

NOV 13 1987

Docket No. 50-336

Mr. Edward J. Mroczka
Senior Vice President
Nuclear Engineering and Operations
Northeast Nuclear Energy Company
P. O. Box 270
Hartford, Connecticut 06141-0270

Dear Mr. Mroczka:

Subject: Issuance of Amendment (TAC 65852/66116)

The Commission has issued the enclosed Amendment No.121 to Facility Operating License No. DPR-65 for Millstone Nuclear Power Station, Unit No. 2, in response to your applications dated July 14, 1987 and September 4, 1987.

The change modifies the Technical Specifications (TS) as follows:

- (1) TS 4.4.5.1.4, "Acceptance Criteria", is modified to address the wall thinning criteria for steam generator sleeves and to remove a footnote and
- (2) TS 3.4.6.2, "Reactor Coolant System Leakage", is changed to decrease the allowable primary-to-secondary leakage (through any one steam generator) from 0.5 to 0.15 gpm.

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

Sincerely,

~~ORIGINAL SIGNED BY~~

David H. Jaffe, Project Manager
Project Directorate I-4
Division of Reactor Projects I/II

Enclosures:

- 1. Amendment No. 121 to DPR-65
- 2. Safety Evaluation

cc w/enclosures:
See nex page

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Millstone Nuclear Power Station
Unit No. 2

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

NORTHEAST NUCLEAR ENERGY COMPANY
THE CONNECTICUT LIGHT AND POWER COMPANY
THE WESTERN MASSACHUSETTS ELECTRIC COMPANY
DOCKET NO. 50-336
MILLSTONE NUCLEAR POWER STATION, UNIT NO. 2
AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No.121
License No. DPR-65

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The applications for amendment by Northeast Nuclear Energy Company, et al. (the licensee), dated July 14, 1987 and September 4, 1987, 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.

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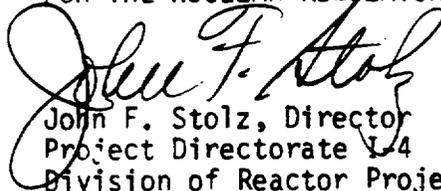
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-65 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 121, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



John F. Stolz, Director
Project Directorate 4
Division of Reactor Projects I/II

Attachment:
Changes to the Technical
Specifications

Date of Issuance: NOV 13 1987

ATTACHMENT TO LICENSE AMENDMENT NO. 121

FACILITY OPERATING LICENSE NO. DPR-65

DOCKET NO. 50-336

Replace the following pages of the Appendix A Technical Specifications with the enclosed pages. The revised pages are identified by amendment number and contain vertical lines indicating the areas of change. The corresponding overleaf pages are provided to maintain document completeness.

Remove

3/4 4-7a
3/4 4-9
B3/4 4-2a
B3/4 4-3

Insert

3/4 4-7a
3/4 4-9
B3/4 4-2a
B3/4 4-3

REACTOR COOLANT SYSTEM

SURVEILLANCE REQUIREMENTS (Continued)

4.4.5.1.3 Inspection Frequencies - The above required inservice inspections of steam generator tubes shall be performed at the following frequencies:

- a. The first inservice inspection shall be performed after 6 Effective Full Power Months but within 24 calendar months of initial criticality. Subsequent inservice inspections shall be performed at intervals of not less than 12 nor more than 24 calendar months after the previous inspection. If two consecutive inspections following service under AVT conditions, not including the preservice inspection, result in all inspection results falling into the C-1 category or if two consecutive inspections demonstrate that previously observed degradation has not continued and no additional degradation has occurred, the inspection interval may be extended to a maximum of once per 40 months.
- b. If the results of the inservice inspection of a steam generator conducted in accordance with Table 4.4-6 at 40 month intervals fall into Category C-3, the inspection frequency shall be increased to at least once per 20 months. The increase in inspection frequency shall apply until the subsequent inspections satisfy the criteria of Specification 4.4.5.1.3.a; the interval may then be extended to a maximum of once per 40 months.
- c. Additional, unscheduled inservice inspections shall be performed on each steam generator in accordance with the first sample inspection specified in Table 4.4-6 during the shutdown subsequent to any of the following conditions:
 1. Primary-to-secondary tubes leaks (not including leaks originating from tube-to-tube sheet welds) in excess of the limits of Specification 3.4.6.2.
 2. A seismic occurrence greater than the Operating Basis Earthquake.
 3. A loss-of-coolant accident requiring actuation of the engineered safeguards.
 4. A main steam line or feedwater line break.

REACTOR COOLANT SYSTEM

SURVEILLANCE REQUIREMENTS (Continued)

4.4.5.1.4 Acceptance Criteria

a. As used in this Specification

1. Imperfection means an exception to the dimensions, finish or contour of a tube or sleeve from that required by fabrication drawings or specifications. Eddy-current testing indications below 20% of the nominal tube or sleeve wall thickness, if detectable, may be considered as imperfections.
2. Degradation means a service-induced cracking, wastage, wear or general corrosion occurring on either inside or outside of a tube or sleeve.
3. Degraded Tube or sleeve means a tube or sleeve containing imperfections \geq 20% of the nominal wall thickness caused by degradation.
4. % Degradation means the percentage of the tube wall or sleeve thickness affected or removed by degradation.
5. Defect means an imperfection of such severity that it exceeds the plugging limit. A tube containing a defect is defective.
6. Plugging Limit means the imperfection depth at or beyond which the tube shall be repaired because it may become unserviceable prior to the next inspection and is equal to 40% of the nominal wall thickness for tubes or sleeves.
7. Unserviceable describes the condition of a tube if it leaks or contains a defect large enough to affect its structural integrity in the event of an Operating Basis Earthquake, a loss-of-coolant accident, or a steam line or feedwater line break as specified in 4.4.5.1.3.c, above.
8. Tube Inspection means an inspection of the steam generator tube from the point of entry (hot leg side) completely around the U - Bend to the top support of the cold leg.

- b. The steam generator shall be determined OPERABLE after completing the corresponding actions (plug or sleeve all tubes exceeding the plugging limit and plug all defecting sleeves) required by Table 4.4-6.

REACTOR COOLANT SYSTEM

REACTOR COOLANT SYSTEM LEAKAGE

LIMITING CONDITION FOR OPERATION

3.4.6.2 Reactor Coolant System leakage shall be limited to:

- a. No PRESSURE BOUNDARY LEAKAGE,
- b. 1 GPM UNIDENTIFIED LEAKAGE,
- c. 1 GPM total primary-to-secondary leakage through both steam generators and 0.15 GPM through any one steam generator, and
- d. 10 GPM IDENTIFIED LEAKAGE from the Reactor Coolant System.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

- a. With any PRESSURE BOUNDARY LEAKAGE, be in COLD SHUTDOWN within 36 hours.
- b. With any Reactor Coolant System leakage greater than any one of the above limits, excluding PRESSURE BOUNDARY LEAKAGE, reduce the leakage rate to within limits within 4 hours or be in COLD SHUTDOWN within the next 36 hours.

SURVEILLANCE REQUIREMENTS

4.4.6.2 Reactor Coolant System leakages shall be demonstrated to be within each of the above limits by:

- a. Monitoring the containment atmosphere particulate radioactivity at least once per 12 hours.
- b. Monitoring the containment sump inventory at least once per 12 hours,
- c. Performance of a Reactor Coolant System water inventory balance at least once per 72 hours during steady state operation except when operating in the shutdown cooling mode.

REACTOR COOLANT SYSTEM

CHEMISTRY

LIMITING CONDITION FOR OPERATION

3.4.7 The Reactor Coolant System chemistry shall be maintained within the limits specified in Table 3.4-1.

APPLICABILITY: ALL MODES.

ACTION:

MODES 1, 2, 3 and 4

- a. With any one or more chemistry parameter in excess of its Steady State Limit but within its Transient Limit, restore the parameter to within its Steady State Limit within 24 hours or be in COLD SHUTDOWN within the next 36 hours.
- b. With any one or more chemistry parameter in excess of its Transient Limit, be in COLD SHUTDOWN within 36 hours.

MODES 5 and 6

With the concentration of either chloride or fluoride in the Reactor Coolant System in excess of its Steady State Limit for more than 24 hours or in excess of its Transient Limit, reduce the pressurizer pressure to ≤ 500 psia, if applicable, and perform an analysis to determine the effects of the out-of-limit condition on the structural integrity of the Reactor Coolant System; determine that the Reactor Coolant System remains acceptable for continued operations prior to increasing the pressurizer pressure above 500 psia or prior to proceeding to MODE 4.

SURVEILLANCE REQUIREMENTS

4.4.7 The Reactor Coolant System chemistry shall be determined to be within the limits by analysis of those parameters at the frequencies specified in Table 4.4-1.

REACTOR COOLANT SYSTEM

BASES

evidence of mechanical damage or progressive degradation due to design, manufacturing errors, or inservice conditions that lead to corrosion. Inservice inspection of steam generator tubing also provides a means of characterizing the nature and cause of any tube degradation so that corrective measures can be taken.

The plant is expected to be operated in a manner such that the secondary coolant will be maintained within those chemistry limits found to result in negligible corrosion of the steam generator tubes. If the secondary coolant chemistry is not maintained within these limits, localized corrosion may likely result in stress corrosion cracking.

The extent of cracking during plant operation would be limited by the limitation of steam generator tube leakage between the primary coolant system and the secondary coolant system (primary-to-secondary leakage = 0.15 GPM, per steam generator). Cracks having a primary-to-secondary leakage less than this limit during operation will have an adequate margin of safety to withstand the loads imposed during normal operation and by postulated accidents. Operating plants have demonstrated that primary-to-secondary leakage of 0.15 gallon per minute can readily be detected by radiation monitors of steam generator blowdown. Leakage in excess of this limit will require plant shutdown and an unscheduled inspection, during which the leaking tubes will be located and plugged.

Wastage-type defects are unlikely with proper chemistry treatment of the secondary coolant. However, even if a defect should develop in service, it will be found during scheduled inservice steam generator tube examinations. Plugging or sleeving will be required for all tubes with imperfections exceeding the plugging limit of 40% of the tube nominal wall thickness. Sleeving repair will be limited to those steam generator tubes with a defect between the tube sheet and the first eggcrate support. Tubes containing sleeves with imperfections exceeding the plugging limit will be plugged. Steam generator tube inspections of operating plants have demonstrated the capability to reliably detect degradation that has penetrated 20% of the original tube wall thickness.

Whenever the results of any steam generator tubing inservice inspection fall into Category C-3, these results will be immediately reported to the Commission pursuant to 10 CFR 50.72. Such cases will be considered by the Commission on a case-by-case basis and may result in a requirement for analysis, laboratory examinations, tests, additional eddy-current inspection, and revision of the Technical Specifications, if necessary.

REACTOR COOLANT SYSTEM

BASES

3/4.4.6 REACTOR COOLANT SYSTEM LEAKAGE

3/4.4.6.1 LEAKAGE DETECTION SYSTEMS

The RCS leakage detection systems required by this specification are provided to monitor and detect leakage from the Reactor Coolant Pressure Boundary. These detection systems are consistent with the recommendations of Regulatory Guide 1.45, "Reactor Coolant Pressure Boundary Leakage Detection Systems."

3/4.4.6.2 REACTOR COOLANT SYSTEM LEAKAGE

Industry experience has shown that while a limited amount of leakage is expected from the RCS, the unidentified portion of this leakage can be reduced to a threshold value of less than 1 GPM. This threshold value is sufficiently low to ensure early detection of additional leakage.

The 10 GPM IDENTIFIED LEAKAGE limitation provides allowance for a limited amount of leakage from known sources whose presence will not interfere with the detection of UNIDENTIFIED LEAKAGE by the leakage detection systems.

The total steam generator tube leakage limit of 1 GPM for all steam generators ensures that the dosage contribution from the tube leakage will be limited to a small fraction of Part 100 limits in the event of either a steam generator tube rupture or steam line break. The 1 GPM limit is consistent with the assumptions used in the analysis of these accidents.

PRESSURE BOUNDARY LEAKAGE of any magnitude is unacceptable since it may be indicative of an impending gross failure of the pressure boundary. Therefore, the presence of any PRESSURE BOUNDARY LEAKAGE requires the unit to be promptly placed in COLD SHUTDOWN.

The 0.15 GPM Primary to Secondary leakage limitation assures structural integrity. A tube with a through-wall circumferential crack which leaks at 0.15 GPM under normal operating conditions retains the structural margins recommended in Regulatory Guide 1.121. In addition, the total leakage under accident conditions would remain below the 1 GPM limit.

REACTOR COOLANT SYSTEM

BASES

3/4.4.7 CHEMISTRY

The limitations on Reactor Coolant System contaminants ensure that corrosion of the Reactor Coolant System is minimized and reduce the potential for Reactor Coolant System leakage or failure due to stress corrosion. Maintaining the concentrations of the contaminants within the Steady State Limits shown on Table 3.4-1 provides adequate corrosion protection to ensure the structural integrity of the Reactor Coolant System over the life of the plant. The associated effects of exceeding the oxygen, chloride and fluoride limits are time and temperature dependent. Corrosion studies show that operation may be continued with contaminant concentration levels in excess of the Steady State Limits, up to the Transient Limits, for the specified limited time intervals without having a significant effect on the structural integrity of the Reactor Coolant System. The time interval permitting continued operation within the restrictions of the Transient Limits provides time for taking corrective actions to restore the contaminant concentrations to within the Steady State Limits.

The surveillance requirements provide adequate assurance that concentrations in excess of the limits will be detected in sufficient time to take corrective action.

3/4.4.8 SPECIFIC ACTIVITY

The limitations on the specific activity of the primary coolant ensure that the resulting 2 hour doses at the site boundary will not exceed an appropriately small fraction of Part 100 limits following a steam generator tube rupture accident in conjunction with an assumed steady state primary-to-secondary steam generator leakage rate of 1.0 GPM and a concurrent loss of offsite electrical power.

The ACTION statement permitting POWER OPERATION to continue for limited time periods with the primary coolant's specific activity $> 1.0 \mu\text{Ci}/\text{gram}$ DOSE EQUIVALENT I-131, but within the allowable limit shown on Figure 3.4-1, accommodates possible iodine spiking phenomenon which may occur following changes in THERMAL POWER.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 121 TO DPR-65

NORTHEAST NUCLEAR ENERGY COMPANY, ET AL.

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 2

DOCKET NO. 50-336

INTRODUCTION

By applications for license amendments dated July 14, 1987 and September 4, 1987, Northeast Nuclear Energy Company, et al. (the licensee), requested changes to the Technical Specifications (TS) for Millstone Unit 2 as follows: (1) TS 4.4.5.1.4, "Acceptance Criteria", is modified to address the wall thinning criteria for steam generator sleeves and to remove a footnote and (2) TS 3.4.6.2, "Reactor Coolant System Leakage", would be changed to decrease the allowable primary-to-secondary leakage (through any one steam generator) from 0.5 to 0.15 gpm.

DISCUSSION AND EVALUATION

With regard to sleeving of steam generator tubes, on December 30, 1983, the NRC staff issued Amendment 89 to the Millstone Unit 2 Operating License, DPR-65. Amendment 89 permitted the licensee to repair degraded steam generator tubes by inserting thin wall tubes (sleeves) in the existing steam generator tubes. In the safety evaluation for Amendment 89, the NRC staff expressed the need for the licensee to develop criteria to address potential degradation of sleeved steam generator tubes. This need was subsequently reflected in a footnote to TS 4.4.5.1.4 as follows: "The plugging limit for sleeves will be determined prior to next refueling outage." Subsequently, on May 24, 1984, the licensee submitted a letter which proposed that sleeved steam generator tubes, degraded forty percent (40%) through wall, should be plugged. By letter dated January 28, 1985, the NRC responded by approving the licensee's plugging criteria for sleeved steam generator tubes. The proposed changes to TS 4.4.5.1.4 would delete the existing footnote and incorporate the plugging criteria for sleeved steam generator tubes in the TS by changing the definitions of imperfection, degradation, degraded tube, % degradation, and plugging limit, as they appear in TS 4.4.5.1.4.

In order to demonstrate the adequacy of the 40% plugging criteria for sleeved steam generator tubes, the NRC staff required the licensee to demonstrate that a 40% degraded sleeve is equivalent in strength to a 40% degraded steam generator tube. Based upon information supplied by the licensee in their letter dated May 25, 1984, we conclude that the sleeve design is such that it is not as stiff as the parent tube. As a result, the bending stresses for the sleeve are less than for a tube under both normal operation and accident conditions. We conclude that a sleeve degraded 40% through wall has a factor of safety of three or more against burst under all conditions specified in Regulatory Guide 1.1 21. Accordingly, the proposed change to the TS which provides for a 40% throughwall plugging criteria for sleeved steam generator tubes, is acceptable.

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The second proposed change to the TS involves the limit for primary-to-secondary leakage through a single steam generator. At the present time, TS 3.4.6.2 limits the primary-to-secondary leakage, in a single steam generator, to 0.5 gpm. The proposed change to TS 3.4.6.2, which would decrease the allowed leakage from 0.5 to 0.15 gpm, resulted from the licensee's January 1987 shutdown of Millstone Unit 2 for high primary-to-secondary leakage. Following the plant shutdown, the licensee identified a steam generator tube with a circumferential crack which was through-wall over at least a portion of the 220° circumferential extent.

Assessments of the safety significance of the leaking tube were performed by the licensee and concluded that operation of the steam generator continued to be safe provided that structural limits could be met for a circumferentially oriented crack. Based on calculations which concluded that a circumferential crack of the size which would allow 0.15 gpm primary-to-secondary leakage was structurally acceptable, an administrative reduction of the allowable leakage from 0.5 gpm to 0.15 gpm per steam generator was adopted for subsequent reactor operation. The proposed change to TS 3.4.6.2 incorporates this limit in the TS. The proposed change to TS 3.4.6.2 provides a more conservative limit on primary-to-secondary leakage that reflects the plant-specific experience of the licensee. Accordingly, the proposed change to TS 3.4.6.2 is acceptable.

ENVIRONMENTAL CONSIDERATION

This amendment changes a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The 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 published a proposed finding that the amendment involves no significant hazards consideration and there has been no public comment on such finding. 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.

CONCLUSION

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

Dated: **NOV 18 1987**

Principal Contributor: D. H. Jaffe