



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 176

TO FACILITY OPERATING LICENSE NO. DPR-65

NORTHEAST NUCLEAR ENERGY COMPANY

THE CONNECTICUT LIGHT AND POWER COMPANY

THE WESTERN MASSACHUSETTS ELECTRIC COMPANY

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 2

DOCKET NO. 50-336

1.0 INTRODUCTION

By letter dated May 27, 1994, as supplemented by letter dated June 1, 1994, the Northeast Nuclear Energy Company (NNECO or the licensee) requested an amendment to change the Technical Specifications (TS) for the Millstone Nuclear Power Station, Unit No. 2. The proposed amendment would revise the Technical Specifications (TS) by adding a footnote to Tables 3.3-3, 3.3-4 and 3.3-5 of the Millstone Unit No. 2 TS denoting that the operability of the automatic initiation logic for the auxiliary feedwater (AFW) system will rely on operator action for the remainder of Cycle 12. The licensee requested that the NRC Staff process the proposed amendment on an emergency basis pursuant to 10 CFR 50.91(a)(5), since failure to act in a timely way would prevent Millstone Unit No. 2 from resuming operation.

2.0 BACKGROUND AND DISCUSSION

On May 27, 1994, NNECO requested the NRC to exercise its discretion not to enforce compliance associated with Action Statement 9 b of Limiting Condition for Operation (LCO) 3.3.2.1 to be effective until the proposed license amendment would be issued. The enforcement discretion would permit NNECO to operate Millstone Unit No. 2 in Modes 1, 2, or 3 while the proposed amendment is being processed. The specific Action Statement 9 b of LCO 3.3.2.1, as applied to the requested change, requires the steam generator low level instrumentation channel to be operable. The steam generator low level instrumentation channel provides automatic initiation of the AFW system.

The AFW system supplies feedwater from the condensate storage tank to the steam generators via three pumps (two motor-driven pumps and one turbine-driven pump). The motor-driven pumps may be initiated either automatically or manually, and the turbine-driven pump is only initiated manually. The automatic initiation logic for the motor-driven AFW pumps and the AFW regulating valves consists of four channels which measure steam generator

level. In the event that any two of the four channels detect a low steam generator level, after a 3 minute and 25 seconds time delay, relays will provide annunciation in the control room and send start signals to both motor driven AFW pumps and open signals to both AFW regulating valves.

During an unscheduled outage to repair a reactor coolant pump seal, NNECO identified that Millstone Unit No. 2 does not conform with their previous commitments regarding automatic initiation of the AFW system. Specifically, they discovered a postulated line-to-line short in the common cable containing the initiation circuits that would defeat the automatic start feature of the AFW system. The manual initiation and control for the AFW pumps is not impacted by this condition. The licensee declared the automatic start feature of the AFW system inoperable and reported the condition to the NRC on May 19, 1994.

The NRC staff granted orally on May 31, 1994, NNECO's request for enforcement discretion associated with Action Statement 9 b of LCO 3.3.2.1 to be effective until the proposed license amendment would be issued. The discretionary action would be effective until a decision by the staff regarding the proposed amendment could be issued. This enforcement discretion was confirmed by the NRC letter to NNECO dated June 3, 1994.

Emergency action is necessary in order to prevent delay in resuming operation and to minimize the effective time of enforcement discretion.

3.0 EVALUATION

The AFW system is designed to supply water to the steam generators for reactor coolant system decay heat removal when the main feedwater (MFW) system is not available. The system consists of one turbine-driven and two motor-driven AFW pumps and associated flow paths. The turbine-driven pump is manually initiated while the motor-driven pumps are normally automatically initiated (steam generator low level) or manually initiated. The AFW automatic initiation function for the motor-driven pumps was added as a result of the staff's Post TMI-2 requirements (Item II.E.1.2 of NUREG-0737). Prior to that modification all three AFW pumps at Millstone 2 were manually initiated. The design basis accidents/events analyses, therefore, did not rely on the automatic initiation system.

The design of the automatic initiation system was intended to be single failure proof and meet the provisions of the Institute of Electrical and Electronic Engineers (IEEE) Standard 279-1971. IEEE 279-1971 includes short circuits as a postulated single failure mode. Recently, the licensee discovered a short circuit that could potentially disable the auto-start circuitry of both motor-driven pumps; the manual start function would not be affected by this failure. TS Tables 3.3-3, 3.3-4, and 3.3-5 require the

automatic start feature for both motor-driven AFW pumps to be operable. Conservatively, the licensee concluded that the short circuit single failure vulnerability would require the automatic initiation system to be declared inoperable when in an applicable mode (Modes 1, 2, or 3).

The licensee proposed to add a note to the affected TS tables that would allow the automatic initiation system to be considered operable with reliance on operator action in the event the short circuit were to occur. This note would only be applicable until the end of Cycle 12. For operation in Cycle 13, modifications to the initiation circuitry would be made to eliminate the reliance on operator action.

Based on its review the staff determined that the automatic initiation system is not relied on for any plant accident analysis or other safety analysis. The plant safety analyses assume manual initiation of the AFW system within 10 minutes following a loss of MFW. The staff also considers the probability of the specific short circuit required to be rather remote (metal encased and low amperage), and in the unlikely event it did occur, the fault would be discovered during routine monthly testing. For all other failures the automatic initiation system will be operable and not vulnerable to a single failure. Thus, the hot short single failure vulnerability does not significantly affect the availability of the AFW system. The staff, therefore, concludes that the proposed TS changes are acceptable and should be approved.

4.0 TECHNICAL SPECIFICATION CHANGES

The following TS changes have been proposed. The staff finds these changes acceptable.

- (1) For Table 3.3-3, ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION, a superscript ⁽¹⁾ would be added to "9. AUXILIARY FEEDWATER and b. Steam Generator Level - Low" and the following footnote would be added:

"(1) For Cycle 12 only, operability of the auxiliary feedwater (AFW) automatic initiation logic will rely on operator action to ensure successful initiation of the AFW. Prior to startup for Cycle 13, modifications to the automatic initiation logic for AFW will be implemented to eliminate the reliance on operator action."

- (2) For Table 3.3-4, ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP VALUES, a superscript ⁽¹⁾ would be added to "9. AUXILIARY FEEDWATER and b. Steam Generator Level - Low" and the following footnote would be added:

- "(1) For Cycle 12 only, operability of the auxiliary feedwater (AFW) automatic initiation logic will rely on operator action to ensure successful initiation of the AFW. Prior to startup for Cycle 13, modifications to the automatic initiation logic for AFW will be implemented to eliminate the reliance on operator action."
- (3) For Table 3.3-5, ENGINEERED SAFETY FEATURES RESPONSE TIMES, a superscript ⁽³⁾ would be added to "8.a Auxiliary Feedwater System" and the following footnote would be added:
- "(3) For Cycle 12 only, operability of the auxiliary feedwater (AFW) automatic initiation logic will rely on operator action to ensure successful initiation of the AFW. Prior to startup for Cycle 13, modifications to the automatic initiation logic for AFW will be implemented to eliminate the reliance on operator action."

5.0 EMERGENCY CIRCUMSTANCES

The design of the automatic initiation system for the AFW system, was intended to be single failure proof and meet the provisions of the Institute of Electrical and Electronic Engineers (IEEE) Standard 279-1971. IEEE 279-1971 includes short circuits as a postulated single failure mode. Recently, during an unplanned shutdown to repair a reactor coolant pump seal, the licensee discovered a short circuit that could potentially disable the auto-start circuitry of both motor-driven AFW pumps; the manual start function would not be affected by this failure. TS Tables 3.3-3, 3.3-4, and 3.3-5 require the automatic start feature for both motor-driven AFW pumps to be operable. Conservatively, on May 19, 1994, the licensee concluded that the short circuit single failure vulnerability would require the automatic initiation system to be declared inoperable when in an applicable mode (Modes 1, 2, or 3). Thus the plant was not allowed to resume power operation in the above condition.

By letter dated May 27, 1994, as supplemented by letter dated June 1, 1994, the licensee requested an amendment to change the TS for the Millstone Unit No. 2. In addition, NNECO requested the NRC staff to process the amendment on an emergency basis. The proposed amendment would revise the Technical Specifications (TS) by adding a footnote to Tables 3.3-3, 3.3-4 and 3.3-5 of the Millstone Unit No. 2 TS denoting that the operability of the automatic initiation logic for the auxiliary feedwater (AFW) system will rely on operator action for the remainder of Cycle 12. Also, the letter dated May 27, 1994, requested the NRC to exercise its discretion not to enforce compliance with the required actions for Millstone Unit 2 LCO 3.3.2.1 should the processing of the proposed license amendment not be completed by May 31, 1994 (the time planned for resuming power operation).

The licensee gave the following reasons to support emergency action: The emergency situation could not be avoided. The single failure vulnerability was identified during the current unscheduled outage. Since

discovery, NNECO has been evaluating options to resolve this issue. However, due to the complexity of this issue, NNECO concluded that there are no apparent design changes which could provide short-term resolution of this condition. The appropriate resolution, if initiated now, would provide an extended delay in plant startup. Instead, NNECO concluded that it would be prudent to more thoroughly evaluate the options and design, engineer, install, and test a modification to resolve these issues during the next refueling outage, if necessary.

In order to resume operation, the licensee needs to ensure that Millstone Unit No. 2 meets the operability requirements of each of the applicable TS, including those pertaining to automatic initiation of the AFW system. NNECO concluded that that they could not meet the operability requirements concerning automatic initiation of the AFW system. Accordingly, NNECO determined that the definition of operability must be modified until the single failure concern could be resolved by design changes. Thus, NNECO proposed to change the Millstone Unit No. 2 TS for the remainder of Cycle 12 by providing a definition of operability for the automatic initiation logic for the AFW system that can be met by the current design. Modifications will be implemented prior to startup for Cycle 13 to bring the automatic initiation logic into compliance with NNECO's previous commitments.

The NRC staff granted orally on May 31, 1994, NNECO's request for enforcement discretion associated with Action Statement 9 b of LCO 3.3.2.1 to be effective until the proposed license amendment would be issued. The discretionary action would be effective until a decision by the staff regarding the proposed amendment could be issued. This enforcement discretion was confirmed by the NRC letter to NNECO dated June 3, 1994.

The staff determined that the request for amendment warranted an emergency basis in order to prevent delay in resuming operation and to minimize the effective time of enforcement discretion.

The staff concluded that the exercise of enforcement discretion in this instance, involved minimum safety impact and was satisfied that it was warranted from a public health and safety perspective.

The NRC staff does not believe that NNECO has abused the emergency provisions of 10 CFR 50.91(a)(5) in this instance. In accordance with 10 CFR 50.91(a)(5) the Commission has determined that emergency circumstances exist warranting prompt action, the situation could not have been avoided, and the licensee and the Commission must act quickly and time does not permit the Commission to publish a Federal Register notice allowing 30 days for prior public comment. The Commission has also determined that the amendment, as discussed in Section 6.0, does not involve a significant hazards consideration.

6.0 FINAL NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

The Commission has made a final determination that the amendment involves no significant hazards consideration. Under the Commission's regulations in 10 CFR 50.92(c), this means that the operation of the facility in accordance with the proposed amendment would not (1) involve a significant increase in the probability or consequences of an accident previously evaluated; or (2) create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) involve a significant reduction in a margin of safety.

The Commission has evaluated the proposed changes against the above standards as required by 10 CFR 50.91(a) and has concluded that the changes do not:

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

The identified single failure in the steam generator level instrumentation circuitry would prevent the auto initiation of both motor-driven pumps. The design basis loss of normal feedwater event presented in FSAR Section 14.2.7 does not rely on the automatic initiation of the AFW system. This analysis relies on the operator manually initiating AFW via the turbine-driven AFW pump 10 minutes after the initiation of the event. Because no credit was taken for the automatic initiation of AFW following the limiting loss of main feedwater event, the consequences of this event are not increased.

The proposed changes will have no significant impact on the probability of occurrence of any design basis accident. The proposed changes can affect only the response of the AFW system to a plant transient. They cannot have any impact on the probability of a loss of normal feedwater or any other accidents described in Chapter 14 of the FSAR.

Although the probability of system failure is increased due to reliance on operator action, the increase in failure probability is not significant. Confirmation of proper feedwater response is already included in the standard post trip actions as specified by the Emergency Operating Procedures. Manual initiation of the AFW system is directed by the emergency operating procedures, addressed in training, and routinely practiced on the simulator. The operators are trained and experience on simulators and in actual plant operation has demonstrated that these manual actions are taken very quickly. Therefore, although the probability of system failure has increased somewhat by reliance on short-term operator action, the increase is not judged to be significant.

Based on the above, the proposed changes do not involve an increase in the probability or consequences of an accident previously evaluated.

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

The identified single failure impacts the automatic initiation of the AFW system. This potential failure of AFW does not change the plant response to any transient or accident.

Although the probability of system failure is increased due to reliance on operator action, the increase in failure probability is not significant. Confirmation of proper feedwater response is already included in the standard post trip actions as specified by the emergency operating procedures. Manual initiation of the AFW system is directed by the emergency operating procedures, addressed in training, and routinely practiced on the simulator. Experience on the simulator and during actual plant operation has demonstrated that these manual actions are taken very quickly. Therefore, although the probability of system failure has increased somewhat by reliance on short-term operator action, the increase is not judged to be significant.

Thus, the proposed changes do not create the possibility of a new or different kind of accident from any previously evaluated.

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

The limiting transient with respect to minimum AFW flow requirements is the loss of main feedwater event. The identified single failure which prevents the automatic initiation of AFW does not impact the loss of main feedwater event consequences, as this event takes credit for manual initiation of the turbine driven AFW pump 10 minutes after the initiation of the event. In addition, based upon a review of the probability of a short circuit that could disable automatic initiation of auxiliary feedwater, it is concluded that probability of this failure is extremely low and the overall reliability of auxiliary feedwater system is not affected. Therefore, the identified single failure does not involve a significant reduction in the margin of safety.

7.0 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.

8.0 ENVIRONMENTAL CONSIDERATION

The amendment changes surveillance requirements. 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 made a final no significant hazards consideration determination with respect to this amendment. 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.

9.0 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.

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Date: June 7, 1994