Proposed Technical Specification Modification

Item No.	Technical Specification	Description of Change	Reason for Change
1.	Index Page III	New Shutdown Margin Pages	Revised Shutdown Margin Designations
2.	3.1.1.1 Page 3/4 1-1	Modify Specification Number to 3.1.1.1.1. Impose Shutdown Margin Requirements for Modes 1 and 2 separate from Mode 3	Refer to Section 7.10 of YAEC-1325
3.	4.1.1.1.1 Page 3/4 1-1	Modify Specification Number to 4.1.1.1.1.1	Allows addition of Mode 3 requirements
4.	4.1.1.1.3 Page 3/4 1-2	Removed	Improves consistancy of Technical Specification with plant operation
5.	4.1.1.1.4 Page 3/4 1-2	Moved to page 3/4 1-2a and renumbered 4.1.1.1.2.2	Mode 3 condition
6.	3.1.1.1.2 Page 3/4 1-2A	Addition of a specific requirement	Refer to Section 7.10 of YAEC-1325
7.	Figure 3.1-1 Page 3/4 1-2B	Figure required for the new Specification 3.1.1.1.2	Refer to Section 7.10 of YAEC-1325
8.	3.1.3.1.a Page 1-23	Change Specification Number 3.1.1.1 to 3.1.1.1.1	New numbering implemented
9.	3.1.3.1.a Page 3/4 1-24	Change Specification Number 3.1.1.1 to 3.1.1.1.1	New numbering implemented
10.	3.1.3.1.e Page 3/4 1-24	Modify to reflect new Figure Numbering, 3.1-1 to 3.1-2	Accomodate new Figure 3.1-1
11.	3.1.3.5 Page 3/4 1-28	Modify to reflect new Figure Numbering, 3.1-1 to 3.1-2	Accomodate new Figure 3.1-1
12.	Figure 3.1-2 page 3/4 1-29	Replace Core XV Figure 3.1-1 with the attached Figure 3.1-2	More restrictive curve for Core XVI
13.	4.2.1.2.c Page 3/4 2-2	Modifies Application of Xenon redistribution and F factors	Required due to new PDIL

Proposed Technical Specification
Modification

Item No.	Technical Specification	Description of Change	Reason for Change
14.	4.2.1.2.e.2.b page 3/4 2-2	Measurement Uncertainty for less than 12 incore detectors removed	Core XV Specific
15.	4.2.1.3 page 3/4 2-3	Removed	Not required to be within the bounds of the safety analysis
16.	Figure 3.2-1 page 3/4 2-4	Replaces Core XV Figure 3.2-1 with the attached revised Figure 3.2-1	Reflects the Core XVI ECCS evaluation. Refer to Section 9.0 of YAEC-1325
17.	Figure 3.2-2 page 3/4 2-5	Replaces Core XV Figure 3.2-2	Core XVI Specific
18.	Figure 3.2-3 Page 3/4 2-6	Replaces Core XV Figure 3.2-3	Core XVI Specific
19.	Figure 3.2-4 page 3/4 2-7	Replaces Core XV Figure 3.2-4	Core XVI Specific
20.	4.2.2.1.3.a&b page 3/4 2-9	Remove part b to continue Measurement Uncertainty Changes	Only valid for Core XV
21.	4.2.2.1.3.a&b page 3/4 2-9	Remove part b to continue Measurement Uncertainty Changes	Only valid for Core XV
22.	4.2.3.2.c page 3/4 2-11	Remove part b to continue Measurement Uncertainty Changes	Only valid for Core XV
23.	Table 3.3-2 page 3/4 3-13	Modification needed for Mode 3 MSLR analysis	Reflects Core XVI analysis Section 7.10.3 YAEC-1325
24.	3.3.3.2.d page 3/4 3-23	Remove requirement of operable thermocouple in one of two hottest Instrumented fuel assemblies	Unnecessary Restriction
25.	3.3.3.2. Exception page 3/4 3-23	Remove	Core XV Specific
26.	4.9.1.1 page 3/4 9-2	Addition	Mode 6 Boron Dilution assumption refer to YAEC-1325 Section 7.3.2.4

Proposed Technical Specification
Modification

Item No.	Technical Specification	Description of Change	Reason for Change
27.	3.10.1 Page 3/4 10-1	Change Specification Number 3.1.1.1 to 3.1.1.1.1	New numbering implemented in all sections
28.	3.10.1 Page 3/4 10-1	Add Mode 3 to specification	Physics Testing exception needed for Mode 3
29.	Bases 3/4 1.1	Modify to word more clearly	Clarification

INDEX

LIMITING CONDITIONS FOR OPERATICN AND SURVEILLANCE REQUIREMENS

SECTION | Page

3/4.1 REACTIVITY CONTROL SYSTEMS

3/4.1.1 BORATION CONTROL

SHUTDOWN MARGIN

LIMITING CONDITION FOR OPERATION

3.1.1.1.1 The SHUTDOWN MARGIN shall be $\geq$ 5.5% $\Delta k/k$.

APPLICABILITY: MODES 1 and 2*

ACTION:

With the SHUTDOWN MARGIN less than required, immediately initiate and continue boration at $\geq$ 26 gpm of 2200 ppm boron concentration or equivalent until the required SHUTDOWN MARGIN is restored.

SURVEILLANCE REQUIREMENTS

4.1.1.1.1.1 The SHUTDOWN MARGIN shall be determined to be $\geq$ that required:

a. Within one hour after detection of an inoperable control rod(s) and at least once per 12 hours thereafter while the rod(s) is inoperable. If the inoperable control rod(s) 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 control rod(s).

b. When in Modes 1 or 2#, at least once per 4 hours by verifying that control bank withdrawal is within the limits of Specification 3.1.3.5.

c. When in Mode 2##, within 4 hours prior to achieving reactor criticality, by verifying that the predicted critical control rod position is within the limits of Specification 3.1.3.5.

d. Prior to initial operation above 5% RATED THERMAL POWER after each fuel loading, by consideration of the factors of e below, with the control banks at the maximum insertion limit of Specification 3.1.3.5.

* See Special Test Exception 3.10.1.
\# With $K_{eff} \geq 1.0$.
\##With $K_{eff} < 1.0$.

SURVEILLANCE REQUIREMENTS (Continued)

e. Factors to consider:

1. Main Coolant System boron concentration,
2. Control rod position,
3. Main Coolant System average temperature,
4. Fuel burnup based on gross thermal energy generation,
5. Xenon concentration, and
6. Samarium concentration.

4.1.1.1.1.2 The overall core reactivity balance shall be compared to predicted values to demonstrate agreement within $\pm$ 0.8 Δ k/k at least once per 31 Effective Full Power Days (EFPD). This comparison shall consider at least those factors stated in Specification 4.1.1.1.1.1.e, above. The predicted reactivity values shall be adjusted (normalized) to correspond to the actual core conditions prior to exceeding a fuel burnup of 60 Effective Full Power Days after each fuel loading.

3.1.1.1.2 The shutdown margin shall be determined from Figure 3.1-1 for main coolant average temperatures above 490°F. Shutdown margin for $T_{avg} \leq 450$ is 4.72% $\Delta k/k$. The shutdown margin requirement is a linear function between 450°F and 490°F.

APPLICABILITY: MODE 3*

ACTION:

With the SHUTDOWN MARGIN less than required, immediately initiate and continue boration at ≥26 gpm of 2200 ppm boron concentration or equivalent until the required SHUTDOWN MARGIN is restored.

SURVEILLANCE REQUIREMENTS

4.1.1.1.2.1 The SHUTDOWN MARGIN shall be determined to be greater than or equal to that required:

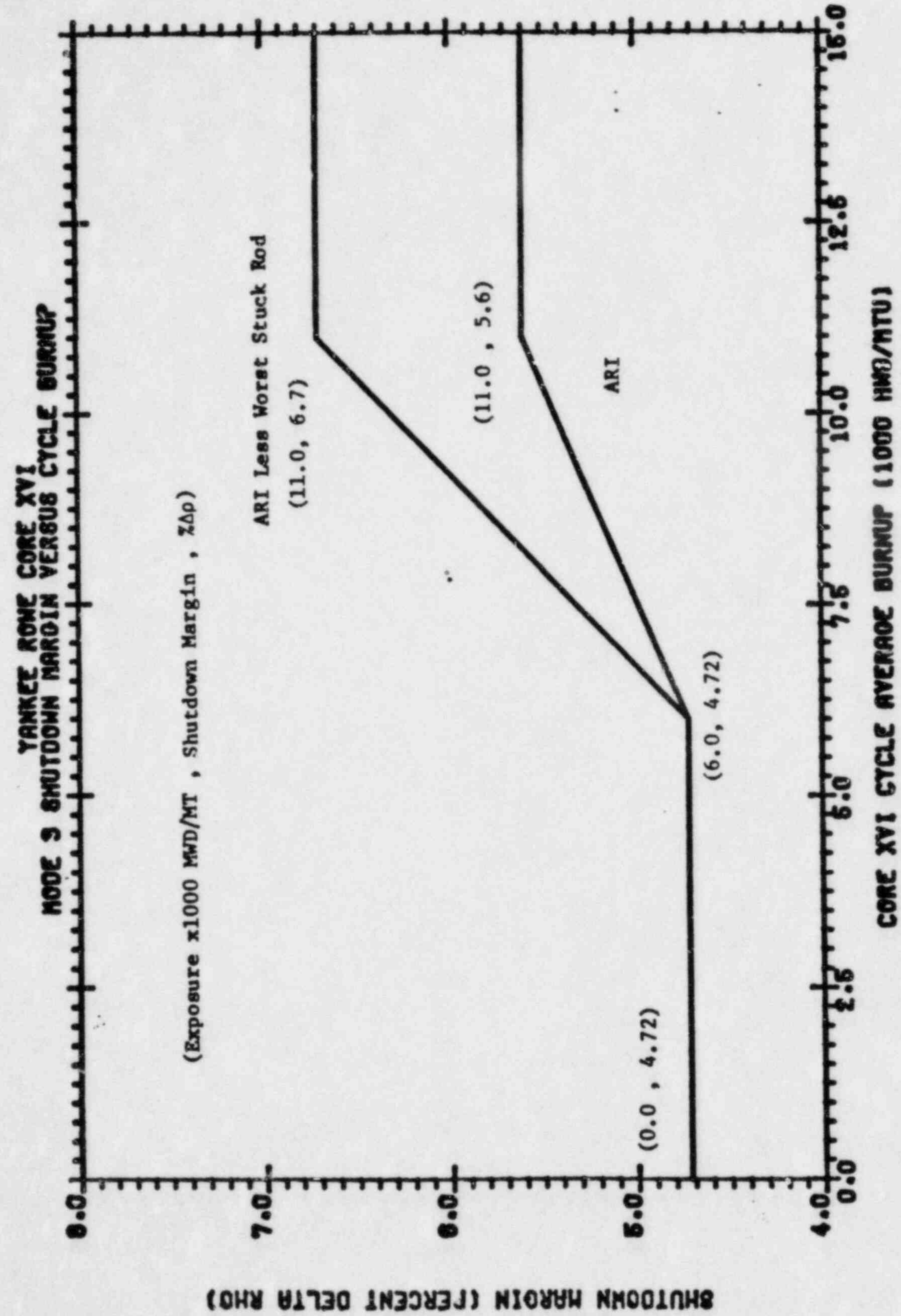
a. When in Mode 3, at least once per 24 hours by consideration of the following factors:

1. Main Coolant System boron concentration,
2. Control rod position,
3. Main Coolant System average temperature,
4. Fuel burnup based on gross thermal energy generation,
5. Xenon concentration, and
6. Samarium concentration.

4.1.1.1.2.2 During a reactor startup in which core reactivity or control positions for criticality are not established, a plot of inverse multiplication rate (or count rate) versus reactivity shall be made.

*See Special Test Exception 3.10.1.

Figure 3.1-1


YANKEE ROWE CORE XVI
MODE 3 SHUTDOWN MARGIN VERSUS CYCLE BURNUP
(Exposure x1000 MWD/MT , Shutdown Margin , %Δρ)
ARI Less Worst Stuck Rod
(11.0, 6.7)
(11.0 , 5.6)
ARI
(6.0, 4.72)
(0.0 , 4.72)
0.0
2.5
5.0
7.5
10.0
12.5
15.0
CORE XVI CYCLE AVERAGE BURNUP (1000 MWD/MTU)
4.0
5.0
6.0
7.0
8.0
SHUTDOWN MARGIN (PERCENT DELTA RHO)

3/4.1.3 MOVABLE CONTROL RODS

CONTROL ROD OPERABILITY

LIMITING CONDITION FOR OPERATION

3.1.3.1 All control rods which are inserted in the core shall be OPERABLE and positioned within ± 8 inches (indicated position) of every other rod in their group.

APPLICABILITY: MODES 1* and 2*.

ACTION:

a. With one or more control rods inoperable due to being immovable as a result of excessive friction or mechanical interference or known to be untrippable, determine that the SHUTDOWN MARGIN requirement of Specification 3.1.1.1.1 is satisfied within 1 hour and be in at least HOT STANDBY within 6 hours.

b. With more than one control rod inoperable or misaligned from any other rod in its group by more than ± 8 inches (indicated position), be in at least HOT STANDBY within 6 hours.

c. With one control rod inoperable or misaligned from any other rod in its group by more than ± 8 inches (indicated position), POWER OPERATION may continue provided that within 1 hour either:

   1. The rod is restored to OPERABLE status within the above alignment requirements, or

   2. The rod is declared inoperable and the SHUTDOWN MARGIN requirement of Specification 3.1.1.1.1 is satisfied. POWER OPERATION may then continue provided that:

      a) An analysis of the potential ejected rod worth is performed within 3 days and the rod worth is determined to be $\leq 0.93\% \Delta\rho$ at zero power and $\leq 0.5\% \Delta\rho$ at RATED THERMAL POWER for the remainder of the fuel cycle, and

*See Special Test Exceptions 3.10.2 and 3.10.4.

LIMITING CONDITION FOR OPERATION (Continued)

b. The SHUTDOWN MARGIN requirement of Specification 3.1.1.1.1 is determined at least once per 12 hours, and

c. A power distribution map is obtained from the movable incore detectors and F_Q and $F^N_{\Delta H}$ are verified to be within their limits within 72 hours.

d. The THERMAL POWER level is reduced to $\leq$ 75% of THERMAL POWER allowable for the Main Coolant Pump combination within one hour and within the next 4 hours the Power Range and Intermediate Power Range Neutron Flux high trip setpoint is reduced to $\leq$ 108% of the 75% of allowable THERMAL POWER, or

e. The remainder of the rods in the group with the inoperable rod are aligned to within $\pm$ 8 inches of the inoperable rod within one hour while maintaining the rod sequence and insertion limits of Figure 3.1-2. The THERMAL POWER level shall be restricted pursuant to Specification 3.1.3.5 during subsequent operation.

SURVEILLANCE REQUIREMENTS

4.1.3.1.1 The position of each control rod shall be determined to be within the limit by verifying the individual rod positions at least once per 4 hours.

4.1.3.1.2 Each control rod not fully inserted shall be determined to be OPERABLE by movement of at least 4 inches in any one direction at least once per 31 days.

4.1.3.1.3 The maximum reactivity insertion rate due to withdrawal of the highest worth control rod group shall be determined not to exceed 1.5×10^{-4} $\Delta k/k$ per second at least once per 18 months.

CONTROL ROD INSERTION LIMITS

LIMITING CONDITION FOR OPERATION

3.1.3.5 The control groups shall be limited in physical insertion as shown in Figure 3.1-2.

APPLICABILITY: MODES 1* and 2*#.

ACTION:

With the control groups inserted beyond the above insertion limits, except for surveillance testing pursuant to Specification 4.1.3.1.2, either;

a. Restore the control groups to within the limits within two hours, or

b. Reduce THERMAL POWER within two hours to less than or equal to that fraction of RATED THERMAL POWER which is allowed by the group position using the above figure, or

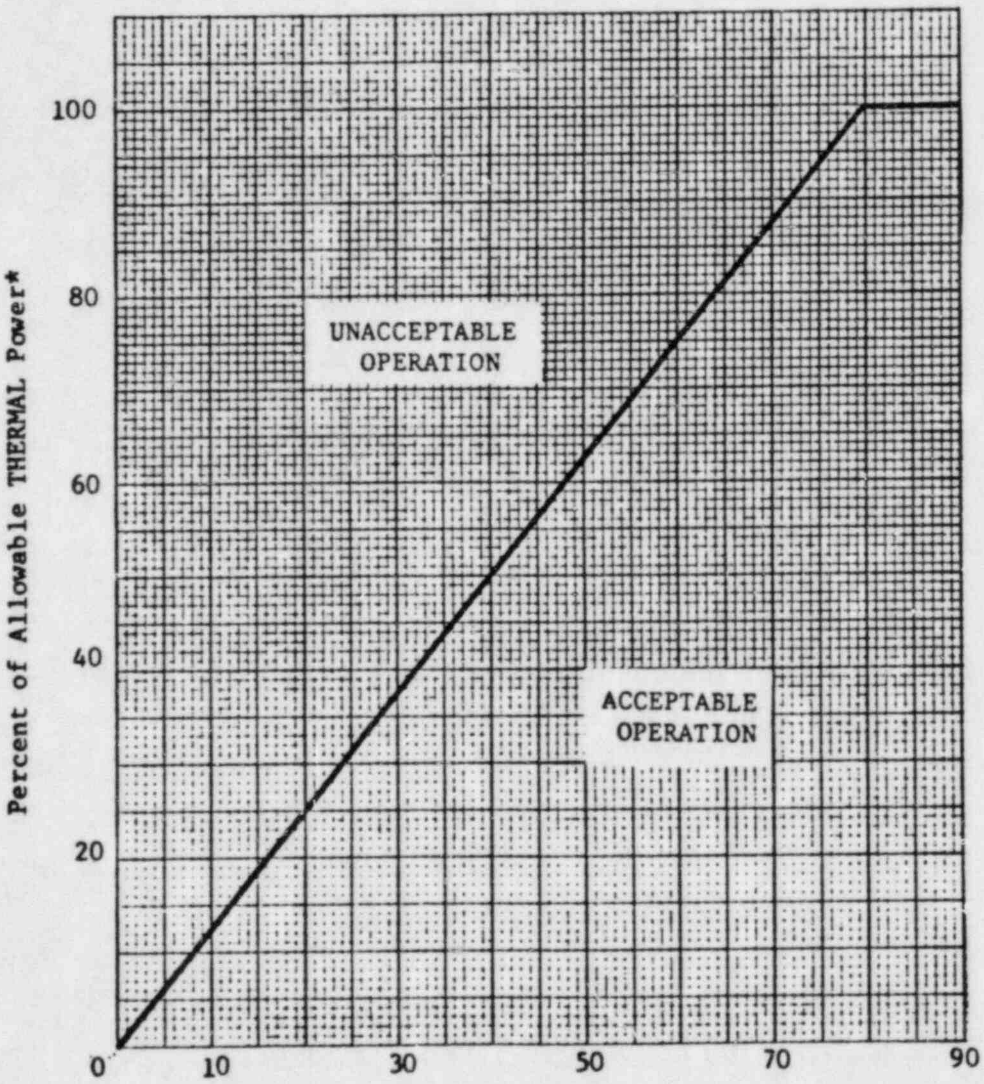
c. Be in at least HOT STANDBY within 6 hours.

SURVEILLANCE REQUIREMENTS

4.1.3.5 The position of each control group shall be determined to be within the insertion limits at least once per 4 hours.

*See Special Test Exceptions 3.10.2 and 3.10.4

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



CONTROL ROD GROUP C POSITION (INCHES WITHDRAWN)

* Allowable THERMAL Power based on the main coolant pump combination in operation.

FIGURE 3.1-2

SURVEILLANCE REQUIREMENTS (Continued)

4.2.1.2 The below factors shall be included in the calculation of peak full power LHGR:

a. Heat flux power peaking factor, F_q^N, measured using incore instrumentation at a power $\geq$ 10%.

b. Effect of inserting the control group from its position at the time of measurement to its insertion limit, F_I as shown in Figure 3.2-2. The rod insertion limit is shown in Figure 3.1-2.

c. The multiplier for xenon redistribution is a function of core lifetime as given in Figure 3.2-3. In addition, if Control Rod Group C is inserted below 80 inches, allowable power may not be regained until power has been at a reduced level defined below for at least twenty-four hours with Control Rod Group C between 80 and 90 inches.

Reduced power = allowable fraction of full power times multiplier given in Figure 3.2-4.

Exceptions:

1. If the rods are inserted below 80 inches and power does not go below the reduced power calculated above, hold at the lowest attained power level for at least twenty-four hours with control Rod Group C between 80 and 90 inches before returning to allowable power.

2. If the rods are inserted below 80 inches and zero power is held for more than forty-eight hours, no reduced power level need be held on the way to the allowable fraction of full power.

d. Shortened stack height factor, 1.009.

e. Measurement uncertainty:

1. 1.05, when at least 17 incore detection system neutron detector thimbles are OPERABLE, or

2. 1.068, when less than 17 incore detection system neutron detector thimbles are OPERABLE.

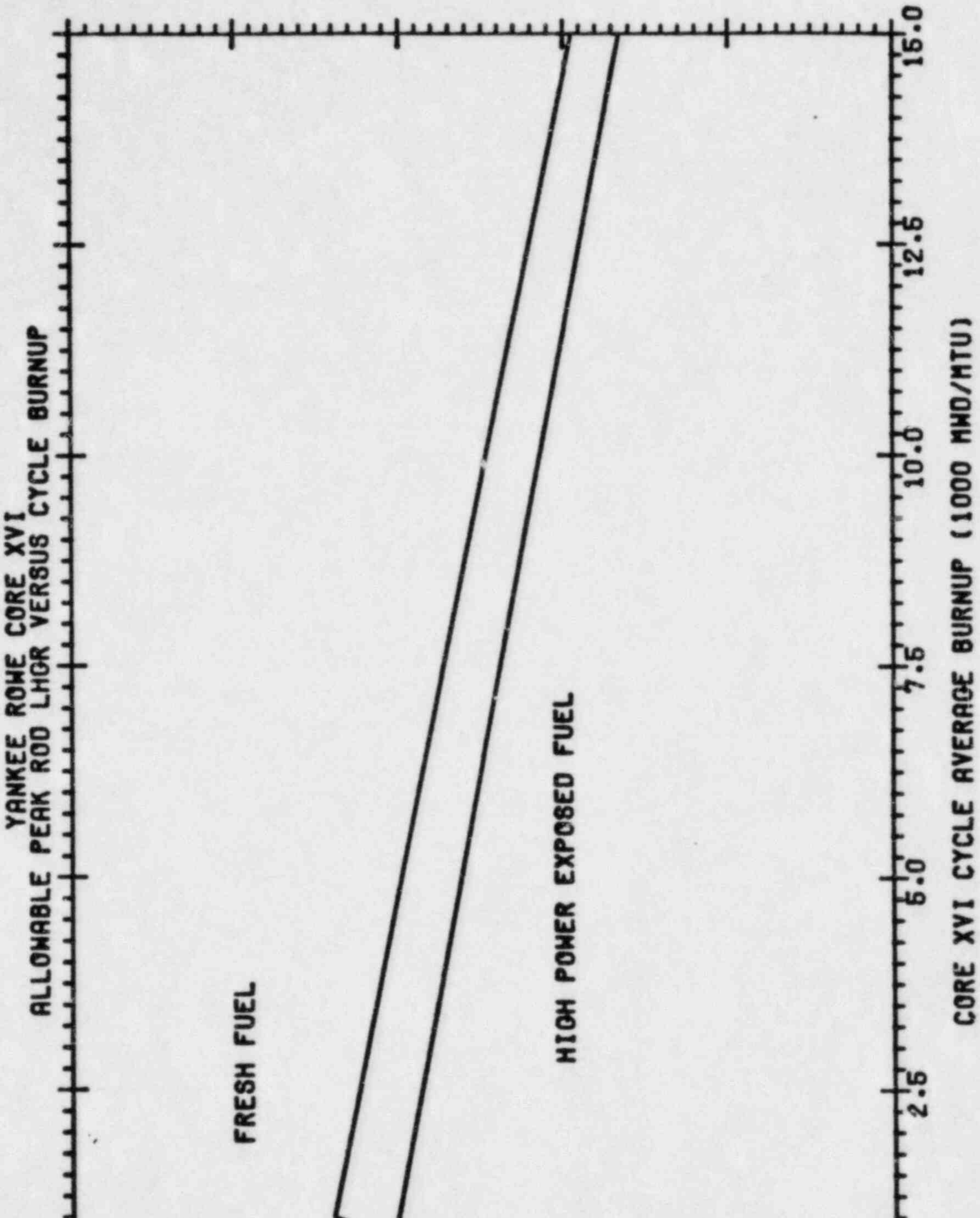
SURVEILLANCE REQUIREMENTS (Continued)

f. Power level uncertainty, 1.03.

g. Heat flux engineering factor, F_q^E, 1.04.

h. Core average linear heat generation rate at full power, 4.40 kW/ft.

Figure 3.2-1


YANKEE ROWE CORE XVI
ALLOWABLE PEAK ROD LHGR VERSUS CYCLE BURNUP
FRESH FUEL
HIGH POWER EXPOSED FUEL
CORE XVI CYCLE AVERAGE BURNUP (1000 MWD/MTU)
0.0
2.5
5.0
7.5
10.0
12.5
15.0
ALLOWABLE PEAK ROD LHGR (KW/FT)
11.5
11.0
10.5
10.0
9.5
9.0

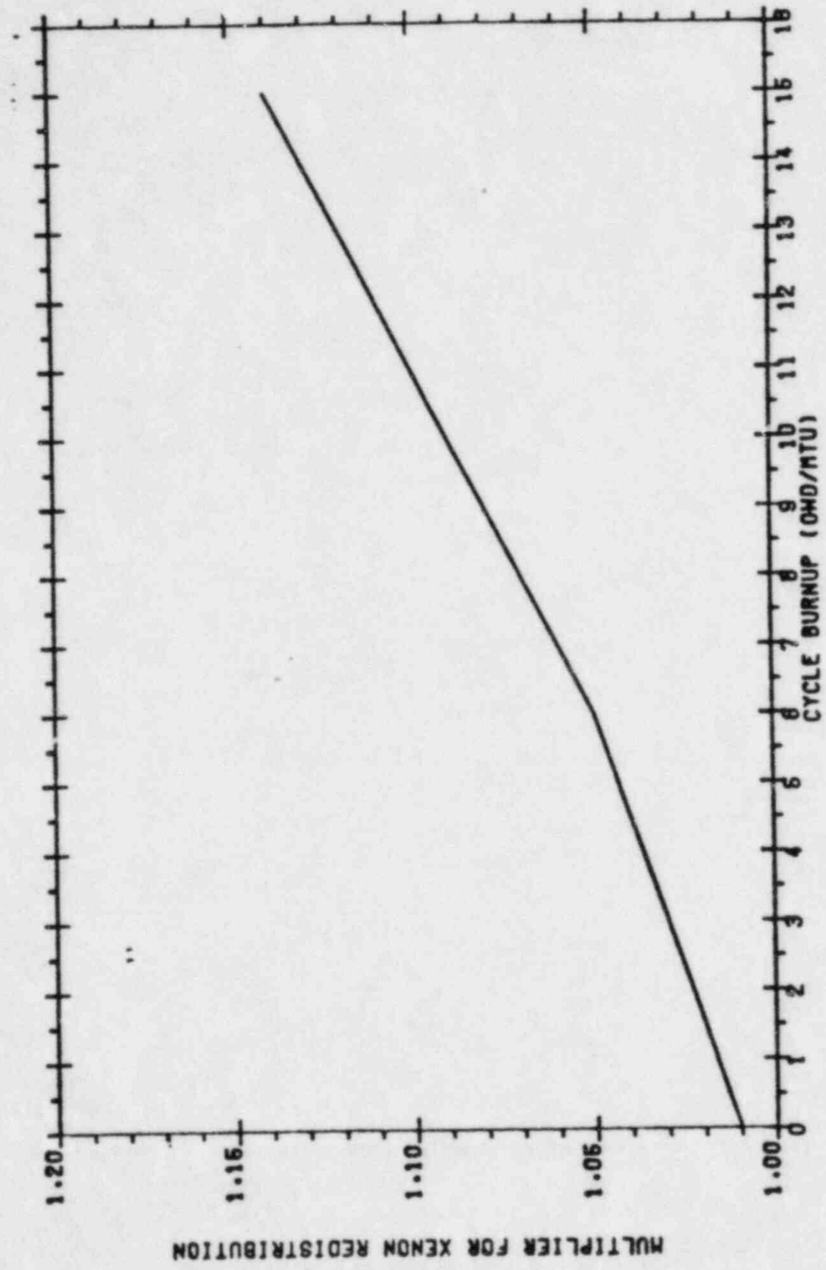


Figure 3.2-3

Multiplier for Xenon Redistribution as a Function of Exposure

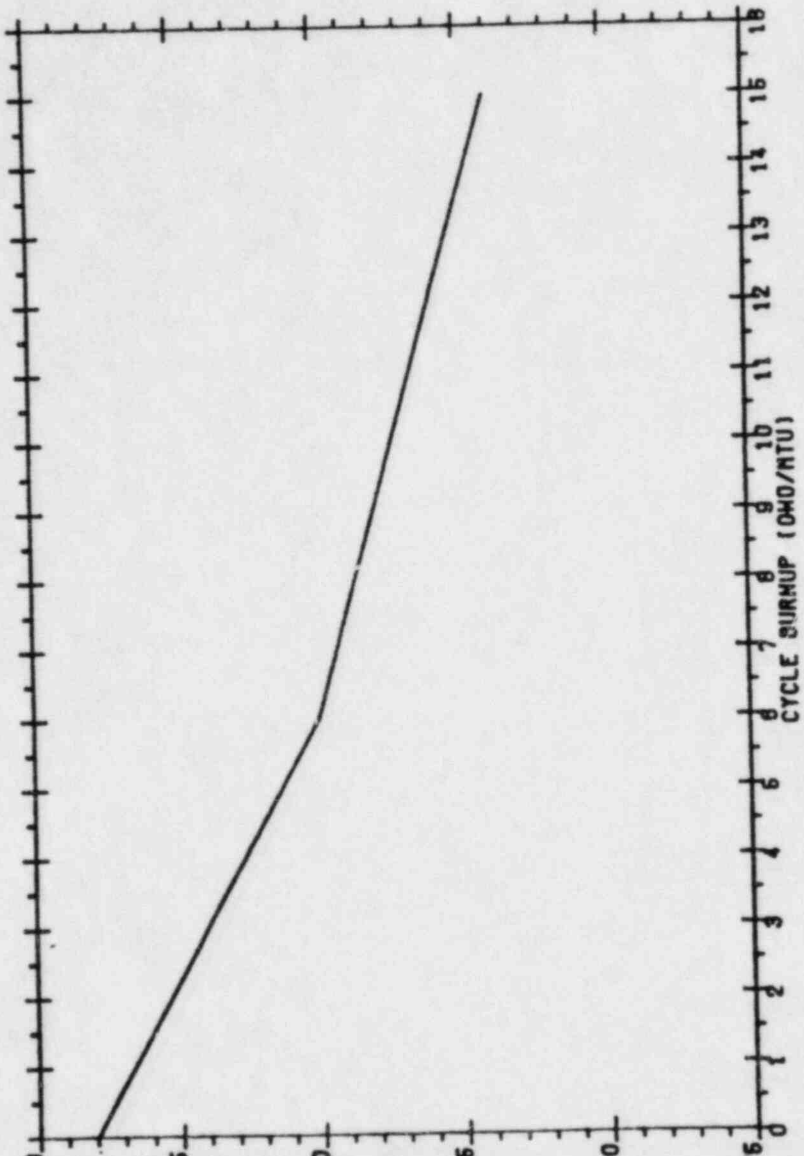


Figure 3.2-4

Multiplier for Reduced Power as a Function of Exposure

SURVEILLANCE REQUIREMENTS

4.2.2.1 F_q shall be determined to be within its limit by:

a. Using the movable incore detectors to obtain a power distribution map:

1. Prior to initial operation above 75% of RATED THERMAL POWER after each fuel loading, and

2. At least once per 1000 Effective Full Power Hours.

b. Increasing the measured F_q component of the power distribution map by:

1. 4% to account for engineering tolerances,

2. 5%, when at least 17 incore detection system neutron detector thimbles are OPERABLE, to account for measurement uncertainty,

3. 6.8%, when less than 17 incore detection system neutron detector thimbles are OPERABLE, to account for measurement uncertainty, and

4. 3% to account for fuel densification.

4.2.2.2 When F_q is measured pursuant to Specification 4.10.2.2, an overall measured F_q shall be obtained from a power distribution map and increased by:

1. 4% to account for engineering tolerances,

2. 5%, when at least 17 incore detection system neutron detector thimbles are OPERABLE, to account for measurement uncertainty,

3. 6.8%, when less than 17 incore detection system neutron detector thimbles are OPERABLE, to account for measurement uncertainty, and

4. 3% to account for fuel densification.

4.2.2.3 The provisions of Specification 4.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.2.3.1 $F^N_{\Delta H}$ shall be determined to be within its limit by using the movable incore detectors to obtain a power distribution map:

a. Prior to operation above 75% RATED THERMAL POWER after each fuel loading, and

b. At least once per 1000 Effective Full Power Hours.

c. The provisions of Specification 4.0.4 are not applicable.

4.2.3.2 The measured $F^N_{\Delta H}$ of 4.2.3.1 above shall be increased, for measurement uncertainty, by:

a. 5%, when at least 17 incore detection system neutron detector thimbles are OPERABLE; or

b. 6.8%, when less than 17 incore detection system neutron detector thimbles are OPERABLE.

TABLE 3.3-2 (continued)

TABLE NOTATION

** The provisions of Specification 3.0.4 are not applicable.

(1)Trip function may be bypassed in this MODE with main coolant pressure <300 psig.

(2)Trip function may be bypassed in this MODE with main coolant pressure <1800 psig and main coolant temperature <490°F.

(3)Automatic initiation of Actuation Channel #1 may be bypassed in this MODE during functional test of the Main Coolant System pressure channel.

(4)Trip may be manually bypassed when the reactor is not critical.

ACTION STATEMENTS

ACTION 10 - With the number of OPERABLE channels or sensors one less than the Total Number of Channels or sensors, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours; however, one safety injection channel high containment pressure sensor may be bypassed for up to 2 hours for surveillance testing per Specification 4.3.2.1.

ACTION 6 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and POWER OPERATION may proceed provided both of the following conditions are satisfied:

1. The inoperable channel is placed in the tripped condition within 1 hour.
2. The Minimum Channels OPERABLE requirement is met; however, one additional channel may be bypassed for up to 2 hours for surveillance testing per Specification 4.3.1.1.

INCORE DETECTION SYSTEM

LIMITING CONDITIONS FOR OPERATION

3.3.3.2 The incore detection system shall be OPERABLE with:

a. At least twelve (12) neutron detector thimbles OPERABLE,

b. A minimum of two (2) OPERABLE neutron detector thimbles per core quadrant, and

c. Sufficient OPERABLE movable neutron detectors, drive, and readout equipment to map these thimbles.

d. At least ten (10) OPERABLE radial position thermocouples.

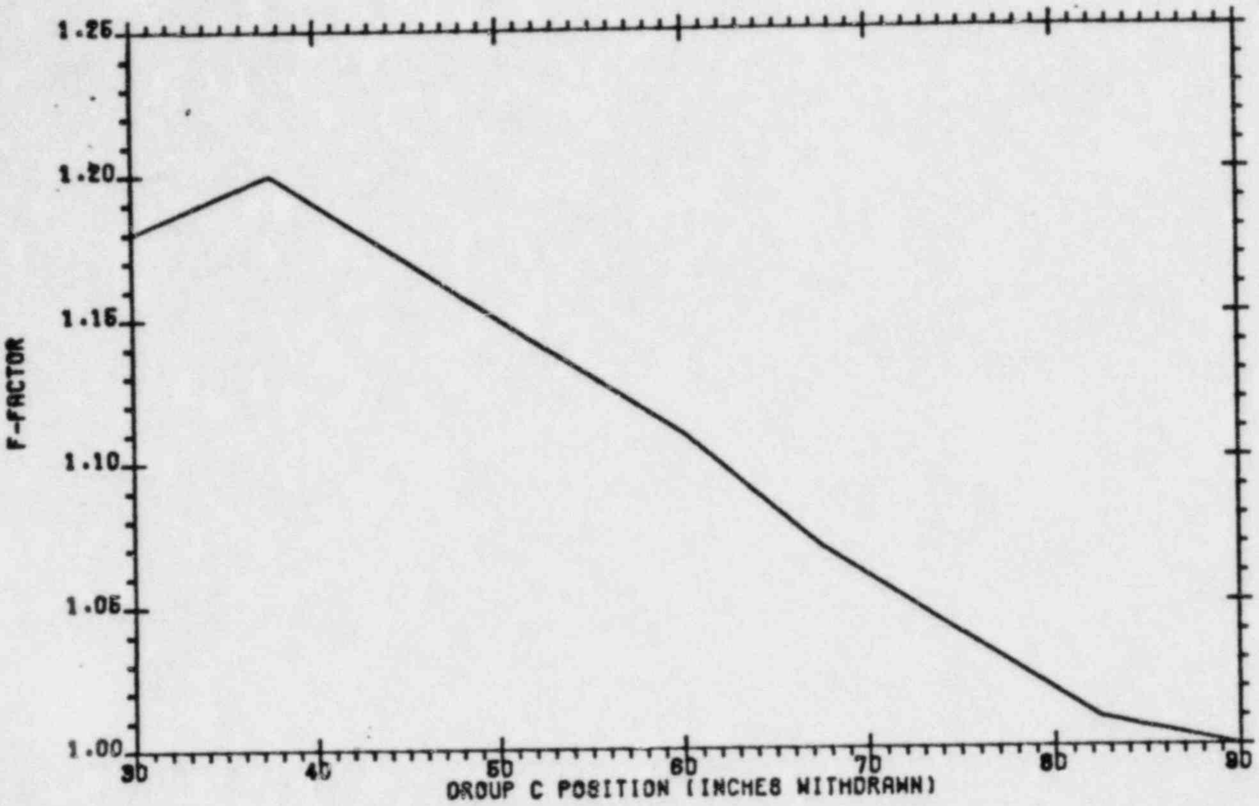
APPLICABILITY: When the incore detection system is used for core power distribution measurements.

ACTION:

With the incore detection system inoperable, do not use the system for the above applicable monitoring or calibration functions. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.3.3.2 The incore neutron detectors shall be demonstrated OPERABLE by normalizing each detector output to be used within 24 hours prior to its use for core power distribution measurements.



$$F_I = \frac{F \text{ @ Limit}}{F \text{ @ Measurement}}$$

FIGURE 3.2-2

Factor F as a Function of Rod Insertion

SURVEILLANCE REQUIREMENTS

4.9.1.1 The above required reactivity condition shall be determined:

a. Prior to removing or unbolting the reactor vessel head, and*

b. Prior to withdrawal of any full-length control rod in excess of 3 feet from its fully inserted position.

c. At least after the insertion of each 5 fuel assemblies by withdrawing a single control rod using the manipulator crane to obtain a plot of control rod position versus inverse count rate multiplication. Using the inverse count rate data obtained, the SHUTDOWN MARGIN shall be calculated. If these calculations indicate that the SHUTDOWN MARGIN will be less than 5% Δ k/k (without the 2% Δ k/k conservative allowance for uncertainties) with all control rods inserted in the fully loaded core, the boron concentration will be increased to provide the required 5% Δ k/k calculated SHUTDOWN MARGIN.

4.9.1.2 Equipment which would make possible inadvertent reactivity increases shall be made inoperable and tagged out of service.

4.9.1.3 The boron concentration of the Main Coolant System and the shield tank cavity shall be determined by chemical analysis at least 3 times per 7 days with a maximum time interval between samples of 72 hours.

4.9.1.4 Before flooding the shield tank cavity with borated water, it shall be determined that the boron concentration of the water in the safety injection tank is not less than the required boron concentration of the Main Coolant System as specified above.

4.9.1.5 A record will be made of the neutron count rate before and after any change in core geometry.

---

* With all four main coolant loops isolated during reactor head removal, assure that all control rods are inserted. With a control rod withdrawn, borate to compensate for the withdrawn rod.

3/4.10 SPECIAL TEST EXCEPTIONS

SHUTDOWN MARGIN

LIMITING CONDITION FOR OPERATION

3.10.1 The SHUTDOWN MARGIN requirement of Specifications 3.1.1.1.1 and 3.1.1.1.2 may be suspended for low power physics tests provided reactivity equivalent to at least the highest estimated control rod worth is available for trip insertion from OPERABLE control rod(s).

APPLICABILITY: MODES 2 and 3.

ACTION:

a. With any control rod not fully inserted and with less than the above reactivity equivalent available for trip insertion, immediately initiate and continue boration at $\geq$ 26 gpm of 2200 ppm boron concentration or its equivalent until the SHUTDOWN MARGIN required by Specifications 3.1.1.1.1 and 3.1.1.1.2 are restored.

b. With all control rods fully inserted and the reactor subcritical by less than the above reactivity equivalent, immediately initiate and continue boration at $\geq$ 26 gpm of 2200 ppm boron concentration or its equivalent until the SHUTDOWN MARGIN required by Specifications 3.1.1.1.1 and 3.1.1.1.2 are restored.

SURVEILLANCE REQUIREMENTS

4.10.1.1 The position of each control rod either partially or fully withdrawn shall be determined at least once per 2 hours.

4.10.1.2 Each control rod not fully inserted shall be demonstrated capable of full insertion when tripped from at least the 50% withdrawn position within 24 hours prior to reducing the SHUTDOWN MARGIN to less than the limits of Specifications 3.1.1.1.1 and 3.1.1.1.2.

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, Main Coolant System boron concentration, and Main Coolant System T_{avg}. The most restrictive condition occurs at EOL, with T_{avg} at no load operating temperature, and is associated with a postulated steam line break accident and resulting uncontrolled Main Coolant System cooldown. The shutdown margins specified are consistent with the assumptions in the safety analysis. With $T_{avg} \leq 330^{o}F$, the reactivity transients resulting from a postulated steam line break cooldown are minimal. 5% Δ k/k SHUTDOWN MARGIN (with all rods inserted) provides adequate protection to preclude criticality for all postulated accidents with the reactor vessel head in place.

To eliminate possible errors in the calculations of the initial reactivity of the core and the reactivity depletion rate, the predicted relation between fuel burnup and the boron concentration, necessary to maintain adequate control characteristics, must be adjusted (normalized) to accurately reflect actual core conditions. Normally, when full power is reached after each refueling, and with the control rod groups in the desired positions, the boron concentration is measured and the predicted steady-state curve is adjusted to this point. As power operation proceeds, the measured boron concentration is compared with the predicted concentration and the slope of the curve relating burnup and reactivity is compared with that predicted. This process of normalization should be completed after about 10% of the total core burnup. Thereafter, actual boron concentration can be compared with prediction and the reactivity status of the core can be continuously evaluated, and any deviation would be thoroughly investigated and evaluated.