# Attachment 1

# Proposed Technical Specification Amendments For McGuire

c. Performing the following calculations:

1. For each core location, calculate the % margin to the maximum allowable design as follows:

$$\% \text{ Operational Margin} = \left( 1 - \frac{F_Q^M(X,Y,Z)}{[F_Q(X,Y,Z)]^{L,OP}} \right) \times 100\%$$

$$\% \text{ RPS Margin} = \left( 1 - \frac{F_Q^M(X,Y,Z)}{[F_Q(X,Y,Z)]^{L,RPS}} \right) \times 100\%$$

where $[F_Q(X,Y,Z)]^{L}_{OP}$ and $[F_Q(X,Y,Z)]^{L}_{RPS}$ are the Operational and RPS design peaking limits defined in the COLR.

2. Find the minimum Operational Margin of all locations examined in 4.2.2.2.c.1 above. If any margin is less than zero, then either of the following actions shall be taken:

(a) Within 15 minutes:

(1) Control the AFD to within new AFD limits that are determined by:

$$(\text{AFD Limit})^{\text{reduced}}_{\text{negative}} = (\text{AFD Limit})^{(3)}_{\text{negative}} + \left| \text{MARGIN}^{\text{MIN}}_{\text{OP}} \right|$$ Absolute Value

$$(\text{AFD Limit})^{\text{reduced}}_{\text{positive}} = (\text{AFD Limit})^{(3)}_{\text{positive}} - \left| \text{MARGIN}^{\text{MIN}}_{\text{OP}} \right|$$ Absolute Value

where $\text{MARGIN}^{\text{MIN}}_{\text{OP}}$ is the minimum margin from 4.2.2.2.c.1, and

(2) Within 8 hours, reset the AFD alarm setpoints to the modified limits of 4.2.2.2.c.2.a, or

(b) Comply with the ACTION requirements of Specification 3.2.2, treating the margin violation in 4.2.2.2.c.1 above as the amount by which $F_Q^{MA}$ is exceeding its limit.

(3) Defined and specified in the COLR per Specification 6.9.1.9.

SURVEILLANCE REQUIREMENTS (Continued)

c. Performing the following calculations:

1. For each core location, calculate the % margin to the maximum allowable design as follows:

$$\% \text{ Operational Margin} = \left( 1 - \frac{F_Q^M(X,Y,Z)}{[F_Q^L(X,Y,Z)]^{OP}} \right) \times 100\%$$

$$\% \text{ RPS Margin} = \left( 1 - \frac{F_Q^M(X,Y,Z)}{[F_Q^L(X,Y,Z)]^{RPS}} \right) \times 100\ \%$$

where $[F_Q^L(X,Y,Z)]^{OP}$ and $[F_Q^L(X,Y,Z)]^{RPS}$ are the Operational and RPS design peaking limits defined in the COLR.

2. Find the minimum Operational Margin of all locations examined in 4.2.2.2.c.1 above. If any margin is less than zero, then either of the following actions shall be taken:

(a) Within 15 minutes:

(1) Control the AFD to within new AFD limits that are determined by:

$$(\text{AFD Limit})^{\text{reduced}}_{\text{negative}} = (\text{AFD Limit})^{\text{COLR}\,(3)}_{\text{negative}}$$

$$+ [\text{MARGIN}^{\text{MIN}}{}_{OP}] \text{ absolute value}$$

$$(\text{AFD Limit})^{\text{reduced}}_{\text{positive}} = (\text{AFD Limit})^{\text{COLR}\,(3)}_{\text{positive}}$$

$$- [\text{MARGIN}^{\text{MIN}}{}_{OP}] \text{ absolute value}$$

where $\text{MARGIN}^{\text{MIN}}{}_{OP}$ is the minimum margin from 4.2.2.2.c.1, and

(2) Within 8 hours, reset the AFD alarm setpoints to the modified limits of 4.2.2.2.c.2.a, or

(b) Comply with the ACTION requirements of Specification 3.2.2, treating the margin violation in 4.2.2.2.c.1 above as the amount by which $F_Q^{MA}$ is exceeding its limit.

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(3) Defined and specified in the COLR per Specification 6.9.1.9.

c. Performing the following calculations:

1. For each core location, calculate the % margin to the maximum allowable design as follows:

$$\% \text{ Operational Margin} = \left( 1 - \frac{F_Q^M(X,Y,Z)}{[F_Q^L(X,Y,Z)]^{OP}} \right) \times 100\%$$

$$\% \text{ RPS Margin} = \left( 1 - \frac{F_Q^M(X,Y,Z)}{[F_Q^L(X,Y,Z)]^{RPS}} \right) \times 100\ \%$$

where $[F_Q^L(X,Y,Z)]^{OP}$ and $[F_Q^L(X,Y,Z)]^{RPS}$ are the Operational and RPS design peaking limits defined in the COLR.

2. Find the minimum Operational Margin of all locations examined in 4.2.2.2.c.1 above. If any margin is less than zero, then either of the following actions shall be taken:

(a) Within 15 minutes:

(1) Control the AFD to within new AFD limits that are determined by:

$$(\text{AFD Limit})^{\text{reduced}}_{\text{negative}} = (\text{AFD Limit})^{\text{COLR}\,(3)}_{\text{negative}}$$

$$+ [\text{MARGIN}^{\text{MIN}}_{OP}] \text{ absolute value}$$

$$(\text{AFD Limit})^{\text{reduced}}_{\text{positive}} = (\text{AFD Limit})^{\text{COLR}\,(3)}_{\text{positive}}$$

$$- [\text{MARGIN}^{\text{MIN}}_{OP}] \text{ absolute value}$$

where $\text{MARGIN}^{\text{MIN}}_{OP}$ is the minimum margin from 4.2.2.2.c.1, and

(2) Within 8 hours, reset the AFD alarm setpoints to the modified limits of 4.2.2.2.c.2.a, or

(b) Comply with the ACTION requirements of Specification 3.2.2, treating the margin violation in 4.2.2.2.c.1 above as the amount by which $F_Q^{MA}$ is exceeding its limit.

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(3) Defined and specified in the COLR per Specification 6.9.1.9.

# Attachment 2

# Description of Proposed Changes and Technical Justification

## Description of Proposed Changes:

Prior to Technical Specification Amendment 130/112, which was approved by the NRC on March 6, 1992, the Technical Specification Manual's instructions for implementing AFD limit reduction referenced the operational space given in the Core Operating Limits Report (COLR). At that time, Technical Specification Surveillance 4.2.2.2f.2a. determined the new AFD limits by reducing the AFD value limits specified in the COLR (reference T/S 3.2.1) by 1% AFD for each percent that the Heat Flux Hot Channel Factor exceeds its limits as determined by the equation given in Specification 4.2.2.2f.1. During compilation of Technical Specification Amendment 130/112 for submittal, the new AFD formula was acquired from the Nuclear Design personnel for incorporation into the amendment. During processing of the amendment, the formula was inadvertently changed. The variance in the formula went undetected by Duke personnel and NRC personnel throughout the submittal's review and approval by the NRC and its implementation by Duke personnel at McGuire.

Later, Nuclear Design Personnel were referencing the AFD formula in McGuire's Technical Specifications in the course of their work. Recognizing the formula was listed incorrectly, they contacted the Reactor Engineering Group at McGuire, who confirmed that their past and present calculations had been correct. They then began the process of correcting the formula as listed in the Technical Specification Manual via this proposed amendment.

Systems Engineering verified via historic files that procedure PT/0/A/4150/02A "Core Power Distribution And Incore/INS Correlation Check", has implemented the AFD limit adjustments correctly both before and after implementation of Technical Specification Amendment 130/112.

## TECHNICAL JUSTIFICATION

**General Discussion:**

The subject Technical Specification (4.2.2.2c.2) is for monitoring core peaking factors to ensure accident analysis assumptions are satisfied during unit operation. If the peaking factor (F-sub-Q) exceeds the surveillance limit, it is necessary to reduce the operating space to ensure any accident remains within the bounds of the analysis.

As presently written, should the surveillance limit be exceeded, the following would apply:

AFD Limit (Red. Neg.) = AFD Limit (COLR) - Margin (Min. Op.)

Exceeding a surveillance limit would result in the "Margin (Min. Op.)" being a negative number, such that the Reduced Negative AFD Limit would be less negative. For example, a negative AFD limit of -20% in the COLR, and a Min. Op. margin of -2% (exceeded surveillance limit), the formula would become:

AFD Limit (Red. Neg.) = -20% - (-2%)

AFD Limit (Red. Neg.) = -18%

Which is a reduction in operating space (limits). However, the present formula for a Margin violation would affect the positive limit as follows:

AFD Limit (Red. Pos.) = AFD Limit (COLR) - Margin (Min. Op.)

As an example, a positive AFD limit of +10% in the COLR, and a Min. Op. margin of -2% (exceeded surveillance limit), the formula would become:

AFD Limit (Red. Pos.) = +10% - (-2%)

AFD Limit (Red. Pos.) = +12%

Which is an actual expansion of operating space on the positive side of the AFD limit curve, which is not the intent of the Technical Specification.

The proposed change is to make the equations identical to those approved for Catawba Nuclear Station:

AFD Limit (Red. Neg.) = AFD Limit (COLR) + [ Margin (Min. Op.) ]

AFD Limit (Red. Pos.) = AFD Limit (COLR) - [ Margin (Min. Op.) ]

The use of Absolute Values in the equations will ensure the proper reduction of operating space is reached. Repeating the examples above:

AFD Limit (Red. Neg.) = AFD Limit (COLR) + [ Margin (Min. Op.) ]

AFD Limit (Red. Neg.) = -20% + [ -2% ]

AFD Limit (Red. Neg.) = -18% Which is correct, and

AFD Limit (Red. Pos.) = AFD Limit (COLR) - [ Margin (Min. Op]

AFD Limit (Red. Pos.) = +10% - [ -2%]

AFD Limit (Red. Pos.) = +8% Which is also correct.

The proper limit reduction is more conservative than the literal interpretation of the Technical Specification, and is presently implemented in McGuire Station Procedures.

# Attachment 3

# No Significant Hazards Analysis

## NO SIGNIFICANT HAZARDS ANALYSIS

**A.** The change would not involve a significant increase in the probability or consequences of an accident previously evaluated.

The monitoring of core power distribution and peaking factors is to ensure accident analysis assumptions such as maximum local pin power at the initiation of an accident are satisfied, and are not involved in the initiation or mitigation of any previously evaluated accident.

The proposed change is actually more conservative than the existing Technical Specification currently being used at McGuire.

**B.** The change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

No plant modifications (hardware or control methods) are involved with this proposed change. The change is simply to correct an error in the Specification introduced in Amendments 130 (Unit 1) and 112 (Unit 2). The proposed change is more restrictive than the current specification. No changes are proposed which could create any new accident scenarios.

**C.** The proposed change will not involve a significant reduction in any margin of safety.

The proposed change ensures the margin of safety is properly maintained by properly reducing (instead of increasing) the Positive AFD limit if a peaking factor exceeds its surveillance limit. The change is more conservative than the existing Specification and will ensure the margins of safety are properly maintained.

# Attachment 4

# Environmental Impact Assessment

## Environmental Impact Assessment

Based on the preceding discussion and the supporting Technical Justification, Duke has concluded that there is no environmental impact involved in this request.