



**Consumers
Power
Company**

General Offices: 212 West Michigan Avenue, Jackson, Michigan 49201 • (517) 788-0550

June 6, 1980

Director, Nuclear Reactor Regulation
Att Mr Dennis M Crutchfield, Chief
Operating Projects Branch No 5
US Nuclear Regulatory Commission
Washington, DC 20555

DOCKET 50-255 - LICENSE DPR-20 -
PALISADES PLANT - H FUEL CYCLE

The attached information was requested by Mr H Balukjian and Mr L Philips
of the NRC as a result of our June 5, 1980 meeting concerning the Palisades
H fuel cycle.

David P Hoffman
Nuclear Licensing Administrator

CC JGKepler, USNRC
NRC Resident Inspector-Palisades

Attachment 4 Pages

*Acc
5/1*

80 06110/65

P

SUMMARY OF CYCLE 4 DNB ANALYSIS

<u>Design Reactor Core Conditions</u>	<u>Design</u>	<u>Nominal</u>
Core Power, (Mwt)	2910	2530
Total Core Flow Rate, (10^6 lbm/hr)	120.2	121.7
Active Core Flow Rate, (10^6 lbm/hr)	113.0	114.4
Core Inlet Temperature, ($^{\circ}$ F)	542.5	537.5
Core Pressure, (psia)	2010	2060
Core Pressure Drop, (psi)	13.17 \pm 0.5	13.5 \pm 0.5
Fuel Bundles in Core	204	204
Core Average Linear Heating Rate, (kw/ft)	6.18	5.37
Fraction of Heat Generated in Fuel	0.975	0.975
MDNBR (at design overpower)	1.305	-----
<u>Nuclear Peaking Factors</u>		
Assembly Radial Peaking, F_R	1.45	
Pin Power Peaking (for interior rods), $F_R \times F_L$	1.66	
Pin Power Peaking (for narrow gap edge rods), $F_R \times F_L$	1.77	
Pin Power Peaking (for H fuel wide gap edge rods), $F_R \times F_L$	1.90	
Axial Peaking, F_a (at 0.6 of active fuel height)	1.41 (H fuel wide gap edge rods) 1.51 (other rods)	
Engineering Factor, F_e	1.03	
Total Peaking Factor	2.76	
Maximum Linear Heating Rate, (kw/ft) Nominal	15.28	
Maximum Linear Heating Rate, (kw/ft) at Overpower	17.23	

Limiting Anticipated Transient

Core Power (including 1.02 uncertainty factor)(MWt)	2580.6
Primary Pressure (psia)	2010
Core Inlet Temperature (°F)	542.5
MDNBR	1.45

Fuel Bundle Descriptions

	<u>Batch E/G</u>	<u>Batch H</u>
Rod Diameter	.415 in	.417 in
Rod Pitch	.55 in	.55 in
Active Fuel Length	131.8 in	131.8 in
Number of Active Rods	208	208
Number of Poison Rods*	8	8
Instrument Tubes	1	1
Number of Guide Bars	8	8
Number of Spacers	10	10
Average Heating Rate at 2530 MWt	5.429 kw/ft,	5.429 kw/ft.

* Poison rod clusters are removable; number of bundles actually containing poison rods is given below.

Distribution of Bundle Types - Cycle 4

<u>Bundle Type</u>	<u>Active Rods/ Bundle</u>	<u>No. of Bundles</u>	<u>No. of Bundles with Poison Rods</u>	<u>Active Fuel Length/Rod</u>	<u>Total Fuel Length</u>
D	216	60	----	131.4	141,912 ft
E/G	208	8/68	8/20	131.8	173,625
H	208	68	16	131.8	155,348
				Total	470,885 ft

DNB ANALYSIS

Comparison of Cycle 3 and Cycle 4

	<u>Cycle 3</u>	<u>Cycle 4</u>
Nominal Core Power (MWt)	2530	2530
Design Overpower (MWt)	2910	2910
Total Vessel Flow Rate (10^6 lbm/hr)	120.2	120.2
Active Core Flow Rate (10^6 lbm/hr)	113.0	113.0
Core Inlet Temperature ($^{\circ}$ F)	542.5	542.5
Core Pressure (psia)	2010	2010
Core Pressure Drop (psi)	13.2 \pm 0.5	13.2 \pm 0.5
Fuel Bundles in Core	204	204
Core Average Linear Heating Rate (kw/ft) at 2530 MWt	5.37	5.37
Fraction of Heat Generated in Fuel	0.975	0.975
Total Peaking Factor (F_Q)	2.76	2.76
MDNBR (at design overpower)	1.309	1.305
Hot Bundle Flow Factor	0.98	0.97
MDNBR (worst anticipated transient*)	1.43	1.45

*Four pump coastdown.