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FROM: Carolina Power & Light Company Raleigh, N. C. E. E. Utley			DATE OF DOC 2-26-74		DATE REC'D 3-7-74		LTR X	MEMO	RPT	OTHER
TO: John F. O'Leary			ORIG 3 signed		CC 37	OTHER		SENT AEC PDR XXX SENT LOCAL PDR XXX		
CLASS	UNCLASS	PROP INFO	INPUT		NO CYS REC'D		DOCKET NO:			
	XXX		XXX		40		50-261			

DESCRIPTION:

Ltr requesting change to Tech Specs and trans the following....

ENCLOSURES:

Figures: H. B. Robinson Unit 2 Cycle 2
Boron vs. Burnup

ACKNOWLEDGED

DO NOT REMOVE

PLANT NAME: H. B. ROBINSON UNIT #2

(40 cys figs attached)

FOR ACTION/INFORMATION 3-7-74 GMC

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Carolina Power & Light Company

February 26, 1974

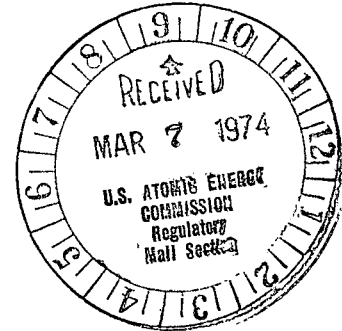
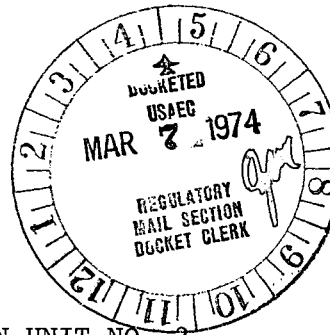
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File: NG-3514

Serial: NG-74-247

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

Dear Mr. O'Leary:



H. B. ROBINSON UNIT NO. 2
LICENSE DPR-23

EXTENSION OF CYCLE 2 OPERATING LIFETIME

Under the provisions of Paragraph e) of Section 2.1 of the H. B. Robinson Technical Specifications, Carolina Power & Light Company submits, for your review and approval, an analysis justifying the operation of H. B. Robinson Unit No. 2, Cycle 2, in excess of 7000 effective full power hours (EFPH). The excess period of operation is required to maintain maximum rated power output until the scheduled refueling date of April 20, 1974, and will result in a total fuel residence time for Cycle 2 not to exceed 7240 EFPH. The end of reactivity life predicted from core operations is 7400 EFPH, as shown in Figure 1. This burnup is not achievable, however, if the scheduled refueling date of April 20 is retained. The analysis presented below will show that the additional 240 EFPH of operation can be easily accommodated by minor changes in plant operating requirements, that the results of accident analyses presented previously are unchanged, and that observed fuel densification phenomena during Cycle 2 operation has not changed appreciably.

The first concern to be addressed is the increase in the number of collapsed fuel rods for the additional period of operation. Referring to Section 2.2 and Figure 2.3 of WCAP-8114, "Fuel Densification - H. B. Robinson Steam Electric Plant, Unit No. 2, Cycle 2," April, 1973, (Proprietary), a total number of rods were predicted to collapse by 7000 EFPH; the number of collapsed rods predicted from Figure 2.3 during the additional 240 EFPH is approximately 70, or about a 5% increase in the total number of collapsed rods.

The increased number of collapsed rods is of significance only in the radiological consequences of a postulated steam line break accident or overpower transient, in which 12% of all flattened rods in the core are assumed to fail. Further, a leak is assumed to exist in a steam generator, allowing fission product activity to be present in the secondary system at the time of the steam break accident or steam relief following

an overpower transient. The Technical Specifications presently contain a plot of maximum steam generator leak rate as a function of cycle time, Figure 3.1-4. Extension of this plot to 7240 EFPH yields a maximum leakage rate limit of 0.3 GPM.

All of the other accidents have been analyzed previously in WCAP-8114, and exhibit little, if any, dependence on cycle length. As stated in Section 5.4.1 of the report, the limiting values of kw/ft for collapsed fuel rods from the standpoint of LOCA analyses is essentially independent of time; thus, no change in peaking factor limitations would be required for the additional period of operation. For the rod ejection accident, little change is expected in core power distribution for the period; thus, the results of the rod ejection analyses would not change appreciably. In addition, the most limiting case was at the beginning of Cycle 2, with substantial margin to centerline melting present at the end of cycle. In the case of the steam line break accident, there is a weak dependence of shutdown margin on fuel depletion alone; the decrease in shutdown margin due to changes in the moderator temperature coefficient and the hot standby control rod worth is less than $0.02\% \Delta\rho$, thus reducing the available shutdown margin to $2.25\% \Delta\rho$. This is still greater than the required shutdown margin of $2.20\% \Delta\rho$ specified in Section 3.10 of the Technical Specifications.

A close scrutiny of incore movable flux traces during Cycle 2 has revealed little change in the characteristics of the flux "blips" which are representative of fuel densification. The number of blips per monitored assembly (there are 46 assemblies which contain incore detector thimbles) has remained essentially constant at approximately two, as may be seen from Figure 2. This indicates that densification was essentially complete by the beginning of Cycle 2 in fuel Regions 2 and 3. Region 4 monitored assemblies have not shown more than one blip total at any time, and that only on occasion. An additional data plot showing the fraction of blips greater than 2% is shown in Figure 3, and supports the claim that densification is not continuing.

An extensive visual examination during the first refueling outage in 1973 did not reveal any collapsed fuel rod sections in Regions 2 and 3 fuel, when some were predicted by the collapse model used in WCAP-8114. This examination, coupled with the observed blip behavior during Cycle 2, gives confidence that the collapse model is conservative.

In summary, Carolina Power & Light Company requests that H. B. Robinson Unit No. 2 be allowed to operate Cycle 2 to a burnup not to exceed 7240 EFPH based upon the above analysis. We propose that, during operation

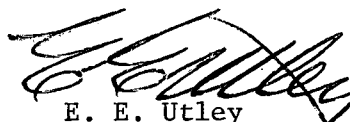
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in excess of 7000 EFPH, steam generator leakage rate be limited to a maximum of 0.3 GPM. With these limitation, we conclude that extended operation will not result in an increase in hazard to the health and safety of the general public.

Yours very truly,



E. E. Utley
Vice-President
Bulk Power Supply

DBW:mvp

Enclosures

cc: Messrs. N. B. Bessac
T. E. Bowman
B. J. Furr
W. B. Howell
D. V. Menscer
D. B. Waters

BORON CONCENTRATION (PPM)

H.B. ROBINSON UNIT 2
CYCLE 2
BORON VERSUS BURNUP

FIGURE 1

Cycle Burnup (KEPPH)

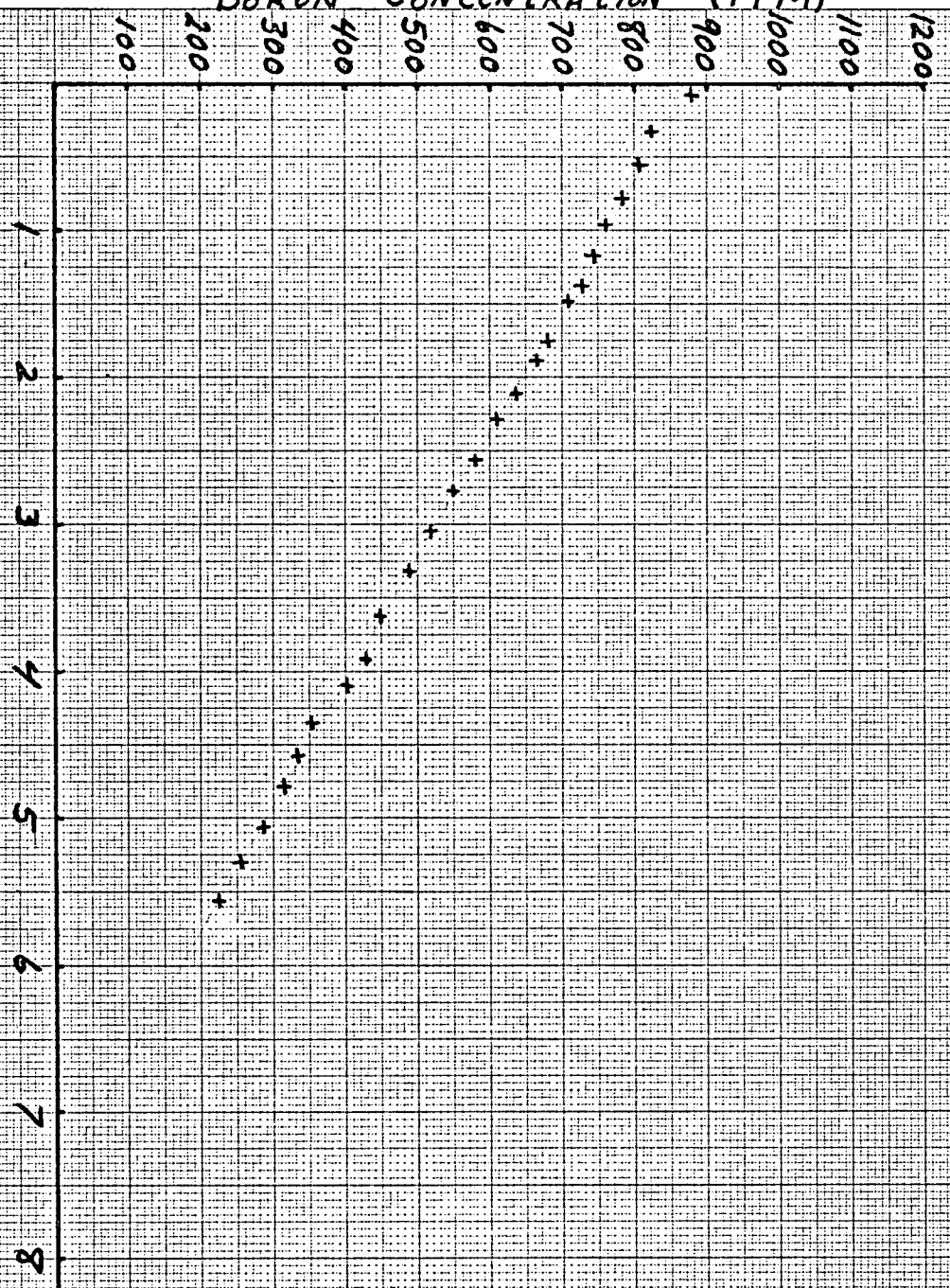


FIGURE 2

B. Robinson 2 Cycle 2

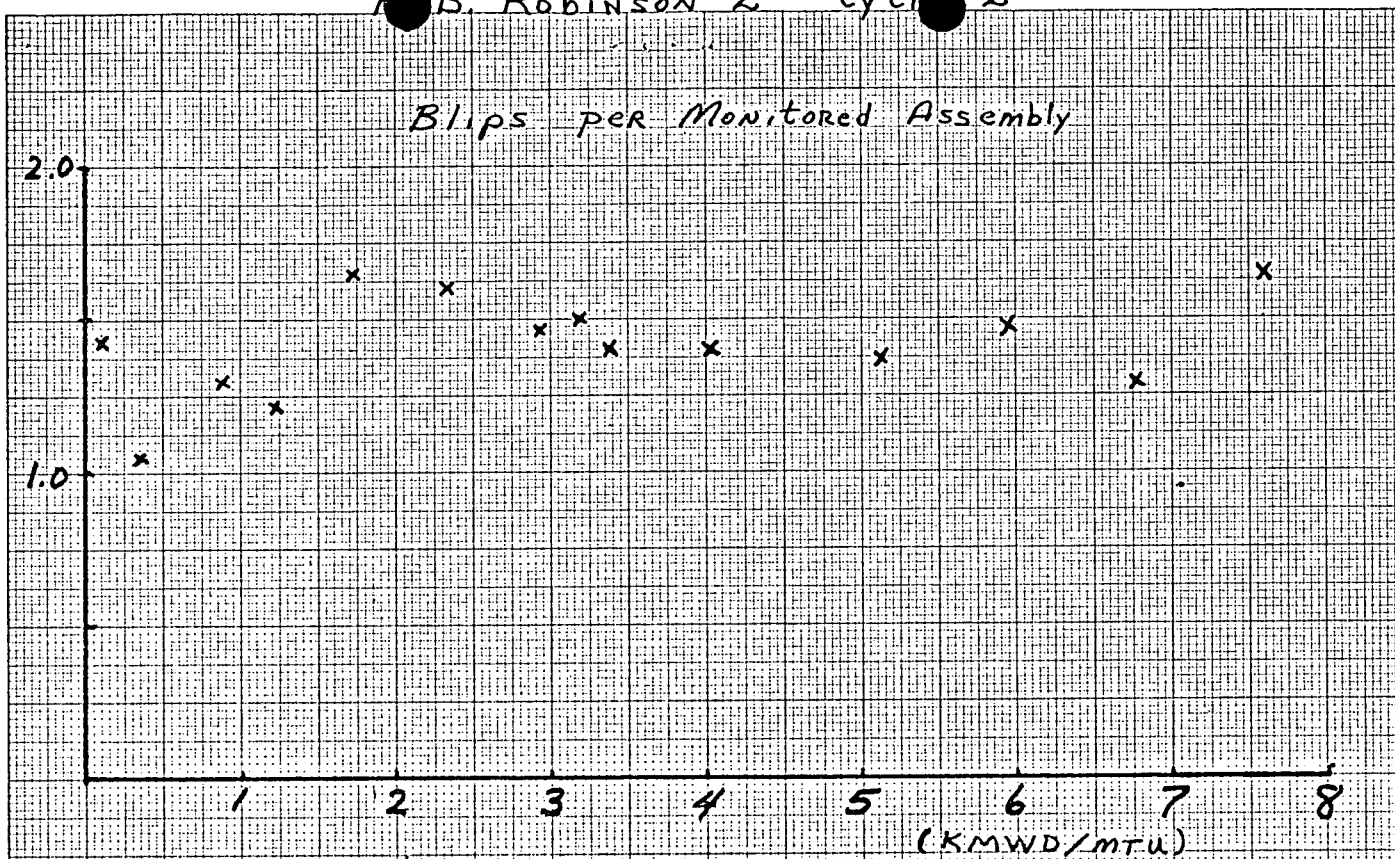


FIGURE 3

