



Serial: NPD-NRC-2009-047  
March 27, 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  
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 059 RELATED TO  
RADIATION PROTECTION DESIGN FEATURES**

Reference: Letter from Manny Comar (NRC) to James Scarola (PEC), dated February 27, 2009, "Request for Additional Information Letter No. 059 Related to SRP Section 12.03-12.04 – Radiation Protection Design Features for the Shearon 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 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 March 27, 2009.

Sincerely,

A handwritten signature in cursive script, appearing to read 'Garry D. Miller'.

Garry D. Miller  
General Manager  
Nuclear Plant Development

Enclosure/Attachments

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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DO84  
NRO

**Shearon Harris Nuclear Power Plant Units 2 and 3  
Response to NRC Request for Additional Information Letter No. 059 Related to SRP  
Section 12.3-12.4 for the Shearon Harris Units 2 and 3 Combined License Application,  
Dated February 27, 2009**

<u>NRC RAI #</u>	<u>Progress Energy RAI #</u>	<u>Progress Energy Response</u>
12.03-12.04-1	H-0442	Response enclosed – see following pages

**NRC Letter No.:** HAR-RAI-LTR-059

**NRC Letter Date:** February 27, 2009

**NRC Review of Final Safety Analysis Report**

**NRC RAI NUMBER:** 12.03-12.04-1

**Text of NRC RAI:**

RG 1.206, Section C.I.12.3.5 requests that an applicant should provide estimated annual dose to construction workers in a new unit construction area, as a result of radiation from onsite sources from the existing operating plant(s). The applicant should provide bases, models, assumptions, and input data.

Harris COL FSAR section 12.4.1.9 provides a description of the potential sources of exposure to construction workers. The dose limits to the workers are reviewed by the staff against the standards of 10 CFR 20.1301.

10 CFR 20.1301(a) (1) states "The total effective dose equivalent to individual members of the public from the licensed operation does not exceed 0.1 rem (1 mSv) in a year".

The staff reviewed related Harris SCOL documents to support an independent assessment of compliance with the regulations. The staff, however, needs additional information to make a determination of reasonable assurance.

Harris COL FSAR Subsection 12.4.1.9 appears to use one year of environmental monitoring data from Thermo Luminescent Dosimeters ( TLDs) to evaluate the potential direct radiation dose to construction workers associated with Unit 1 & 2 operations. Please provide the following bases information:

- i) Sufficient bases information to demonstrate that the TLD data used is consistent with previous years of data collected and why the selected single year (2004) is appropriate;
- ii) Include a discussion in the bases of the effect of capacity factor for Unit 1 during 2004 on results;
- iii) The bases for detection level and error bounds for doses based on the single year of TLD Data that provide an estimate of construction worker exposure meeting the standards of 10 CFR 20.1301; and
- iv) A description of the specific TLD locations that are used to estimate the dose to construction workers and justification for the assumption that the selected TLD locations are representative of the exposure that is estimated to be received by the construction workers.

**PGN RAI ID #:** H-0442

**PGN Response to NRC RAI:**

Data from a seven (7) year period, first quarter 1999 through third quarter 2006, was used to determine dose values for the HAR construction workers.

The Thermo Luminescent Dosimeters (TLDs) used to estimate the direct radiation doses to construction workers are located on the protected area fence line (See Environmental Report Figure 4.5-3). There are 16 TLD locations along the protected area fence line. The maximum dose of gamma radiation over any 90-day period for the 16 protected area fence line TLD locations was approximately 24 mrem (See Environmental Report Figure 4.5-2). Using the maximum gamma dose (without background correction) of the 16 protected area fence line TLD locations over a 7-year period is considered both reasonable and conservative for estimating the potential radiation doses to the construction workers.

As can be seen from Environmental Report Figure 4.5-2, the maximum value of 24 mrem for a quarter is the plus 2 sigma value.

The maximum value of 24 mrem in 90 days is from the third quarter of 2001 and the first quarter of 2002 (See Environmental Report figure 4.5-2). As stated in FSAR Subsection 12.4.1.9.3, this works out to an exposure rate of 11.1  $\mu$ rem/hr. Assuming a 2080-hour work year, the annual radiation exposure to a construction worker is approximately 24 mrem. In addition, for the majority of the time during construction of the HAR facilities, the construction workers would be located much farther from the HNP operating radiation sources than the distances reflected in the protected area fence line TLD locations. The HAR facilities will be located outside the HNP protected area fence line and will be away from any HNP radiation sources.

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

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

1. Revise the third bullet of FSAR Subsection 12.4.1.9.3 from:

"The direct radiation exposure was based on a 2,080-hour work year and an exposure rate of 11.1  $\mu$ rem/hr or 24 mrem/yr."

To read:

"The direct radiation exposure was based on a 2,080-hour work year and an exposure rate of 11.1  $\mu$ rem/hr or 24 mrem/yr. This exposure was determined from HNP protected area fence line Thermo Luminescent Dosimeter (TLD) readings that have been compiled over approximately 7 years. There are 16 TLD locations along the HNP protected area fence line as shown on Figure 12.4-201. The maximum dose of gamma radiation over any 90-day period for the 16 protected area fence line TLD locations was approximately 24 mrem (without background correction) as shown on Figure 12.4-202. The construction workers would be located much farther from the HNP operating radiation sources than the distances reflected in the protected area fence line TLD locations, since the HAR 2 and 3 facilities are located outside the HNP protected area fence line. No credit for the reduction in potential dose rate is given for the distance from the HNP protected area fence line TLD locations to the HAR facility construction areas."

2. Add following figures to the HAR FSAR:

- Figure 12.4-201, Revision 0 Draft.
- Figure 12.4-202, Revision 0 Draft.

**Attachments/Enclosures:**

New FSAR Figure 12.4-201 (Revision 0 Draft) – Depiction of HNP Area TLD Locations (1 page)

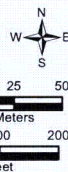
New FSAR Figure 12.4-202 (Revision 0 Draft) – Average of the Protected Area Fence Line TLD Readings (1 page)





LOCATION	DESCRIPTION
1 - 16	Locations at the fence around the plant
17	Security Building
18, 19	Administration Building: 1st Floor, 2nd Floor
20, 21	Service Building: 1st Floor, 2nd Floor
22, 23, 24	K Building: 1st Floor, 3rd Floor, 4th Floor
25	Blue Heaven
26	Waste Processing Building - Dosimetry Office

LOCATION	DESCRIPTION
27	Waste Processing Building - 276 Elevation Hallway
28	Plant Access Facility
29	Mobile Equipment Shop
30	Chemical Warehouse
31	Paint Shop
32	Bulk Warehouse
33	Water Treatment Building



Progress Energy Carolinas  
**Shearon Harris Nuclear Power Plant**  
**Units 2 and 3**  
**Part 2, Final Safety Analysis Report**

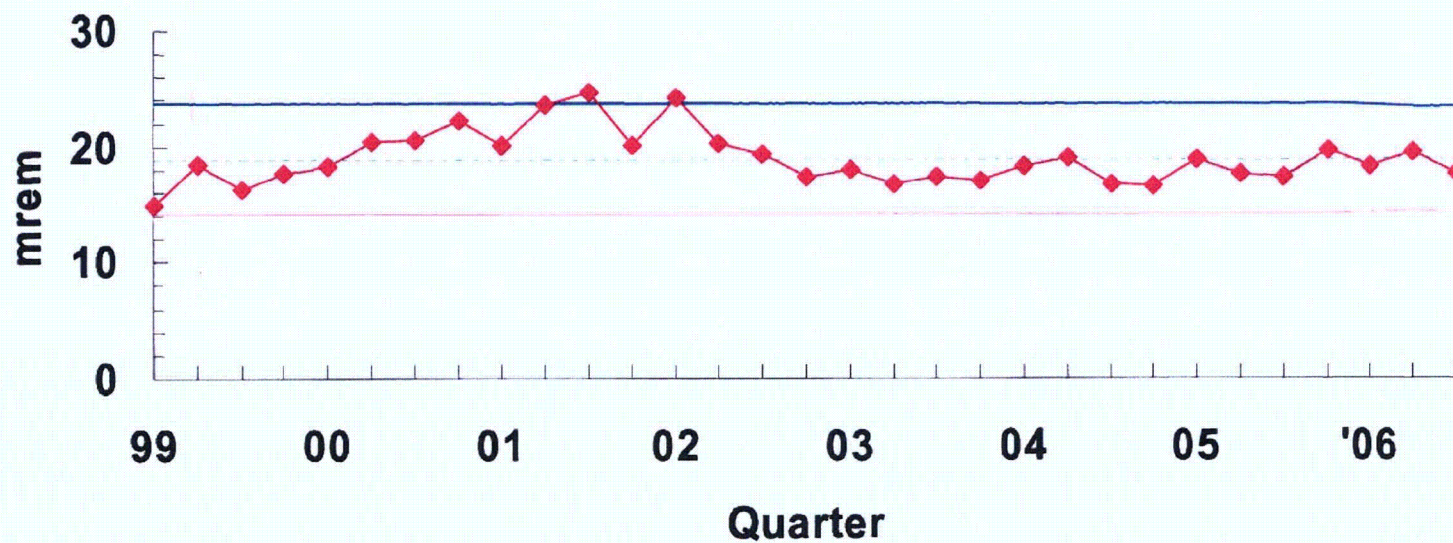
Depiction of HNP Area TLD Locations

FIGURE 12.4-201

Rev. 0 Draft

Source: Nuclear Generation Group (NGG), 2006





— +2 sigma    - - - Mean    — -2 sigma    ◆ 90-d dose

SOURCE: Nuclear Generation Group (NGG), 2006

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Average of the Protected Area  
 Fence Line TLD Readings

FIGURE 12.4-202

Rev. 0 Draft