TABLE 9-1

CALVERT CLIFFS 1 CYCLE 7
TECHNICAL SPECIFICATION CHANGES

Change	Tech. Spec. #	Action
1	Table 2.2-1 page 2-9	Change Steam Generator Low Pressure Trip setting from 635 psia to 685 psia.
2	Table 2.2-1 page 2-10	Change Steam Generator Low Pressure Trip Bypass limit from 710 psia to 785 psia.
3	B 2.1.1 page B 2-1	Change LHGR to centerline melt limit from 21.3 kw/ft to 22.0 kw/ft.
4	B 2.2.1 page B 2-5	Change Steam Generator Low Pressure Trip setting from 635 psia to 685 psia and change uncertainty from 87 psia to 85 psia.
5	B 2.2.1 page B 2-6	Revise description of the Steam Generator Low Water Level Trip.
6	3/4.1.1.1 page 3/4 1-1	Change shutdown margin, $T_{avg} > 200^{o}F$, from 5.3% $\Delta k/k$ to 4.3% $\Delta k/k$.
7	3.1.1.4 page 3/4 1-5	Change moderator temperature coefficient negative limit from -2.2×10^{-4} $\Delta k/k/^{o}F$ to -2.5×10^{-4} $\Delta k/k/^{o}F$.
8	4.1.1.4.2 page 3/4 1-6	Change MTC surveillance Item (b).
9	Figure 3.2-3b page 3/4 2-4a	Replace Figure 3.2-3b with enclosed Figure 3.2-3b.
10	3.2.2.1 page 3/4 2-6	Change calculated value of F_{xy}^{T} from 1.65 to 1.70.
11	Figure 3.2-3a page 3/4 2-7a	Replace Figure 3.2-3a with enclosed new Figure 3.2-3a
12	3.2.3 page 3/4 2-9	Change Figure 3.2-3a to Figure 3.2-3c.
13	Figure 3.2-3c page 3/4 2-10a (new)	Insert enclosed new Figure 3.2-3c after page 3/4 2-10.
14	Table 3.2-1 page 3/4 2-14	Change minimum pressurizer pressure from 2225 psia to 2200 psia.

TABLE 9-1
(continued)

Change	Tech. Spec. #	Action
15	Table 3.3-1 page 3/4 3-4	Change Steam Generator Low Pressure Trip Bypass limit from 710 psia to 785 psia.
16	Table 3.3-3 page 3/4 3-14	Revise and augment the Auxiliary Feedwater Section as indicated on the sample page.
17	Table 3.3-3 page 3/4 3-15	Change Main Steam Line Isolation (SGIS) Steam Generator Low Pressure Trip Bypass limit from 710 psia to 785 psia.
18	Table 3.3-4 page 3/4 3-17	Change Main Steam Line Isolation (SGIS) steam Generator Low Pressure Trip setting from 635 psia to 685 psia.
19	Table 3.3-4 page 3/4 3-19	Revise and augment the Auxiliary Feedwater Section as indicated on the sample page.
20	Table 3.3-5 page 3/4 3-20	Add the line for AFAS.
21	Table 3.3-5 page 3/4 3-21	Revise and augment the Steam Generator Level-Low Section and add the Steam Generator ΔP-High Section, as indicated on the sample page.
22	Table 4.3-2 page 3/4 3-23	Revise and augment the Auxiliary Feedwater Section as indicated on the sample page.
23	3.7.1.2 pages 3/4 7-5 and 3/4 7-5a	Replace Pages 3/4 7-5 and 3/4 7-5a with enclosed Pages 3/4 7-5 and 3/4 7-5a.
24	Figure 3.7-1 page 3/4 7-5b	Delete Figure 3.7-1.
25	3.10.4 page 3/4 10-4	Change 4.10.5.2 to 4.10.4.2.
26	B 3/4.1.1.1 and B 3/4.1.1.2 page B 3/4 1-1	Change shutdown margin, $T_{avg}>200^{o}F$, from 5.3% Δk/k at EOC and 4.5% Δk/k at BOC to 4.3% Δk/k at both EOC and BOC.
27	B 3/4.7.1.2 page B 3/4 7-2	Change bases for Tech. Spec. 3/4.7.1.2 as indicated on sample page.

TABLE 9-2

EXPLANATIONS FOR CYCLE 7 TECH. SPEC. CHANGES

Changes	Tech. Spec. #	Explanation
1	Table 2.2-1	The Steam Generator Low Pressure Trip setting is being raised to accommodate the Safety Grade Auxiliary Feedwater Actuation System
2	Table 2.2-1	The Steam Generator Low Pressure Trip Bypass limit is being raised to reflect the change in the trip setting (see Change No. 1).
3	B 2.1.1	LHGR to centerline melt is being raised to increase operating margins and flexibility.
4	B 2.2.1	See Change No. 1.
5	B 2.2.1	The basis for the Steam Generator Low Water Level Trip is being adjusted to be consistent with the Safety Grade Auxiliary Feedwater Actuation System.
6	3/4 1.1.1	The shutdown margin is being lowered to reduce operating requirements with regard to shutdown boron levels, consistent with the generic SLB analysis presented herein (see Table 7-2) and existing safety analyses (see note to Table 5-2).
7	3.1.1.4	The moderator temperature coefficient negative limit is being increased to accommodate the effects of extended burnup.
8	4.1.1.4.2	The surveillance requirements on MTC are being modified to allow the use of MTC determinations made during power ascension startup measurements for the purpose of satisfying surveillance requirements. This change is consistent with the objective of assuring that the most positive MTC at power conditions, which occurs at the highest boron concentration, meets Tech. Spec. 3.1.1.4.b.
9	Figure 3.2-3b	Figure 3.2-3b is being revised due to the separation of the allowable F_{xy}^T and F_r^T curves into separate figures (see Change Nos. 11, 12 and 13).

TABLE 9-2
(continued)

Changes	Tech. Spec. #	Explanation
10	3.2.2.1	The planar radial peaking factor, F_{xy}^T, is being raised for Cycle 7 to increase operating margins and flexibility.
11	Figure 3.2-3a	The planar radial peaking factor, F_{xy}^T, is being raised for Cycle 7 to increase operating margins and flexibility and the F_{xy}^T curve is being separated from the F_r^T curve to accommodate different F_{xy}^T and F_r^T values.
12	3.2.3	Figure 3.2-3c is being added to facilitiate the separation of the F_{xy}^T and F_r^T curves to accommodate different F_{xy}^T and F_r^T values.
13	Figure 3.2-3c	See Change No. 12.
14	Table 3.2-1	The minimum steady state pressurizer pressure has been lowered to increase operating flexibility.
15	Table 3.3-1	See Change No. 2.
16	Table 3.3-3	The description of the Engineered Safety Feature Actuation System Instrumentation for Auxiliary Feedwater is being revised and augmented to reflect the implementation of the Safety Grade Auxilary Feedwater Actuation System.
17	Table 3.3-3	The Main Steam Line Isolation (SGIS) Steam Generator Low Pressure Trip Bypass limit is being raised to reflect the change in the trip setting (see Change No. 18).
18	Table 3.3-4	The Main Steam Line Isolation (SGIS) Steam Generator Low Pressure Trip setting is being raised to accommodate the Safety Grade Auxiliary Feedwater Actuation System.

TABLE 9-2
(continued)

Changes	Tech. Spec. #	Explanation
19	Table 3.3-4	The Engineered Safety Feature Actuation System Instrumentation Trip values for Auxiliary Feedwater are being revised and augmented to reflect the implementation of the Safety Grade Auxiliary Feedwater Actuation System.
20	Table 3.3-5	The line for AFAS is being added due to the implementation of the Safety Grade Auxiliary Feedwater Actuation System.
21	Table 3.3-5	The Engineered Safety Feature Response Times for Steam Generator Level-Low are being revised and augmented and those for Steam Generator ΔP-High are being added to reflect the implementation of the Safety Grade Auxiliary Feedwater Actuation System.
22	Table 4.3-2	The Engineered Safety Feature Actuation System Instrumentation Surveillance Requirements for Auxiliary Feedwater are being revised and augmented to reflect the implementation of the Safety Grade Auxiliary Feedwater Actuation System.
23	3.7.1.2	The Limiting Condition for Operation (LCO) of the Auxiliary Feedwater System is being revised and augmented to reflect the implementation of the Safety Grade Auxiliary Feedwater Actuation System.
24	Figure 3.7-1	Figure 3.7-1 is being removed to be consistent with revised and augmented Tech. Spec. 3.7.1.2 (see Change No. 23).
25	3.10.4	A "typo" is being corrected.
26	B 3/4.1.1.1 and B 3/4.1.1.2	The shutdown margin is being decreased to make it consistent with Tech. Spec. 3/4.1.1.1.
27	B 3/4.7.1.2	The bases for the Auxiliary Feedwater LCO are being modified to reflect the implementation of the Safety Grade Auxiliary Feedwater Actuation System.

TABLE 2.2-1 (Cont'd)

REACTOR PROTECTIVE INSTRUMENTATION TRIP SETPOINT LIMITS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES
4. Pressurizer Pressure - High	≤ 2400 psia	≤ 2400 psia
5. Containment Pressure - High	≤ 4 psig	≤ 4 psig
6. Steam Generator Pressure - Low (2)	≥ 635 → 685 psia	≥ 635 → 685 psia
7. Steam Generator Water Level - Low	≥ 10 inches below top of feed ring.	≥ 10 inches below top of feed ring.
8. Axial flux offset (3)	Trip setpoint adjusted to not exceed the limit lines of Figure 2.2-1.	Trip setpoint adjusted to not exceed the limit lines of Figure 2.2-1.
9. Thermal Margin/Low Pressure (1)		
a. Four Reactor Coolant Pumps Operating	Trip setpoint adjusted to not exceed the limit lines of Figures 2.2-2 and 2.2-3.	Trip setpoint adjusted to be not less than the larger of (1) the value calculated from Figures 2.2-2 and 2.2-3 and (2) 1875 psig.
b. Steam Generator Pressure Difference - High (1)	≤ 135 psid	≤ 135 psid
10. Loss of Load	N.A.	N.A.
11. Rate of Change of Power - High (4)	≤ 2.6 decades per minute	≤ 2.6 decades per minute

TABLE NOTATION

(1) Trip may be bypassed below 10^{-4}% of RATED THERMAL POWER; bypass shall be automatically removed when THERMAL POWER is ≥ 10^{-4}% of RATED THERMAL POWER.

TABLE 2.2-1 (Cont'd)

TABLE NOTATIONS (Cont'd)

(2) Trip may be manually bypassed below 710 [785] psia; bypass shall be automatically removed at or above 710 [785] psia.

(3) Trip may be bypassed below 15% of RATED THERMAL POWER; bypass shall be automatically removed when THERMAL POWER is ≥ 15% of RATED THERMAL POWER.

(4) Trip may be bypassed below 10^{-4}% and above 12% of RATED THERMAL POWER.

2.1 SAFETY LIMITS

BASES

2.1.1 REACTOR CORE

22.0

The restrictions of this safety limit prevent overheating of the fuel cladding and possible cladding perforation which would result in the release of fission products to the reactor coolant. Overheating of the fuel is prevented by maintaining the steady state peak linear heat rate at or less than 21.3 kw/ft. Centerline fuel melting will not occur for this peak linear heat rate. Overheating of the fuel cladding is prevented by restricting fuel operation to within the nucleate boiling regime where the heat transfer coefficient is large and the cladding surface temperature is slightly above the coolant saturation temperature.

Operation above the upper boundary of the nucleate boiling regime could result in excessive cladding temperatures because of the onset of departure from nucleate boiling (DNB) and the resultant sharp reduction in heat transfer coefficient. DNB is not a directly measurable parameter during operation and therefore THERMAL POWER and Reactor Coolant Temperature and Pressure have been related to DNB through the CE-1 correlation. The CE-1 DNB correlation has been developed to predict the DNB flux and the location of DNB for axially uniform and non-uniform heat flux distributions. The local DNB heat flux ratio, DNBR, defined as the ration of the heat flux that would cause DNB at a particular core location to the local heat flux, is indicative of the margin to DNB.

The minimum value of the DNBR during steady state operation, normal operational transients, and anticipated transients is limited to 1.23. This value corresponds to a 95 percent probability at a 95 percent confidence level that DNB will not occur and is chosen as an appropriate margin to DNB for all operating conditions.

The curves of Figures 2.1-1, 2.1-2, 2.1-3 and 2.1-4 show the loci of points of THERMAL POWER, Reactor Coolant System pressure and maximum cold leg temperature of various pump combinations for which the minimum DNBR is no less than 1.23 for the family of axial shapes and corresponding radial peaks shown in Figure B2.1-1. The limits in Figures 2.1-1, 2.1-2, 2.1-3 and 2.1-4 were calculated for reactor coolant inlet temperatures less than or equal to 580°F. The dashed line at 580°F coolant inlet temperature is not a safety limit; however, operation above 580°F is not possible because of the actuation of the main steam line safety valves which limit the maximum value of reactor inlet temperature. Reactor operation at THERMAL POWER levels higher than 110% of RATED THERMAL POWER is prohibited by the high power level trip setpoint specified in

operation of the reactor at reduced power if one or two reactor coolant pumps are taken out of service. The low-flow trip setpoints and Allowable Values for the various reactor coolant pump combinations have been derived in consideration of instrument errors and response times of equipment involved to maintain the DNBR above 1.23 under normal operation and expected transients. For reactor operation with only two or three reactor coolant pumps operating, the Reactor Coolant Flow-Low trip setpoints, the Power Level-High trip setpoints, and the Thermal Margin/Low Pressure trip setpoints are automatically changed when the pump condition selector switch is manually set to the desired two- or three-pump position. Changing these trip setpoints during two and three pump operation prevents the minimum value of DNBR from going below 1.23 during normal operational transients and anticipated transients when only two or three reactor coolant pumps are operating.

Pressurizer Pressure-High

The Pressurizer Pressure-High trip, backed up by the pressurizer code safety valves and main steam line safety valves, provides reactor coolant system protection against overpressurization in the event of loss of load without reactor trip. This trip's setpoint is 100 psi below the nominal lift setting (2500 psia) of the pressurizer code safety valves and its concurrent operation with the power-operated relief valves avoids the undesirable operation of the pressurizer code safety valves.

Containment Pressure-High

The Containment Pressure-High trip provides assurance that a reactor trip is initiated concurrently with a safety injection. The setpoint for this trip is identical to the safety injection setpoint.

Steam Generator Pressure-Low

685

The Steam Generator Pressure-Low trip provides protection against an excessive rate of heat extraction from the steam generators and subsequent cooldown of the reactor coolant. The setting of 635 psia is sufficiently below the full-load operating point of 850 psia so as not to interfere with normal operation, but still high enough to provide the required protection in the event of excessively high steam flow. This setting was used with an uncertainty factor of ±87 psi which was based on the main steam line break event.

85

LIMITING SAFETY SYSTEM SETTINGS

BASES

Steam Generator Water Level

The Steam Generator Water Level-Low trip provides core protection by preventing operation with the steam generator water level below the minimum volume required for adequate heat removal capacity and assures that the pressure of the reactor coolant system will not exceed its Safety Limit. ~~The specified setpoint provides allowance that there will be sufficient water inventory in the steam generators at the time of trip to provide a margin of more than 13 minutes before auxiliary feedwater is required.~~ The specified setpoint in combination with the auxiliary feedwater actuation system ensures that sufficient water inventory exists in both steam generators to remove decay heat following a loss of main feedwater flow event.

Axial Flux Offset

The axial flux offset trip is provided to ensure that excessive axial peaking will not cause fuel damage. The axial flux offset is determined from the axially split excore detectors. The trip setpoints ensure that neither a DNBR of less than 1.23 nor a peak linear heat rate which corresponds to the temperature for fuel centerline melting will exist as a consequence of axial power maldistributions. These trip setpoints were derived from an analysis of many axial power shapes with allowances for instrumentation inaccuracies and the uncertainty associated with the excore to incore axial flux offset relationship.

Thermal Margin/Low Pressure

The Thermal Margin/Low Pressure trip is provided to prevent operation when the DNBR is less than 1.23.

The trip is initiated whenever the reactor coolant system pressure signal drops below either 1875 psia or a computed value as described below, whichever is higher. The computed value is a function of the higher of ΔT power or neutron power, reactor inlet temperature, and the number of reactor coolant pumps operating. The minimum value of reactor coolant flow rate, the maximum AZIMUTHAL POWER TILT and the maximum CEA deviation permitted for continuous operation are assumed in the generation of this trip function. In addition, CEA group sequencing in accordance with Specifications 3.1.3.5 and 3.1.3.6 is assumed. Finally, the maximum insertion of CEA banks which can occur during any anticipated operational occurrence prior to a Power Level-High trip is assumed.

3/4.1 REACTIVITY CONTROL SYSTEMS

3/4.1.1 BORATION CONTROL

SHUTDOWN MARGIN - T_{avg} > 200°F

LIMITING CONDITION FOR OPERATION

3.1.1.1 The SHUTDOWN MARGIN shall be ≥ 5.3%* [4.3%] Δk/k.

APPLICABILITY: MODES 1, 2**, 3 and 4.

ACTION:

With the SHUTDOWN MARGIN < 5.3%* [4.3%] Δk/k, immediately initiate and continue boration at ≥ 40 gpm of 2300 ppm boric acid solution or equivalent until the required SHUTDOWN MARGIN is restored.

SURVEILLANCE REQUIREMENTS

4.1.1.1.1 The SHUTDOWN MARGIN shall be determined to be ≥ 5.3%* [4.3%] Δk/k:

a. Within one hour after detection of an inoperable CEA(s) and at least once per 12 hours thereafter while the CEA(s) is inoperable. If the inoperable CEA is immovable or untrippable, the above required SHUTDOWN MARGIN shall be increased by an amount at least equal to the withdrawn worth of the immovable or untrippable CEA(s).

b. When in MODES 1 or 2#, at least once per 12 hours by verifying that CEA group withdrawal is within the Transient Insertion Limits of Specification 3.1.3.6.

c. When in MODE 2##, within 4 hours prior to achieving reactor criticality by verifying that the predicted critical CEA position is within the limits of Specification 3.1.3.6.

d. Prior to initial operation above 5% RATED THERMAL POWER after each fuel loading, by consideration of the factors of e below, with the CEA groups at the Transient Insertion Limits of Specification 3.1.3.6.

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* Adherence to Technical Specification 3.1.3.6 as specified in Surveillance Requirements 4.1.1.1.1 assures that there is sufficient available shutdown margin to match the shutdown margin requirements of the safety analyses.

** See Special Test Exception 3.10.1.

\# With K_{eff} ≥ 1.0.

\## With K_{eff} < 1.0.

MODERATOR TEMPERATURE COEFFICIENT

LIMITING CONDITION FOR OPERATION

3.1.1.4 The moderator temperature coefficient (MTC) shall be:

a. Less positive than 0.5×10^{-4} $\Delta k/k/^{\circ}F$ whenever THERMAL POWER is $\leq$ 70% of RATED THERMAL POWER,

b. Less positive than 0.2×10^{-4} $\Delta k/k/^{\circ}F$ whenever THERMAL POWER is > 70% of RATED THERMAL POWER, and

c. Less negative than -2.2 $\times 10^{-4}$ $\Delta k/k/^{\circ}F$ at RATED THERMAL POWER.
-2.5

APPLICABILITY: MODES 1 and 2*#

ACTION:

With the moderator temperature coefficient outside any one of the above limits, be in at least HOT STANDBY within 6 hours.

SURVEILLANCE REQUIREMENTS

4.1.1.4.1 The MTC shall be determined to be within its limits by confirmatory measurements. MTC measured values shall be extrapolated and/or compensated to permit direct comparison with the above limits.

*With $K_{eff} \geq 1.0$.

#See Special Test Exception 3.10.2.

REACTIVITY CONTROL SYSTEMS

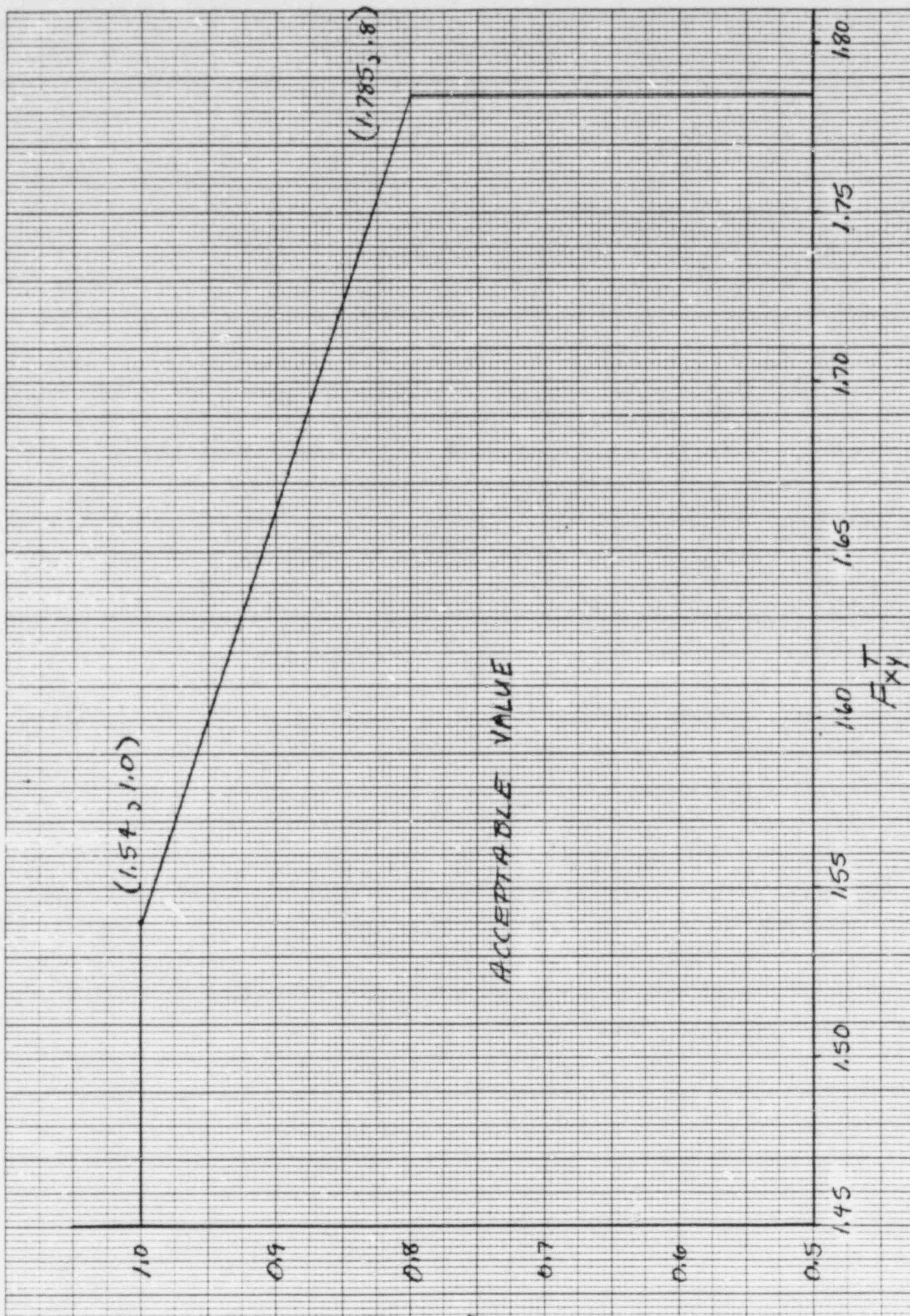
SURVEILLANCE REQUIREMENTS (Continued)

4.1.1.4.2 The MTC shall be determined at the following frequencies and THERMAL POWER conditions during each fuel cycle:

a. Prior to initial operation above 5% of RATED THERMAL POWER, after each fuel loading.

b. At any THERMAL POWER, above 90% of RATED THERMAL POWER, within 7 EFPD after ~~reaching a RATED THERMAL POWER equilibrium boron concentration of 800 ppm.~~ initially reaching an equilibrium condition at or above 90% of RATED THERMAL POWER

c. At any THERMAL POWER, within 7 EFPD after reaching a RATED THERMAL POWER equilibrium boron concentration of 300 ppm.



TOTAL PLANAR RADIAL PEAKING FACTOR vs N

Figure 3.2-3b

TOTAL PLANAR RADIAL PEAKING FACTOR - F_{xy}^{T}

LIMITING CONDITION FOR OPERATION

3.2.2.1 The calculated value of F_{xy}^{T}, defined as $F_{xy}^{T} = F_{xy}(1+T_q)$, shall be limited to ≤ 1.65. → 1.70

APPLICABILITY: MODE 1*.

ACTION:

With F_{xy}^{T} > 1.65, → 1.70 within 6 hours either:

a. Reduce THERMAL POWER to bring the combination of THERMAL POWER and F_{xy}^{T} to within the limits of Figure 3.2-3a and withdraw the full length CEAs to or beyond the Long Term Steady State Insertion Limits of Specification 3.1.3.6; or

b. Be in at least HOT STANDBY.

SURVEILLANCE REQUIREMENTS

4.2.2.1.1 The provisions of Specification 4.0.4 are not applicable.

4.2.2.1.2 F_{xy}^{T} shall be calculated by the expression $F_{xy}^{T} = F_{xy}(1+T_q)$ and F_{xy}^{T} shall be determined to be within its limit at the following intervals:

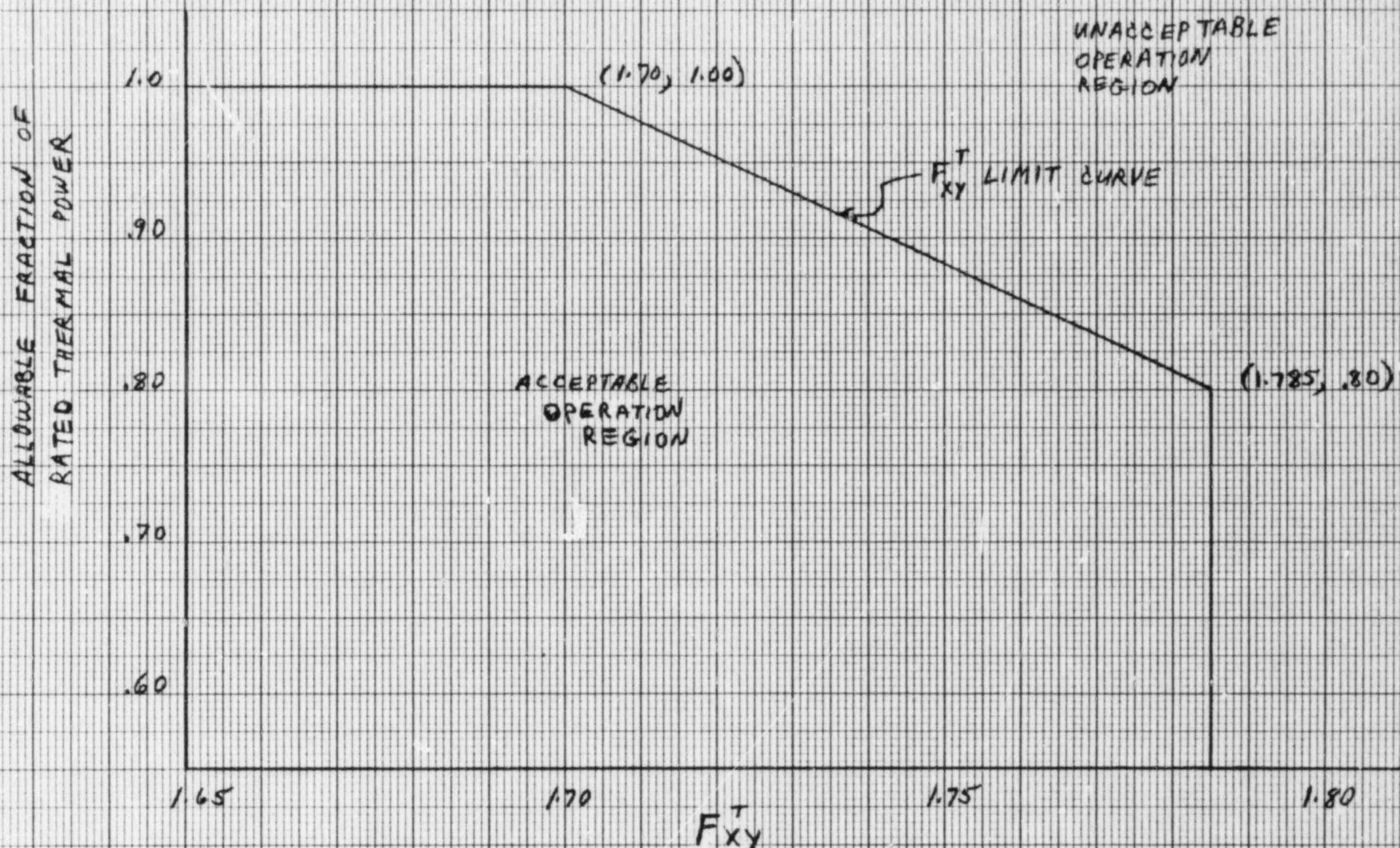
a. Prior to operation above 70 percent of RATED THERMAL POWER after each fuel loading,

b. At least once per 31 days of accumulated operation in MODE 1, and

c. Within four hours if the AZIMUTHAL POWER TILT (T_q) is > 0.030.

---

*See Special Test Exception 3.10.2.



TOTAL PLANAR RADIAL PEAKING FACTOR vs ALLOWABLE FRACTION OF RATED THERMAL POWER

Figure 3.2-3a

POWER DISTRIBUTION LIMITS

TOTAL INTEGRATED RADIAL PEAKING FACTOR - F_r^T

LIMITING CONDITION FOR OPERATION

3.2.3 The calculated value of F_r^T, defined as $F_r^T = F_r(1+T_q)$, shall be limited to $\leq$ 1.650.

APPLICABILITY: MODE 1*.

ACTION:

With F_r^T > 1.650 within 6 hours either:

a. Be in at least HOT STANDBY, or

b. Reduce THERMAL POWER to bring the combination of THERMAL POWER and F_r^T to within the limits of Figure 3.2.3a, withdraw the full length CEAs to or beyond the Long Term Steady State Limits of Specification 3.1.3.6, and insert new value of F_r^T in BASSS; or

c. Reduce THERMAL POWER to bring the combination of THERMAL POWER and F_r^T to within the limits of Figure 3.2-3a and withdraw the full length CEAs to or beyond the Long Term Steady State Insertion Limits of Specification 3.1.3.6. The THERMAL POWER limit determined from Figure 3.2-3a shall then be used to establish a revised upper THERMAL POWER level limit on Figure 3.2-4 (truncate Figure 3.2-4 at the allowable fraction of RATED THERMAL POWER determined by Figure 3.2-3a) and subsequent operation shall be maintained within the reduced acceptable operation region of Figure 3.2-4.

3.2-3c 3.2-3c 3.2-3c 3.2-3c

SURVEILLANCE REQUIREMENTS

4.2.3.1 The provisions of Specification 4.0.4 are not applicable.

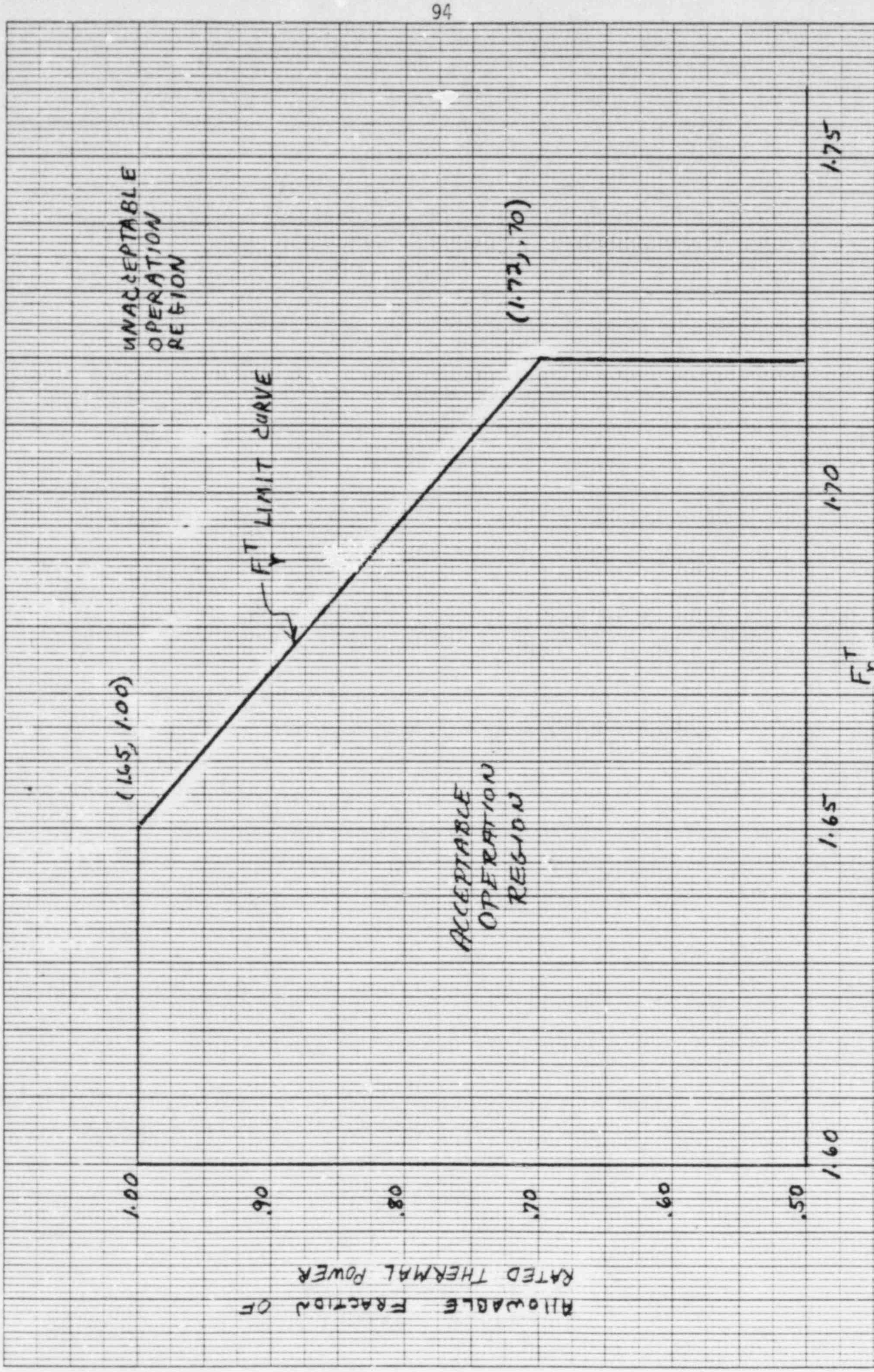
4.2.3.2 F_r^T shall be calculated by the expression $F_r^T = F_r(1+T_q)$ and F_r^T shall be determined to be within its limit at the following intervals:

a. Prior to operation above 70 percent of RATED THERMAL POWER after each fuel loading,

b. At least once per 31 days of accumulated operation in MODE 1, and

c. Within four hours if the AZIMUTHAL POWER TILT (T_q) is > 0.030.

*See Special Test Exception 3.10.2.



TOTAL INTEGRATED RADIAL PEAKING FACTOR vs ALLOWABLE FRACTION OF RATED THERMAL POWER
Figure 3.2-3c

TABLE 3.2-1

DNB PARAMETERS

Parameter	LIMITS Four Reactor Coolant Pumps Operating	Three Reactor Coolant Pumps Operating	Two Reactor Coolant Pumps Operating-Same Loop	Two Reactor Coolant Pumps Operating-Opposite Loop
Cold Leg Temperature	≤ 548°F	**	**	**
Pressurizer Pressure	≥ 2225 psia* → 2200	**	**	**
Reactor Coolant System Total Flow Rate	≥ 370,000 gpm	**	**	**
AXIAL SHAPE INDEX	***	**	**	**

*Limit not applicable during either a THERMAL POWER ramp increase in excess of 5% of RATED THERMAL POWER per minute or a THERMAL POWER step increase of greater than 10% of RATED THERMAL POWER.

**These values left blank pending NRC approval of ECCS analyses for operation with less than four reactor coolant pumps operating.

***The AXIAL SHAPE INDEX, Core Power shall be maintained within the limits established by the Better Axial Shape Selection System (BASSS) for CEA insertions of the lead bank of < 55% when BASSS is OPERABLE, or within the limits of FIGURE 3.2-4 for CEA insertions specified by FIGURE 3.1-2.

TABLE 3.3-1 (Continued)

TABLE NOTATION

*With the protective system trip breakers in the closed position and the CEA drive system capable of CEA withdrawal.

#The provisions of Specification 3.0.4 are not applicable.

(a) Trip may be bypassed below 10^{-4} of RATED THERMAL POWER; bypass shall be automatically removed when THERMAL POWER is $\geq 10^{-4}$ of RATED THERMAL POWER.

(b) Trip may be manually bypassed below 710 [785] psia; bypass shall be automatically removed at or above 710 [785] psia.

(c) Trip may be bypassed below 15% of RATED THERMAL POWER; bypass shall be automatically removed when THERMAL POWER is $\geq$ 15% of RATED THERMAL POWER.

(d) Trip may be bypassed below 10^{-4}% and above 12% of RATED THERMAL POWER.

(e) Trip may be bypassed during testing pursuant to Special Test Exception 3.10.3.

(f) There shall be at least two decades of overlap between the Wide Range Logarithmic Neutron Flux Monitoring Channels and the Power Range Neutron Flux Monitoring Channels.

ACTION STATEMENTS

ACTION 1 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, restore the inoperable channel to OPERABLE status within 48 hours or be in HOT STANDBY within the next 6 hours and/or open the protective system trip breakers.

ACTION 2 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in either the bypassed or tripped condition within 1 hour. For the purposes of testing and maintenance, the inoperable channel may be bypassed for up to 48 hours from time of initial loss of OPERABILITY; however, the inoperable channel shall then be either restored to OPERABLE status or placed in the tripped condition.

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
8. CVCS ISOLATION					
a. Manual (CVCS Isolation Valve Control Switches)	1/Valve	1/Valve	1/Valve	1, 2, 3, 4	6
b. West Penetration Room/Letdown Heat Exchanger Room Pressure - High	4	2	3	1, 2, 3, 4	7*
9. AUXILIARY FEEDWATER Actuation System					
a. Manual (Trip Buttons)	2 sets of 2 per S/G	1 set of 2 per S/G	2 sets of 2 per S/G	1, 2, 3	6
b. Steam Generator Level - Low	4/SG	2/SG	3/SG	1,2,3	7
c. Steam Generator ΔP High	4/SG	2/SG	3/SG	1,2,3	7

*

3/4 3-14

97

TABLE 3.3-3 (Continued)

TABLE NOTATION

(a) Trip function may be bypassed in this MODE when pressurizer pressure is < 1800 psia; bypass shall be automatically removed when pressurizer pressure is ≥ 1800 psia.

(c) Trip function may be bypassed in this MODE below 710 psia; bypass shall be automatically removed at or above 710 psia.

785

785

* The provisions of Specification 3.0.4 are not applicable.

ACTION STATEMENTS

ACTION 6 - With the number of OPERABLE channels one less than the Total Number of Channels, restore the inoperable channel to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

ACTION 7 - With the number of OPERABLE channels one less than the Total Number of Channels, operation may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in either the bypassed or tripped condition within 1 hour. For the purposes of testing and maintenance, the inoperable channel may be bypassed for up to 48 hours from time of initial loss of OPERABILITY; however, the inoperable channel shall then be either restored to OPERABLE status or placed in the tripped condition.

b. Within one hour, all functional units receiving an input from the inoperable channel are also placed in the same condition (either bypassed or tripped, as applicable) as that required by a. above for the inoperable channel.

c. The Minimum Channels OPERABLE requirement is met; however, one additional channel may be bypassed for up to 48 hours while performing tests and maintenance on that channel provided the other inoperable channel is placed in the tripped condition.

TABLE 3.3-4

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP VALUES

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES
1. SAFETY INJECTION (SIAS)		
a. Manual (Trip Buttons)	Not Applicable	Not Applicable
b. Containment Pressure - High	≤ 4.75 psig	≤ 4.75 psig
c. Pressurizer Pressure - Low	≥ 1725 psia	≥ 1725 psia
2. CONTAINMENT SPRAY (CSAS)		
a. Manual (Trip Buttons)	Not Applicable	Not Applicable
b. Containment Pressure -- High	≤ 4.75 psig	≤ 4.75 psig
3. CONTAINMENT ISOLATION (CIS) #		
a. Manual CIS (Trip Buttons)	Not Applicable	Not Applicable
b. Containment Pressure - High	≤ 4.75 psig	≤ 4.75 psig
4. MAIN STEAM LINE ISOLATION		
a. Manual (MSIV Hand Switches and Feed Head Isolation Hand Switches)	Not Applicable	Not Applicable
b. Steam Generator Pressure - Low	≥ 635 psia → 685	≥ 635 psia → 685

Containment isolation of non-essential penetrations is also initiated by SIAS (functional units 1.a and 1.c).

TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP VALUES

FUNCTIONAL UNIT		TRIP VALUE	ALLOWABLE VALUES
8.	CVCS ISOLATION		
	West Penetration Room/Letdown Heat Exchanger Room Pressure - High	$\leq$ 0.5 psig	$\leq$0.5 psig
9.	AUXILIARY FEEDWATER ACTUATION SYSTEM		
	a. Manual (trip buttons)	Not Applicable	Not Applicable
	b. Steam Generator (A or B) Level - Low	-194 inches To -149 inches (inclusive)	-194 inches To -149 inches (inclusive)
	c. Steam Generator ΔP-High (SG-A > SG-B)	$\leq$135.0 psi	$\leq$135.0 psi
	d. Steam Generator ΔP-High (SG-B > SG-A)	$\leq$135.0 psi	$\leq$135.0 psi

(1) % of the distance between steam generator upper and lower level instrument nozzles.

* 100

TABLE 3.3-5

ENGINEERED SAFETY FEATURES RESPONSE TIMES

INITIATING SIGNAL AND FUNCTION	RESPONSE TIME IN SECONDS
1. Manual	
a. SIAS Safety Injection (ECCS)	Not Applicable
b. CSAS Containment Spray	Not Applicable
c. CIS Containment Isolation	Not Applicable
d. RAS Containment Sump Recirculation	Not Applicable
e. AFAS Auxiliary Feedwater Initiation	Not Applicable
2. Pressurizer Pressure-Low	
a. Safety Injection (ECCS)	≤ 30*/30**
3. Containment Pressure-High	
a. Safety Injection (ECCS)	≤ 30*/30**
b. Containment Isolation	≤ 30
c. Containment Fan Coolers	≤ 35*/10**
4. Containment Pressure--High	
a. Containment Spray	≤ 60*/60** (1)
5. Containment Radiation-High	
a. Containment Purge Valves Isolation	≤ 5

TABLE 3.3-5 (Continued)

ENGINEERED SAFETY FEATURES RESPONSE TIMES

INITIATING SIGNAL AND FUNCTION	RESPONSE TIME IN SECONDS
6. Steam Generator Pressure-Low	
a. Main Steam Isolation	≤6.9
b. Feedwater Isolation	≤80
7. Refueling Water Tank-Low	
a. Containment Sump Recirculation	≤80
8. Reactor Trip	
a. Feedwater Flow Reduction to 5%	≤20
9. Loss of Power	
a. 4.16 kv Emergency Bus Undervoltage (Loss of Voltage)	≤2.2***
b. 4.16 kv Emergency Bus Undervoltage (Degraded Voltage)	≤8.4***
10. Steam Generator Level - Low	
a. Steam Driven AFW Pump	≤54.5
b. Motor Driven AFW Pump	≤54.5* / 14.5**
11. Steam Generator ΔP-High	
a. Auxiliary Feedwater Isolation	≤20.0

*

TABLE NOTATION

* Diesel generator starting and sequence loading delays included.

** Diesel generator starting and sequence loading delays not included. Offsite power available.

*** Response time measured from the incidence of the undervoltage condition to the diesel generator start signal.

(1) Header fill time not included.

TABLE 4.3-2 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
5. CONTAINMENT SUMP RECIRCULATION (RAS)				
a. Manual RAS (Trip Buttons)	N.A.	N.A.	R	N.A.
b. Refueling Water Tank - Low	N.A.	R	M	1, 2, 3
c. Automatic Actuation Logic	N.A.	N.A.	M(1)	1, 2, 3
6. CONTAINMENT PURGE VALVES ISOLATION##				
a. Manual (Purge Valve Control Switches	N.A.	N.A.	R	N.A.
b. Containment Radiation - High Area Monitor	S	R	M	6
7. LOSS OF POWER				
a. 4.16 kv Emergency Bus Undervoltage (Loss of Voltage	N.A.	R	M	1, 2, 3
b. 4.16 kv Emergency Bus Undervoltage (Degraded Voltage	N.A.	R	M	1, 2, 3
8. CVCS ISOLATION West Penetration Room/ Letdown Heat Exchange Room Pressure - High	N.A.	R	M	1, 2, 3, 4
9. AUXILIARY FEEDWATER *				
a. Manual (Trip Buttons)	N.A.	N.A.	R	N.A.
b. Steam Generator Level-Low	S	R	M	1, 2, 3
c. Steam Generator ΔP-High	S	R	M	1, 2, 3
d. Automatic Actuation Logic	N.A.	N.A.	M(1)	1, 2, 3

*

Containment purge valve isolation is also initiated by SIAS (functional units 1.a, 1.b and 1.c).

PLANT SYSTEMS

AUXILIARY FEEDWATER SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.1.2 Two auxiliary feedwater trains consisting of one steam-driven and one motor-driven pump and associated flow paths capable of automatically initiating flow shall be OPERABLE.* (An OPERABLE steam-driven train shall consist of one pump aligned for automatic flow initiation and one pump aligned in standby.)**

APPLICABILITY: MODES 1, 2 AND 3

ACTION:

a. With 13(23) motor-driven pump inoperable

   1. Align the standby steam-driven pump to automatic initiating status within 72 hours or be in HOT shutdown within the next 12 hours, and

   2. Restore 13(23) motor-driven pump to OPERABLE status within the next 14 days or be in HOT SHUTDOWN within the next 12 hours.

b. With one steam-driven pump inoperable:

   1. Align the OPERABLE steam-driven pump to automatic initiating status within 72 hours or be in HOT SHUTDOWN within the next 12 hours, and

   2. Restore the inoperable steam-driven pump to standby status (or automatic initiating status if the other steam-driven pump is to be placed in standby) within the next 30 days or be in HOT SHUTDOWN within the next 12 hours.

c. Whenever a subsystem/s (a subsystem consisting of one pump, piping, valves and controls in the direct flow path) required for operability is inoperable for the performance of periodic testing (e.g. manual discharge valve closed for pump Total Dynamic Head Test or Logic Testing) a dedicated operator/s will be stationed at the local station/s with direct communication to the Control Room. Upon completion of any testing, the subsystem/s required for operability will be returned to its proper status and verified in its proper status by an independent operator check.

d. The requirements of Specification 3.0.4 are not applicable whenever one motor and one steam-driven pump (or two steam-driven pumps) are aligned for automatic flow initation.

---

* For a period of up to 30 days following the entering into Mode 3 (up through and including MODE 1 operation) from the Cycle 7 Unit 1 startup the automatic actuation features of the auxiliary feedwater system may be inoperable.

** A standby pump shall be available for operation but aligned so that automatic flow initiation is defeated upon AFAS actuation.

PLANT SYSTEMS

AUXILIARY FEEDWATER SYSTEM

SURVEILLANCE REQUIREMENTS

4.7.1.2 Each auxiliary feedwater flowpath shall be demonstrated OPERABLE:

a. At least once per 31 days by:

1. Verifying that each steam-driven pump develops a Total Dynamic Head of $\geq$2800 ft. on recirculation flow (if verification must be demonstrated during startup, surveillance testing shall be performed upon achieving an RCS temperature $\geq$ 300°F and prior to entering MODE 1).

2. Verifying that the motor-driven pump develops a Total Dynamic Head of $\geq$ 3100 ft. on recirculation flow.

3. Cycling each testable, remote-operated valve that is not in its operating position through at least one complete cycle.

4. Verifying that each valve (manual, power operated or automatic) in the direct flow path is in its correct position.

b. Before entering MODE 3 after a COLD SHUTDOWN of at least 14 days by completing a flow test that verifies the flow path from the condensate storage tank to the steam generators.

c. At least once per 18 months by verifying that each automatic valve in the flow path actuates to its correct position and each auxiliary feedwater pump automatically starts and delivers flow to each flow leg upon receipt of each auxiliary feedwater actuation system (AFAS) test signal.

SPECIAL TEST EXCEPTIONS

CENTER CEA MISALIGNMENT

LIMITING CONDITION FOR OPERATION

3.10.4 The requirements of Specifications 3.1.3.1 and 3.1.3.6 may be suspended during the performance of PHYSICS TESTS to determine the isothermal temperature coefficient and power coefficient provided:

a. Only the center CEA (CEA #1) is misaligned, and

b. The limits of Specification 3.2.1 are maintained and determined as specified in Specification 4.10.5.2 below.

4.10.4.2

APPLICABILITY: MODES 1 and 2.

ACTION:

With any of the limits of Specification 3.2.1 being exceeded while the requirements of Specifications 3.1.3.1 and 3.1.3.6 are suspended, either:

a. Reduce THERMAL POWER sufficiently to satisfy the requirements of Specification 3.2.1, or

b. Be in HOT STANDBY within 6 hours.

SURVEILLANCE REQUIREMENTS

4.10.4.1 The THERMAL POWER shall be determined at least once per hour during PHYSICS TESTS in which the requirements of Specifications 3.1.3.1 and/or 3.1.3.6 are suspended and shall be verified to be within the test power plateau.

4.10.4.2 The linear heat rate shall be determined to be within the limits of Specification 3.2.1 by monitoring it continuously with the Incore Detector Monitoring System pursuant to the requirements of Specifications 4.2.1.3 and 3.3.3.2 during PHYSICS TESTS above 5% of RATED THERMAL POWER in which the requirements of Specifications 3.1.3.1 and/or 3.1.3.6 are suspended.

3/4.1 REACTIVITY CONTROL SYSTEMS

BASES

3/4.1.1 BORATION CONTROL

3/4.1.1.1 and 3/4.1.1.2 SHUTDOWN MARGIN

A sufficient SHUTDOWN MARGIN ensures that 1) the reactor can be made subcritical from all operating conditions, 2) the reactivity transients associated with postulated accident conditions are controllable within acceptable limits, and 3) the reactor will be maintained sufficiently subcritical to preclude inadvertent criticality in the shutdown condition.

SHUTDOWN MARGIN requirements vary throughout core life as a function of fuel depletion, RCS boron concentration and RCS T_{avg}. The minimum available SHUTDOWN MARGIN for no load operating conditions at beginning of life is 4.5% Δk/k and at end of life is 5.3% Δk/k. The SHUTDOWN MARGIN is based on the safety analyses performed for a steam line rupture event initiated at no load conditions. The most restrictive steam line rupture event occurs at EOC conditions. For the steam line rupture event at beginning of cycle conditions, a minimum SHUTDOWN MARGIN of less than 4.5% Δk/k is required to control the reactivity transient, and end of cycle conditions require 5.3% Δk/k. Accordingly, the SHUTDOWN MARGIN requirement is based upon this limiting condition and is consistent with FSAR safety analysis assumptions. With $T_{avg} \le 200°F$, the reactivity transients resulting from any postulated accident are minimal and a 3% Δk/k shutdown margin provides adequate protection. With the pressurizer level less than 90 inches, the sources of non-borated water are restricted to increase the time to criticality during a boron dilution event.

3/4.1.1.3 BORON DILUTION

A minimum flow rate of at least 3000 GPM provides adequate mixing, prevents stratification and ensures that reactivity changes will be gradual during boron concentration reductions in the Reactor Coolant System. A flow rate of at least 3000 GPM will circulate an equivalent Reactor Coolant System volume of 9,601 cubic feet in approximately 24 minutes. The reactivity change rate associated with boron concentration reductions will therefore be within the capability of operator recognition and control.

3/4.1.1.4 MODERATOR TEMPERATURE COEFFICIENT (MTC)

The limitations on MTC are provided to ensure that the assumptions used in the accident and transient analyses remain valid through each fuel cycle. The surveillance requirements for measurement of the MTC during each fuel cycle are adequate to confirm the MTC value since this coefficient changes slowly due principally to the reduction in RCS boron concentration associated with fuel burnup. The confirmation that the measured MTC value is within its limit provides assurances that the coefficient will be maintained within acceptable values throughout each fuel cycle.

PLANT SYSTEMS

BASES

U = maximum number of inoperable safety valves per operating steam line

106.5 = Power Level-High Trip Setpoint for two loop operation

46.8 = Power Level-High Trip Setpoint for single loop operation with two reactor coolant pumps operating in the same loop

X = Total relieving capacity of all safety valves per steam line in lbs/hour

Y = Maximum relieving capacity of any one safety valve in lbs/hour

3/4.7.1.2 AUXILIARY FEEDWATER SYSTEM

The OPERABILITY of the auxiliary feedwater system ensures that the Reactor Coolant System can be cooled down to less than 300°F from normal operating conditions in the event of a total loss of offsite power. A capacity of 400 gpm is sufficient to ensure that adequate feedwater flow is available to remove decay heat and reduce the Reactor Coolant System temperature to less than 300°F when the shutdown cooling system may be placed into operation.

Flow control valves, installed in each leg supplying the steam generators, are set to maintain a nominal flow setpoint of 160 gpm plus or minus 10 gpm for operator setting band. The nominal flow setpoint of 160 gpm incorporates a total instrument loop error band of plus 47 gpm and minus 60 gpm. The operator setting band, when combined with the instrument loop error, results in a total flow band limits of 90 gpm (minimum and 217 gpm (maximum). Safety analyses show that more flow during an overcooling transient and less flow during an undercooling transient could be tolerated; i.e., flow fluctuations outside this flow band but within the assumptions used in the analyses listed below, are allowable.

In the spectrum of events analyzed in which automatic initiation of auxiliary feedwater occurs, the following flow conditions are allowed with an operator action time of 10 minutes.

(1)	Loss of Feedwater:	0 gpm Auxiliary Feedwater Flow
(2)	Feedline Break:	0 gpm Auxiliary Feedwater Flow
(3)	Main Steam Line Break:	1300 gpm Auxiliary Feedwater Flow (This being the maximum flow through the AFW suction line, with one unit requiring flow, prior to pump cavitation due to low NPSH.)

At 10 minutes after an Auxiliary Feedwater Actuation Signal the operator is assumed to be available to increase or decrease auxiliary feedwater flow to that required by existing plant conditions.

10.0 STARTUP TESTING

The startup testing program proposed for Cycle 7 is identical to the program proposed for the reference cycle in Reference 1.

11.0 REFERENCES

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