

1.0 CORE OPERATING LIMITS REPORT

This Core Operating Limits Report (COLR) for Salem Unit 1 Cycle 13 has been prepared in accordance with the requirements of Technical Specification 6.9.1.9.

The Technical Specifications affected by this report are listed below:

3/4.1.1.4 Moderator Temperature Coefficient

3/4.1.3.5 Control Rod Insertion Limits

3/4.2.1 Axial Flux Difference

3/4.2.2 Heat Flux Hot Channel Factor - $F_Q(Z)$

3/4.2.3 Nuclear Enthalpy Rise Hot Channel Factor - $F_{\Delta H}^N$

2.0 OPERATING LIMITS

The cycle-specific parameter limits for the specifications listed in Section 1.0 are presented in the following subsections. These limits have been developed using the NRC-approved methodologies specified in Technical Specification 6.9.1.9.

2.1 Moderator Temperature Coefficient (Specification 3/4.1.1.4)

2.1.1 The Moderator Temperature Coefficient (MTC) limits are:

The BOL/ARO/HZP-MTC shall be less positive than $0 \Delta k/k/^\circ F$.

The EOL/ARO/RTP-MTC shall be less negative than $-4.4 \times 10^{-4} \Delta k/k/^\circ F$.

2.1.2 The MTC Surveillance limit is:

The 300 ppm/ARO/RTP-MTC should be less negative than or equal to $-3.7 \times 10^{-4} \Delta k/k/^\circ F$.

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

2.2 Control Rod Insertion Limits (Specification 3/4.1.3.5)

2.2.1 The control rod banks shall be limited in physical insertion as shown in Figure 1.

2.3 Axial Flux Difference (Specification 3/4.2.1)

[Constant Axial Offset Control (CAOC) Methodology]

2.3.1 The Axial Flux Difference (AFD) target band is +6%, -9%.

2.3.2 The AFD Acceptable Operation Limits are provided in Figure 2.

2.4 Heat Flux Hot Channel Factor - $F_Q(Z)$ (Specification 3/4.2.2)

[F_{xy} Methodology]

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

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

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

2.4.1 $F_Q^{RTP} = 2.40$

2.4.2 $K(Z)$ is provided in Figure 3.

$$F_{xy}^L \doteq F_{xy}^{RTP} [1.0 + PF_{xy} (1.0 - P)]$$

2.4.3 where: $F_{xy}^{RTP} = 1.77$ for the unrodded core planes

2.13 for the core plane containing Bank D control rods

$$PF_{xy} = 0.3$$

2.5 Nuclear Enthalpy Rise Hot Channel Factor - $F_{\Delta H}^N$ (Specification 3/4.2.3)

$$F_{\Delta H}^N = F_{\Delta H}^{RTP} [1.0 + PF_{\Delta H} (1.0 - P)]$$

Operation with $F_{\Delta H}^N$ values equal to or less than those given by the above equation are acceptable.

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

2.5.1 $F_{\Delta H}^{RTP} = 1.65$

2.5.2 $PF_{\Delta H} = 0.3$

FIGURE 1
ROD BANK INSERTION LIMITS vs. THERMAL POWER

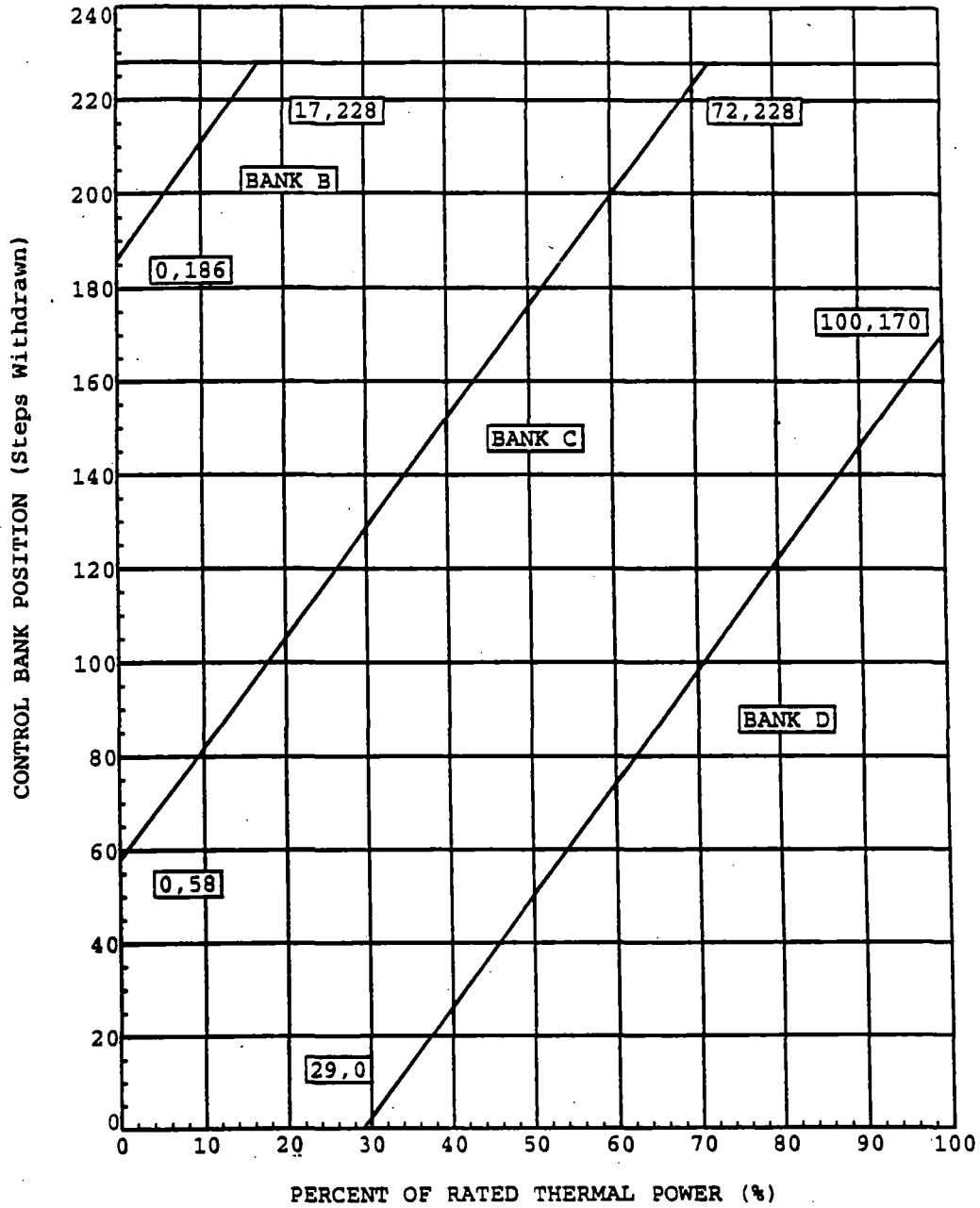


FIGURE 2
AXIAL FLUX DIFFERENCE LIMITS AS A FUNCTION OF
RATED THERMAL POWER

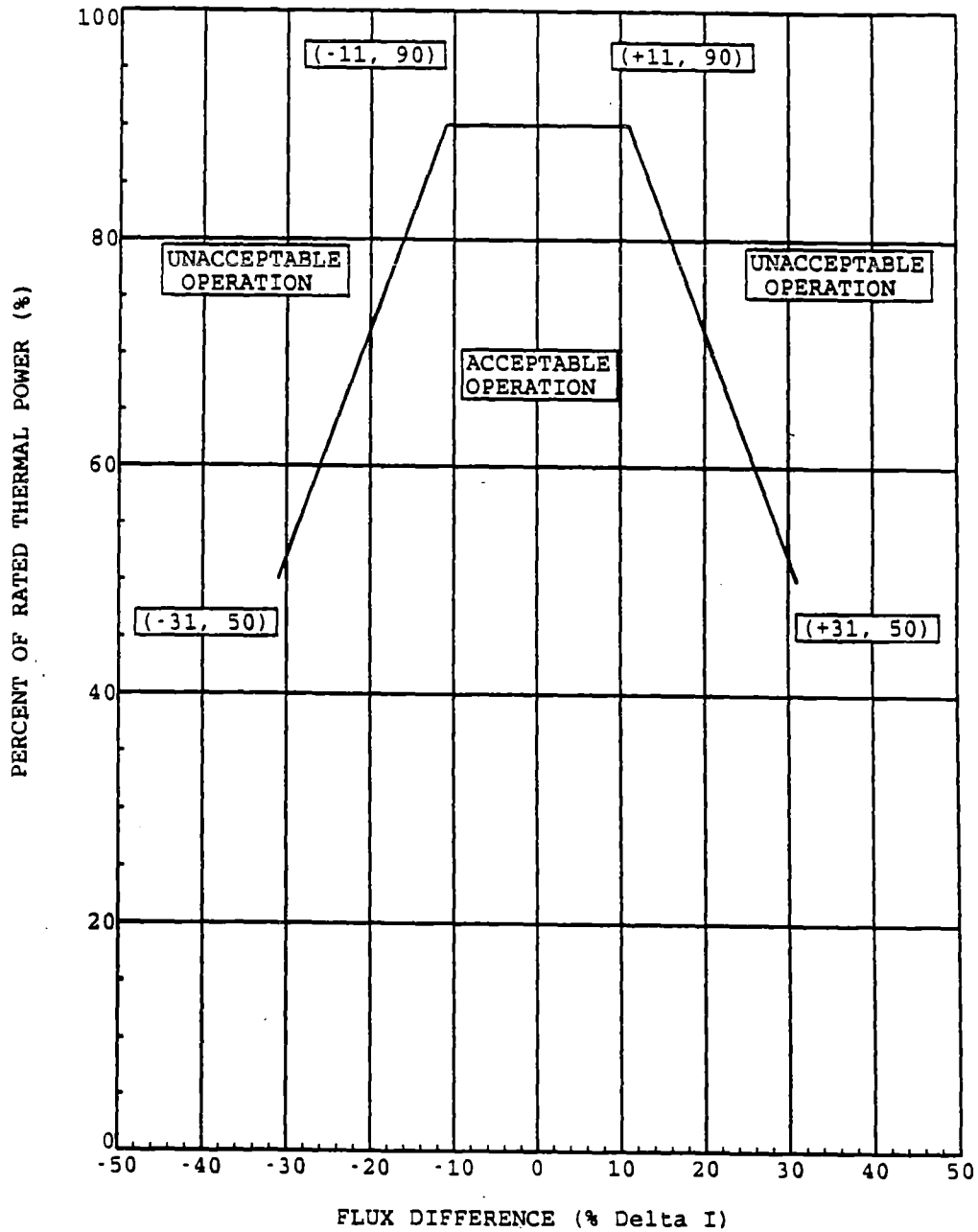


FIGURE 3
 K(Z) - NORMALIZED $F_Q(Z)$ AS A FUNCTION OF CORE HEIGHT

