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161-01858-DBK/SW
April 19, 1989

Docket Nos. STN 50-528

U. S. Nuclear Regulatory Commission
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Reference: 161-01620-DBK/BJA, dated January 18, 1989

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Unit 1
Reload Analysis Report for Unit 1, Cycle 3
File: 89-056-026

Attached, for your information, is the revised Reload Analysis Report which supercede those previously transmitted in the Reference. In addition, clean graphs are provided for the PVNGS Unit 1, Cycle 3 Technical Specifications changes. The changes include addition of final references and corrected typographical errors.

Very truly yours,

D. B. Karner
Executive Vice President

DBK/SW/jle

Attachment

cc: G. W. Knighton (all w/attachment)
T. L. Chan
T. J. Polich
A. C. Gehr

A001
1/1

1.0 INTRODUCTION AND SUMMARY

This report provides an evaluation of the design and performance of Palo Verde Nuclear Generating Station Unit 1 (PVNGS-1) during its third cycle of operation at 100% rated core power of 3800 MWt and NSSS power of 3822 MWt. Operating conditions for Cycle 3 have been assumed to be consistent with those of the previous cycle and are summarized as full power operation under base load conditions. The core will consist of irradiated Batch B, C and D assemblies, along with fresh Batch E assemblies. The Cycle 2 termination burnup has been assumed to be between 298 and 350 EFPD (Effective Full Power Days).

The second cycle of operation will hereafter be referred to in this report as the "Reference Cycle."

The safety criteria (margins of safety, dose limits, etc.) applicable for the plant were established in Reference 1-1. A review of all postulated accidents and anticipated operational occurrences has shown that the Cycle 3 core design meets these safety criteria.

The Cycle 3 reload core characteristics have been evaluated with respect to the Reference Cycle. Specific differences in core fuel loadings have been accounted for in the present analysis. The status of the postulated accidents and anticipated operational occurrences for Cycle 3 can be summarized as follows:

1. Transient data are less severe than those of the Reference Cycle analysis; therefore, no reanalysis is necessary, or

2. Transient data are <u>not</u> bounded by those of the Reference Cycle analysis, therefore, reanalysis is required.

TABLE 3-1

PALO VERDE NUCLEAR GENERATING STATION UNIT 1

Cycle 3 Core Loading

Assembly Designation	Number of Assemblies	Fuel Rods per Assembly	Initial Enrichment (w/o U-235)	Number Shims/ Assembly	Initial Shim Loading (gm B10/in)	Total of Fuel Rods	Number Shim Rods
B	1	208 12	2.78 1.92	16	.01842	208 12	16
C	36	224 12	3.30 2.78	0	---	8064 432	0
C/	16	208 12	3.30 2.78	16	.01151	3328 192	256
D	36	184 52	4.05 3.36	0	---	6624 1872	0
D*	28	176 52	3.36 2.78	8	.008	4928 1456	224
Dx	12	216 12	3.36 2.78	8	.008	2592 144	96
D/	4	216 12	3.36 2.78	8	.020	864 48	32
E0	24	184 52	4.03 3.90	0	---	4416 1248	0
E1	20	168 52	4.03 3.90	16	.024	3360 1040	320
E2	12	168 52	3.90 3.60	16	.024	2016 624	192
E3	12	168 52	3.90 3.60	16	.026	2016 624	192
E4	32	168 52	3.90 3.60	16	.016	5376 1664	512
E5	8	180 52	4.03 3.90	4	.012	1440 416	32
TOTAL	241					55004	1872

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(7-10) USNRC, "Safety Evaluation by the Office of Nuclear Reactor Regulation Related to Amendment No. 24 to Facility Operating License No. NPF-41, Arizona Public Service Company, et. al. Palo Verde Nuclear Generating Station, Unit No. 1 Docket No. STN50-528," October 21, 1987.

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(7-12) Letter to D. G. Eisenhut from A. E. Scherer, Letter No. LD-82-040, March 31, 1982.

12.8 SECTION 8.0 REFERENCES-ECCS ANALYSIS

(8-1) "Acceptance Criteria for Emergency Core Cooling Systems for Light Water Cooled Nuclear Power Reactors," Federal Register, Vol. 39, No. 3, Friday, January 4, 1974.

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(8-4) CENPD-132-P, "Calculational Methods for the C-E Large Break LOCA Evaluation Model", August 1974.

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(8-5) CENPD-135-P, "STRIKIN-II, A Cylindrical Geometry Fuel Rod Heat Transfer Program", April 1974.

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(8-9) ANPP-33609-EEVB/KLM, dated September 30, 1985, "Limiting Small Break LOCA Analysis - Additional Information".

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NONE

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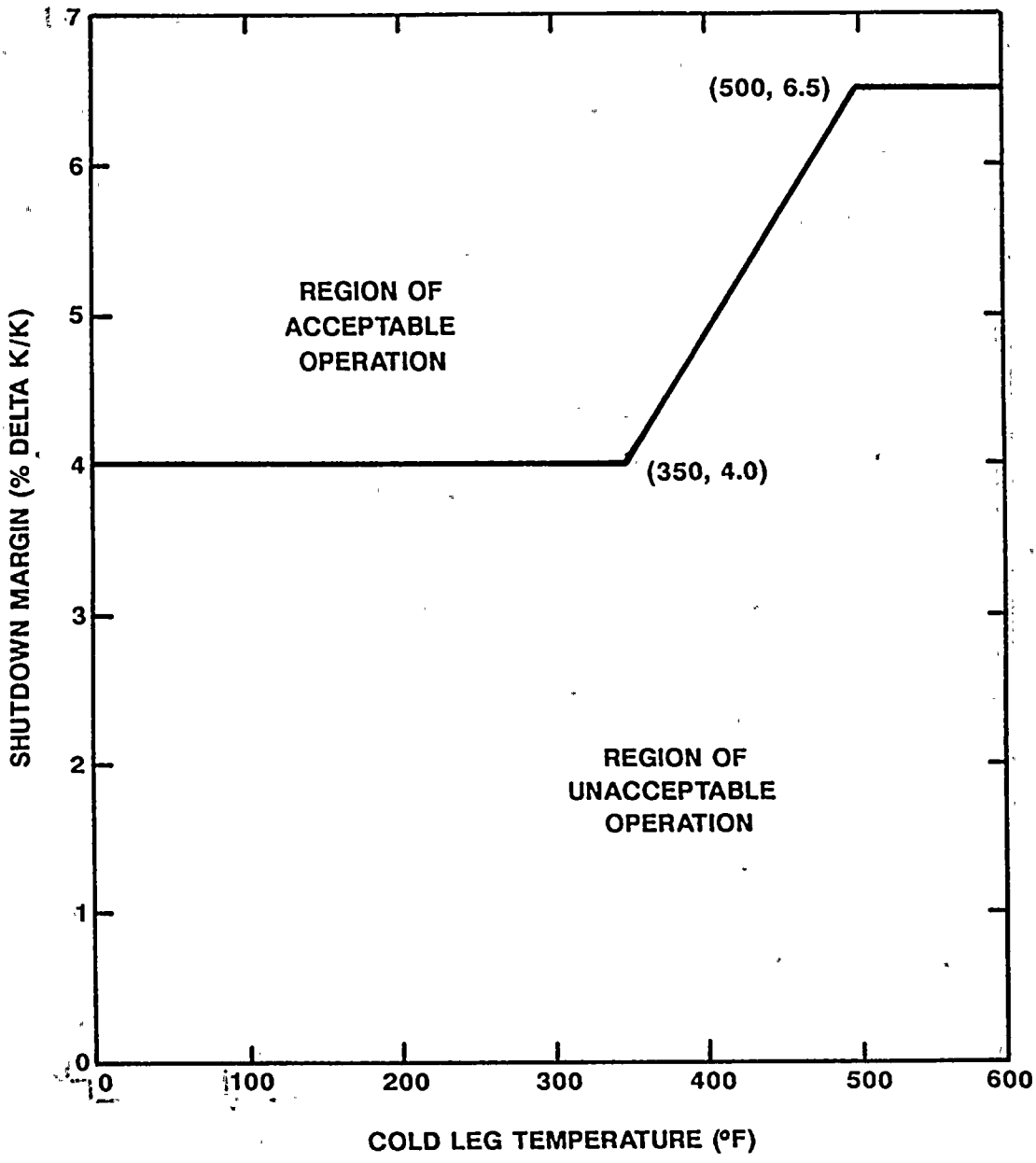


FIGURE 3.1-1A

SHUTDOWN MARGIN vs. COLD LEG TEMPERATURE

FIGURE 3.1-3

CEA INSERTION LIMITS vs. THERMAL POWER

(COLSS IN SERVICE)

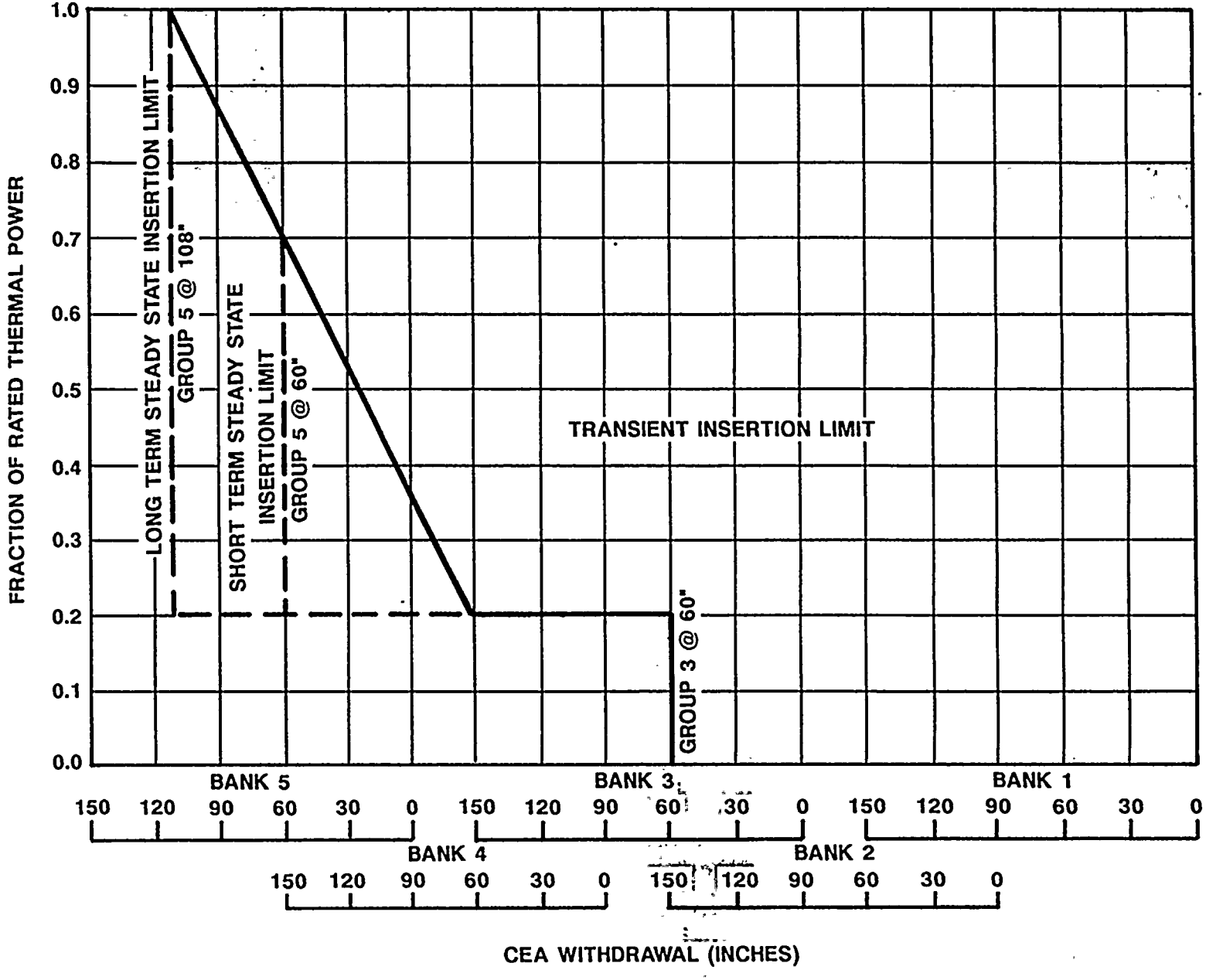
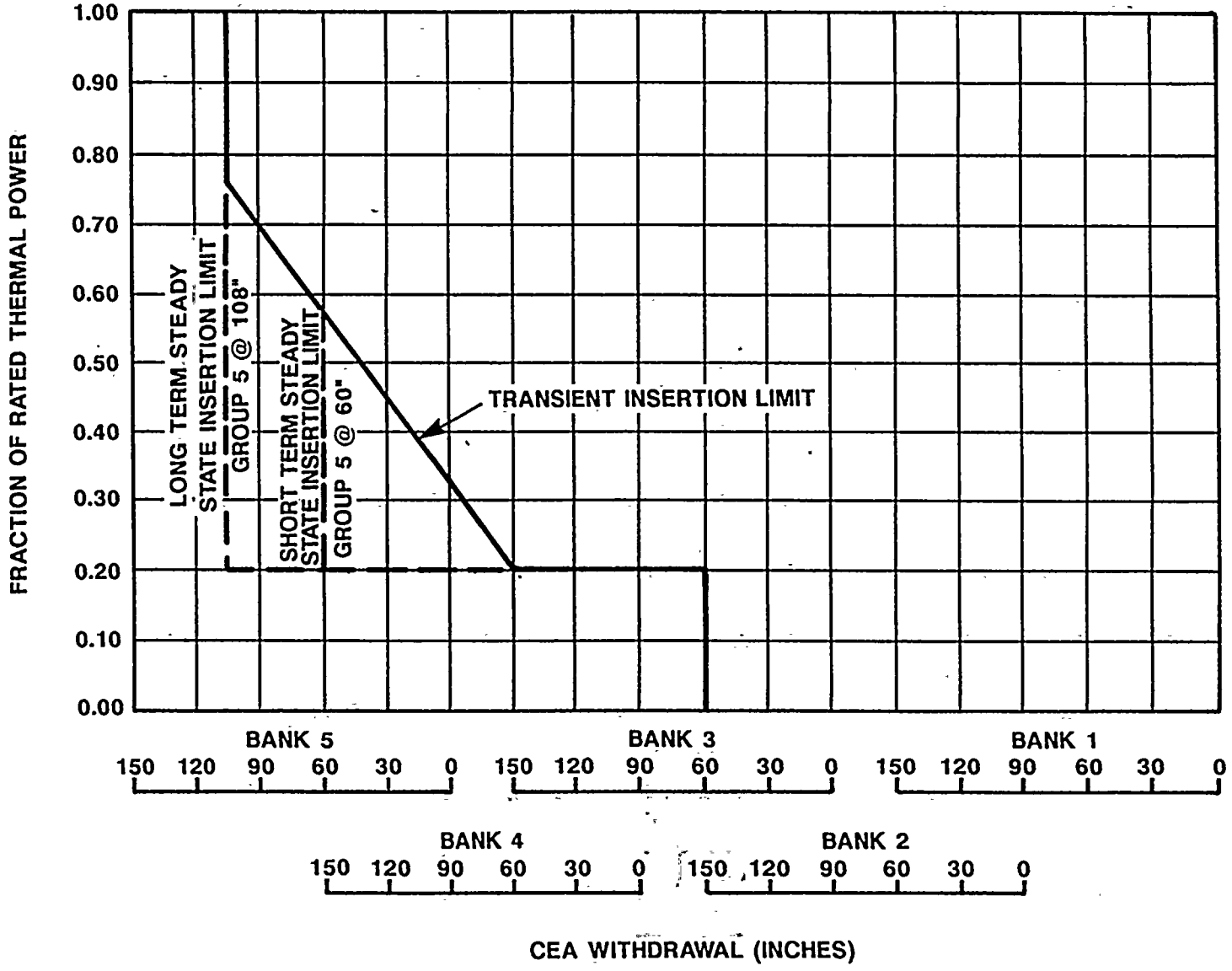


FIGURE 3.1-4

CEA INSERTION LIMITS vs. THERMAL POWER
(COLSS OUT OF SERVICE)



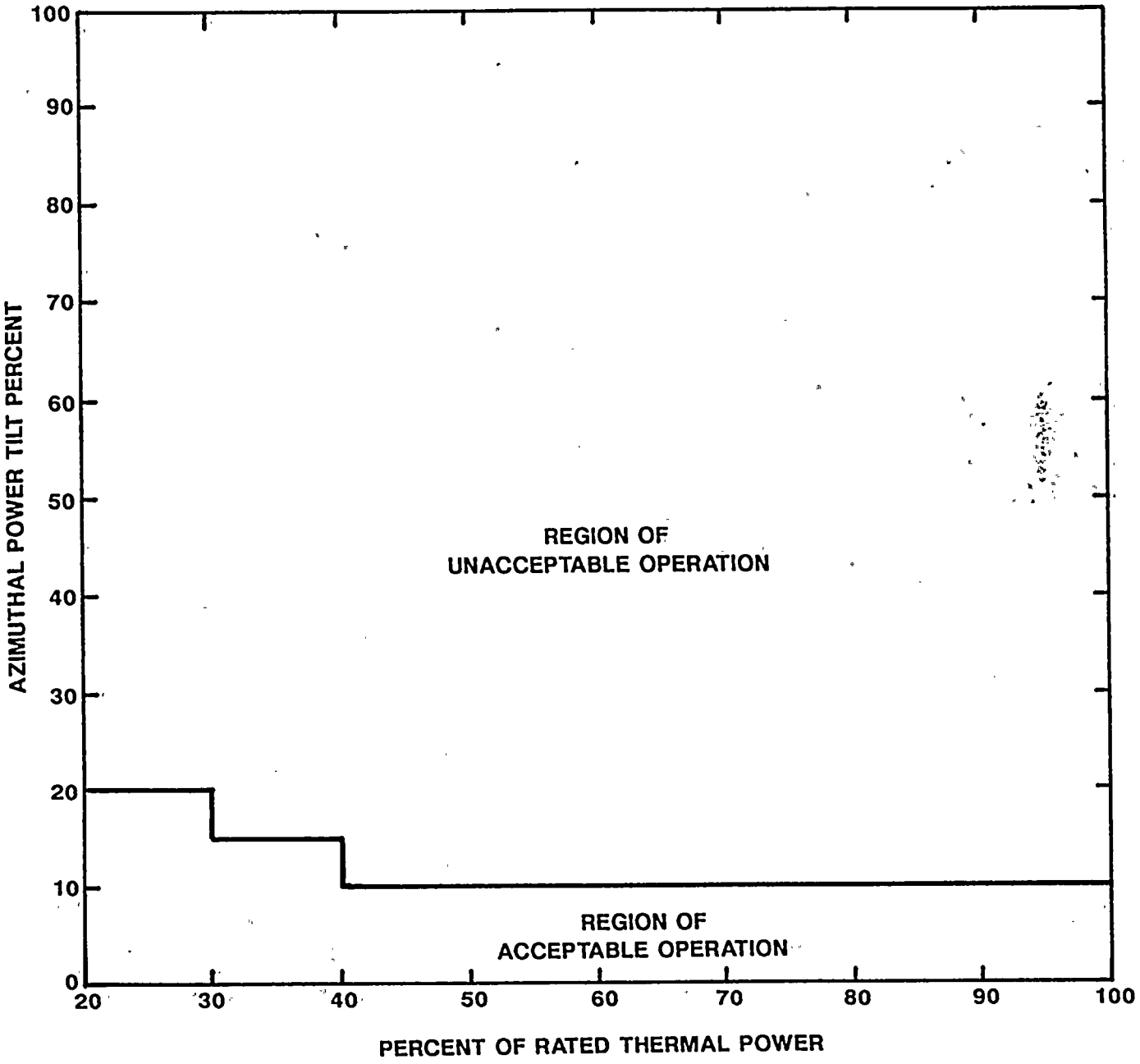


FIGURE 3.2-1A
AZIMUTHAL POWER TILT LIMIT vs. THERMAL POWER
(COLSS IN SERVICE)

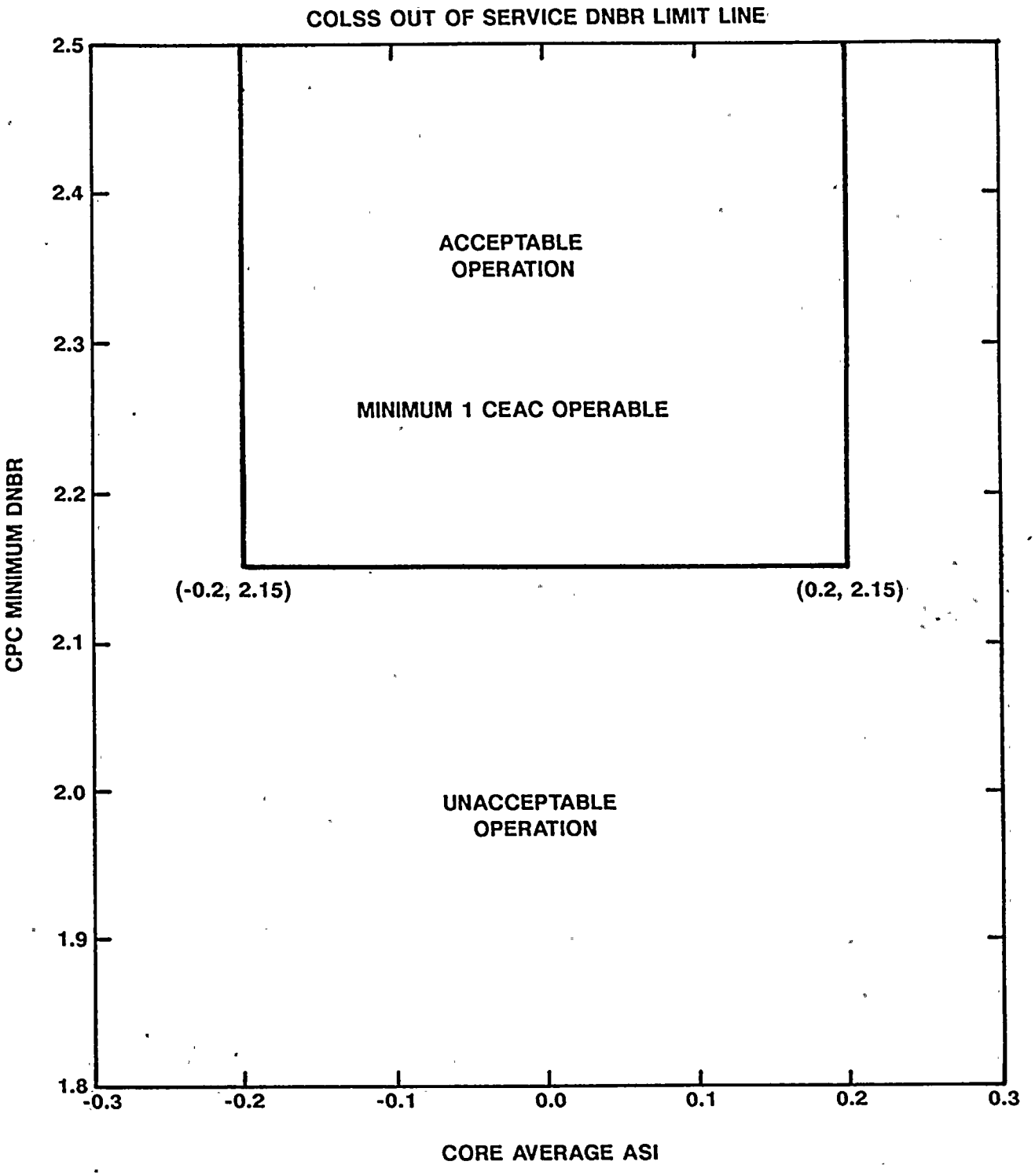


FIGURE 3.2-2

DNBR MARGIN OPERATING LIMIT BASED ON CORE PROTECTION CALCULATORS
(COLSS OUT OF SERVICE, CEAC'S OPERABLE)

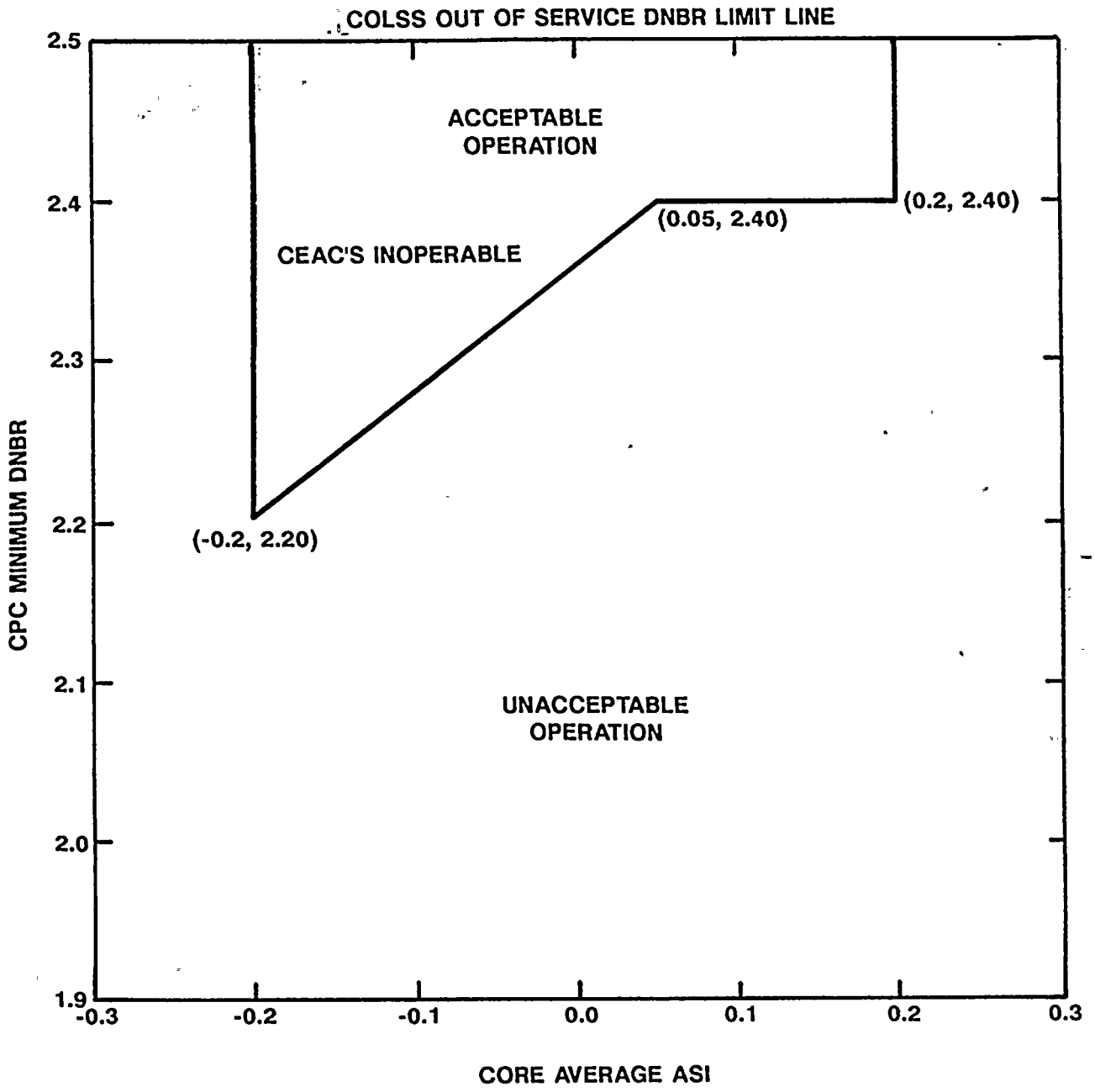


FIGURE 3.2-2a

DNBR MARGIN OPERATING LIMIT BASED ON CORE PROTECTION CALCULATORS
(COLSS OUT OF SERVICE, CEAC'S INOPERABLE)