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May 19, 1995

Docket No. 50-423
B15146

Re: 10CFR50.90

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Millstone Nuclear Power Station, Unit No. 3
Proposed Revision to Technical Specifications
Demineralized Water Storage Tank and Condensate Storage Tank

Introduction

Pursuant to 10CFR50.90, Northeast Nuclear Energy Company (NNECO) hereby proposes to amend its Operating License, NPF-49, by incorporating the changes identified in Attachments 1 and 2 into the Technical Specifications of Millstone Unit No. 3. The proposed change clarifies the limiting condition for operation by indicating in Section 3.7.1.3, "Demineralized Water Storage Tank" that the total volume of 334,000 gallons in the demineralized water storage tank (DWST) consists of usable and unusable volume in the tank. The proposed change to Surveillance Requirement 4.7.1.3.2 clarifies by indicating that a total volume of the water stored in the DWST and the condensate storage tank (CST) to support the auxiliary feedwater operation should be increased by 30,000 gallons and be at least 364,000 gallons when combining the volumes of the DWST and CST. In addition, Bases Section 3/4.7.1.3, "Demineralized Water Storage Tank," is being revised to incorporate the plant-specific requirements for safety grade cold shutdown. Bases Section 3/4.7.1.2 is being revised to indicate that the auxiliary feedwater system may continue to operate in parallel with the residual heat removal (RHR) system for cooldown below 350°F.

Background

The current design basis requirement for the DWST assumes that it has sufficient inventory to mitigate the transients discussed in Chapter 15 of the Millstone Unit No. 3 final safety analysis report (FSAR). The inventory also allows:

(1) for ten hours of hot standby condition of the plant;

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(2) for an additional six hour cooldown period sufficient to reduce reactor coolant system (RCS) temperature to 350°F to allow RHR system operation; and

(3) for 30 minutes of spillage in the event of a secondary system rupture before an operator isolates the depressurized steam generator.

This DWST volume requirement was based on a standard Westinghouse designed NSSS similar to Millstone Unit No. 3. This original requirement did not account for the operation of a reactor coolant pump (RCP) during a safety grade cold shutdown (SGCS). During an internal safety system functional inspection (SSFI), a question was raised about the capacity of the DWST relative to the requirements for SGCS, specifically if SGCS occurred without a loss of power (LOP) (i.e., electric power to the RCP will be available). It is noted that the Millstone Unit No. 3 FSAR description related to the SGCS is not clear. The current FSAR SGCS analysis assumes an LOP as the most limiting condition from the plant transient perspective. However, NNECO determined that the DWST volume alone may not be sufficient for a SGCS with offsite power available because of the reactor coolant pump heat addition. In addition, service water could be used to replenish DWST volume if the original DWST capacity is insufficient to achieve cold shutdown. This action is highly undesirable due to the potential damage of injecting salt water into the steam generators and secondary coolant piping.

Because of the questions about the adequacy of the DWST capacity and lack of clarity in the existing FSAR description with respect to the SGCS analysis, NNECO contracted Westinghouse to reanalyze the entire SGCS design basis requirements.

Westinghouse reevaluated the SGCS requirements, specifically the DWST capacity requirement with or without the RCP operation (i.e., with or without an LOP) and concluded that the SGCS can be successfully achieved with the present size of the DWST (i.e., utilizing only the usable volume of the tank), but with a different time schedule/scenario from the current FSAR analysis. Specifically, the new SGCS volumetric requirements were calculated for 5 hours of hot standby with steam discharge to atmosphere concurrent with total loss-of-offsite power, with an additional 7 hour cooldown period to reduce RCS temperature to 350°F for an RHR entry condition and for the cooldown below 350°F when steaming continues in parallel with RHR operation until the entire heat load can be handled by the RHR system. The volume for 30 minutes of spillage is also included. This entire time frame for cooldown is still consistent with the FSAR and the

NRC's SER[1] where it is shown that the plant could be brought to RHR entry conditions within 36 hours. However, this evaluation identified that the reactor plant component cooling (CCP) piping assumed stress analysis temperatures downstream of the RHR heat exchangers and service water downstream component cooling water heat exchangers may be exceeded (if the SGCS coincides with the maximum auxiliary heat loads and high service water temperatures). In order to accommodate these increased temperatures, this condition is being clarified as an emergency condition for purposes of the ASME code based on it being a low probability event. This change in the assumption constitutes a change in the design basis which requires a NRC review and approval. Therefore, NNECO decided to process a change to the Limiting Condition for Operation (LCO) and the basis for the DWST and auxiliary feedwater system (AFW) technical specifications.

Description of the Proposed Changes

NNECO proposed to revise the Millstone Unit No. 3 Technical Specifications as follows:

1. Section 3.7.1.3: A note to the LCO is added to indicate that the DWST inventory consists of usable and unusable volume. The contained water volume limit of 334,000 gallons in the DWST includes an allowance for water not usable because of the tank discharge line location, or other physical characteristics of the tank and an allowance for 30 minutes of spillage.

2. Section 4.7.1.3.2: The proposed change to Surveillance Requirement 4.7.1.3.2 will increase the requirement for the combined volume of the DWST and CST. The current surveillance requirement requires that the total volume of water contained in both the DWST and CST be at least 334,000 gallons. A recent calculation verified that 30,000 gallons volume is considered unusable due to a vortex formation. Therefore, if the CST is used as a backup source for the AFW system, a total combined volume of the both tanks should be increased to account for the unusable volume in the CST.

3. Bases Section 3/4.7.1.3: Demineralized Water Storage Tank changes to the basis for the DWST inventory and the required

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(1) Safety Evaluation Report related to the operation of Millstone Nuclear Power Station, Unit No. 3 (NUREG-1031), August 1984.

CST inventory are being proposed to incorporate the plant-specific requirements for safety grade cold shutdown.

4. Bases Section 3/4.7.1.2, Auxiliary Feedwater System: Bases Section 3/4.7.1.2 is being revised to add the following: "The auxiliary feedwater system may continue to operate in parallel with the residual heat removal system for cooldown below 350°F."

Safety Assessment

Changes to the basis for the demineralized water storage tank (DWST) inventory and the required condensate storage tank (CST) inventory are being proposed to incorporate the plant specific requirements for safety grade cold shutdown. The required CST inventory is being changed to take into account the unusable volume in the tank. A note to the limiting condition for operation (LCO) is also added to indicate that the DWST inventory consists of usable and unusable volume.

The DWST is the primary source of water for the auxiliary feedwater (AFW) system and is safety related. The tank volume was originally determined based upon the assumption that ten hours in hot standby and six hours for cooldown was sufficient to achieve residual heat removal (RHR) entry conditions. These assumptions are typical for Westinghouse designed nuclear plants. However, limitations of the reactor plant component cooling system (CCP) and the service water system (SWS) require changes to these assumptions. Thus, a change in the LCO and the basis for the DWST and AFW Technical Specifications is required.

The CCP system is an intermediate cooling loop that transfers heat from safety grade systems, such as RHR and spent fuel pool cooling (SFPC), to the SWS. The CCP piping system design temperature of the 115°F, places a significant limitation on the use of the RHR system. Similarly, the SWS design temperature of 95°F will limit the use of the RHR system. While the RHR system is fully capable of removing decay heat at 16 hours, the limitations of the CCP system do not allow full use of the RHR capacity. The flow through the RHR system must be throttled and decay heat removal must be supplemented with steam generator cooling until 30 hours when the decay heat has dropped low enough so that the CCP design temperature and service water design temperature no longer restricts the capability of RHR to be used for the full heat load.

An evaluation was performed for possible safety grade cooldown scenarios within the limitations of the CCP system and the minimum required DWST inventory. With a maximum CCP temperature

of 150°F, the attached Table 1 shows that cooldown, utilizing only safety grade equipment, can be accomplished within the minimum required DWST inventory. Both offsite power available and loss of offsite power have been taken into account by assuming the heat load from one RCS pump operating for twelve hours. In addition, the limiting single failure of one train of safety systems has been assumed. An allowance for AFW loss due to feedwater line rupture has also been taken into account. The time frame for cooldown is still consistent with the FSAR and the NRC's Safety Evaluation Report[2] where it is shown that the plant could be brought to RHR entry conditions within 36 hours.

Even with the simultaneous steam generator and RHR cooling, the maximum calculated CCP temperature and service water temperature will exceed their normal operating design temperatures by a maximum of 35°F. However, the impact of the higher temperature on piping, pipe supports, and component stress has been evaluated and found to be acceptable. Since a safety grade cooldown is only required under emergency conditions, the condition is classified as an Emergency Condition under the ASME Code, where exceeding the design conditions is acceptable. Evaluations have been performed to show that sufficient margin exists to accommodate the expected temperature excursion. The impact on the piping is an increase in the range of expansion stress resulting in a decrease in the number of cycles that may be accommodated. The piping, supports, and components will be inspected after a safety grade cooldown to determine if there is any impact due to the thermal transient. It should be noted that the maximum CCP and service water temperature was based upon a technical specification maximum ultimate heat sink temperature of 75°F. Normally, the heat sink temperature is well below 75°F. Thus, the likelihood of exceeding the CCP and service water design temperatures is low. Thus, it is concluded that safety grade cold shutdown can be accomplished within the minimum required DWST inventory with no significant impact on the CCP or SWS.

The CST is the backup water supply for the auxiliary feedwater system. The action statement for Technical Specification 3.7.1.3 allows the option of demonstrating the operability of the CST in lieu of shutdown if the DWST is inoperable. The surveillance requirement for the inventory in the tank is being changed to take into account the unusable volume in the CST. This provides additional assurance that sufficient inventory will be available in the event that a safety grade cold shutdown is required.

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(2) Ibid

Significant Hazards Consideration Determination

In accordance with 10CFR50.92, NNECO has reviewed the proposed changes and has concluded that they do not involve a significant hazards consideration (SHC). The basis for this conclusion is that the three criteria of 10CFR50.92(c) are not compromised. The proposed changes do not involve an SHC because the changes would not:

1. Involve a significant increase in the probability or consequences of an accident previously evaluated.

   The proposed change to the LCO and the bases for the DWST and AFW bases address the assumption changes for the demonstration of safety grade cold shutdown. These assumption changes do not affect the assumptions used for any previously evaluated accident. In addition, changes to these assumptions cannot affect the probability of any previously evaluated accident.

   The increase in the required condensate storage tank minimum volume as a backup to the demineralized water storage tank only provides additional assurance that an adequate water supply will be available for safety grade cold shutdown and cannot affect the probability or consequences of any previously evaluated accident.

2. Create the possibility of a new or different kind of accident from any previously analyzed.

   The proposed change to the LCO and the bases for the DWST and AFW bases address assumption changes for the demonstration of safety grade cold shutdown. The increase in required CST inventory only provides additional assurances of sufficient backup water supply for safety grade cold shutdown. Since there is no impact to normal operation, the change does not create the possibility for a new or different kind of accident from any previously analyzed.

3. Involve a significant reduction in the margin of safety.

   The change to the LCO and the bases of the DWST and AFW Technical Specifications is needed to reflect a change in the assumptions made for safety grade cold shutdown. The current basis for the minimum DWST inventory reflects generic analysis that assumes that ten hours at hot standby and six hours for cooldown are sufficient to achieve RHR entry conditions. However, because of design temperature

limits for the CCP and the SWS, the RHR cannot be used to remove all decay heat at sixteen hours. While the RHR system flow capacity to remove decay at sixteen hours, the RHR system flow must be throttled and decay heat removal must be supplemented with continued cooling from the steam generator to maintain acceptable temperatures for the CCP and SWS. At thirty hours, decay heat has decreased low enough so that the temperature limitations no longer restrict the capability of RHR to remove all the heat loads.

Even with the steam generator cooling supplementing RHR, the peak CCP temperature will exceed the design temperature of 115°F by a maximum of 35°F. However, the impact of the thermal transient on the piping, supports, and components of the CCP and SWS have been evaluated and found to be acceptable. The loads are consistent with the Emergency Condition classification of the ASME Code. Inspection will be performed following a safety grade cold shutdown to confirm that there was no impact from the thermal transient.

With these assumption changes, it has been shown that RHR entry conditions can be achieved consistent with the NRC's Safety Evaluation Report with no significant impact on the CCP and SWS. Thus, the change in assumptions do not reduce the margin of safety.

The increase in CST inventory provides additional assurance that the CST will provide a backup supply of auxiliary feedwater for safety grade cold shutdown in the event that the DWST is inoperable. The increase in inventory takes into account the unusable volume in the CST. Thus, this change has no impact on the margin of safety.

Moreover, the Commission has provided guidance concerning the application of standards in 10CFR50.92 by providing certain examples (March 6, 1986, 51FR7751) of amendments that are considered not likely to involve an SHC. The proposed changes to Section 3.7.1.2 and Surveillance Requirement 4.7.1.3.2 are not enveloped by any of the examples. However, NNECO has concluded that the proposed changes do not negatively impact the public health or safety, nor do they involve an SHC.

Environmental Considerations

NNECO has reviewed the proposed license amendment against the criteria of 10CFR51.22 for environmental considerations. The proposed changes do not involve an SHC, do not increase the types and amounts of effluents that may be released offsite, nor significantly increase individual or cumulative occupational

radiation exposures. Based on the foregoing, NNECO concludes that the proposed changes meet the criteria delineated in 10CFR51.22(c)(9) for a categorical exclusion from the requirements for an environmental impact statement.

The Millstone Unit No. 3 Nuclear Review Board have reviewed and approved this proposed amendment and concur with the above determination.

In accordance with 10CFR50.91(b), we are providing the State of Connecticut with a copy of this proposed amendment via facsimile to ensure their awareness of this request.

Regarding our proposed schedule for this amendment, we request issuance at your earliest convenience with the amendment effective as of the date of issuance and to be implemented within 60 days of issuance.

If you should have any questions, please contact Mr. R. G. Joshi at (203) 440-2080.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

J. F. Opeka
Executive Vice President

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Subscribed and sworn to before me

this 19th day of May, 1995

Gerard P. van Noordennen

Date Commission Expires: 12/31/97

TABLE 1

Safety Grade Cold Shutdown Scenario

STEP	INITIATION TIME (HOURS)	COMPLETION TIME (HOURS)
Hot standby - borate to cold shutdown	0	5
Steam generator cooldown to 350°F	5	12
Simultaneous steam generator cooling and RHR cooling at 350°F	12	30
RHR only sufficient to remove decay heat	30	-