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Carolina Power & Light Company Raleigh, N. C. 27602 E. E. Utley	10-1-73	10-4-73	X			

TO:	ORIG	CC	OTHER	
R. Scheme1	3 signed	37		SENT AEC PDR X SENT LOCAL PDR X

CLASS	UNCLASS	PROP INFO	INPUT	NO CYS REC'D	DOCKET NO:
	XXX			40	50-261

DESCRIPTION:
Ltr re our 9-12-73 ltr .....trans the following:

ENCLOSURES:
Addl Info Concerning Loss-of-Coolant Analyses

ACKNOWLEDGED
DO NOT REMOVE

(3 Orig & 37 cys rec'd)

PLANT NAME: H. B. Robinson Unit 1

FOR ACTION/INFORMATION 10-4-73 GC

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CASE	KNIGHT	BALLARD	GOULBOURNE (L)	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)	
	IPPOLITO	YOUNGBLOOD	WADE (E)	
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✓16 - CYS ACRS ~~XXXXXX~~ SENT TO LIC. ASST. 10-4-73 TEETS

(1)(2)(10)-NATIONAL LAB'S
1-R.Schoonmaker,OC,GT,D-323
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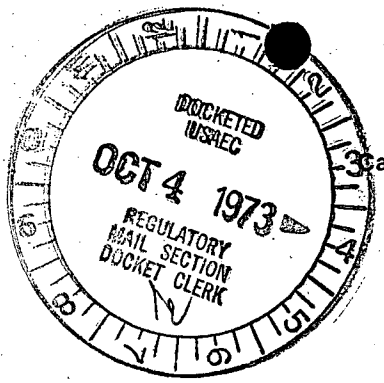
1-GERALD ULRIKSON...ORNL

1-PDR-SAN/LA/NY
1-GERALD LELLOUCHE BROOKHAVEN NAT. LAB
1-AGMED(WALTER KOESTER RM-C-427-GT
1-RD..MULLER..F-309 GT

16

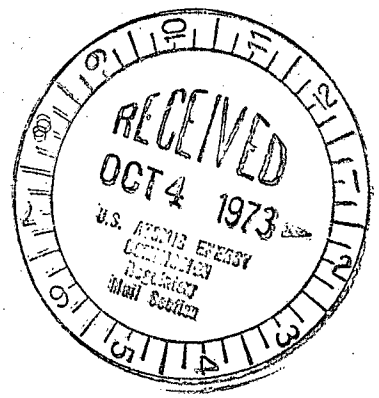


CP&L
Carolina Power & Light Company

October 1, 1973

File: NG-3514

Serial: NG-73-442



Mr. Robert J. Schemel, Chief
Operating Reactors Branch #1
Directorate of Licensing
Office of Regulation
U. S. Atomic Energy Commission
Washington, D. C. 20545

Dear Mr. Schemel:

H. B. ROBINSON UNIT NO. 2
LICENSE DPR-23
ADDITIONAL INFORMATION CONCERNING LOSS-OF-COOLANT ANALYSES

In your letter of September 12, 1973, you asked for additional information regarding analyses of loss-of-coolant accident conditions for the H. B. Robinson Plant, based on our submittal of August 1, 1973. In response to this request, we have prepared the attached submittal, which specifically addresses each of the seven items in your letter so that you may better evaluate the adequacy of the proposed revision to the densification penalty factors contained in our August 1 letter.

DBW:mvp

Attachment

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

Yours very truly,

E. E. Utley
Vice-President
Bulk Power Supply

7415

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

H. B. ROBINSON UNIT NO. 2
LICENSE DPR-23
ADDITIONAL INFORMATION CONCERNING LOSS-OF-COOLANT ANALYSES
September 28, 1973

Item 1:

Describe the axial flux shapes used in the analyses.

Response:

With respect to loss-of-coolant evaluation, the two important parameters are peak linear power and location of peak power. These are presented in Table 1.

Item 2:

Present the core reflooding rate as a function of time.

Response:

See Figure 1.

Item 3:

For reflooding when coolant reaches the bottom of the core, give the maximum fuel clad temperature at the 6, 8, and 10 foot elevations.

Response:

See Table 1.

Item 4:

Discuss the correlation of FLECHT data with these analyses.

Response:

The FLECHT heat transfer correlation presented in WCAP-7931 was used in the analysis for the heat transfer coefficient at all elevations. The correlation has been derived from the FLECHT data and represents a best fit at the peak power (six foot) location to all the data. In general, the correlation predicts lower heat transfer at elevations greater than six feet than at the mid-plane.

The fluid temperatures at early times in the FLECHT tests were nearly equal to the local rod temperatures at the higher elevations resulting in very small heat transfer coefficients. The fluid conditions at the upper elevations reflected the heat release from the peak power zones below the upper elevations. For a skew-to-the-top power shape the heat release below the peak location would be smaller than in the FLECHT tests resulting in more efficient heat transfer from the rods.

Thus, this analysis is conservative.

Item 5:

Discuss the values of the thermal heat transfer coefficient during reflooding of the core.

Response:

Plots of the calculated FLECHT heat transfer coefficient used in the analysis for different evelations are shown in Figure 2. As the figure shows, the heat transfer decreases with increasing elevations. This is borne out by the data in WCAP-7931. Again, the low values at early times are believed due to the larger heat release to the fluid since the power peak is below the elevation being examined.

Item 6:

How much metal water reaction occurs during the LOCA?

Response:

See Table 1.

Item 7:

Identify the peak fuel clad temperatures and the times at which they occur.

Response:

See Table 1.

TABLE 1

RESULTS OF ANALYSIS

Fuel Region	Elevation Feet	Peak Rod Power kw/ft	Hot Spot Clad Temp. at Bottom of Core Recovery, Sec.	Peak Clad Temp. at Hot Spot, °F	Time of Peak Clad Temp., Sec.	Metal Water Reaction at Hot Spot, % of Original Clad Volume
Region 3, With Flattened Rods	6	14.2	1610	1800	86	1.5
	8	13.35	1570	1800	113	2.9
	10	12.25	1250	1800	206	2.1
Region 3 Intact Rods	6	14.2	2080	2300	72	7.9
	8	13.9	2050	2300	95	10.2
	10	13.6	1660	2300	205	14.0

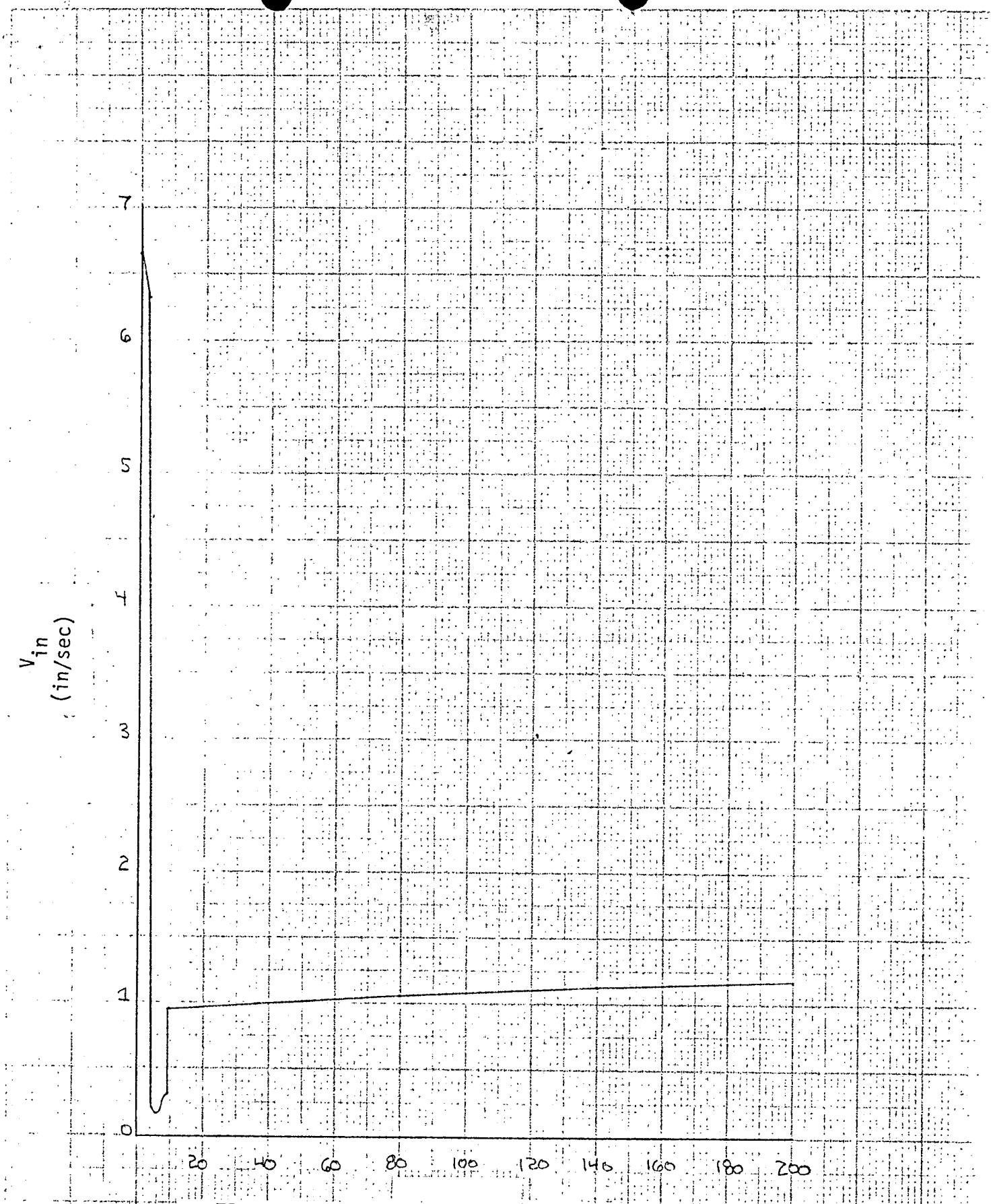

V_{in} (in/sec)
0
1
2
3
4
5
6
7
20
40
60
80
100
120
140
160
180
200
TIME AFTER BOTTOM OF CORE RECOVERY - SEC.

FIGURE 1

CURVE NO.

FLECHT Reflood Heat Transfer
Calculated Using WCAP-7931

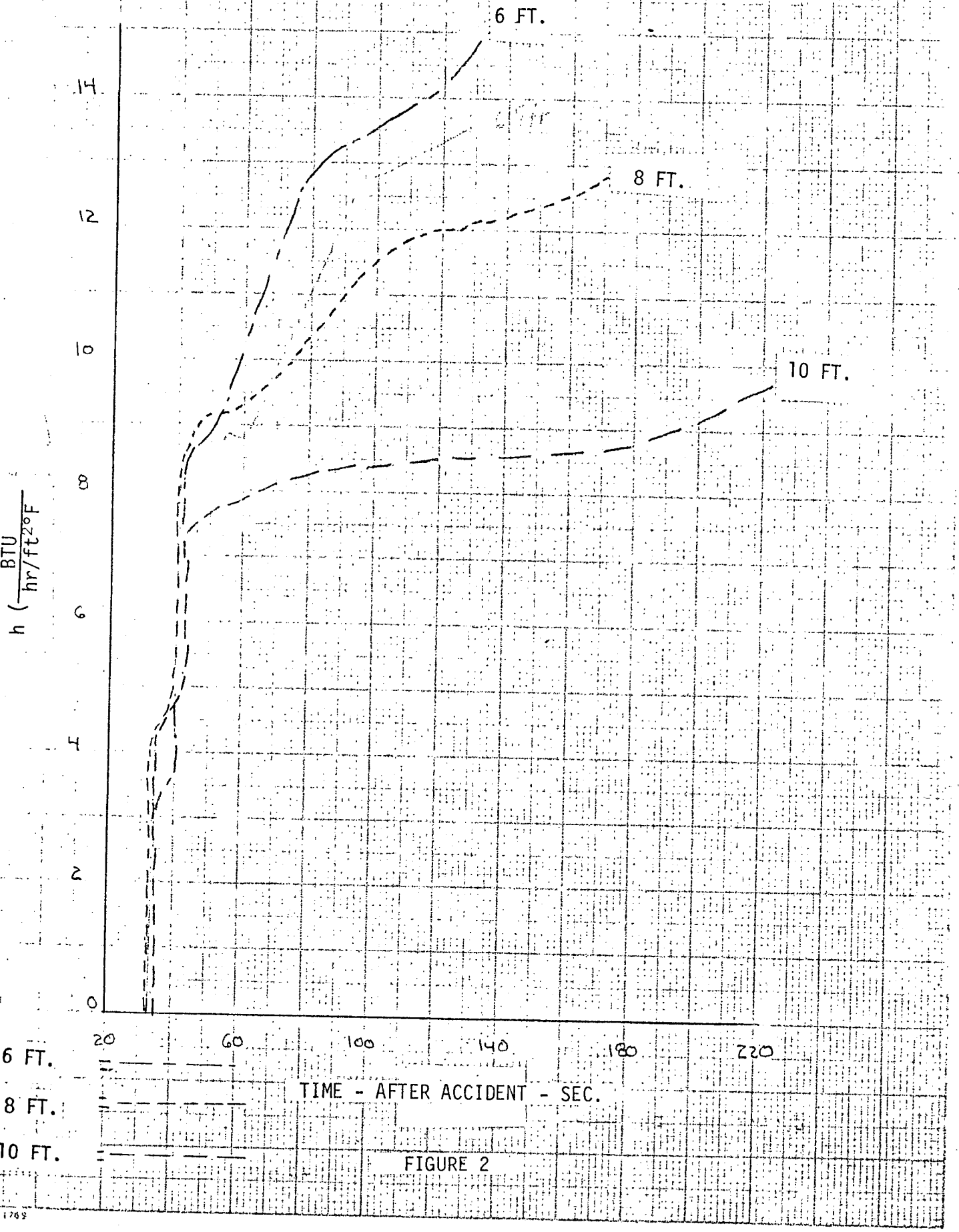


FIGURE 2

SIGNATURE _____ DATE _____ CURVE NO. _____