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RECIP.NAME RECIPIENT AFFILIATION
SCHWENCER,A. Operating Reactors Branch 1

SUBJECT: Forwards isothermal moderator temp coefficient data as suppl to request for license amend dtd 790418.

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CP&L
Carolina Power & Light Company

August 8, 1979

FILE: NG-3514(R) SERIAL: GD-79-2013

Office of Nuclear Reactor Regulations
Attention: Mr. Albert Schwencer, Chief
Operating Reactors Branch No. 1
United States Nuclear Regulatory Commission
Washington, D.C. 20555

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261
LICENSE NO. DPR-23
REQUEST FOR LICENSE AMENDMENT - ISOTHERMAL MODERATOR TEMPERATURE COEFFICIENT

Dear Mr. Schwencer:

On April 18, 1979, Carolina Power & Light Company submitted a license amendment request to allow a small positive moderator temperature coefficient. In a telephone call between CP&L, Exxon Nuclear Corporation and your staff on June 1, 1979, the following information was provided to the NRC:

1. The actual initial MDNBR value from XN-75-14 was 1.86. A value of 1.87 that appeared in some documentation was a typographical error.

2. The MDNBR value of 1.86 was obtained by forcing up the axial peaking factor until MDNBR reached the value desired. The MDNBR obtained in the recent analysis was obtained by using a more appropriate value for axial peaking. Therefore, MDNBR increased to 2.29.

3. The transients used in document XN-75-14 were representative rather than most limiting cases. They were chosen to show consistency with values calculated by the NSSS vendor.

Also, during the phone conversation of June 1, 1979, your staff indicated that they wanted assurance that the moderator temperature coefficient was $\leq$ 0 pcm/°F at high power. Attached is a supplement to our submittal of April 18, 1979. The modified submittal requires that the moderator temperature coefficient be $\leq$ 0 pcm/°F at rated power. Please substitute the attached page 3.1-11 for the one provided in our April 18, 1979 submittal. As pointed out in that submittal, current transient analysis shows satisfactory results with a positive moderator temperature coefficient of +2 pcm/°F. In addition, the positive moderator temperature coefficient could only exist at the beginning of the fuel cycle and at low power levels.

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411 Fayetteville Street • P. O. Box 1551 • Raleigh, N. C. 27602

A license fee for this change has been previously submitted.

If you or your staff have any further questions on this subject, we will be glad to discuss them.

Yours very truly,

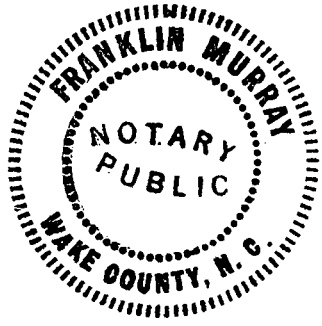
E. E. Utley
Executive Vice President
Power Supply & Customer Services

EEU/jcb

Sworn to and subscribed before me this 8th day of August, 1979.

Franklin Murray
NOTARY PUBLIC

My Commission expires: October 4, 1981



3.1.3 Minimum Conditions for Criticality

3.1.3.1 Except during low power physics tests, the reactor shall not be made critical at any temperature, above which the moderator temperature coefficient is greater than:

a) +2.0 pcm/°F at less than 50% of rated power, or

b) +2.0 pcm/°F at 50% of rated power and linearly decreasing to 0 pcm/°F at rated power.

3.1.3.2 In no case shall the reactor be made critical above and to the left of the criticality limit shown on Figure 3.1-1.

3.1.3.3 When the reactor coolant temperature is in a range where the moderator temperature coefficient is greater than as specificed in 3.1.3.1 above, the reactor shall be subcritical by an amount equal to or greater than the potential reactivity insertion due to depressurization.

3.1.3.4 The reactor shall be maintained subcritical by at least 1% until normal water level is established in the pressurizer.

Basis

During the early part of fuel cycle, the moderator temperature coefficient may be slightly positive at low power levels. The moderator coefficient at low temperatures or powers will be most positive at the beginning of the fuel cycle, when the boron concentration in the coolant is the greatest. At all times, the moderator coefficient is calculated to be negative in the high power operating range, and after a very brief period of power operation, the coefficient will be negative in all circumstances due to the reduced boron concentration as Xenon and fission products build into the core. The requirement that the reactor is not to be made critical when the moderator coefficient is more positive than as specified in 3.1.3.1 above has been imposed to prevent any unexpected power excursion during normal operations as a result of either an increase of moderator temperature or decrease of coolant pressure. This requirement is waived during low power physics tests to permit measurement of reactor moderator coefficient and other physics design parameters of interest. During physics tests, special operating precautions will be taken. In addition, the strong negative Doppler coefficient[2] and the small integrated $\Delta k/k$ would limit the magnitude of a power excursion resulting from a reduction of moderator density.