FEB 1 0 1977

Distribution
Docket
ORB #3
Local PDR
NRC PDR
VStello
KRGoller/TJCarter
GLear
DJaffe
CParrish
Attorney, OELD
OI&E (5)
BJones (4)
BScharf (10)
DEisenhut
ACRS (16)
OPA (Clare Miles)
DRoss
TBAbernathy
JRBuchanan
DEisenhut
JMcGough
MFairtile

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. 22 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 November 16, 1976.

The amendment to the Technical Specifications will upgrade the provisions for steam generator tube inspection to be consistent with the guidance contained in Regulatory Guide 1.83, Revision 1, dated July 1975. With regard to implementation of these Technical Specifications, the surveillance intervals for steam generator tube inspections may be extended up to 25% with the provision that three consecutive inspections not exceed 3.25 times the inspection interval as specified in Technical Specification 4.0.2. In addition, the words "adjacent tube", as they apply to the alternate tube selection process of Technical Specification 4.4.5.2.b.3 is to be interpreted to mean the nearest tube capable of being inspected.

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. 22
2. Safety Evaluation
3. FEDERAL REGISTER Notice

cc w/encls:
See next page

*SEE PREVIOUS YELLOW FOR CONCURRENCES

| | | | | | | |
|---|---|---|---|---|---|---|
| OFFICE | ORB #3 | DOR | DOR | DOR | OELD | ORB #3 |
| SURNAME | *Parrish/Jaffe | *MFairtile | *JMcGough | *DEisenhut | * | GLear |
| DATE | 12/21/76 | 12/22/76 | 12/20/76 | 12/27/76 | 1/11/77 | 2/ /77 |

Distribution
Docket
ORB #3
Local PDR
NRC PDR
VStello
KGoller/TJCarter
GLear
CParrish
DJaffe
Attorney, OELD
OI&E (5)
BJones (4)
BScharf (10)
DEisenhut
ACRS (16)
OPA (Clare Miles)
DRoss
TBAbernathy
JRBuchanan
DEisenhut
GMcGough
MFairtile

Docket No. 50-336

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

Gentlemen:

The Commission has issued the enclosed Amendment No. 22 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 November 16, 1976.

The amendment to the Technical Specifications will upgrade the provisions for steam generator tube inspection to be consistent with the guidance contained in Regulatory Guide 1.83, Revision 1, dated July 1975. With regard to implementation of these Technical Specifications, the surveillance intervals for steam generator tube inspections may be extended up to 25% with the provision that three consecutive inspections not exceed 3.25 times the inspection interval as specified in Technical Specification 4.0.2

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. 22
2. Safety Evaluation
3. Federal Register Notice

cc w/encls:
See next page

| | | | | | | |
|---|---|---|---|---|---|---|
| OFFICE | ORB #3 | DOR | DOR | DOR | OELD | ORB #3 |
| SURNAME | CParrish/Jaffe | MFairtile | JMcGough | DEisenhut | LCHANDLER | GLear |
| DATE | 12/21/76 | 12/22/76 | 12/30/76 | 12/27/76 | 1/11/76 | 2/10/77 |

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. E. J. Ferland
Plant Superintendent
Millstone Plant
P. O. Box 127
Waterford, Connecticut 06385

Chief, Energy Systems Analysis Branch (AW-459)
Office of Radiation Programs
U. S. Environmental Protection Agency
Room 645, East Tower
401 M Street, S. W.
Washington, D. C. 20460

U. S. Environmental Protection Agency
Region I Office
ATTN: EIS COORDINATOR
John F. Kennedy Federal Building
Boston, Massachusetts 02203

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. 22
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 November 16, 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. This 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:

ATTACHMENT TO LICENSE AMENDMENT NO. 22

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 4-5
3/4 4-6
3/4 4-7
3/4 4-7a (added)
3/4 4-7b (added)
3/4 4-7c (added)
3/4 4-7d (added)
B 3/4 4-2
B 3/4 4-2a (added)

LIMITING CONDITION FOR OPERATION

3.4.5 Each steam generator shall be OPERABLE.

APPLICABILITY: MODES 1, 2 and 3.

ACTION:

With one or more steam generators inoperable, restore the inoperable generator(s) to OPERABLE status prior to increasing $T_{avg}$ above 200°F.

SURVEILLANCE REQUIREMENTS

4.4.5.0 Each steam generator shall be demonstrated OPERABLE by performance of the following augmented inservice inspection program.

4.4.5.1 Steam Generator Sample Selection and Inspection - Each steam generator shall be determined OPERABLE during shutdown by selecting and inspecting at least the minimum number of steam generators specified in Table 4.4-5.

4.4.5.2 Steam Generator Tube Sample Selection and Inspection - The steam generator tube minimum sample size, inspection result classification, and the corresponding action required shall be as specified in Table 4.4-6. The inservice inspection of steam generator tubes shall be performed at the frequencies specified in Specification 4.4.5.3 and the inspected tubes shall be verified acceptable per the acceptance criteria of Specification 4.4.5.4. The tubes selected for each inservice inspection shall include at least 3% of the total number of tubes in all steam generators; the tubes selected for these inspections shall be selected on a random basis except:

a. Where experience in similar plants with similar water chemistry indicates critical areas to be inspected, then at least 50% of the tubes inspected shall be from these critical areas.

b. The first sample of tubes selected for each inservice inspection (subsequent to the preservice inspection) of each steam generator shall include:

SURVEILLANCE REQUIREMENTS (Continued)

1. All nonplugged tubes that previously had detectable wall penetrations (>20%).

2. Tubes in those areas where experience has indicated potential problems.

3. A tube inspection (pursuant to Specification 4.4.5.4.a.8) shall be performed on each selected tube. If any selected tube does not permit the passage of the eddy current probe for a tube inspection, this shall be recorded and an adjacent tube shall be selected and subjected to a tube inspection.

c. The tubes selected as the second and third samples (if required by Table 4.4-6) during each inservice inspection may be subjected to a partial tube inspection provided:

1. The tubes selected for these samples include the tubes from those areas of the tube sheet array where tubes with imperfections were previously found.

2. The inspection include those portions of the tubes where imperfections were previously found.

The results of each sample inspection shall be classified into one of the following three categories:

| Category | Inspection Results |
|---|---|
| C-1 | Less than 5% of the total tubes inspected are degraded tubes and none of the inspected tubes are defective. |
| C-2 | One or more tubes, but not more than 1% of the total tubes inspected are defective, or between 5% and 10% of the total tubes inspected are degraded tubes. |
| C-3 | More than 10% of the total tubes inspected are degraded tubes or more than 1% of the inspected tubes are defective. |

Note: In all inspections, previously degraded tubes must exhibit significant (>10%) further wall penetrations to be included in the above percentage calculations.

SURVEILLANCE REQUIREMENTS (Continued)

4.4.5.3 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 4.4.5.3.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.

SURVEILLANCE REQUIREMENTS (Continued)

4.4.5.4 Acceptance Criteria

a. As used in this Specification

1. Imperfection means an exception to the dimensions, finish or contour of a tube from that required by fabrication drawings or specifications. Eddy-current testing indications below 20% of the nominal tube 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.

3. Degraded Tube means a tube containing imperfections $\geq$20% of the nominal wall thickness caused by degradation.

4. % Degradation means the percentage of the tube wall 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 removed from service because it may become unserviceable prior to the next inspection and is equal to 40% of the nominal tube wall thickness.

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 4.4.5.3.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 all tubes exceeding the plugging limit and all tubes containing through-wall cracks) required by Table 4.4-6.

SURVEILLANCE REQUIREMENTS (Continued)

4.4.5.5 Reports

a. Following each inservice inspection of steam generator tubes, the number of tubes plugged in each steam generator shall be reported to the Commission within 15 days.

b. The complete results of the steam generator tube inservice inspection shall be included in the Annual Operating Report for the period in which this inspection was completed. This report shall include:

   1. Number and extent of tubes inspected.

   2. Location and percent of wall-thickness penetration for each indication of an imperfection.

   3. Identification of tubes plugged.

c. Results of steam generator tube inspections which fall into Category C-3 and require prompt notification of the Commission shall be reported pursuant to Specification 6.9.1 prior to resumption of plant operation. The written followup of this report shall provide a description of investigations conducted to determine cause of the tube degradation and corrective measures taken to prevent recurrence.

## TABLE 4.4-5

### MINIMUM NUMBER OF STEAM GENERATORS TO BE INSPECTED DURING INSERVICE INSPECTION

| | |
|---|---|
| Preservice Inspection | Yes |
| No. of Steam Generators per Unit | Two |
| First Inservice Inspection | One |
| Second & Subsequent Inservice Inspections | One[1] |

Table Notation:

1. The inservice inspection may be limited to one steam generator on a rotating schedule encompassing 3 N % of the tubes (where N is the number of steam generators in the plant) if the results of the first or previous inspections indicate that all steam generators are performing in a like manner. Note that under some circumstances, the operating conditions in one or more steam generators may be found to be more severe than those in other steam generators. Under such circumstances the sample sequence shall be modified to inspect the most severe conditions.

TABLE 4.4-6

STEAM GENERATOR TUBE INSPECTION

| 1ST SAMPLE INSPECTION | | | 2ND SAMPLE INSPECTION | | 3RD SAMPLE INSPECTION | |
|---|---|---|---|---|---|---|
| Sample Size | Result | Action Required | Result | Action Required | Result | Action Required |
| A minimum of S Tubes per S. G. | C–1 | None | N/A | N/A | N/A | N/A |
| | C–2 | Plug defective tubes and inspect additional 2S tubes in this S. G. | C–1 | None | N/A | N/A |
| | | | C–2 | Plug defective tubes and inspect additional 4S tubes in this S. G. | C–1 | None |
| | | | | | C–2 | Plug defective tubes |
| | | | | | C–3 | Perform action for C–3 result of first sample |
| | | | C–3 | Perform action for C–3 result of first sample | N/A | N/A |
| | C–3 | Inspect all tubes in this S. G., plug defective tubes and inspect 2S tubes in each other S. G.<br><br>Prompt notification to NRC pursuant to specification 6.9.1 | All other S. G.s are C–1 | None | N/A | N/A |
| | | | Some S. G.s C–2 but no additional S. G. are C–3 | Perform action for C–2 result of second sample | N/A | N/A |
| | | | Additional S. G. is C–3 | Inspect all tubes in each S. G. and plug defective tubes. Prompt notification to NRC pursuant to specification 6.9.1 | N/A | N/A |

$S = 3\frac{N}{n}\%$ Where N is the number of steam generators in the unit, and n is the number of steam generators inspected during an inspection

## 3/4.4.6 REACTOR COOLANT SYSTEM LEAKAGE

### LEAKAGE DETECTION SYSTEMS

#### LIMITING CONDITION FOR OPERATION

3.4.6.1 The following Reactor Coolant System leakage detection systems shall be OPERABLE:

a. A containment atmosphere particulate radioactivity monitoring system,

b. The containment sump level monitoring system, and

c. A containment atmosphere gaseous radioactivity monitoring system.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

a. With one of the above radioactivity monitoring leakage detection systems inoperable, operations may continue for up to 30 days provided:

   1. The other two above required leakage detection systems are OPERABLE, and

   2. Appropriate grab samples are obtained and analyzed at least once per 24 hours;

   otherwise, be in COLD SHUTDOWN within the next 36 hours.

b. With the containment sump level monitoring system inoperable, restore the inoperable system to OPERABLE status within 7 days or be in COLD SHUTDOWN within the next 36 hours.

#### SURVEILLANCE REQUIREMENTS

4.4.6.1 The leakage detection systems shall be demonstrated OPERABLE by:

a. Containment atmosphere gaseous and particulate monitoring systems-performance of CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST at the frequencies specified in Table 4.3-3, and

b. Containment sump level monitoring system-performance of CHANNEL CALIBRATION TEST at least once per 18 months.

## 3/4.4.1 REACTOR COOLANT LOOPS

The plant is designed to operate with both reactor coolant loops and associated reactor coolant pumps in operation, and maintain DNBR above 1.30 during all normal operations and anticipated transients. STARTUP and POWER OPERATION may be initiated and may proceed with one or two reactor coolant pumps not in operation after the setpoints for the Power Level-High, Reactor Coolant Flow-Low, and Thermal Margin/Low Pressure trips have been reduced to their specified values. Reducing these trip setpoints ensures that the DNBR will be maintained above 1.30 during three pump operation and that during two pump operation the core void fraction will be limited to ensure parallel channel flow stability within the core and thereby prevent premature DNB.

A single reactor coolant loop with its steam generator filled above the low level trip setpoint provides sufficient heat removal capability for core cooling while in MODES 2 and 3; however, single failure considerations require plant cooldown if component repairs and/or corrective actions cannot be made within the allowable out-of-service time.

## 3/4.4.2 and 3/4.4.3 SAFETY VALVES

The pressurizer code safety valves operate to prevent the RCS from being pressurized above its Safety Limit of 2750 psia. Each safety valve is designed to relieve 296,000 lbs per hour of saturated steam at the valve setpoint. The relief capacity of a single safety valve is adequate to relieve any overpressure condition which could occur during shutdown. In the event that no safety valves are OPERABLE, an operating shutdown cooling loop, connected to the RCS, provides overpressure relief capability and will prevent RCS overpressurization.

During operation, all pressurizer code safety valves must be OPERABLE to prevent the RCS from being pressurized above its safety limit of 2750 psia. The combined relief capacity of these valves is sufficient to limit the Reactor Coolant System pressure to within its Safety Limit of 2750 psia following a complete loss of turbine generator load while operating at RATED THERMAL POWER and assuming no reactor trip until the first Reactor Protective System trip setpoint (Pressurizer Pressure-High) is reached (i.e., no credit is taken for a direct reactor trip on the loss of turbine) and also assuming no operation of the pressurizer power operated relief valve or steam dump valves.

## 3/4.4.4 PRESSURIZER

A steam bubble in the pressurizer ensures that the RCS is not a hydraulically solid system and is capable of accommodating pressure surges during operation. The steam bubble also protects the pressurizer code safety valves and power operated relief valve against water relief. The power operated relief valve and steam bubble function to relieve RCS pressure during all design transients. Operation of the power operated relief valve in conjunction with a reactor trip on a Pressurizer--Pressure-High signal, minimizes the undesirable opening of the spring-loaded pressurizer code safety valves.

## 3/4.4.5 STEAM GENERATORS

The Surveillance Requirements for inspection of the steam generator tubes ensure that the structural integrity of this portion of the RCS will be maintained. The program for inservice inspection of steam generator tubes is based on a modification of Regulatory Guide 1.83, Revision 1. Inservice inspection of steam generator tubing is essential in order to maintain surveillance of the conditions of the tubes in the event that there is 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 = 1 gallon per minute, total). 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 1 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 will be required for all tubes with imperfections exceeding the plugging limit of 40% of the tube nominal wall thickness. 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 promptly reported to the Commission pursuant to Specification 6.9.1 prior to resumption of plant operation. 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.

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

# SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

## SUPPORTING AMENDMENT NO. 22 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 November 16, 1976, Northeast Nuclear Energy Company (NNECO) requested a change to the Millstone Unit No. 2 Technical Specifications. The proposed change would upgrade the provisions for steam generator tube inspection contained in the Technical Specifications to be consistent with the guidance contained in Regulatory Guide 1.83, Revision 1, dated July 1975.

### Discussion

By letter dated September 10, 1976, we requested that NNECO upgrade the Millstone Unit No. 2 steam generator tube inspection program contained in the existing Technical Specifications. The Technical Specifications existing at that time were based upon guidance contained in Regulatory Guide 1.83 entitled "Inservice Inspection of Pressurized Water Reactor Steam Generator Tubes".

Model Technical Specifications were enclosed in our September 10, 1976 letter. These Model Technical Specifications were based upon guidance contained in Revision 1 to Regulatory Guide 1.83. The Model Technical Specifications are more conservative than the existing Technical Specifications for steam generator tube inspection. This added conservatism results from (1) a requirement for more frequent steam generator tube inspections, (2) a larger number of steam generator tubes in each inspection sample, and (3) more stringent acceptance criteria with regard to steam generator tube integrity.

In response to our letter dated September 10, 1976, NNECO submitted, on November 16, 1976, proposed Technical Specifications for steam generator tube inspection. The Technical Specifications proposed by NNECO in their November 16, 1976 letter satisfy, in both form and content, the substantive requirements contained in our Model Technical Specifications.

Evaluation

Structures, systems, and components important to safety of a nuclear power plant are designed, fabricated, constructed, and tested so as to provide reasonable assurance that the facility can be operated without undue risk to the health and safety of the public. To continuously maintain such assurance, General Design Criterion 32 requires that components which are part of the reactor coolant pressure boundary be designed to permit periodic inspection and testing of important areas and features to assess their structural and leaktight integrity. The steam generator tubing is part of the reactor coolant system pressure boundary and is an important part of a major barrier against fission product release to the environment. It also acts as a barrier against steam release to the containment in the event of a LOCA. To act as an effective barrier, this tubing must be free of cracks, perforations, and general deterioration. For this reason, a program of periodic inservice inspection is being established to assure the continued integrity of the steam generator tubes over the service life of the plant.

Generally, the major elements of the proposed steam generator tube inservice inspection program for Millstone Unit No. 2 consist of specified: (a) sample selection, (b) examination methods, (c) inspection intervals, (d) acceptance criteria, and (e) reporting requirements. Each of these major elements of the program is separately evaluated below.

(a) Sample Selection

The proposed sampling scheme is generally patterned after Regulatory Guide 1.83, Revision 1, "Inservice Inspection of Pressurized Water Reactor Steam Generator Tubes". However, there are some deviations from Regulatory Guide 1.83 that we require to improve the program and/or reduce the potential radiation exposure of personnel that must perform the inspections. The principal deviations from Regulatory Guide 1.83 supplementary sampling requirements are evaluated below:

(i) Regulatory Position C.5.a, "Supplementary Sampling Requirements" recommend that if the eddy current inspection results during an inservice inspection indicate <u>any</u> tubes with previously undetected imperfections of 20% or greater depth, additional steam generators, if any, should be inspected. In other words, because of a <u>single</u> tube in <u>one</u> steam generator with previously undetected imperfection of 20% or greater depth but still well below the plugging limit, all steam generators in the plant should be inspected. Although the detection of any defect warrants further inspection to determine the extent of degradation in the steam generators, we believe that this inspection should be expanded initially to determine the extent of any <u>further</u> degradation in the steam generator under inspection. If the expanded inspection indicates more extensive defect conditions, then expansion to the other steam generator is required. This approach will provide careful stepwise expansion of inspection based on the results of successive steps, while tending to minimize the exposure of inspection personnel resulting from initial positioning of inspection equipment in a steam generator. This inspection approach is appropriate for this facility in which system characteristics are such that all steam generators are expected to perform in a similar manner.

(ii) Regulatory Guide 1.83, Revision 1 requires additional inspections if the initial inspection results indicate that more than 10% of the inspected tubes have detectable wall penetration of greater than 20% or that one or more tubes inspected have an indication in excess of the plugging limit. The additional inspections require a complete tube inspection of an additional 3% and if required a third inspection of 6% of the tubes. The programs set forth in the Millstone Technical Specifications require a second inspection doubling the number of tubes inspected in the first sample. Again if more than 10% of the tubes show a detectable penetration greater than 20% or 1% are defective tubes, a third sample is required again doubling the number of tubes inspected in the second sample. In the first sample, sampling is to concentrate on areas of the tube array where prior inspections or experience have indicated potential problems, and full length traverse of each inspected tube is required. For a second or third sample, if required, the inspection may concentrate on areas of the tube array and portions of the tube in which the first sample or the second sample indicated potential problems.

Based on the considerations discussed above, we have concluded that the sample selection scheme is acceptable.

(b) Examination Method

The proposed examination methods include nondestructive examination by eddy current testing. The specified methods are capable of locating and identifying stress corrosion cracks and tube wall thinning from chemical wastage, mechanical damage or other causes. Based on our review of these methods, and experience gained using these methods by the industry, we have concluded that the examination methods are acceptable.

(c) Inspection Intervals

The proposed inspection intervals, as modified and concurred in by the NNECO, are compatible with those recommended in Regulatory Guide 1.83; and thus, are acceptable.

(d) Acceptance Criteria

The principal parameter used to determine whether any one steam generator tube is acceptable for continued service is the measured imperfection depth. In order to specify what level of imperfection is acceptable, a tube "plugging limit" is established. The "plugging limit" is defined in the Technical Specifications as the imperfection depth beyond which the tube must be removed from service, because the tube may become defective prior to the next scheduled inspection. For Millstone Unit No. 2 the "plugging limit" is 40% of the nomimal tube wall thickness.

The "plugging limit" is based on (1) the minimum tube wall thickness needed to maintain steam generator tube integrity during the limiting loadings associated with normal operating, or loss of coolant or main steam line break accidents combined with a Safe Shutdown Earthquake (SSE), and (2) an operational allowance to account for the time interval between inspections. Based on other evaluations made by the NRC staff 1/ and Regulatory Guide 1.121 2/, we have concluded that a minimum tube wall thickness of 50% is adequate to sustain all the forces associated with normal operating and accident conditions. To provide an additional margin of safety, however, an operational allowance of 10% is incorporated into the "plugging limit" to insure tube integrity will be maintained until the next inservice inspection. This allowance is adequate for the carefully controlled secondary water chemistry conditions that are normally maintained at Millstone Unit No. 2. Therefore, the acceptable tube wall thickness needed for continued service is 50% plus 10% or 60% or alternately, the "plugging limit" (imperfection depth) is established as 40%. This limit will provide adequate protection against wastage type corrosion or part thru wall cracks. Protection against the unanticipated development of through wall cracks during operation between inspections is provided by the very stringent primary to secondary leak limits which will assure that through wall cracks will be detected and plugged while the tubes still retain a high margin of strength against failure.

Based on our review, the acceptance criteria are acceptable.

1/ Supplemental Testimony of James P. Knight before the Atomic Safety and Licensing Appeal Board in the matter of Northern States Power Company, Docket Nos. 50-282/306.

2/ Regulatory Guide 1.121, "Bases for Plugging Degraded PWR Steam Generator Tubes," August, 1976.

(e) Reporting Requirements

Regulatory Guide 1.83, Revision 1, requires a licensee to report to the Commission and to await resolution and approval of the proposed remedial action when the inspection results exceed the limits specified in the Guide. It also states that additional sampling and more frequent inspection may be required. In the proposed Technical Specifications, it is clearly stated what additional inspection NNECO must perform without reporting to the NRC and requires (1) a report on the number of tubes plugged in each steam generator within 15 days following the steam generator tube inspection, (2) a complete report on the inspection in the next annual operating report, and (3) in the most severe cases described in the Technical Specifications, prompt notification of the NRC must be made together with a written followup.

It is our position that the reporting requirements are reasonable and will facilitate reporting of pertinent information without unnecessarily increasing plant downtime; and thus, are acceptable.

In summary, we have concluded that the proposed steam generator tube inservice inspection program will provide added assurance of the continued integrity of the steam generator tubes; and thus, 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 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 changes do not involve a significant increase in the probability or consequences of accidents previously considered and do not involve a significant decrease in a safety margin, the changes do 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: February 10, 1977

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. 22 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 the date of issuance.

The amendment to the Technical Specifications will upgrade the provisions for steam generator tube inspection to be consistent with the guidance contained in Regulatory Guide 1.83, Revision 1, dated July 1975.

The application for 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 November 16, 1976, (2) Amendment No. 22 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 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 10th day of February, 1977.

FOR THE NUCLEAR REGULATORY COMMISSION

George Lear

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