

**ATTACHMENT**  
**Byron Unit 1 Cycle 7**  
**Operating Limits Report (OLR)**  
**Revision 2**

**BYRON UNIT 1 CYCLE 7  
OPERATING LIMITS REPORT - F<sub>xy</sub> PORTION**

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 F<sub>xy</sub> 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:

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

- 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:

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

These F<sub>xy</sub>(z) limits were used to confirm that the heat flux hot channel factor F<sub>q</sub>(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 F<sub>xy</sub> 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 1 for the plot of [ F<sub>q</sub><sup>T</sup>(z) x P<sub>rel</sub> ] vs. Axial Core Height.

**BYRON UNIT 1 CYCLE 7**  
**OPERATING LIMITS REPORT - MTC PORTION**

- a) The Moderator Temperature Coefficient (MTC) limits are:
- 1) The BOL/ARO/HZP-MTC shall be less positive than  $0 \Delta k/k/^\circ F$ .
  - 2) The EOL/ARO/RTP-MTC shall be less negative than  $-4.1 \times 10^{-4} \Delta k/k/^\circ F$ .

- b) The MTC surveillance limit is:

The 300 ppm/ARO/RTP-MTC should be less negative than or equal to  $-3.2 \times 10^{-4} \Delta k/k/^\circ F$ .

where:

- BOL stands for Beginning of Cycle Life
- ARO stands for All Rods Out
- HZP stands for Hot Zero Thermal Power
- EOL stands for End of Cycle Life
- RTP stands for RATED THERMAL POWER

**BYRON UNIT 1 CYCLE 7  
OPERATING LIMITS REPORT**

Table 1  
Maximum  $F_Q \cdot P$  vs. Axial Core Height During Normal Operation

|        |    | CORE HEIGHT | MAXIMUM       |
|--------|----|-------------|---------------|
|        |    | (FEET)      | $F_Q \cdot P$ |
| BOTTOM | 1  | 0.1252      | 0.41          |
|        | 2  | 0.3756      | 0.77          |
|        | 3  | 0.6259      | 1.83          |
|        | 4  | 0.8763      | 2.13          |
|        | 5  | 1.1267      | 2.37          |
|        | 6  | 1.3771      | 2.47          |
|        | 7  | 1.6274      | 2.50          |
|        | 8  | 1.8778      | 2.47          |
|        | 9  | 2.1282      | 2.27          |
|        | 10 | 2.3786      | 2.40          |
|        | 11 | 2.6289      | 2.44          |
|        | 12 | 2.8793      | 2.47          |
|        | 13 | 3.1297      | 2.48          |
|        | 14 | 3.3801      | 2.49          |
|        | 15 | 3.6305      | 2.50          |
|        | 16 | 3.8808      | 2.30          |
|        | 17 | 4.1312      | 2.49          |
|        | 18 | 4.3816      | 2.49          |
|        | 19 | 4.6320      | 2.48          |
|        | 20 | 4.8823      | 2.46          |
|        | 21 | 5.1327      | 2.44          |
|        | 22 | 5.3831      | 2.40          |
|        | 23 | 5.6335      | 2.18          |
|        | 24 | 5.8838      | 2.35          |
|        | 25 | 6.1342      | 2.44          |
|        | 26 | 6.3846      | 2.45          |
|        | 27 | 6.6350      | 2.46          |
|        | 28 | 6.8853      | 2.46          |
|        | 29 | 7.1357      | 2.44          |
|        | 30 | 7.3861      | 2.28          |
|        | 31 | 7.6365      | 2.42          |
|        | 32 | 7.8868      | 2.39          |
|        | 33 | 8.1372      | 2.35          |
|        | 34 | 8.3876      | 2.32          |
|        | 35 | 8.6380      | 2.32          |
|        | 36 | 8.8883      | 2.27          |
|        | 37 | 9.1387      | 2.19          |
|        | 38 | 9.3891      | 2.31          |
|        | 39 | 9.6395      | 2.31          |
|        | 40 | 9.8898      | 2.34          |
|        | 41 | 10.1402     | 2.36          |
|        | 42 | 10.3906     | 2.36          |
|        | 43 | 10.6410     | 2.23          |
|        | 44 | 10.8914     | 2.13          |
|        | 45 | 11.1417     | 1.94          |
|        | 46 | 11.3921     | 1.66          |
|        | 47 | 11.6425     | 0.71          |
| TOP    | 48 | 11.8929     | 0.41          |

Figure 1  
Byron Unit 1 Cycle 7  
FQ(Z) X P versus CORE HEIGHT

