

JUN 27 2002



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United States Nuclear Regulatory Commission  
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Gentlemen:

**REVISED CORE OPERATING LIMITS REPORT - CYCLE 13  
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 Revisions 1 and 2 of the Core Operating Limits Report (COLR) for Salem Unit 2 Cycle 13 (NFS-0209, Rev. 1 and Rev. 2) in Attachments 1 and 2 to this letter.

Revision 1 of the COLR clarifies section 2.3, noting that a more restrictive Axial Flux Difference band may be prescribed by plant procedure. Revision 2 makes administrative changes to the List of Effective Pages and to the Summary of Changes.

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

Sincerely,

A handwritten signature in black ink, appearing to read "G. Salamon".

for

G. Salamon  
Manager - Nuclear Safety & Licensing

Attachments (2)

A001

JUN 27 2002

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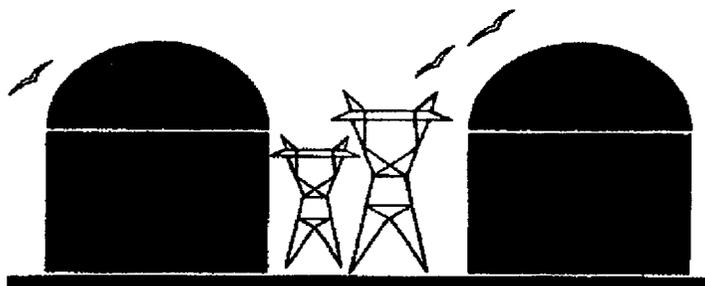
**SALEM GENERATING STATION UNIT NO. 2  
FACILITY OPERATING LICENSE DPR-75  
DOCKET NO. 50-311**

**CORE OPERATING LIMITS REPORT - CYCLE 13  
REVISION 1**

PSEG Nuclear LLC

NFS-0209  
Revision 1  
June 2002

## Core Operating Limits Report for Salem Unit 2, Cycle 13



PREPARED:

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Joseph P. Dascanio  
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NFS-0209  
Revision 1  
June 2002

PSEG Nuclear LLC  
SALEM UNIT 2 CYCLE 13 COLR

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## SUMMARY OF CHANGES

The purpose of Revision 1 is to modify the requirements of Section 2.3, Axial Flux Difference (Specification 3/4.2.1).

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## 1.0 CORE OPERATING LIMITS REPORT

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

- 3/4.1.1.3 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 -  $F^N_{\Delta H}$

## 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 3/4.1.1.3)

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 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 3/4.2.2)

[ $F_{xy}$  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:  $P = \frac{\text{THERMAL POWER}}{\text{RATED THERMAL POWER}}$

2.4.1  $F_Q^{RTP} = 2.40$

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

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

where:  $F_{xy}^{RTP} = 1.78$  for unrodded core planes 1 through 31  
 $1.82$  for unrodded core planes 32 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:

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

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:

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

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 -  $F_{\Delta H}^N$  (Specification 3/4.2.3)

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

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

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

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,  $U_{FAH}$ , to be applied to the Nuclear Enthalpy Rise Hot Channel Factor,  $F_{\Delta H}^N$ , shall be calculated by the following formula:

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

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,  $U_{FAH}$ , to be applied to the Nuclear Enthalpy Rise Hot Channel Factor  $F_{\Delta H}^N$  shall be calculated by the following formula:

$$U_{FAH} = U_{FAHm}$$

where:

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

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.

FIGURE 1

ROD BANK INSERTION LIMITS vs. THERMAL POWER

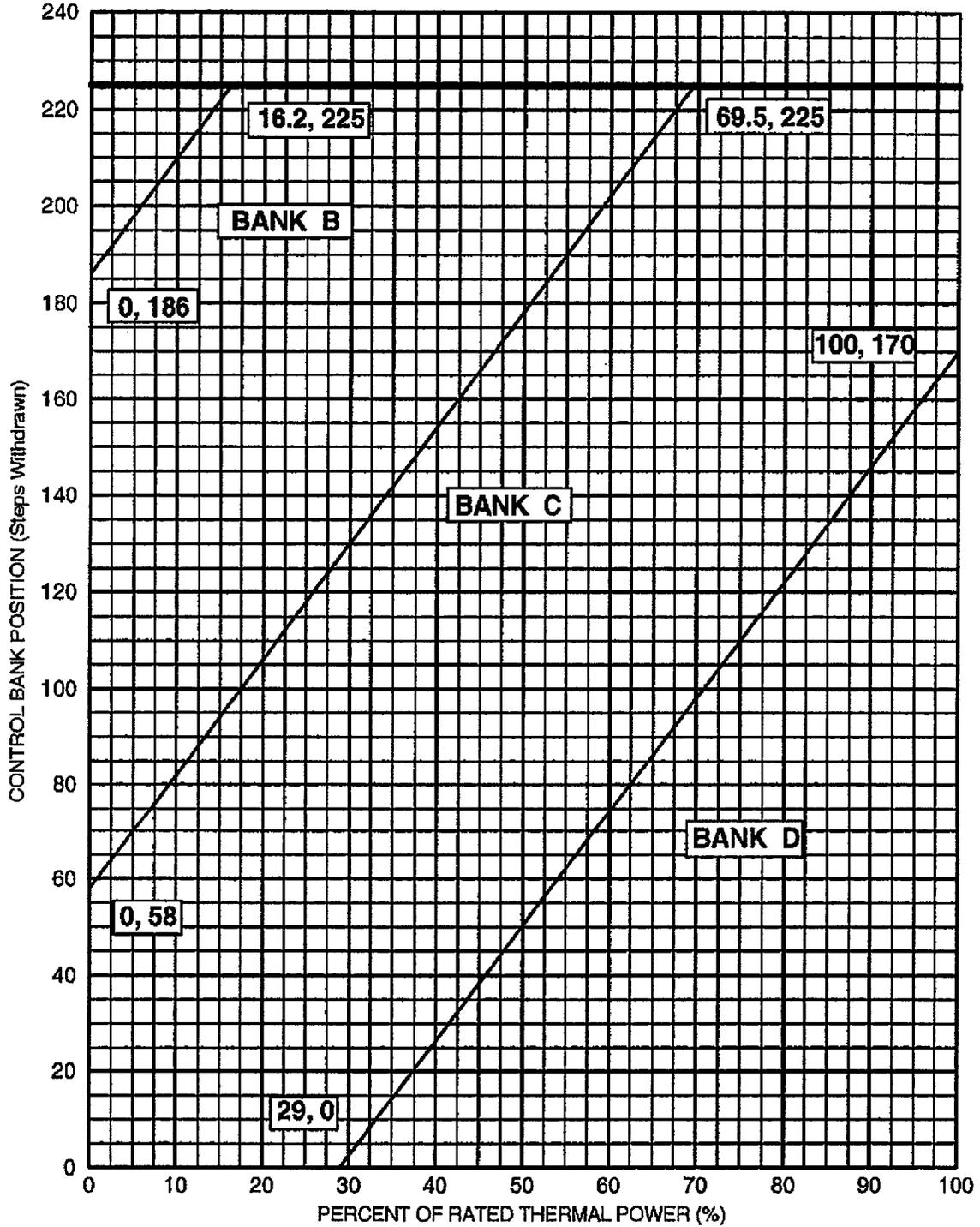


FIGURE 2

AXIAL FLUX DIFFERENCE LIMITS AS A FUNCTION OF  
RATED THERMAL POWER

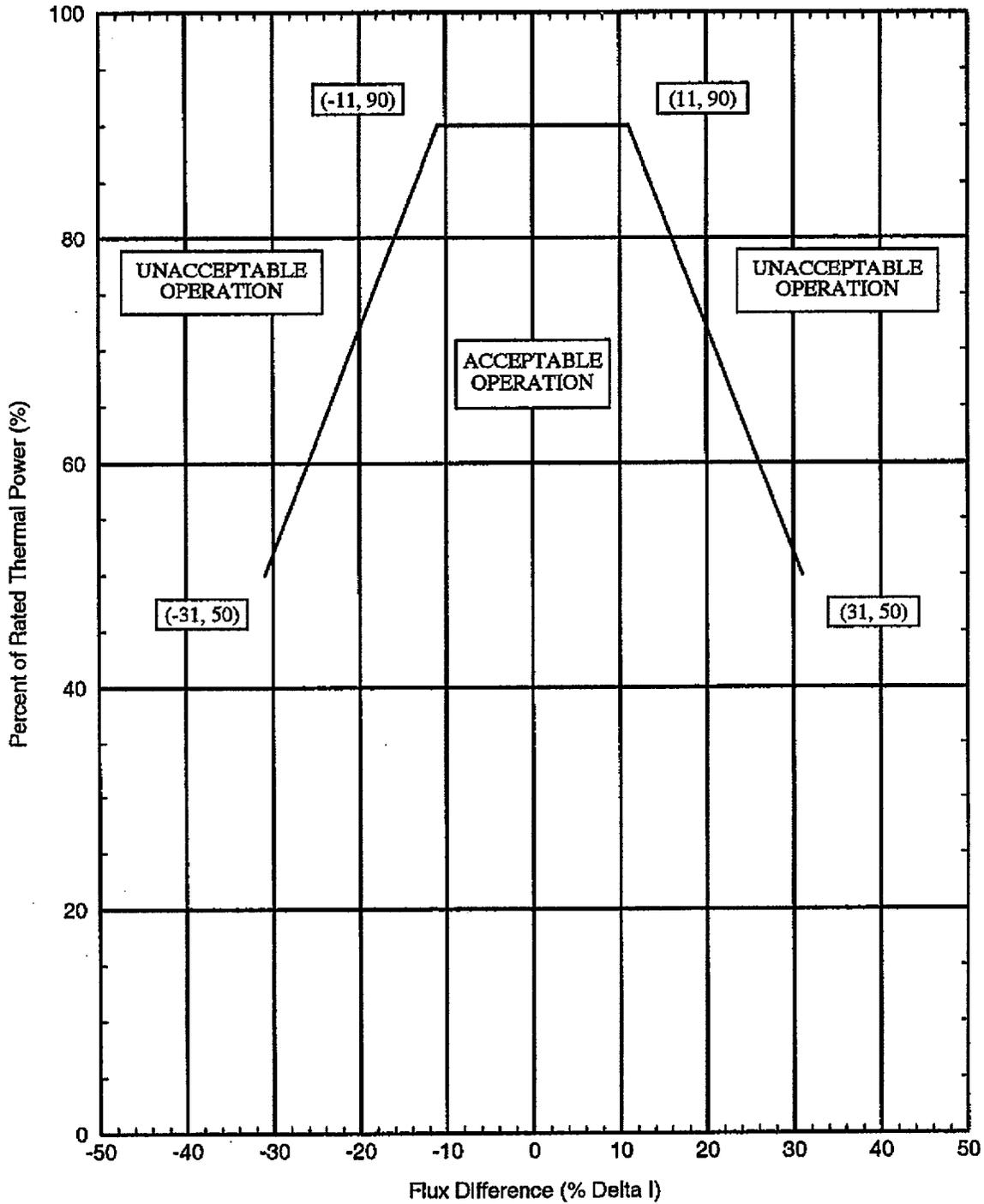
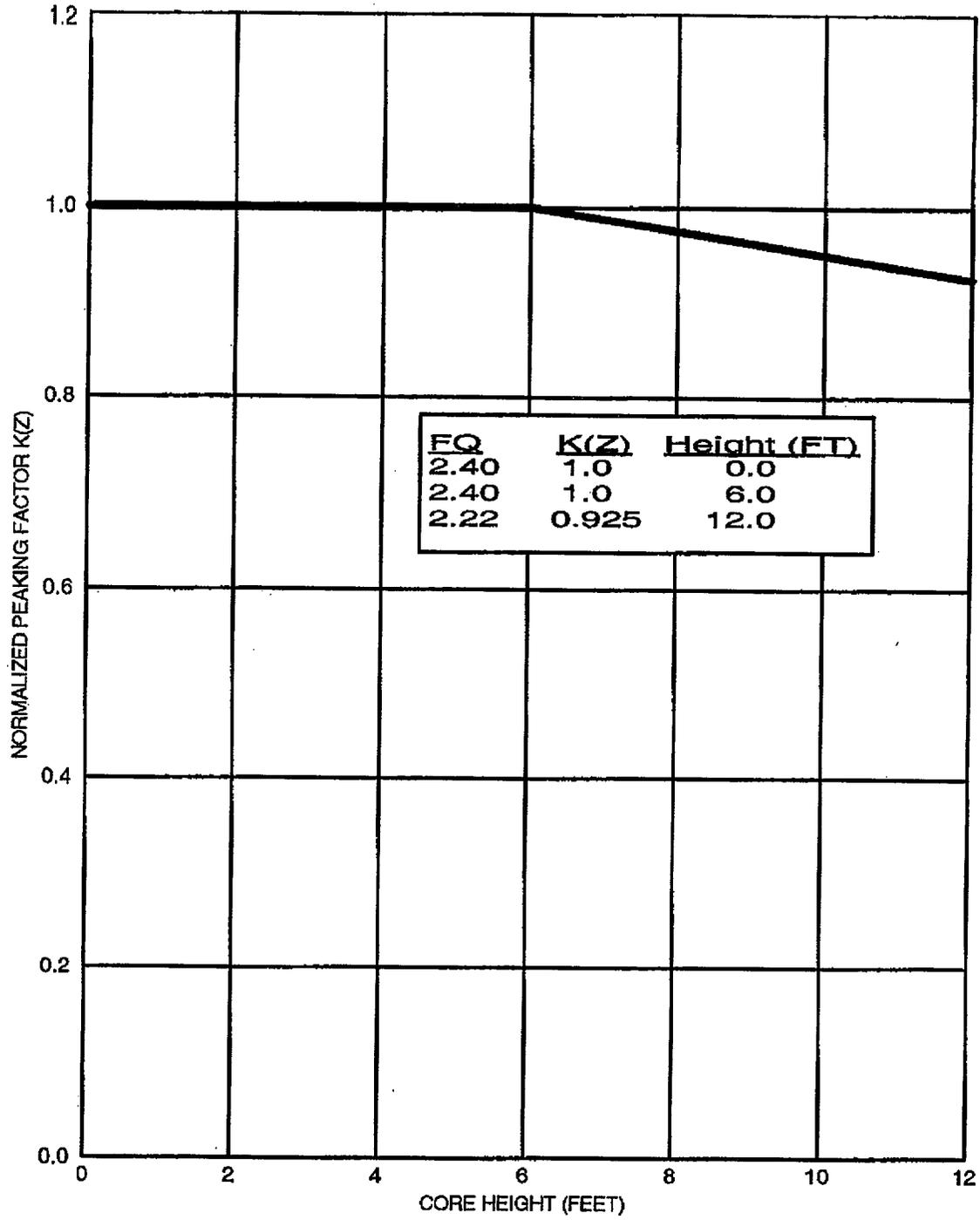


FIGURE 3

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



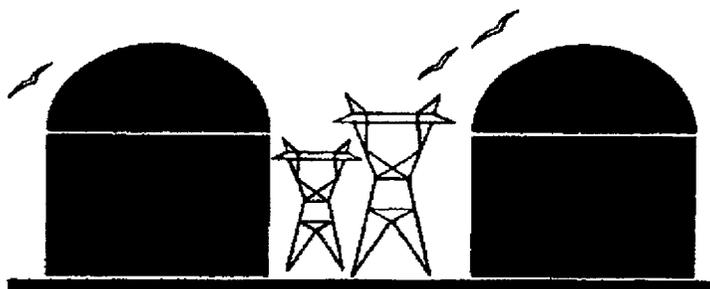
**SALEM GENERATING STATION UNIT NO. 2  
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**CORE OPERATING LIMITS REPORT - CYCLE 13  
REVISION 2**

PSEG Nuclear LLC

**NFS-0209**  
**Revision 2**  
**June 2002**

## Core Operating Limits Report for Salem Unit 2, Cycle 13



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CONCURRENCE: *TK Ross* DATE: 6/13/2002  
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APPROVED: *TK Ross for MM Mannion* DATE: 6/13/2002  
Michael M. Mannion  
Manager, Nuclear Fuel Section

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Revision 2  
June 2002

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## SUMMARY OF CHANGES

- Revision 1: The purpose of Revision 1 is to modify the requirements of Section 2.3, Axial Flux Difference (Specification 3/4.2.1). In addition, a page was added to document the list of effective pages and summary of changes.
- Revision 2: The purpose of Revision 2 was administrative. The page documenting the list of effective pages and summary of changes is now identified as page 1a. In addition, the list of effective pages was modified to include all pages in the document and their revision level.

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[Constant Axial Offset Control (CAOC) Methodology]

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[ $F_{xy}$  Methodology]

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

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

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$$PF_{xy} = 0.3$$

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- 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:

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

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:

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

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 -  $F_{\Delta H}^N$  (Specification 3/4.2.3)

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

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where:

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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.

FIGURE 1

ROD BANK INSERTION LIMITS vs. THERMAL POWER

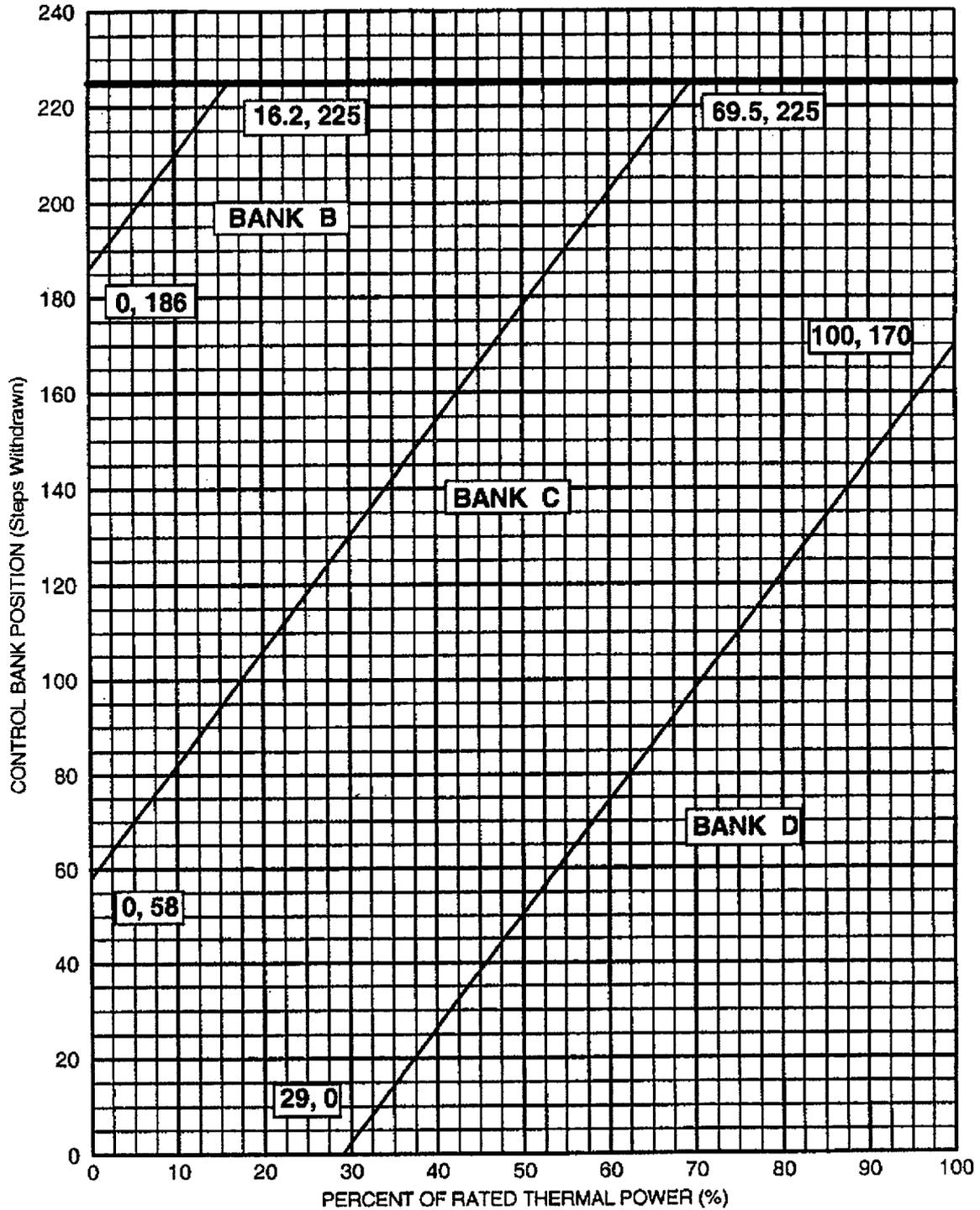
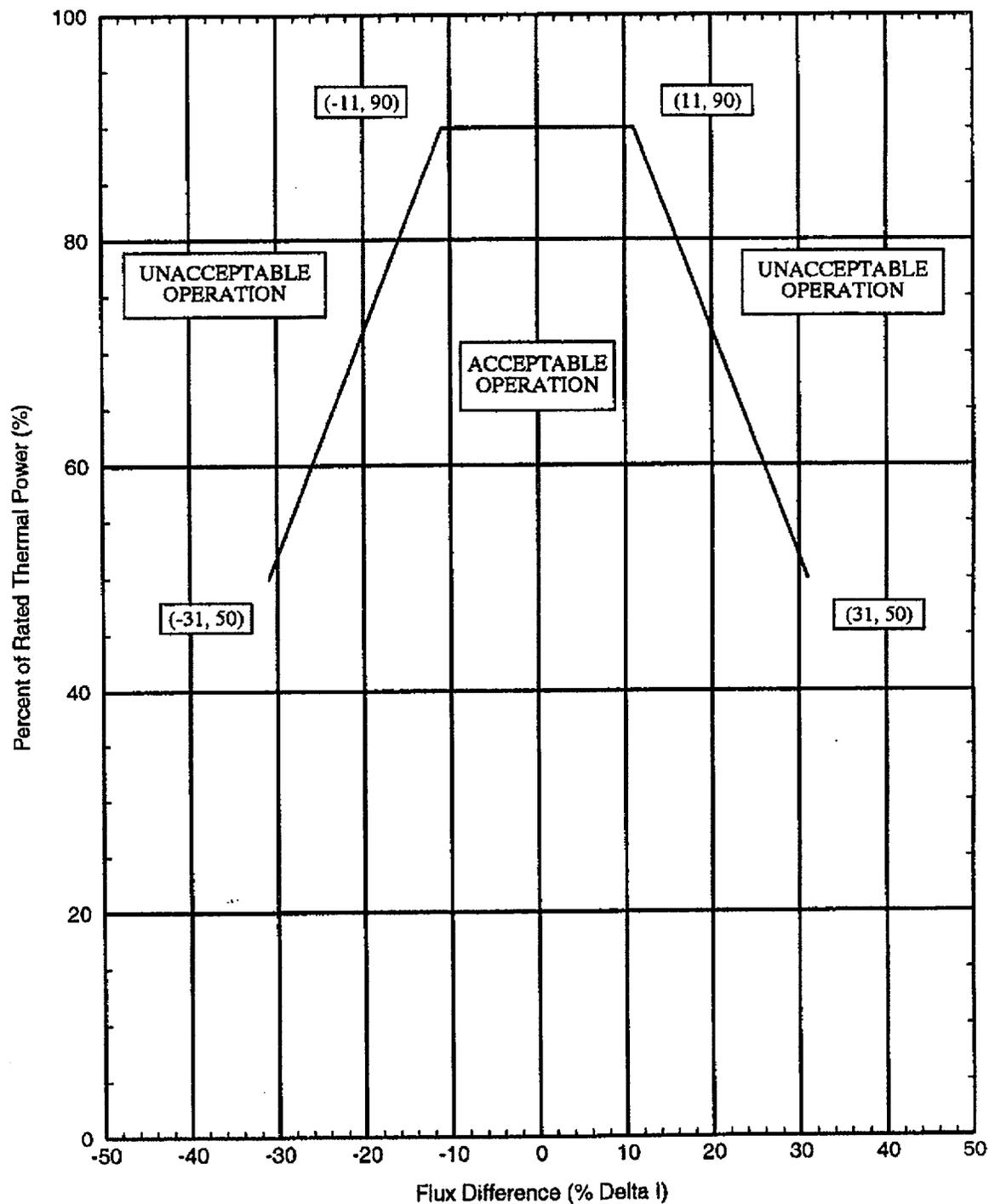


FIGURE 2

AXIAL FLUX DIFFERENCE LIMITS AS A FUNCTION OF  
RATED THERMAL POWER



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FIGURE 3

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

