Progress Energy

James Scarola
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Serial: NPD-NRC-2008-054 10CFR52.79
October 31, 2008

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. 023 RELATED TO PROBABLE MAXIMUM FLOOD ON STREAMS AND RIVERS

Reference: Letter from Manny Comar (NRC) to James Scarola (PEC), dated September 26, 2008, "Request for Additional Information Letter No. 023 Related to SRP Section 02.04.03 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.

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 31, 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
Mr. Manny Comar, U.S. NRC Project Manager

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Shearon Harris Nuclear Power Plant Units 2 and 3
Response to NRC Request for Additional Information Letter No. 023 Related to SRP Section 02.04.03 for the Combined License Application, dated September 26, 2008

NRC RAI #	Progress Energy RAI #	Progress Energy Response
02.04.03-4	H-0129	Response enclosed – see following pages

NCR Letter No.: HAR-RAI-LTR-023

NRC Letter Date: September 26, 2008

NRC Review of Final Safety Analysis Report

NRC RAI #: 02.04.03-4

Text of NRC RAI:

Based on discussions with US Army Corps of Engineers personnel, the NRC staff have determined that ETL 1110-2-221 "Wave Runup and Wind Setup on Reservoir Embankments" has been superceded by guidance found in EM 1110-2-1420 "Hydrologic Engineering Requirements for Reservoirs" and guidance found in the Coastal Engineering Manual (EM 1110-2-1100). The staff requests the applicant to show how their current methodology results in a conservative estimate of wind-wave effects.

PGN RAI ID #: H-0129

PGN Response to NRC RAI:

Methodology Used to Estimate Wind-Wave Effects

The methodology used to estimate wind-wave effects in the FSAR adheres to the "Acceptance Criteria" given in the U.S. Nuclear Regulatory Commission's (NRC's) Standard Review Plan (SRP), NUREG-0800, Revision 4 - March 2007, Section 2.4.3 "PROBABLE MAXIMUM FLOOD (PMF) ON STREAMS AND RIVERS". The SRP refers to the following references for determining wind-wave effects:

> *19. ETL 1110-2-221, "Wave Runup and Wind Setup on Reservoir Embankments," U.S. Army Corps of Engineers, November 1976.*
>
> *21. "Hydrology for Engineers," Ray K. Linsley, Jr., Max A. Kohler, and Joseph L. H. Paulhus, McGraw-Hill Book Co., Third Edition, 1982.*

Both of these references describe the analytical procedure for determining wind-wave effects that was followed in the FSAR.

According to EM 1110-2-1420 Chapter 15 "Dam Freeboard Requirements," the computation procedure for wind-wave effects is given as follows:

> ***15-3. Computation of Wave and Wind Tide Characteristics:*** *Effective wind fetch (F_e) for wave generation - The characteristics of wind-generated waves are influenced by the distance that wind moves over the water surface in the "fetch" direction. The generally narrow irregular shoreline of inland reservoirs will have lower waves than open coast because there is less water surface for the wind to act on. The method to compensate for the reduced water surface for an enclosed body of water is computation of an effective fetch. The effective fetch (F_e) adjusts radial lines from the embankment to various points on the reservoir shore. The radials spanning 45 deg on each side of the central radial are adjusted by the cosine (cos) of their angle to the central radial to estimate an average effective fetch.*

It is noted that EM 1110-2-1420 refers to the use of an "effective fetch" instead of a straight line fetch for enclosed bodies of water such as an inland reservoir. The effective fetch procedure described in ETL 1110-2-221 was used in the FSAR analysis to determine the wind-wave effects for the Main and Auxiliary Reservoirs associated with the HAR site. USACE Coastal Engineering Manual (EM 1110-2-1100) describes methods for simplified wave predictions in open waters such as oceans, the Great Lakes, or other large open water bodies. Since EM 1110-2-1100 describes wind-wave effects using a straight line method for coastal waters, this manual was not used to prepare the FSAR.

Description of Conservative Estimate of Wind-Wave Effects

As shown in FSAR Figures 2.4.3-219 through 2.4.3-222, the prevailing wind direction was assumed to be blowing from approximately northwest (NW), northwest (NW), south (S), north (N), south (S), west/northwest (W/NW), and south (S) at location points 1, 2, 3, 4, 5, 6, and 7, respectively, to give the maximum fetch distance. However, climatological records available from the National Climatic Data Center (NCDC) website indicate that the prevailing wind direction is southwest (SW) for all months of the year.

Furthermore, according to EM 1110-2-1420, Chapter 15, Section 15-1, para. b:

> *Estimating freeboard. Freeboard is generally based on maximum probable wind conditions when the reference elevation is the normal operating level. When estimating the freeboard to be used with the probable maximum reservoir level, a lesser wind condition is used because it is improbable that maximum wind conditions will occur simultaneously with the maximum flood level. A first step in wave height determinations is a study of available wind records to determine velocities and related durations and directions. Three basic considerations are generally used in establishing freeboard allowance. These are wave characteristics, wind setup, and wave runup.*

If the above guidelines from EM 1110-2-1420 had been followed, then the southwest (SW) wind direction would have been used to characterize wind-wave effects to compute wind setup and wave run-up for the FSAR. However, review of FSAR Figures 2.4.3-219 through 2.4.3-222 shows that the fetch distance in the SW direction for all seven locations is very small. As a result, an analysis performed in this manner would have resulted in much lower wind-wave effects than those used in the FSAR. Thus, the methodology used in the FSAR gives a conservative estimate of wind-wave effects.

Associated HAR COL Application Revisions:

No COLA revisions have been identified associated with this response.

Attachments/Enclosures:

None.