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CORE OPERATING LIMITS REPORT - CYCLE 14, REVISION 1
SALEM GENERATING STATION UNIT NO. 2
FACILITY OPERATING LICENSE DPR-75
DOCKET NO. 50-311

In accordance with section 6.9.1.9 of the Salem Unit 2 Technical Specifications, PSEG Nuclear LLC submits Revision 1 of the Core Operating Limits Report (COLR) for Salem Unit 2 Cycle 14 (NFS-0231, Rev. 1) in Attachment 1 to this letter.

Should you have any questions regarding this submittal, please contact Mr. Paul Duke at (856) 339-1466.

Sincerely,

S. Mannon
Manager - Nuclear Safety & Licensing

Attachment

A001

APR 1 4 2004

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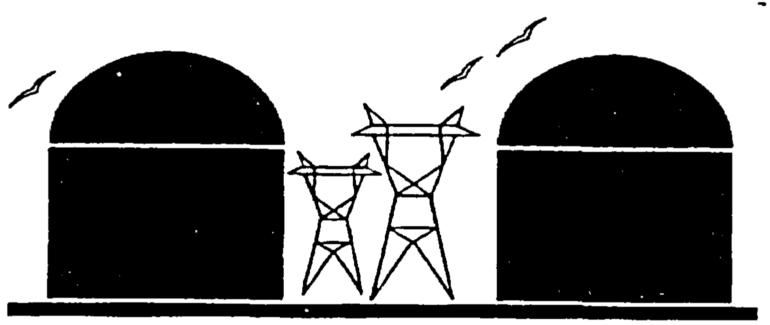
PSEG Nuclear LLC

NFS-0231
Revision 1
March 2004

Core Operating Limits Report for Salem Unit 2, Cycle 14



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SUMMARY OF CHANGES

Revision 1: The purpose of Revision 1 is to incorporate the provisions of Amendment No. 244 regarding Technical Specification 3.9.1 Boron Concentration.

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LIST OF FIGURES

1.0 CORE OPERATING LIMITS REPORT

This Core Operating Limits Report (COLR) for Salem Unit 2 Cycle 14 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:

3.1.1.3	Moderator Temperature Coefficient
3.1.3.5	Control Rod Insertion Limits
3.2.1	Axial Flux Difference
3.2.2	Heat Flux Hot Channel Factor - $F_Q(Z)$
3.2.3	Nuclear Enthalpy Rise Hot Channel Factor - $F^N_{\Delta H}$
3.9.1	Boron Concentration

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 3.1.1.3)

2.1.1 The Moderator Temperature Coefficient (MTC) limits are:

The BOL/ARO/HZP-MTC shall be less positive than or equal to 0 Δk/k/°F.

The EOL/ARO/RTP-MTC shall be less negative than or equal to -4.4×10^{-4} Δk/k/°F.

2.1.2 The MTC Surveillance limit is:

The 300 ppm/ARO/RTP-MTC should be less negative than or equal to -3.7×10^{-4} Δk/k/°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 3.1.3.5)

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

2.3 Axial Flux Difference (Specification 3.2.1)

[Constant Axial Offset Control (CAOC) Methodology]

2.3.1 The Axial Flux Difference (AFD) target band shall be the more restrictive of (+6%, -9%) or the target band as defined in Reference 2.

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

2.4 Heat Flux Hot Channel Factor - $F_Q(Z)$ (Specification 3.2.2)

[F_{xy} Methodology]

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

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

where: $P = \dfrac{THERMAL\ POWER}{RATED\ THERMAL\ POWER}$

2.4.1 $F_Q^{RTP} = 2.40$

2.4.2 K(Z) is provided in Figure 3.

2.4.3 $F_{xy}^L = F_{xy}^{RTP} [1.0 + PF_{xy}(1.0 - P)]$

where: $F_{xy}^{RTP} = 1.76$ for unrodded upper core planes 1 through 21

1.82 for unrodded lower core planes 22 through 61

2.13 for the core planes containing Bank D control rods

$PF_{xy} = 0.3$

2.4.4 If the Power Distribution Monitoring System (PDMS) is used for core power distribution surveillance and is OPERABLE, as defined in Technical Specification 3.3.3.14, the uncertainty, U_{FQ}, to be applied to the Heat Flux Hot Channel Factor $F_Q(z)$ shall be calculated by the following formula:

$$U_{FQ} = \left(1.0 + \frac{U_Q}{100.0}\right) \bullet U_e$$

where:

U_Q = Uncertainty for power peaking factor as defined in equation 5-19 of Reference 1.
U_e = Engineering uncertainty factor.
= 1.03

Note: U_{FQ}= PDMS Surveillance Report Core Monitor Fxy Uncertainty in %.

2.4.5 If the INCORE movable detectors are used for core power distribution surveillance, the uncertainty, U_{FQ}, to be applied to the Heat Flux Hot Channel Factor $F_Q(z)$ shall be calculated by the following formula:

$$U_{FQ} = U_{qu} \bullet U_e$$

where:

U_{qu} = Base F_Q measurement uncertainty.
= 1.05
U_e = Engineering uncertainty factor.
= 1.03

2.5 Nuclear Enthalpy Rise Hot Channel Factor - $F^N_{\Delta H}$ (Specification 3.2.3)

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

where: $P = \dfrac{THERMAL\ POWER}{RATED\ THERMAL\ POWER}$

2.5.1 $F_{\Delta H}^{RTP}(RFA\ with\ IFM) = 1.65$ and $F_{\Delta H}^{RTP}(V5H\ without\ IFM) = 1.57$

2.5.2 $PF_{\Delta H} = 0.3$

2.5.3 If the Power Distribution Monitoring System (PDMS) is used for core power distribution surveillance and is OPERABLE, as defined in Technical Specification 3.3.3.14, the uncertainty, $U_{F\Delta H}$, to be applied to the Nuclear Enthalpy Rise Hot Channel Factor, $F_{\Delta H}^N$, shall be calculated by the following formula:

$$U_{F\Delta H} = 1.0 + \frac{U_{\Delta H}}{100.0}$$

where:

$U_{\Delta H}$ = Uncertainty for enthalpy rise as defined in equation 5-19 of Reference 1.

2.5.4 If the INCORE movable detectors are used for core power distribution surveillance, the uncertainty, $U_{F\Delta H}$, to be applied to the Nuclear Enthalpy Rise Hot Channel Factor $F_{\Delta H}^N$ shall be calculated by the following formula:

$$U_{F\Delta H} = U_{F\Delta Hm}$$

where:

$U_{F\Delta Hm}$ =Base $F_{\Delta H}$ measurement uncertainty.
= 1.04

2.6 Boron Concentration (Specification 3.9.1)

A Mode 6 boron concentration, maintained at or above 2076 ppm, in the Reactor Coolant System, the fuel storage pool, the refueling canal, and the refueling cavity ensures the most restrictive of the following reactivity conditions is met:

a) A K-effective (K_{eff}) of 0.95 or less at All Rods In (ARI), Cold Zero Power (CZP) conditions with a 1% Δk/k uncertainty added.

b) A K_{eff} of 0.99 or less at All Rods Out (ARO), CZP conditions with a 1% Δk/k uncertainty added.

c) A boron concentration of greater than or equal to 2000 ppm, which includes a 50 ppm conservative allowance for uncertainties.

3.0 REFERENCES

1. WCAP-12472-P-A, BEACON Core Monitoring and Operations Support System, August 1994.

2. S2.RE-RA.ZZ-0011(Q), Tables.

3. Salem Nuclear Generating Station Unit No. 2, Amendment No. 244, License No. DPR-75, Docket No. 50-311.

FIGURE 1

ROD BANK INSERTION LIMITS vs. THERMAL POWER

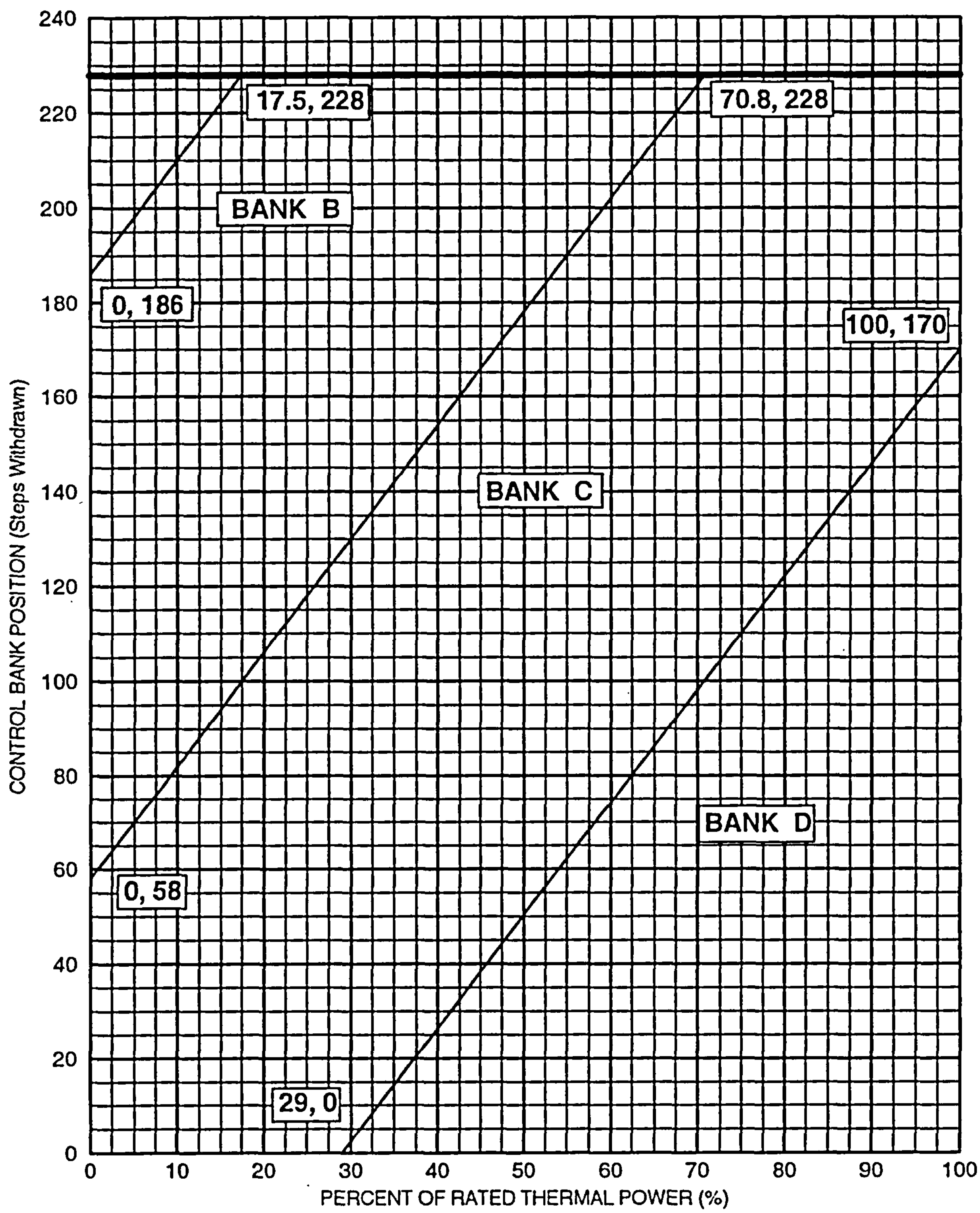

FIGURE 2

AXIAL FLUX DIFFERENCE LIMITS AS A FUNCTION OF RATED THERMAL POWER

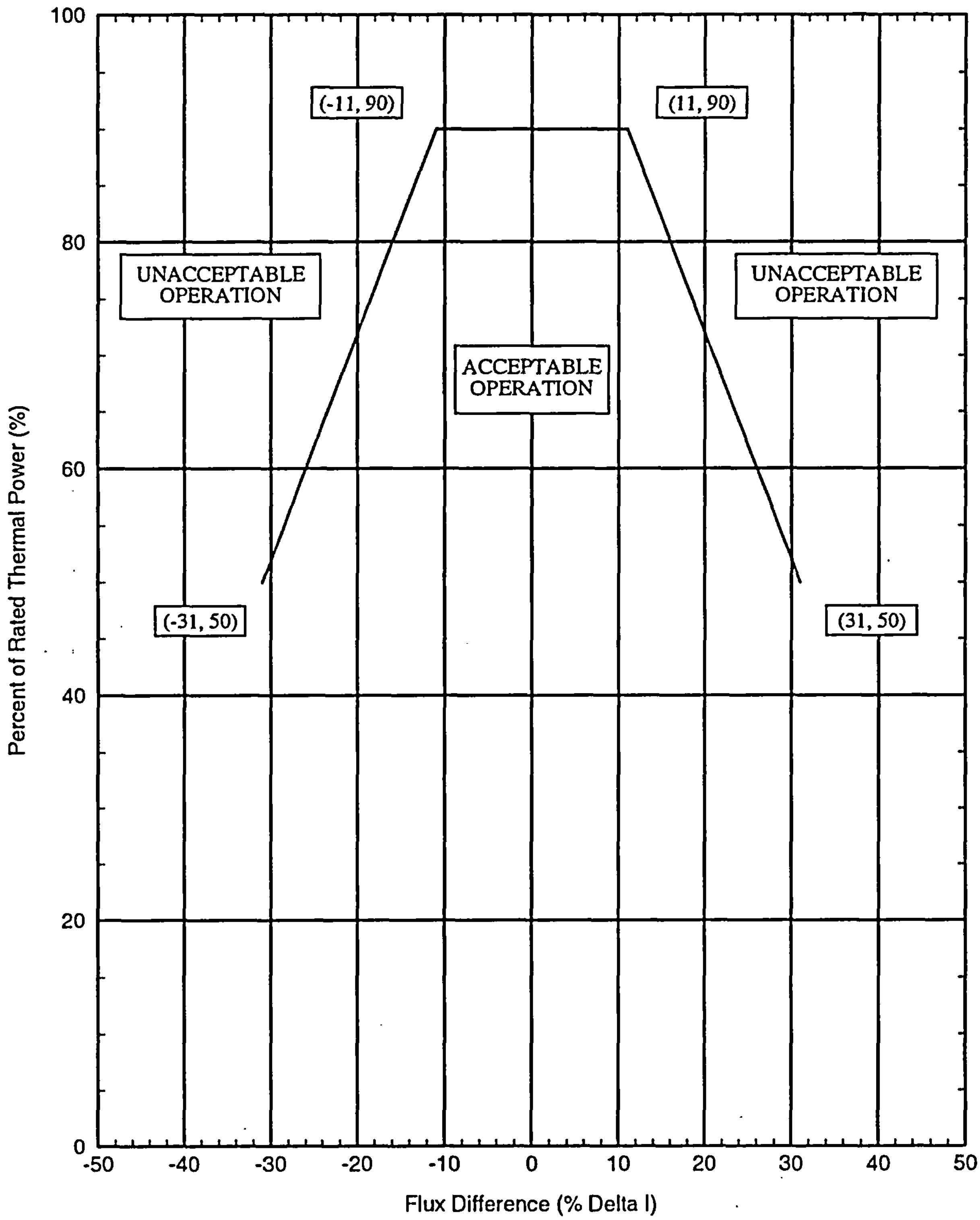

FIGURE 3

K(Z) - NORMALIZED FQ(Z) AS A FUNCTION OF CORE HEIGHT