



Serial: NPD-NRC-2009-180  
August 6, 2009

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  
SUPPLEMENT 2 TO RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION LETTER  
NO. 016 RELATED TO PROBABILISTIC RISK ASSESSMENT AND SEVERE ACCIDENT  
EVALUATION**

- References:
1. Letter from Ravindra G. Joshi (NRC) to James Scarola (PEC), dated September 24, 2008, "Request for Additional Information Letter No. 016 Related to SRP Section 19 for the Harris Units 2 and 3 Combined License Application"
  2. Letter from James Scarola (PEC) to U. S. Nuclear Regulatory Commission, dated October 29, 2008, "Response to Request for Additional Information Letter No. 016 Related to Probabilistic Risk Assessment and Severe Accident Evaluation," Serial: NPD-NRC-2008-047
  3. Letter from Garry D. Miller (PEC) to U. S. Nuclear Regulatory Commission, dated July 6, 2009, "Supplement 1 to Response to Request for Additional Information Letter No. 016 Related to Probabilistic Risk Assessment and Severe Accident Evaluation," Serial: NPD-NRC-2009-130

Ladies and Gentlemen:

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

A revised response to the 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 me at (919) 546-6107.

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

Executed on August 6, 2009.

Sincerely,

A handwritten signature in black ink, appearing to read "Garry D. Miller". The signature is fluid and cursive, with the first name "Garry" being more prominent and the last name "Miller" following in a similar style.

Garry D. Miller  
General Manager  
Nuclear Plant Development

Enclosure

cc : U.S. NRC Region II, Regional Administrator  
U.S. NRC Resident Inspector, SHNPP Unit 1  
Mr. Brian Hughes, U.S. NRC Project Manager

**Shearon Harris Nuclear Power Plant Units 2 and 3  
Supplement 2 to Response to NRC Request for Additional Information Letter No. 016  
Related to SRP Section 19 for the Combined License Application,  
dated September 24, 2008**

<u>NRC RAI #</u>	<u>Progress Energy RAI #</u>	<u>Progress Energy Response</u>
19-1	H-0385 & H-0480	July 6, 2009; NPD-NRC-2009-130 & Supplemental response enclosed – see following pages
19-2	H-0084	NPD-NRC-2008-047; October 29, 2008

**NRC Letter No.:** HAR-RAI-LTR-016

**NRC Letter Date:** September 24, 2008

**NRC Review of Final Safety Analysis Report**

**NRC RAI #:** 19-1

**Text of NRC RAI:**

Part of AP1000 DCD COL Information Item 19.59.10-2 calls for the following action by COL applicants:

The Combined License applicant will confirm that the High Winds, Floods, and Other External Events analysis documented in Section 19.58 is applicable to the COL site. Further evaluation will be required if the COL site is shown to be outside of the bounds of the High Winds, Floods, and Other External Events analysis documented in Section 19.58.

The above requirement is replaced by the following words in STD COL 19.59.10-2:

It has been confirmed that the High Winds, Floods, and Other External Events analysis documented in Section 19.58 is applicable to the site...

Please provide supporting information or appropriate references that ensure that all of the key site-related assumptions in the Section 19.58 External Events analyses are valid for the Harris site.

**PGN RAI ID #:** H-0480

**PGN Response to NRC RAI:**

Progress Energy has revisited the assessment of tornado strike probability for the HAR site that is provided in FSAR Rev. 1 Subsection 2.3.1.2.2 "Tornadoes and Severe Winds" as part of the response to RAI 19-1. Based on this review, Progress Energy has concluded that a revision to the analysis is justified to better reflect the potential for tornado strikes in the vicinity of the site. The following response to RAI 19-1 is provided as a supplement to the previous response (see PEC letter dated July 6, 2009; Serial: NPD-NRC-2009-130).

A discussion of the probability of occurrence of a tornado strike for the HAR site is provided in HAR FSAR Rev. 1 Subsection 2.3.1.2.2, "Tornadoes and Severe Winds." This probability was determined using the following empirical relationship:

$$P_s = \bar{n} \left( \frac{a}{A} \right)$$

where

$P_s$  = Probability that a tornado will strike a particular location during a 1-year interval.

- $\bar{n}$  = Average number of tornadoes per year (i.e., equal to 1.46 for the eight-county area containing and surrounding the HAR site, as calculated from Table 2.3.1-204).
- $a$  = Average individual tornado area, equal to 0.813 square kilometers ( $\text{km}^2$ ) (0.314 square miles [ $\text{mi.}^2$ ]) for the HAR site, as calculated from Table 2-14 in NUREG/CR-4461, Rev. 2.
- $A$  = Total area of concern (e.g.,  $1^\circ$  square at  $35^\circ 30'$  mid/latitude) equal to 10,078  $\text{km}^2$  (3891.15  $\text{mi.}^2$ ).

Using this equation, the tornado strike probability (for a tornado of any intensity) for the HAR site,  $P_s$ , is estimated to be 0.000118, which corresponds to a return frequency of once in 8475 years.

Based on Progress Energy's review of the assessment provided in HAR FSAR Rev. 1 Subsection 2.3.1.2.2, "Tornadoes and Severe Winds" the following revisions have been determined to be appropriate:

- The average individual tornado area was revised to include a weighted adjustment of the expected individual tornado area from NUREG/CR-4461, Rev. 2 by the tornado occurrences provided in FSAR Table 2.3.1-204. This results in a calculated average individual tornado area of 1.093 square kilometers ( $\text{km}^2$ ) (0.422 square miles [ $\text{mi.}^2$ ]) for the HAR site.
- The total area of concern is being revised from a  $1^\circ$  square at  $35^\circ 30'$  mid/latitude to the land area of the eight counties comprising and immediately surrounding the HAR site. This results in a total area of concern of 11,283  $\text{km}^2$  (4356.5  $\text{mi.}^2$ ).

Using these revised values for the average individual tornado area and the total area of interest, the tornado strike probability (for a tornado of any intensity) for the HAR site,  $P_s$ , is estimated to be  $1.41\text{E-}4$  /year, which corresponds to a return frequency of once in 7071 years.

These above described revisions will be incorporated into a future revision of the HAR FSAR.

#### **Associated HAR COL Application Revisions:**

The following text in HAR FSAR Rev. 1 Subsection 2.3.1.2.2, "Tornadoes and Severe Winds," will be revised from:

- $a$  = Average individual tornado area, equal to 0.813 square kilometers ( $\text{km}^2$ ) (0.314 square miles [ $\text{mi.}^2$ ]) for the HAR site, as calculated from Table 2-14 in NUREG/CR-4461, Rev. 2.
- $A$  = Total area of concern (e.g.,  $1^\circ$  square with  $35^\circ 30'$  mid/latitude) equal to 10,078  $\text{km}^2$  (3891.15  $\text{mi.}^2$ ).

Using this equation, the tornado strike probability (for a tornado of any intensity) for the HAR site,  $P_s$ , is estimated to be 0.000118, which corresponds to a return frequency of once in 8475 years.

to read:

$a$  = Average individual tornado area, equal to 1.093 square kilometers ( $\text{km}^2$ ) (0.422 square miles [ $\text{mi}^2$ ]) for the HAR site. This calculation weights the expected individual tornado area from NUREG/CR-4461 Rev. 2, Table 2-14 by the tornado occurrences in Table 2.3.1-204.

$A$  = Total area of concern (i.e., eight county area equal to 11,283  $\text{km}^2$  (4356.5  $\text{mi}^2$ )).

Using this equation, the tornado strike probability (for a tornado of any intensity) for the HAR site,  $P_s$ , is estimated to be  $1.41\text{E-}4$  /year, which corresponds to a return frequency of once in 7071 years.

**Attachments/Enclosures:**

None.