NOV 2 3 1976

DISTRIBUTION:
Docket
NRC PDR
Local PDR
ORB#3 Rdg
Stello
KRGoller/TJCarter
CParrish
DJaffe
OELD
OI&E (5)
BJones (4)
BScharf (15)
JMcGough
DEisenhut
ACRS (16)
CMiles
DRoss
TBAbernathy
JRBuchanan
File
Xtra Copies

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. 21 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 July 21, 1976.

The amendment revised the Technical Specifications to remove a power level restriction which had been associated with previous operation of the facility using excore detectors and adds a more restrictive remedial action in the event that the axial shape index (ASI) operating limits are exceeded. Since we do not have information regarding the degree to which Millstone Unit No. 2 can maintain the ASI within the required limit using excore detector, we request that you forward such information as it becomes available.

Copies of the Safety Evaluation and the Federal Register Notice are also enclosed.

Sincerely,

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

Enclosures:
1. Amendment No. 21
2. Safety Evaluation
3. Federal Register Notice

cc:
See next page

SEE PREVIOUS YELLOW FOR CONCURRENCES

OFFICE➤	ORB#3	ORB#3				
SURNAME➤	DJaffe:acr	GLear				
DATE➤	11/18/76	11/22/76				

Form AEC-318 (Rev. 9-53) AECM 0240

☆ U. S. GOVERNMENT PRINTING OFFICE: 1974-526-166

DISTRIBUTION:
Docket
NRC PDR
Local PDR
ORB#3 Rdg
VStello
KRGoller/TJCarter
CParrish
DJaffe
OELD
OI&E (5)
BJones (4)
BScharf (15)
JMcGough
DEisenhut
ACRS (16)
CMiles
DRoss
TBAbernathy
JRBuchanan
AK File
Xtra Copies

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. 21 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 July 21, 1976.

The amendment revised the Technical Specifications to remove a power level restriction which had been associated with previous operation of the facility using excore detectors and adds a more restrictive remedial action in the event that the axial shape index operating limits are exceeded.

Copies of the Safety Evaluation and the Federal Register Notice are also enclosed.

Sincerely,

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

Enclosures:
1. Amendment No. 21
2. Safety Evaluation
3. Federal Register Notice

cc w/encls:
See next page

OFFICE ➤	ORB#3	ORB#3	OELD	ORB#3	STSG/DOR	
SURNAME ➤	CParrish	DJaffe:bcp	LSchAndler	GLear	JMcGough	PCheck
DATE ➤	10/28/76	10/28/76	10/16/76	10/22/76	10/29/76	10/29/76

Form AEC-318 (Rev. 9-53) AECM 0240 ☆ U. S. GOVERNMENT PRINTING OFFICE: 1974-526-166

cc: William H. Cuddy, Esquire
Day, Berry & Howard
Counselors At Law
One Constitution Plaza
Hartford, Connecticut 06103

Mr. J. R. McCormick, President
The Hartford Electric Light Company
P. O. Box 2370
Hartford, Connecticut 06101

Anthony Z. Roisman, Esquire
Roisman, Kessler and Cashdan
1025 15th Street, N. W.
5th Floor
Washington, D. C. 20005

Robert Bishop
Department of Planning & Energy Policy
20 Grand Street
Hartford, Connecticut 06115

Mr. Albert L. Partridge, First Selectman
Town of Waterford
Hall of Records - 200 Boston Post Road
Waterford, Connecticut 06385

Northeast Nuclear Energy Company
ATTN: Mr. F. W. Hartley
Plant Superintendent
Millstone Plant
P. O. Box 127
Waterford, Connecticut 06385

Waterford Public Library
Rope Ferry Road, Route 156
Waterford, Connecticut 06385

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. 21
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 July 21, 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 a change to the Technical Specifications as indicated in the attachment to this license amendment.

3. The license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

George Lear

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

Attachment:
Changes to the
Technical Specifications

Date of Issuance: November 23, 1976

ATTACHMENT TO LICENSE AMENDMENT NO. 21

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 area of change. The corresponding overleaf pages are also provided to maintain document completeness.

Pages

3/4 2-1
3/4 2-2
3/4 2-4

3/4.2 POWER DISTRIBUTION LIMITS

LINEAR HEAT RATE

LIMITING CONDITION FOR OPERATION

3.2.1 The linear heat rate shall not exceed the limits shown on Figure 3.2-1.

APPLICABILITY: MODE 1.

ACTION:

During operation with the linear heat rate being monitored by the Incore Detector Monitoring System, comply with the following ACTION:

With the linear heat rate exceeding its limit, as indicated by four or more coincident incore channels, immediately initiate corrective action to reduce the linear heat rate to within the limits and either:

a. Restore the linear heat rate to within its limits within one hour, or

b. Be in HOT STANDBY within the next 4 hours.

During operation with the linear heat rate being monitored by the Excore Detector Monitoring System, comply with following ACTIONS:

With the linear heat rate exceeding its limit, as indicated by the AXIAL SHAPE INDEX being outside of the power dependent limits on the Power Ratio Recorder and with the THERMAL POWER:

a. Above 100% of the allowable power level determined by the expression (L/17.0)(M) in Specification 4.2.1.2.b, within 15 minutes either restore the AXIAL SHAPE INDEX to with the limits of Figure 3.2-2 or reduce THERMAL POWER to $\leq$ 100% of the allowable power level determined by the expression (L/17.0)(M) in Specification 4.2.1.2.b.

b. $\leq$ 100% of the allowable power level determined by the expression (L/17.0)(M) in Specification 4.2.1.2.b, either restore the AXIAL SHAPE INDEX to within the limits of Figure 3.2-2 within 1 hour from initially exceeding the linear heat rate limit or be in HOT STANDBY within the next 4 hours.

SURVEILLANCE REQUIREMENTS

4.2.1.1 The linear heat rate shall be determined to be within its limits by continuously monitoring the core power distribution with either the excore detector monitoring system or with the incore detector monitoring system.

SURVEILLANCE REQUIREMENTS (Continued)

4.2.1.2 Excore Detector Monitoring System - The excore detector monitoring system may be used for monitoring the core power distribution by:

a. Verifying at least once per 31 days that the AXIAL SHAPE INDEX alarm setpoints are adjusted to within the limits shown on Figure 3.2-2.

b. Verifying at least once per 31 days that the AXIAL SHAPE INDEX is maintained within the allowable limits of Figure 3.2-2, where 100 percent of the allowable power represents the maximum THERMAL POWER allowed by the following expression:

$$\frac{L}{17.0} \times M$$

where:

1. L is the maximum allowable linear heat rate as determined from Figure 3.2-1 and is based on the core average burnup at the time of the latest incore flux map.

2. M is the maximum allowable THERMAL POWER level for the existing Reactor Coolant Pump combination.

4.2.1.3 Incore Detector Monitoring System - The incore detector monitoring system may be used for monitoring the core power distribution by verifying that the incore detector Local Power Density alarms:

a. Are adjusted to satisfy the requirements of the core power distribution map which shall be updated at least once per 31 days.

b. Have their alarm setpoint adjusted to less than or equal to the limits shown on Figure 3.2-1 when the following factors are appropriately included in the setting of these alarms:

1. Flux peaking augmentation factors as shown in Figure 4.2-1,

2. A measurement-calculational uncertainty factor of 1.08,

3. An engineering uncertainty factor of 1.03,

4. A linear heat rate uncertainty factor of 1.01 due to axial fuel densification and thermal expansion, and

5. A THERMAL POWER measurement uncertainty factor of 1.02.

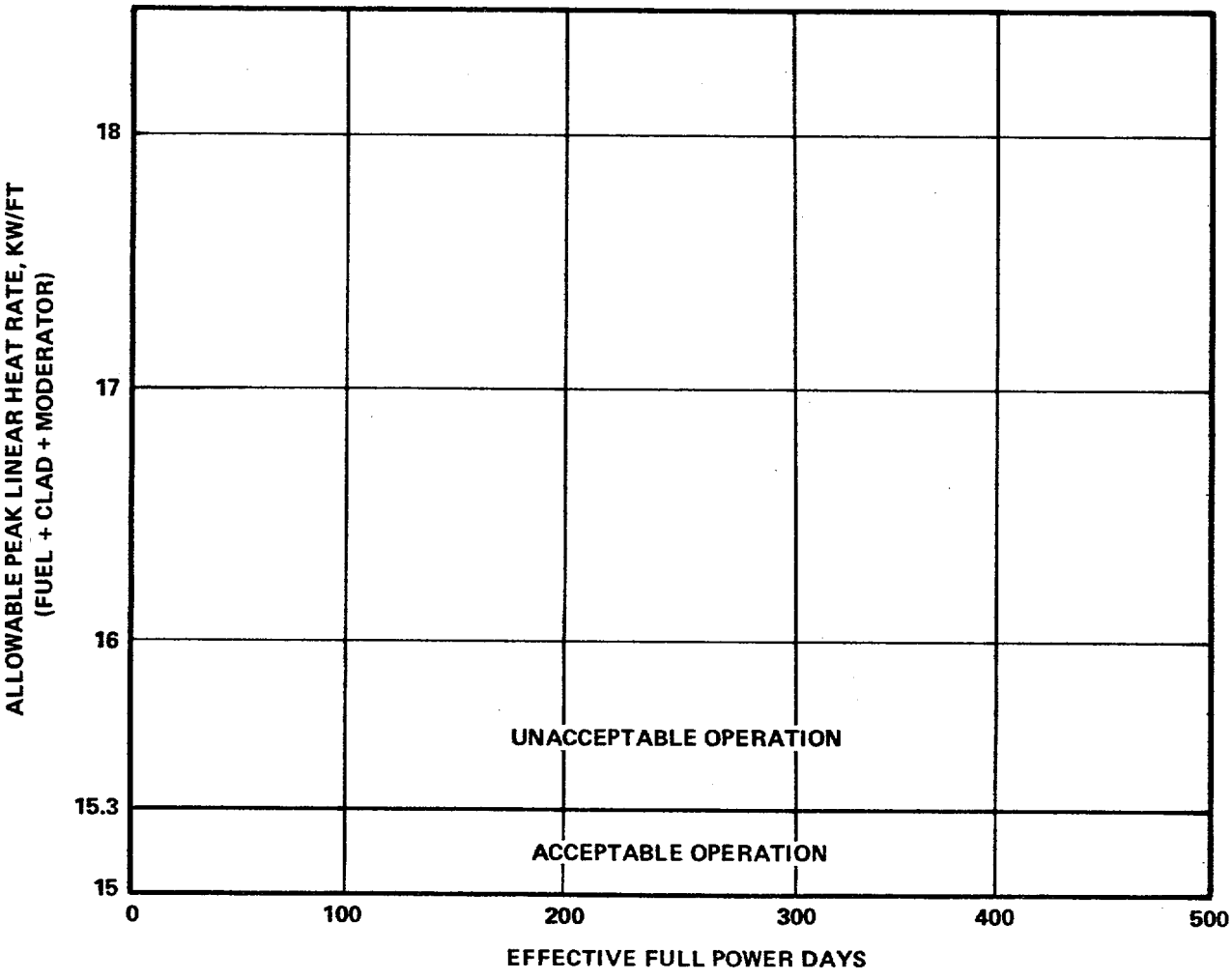

FIGURE 3.2-1

Allowable Peak Linear Heat Rate vs Burnup

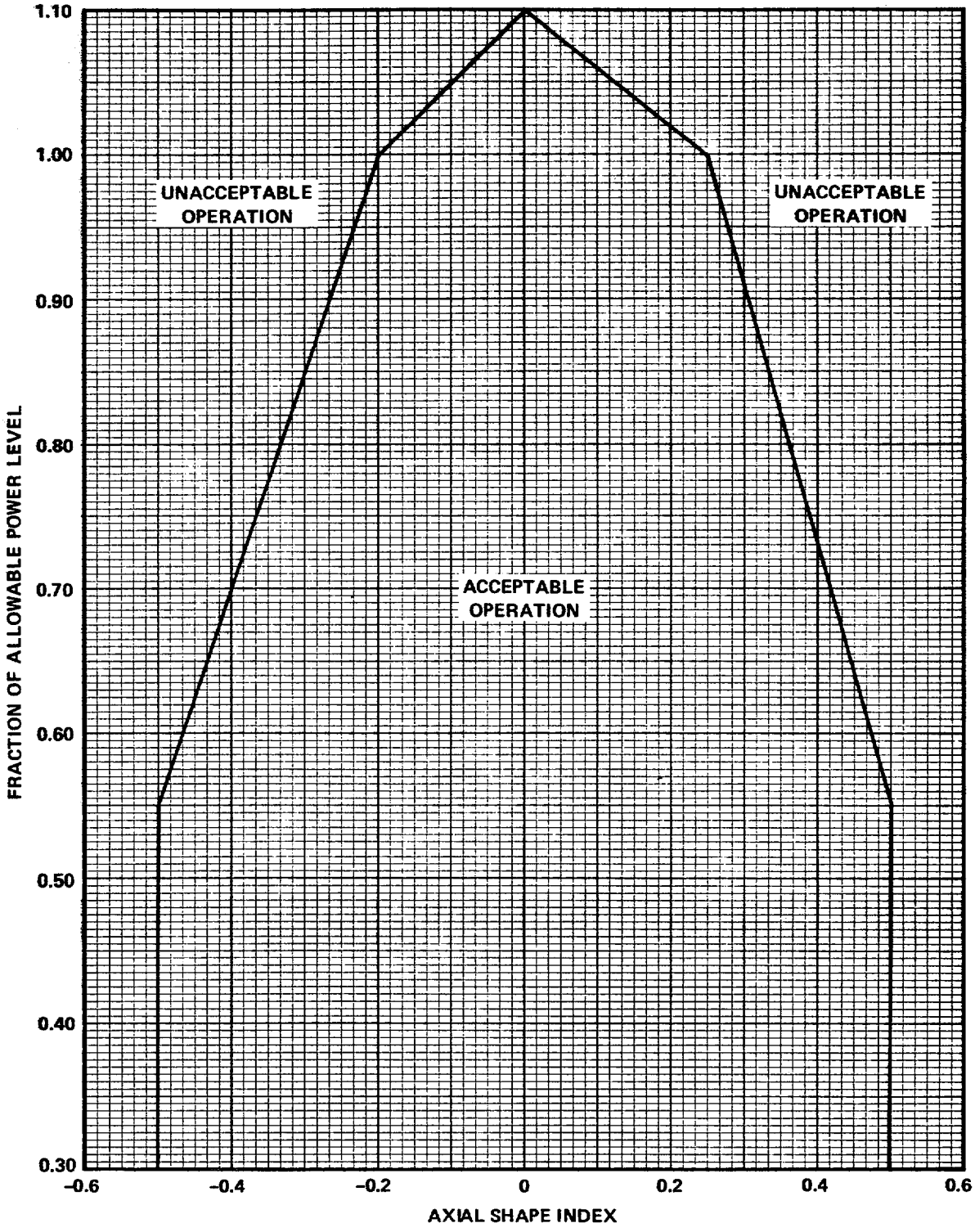

FIGURE 3.2-2

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. 21 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 July 21, 1976, Northeast Nuclear Energy Company (NNECO) requested a change to the Millstone Unit No. 2 Technical Specifications. The proposed change removes a power level restriction which has been associated with previous operation of Millstone Unit No. 2, using the excore detectors, and also adds a more restrictive remedial action in the event that the Axial Shape Index operating limits are exceeded. In reviewing NNECO's July 21, 1976 application, we found that changes in the proposed Technical Specifications had to be made in order to meet our requirements. These changes were subsequently made with the concurrence of NNECO.

Discussion

Technical Specification 4.2.1.2 contains Figure 3.2-2 which shows the limiting values of the Axial Shape Index (ASI) as a function of the fraction of allowable power level. This curve is the plot of ASI values for which the Linear Heat Generation Rate (LHGR) equals the Loss of Coolant Accident (LOCA) limiting LHGR ($LHGR_{max}$). The ASI curve is characteristically shaped like a "teepee" in which the limits of the ASI become smaller with increasing power. The point of the "teepee" is scaled to approximately 99% of full reactor thermal power: The ordinate of the ASI curve is given in relative units from 0 to 1.1 with a scaling factor defined as (L) M/17.0 where L is the maximum allowable LHGR and M is the reactor thermal power limit. Since the Technical Specifications limits $LHGR_{max}$ to 15.3 KW/ft, the ordinate of the point of the "teepee" is scaled to 1.1 (15.3/17.0) which is equivalent to 99% power.

At the present time, Technical Specification 4.2.1.2 limits power to 89% reactor thermal power, when operating the reactor using excore detectors. This restriction was imposed in order to prevent operation near the point of the "teepee" where a small variation in ASI would lead to operation outside of the ASI "teepee" limits. NNECO's application for license amendment dated July 21, 1976 requests deletion of this reactor thermal power level restriction.

Millstone Unit No. 2 Technical Specification 3.2.1 requires that the peak LHGR not exceed an $LHGR_{max}$ value of 15.3 KW/ft in recognition of the peak fuel clad temperature and oxidation limits, following a LOCA, as specified in 10 CFR Part 50, Section 50.46. For implementation, Technical Specification 3.2.1 is based upon two methods of assuring that the peak LHGR does not exceed 15.3 KW/ft.

The preferred method of monitoring the peak LHGR utilizes the plant computer to monitor and process the signals from 45 fixed, incore, neutron detectors. These incore detectors gives a detailed power distribution from which the LHGR can be determined. The second method is available in the event that the plant computer is not operable or the incore detectors cannot be utilized. The second method utilizes 4 excore, neutron detector strings to monitor the peak LHGR. Each detector string has two detectors, one monitoring the upper half and the other monitoring the lower half of the reactor core. Since the excore detectors cannot give a detailed power distribution, the peak LHGR must be inferred. Determining the peak LHGR from the excore detectors involves the Axial Shape Index (ASI). The ASI for a particular excore neutron detector string is calculated as the difference divided by the sum of the measured upper and lower neutron detector signals $\left(\frac{U-L}{U+L}\right)$. The measured ASI is displayed on the reactor power ratio recorder. Also shown on this recorder is the preprogrammed calculated limits for ASI. This preprogrammed "teepee" represents the locus of all points for which the peak LHGR equals $LHGR_{max}$ as a function of power level. An alarm (visual and audio) alerts the operator if the measured ASI exceeds the preprogrammed limits.

Evaluation

As indicated above, the ASI curve contained in Figure 3.2-2 contains limiting values of ASI for which the peak LHGR equals $LHGR_{max}$. Thus, provided that the reactor is operated below 99% of the maximum allowable reactor thermal power level, operation within the constraints of the ASI curve will assure that $LHGR_{max}$ is not violated. For this reason operation of the reactor utilizing excore detectors, above the current (Technical Specification) power restriction of 89% power but below (the ASI "teepee" limited) 99% power does not involve a decrease in the safety margin associated with the LOCA limiting LHGR (i.e., $LHGR_{max}$). Since the safety margin associated with the LHGR has not been decreased, the consequences of a LOCA will not be more severe in terms of peak clad temperature and oxidation than those previously analyzed for operation between 89% and 99% power.

In terms of actual operation of the reactor utilizing excore detectors operation at higher power levels is more likely to result in violation of the limits of the ASI curve. This possibility exists, as noted above, because the ASI teepee (band width) becomes more narrow with increased power. As a consequence and because of limited experience utilizing excore detectors, the present power level restriction was imposed in the Technical Specifications. Since that time, sufficient experience utilizing excore detectors has been obtained assuring that operation within the more narrow ASI limits can be achieved.

At the present time, if the ASI limits are exceeded, Technical Specification 3.2.1 requires that reactor operation be restored within the limits of the ASI curve in one hour or that the reactor be brought to the hot standby condition within four hours. In order to counter the increased probability that the ASI limits will be exceeded at power levels above the present restriction of 89% reactor thermal power, the licensee proposes that Technical Specification 3.2.1 be revised to require that (1) at power levels above 89% reactor thermal power if the measured value of ASI exceeds allowable limits, reactor operation must be restored within the limits of the ASI curve within fifteen minutes or reduce the reactor power to be equal to or below 89% power and (2) if the ASI limits are exceeded at power levels equal to or below 89% power, reactor operation must be restored within the limits of the ASI curve within one hour from initially exceeding the limits of the ASI curve or bring the reactor to the hot standby condition within four hours. For example, if reactor operation occurred outside of the ASI limits for 15 minutes above 89% power, operation within the ASI limits below 89% power must be achieved within 45 minutes or the reactor must be in the hot standby condition within the next 4 hours. The hot standby condition is defined as average reactor coolant temperature and nuetron multiplication factor (K_{eff}) are >300°F and <0.99, respectively.

Although it is more likely that operation above 89% reactor thermal power will lead to violation of the ASI limits, the allowable time to achieve operation within the ASI limits above 89% power has been sufficiently shortened so as not to significantly increase the cumulative time that the reactor is operated outside of the ASI limits. Thus, the joint probability of a LOCA coincident with reactor operation outside of the ASI limits is not significantly different from that previously considered.

Environmental Consideration

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 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) because the amendment does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the amendment does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) 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: November 23, 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. 21 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, located in the Town of Waterford, Connecticut. The amendment is effective as of its date of issuance.

The amendment changed the Technical Specifications to remove a power level restriction which was associated with previous operation of the facility using excore detectors, and added a more restrictive remedial action in the event that the Axial Shape Index operating limits are exceeded.

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. Prior public notice of this amendment was not required since the amendment does not involve a significant hazards consideration.

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 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 July 21, 1976, (2) Amendment No. 21 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, Water ford, Connecticut 06385.

A 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 23 day of November 1976.

FOR THE NUCLEAR REGULATORY COMMISSION

George Lear

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