



**James Scarola**  
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Serial: NPD-NRC-2008-028  
September 5, 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. 002 RELATED TO  
ONSITE METEOROLOGICAL MEASUREMENTS PROGRAMS**

Reference: Letter from Manny Comar (NRC) to James Scarola (PEC), dated August 12, 2008,  
"Request for Additional Information Letter No. 002 Related to SRP Section  
02.03.03 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.

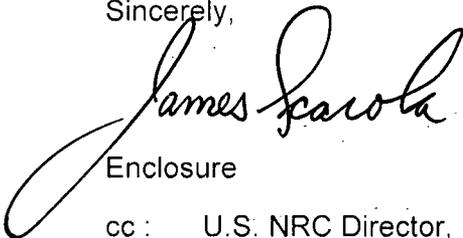
A response to each NRC request is addressed in the enclosure. The enclosure also identifies changes that will be made in a future revision of the Shearon Harris Nuclear Power Plant Units 2 and 3 application.

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 5, 2008.

Sincerely,



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. 002 Related to SRP Section  
02.03.03 for the Combined License Application dated August 12, 2008**

<u>NRC RAI #</u>	<u>Progress Energy RAI #</u>	<u>Progress Energy Response</u>
02.03.03-1	H-0022	Response enclosed – see following pages
02.03.03-2	H-0023	Response enclosed – see following pages
02.03.03-3	H-0024	Response enclosed – see following pages
02.03.03-4	H-0025	Response enclosed – see following pages
02.03.03-5	H-0026	Response enclosed – see following pages
02.03.03-6	H-0027	Response enclosed – see following pages
02.03.03-7	H-0028	Response enclosed – see following pages
02.03.03-8	H-0029	Response enclosed – see following pages
02.03.03-9	H-0030	Response enclosed – see following pages
02.03.03-10	H-0031	Response enclosed – see following pages

**NRC Letter No.:** HAR-RAI-LTR-002

**NRC Letter Date:** August 12, 2008

**NRC Review of Final Safety Analysis Report**

**NRC RAI #:** 02.03.03-1

**Text of NRC RAI:**

During the staff's pre-application readiness assessment visit, the staff noted the presence of trees in certain sectors within a distance of less than 10-times their height to the meteorological tower. The 10-times height criteria is discussed in Regulatory Guide 1.23, Rev. 1. The applicant's onsite staff noted that the trees were to be trimmed to meet this criteria. Please confirm that any trees surrounding the tower will not adversely influence the onsite meteorological measurements.

**PGN RAI ID #:** H-0022

**PGN Response to NRC RAI:**

In 2007, Progress Energy performed some clearing of trees in the area surrounding the meteorological tower to ensure compliance with guidance provided in Regulatory Guide 1.23, Rev. 1 relative to airflow obstructions. There are no trees within 10 obstruction heights of the tower that would adversely influence the meteorological measurements.

**Associated HAR COL Application Revisions:**

No COLA revisions have been identified associated with this response.

**Attachments/Enclosures:**

None.

**NRC Letter No.:** HAR-RAI-LTR-002

**NRC Letter Date:** August 12, 2008

**NRC Review of Final Safety Analysis Report**

**NRC RAI #: 02.03.03-2**

**Text of NRC RAI:**

Please provide the maximum width of the proposed cooling towers. This information is necessary for the staff to confirm that the meteorological measurements will not be adversely affected from the proposed cooling towers.

**PGN RAI ID #: H-0023**

**PGN Response to NRC RAI:**

The existing hyperbolic natural draft cooling tower is 523 feet (ft.) tall with a base diameter of 385 ft. The tower tapers to a diameter of 207 ft. 7 inches (in.) at a height of 381 ft. 9 in. above ground, then flares out to a diameter of 230 ft. diameter at the top. The dimensions of the proposed 600-ft. natural draft cooling towers for HAR Units 2 and 3, which have not yet been designed, can be expected to be proportionally similar to the existing HNP Unit 1 cooling tower. Based on a proportional scaling of the two towers, the new cooling towers are estimated to have a base diameter of 442 ft., a minimum diameter of 240 ft., and a diameter at the top of 265 ft.

**Associated HAR COL Application Revisions:**

No COLA revisions have been identified associated with this response.

**Attachments/Enclosures:**

None.

**NRC Letter No.:** HAR-RAI-LTR-002

**NRC Letter Date:** August 12, 2008

**NRC Review of Final Safety Analysis Report**

**NRC RAI #:** 02.03.03-3

**Text of NRC RAI:**

In accordance with Regulatory Guide 1.206, please include a section in FSAR Section 2.3.3 that summarizes the deviations from Regulatory Guide 1.23, Rev. 1, and provides adequate justification, or justify another alternative.

**PGN RAI ID #:** H-0024

**PGN Response to NRC RAI:**

A detailed summary of all exceptions to Regulatory Guide (RG) 1.23, Rev. 1 is provided in Appendix 1AA "Conformance with Regulatory Guides" of FSAR Chapter 1. Three exceptions were noted, and each is discussed below:

**Exception No. 1:** "RG 1.23, Rev. 1 states that COLs should use consecutive 24 months of data as long as the data are "defendable, representative and complete" and not more than 10 years old at time of COLA submittal. Meteorological data provided are for the 5-year period from March 1, 1994 to February 28, 1999."

As discussed in the third paragraph of FSAR Subsection 2.3.2, the 1994 – 1999 data period is the most recent consecutive period of record available that was based on the scalar average wind speeds. While a portion of the data period exceeds the 10-year guidance, more than 24 months of the data are compliant. Progress Energy therefore considers that the use of the 1994 – 1999 data is justified for use in support of the COLA.

**Exception No. 2:** "RG 1.23, Rev. 1 states that measurements (wind speed and direction and vertical temperature difference) should be made at 10 m and 60 m. HNP/HAR Measurements are made at 12 m and 61 m."

A description of the tower measurement levels is described in Subsection 2.3.2.1.1 of the FSAR, which states the small difference between the existing monitoring levels and the recommended levels in RG 1.23, Rev. 1. It is noted that RG 1.23, Rev. 1 states that "Wind speed and direction should be measured on one open-lattice tower or mast measured at heights of approximately 10 meters (33 feet) and 60 meters (197 feet) above ground level." Progress Energy believes that the measurement levels for wind speed and direction and vertical temperature difference, at 12 and 61 meters, are consistent with the guidance of "approximately" 10 and 60 meters.

**Exception No. 3:** "RG 1.23, Rev. 1 states that the on-site wind data should be compiled into annual joint frequency tables (JFTs). The RG provides Table 3 as a "suitable format for data compilation and reporting." JFTs (Tables 2.3.2-201 through 2.3.2-252) were prepared using a similar format, but with the speed categories recommended by RG 1.23, Rev. 0."

Subsection 2.3.2.1.1 of the FSAR also identifies that the six wind speed categories used in the preparation of the JFTs differ from the 11 wind speed categories that are recommended in Table 3 of RG 1.23, Rev. 1. The JFTs presented in FSAR Tables 2.3.2-201 through 2.3.2-252 (as well as those in Table 2.3.4-202, "Meteorological Input Data for PAVAN Model") were prepared using the six wind speed classes specified in RG 1.23, Rev. 0. This information was used to demonstrate that the HAR facility was bounded by the X/Q Site Parameters in DCD Rev. 16, as described in FSAR Section 2.3.4.2. Given the transitional nature of the RG 1.23 guidance during the preparation of the HAR COLA, Progress Energy also evaluated the impact of using the 11 wind speed categories specified in RG 1.23, Rev. 1 on the

X/Q PAVAN analysis. The results of that analysis were also bounded by the DCD Rev. 16 site parameters for X/Q. Based on these findings, a revision of the JFTs in Tables 2.3.2-201 through 2.3.2-252 did not appear to be justified. However, Progress Energy will reevaluate this exception in a future amendment to the FSAR in accordance with revised DCD requirements and make conforming changes as necessary.

**Associated HAR COL Application Revisions:**

For Exception No. 1, revise the last sentence of the third paragraph of FSAR Section 2.3.2 from: "Additionally, more than 1 year of the data will be less than 10 years old at the time of the submittal of this application."

To read:

"While a portion of the data period exceeds the 10-year guidance, more than 24 months of the data are compliant. Progress Energy therefore considers that the use of the 1994 – 1999 data is justified for use in support of the COLA."

For Exception No. 2, insert the following sentence before the last sentence of the first paragraph of FSAR Section 2.3.2.1.1:

"However, Progress Energy believes that the measurement levels for wind speed and direction and vertical temperature difference, at 12 and 61 meters, are consistent with the guidance of 'approximately' 10 and 60 meters in RG 1:23, Rev.1 and their continued use is therefore justified."

**Attachments/Enclosures:**

None.

**NRC Letter No.:** HAR-RAI-LTR-002

**NRC Letter Date:** August 12, 2008

**NRC Review of Final Safety Analysis Report**

**NRC RAI #:** 02.03.03-4

**Text of NRC RAI:**

Regulatory Guide 1.23 states that moisture measurements height(s) should be representative of water-vapor release and for natural draft cooling towers, atmospheric moisture measurements may be made at the highest measurement level on the meteorological tower. Please clarify how the pre-operational and operational onsite meteorological program complies with this criteria, or justify why meeting the guidance criteria is not necessary.

**PGN RAI ID #:** H-0025

**PGN Response to NRC RAI:**

The height of the existing HNP natural draft cooling tower is 523 feet (ft.) (FSAR Subsection 2.3.3.1), which is approximately 2.6 times the height of the 200-ft. HNP meteorological monitoring tower (FSAR Subsection 2.3.3). The height of the proposed HAR Units 2 and 3 cooling towers is 600 ft. (FSAR Subsection 2.3.2.2.3), which is 3 times the height of the meteorological tower. The HNP meteorological monitoring tower is located approximately 4200 ft. northeast of the existing HNP cooling tower and approximately 3500 ft. east-northeast of the location of the proposed cooling towers for HAR Units 2 and 3 (Refer to FSAR Figure 2.3.3-201). The base elevation of the plant is approximately the same as the base elevation of the meteorological monitoring tower (260 ft. as described in FSAR Subsection 2.3.3.1). Because the water vapor from the existing and proposed cooling towers is released at an elevation that is significantly greater than the highest elevation of the meteorological monitoring tower, it is not expected that a moisture sensor at the top of the tower would record moisture effects from the existing or proposed cooling towers during operation. Also, the moisture differences between the 12 and 61-meter (m) levels on the tower are not expected to be appreciably different except possibly during the transition from very stable to neutral or unstable atmospheric conditions in the presence of significant surface moisture. This transition typically occurs during convective heating of the surface due to solar insolation and mixing of the surface layer (i.e., the lowest 100 to 200 m) typically occurs rapidly. Once this process starts, the difference in relative humidity between the 12 and 61-m levels of the tower should be minimal. Given the above considerations, upper-level monitoring of atmospheric moisture does not seem warranted. Progress Energy proposes that dew point measurements continue to be made at the lower level since this is considered to be representative of the upper level of the met tower.

**Associated HAR COL Application Revisions:**

No COLA revisions have been identified associated with this response.

**Attachments/Enclosures:**

None.

**NRC Letter No.:** HAR-RAI-LTR-002

**NRC Letter Date:** August 12, 2008

**NRC Review of Final Safety Analysis Report**

**NRC RAI #: 02.03.03-5**

**Text of NRC RAI:**

Please state in FSAR Section 2.3.3 how often the guyed wires, as part of the guyed tower, and tower anchors are inspected.

**PGN RAI ID #:** H-0026

**PGN Response to NRC RAI:**

The guy wires and the tower anchors are inspected on a semi-annual basis in conjunction with semi-annual instrument maintenance and calibration events. A statement to this effect will be included in a future amendment to FSAR Subsection 2.3.3.

**Associated HAR COL Application Revisions:**

The following bullet will be added to FSAR Subsection 2.3.3.1.4 "Maintenance and Calibration":

- "The guy wires and the tower anchors are inspected prior to instrument maintenance and calibration events on a semi-annual basis."

**Attachments/Enclosures:**

None.

**NRC Letter No.:** HAR-RAI-LTR-002

**NRC Letter Date:** August 12, 2008

**NRC Review of Final Safety Analysis Report**

**NRC RAI #:** 02.03.03-6

**Text of NRC RAI:**

Please provide the digital sampling rate of meteorological data as part of the preoperational and operational onsite meteorological measurements program.

**PGN RAI ID #:** H-0027

**PGN Response to NRC RAI:**

The digital sampling rate of the instrumentation is discussed in the second paragraph of FSAR Subsection 2.3.2 "Local Meteorology." For the data period 1994 – 1999, the digital sampling rate was once every 10 seconds. Beginning with a datalogger change in August of 2001, the sampling rate has been once every second. The operational onsite meteorological measurements program is planned to continue with the current sampling rate.

**Associated HAR COL Application Revisions:**

No COLA revisions have been identified associated with this response.

**Attachments/Enclosures:**

None.

**NRC Letter No.:** HAR-RAI-LTR-002

**NRC Letter Date:** August 12, 2008

**NRC Review of Final Safety Analysis Report**

**NRC RAI #: 02.03.03-7**

**Text of NRC RAI:**

Please clarify whether the first bullet on FSAR Page 2.3-29 should read "daily and monthly averages."

**PGN RAI ID #: H-0028**

**PGN Response to NRC RAI:**

In the first bullet on FSAR Page 2.3-29, the words "daily monthly averages" should read "daily and monthly averages." This will be revised in a future amendment to the document.

**Associated HAR COL Application Revisions:**

Revise the words "daily monthly averages" in the first bullet in FSAR Section 2.3.3.1.5 "Data Reduction" to read "daily and monthly averages."

**Attachments/Enclosures:**

None.

**NRC Letter No.:** HAR-RAI-LTR-002

**NRC Letter Date:** August 12, 2008

**NRC Review of Final Safety Analysis Report**

**NRC RAI #:** 02.03.03-8

**Text of NRC RAI:**

Regulatory Guide 1.206, Section C.1.2.3.3 states that a COL applicant should describe both the preoperational and operational programs for meteorological measurements at the site. It further states that Regulatory Guide 1.23 contains guidance on acceptable onsite meteorological programs and any deviations from the guidance provided should be identified and justified. Currently, FSAR Section 2.3.3 doesn't differentiate from the preoperational and planned operational meteorological programs. Please describe the aspects of both programs separately as part of FSAR Section 2.3.3, or justify describing the programs jointly.

**PGN RAI ID #:** H-0029

**PGN Response to NRC RAI:**

The planned operational meteorological monitoring program will be a continuation of the existing program. With the possible exception of routine equipment upgrades that periodically occur when older equipment is replaced with more current and typically more accurate or reliable equipment or components, the only change to the system that is currently being contemplated is a reprogramming of the existing electronic data loggers to record wind speeds as scalar averages, rather than as vector averages (the current configuration). The schedule for this change has not been established. Once the change has been made, a statement will be included in an amendment to FSAR Subsection 2.3.3, which currently describes the intent to continue operation of the existing system as the operational monitoring system for HAR Units 2 and 3. Since there is currently an operating meteorological program for the existing HNP Unit 1 that meets the guidance provided in RG 1.23, Rev. 1, the existing meteorological program was used as the pre-operational monitoring program for HAR Units 2 and 3 and the program is planned to be continued as the operational program for Units 2 & 3, as well as Unit 1. Given that the existing program is planned to be continued during operation, both programs were described jointly.

**Associated HAR COL Application Revisions:**

The following paragraph will be added after the second paragraph of FSAR Section 2.3.3:

"The planned operational meteorological monitoring program will be a continuation of the existing program. Since there is currently an operating meteorological program for the existing HNP Unit 1 that meets the guidance provided in RG 1.23, Rev. 1, the existing meteorological program was used as the pre-operational monitoring program for HAR Units 2 and 3 and the program is planned to be continued as the operational program for Units 2 & 3, as well as Unit 1. Given that the existing program is planned to be continued during operation, both programs are described jointly."

**Attachments/Enclosures:**

None.

**NRC Letter No.:** HAR-RAI-LTR-002

**NRC Letter Date:** August 12, 2008

**NRC Review of Final Safety Analysis Report**

**NRC RAI #:** 02.03.03-9

**Text of NRC RAI:**

FSAR Section 2.3.2 states that dual measurements of wind speed are being taken to compare scalar and vector averaging techniques. Please provide any initial results of this review to the staff.

**PGN RAI ID #:** H-0030

**PGN Response to NRC RAI:**

Progress Energy has conducted a comparison of vector and scalar average wind speeds at the lower level on its onsite meteorological monitoring tower since October 1, 2006. Scalar average measurements have been added to the tower (at the 11-meter (m) level) for purposes of performing a comparison with the vector average measurements that are being made at the 12-m level. Statistical regression analyses of the results have been performed for comparison purposes, with the following results:

$$U_{\text{SCALAR}} = 1.03 \times U_{\text{VECTOR}} + 0.4 \quad (10/1/06 - 1/31/07; r=0.99; \text{mph})$$

$$U_{\text{SCALAR}} = 1.00 \times U_{\text{VECTOR}} + 0.31 \quad (10/1/06 - 4/30/08; r=0.92; \text{mph})$$

Where: U = Wind speed (mph)

r = Correlation coefficient

**Associated HAR COL Application Revisions:**

No COLA revisions have been identified associated with this response.

**Attachments/Enclosures:**

None.

**NRC Letter No.:** HAR-RAI-LTR-002

**NRC Letter Date:** August 12, 2008

**NRC Review of Final Safety Analysis Report**

**NRC RAI #:** 02.03.03-10

**Text of NRC RAI:**

FSAR Section 2.3.3.1.5 states that an off-site meteorological consultant retrieves the meteorological data from the datalogger on a daily basis (except weekends and holidays) and reviews data for potential problems and compares the data with nearby Raleigh-Durham data for consistency. In light of this data review procedure, please clarify how almost five years of onsite data from August 2001 through late 2006 could be collected with a change in the wind speed sampling rate and averaging technique going unnoticed, resulting in data that is considered unrepresentative of expected site conditions.

**PGN RAI ID #:** H-0031

**PGN Response to NRC RAI:**

The offsite meteorological consultant typically reviews the data for general consistency to ensure that the basic systems are working properly. For differential temperature (DT) measurements, this consistency check involves a comparison of responses of redundant DT systems on the tower. Ambient temperature data (10-meter [m] level) are compared to the National Weather Service Raleigh-Durham Airport (NWS-KRDU) ambient temperature data for consistency. Lower wind speed and direction are compared to similar data from NWS-KRDU for general trend and agreement. Upper and lower wind directions are expected to be similar during non-calm conditions. Upper wind speeds are expected to be higher than the lower wind speeds. If any inconsistencies are noted during these daily checks, a site visit is justified for instrument maintenance, replacement, or re-calibration. The change in wind speed averaging from scalar to vector was only noted after the results of dispersion modeling indicated higher than expected concentrations. A more detailed investigation, including a review of the raw data, indicated that there was a higher frequency of occurrence of light and calm winds (which would explain the higher predicted concentrations). This increase in the frequency of calms and light winds was only noted after performing a long-term trend analysis. While the differences in the data at low wind speeds are significant (as much as approximately 0.4 miles per hour [mph]), this was not evident in the simple daily reviews of the data. It should also be noted that the vector and scalar averaging of wind speeds are both technically acceptable, but for light wind speeds they can be very different. See also the response to RAI 02.03.03-9, which provides the results of a statistical comparison of vector and scalar averaging results.

**Associated HAR COL Application Revisions:**

No COLA revisions have been identified associated with this response.

**Attachments/Enclosures:**

None.