Technical Specification 5.6.5d

APS

Palo Verde Nuclear Generating Station

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102-06095-TNW/REB/CJS
November 17, 2009

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS) Units 1, 2, and 3
Docket Nos. STN 50-528, 50-529, and 50-530
Revised Core Operating Limits Reports (COLRs), Units 1, 2 and 3

Pursuant to PVNGS Technical Specification, Section 5.6.5, enclosed are the revised Core Operating Limits Reports (COLRs). Unit 1 - Revision 20, Unit 2 - Revision 16, and Unit 3 - Revision 19, were made effective October 29, 2009. These revisions include changes resulting from License Amendment No. 174, dated August 26, 2009.

By copy of this letter and the enclosures, these COLR revisions are being provided to the NRC Region IV Administrator and the PVNGS Senior Resident Inspector. This letter does not make any commitments to the NRC. Should you need further information regarding this submittal, please contact Russell A. Stroud, Licensing Section Leader, at (623) 393-5111.

Sincerely,

Ray E Buzard for T. Weber

TNW/RAS/CJS/gat

Enclosure 1 - PVNGS Unit 1 Core Operating Limits Report (COLR), Revision 20
Enclosure 2 - PVNGS Unit 2 Core Operating Limits Report (COLR), Revision 16
Enclosure 3 - PVNGS Unit 3 Core Operating Limits Report (COLR), Revision 19

cc:	E. E. Collins Jr.	NRC Region IV Regional Administrator
	J. R. Hall	NRC NRR Project Manager
	R. I. Treadway	NRC Senior Resident Inspector for PVNGS

A001
NRR

Enclosure 1

PVNGS Unit 1 Core Operating Limits Report (COLR)
Revision 20

PALO VERDE NUCLEAR GENERATING STATION (PVNGS)

UNIT 1

CORE OPERATING LIMITS REPORT

Revision 20

Effective October 29, 2009

Responsible Engineer Date	Napier, Joseph J (Z71881) Digitally signed by Napier, Joseph J(Z71881) DN: cn=Napier, Joseph J (Z71881) Reason: I am the author of this document Date: 2009.10.27 16:17:19 -07'00'
Independent Reviewer Date	Bodnar, Walter S (Z06432) Digitally signed by Bodnar, Walter S(Z06432) DN: cn=Bodnar, Walter S (Z06432) Reason: I have reviewed this document Date: 2009.10.27 16:22:54 -07'00'
Responsible Section Leader Date	Rowland, James W (Z80533) Digitally signed by Rowland, James W(Z80533) DN: cn=Rowland, James W (Z80533) Reason: I am approving this document as temporary Reload Analysis SL Date: 2009.10.27 17:04:16 -07'00'

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This Report has been prepared in accordance with the requirements of Technical Specification 5.6.5. The Core Operating Limits have been developed using the NRC approved methodologies specified in Section 5.6.5 b of the Palo Verde Unit 1 Technical Specifications.

AFFECTED PVNGS TECHNICAL SPECIFICATIONS

3.1.1	Shutdown Margin (SDM) - Reactor Trip Breakers Open
3.1.2	Shutdown Margin (SDM) - Reactor Trip Breakers Closed
3.1.4	Moderator Temperature Coefficient (MTC)
3.1.5	Control Element Assembly (CEA) Alignment
3.1.7	Regulating CEA Insertion Limits
3.1.8	Part Strength CEA Insertion Limits
3.2.1	Linear Heat Rate (LHR)
3.2.3	Azimuthal Power Tilt (T_q)
3.2.4	Departure From Nucleate Boiling Ratio (DNBR)
3.2.5	Axial Shape Index (ASI)
3.3.12	Boron Dilution Alarm System (BDAS)
3.9.1	Boron Concentration

ANALYTICAL METHODS

The COLR contains the complete identification for each of the Technical Specification referenced topical reports (i.e., report number, title, revision, date, and any supplements) that provide the NRC-approved analytical methods used to determine the core operating limits, described in the following documents::

Title	Report No.	Rev	Date	Suppl
CE Method for Control Element Assembly Ejection Analysis (13-N001-1301-01204-1)	CENPD-0190-A	N.A.	January 1976	N.A.
The ROCS and DIT Computer Codes for Nuclear Design (13-N001-1900-01412-0)	CENPD-266-P-A	N.A.	April 1983	N.A.
Modified Statistical Combination of Uncertainties (13-N001-1303-01747-2)	CEN-356(V)-P-A	01-P-A	May 1988	N.A.
System 80™ Inlet Flow Distribution (13-N001-1301-01228-0)	Enclosure 1-P to LD-82-054	N.A.	February 1993	1-P
Calculative Methods for the CE Large Break LOCA Evaluation Model for the Analysis of CE and W Designed NSSS (13-N001-1900-01192-3)	CENPD-132	N.A.	March 2001	4-P-A
Calculative Methods for the CE Small Break LOCA Evaluation Model (13-N001-1900-01185-3)	CENPD-137-P	N.A.	April 1998	2-P-A
Fuel Rod Maximum Allowable Pressure (13-N001-0201-00026-1)	CEN-372-P-A	N.A.	May 1990	N.A.
Arizona Public Service Company PWR Reactor Physics Methodology Using CASMO-4/SIMULATE-3 (NFM-005)	NFM-005	N.A.	January 2006	N.A.
Technical Description Manual for the CENTS CodeVolume 1 (CENTS-TD MANUAL-VOL 1)	CE-NPD 282-P-A Vols. 1	2	March 2005	N.A.
Technical Description Manual for the CENTS Code Volume 2 (CENTS-TD MANUAL-VOL 2)	CE-NPD 282-P-A Vols. 2	2	March 2005	N.A.

Title	Report No.	Rev	Date	Suppl
Technical Description Manual for the CENTS CodeVolume 3 (CENTS-TD MANUAL-VOL 3)	CE-NPD 282-P-A Vols. 3	2	March 2005	N.A.
Implementation of ZIRLO^{TM} Cladding Material in CE Nuclear Power Fuel Assembly Designs (13-N001-1900-01329-0)	CENPD-404-P-A	0	November 2001	N.A.
HERMITE, A Multi-Dimensional Space-Time Kinetics Code for PWR Transients (HERMITE-TOPICAL)	CENPD-188-A		July 1976	
TORC Code, A Computer Code for Determining the Thermal Margin of a Reactor Core (N001-1301-01202)	CENPD-161-P-A		April 1986	
CETOP-D Code Structures and Modeling Methods for San Onofre Nuclear Generating Station Units 2 and 3, (N001-1301-01185)	CEN-160(S)-P		September 1981	
CPC Methodology Changes for the CPC Improvement Program, (N001-1303-02283)	CEN-310-P-A	0	April 1986	
Loss of Flow, C-E Methods for Loss of Flow Analysis, (N001-1301-01203)	CENPD-183-A	0	June 1984	
Methodology for Core Designs Containing Erbium Burnable Absorbers (N001-0201-00035)	CENPD-382-P-A	0	August 1993	
Verification of the Acceptability of a 1-Pin Burnup Limit of 60 MWD/kgU for Combustion Engineering 16 x 16 PWR Fuel (N001-0201-00042)	CEN-386-P-A	0	August 1992	

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

3.1.1 - Shutdown Margin (SDM) - Reactor Trip Breakers Open

The Shutdown Margin shall be greater than or equal to that shown in Figure 3.1.1-1.

3.1.2 - Shutdown Margin (SDM) - Reactor Trip Breakers Closed

The Shutdown Margin shall be greater than or equal to that shown in Figure 3.1.2-1.

3.1.4 - Moderator Temperature Coefficient (MTC)

The moderator temperature coefficient (MTC) shall be within the area of Acceptable Operation shown in Figure 3.1.4-1.

3.1.5 - Control Element Assembly (CEA) Alignment

With one or more full-strength or part-strength CEAs misaligned from any other CEAs in its group by more than 6.6 inches, the minimum required MODES 1 and 2 core power reduction is specified in Figure 3.1.5-1. The required power reduction is based on the initial power before reducing power.

3.1.7 - Regulating CEA Insertion Limits

With COLSS IN SERVICE, regulating CEA groups shall be limited to the withdrawal sequence and to the insertion limits[1] shown in Figure 3.1.7-1[2]; with COLSS OUT OF SERVICE, regulating CEA groups shall be limited to the withdrawal sequence and to the insertion limits[1] shown in Figure 3.1.7-2.[2] Regulating Groups 1 and 2 CEAs shall be maintained fully withdrawn[3] while in Modes 1 and 2 (except while performing SR 3.1.5.3).

[1] A reactor power cutback will cause either (Case 1) Regulating Group 5 or Regulating Group 4 and 5 to be dropped with no sequential insertion of additional Regulating Groups (Groups 1, 2, 3, and 4) or (Case 2) Regulating Group 5 or Regulating Group 4 and 5 to be dropped with all or part of the remaining Regulating Groups (Groups 1, 2, 3, and 4) being sequentially inserted. In either case, the Transient Insertion Limit and withdrawal sequence specified in the CORE OPERATING LIMITS REPORT can be exceeded for up to 2 hours.

[2] The Separation between Regulating Groups 4 and 5 may be reduced from the 90 inch value specified in Figures 3.1.7-1 and 3.1.7-2 provided that each of the following conditions are satisfied:

a) Regulating Group 4 position is between 60 and 150 inches withdrawn.

b) Regulating Group 5 position is maintained at least 10 inches lower than

Regulating Group 4 position.

c) Both Regulating Group 4 and Regulating Group 5 positions are maintained above the Transient Insertion Limit specified in Figure 3.1.7-1 (COLSS In Service) or Figure 3.1.7-2 (COLSS Out of Service).

[3] Fully withdrawn - ≥147.75" (Pulse Counter indication) and ≥145.25" (RSPT indication)

3.1.8 - Part Strength CEA Insertion Limits

The part strength CEA groups shall be limited to the insertion limits shown in Figure 3.1.8-1.

3.2.1 - Linear Heat Rate (LHR)

The linear heat rate limit of 13.1 kW/ft shall be maintained.

3.2.3 - Azimuthal Power Tilt (T_q)

The AZIMUTHAL POWER TILT (T_q) shall be less than or equal to 10% with COLSS IN SERVICE when power is greater than 20% and less than or equal to 50%. Additionally, the AZIMUTHAL POWER TILT (T_q) shall be less than or equal to 5% with COLSS IN SERVICE when power is greater than 50%. See Figure 3.2.3-1.

3.2.4 - Departure From Nucleate Boiling Ratio (DNBR)

COLSS IN SERVICE and Both CEACs INOPERABLE in Any OPERABLE CPC Channel - Maintain COLSS calculated core power less than or equal to COLSS calculated core power operation limit based on DNBR decreased by the allowance shown in Figure 3.2.4-1.

COLSS OUT OF SERVICE and CEAC(s) OPERABLE - Operate within the region of acceptable operation of Figure 3.2.4-2 using any operable CPC channel.

COLSS OUT OF SERVICE and Both CEACs INOPERABLE in Any OPERABLE CPC Channel - Operate within the region of acceptable operation of Figure 3.2.4-3 using any operable CPC channel with both CEACs INOPERABLE.

3.2.5 - Axial Shape Index (ASI)

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

COLSS OPERABLE
$-0.18 \leq ASI \leq 0.17$ for power $\geq 50\%$
$-0.28 \leq ASI \leq 0.17$ for power $>20\%$ and $< 50\%$

COLSS OUT OF SERVICE (CPC)
$-0.10 \leq ASI \leq 0.10$ for power $>20\%$

3.3.12 - Boron Dilution Alarm System (BDAS)

With one or both start-up channel high neutron flux alarms inoperable, the RCS boron concentration shall be determined at the applicable monitoring frequency specified in Tables 3.3.12-1 through 3.3.12-5.

3.9.1 - Boron Concentration

The boron concentration of all filled portions of the Reactor Coolant System and the refueling canal shall be maintained at a uniform concentration $\geq$ 3000 ppm.

FIGURE 3.1.1-1
SHUTDOWN MARGIN VERSUS COLD LEG TEMPERATURE
REACTOR TRIP BREAKERS OPEN

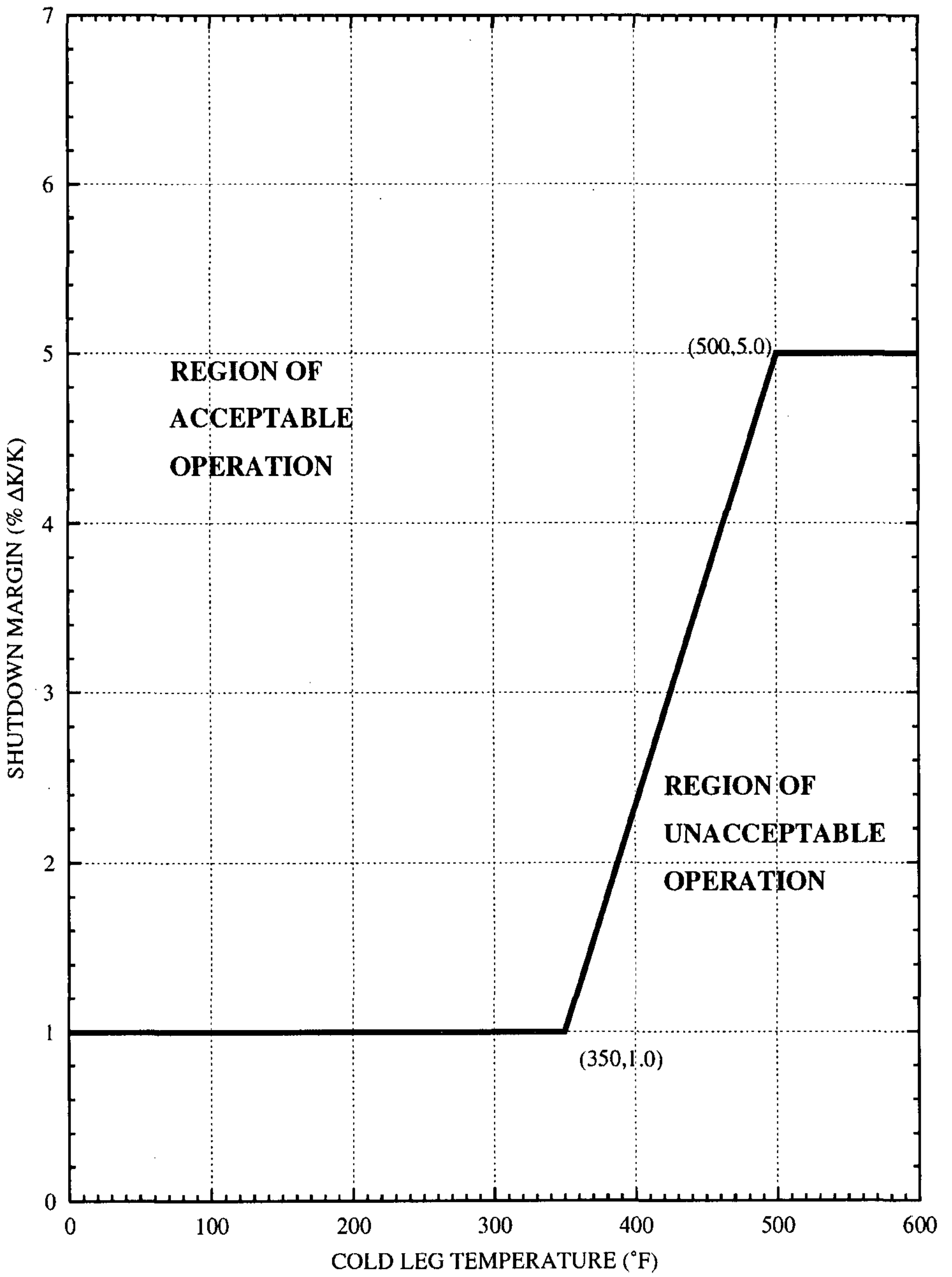


FIGURE 3.1.2-1
SHUTDOWN MARGIN VERSUS COLD LEG TEMPERATURE
REACTOR TRIP BREAKERS CLOSED

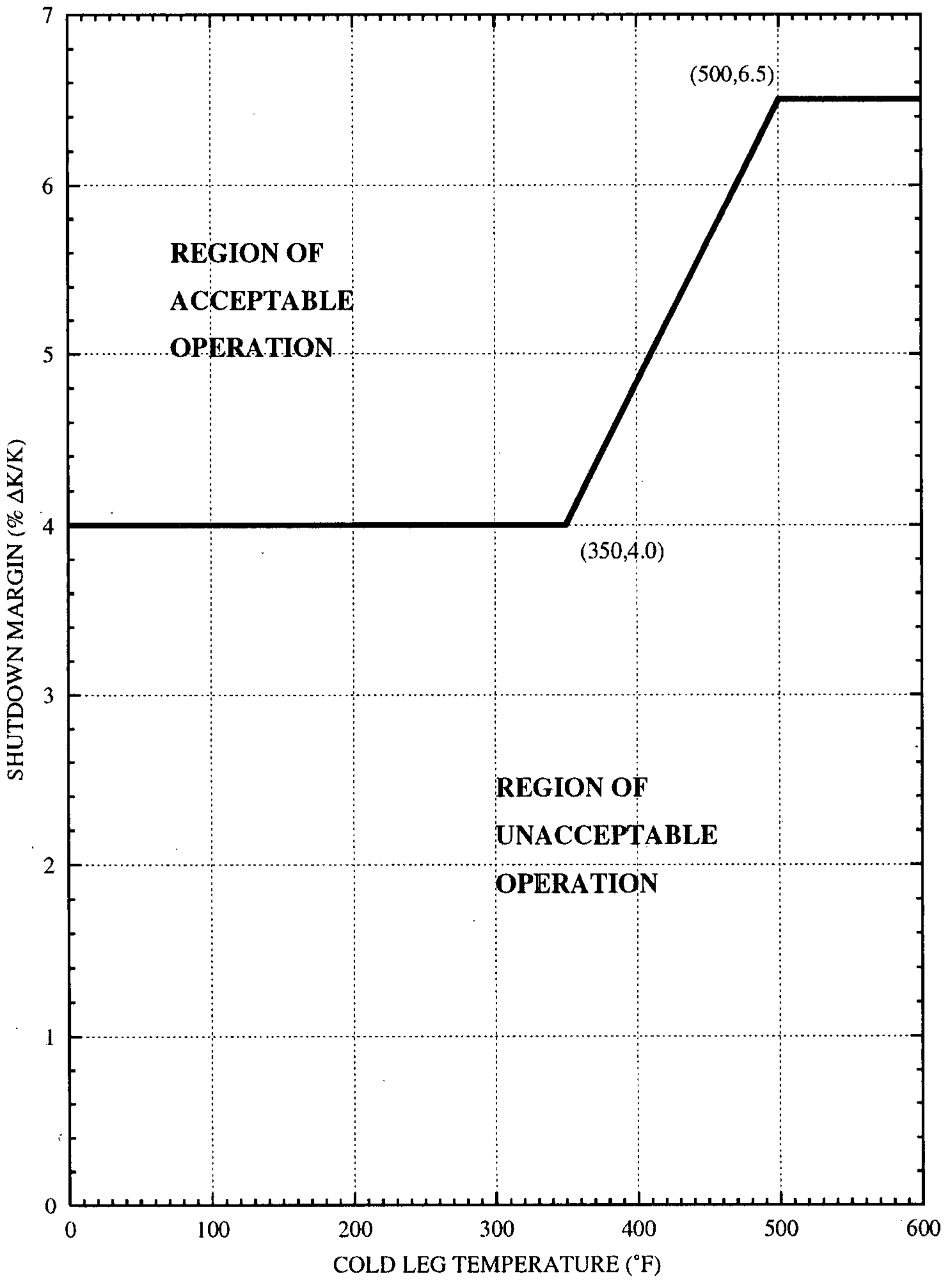


FIGURE 3.1.4-1

MTC ACCEPTABLE OPERATION, MODES 1 AND 2

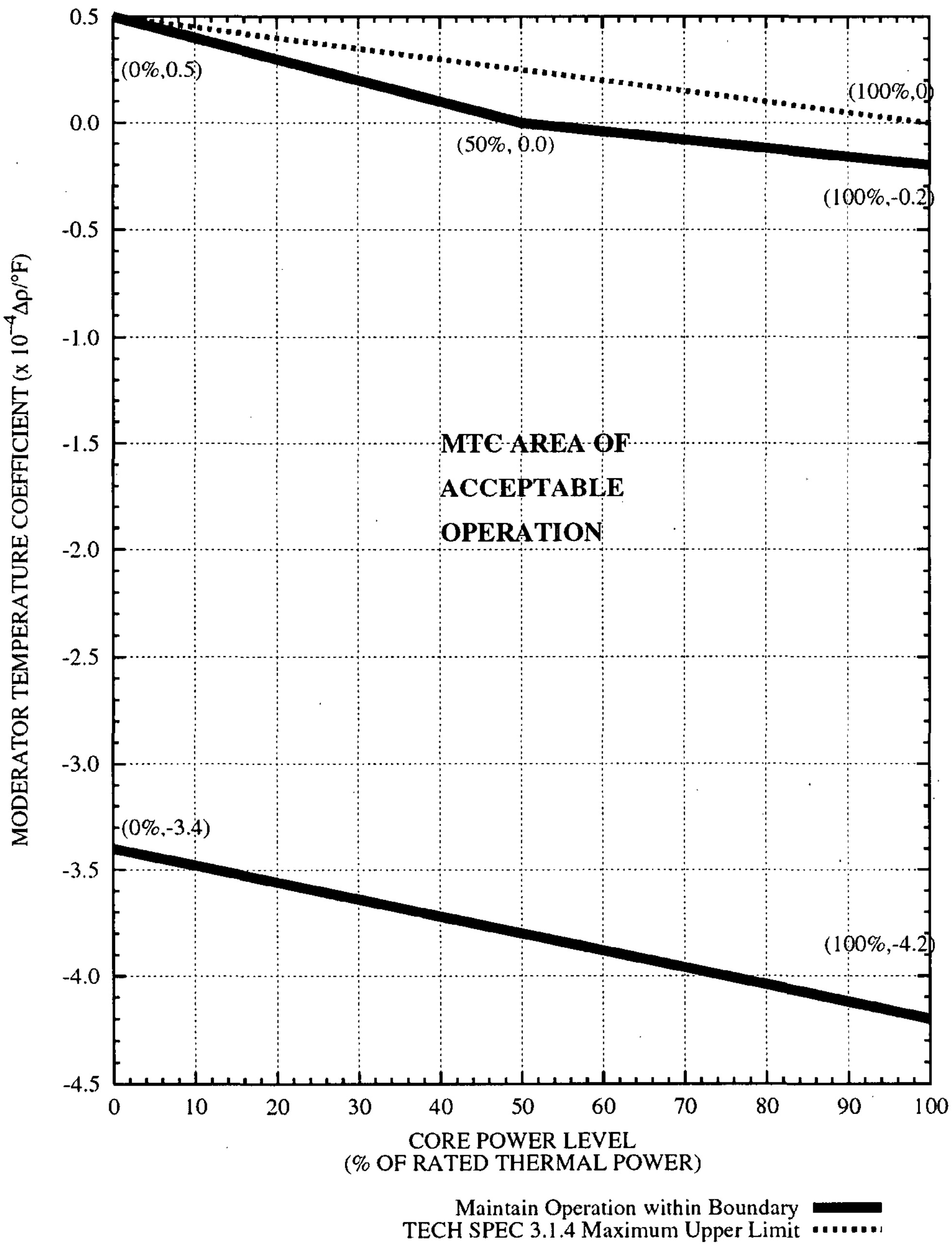
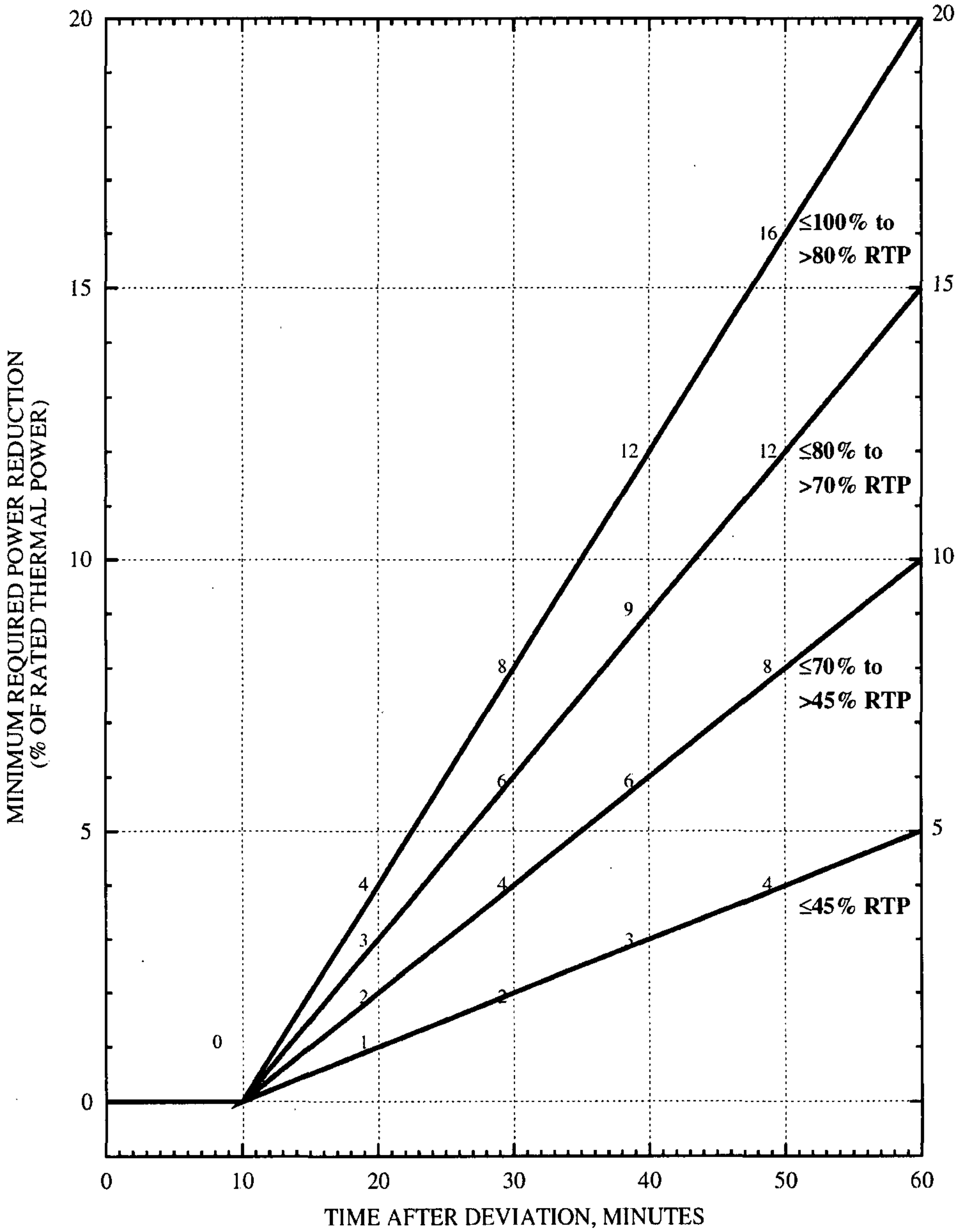
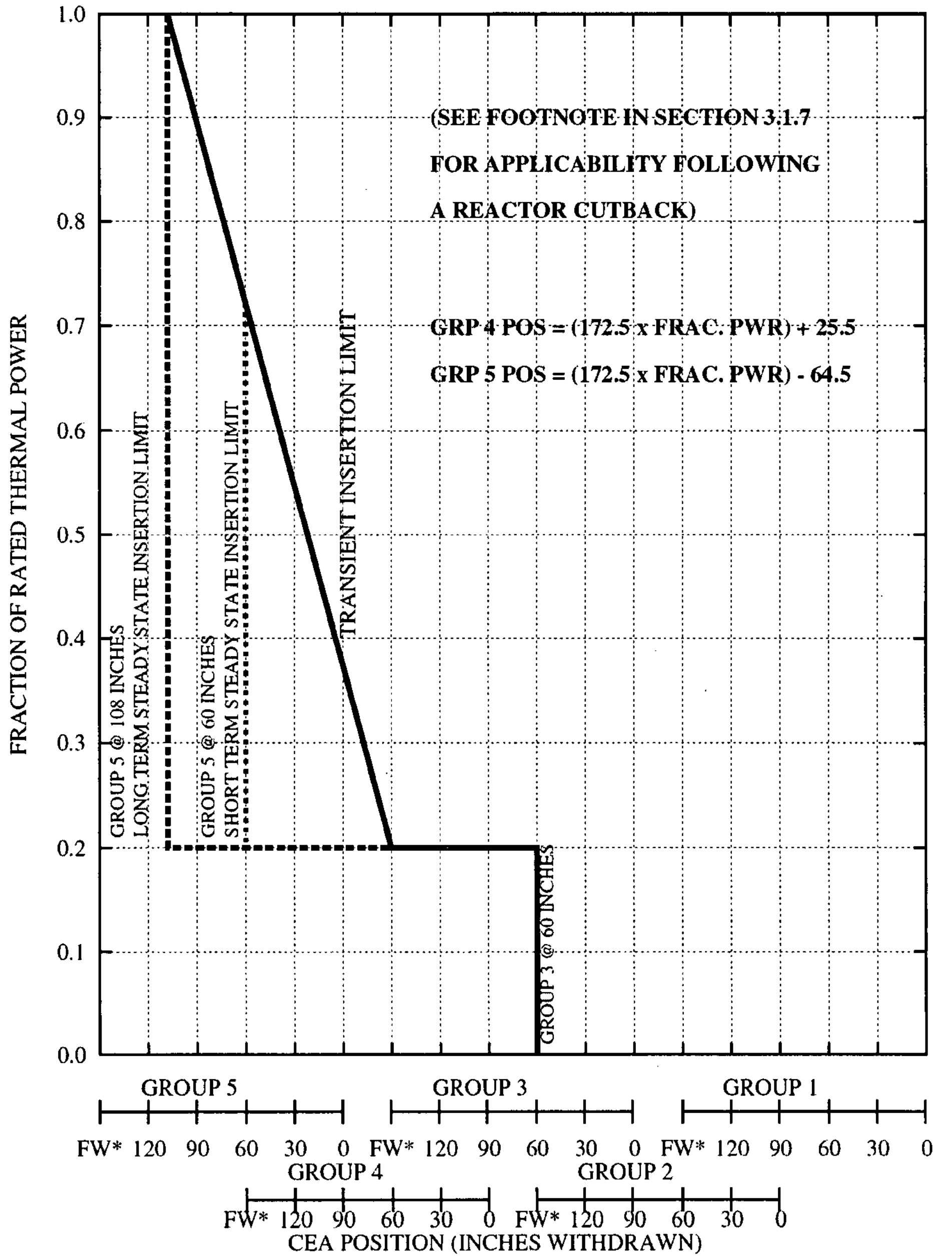


FIGURE 3.1.5-1
CORE POWER REDUCTION AFTER CEA DEVIATION*



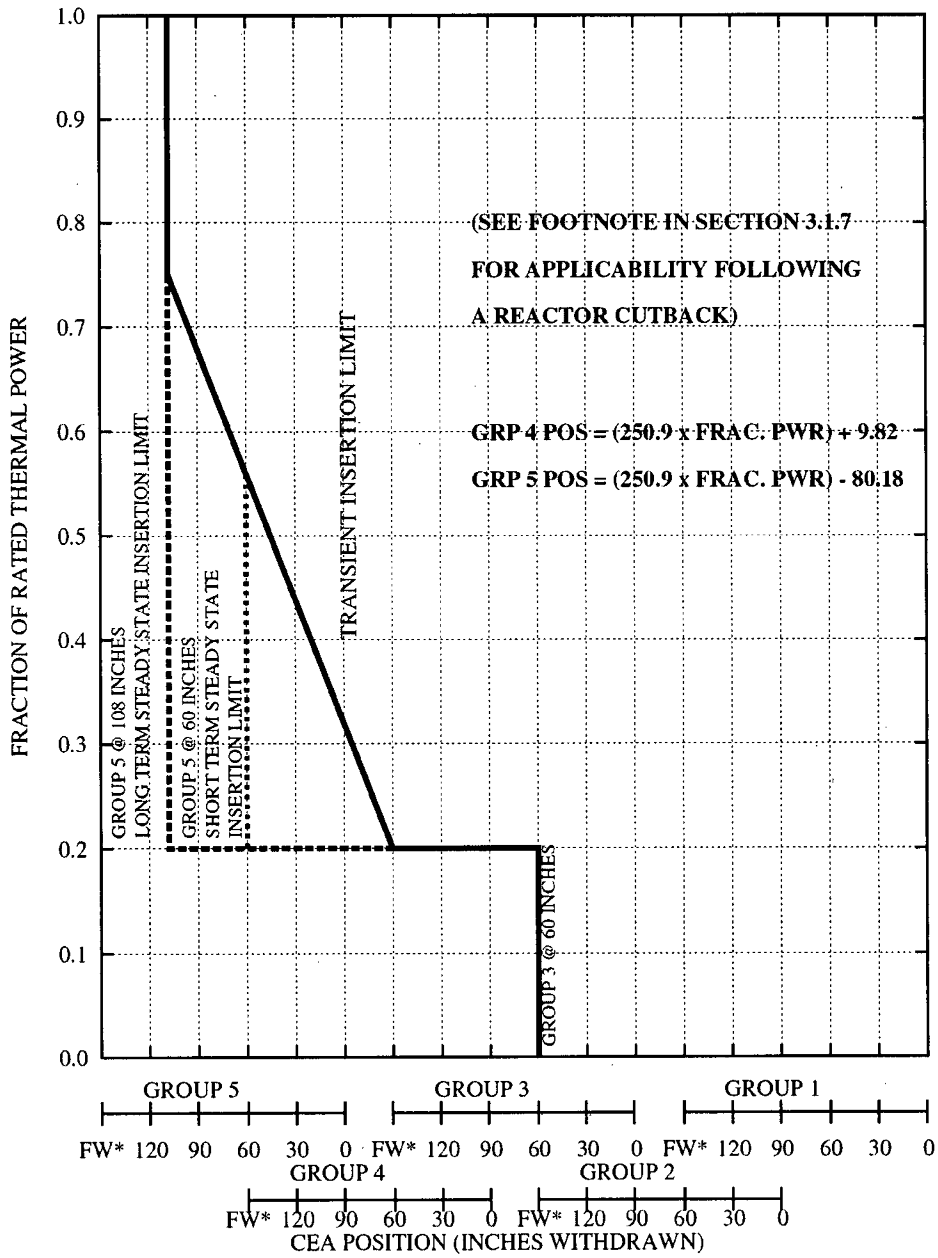
* WHEN CORE POWER IS REDUCED TO 35% OF RATED THERMAL POWER PER THIS LIMIT CURVE, FURTHER REDUCTION IS NOT REQUIRED.

FIGURE 3.1.7-1
CEA INSERTION LIMITS VERSUS THERMAL POWER
(COLSS IN SERVICE)



*Fully Withdrawn (FW) is defined as ≥ 147.75” (Pulse Counter) and ≥ 145.25” (RSPT).

FIGURE 3.1.7-2
CEA INSERTION LIMITS VERSUS THERMAL POWER
(COLSS OUT OF SERVICE)



*Fully Withdrawn (FW) is defined as ≥ 147.75” (Pulse Counter) and ≥ 145.25” (RSPT).

FIGURE 3.1.8-1
PART STRENGTH CEA INSERTION LIMITS
VERSUS THERMAL POWER

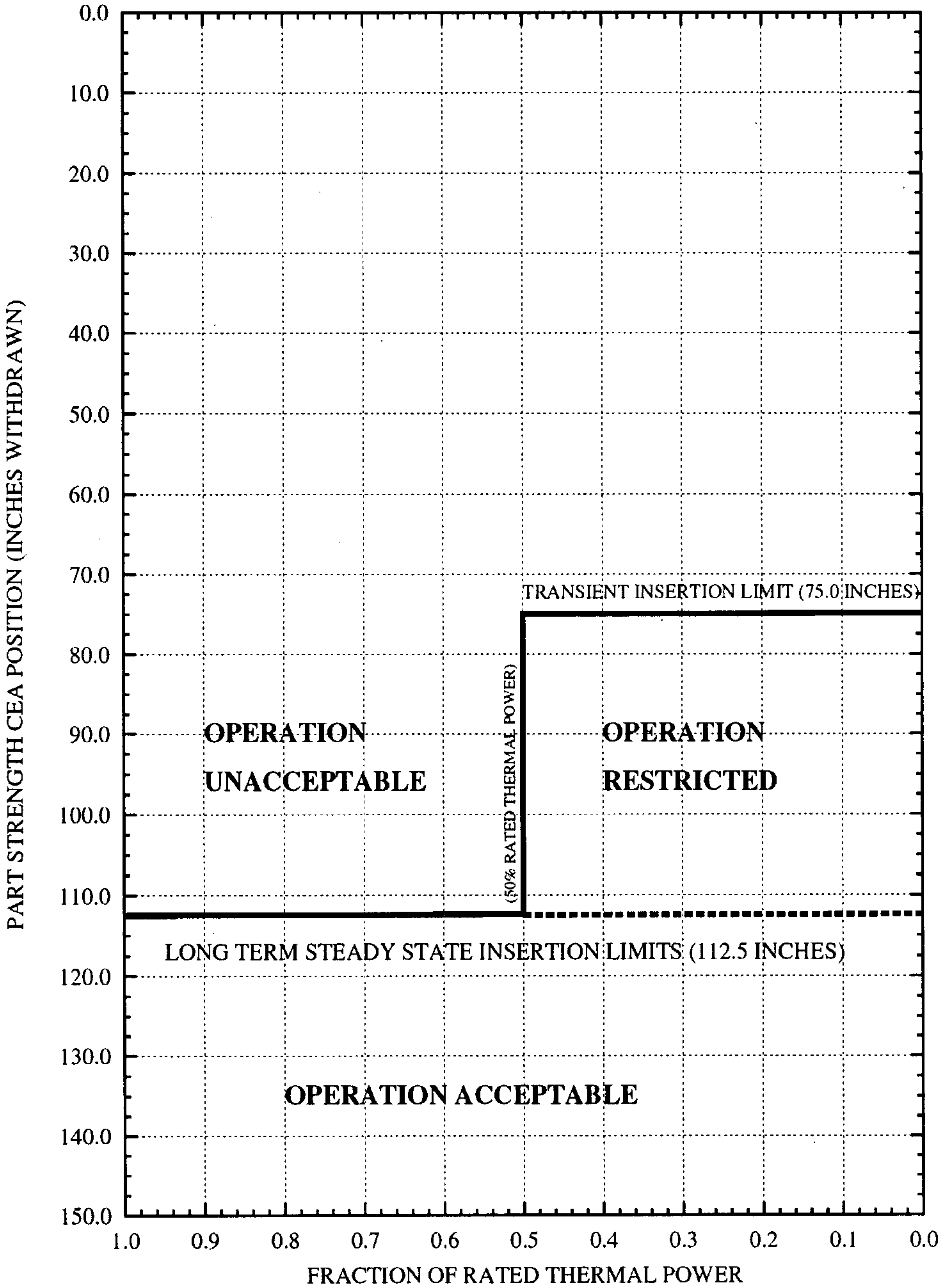


FIGURE 3.2.3-1
AZIMUTHAL POWER TILT VERSUS THERMAL POWER
(COLSS IN SERVICE)

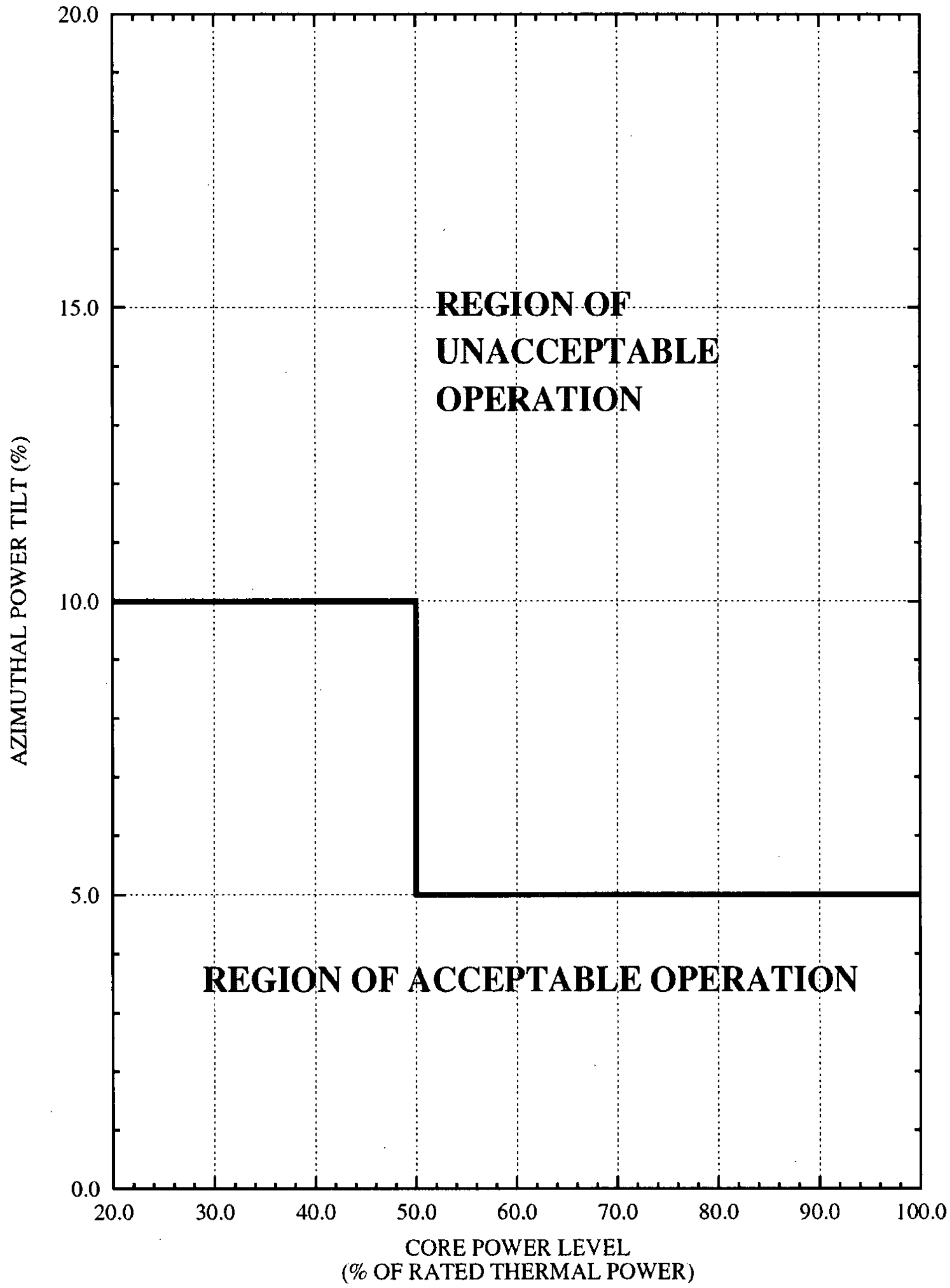


FIGURE 3.2.4-1
COLSS DNBR OPERATING LIMIT
ALLOWANCE FOR BOTH CEACs INOPERABLE
IN ANY OPERABLE CPC CHANNEL

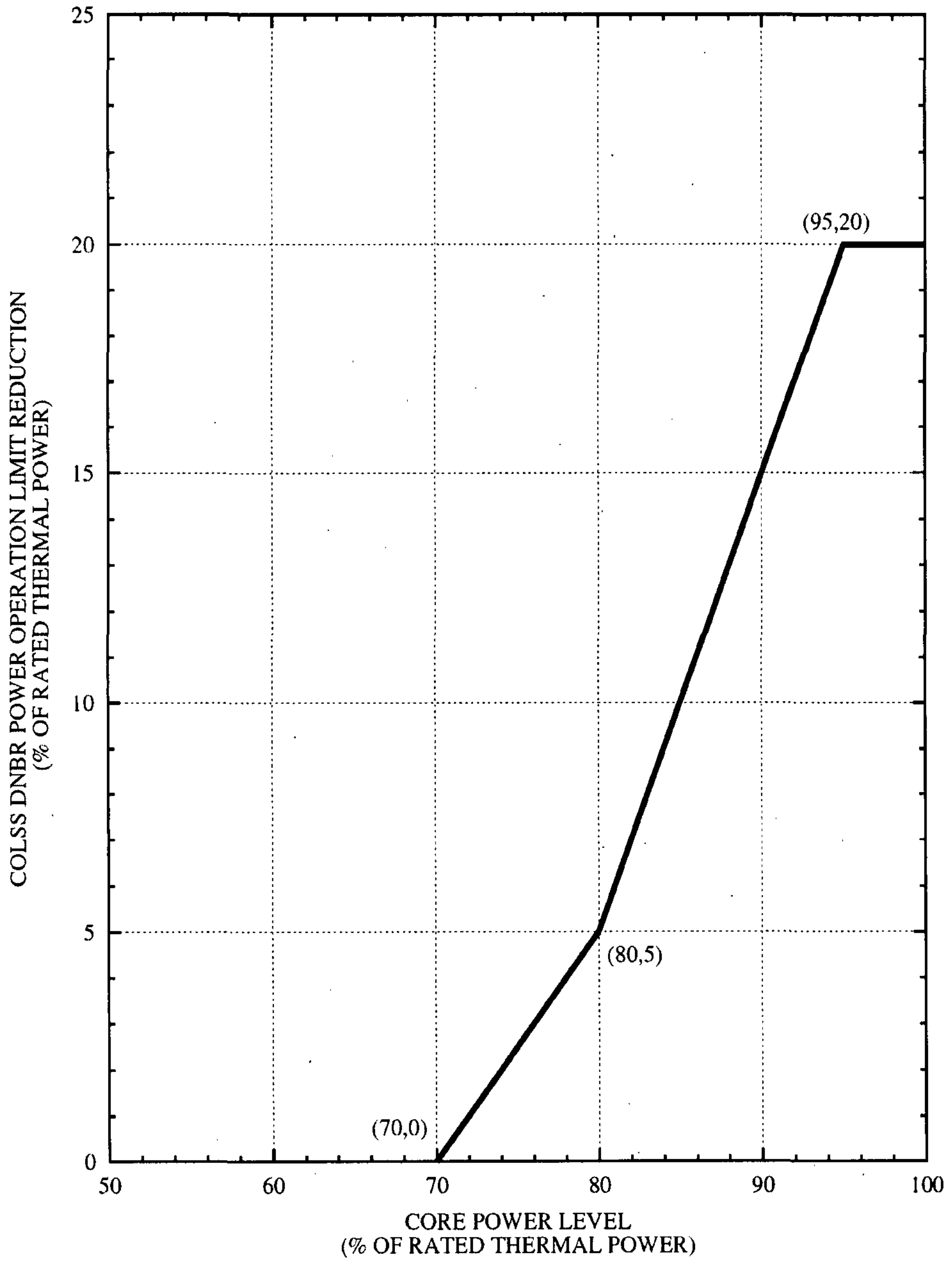


FIGURE 3.2.4-2
DNBR MARGIN OPERATING LIMIT BASED ON
THE CORE PROTECTION CALCULATORS
(COLSS OUT OF SERVICE, CEAC(s) OPERABLE)

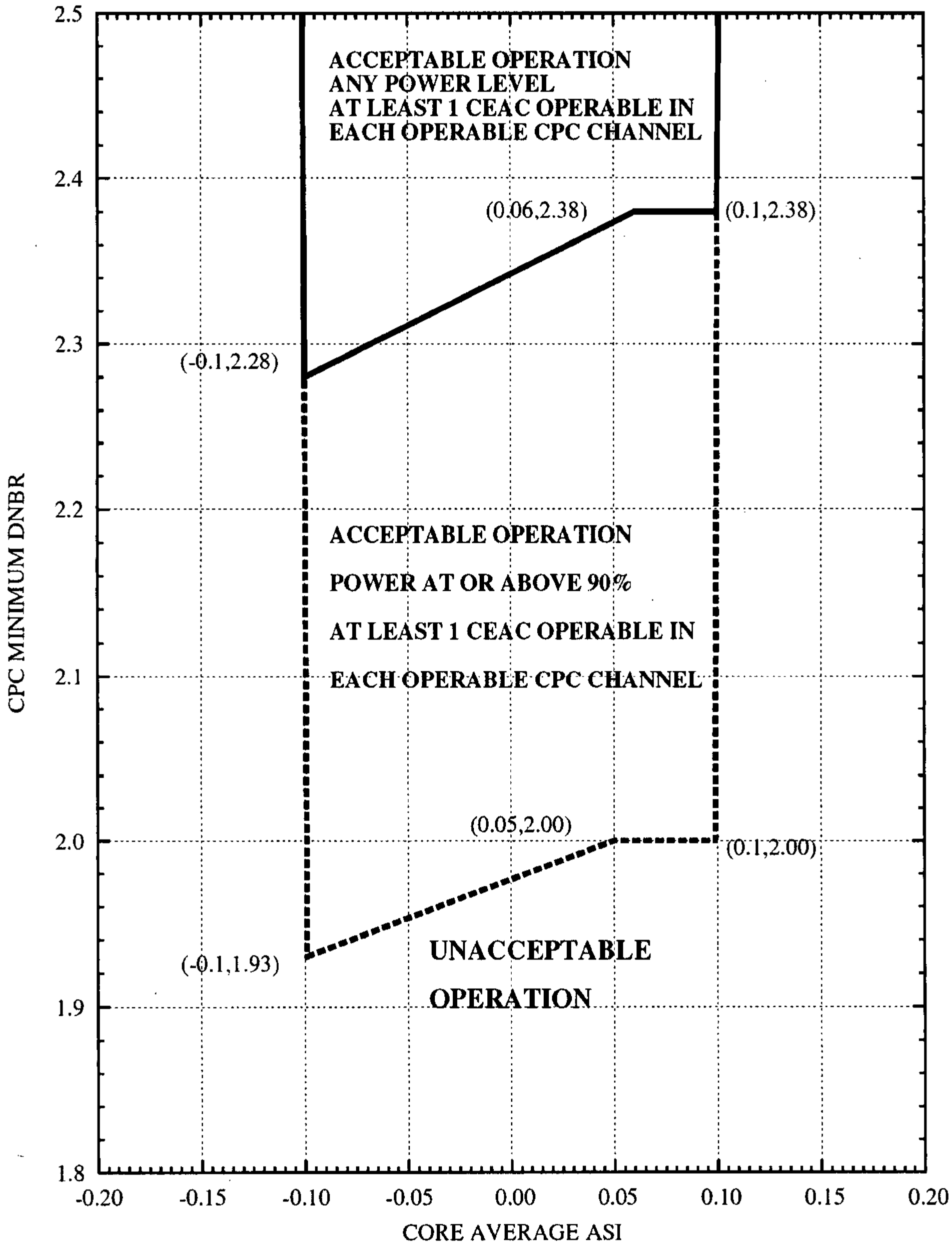


FIGURE 3.2.4-3
DNBR MARGIN OPERATING LIMIT BASED ON
THE CORE PROTECTION CALCULATORS
(COLSS OUT OF SERVICE, BOTH CEACs INOPERABLE
IN ANY OPERABLE CPC CHANNEL)

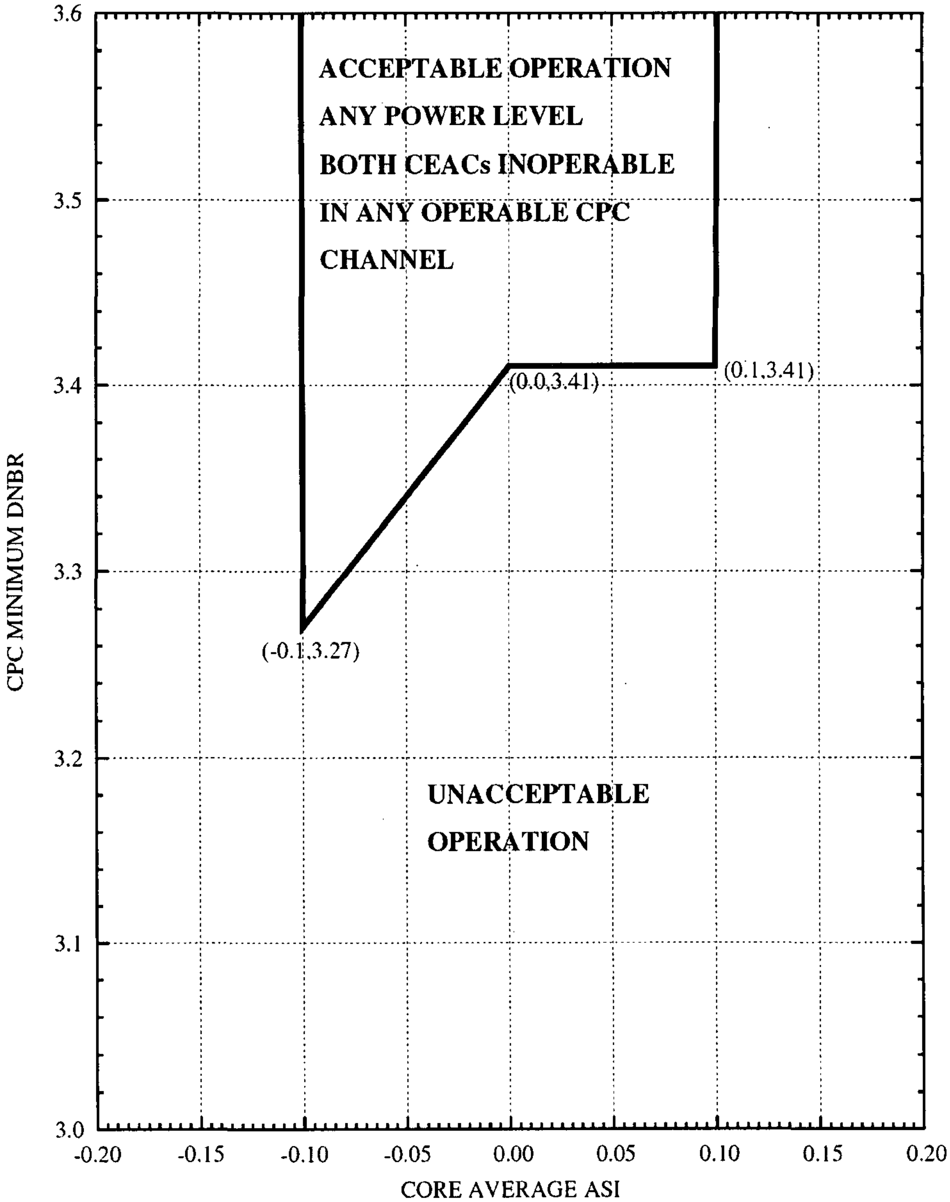


Table 3.3.12-1

REQUIRED MONITORING FREQUENCIES FOR BACKUP BORON DILUTION DETECTION AS A FUNCTION OF OPERATING CHARGING PUMPS AND PLANT OPERATIONAL MODES FOR $K_{eff} > 0.98$

OPERATIONAL MODE	Number of Operating Charging Pumps			
	0	1	2	3
3	12 hours	0.5 hours	ONA	ONA
4 not on SCS	12 hours	0.5 hours	ONA	ONA
5 not on SCS	8 hours	0.5 hours	ONA	ONA
4 & 5 on SCS	ONA	ONA	ONA	ONA

Notes: SCS = Shutdown Cooling System
ONA = Operation Not Allowed

Table 3.3.12-2

REQUIRED MONITORING FREQUENCIES FOR BACKUP BORON DILUTION DETECTION AS A FUNCTION OF OPERATING CHARGING PUMPS AND PLANT OPERATIONAL MODES FOR $0.98 \geq K_{eff} > 0.97$

OPERATIONAL MODE	Number of Operating Charging Pumps			
	0	1	2	3
3	12 hours	1 hour	0.5 hours	ONA
4 not on SCS	12 hours	1.5 hours	0.5 hours	ONA
5 not on SCS	8 hours	1.5 hours	0.5 hours	ONA
4 & 5 on SCS	8 hours	0.5 hours	ONA	ONA

Notes: SCS = Shutdown Cooling System
ONA = Operation Not Allowed

Table 3.3.12-3

REQUIRED MONITORING FREQUENCIES FOR BACKUP BORON DILUTION DETECTION AS A FUNCTION OF OPERATING CHARGING PUMPS AND PLANT OPERATIONAL MODES FOR $0.97 \geq K_{eff} > 0.96$

OPERATIONAL MODE	Number of Operating Charging Pumps			
	0	1	2	3
3	12 hours	2.5 hours	1 hour	ONA
4 not on SCS	12 hours	2.5 hours	1 hour	0.5 hours
5 not on SCS	8 hours	2.5 hours	1 hour	0.5 hours
4 & 5 on SCS	8 hours	1 hour	ONA	ONA

Notes: SCS = Shutdown Cooling System
ONA = Operation Not Allowed

Table 3.3.12-4

REQUIRED MONITORING FREQUENCIES FOR BACKUP BORON DILUTION DETECTION AS A FUNCTION OF OPERATING CHARGING PUMPS AND PLANT OPERATIONAL MODES FOR $0.96 \geq K_{eff} > 0.95$

OPERATIONAL MODE	Number of Operating Charging Pumps			
	0	1	2	3
3	12 hours	3 hours	1 hour	0.5 hours
4 not on SCS	12 hours	3.5 hours	1.5 hours	0.75 hours
5 not on SCS	8 hours	3.5 hours	1.5 hours	0.75 hours
4 & 5 on SCS	8 hours	1.5 hours	0.5 hours	ONA

Notes: SCS = Shutdown Cooling System
ONA = Operation Not Allowed

Table 3.3.12-5

REQUIRED MONITORING FREQUENCIES FOR BACKUP BORON DILUTION DETECTION AS A FUNCTION OF OPERATING CHARGING PUMPS AND PLANT OPERATIONAL MODES FOR $K_{eff} \leq 0.95$

OPERATIONAL MODE	Number of Operating Charging Pumps			
	0	1	2	3
3	12 hours	4 hours	1.5 hours	1 hour
4 not on SCS	12 hours	4.5 hours	2 hours	1 hour
5 not on SCS	8 hours	4.5 hours	2 hours	1 hour
4 & 5 on SCS	8 hours	2 hours	0.75 hours	ONA
6	24 hours	1.5 hours	ONA	ONA

Notes: SCS = Shutdown Cooling System
ONA = Operation Not Allowed

Enclosure 2

PVNGS Unit 2 Core Operating Limits Report (COLR) Revision 16

O'Connor, Tina M (Z06952)

Digitally signed by O'Connor, Tina M(Z06952)
DN: cn=O'Connor, Tina M (Z06952)
Reason: I attest to the accuracy and integrity of this document
Date: 2009.10.28 05:57:33 -07'00'

PALO VERDE NUCLEAR GENERATING STATION (PVNGS)

UNIT 2

CORE OPERATING LIMITS REPORT

Revision 16 Effective 10/29/2009

Responsible Engineer Date	Foster, Glenn A (Z35831) Digitally signed by Foster, Glenn A(Z35831) DN: cn=Foster, Glenn A (Z35831) Reason: I am the author of this document Date: 2009.10.27 16:10:17 -07'00'
Independent Reviewer Date	Delorenzi, Mark J (Z01931) Digitally signed by Delorenzi, Mark J(Z01931) DN: cn=Delorenzi, Mark J (Z01931) Reason: I have reviewed this document Date: 2009.10.27 16:34:06 -07'00'
Responsible Section Leader Date	Rowland, James W (Z80533) Digitally signed by Rowland, James W(Z80533) DN: cn=Rowland, James W (Z80533) Reason: I am approving this document as temporary Reload Analysis SL Date: 2009.10.27 16:50:38 -07'00'

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This Report has been prepared in accordance with the requirements of Technical Specification 5.6.5. The Core Operating Limits have been developed using the NRC approved methodologies specified in Section 5.6.5 b of the Palo Verde Unit 2 Technical Specifications.

AFFECTED PVNGS TECHNICAL SPECIFICATIONS

3.1.1	Shutdown Margin (SDM) - Reactor Trip Breakers Open
3.1.2	Shutdown Margin (SDM) - Reactor Trip Breakers Closed
3.1.4	Moderator Temperature Coefficient (MTC)
3.1.5	Control Element Assembly (CEA) Alignment
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2) The ROCS and DIT Computer Codes for Nuclear Design (N001-1900-01412-0)	CENPD-266-P-A	N.A.	April 1983	N.A.
3) Modified Statistical Combination of Uncertainties (N001-1303-01747-2)	CEN-356(V)-P-A	01-P-A (AR1)	May 1988 (April 1996)	N.A.
4) System 80^{TM} Inlet Flow Distribution (N001-1301-01228-0)	Enclosure 1-P to LD-82-054	N.A.	February 1993	1-P
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9) Technical Description Manual for the CENTS CodeVolume 1 (CENTS-TD MANUAL-VOL 1)	CE-NPD 282-P-A Vols. 1	2	March 2005	N.A.
10) Technical Description Manual for the CENTS Code Volume 2 (CENTS-TD MANUAL-VOL 2)	CE-NPD 282-P-A Vols. 2	2	March 2005	N.A.
11) Technical Description Manual for the CENTS CodeVolume 3 (CENTS-TD MANUAL-VOL 3)	CE-NPD 282-P-A Vols. 3	2	March 2005	N.A.

Title	Report No.	Rev	Date	Supplement
12) Implementation of ZIRLO™ Cladding Material in CE Nuclear Power Fuel Assembly Designs (N001-1900-01329-0)	CENPD-404-P-A	0	November 2001	N.A.
13) HERMITE, A Multi-Dimensional Space-Time Kinetics Code for PWR Transients	CENPD-188-A		July 1976	
14) TORC Code, A Computer Code for Determining the Thermal Margin of a Reactor Core.	CENPD-161-P-A		April 1986	
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16) CPC Methodology Changes for the CPC Improvement Program (N001-1303-02283)	CEN-310-P-A	0	April 1986	
17) Loss of Flow, C-E Methods for Loss of Flow Analysis (N001-1301-01203)	CENPD-183-A	0	June 1984	
18) Methodology for Core Designs Containing Erbium Burnable Absorbers (N001-0201-00035)	CENPD-382-P-A	0	August 1993	
19) Verification of the Acceptability of a 1-Pin Burnup Limit of 60 MWD/kgU for Combustion Engineering 16 x 16 PWR Fuel (N001-0201-00042)	CEN-386-P-A	0	August 1992	

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With one or more full-strength or part-strength CEAs misaligned from any other CEAs in its group by more than 6.6 inches, the minimum required MODES 1 and 2 core power reduction is specified in Figure 3.1.5-1. The required power reduction is based on the initial power before reducing power.

3.1.7 - Regulating CEA Insertion Limits

With COLSS IN SERVICE, regulating CEA groups shall be limited to the withdrawal sequence and to the insertion limits[1] shown in Figure 3.1.7-1[2]; with COLSS OUT OF SERVICE, regulating CEA groups shall be limited to the withdrawal sequence and to the insertion limits[1] shown in Figure 3.1.7-2.[2] Regulating Groups 1 and 2 CEAs shall be maintained fully withdrawn[3] while in Modes 1 and 2 (except while performing SR 3.1.5.3).

[1] A reactor power cutback will cause either (Case 1) Regulating Group 5 or Regulating Group 4 and 5 to be dropped with no sequential insertion of additional Regulating Groups (Groups 1, 2, 3, and 4) or (Case 2) Regulating Group 5 or Regulating Group 4 and 5 to be dropped with all or part of the remaining Regulating Groups (Groups 1, 2, 3, and 4) being sequentially inserted. In either case, the Transient Insertion Limit and withdrawal sequence specified in the CORE OPERATING LIMITS REPORT can be exceeded for up to 2 hours.

[2] The Separation between Regulating Groups 4 and 5 may be reduced from the 90 inch value specified in Figures 3.1.7-1 and 3.1.7-2 provided that each of the following conditions are satisfied:

a) Regulating Group 4 position is between 60 and 150 inches withdrawn.

b) Regulating Group 5 position is maintained at least 10 inches lower than Regulating Group 4 position.

c) Both Regulating Group 4 and Regulating Group 5 positions are maintained above the Transient Insertion Limit specified in Figure 3.1.7-1 (COLSS In Service) or Figure 3.1.7-2 (COLSS Out of Service).

[3] Fully withdrawn - ≥147.75" (Pulse Counter indication) and ≥145.25" (RSPT indication)

3.1.8 - Part Strength CEA Insertion Limits

The part strength CEA groups shall be limited to the insertion limits shown in Figure 3.1.8-1.

3.2.1 - Linear Heat Rate (LHR)

The linear heat rate limit of 13.1 kW/ft shall be maintained.

3.2.3 - Azimuthal Power Tilt (T_q)

The AZIMUTHAL POWER TILT (T_q) shall be less than or equal to 10% with COLSS IN SERVICE when power is greater than 20% and less than or equal to 50%. Additionally, the AZIMUTHAL POWER TILT (T_q) shall be less than or equal to 5% with COLSS IN SERVICE when power is greater than 50%. See Figure 3.2.3-1.

3.2.4 - Departure From Nucleate Boiling Ratio (DNBR)

COLSS IN SERVICE and Both CEACs INOPERABLE in Any OPERABLE CPC Channel - Maintain COLSS calculated core power less than or equal to COLSS calculated core power operation limit based on DNBR decreased by the allowance shown in Figure 3.2.4-1.

COLSS OUT OF SERVICE and CEAC(s) OPERABLE - Operate within the region of acceptable operation of Figure 3.2.4-2 using any operable CPC channel.

COLSS OUT OF SERVICE and Both CEACs INOPERABLE in Any OPERABLE CPC Channel - Operate within the region of acceptable operation of Figure 3.2.4-3 using any operable CPC channel with both CEACs INOPERABLE.

3.2.5 - Axial Shape Index (ASI)

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

COLSS OPERABLE
$-0.18 \leq ASI \leq 0.17$ for power $\geq 50\%$
$-0.28 \leq ASI \leq 0.17$ for power $>20\%$ and $< 50\%$

COLSS OUT OF SERVICE (CPC)
$-0.10 \leq ASI \leq 0.10$ for power $>20\%$

3.3.12 - Boron Dilution Alarm System (BDAS)

With one or both start-up channel high neutron flux alarms inoperable, the RCS boron concentration shall be determined at the applicable monitoring frequency specified in Tables 3.3.12-1 through 3.3.12-5.

3.9.1 - Boron Concentration

The boron concentration of all filled portions of the Reactor Coolant System and the refueling canal shall be maintained at a uniform concentration $\geq$ 3000 ppm.

FIGURE 3.1.1-1
SHUTDOWN MARGIN VERSUS COLD LEG TEMPERATURE
REACTOR TRIP BREAKERS OPEN

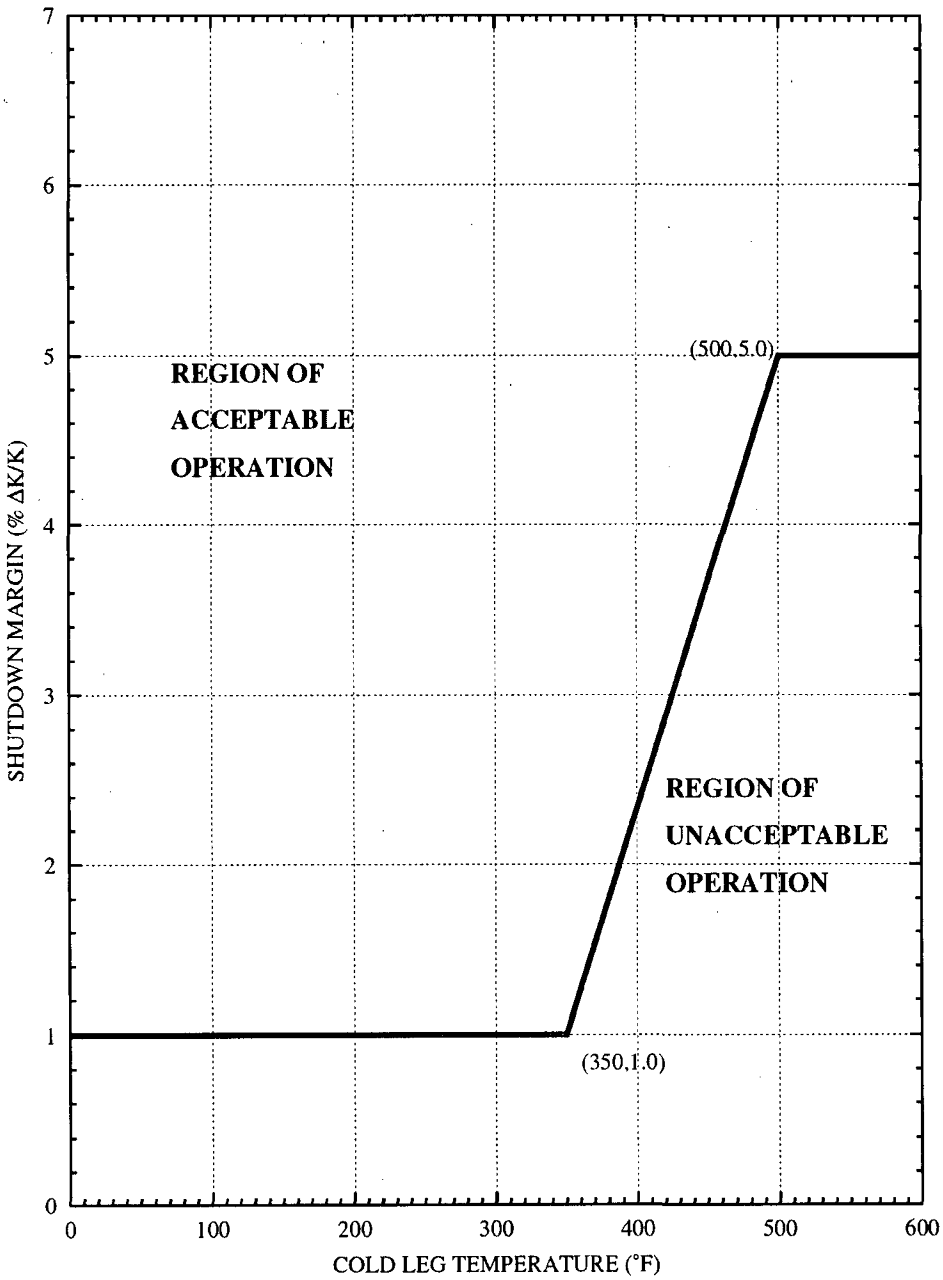


FIGURE 3.1.2-1
SHUTDOWN MARGIN VERSUS COLD LEG TEMPERATURE
REACTOR TRIP BREAKERS CLOSED

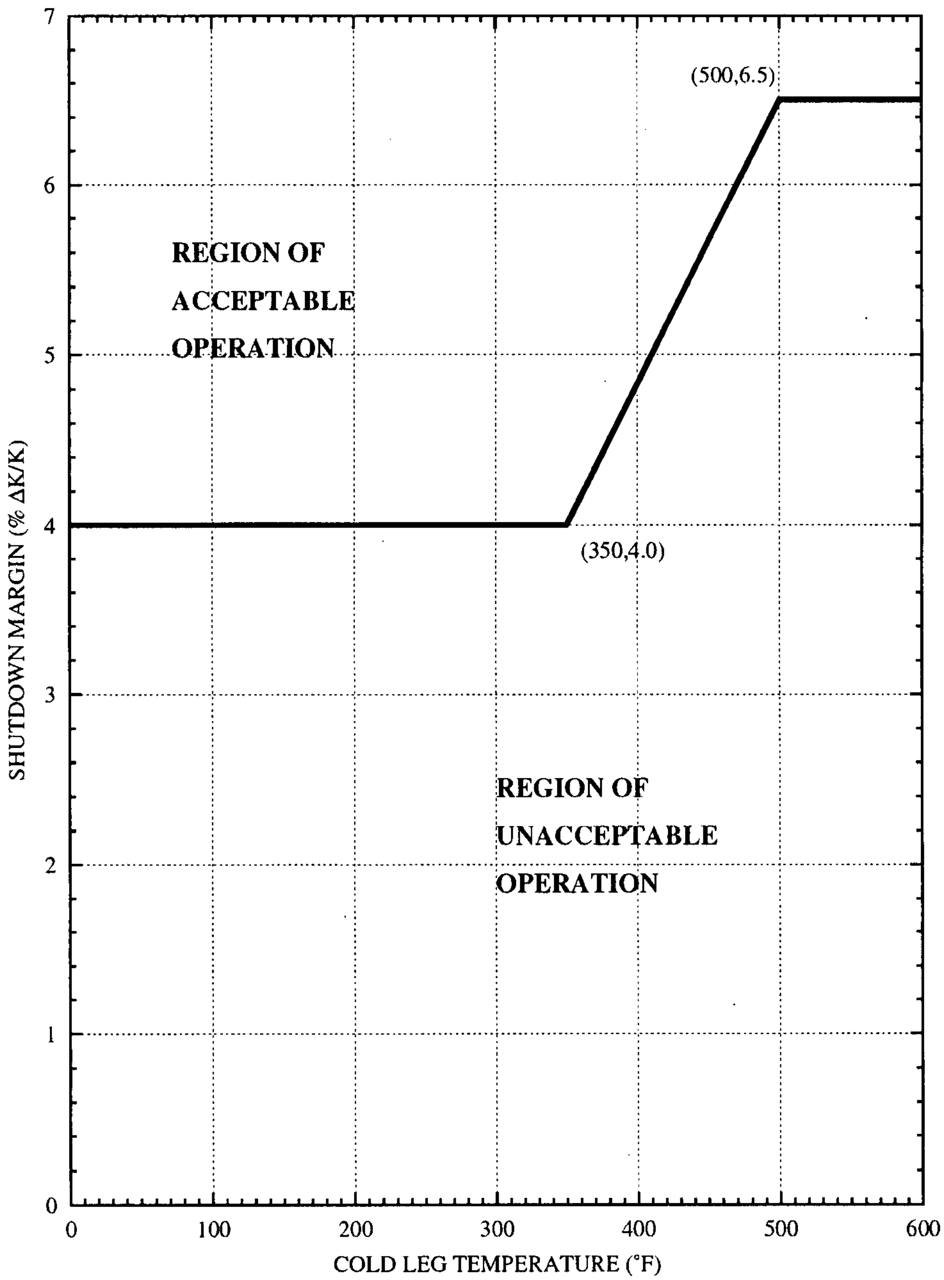


FIGURE 3.1.4-1
MTC ACCEPTABLE OPERATION, MODES 1 AND 2

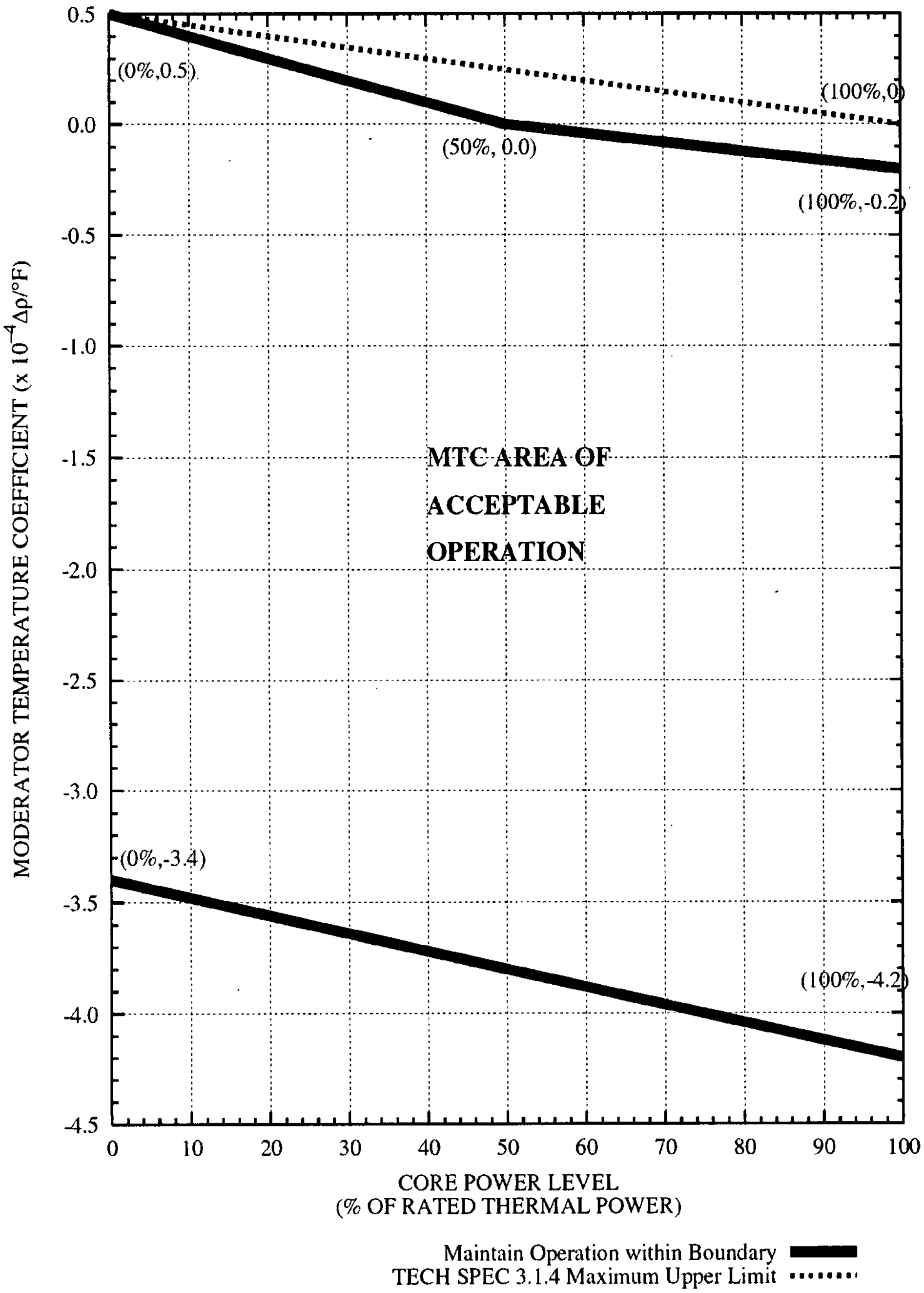
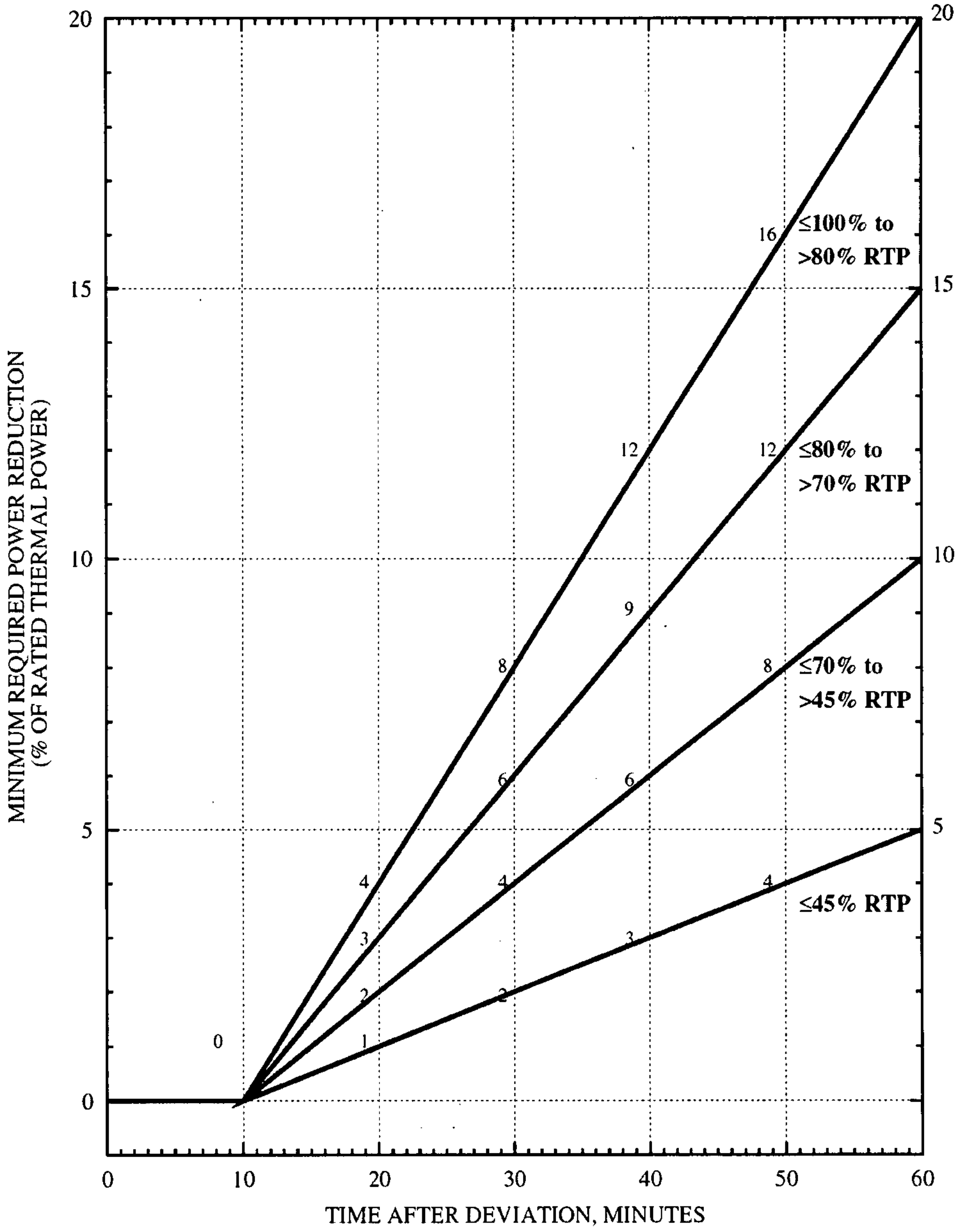
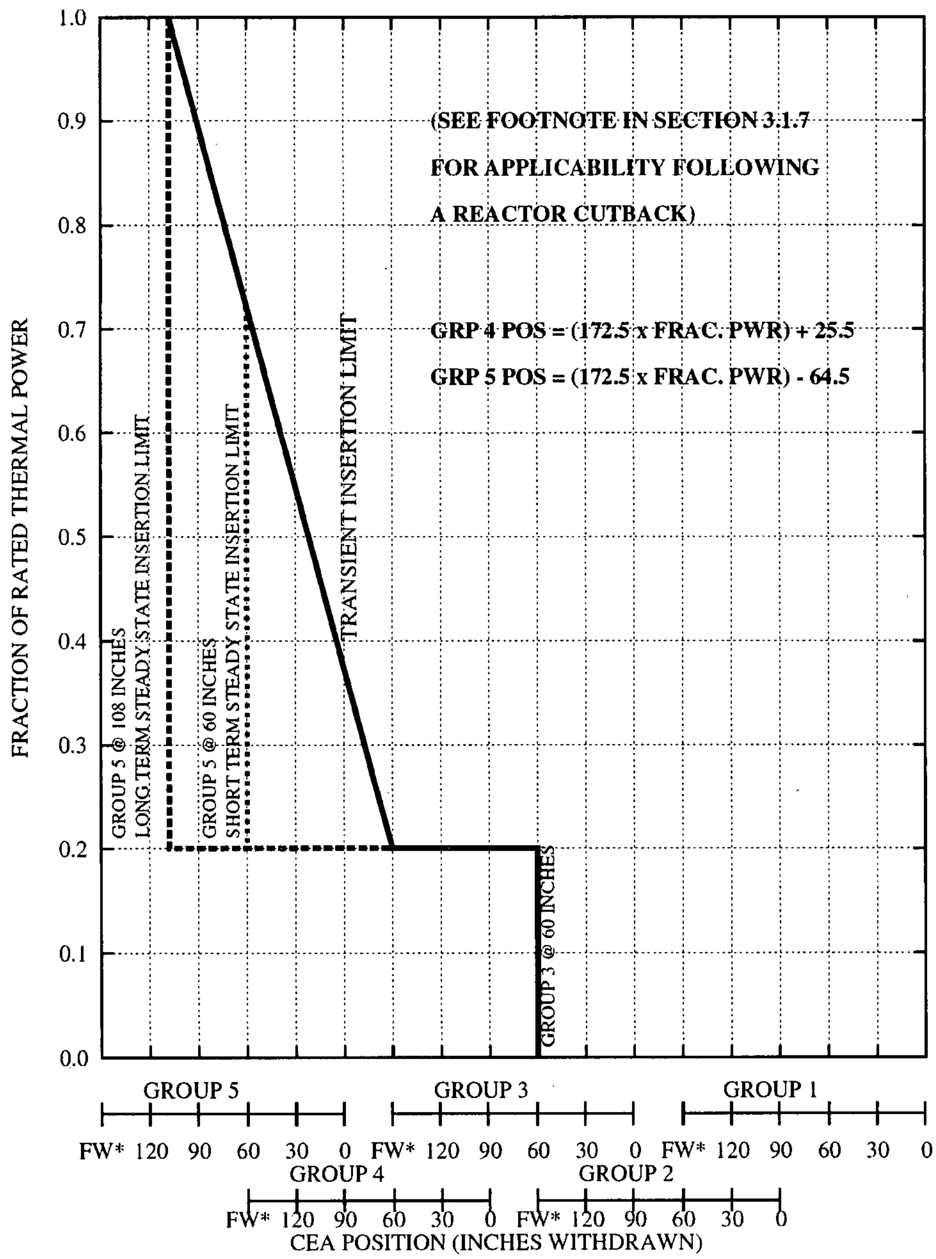


FIGURE 3.1.5-1
CORE POWER REDUCTION AFTER CEA DEVIATION*



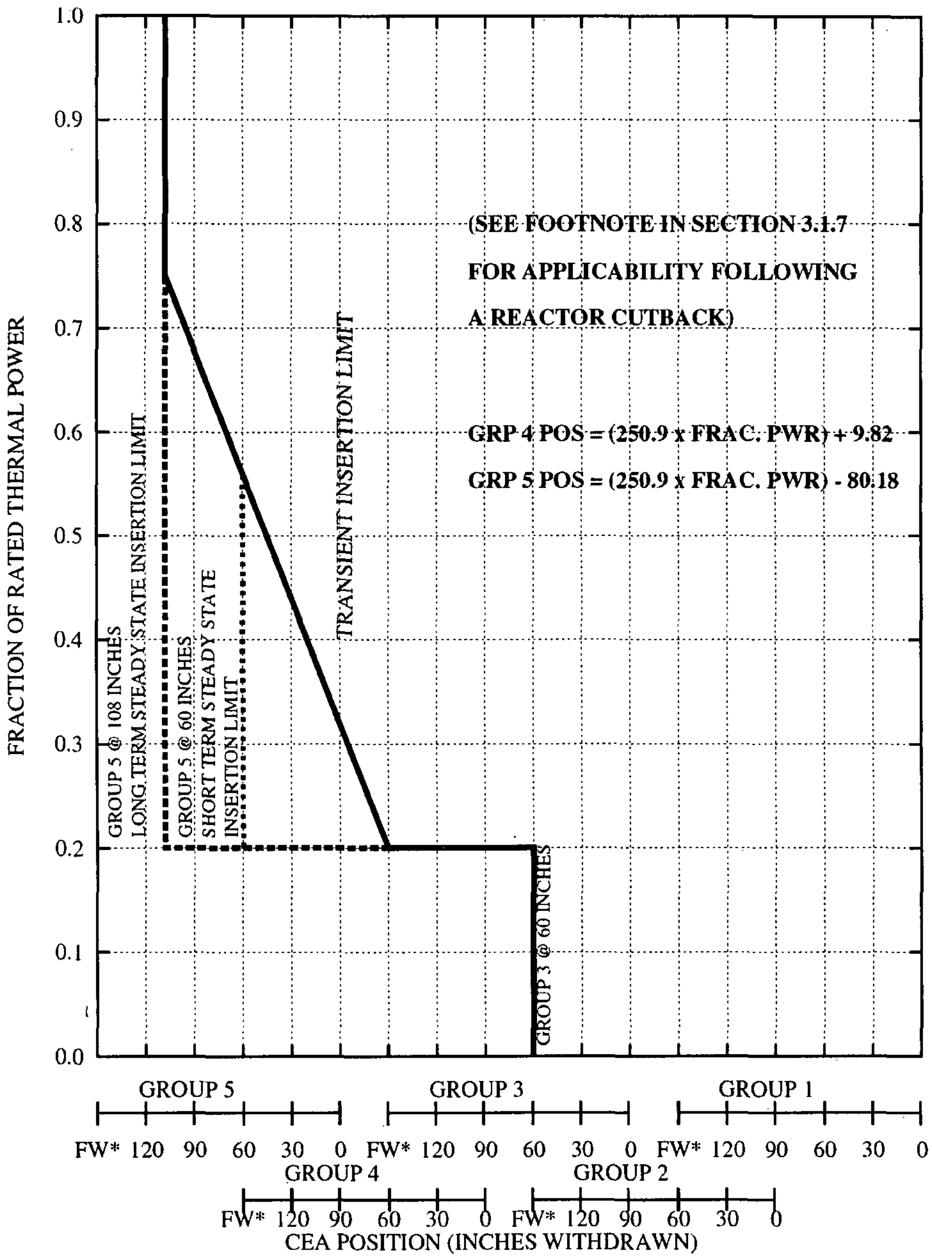
* WHEN CORE POWER IS REDUCED TO 35% OF RATED THERMAL POWER PER THIS LIMIT CURVE, FURTHER REDUCTION IS NOT REQUIRED.

FIGURE 3.1.7-1
CEA INSERTION LIMITS VERSUS THERMAL POWER
(COLSS IN SERVICE)



*Fully Withdrawn (FW) is defined as ≥ 147.75" (Pulse Counter) and ≥ 145.25" (RSPT).

FIGURE 3.1.7-2
CEA INSERTION LIMITS VERSUS THERMAL POWER
(COLSS OUT OF SERVICE)



*Fully Withdrawn (FW) is defined as ≥ 147.75” (Pulse Counter) and ≥ 145.25” (RSPT).

FIGURE 3.1.8-1
PART STRENGTH CEA INSERTION LIMITS
VERSUS THERMAL POWER

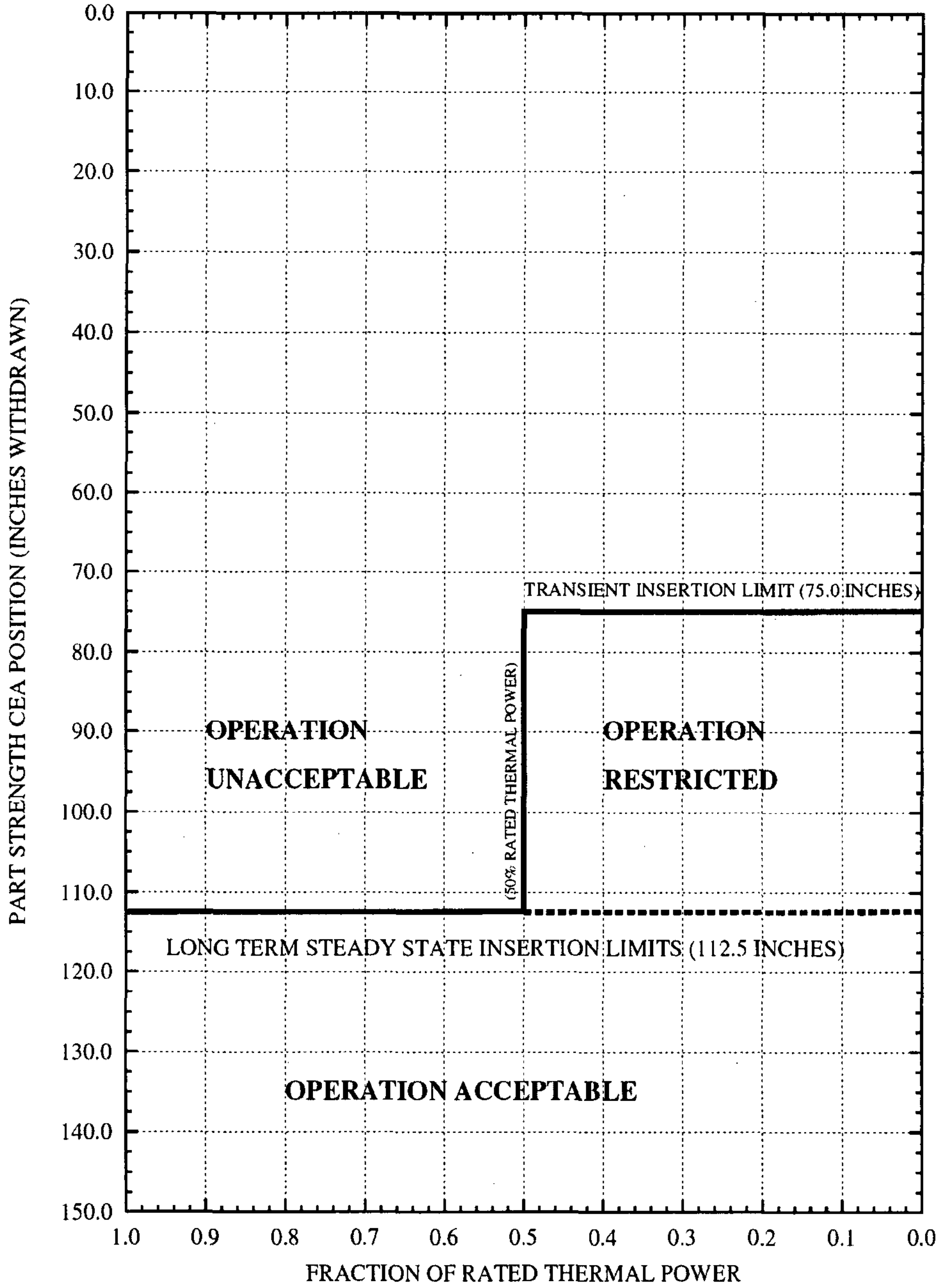


FIGURE 3.2.3-1
AZIMUTHAL POWER TILT VERSUS THERMAL POWER
(COLSS IN SERVICE)

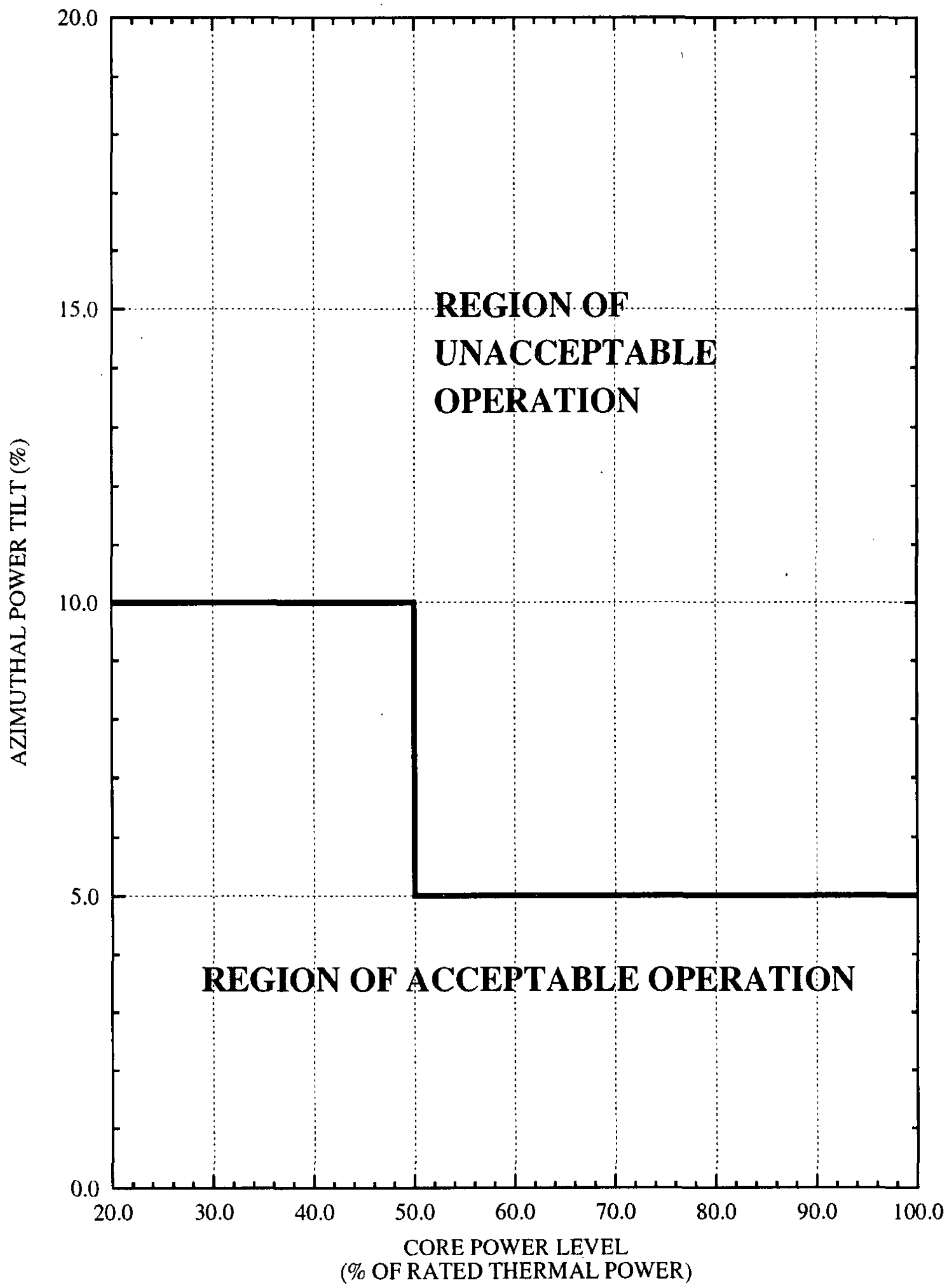


FIGURE 3.2.4-1
COLSS DNBR OPERATING LIMIT
ALLOWANCE FOR BOTH CEACs INOPERABLE
IN ANY OPERABLE CPC CHANNEL

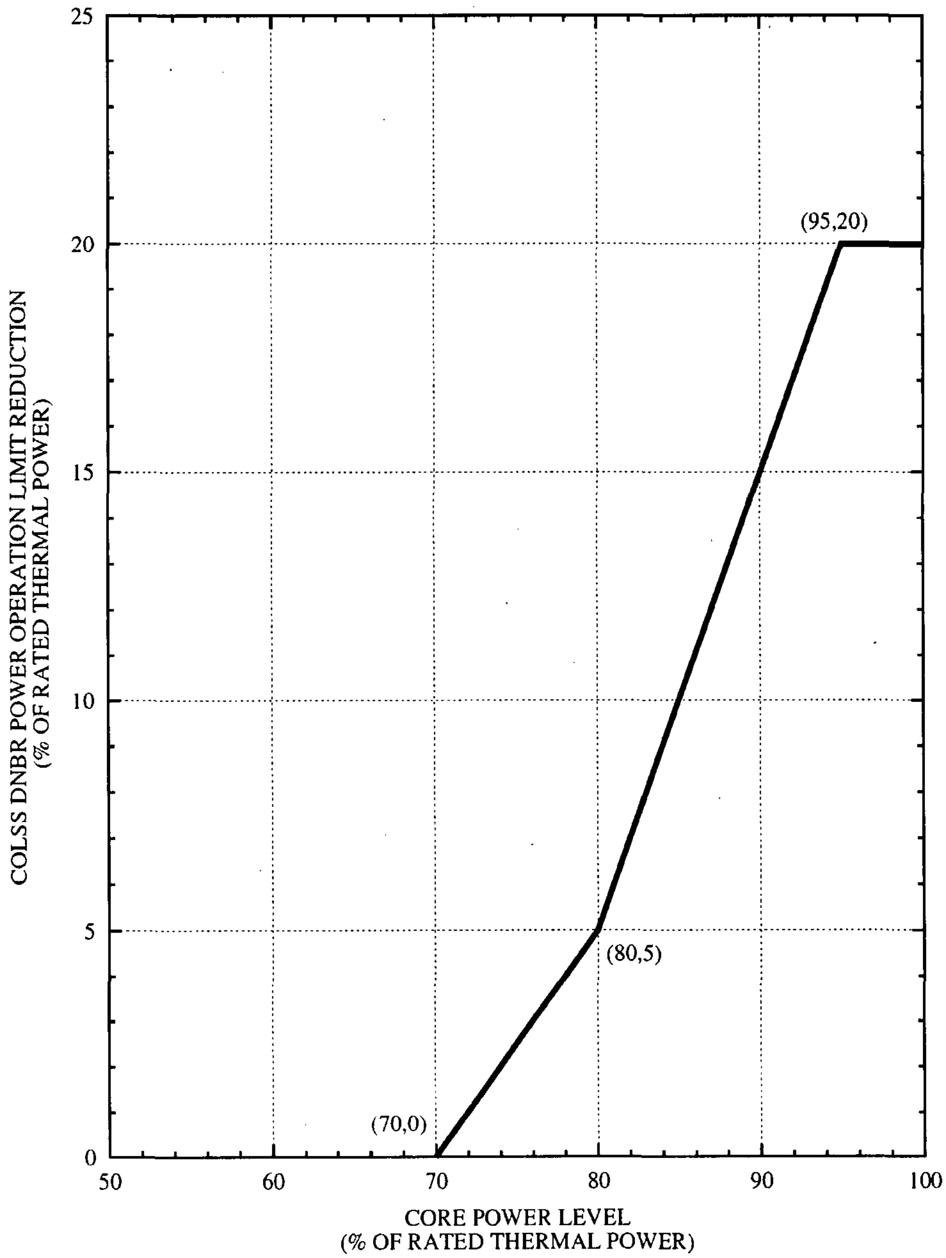


FIGURE 3.2.4-2
DNBR MARGIN OPERATING LIMIT BASED ON
THE CORE PROTECTION CALCULATORS
(COLSS OUT OF SERVICE, CEAC(s) OPERABLE)

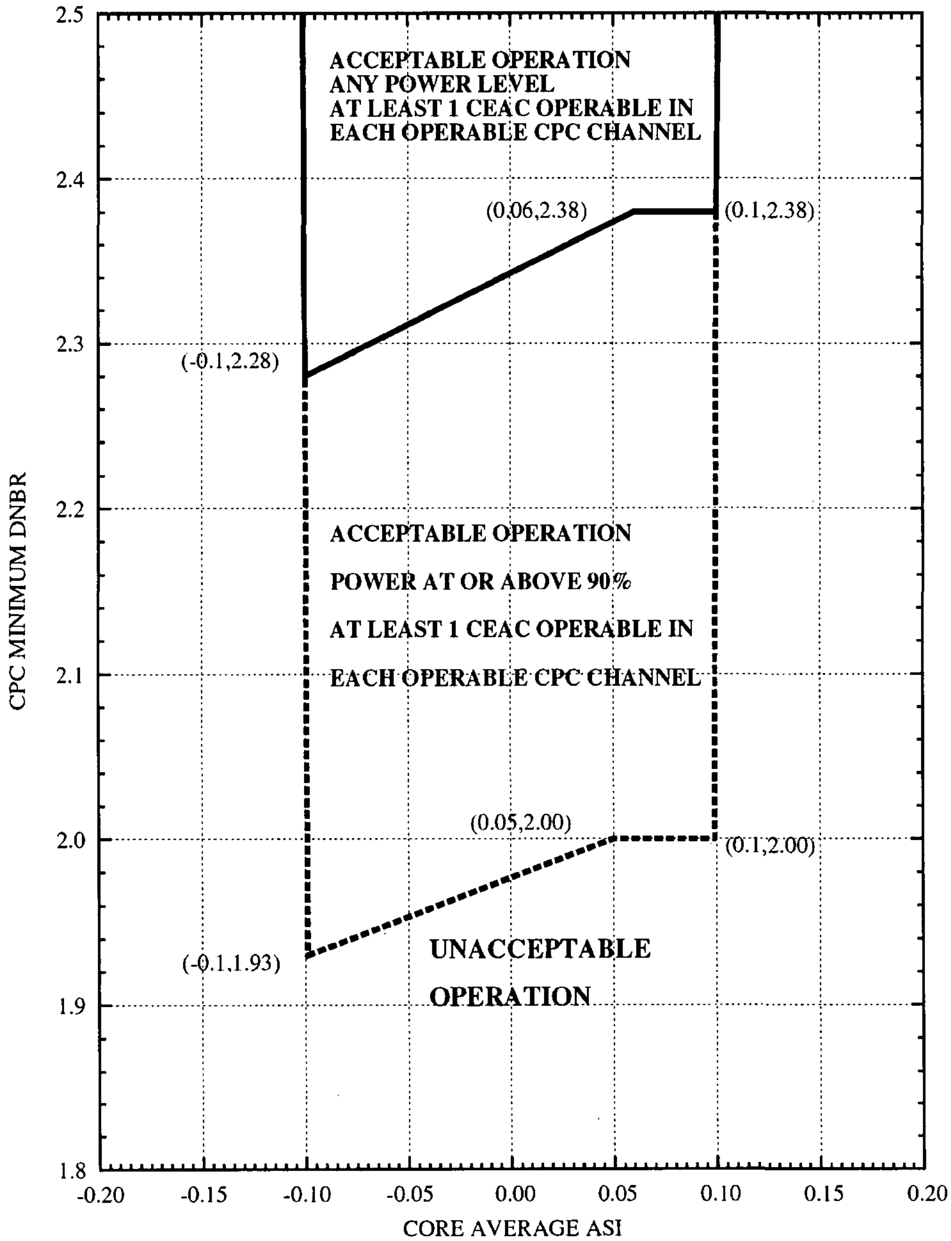


FIGURE 3.2.4-3
DNBR MARGIN OPERATING LIMIT BASED ON
THE CORE PROTECTION CALCULATORS
(COLSS OUT OF SERVICE, BOTH CEACs INOPERABLE
IN ANY OPERABLE CPC CHANNEL)

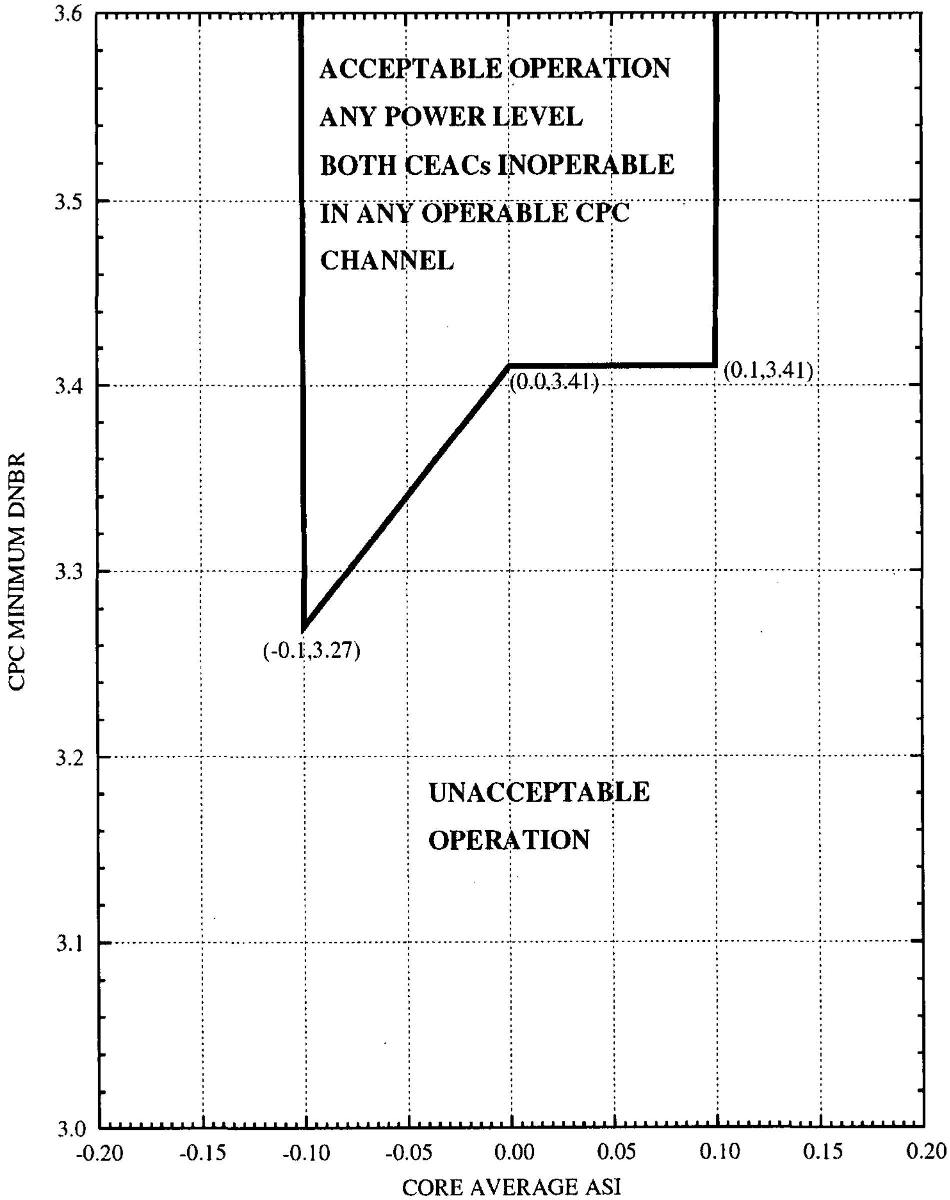


Table 3.3.12-1

REQUIRED MONITORING FREQUENCIES FOR BACKUP BORON DILUTION DETECTION AS A FUNCTION OF OPERATING CHARGING PUMPS AND PLANT OPERATIONAL MODES FOR $K_{eff} > 0.98$

OPERATIONAL MODE	Number of Operating Charging Pumps			
	0	1	2	3
3	12 hours	0.5 hours	ONA	ONA
4 not on SCS	12 hours	0.5 hours	ONA	ONA
5 not on SCS	8 hours	0.5 hours	ONA	ONA
4 & 5 on SCS	ONA	ONA	ONA	ONA

Notes: SCS = Shutdown Cooling System
ONA = Operation Not Allowed

Table 3.3.12-2

REQUIRED MONITORING FREQUENCIES FOR BACKUP BORON DILUTION DETECTION AS A FUNCTION OF OPERATING CHARGING PUMPS AND PLANT OPERATIONAL MODES FOR $0.98 \geq K_{eff} > 0.97$

OPERATIONAL MODE	Number of Operating Charging Pumps			
	0	1	2	3
3	12 hours	1 hour	0.5 hours	ONA
4 not on SCS	12 hours	1.5 hours	0.5 hours	ONA
5 not on SCS	8 hours	1.5 hours	0.5 hours	ONA
4 & 5 on SCS	8 hours	0.5 hours	ONA	ONA

Notes: SCS = Shutdown Cooling System
ONA = Operation Not Allowed

Table 3.3.12-3

REQUIRED MONITORING FREQUENCIES FOR BACKUP BORON DILUTION DETECTION AS A FUNCTION OF OPERATING CHARGING PUMPS AND PLANT OPERATIONAL MODES FOR $0.97 \geq K_{eff} > 0.96$

OPERATIONAL MODE	Number of Operating Charging Pumps			
	0	1	2	3
3	12 hours	2.5 hours	1 hour	ONA
4 not on SCS	12 hours	2.5 hours	1 hour	0.5 hours
5 not on SCS	8 hours	2.5 hours	1 hour	0.5 hours
4 & 5 on SCS	8 hours	1 hour	ONA	ONA

Notes: SCS = Shutdown Cooling System
ONA = Operation Not Allowed

Table 3.3.12-4

REQUIRED MONITORING FREQUENCIES FOR BACKUP BORON DILUTION DETECTION AS A FUNCTION OF OPERATING CHARGING PUMPS AND PLANT OPERATIONAL MODES FOR $0.96 \geq K_{eff} > 0.95$

OPERATIONAL MODE	Number of Operating Charging Pumps			
	0	1	2	3
3	12 hours	3 hours	1 hour	0.5 hours
4 not on SCS	12 hours	3.5 hours	1.5 hours	0.75 hours
5 not on SCS	8 hours	3.5 hours	1.5 hours	0.75 hours
4 & 5 on SCS	8 hours	1.5 hours	0.5 hours	ONA

Notes: SCS = Shutdown Cooling System
ONA = Operation Not Allowed

Table 3.3.12-5

REQUIRED MONITORING FREQUENCIES FOR BACKUP BORON DILUTION DETECTION AS A FUNCTION OF OPERATING CHARGING PUMPS AND PLANT OPERATIONAL MODES FOR $K_{eff} \leq 0.95$

OPERATIONAL MODE	Number of Operating Charging Pumps			
	0	1	2	3
3	12 hours	4 hours	1.5 hours	1 hour
4 not on SCS	12 hours	4.5 hours	2 hours	1 hour
5 not on SCS	8 hours	4.5 hours	2 hours	1 hour
4 & 5 on SCS	8 hours	2 hours	0.75 hours	ONA
6	24 hours	1.5 hours	ONA	ONA

Notes: SCS = Shutdown Cooling System
ONA = Operation Not Allowed

Enclosure 3

PVNGS Unit 3 Core Operating Limits Report (COLR) Revision 19

PALO VERDE NUCLEAR GENERATING STATION (PVNGS)

UNIT 3

CORE OPERATING LIMITS REPORT

Revision 19

Effective Date: October 29, 2009

Responsible Engineer Date	Napier, Joseph J (Z71881)	Digitally signed by Napier, Joseph J (Z71881) DN: cn=Napier, Joseph J(Z71881) Reason: I am the author of this document Date: 2009.10.27 16:14:33 -07'00'
Independent Reviewer Date	Bodnar, Walter S (Z06432)	Digitally signed by Bodnar, Walter S(Z06432) DN: cn=Bodnar, Walter S(Z06432) Reason: I have reviewed this document Date: 2009.10.27 16:20:09 -07'00'
Responsible Section Leader Date	Rowland, James W (Z80533)	Digitally signed by Rowland, James W(Z80533) DN: cn=Rowland, James W (Z80533) Reason: I am approving this document as temporary Reload Analysis SL Date: 2009.10.27 17:00:05 -07'00'

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List of Tables

This Report has been prepared in accordance with the requirements of Technical Specification 5.6.5. The Core Operating Limits have been developed using the NRC approved methodologies specified in Section 5.6.5 b of the Palo Verde Unit 1 Technical Specifications.

AFFECTED PVNGS TECHNICAL SPECIFICATIONS

3.1.1	Shutdown Margin (SDM) - Reactor Trip Breakers Open
3.1.2	Shutdown Margin (SDM) - Reactor Trip Breakers Closed
3.1.4	Moderator Temperature Coefficient (MTC)
3.1.5	Control Element Assembly (CEA) Alignment
3.1.7	Regulating CEA Insertion Limits
3.1.8	Part Strength CEA Insertion Limits
3.2.1	Linear Heat Rate (LHR)
3.2.3	Azimuthal Power Tilt (T_q)
3.2.4	Departure From Nucleate Boiling Ratio (DNBR)
3.2.5	Axial Shape Index (ASI)
3.3.12	Boron Dilution Alarm System (BDAS)
3.9.1	Boron Concentration

ANALYTICAL METHODS

The COLR contains the complete identification for each of the Technical Specification referenced topical reports (i.e., report number, title, revision, date, and any supplements) that provide the NRC-approved analytical methods used to determine the core operating limits, described in the following documents:

Title	Report No.	Rev	Date	Suppl
CE Method for Control Element Assembly Ejection Analysis (13-N001-1301-01204-1)	CENPD-0190-A	N.A.	January 1976	N.A.
The ROCS and DIT Computer Codes for Nuclear Design (13-N001-1900-01412-0)	CENPD-266-P-A	N.A.	April 1983	N.A.
Modified Statistical Combination of Uncertainties (13-N001-1303-01747-2)	CEN-356(V)-P-A	01-P-A	May 1988	N.A.
System 80^{TM} Inlet Flow Distribution (13-N001-1301-01228-0)	Enclosure 1-P to LD-82-054	N.A.	February 1993	1-P
Calculative Methods for the CE Large Break LOCA Evaluation Model for the Analysis of CE and W Designed NSSS (13-N001-1900-01192-3)	CENPD-132	N.A.	March 2001	4-P-A
Calculative Methods for the CE Small Break LOCA Evaluation Model (13-N001-1900-01185-3)	CENPD-137-P	N.A.	April 1998	2-P-A
Fuel Rod Maximum Allowable Pressure (13-N001-0201-00026-1)	CEN-372-P-A	N.A.	May 1990	N.A.
Arizona Public Service Company PWR Reactor Physics Methodology Using CASMO-4/SIMULATE-3 (NFM-005)	NFM-005	N.A.	January 2006	N.A.
Technical Description Manual for the CENTS CodeVolume 1 (CENTS-TD MANUAL-VOL 1)	CE-NPD 282-P-A Vols. 1	2	March 2005	N.A.
Technical Description Manual for the CENTS Code Volume 2 (CENTS-TD MANUAL-VOL 2)	CE-NPD 282-P-A Vols. 2	2	March 2005	N.A.

Title	Report No.	Rev	Date	Suppl
Technical Description Manual for the CENTS CodeVolume 3 (CENTS-TD MANUAL-VOL 3)	CE-NPD 282-P-A Vols. 3	2	March 2005	N.A.
Implementation of ZIRLO™ Cladding Material in CE Nuclear Power Fuel Assembly Designs (13-N001-1900-01329-0)	CENPD-404-P-A	0	November 2001	N.A.
HERMITE, A Multi-Dimensional Space-Time Kinetics Code for PWR Transients (HERMITE-TOPICAL)	CENPD-188-A		July 1976	
TORC Code, A Computer Code for Determining the Thermal Margin of a Reactor Core (N001-1301-01202)	CENPD-161-P-A		April 1986	
CETOP-D Code Structures and Modeling Methods for San Onofre Nuclear Generating Station Units 2 and 3, (N001-1301-01185)	CEN-160(S)-P		September 1981	
CPC Methodology Changes for the CPC Improvement Program, (N001-1303-02283)	CEN-310-P-A	0	April 1986	
Loss of Flow, C-E Methods for Loss of Flow Analysis, (N001-1301-01203)	CENPD-183-A	0	June 1984	
Methodology for Core Designs Containing Erbium Burnable Absorbers (N001-0201-00035)	CENPD-382-P-A	0	August 1993	
Verification of the Acceptability of a 1-Pin Burnup Limit of 60 MWD/kgU for Combustion Engineering 16 x 16 PWR Fuel (N001-0201-00042)	CEN-386-P-A	0	August 1992	

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

3.1.1 - Shutdown Margin (SDM) - Reactor Trip Breakers Open

The Shutdown Margin shall be greater than or equal to that shown in Figure 3.1.1-1.

3.1.2 - Shutdown Margin (SDM) - Reactor Trip Breakers Closed

The Shutdown Margin shall be greater than or equal to that shown in Figure 3.1.2-1.

3.1.4 - Moderator Temperature Coefficient (MTC)

The moderator temperature coefficient (MTC) shall be within the area of Acceptable Operation shown in Figure 3.1.4-1.

3.1.5 - Control Element Assembly (CEA) Alignment

With one or more full-strength or part-strength CEAs misaligned from any other CEAs in its group by more than 6.6 inches, the minimum required MODES 1 and 2 core power reduction is specified in Figure 3.1.5-1. The required power reduction is based on the initial power before reducing power.

3.1.7 - Regulating CEA Insertion Limits

With COLSS IN SERVICE, regulating CEA groups shall be limited to the withdrawal sequence and to the insertion limits[1] shown in Figure 3.1.7-1[2]; with COLSS OUT OF SERVICE, regulating CEA groups shall be limited to the withdrawal sequence and to the insertion limits[1] shown in Figure 3.1.7-2.[2] Regulating Groups 1 and 2 CEAs shall be maintained fully withdrawn[3] while in Modes 1 and 2 (except while performing SR 3.1.5.3).

[1] A reactor power cutback will cause either (Case 1) Regulating Group 5 or Regulating Group 4 and 5 to be dropped with no sequential insertion of additional Regulating Groups (Groups 1, 2, 3, and 4) or (Case 2) Regulating Group 5 or Regulating Group 4 and 5 to be dropped with all or part of the remaining Regulating Groups (Groups 1, 2, 3, and 4) being sequentially inserted. In either case, the Transient Insertion Limit and withdrawal sequence specified in the CORE OPERATING LIMITS REPORT can be exceeded for up to 2 hours.

[2] The Separation between Regulating Groups 4 and 5 may be reduced from the 90 inch value specified in Figures 3.1.7-1 and 3.1.7-2 provided that each of the following conditions are satisfied:

a) Regulating Group 4 position is between 60 and 150 inches withdrawn.

b) Regulating Group 5 position is maintained at least 10 inches lower than

Regulating Group 4 position.

c) Both Regulating Group 4 and Regulating Group 5 positions are maintained above the Transient Insertion Limit specified in Figure 3.1.7-1 (COLSS In Service) or Figure 3.1.7-2 (COLSS Out of Service).

[3] Fully withdrawn - ≥147.75" (Pulse Counter indication) and ≥145.25" (RSPT indication)

3.1.8 - Part Strength CEA Insertion Limits

The part strength CEA groups shall be limited to the insertion limits shown in Figure 3.1.8-1.

3.2.1 - Linear Heat Rate (LHR)

The linear heat rate limit of 13.1 kW/ft shall be maintained.

3.2.3 - Azimuthal Power Tilt (T_q)

The AZIMUTHAL POWER TILT (T_q) shall be less than or equal to 10% with COLSS IN SERVICE when power is greater than 20% and less than or equal to 50%. Additionally, the AZIMUTHAL POWER TILT (T_q) shall be less than or equal to 5% with COLSS IN SERVICE when power is greater than 50%. See Figure 3.2.3-1.

3.2.4 - Departure From Nucleate Boiling Ratio (DNBR)

COLSS IN SERVICE and Both CEACs INOPERABLE in Any OPERABLE CPC Channel - Maintain COLSS calculated core power less than or equal to COLSS calculated core power operation limit based on DNBR decreased by the allowance shown in Figure 3.2.4-1.

COLSS OUT OF SERVICE and CEAC(s) OPERABLE - Operate within the region of acceptable operation of Figure 3.2.4-2 using any operable CPC channel.

COLSS OUT OF SERVICE and Both CEACs INOPERABLE in Any OPERABLE CPC Channel - Operate within the region of acceptable operation of Figure 3.2.4-3 using any operable CPC channel with both CEACs INOPERABLE.

3.2.5 - Axial Shape Index (ASI)

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

COLSS OPERABLE
$-0.18 \leq \text{ASI} \leq 0.17$ for power $\geq 50\%$
$-0.28 \leq \text{ASI} \leq 0.17$ for power $>20\%$ and $< 50\%$

COLSS OUT OF SERVICE (CPC)
$-0.10 \leq \text{ASI} \leq 0.10$ for power $>20\%$

3.3.12 - Boron Dilution Alarm System (BDAS)

With one or both start-up channel high neutron flux alarms inoperable, the RCS boron concentration shall be determined at the applicable monitoring frequency specified in Tables 3.3.12-1 through 3.3.12-5.

3.9.1 - Boron Concentration

The boron concentration of all filled portions of the Reactor Coolant System and the refueling canal shall be maintained at a uniform concentration $\geq$ 3000 ppm.

FIGURE 3.1.1-1
SHUTDOWN MARGIN VERSUS COLD LEG TEMPERATURE
REACTOR TRIP BREAKERS OPEN

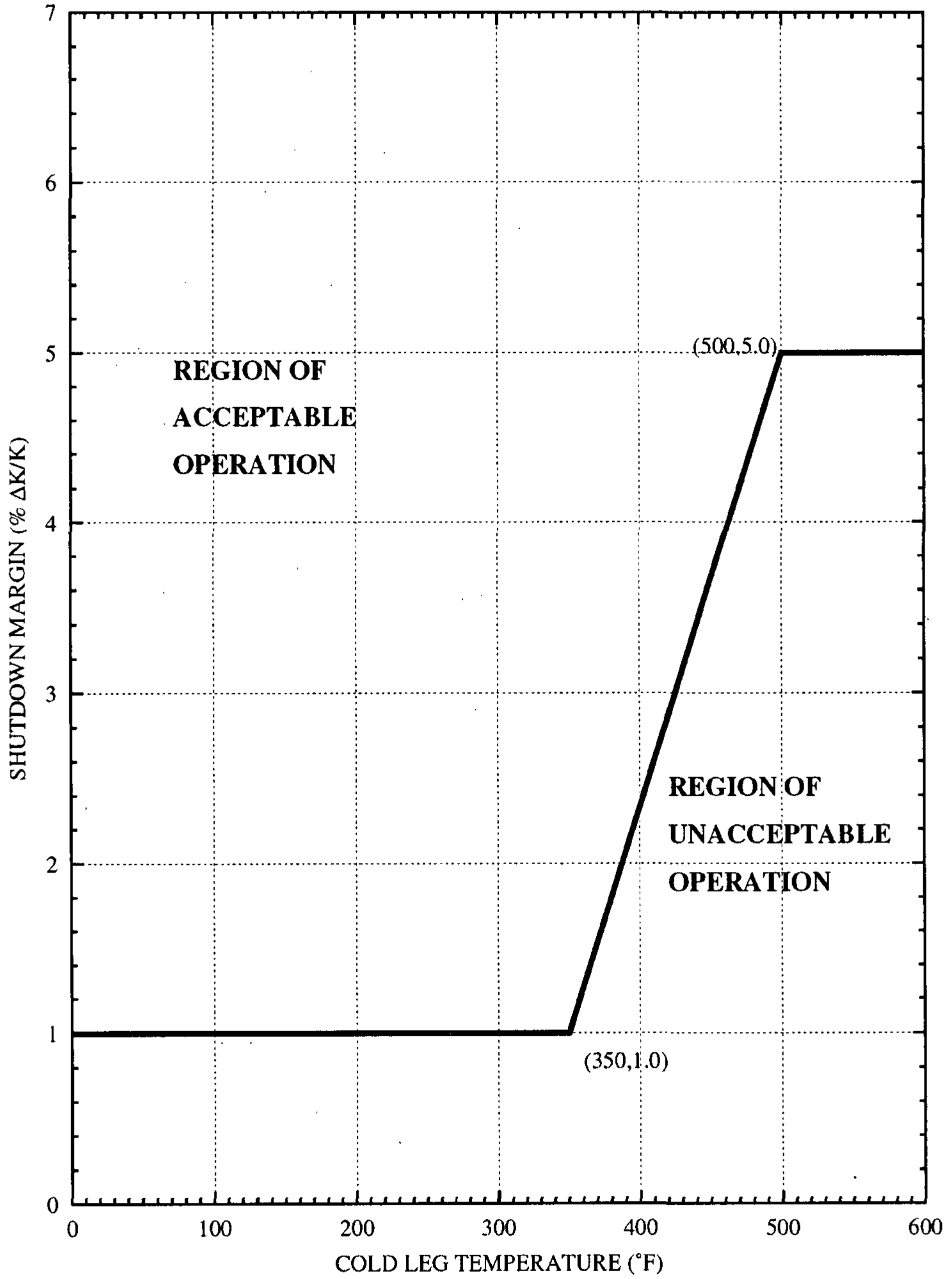


FIGURE 3.1.2-1
SHUTDOWN MARGIN VERSUS COLD LEG TEMPERATURE
REACTOR TRIP BREAKERS CLOSED

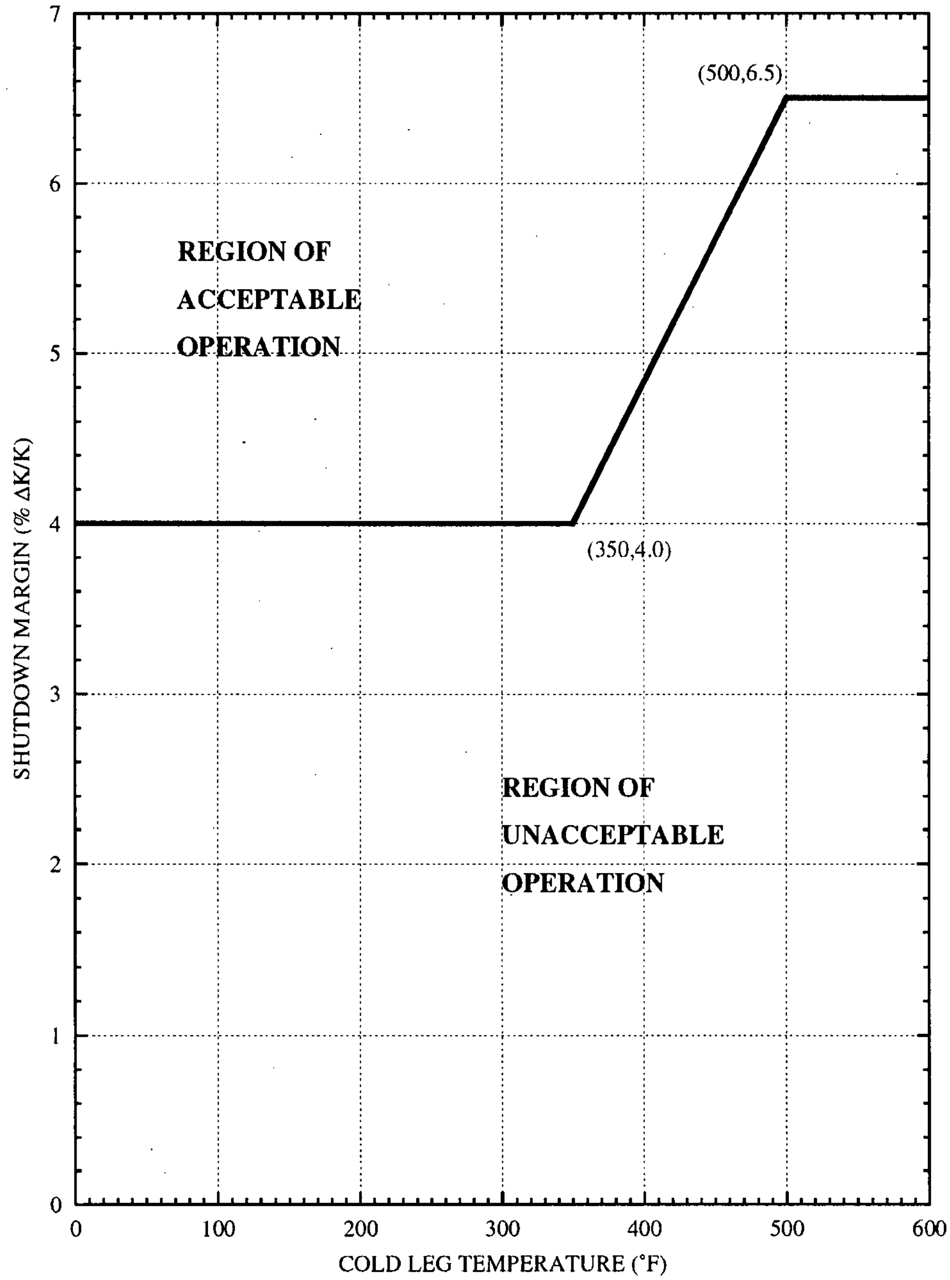


FIGURE 3.1.4-1
MTC ACCEPTABLE OPERATION, MODES 1 AND 2

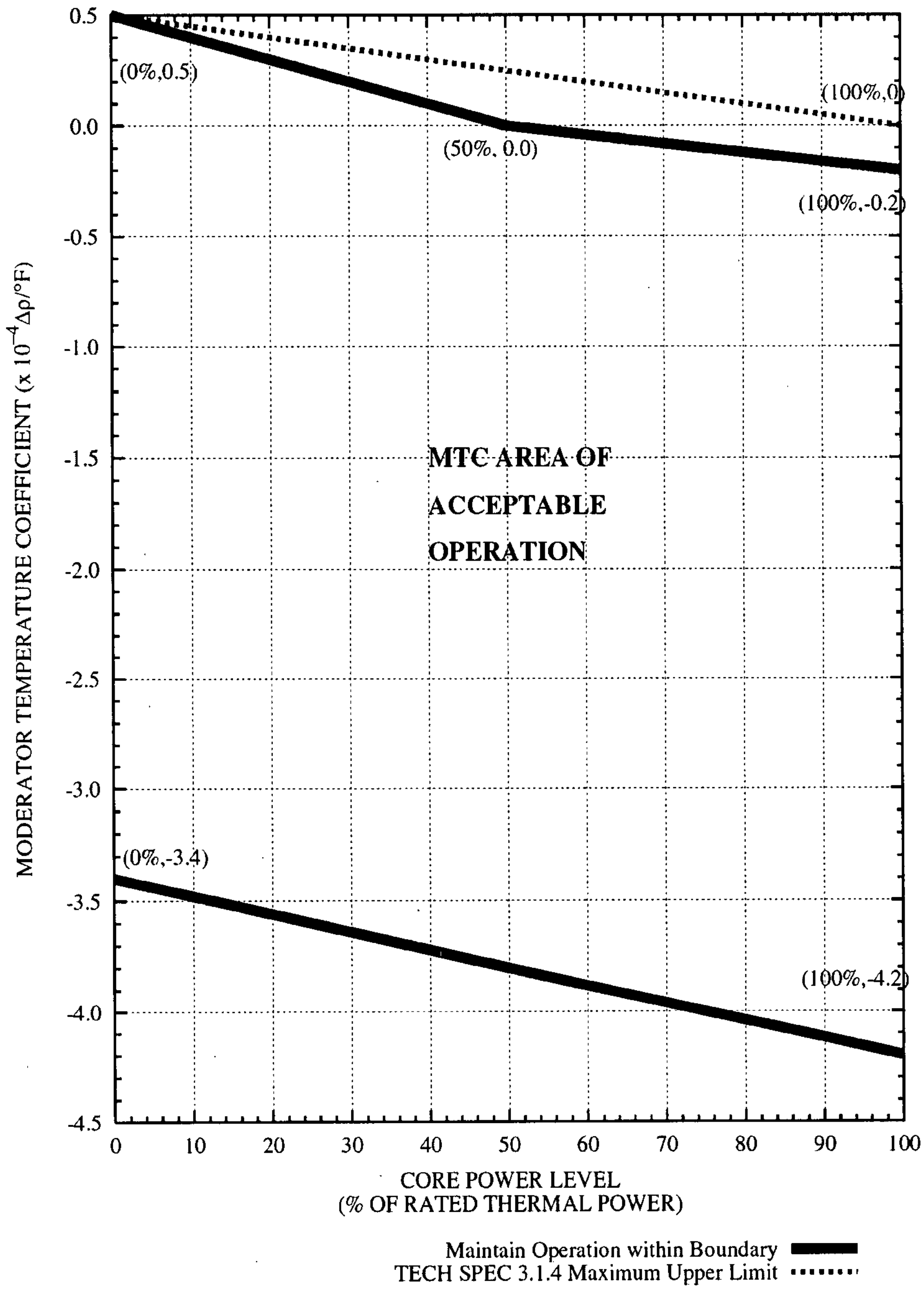
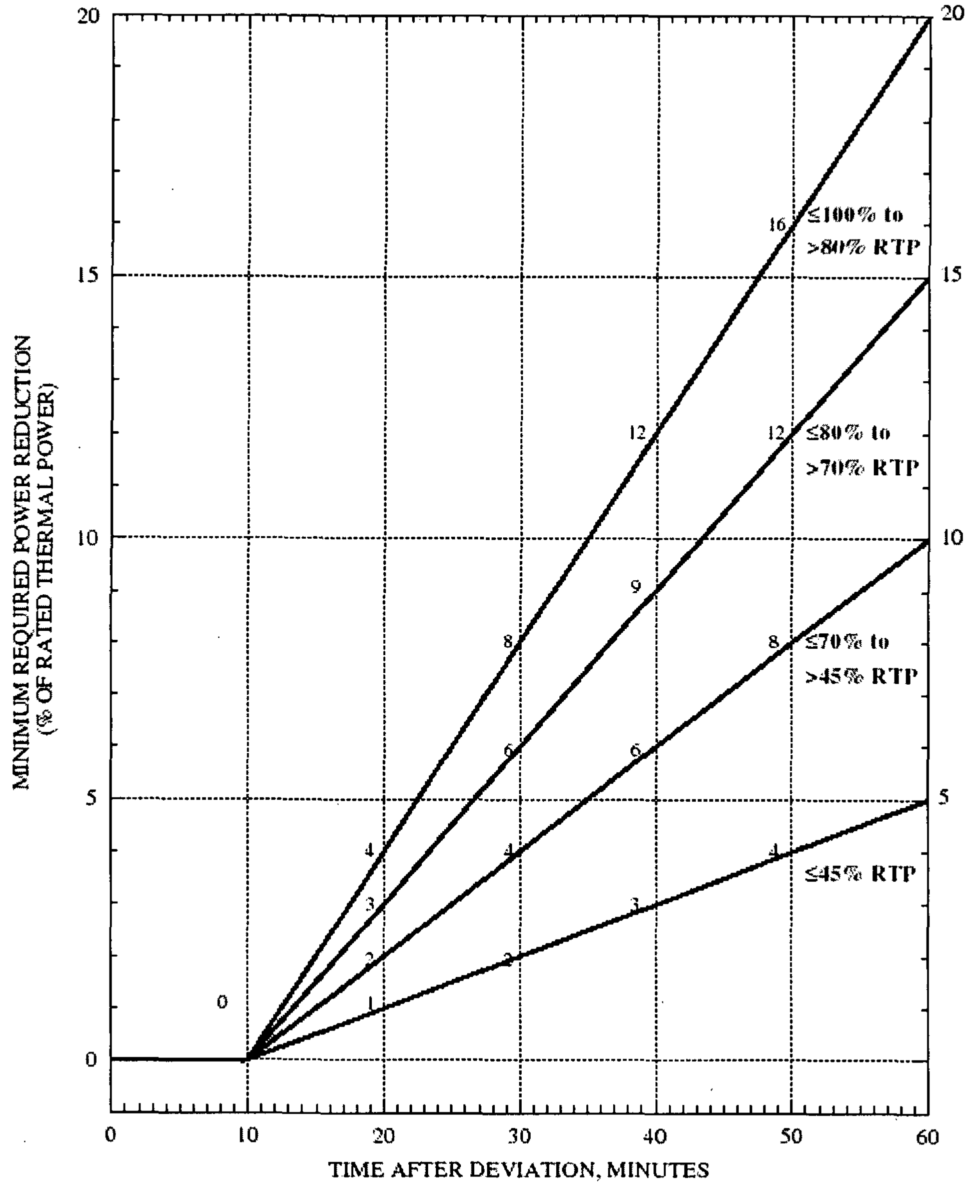
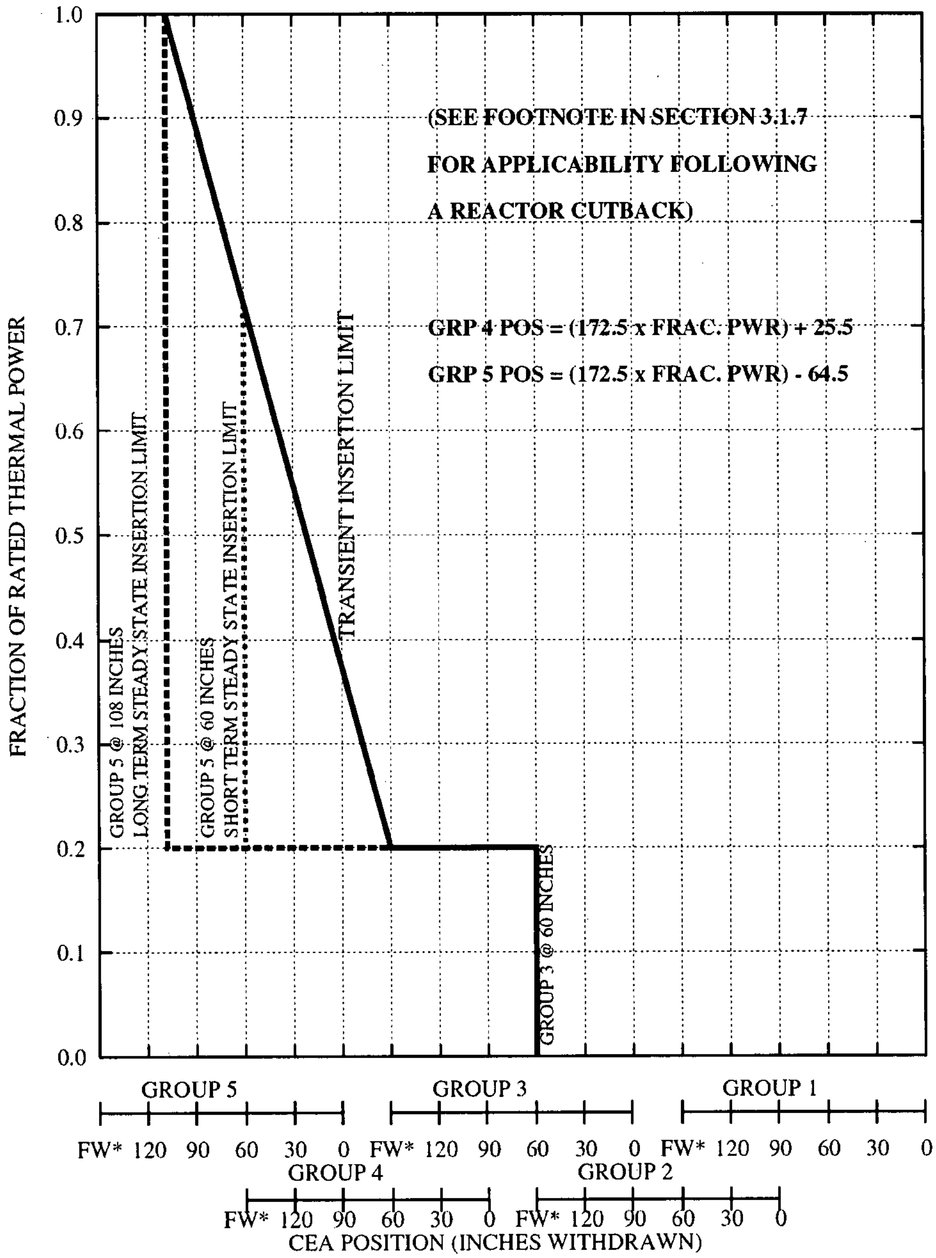


FIGURE 3.1.5-1
CORE POWER REDUCTION AFTER CEA DEVIATION*



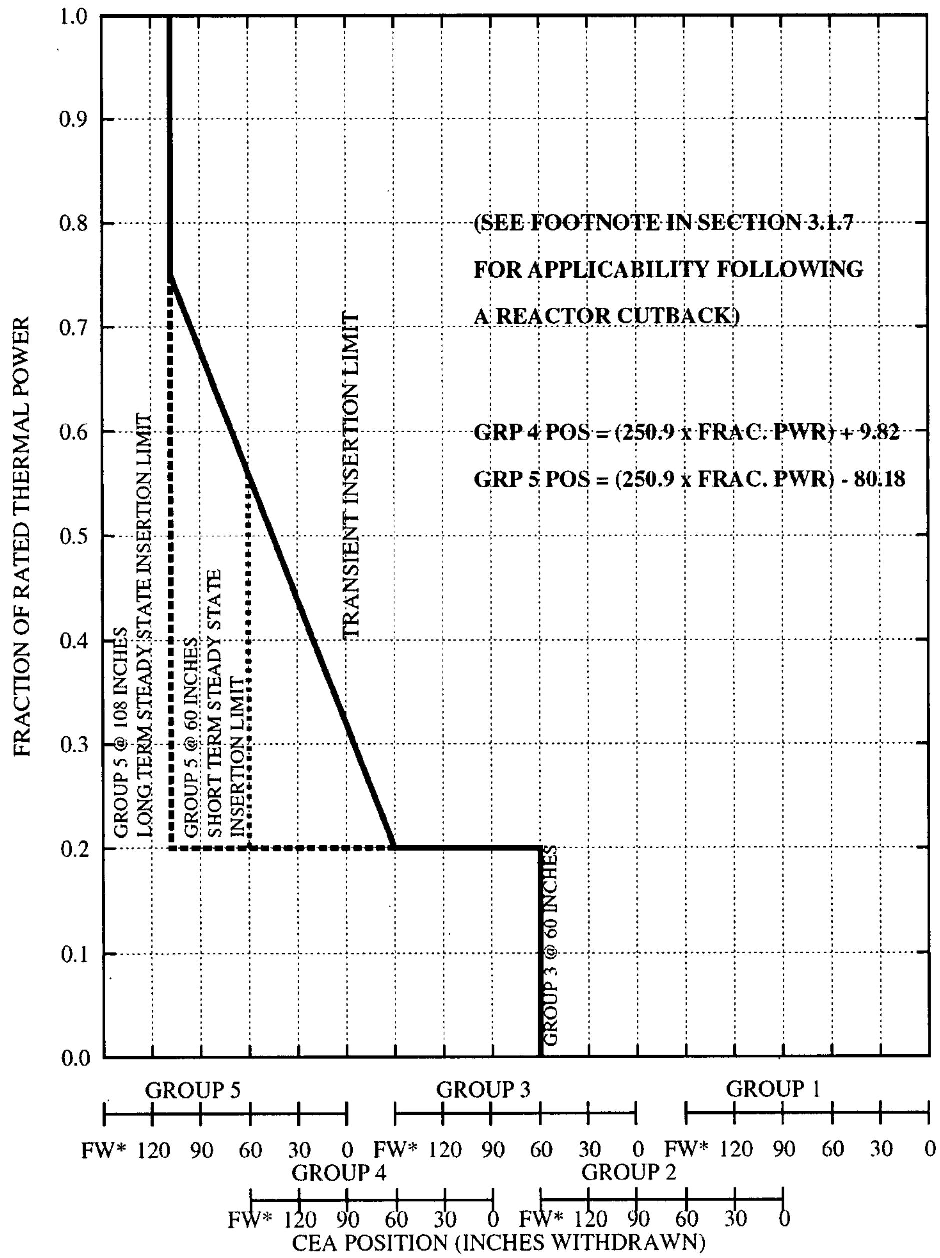
* WHEN CORE POWER IS REDUCED TO 35% OF RATED THERMAL POWER PER THIS LIMIT CURVE, FURTHER REDUCTION IS NOT REQUIRED.

FIGURE 3.1.7-1
CEA INSERTION LIMITS VERSUS THERMAL POWER
(COLSS IN SERVICE)



*Fully Withdrawn (FW) is defined as $\geq$ 147.75" (Pulse Counter) and $\geq$ 145.25" (RSPT).

FIGURE 3.1.7-2
CEA INSERTION LIMITS VERSUS THERMAL POWER
(COLSS OUT OF SERVICE)



*Fully Withdrawn (FW) is defined as ≥ 147.75" (Pulse Counter) and ≥ 145.25" (RSPT).

FIGURE 3.1.8-1
PART STRENGTH CEA INSERTION LIMITS
VERSUS THERMAL POWER

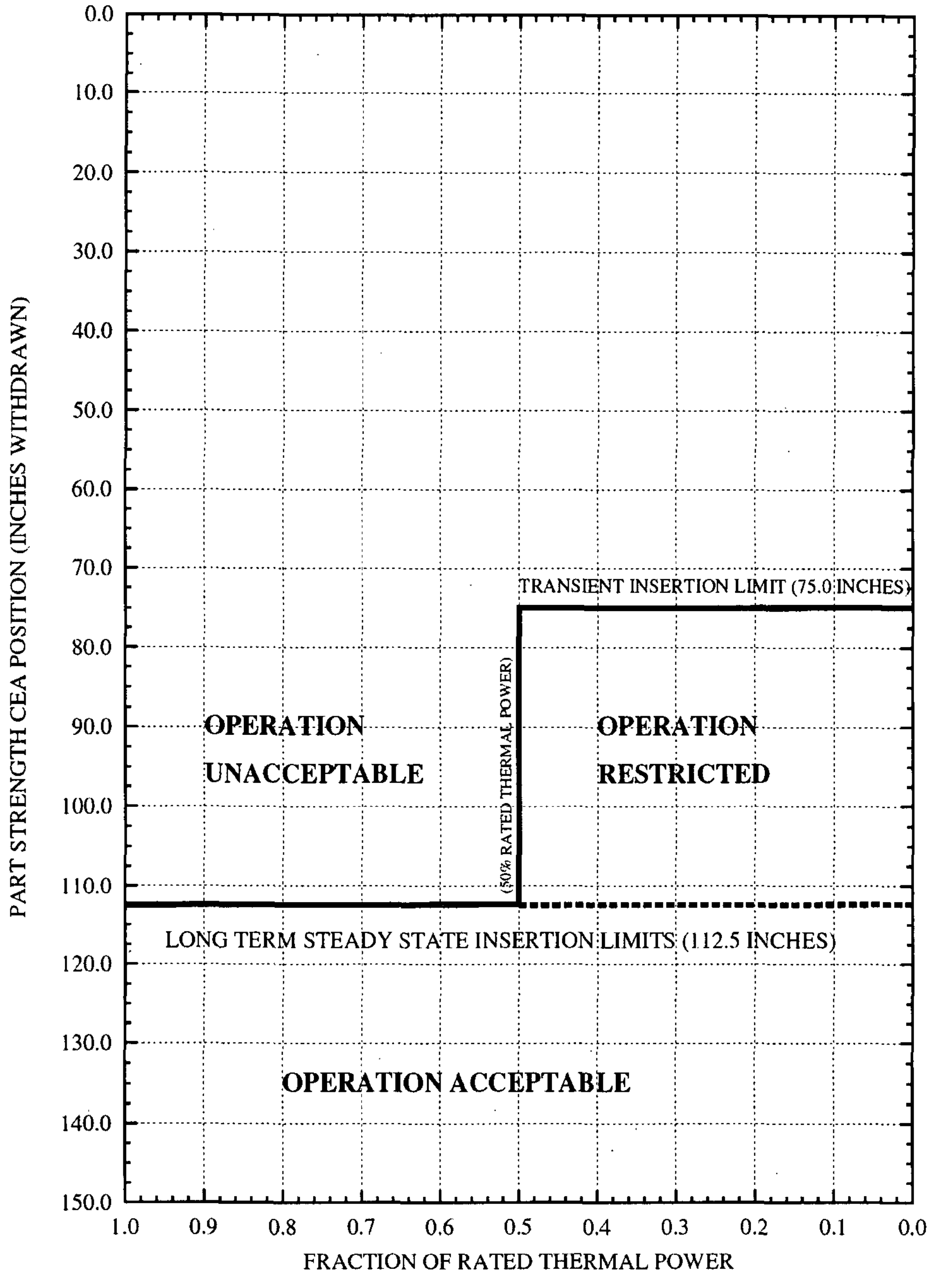


FIGURE 3.2.3-1
AZIMUTHAL POWER TILT VERSUS THERMAL POWER
(COLSS IN SERVICE)

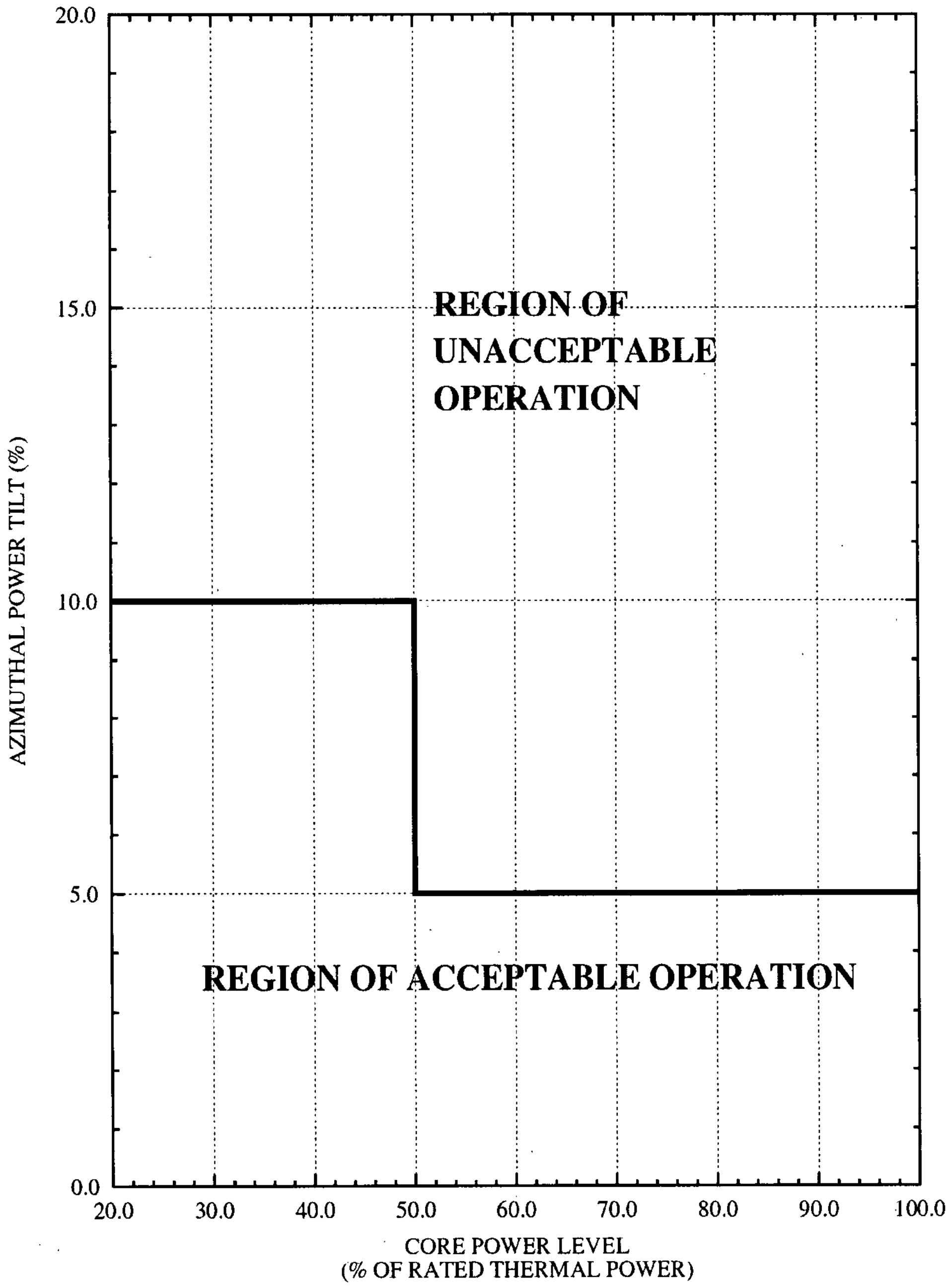


FIGURE 3.2.4-1
COLSS DNBR OPERATING LIMIT
ALLOWANCE FOR BOTH CEACs INOPERABLE
IN ANY OPERABLE CPC CHANNEL

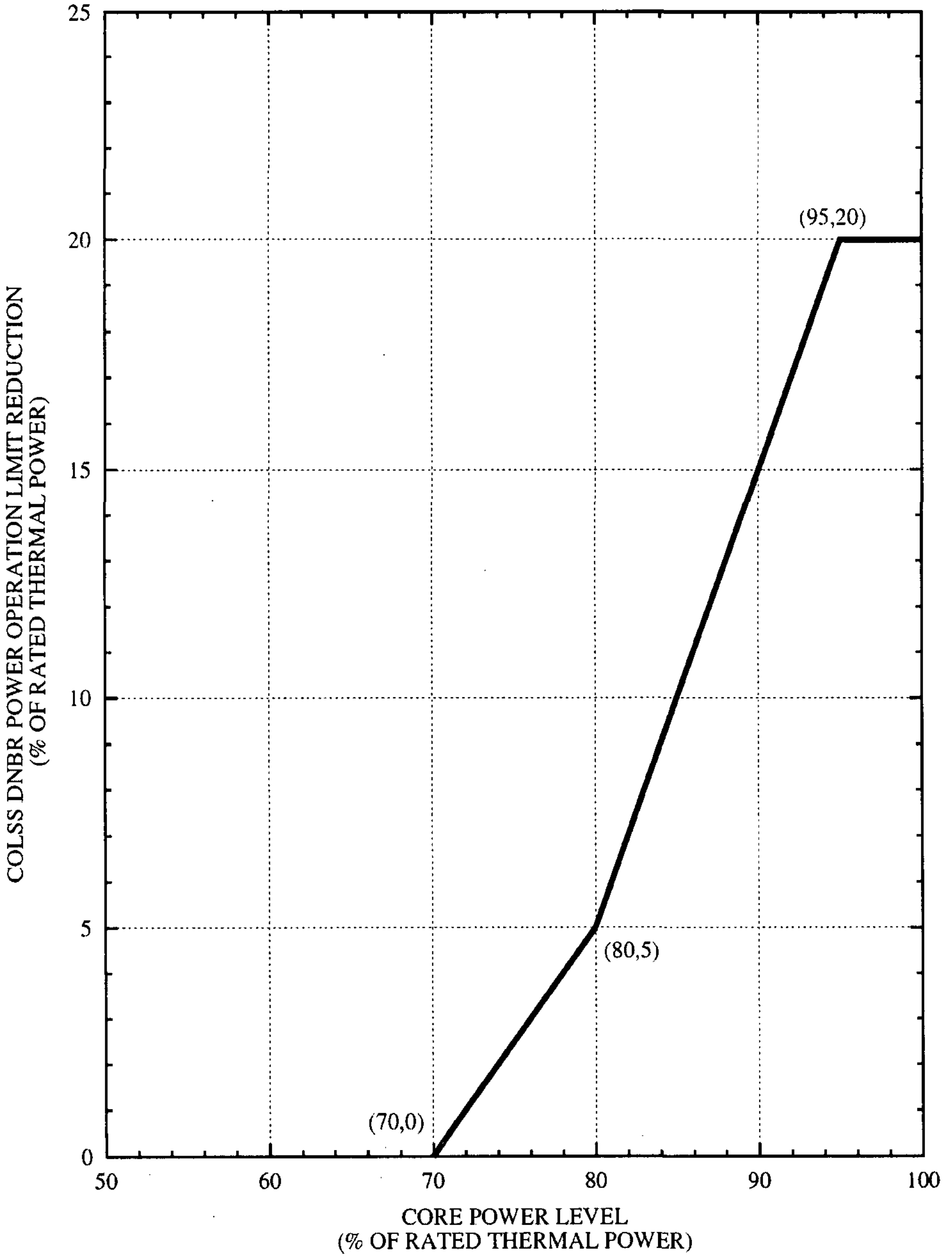


FIGURE 3.2.4-2
DNBR MARGIN OPERATING LIMIT BASED ON
THE CORE PROTECTION CALCULATORS
(COLSS OUT OF SERVICE, CEAC(s) OPERABLE)

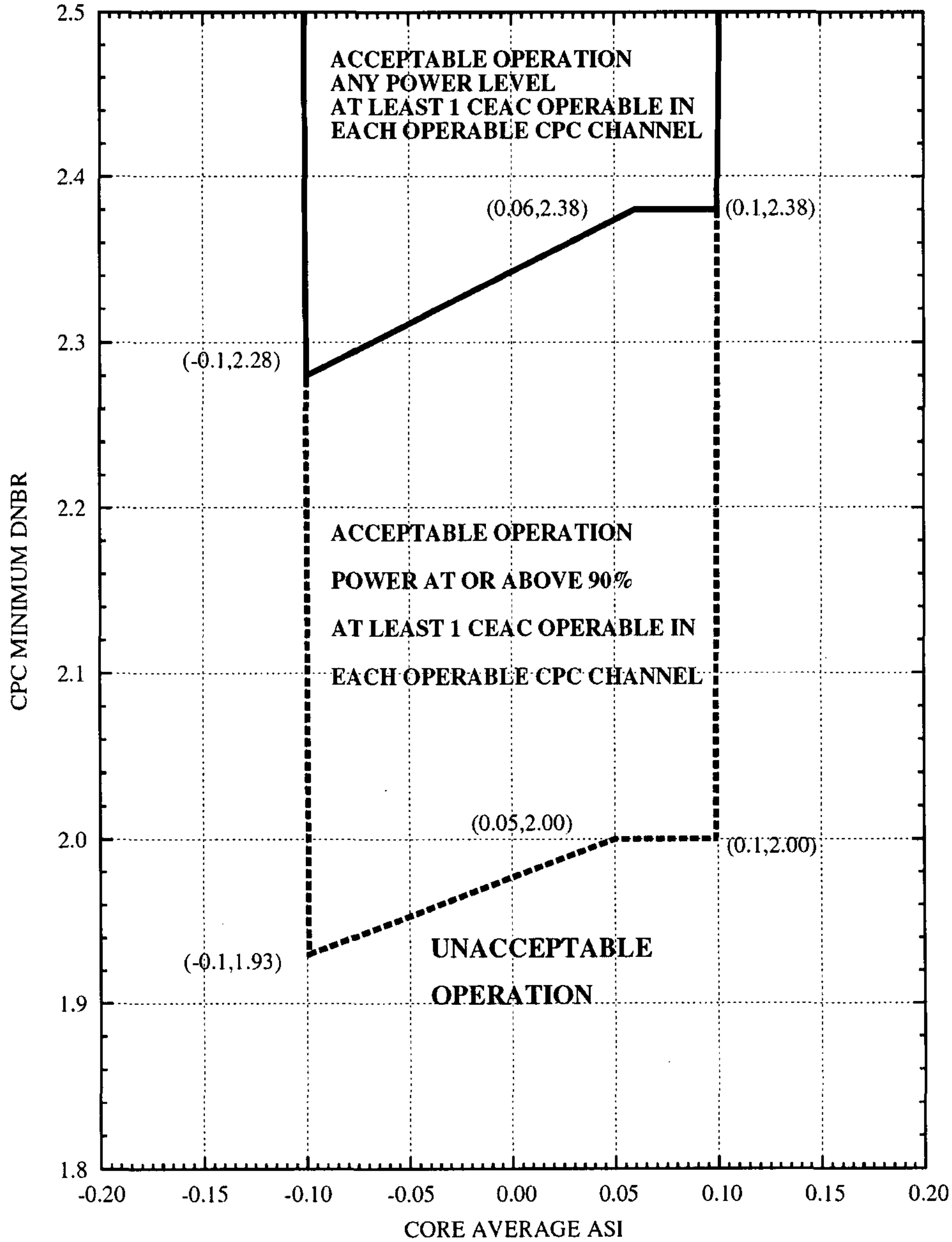


FIGURE 3.2.4-3
DNBR MARGIN OPERATING LIMIT BASED ON
THE CORE PROTECTION CALCULATORS
(COLSS OUT OF SERVICE, BOTH CEACs INOPERABLE
IN ANY OPERABLE CPC CHANNEL)

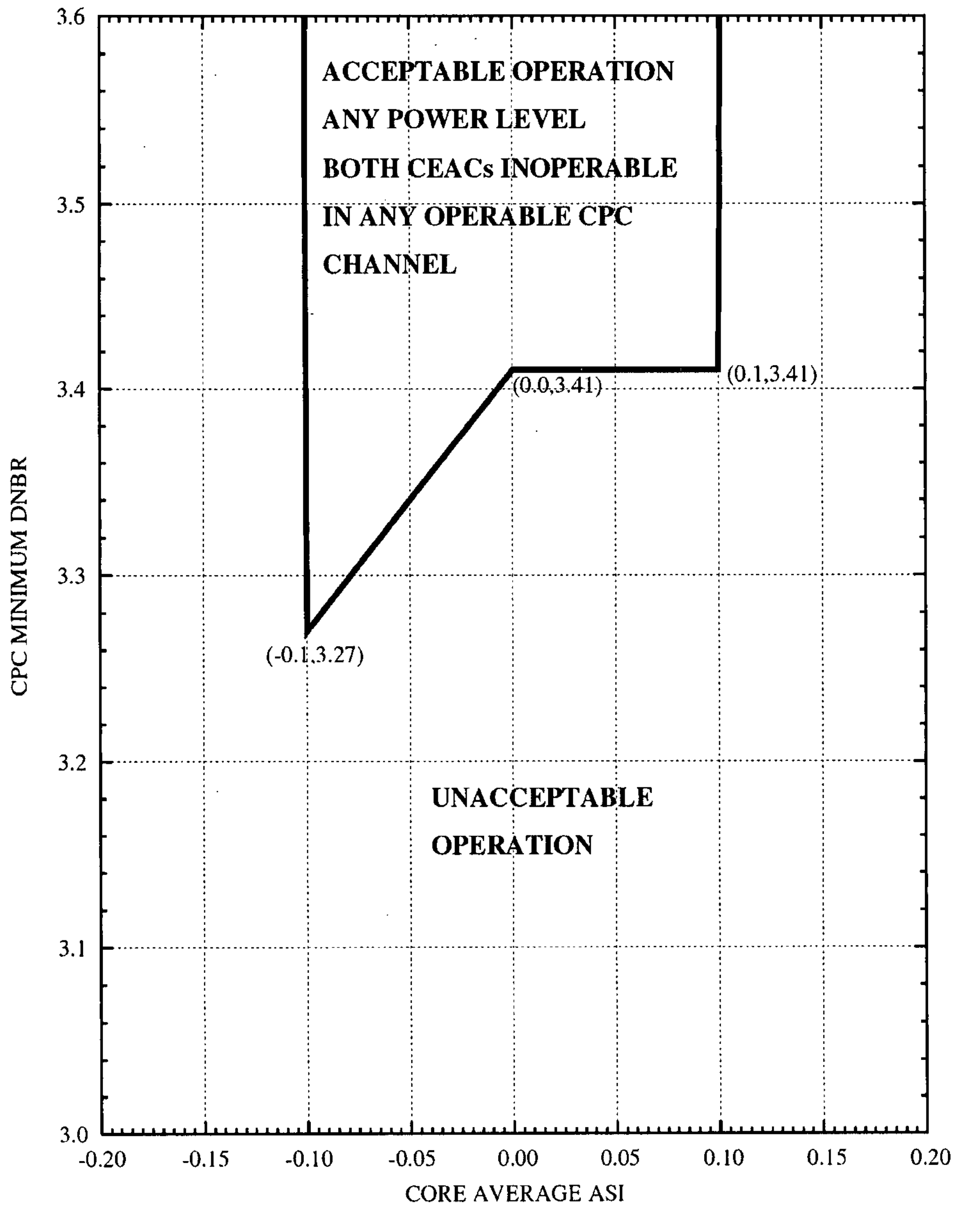


Table 3.3.12-1

REQUIRED MONITORING FREQUENCIES FOR BACKUP BORON DILUTION DETECTION AS A FUNCTION OF OPERATING CHARGING PUMPS AND PLANT OPERATIONAL MODES FOR $K_{eff} > 0.98$

OPERATIONAL MODE	Number of Operating Charging Pumps			
	0	1	2	3
3	12 hours	0.5 hours	ONA	ONA
4 not on SCS	12 hours	0.5 hours	ONA	ONA
5 not on SCS	8 hours	0.5 hours	ONA	ONA
4 & 5 on SCS	ONA	ONA	ONA	ONA

Notes: SCS = Shutdown Cooling System
ONA = Operation Not Allowed

Table 3.3.12-2

REQUIRED MONITORING FREQUENCIES FOR BACKUP BORON DILUTION DETECTION AS A FUNCTION OF OPERATING CHARGING PUMPS AND PLANT OPERATIONAL MODES FOR $0.98 \geq K_{eff} > 0.97$

OPERATIONAL MODE	Number of Operating Charging Pumps			
	0	1	2	3
3	12 hours	1 hour	0.5 hours	ONA
4 not on SCS	12 hours	1.5 hours	0.5 hours	ONA
5 not on SCS	8 hours	1.5 hours	0.5 hours	ONA
4 & 5 on SCS	8 hours	0.5 hours	ONA	ONA

Notes: SCS = Shutdown Cooling System
ONA = Operation Not Allowed

Table 3.3.12-3

REQUIRED MONITORING FREQUENCIES FOR BACKUP BORON DILUTION DETECTION AS A FUNCTION OF OPERATING CHARGING PUMPS AND PLANT OPERATIONAL MODES FOR $0.97 \geq K_{eff} > 0.96$

OPERATIONAL MODE	Number of Operating Charging Pumps			
	0	1	2	3
3	12 hours	2.5 hours	1 hour	ONA
4 not on SCS	12 hours	2.5 hours	1 hour	0.5 hours
5 not on SCS	8 hours	2.5 hours	1 hour	0.5 hours
4 & 5 on SCS	8 hours	1 hour	ONA	ONA

Notes: SCS = Shutdown Cooling System
ONA = Operation Not Allowed

Table 3.3.12-4

REQUIRED MONITORING FREQUENCIES FOR BACKUP BORON DILUTION DETECTION AS A FUNCTION OF OPERATING CHARGING PUMPS AND PLANT OPERATIONAL MODES FOR $0.96 \geq K_{eff} > 0.95$

OPERATIONAL MODE	Number of Operating Charging Pumps			
	0	1	2	3
3	12 hours	3 hours	1 hour	0.5 hours
4 not on SCS	12 hours	3.5 hours	1.5 hours	0.75 hours
5 not on SCS	8 hours	3.5 hours	1.5 hours	0.75 hours
4 & 5 on SCS	8 hours	1.5 hours	0.5 hours	ONA

Notes: SCS = Shutdown Cooling System
ONA = Operation Not Allowed

Table 3.3.12-5

REQUIRED MONITORING FREQUENCIES FOR BACKUP BORON DILUTION DETECTION AS A FUNCTION OF OPERATING CHARGING PUMPS AND PLANT OPERATIONAL MODES FOR $K_{eff} \leq 0.95$

OPERATIONAL MODE	Number of Operating Charging Pumps			
	0	1	2	3
3	12 hours	4 hours	1.5 hours	1 hour
4 not on SCS	12 hours	4.5 hours	2 hours	1 hour
5 not on SCS	8 hours	4.5 hours	2 hours	1 hour
4 & 5 on SCS	8 hours	2 hours	0.75 hours	ONA
6	24 hours	1.5 hours	ONA	ONA

Notes: SCS = Shutdown Cooling System
ONA = Operation Not Allowed