Progress Energy

James Scarola
Senior Vice President and Chief Nuclear Officer
Progress Energy Carolinas, Inc.

Serial: NPD-NRC-2008-035
September 17, 2008

10CFR52.79

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555-0001

SHEARON HARRIS NUCLEAR POWER PLANT UNITS 2 AND 3
DOCKET NOS. 52-022 AND 52-023
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 005 RELATED TO REGIONAL CLIMATOLOGY

Reference: Letter from Manny Comar (NRC) to James Scarola (PEC), dated August 18, 2008, "Request for Additional Information Letter No. 005 Related to SRP Section 02.03.01 for the Harris Units 2 and 3 Combined License Application"

Ladies and Gentlemen:

Progress Energy Carolinas, Inc. (PEC) hereby submits our response to the Nuclear Regulatory Commission's (NRC) request for additional information provided in the referenced letter.

A response to each NRC request is addressed in the enclosure. The enclosure also identifies changes that will be made in a future revision of the Shearon Harris Nuclear Power Plant Units 2 and 3 application.

If you have any further questions or need additional information, please contact Bob Kitchen at (919) 546-6992 or Garry Miller at (919) 546-6107.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on September 17, 2008.

Sincerely,

James Scarola

Enclosure

cc : U.S. NRC Director, Office of New Reactors/NRLPO
U.S. NRC Office of Nuclear Reactor Regulation/NRLPO
U.S. NRC Region II, Regional Administrator
U.S. NRC Resident Inspector, SHNPP Unit 1
Mr. Manny Comar, U.S. NRC Project Manager

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Shearon Harris Nuclear Power Plant Units 2 and 3
Responses to NRC Request for Additional Information Letter No. 005 Related to SRP Section 02.03.01 for the Combined License Application, dated August 18, 2008

NRC RAI #	Progress Energy RAI #	Progress Energy Response
02.03.01-1	H-0001	Response enclosed – see following pages
02.03.01-2	H-0002	Response enclosed – see following pages
02.03.01-3	H-0003	Response enclosed – see following pages
02.03.01-4	H-0004	Response enclosed – see following pages
02.03.01-5	H-0005	Response enclosed – see following pages
02.03.01-6	H-0006	Response enclosed – see following pages
02.03.01-7	H-0007	Response enclosed – see following pages
02.03.01-8	H-0008	Response enclosed – see following pages
02.03.01-9	H-0009	Response enclosed – see following pages
02.03.01-10	H-00012	Response enclosed – see following pages
02.03.01-11	H-00013	Response enclosed – see following pages

NRC Letter No.: HAR-RAI-LTR-005

NRC Letter Date: August 18, 2008

NRC Review of Final Safety Analysis Report

NRC RAI #: 02.03.01-1

Text of NRC RAI:

Consistent with NUREG-0800, Section 2.3.1, please identify the National Climatic Data Center (NCDC) state climatic division for the proposed site.

PGN RAI ID #: H-0001

PGN Response to NRC RAI:

The HAR site is located in the Central Piedmont state climate division of the National Climatic Data Center (NCDC); information is available at http://www.cdc.noaa.gov/USclimate/map.html. FSAR Subsection 2.3.1 will be revised to include this information in a future amendment to the document.

Associated HAR COL Application Revisions:

The following sentence will be added to the end of the first paragraph of FSAR Subsection 2.3.1.1:. "The HAR site is located in the Central Piedmont state climate division of the NCDC."

A reference to the source of the information, which was obtained from the NCDC website at http://www.cdc.noaa.gov/USclimate/map.html, will be included at the time of the amendment.

Attachments/Enclosures:

None.

NCR Letter No.: HAR-RAI-LTR-005

NRC Letter Date: August 18, 2008

NRC Review of Final Safety Analysis Report

NRC RAI #: 02.03.01-2

Text of NRC RAI:

This request for additional information relates to FSAR Table 2.3.1-202.

a) The extreme wind speeds are labeled as both fastest mile and peak gust. Please clarify this apparent discrepancy.

b) The staff compared the extreme wind speeds against data from the National Institute of Standards and Technology (NIST) and Texas Tech. A database of peak gust wind speeds is available at http://www.itl.nist.gov/div898/winds/nistttu.htm. The staff found similar values for all of the stations except Greensboro, NC. FSAR table 2.3.1-202 lists an extreme wind gust of 60 mph, which occurred during October, 1985, while the NIST database reports an extreme wind gust of 97 mph, which occurred during July, 1976. Please justify the 60 mph wind speed presented in Table 2.3.1-202.

c) The maximum annual precipitation period of record listed appears to be incorrect for all four meteorological stations. For example, although the data from Charlotte, NC may have a 127 year period of record, the precipitation amounts reported in the NCDC annual data summaries only provide the most recent 30 year period. Please revise the table as appropriate.

PGN RAI ID #: H-0002

PGN Response to NRC RAI:

a) The fastest mile and peak gust information was not consistently available (or clearly identified) for all locations. As a result, the highest value available that was provided in the climatological records was provided. The indicated value as presented in the table is either the fastest mile or the peak gust, whichever is available and/or higher.

b) The 60-mile per hour (mph) wind speed for Greensboro was obtained from Reference 2.3-202 ("Weather of U.S. Cities," Fourth Edition, 1992). A review of the National Institute of Standards and Technology (NIST) database indicates that, on July 15, 1976, a wind speed of 97 mph was observed (20-foot (ft.) anemometer height). The 60 mph wind speed indicated in FSAR Table 2.3.1-202 will be revised to 97 mph, and the NIST database will be referenced in a future amendment to the FSAR.

c) The maximum annual precipitation values presented in Table 2.3.1-202 were obtained from the Local Climatological Data summaries for the respective observing stations. These summaries contain data only for a 30-year period of record, although the indicated period of record for long-term averages was indicated (for Charlotte/Douglas station) to be 127 years. A review of the Southeast Regional Climate Center website (http://www.sercc.com) identified some higher annual precipitation values from a longer-term period of record.

FSAR Table 2.3.1-202 will be revised in a future amendment to the FSAR to reflect this information, as shown below.

Associated HAR COL Application Revisions:

In FSAR Table 2.3.1-202 (Sheet 1 of 2), under the parameter Wind, the Fastest Mile/Peak Gust value for the Greensboro/Piedmont station will be revised from "60 (Oct. 1995)" to read "97 (July 1996)[b]." A new footnote "b" will also be added to the table, referencing the NIST database.

In FSAR Table 2.3.1-202 (Sheet 2 of 2), under the parameter Precipitation, the table entries will be revised from:

	Station							
Parameter	Charlotte/ Douglas	POR (yrs)	Greensboro/ Piedmont	POR (yrs)	Raleigh-Durham	POR (yrs)	Wilmington	POR (yrs)
Precipitation (in.)								
Maximum annual	57.04 (1979)	127	62.32 (2003)	77	54.15 (1989)	119	72.06 (1999)	134

To read:

	Station							
Parameter	Charlotte/ Douglas	POR (yrs)	Greensboro/ Piedmont	POR (yrs)	Raleigh-Durham	POR (yrs)	Wilmington	POR (yrs)
Precipitation (in.)								
Maximum annual	67.10 (1936)	115	62.32 (2003)	75	64.22 (1936)	116	72.06 (1999)	75

The following reference will be added to the table (using a reference number to be identified at the time the amendment is made):

"Southeast Regional Climate Center, "Historical Climate Summaries for North Carolina," Website, http://www.sercc.com/climateinfo/historical/historical_nc.html, accessed August 20, 2008. "

Attachments/Enclosures:

None.

NCR Letter No.: HAR-RAI-LTR-005

NRC Letter Date: August 18, 2008

NRC Review of Final Safety Analysis Report

NRC RAI #: 02.03.01-3

Text of NRC RAI:

In FSAR Section 2.3.1.2.2, the design-basis tornado maximum wind speed site characteristic for the proposed COL site is given as 230 miles per hour (mi/h); however, in FSAR Table 2.0-201, the same site characteristic is listed as 300 mi/h. Please correct this apparent discrepancy. Also, please include a site characteristic for the maximum pressure differential in FSAR Table 2.0-201.

PGN RAI ID #: H-0003

PGN Response to NRC RAI:

The discussion of design-basis tornado (DBT) maximum wind speed site characteristics in FSAR Section 2.3.1.2.2 identifies the maximum site characteristic wind speeds based on both the original Fujita scale (300 mph) and the Enhanced-Fujita (E-F) scale (230 mph) using NRC's two most recent guidance documents (i.e., Draft Regulatory Guide DG-1143 and Regulatory Guide (RG) 1.76, Revision 1). Progress Energy believes that the use of the higher of the two values (i.e., 300 mph) is appropriate for comparison with the AP 1000 DCD maximum wind speed site parameter, since it is both conservative and consistent with the DCD Site Parameters established for the AP 1000. This same reasoning applies to the maximum pressure drop site characteristic, which is established as 2.0 lb/in^2 in Draft Regulatory Guide DG-1143 and 1.2 lb/in^2 in RG 1.76, Revision 1 and Progress Energy has elected to use the higher of each of the two values as the site characteristic values. Revisions to FSAR Section 2.3.1.2.2 and FSAR Table 2.0-201 will be made in a future amendment, as described below.

Associated HAR COL Application Revisions:

The third to the last paragraph in FSAR Section 2.3.1.2.2 will be revised in a future amendment from:
"These parameters are NRC's published design-basis tornado parameters for the region surrounding the HAR site. They are less stringent than the proposed design criteria for the AP1000 units that will be used for HAR 2 and HAR 3."

To read:
"These parameters are NRC's published design-basis tornado parameters for the region surrounding the HAR site. They are less stringent than the proposed design criteria for the AP1000 units that will be used for HAR 2 and HAR 3. However, since the maximum site characteristics for wind speed and pressure drop associated with the guidance in NRC Draft Regulatory Guide DG-1143 are higher than those in RG 1.76, Revision 1, those values will be used as the maximum site characteristics for comparison with the DCD site parameters in FSAR Table 2.0-201."

The HAR Site Characteristics in Table 2.0-201 (Sheet 1 of 9) under the category of "Tornado" will be revised from:

"300 mph"

To read:

"300 mph
Maximum pressure differential of 2.0 lb/in^2"

Attachments/Enclosures:

None.

NCR Letter No.: HAR-RAI-LTR-005

NRC Letter Date: August 18, 2008

NRC Review of Final Safety Analysis Report

NRC RAI #: 02.03.01-4

Text of NRC RAI:

The following request for additional information relates to the site characteristic 3-second gust wind speed that represents a 100-year return period for the Harris site, as discussed in FSAR Section 2.3.1.2.2. Using the Structural Engineering Institute/American Society of Civil Engineers (SEI/ASCE) 7-05, "Minimum Design Loads for Buildings and Other Structures," an estimate of 96 miles per hour (mi/h) was proposed.

a) General Design Criteria (GDC) 2 to Appendix A to 10 CFR Part 50 states that structures, systems, and components (SSCs) important to safety shall be designed to withstand the effects of natural phenomena such as extreme winds without loss of capability to perform their safety functions. GDC 2 further states that the design bases for these SSCs shall reflect appropriate consideration of the most severe of the natural phenomena that have been historically reported for the site and surrounding area, with sufficient margin for the limited accuracy, quantity, and period of time in which the historical data have been accumulated. Similarly, 10 CFR 52.79(a)(iii) states that the COL FSAR must identifying the most severe of the natural phenomena that have been historically reported for the site and surrounding area.

Along with the SEI/ASCE 7-05 design standard, the staff also considered historical wind data from the National Institute of Standards and Technology (NIST) and Texas Tech. These data are available at http://www.itl.nist.gov/div898/winds/nistttu.htm. A database of peak gust wind speeds is available for certain cities, including Charlotte, Greensboro, and Raleigh-Durham. In July, 1976 a peak 3-second wind gust of 97 mi/h was recorded at Greensboro, NC.

Please justify why the peak 3-second wind gust site characteristic value for safety-related SSCs is not based on the most severe wind gust that has historically been reported in the vicinity of the Harris site.

PGN RAI ID #: H-0004

PGN Response to NRC RAI:

Please see the response to RAI 02.03.01-2, which confirms that the highest observed peak gust in the region is 97 miles per hour (mph) as observed at Greensboro in 1976. FSAR Table 2.0-201 will be revised to include this value in a future amendment to the document.

Associated HAR COL Application Revisions:

The peak 3-second gust site characteristic in FSAR Table 2.0-201 (Sheet 1 of 9) will be revised from:

"96 mph (3 second gust)"

To read:

"97 mph (3 second gust)"

Attachments/Enclosures:

None.

NCR Letter No.: HAR-RAI-LTR-005

NRC Letter Date: August 18, 2008

NRC Review of Final Safety Analysis Report

NRC RAI #: 02.03.01-5

Text of NRC RAI:

Please clarify the following statement from FSAR Section 2.3.1.2.3:

"*Mean annual probabilities of occurrence of measurable winter weather precipitation in Raleigh-Durham are 1.27 cm (0.5 in.), 3.30 cm (1.3 in.), and 1.78 cm (0.7 in.) for freezing rain, sleet, and snowfall, respectively. These probabilities correspond to an expected annual occurrence of measurable precipitation in Raleigh-Durham of approximately 100 percent, 77 percent, and 100 percent for freezing rain, sleet, and snowfall, respectively.*"

This statement is confusing because 1.27 cm, 3.30 cm, and 1.78 cm are not probabilities.

PGN RAI ID #: H-0005

PGN Response to NRC RAI:

The FSAR should state occurrences rather than probabilities in the sentence that provides winter weather precipitation amounts. The text will be revised in a future amendment to the FSAR.

Associated HAR COL Application Revisions:

The second and third sentences of FSAR Subsection 2.3.1.2.3 "Heavy Snow and Severe Glaze Storms" will be revised from:

"Mean annual probabilities of occurrence of measurable winter weather precipitation in Raleigh-Durham are 1.27 cm (0.5 in.), 3.30 cm (1.3 in.), and 1.78 cm (0.7 in.) for freezing rain, sleet, and snowfall, respectively. These probabilities correspond to an expected annual occurrence of measurable precipitation in Raleigh-Durham of approximately 100 percent, 77 percent, and 100 percent for freezing rain, sleet, and snowfall, respectively (Reference 2.3-218)."

To read:

"Mean annual occurrences of measurable winter weather precipitation in Raleigh-Durham are 1.27 cm (0.5 in.), 3.30 cm (1.3 in.), and 1.78 cm (0.7 in.) for freezing rain, sleet, and snowfall, respectively. The probability of occurrence of measurable precipitation in Raleigh-Durham is 100 percent, 77 percent, and 100 percent for freezing rain, sleet, and snowfall, respectively (Reference 2.3-218)."

Attachments/Enclosures:

None.

NCR Letter No.: HAR-RAI-LTR-005

NRC Letter Date: August 18, 2008

NRC Review of Final Safety Analysis Report

NRC RAI #: 02.03.01-6

Text of NRC RAI:

FSAR Section 2.3.1.2.4 states that sustained hurricane force winds have not been recorded at the Raleigh-Durham weather station and wind and precipitation from hurricanes can be expected to be no greater than those produced by severe thunderstorms.

a) Please justify this statement considering that there have been 27 hurricanes that have passed within 100 nautical miles of Wake County, NC, as shown in the attachment 1.

b) Consistent with NUREG-0800, Section 2.3.1, please provide the annual frequency of hurricanes that have occurred in the vicinity of the Harris site in FSAR Section 2.3.1.2.4.

PGN RAI ID #: H-0006

PGN Response to NRC RAI:

a) Progress Energy agrees that a number of hurricane tracks have been observed to pass within 100 nautical miles of Wake County. The State Climate Office of North Carolina (information available at: http://www.nc-climate.ncsu.edu/climate/hurricane.php) reports that there have been 48 reported hurricanes and tropical storms that have made direct landfall in North Carolina during the period 1857 to 2005. A review of the NOAA Coastal Services Center website (information available at: http://maps.csc.noaa.gov/hurricanes/) indicates that only four hurricanes rated Category 2-5 have passed within 50 nautical miles of Wake County and that only 11 hurricanes rated Category 2-5 have passed within 100 nautical miles of Wake County. However, it is noted that the region of maximum winds in a hurricane, especially over land, can be relatively localized near the center of the storm. The available climatological information, as summarized in FSAR Table 2.3.1-202, indicates that the fastest recorded peak gust for Raleigh-Durham is 60 miles per hour (mph). The other regional stations, namely Charlotte-Douglas, Greensboro, and Wilmington, have recorded hurricane force winds of 87, 97, and 78 mph, respectively and 97 mph is proposed as the peak 3-second gust site characteristic (see response to RAI 02.03.01-2). It is reasonable to expect that hurricane force winds could be experienced at the HAR site as a result of the occurrence of landfalling hurricanes in the future.

Also refer to the response to HAR RAI 02.03.01-2, which provides an update to FSAR Table 2.3.1-202, specifically with regard to peak gust information for the regional observing stations that surround the HAR site.

b) Based on the information provided in the response to part a) of this RAI, there have been 48 reported hurricanes and tropical storms that have made direct landfall in North Carolina during the period 1857 to 2005, which corresponds to an average frequency of occurrence of 0.32 storms per year. During this same period, there have also been four Category 2-5 storm tracks that have passed within 50 nautical miles of Wake County and 11 Category 2-5 storm tracks that have passed within 100 nautical miles of Wake County.

Associated HAR COL Application Revisions:

The first two sentences of FSAR Subsection 2.3.1.2.4 will be revised in a future amendment from:

"Hurricanes have been observed in coastal areas of North Carolina, which lies along the Atlantic Coast of the eastern United States. Sustained hurricane force winds (greater than 119 km/h [74 mph]) have not been recorded at the Raleigh-Durham weather station."

To read:

"Hurricanes have been observed in coastal and inland areas of North Carolina. While sustained hurricane force winds (greater than 119 km/h [74 mph]) have not been recorded at the Raleigh-Durham weather station, climatological and storm-event records indicate that a number of hurricane tracks have passed within 100 nautical miles of the HAR site."

The last sentence of FSAR Subsection 2.3.1.2.4 will be deleted in a future amendment, which currently reads as follows:

"As would be expected at this location, the intensities of wind and precipitation are generally no greater than those produced by severe thunderstorms."

The following paragraph will be added to the end of FSAR Subsection 2.3.1.2.4 in a future amendment:

"The State Climate Office of North Carolina reports that there have been 48 reported hurricanes and tropical storms that have made direct landfall in North Carolina during the period 1857 to 2005, which corresponds to an annual average frequency of occurrence of 0.32 storms per year. The NOAA Coastal Services Center reports that only four hurricanes rated Category 2-5 have passed within 50 nautical miles of Wake County and that only 11 hurricanes rated Category 2-5 have passed within 100 nautical miles of Wake County during the same period. "

A reference to the above described sources of information, which are available at the following websites will be provided at the time of the amendment:

http://www.nc-climate.ncsu.edu/climate/hurricane.php

http://maps.csc.noaa.gov/hurricanes/

Attachments/Enclosures:

None.

NCR Letter No.: HAR-RAI-LTR-005

NRC Letter Date: August 18, 2008

NRC Review of Final Safety Analysis Report

NRC RAI #: 02.03.01-7

Text of NRC RAI:

Please clarify in FSAR Sections 2.3.1 through 2.3.5 whether one or two natural draft cooling towers are proposed. FSAR Sections 2.3.1.2.5, 2.3.2.2, 2.3.2.2.2, and 2.3.2.2.3 stated that only one tower is being proposed, while FSAR Section 2.3.3.1 and FSAR Figure 2.3.3-201 indicated that two cooling towers are proposed.

PGN RAI ID #: H-0007

PGN Response to NRC RAI:

Two cooling towers will be used, one for each of HAR Units 2 and 3. The text of FSAR Subsections 2.3.1.2.5, 2.3.2.2, 2.3.2.2.2, and 2.3.2.2.3 will be revised in a future amendment to clarify that there will be two cooling towers, one for each of HAR Units 2 and 3.

Associated HAR COL Application Revisions:

FSAR Subsections 2.3.1.2.5, 2.3.2.2, 2.3.2.2.2, and 2.3.2.2.3 will be revised to clarify that there will be two new natural draft cooling towers, one for each of HAR Units 2 and 3.

Attachments/Enclosures:

None.

NCR Letter No.: HAR-RAI-LTR-005

NRC Letter Date: August 18, 2008

NRC Review of Final Safety Analysis Report

NRC RAI #: 02.03.01-8

Text of NRC RAI:

The staff noted several design-basis temperatures listed as "not available" in FSAR Table 2.3.1-206. Please clarify further why these temperatures can not be derived or at least estimated, or subsequently please specify why these temperatures are not necessary.

PGN RAI ID #: H-0008

PGN Response to NRC RAI:

FSAR Subsection 2.3.1.2.7 "Ambient Air Temperatures" and the associated Table 2.3.1-206 have been revised for clarification and will be included in a future amendment to the FSAR. The revised FSAR Subsection 2.3.1.2.7 provides a more direct comparison with the Maximum Safety, Maximum Normal, Minimum Safety, and Minimum Normal design parameters specified in the DCD. The revised FSAR Table 2.3.1-206 now only indicates "NA" (not applicable) for information which is not required as a design basis by the DCD.

Associated HAR COL Application Revisions:

The entire contents of FSAR Subsection 2.3.1.2.7 "Ambient Air Temperatures" will be replaced with the following text in a future amendment:

2.3.1.2.7 Ambient Air Temperatures

A summary of the ambient air temperatures at the major meteorological observing stations surrounding the HAR site (i.e., Charlotte/Douglas, Greensboro, and Raleigh-Durham) is provided in Table 2.3.1-206 for the following frequencies of occurrence of dry and wet bulb temperature:

Maximum Temperatures:

- 0-percent Occurrence
- 0.4-percent Occurrence
- 1.0-percent Occurrence
- 2.0-percent Occurrence
- "Maximum Safety" (DCD Site Parameter)
- "Maximum Normal" (DCD Site Parameter)

Minimum Temperatures:

- 97.5-percent Occurrence
- 99.0-percent Occurrence
- 99.6-percent Occurrence
- 100-percent Occurrence
- "Minimum Safety" (DCD Site Parameter)

"Minimum Normal" (DCD Site Parameter)

The "Maximum Safety" temperatures for Raleigh-Durham in Table 2.3.1-206 were developed using over 50 years of temperature observations and statistical regression techniques to estimate temperatures for a 100-year period. Observed temperature data and statistics were obtained from NOAA EWD data (Reference 2.3-217), NOAA SAMSON data (Reference 2.3-220), and the ASHRAE fundamentals handbook (Reference 2.3-227). The results are provided for comparison with the AP1000 DCD site parameters as listed in DCD Table 2-1. A discussion of each of the DCD site parameters for air temperature is provided in the subsections below.

2.3.1.2.7.1 Maximum Safety Dry Bulb and Coincident Wet Bulb Temperature

This DCD site parameter is represented by a single data pair consisting of a maximum dry bulb temperature of 115°F (minimum of 2 consecutive hours), and a coincident (same 2-hour period) wet bulb temperature of 86.1°F. The estimated Maximum Safety 100-year recurrent dry bulb and coincident wet bulb temperature data pair for Raleigh-Durham (the closest and most representative station) is shown in Table 2.3.1-206 to be 106.6/73.6°F. When compared with the DCD site parameter data pair of 115/86.1°F, these values are seen to be bounded by the DCD site parameter and well below the Maximum Safety DCD limits. Although not calculated for the Charlotte/Douglas and Greensboro stations, a comparison of other temperature measurements in Table 2.3.1-206 from those stations with the Raleigh-Durham data indicates that estimated Maximum Safety values at those stations would also be well below the DCD Maximum Safety limit.

2.3.1.2.7.2 Maximum Safety Wet Bulb Temperature (Non-Coincident)

This DCD site parameter is represented by a maximum wet bulb temperature of 86.1°F that exists for a minimum of 2 consecutive hours. The estimated Maximum Safety 100-year recurrent non-coincident wet bulb temperature for Raleigh-Durham is 83.5°F, Raleigh-Durham) and is well below the DCD site parameter value of 86.1°F. Although higher wet bulb temperatures are reported in Table 2.3.1-206 (0 percent occurrence values), those values are not representative of a consecutive 2-hour period.

2.3.1.2.7.3 Maximum Normal Dry Bulb and Coincident Wet Bulb Temperature

This DCD site parameter is represented by a single data pair consisting of a maximum dry bulb temperature of 101°F, excluding the highest 1 percent of values, in combination with a coincident (same hour) wet bulb temperature of 80.1°F. The Maximum Normal temperatures in Table 2.3.1-206 are well below the Maximum Normal DCD site parameter of 101°F dry bulb/80.1°F coincident wet bulb, with the highest observed values being 91°F dry bulb/75°F wet bulb (Raleigh-Durham).

2.3.1.2.7.4 Maximum Normal Wet Bulb Temperature (Non-Coincident)

This DCD site parameter is represented by a maximum wet bulb temperature of 80.1°F, excluding the highest 1 percent of values. The highest Maximum Normal wet bulb temperature in Table 2.3.1-206 is 77°F (Raleigh-Durham).

2.3.1.2.7.5 Minimum Safety Dry Bulb Temperature

This DCD site parameter is represented by a minimum dry bulb temperature of -40°F that exists for a minimum of 2 consecutive hours. The estimates of Minimum Safety temperatures that are provided in Table 2.3.1-206 are well above the DCD site parameter, with the lowest estimated Minimum Safety dry bulb temperature being only -11°F (Greensboro).

2.3.1.2.7.6 Minimum Normal Dry Bulb Temperature

This DCD site parameter is represented by a minimum dry bulb temperature of -10°F, excluding the lowest 1 percent of values. The Minimum Normal temperatures in Table 2.3.1-206 are well above the DCD site parameter of -10°F dry bulb. The lowest Minimum Normal dry bulb temperature shown in the table is only 19°F (Greensboro).

The entire contents of FSAR Table 2.3.1-206 "Summary of Dry and Wet Bulb Temperature Observations for Charlotte/Douglas, Greensboro, and Raleigh-Durham, North Carolina" will be replaced with the following table in a future amendment:

Attachments/Enclosures:

None.

Table 2.3.1-206
Ambient Dry and Wet Bulb Temperature Observations for Charlotte/Douglas, Greensboro and Raleigh-Durham, North Carolina

Maximum and Minimum Dry Bulb Temperatures (with Coincident Wet Bulb Temperatures) (°F)

	Charlotte/Douglas		Greensboro		Raleigh-Durham	
	Dry Bulb	Coincident Wet Bulb	Dry Bulb	Coincident Wet Bulb	Dry Bulb	Coincident Wet Bulb
Maximum Temperatures						
0% Occurrence	103	75	103	73	104	72
0.4% Occurrence	94	75	93	75	93	76
1.0% Occurrence	91	74	90	74	91	75
2.0% Occurrence	89	73	88	73	89	75
"Maximum Safety" [a]	(e)	(e)	(e)	(e)	106.6	73.6
"Maximum Normal" [b]	91	74	90	74	91	75
Minimum Temperatures						
97.5% Occurrence	28	25	24	21	26	23
99.0% Occurrence	23	20	19	17	20	18
99.6% Occurrence	19	17	14	12	16	14
100% Occurrence	-5	-7	-8	-10	-7	-9
"Minimum Safety" [c]	-11	NA	-13	NA	-13	NA
"Minimum Normal" [d]	23	NA	19	NA	20	NA

Maximum Wet Bulb Temperatures (with Coincident Dry Bulb Temperatures) (°F)

	Charlotte/Douglas		Greensboro		Raleigh-Durham	
	Wet Bulb	Coincident Dry Bulb	Wet Bulb	Coincident Dry Bulb	Wet Bulb	Coincident Dry Bulb
0% Occurrence	89	81	89	81	92	83
0.4% Occurrence	77	88	77	87	78	88
1.0% Occurrence	76	87	76	86	77	86
2.0% Occurrence	75	85	75	85	76	85
"Maximum Safety" [a]	(e)	(e)	(e)	(e)	83.5	NA
"Maximum Normal" [b]	76	NA	76	NA	77	NA

a) "Maximum Safety" temperatures are 100-yr estimates based on available POR and a regression analyses.
b) "Maximum Normal" temperatures are based 24-year POR from Reference 2.3-217.
c) "Minimum Safety" temperatures are 100-year estimates based on a 30-year POR from Reference 2.3-227.
d) "Minimum Normal" temperatures are based on 24-year POR from Reference 2.3-217.
e) Maximum Safety values not calculated for these stations.

°F = degrees Fahrenheit; NA = Not Applicable per AP1000 DCD
Sources: References 2.3-217, 2.3-220, and 2.3-227

NCR Letter No.: HAR-RAI-LTR-005

NRC Letter Date: August 18, 2008

NRC Review of Final Safety Analysis Report

NRC RAI #: 02.03.01-9

Text of NRC RAI:

In accordance with NUREG-0800, Section 2.3.1, please identify the site's Air Quality Control Region (AQCR). Also, please describe any potential impact on plant operation due the nonattainment status for 8-hour ozone in Wake County, NC.

PGN RAI ID #: H-0009

PGN Response to NRC RAI:

As described in FSAR Subsection 2.3.1.2.6, the North Carolina Department of Environment and Natural Resources, Division of Air Quality, is organized into seven regions for the purpose of controlling air quality in the state. The proposed facility will be located in Wake County, which is in the state's Raleigh Region. Wake County has recently been re-designated as attainment for ozone, eliminating the potential for any nonattainment area permitting requirements (information available at: http://www.epa.gov/oar/oaqps/greenbk/ancl.html#NORTH%20CAROLINA). Since Wake County has been re-designated as attainment for 8-hour ozone, there will be no potential impacts on plant operation due to nonattainment area permitting requirements.

Associated HAR COL Application Revisions:

None.

Attachments/Enclosures:

None.

NCR Letter No.: HAR-RAI-LTR-005

NRC Letter Date: August 18, 2008

NRC Review of Final Safety Analysis Report

NRC RAI #: 02.03.01-10

Text of NRC RAI:

Currently, FSAR Table 2.0-201 lists the maximum safety noncoincident wet bulb temperature as 82.8 °F based on a zero percent exceedance from the data available. To adequately account for cyclical extremes, please base this site characteristic on an estimated 100-year period of record. An acceptable technique, which uses a Gumbel Distribution, is presented in Chapter 27 of the 2001 ASHRAE Handbook ("Fundamentals").

PGN RAI ID #: H-0012

PGN Response to NRC RAI:

Estimates of the 100-year return interval Maximum Safety temperatures were made using over 50 years of data and statistical regression techniques. The results are provided in the response to RAI 02.03.01-8. The revised Maximum Safety noncoincident wet bulb temperature is 83.5 °F. Table 2.0-201 will be revised in a future amendment to the FSAR to reflect this and other changes, as well as to incorporate recent revisions to the DCD Site Parameters for Air Temperature.

See also the response to RAI 02.03.01-08.

Associated HAR COL Application Revisions:

The "Air Temperature" section of FSAR Table 2.0-201 will be revised as indicated in Table 2.0-201 (Sheet 1 of 9) as shown below.

Attachments/Enclosures:

None.

HAR SUP 2.0-1

Table 2.0-201 (Sheet 1 of 9)
Comparison of AP1000 DCD Site Parameters
and Shearon Harris Nuclear Power Plant Units 2 and 3 Site Characteristics

	AP 1000 DCD Site Parameters	HAR Site Characteristics	HAR Site Characteristic Reference	Bounding Yes/No
Air Temperature				
Maximum Safety[a]	115°F dry bulb / 86.1°F coincident wet bulb	106.6°F dry-bulb/73.6°F coincident wet-bulb (100-year return estimate of 2-hour duration, 0% exceedance value)	FSAR 2.3.1.2.7	Yes
	86.1°F wet bulb (noncoincident)	83.5°F wet bulb (noncoincident) (Frequency of occurrence 0% for period of available record)	FSAR 2.3.1.2.7	Yes
Minimum Safety[a]	-40°F	-11°F (100 yr. return period)	FSAR 2.3.1.2.7	Yes
Maximum Normal[b]	101°F dry bulb / 80.1°F coincident wet bulb	91°F dry bulb / 75°F coincident wet bulb	FSAR 2.3.1.2.7	Yes
	80.1°F wet bulb (noncoincident)[c]	77°F wet bulb (noncoincident)	FSAR 2.3.1.2.7	Yes
Minimum Normal[b]	-10°F	19°F dry bulb	FSAR 2.3.1.2.7	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) (Maximum sustained wind speed 100 mph; importance factor 1.15; exposure C; topographic factor 1.0)	FSAR 2.3.1.2.2	Yes
Tornado	300 mph Maximum pressure differential of 2.0 lb/in^2	300 mph	FSAR 2.3.1.2.2	Yes

NCR Letter No.: HAR-RAI-LTR-005

NRC Letter Date: August 18, 2008

NRC Review of Final Safety Analysis Report

NRC RAI #: 02.03.01-11

Text of NRC RAI:

The staff cautions against the use of the NCDC Storm Events Database because many severe weather reports are often incomplete or missing as the period of record considered increases. The following graph shows the annual number of hail events that have occurred in Wake County, NC. Note the increase in the number of reported events in attachment 1. Please revise FSAR Section 2.3.1.2.3 to account for this data, or justify another alternative.

PGN RAI ID #: H-0013

PGN Response to NRC RAI:

It is assumed that the FSAR subsection referred to in the comment should be FSAR Subsection 2.3.1.2.1 "Thunderstorms, Hail, and Lightning." It is acknowledged that there has been an increase in the reported number of storm events over time primarily as a result of increased reporting efficiency and confirmation skill and that many storms may have been overlooked in the early data collection years. Additionally, the increase in urbanization over the past 50 years has effectively resulted in an increase in the number of reported storms, if for no other reason than there are more targets damaged by hail and thunderstorms in an urban area than in a rural area. As a result, there is a higher frequency of reported incidents in urban areas than in rural areas. The same observation was made with regard to the reported occurrences of tornadoes, as described in FSAR Subsection 2.3.1.2.2 "Tornadoes and Severe Winds." Additional text providing this clarification will be included in FSAR Subsection 2.3.1.2.1 in a future amendment to the FSAR (see below).

Associated HAR COL Application Revisions:

The following text will be added to the end of the third paragraph of FSAR Subsection 2.3.1.2.1 "Thunderstorms, Hail, and Lightning":
"It is noted that there has been a significant increase in the reported number of hail events over time, primarily as a result of increased reporting efficiency and confirmation skill and that many storms may have been overlooked in the early data collection years. Additionally, the increase in urbanization over the past 50 years has effectively resulted in an increase in the number of reported storms, if for no other reason than there are more targets damaged by hail and thunderstorms in an urban area than in a rural area. As a result, there is a higher frequency of reported storms in urban areas than in rural areas. While 182 hail storms were reported in Wake County over the period 1950 to 2006, more recent storm reports (Reference 2.3-209) indicate that there is a greater frequency of reported storms in more recent years."

Attachments/Enclosures:

None.