**Progress Energy**

**James Scarola**
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Serial: NPD-NRC-2008-047
October 29, 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. 016 RELATED TO PROBABILISTIC RISK ASSESSMENT AND SEVERE ACCIDENT EVALUATION**

Reference: 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"

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 October 29, 2008.

Sincerely,

James Scarola

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

| NRC RAI # | Progress Energy RAI # | Progress Energy Response |
|---|---|---|
| 19-1 | H-0083 | Response enclosed – see following pages |
| 19-2 | H-0084 | Response enclosed – see following pages |

**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-0083

**PGN Response to NRC RAI:**

The external events of interest are described in Section 19.58, "Winds, Floods, and Other External Events," of the Combined Operating License (COL) which incorporates Section 19.58 of the Design Control Document (DCD) with no departure or supplement. The text of DCD Section 19.58 is updated by the AP1000 Standard COL Technical Report, APP-GW-GLR-101, which addresses the following external events for DCD Section 19.58.2, "External Events Analysis":

19.58.2.1 Severe Winds and Tornadoes
19.58.2.2 External Floods
19.58.2.3 Transportation and Nearby Facility Accidents
19.58.2.3.1 Aviation Accidents
19.58.2.3.2 Marine Accidents
19.58.2.3.3 Pipeline Accidents
19.58.2.3.4 Railroad and Truck Accidents

The table below provides the Harris specific event frequencies for the above events except for the section 19.58.2.3.1, Aviation Accidents, which will be provided later in a supplemental response to NRC RAI letter 007.

| Category | Event | Applicable to Site? | Explanation of Applicability Evaluation | Event Frequency |
|---|---|---|---|---|
| High winds | F0 Tornado | Y | From the data covering 56.7 years in COL Table 2.3.1-204, the number of each type of tornado as recorded by NOAA for the eight counties (total of 4356 $mi^2$) containing and surrounding the Harris site was identified. For each type of tornado, the event frequency was estimated from the product of the number of tornadoes divided by the number of years and the expected area of a tornado from Table 2-14 of NUREG/CR-4461 divided by the total area of the counties. | 2.66E-06 |
| | F1 Tornado | Y | | 2.57E-05 |
| | F2 Tornado | Y | | 4.38E-05 |
| | F3 Tornado | Y | | 4.34E-05 |
| | F4 Tornado | Y | | 2.62E-05 |
| | F5 Tornado | Y | There being no recorded occurrence of an F5 tornado in COL Table 2.3.1-204 or the NOAA National Climatic Data Center website, the event frequency was estimated to be the same as for an F4 tornado. | 2.62E-05 |
| | Category 1 Hurricane | Y | From data covering 157 years on the NOAA Coastal Services Center website, the number of hurricanes of each category coming within 100 nautical miles of the Harris site was identified. The event frequency was estimated from number of hurricanes divided by the number of years. | 5.73E-02 |
| | Category 2 Hurricane | Y | | 3.82E-02 |
| | Category 3 Hurricane | Y | | 1.91E-02 |
| | Category 4 Hurricane | Y | There being no recorded occurrence of a Category 4 or Category 5 hurricane within 100 nautical miles of the Harris site in the data covering 157 years on the NOAA Coastal Services Center website, the event frequency was estimated based on the assumed occurrence of one such hurricane during the next 157 years. | 3.18E-03 |
| | Category 5 Hurricane | Y | | 3.18E-03 |
| | Extratropical Cyclones | Y | From data covering 58.5 years on the NOAA National Climatic Data Center website, the number of thunderstorms and high wind events for the eight counties containing and surrounding the Harris site was identified. The event frequency was estimated from dividing that number by the number of years. | 1.44E-02 |
| External Flood | External Flood | Y | At 140 miles from the Atlantic coast and a grade elevation of 260 feet NGVD29 (COL Section 2.4.5), elimination, by engineering judgment, of the flooding related to storm surges from a Category 5 hurricane (DCD Section 19.58.2.2) was considered appropriate for Harris. COL Section 2.4.4 indicates no dams upstream or downstream of the Harris lake that could affect safety-related facilities. The sensitivity analysis in DCD | 1E-7 |

| Category | Event | Applicable to Site? | Explanation of Applicability Evaluation | Event Frequency |
|---|---|---|---|---|
| | | | Section 19.58.2.2 for flooding-induced failure of the switchyard and non-safety structures was considered bounding for the Harris site based on the resulting conditional core damage probability. For flood-induced failure of safety-related structures and facilities, the evaluation of the applicability of the key site-related assumptions for external flooding comprised the probable maximum flood analysis described in COL Table 2.0-201 and confirmation of conformance to site selection criteria. | |
| Transportation and Nearby Facility Accidents | Aviation Accident | Y | The aviation hazards analysis, to which Progress Energy committed in response to NRC RAI letter 007 dated 8-21-08, has not been completed. (Reference: Progress Energy letter dated 9-17-08, serial NPD-NRC-2008-033.) | TBD |
| | Marine Accident | N | DCD 19.58.2.3.2 indicates that only sites with large waterways with ship and/or barge traffic that goes through or near the site need to consider marine accidents. COL Section 2.2.2.4 indicates that the Cape Fear River north of Fayetteville is not navigable by barges or large boats. | N/A |
| | Pipeline Accident | Y | COL Section 2.2.3.1.2 concluded that the explosion and fire caused by the ignition of a dense gas cloud released by the rupture of a nearby pipeline would not result in damage to critical facilities that could impede the continued safe operation or prevent safe shutdown of the plant. With regard to toxicity of released material, the same AP1000 design features, which are described in DCD Section 19.58.2.3.3 and which were shown to be unimportant in the Marine Accident evaluation (DCD Section 19.58.2.3.4), are applicable for the Harris site. | 1E-7 |
| | Railroad and Truck Accidents | Y | COL Section 2.2.3.1.1 concluded that no adverse effects are anticipated due to the transport of explosives via railway or roadway. The annual probabilities provided in COL Section 2.2.3.1.3.2 for both severe hazardous chemicals from railcar shipments reaching the Harris site and a significant accidental release for an unknown but toxic shipment are bounded by the value in DCD Section 19.58.2.3.4. | 1E-7 |

**Associated HAR COL Application Revisions:**

No new COLA revisions have been identified associated with this response.

**Attachments/Enclosures:**

None.

**NRC Letter No.:** 016

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

**NRC Review of Final Safety Analysis Report**

**NRC RAI NUMBER:** 19-2

**Text of NRC RAI:**

STD COL 19.59.10-2 states that "The PRA will be updated to reflect these differences [between the as built plant and design used as the basis for the AP1000 PRA and DCD Table 19.59-18] if they potentially result in a significant increase in core damage frequency or large release frequency."

(a) Please clarify how the Harris PRA (to be completed by fuel load) will be updated to account for Harris site-specific information per 10 CFR 52.79(d)(1) and 10 CFR 50.71(h)(1) as well as as-built information.

(b) Please define "significant increase."

**PGN RAI ID #:** H-0084

**PGN Response to NRC RAI:**

(a) The PRA will be updated as described in FSAR Subsection 19.59.10.6. The process for development of the plant specific PRA will include evaluation of plant as-built differences, departures from certified design and the results of the plant specific review of DCD Table 19.59-18. The update process described in FSAR Subsection 19.59.10.6 is consistent with the requirements of 10 CFR 52.79(d)(1) and 10 CFR50.71(h)(1).

(b) Any difference in the AP1000 PRA-based insights of DCD Table 19.59-18 could potentially result in an increase in core damage frequency (CDF) or large release frequency (LRF). Plant specific PRA-based insight differences will be evaluated and the plant specific PRA model modified as necessary to reflect the plant specific design and the PRA-based insight; as such, the FSAR will be revised to remove "significant increase."

**Associated HAR COL Application Revisions:**

The following change will be made to the HAR FSAR in a future amendment:

Revise the second paragraph of FSAR Subsection 19.59.10.5 from:

> "A review of the differences between the as-built plant and the design used as the basis for the AP1000 PRA and DCD Table 19.59-18 will be completed prior to fuel load. The PRA will be updated to reflect these differences if they potentially result in a significant increase in core damage frequency or large release frequency."

To read:

> "A review of the differences between the as-built plant and the design used as the basis for the AP1000 PRA and DCD Table 19.59-18 will be completed prior to fuel load. The plant specific PRA-based insight differences will be evaluated and the plant specific PRA model modified as necessary to account for plant-specific design and any design changes or departures from the design certification PRA."

**Attachments/Enclosures:**

None.