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October 31, 2008

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
Response to Request for Additional Information
(RAI No. 835)
Ltr# WLG2008.10-15

Reference: Letter from Brian Hughes (NRC) to Peter Hastings (Duke Energy), *Request for Additional Information Letter No. 023 Related To SRP Section 02.01.03 for the William States Lee III Units 1 And 2 Combined License Application*, dated September 23, 2008

This letter provides the Duke Energy response to the Nuclear Regulatory Commission's request for additional information (RAI) 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, 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 Peter S. Hastings, Nuclear Plant Development Licensing Manager, at 980-373-7820.

Bryan J. Dolan
Vice President
Nuclear Plant Development

D093
NRO

Enclosure: Duke Energy Response to Request for Additional Information Letter 023, RAI 02.01.03-001

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

Bryan J. Dolan

Subscribed and sworn to me on October 31, 2008

Phoebe P. Elliott

Notary Public

My commission expires: June 26, 2011

SEAL

xc (w/o enclosure):

Michael Johnson, Director, Office of New Reactors
Gary Holahan, Deputy Director, Office of New Reactors
David Matthews, Director, Division of New Reactor Licensing
Scott Flanders, Director, Site and Environmental Reviews
Glenn Tracy, Director, Division of Construction Inspection and Operational Programs
Charles Ader, Director, Division of Safety Systems and Risk Assessment
Michael Mayfield, Director, Division of Engineering
Luis Reyes, Regional Administrator, Region II
Loren Plisco, Deputy Regional Administrator, Region II
Thomas Bergman, Deputy Division Director, DNRL
Stephanie Coffin, Branch Chief, DNRL

xc (w/ enclosure):

Brian Hughes, Senior Project Manager, DNRL

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

RAI Letter No. 023

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

Reference NRC RAI Number(s): RAI 02.01.03-001

NRC RAI:

RG 1.206 provides guidance for providing population data to meet the siting criteria set forth in 10 CFR 100.21. Provide clarification on how the growth rate ratio for each county was calculated and also the detailed methodology used for population projections. What was the basis for the time frame for calculating growth rate by County? Is this calculated growth rate by county used on a linear basis for population projections into future years? Please clarify the use of the term 'growth ratio' and how it is used for determining population projections.

Duke Energy Response:

10 CFR 100.21 states "Reactor sites should be located away from very densely populated centers. Areas of low population density are, generally, preferred. However, in determining the acceptability of a particular site located away from a very densely populated center but not in an area of low density, consideration will be given to safety, environmental, economic, or other factors, which may result in the site being found acceptable."

There are also several paragraphs in RG 1.206 that provide guidance for the siting criteria. The paragraphs specific to population projections are C.I.2.1.3.1 (Population Within 10 Miles) and C.I.2.1.3.2 (Population Between 10 and 50 Miles). The regulatory guidance related to this RAI states that the applicant should describe the basis for the population projections and provide the methodology and sources used to obtain the population data, including the projection.

Duke Energy has provided additional details in the attached markup of FSAR Subsection 2.1.3 regarding the population growth rate, detailed methodology used for population projections, and the basis for the time frame for calculating the growth rate by county. To project total population for the Lee Nuclear Station Region, three Geographical Information System (GIS) mapping processes are used to produce a series of population tables. The first process converts US Census block data to sector data geography, the second process converts county population projections to sector population data, and the third converts transient data to sector transient population data. The data tables produced provide population numbers that correspond to the geographic area defined by radial distance from the designated site center point and 16 compass point directions. This markup will be included in a subsequent revision of the Final Safety Analysis Report for the Lee Nuclear Station.

North Carolina and South Carolina have projected county populations out to 2030. The population projections from both states are derived from county estimates. The growth in all the affected counties shows a linear trend, therefore a least squares linear regression was used to develop an equation for population in each county. These equations were used to calculate population estimates for the years not projected by the state. Population was calculated out to 2056, which corresponds to 40 years after the originally estimated startup date for Unit 1.

The estimated commercial operation date for Unit 1 is being revised to 2018 in a future revision to the FSAR. This change would have an impact on the population projection of less than two percent.

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

FSAR Subsections 2.1.3

Attachment:

1) Revision to FSAR Subsection 2.1.3

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

Attachment 1 to RAI 02.01.03-001

Revision to FSAR Subsection 2.1.3

COLA Part 2, FSAR, Chapter 2, Subsection 2.1.3 will be revised as follows:

2.1.3 POPULATION DISTRIBUTION

To project total population for the Lee Nuclear Station Region, three Geographical Information System (GIS) mapping processes are used to produce a series of population tables. The first process converts US Census block data to sector data geography, the second process converts county level population projections to sector level data, and the third converts transient population data to sector level data. The data tables produced provide population values that correspond to the geographic area defined by radial distance from the Lee Nuclear Station site center point and 16 compass point directions. These tables correspond directly to the distances and directions displayed in Figure 2.1-205 and Figure 2.1-206.

A sector is defined as an area between two radial distances and two angular lines from a point. In the case of Lee Nuclear Station the radial distances are defined in NUREG-1555, the two angles form a wedge based on each of the 16 compass points and the center point is the designated site center point. Using NUREG-1555 as a guideline, GIS software produced shapefile, called a sector grid, is produced containing sectors in every direction. ~~The population distribution surrounding the Lee Nuclear Site, up to an 80-km (50-mi.) radius, was estimated based upon the most recent US Census Bureau decennial census data (Reference 218).~~ The population distribution is estimated in nine concentric radial bands at 0 to 2-km (1.24-mi.), 2 to 4-km (2.5-mi.), 4 to 6-km (3.7-mi.), 6 to 8-km (5-mi.), 8 to 10-km (6.2-mi.), 10 to 16-km (10-mi.), 16 to 40-km (25-mi.), 40 to 60-km (37-mi.), and 60 to 80-km (50-mi.) from the designated site center point between the two reactors. These bands are then subdivided into 16 directional sectors centered on ~~one of~~the 16 compass points, with each direction consisting of 22.5 degrees as defined in NUREG-1555.

To display all sectors defined by the directions and distances, two maps were produced. Population sectors for 0 to 16-km (10-mi.) are shown in Figure 2.1-206 and 16 to 80-km (50-mi.) in Figure 2.1-205. ~~These figures display area weighted US Census Bureau 2000 population data. The population projections were derived from county estimates that were based on the cohort-component method (References 209 and 232).~~ To convert US Census Block data to sector data, the sector grid shapefile is overlaid onto the census block shapefile, and the shapefiles are integrated. US Census blocks that have been bisected by the sector grid are area weighted. The values falling within each sector are summed. The resulting data has an unrounded population value for each sector for the year 2000. The population distribution surrounding the Lee Nuclear Site, up to an 80-km (50-mi.) radius, is estimated based upon the most recent US Census Bureau decennial census data (Reference 218).
Many states establish official population projections, and county projection information is available from a state's official on-line source. These population projections are used for economic development and planning purposes. Both North Carolina and South Carolina have population projection data available for specific years for every county in their respective state. North Carolina and South Carolina have projected county populations to 2030. The population projections for both states are derived from county estimates and based on the cohort-component method (References 209 and 232). The data set is reduced to the counties located within, or partially within the region. The plot of this data set illustrates a linear trend for all of the counties in the region. Due to this trend, a least squares linear regression is applied to the counties and an equation is produced for each

county. These equations are then used to calculate population estimates for the years not projected by the state. The resulting values from the ~~Using linear regression, an equation was derived for each county. The~~ equations ~~is~~are used in conjunction with the 2000 census data to produce a growth ratio, or index, for each year and each county included in the region. The data is then joined to a county shapefile using GIS. The county indexes are area weighted by sector and summed for each sector, producing a population growth index by sector. ~~Ratios were calculated for each county and for each year, then weighted by area and summed into sectors.~~ For any county with a negative growth rate, a growth ratio of one ~~was~~is used to produce the most conservative results ~~witout~~without overestimating ~~the ratio set was then used to produce a sector level population projection ratio set for the 80-km (50-mi.) region. The census population numbers were then sorted into the polar grid. In the instance that census blocks were divided by sector boundary lines, the population was weighted by area to produce proportionate data values. The values for each sector were summed and multiplied by their projection ratio to produce the final population sector tables (Tables 2.1-203 and 2.1-204). These tables provide additional projected population numbers that correspond by sector to Figures 2.1-205 and 2.1-206 (Reference 218)~~. Using a growth ratio of one does not allow the county's population to decline.

The transient population data is collected by location. These locations are converted to points and areas, and using GIS, integrated into the sector polygon. Any area that is bisected by the sector grid is area weighted. The values falling within each sector are summed. The resulting data is the un-rounded transient sector population for the region.

The US Census based sector data (Block 2000) or the transient sector population is multiplied by these indices for each year of interest. Population tables are then generated for each sector and year of interest. Each sector is listed by compass direction and furthest radial distance. Tables 2.1-203 and 2.1-204 correspond to Figures 2.1-205 and 2.1-206 by compass direction and radial distance.