



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

June 5, 2009

Chris L. Burton, Vice President
Shearon HNP Nuclear Power Plant
Carolina Power & Light Company
Post Office Box 165, Mail Zone 1
New Hill, North Carolina 27562-0165

SUBJECT: SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1 – REQUEST FOR
ADDITIONAL INFORMATION REGARDING AMENDMENT TO REMOVE
CREDIT FOR BORAFLEX IN THE BOILING WATER REACTOR SPENT FUEL
POOL STORAGE RACKS (TAC NO. ME0012)

Dear Mr. Burton:

By letter dated September 29, 2008, as supplemented by letter dated January 16, 2009, Carolina Power & Light Company, now doing business as Progress Energy Carolinas, Inc., submitted a proposed amendment for the Shearon Harris Nuclear Power Plant, Unit 1.

The proposed amendment would modify Technical Specification (TS) Sections 5.6.1.3.a and 5.6.1.3.b to incorporate the results of a new criticality analysis. Specifically the TSs would be revised to add new requirements for the Boiling Water Reactor (BWR) spent fuel storage racks containing Boraflex in Spent Fuel Pools A and B. The requirements for the BWR spent fuel racks as currently contained in TS 5.6.1.3 would be revised to specify applicability to the spent fuel storage racks containing Boral in Spent Fuel Pool B.

The U.S. Nuclear Regulatory Commission staff has determined that it needs additional information in order to complete its review. Please respond to the enclosed requests by August 7, 2009, in order to facilitate a timely completion of the staff review. Please contact me at 301-415-3178 if you have any questions on this issue, would like to participate in a conference call, or if you require additional time to submit your responses.

Sincerely,

A handwritten signature in black ink, appearing to read "Marlayna Vaaler".

Marlayna Vaaler, Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-400

Enclosure: As stated

cc w/enclosure: Distribution via ListServ

REQUEST FOR ADDITIONAL INFORMATION
SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1
REQUEST FOR LICENSE AMENDMENT TO
REMOVE CREDIT FOR BORAFLEX IN THE BOILING WATER REACTOR
SPENT FUEL STORAGE RACKS
DOCKET NO. 50-400

The NRC staff has determined that it needs responses to the following questions in order to continue its review of the subject document:

1. Code validation – MCNP4a

Appendix A of Holtec Report No. HI-2043321, Revision 4, "Criticality Safety Analyses of BWR [Boiling Water Reactor] Fuel Without Credit for Boraflex in the Racks at the Harris Nuclear Power Station," discusses the validation of the MCNP4a code used in criticality calculations. To allow the staff to evaluate the adequacy of the validation, please provide the following additional information:

- a) Please identify the cross section library and energy group used in the MCNP4a calculations.
- b) Please identify the cross section library and energy group used in the benchmark calculations.
- c) Please identify any known problems associated with the libraries that may adversely affect the analysis.
- d) Please document and justify the area of applicability for the benchmarks.
- e) How did the analyses associated with the license amendment application account for the measurement uncertainties for the benchmarks?

2. Code validation – CASMO4

Please discuss why there is not a need to apply any methodology uncertainties associated with using the CASMO4 code to determine the relative reactivity differences for temperature variation, manufacturing tolerances, and depletion uncertainty.

3. Depletion parameters

The following questions pertain to the licensee's response to Question 5 in Letter HNP-09-007, dated January 16, 2009:

Enclosure

- a) The application, as supplemented, cites NUREG/CR-6760 to conclude that not modeling Gadolinium is conservative for BWR fuel. However, it is not clear that any conclusions from NUREG/CR-6760 directly pertain to BWR scenarios. Please provide quantitative justification showing that neglecting Gadolinium is conservative for BWR operating conditions.
- b) The assumed fuel temperature (1038°F) appears to be somewhat low for a maximum value. Please provide evidence that the assumed fuel temperature is indeed the maximum for BWR fuel stored at the Shearon Harris Nuclear Power Plant, Unit 1 (HNP).
- c) The assumed void fraction (40 percent) appears to be a core average value. The void fraction at the upper part of a typical BWR could be significantly higher. Please provide evidence that the assumed void fraction is indeed the maximum for BWR fuel stored at HNP.
- d) Please provide evidence to demonstrate that assuming no control rods during depletion is conservative.

4. Axial burnup profile

The volume weighted relative burnup values (accounting for the different nodal length of the top node), indicate about 2 percent more burnup than expected, which appears to be non-conservative.

Please describe and justify how the application, as supplemented, determines the relative burnup values in Table 6 of the January 16, 2009, submittal.

5. Soluble boron calculations

Please demonstrate that the effect of soluble boron on the biases and uncertainties for the borated normal and accident cases are conservative.

6. BWR rack interface

Please demonstrate the acceptability of the interface configurations as applied to the BWR racks in the HNP spent fuel pools.

7. BWR flow channel

Please discuss the effect of the flow channel on the calculated reactivity for the BWR racks in the HNP spent fuel pools. Will the channel always be present during storage? How are the manufacturing tolerances for the flow channel addressed in determination of the maximum k-eff value? Consider the presence of boron in the spent fuel pool when determining the reactivity effect.

8. Since the Boraflex monitoring program will be discontinued as a result of this proposed license amendment request, please explain how HNP will be able to identify and mitigate

any degradation of the Boraflex that may impede other plant operations. Examples may include excessive silica levels impacting the spent fuel pool chemistry or an unforeseen damage mechanism to the Boraflex cladding that may impact safe fuel handling.

9. Technical Specifications

- a) Please propose a limiting condition for operation (LCO) and a surveillance requirement (SR) for Spent Fuel Storage, equivalent in intent to the Westinghouse Owners Group (WOG) Standard Technical Specification (STS) 3.7.17.
- b) The proposed TS 5.6.1.3.b should specify the enrichment and k-inf limit for the BWR fuel to be stored in the Boraflex racks for Pools "A" and "B." Please revise this specification accordingly.

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Sincerely,

/RA/

Marlayna Vaaler, Project Manager
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