Consumers
Power
Company

General Offices: 212 West Michigan Avenue, Jackson, Michigan 49201 • Area Code 517 788-.. 550

September 26, 1977

Director of Nuclear Reactor Regulation
Att: Mr Don K Davis, Acting Branch Chief
Operating Reactor Branch No 2
US Nuclear Regulatory Commission
Washington, DC 20555

DOCKET 50-155, LICENSE DPR-6 -
BIG ROCK POINT PLANT - T/S CHANGE
REQUEST - DRY OUT TIME LIMITS

Transmitted herewith are three (3) original and thirty-seven (37) conformed copies of a proposed change to the Technical Specifications for the Big Rock Point Plant, Docket 50-155, License DPR-6.

The purpose of this change is to provide specifications on the assembly averaged power-void relation to ensure that dry out times in the event of a Loss of Coolant Accident (assuming actual core operating conditions) will be conservative when compared to the dry out times used in the LOCA analysis. This, in turn, will ensure the applicability of the Technical Specifications MAPLHGR limits.

David A Bixel

David A Bixel
Nuclear Licensing Administrator

CC: JGKeppler, USNRC

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CONSUMERS POWER COMPANY
Docket 50-155
Request for Change to the Technical Specifications
License DPR-6

For the reasons hereinafter set forth, it is requested that the Technical Specifications contained in Facility Operating License DPR-6, Docket 50-155, be changed as described in Section I, below:

I. Changes

A. Add to bottom of Table 1:

"Minimum Bundle Dry Out Time**** Figure 1 Figure 2 Figure 2 Figure 2"

B. Add footnote to Table 1:

"****Based on the General Electric Bundle Dry Out Correlation for Non-Jet Pump Boiling Water Reactors (NEDE-20566)."

C. Add new Figures 1 and 2 after Table 2.

NOTE: Corrected Technical Specifications pages and new figures are attached. These pages also reflect the Technical Specifications change request dated April 15, 1977.

II. Discussion

The Big Rock Point ECCS model utilizes an empirical correlation to determine the duration of nucleate boiling heat transfer in the early period following the postulated pipe break. This correlation for time to dry out is found to be proportional to the ratio of assembly water volume to power. Dry out time is a significant parameter in determining the extent of nucleate and transition boiling heat transfer, and consequently the peak cladding temperature.

During power operation, the assembly average void fraction and assembly power for ENC 11 x 11 and GE 9 x 9 fuel shall be such that the following relationship is satisfied:

$$\text{Actual Dry Out Time} \geq T(Q)$$

where the actual dry out time is a function of assembly power and assembly average voids, which in turn are computed (utilizing the GE dry out correlation for nonjet pump plants) on the basis of real time in core measurements involving the total bundle power, the axial power distribution, the inlet subcooling and the coolant flow rate. The parameter T(Q) is the dry out time used in the ECCS heatup analysis as a function of total bundle peak linear heat generation rate Q. Q is equal to the MAPLHGR limit times the number of active fuel rods in the assembly. The function T(Q) is given in Figure 1 for ENC fuel and in Figure 2 for GE fuel.

The specification on the assembly averaged power-void relation provides assurance that dry out times in the event of a LOCA for actual core operating conditions (considering such factors as inlet subcooling, radial power distribution, axial power distribution) will be conservative relative to the dry out times used in the LOCA analysis; hence, assuring applicability of the MAPLHGR limits. The power-void relation is intended for operations at normal core pressure (1350 psia) but is otherwise applicable without restriction on either core power or flow. The factor of 1.02 conservatism in MAPLHGR limits is retained in the power-void relationship since dry out times actually used in establishing MAPLHGR limits are based on 2% higher radial powers than those associated with the Q values in the power-void relation.

III. Conclusion

Based on the foregoing, both the Big Rock Point Plant Review Committee and the Safety and Audit Review Board have concluded that this change does not involve an unreviewed safety question.

CONSUMERS POWER COMPANY

By C R Bilby

C R Bilby, Vice President
Production & Transmission

Sworn and subscribed to before me this 26th day of September 1977.

Sylvia B Ball

Sylvia B Ball, Notary Public
Jackson County, Michigan
My commission expires April 13, 1980.

TABLE 1

	Reload E-G and Modified E-G F & J-2	Reload G	Reload G-1U	Reload G-3
Minimum Core Burnout Ratio at Overpower	1.5*	1.5**	1.5**	1.5**
Transient Minimum Burnout Ratio in Event of Loss of Recirculation Pumps From Rated Power	1.5	1.5	1.5	1.5
Maximum Heat Flux at Overpower, Btu/h-ft^2	500,000	395,000	407,000	392,900
Maximum Steady State Heat Flux, Btu/h-ft^2	410,000	324,000	333,600	322,100
Maximum Average Planar Linear Heat Generation Rate, Steady State, kW/ft	***	***	***	***
Stability Criterion: Maximum Measured Zero-to-Peak Flux Amplitude, Percent of Average Operating Flux	20	20	20	20
Maximum Steady State Power Level, MW_t	240	240	240	240
aximum Value of Average Core Power Density @ 240 MW_t, kW/L	46	46	46	46
Nominal Reactor Pressure During Steady State Power Operation, psig	1335	1335	1335	1335
Minimum Recirculation Flow Rate, Lb/h (Except During Pump Trip Tests or Natural Circulation Tests as Outlined in Section 8)	6×10^6	6×10^6	6×10^6	6×10^6
Minimum Bundle Dry Out Time*****	Figure 1	Figure 2	Figure 2	Figure 2

Rate-of-Change-of-Reactor Power During Power Operation:

Control rod withdrawal during power operation shall be such that the average rate-of-change-of-reactor power is less than 50 MW_t per minute when power is less than 120 MW_t, less than 20 MW_t per minute when power is between 120 and 200 MW_t, and 10 MW_t per minute when power is between 200 and 240 MW_t.

*Based on correlation given in "Design Basis for Critical Heat Flux Condition in Boiling Water Reactors," by J M Healzer, J E Hench, E Janssen and S Levy, September 1966 (APED 5286 and APED 5286, Part 2).

**Based on Exxon Nuclear Corporation Synthesized Hench Levy.

***To be determined by linear extrapolation from Table 2 attached.

* Based on the General Electric Bundle Dry Out Correlation for Nonjet Pump Boiling Water Reactors (NEDE-20566).

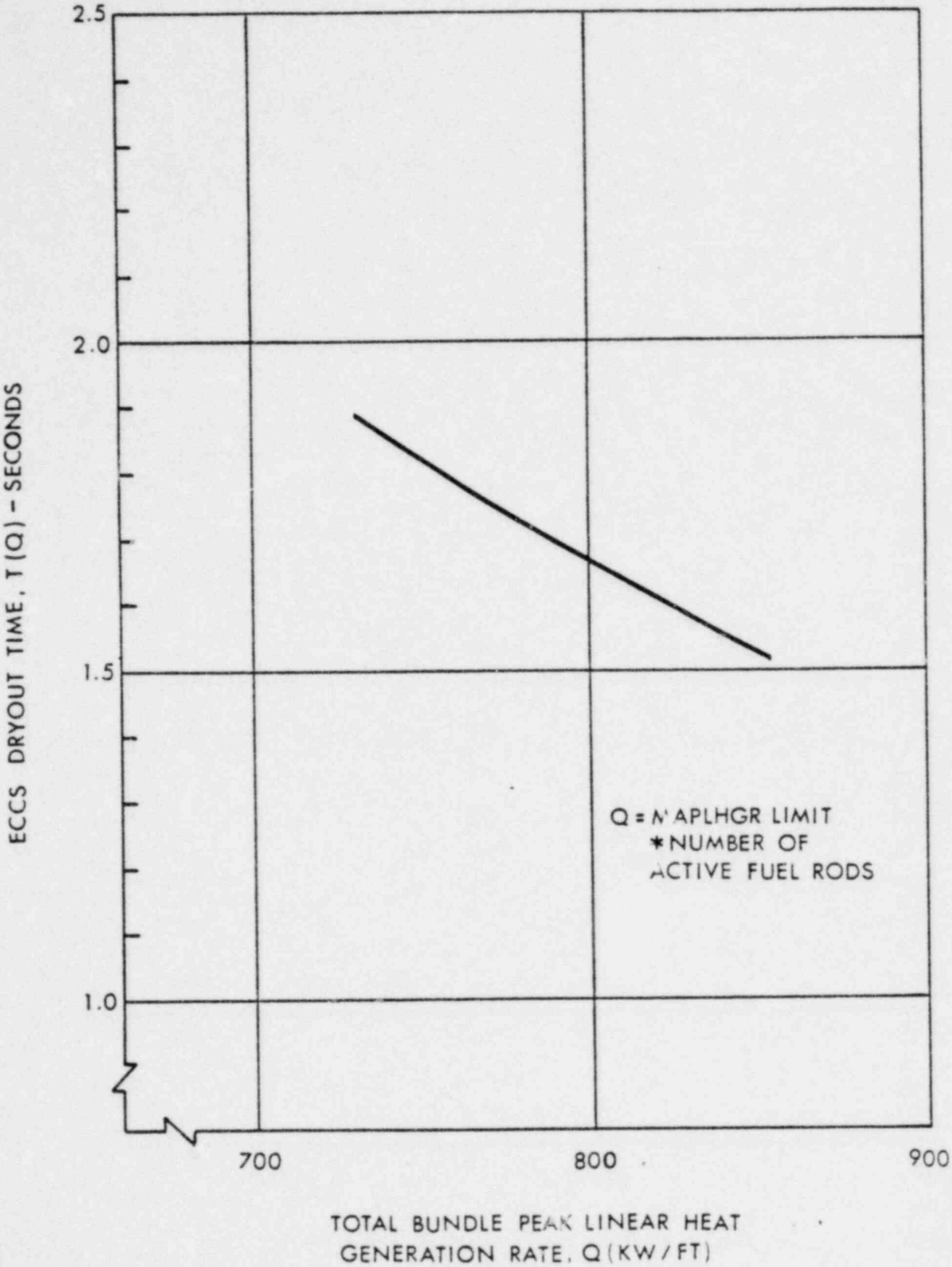

Figure 1

FUNCTION T(Q) FOR ENC 11X11 FUEL
POWER VOID RELATION

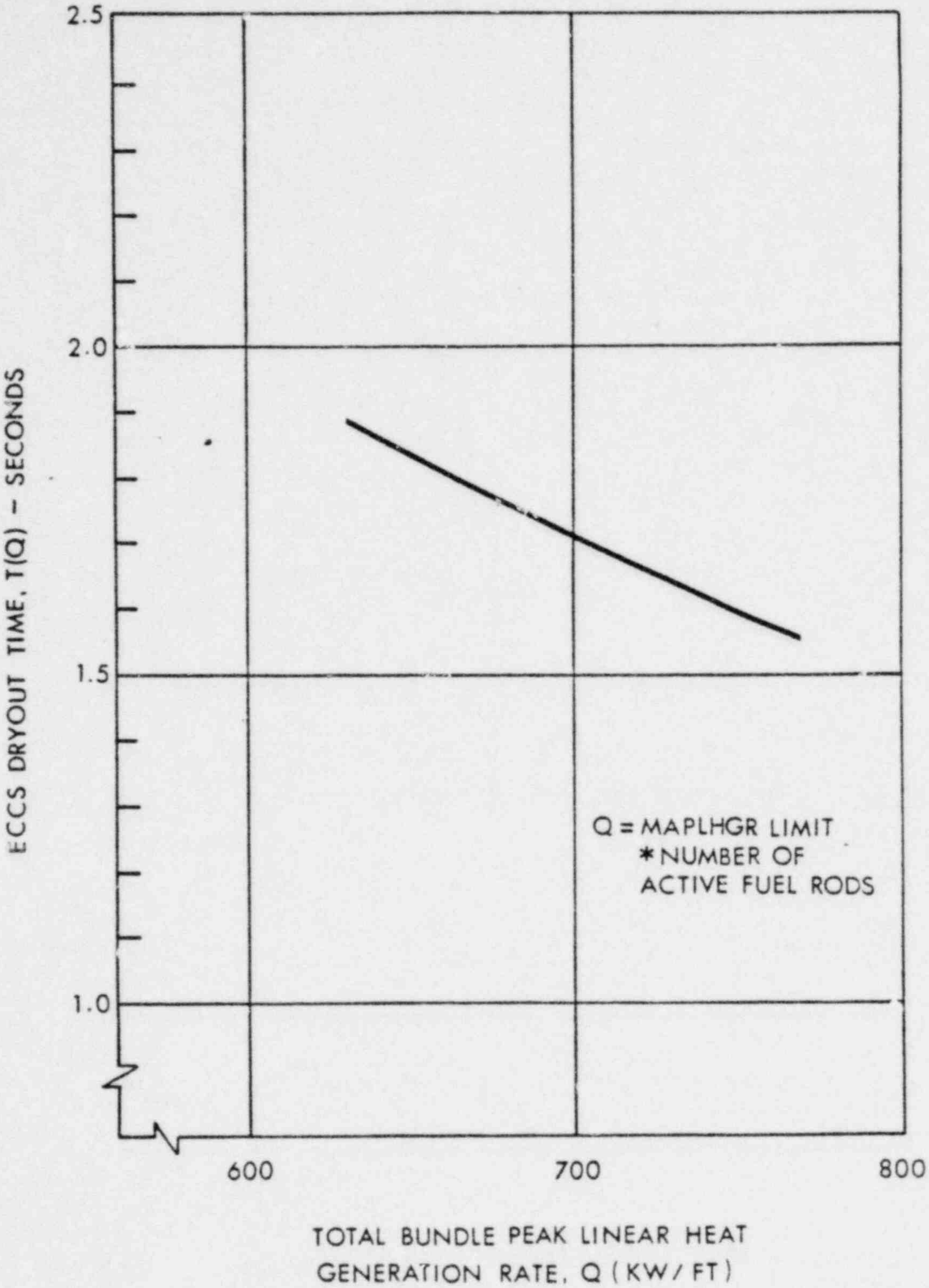

Figure 2

FUNCTION T(Q) FOR GE 9X9 FUEL
POWER VOID RELATION

NRC FORM 195
(2-76)

U.S. NUCLEAR REGULATORY COMMISSION

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DOCKET NUMBER: 50-155

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TO: Mr. Don K Davis

FROM: Consumers Power Co.
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David A. Bixel

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ENCLOSURE

License No. DPR-6 Appl for Amend: tech specs proposed change concerning providing specifications on the assembly averaged power-void relation to ensure that dry out times in the enent of a LOCA (assuming actual core operating conditions) will be conservative when compared to the dry out times used in the LOCA analysis... Notorized 09/26/77...

5p

PLANT NAME: BIG ROCK POINT

jcm 09/29/77

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