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Carolina Power & Light Company Raleigh, N. C. 27602 J. A. Jones	6-20-73	6-21-73				FACSIMILE

TO:	ORIG	CC	OTHER	SENT AEC PDR	SENT LOCAL PDR
Mr. O'Leary	1			X	X

CLASS	UNCLASS	PROP INFO	INPUT	NO CYS REC'D	DOCKET NO:
	X			1	50-261

DESCRIPTION:

Facsimile, requesting 100% Thermal Power Authorization.....for the H, B. Robinson Unit No. 2.....

ENCLOSURES:

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ACKNOWLEDGED

PLANT NAME: H. B. Robinson Unit No. 2

FOR ACTION/INFORMATION 6-21-73 AB

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MUNTZING/STAFF	MACCARY	KASTNER	GEARIN (L)	
CASE	KNIGHT	BALLARD	GOULBOURNE (E)	PLANS
GIAMBUSSO	PAWLICKI	SPANGLER	LEE (L)	MCDONALD
BOYD	SHAO		MAIGRET (L)	DUBE
MOORE (L)(BWR)	STELLO	ENVIRO	SERVICE (L)	
DEYOUNG(L)(PWR)	HOUSTON	MULLER	SHEPPARD (E)	INFO
✓SKOVHOLT (L)	NOVAK	DICKER	SMITH (L)	C. MILES
P. COLLINS	ROSS	KNIGHTON	✓TEETS (L)	
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REG OPR	TEDESCO	REGAN	WILLIAMS (E)	
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✓16 - CYS ACRS ~~HOLDING~~ SENT TO LIC ASST. S. TEETS ON 6-21-73

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1-R. CARROLL-OC,GT-B227
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Carolina Power & Light Company

June 20, 1973

50-261

File: NG-5213

NG-73-110

DOCKETED USAEC JUN 21 1973 REGULATORY MAIL SECTION DOCKET CLERK

RECEIVED JUN 21 1973 U.S. ATOMIC ENERGY COMMISSION Regulatory Mail Section

Mr. John F. O'Leary, Director
Directorate of Reactor Licensing
U. S. Atomic Energy Commission
Washington, D. C. 20545

Dear Mr. O'Leary:

H. B. ROBINSON UNIT NO. 2
LICENSE DPR-23
REQUEST FOR 100% THERMAL POWER AUTHORIZATION

During the week of June 11-15 Carolina Power & Light Company experienced severe demands on its power generation capacity, not only in our own service area but also from neighboring utilities. On June 11, for example, there was zero spinning reserve on our system; and we were supplying 1000 MWe or approximately 20% of our total generating capacity to a neighboring utility. Although this demand has lessened during the past week, it is expected that a similar situation could develop at anytime during the ensuing summer months due to a combination of plant breakdowns and extreme temperature conditions. In order to provide the maximum system power generation during these periods of peak demand and ensure to the greatest extent possible the system stability of the Southeastern United States, Carolina Power & Light Company requests authorization to operate the H. B. Robinson Unit No. 2 Plant at 100% power, subject to the following conditions:

1) The operational mode of the plant will be base load, with the exception of the weekly turbine valve test.

2) A full-core flux map utilizing the movable detector system will be performed at least every two weeks to determine the value of the maximum peak kw/ft. The value so determined shall be maintained $\leq$ 14.2 kw/ft in Regions 2 and 3 and $\leq$ 15.1 in Region 4.

3) Surveillance of the axial peaking factor will be performed every eight hours with at least two thimbles, representative of the average core axial peaking factor, F_z. The limiting value of F_z will be determined from the full-core flux map in Paragraph Two in the following manner:

a) For Regions 2 and 3 fuel assemblies, which are predicted

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to incur a low frequency of collapse during Cycle 2, the maximum value of F_z at rated power will be determined by $F_z = \frac{2.41}{F_{xy}^N \cdot F_u^N \cdot 1.03 \cdot S'(z)}$

where F_{xy}^N is the value of the peaking factor in the unrodded portion of the core for Regions 2 and 3, F_u^N is the uncertainty allowance for axial surveillance, equal to 1.077, and $S'(z)$ is the maximum value of the densification penalty factor for collapsed fuel rods. A suitable value of $S'(z)$ is 1.25, based on analysis of incore flux maps which have been taken recently at power levels greater than 75% power. The value of 1.03 is the engineering factor, F_q^E.

b) For Region 4 fuel assemblies, which are not subject to collapse during Cycle 2, the maximum value of F_z at rated power will be determined by $F_z = \frac{2.56}{F_{xy}^N \cdot F_u^N \cdot 1.03 \cdot S''(z)}$

where F_{xy}^N is of the value of the peaking factor in the unrodded portion of the core for Region 4, F_u^N is as described in Section a, and $S''(z)$ is the maximum value of the densification penalty factor for uncollapsed fuel rods. A suitable value of $S''(z)$ is 1.15 based on the flux maps described in Section a above.

4) The movement of Bank D during power operations will be restricted to no more than a total of five steps in any one direction with the above surveillance frequency. If the rod bank movement exceeds five steps, the frequency of surveillance will be increased to monitor F_z every half hour for the first two hours after the accumulated rod motion, with normal surveillance thereafter.

5) The use of the Axial Power Distribution Monitoring System shall be employed as soon as possible as an aid to the operator in the surveillance of F_z, but it is not required to perform the above mentioned surveillance. This surveillance can be accomplished by the plant operators and the plant computer.

The limiting value of F_z during surveillance will be the lower of the two values as determined from Sections 3a and 3b, and the location of the thimbles chosen to be representative of the axial power shape will be in the limiting region.

The values of the densification penalty factors are not expected to increase above the values given above, based upon the incore flux maps. The limiting value of F_z as determined is applicable for cases where the peak occurs in the top of the core or a positive offset, and is extremely conservative

in cases where the peak occurs in the bottom of the core, or a negative value of offset. However, the F_Z limit will be applied for both positive and negative offset values using the limiting values of S(z) outlined above until the Axial Power Distribution Monitoring System (APDMS) is operational. When APDMS is in use, the equations in Section 3a and 3b will be modified to allow the determination of the limiting value of F(z) S(z) which represents the product of the densification penalty factor S(z) as a function of core height and the corresponding value of the average core axial point-to-average power F(z) from the incore movable detector system. The peak value of this quantity will be determined during core surveillance and will be maintained equal to or less than the limiting value. Values of S(z) as a function of core height are found in WCAP-8115 for Regions 2 and 3 and WCAP-7984 for Region 4.

For the initial power increase from 94.8% to 100% of rated power the values of F_{xy}^N to be used in the equation in Sections 3a and 3b above are 1.40 for Regions 2 and 3 and 1.58 for Region 4 fuel. These numbers have been derived from flux maps taken at 90%, 94% and 100% power over a two weeks' period of time, and represents the maximum value considering all three maps, in the unrodded plane of the core. Change in the values of peak F_{xy} from map to map is small, ranging from 1.37 to 1.40 in Regions 2 and 3 and essentially no change in Region 4; these results coupled with the uncertainty factor of 1.077 ensures that the value of F_Z so determined is conservative. The resulting values of F_Z applicable to initial operation at 100% power is 1.24 for Regions 2 and 3 and 1.27 for Region 4. Thus, Regions 2 and 3 are limiting as expected, and this value of F_Z will apply until a new determination is made based on a subsequent full-core flux map.

The values of F_{xy}^N found from the in-core maps are higher than those expected based on design calculations, but do not result in the violation of hot channel factor limits. The methods employed in the design calculations are presently being investigated, and it is expected that these numbers will decrease due to the following:

1) Better modeling of the core as a result of feedback of experimental data.

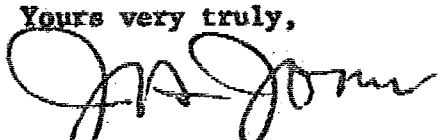
2) Flattening of the radial power distribution due to depletion. The larger value of F_{xy}^N simply results in tighter control of the axial power distribution during plant operation to assure that the limiting value of kw/ft is not violated.

The limits specified above are consistent with the limits on peaking factors set forth in the densification report for H. B. Robinson WCAP 8115 submitted on April 20, 1973.

Your prompt attention to this request would be appreciated.

JAJ:mp

Yours very truly,



J. A. Jones
Executive Vice-President

cc: Mr. C. D. Barham
Mr. N. B. Bessac
Mr. B. J. Furr
Mr. D. V. Menscer
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Mr. D. B. Waters