ATTACHMENT FOUR

PROPOSED TECHNICAL SPECIFICATION REVISIONS

FOR

RELAXED AXIAL OFFSET CONTROL (RAOC)

PAGE	SECTION	DESCRIPTION
2-8	2.2.1 Table 2.2-1	Change in negative value for the OTDT setpoint f_1(delta-I) penalty term.
3/4 2-1 3/4 2-2 3/4 2-2(a)	3/4.2.1 AFD	Change from CAOC to RAOC, Insert A.
3/4 2-6 3/4 2-7 3/4 2-7(a) 3/4 2-7(b)	4.2.2.2-4.2.2.4 F_Q Surveillances	Changes to implement RAOC, Inserts B-F.
6-21 6-21a	6.9.1.9	Change from CAOC to RAOC, Insert G.
B 3/4 2-1 B 3/4 2-2 B 3/4 2-3	B 3/4.2.1	Change to AFD Bases, Insert H.

TABLE 2.2-1 (Continued)

TABLE NOTATIONS (Continued)

NOTE 1: (Continued)

T' $\leq$ 588.4°F (Referenced T_{avg} at RATED THERMAL POWER);

K_3 = 0.00116;

P = Pressurizer pressure, psig;

P' = 2235 psig (Nominal RCS operating pressure);

S = Laplace transform operator, s^{-1};

and $f_1(\Delta I)$ is a function of the indicated difference between top and bottom detectors of the power-range neutron ion chambers; with gains to be selected based on measured instrument response during plant STARTUP tests such that:

(i) For $q_t - q_b$ between ~~-35%~~ -24% and + 6%, $f_1(\Delta I) = 0$, where q_t and q_b are percent RATED THERMAL POWER in the top and bottom halves of the core respectively, and $q_t + q_b$ is total THERMAL POWER in percent of RATED THERMAL POWER;

(ii) For each percent that ~~the magnitude of q_t - q_b exceeds -35%,~~ $q_t - q_b$ is more negative than -24%, the ΔT Trip Setpoint shall be automatically reduced by ~~1.91%~~ 3.25% of its value at RATED THERMAL POWER; and

(iii) For each percent that the magnitude of $q_t - q_b$ exceeds +6%, the ΔT Trip Setpoint shall be automatically reduced by 1.89% of its value at RATED THERMAL POWER.

NOTE 2: The channel's maximum Trip Setpoint shall not exceed its computed Trip Setpoint by more than 2.3% of ΔT span.

REPLACE WITH INSERT A

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3/4.2 POWER DISTRIBUTION LIMITS

3/4.2.1 AXIAL FLUX DIFFERENCE

LIMITING CONDITION FOR OPERATION

3.2.1 The indicated AXIAL FLUX DIFFERENCE (AFD) shall be maintained within the target band (flux difference units) about the target flux difference as specified in the Core Operating Limits Report (COLR).

The indicated AFD may deviate outside the applicable required target band at greater than or equal to 50% but less than 0.9 APL^{ND}** or 90% of RATED THERMAL POWER, whichever is less, provided the indicated AFD is within the Acceptable Operation Limits specified in the COLR and the cumulative penalty deviation time does not exceed 1 hour during the previous 24 hours.

The indicated AFD may deviate outside the applicable required target band at greater than 15% but less than 50% of RATED THERMAL POWER provided the cumulative penalty deviation time does not exceed 1 hour during the previous 24 hours.

APPLICABILITY: MODE 1, above 15% of RATED THERMAL POWER*,#

ACTION:

a. With the indicated AFD outside of the applicable required target band and with THERMAL POWER greater than or equal to 0.9 APL^{ND}** or 90% of RATED THERMAL POWER, whichever is less, within 15 minutes, either:

1. Restore the indicated AFD to within the applicable required target band limits, or

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*See Special Test Exception Specification 3.10.2.

#Surveillance testing of the Power Range Neutron Flux channel may be performed pursuant to Specification 4.3.1.1 provided the indicated AFD is maintained within the Acceptable Operation Limits specified in the COLR and THERMAL POWER <APL^{NO}***. A total of 16 hours operation may be accumulated with the AFD outside of the applicable required target band during testing without penalty deviation.

**APL^{ND} is the minimum allowable power level for RESTRICTED AFD OPERATION and is specified in the Core Operating Limits Report per Specification 6.9.1.9.

***APL^{NO} is equal to the

$$\text{minimum over } Z \left(\frac{F_Q^{RTP} * K(Z)}{F_Q^M(Z) * W(Z)_{NO}} * 100 \right)$$

and $F_Q^M(Z)$ and $W(Z)_{NO}$ are defined in 4.2.2.2.c.

REPLACE WITH INSERT A

POWER DISTRIBUTION L'MITS

LIMITING CONDITION FOR OPERATION

ACTION (Continued)

2. Reduce THERMAL POWER to less than 0.9 APL^{ND**} or 90% of RATED THERMAL POWER, whichever is less, and discontinue RESTRICTED AFD OPERATION (if applicable).

b. With the indicated AFD outside of the applicable required target band for more than 1 hour of cumulative penalty deviation time during the previous 24 hours or outside the Acceptable Operation Limits specified in the COLR and with THERMAL POWER less than 0.9 APL^{ND**} or 90%, whichever is less, but equal to or greater than 50% of RATED THERMAL POWER, reduce:

1. THERMAL POWER to less than 50% of RATED THERMAL POWER within 30 minutes, and

2. The Power Range Neutron Flux-High Setpoints to less than or equal to 55% of RATED THERMAL POWER within the next 4 hours.

c. With the indicated AFD outside of the applicable required target band for more than 1 hour of cumulative penalty deviation time during the previous 24 hours and with THERMAL POWER less than 50% but greater than 15% of RATED THERMAL POWER, the THERMAL POWER shall not be increased equal to or greater than 50% of RATED THERMAL POWER until the indicated AFD is within the applicable required target band.

SURVEILLANCE REQUIREMENTS

4.2.1.1 The indicated AFD shall be determined to be within its limits during POWER OPERATION above ~~15%~~ 50% of RATED THERMAL POWER by:

a. Monitoring the indicated AFD for each OPERABLE excore channel:

1. At least once per 7 days when the AFD Monitor Alarm is OPERABLE, and

2. At least once per hour for the first 24 hours after restoring the AFD Monitor Alarm to OPERABLE status.

b. Monitoring and logging the indicated AFD for each OPERABLE excore channel at least once per hour for the first 24 hours and at least once per 30 minutes thereafter, when the AFD Monitor Alarm is inoperable. The logged values of the indicated AFD shall be assumed to exist during the interval preceding each logging.

INSERT A

3.2.1 The indicated AXIAL FLUX DIFFERENCE (AFD) shall be maintained within:

a. the allowed operating space as specified in the CORE OPERATING LIMITS REPORT (COLR) for Relaxed Axial Offset Control (RAOC) operation, or

b. the target band specified in the COLR about the target flux difference during RESTRICTED AFD OPERATION (RAFDO).

APPLICABILITY: Mode 1 above 50% of RATED THERMAL POWER.*

ACTION:

a. For RAOC operation with the indicated AFD outside of the limits specified in the COLR,

1. Either restore the indicated AFD to within the COLR limits within 15 minutes, or

2. Reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within 30 minutes and reduce the Power Range Neutron Flux-High Trip setpoints to less than or equal to 55% of RATED THERMAL POWER within the next 4 hours.

b. For RAFDO above APL^{ND}** with the indicated AFD outside of the applicable target band about the target flux difference:

1. Either restore the indicated AFD to within the COLR specified target band limits within 15 minutes, or

2. Reduce THERMAL POWER to less than APL^{ND} and discontinue RAFDO within 30 minutes.

c. THERMAL POWER shall not be increased above 50% of RATED THERMAL POWER unless the indicated AFD is within the limits specified in the COLR.

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*See Special Test Exception 3.10.2.

**APL^{ND} is the minimum allowable (nuclear design) power level for RESTRICTED AFD OPERATION and is specified in the CORE OPERATING LIMITS REPORT per Specification 6.9.1.9.

SURVEILLANCE REQUIREMENTS

4.2.1.2 The indicated AFD shall be considered outside of its ~~target band~~ limits when at least two ~~or more~~ OPERABLE excore channels are indicating the AFD to be outside the limits. ~~target band. Penalty deviation outside of the above required target band shall be accumulated on a time basis of:~~

~~a. One minute penalty deviation for each 1 minute of POWER OPERATION outside of the target band at THERMAL POWER levels equal to or above 50% of RATED THERMAL POWER, and~~

~~b. One half minute penalty deviation for each 1 minute of POWER OPERATION outside of the target band at THERMAL POWER levels between 15% and 50% of RATED THERMAL POWER.~~

4.2.1.3 The target flux difference of each OPERABLE excore channel shall be determined by measurement at least once per 92 Effective Full Power Days. The provisions of Specification 4.0.4 are not applicable.

4.2.1.4 The target flux difference shall be updated at least once per 31 Effective Full Power Days by either determining the target flux difference ~~pursuant to Specification 4.2.1.3 above~~ or by linear interpolation between the most recently measured value and the calculated value at the end of the cycle life. The provisions of Specification 4.0.4 are not applicable.

in conjunction with the surveillance requirements of Specification 3/4.2.2

4.2.2.1 The provisions of Specification 4.0.4 are not applicable.

4.2.2.2 For Normal Operation, $F_Q(z)$ shall be evaluated to determine if $F_Q(z)$ is within its limit by:

a. Using the movable incore detectors to obtain a power distribution map at any THERMAL POWER greater than 5% of RATED THERMAL POWER.

b. Increasing the measured $F_Q(z)$ component of the power distribution map by 3% to account for manufacturing tolerances and further increasing the value by 5% to account for measurement uncertainties.

→ *Verify that the requirements of Specification 3.2.2 are satisfied.*

c. Satisfying the following relationship:

$$F_Q^M(Z) \leq \frac{F_Q^{RTP} \times K(Z)}{P \times W(Z)_{NO}} \text{ for } P > 0.5$$

$$F_Q^M(Z) \leq \frac{F_Q^{RTP} \times K(Z)}{W(Z)_{NO} \times 0.5} \text{ for } P \leq 0.5$$

where $F_Q^M(Z)$ is the measured $F_Q(Z)$ increased by the allowances for manufacturing tolerances and measurement uncertainty, F_Q^{RTP} is the F_Q limit, $K(Z)$ is the normalized $F_Q(Z)$ as a function of core height, P is the relative THERMAL POWER, and $W(Z)_{NO}$ is the cycle dependent, Normal Operation function that accounts for power distribution transients encountered during Normal Operation. F_Q^{RTP}, $K(Z)$ and $W(Z)_{NO}$ are specified in the Core Operating Limits Report as per Specification 6.9.1.9.

d. Measuring $F_Q^M(z)$ according to the following schedule:

1. Upon achieving equilibrium conditions after exceeding, by 10% or more of RATED THERMAL POWER, the THERMAL POWER at which $F_Q(z)$ was last determined,* or

2. At least once per 31 Effective Full Power Days (EFPD), whichever occurs first.

*During power escalation at the beginning of each cycle (expected operation at a power level for greater than 72 hours), power level may be increased until a power level for extended operation has been achieved ~~and after which~~ a power distribution map will be obtained.

4.2.2.2 (Continued)

e. With measurements indicating

$$\text{maximum over } z \left(\frac{F_Q^M(z)}{K(z)} \right)$$

has increased since the previous determination of $F_Q^M(z)$, either of the following actions shall be taken:

1. $F_Q^M(z)$ shall be increased by 2% over that specified in Specification 4.2.2 2c., or

2. $F_Q^M(z)$ shall be measured at least once per 7 Effective Full Power Days until two successive maps indicate that

$$\text{maximum over } z \left(\frac{F_Q^M(z)}{K(z)} \right) \text{ is not increasing.}$$

f. With the relationships specified in Specification 4.2.2.2c. above not being satisfied:

1. Calculate the percent $F_Q(z)$ exceeds its limit by the following expression:

$$\left[\left(\text{max. over } z \text{ of} \left(\frac{F_Q^M(z) \times W(z)\ NO}{\frac{F_Q^{RTP}}{P} \times K(z)} \right) \right) - 1 \right] \times 100 \text{ for } P \geq 0.5$$

$$\left[\left(\text{max. over } z \text{ of} \left(\frac{F_Q^M(z) \times W(z)\ NO}{\frac{F_Q^{RTP}}{0.5} \times K(z)} \right) \right) - 1 \right] \times 100 \text{ for } P < 0.5$$

2. Either one of the following actions shall be taken:

INSERT B →

~~(a)~~ (b) Comply with the requirements of Specification 3.2.2 for $F_Q(z)$ exceeding its limit by the percent calculated above, or

~~(b)~~ (c) Verify that the requirements of Specification 4.2.2.3 for RESTRICTED AFD OPERATION are satisfied and enter RESTRICTED AFD OPERATION.

g. The limits specified in Specifications 4.2.2.2.c., 4.2.2.2.e., and 4.2.2.2.f. above are not applicable in the following core plane regions:

1. Lower core region from 0 to 15%, inclusive.

2. Upper core region from 85 to 100%, inclusive.

SURVEILLANCE REQUIREMENTS (Continued)

4.2.2.3 RESTRICTED AFD OPERATION (RAFDO) is permitted at powers above APL^{ND}* if the following conditions are satisfied:

a. Prior to entering RAFDO, maintain THERMAL POWER above APL^{ND} and less than or equal to that allowed by Specification 4.2.2.2 for at least the previous 24 hours. Maintain RAFDO surveillance (AFD within the limits specified in the COLR) during this time period. RAFDO is then permitted providing THERMAL POWER is maintained between APL^{ND} and APL^{RAFDO} or between APL^{ND} and 100% (whichever is more limiting) and F_Q surveillance is maintained pursuant to Specification 4.2.2.4. APL^{RAFDO} is defined as:

$$APL^{RAFDO} = \underset{\text{over } Z}{\text{minimum}} \left\{ \frac{F_Q^{RTP} \times K(Z)}{F_Q^M(Z) \times W(Z)_{RAFDO}} \right\} \times 100\%$$

where $F_Q^M(Z)$ is the measured $F_Q(Z)$ increased by the allowances for manufacturing tolerances and measurement uncertainty. The F_Q limit is F_Q^{RTP} ↑ INSERT C. $W(Z)_{RAFDO}$ is the cycle dependent function that accounts for limited power distribution transients encountered during RAFDO. F_Q^{RTP}, $K(Z)$, and $W(Z)_{RAFDO}$ are specified in the Core Operating Limits Report as per Specification 6.9.1.9.

b. During RAFDO, if the THERMAL POWER is decreased below APL^{ND} then the conditions of 4.2.2.3.a. shall be satisfied before re-entering RAFDO.

4.2.2.4 During RAFDO, $F_Q(Z)$ shall be evaluated to determine if $F_Q(Z)$ is within its limits by:

a. Using the movable incore detectors to obtain a power distribution map at any THERMAL POWER above API^{ND}.

b. Increasing the measured $F_Q(Z)$ component of the power distribution map by 3% to account for manufacturing tolerances and further increasing the value by 5% to account for measurement uncertainties. *Verify that the requirements of Specification 3.2.2 are satisfied.*

c. Satisfying the following relationship:

$$F_Q^M(Z) \leq \frac{F_Q^{RTP} \times K(Z)}{P \times W(Z)_{RAFDO}} \quad \text{for } P > APL^{ND}$$

INSERT D ↓

where $F_Q^M(Z)$ is the measured $F_Q(Z)$. The F_Q limit is F_Q^{RTP}. P is the relative THERMAL POWER. $W(Z)_{RAFDO}$ is the cycle dependent function that accounts for limited power distribution transients encountered during RAFDO. F_Q^{RTP}, $K(Z)$, and $W(Z)_{RAFDO}$ are specified in the Core Operating Limits Report as per Specification 6.9.1.9.

* INSERT E

4.2.2.4 (Continued)

d. Measuring $F_Q^M(z)$ in conjunction with target flux difference determination according to the following schedule:

1. Prior to entering RAFDO after satisfying Section 4.2.2.3 unless a full core flux map has been taken in the previous 31 EFPD with the relative thermal power having been maintained above APL^{ND} for the 24 hours prior to mapping, and

2. At least once per 31 Effective Full Power Days.

e. With measurements indicating

$$\text{maximum over } z \left[\frac{F_Q^M(z)}{K(z)}\right]$$

has increased since the previous determination of $F_Q^M(z)$ either of the following actions shall be taken:

1. $F_Q^M(z)$ shall be increased by 2 percent over that specified in 4.2.2.4.c, or

2. $F_Q^M(z)$ shall be measured at least once per 7 EFPD until two successive maps indicate that

$$\text{maximum over } z \left[\frac{F_Q^M(z)}{K(z)}\right] \text{ is not increasing.}$$

f. INSERT F

~~With the relationship specified in 4.2.2.4.e above not being satisfied, comply~~ 2. Comply with the requirements of Specification 3.2.2 for $F_Q(z)$ exceeding its limit by the percent calculated with the following expression:

$$\left[\left(\text{max. over } z \text{ of } \frac{F_Q^M(z) \times W(z)_{RAFDO}}{F_Q^{RTP} \times K(z)}\right) - 1\right] \times 100 \text{ for } P \geq APL^{ND}$$

P

g. The limits specified in 4.2.2.4.c, 4.2.2.4.e, and 4.2.2.4.f above are not applicable in the following core plane regions:

1. Lower core region from 0 to 15 percent, inclusive.

2. Upper core region from 85 to 100 percent, inclusive.

4.2.2.5 When $F_Q(z)$ is measured for reasons other than meeting the requirements of Specification 4.2.2.2 or 4.2.2.4, an overall measured $F_Q(z)$ shall be obtained from a power distribution map and increased by 3% to account for manufacturing tolerances and furtner increased by 5% to account for measurement uncertainty.

MONTHLY OPERATING REPORT

6.9.1.8 Routine reports of operating statistics and shutdown experience, including documentation of all challenges to the pressurizer PORVs or RCS safety valves, shall be submitted on a monthly basis to the Director, Office of Resource Management, U. S. Nuclear Regulatory Commission, Washington, D. C. 20555, with a copy to the NRC Regional Office, no later than the 15th of each month following the calendar month covered by the report.

CORE OPERATING LIMITS REPORT

6.9.1.9 Core operating limits shall be established and documented in the CORE OPERATING LIMITS REPORT prior to each reload cycle, or prior to any remaining portion of a reload cycle, for the following:

a. Moderator Temperature Coefficient BOL and EOL limits and 300 ppm surveillance limit for Specification 3/4.1.1.3,

b. Shutdown Bank Insertion Limit for Specification 3/4.1.3.5,

c. Control Bank Insertion Limits for Specification 3/4.1.3.6,

d. Axial Flux Difference Limits, target band, and APL^{ND} for Specification 3/4.2.1, $\hat{RAFDO}$

e. Heat Flux Hot Channel Factor, F_Q^{RTP}, K(Z), $W(Z)_{NO}$, APL^{ND} and $W(Z)_{RAFDO}$ for Specification 3/4.2.2, (as required)

f. Nuclear Enthalpy Rise Hot Channel Factor $F_{\Delta H}$, and Power Factor Multiplier, $PF_{\Delta H}$, limits for Specification 3/4.2.3.

The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents.

a. WCAP-9272-P-A, "WESTINGHOUSE RELOAD SAFETY EVALUATION METHODOLOGY", July 1985 (W Proprietary).

(Methodology for Specification 3.1.1.3 - Moderator Temperature Coefficient 3.1.3.5 - Shutdown Bank Insertion Limit; 3.1.3.6 - Control Bank Insertion Limit; ~~3.2.1 - Axial Flux Difference; 3.2.2 - Heat Flux Hot Channel Factor;~~ and 3.2.3 - Nuclear Enthalpy Rise Hot Channel Factor.)

~~b. WCAP-8385, "POWER DISTRIBUTION CONTROL AND LOAD FOLLOWING PROCEDURES - TOPICAL REPORT", September 1974 (W Proprietary).~~

~~(Methodology for Specification 3.2.1 - Axial Flux Difference (Constant Axial Offset Control).)~~

CORE OPERATING LIMITS REPORT (Continued)

~~b2. T. M. Anderson to K. Kniel (Chief of Core Performance Branch, NRC) January 31, 1980 -- Attachment: Operation and Safety Analysis Aspects of an Improved Load Follow Package.~~

~~(Methodology for Specification 3.2.1 - Axial Flux Difference (Constant Axial Offset Control).)~~

~~b3. NUREG-0800, Standard Review Plan, U. S. Nuclear Regulatory Commission, Section 4.3 Nuclear Design, July 1981. Branch Technical Position CPB 4.3-1, Westinghouse Constant Axial Offset Control (CAOC), Rev. 2, July 1981.~~

~~(Methodology for Specification 3.2.1 - Axial Flux Difference (Constant Axial Offset Control).)~~

6. ~~c.~~ WCAP-10216-P-A, "RELAXATION OF CONSTANT AXIAL OFFSET CONTROL AND F_Q SURVEILLANCE TECHNICAL SPECIFICATION," June 1983 (W Proprietary).

→ INSERT G

~~(Methodology for Specification 3.2.2 - Heat Flux Hot Channel Factor (F_Q Methodology for W(Z) surveillance requirements).~~

c. ~~d.~~ WCAP-10266-P-A, REV. 2, "THE 1981 VERSION OF WESTINGHOUSE EVALUATION MODEL USING BASH CODE," March 1987 (W Proprietary).

(Methodology for Specification 3.2.2 - Heat Flux Hot Channel Factor).

The core operating limits shall be determined so that all applicable limits (e.g., fuel thermal-mechanical limits, core thermalhydraulic limits, nuclear limits such as shutdown margin, and transient and accident analysis limits) of the safety analysis are met.

The CORE OPERATING LIMITS REPORT, including any mid-cycle revisions or supplements shall be provided, upon issuance for each reload cycle, to the NRC Document Control Desk with copies to the Regional Administrator and Resident Inspector.

SPECIAL REPORTS

6.9.2 Special Reports shall be submitted to the Regional Administrator of the NRC Regional Office within the time period specified for each report.

6.10 RECORD RETENTION

In addition to the applicable record retention requirements of Title 10, Code of Federal Regulations, the following records shall be retained for at least the minimum period indicated.

6.10.1 The following records shall be retained for at least 5 years:

a. Records and logs of unit operation covering time interval at each power level;

INSERT B

(a) Within 15 minutes, control the AFD to within new AFD limits which are determined by tightening both the negative and positive AFD limits of Specification 3.2.1 by 1% AFD for each percent $F_Q(z)$ exceeds its limits as determined in Specification 4.2.2.2.f.1. Within 8 hours, reset the AFD alarm setpoints to these modified limits, or

INSERT C

K(Z) is the normalized $F_Q(Z)$ as a function of core height.

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increased by the allowances for manufacturing tolerances and measurement uncertainty. K(Z) is the normalized $F_Q(Z)$ as a function of core height.

INSERT E

* APL^{ND} is the minimum allowable (nuclear design) power level for RESTRICTED AFD OPERATION in Specification 3.2.1 and specified in the Core Operating Limits Report as per Specification 6.9.1.9.

INSERT F

With the relationship specified in 4.2.2.4.c above not being satisfied, either of the following actions shall be taken:

1. Place the core in an equilibrium condition where the limit in 4.2.2.2.c is satisfied, and remeasure $F_Q^M(z)$, or

INSERT G

(Methodology for Specification 3.2.1 - Axial Flux Difference (Relaxed Axial Offset Control) and 3.2.2 - Heat Flux Hot Channel Factor (W(Z) surveillance requirements of F_Q Methodology)

3/4.2 POWER DISTRIBUTION LIMITS

BASES

The specifications of this section provide assurance of fuel integrity during Condition I (Normal Operation) and II (Incidents of Moderate Frequency) events by: (1) maintaining the minimum DNBR in the core at or above the safety analysis DNBR limits during normal operation and in short-term transients, and (2) limiting the fission gas release, fuel pellet temperature, and cladding mechanical properties to within assumed design criteria. In addition, limiting the peak linear power density during Condition I events provides assurance that the initial conditions assumed for the LOCA analyses are met and the ECCS acceptance criteria limit of 2200°F is not exceeded.

The definition of certain not channel and peaking factors as used in these specifications are as follows:

$F_Q(Z)$ Heat Flux Hot Channel Factor, is defined as the maximum local heat flux on the surface of a fuel rod at core elevation Z divided by the average fuel rod heat flux, allowing for manufacturing tolerances on fuel pellets and rods; and

$F^N_{\Delta H}$ Nuclear Enthalpy Rise Hot Channel Factor, is defined as the ratio of the integral of linear power along the rod with the highest integrated power to the average rod power.

3/4.2.1 AXIAL FLUX DIFFERENCE

The limits on AXIAL FLUX DIFFERENCE (AFD) assure that the $F_Q(Z)$ upper bound envelopes of the F_Q limit specified in the Core Operating Limits Report (COLR) times the normalized axial peaking factor are not exceeded during either normal operation or in the event of xenon redistribution following power changes.

Target flux difference is determined at equilibrium xenon conditions. The full-length rods may be positioned within the core in accordance with their respective insertion limits and should be inserted near their normal position for steady-state operation at high power levels. The value of the target flux difference obtained under these conditions divided by the fraction of RATED THERMAL POWER is the target flux difference at RATED THERMAL POWER for the associated core burnup conditions. Target flux differences for other THERMAL POWER levels are obtained by multiplying the RATED THERMAL POWER value by the appropriate fractional THERMAL POWER level. The periodic updating of the target flux difference value is necessary to reflect core burnup considerations.

INSERT H →

~~The limits on AXIAL FLUX DIFFERENCE (AFD) are given in the COLR. Two modes of operation are permissible. One mode is Normal Operation and the AFD limit is specified in the COLR. After extended load following maneuvers, the AFD limits may result in restrictions in the maximum allowed power to guarantee operation with $F_Q(Z)$ less than its limiting value. To prevent this occurrence, another operating mode which restricts the AFD to a relatively small target~~

INSERT H

At power levels below APL^{ND}, the limits on AFD are specified in the COLR for RAOC operation. These limits were calculated in a manner such that expected operational transients, e.g., load follow operations, would not result in the AFD deviating outside of those limits. However, in the event such a deviation occurs, the 15 minute period of time allowed outside of the limits at reduced power levels will not result in significant xenon redistribution such that the envelope of peaking factors would change sufficiently to prevent operation in the vicinity of the APL^{NB} power level.

At power levels greater than APL^{ND}, two modes of operation are permissible: 1) RAOC with fixed AFD limits as a function of reactor power level and 2) Restricted AFD Operation (RAFDO) which is defined as the maintenance of the AFD within a band about a target value. Both the fixed AFD limits for RAOC operation and the target band for RAFDO are specified in the COLR. RAOC operations above APL^{ND} are the same as for operation below APL^{ND}. However, it is possible when following extended load following maneuvers that the AFD limits may result in restrictions in the maximum allowed power or AFD in order to guarantee operation with $F_Q(Z)$ less than its limiting value. To allow operation at the maximum permissible value, the RAFDO operating procedure restricts the indicated AFD to a relatively small target band and does not allow significant changes in power level (i.e., power maintained between APL^{ND} and either APL^{RAFDO} or 100% RTP, whichever is less). For RAFDO, it is expected that the plant will operate within the target band. Operation outside of the target band for the short time period allowed (15 minutes) will not result in significant xenon redistribution such that the envelope of peaking factors would change sufficiently to prohibit continued operation in the power region defined above. To assure there is no residual xenon redistribution impact for past operation on the RAFDO operation, prior to entering RAFDO a 24-hour waiting period at a power level above APL^{NB} and less than or equal to that allowed by Specification 4.2.2.2 is necessary. During this time period, load changes and control rod motion are restricted to that allowed by the RAFDO procedure. After the waiting period, extended RAFDO is permissible.

Provisions for monitoring the AFD on an automatic basis are derived from the plant process computer through the AFD Monitor Alarm. The computer determines the one-minute average of each of the OPERABLE excore detector outputs and provides an alarm message immediately if the one-minute average AFD for at least two OPERABLE excore channels are: 1) outside the allowed delta-I vs. power operating space (for RAOC operation), or 2) outside the acceptable AFD target band (for RAFDO). These alarms are active when power is greater than: 1) 50% of RATED THERMAL POWER (for RAOC operation), or 2) APL^{ND} (for RAFDO). Penalty deviation minutes for RAFDO are not accumulated based on the short period of time during which operation outside of the target band is allowed.

3/4.2.1 AXIAL FLUX DIFFERENCE (Continued)

~~band and does not allow significant changes in power level has been defined.~~ This mode is called RESTRICTED AFD OPERATION, which restricts the AFD to the limits specified in the COLR and restricts power levels to between APL_{RAFDO}^{ND} and either APL_{RAFDO}^{ND} or 100% of RATED THERMAL POWER, whichever is less. Prior to entering RESTRICTED AFD OPERATION, a 24-hour waiting period at a power level ($\pm$2%) above APL_{RAFDO}^{ND} and below that allowed by Normal Operation is necessary. During this time period load changes and control rod motion are restricted to that allowed by the RESTRICTED AFD OPERATION procedure. After the waiting period, RESTRICTED AFD OPERATION is permitted.

Although it is intended that the plant will be operated with the AFD within the target band required by Specification 3.2.1 about the target flux difference, during rapid plant THERMAL POWER reductions, control rod motion will cause the AFD to deviate outside of the target band at reduced THERMAL POWER levels. This deviation will not affect the xenon redistribution sufficiently to change the envelope of peaking factors which may be reached on a subsequent return to RATED THERMAL POWER (with the AFD within the target band) provided the time duration of the deviation is limited. Accordingly, a 1-hour penalty deviation limit cumulative during the previous 24 hours is provided for operation outside of the target band but within the limits specified in the COLR while at THERMAL POWER levels between 50% and 90% of RATED THERMAL POWER. For THERMAL POWER levels between 15% and 50% of RATED THERMAL POWER, deviations of the AFD outside of the target band are less significant. The penalty of 2 hours actual time reflects this reduced significance.

Provisions for monitoring the AFD on an automatic basis are derived from the plant process computer through the AFD Monitor Alarm. The computer determines the 1 minute average of each of the OPERABLE excore detector outputs and provides an alarm message immediately if the AFD for two or more OPERABLE excore channels are outside the target band and the THERMAL POWER is greater than 90% of RATED THERMAL POWER. During operation at THERMAL POWER levels between 50% and 90% and between 15% and 50% RATED THERMAL POWER, the computer outputs an alarm message when the penalty deviation accumulates beyond the limits of 1 hour and 2 hours, respectively.

~~Figure B 3/4.2-1 shows a typical monthly target band.~~

3/4.2.2 and 3/4.2.3 HEAT FLUX HOT CHANNEL FACTOR AND NUCLEAR ENTHALPY RISE HOT CHANNEL FACTOR

The limits on heat flux hot channel factor and nuclear enthalpy rise hot channel factor ensure that 1) the design limits on peak local power density and minimum DNBR are not exceeded, and 2) in the event of a LOCA the peak fuel clad temperature will not exceed the 2200°F ECCS acceptance criteria limit.

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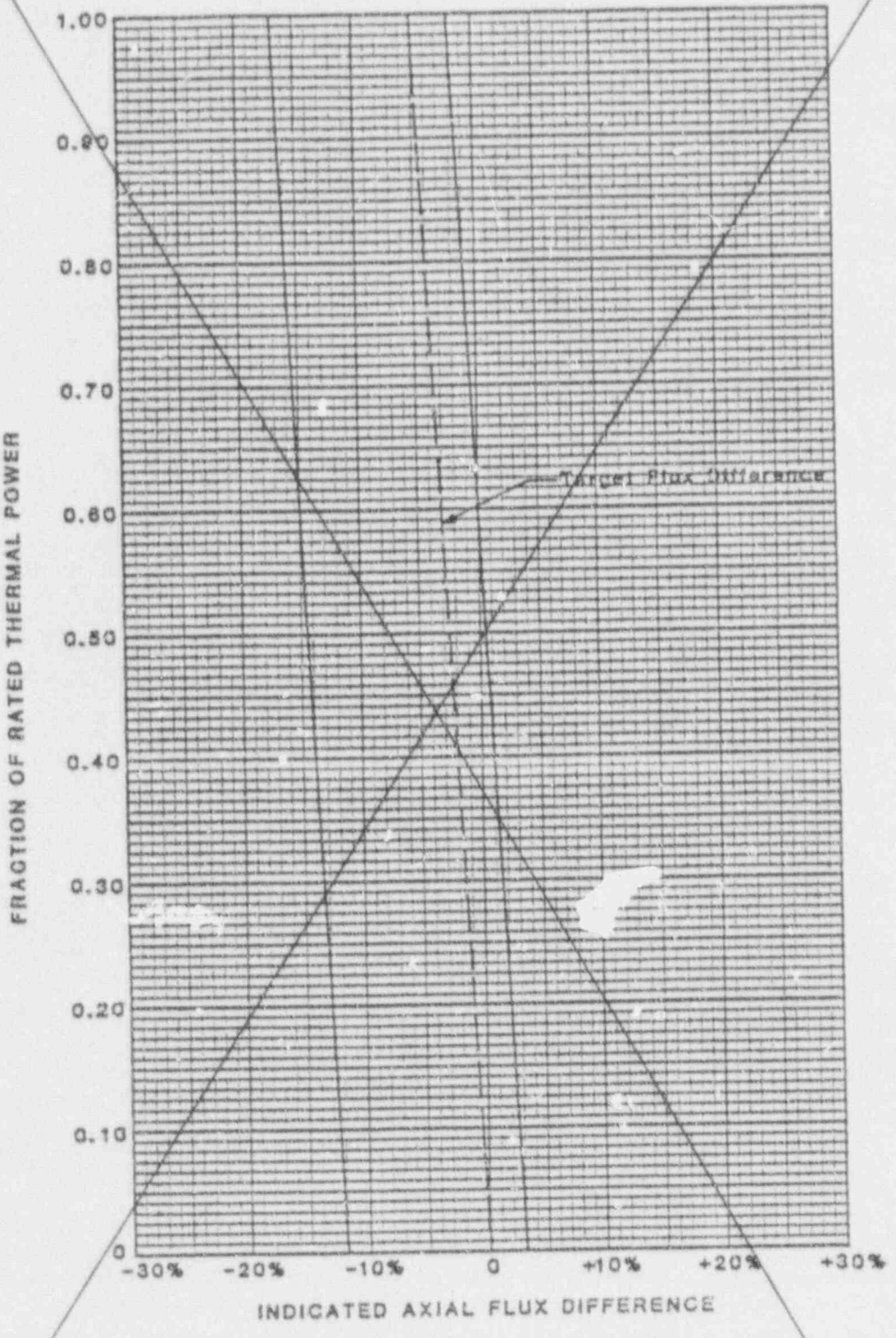

FIGURE B 3/4.2-1

TYPICAL INDICATED AXIAL FLUX DIFFERENCE VERSUS THERMAL POWER

ATTACHMENT FIVE

PRELIMINARY CYCLE 6 COLR CHANGES FOR

RELAXED AXIAL OFFSET CONTROL (RAOC)

PAGE	SECTION	DESCRIPTION
7 of 15	2.4 AFD	Change from CAOC to RAOC, Insert 1.
8 of 15	2.4 AFD	Change of the CAOC Figure to the RAOC Figure, Insert 2.
9 of 15	2.5 (F_Q)	Change from CAOC to RAOC description.