

UNITED STATES ATOMIC ENERGY COMMISSION

NORTHERN STATES POWER COMPANY

Monticello Nuclear Generating Plant

Docket No. 50-263

REQUEST FOR AUTHORIZATION OF
A CHANGE IN TECHNICAL SPECIFICATIONS
OF APPENDIX A

PROVISIONAL OPERATING LICENSE NO. DPR-22

(Change Request Dated February 27, 1974)

Northern States Power Company, a Minnesota corporation, requests authorization for changes to the Technical Specifications as shown on the attachments labeled Exhibit A and Exhibit B. Exhibit A describes the proposed changes along with reasons for change. Exhibit B is a set of Technical Specification pages incorporating the proposed changes.

This request contains no restricted or other defense information.

NORTHERN STATES POWER COMPANY

By

Wade Larkin
Wade Larkin

Group Vice President - Power Supply

On this 27 day of February, 1974, before me a notary public in and for said County, personally appeared Wade Larkin, Group Vice President - Power Supply, and being first duly sworn acknowledged that he is authorized to execute this document in behalf of Northern States Power Company, that he knows the contents thereof and that to the best of his knowledge, information and belief, the statements made in it are true and that it is not interposed for delay.

John J. Smith
John J. Smith

JOHN J. SMITH

Notary Public, Hennepin County, Minnesota
My Commission Expires March 3, 1976

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EXHIBIT A

MONTICELLO NUCLEAR GENERATING PLANT
DOCKET NO. 50-263

CHANGE REQUEST DATED FEBRUARY 27, 1974

PROPOSED CHANGES TO THE TECHNICAL SPECIFICATIONS
APPENDIX A OF PROVISIONAL OPERATING
LICENSE NO. DPR-22

Pursuant to 10CFR50.59, the holders of the above-mentioned license hereby propose the following changes to Appendix A, Technical Specifications.

1. PROPOSED CHANGES

On page 6, TS 2.3.A.1, line 4, change the words "...above the curve..." to "...above the applicable curve..."

On page 7, TS 2.3.A.1, expand the equation for the scram setting to two equations as follows:

$$S = \frac{486,000}{X} P \quad (7 \times 7 \text{ fuel})$$

$$S = \frac{425,000}{X} P \quad (8 \times 8 \text{ fuel})$$

On page 7, TS 2.3.B, line 4, change the words "...above the curve..." to "...above the applicable curve..."

On page 7, TS 2.3.B, expand the equation for the rod block trip setting to two equations as follows:

$$RB = \frac{437,400}{X} P \quad (7 \times 7 \text{ fuel})$$

$$RB = \frac{382,400}{X} P \quad (8 \times 8 \text{ fuel})$$

REASON FOR CHANGE

These proposed changes add the appropriate equations for the scram setting and rod block trip setting for the 8x8 fuel element design described in Reference 1. These equations are derived in the same manner as were the existing equations governing 7x7 fuel design.

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2. PROPOSED CHANGE

On page 10, Figure 2.1.1, make the following changes:

Change "...is ≤ 3.08 " to "...is less than or equal to the design value"

Change "For Peaking Factors > 3.08 " to "For Peaking Factors Greater than Design"

Change "...Peaking > 3.08 " to "...Peaking $> DPF$ "

Change "PF = Peaking Factor > 3.08 " to "PF = Peaking Factor"

Add the words,

"DPF = Design Peaking Factor
= 3.08 for 7x7 fuel
= 3.04 for 8x8 fuel"

REASON FOR CHANGE

As discussed in Reference 1, the design peaking factor of 8x8 fuel is 3.04 relative to a design value of 3.08 for the 7x7 fuel element design.

3. PROPOSED CHANGES

On page 12, Figure 2.3.2, change the title to "Relationship Between Peak Heat Flux and Power for Peaking Factors of 3.08 (7x7 fuel) and 3.04 (8x8 fuel)"

On page 12, Figure 2.3.2, add a curve of the form and with the label, "X=354,250 P (8x8 fuel)"

REASON FOR CHANGE

The additional curve reflects the design of 8x8 fuel as described in Reference 1. It is derived in the same manner as the existing 7x7 curve.

4. PROPOSED CHANGES

On page 14, TS Bases 2.1, third paragraph, line 2, extend the sentence ending in "...total peaking factor of 3.08." to read "...total peaking factor of 3.08 for 7x7 fuel and 3.04 for 8x8 fuel."

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On page 14, TS Bases 2.1, third paragraph, lines 4 and 5, delete the words, "The total peaking factor is less than 3.08 if the control rod withdrawal sequence is followed. However," making the words read "... (LPRM) System. To maintain..."

On page 14, TS Bases 2.1, third paragraph, last line, change the words, "...peaking factor in excess of 3.08." to "...peaking factor in excess of the design value."

REASON FOR CHANGE

As discussed above, these changes reference the characteristic peaking factor of the 8x8 fuel design. The sentence removed from lines 4 and 5 is a generalization which is incorrect in certain situations. In particular, during plant startups with transient xenon conditions, the peaking factor is likely to exceed the design peaking factor at low reactor power levels. It is for this very reason that Specifications 2.1 and 2.3 make provisions for peaking factors greater than design values for reduced reactor power levels.

5. PROPOSED CHANGE

On page 16, TS Bases 2.1, first paragraph, second line, change the words, "...time constant of the fuel which is 8-9 seconds." to read, "time constant of the fuel."

REASON FOR CHANGE

Stating a numerical value for the fuel time constant of a given fuel design is an over-simplification of the heat transfer mechanism. Extensive discussions of this subject is found in Reference 2 where the effects of fuel pellet density, gap size and conductance, stored energy, etc., are considered.

6. PROPOSED CHANGES

On page 19, TS Bases 2.3.A, third paragraph, expand the phrase, "...peaking factor of 3.08." to read "...peaking factor of 3.08 for 7x7 fuel and 3.04 for 8x8 fuel."

On page 19, TS Bases 2.3.A, third paragraph, third line, change the number "3.08" to read "the design value."

On page 19, TS Bases 2.3.A, third paragraph, sixth line, change the number "3.08" to read "the design value."

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On page 19, TS Bases 2.3.A, third paragraph, change the last sentence to read, "If the APRM scram setting should require a change due to an abnormal peaking condition, it will be done by increasing the APRM gain and thus reducing the slope and intercept point of the flow-biased scram curve by the reciprocal of the APRM gain change."

REASON FOR CHANGES

Changes are proposed, as appropriate, to acknowledge the unique peaking factors of 7x7 and 8x8 fuel as discussed in Reference 1.

A change is proposed in the way settings are altered to allow operation with peaking factors in excess of design values. By increasing the gain on an APRM to an artificially high reading, one is in effect lowering both the scram and rod block settings by the same factor. This method adjusts the scram curve in the same manner as the safety limit is adjusted for operation with excessive peaking factors.

For example, looking at the safety limit for 7x7 fuel (page 10), suppose the short term peaking factor exceeds design by the factor k such that $k = PF/3.08$. The APRM gain would then be increased such that indicated power, P , would be P (indicated) = $k \times P$ (actual). This, in effect, would decrease the scram and rod block settings (required by Specification 2.3.A.1) to $S \leq (1/k) \times (0.65 W + 55.0)$; $RB \leq (1/k) \times (0.65 W + 43.0)$. The slopes of these curves would therefore change in the same manner as the safety limit curves (page 10); that is, $SL = (1/k) \times SL_0$.

7. PROPOSED CHANGES

On page 21, TS Bases 2.3.B, first paragraph, line two, expand the words, "...peaking factor was 3.08" to read "peaking factor was 3.08 for 7x7 fuel and 3.04 for 8x8 fuel."

On page 21, TS Bases 2.3.B, first paragraph, fifth line, replace the number "3.08" with the words "the design value."

On page 21, first paragraph, change the last sentence to read, "The rod block setting is changed by increasing the APRM gain and thus reducing the slope and intercept point of the flow-biased rod block curve by the reciprocal of the APRM gain change."

REASON FOR CHANGES

These proposed changes acknowledge the unique peaking factors 7x7 and 8x8 fuel as discussed in Reference 1.

Item 6, above, discusses the proposed method for adjusting the scram setting when peaking factors exceed design. That discussion is equally applicable to the rod block setting referenced in this item.

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8. PROPOSED CHANGES

On page 190, TS 5.1.A, change the name "Great Northern Railway." to "Burlington Northern Railway."

REASON FOR CHANGE

The consolidation of railroad companies has led to a new name for the company holding the right-of-way discussed.

9. PROPOSED CHANGE

On page 190, TS 5.2.A, change the Specification to read,
"A. The reactor core shall consist of not more than 484
fuel assemblies of 49 or 63 fuel rods each."

REASON FOR CHANGE

This proposed change incorporates the 8x8 fuel design into the discussion of reactor design features.

REFERENCES

1. "Second Reload Submittal," L O Mayer (NSP) to J F O'Leary (USAEC), November 19, 1973.
2. General Electric topical report NEDO-20181, Revision 1, "GEGAP-III: A Model for the Prediction of Pellet-Cladding Thermal Conductance in BWR Fuel Rods," November 1973.

EXHIBIT B

This exhibit consists of the following pages revised to incorporate the proposed changes:

PAGES

6
7
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12
14
16
19
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