

UNITED STATES NUCLEAR REGULATORY COMMISSION WASHINGTON, D. C. 20555

September 13, 1984

Docket Nos: 50-369 and 50-370

Mr. H. B. Tucker, Vice President Nuclear Production Department Duke Power Company 422 South Church Street Charlotte, North Carolina 28242

Dear Mr. Tucker:

Subject: Issuance of Amendment No. 34 to Facility Operating License NPF-9 and Amendment No. 15 to Facility Operating License NPF-17 - McGuire Nuclear Station, Units 1 and 2

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 34 to Facility Operating License NPF-9 and Amendment No. 15 to Facility Operating License NPF-17 for the McGuire Nuclear Station, Units 1 and 2. These amendments consist of changes to the Technical Specifications in response to your application which was submitted on June 14, 1984. The amendments were authorized by telephone on June 21, 1984, and were confirmed by letter that same day.

The amendments expand the Power Distribution Limits section of the Unit 1 Technical Specifications to include Base Load Operation in addition to the currently approved Relaxed Axial Offset Control operation. The amendments were issued on an expedited basis to prevent plant derating.

A copy of the related safety evaluation report supporting Amendment No. 34 to Facility Operating License NPF-9 and Amendment No. 15 to Facility Operating License NPF-17 is enclosed.

Sincerely,

Elinor G. Adensam, Chief Licensing Branch No. 4 Division of Licensing

Enclosures: 1. Amendment No. ³⁴ to NPF-9 2. Amendment No. ¹⁵ to NPF-17 3. Safety Evaluation

05000369

PDR

cc w/encl: See next page

PDR ADOCK

8410110524 84091

DESIGNATED ORIGINAL Alach fied By_

• McGuire

Ċ.

Mr. H. B. Tucker, Vice President Nuclear Production Department Duke Power Company 422 South Church Street Charlotte, North Carolina 28242 cc: Mr. A. Carr Duke Power Company P.O. Box 33189 422 South Church Street Charlotte, North Carolina 28242 Mr. F. J. Twogood Power Systems Division Westinghouse Electric Corp. P.O. Box 355 Pittsburgh, Pennsylvania 15230 Mr. Robert Gill Duke Power Company Nuclear Production Department P.O. Box 33189 Charlotte, North Carolina 28242 J. Michael McGarry, III, Esq. Bishop, Liberman, Cook, Purcell and Reynolds 1200 Seventeenth Street, N.W. Washington, D. C. 20036 Mr. Wm. Orders Senior Resident Inspector c/o U.S. Nuclear Regulatory Commission Route 4, Box 529 Hunterville, North Carolina 28078 James P. O'Reilly, Regional Admin. U.S. Nuclear Regulatory Commission, Region II 101 Marietta Street, N.W., Suite 2900 Atlanta, Georgia 30323 Dr. John M. Barry Department of Environmental Health Mecklenburg County 1200 Blythe Boulevard

Charlotte, North Carolina 28203

Department of Justice Justice Building Raleigh, North Carolina 27602 County Manager of Mecklenburg County 720 East Fourth Street Charlotte, North Carolina 28202 EIS Coordinator U.S. Environmental Protection Agency Region IV Office 345 Courtland Street, N.E. Atlanta, Georgia 30308 Chairman, North Carolina Utilities Commission 430 North Salisbury Street Dobbs Building Raleigh, North Carolina 27602 R. S. Howard Operating Plants Projects Regional Manager Westinghouse Electric Corporation -R&D 701 P.O. Box 2728 Pittsburgh, Pennsylvania 15230

Attorney General

Mr. Dayne H. Brown, Chief Radiation Protection Branch Division of Facility Services Department of Human Resources P.O. Box 12200 Raleigh, North Carolina 27605



8410110528 840913 PDR ADOCK 05000369

PDR

UNITED STATES NUCLEAR REGULATORY COMMISSION WASHINGTON, D. C. 20555

DUKE POWER COMPANY

DOCKET NO. 50-369

MCGUIRE NUCLEAR STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 34 License No. NPF-9

- 1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment to the McGuire Nuclear Station, Unit 1 (the facility) Facility Operating License No. NPF-9 filed by the Duke Power Company (licensee) dated June 14, 1984, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's regulations as set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, as amended, the provisions of the Act, and the regulations of the Commission;
 - C. There is reasonable assurance: (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;
 - D. The issuance of this license amendment will not be inimical to the common defense and security or to the health and safety of the public;
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
- Accordingly, the license is hereby amended by page changes to the Technical Specifications as indicated in the attachments to this license amendment and paragraph 2.C.(2) of Facility Operating License No. NPF-9 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 34, are hereby incorporated into this license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment was effective June 21, 1984.

FOR THE NUCLEAR REGULATORY COMMISSION

Elina I. allenson

Elinor G. Adensam, Chief Licensing Branch No. 4 Division of Licensing

Attachment: Technical Specification Changes

Date of Issuance: September 13, 1984



UNITED STATES NUCLEAR REGULATORY COMMISSION WASHINGTON, D. C. 20555

DUKE POWER COMPANY

DOCKET NO. 50-370

MCGUIRE NUCLEAR STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 15 License No. NPF-17

- 1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment to the McGuire Nuclear Station, Unit 2 (the facility) Facility Operating License No. NPF-17 filed by the Duke Power Company (licensee) dated June 14, 1984, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's regulations as set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, as amended, the provisions of the Act, and the regulations of the Commission;
 - C. There is reasonable assurance: (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;
 - D. The issuance of this license amendment will not be inimical to the common defense and security or to the health and safety of the public;
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
- 2. Accordingly, the license is hereby amended by page changes to the Technical Specifications as indicated in the attachments to this license amendment and paragraph 2.C.(2) of Facility Operating License No. NPF-17 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 15, are hereby incorporated into this license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment was effective June 21, 1984.

FOR THE NUCLEAR REGULATORY COMMISSION

Elinor G. Adensam, Chief Licensing Branch No. 4 Division of Licensing

Attachment: Technical Specification Changes

Date of Tssuance: September 13, 1984

ATTACHMENT TO LICENSE AMENDMENT NO. 34

FACILITY OPERATING LICENSE NO. NPF-9

DOCKET NO. 50-369

AND

TO LICENSE AMENDMENT NO. 15

FACILITY OPERATING LICENSE NO. NPF-17

DOCKET NO. 50-370

Replace the following pages of the Appendix "A" Technical Specifications with the enclosed pages. The revised pages are identified by Amendment number and contain a vertical line indicating the area of change.

Amen Pag	ded e		
3/4 3/4 3/4 3/4 3/4	2-1 2-1a 2-7 2-8 2-9	(new	page)
3/4 3/4 B3/4	2-9a 2-9b 2-1	(new (new	page) page)
B3/4 B3/4 B3/4	2-2 2-2a 2-6 6-21	(new	page)

3/4.2 POWER DISTRIBUTION LIMITS

3/4.2.1 AXIAL FLUX DIFFERENCE (UNIT 1)

LIMITING CONDITION FOR OPERATION

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

- a. the allowed operational space defined by Figure 3.2-1 for RAOC operation, or
- b. within a \pm 3 percent target band about the target flux difference during base load operation.

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

ACTION:

- a. For RAOC operation with the indicated AFD outside of the Figure 3.2-1 limits,
 - 1. Either restore the indicated AFD to within the Figure 3.2-1 limits within 15 minutes, or
 - 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 Base Load operation above APL^{ND**} with the indicated AXIAL FLUX DIFFERENCE outside of the applicable target band about the target flux difference:
 - 1. Either restore the indicated AFD to within the target band limits within 15 minutes, or
 - 2. Reduce THERMAL POWER to less than APLND of RATED THERMAL POWER and discontinue Base Load operation within 30 minutes.
- c. THERMAL POWER shall not be increased above 50% of RATED THERMAL POWER unless the indicated AFD is within the Figure 3.2-1 limits.

*See Special Test Exception 3.10.2.

**APLND is the minimum allowable power level for base load operation and will be provided in the Peaking Factor Limit Report per Specification 6.9.1.9.

McGUIRE - UNITS 1 and 2

3/4 2-1

SURVEILLANCE REQUIREMENTS

4.2.1.1 The indicated AFD shall be determined to be within its limits during POWER OPERATION above 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 Monitoring 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.

4.2.1.2 The indicated AFD shall be considered outside of its limits when at least two OPERABLE excore channels are indicating the AFD to be outside the limits.

4.2.1.3 When in Base Load operation, the target axial 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 When in Base Load operation, 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 4.2.1.3 above or by linear interpolation between the most recently measured value and 0 percent at the end of cycle life. The provisions of Specification 4.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS (UNIT 1)

4.2.2.1 The provisions of Specification 4.0.4 are not applicable.

4.2.2.2 For RAOC 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 at 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.
- c. Satisfying the following relationship:

$$F_Q^M(z) \le \frac{2.15}{P \times W(z)} \text{ for } P > 0.5$$

 $F_Q^M(z) < \frac{2.15}{W(z) \times 0.5} \text{ for } P \le 0.5$

where $F_Q^M(z)$ is the measured $F_Q(z)$ increased by the allowances for manufacturing tolerances and measurement uncertainty, 2.15 is the F_Q

- __limit, K(z) is given in Figure 3.2-2, P is the relative THERMAL POWER, and W(z) is the cycle dependent function that accounts for power distribution transients encountered during normal operation. This function is given in the Peaking Factor Limit Report as per Specification 6.9.1.9.
- d. Measuring $F_0^{M}(z)$ 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 $F_0(z)$ was last determined,* or
 - 2. At least once per 31 Effective Full Power Days, whichever occurs first.

McGUIRE - UNITS 1 and 2

Amendment No.³⁴ (Unit 1) Amendment No.¹⁵ (Unit 2)

^{*}During power escalation at the beginning of each cycle, power level may be increased until a power level for extended operation has been achieved and a power distribution map obtained.

e. With measurements indicating

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

- 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

maximum
$$\left(\frac{F_{Q}^{M}(z)}{K(z)}\right)$$
 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:

$$\begin{cases} \begin{pmatrix} \text{maximum} \\ \text{over } z \end{pmatrix} & \left[\frac{F_0^{M}(z) \times W(z)}{\frac{2.15}{P} \times K(z)} \right] -1 \\ & 100 \quad \text{for } P \ge 0.5 \\ & \left[\begin{pmatrix} \text{maximum} \\ \text{over } z \end{pmatrix} & \left[\frac{F_0^{M}(z) \times W(z)}{\frac{2.15}{0.5} \times K(z)} \right] -1 \\ & 100 \quad \text{for } P < 0.5 \end{cases}$$

2) One of the following actions shall be taken:

a) Within 15 minutes, control the AFD to within new AFD limits which are determined by reducing the AFD limits of 3.2-1 by 1% AFD for each percent F₀(z) exceeds its limits

as determined in Specification 4.2.2.2f.1). Within 8 hours, reset the AFD alarm setpoints to these modified limits, or

- b) Comply with the requirements of Specification 3.2.2 for $F_Q(z)$ exceeding its limit by the percent calculated above, or
- c) Verify that the requirements of Specification 4.2.2.3 for Base Load operation are satisfied and enter Base Load operation.

McGUIRE - UNITS 1 and 2

3/4 2-8

- The limits specified in Specifications 4.2.2.2c, 4.2.2.2e., and g. 4.2.2.2f. 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.

4.2.2.3 Base Load operation is permitted at powers above APLND if the following conditions are satisfied:

Prior to entering Base Load operation, maintain THERMAL POWER above а. APLND and less than or equal to that allowed by Specification 4.2.2.2 for at least the previous 24 hours. Maintain Base Load operation surveillance (AFD within \pm 3% of target flux difference) during this time period. Base Load operation is then permitted providing THERMAL POWER is maintained between APL^{ND} and APL^{BL} or between APL^{ND} and 100% (whichever is most limiting) and F_Q surveillance is maintained

pursuant to Specification 4.2.2.4. APL^{BL} is defined as:

 $APL^{BL} = \underset{over Z}{\text{minimum}} \left[\frac{(2.15 \times K(Z))}{F_{O}^{M}(Z) \times W(Z)_{BL}} \right] \times 100\%$

where: $F_{\Omega}^{m}(z)$ is the measured $F_{\Omega}(z)$ increased by the allowances for manufacturing tolerances and measurement uncertainty. The F₀ limit is 2.15. K(z) is given in Figure 3.2-2. $W(z)_{BL}$ is the cycle dependent function that accounts for limited power distribution transients encountered during base load operation. The function is given in the Peaking Factor Limit Report as per Specification 6.9.1.9.

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

4.2.2.4 During Base Load Operation $F_0(Z)$ shall be evaluated to determine if $F_0(Z)$ is within its limit by:

- Using the movable incore detectors to obtain a power distribution а. map at any THERMAL POWER above APLND
- b. Increasing the measured $F_0(Z)$ 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.

McGUIRE - UNITS 1 and 2

- c. Satisfying the following relationship: $F_Q^M(Z) \leq \frac{2.15 \times K(Z)}{P \times W(Z)_{BL}} \text{ for } P > APL^{ND}$ where: $F_Q^M(Z)$ is the measured $F_Q(Z)$. The F_Q limit is 2.15. K(Z) is given in Figure 3.2-2. P is the relative THERMAL POWER. $(W(Z)_{BL}$ is the cycle dependent function that accounts for limited power distribution transients encountered during normal operation. This function is given in the Peaking Factor Limit Report as per Specification 6.9.1.9. d. Measuring $F_Q^M(Z)$ in conjunction with target flux difference determination according to the following schedule: 1. Prior to entering BASE LOAD operation after satisfying Section
 - Prior to entering BASE LOAD operation 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 APLND for the 24 hours prior to mapping, and
 - 2. At least once per 31 effective full power days.
- e. With measurements indicating

 $\begin{array}{c} F_0^{m}(Z) \\ maximum \left[\frac{K(Z)}{K(Z)} \right] \\ over Z \end{array}$

has increased since the previous determination $F_Q^M(Z)$ 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 2 successive maps indicate that

maximum [
$$\frac{F_0^M(Z)}{K(Z)}$$
] is not increasing.

- 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 equilbrium condition where the limit in 4.2.2.2.c is satisfied, and remeasure $F_{\Omega}^{M}(Z)$, or

McGUIRE - UNITS 1 and 2

3/4 2-9a

2. Comply with the requirements of Specification 3.2.2 for $F_Q(Z)$ exceeding its limit by the percent calculated with one of the following expressions:

[(max. over z of [
$$\frac{F_Q^M(Z) \times W(Z)_{BL}}{\frac{2.15}{P} \times K(Z)}$$
]) -1] x 100 for P > APLND

[(max. over z of [$\frac{F_Q^M(Z) \times W(Z)}{\frac{2.15}{P} \times K(Z)}$]) -1] x 100 for 0.5 \leq P < APLND

- 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 plan regions:
 - 1. Lower core region 0 to 15 percent, inclusive.
 - 2. Upper core region 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 an overall measured $F_Q(z)$ shall be obtained from a power distribution map and increased by 3% to account for manufacturing tolerances and further increased by 5% to account for measurement uncertainty.

3/4.2 POWER DISTRIBUTION LIMITS

R	Δ	ς	F	ς	
0	റ	J	<u>ــ</u>	J	

 F^{N}

2

Jnit No.

ΔH

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 calculated DNBR in the core at or above the design limit 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 definitions of certain hot 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;
 - 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; and
- xy(Z) Radial Peaking Factor, is defined as the ratio of peak power density to average power density in the horizontal plane at core elevation Z.

3/4.2.1 AXIAL FLUX DIFFERENCE

The limits on AXIAL FLUX DIFFERENCE (AFD) assure that the $FQ^{(Z)}$ upper bound envelope of 2.32 (Unit 2), 2.15 (Unit 1) times the normalized axial peaking factor is 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.

McGUIRE + UNITS 1 and 2

POWER DISTRIBUTION LIMITS

BASES

AXIAL FLUX DIFFERENCE (Continued)

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 of Figure 3.2-1 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.

For Unit 1, at power levels below APLND, the limits on AFD are defined by Figures 3.2-1, i.e. that defined by the RAOC operating procedure and limits. 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 short 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 APLND power level.

At power levels greater than APLND, two modes of operation are permissible; 1) RAOC, the AFD limit of which are defined by Figure 3.2-1, and 2) Base Load operation, which is defined as the maintenance of the AFD within a $\pm 3\%$ band about a target value. The RAOC operating procedure above APLND is the same as that defined for operation below APLND. 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 Base Load operating procedure restricts the

McGUIRE - UNITS 1 and 2

B 3/4 2-2

Amendment No.34 (Unit 1) Amendment No.15 (Unit 2)

Jnit No.

Ч

Jnit No.

 \sim

POWER DISTRIBUTION LIMITS

BASES

AXIAL FLUX DIFFERENCE (Continued)

indicated AFD to relatively small target band and power swings (AFD target band of $\pm 3\%$, APLND \leq power \leq APL^{BL} or 100% Rated Thermal Power, whichever is lower). For Base Load operation, it is expected that the plant will operate within the target band. Operation outside of the target band for the short time period allowed 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 from past operation on the Base Load

operation, a 24 hour waiting period at a power level above APLND and allowed by RAOC is necessary. During this time period load changes and rod motion are restricted to that allowed by the Base Load procedure. After the waiting period extended Base Load operation is permissible.

For Unit 1, the computer determines the one minute average of each of the OPERABLE excore detector outputs and provides an alarm message immediately if the AFD for at least 2 of 4 or 2 of 3 OPERABLE excore channels are: 1) outside the allowed ΔI power operating space (for RAOC operation), or 2) outside the allowed ΔI target band (for Base Load operation). These alarms are active when power is greater than: 1) 50% of RATED THERMAL POWER (for RAOC operation),

or 2) APLND (for Base Load operation). Penalty deviation minutes for Base Load operation are not accumulated based on the short period of time during which operation outside of the target band is allowed.

3/4.2.2 and 3/4.2.3 HEAT FLUX HOT CHANNEL FACTOR, and RCS FLOW RATE AND NUCLEAR ENTHALPY RISE HOT CHANNEL FACTOR

The limits on heat flux hot channel factor, RCS flow rate, 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.

Each of these is measurable but will normally only be determined periodically as specified in Specifications 4.2.2 and 4.2.3. This periodic surveillance is sufficient to insure that the limits are maintained provided:

Amendment No.³⁴ (Unit 1) Amendment No.¹⁵ (Unit 2)

Unit No. 1

POWER DISTRIBUTION LIMITS

BASES

HEAT FLUX HOT CHANNEL FACTOR and RCS FLOW RATE AND NUCLEAR ENTHALPY RISE HOT CHANNEL FACTOR (Continued)

The hot channel factor $F_Q^M(z)$ is measured periodically and increased by a cycle and height dependent power factor appropriate to either RAOC or Base Load operation, W(z) or $W(z)_{BL}$, to provide assurance that the limit on the hot channel factor, $F_0(z)$, is met. W(z) accounts for the effects of normal operation transients and was determined from expected power control maneuvers over the full range of burnup conditions in the core. $W(z)_{BL}$ accounts for the more restrictive operating limits allowed by Base Load operation which result in less severe transient values. The W(z) function for normal operation is provided in the Peaking Factor Limit Report per Specification 6.9.1.9.

3/4.2.4 QUADRANT POWER TILT RATIO

The QUADRANT POWER TILT RATIO limit assures that the radial power distribution satisfies the design values used in the power capability analysis. Radial power distribution measurements are made during STARTUP testing and periodically during power operation.

The 2-hour time allowance for operation with a tilt condition greater than 1.02 but less than 1.09 is provided to allow identification and correction of a dropped or misaligned rod. In the event such action does not correct the tilt, the margin for uncertainty on F_0 is reinstated by reducing the power by 3% from RATED THERMAL POWER for each percent of tilt in excess of 1.0.

For purposes of monitoring QUADRANT POWER TILT RATIO when one excore detector is inoperable, the moveable incore detectors are used to confirm that the normalized symmetric power distribution is consistent with the QUADRANT POWER TILT RATIO. The incore detector monitoring is done with a full incore flux map or two sets of four symmetric thimbles. The two sets of four symmetric thimbles is a unique set of eight detector locations. These locations are C-8, E-5, E-11, H-3, H-13, L-5, L-11, N-8.

3/4.2.5 DNB PARAMETERS

. The limits on the DNB-related parameters assure that each of the parameters are maintained within the normal steady-state envelope of operation assumed in the transient and accident analyses. The limits are consistent with the initial FSAR assumptions and have been analytically demonstrated adequate to maintain a design limit DNBR throughout each analyzed transient.

The 12-hour periodic surveillance of these parameters through instrument readout is sufficient to ensure that the parameters are restored within their limits following load changes and other expected transient operation.

McGUIRE - UNITS 1 and 2 B3/4 2-6

ADMINISTRATIVE CONTROLS

RADIAL PEAKING FACTOR LIMIT REPORT

6.9.1.9 The F limit for RATED THERMAL POWER (F_{xy}^{RTP}) shall be provided to the Regional Administrator of the NRC Regional Office, with a copy to the Director, Nuclear Reactor Regulation, Attention: Chief, Core Performance Branch, U. S. Nuclear Regulatory Commission, Washington, D.C. 20555 for all core planes containing Bank "D" control rods and all unrodded core planes at least 60 days prior to cycle initial criticality. In the event that the limit would be submitted at some other time during core life, it shall be submitted 60 days prior to the date the limit would become effective unless otherwise exempted by the Commission.

Any information needed to support F_{xy}^{RTP} will be by request from the NRC and need not be included in this report.

The W(z) functions for RAOC and Base Load operation and the value for APLND (as required) shall be provided to the Director, Nuclear Reactor Regulations, Attention: Chief, Core Performance Branch, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555 at least 60 days prior to cycle initial criticality. In the event that these values would be submitted at some other time during core life, it will be submitted 60 days prior to the date the values would become effective unless otherwise exempted by the Commission.

Any information needed to support W(z), $W(z)_{BL}$ and APL^{ND} will be by request from the NRC and need not be included in this report.

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.

Jnit No.

Ч

No.

Unit

 \sim

McGUIRE - UNITS 1 and 2

6-21



UNITED STATES NUCLEAR REGULATORY COMMISSION WASHINGTON, D. C. 20555

SAFETY EVALUATION REPORT

RELATED TO AMENDMENT NO. 34 TO FACILITY OPERATING LICENSE NPF-9

AND TO AMENDMENT NO. 15 TO FACILITY OPERATING LICENSE NPF-17

DUKE POWER COMPANY

MCGUIRE NUCLEAR STATION, UNITS 1 AND 2

INTRODUCTION

By letter dated June 14, 1984, Duke Power Company proposed to amend Facility Operating Licenses NPF-9 and NPF-17 for McGuire Nuclear Station, Units 1 and 2, respectively. The proposed amendments expand the Power Distribution Limits section of the McGuire Unit 1 Technical Specifications to include Base Load Operation in addition to the currently approved Relaxed Axial Offset Control (RAOC) operation. The licensee's submittal contains changes to implement Base Load Operation and corresponding changes to the Bases and administrative sections of the specifications.

The need for the change in the technical specifications arose subsequent to the Unit 1 Cycle 2 zero power physics testing in early May during which a quadrant power tilt was identified. All zero power physics parameters met acceptance criteria except the all rods out hot zero power critical boron concentration and the radial power distribution. A review of the hot zero power results was performed by Westinghouse, and power escalation was performed consistent with the Westinghouse position statement on core tilt. At 100% full power the measured incore quadrant power tilt decreased and the measured power distribution met acceptance criteria, although the power in the peripheral fuel assemblies remained higher than predicted. On June 6, 1984, the transient adjusted LOCA peaking factor was determined by the licensee to exceed its limit, forcing the reduction in the RAOC limits, thus derating the reactor to less than 100% RTP (i.e. 95% RTP). The licensee acted promptly in providing the required technical bases to support a request for an immediately effective change in the McGuire Technical Specifications.

EVAULATION

McGuire Unit 1 is currently derated to 95% of Rated Thermal Power (RTP) because of a quadrant power tilt and in-out shift in core power distribution which has been experienced since Cycle 2 start-up, forcing a reduction in the RAOC limits such that the unit is effectively restricted to 95% RTP.

Both the new proposed Base Load Operation and RAOC establish a maximum total core peaking factor, F_0 , by multiplying a steady-state measured actual core peaking factor by a transient factor, W(Z). The RAOC W(Z) factors are large (up to about 1.3) because they are derived from analysis of a broad spectrum of load following maneuvers, with a wide band of allowable axial flux difference (AFD). Base Load Operation proposes to restrict the allowed load

8410110532 840913 PDR ADDCK 05000369 PDR PDR following maneuvers to a very restricted band of power level (80 to 100% RTP is currently proposed) and the AFD to $\pm 3\%$. Additionally, the reactor must have been operated within the $\pm 3\%$ AFD band at the lower allowed Base Load Operation power level or, if greater, the highest power level allowed by RAOC, for 24 hours prior to entering the Base Load Operation mode. Because the Base Load Operation mode closely approximates running the reactor at equilibrium at full power with no change in axial shape (AFD), there is very little chance for change in the xenon concentration. Therefore, the transient factor W(Z)_{B1} is much smaller (1.08 or less) than the 1.3 W(Z) for RAOC. The product of the W(Z)_{B1} x the measured F₀ can more easily meet the F₀ limit of 2.15, so the reactor probably will not have to be derated.

Because the licensee is trading the ability to maneuver the reactor with RAOC for a lower peaking factor with Base Load Operation using the same analysis techniques with appropriate changes in the assumptions, Base Load Operation is acceptable. There is no change in the F₀ limit of 2.15 used as an input condition for the LOCA analysis, and derates in either mode of operation are required similarly by the Specifications if the F₀ limit is exceeded.

We reviewed each of the Technical Specification changes proposed in the licensee's June 14 submittal and find they appropriately define the requirements for Base Load Operation and transitions to and from RAOC operation presently specified. We also reviewed the changes to the corresponding Bases and administrative sections of the specifications and find them appropriate and acceptable.

Specification 6.9.1.9 requires submittal of Peaking Factor Limit Reports which define the RAOC W(Z) and W(Z)_{BL} functions and the lower power level assumed for Base Load Operation 60 days before their intended use unless otherwise exempted by the Commission. The licensee's submittal included a revised report for RAOC and a report for Base Load Operation. We have reviewed these reports for McGuire Unit 1 Cycle 2 and find them acceptable for use as of the date of this evaluation.

FINAL NO SIGNIFICANT HAZARDS CONSIDERATION (SHC) DETERMINATION

For the reasons discussed above we conclude that the proposed Technical Specification changes do not (1) involve a significant increase in the probability or consequences of an accident previously evaluated, (2) create the possibility of a new or different kind of accident from any accident previously evaluated or (3) involve a significant reduction in a margin of safety, in that they do not permit operation outside previously evaluated limits in a mode not previously evaluated, and therefore do not involve a significant hazards consideration.

The Commission consulted with the State of North Carolina. The State of North Carolina did not have any comments. Based on the Commission's final review and the absence of State comments, the Commission has made a final determination that these amendments involve no significant hazards consideration.

ENVIRONMENTAL CONSIDERATION

The amendments involve a change in use of a facility component located within the restricted area as defined in 10 CFR Part 20. The staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has made a final no significant hazards consideration finding with respect to the amendments. Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR Sec 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

CONCLUSION

Based on the considerations discussed above, we have concluded that: (1) the amendment (a) does not significantly increase the probability or consequences of accidents previously considered, (b) does not create the possibility of a new or different kind of accident from any accident previously evaluated, and (c) does not significantly reduce a margin of safety and therefore does not involve significant hazards considerations; (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such acitivities will be conducted in compliance with the Commission's regulations and the issuance of the amendment will not be inimical to the common defense and security or the health and safety of the public.

Principal Contributors: M. Dunenfeld - Core Performance Branch, DSI R. Birkel - Licensing Branch No. 4, DL

Dated: September 13, 1984 September 13, 1984

AMENDMENT NO. 34 TO FACILITY OPERATING LICENSE NPF-9 - McGUIRE NUCLEAR STATION, UNIT 1 AMENDMENT NO. 15 TO FACILITY OPERATING LICENSE NPF-17 - McGUIRE NUCLEAR STATION, UNIT 2

DISTRIBUTION:

è

Docket Nos. 50-369/370 NRC PDR Local PDR PRC System NSIC LB #4 r/f E. Adensam R. Birkel M. Duncan Attorney, OELD R. Diggs, ADM T. Barnhart (8) ACRS (16) E. L. Jordan, DEQA:I&E J. N. Grace, DRP:I&E L. J. Harmon, I&E File D. Brinkman

DESIGNATED ORIGINAL 1 A Certified By_