

MAR 2 1977

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Docket No. 50-336

Northeast Nuclear Energy Company  
ATTN: Mr. D. C. Switzer, President  
P. O. Box 270  
Hartford, Connecticut 06101

Gentlemen:

The Commission has issued the enclosed Amendment No. 23 to Facility Operating License No. DPR-65 for the Millstone Nuclear Power Station, Unit No. 2. The amendment consists of changes to the Technical Specifications in response to your application dated October 7, 1976, which provided the ECCS reevaluation required by our Order for Modification of License dated June 17, 1976.

This amendment terminates the 14.1 kw/ft limit on PLHGR as stated in our Order for Modification of License issued June 17, 1976 and also increases the PLHGR from 14.1 kw/ft to 16.3 kw/ft.

Copies of the Safety Evaluation and the FEDERAL REGISTER notice are also enclosed.

Sincerely,

Original signed by  
George Lear, Chief  
Operating Reactors Branch #3  
Division of Operating Reactors

Enclosures:

1. Amendment No. 23
2. Safety Evaluation
3. FEDERAL REGISTER Notice

cc w/encls:  
See next page

OFFICE	ORB #3	ORB #3	OELD	ORB #3	DOR DAB
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DATE	2/17/77	2/17/77	2/28/77	3/2/77	2/18/77

cc  
R

Northeast Nuclear Energy Company

- 2 -

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Counselors At Law  
One Constitution Plaza  
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U. S. Environmental Protection Agency  
Region I Office  
ATTN: EIS COORDINATOR  
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Boston, Massachusetts 02203

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Northeast Nuclear Energy Company  
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Plant Superintendent  
Millstone Plant  
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Chief, Energy Systems Analysis Branch (AW-459)  
Office of Radiation Programs  
U. S. Environmental Protection Agency  
Room 645, East Tower  
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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

THE CONNECTICUT LIGHT AND POWER COMPANY,  
THE HARTFORD ELECTRIC LIGHT COMPANY,  
WESTERN MASSACHUSETTS ELECTRIC COMPANY, AND  
NORTHEAST NUCLEAR ENERGY COMPANY

DOCKET NO. 50-336

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 23  
License No. DPR-65

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by The Connecticut Light and Power Company, The Hartford Electric Light Company, Western Massachusetts Electric Company, and Northeast Nuclear Energy Company (the licensees), dated October 7, 1976, 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.

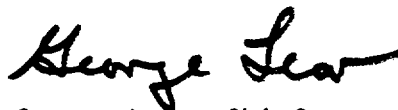
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-65 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 23, 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 its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



George Lear, Chief  
Operating Reactors Branch #3  
Division of Operating Reactors

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: March 2, 1977

ATTACHMENT TO LICENSE AMENDMENT NO. 23

FACILITY OPERATING LICENSE NO. DPR-65

DOCKET NO. 50-336

Replace the following page of the Appendix "A" Technical Specifications with the enclosed page. The revised page is identified by Amendment number and contains vertical lines indicating the area of change. The corresponding overleaf page 3/4 2-4 is also provided to maintain document completeness. No changes were made on 3/4 2-4.

Page

3/4 2-3

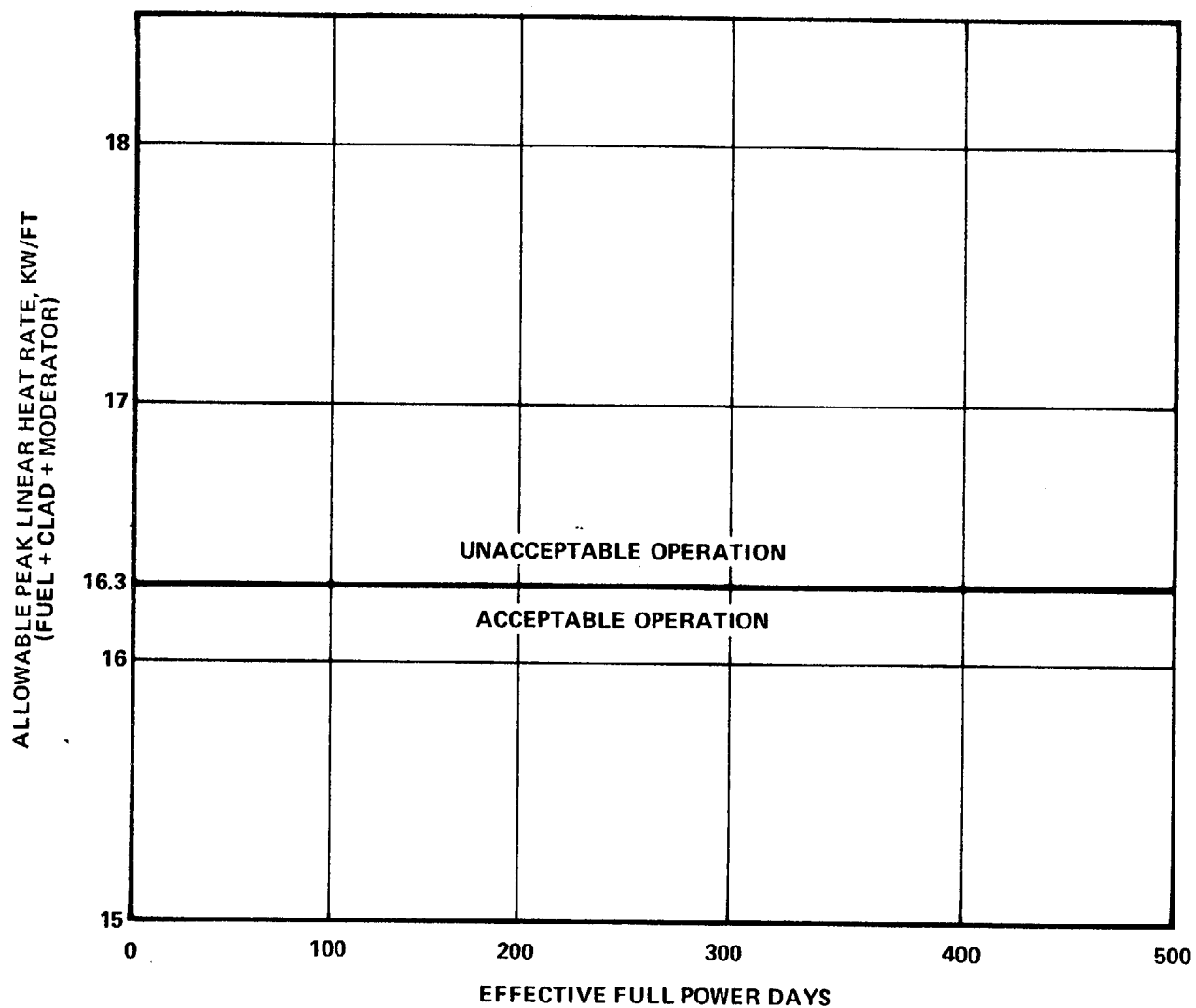


Figure 3.2-1 Allowable Peak Linear Heat Rate vs Burnup

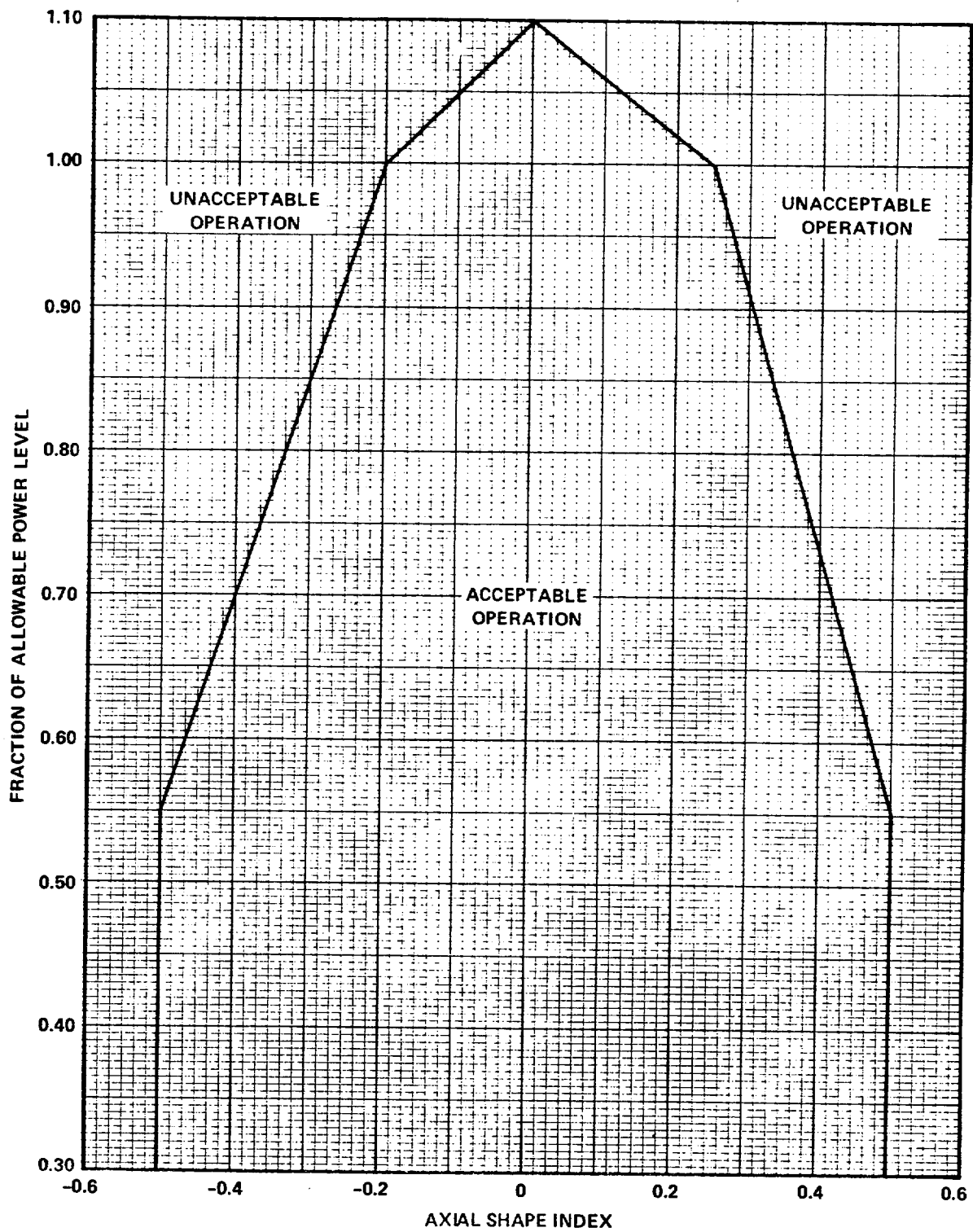


FIGURE 3.2-2

AXIAL SHAPE INDEX vs Fraction of Allowable Power Level per Specification 4.2.1.2b



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
SUPPORTING AMENDMENT NO. 23 TO FACILITY OPERATING LICENSE NO. DPR-65  
NORTHEAST NUCLEAR ENERGY COMPANY  
MILLSTONE NUCLEAR POWER STATION, UNIT NO. 2  
DOCKET NO. 50-336

Introduction

By application for license Amendment dated October 7, 1976, Northeast Nuclear Energy Company (NNECO) requested a change to the Technical Specifications for Millstone Unit No. 2. The proposed change to Technical Specification 4.2.1.3.b would increase the value of the Limiting Condition for Operation associated with the Peak Linear Heat Generation Rate (PLHGR) from 15.3 kw/ft to 16.3 kw/ft. The Technical Specification limit for PLHGR of 15.3 kw/ft had been limited to 14.1 kw/ft by our Order for Modification of License, dated June 17, 1976, as a result of errors which had been discovered in the Combustion Engineering (CE) Emergency Core Cooling System (ECCS) model. The Order had also required NNECO to perform an ECCS reanalysis. The October 7, 1976 submittal incorporates the required ECCS reanalysis.

Discussion

In our Safety Evaluation Report associated with issuance of the Facility Operating License, (1) our review of the emergency core cooling system (ECCS) performance evaluation for Millstone Unit No. 2 was documented. In addition to the LOCA, our review also addressed the specific areas of minimum containment pressure, single failure criterion, effect of boric acid concentration on long term cooling capability and submerged valves. As a result of our review, we concluded that the ECCS performance of Millstone Unit No. 2 would be in conformance with the acceptance criteria of 10 CFR Part 50, Section 50.46 provided that the peak linear heat generation rate (PLHGR) did not exceed 15.3 kilowatts per foot (kw/ft).

In June, 1976, (2) NNECO informed us that an internal audit of the Combustion Engineering (CE) loss-of-coolant accident (LOCA) heatup code STRIKIN-II, which had been used in the LOCA analysis of Millstone Unit No. 2, had disclosed several errors in coding. After discussing the nature of the errors with us, CE made appropriate corrections to the STRIKIN-II code. A corrected analysis of ECCS performance was made for the previously determined worst break case (the coolant line break which yields the highest peak fuel clad temperature) for Millstone Unit No. 2. The corrected analysis indicated that a PLHGR of 15.1 kw/ft was now appropriate for this



plant. However, we concluded that the PLHGR should be further reduced by an additional 1 kw/ft (to 14.1 kw/ft) until a more complete break spectrum was submitted and the STRIKIN-II model corrections were reviewed and determined to be acceptable. The 14.1 kw/ft PLHGR limitation was documented by the issuance of an Order for Modification of license on June 17, 1976<sup>(3)</sup>.

The corrections to the STRIKIN-II code were documented by CE in August, 1976,<sup>(4)</sup> and we reviewed and approved the corrections in October, 1976 by an amendment to our Status Report.<sup>(5)</sup>

### Evaluation

Using the corrected and approved version of STRIKIN-II, a revised LOCA analysis was performed for Millstone Unit No. 2. The analysis with corresponding proposed Technical Specification changes was submitted by NNECO via letter dated October 7, 1976.<sup>(6)</sup> The corrected calculations included ECCS model improvements in the areas of containment wall nodding and safety injection system section pressure drop for which the staff review and approval is documented in Reference 7. These improvements provided the basis for the increase in PLHGR discussed herein.

In reviewing NNECO's October 7, 1976 submittal, we evaluated the Millstone Unit No. 2 ECCS performance with regard to (1) peak fuel clad temperature, fuel clad oxidation and hydrogen generation as a function of size and location (spectrum) of coolant line breaks, (2) the effect of passive failures on long term cooling, and (3) the effect of fuel rod bowing on fuel rod and poison rod behavior. Our evaluation of these aspects of NNECO's October 7, 1976 ECCS reanalysis is contained in the following sections:

#### (1) Break Spectrum Analysis

The corrected analysis included a spectrum of six large breaks at a PLHGR of 15.3 kw/ft. A second analysis was then performed at the increased PLHGR of 16.3 kw/ft for the previous three most limiting breaks. The above analyses were performed allowing a return to nucleate boiling. Previous analyses applicable to Millstone Unit No. 2 have shown that both small breaks and large breaks in locations other than the cold leg pump discharge are not limiting. Hence, at our request, a third, final analysis was performed for the worst break: the double ended split break in the recirculation pump discharge with a discharge coefficient of 0.8 (abbreviated as 0.8 DES/PD) for which return to nucleate boiling was not allowed.

We conclude that the break spectrum included in the Millstone Unit No. 2 corrected ECCS analysis is acceptable.

Table 1 summarizes the results of the corrected ECCS calculations for the limiting fuel rod at a PLHGR of 16.3 kw/ft.

TABLE 1

RESULTS OF ECCS CALCULATIONS - PLHGR = 16.3 kw/ft

<u>Break</u>	<u>Peak Clad Temperature</u>	<u>Local Clad Oxidation</u>	<u>Hydrogen Generation</u>	<u>Return to Nucleate Boiling</u>
*1.0 DEG/PD	2111 °F	13.98%	<0.711%	Yes
0.8 DEG/PD	2112 °F	13.97%	<0.723%	Yes
0.8 DES/PD	2160 °F	13.78%	<0.681%	Yes
0.8 DES/PD	2191 °F	13.94%	<0.686%	No

\*Double ended guillotine break in the Pump Discharge Line with a discharge coefficient of 1.0.

As indicated in Table 1, the predicted values of peak clad temperature, local clad oxidation, and hydrogen generation are below their respective limits of 2200°F, 17 percent, and 1 percent as specified in 10 CFR Part 50, Sections 50.46(b)(1), (2), and (3), respectively.

(2) Passive Failure Considerations

We have evaluated NNECO's capability to detect and isolate a leak equivalent to a High Pressure Safety Injection (HPSI) pump seal failure in the ECCS while in the recirculation mode which could affect the long term cooling capability of the facility as described in 10 CFR Part 50, Section 50.46(b)(5).

The Millstone Unit No. 2 design provides for individual water tight ECCS rooms which contain fully redundant equipment. A seismic Category 1 system provides water level alarms in the control room in the event of compartment flooding. Remote manual valves are available to isolate the HPSI pump seal leak and prevent further flooding. We conclude that this design meets our requirements regarding passive failures during long term cooling.

(3) Effects of Fuel Rod Bowing

The effect of fuel rod bowing on fuel rod and poison shim rod behavior has not been explicitly included in the Millstone Unit No. 2 corrected ECCS analysis. However, the subject of the effects of fuel rod bowing on CE 14 x 14 fuel, such as that used in Millstone Unit No. 2, is discussed generically in a letter submitted to the Nuclear Regulatory Commission by CE (reference 3). In the letter, CE states its position.

that the uncertainty factors which are presently applied to the CE 14 x 14 fuel are sufficiently large to account for the effects of rod bowing. These uncertainty factors are the 8% factor applied for nuclear power distribution measurement uncertainty and the 3% engineering factor uncertainty.

We have reviewed the generic rod bowing information submitted by CE and we conclude that the uncertainty factors which are presently included in the safety analysis for Millstone Unit No. 2, and which are described above, are sufficient to account for rod bowing effects.

As a result of our evaluation as described in the above sections, we conclude that the Millstone Unit No. 2 ECCS performance with reactor operation at a PLHGR of 16.3 kw/ft will conform to the peak clad temperature, maximum oxidation, hydrogen generation, coolable geometry and long term cooling criteria of 10 CFR Part 50, Section 50.46(b) and is therefore acceptable. Thus, the proposed change in Millstone Unit No. 2 Technical Specification 4.2.1.3.b., which increases the PLHGR from 15.3 to 16.3 kw/ft, is acceptable.

#### Environmental Considerations

We have determined that the amendment does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and pursuant to 10 CFR §51.5(d)(4) that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this 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 this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Dated: March 2, 1977

## REFERENCES

1. Safety Evaluation of the Millstone Point Nuclear Power Station, Unit No. 2, Supplement 2, Docket No. 50-336, August 1, 1975.
2. Millstone Unit No. 2 ECCS Performance Evaluation Errors, Letter to G. Lear from D. C. Switzer, June 14, 1976.
3. Millstone Unit No. 2 Order for Modification of License, Letter to D. C. Switzer, From G. Lear, June 17, 1976.
4. Supplement 4-P to CENPD-135, STRIKIN-II, August, 1976.
5. Amendment No. 1 to the Status Report by the Directorate of Licensing in the Matter of Combustion Engineering, Inc. ECCS Evaluation Model Conformance to 10 CFR 50, Appendix K, October, 1976.
6. Millstone Unit No. 2 Revised LOCA Analysis and Proposed Revisions to Technical Specifications, Letter to G. Lear from D. C. Switzer, October 7, 1976.
7. NRC Staff Review of the Combustion Engineering Proposed ECCS Evaluation Model Changes, Letter from O. D. Parr, (NRC) to A. E. Scherer (CE), December 9, 1975.
8. Fuel and Poison Rod Bowing Effects in Combustion Engineering Fuel, Letter to D. F. Ross from A. E. Scherer, July 16, 1976.
9. Millstone Unit No. 2 Proposed Revisions to Technical Specifications, letter to G. Lear from D. C. Switzer, December 6, 1976.

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NO. 50-336

NORTHEAST NUCLEAR ENERGY COMPANY,  
THE CONNECTICUT LIGHT AND POWER COMPANY,  
THE HARTFORD ELECTRIC LIGHT COMPANY, AND  
WESTERN MASSACHUSETTS ELECTRIC COMPANY

NOTICE OF ISSUANCE OF AMENDMENT TO FACILITY  
OPERATING LICENSE

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 23 to Facility Operating License No. DPR-65, issued to Northeast Nuclear Energy Company, The Connecticut Light and Power Company, The Hartford Electric Light Company, and Western Massachusetts Electric Company, which revised Technical Specifications for operation of the Millstone Nuclear Power Station, Unit No. 2 (the facility), located in the Town of Waterford, Connecticut. The amendment is effective as of the date of issuance.

The amendment authorized an increase in the facility's Peak Linear Heat Generation Rate (PLHGR) from 15.3 kw/ft to 16.3 kw/ft and removed the restriction of reduced PLHGR of 14.1 kw/ft imposed by the Commission's Order for Modification of License issued June 17, 1976.

The application for the amendment complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendment. Notice of Proposed Issuance of Amendment to Facility Operating License in connection with this action was published in the FEDERAL REGISTER on January 10, 1977 (42 F.R. 2139). No request for a hearing or petition for leave to intervene was filed following notice of the proposed action.

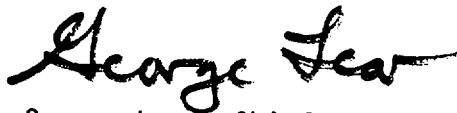
The Commission has determined that the issuance of this amendment will not result in any significant environmental impact and that pursuant to 10 CFR §51.5(d)(4) an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with issuance of this amendment.

For further details with respect to this action, see (1) the application for amendment dated October 7, 1976, (2) Amendment No. 23 to License No. DPR-65, and (3) the Commission's related Safety Evaluation. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, N. W., Washington, D. C. and at the Waterford Public Library, Rope Ferry Road, Waterford, Connecticut 06385.

A single copy of items (2) and (3) may be obtained upon request addressed to the U. S. Nuclear Regulatory Commission, Washington, D. C. 20555, Attention: Director, Division of Operating Reactors.

Dated at Bethesda, Maryland, this 2nd day of March 1977.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in black ink that reads "George Lear". The signature is written in a cursive, flowing style.

George Lear, Chief  
Operating Reactors Branch #3  
Division of Operating Reactors