



OCT 15 1999

Carolina Power & Light Company
Harris Nuclear Plant
PO Box 165
New Hill NC 27562

SERIAL: HNP-99-156

United States Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, DC 20555

SHEARON HARRIS NUCLEAR POWER PLANT
DOCKET NO. 50-400/LICENSE NO. NPF-63
SUPPLEMENTAL INFORMATION REGARDING THE
LICENSE AMENDMENT REQUEST TO PLACE HNP
SPENT FUEL POOLS 'C' AND 'D' IN SERVICE

Dear Sir or Madam:

Enclosure 8 of the HNP license amendment request (ref. SERIAL: HNP-98-188, dated December 23, 1998) provided a detailed Alternative Plan for demonstrating compliance with ASME Boiler & Pressure Vessel Code requirements for spent fuel pool cooling and cleanup system piping in accordance with 10 CFR 50.55a(a)(3)(i). By letter dated March 24, 1999, the NRC issued a request for additional information (RAI) related to the Harris Nuclear Plant (HNP) license amendment request to place spent fuel pools C and D in service. The March 24, 1999 RAI included a request to identify each of the embedded field welds within the scope of the Alternative Plan. The HNP response (ref. SERIAL: HNP-99-069, dated April 30, 1999) provided a field weld matrix which identified the field welds to be inspected by using a high resolution remote video camera. The sample size was selected based on a feasibility walkdown with the camera vendor. CP&L has continued, however, to investigate alternative inspection methods with other vendors. Through these efforts with another vendor, CP&L has successfully performed a remote camera inspection of all 15 embedded field welds included within the scope of the Alternative Plan. In the course of the inspection, two field welds (2-SF-1-FW-3 and 2-SF-1-FW-6) which were not embedded in concrete, but within the scope of the Alternative Plan, were cut out to facilitate removal of piping to provide access for the camera inspections. An updated field weld matrix will be provided to reflect the removal of these two welds and the inspection of all 15 embedded field welds.

In addition, by letter dated April 29, 1999, the NRC issued an RAI related to the criticality control provisions in the HNP license amendment request. Item 1 of this RAI requested information regarding a postulated fresh fuel assembly misloading event. As a supplement to our June 14, 1999 response (ref. SERIAL: HNP-99-094) to requested item 1 of the RAI, we had our vendor, Holtec International, perform additional fuel assembly misloading analyses. The results of these analyses are included as an Enclosure to this letter. These analyses demonstrate that criticality will not occur as a result of the postulated misloading of a fresh fuel assembly in the spent fuel storage racks for HNP pools C and D.

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This information is provided as a supplement to our December 23, 1998 license amendment request and does not change our initial determination that the proposed license amendment represents a no significant hazards consideration.

Please refer any questions regarding the enclosed information to Mr. Steven Edwards at (919) 362-2498.

Sincerely,

J.H. Sells for DBA

Donna B. Alexander
Manager, Regulatory Affairs
Harris Nuclear Plant

KWS/kws

Enclosure:

c: (all w/ Enclosure)

Mr. J. B. Brady, NRC Senior Resident Inspector
Mr. Mel Fry, N.C. DEHNR
Mr. R. J. Laufer, NRC Project Manager
Mr. L. A. Reyes, NRC Regional Administrator - Region II

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October 11, 1999

Mr. Steven Edwards
Manager of Projects
Carolina Power & Light Company
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References: Holtec Project 70324
CP&L Contract XTA7000024

Subject: Additional Criticality Analysis Results

Dear Mr. Edwards,

Per your request, and in support of the recent NRC RAIs pertaining to the criticality evaluations performed for fuel storage in pools C and D, we have performed additional analyses.

RAI #1 from the NRC stated that an evaluation of a fuel assembly misloading event should be analyzed. Holtec's previous response drew upon earlier spent fuel rack evaluations and stated that the k_{eff} would remain below 0.95 with a minimum of 400 ppm soluble boron in the pool.

As a supplement to this response, Holtec International has performed additional analyses for the Harris Spent Fuel Pools C and D to determine the amount of soluble boron required to maintain k_{inf} below 0.95 with a misloaded fresh PWR fuel assembly. The results of this analysis are summarized here.

The inadvertent misloading of a fresh PWR fuel assembly into Harris Pools C and D was analyzed using MCNP-4A and CASMO-3. A Δk_{inf} for the misloading event was calculated using MCNP and this Δk_{inf} was applied to the maximum k_{inf} in the licensing amendment report (LAR) to determine the maximum k_{inf} under the misloading scenario. This accident scenario consisted of a single 5 wt.% ^{235}U PWR fresh fuel assembly misloaded into the PWR racks surrounded by fuel of maximum reactivity as determined by the burnup and enrichment curve in the LAR. The k_{inf} for the PWR racks with the misloaded fresh assembly, without taking credit for soluble boron, was determined to be 0.9916 with a 95%/95% confidence level.



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A second scenario was also analyzed in which the fresh 5 wt.% ^{235}U PWR fuel assembly was placed in a PWR storage cell adjacent to the BWR storage racks. The PWR and BWR racks were filled with fuel of maximum permissible reactivity. The k_{inf} for this scenario with the misloaded fresh 5 wt.% ^{235}U PWR fuel assembly, without taking credit for soluble boron, was 0.9932 with a 95%/95% confidence level.

These results clearly demonstrate that the spent fuel pool will remain subcritical even with a fresh 5 wt.% ^{235}U PWR fuel assembly misloaded in the PWR racks.

The April 1978 NRC letter to All Power Reactor Licensees states that "The double contingency principle of ANSI N-16.1-1975 shall be applied. It shall require two unlikely, independent, concurrent events to produce a criticality accident." Consistent with this approach, credit for soluble boron, which is normally in the spent fuel pool, was taken when the misloaded fresh 5 wt.% ^{235}U PWR fuel was analyzed. It was determined that the maximum k_{inf} for the misloading accident is 0.9352 with 400 ppm soluble boron in the spent fuel pool water. Therefore, the minimum amount of soluble boron required to maintain k_{inf} less than the regulatory limit of 0.95 under all postulated abnormal and accident conditions is 400 ppm.

Additional calculations were also performed to determine the k_{inf} for the misloading accident with 1000 and 2000 ppm soluble boron in the spent fuel pool water. The maximum k_{inf} was calculated to be 0.8671 and 0.7783 for the 1000 and 2000 ppm respectively. These results demonstrate that there is considerable un-credited margin in the criticality analysis of Harris Spent Fuel Pools C and D.

If you have any questions please feel free to contact me.

Sincerely,

Scott H. Pellet
Project Manager

cc: Holtec Engineering File 80964
Holtec Contracts file

Document ID: 80964SP1