NRC DISTRIBUTION FOR PART 50 DOCKET MATERIAL
(TEMPORARY FORM)

CONTROL NO: 1342
FILE:

FROM	DATE OF DOC	DATE REC'D	LTR	TWX	RPT	OTHER
Caroling Pwr & Light Co Raleigh, NC E E Utley	11-24-75	11-28-75	XXXX			

TO	ORIG	CC	OTHER	SENT NRC PDR	SENT LOCAL PDR
Mr Rusche	3 signed			XX	XX

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

DESCRIPTION:

Ltr w/attch.....notarized 11-24-75.....
furnishing info concerning cycle #4 reload
.....(40 cys ltr rec'd)

ENCLOSURES:

ACKNOWLEDGED
DO NOT REMOVE

PLANT NAME: Robinson #2

FOR ACTION/INFORMATION 11-28-75 ehf

BUTLER (L) W/ Copies	SCHWENCER (L) W/ Copies	ZIEMANN (L) W/ Copies	REGAN (E) W/ Copies	REID(L) W/6 COPIES
CLARK (L) W/ Copies	STOLZ (L) W/ Copies	DICKER (E) W/ Copies	LEAR (L) W/ Copies	
PARR (L) W/ Copies	VASSALLO (L) W/ Copies	KNIGHTON (E) W/ Copies	SPIES W/ Copies	
KNIEL (L) W/ Copies	PURPLE (L) W/ Copies	YOUNGBLOOD (E) W/ Copies	LPM W/ Copies	

INTERNAL DISTRIBUTION

~~REG FILE~~	TECH REVIEW	DENTON	LIC ASST	A/T IND
NRC PDR	SCHROEDER	GRIMES	R. DIGGS (L)	BRAITMAN
OGC, ROOM P-506A	MACCARY	GAMMILL	H. GEARIN (L)	SALTZMAN
GOSSICK/STAFF	KNIGHT	KASTNER	E. GOULBOURNE (L)	MELTZ
CASE	PAWLICKI	BALLARD	P. KREUTZER (E)	
GIAMBUSSO	SHAO	SPANGLER	J. LEE (L)	PLANS
BOYD	STELLO		M. RUSHBROOK(L)	MCDONALD
MOORE (L)	HOUSTON	ENVIRO	S. REED (E)	CHAPMAN
DEYOUNG (L)	NOVAK	MULLER	M. SERVICE (L)	DUBE (Ltr)
SKOVHOLT (L)	ROSS	DICKER	S. SHEPPARD (L)	E. COUPE
GOLLER (L) (Ltr)	IPPOLITO	KNIGHTON	M. SLATER (E)	PETERSON
P. COLLINS	TEDESCO	YOUNGBLOOD	H. SMITH (L)	HARTFIELD (2)
DENISE	J.COLLINS	REGAN	S. TEETS (L)	KLECKER
REG OPR	LAINAS	PROJECT LDR	G. WILLIAMS (E)	EISENHUT
FILE & REGION (2)	BENAROYA	BAJWA	V. WILSON (L)	WIGGINTON
MIPC	VOLLMER	HARLESS	R. INGRAM (L)	
			M. DUNCAN (E)	

EXTERNAL DISTRIBUTION

1 – LOCAL PDR Hartsville, S.C.		
1 – TIC (ABERNATHY) (1)(2)(10)	– NATIONAL LABS _____	1 – PDR-SAN/LA/NY
1 – NSIC (BUCHANAN)	1 – W. PENNINGTON, Rm E-201 GT	1 – BROOKHAVEN NAT LAB
1 – ASLB	1 – CONSULTANTS	1 – G. ULRIKSON ORNL
1 – Newton Anderson	NEWMARK/BLUME/AGBABIAN	
16 – ACRS ~~HOLDING~~/SENT		

TO L.A. Ingram

mbj

CP&L

Carolina Power & Light Company

November 24, 1975

FILE: NG-3514(R) SERIAL: NG-75-2090

Mr. Benard C. Rusche, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

RE: H. B. ROBINSON UNIT NO. 2
DOCKET NO. 50-261
FACILITY OPERATING LICENSE NO. DPR-23

Dear Mr. Rusche:

In response to various discussions with your staff regarding the Cycle 4 reload application, Carolina Power & Light Company (CP&L) provides the following information:

Westinghouse fuel performance analysis justifying operation under conditions which will be experienced during Cycle 4 has been previously submitted in the following documents: 1) H. B. Robinson Unit 2 FSAR; 2) Application for Operation at 2300 MWt Core Power dated February 1, 1974 including WCAP-8243 (Proprietary) and WCAP-8244 (Non-Proprietary), "H. B. Robinson Unit 2 - Justification for Operation at 2300 MWt;" 3) ECCS Analysis for 2300 MWt Operation Documented in our letter of October 2, 1974, and Supplemented by letters of March 14, 1975, April 18, 1975, June 20, 1975, and July 24, 1975; and 4) WCAP-8114, "Fuel Densification - H. B. Robinson Steam Electric Plant Unit No. 2, Cycle 2."

The operation of Westinghouse fuel in Cycle 4 has been evaluated based on considerations of the effect of fuel rod bowing. An ECCS peaking factor penalty that increases as a function of fuel assembly burnup is associated with fuel rod bowing for Westinghouse fuel. This power penalty applies in varying degrees to the Region 4, 5, and 6 fuel that will be present in Robinson Cycle 4. One way of offsetting this penalty during initial operation in Cycle 4 can be realized by the fact that the ECCS analysis was performed at the uprated core thermal power rating of 2300 MWt, while the core is presently licensed at a core power of 2200 MWt. This power reduction of 100 MWt, or 4.3%, when compared with data contained in the Westinghouse letter of October 29, 1975 (Mr. C. Eicheldinger to Mr. D. Vassalo), blankets all fuel assemblies with burnups up to 23,000 MWD/MTU. However, by the end of Cycle 4, there will be some fuel assemblies which exceed this burnup. These are shown in the attached Figure 1.

The assemblies which exceed the burnup of 23,000 MWD/MTU generally are located toward the center of the core and have peak rod powers which are at least 12% less than the peak, as can be seen in Figure 1 for the unrodded core. An

13421

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

exception to this occurs in the plane containing the D bank rods, where one assembly on the diagonal with a burnup of 23,167 MWD/MTU has a peak rod power 2.2% less than the peak in the core. The amount of power reduction in these assemblies is more than adequate to offset the maximum additional power penalty of 0.7% for discharge burnups up to 33,000 MWD/MTU as obtained from the Westinghouse data. These power reductions will be verified by power distribution measurements when burnup values approach 23,000 MWD/MTU.

At present, CP&L is seeking an uprating to 2300 MWt core power for the Robinson plant. If this is approved by the Commission during Cycle 4 operation, the power penalty due to fuel rod bowing must be accounted for in a different manner than outlined above. In this event, CP&L would propose appropriate changes to the technical specifications to penalize the total peaking factor for the uprated condition and will propose means of assuring the maintenance of the peaking factor under operating conditions at 2300 MWt.

With respect to the DNB penalty associated with bowed fuel rods, Westinghouse has determined that, for the Robinson fuel, the penalty for rod to rod contact for discharged fuel (33,000 MWD/MTU) is 5.57% based on the average core linear power of 5.85 kw/ft at 2300 MWt. Considering that the lead burnup assembly in Region 6 during Cycle 4 is 24,452 MWD/MTU, a reduction factor can be applied to this penalty. From Westinghouse data, a factor of 0.50 can be applied, reducing the penalty for this fuel to less than 2.8%. This penalty is easily accommodated by a modification to the Westinghouse DNB model that accounts for a benefit in DNB ratio due to the reduction in fuel rod pitch. This benefit of 3.3% thus compensates for the penalty of 2.8%, resulting in no requirement for DNB penalty as a result of fuel rod bowing for Cycle 4 operation.

As discussed with your staff, the parameters used in the transient analysis for Cycle 4 (i.e., moderator temperature coefficient, etc.) are conservative and bounded by the values used in the original FSAR analysis.

We hope this information is sufficient for your staff to complete their review of the Cycle 4 reload application.

Yours very truly,

E. E. Utley
Vice President
Bulk Power Supply

RLMjr/nja

Sworn to and subscribed before me this 24th day of November, 1975.

Marilyn Y. Pease
Notary Public

My Commission Expires: October 19, 1980

FIGURE 1

CALCULATED END OF CYCLE 4 BURNUP DISTRIBUTION

PDQ7/HARMONY

1.050 30169 82%	1.025 23463 80%	1.021 24133 79%	1.261 20324	1.222 22326	.980 23236 76%	1.129 23003 88%	1.066 8048
1.025 23473 80%	1.268 19766	1.286 18635	1.020 24452 79%	1.244 22445	1.049 22036	1.248 11416	1.011 6507
1.021 24172 79%	1.268 18597	1.075 20731	.980 23253 76%	1.275 19028	.974 23792 76%	1.140 9117	
1.263 20261	1.020 23429 79%	.980 23282 76%	.996 23167 77%	1.212 22025	1.262 11443	1.007 6478	
1.221 22245	1.244 22323	1.276 18984	1.212 21987	1.225 18683	1.081 7392		
.941 22834	1.045 21928	.971 23947 76%	1.262 11411	1.082 7387			
1.127 22907	1.248 11339	1.140 9065	1.008 6454				
1.068 8005	1.014 6473						

Format:
-Maximum Pin Power
-Burnup
-Pin Power, Percentage of Peak