May 23, 1995

Mr. John F. Opeka
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SUBJECT: ISSUANCE OF AMENDMENT (TAC NO. M91423)

Dear Mr. Opeka:

The Commission has issued the enclosed Amendment No. 114 to Facility Operating License No. NPF-49 for the Millstone Nuclear Power Station, Unit No. 3. This amendment is in response to your application dated January 24, 1995, as supplemented March 22 and 29, 1995, and April 25, 1995.

The amendment revises Technical Specification 3.2.3.1.a and Table 2.2-1 to reduce the minimum reactor coolant system (RCS) flow rate by 4%, with corresponding changes in loop flow. The current minimum RCS flow rate of 387,480 gallons per minute (gpm) is reduced to 371,920 gpm for four-loop operation.

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

Sincerely,

Original signed by M. Griggs for

Vernon L. Rooney, Senior Project Manager
Project Directorate I-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-423

Enclosures: 1. Amendment No. 114 to NPF-49
2. Safety Evaluation

cc w/encls: See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

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cc w/encls: See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

NORTHEAST NUCLEAR ENERGY COMPANY, ET AL.

DOCKET NO. 50-423

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 114
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 January 24, 1995, as supplemented March 22 and 29, 1995, and April 25, 1995, comply 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.

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. 114 , 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 60 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Phillip F. McKee, Director
Project Directorate I-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: May 23, 1995

ATTACHMENT TO LICENSE AMENDMENT NO. 114

FACILITY OPERATING LICENSE NO. NPF-49

DOCKET NO. 50-423

Replace the following pages of the Appendix A Technical Specifications with the attached pages. The revised pages are identified by amendment number and contain vertical lines indicating the areas of change.

Remove	Insert
2-5	2-5
2-6	2-6
2-10	2-10
2-12	2-12
3/4 2-19	3/4 2-19

TABLE 2.2-1

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TOTAL ALLOWANCE (TA)	Z	SENSOR ERROR (S)	TRIP SETPOINT	ALLOWABLE VALUE
1. Manual Reactor Trip	N.A.	N.A.	N.A.	N.A.	N.A.
2. Power Range, Neutron Flux					
a. High Setpoint					
1) Four Loops Operating	7.5	4.56	0	≤ 109% of RTP**	≤ 111.1% of RTP**
2) Three Loops Operating	7.5	4.56	0	≤ 80% of RTP**	≤ 82.1% of RTP**
b. Low Setpoint	8.3	4.56	0	≤ 25% of RTP**	≤ 27.1% of RTP**
3. Power Range, Neutron Flux, High Positive Rate	1.6	0.5	0	≤ 5% of RTP** with a time constant ≥ 2 seconds	≤ 6.3% of RTP** with a time constant ≥ 2 seconds
4. Power Range, Neutron Flux, High Negative Rate	1.6	0.5	0	≤ 5% of RTP** with a time constant ≥ 2 seconds	≤ 6.3% of RTP** with a time constant ≥ 2 seconds
5. Intermediate Range, Neutron Flux	17.0	8.41	0	≤ 25% of RTP**	≤ 30.9% of RTP**
6. Source Range, Neutron Flux	17.0	10.01	0	≤ 10^{+5}cps	≤ 1.4 x 10^{+5} cps
7. Overtemperature ΔT					
a. Four Loops Operating					
1) Channels I, II	10.0	8.14	1.61 + 1.33 (Temp + Press)	See Note 1	See Note 2
2) Channels III, IV	10.0	7.17	1.61 + 2.60 (Temp + Press)	See Note 1	See Note 2

**RTP = RATED THERMAL POWER

TABLE 2.2-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TOTAL ALLOWANCE (TA)	Z	SENSOR ERROR (S)	TRIP SETPOINT	ALLOWABLE VALUE
b. Three Loops Operating					
1) Channels I, II	10.0	6.80	1.71 + 1.33 (Temp + Press)	See Note 1	See Note 2
2) Channels III, IV	10.0	5.83	1.71 + 2.60 (Temp + Press)	See Note 1	See Note 2
8. Overpower ΔT (Four Loops Operating)	4.8	1.28	1.61	See Note 3	See Note 4
9. Pressurizer Pressure-Low	5.0	1.77	3.3	≥ 1900 psia	≥ 1890 psia
10. Pressurizer Pressure-High	5.0	1.77	3.3	≤ 2385 psia	≤ 2395 psia
11. Pressurizer Water Level-High	8.0	5.13	2.7	≤ 89% of instrument span	≤ 90.7% of instrument span
12. Reactor Coolant Flow-Low	2.5	1.52	0.78	≥ 90% of loop design flow*	≥ 89.1% of loop design flow*
13. Steam Generator Water Level Low-Low	18.10	16.64	1.50	≥ 18.10% of narrow range instrument span	≥ 17.11% of narrow range instrument span
14. General Warning Alarm	N.A.	N.A.	N.A.	N.A.	N.A.
15. Low Shaft Speed - Reactor Coolant Pumps	3.8	0.5	0	≥ 95.8% of rated speed	≥ 92.5% of rated speed

*Minimum Measured Flow Per Loop = 1/4 of the RCS Flow Rate Limit as listed in Section 3.2.3.1.a (Four Loops Operating); 1/3 of the RCS Flow Rate Limit as listed in Section 3.2.3.2.a (Three Loops Operating)

Amendment No. 17, 31, 43, 99, 114

TABLE NOTATIONS (Continued)

NOTE 1: (Continued)

T' $\leq$ 587.1°F (Nominal T_{avg} at RATED THERMAL POWER);

K_3 = 0.001311/psi;

P = Pressurizer pressure, psia;

P' = 2250 psia (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:

(1) For $q_t - q_b$ between -26% and + 3%, $f_1(\Delta I) = 0$, 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;

(2) For each percent that the magnitude of $q_t - q_b$ exceeds -26%, the ΔT Trip Setpoint shall be automatically reduced by 3.55% of its value at RATED THERMAL POWER; and

(3) For each percent that the magnitude of $q_t - q_b$ exceeds +3%, the ΔT Trip Setpoint shall be automatically reduced by 1.98% 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 1.4% ΔT span (Four Loop Operation); 2.7% ΔT span (Three Loop Operation).

TABLE 2.2-1 (Continued)

TABLE NOTATIONS (Continued)

NOTE 3: (Continued)

K_6 = 0.00180/°F for T > T" and K_6 = 0 for T ≤ T",

T = As defined in Note 1,

T" = Indicated T_{avg} at RATED THERMAL POWER (Calibration temperature for ΔT instrumentation, ≤ 587.1°F),

S = As defined in Note 1, and

$f_2(\Delta I)$ = 0 for all ΔI.

NOTE 4: The channel's maximum Trip Setpoint shall not exceed its computed Trip Setpoint by more than 2.7% ΔT span. (Four Loop Operation)

NOTE 5: Setpoint is for increasing power.

NOTE 6: Setpoint is for decreasing power.

POWER DISTRIBUTION LIMITS

3/4.2.3 RCS FLOW RATE AND NUCLEAR ENTHALPY RISE HOT CHANNEL FACTOR

FOUR LOOPS OPERATING

LIMITING CONDITION FOR OPERATION

3.2.3.1 The indicated Reactor Coolant System (RCS) total flow rate and $F^N_{\Delta H}$ shall be maintained as follows:

a. RCS total flow rate $\geq$ 371,920 gpm, and

b. $F^N_{\Delta H} \leq F^{RTP}_{\Delta H} [1.0 + PF_{\Delta H} (1.0 - P)]$

Where:

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

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 3.2.3.1b. takes into consideration a measurement uncertainty of 4% for incore measurement,

3) $F^{RTP}_{\Delta H}$ = The $F^N_{\Delta H}$ limit at RATED THERMAL POWER in the CORE OPERATING LIMITS REPORT (COLR),

4) $PF_{\Delta H}$ - The power factor multiplier for $F^N_{\Delta H}$ provided in the COLR, and

5) The measured value of RCS total flow rate shall be used since uncertainties of 2.4% for flow measurement have been included in Specification 3.2.3.1a.

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

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 114

TO FACILITY OPERATING LICENSE NO. NPF-49

NORTHEAST NUCLEAR ENERGY COMPANY, ET AL.

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 3

DOCKET NO. 50-423

1.0 INTRODUCTION

By letter dated January 24, 1995, as supplemented March 22 and 29, 1995, and April 25, 1995, the Northeast Nuclear Energy Company (NNECO or the licensee), submitted a request for changes to the Millstone Nuclear Power Station, Unit No. 3 Technical Specifications (TS) 3.2.3.1.a and Table 2.2-1. The requested changes would reduce the minimum reactor coolant system (RCS) flow rate acceptance criterion for four-loop operation from 387,480 gallons per minute (gpm) to 371,920 gpm. A corresponding change in loop flow rate was also proposed. The proposed changes provide more operational flexibility with respect to the minimum RCS flow rate requirement. The April 25, 1995, letter provided clarifying information that did not change the initial proposed no significant hazards consideration determination.

2.0 BACKGROUND

During the first refueling outage in 1987, the internals of the four reactor coolant pumps (RCPs) were modified after seven turning vane bolt locking cups were dislodged and transported to the reactor vessel. During the 1993 refueling outage, loose parts from the RCP internals were discovered in the reactor vessel again. As a result of the licensee's evaluation, the RCPs "A," "B," and "D" were replaced with the spares from the Seabrook plant, and RCP "C" was replaced with a spare pump stored at Millstone 3. Based on a Westinghouse review of the RCP modification, the licensee anticipated that Millstone 3 could be operated at full power without minimum RCS flow rate requirement problems with the new pumps. The licensee performed a precision calorimetric RCS flow rate measurement test in November 1993 and found that individual loop flows showed a decline of between 2.9% and 6% from the February 1992 test results. While Millstone 3 can still operate at full power and meet the minimum RCS flow rate requirements, the licensee considers the margin between actual RCS flow rate and the TS requirement to be undesirably small.

NNECO submitted a previous amendment request dated November 24, 1993, (supplemented by letter dated January 10, 1994) with an evaluation which addressed the impact of a 4% reduction in the RCS flow rate limit on the Final Safety Analysis Report (FSAR) safety analysis. That evaluation concluded that

a reduction in minimum measured flow (MMF) and thermal design flow (TDF) by 4% was acceptable. The MMF is equal to TDF plus flow uncertainties. Specifically, the licensee concluded that sufficient margin exists in the system pressure, peak cladding temperature (PCT) and departure from nucleate boiling (DNB) limits to offset the negative effects of the change.

In a letter dated August 1, 1994, NNECO withdrew the license amendment request dated November 24, 1993, due to a significant loss in the available DNB margin with the existing plant configuration. Subsequently, NNECO stated that the DNB margin has been recovered by taking credit for thimble plug reinsertion and F delta H reduction.

Currently, the RCS total flow rate for four-loop operation in TS 3.2.3.1.a is 387,480 gpm for the current Cycle 5. Therefore, the licensee proposed a 4% decrease in the Millstone Unit 3 TS acceptance criteria for RCS flow rate to increase the operating margin beginning with the Cycle 6 operation. The 4% decrease would place the minimum RCS flow rate at 371,920 gpm.

3.0 EVALUATION

NNECO made safety assessments using a RCS flow rate reduction of 4% for MMF and TDF in the evaluations below. The MMF is used in the TS whereas the TDF is used in those accident analyses using the revised thermal design procedure. The assessment addresses four-loop operation only.

3.1 LOCA and Non-LOCA Transient Analyses

The licensee evaluated the Millstone 3 transient and accident analyses to support the proposed TS change for a reduced minimum RCS flow rate during four loop operation. The evaluation was performed to ensure that either the safety analyses documented in the FSAR were still bounding, or the consequences of the transients with a reduced RCS flow rate continued to meet the acceptance criteria for each event category.

Decreasing the TDF impacts both the RCS loop flow rate and the operating temperature of RCS. These two effects were evaluated for the large break loss -of-coolant accident (LBLOCA). The results of the evaluation indicated that the reduction in RCS flow rate would have a negligible impact on the analysis since the change in operating temperature of RCS as a result of reduction of RCS flow rate is relatively small. RCS temperature increases about 1 °F in the hot leg and decreases about 1 °F in the cold leg. Based on a conservative PCT sensitivity study, a 12 °F penalty could be added on to the PCT and would result in a predicted PCT that satisfies the 10 CFR 50.46 acceptance criteria for the LBLOCA.

The reduction in RCS flow rate would have a negligible impact on the small break LOCA (SBLOCA) analysis because the RCS flow rate is dominated by the break after the event occurs. Nevertheless, a 12 °F penalty could be

conservatively added on to the PCT due to the RCS temperature increase and would result in a predicted PCT that satisfies the 10 CFR 50.46 acceptance criteria for the SBLOCA.

The licensee also evaluated the impact of the reduced TDF to non-LOCA transients and accidents. The results of the evaluation show that for transients which challenge fuel performance, sufficient thermal margin remains available to preclude DNB from occurring. For transients that result in increasing system pressure, the results of the licensee's evaluation indicted that the peak system pressure following those transients, such as loss of a load, turbine trip, locked rotor, and feedline break, will remain within 110% of the system design pressure. For events resulting in radiological consequences, such as locked rotor accident and steam generator tube rupture accident, the results of its study ensure that the amount of fuel failure or offsite doses remain within acceptable limits.

3.2 Containment Accident Response

Analysis of containment accident response involves calculation of break flow mass and energy releases using a thermal-hydraulic analysis code. The mass and energy results were then input to a containment thermal-hydraulic analysis code which calculated the containment pressure and temperature responses. Such calculations, based on the existing RCS flow rate, were performed for Millstone 3 and are documented in the FSAR. The licensee considered the potential effects on containment accident response of the proposed 4% reduction in core flow.

The reduction in RCS flow would not involve any change in T_{avg}, RCS pressure limits or licensed power level. However, the flow reduction will be accompanied by an increase in the RCS hot leg temperature and a corresponding decrease in cold leg temperature. The licensee concluded that the RCS flow reduction would have no effect on the break flow profiles. For this reason, the current containment response analyses remain valid and new analyses are not required.

3.3 Proposed Changes to Table 2.2-1

The licensee evaluated the changes to the overtemperature and overpower delta-T reactor trip functions and determined that there was no impact on safety. This is because the reactor trip setpoints are preserved since there is no change required to K_1 through K_6 or the $f(\Delta I)$ penalty function of the overtemperature delta-T. The revised values of Z, S, and the allowable values for overtemperature and overpower delta-T functions for four-loop operation are included in Technical Specification Table 2.2-1.

4.0 SUMMARY

The NRC staff reviewed the proposed changes to TS 3.2.3.1.a and Table 2.2-1. The proposed changes do not involve an increase in the mass and energy releases form high energy line breaks in containment. The proposed reduction

in RCS flow is acceptable with respect to containment pressure and temperature considerations. Results from previously analyzed accidents remained within acceptable licensing basis limits. Sufficient margins exist in the system pressure, PCT and DNB limits to offset the negative effects of the 4% change. The proposed changes were supported by appropriate analyses. Based on the NRC staff's evaluation, the 4% reduction in RCS flow rate is acceptable.

5.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Connecticut State official was notified of the proposed issuance of the amendment. The State official had no comments.

6.0 ENVIRONMENTAL CONSIDERATION

The 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 NRC 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 issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (60 FR 11136 and 60 FR 18626). 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.

7.0 CONCLUSION

The Commission has 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, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: Harry Balukjian
William Long

Date: May 23, 1995