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U. S. Nuclear Regulatory Commission
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Subject: Arkansas Nuclear One - Unit 2
Docket No. 50-368
License No. NPF-6
ANO-2 Cycle 16 Core Operating Limits Report

Dear Sir or Madam:

Arkansas Nuclear One, Unit 2 (ANO-2) Technical Specification 6.9.5 requires submittal of the Core Operating Limits Report (COLR) for each reload cycle. Attached is Revision 0 of the COLR for ANO-2 Cycle 16. This completes the reporting requirement for the referenced specification. This submittal contains no commitments. Should you have any questions, please contact me.

Sincerely,

Sherrie R. Cotton

Sherrie R. Cotton
Director, Nuclear Safety Assurance

SRC/nbm
Attachment

A001

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ENTERGY OPERATIONS

ARKANSAS NUCLEAR ONE - UNIT 2

CORE OPERATING LIMITS REPORT

FOR CYCLE 16

01-R-2008-04
Revision 0

CORE OPERATING LIMITS REPORT
FOR CYCLE 16

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ARKANSAS NUCLEAR ONE - UNIT 2

CORE OPERATING LIMITS REPORT
FOR CYCLE 16

I. INTRODUCTION

This CORE OPERATING LIMITS REPORT (COLR) has been prepared in accordance with the requirements of Arkansas Nuclear One - Unit 2 (ANO-2) Technical Specification 6.9.5 for ANO-2's Cycle 16. This is Revision 0 of the Cycle 16 COLR.

II. SUMMARY OF CHANGES

Listed below are the changes to the COLR from the latest revision of the Cycle 15 COLR.

- The lower limit for MTC (Figure 1) has been revised form –3.4 E-04 Δk/k/°F to –3.8 E-04 Δk/k/°F.

- Modified the EFPD breakpoints in the Core Operating Limit for Moderator Temperature Coefficient (MTC) that specifies where a less positive (burnup dependent) MTC was credited in the safety analyses. The first breakpoint is at 124.9 EFPD. The second breakpoint is 353.2 EFPD.

- The required downpower and time frame for a dropped CEA (Figure 2) has changed. Also the title to this figure was changed to "Required Power Reduction After Inward CEA Deviation".

- Linear Heat Rate has been changed from ≤ 13.5 kW/ft to ≤ 13.7 kW/ft up to a burnup of 187 EFPD and ≤ 12.6 kW/ft for burnups exceeding 187 EFPD.

- With COLSS in service and neither CEAC operable, COLSS calculated core power must be maintained less than or equal to COLSS calculated core power operating limit based on DNBR decreased by 10%. The 10% was 13%.

- DNBR Margin with COLSS out of service and at least one CEAC operable (Figures 4). Added a note to this figure to clarify that DNBR greater than that indicated at the top of the figure is acceptable, provided the indicated ASI limits remain between the bounds that are shown for lower DNBR.

- DNBR Margin with COLSS out of service and both CEACs inoperable (Figure 5). Added a note to this figure to clarify that DNBR greater than that indicated at the top of the figure is

acceptable, provided the indicated ASI limits remain between the bounds that are shown for lower DNBR.

III. AFFECTED TECHNICAL SPECIFICATIONS

1)	3/4.1.1.1	Shutdown Margin - $T_{avg} > 200°F$
2)	3/4.1.1.2	Shutdown Margin - $T_{avg} \leq 200°F$
3)	3.1.1.4	Moderator Temperature Coefficient
4)	3.1.3.1	CEA Position
5)	3.1.3.6	Regulating CEA Insertion Limits
6)	3/4.2.1	Linear Heat Rate
7)	3.2.3	Azimuthal Power Tilt - T_q
8)	3/4.2.4	DNBR Margin
9)	3.2.7	Axial Shape Index

IV. CORE OPERATING LIMITS

The cycle-specific operating limits for the specifications listed are presented below.

1) 3/4.1.1.1 - SHUTDOWN MARGIN- $T_{avg} \geq 200°F$

The SHUTDOWN MARGIN shall be greater than or equal to 5.0 % Δk/k in Modes 1, 2, 3, and 4.

2) 3/4.1.1.2 - SHUTDOWN MARGIN - $T_{avg} \leq 200°F$

The SHUTDOWN MARGIN shall be greater than or equal to 5.0% Δk/k in Mode 5.

3) 3.1.1.4 - MODERATOR TEMPERATURE COEFFICIENT

The Moderator Temperature Coefficient (MTC) shall be in accordance with Figure 1. The Beginning of Cycle (BOC) positive COLR MTC limit line of Figure 1 is from BOC to 124.9 EFPD. From 353.2 EFPD to End of Cycle (EOC) the positive COLR MTC limit line is linear from an MTC of 0.0 E-4 Δk/k/°F at 0% power to an MTC of -1.0 E-4 Δk/k/°F at 100% power which is bounded by the BOC positive MTC limit. Between 124.9 EFPD and 353.2 EFPD the positive MTC limit may be interpolated linearly with burnup.

4) 3.1.3.1 - CEA POSITION

With one or more CEAs trippable but misaligned from any other CEAs in its group by more than the Technical Specification 3.1.3.1 allowed value, the minimum required core power reduction for Modes 1 and 2 is specified in Figure 2.

5) 3.1.3.6 - REGULATING CEA INSERTION LIMITS

The regulating CEA groups (Groups 6 & P) shall be limited to the withdrawal and insertion limits shown on Figure 3. Figure 3 assumes that Groups 1 through 5 are at or above the Programmed Insertion Limit.

6) 3/4.2.1 - LINEAR HEAT RATE

With COLSS out of service, the linear heat rate shall be maintained ≤ 13.7 kW/ft for cycle burnup up to 187 EFPD; and ≤ 12.6 kW/ft for burnup exceeding 187 EFPD.

7) 3.2.3 - AZIMUTHAL POWER TILT- T_q

The measured AZIMUTHAL POWER TILT shall be maintained ≤ 0.03.

8) 3/4.2.4 - DNBR MARGIN

The DNBR limit shall be maintained by one of the following methods:

a) With COLSS in service and neither CEAC operable - Maintain COLSS calculated core power less than or equal to COLSS calculated core power operating limit based on DNBR decreased by 10%.

b) With COLSS out of service and at least one CEAC operable - Operate within the Region of Acceptable Operation shown on Figure 4, using any operable CPC channel.

c) With COLSS out of service and neither CEAC operable - Operate within the Region of Acceptable Operation shown on Figure 5, using any operable CPC channel.

9) 3.2.7 - AXIAL SHAPE INDEX

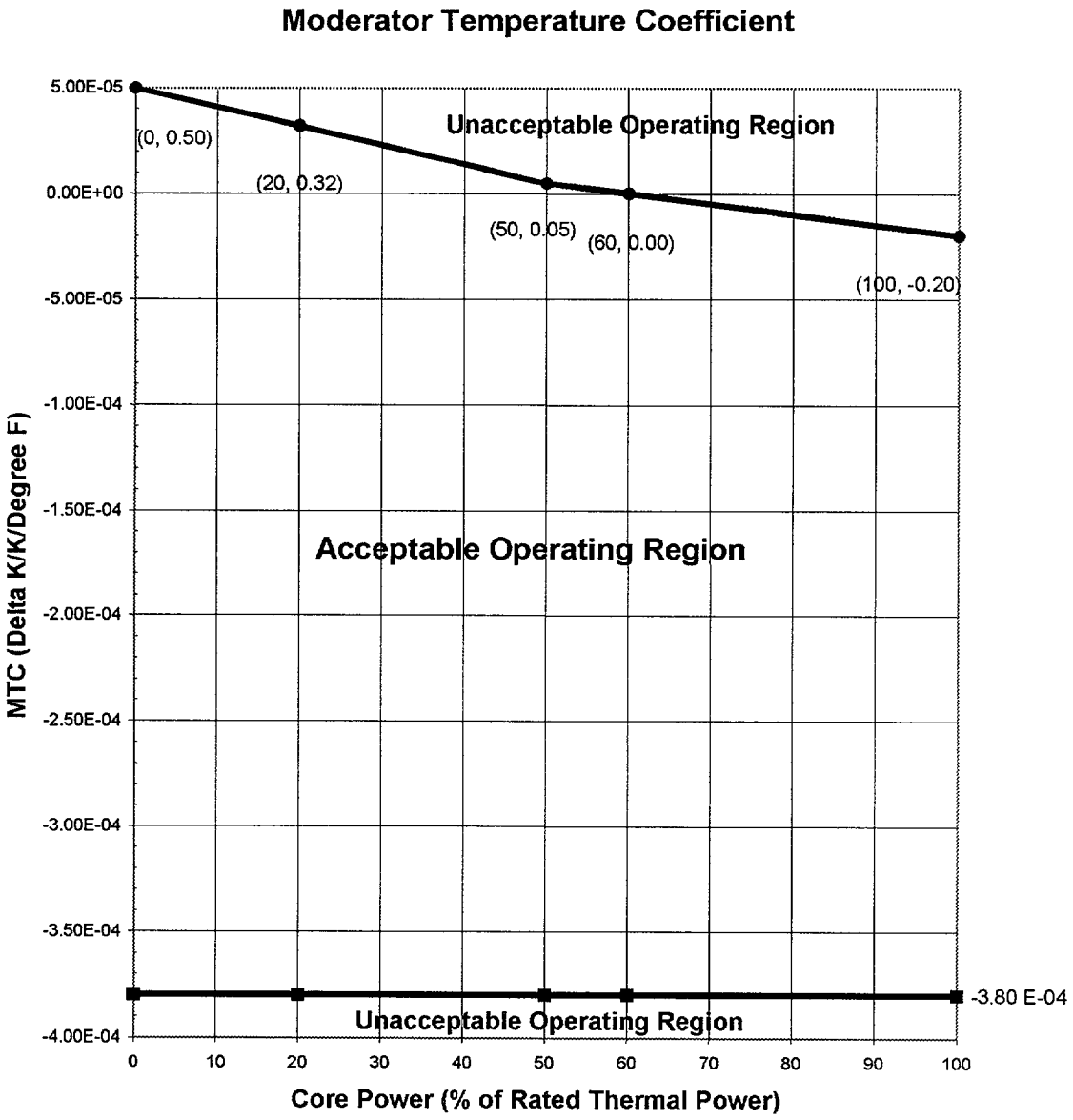
The core average AXIAL SHAPE INDEX (ASI) shall be maintained within the following limits:

a) COLSS IN SERVICE
$-0.27 \leq ASI \leq +0.27$

b) COLSS OUT OF SERVICE (CPC)
$-0.20 \leq ASI \leq +0.20$

V. LIST OF FIGURES

FIGURE 1

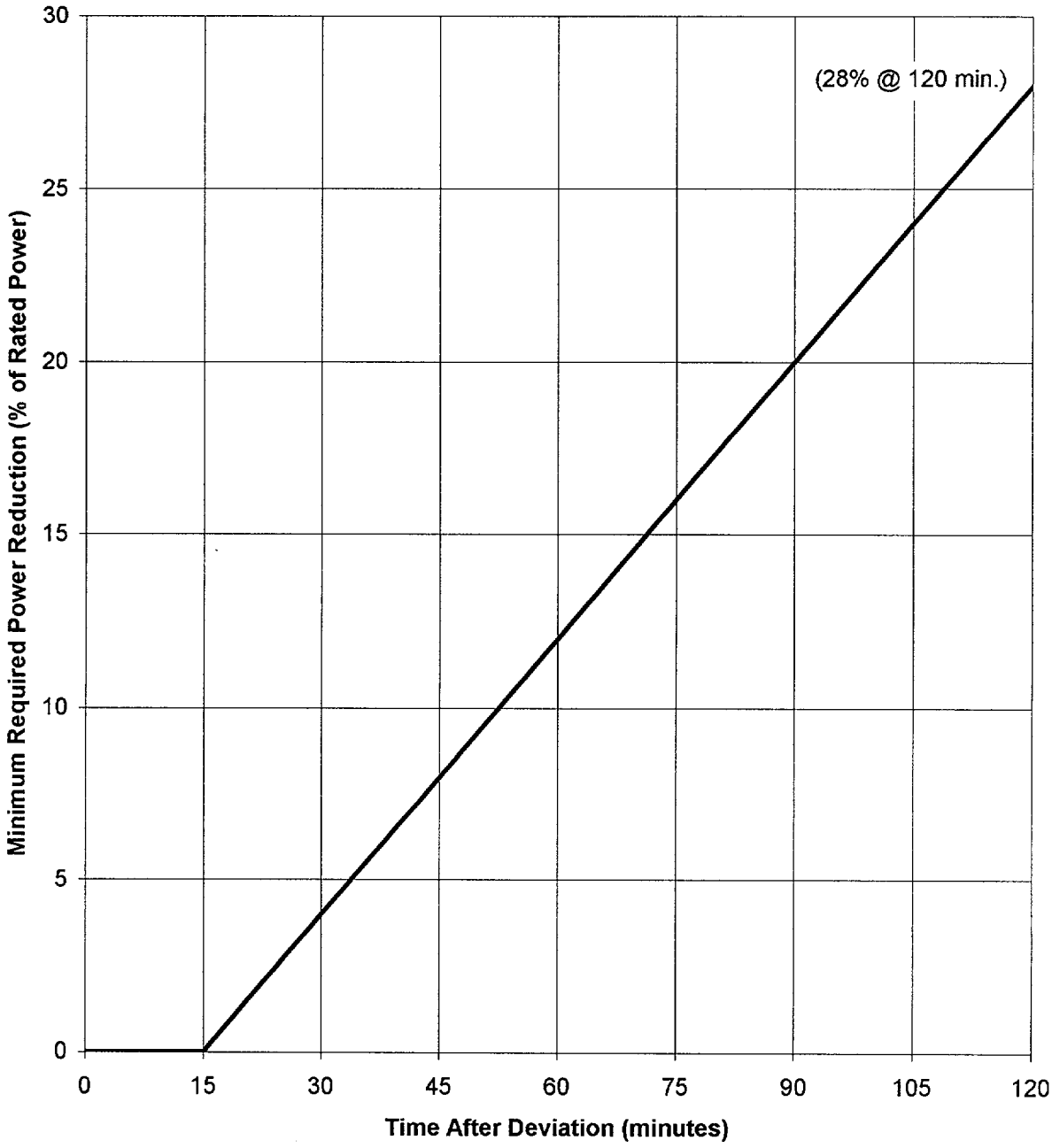


Note:

Per Technical Specification 3.1.1.4.a. and b., the Moderator Temperature Coefficient (MTC) maximum upper design limit shall be less positive than $+0.5 \times 10^{-4}$ $\Delta k/k/°F$ whenever THERMAL POWER is ≤ 70% of RATED THERMAL POWER and less positive than 0.0×10^{-4} $\Delta k/k/°F$ whenever THERMAL POWER is > 70% of RATED THERMAL POWER. Therefore, the actual MTC must be less than the COLR upper limit at zero power. At all other powers, the actual MTC may be equal to the COLR upper limit.

FIGURE 2

REQUIRED POWER REDUCTION AFTER INWARD CEA DEVIATION*

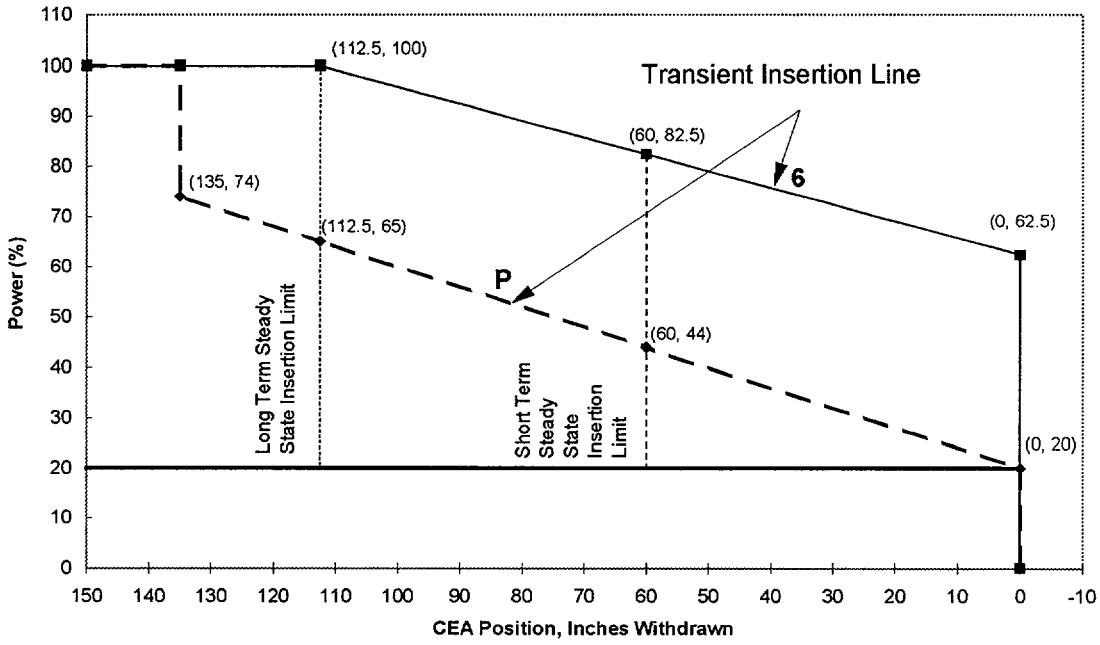


***When core power is reduced to 60% of rated power per this limit curve, further reduction is not required**

FIGURE 3

CEA INSERTION LIMITS VERSUS THERMAL POWER

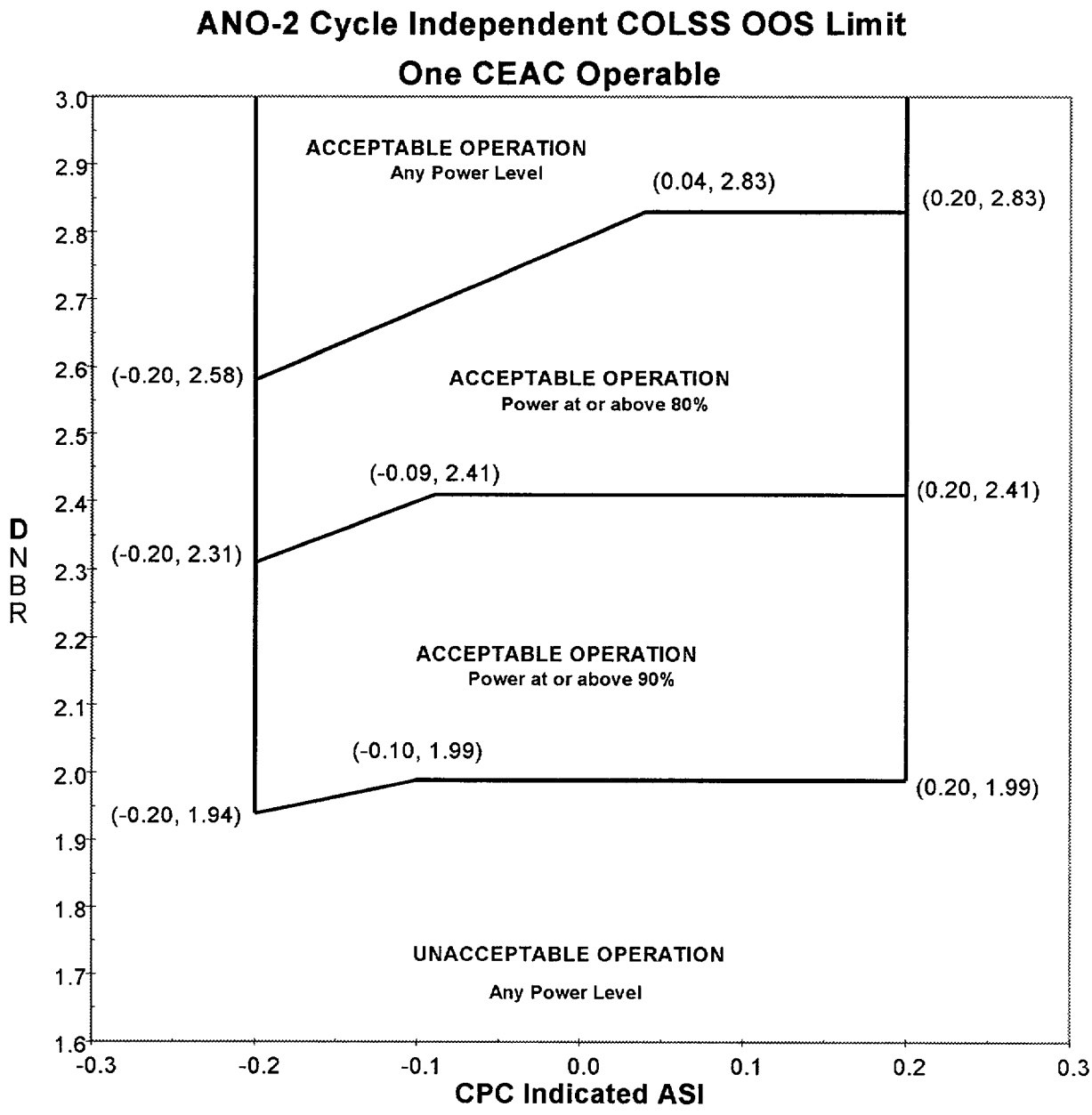
Groups 6 and P PDIL



Note: Regulating Groups 1 through 5 at or above the Programmed Insertion Limit.

FIGURE 4

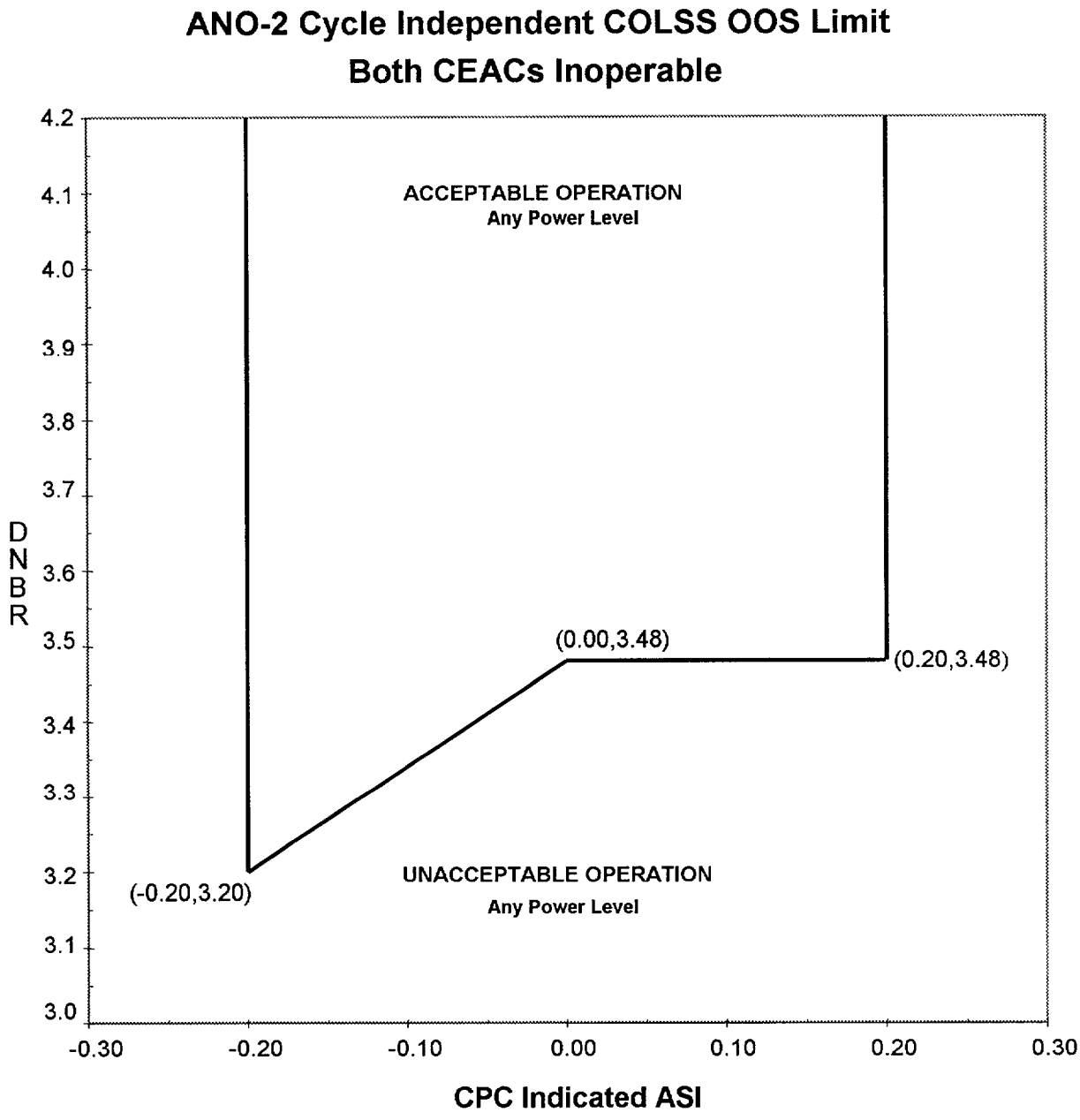
DNBR MARGIN OPERATING LIMIT BASED
ON CORE PROTECTION CALCULATORS



NOTE: DNBR greater than that indicated at the top of the figure is acceptable, provided the indicated ASI limits remain between the bounds that are shown for lower DNBR.

FIGURE 5

DNBR MARGIN OPERATING LIMIT BASED ON CORE PROTECTION CALCULATORS



- **NOTE:** DNBR greater than that indicated at the top of the figure is acceptable, provided the indicated ASI limits remain between the bounds that are shown for lower DNBR.