



UNITED STATES
NUCLEAR REGULATORY COMMISSION
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ENCLOSURE

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATING TO APPENDIX F TO TOPICAL REPORT BAW-10187P,
"STATISTICAL CORE DESIGN FOR B&W-DESIGNED 177 FA PLANTS"
B&W FUEL COMPANY

1. INTRODUCTION

In a letter of March 24, 1993 (Ref. 1), the U.S. Nuclear Regulatory Commission (NRC) accepted topical report BAW-10187P, "Statistical Core Design for B&W-Designed 177 FA Plants" (Ref. 2) for referencing in licensing applications subject to the limitations delineated in the NRC safety evaluation report. Application of the statistical core design (SCD) method described in BAW-10187P resulted in a departure from nucleate boiling ratio (DNBR) statistical design limit (SDL) of 1.237 for the hottest fuel pin. Subsequently, B&W Fuel Company (BWFC) submitted Appendix F to BAW-10187P entitled "Exit Limited SCD Analysis" for NRC review (Ref. 3).

2. EVALUATION

In the original submittal of topical report BAW-10187P, the assumption was made that the SDL did not vary significantly with axial power shape. Subsequent studies, however, have indicated that there are some conditions under which the SDL is sensitive to axial power shape (Ref. 3). This sensitivity was found to exist if the minimum DNBR is located at or near the core exit.

To obtain an SDL that is conservative for all axial power shapes, a series of LYNXT computer code cases were run by BWFC and response surface models were generated, each representing a different axial power shape. A maximum hot pin SDL that bounded all cases, including core exit limited cases, was found to be 1.313. A sufficient number of cases and different axial power shapes were evaluated using approved methods to ensure that this limit provides the limiting hot pin 95 percent protection at a 95 percent confidence level against departure from nucleate boiling and that similar protection is provided to all other fuel pins on a core-wide basis. Therefore, the staff finds a hot pin SDL of 1.313 acceptable.

3. CONCLUSIONS

The staff finds the application of the information in Appendix F to BAW-10187P acceptable for referencing in license applications for B&W-designed 177 FA (fuel assembly) plants subject to the same limitations delineated in the NRC safety evaluation report for BAW-10187P (Ref. 1). The previously approved hot pin SDL of 1.237 has been increased to 1.313 to conservatively bound all axial power shapes.

4. REFERENCES

- (1) Letter from A. C. Thadani (NRC) to J. H. Taylor (BWFC), "Acceptance for Referencing of Topical Report BAW-10187P, Statistical Core Design for B&W-Designed 177 FA Plants," (TAC No. M85118), March 24, 1993.
- (2) BAW-10187P, "Statistical Core Design for B&W-Designed 177 FA Plants," B&W Fuel Company, November 1992.
- (3) Letter from J. H. Taylor (BWFC) to Document Control Desk (NRC), JHT/94-35, transmitting Appendix F to BAW-10187P, February 25, 1994.