

Byron Unit 1 Cycle 7

Operating Limits Report - Fxy Portion - Revision 1

This Radial Peaking Factor Limits Report is provided in accordance with Paragraph 6.9.1.9 of the Byron Unit 1 Nuclear Plant Technical Specifications.

The Fxy limits for RATED THERMAL POWER within specified core planes for Cycle 7 shall be:

a: For the lower core region from greater than or equal to 0% to less than or equal to 50%:

1. For all core planes containing bank "D" control rods:

$$F_{xy}^{RTP} \leq 1.950 \quad \text{Cycle Burnup} \geq 0 \text{ MWD/MTU}$$

2. For all unrodded core planes:

$$\begin{array}{ll} F_{xy}^{RTP} \leq 1.732 & 0 \leq \text{Cycle Burnup} \leq 10,000 \text{ MWD/MTU} \\ \leq 1.746 & 10,000 < \text{Cycle Burnup} < 16,000 \text{ MWD/MTU} \\ \leq 1.716 & \text{Cycle Burnup} \geq 16,000 \text{ MWD/MTU} \end{array}$$

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b: For the upper core region from greater than 50% to less than or equal to 100%:

1. For all core planes containing bank "D" control rods:

$$F_{xy}^{RTP} \leq 1.890 \quad \text{Cycle Burnup} \geq 0 \text{ MWD/MTU}$$

2. For all unrodded core planes:

$$\begin{array}{ll} F_{xy}^{RTP} \leq 1.784 & 0 \leq \text{Cycle Burnup} \leq 10,000 \text{ MWD/MTU} \\ \leq 1.807 & 10,000 < \text{Cycle Burnup} < 16,000 \text{ MWD/MTU} \\ \leq 1.769 & \text{Cycle Burnup} > 16,000 \text{ MWD/MTU} \end{array}$$

These Fxy(z) limits were used to confirm that the heat flux hot channel factor FQ(z) will be limited to the Technical Specification values of:

$$F_Q(z) \leq \frac{[2.50]}{P} [K(z)] \quad \text{for } P > 0.5 \text{ and}$$

$$F_Q(z) \leq [5.00] [K(z)] \quad \text{for } P \leq 0.5$$

assuming the most limiting axial power distributions expected to result from the insertion and removal of Control Banks C and D during operation, including the accompanying variations in the axial xenon and power distributions as described in the "Power Distribution Control and Load Following Procedures," WCAP-8403, September, 1974. Therefore, these Fxy limits provide assurance that the initial conditions assumed in the LOCA analysis are met, along with the ECCS acceptance criteria of 10 CFR 50.46.

See the Attached Figure for the plot of $[F_Q^T * P_{rel}]$ vs. Axial Core Height.

Byron Unit 1 Cycle 7 Fxy Limit Analysis

