceedance Dry Bulb and Wet Bulb Temperature" as follows:

1% Seasonal Exceedance Dry Bulb and Wet Bulb Temperature

As described in DCD Table 2-1, the 1% seasonal exceedance is approximately equivalent to the 0.4% annual exceedance. The maximum normal limits represent the maximum normal range of operation for power generation systems. The maximum coincident normal temperature limit is based on a 1% seasonal exceedance dry bulb temperature that persists for two hours or more in historical meteorological data. The complementary coincident wet bulb temperature is not selected based on a median or a maximum value from the 1% 0.4% annual exceedance coincident data set. Since a slightly lower dry bulb temperature with its complementary coincident wet bulb temperature may be more limiting, the 1% 0.4% annual exceedance wet bulb value, disregarding any hourly persistence limitation, was selected as the coincident wet bulb temperature. This methodology specified by Westinghouse is considered a conservative approach to the selection of the maximum normal coincident condition. Based on the 45-year sequential hourly meteorological data set for the Greer Greenville/Spartanburg Airport NWS station, the 1% 0.4% annual exceedance dry bulb temperature was 9194°F and the coincident 1% 0.4% annual exceedance wet bulb temperature was 7677°F.

The maximum normal non-coincident wet bulb temperature limit is the 1% 0.4% annual exceedance wet bulb temperature that has existed at the site for 2 hours or more based on historical meteorological data. From the 45-year sequential hourly meteorological data set for the Greer Greenville/Spartanburg Airport NWS station, the maximum normal non-coincident wet bulb temperature was determined to be 7677°F.

COLA Part 2, FSAR Chapter 2, Table 2.3-293 is revised as follows:

TABLE 2.3-293
 LEE NUCLEAR STATION DESIGN TEMPERATURES

	Frequency of Occurrence			
	0%	100-year		4-0.4 %
Cooling dry-bulb temperature, °F	103	107		9494
Coincident wet-bulb temperature, °F	78	84		7677
Evaporation wet-bulb (noncoincident), °F	81	85		7677
		Dry Bulb Temperature °F		
		Maximum	Minimum	
4-0.4 percent <u>annual</u> exceedance		9494	2420	
0 percent exceedance		103	-1	
100-year return		107	-5	

Notes:

1. Based on 45 years (1963-2007) of meteorological data measured at the NWS station at Greenville-Spartanburg Airport (GSP).