NORTHEAST UTILITIES

THE CONNECTICUT LIGHT AND POWER COMPANY
WESTERN MASSACHUSETTS ELECTRIC COMPANY
HOLYOKE WATER POWER COMPANY
NORTHEAST UTILITIES SERVICE COMPANY
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April 29, 1988

Docket No. 50-336
B12733
Re: 10CFR50.90

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

Gentlemen:

Millstone Nuclear Power Station, Unit No. 2
Proposed Revision to Technical Specifications
Boric Acid Concentration Reduction

Pursuant to 10CFR50.90, Northeast Nuclear Energy Company (NNECO) hereby proposes to amend its Operating License DPR-65 by incorporating the changes identified in Attachment 1 into the Technical Specifications of Millstone Unit No. 2.

BACKGROUND

These proposed changes are being initiated as a result of a study performed for NNECO by Combustion Engineering which demonstrates that the boric acid concentration in the Boric Acid Storage Tanks (BASTs) can be reduced to the point where heat tracing of the boric acid make-up system is no longer required. Heat tracing is required at higher concentrations to prevent boric acid precipitation. The basis for allowing a reduced concentration stems from a new methodology in which boration of the Reactor Coolant System is performed concurrently with plant cooldown.

Southern California Edison (San Onofre Units 2 and 3) and Arkansas Power and Light Company (Arkansas Nuclear One - Unit 2) have applied for and received similar changes for their nuclear power plants.

DESCRIPTION OF CHANGES

The proposed changes to the Technical Specifications are provided in Attachment 1. These proposed changes will allow a reduction of the concentration of boric acid in the BASTs and associated piping to a level where heat tracing is no longer required to prevent boron precipitation. The proposed changes would delete the requirement for heat tracing from the Limiting Condition for Operation (LCO). Boric acid concentration will be reduced below 3.5 percent, and solution temperature will be kept greater than 55°F. This would be verified by a 24-hour surveillance of each BAST and associated piping.

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Specific changes would be as follows:

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Section 3.1.2.1: remove the requirement for a heat tracing circuit.

Section 4.1.2.1: combine opening statement of a.1 and a; delete Section 4.1.2.1.a.2.

Section 4.1.2.1.c: insert requirement to verify 55°F temperature for the boric acid piping.

Pages 3/4 1-9, 3/4 1-10

Combine Sections 3.1.2.2 1 and 3.1.2.2.2 and their associated surveillance requirements into one new specification. The LCO will require that redundant flow paths are available to perform boration of the Reactor Coolant System (RCS). Delete the requirement to demonstrate the operability of the heat tracing circuit. Add the requirement for a 24-hour surveillance to verify a minimum 55°F temperature of the boric acid piping.

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Page 3/4 1-16, 3/4 1-16a

Increase minimum volume of Refueling Water Storage Tank (RWST) from 57,000 gallons to 57,300 gallons in Modes 5 and 6. Delete the requirement for heat tracing in the Boric Acid Storage Tanks (BASTs). Incorporate the requirements for a boric acid concentration of between 2.5 and 3.5 weight percent boron, a minimum volume of 3750 gallons and a minimum solution temperature of 55°F. Add the requirement for a 24-hour surveillance to verify a minimum 55°F temperature of the BAST.

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Replace old figure with new figure.

Page 3/4 1-18

Modify section 3.1.2.8.a to permit operation with a variety of BAST volumes, tank selections and BAST boron concentrations. It is also required that the RWST with specified water volume and boron concentration be operable. Also change the frequency of temperature surveillance of the BAST contents from once per seven days to once per 24-hours. Remove the requirement for a heat tracing circuit.

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Remove the requirement to verify BAST temperature once per 7 days. Add the requirement to verify BAST temperature at least once per 24 hours.

Bases Page B 3/4 1-2

Section 3/4.1.2: remove the requirement for heat tracing systems; make changes and add wording to allow boration systems to operate with a lower boron concentration.

Bases Pages B 3/4 1-3, B 3/4 1-4, B 3/4 1-4a

Section 3/4.1.2: remove conditions relating to operating with a higher (6.25 percent) boron concentration, and add wording to allow operation with lower (3.5 percent) boron concentration.

SAFETY ASSESSMENT

The technical basis for this proposed change is presented in detail as Attachment 2.

The proposed change involves a reduction in the concentration of boric acid in the BASTs and associated piping to a concentration where heat tracing is no longer required to prevent boron precipitation. This change will prevent equipment unavailability due to piping blockage from precipitated boric acid. It will also eliminate the need for maintenance of heat tracing and is, therefore, in keeping with the as-low-as-reasonably-achievable (ALARA) radiation exposure goal.

Other benefits associated with this proposed change are listed below:

- The higher pH (i.e., toward neutral pH) associated with the reduced boric acid concentration is less aggressive from a piping corrosion standpoint.
- The elimination of spots of high temperature associated with heat tracing will minimize the potential for stress corrosion cracking in piping.

A summary of the individual Technical Specification changes and their safety implications are presented below.

Specification 3/4.1.2.1 Boration Systems Flow Paths - Shutdown

The requirement for operability of heat tracing will be deleted from the LCO since boron precipitation is no longer a concern if the boric acid concentration is below 3.5 percent and the solution temperature is greater than 50°F.

The seven-day surveillance to verify that heat traced portions of the boric acid system are at an acceptable temperature will be replaced with a 24-hour surveillance to ensure that each BAST and piping contents are above 55°F. This provides adequate margin over the actual boron precipitation temperature of approximately 50°F.

Specification 3/4.1.2.2 Boration Systems Flow Paths - Operating

Existing Specification 3.1.2.2.1 (Modes 1 and 2) and 3.1.2.2.2 (Modes 3 and 4) and their associated surveillance requirements will be incorporated into one new specification. The LCO for this specification requires that sufficient boric acid redundant flow paths are available to perform boration of the RCS from the BAST(s) and the RWST.

Redundant flow paths from the BAST to the charging pump suction will be assured by the requirement to have an operable boric acid pump and gravity feed valve available for each tank which is used as a source. The boric acid pumps and gravity feed valves are on separate vital electrical power supplies to assure reliability and redundancy.

Since the contained volume in the BASTs is insufficient to make up for shrinkage during cooldown and provide the required shutdown margin, the flow path from the RWST to the charging pumps is required to be operable in Modes 1, 2, 3, and 4. The redundancy in flow paths from the RWST is achieved through the charging pump flow paths guaranteed by Technical Specification 3.1.2.2 and the HPSI flow path guaranteed by Technical Specifications 3.5.2 and 3.5.3.

The surveillance requirement to demonstrate operability of the heat tracing will be deleted since it is no longer required and the surveillance requirement to verify at least once per 24 hours that the temperature of the BASTs and piping is above 55°F will be added to preclude boron precipitation and ensure system availability.

Specification 3/4.1.2.7 Borated Water Sources - Shutdown

In Specification 3.1.2.7.b, the volume of water required in the RWST will be increased to reflect the new analysis. This analysis results in a 300 gallon increase in the required water volume.

Specification 4.1.2.7 increases the solution temperature verification for the BASTs from once per seven days to once per 24 hours, which is conservative.

Specification 3/4.1.2.8 Borated Water Source - Operating

Technical Specification 3.1.2.8.a will be modified to permit operations with a variety of BAST volume, tank selections, and BAST boron concentration and will require that the RWST be operable with a minimum contained volume of 370,000 gallons of water and a minimum boron concentration of 1720 ppm. All options provide suitable availability of negative reactivity to maintain the design

basis; however, these options also provide the flexibility to take a BAST out of service if sufficient volume and boron concentration is maintained in the second BAST. Since the volume of the BAST(s) is insufficient to make up for shrinkage during cooldown and provide the required shutdown margin, Specification 3.1.2.8.b requires that the RWST be available in Modes 1, 2, 3, and 4 with sufficient volume and boron concentration to make up for cooldown shrinkage. In addition, the concentration and volume of the RWST is sufficient to borate the RCS, using feed-and-bleed, if the borated water source from the BAST(s) became inoperable.

Specification 4.1.2.8 will be modified to change the surveillance requirement for the BAST concentration from once per seven days to once per 24 hours, which is conservative.

Bases

The bases to the above Technical Specifications will be modified to accurately reflect the re-analysis that was performed to support these changes.

Summary

The modifications proposed will not result in any mechanical degradation of the boration system and will, in fact, result in a system with increased overall availability.

NNECO has determined that this change will meet or exceed all requirements for shutdown margin as described in the bases of the Technical Specification.

SIGNIFICANT HAZARDS CONSIDERATION

NNECO has reviewed the proposed changes in accordance with 10CFR50.92 and has concluded that they do not involve a significant hazards consideration in that these changes would not:

1. Involve a significant increase in the probability or consequences of an accident previously analyzed. From the standpoint of system availability, the proposed change will actually improve system reliability. The reduction in the system boric acid concentration ensures that for normal conditions there will be no precipitation of boric acid in this system without the operation of heat tracing. Elimination of the need to rely on proper operation of the heat tracing represents an improvement in reliability of the system. Removing the heat tracing from service would eliminate high temperature areas associated with heat tracing and thus minimize the potential for stress corrosion cracking in piping. Also, the more neutral pH resulting from a lower boron concentration is less aggressive to piping materials. Reducing the concentration of the BAST solution has no adverse impact on the accident analysis since the BAST is not credited as a source of boron for reactivity control.

2. Create the possibility of a new or different kind of accident from any previously analyzed. No new systems are required to be installed to implement the proposed change. The proposed change will enhance plant operability and reduce personnel exposure due to maintenance by taking the heat tracing system out of service. This conforms to ALARA principles. With the proposed Technical Specification change and the appropriate changes to the procedures, there are two events that can be postulated which could result in reduction in the shutdown margin below the minimum required value. These are:

   - o If the plant is kept at hot standby for an extended period of time (t>26 hours) with no letdown, the amount of boron which can be injected may not be sufficient to compensate for a reactivity insertion due to Xenon decay. Note that the RCP seal bleedoff is equivalent to a small letdown flow rate and will be available even if letdown is isolated. However, this flow path is not credited in the analysis. The appropriate plant procedure(s) will be modified to instruct the operator to either establish a letdown path or initiate a cooldown within 26 hours after reactor shutdown. Either of the two options will allow the operator to inject sufficient boron to maintain the shutdown margin required by Technical Specifications.

   - o Since the current cooldown procedure requires the operator to borate the plant to the required concentration for cold shutdown conditions prior to initiating the cooldown, the minimum required shutdown margin all through the cooldown is ensured. With the proposed change, the operator may not be able to borate the plant to the required concentration (especially, if the letdown is not available) prior to initiating cooldown. In that case, the operator will continue to borate the plant during the cooldown with the possibility that an error or an equipment failure may result in insufficient shutdown margin at some time during the cooldown. However, the cooldown procedure will be modified to include sufficient instruction on how to maintain and to ensure the required shutdown margin during the cooldown.

   Since both of the events discussed above can occur only on a long time scale (i.e., at least several hours), the instructions and the precautions in the procedures provide adequate protection. With the appropriate procedure changes, the two events discussed above are highly unlikely and need not be considered a new unanalyzed accident. Therefore, we conclude there will be no reduction in the shutdown margin.

3. Involve a significant reduction in the margin of safety. A combined volume requirement for the BASTs and the RWST is being added along with a revised Figure 3.1-1 which will integrate BAST volume, BAST concentration and RWST concentration. The minimum boration capability will ensure a shutdown margin of 2.9 percent delta k/k for temperatures above 200°F and a shutdown margin of at least 2 percent delta k/k for temperatures below 200°F. This change or the failure modes associated with the change will

have no impact on protective boundaries. This will not reduce the margin of safety.

The Commission has provided guidance concerning the application of standards in 10CFR50.92 by providing certain examples (51FR7751, March 6, 1986). The proposed changes described herein most closely resemble example (vi), a change which either may result in some increase to the probability or consequences of a previously analyzed accident or may reduce in some way a safety margin, but where the results of the change are clearly within all acceptable criteria with respect to the system or component specified in the Standard Review Plan (e.g., a change resulting from the application of a small refinement of a previously used calculational model or design method).

The Millstone Unit No. 2 Nuclear Review Board has reviewed and approved the attached proposed revisions and has concurred with the above determinations.

The proposed changes need to be approved prior to performing any plant modifications. NNECO requests that these proposed changes become effective 60 days after approval and issuance of the amendment. This would allow sufficient time for procedural changes and appropriate training of operating personnel. The plant will maintain the Heat Tracing System operable until the level of boric acid concentration is reduced to the proposed maximum level, at which time the Heat Tracing System will be deenergized.

In accordance with 10CFR50.91(b) we are providing the State of Connecticut with a copy of this proposed amendment.

Pursuant to the requirements of 10CFR170.12(c), enclosed with this amendment request is the application fee of $150.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

E. J. Mroczka
Senior Vice President

Attachment

cc: Kevin McCarthy
Director Radiation Control Unit
Department of Environmental Protection
Hartford, Connecticut 06116

W. T. Russell, Region I Administrator
D. H. Jaffe, NRC Project Manager, Millstone Unit No. 2
W. J. Raymond, Senior Resident Inspector, Millstone Unit Nos. 1, 2, and 3

STATE OF CONNECTICUT)
) ss. Berlin
COUNTY OF HARTFORD)

Then personally appeared before me E. J. Mroczka, who being duly sworn, did state that he is Senior Vice President of Northeast Nuclear Energy Company, a Licensee herein, that he is authorized to execute and file the foregoing information in the name and on behalf of the Licensee herein and that the statements contained in said information are true and correct to the best of his knowledge and belief.

Lorraine J. D'Amico
Notary Public

My Commission Expires March 31, 1993

Docket No. 50-336
B12733

Attachment 1

Millstone Nuclear Power Station, Unit No. 2

Proposed Changes to Technical Specifications

April 1988