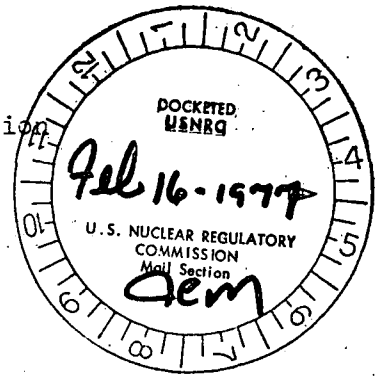
Consumers Power Company

Regulatory Docket File

General Offices: 212 West Michigan Avenue, Jackson, Michigan 49201 • Area Code 517 788-0550

February 14, 1977



Director of Nuclear Reactor Regulation
Att: Mr Albert Schwencer, Chief
Operating Reactor Branch No 1
US Nuclear Regulatory Commission
Washington, DC 20555

DOCKET 50-255, LICENSE DPR-20 -
PALISADES PLANT - PRIMARY SYSTEM
PRESSURE INCREASE TO 2,100 PSIA

In response to your requests in our meeting of January 19, 1977 and in subsequent telephone conversations, the following additional information is being provided in support of the Technical Specifications Change to increase the Palisades primary system pressure to 2,100 psia (submitted by letter dated January 3, 1977).

A question was raised concerning the adequacy of our fracture toughness requirement and associated curves. The analysis and associated curves provided by letter dated January 6, 1977 did assume an operating pressure greater than 2,100 psia (see Page 3-10 of reference letter).

In answer to your questions concerning steam generator tube stresses and steam generator tube plugging criteria, please refer to the report entitled "Analysis To Determine Allowable Tube Wall Degradation for Palisades Steam Generators," which was transmitted under cover letter dated February 12, 1976 and subsequently amended in letters dated March 22, 1976 and April 6, 1976. Review of this report indicates that:

1. All transients analyzed in the report, including LOCA, steam line break, and normal operation, assumed a primary system operating pressure of 2,100 psia.

2. The question of the effect of different LOCA break sizes and locations on steam generator tube stress was addressed in the report via a sensitivity study. Refer to Figures B.5 and B.6 in the report.

You also requested pertinent heatup code input at end-of-bypass and beginning-of-core-recovery for the worst break as reported in XN-76-52, "Operation of the Palisades Reactor at 2100 Psia: A LOCA, Thermal-Hydraulic, Neutronics, and

1665

Mechanical Design Assessment," and for the same break at 1,800 psia as reported in XN-76-4, Supplement 2, "Palisades LOCA Analysis Using the ENC WREM-Based PWR ECCS Evaluation Model." The worst break is the 1.0 DES/PD break in Loop 1 for Type D fuel. This information is provided in Tables 1 through 3 (attached).

David A Bixel
Nuclear Licensing Administrator

CC: JGKeppler, USNRC

TABLE 1. Selected Hot Rod Temperatures at EOBY*

Axial Node	Elevation From Core Bottom, In	Fuel Average Temp, °F		Clad Outside Surface Temp, °F	
		2,100 Psia	1,800 Psia	2,100 Psia	1,800 Psia
6	59.4	1,213	1,264	1,060	1,214
11	74.4	1,322	1,377	1,144	1,315
15	86.4	1,351	1,409	1,166	1,343
19**	98.4	1,435	1,471	1,231	1,383

*EOBY = 16.82 s for 2,100 psia case; = 21.85 s for 1,800 psia case.
**Peak clad temperature node.

TABLE 2. Selected Hot Rod Temperatures at BOCREC*

Axial Node	Elevation From Core Bottom, In	Fuel Average Temp, °F		Clad Outside Surface Temp, °F	
		2,100 Psia	1,800 Psia	2,100 Psia	1,800 Psia
6	59.4	1,439	1,514	1,431	1,506
11	74.4	1,574	1,647	1,562	1,631
15	86.4	1,609	1,683	1,594	1,663
19**	98.4	1,677	1,731	1,657	1,709

*BOCREC = 35.34 s for 2,100 psia case; however, the temperatures given correspond to 34.32 s because a data edit was not available for the exact time of BOCREC.
BOCREC = 40.54 s for 1,800 psia case.
**Peak clad temperature node.

TABLE 3. Reflood Input to Heatup Code at BOCREC

Coolant Saturation Temperature

2,100 Psia		1,800 Psia	
Time	T_{sat}, °F	Time	T_{sat}, °F
16.82	275.0	21.85	272.3
33.20	269.0	35.2	268.1
53.20	265.0	45.2	266.2
83.20	262.0	65.2	262.4
120.10	257.6	100.1	259.3
160.10	254.0	150.1	254.4
200.10	250.3	250.1	246.1
250.10	246.0		

Core Inlet Subcooling

2,100 Psia Case - 178.6°F
1,800 Psia Case - 169.0°F

Core Flooding Rate

2,100 Psia Case - See Figure 3.23 of Reference 1
1,800 Psia Case - See Figure 2.22 of Reference 2

Inlet Core Flow

2,100 Psia Case - See Figure 3.27 of Reference 1
1,800 Psia Case - See Figure 2.26 of Reference 2

References

1. XN-76-52, Operation of the Palisades Reactor at 2100 Psia: A LOCA, Thermal-Hydraulics, Neutronics, and Mechanical Design Assessment

2. XN-76-4, Supplement 2, Palisades LOCA Analyses Using the ENC WREM-Based PWR ECCS Evaluation Model