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August 23, 2013

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

10 CFR 52.79

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 7159)
Ltr#: WLG2013.08-02

Reference: Letter from Brian Hughes (NRC) to Robert Kitchen (Duke Energy), Request for Additional Information Letter No. 109, Related to SRP Section 11.3 – Gaseous Waste Management System for the William States Lee III Units 1 and 2 Combined License Application, dated July 24, 2013 (ML13205A093)

This letter provides the Duke Energy response to the Nuclear Regulatory Commission's request for additional information (RAI) 11.03-04, 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 Robert H. Kitchen, Nuclear Development Licensing Director, at (704) 382-4046.

I declare under penalty of perjury that the forgoing is true and correct. Executed August 23, 2013.

Sincerely,

Christopher M. Fallon

Christopher M. Fallon
Vice President
Nuclear Development

D093
NRO

Enclosure:

1) Lee Nuclear Station Units 1 and 2 Response to Request for Additional Information (RAI) Letter No. 109, RAI 11.03-004 (eRAI 7159)

xc (w/o enclosure):

Frederick Brown, Deputy Regional Administrator, Region II

xc (w/ enclosure):

Brian Hughes, Senior Project Manager, DNRL
Patricia Vokoun, Project Manager, DSER
Terri Miley, PNNL

Enclosure 1

Lee Nuclear Station Units 1 and 2 Response to Request for Additional Information (RAI)

RAI Letter No. 109

RAI 11.03-004 (eRAI 7159)

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

RAI Letter No. 109

NRC Technical Review Branch: Health Physic Branch (AP1000/EPR Projects)(CHPB)

Reference NRC RAI Number(s): 11.03-004 (eRAI 7159)

NRC RAI:
11.03-4

10 CFR 50 Appendix I Section II as it relates to dose objectives for the highest organ dose and total body dose calculations.

In FSAR 11.3.3.4.1 the applicant states:

"The maximum dose rate to any organ considering every pathway is calculated to be 8.80 mrem/yr to an infant's thyroid. The maximum total body dose rate is calculated to be 1.35 mrem /yr to a child. These are below the 10 CFR 50 Appendix I design objectives of 5 mrem/yr to total body and 15 mrem/yr to any organ including skin."

Staff has found that the 8.8 mrem/yr and 1.35 mrem/yr values stated above are found in FSAR Table 11.3-202, "Individual Doses," where staff has determined that the applicant is using the totals for ground, plume, inhalation and food pathways to calculate the dose to an infant's thyroid and the child's total body.

However, Table 11.3-205, "Calculated Maximum Individual Doses Compared to 10 CFR 50 Appendix I Limits," shows that the maximum dose to an organ is 8.32 mrem/yr from the ground, inhalation, and food pathways (as it is described in Regulatory Guide 1.109) and Table 11.3-205 also shows that the total body dose of 4.73E-1 mrem/yr is from the immersion doses from noble gases (as it is also described in Regulatory Guide 1.109).
The staff requests the applicant address the following:

1. Provide staff with the reasoning behind using two different sets of dose values to meet the 10 CFR 50 Appendix I dose objectives, or make consistent the two sets of values used in meeting the dose objectives.

2. In making clear the assumptions used to meet the dose objectives, provide updates to Table 11.3-205, "Calculated Maximum Individual Doses Compared to 10 CFR 50 Appendix I Limits." These updates are to include footnotes that describe the pathways that make up each dose result. For example, Table 11.3-205 uses Regulatory Guide 1.109 to describe the various dose pathways used to calculate the dose result.

3. Updates to Tables 11.3-206, "Maximum Individual Doses from Both Units due to Routine Gaseous Effluents Compared to 10 CFR 20.1301 Limits," and 11.3-207, "Collective Gaseous Doses Compared to 40 CFR 190 Limits" are also requested to make these consistent with the updates requested by staff for Table 11.3-205.

Please revise the FSAR as appropriate and provide markups.

Duke Energy Response:

In response to this Request for Additional Information (RAI), clarifying changes have been made to FSAR Tables 11.3-205, 11.3-206, and 11.3-207. The intent of the changes is to clarify the assumptions used in determining the limiting doses. These changes are described below.

1. Table 11.3-205 was revised to include a line item that represents the "Maximum Dose to Any Organ Including Noble Gas Total Body Dose." This line item is consistent with the results given in Table 11.3-202 (i.e., 8.80 mrem/yr). In addition, a clarifying footnote was added to Table 11.3-205 that states "The maximum organ dose listed here includes the dose due to ground exposure, inhalation, food pathways, and the total body plume (noble gas) dose given above." The FSAR markup to Table 11.3-205 is provided in Attachment 1 of this response.

2. The TEDE dose listed in Table 11.3-206 already includes the total body contribution from immersion in noble gases. A footnote was added to Table 11.3-206 to clarify that the TEDE reported is 3% of the thyroid dose plus the total body dose, consistent with Regulatory Guide 1.183. The FSAR markup to Table 11.3-206 is provided in Attachment 2 of this response.

3. The dose listed in Table 11.3-207 for Max to Any Other Organ already includes the total body contribution from immersion in noble gases. New footnote a) will be added to reflect the total body dose resulting from plume (noble gas) and radioiodine and particulate exposure pathways due to radiological releases from both units. Former Footnote a), now Footnote b) will be revised to include what pathways are used to calculate the result. The FSAR markup to Table 11.3-207 is provided in Attachment 3 of this response.

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

FSAR Table 11.3-205

FSAR Table 11.3-206

FSAR Table 11.3-207

Attachments:

1) Attachment 1 – Revision to FSAR Table 11.3-205
2) Attachment 2 – Revision to FSAR Table 11.3-206
3) Attachment 3 – Revision to FSAR Table 11.3-207

Attachment 1

Lee Nuclear Station Units 1 and 2 Response to Request for Additional Information (RAI)

RAI 11.03-004

Revision to FSAR Table 11.3-205

WLS COL 11.3-1
WLS COL 11.5-3

TABLE 11.3-205
CALCULATED MAXIMUM INDIVIDUAL DOSES COMPARED TO
10 CFR PART 50 APPENDIX I LIMITS

Description	Limit	Calculated Values
Noble Gases[1]		
Gamma Dose (mrad)	10	7.73E-01
Beta Dose (mrad)	20	3.25E+00
Total Body Dose (mrem)	5	4.73E-01
Skin Dose (mrem)	15	2.38E+00
Radioiodines and Particulates		
Total Body Dose (mrem)	-	8.76E-01
Max to Any Organ (mrem)[2]	15	8.32E+00
Maximum Dose to Any Organ Including Noble Gas Total Body Dose (mrem)[3]	15	8.80E+00

1) Doses due to noble gases in the released plume are calculated at the location of maximum dose at the site boundary (location of highest χ/Q values). This location is 0.81 miles southeast of the Effluent Release Boundary.

2) The maximum dose to any organ is the dose to the thyroid of an infant.

3) The maximum organ dose listed here includes the dose due to ground exposure, inhalation, food pathways, and the total body plume (noble gas) dose given above.

Attachment 2

Lee Nuclear Station Units 1 and 2 Response to Request for Additional Information (RAI)

RAI 11.03-004

Revision to FSAR Table 11.3-206

WLS COL 11.3-1
WLS COL 11.5-3

TABLE 11.3-206
MAXIMUM INDIVIDUAL DOSES FROM BOTH UNITS DUE TO ROUTINE GASEOUS EFFLUENTS COMPARED TO 10 CFR 20.1301 LIMITS

Description	Limit	Calculated Values
TEDE (mrem)[(a)]	100	3.12E+00
Maximum Dose per Hour (mrem/hr)	2	3.56E-04

a) Consistent with Regulatory Guide 1.183, the TEDE reported here is 3% of the thyroid dose plus the total body dose from Table 11.3-202. The maximum TEDE is to a child.

Attachment 3

Lee Nuclear Station Units 1 and 2 Response to Request for Additional Information (RAI)

RAI 11.03-004

Revision to FSAR Table 11.3-207

TABLE 11.3-207
COLLECTIVE GASEOUS DOSES COMPARED TO
40 CFR PART 190 LIMITS

Description	Limit	Calculated Values for Both Units
Total Body Dose Equivalent (mrem)[(a)]	25	2.70E+00
Thyroid Dose (mrem)	75	1.76E+01
Max to Any Other Organ (mrem)[(a~~b~~)]	25	8.14E+00

a) The total body dose resulting from plume (noble gas) and radioiodine and particulate exposure pathways due to radiological releases from both units.

~~a~~)b) Note that maximum dose to any organ other than the thyroid is the dose to the bone of a child. The max dose to any other organ listed here includes the dose due to ground exposure, inhalation, food pathways, and the total body plume (noble gas) as given in Table 11.3-202.