

March 21, 1985



VIRGINIA POWER

Mr. Harold R. Denton, Director  
Office of Nuclear Reactor Regulation  
Attn: Mr. Steven A. Varga, Chief  
Operating Reactors Branch No. 1  
Division of Licensing  
U. S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Serial No. 85-064  
PSE/RCA/mjp/2001N  
Docket Nos. 50-280  
50-281  
License Nos. DPR-32  
DPR-37

Gentlemen:

VIRGINIA POWER  
REDUCTION IN ROD BOW DNBR PENALTY FOR  
SURRY POWER STATION UNIT NOS. 1 AND 2

In a February 21, 1978 letter from Mr. C. M. Stallings of Virginia Power to Mr. E. G. Case of the NRC (Serial No. 095) Virginia Power proposed the elimination of a  $F_{\Delta H}^N$  penalty, due to rod bow, from the Surry Power Station Technical Specifications. An enclosed safety evaluation noted that the appropriate DNBR penalty, then conservatively estimated to be 11.7%, was met by more than 18% retained DNBR margin. The NRC subsequently approved the Technical Specification change. Later, the NRC approved generic 11.4% full flow and 14.0% low flow penalties as applicable to all 15 x 15 fuel.

Through the use of an improved fuel rod bowing evaluation methodology, Westinghouse has since successfully demonstrated to the NRC that the existing rod bow penalty on 15x15 L-grid fuel can be further reduced. Virginia Power has employed this benefit to reduce the rod bow penalty, allowing for an accompanying decrease in Surry Power Station's retained DNBR margin. Specifically, the 7% DNBR credit associated with the densification power spike has been removed from the retained margin. Implementation of these changes has no impact on the Technical Specifications or the conservatism of previous DNBR analyses. A safety evaluation is therefore provided in Enclosure 1 for your information only.

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This change has been reviewed and approved by the Station Nuclear Safety and Operating Committee and the Safety Evaluation and Control Staff. It has been determined that this penalty reduction does not involve any unreviewed safety questions as defined in 10CFR50.59 or a significant hazards consideration as defined in 10CFR50.92.

Very truly yours,

W. L. Stewart

Enclosure:  
Safety Evaluation for proposed Rod Bow Penalty changes

cc: Dr. J. Nelson Grace  
Regional Administrator  
Region II

Mr. D. J. Burke  
NRC Resident Inspector  
Surry Power Station

Mr. Charles Price  
Department of Health  
109 Governor Street  
Richmond, Virginia 23219

## Safety Evaluation

An improved Westinghouse methodology to analyze the effect of fuel rod bowing was presented in References 1, 2 and 3 and approved by the NRC in Reference 4. VEPCO intends to apply the results of these methods to determine the departure from nucleate boiling ratio (DNBR) effects of rod bow for the Surry Power Station Units 1 and 2, which are fueled with Westinghouse Standard 15 x 15 fuel assemblies. VEPCO will continue to use a conservative design uncertainty (F<sub>2U</sub>) value of 1.0815 (1.05 x 1.03) for evaluation of the total overall peaking factor F<sub>2</sub>, even though a smaller value can be justified based on the information presented in Figure 6.1 of Reference 1.

The total retained DNBR Margin for 15 x 15 fuel has been quantified to be 18.1% (Ref. 5). The component parts of this margin are identified in the attached Table 1, taken from Reference 5. This retained margin has been used in the past to offset the previous (Ref 6) DNBR rod bow penalties of 11.4% (full flow) and 14% (low flow) associated with 85% gap closure data. The new L-grid rod bow DNBR penalties given in Figure 6-4 of Reference 1 are substantially less than these values. Therefore, the removal of the 7% DNBR credit associated with the densification power spike from the 18.1% retained DNBR margin is justifiable because adequate margin is available. The retained DNBR margin would be reduced to 11.1%, which is more than adequate to offset the Reference 1 L-grid rod bow penalties. The removal of the densification power spike will be seen directly as an increase in DNBR in any future Surry licensing submittals. This will

offer two benefits: 1) allow the calculated DNBR numbers to more accurately reflect the true margin to the DNB limit and 2) simplify the procedure associated with performing a DNBR calculation.

As a result of our evaluation, we have determined that the implementation of the updated rod bow penalty and the removal of the densification power spike credit for Surry does not result in an unreviewed safety question as defined in 10CFR50.59. In addition, the change does not involve a "significant hazards consideration". There is a reduction of the retained DNBR margin due to the removal of the densification penalty; however, this is compensated for by implementation of the NRC-approved rod bow penalties, which enable a commensurate level of safety to be maintained.

Table 1: Retained DNBR Margin

W Standard 15 x 15 Fuel

1.24 DNBR vs. 1.30 DNBR	4.8%
Pitch Reduction	3.3%
TDC .019 vs. .038	3.0%
Densification Spike	7.0%
Total Retained Margin	<u>18.1%</u>

## References

1. J. Skaritka, et al., "Fuel Rod Bow Evaluation", WCAP-8691 Rev 1, (Proprietary) and WCAP-8692 Rev. 1 (Non-proprietary), July 1979.
2. Letter, E. P. Rahe, Jr. (W) to J. R. Miller (NRC), "Partial Response to Request Number 1 for Additional Information on WCAP-8691 Rev. 1," NS-EPR-2515, dated October 9, 1981.
3. Letter, E. P. Rahe, Jr. (W) to J. R. Miller (NRC), "Remaining Response to Request Number 1 for Additional Information on WCAP-8691 Rev. 1," NS-EPR-2572, dated March 16, 1982.
4. Letter, C. O. Thomas (NRC) to E. P. Rahe, Jr. (W), "Acceptance for Referencing of Licensing Topical Report WCAP-8691(P) / WCAP-8692(NP)," dated December 29, 1982.
5. Letter, C. Eicheldinger (W) to V. Stello, Jr. (NRC), NS-CE-1161, August 13, 1976.
6. Letter, T. M. Anderson (W) to J. F. Stolz (NRC), NS-TMA-2053, dated March 16, 1979.