November 7, 198

Docket No. 50-423

Mr. Edward J. Mroczka
Senior Vice President
Nuclear Engineering and Operations
Northeast Nuclear Energy Company
Post Office Box 270
Hartford, Connecticut 06141-0270

Dear Mr. Mroczka:

SUBJECT: ISSUANCE OF AMENDMENT (TAC NO. 69347)

DISTRIBUTION
Docket File
NRC & Local PDRs
SVarga
BBoger
SNorris
DJaffe
OGC
D. Hagan
E. Jordan
B. Grimes
T. Barnhart(4)
Wanda Jones
E. Butcher
ACRS(10)
GPA/PA
ARM/LFMB
Gray File

The Commission has issued the enclosed Amendment No. 27 to Facility Operating License No. NPF-49 for Millstone Nuclear Power Station, Unit No. 3, in response to your application dated September 2, 1988.

The amendment revise Technical Specification Sections 4.2.3.1.6, 4.2.3.2.6 and the bases for Technical Specification 3/4.2.3 to require a 0.1 percent penalty to added to Reactor Coolant System (RCS) flow measurement uncertainty values if the feedwater flow venturis are not cleaned at least once every 18 months. This is to be done before the precision heat balance is performed to calibrate the reactor coolant flow rate indicators. This change is necessary to incorporate an NRC staff concern addressed in the Safety Evaluation for Amendment No. 12, the RTD bypass manifold elimination.

A copy of the related Safety Evaluation is also enclosed. The notice of issuance will be included in the Commission's bi-weekly Federal Register notice.

Sincerely,

original signed by

David H. Jaffe, Project Manager
Project Directorate I-4
Division of Reactor Projects I/II
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 27 to NPF-49
2. Safety Evaluation

cc w/enclosures:
See next page

LA:PDI-4	PM:PDI-4	PD:PDI-4	OGC
SNorris	DJaffe:cd	JStolz	
10/24/88	10/24/88	10/24/88	11/2/88

DF01
1/1

C/P1 cc

Mr. E. J. Mroczka
Northeast Nuclear Energy Company

Millstone Nuclear Power Station
Unit No. 3

cc:

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

NORTHEAST NUCLEAR ENERGY COMPANY, ET AL.*

DOCKET NO. 50-423

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 27
License No. NPF-49

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Northeast Nuclear Energy Company, et al. (the licensee) dated September 2, 1988, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and 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;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   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.

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*Northeast Nuclear Energy Company is authorized to act as agent and representative for the following Owners: Central Maine Power Company, Central Vermont Public Service Corporation, Chicopee Municipal Lighting Plant, City of Burlington, Vermont, Connecticut Municipal Electric Light Company, Massachusetts Municipal Wholesale Electric Company, Montaup Electric Company, New England Power Company, The Village of Lyndonville Electric Department, Western Massachusetts Electric Company, and Vermont Electric Generation and Transmission Cooperative, Inc., and has exclusive responsibility and control over the physical construction, operation and maintenance of the facility.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-49 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 27 , and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance, to be implemented within 30 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

John F. Stolz, Director
Project Directorate I-4
Division of Reactor Projects I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: November 7, 1988

ATTACHMENT TO LICENSE AMENDMENT NO. 27

FACILTIY OPERATING LICENSE NO. NPF-49

DOCKET NO. 50-423

Replace the following pages of the Appendix A Technical Specifications with the enclosed pages. The revised pages are identified by amendment number and contain vertical lines indicating the areas of change. Any corresponding overleaf pages are provided to maintain document completeness.

Remove	Insert
3/4 2-17	3/4 2-17
3/4 2-19	3/4 2-19
B 3/4 2-6	B 3/4 2-6

SURVEILLANCE REQUIREMENT (Continued)

4.2.3.1.5 The RCS total flow rate shall be determined by precision heat balance measurement at least once per 18 months. Within 7 days prior to performing the precision heat balance, the instrumentation used for determination of steam pressure, feedwater pressure, feedwater temperature, and feedwater venturi ΔP in the calorimetric calculations shall be calibrated.

4.2.3.1.6 If the feedwater venturis are not inspected and cleaned at least once per 18 months, an additional 0.1% will be added to the total RCS flow measurement uncertainty.

POWER DISTRIBUTION LIMITS

RCS FLOW RATE AND NUCLEAR ENTHALPY RISE HOT CHANNEL FACTOR

THREE LOOPS OPERATING

LIMITING CONDITION FOR OPERATION

3.2.3.2 The indicated Reactor Coolant System (RCS) total flow rate and F^N_H shall be maintained as follows:

a. RCS total flow rate $\geq$ 304,780 gpm, and

b. $F^N_{\Delta H} \leq 1.351 \left[1.0 + 0.43 (1.0 - P)\right]$

Where:

1) $P = \frac{\text{THERMAL POWER}}{\text{RATED THERMAL POWER}}$,

2) $F^N_{\Delta H}$ = Measured values of $F^N_{\Delta H}$ obtained by using the movable incore detectors to obtain a power distribution map. The measured value of $F^N_{\Delta H}$ should be used since Specification 3.2.3.2b. takes into consideration a measurement uncertainty of 4% for incore measurement, and

3) The measured value of RCS total flow rate shall be used since uncertainties of 2.0% for flow measurement have been included in Specification 3.2.3.2a.

APPLICABILITY: MODE 1.

ACTION:

With the RCS total flow rate or $F^N_{\Delta H}$ outside the region of acceptable operation:

a. Within 2 hours either:

1. Restore the RCS total flow rate and $F^N_{\Delta H}$ to within the above limits, or

2. Reduce THERMAL POWER to less than 32% of RATED THERMAL POWER and reduce the Power Range Neutron Flux - High Trip Setpoint to less than or equal to 37% of RATED THERMAL POWER within the next 4 hours.

LIMITING CONDITION FOR OPERATION

ACTION (Continued)

b. Within 24 hours of initially being outside the above limits, verify through incore flux mapping and RCS total flow rate that $F^N_{\Delta H}$ and RCS total flow rate are restored to within the above limits, or reduce THERMAL POWER to less than 5% of RATED THERMAL POWER within the next 2 hours.

c. Identify and correct the cause of the out-of-limit condition prior to increasing THERMAL POWER above the reduced THERMAL POWER limit required by ACTION a.2. and/or b., above; subsequent POWER OPERATION may proceed provided that $F^N_{\Delta H}$ and indicated RCS total flow rate are demonstrated, through incore flux mapping and RCS total flow rate comparison, to be within the region of acceptable operation prior to exceeding the following THERMAL POWER levels:

1. A nominal 32% of RATED THERMAL POWER, and

2. A nominal 50% of RATED THERMAL POWER.

SURVEILLANCE REQUIREMENT (Continued)

4.2.3.2.1 The provisions of Specification 4.0.4 are not applicable.

4.2.3.2.2 RCS total flow rate and $F^N_{\Delta H}$ shall be determined to be within the acceptable range at least once per 31 Effective Full Power Days.

4.2.3.2.3 The indicated RCS total flow rate shall be verified to be within the acceptable range at least once per 12 hours when the most recently obtained value of $F^N_{\Delta H}$, obtained per Specification 4.2.3.2.2, is assumed to exist.

4.2.3.2.4 The RCS total flow rate indicators shall be subjected to a CHANNEL CALIBRATION at least once per 18 months. The measurement instrumentation shall be calibrated within 7 days prior to the performance of the calorimetric flow measurement.

4.2.3.2.5 The RCS total flow rate shall be determined by precision heat balance measurement at least once per 18 months. Within 7 days prior to performing the precision heat balance, the instrumentation used for determination of steam pressure, feedwater pressure, feedwater temperature, and feedwater venturi ΔP in the calorimetric calculations shall be calibrated.

4.2.3.2.6 If the feedwater venturis are not inspected and cleaned at least once per 18 months, an additional 0.1% will be added to the total RCS flow measurement uncertainty.

3/4.2.4 QUADRANT POWER TILT RATIO

LIMITING CONDITION FOR OPERATION

3.2.4 The QUADRANT POWER TILT RATIO shall not exceed 1.02.

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

ACTION:

a. With the QUADRANT POWER TILT RATIO determined to exceed 1.02 but less than or equal to 1.09:

1. Calculate the QUADRANT POWER TILT RATIO at least once per hour until either:

a) The QUADRANT POWER TILT RATIO is reduced to within its limit, or

b) THERMAL POWER is reduced to less than 50% of RATED THERMAL POWER.

2. Within 2 hours either:

a) Reduce the QUADRANT POWER TILT RATIO to within its limit, or

b) Reduce THERMAL POWER at least 3% from RATED THERMAL POWER for each 1% of indicated QUADRANT POWER TILT RATIO in excess of 1 and similarly reduce the Power Range Neutron Flux-High Trip Setpoints within the next 4 hours.

3. Verify that the QUADRANT POWER TILT RATIO is within its limit within 24 hours after exceeding the limit or reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within the next 2 hours 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; and

4. Identify and correct the cause of the out-of-limit condition prior to increasing THERMAL POWER; subsequent POWER OPERATION above 50% of RATED THERMAL POWER may proceed provided that the QUADRANT POWER TILT RATIO is verified within its limit at least once per hour for 12 hours or until verified acceptable at 95% or greater RATED THERMAL POWER.

*See Special Test Exceptions Specification 3.10.2.

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

c. The control rod insertion limits of Specifications 3.1.3.5 and 3.1.3.6 are maintained; and

d. The axial power distribution, expressed in terms of AXIAL FLUX DIFFERENCE, in maintained within the limits.

$F^N_{\Delta H}$ will be maintained within its limits provided Conditions a. through d. above are maintained. The relaxation of $F^N_{\Delta H}$ as a function of THERMAL POWER allows changes in the radial power shape for all permissible rod insertion limits.

The $F^N_{\Delta H}$ as calculated in Specifications 3.2.3.1 and 3.2.3.2 are used in the various accident analyses where $F^N_{\Delta H}$ influences parameters other than DNBR, e.g., peak clad temperature, and thus is the maximum "as measured" value allowed.
The difference between the three and four-loop $F^N_{\Delta H}$ equations is due to a more restrictive $F^N_{\Delta H}$ used in the safety analyses for three-loop operation. In four-loop operation, the allowable measured $F^N_{\Delta H}$ calculated in Specification 3.2.3.1 at 65% Rated Thermal Power is $\leq$ 1.65. In three-loop operation, however, $F^N_{\Delta H}$ is restricted to a measured value $\leq$ 1.55 to be consistent with the safety analyses for three loop operation. At zero power, both specifications allow the same measured $F^N_{\Delta H}$.

Fuel rod bowing reduces the value of DNB ratio. Credit is available to offset this reduction in the generic margin. The generic margins, totaling 9.1% DNBR completely offset any rod bow penalties. This margin includes the following:

a. Design limit DNBR of 1.30 vs 1.28,

b. Grid Spacing (K_s) of 0.046 vs. 0.059,

c. Thermal Diffusion Coefficient of 0.038 vs 0.059,

d. DNBR Multiplier of 0.86 vs. 0.88, and

e. Pitch reduction.

The applicable values of rod bow penalties are referenced in the FSAR.

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

When an F_Q measurement is taken, an allowance for both experimental error and manufacturing tolerance must be made. An allowance of 5% is appropriate for a full-core map taken with the Incore Detector Flux Mapping System, and a 3% allowance is appropriate for manufacturing tolerance.

The Radial Peaking Factor, $F_{xy}(Z)$, is measured periodically to provide assurance that the Hot Channel Factor, $F_Q(Z)$, remains within its limit. The F_{xy} limit for RATED THERMAL POWER (F_{xy}^{RTP}) as provided in the Radial Peaking Factor Limit Report per Specification 6.9.1.6 was determined from expected power control manuevers over the full range of burnup conditions in the core.

When RCS flow rate and $F_{\Delta H}^N$ are measured, no additional allowances are necessary prior to comparison with the limits of the Limiting Condition for Operation. Measurement errors of 1.8% for four loop flow and 2.0% for three loop flow for RCS total flow rate and 4% for $F_{\Delta H}^N$ have been allowed for in determination of the design DNBR value.

The measurement error for RCS total flow rate is based upon performing a precision heat balance and using the result to calibrate the RCS flow rate indicators. Potential fouling of the feedwater venturi which might not be detected could bias the result from the precision heat balance in a nonconservative manner. Therefore, a penalty of 0.1% for undetected fouling of the feedwater venturi will be added if venturis are not inspected and cleaned at least once per 18 months. Any fouling which might bias the RCS flow rate measurement greater than 0.1% can be detected by monitoring and trending various plant performance parameters. If detected, action shall be taken before performing subsequent precision heat balance measurements, i.e., either the effect of the fouling shall be quantified and compensated for in the RCS flow rate measurement or the venturi shall be cleaned to eliminate the fouling.

The 12-hour periodic surveillance of indicated RCS flow is sufficient to detect only flow degradation which could lead to operation outside the acceptable region of operation defined in Specifications 3.2.3.1 and 3.2.3.2.

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.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 27

TO FACILITY OPERATING LICENSE NO. NPF-49

NORTHEAST NUCLEAR ENERGY COMPANY, ET AL.

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 3

DOCKET NO. 50-423

INTRODUCTION

By Application for License Amendment dated September 2, 1988, Northeast Nuclear Energy Company (NNECO) proposed changes to the Millstone Unit 3 Technical Specifications (TS). The proposed amendment would revise Technical Specification Sections 4.2.3.1.6, 4.2.3.2.6 and the bases for TS 3/4.2.3 to require a 0.1 percent penalty to be added to Reactor Coolant System (RCS) flow measurement uncertainty values if the feedwater flow venturis are not cleaned at least once every 18 months. This is to be done before the precision heat balance is performed to calibrate the reactor coolant flow rate indicators. This change was necessary to incorporate an NRC staff concern addressed in the Safety Evaluation for Amendment No. 12, the RTD bypass Manifold elimination.

DISCUSSION AND EVALUATION

On January 20, 1988, the NRC issued Amendment No. 12 to the Facility Operating License for Millstone Unit No. 3. Enclosure 2 to the January 20, 1988 letter provided an evaluation of the licensee's methodology for determining RCS flow. One component of the overall RCS flow uncertainty is the uncertainty related to the condition of the feedwater flow sensing instrumentation. Since the feedwater flow venturi sensors are prone to fouling, overall RCS flow uncertainty may be increased by as much as 0.1% if such fouling is not corrected. In the event that the feedwater flow venturi sensors cannot be inspected during refueling outages, it is conservative to assume that fouling has occurred and that the increase of 0.1% for RCS flow uncertainty is applicable. Regarding the effect of venturi fouling on RCS flow uncertainty, Enclosure 2 to the NRC staff's January 20, 1988 letter concluded that:

> "TS sections 4.2.3.1.6, 4.2.3.2.6 and the bases for TS section 3/4.2.4 [sic] (page B 3/4 2-6) will need to be modified to state that the penalty for undetected fouling of the feedwater venturis of 0.1% will be added to the flow measurement uncertainty values if the venturis are not cleaned. This is to be done before the precision heat balance is made to calibrate the RCS flow rate indicators (approximately once per 18 months).

The licensee has stated that the feedwater venturis have been cleaned for the Cycle 2 operation. The licensee has stated (Ref. 10) that the above TS's will be modified to reflect the requirement of 0.1% penalty if the venturis are not cleaned and submitted for NRC approval. The staff requires this modification prior to Cycle 3 operation."

At the present time, TS 4.2.3.1.6 requires that, in the event that the venturis are not inspected, the 0.1% uncertainty factor for RCS flow is imposed. No "cleaning" requirement is contained in TS 4.2.3.1.6. However, the proposed change to TS 4.2.3.1.6 contains the cleaning requirement. No similar requirement is presently in TS 4.2.3.2.6. The proposed change to TS 4.2.3.2.6, however, is identical to that proposed for TS 4.2.3.1.6.

The NRC staff has noted that the licensee's incorporation of the 0.1 percent penalty requirement into the TS satisfies a licensee commitment documented in the Amendment No. 12 Safety Evaluation. Therefore, the staff finds the licensee evaluation acceptable.

ENVIRONMENTAL CONSIDERATION

This amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The staff has determined that the amendment involves 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 previously published a proposed finding that the amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 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 amendment.

CONCLUSION

We have concluded, based on the considerations discussed above, that (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities 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 to the health and safety of the public.

Dated: November 7, 1988

Principal Contributor: G. S. Barber