

November 14, 1996

Mr. Ted C. Feigenbaum
Executive Vice President and
Chief Nuclear Officer
Northeast Utilities Service Company
c/o Mr. Terry L. Harpster
Director - Nuclear Licensing Services
P.O. Box 128
Waterford, CT 06385

SUBJECT: ISSUANCE OF AMENDMENT (TAC NO. M95504)

Dear Mr. Feigenbaum:

The Commission has issued the enclosed Amendment No. 131 to Facility Operating License No. NPF-49 for the Millstone Nuclear Power Station, Unit No. 3, in response to your application dated June 3, 1996, with clarifying information provided by letter dated October 23, 1996.

The amendment clarifies a restriction on shutdown margin monitor operability while changing operational modes, so that it only limits reactivity changes caused by boron dilution and rod withdrawal. The amendment also corrects a technical specification numerical reference so that the specification number cited is in agreement with Amendment 99, dated December 29, 1994.

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

Sincerely,

(Original Signed by)

Vernon L. Rooney, Senior Project Manager
Special Projects Office - Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-423

Enclosures: 1. Amendment No. 131 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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Sincerely,

A handwritten signature in black ink, appearing to read "V. L. Rooney", written over a horizontal line.

Vernon L. Rooney, Senior Project Manager
Special Projects Office - Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-423

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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. 131
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 June 3, 1996, as supplemented October 23, 1996, 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.

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. 131, 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
Deputy Director for Licensing
Special Projects Office
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications

Date of Issuance: November 14, 1996

ATTACHMENT TO LICENSE AMENDMENT NO. 131

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

3/4 3-6
B 3/4 3-3

Insert

3/4 3-6
B 3/4 3-3
B 3/4 3-3a
B 3/4 3-3b

TABLE 3.3-1 (Continued)

ACTION STATEMENTS (Continued)

- ACTION 3 - With the number of channels OPERABLE one less than the Minimum Channels OPERABLE requirement and with the THERMAL POWER level:
- a. Below the P-6 (Intermediate Range Neutron Flux Interlock) Setpoint, restore the inoperable channel to OPERABLE status prior to increasing THERMAL POWER above the P-6 Setpoint, and
 - b. Above the P-6 (Intermediate Range Neutron Flux Interlock) Setpoint but below 10% of RATED THERMAL POWER, restore the inoperable channel to OPERABLE status prior to increasing THERMAL POWER above 10% of RATED THERMAL POWER.
- ACTION 4 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, suspend all operations involving positive reactivity changes.
- ACTION 5 -
- (a) With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, restore the inoperable channel to OPERABLE status within 48 hours or suspend all operations involving positive reactivity changes via dilution and rod withdrawal, and verify valves as per Specification 4.1.1.2.2 are closed and secured in position within the next four hours.
 - (b) With no channels OPERABLE, suspend all operations involving positive reactivity changes via dilution and rod withdrawal, and verify valves per Specification 4.1.1.2.2 are closed and secured in position within the next 4 hours. Verify compliance with the SHUTDOWN MARGIN requirements of Specification 3.1.1.1.2 or 3.1.1.2 as applicable within the next hour. Continue to verify valves closed and secured every 14 days and verify SHUTDOWN MARGIN every 12 hours.
- ACTION 6 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:
- a. The inoperable channel is placed in the tripped condition within 6 hours, and
 - b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.1.1.
- ACTION 7 - (Not used)
- ACTION 8 - With less than the Minimum Number of Channels OPERABLE, within 1 hour determine by observation of the associated permissive annunciator window(s) that the interlock is in its required state for the existing plant condition, or apply Specification 3.0.3.

INSTRUMENTATION

BASES

REACTOR TRIP SYSTEM INSTRUMENTATION and ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION (Continued)

The Engineered Safety Features Actuation System interlocks perform the following functions:

- P-4 Reactor tripped - Actuates Turbine trip, closes main feedwater valves on T_{avg} below Setpoint, prevents the opening of the main feedwater valves which were closed by a Safety Injection or High Steam Generator Water Level signal, allows Safety Injection block so that components can be reset or tripped.
- Reactor not tripped - prevents manual block of Safety Injection.
- P-11 On increasing pressurizer pressure, P-11 automatically reinstates Safety Injection actuation on low pressurizer pressure and low steam line pressure. On decreasing pressure, P-11 allows the manual block of Safety Injection actuation on low pressurizer pressure and low steam line pressure.
- P-12 On increasing reactor coolant loop temperature, P-12 automatically provides an arming signal to the Steam Dump System. On decreasing reactor coolant loop temperature, P-12 automatically removes the arming signal from the Steam Dump System.
- P-14 On increasing steam generator water level, P-14 automatically trips all feedwater isolation valves, main feed pumps and main turbine, and inhibits feedwater control valve modulation.

Shutdown Margin Monitors

Background:

The purpose of the Shutdown Margin Monitors (SMM) is to annunciate an increase in core subcritical multiplication allowing the operator at least 15 minutes response time to mitigate the consequences of the inadvertent addition of unborated primary grade water (boron dilution event) into the Reactor Coolant System (RCS) when the reactor is shut down (Modes 3, 4, and 5).

The SMMs utilizes two channels of source range instrumentation (GM detectors). Each channel provides a signal to its applicable train of SMM. The SMM channel uses the last 600 or more counts to calculate the count rate and updates the measurement after 30 new counts or 1 second, whichever is longer. Each channel has 20 registers that hold the counts (20 registers X 30 count = 600 counts) for averaging the rate. As the count rate decreases, the longer it takes to fill the registers (fill the 30 count minimum). As the instrument's measured count rate decreases, the delay time in the instrument's response increases. This delay time leads to the requirement of a minimum count rate for OPERABILITY.

BASES (continued)

During the dilution event, count rate will increase to a level above the normal steady state count rate. When this new count rate level increases above the instrument's setpoint, the channel will alarm alerting the operator of the event.

Applicable Safety Analysis

The SMM senses abnormal increases in the source range count per second and alarms the operator of an inadvertent dilution event. This alarm will occur at least 15 minutes prior to the reactor achieving criticality. This 15 minute window allows adequate operator response time to terminate the dilution, FSAR Section 15.4.6.

LCO

LCO 3.3.1 provides the requirements for OPERABILITY of the instrumentation of the SMMs that are used to mitigate the boron dilution event. Two trains are required to be OPERABLE to provide protection against single failure.

Applicability

The SMM must be OPERABLE in MODES 3, 4, and 5 because the safety analysis identifies this system as the primary means to alert the operator and mitigate the event. The SMMs are allowed to be blocked during start up activities in MODE 3 in accordance with approved plant procedures. The alarm is blocked to allow the SMM channels to be used to monitor the 1/M approach to criticality.

The SMM are not required to be operable in MODES 1 and 2 as other RPS is credited with accident mitigation, over temperature delta temperature and power range neutron flux high (low setpoint of 25 percent RTP) respectively. The SMMs are not required to be OPERABLE in Mode 6 as the dilution event is precluded by administrative controls over all dilution flow paths (Technical Specification 4.1.1.2.2).

Actions

Channel inoperability of the SMMs can be caused by failure of the channel's electronics, failure of the channel to pass its calibration procedure, or by the channel's count rate falling below the minimum count rate for operability. This can occur when the count rate is so low that the channel's delay time is in excess of that assumed in the safety analysis. In any of the above conditions, the channel must be declared inoperable and the appropriate action statement entered. If the SMMs are declared inoperable due to low count rates, an RCS heatup will cause the SMM channel count rate to increase to above the minimum count rate for operability. Allowing the plant to increase modes will actually return the SMMs to OPERABLE status. Once the SMM channels are above the minimum count rate for operability, the channels can be declared operable and the LCO action statements can be exited.

5(a) With one train of SMM inoperable, Action 5(a) requires the inoperable train to be returned to OPERABLE status within 48 hours. In this condition, the remaining SMM train is adequate to provide protection. If the above required action cannot be met, alternate compensatory actions must be

BASES (continued)

performed to provide adequate protection from the boron dilution event. All operations involving positive reactivity changes associated with RCS dilutions and rod withdrawal must be suspended, and all dilution flowpaths must be closed and secured in position (locked closed per Technical Specification 4.1.1.2.2) within the following 4 hours.

5(b) With both trains of SMM inoperable, alternate protection must be provided:

1. Positive reactivity operations via dilutions and rod withdrawal are suspended. The intent of this action is to stop any planned dilutions of the RCS. The SMMs are not intended to monitor core reactivity during RCS temperature changes. The alarm setpoint is routinely reset during the plant heatup due to the increasing count rate. During cooldowns as the count rate decreases, baseline count rates are continually lowered automatically by the SMMs. The Millstone Unit No. 3 boron dilution analysis assumes steady state RCS temperature conditions.
2. All dilution flowpaths are isolated and placed under administrative control (locked closed). This action provides redundant protection and defense in depth (safety overlap) to the SMMs. In this configuration, a boron dilution event (BDE) cannot occur. This is the basis for not having to analyze for BDE in Mode 6. Since the BDE cannot occur with the dilution flow paths isolated, the SMMs are not required to be operable as the event cannot occur and operable SMMs provide no benefit.
3. Increase the shutdown margin surveillance frequency from every 24 hours to every 12 hours. This action in combination with the above, provide defense in depth and overlap to the loss of the SMMs.

Surveillance Requirements

The SMMs are subject to an ACOT every 92 days to ensure each train of SMM is fully operational. This test shall include verification that the SMMs are set per the Core Operating Limit Report.

3/4.3.3 MONITORING INSTRUMENTATION

3/4.3.3.1 RADIATION MONITORING FOR PLANT OPERATIONS

The OPERABILITY of the radiation monitoring instrumentation for plant operations ensures that: (1) the associated action will be initiated when the radiation level monitored by each channel or combination thereof reaches its Setpoint, (2) the specified coincidence logic is maintained, and (3) sufficient redundancy is maintained to permit a channel to be out-of-service for testing or maintenance. The radiation monitors for plant operations senses radiation levels in selected plant systems and locations and determines whether or not predetermined limits are being exceeded. If they are, the signals are combined into logic matrices sensitive to combinations indicative of various accidents and abnormal conditions. Once the required logic combination is completed, the system sends actuation signals to initiate alarms.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 131

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 June 3, 1996, as supplemented October 23, 1996, the Northeast Nuclear Energy Company, et al. (the licensee), submitted a request for changes to the Millstone Nuclear Power Station, Unit No. 3, Technical Specifications (TSs). The requested changes would amend the TSs for Millstone Unit 3 pertaining to Table 3.3-1.

The October 23, 1996, letter provided clarifying information that did not change the scope of the June 3, 1996 request and the initial proposed no significant hazards consideration determination.

Millstone Unit 3 (MU3) was shut down mid-cycle due to a problem with the turbine-driven auxiliary feedwater pump discharge valves. Subsequent to the shutdown, MU3 commenced a mid-cycle outage to resolve equipment problems and respond to NRC requests for information. While in the shutdown mode, the licensee noticed that the secondary sources in proximity to the Shutdown Margin Monitors (SMM) were decaying as MU3 remained in an extended mid-cycle outage. The licensee expected the count rate from these sources to fall below a minimum count rate in early July of 1996, at which point the SMM would not be able to detect the degraded count rate, and thus, the SMMs would be deemed inoperable. With the SMMs deemed inoperable, MU3 cannot change modes during plant startup because the exclusion clause of Action Statement 5(b) of TS 3.0.4 prevents them from doing so. Consequently, the licensee is requesting a TS change to remove this exclusion clause and allow the plant to change modes with the SMMs inoperable. Past plant startup experience has shown that once the unit is in Mode 3, there will be sufficient neutron leakage to increase the count rate above the minimum count rate and the SMMs will again be deemed operable.

The licensee pointed out that this request is consistent with the approved Standard Technical Specifications, NUREG-1431, where entry into a higher Operational Mode is allowed with inoperable SMMs.

As a result, the licensee proposes to revise MU3 Table 3.3-1 to allow changing to a higher mode with both SMMs inoperable in accordance with Technical Specification (TS) 3.0.4.

Specifically, the change to Table 3.3-1 will be to delete the following statement from Action 5(b): "Entry into an OPERATIONAL MODE pursuant to Specification 3.0.4 is not permitted," and adding the following clarification to Action 5(a) and 5(b): "via dilution and rod withdrawal." The references to 5(a) and 5(b) address positive moderator reactivity changes associated with mode changes.

Also, the licensee proposes to change two references in Action Statements 5(a) and 5(b), from the now nonexistent Specification 4.4.1.4.2.3 to Specification 4.1.1.2.2. Specification 4.4.1.4.2.3 was eliminated, and at the same time the substance contained therein was relocated to Specification 4.1.1.2.2, by License Amendment 99, issued December 29, 1994. However, the corresponding editorial changes to reference the correct specification (Specification 4.1.1.2.2) in Action Statements 5(a) and 5(b) were inadvertently omitted from the request in connection with License Amendment 99. This amendment would rectify this administrative error.

2.0 EVALUATION

The safety function of the Shutdown Margin Monitors (SMM) is to mitigate the consequences of the inadvertent addition of unborated primary grade water into the reactor coolant system (RCS). Their function is to annunciate an increase in core subcritical multiplication allowing the operator at least 15 minutes response time to mitigate the consequences of the inadvertent addition of unborated water (boron dilution event (BDE)) into the RCS when the reactor is in a shutdown condition (Modes 3, 4, and 5). The SMM is not a credited for any function from other design basis events.

As the number of neutrons reaching the SMMs (the count rate) decrease, as is the case in MU3, the longer it takes the SMMs to respond. Consequently, the delay time in the SMMs response increases. This delay time leads to the requirement of a minimum count rate for operability. As stated above, TS 3.0.4 does not permit modes changes with the SMMs inoperable (LCO 3.3.1, Action Statement 5B, TS Table 3.3-1). MU3 is proposing to revise Table 3.3-1 to allow mode changes to higher modes, specifically Mode 3.

The licensee analyzed the proposed changes to the TS Table 3.3-1 and concluded that the change to the TS will not decrease the margin of safety provided by the SMMs in operation. The same analysis dictates that with both the SMMs inoperable, and with the boron dilution flow paths locked closed, the SMMs are not required to provide an alarm to the operators to allow them to mitigate the BDE, and thus their continued operation provides no added safety benefit. The Millstone Unit 3 Limiting Condition for Operation (LCO) for both the SMMs being inoperable does not require the plant to change modes, and therefore

permits continued operation of the plant for an unlimited period of time. The proposed TS change will allow MU3 to increase modes while complying with the LCO Action Statements. These action statements must be performed to ensure safety and are stated below:

- a) All positive reactivity operations via dilution and rod withdrawal must be suspended.

This action statement is intended to stop any planned dilution of the Reactor Coolant System (RCS). Typically, the SMMs play no role in monitoring core reactivity during plant heatup (RCS temperature changes), and the alarm setpoint is routinely re-set during plant heatup due to the increasing count rate. On the other hand, during plant cooldowns, as the count rate decreases, the baseline count rate are continually lowered automatically by the SMMs.

The licensee also pointed out that, if the situation arose where the SMMs are still inoperable in Mode 3, and entrance into Mode 5 (plant cooldown) is desired, entrance into Mode 5 under this hypothetical situation will put the plant in a safer configuration (removal of the stored energy in the RCS) as opposed to maintaining Mode 3 operation.

- b) All dilution flow paths must be isolated and placed under administrative control (locked closed). Also, the shutdown margin surveillance frequency must be increased from 24 hours to every 12 hours.

This action is intended to provide redundant protection and defense in depth to the SMMs. In this configuration, a BDE is prevented and is the basis for not requiring a BDE analysis in Mode 6. Since the occurrence of a BDE is prevented, the SMMs are not required to be operable.

The proposed TS amendment will allow MU3 to enter into a higher operation mode with both SMMs inoperable. Because the boron dilution flow paths are blocked, significantly reducing the probability of BDE, the safety of the plant has not been compromised. Based on past plant startups, the licensee anticipates that going to a higher mode (in this case RCS heatup), will cause the SMMs channels count rate to increase to above the minimum count rate for operability.

Furthermore, additional analysis by the licensee has shown that the Isothermal Temperature Coefficient (ITC) for Millstone 3 is NEGATIVE in the temperature range from cold shutdown conditions (68 degrees F) to no load hot (557 degrees F) temperature conditions. The ITC is the sum of both the moderator temperature coefficient and the fuel doppler coefficient. For operating conditions where the core is uniformly heated or cooled, the associated reactivity change is due to the combined or isothermal effect of both the change in the fuel temperature and the moderator temperature. Over reactor core life, the ITC becomes more negative with core age, primarily due to the reduction in RCS boron concentration. The net reactivity change due to burnup varies from an approximate low of -1300 pcm at beginning of core life to an approximate high of -4100 pcm. Data provided by the licensee by letter dated October 23, 1996, shows that the change in reactivity as a function of plant heatup is negative. Also, the change in reactivity as a function of plant burnup is also negative. In the case of Millstone Unit 3,

changing temperature, i.e., heating up from Mode 5 (68 degrees F) to Mode 3 (557 degrees F) will introduce negative reactivity into the core, which is a move in the conservative direction.

Consequently, once the channels are above the minimum count rate for operability, the channels can be declared operable and the LCO action statement can be exited. With the SMMs operable, the dilution flow paths can be returned to service in anticipation of the RCS boron concentration reduction during the approach to criticality.

The NRC staff has reviewed the reports submitted by the licensee for the continued operation of Millstone Unit 3. The appropriate material was submitted in regard to Technical Specification changes pertaining to SMMs inoperability while changing modes. Based on this review, the staff has concluded that the requested TS change(s) are acceptable, and satisfy the staff's positions and requirements in these areas.

In regard to the proposed changes to Action Statements 5(a) and 5(b) to reference Specification 4.1.1.2.2 instead of Specification 4.4.1.4.2.3, which no longer exists, the staff finds that the changes are editorial in nature and are acceptable in light of the relocation of the substance of Specification 4.4.1.4.2.3 to Specification 4.1.1.2.2 by License Amendment No. 99, issued December 29, 1994.

3.0 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.

4.0 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 (61 FR 31559 dated June 20, 1996). 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.

5.0 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: A. Attard

Date: November 14, 1996