

50-289

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## DESCRIPTION

Ltr trans the following:

PLANT NAME: Three Mile Island #1

## ENCLOSURE

Discussion of maggins available to cover the  
rod bow penalty....& a request that tech specs  
change #36 be withdrawn.....

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## SAFETY

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October 19, 1976

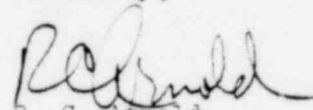
Director of Nuclear Reactor Regulation  
Attn: Mr. Robert W. Reid, Chief  
Operating Reactors Branch No. 4  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Dear Sir:

Three Mile Island Nuclear Station Unit 1 (TMI-1)  
Docket No. 50-289  
Operating License DPR-50  
Technical Specification Change Request 36

Pursuant to the telephone conversation between Mr. R. Labelle and R. Landry of the NRC and representatives of the Babcock & Wilcox Company, the attached discussion of margins available to cover the rod bow penalty is forwarded. Furthermore, we request that Technical Specification Change Request No. 36 be withdrawn from consideration.

Sincerely,

  
R. C. Arnold  
Vice President

RCA:JJM:rk  
Enclosures  
cc: Mr. Weldon B. Arehart  
Mr. Harry B. Reese, Jr.



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## TMI-1 AVAILABLE MARGIN TO OFFSET PERCEIVED DNBR ROD BOW PENALTY

The NRC - imposed DNBR penalty for end-of-third-cycle has been calculated to be 10.4% \* based upon the B&W bow divided by 138 times the DNBR penalty (at full closure) calculated for B&W plants at 2400 PSIA. The margins which B&W has identified to offset this penalty are as follows:

Credit for flow area reduction factor, FA, at 1.30 DNBR	= 1.0% DNBR
Available Vent Valve Credit at 1.30 DNBR	= 7.5% DNBR
Credit for elimination of densification power spike penalty	= 4.0% DNBR
Credit resulting from analysis at higher than licensed power	= 3.0% DNBR
(2568 Mwt vs. 2535 MWT)	
TOTAL AVAILABLE CREDITS	= 15.5% DNBR

The following discussion provides documentation for the claimed 7.5% credit available from elimination of the vent valve penalty. This credit was calculated on the basis of analyses performed to define Technical Specification Limits for Cycle 2 operation of TMI-1.

### PRESSURE-TEMPERATURE ENVELOPE

The original envelope generated by B&W for Cycle 2 was based upon the 4 Pump, open vent valve (ovv) limit curve, which incorporated a 1.9% DNBR Densification Penalty (and 4.6% Vent Valve Flow Penalty).

The Limit Curve was defined by the following points:

Pressure (PSIA)	TOUT
1800	586.8
2000	606.4
2200	621.2
2400	634.6

The corresponding variable low pressure trip setpoint is:

$$P = 11.75 \text{ Tout} - 5103 \text{ (PSIG)} \quad (1)$$

The revised envelope, provided in Cycle 2 Tech. Spec. Rev. 3 (and submitted by Met. Ed. as Change Request 36), was based on the more limiting of the 3 or 4 Pump Limit Curves, which incorporated a 5.9% DNBR densification penalty and assumed closed vent valves. The limit curve was defined by the following:

Pressure (PSIA)	TOUT (3 Pump Case)
1800	589.3
2000	608.9
2200	623.1
2400	635.7

The corresponding variable low pressure trip setpoint is:

$$P = 11.379 \text{ Tout} - 4914 \text{ (PSIG)} \quad (2)$$

\* B&W calculation - latest NRC calculation shows 11.2% penalty (end of Cycle 3)

#### TMI-1 CYCLE 2 TECH. SPECS.

The available credit remaining from the unused vent valve credit was based upon the assumption that TMI-1 was operating under the more restrictive of the two variable low pressure trip setpoints (equation 1). Available credit was calculated by taking the "full vent credit" of 11.5% less the difference in densification penalties between the original and corrected curves ( $11.5\% - 4\% = 7.5\%$ ). A subsequent analysis has shown that by utilizing equation 1 the margin between the corresponding limit curve and 1.30 DNBR is at least 8.5% for all pressures. For example, at 2200 PSIA, the maximum outlet temperature is 621.2 F, as shown in Tech. Spec. Figure 2.1-3, and the corresponding MDNBR is 1.41 for the closed vent valve case, including 5.9% densification penalty. Thus the quoted available "vent valve" margin of 7.5% is valid when equation (1) is utilized as the variable low pressure trip setpoint. It is therefore recommended that the proposed P-T envelope presented in Change Request 36 be withdrawn in order to preserve this margin.

#### FLUX/FLOW TRIP SETPOINT

The original setpoint specified for Cycle 2 operation (1.08) was justified by a transient thermal-hydraulic analysis which assumed one open vent valve and a 1.9% DNBR densification penalty. This analysis justified a maximum allowable setpoint (error corrected) of 1.08.

When the densification penalty was revised to 5.9% (DNBR) a new T-H transient analysis was performed to justify the previously specified setpoint of 1.08. This analysis incorporated the 5.9% densification penalty and assumed that all vent valves remain closed. The resulting MDNBR of 1.47 demonstrates that the minimum available margin to DNB ( $1.47 - 1.30$ ) is greater than the 7.5% available vent valve credit quoted for coverage of the rod bow penalty.

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