

Lew W. Myers
Senior Vice PresidentOctober 26, 2000
L-00-118724-682-5234
Fax: 724-643-8069

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

**Subject: Beaver Valley Power Station, Unit No. 2
Docket No. 50-412, License No. NPF-73
Cycle 9 Reload and Core Operating Limits Report**

Beaver Valley Power Station, Unit No. 2 completed the eighth cycle of operation on September 23, 2000, with a burnup of 17,788.21 MWD/MTU. This letter describes the Cycle 9 reload design, provides a copy of the Core Operating Limits Report (COLR) in accordance with Technical Specification 6.9.5.d, and documents our review in accordance with 10 CFR 50.59 including our determination that no unreviewed safety question is involved.

The Cycle 9 core configuration features a low leakage pattern and involves fresh Region 11 fuel assemblies containing ZIRLO™ clad fuel tubes, ZIRLO™ guide thimble tubes, ZIRLO™ instrument tubes and ZIRLO™ mid grids. 29 Region 8A and 8B, 20 Region 9A and 12 Region 9B fuel assemblies were discharged and replaced with 1 reinserted Region 8B assembly, 48 fresh Region 11A fuel assemblies enriched to 4.20 nominal weight percent and 12 fresh Region 11B fuel assemblies enriched to 4.80 nominal weight percent.

FirstEnergy Nuclear Operating Company has performed a review of this reload core design including a review of the core characteristics to determine those parameters affecting the postulated accidents described in the Updated Final Safety Analysis Report (UFSAR). The consequences of those accidents described in the UFSAR which could potentially be affected by the reload core characteristics were evaluated in accordance with the NRC approved methodology described in WCAP-9272-P-A "Westinghouse Reload Safety Evaluation Methodology." The effect of the reload design was either accommodated within the conservatism of the assumptions used in the current analysis design basis, or it was demonstrated through evaluation that the reload parameters would not change the conclusions of the UFSAR.

No technical specification changes are required as a result of this reload design.

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The Core Operating Limits Report (COLR) is enclosed in accordance with Technical Specification 6.9.5.d. The COLR has been updated for this cycle by 1) revising the Technical Specification location in the first paragraph pursuant to Amendment No. 97, 2) revising the radial peaking factor at rated thermal power [F_{XY} (RTP)] limits for unrodded core planes on page 4.1-2, and 3) revising Figure 4.1-4 to address the maximum total peaking factor times relative power limits for the Cycle 9 core.

The Beaver Valley Onsite Safety Committee has reviewed the Reload Safety Evaluation and COLR and determined that this reload design will not adversely affect the safety of the plant and does not involve an unreviewed safety question.

If there are any questions concerning this matter, please contact Mr. Thomas S. Cosgrove, Manager, Licensing at 724-682-5203.

Sincerely,



Lew W. Myers

Enclosure

c: Mr. L. J. Burkhart, Project Manager
Mr. D. M. Kern, Sr. Resident Inspector
Mr. H. J. Miller, NRC Region I Administrator
Mr. L. E. Ryan (BRP/DEP)

LICENSING REQUIREMENTS MANUAL

4.1 CORE OPERATING LIMITS REPORT

This Core Operating Limits Report provides the cycle specific parameter limits developed in accordance with the NRC approved methodologies specified in Technical Specification Administrative Control 6.9.5.

Specification 3.1.3.5 Shutdown Rod Insertion Limits

The Shutdown rods shall be withdrawn to at least 225 steps.

Specification 3.1.3.6 Control Rod Insertion Limits

Control Banks A and B shall be withdrawn to at least 225 steps.

Control Banks C and D shall be limited in physical insertion as shown in Figure 4.1-1.

Specification 3.2.1 Axial Flux Difference

NOTE: The target band is $\pm 7\%$ about the target flux from 0% to 100% RATED THERMAL POWER.

The indicated Axial Flux Difference:

- a. Above 90% RATED THERMAL POWER shall be maintained within the $\pm 7\%$ target band about the target flux difference.
- b. Between 50% and 90% RATED THERMAL POWER is within the limits shown on Figure 4.1-2.
- c. Below 50% RATED THERMAL POWER may deviate outside the target band.

Specification 3.2.2 $F_Q(Z)$ and F_{xy} Limits

$$F_Q(Z) \leq \frac{CF_Q}{P} * K(Z) \quad \text{for } P > 0.5$$

$$F_Q(Z) \leq \frac{CF_Q}{0.5} * K(Z) \quad \text{for } P \leq 0.5$$

Where: $CF_Q = 2.3$

$$P = \frac{\text{THERMAL POWER}}{\text{RATED THERMAL POWER}}$$

$K(Z)$ = the function obtained from Figure 4.1-3.

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The F_{xy} limits [$F_{xy}(L)$] for RATED THERMAL POWER within specific core planes shall be:

$$F_{xy}(L) = F_{xy}(RTP) (1 + PF_{xy} * (1-P))$$

Where: For all core planes containing D-Bank:

$$F_{xy}(RTP) \leq 1.71$$

For unrodded core planes:

$$F_{xy}(RTP) \leq 1.74 \text{ from 1.80 ft. elevation to 2.30 ft. elevation}$$

$$F_{xy}(RTP) \leq 1.79 \text{ from 2.30 ft. elevation to 6.00 ft. elevation}$$

$$F_{xy}(RTP) \leq 1.83 \text{ from 6.00 ft. elevation to 7.70 ft. elevation}$$

$$F_{xy}(RTP) \leq 1.79 \text{ from 7.70 ft. elevation to 8.90 ft. elevation}$$

$$F_{xy}(RTP) \leq 1.68 \text{ from 8.90 ft. elevation to 10.2-ft. elevation}$$

$$PF_{xy} = 0.2$$

$$P = \frac{\text{THERMAL POWER}}{\text{RATED THERMAL POWER}}$$

Figure 4.1-4 provides the maximum total peaking factor times relative power ($F_Q^T * P_{rel}$) as a function of axial core height during normal core operation.

Specification 3.2.3 $F_{\Delta H}^N$

$$F_{\Delta H}^N \leq CF_{\Delta H} * (1 + PF_{\Delta H} (1 - P))$$

Where: $CF_{\Delta H} = 1.62$

$$PF_{\Delta H} = 0.3$$

$$P = \frac{\text{THERMAL POWER}}{\text{RATED THERMAL POWER}}$$

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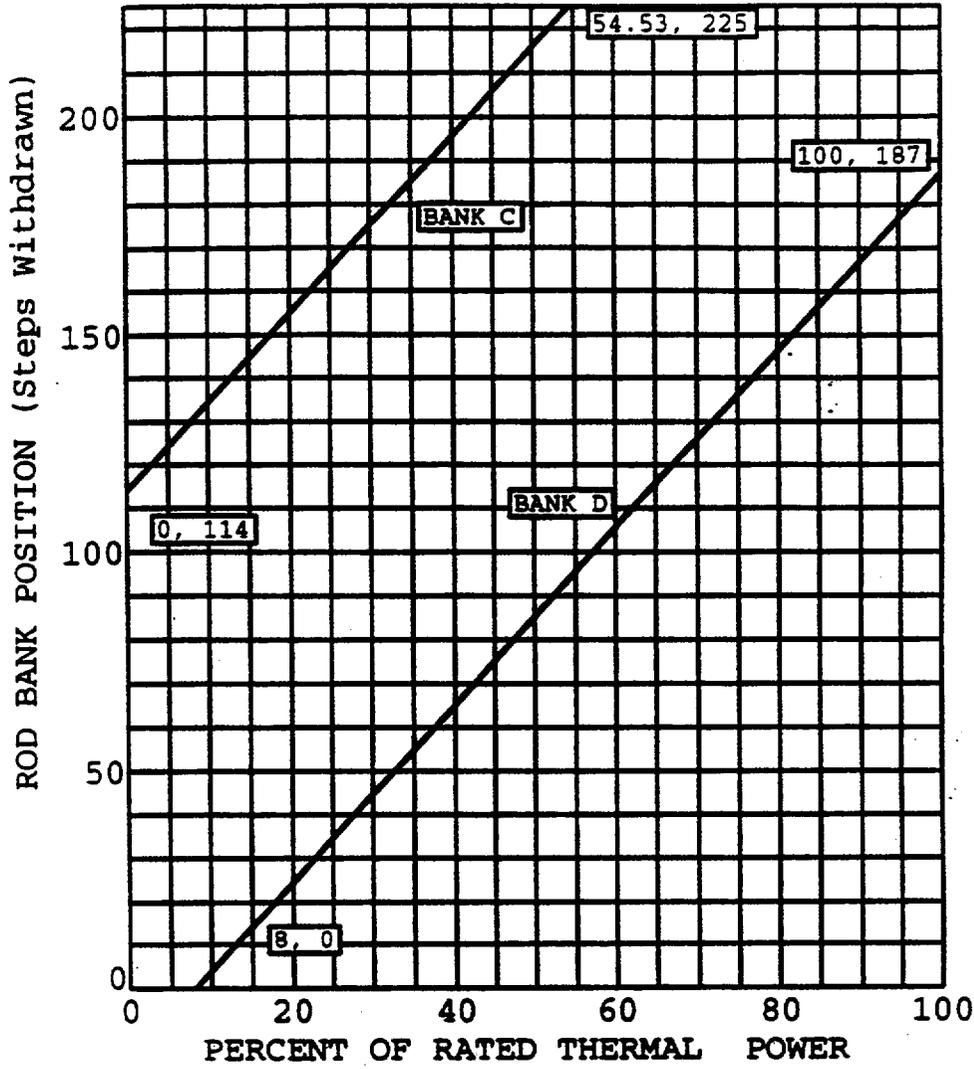


FIGURE 4.1-1
CONTROL ROD INSERTION LIMITS AS A
FUNCTION OF RATED POWER LEVEL

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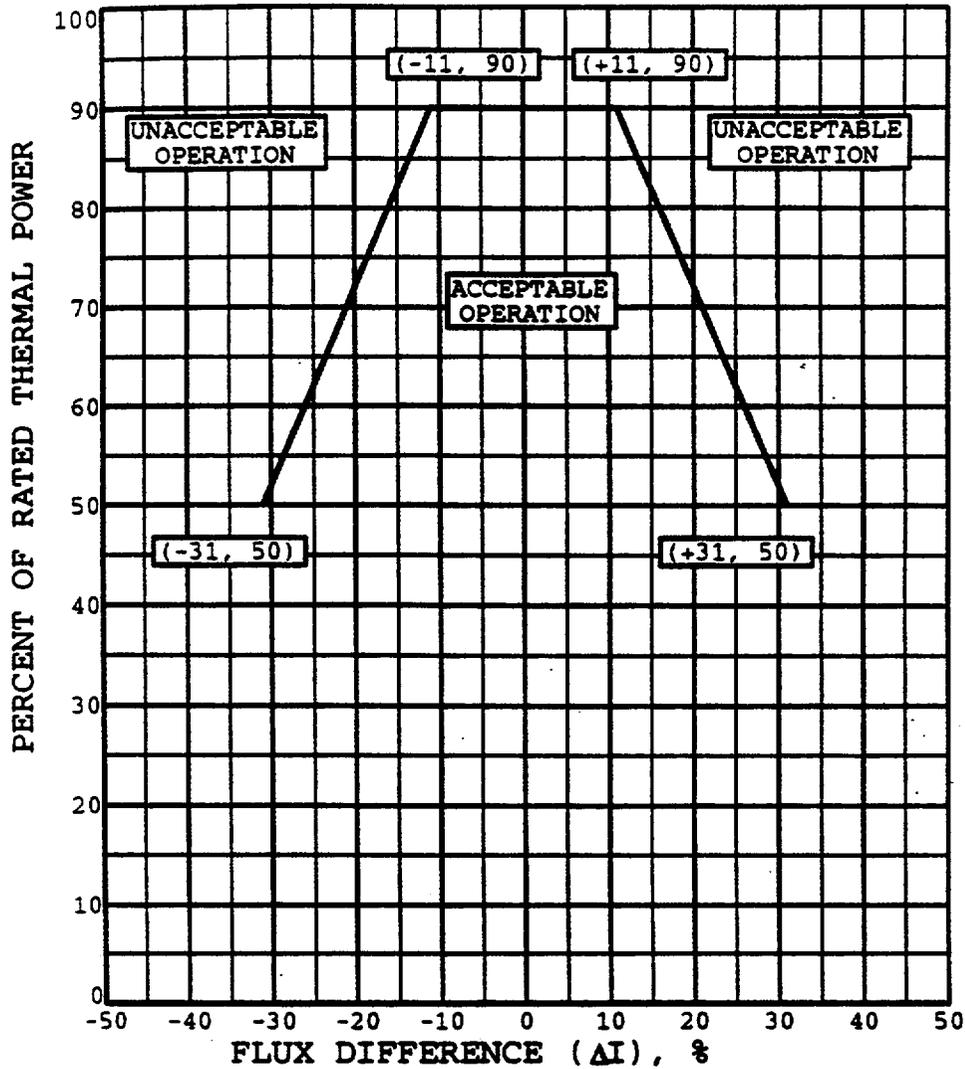


FIGURE 4.1-2

AXIAL FLUX DIFFERENCE LIMITS AS A FUNCTION OF
RATED THERMAL POWER

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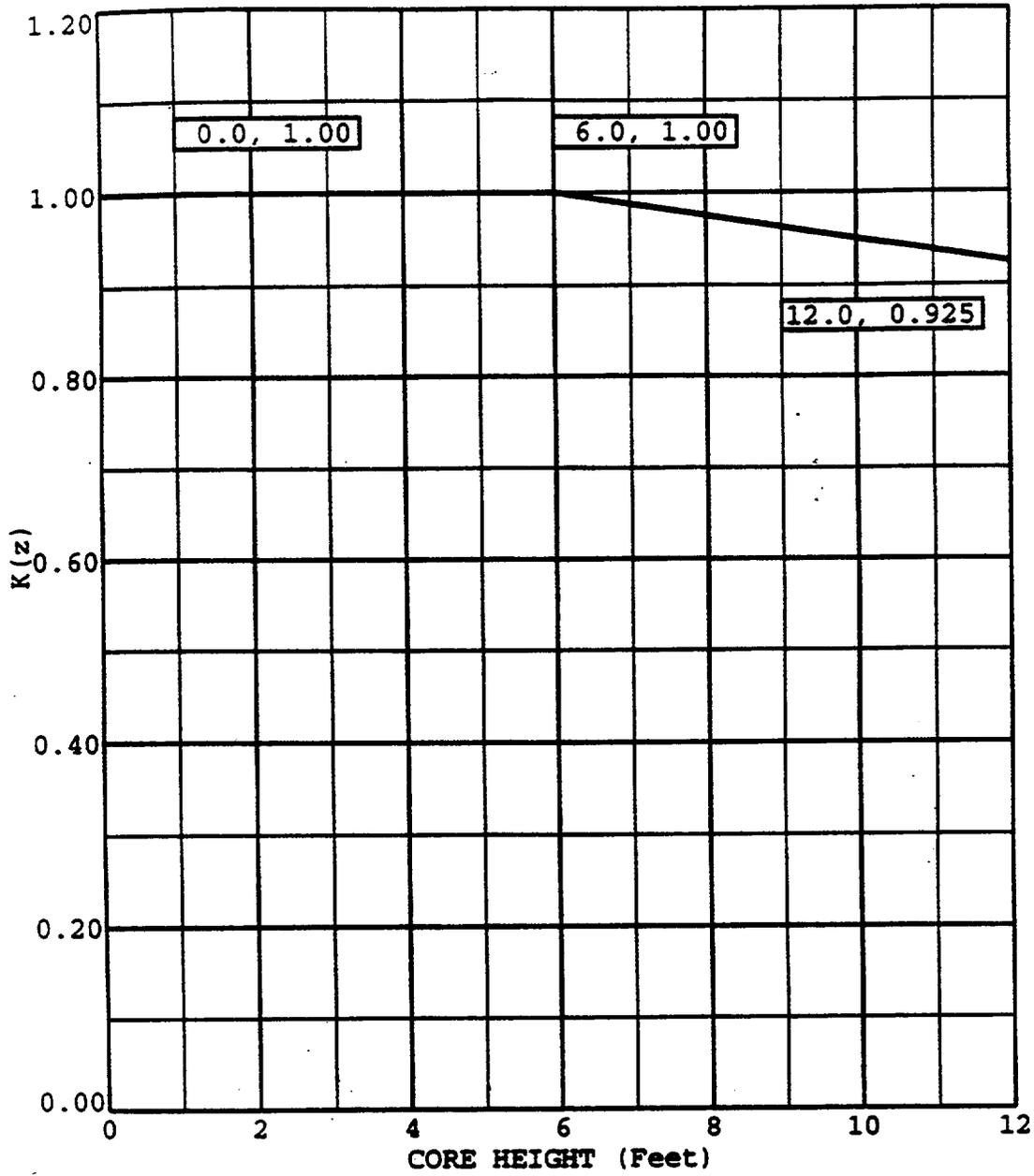


FIGURE 4.1-3

F₀T NORMALIZED OPERATING ENVELOPE, K(Z)

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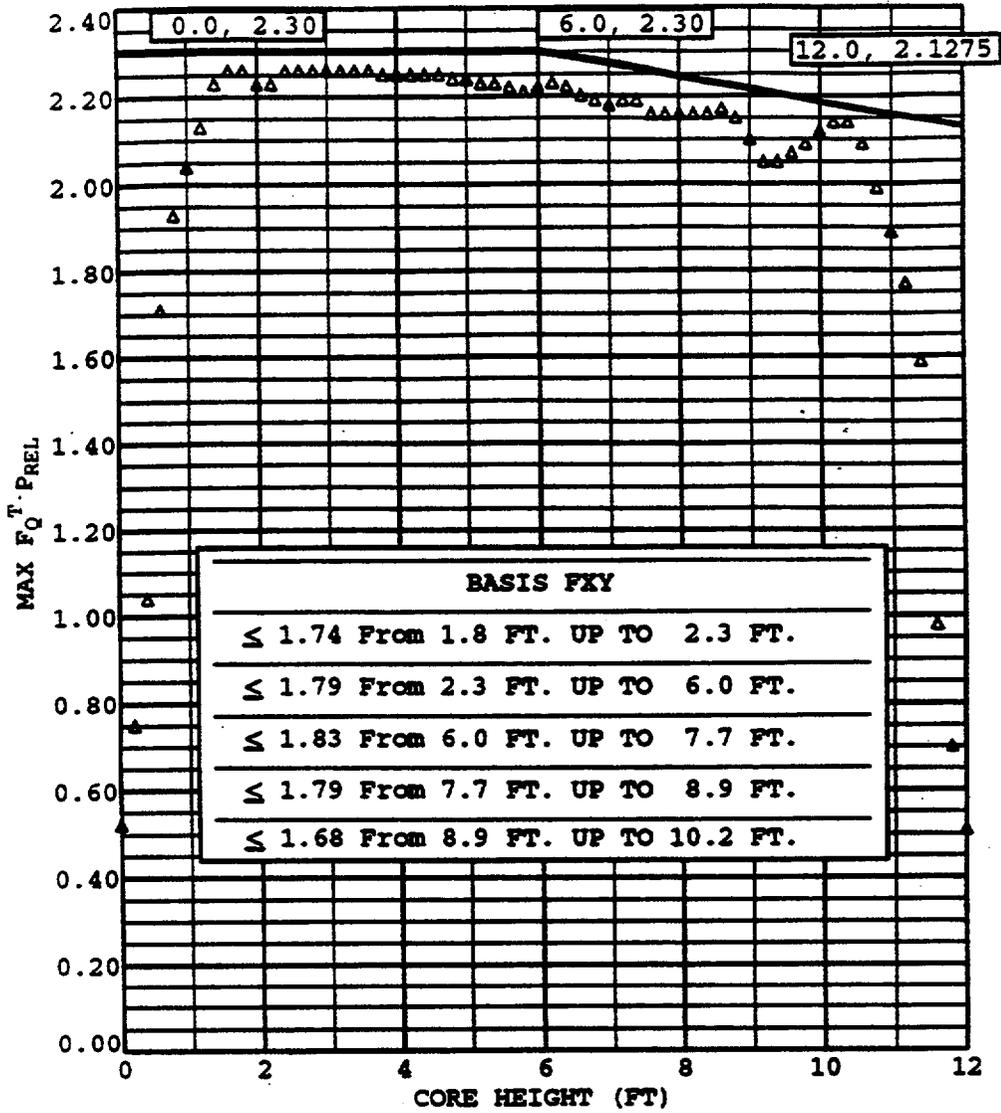


FIGURE 4.1-4
MAXIMUM ($F_Q T \cdot Prel$) VS. AXIAL CORE HEIGHT
DURING NORMAL OPERATION