

Mr. Neil S. Carns  
Senior Vice President  
and Chief Nuclear Officer  
Northeast Nuclear Energy Company  
c/o Ms. Patricia A. Loftus  
Director - Regulatory Affairs  
P.O. Box 128  
Waterford, CT 06385

June 24, 1997

SUBJECT: ISSUANCE OF AMENDMENT (TAC NO. M98456)

Dear Mr. Carns:

The Commission has issued the enclosed Amendment No. 142 to Facility Operating License No. NPF-49 for the Millstone Nuclear Power Station, Unit No. 3, in response to your application dated April 15, 1997.

The amendment makes changes to Technical Specification (TS) Sections 4.3.3.6 and 4.6.4.1, which require that the hydrogen monitors be periodically tested. Specifically, the changes increase the testing interval of the monitor's hydrogen sensor, correct inconsistencies between the TS surveillances, and make changes to the Bases of the surveillances.

A copy of the related Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

Original signed by:

James W. Andersen, Project Manager  
Special Projects Office - Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-423

Enclosures: 1. Amendment No. 142 to NPF-49  
2. Safety Evaluation

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

June 24, 1997

Mr. Neil S. Carns  
Senior Vice President  
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Northeast Nuclear Energy Company  
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Sincerely,

A handwritten signature in black ink, appearing to be "JW Andersen", is written over the typed name and title.

James W. Andersen, Project Manager  
Special Projects Office - Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-423

Enclosures: 1. Amendment No. 142 to NPF-49  
2. Safety Evaluation

cc w/encls: See next page

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Unit 3

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Northeast Nuclear Energy Company

Millstone Nuclear Power Station  
Unit 3

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

NORTHEAST NUCLEAR ENERGY COMPANY, ET AL.

DOCKET NO. 50-423

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 142  
License No. NPF-49

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Northeast Nuclear Energy Company, et al. (the licensee) dated April 15, 1997, 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. NPF-49 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 142 , and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance, to be implemented within 60 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Phillip F. McKee  
Deputy Director for Licensing  
Special Projects Office  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: June 24, 1997

ATTACHMENT TO LICENSE AMENDMENT NO. 142

FACILITY OPERATING LICENSE NO. NPF-49

DOCKET NO. 50-423

Replace the following pages of the Appendix A, Technical Specifications, with the attached pages. The revised pages are identified by amendment number and contain vertical lines indicating the areas of change.

Remove

3/4 3-59a

3/4 3-63

3/4 6-16

B 3/4 3-5

B 3/4 6-3

B 3/4 6-3a

B 3/4 6-3b

-

Insert

3/4 3-59a

3/4 3-63

3/4 6-16

B 3/4 3-5

B 3/4 6-3

B 3/4 6-3a\*

B 3/4 6-3b\*

B 3/4 6-3c\*

\* overflow page - no change

## **LIMITING CONDITION FOR OPERATION (Continued)**

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action taken, the cause of the inoperability, and the plans and schedule for restoring the channel to OPERABLE status.

- f. With the number of OPERABLE channels for the reactor vessel water level monitor less than the minimum channels OPERABLE requirements of Table 3.3-10, either restore the inoperable channel(s) to OPERABLE status within 48 hours if repairs are feasible without shutting down or:
  - 1. Initiate an alternate method of monitoring the reactor vessel inventory;
  - 2. Prepare and submit a Special Report to the Commission pursuant to Specification 6.9.2 within 30 days following the event outlining the action taken, the cause of the inoperability, and the plans and schedule for restoring the channel(s) to OPERABLE status; and
  - 3. Restore the channel(s) to OPERABLE status at the next scheduled refueling.
- g. Entry into an OPERATIONAL MODE is permitted while subject to these ACTION requirements.

## **SURVEILLANCE REQUIREMENTS**

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4.3.3.6.1 Each accident monitoring instrumentation channel shall be demonstrated OPERABLE by performance of the CHANNEL CHECK and CHANNEL CALIBRATION at the frequencies shown in Table 4.3-7.

4.3.3.6.2 Each hydrogen monitor shall also be demonstrated OPERABLE by a Hydrogen Sensor Calibration and an ANALOG CHANNEL OPERATIONAL TEST at least once per 92 days on a STAGGERED TEST BASIS.



TABLE 4.3-7 (Continued)

ACCIDENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<u>INSTRUMENT</u>	<u>CHANNEL CHECK</u>	<u>CHANNEL CALIBRATION</u>
16. Containment Area - High Range Radiation Monitor	M	R*
17. Reactor Vessel Water Level	M	R**
18. Containment Hydrogen Monitor	S	R
19. Neutron Flux	M	R

\* CHANNEL CALIBRATION may consist of an electronic calibration of the channel, not including the detector, for range decades above 10 R/h and a one point calibration check of the detector below 10 R/h with an installed or portable gamma source.

\*\* Electronic calibration from the ICC cabinets only.

## **CONTAINMENT SYSTEMS**

### **3/4.6.4 COMBUSTIBLE GAS CONTROL**

#### **HYDROGEN MONITORS**

##### **LIMITING CONDITION FOR OPERATION**

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3.6.4.1 Two independent containment hydrogen monitors shall be OPERABLE.

**APPLICABILITY:** MODES 1, 2, and 3.

**ACTION:**

- a. With one hydrogen monitor inoperable, restore the inoperable monitor to OPERABLE status within 30 days or be in at least HOT STANDBY within the next 6 hours and in at least HOT SHUTDOWN within the following 6 hours.
- b. With both hydrogen monitors inoperable, restore at least one monitor to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in at least HOT SHUTDOWN within the following 6 hours.
- c. Entry into an OPERATIONAL MODE is permitted while subject to these ACTION requirements.

##### **SURVEILLANCE REQUIREMENTS**

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4.6.4.1 Each hydrogen monitor shall be demonstrated OPERABLE:

- a. By the performance of a CHANNEL CHECK at least once per 12 hours, and
- b. By the performance of a Hydrogen Sensor Calibration and an ANALOG CHANNEL OPERATIONAL TEST at least once per 92 days on a STAGGERED TEST BASIS, and
- c. By the performance of a CHANNEL CALIBRATION at least once each REFUELING INTERVAL.

## INSTRUMENTATION

### BASES

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#### REMOTE SHUTDOWN INSTRUMENTATION (Continued)

instrumentation, control, and power circuits and transfer switches necessary to eliminate effects of the fire and allow operation of instrumentation, control and power circuits required to achieve and maintain a safe shutdown condition are independent of areas where a fire could damage systems normally used to shut down the reactor. This capability is consistent with General Design Criterion 3 and Appendix R to 10 CFR Part 50.

#### 3/4.3.3.6 ACCIDENT MONITORING INSTRUMENTATION

The OPERABILITY of the accident monitoring instrumentation ensures that sufficient information is available on selected plant parameters to monitor and assess these variables following an accident. The instrumentation included in this specification are those instruments provided to monitor key variables, designated as Category 1 instruments following the guidance for classification contained in Regulatory Guide 1.97, Revision 2, "Instrumentation for Light-Water-Cooled Nuclear Power Plants To Assess Plant and Environs Conditions During and Following an Accident."

In the event more than four sensors in a Reactor Vessel Level channel are inoperable, repairs may only be possible during the next refueling outage. This is because the sensors are accessible only after the missile shield and reactor vessel head are removed. It is not feasible to repair a channel except during a refueling outage when the missile shield and reactor vessel head are removed to refuel the core. If only one channel is inoperable, it should be restored to OPERABLE status in a refueling outage as soon as reasonably possible. If both channels are inoperable, at least one channel shall be restored to OPERABLE status in the nearest refueling outage.

Hydrogen Monitors are provided to detect high hydrogen concentration conditions that represent a potential for containment breach from a hydrogen explosion. Containment hydrogen concentration is also important in verifying the adequacy of mitigating actions. The requirement to perform a hydrogen sensor calibration at least once every 92 days is based upon vendor recommendations to maintain sensor calibration. This calibration consists of a two point calibration, utilizing gas containing approximately one percent hydrogen gas for one of the calibration points, and gas containing approximately four percent hydrogen gas for the other calibration point.

#### 3/4.3.3.7 Deleted.

## CONTAINMENT SYSTEMS

### BASES

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#### 3/4.6.3 CONTAINMENT ISOLATION VALVES

The OPERABILITY of the containment isolation valves ensures that the containment atmosphere will be isolated from the outside environment in the event of a release of radioactive material to the containment atmosphere or pressurization of the containment and is consistent with the requirements of General Design Criteria 54 through 57 of Appendix A to 10 CFR Part 50. Containment isolation within the time limits specified for these isolation valves designed to close automatically ensures that the release of radioactive material to the environment will be consistent with the assumptions used in the analyses for a LOCA. FSAR Table 6.2-65 lists all containment isolation valves. The addition or deletion of any containment isolation valve shall be made in accordance with Section 50.59 of 10CFR50 and approved by the Plant Operation Review Committee.

#### 3/4.6.4 COMBUSTIBLE GAS CONTROL

Hydrogen Monitors are provided to detect high hydrogen concentration conditions that represent a potential for containment breach from a hydrogen explosion. Containment hydrogen concentration is also important in verifying the adequacy of mitigating actions. The requirement to perform a hydrogen sensor calibration at least every 92 days is based upon vendor recommendations to maintain sensor calibration. This calibration consists of a two point calibration, utilizing gas containing approximately one percent hydrogen gas for one of the calibration points, and gas containing approximately four percent hydrogen gas for the other calibration point.

The OPERABILITY of the equipment and systems required for the detection and control of hydrogen gas ensures that this equipment will be available to maintain the hydrogen concentration within containment below its flammable limit during post-LOCA conditions. Either recombiner unit or the Mechanical Vacuum Pumps are capable of controlling the expected hydrogen generation associated with: (1) zirconium-water reactions, (2) radiolytic decomposition of water, and (3) corrosion of metals within containment. These Hydrogen Control Systems are consistent with the recommendations of Regulatory Guide 1.7, "Control of Combustible Gas Concentrations in Containment Following a LOCA," March 1971.

The Post-LOCA performance of the hydrogen recombiner blowers is based on a series of equations supplied by the blower manufacturer. These equations are also the basis of the acceptance criteria used in the surveillance procedure. The required performance was based on starting containment conditions before the LOCA of 10.59 psia (total pressure), 120°F and 100% relative humidity.

The surveillance procedure shall use the following methods to verify acceptable blower flow rate:

## CONTAINMENT SYSTEMS

### BASES

#### 3/4.6.4 COMBUSTIBLE GAS CONTROL (Continued)

1. Definitions and constants

CFM = cubic feet per minute

RPM = revolutions per minute

Blower RPM = 3550

Blower ft<sup>3</sup>/revolution = .028 ft<sup>3</sup>

Standard CFM = gas volume converted to conditions of 68°F and 14.7 psia.

2. Measure and record the following information:

Pcontainment--Average of 3LMS\*P934, 935, 936, and 937 (psia)

Pout--From 3HCS-PI1A or B (psia)

Tc--Containment temperature (°F)

Pin--Measure with a new inlet gauge or calculate from Equation 3a below (psia)

scfm measured--See Procedure/Form 3613A.3-1

ΔP<sub>i</sub>--From Table 2 (psi)

A--As found Slip Constant

Accuracy--Instrument accuracy range from Table 1.

3. Calculate as found slip constant (A)

a.  $P_{in} = P_{containment} - \Delta P_i$

b.

$$A = 3550 - \frac{\left[ \frac{scfm_{measured} - Accuracy}{0.028 * 0.95} \right] * \left[ \frac{14.7}{P_{in}} * \frac{T_c + 460}{528} \right]}{\left[ \left[ \frac{P_{out}}{P_{in}} * 14.7 \right] - 14.7^{1/2} \right] * \left( \frac{14.7}{P_{in}} * \frac{T_c + 460}{528} \right)^{1/2}}$$

## CONTAINMENT SYSTEMS

### BASES

#### 3/4.6.4 COMBUSTIBLE GAS CONTROL (Continued)

4. Calculate expected post accident flow rate using A calculated in Step 3.
  - a. Slip RPM
$$= A * (4.937)^{\frac{1}{2}} * 1.218$$
  - b. Actual Inlet CFM
$$ACFM = .028 (3550 - \text{Slip RPM})$$
  - c. Standard CFM
$$\text{scfm} = ACFM 0.725$$
  - d. Postaccident scfm Minimum =  $\text{scfm} * 0.95$
  - e. Acceptance Flow Rate  
Postaccident scfm minimum  $\geq 41.52$  scfm.

Table 1 Accuracy Range (Ref. 2)

<u>scfm (measured)</u>	<u>Accuracy Range</u>
40 to 50	5.8 scfm
50 to 80	4.7 scfm

Table 2 Inlet Piping Loss (Ref. 1)

<u>scfm Measured (Unadjusted)</u>	<u><math>\Delta P_i</math> (psi)</u>
30	.21
40	.31
50	.52
60	.73
70	.98
80	1.28

- References: 1. Calculation 90-RPS-722GM, "Flow Acceptance Criteria for 3HCS\*RBNR 1A/B Blowers 3HCS\*C1A/B."
2. Calculation PA 90-LOE-0132GE, "Hydrogen Recombiner Flow Error Analysis."

The acceptance flow rate is the required flow rate at the worst case containment conditions 24 hours after the LOCA. The analysis assumes the recombiners are started no later than 24 hours after the accident. The 18-month surveillance shall verify the gas temperature and blower flow rate concurrently.

## **CONTAINMENT SYSTEMS**

### **BASES**

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#### **3/4.6.5 SUBATMOSPHERIC PRESSURE CONTROL SYSTEM**

##### **3/4.6.5.1 STEAM JET AIR EJECTOR**

The closure of the isolation valves in the suction of the steam jet air ejector ensures that: (1) the containment internal pressure may be maintained within its operation limits by the mechanical vacuum pumps, and (2) the containment atmosphere is isolated from the outside environment in the event of a LOCA. These valves are required to be closed for containment isolation.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 142

TO FACILITY OPERATING LICENSE NO. NPF-49

NORTHEAST NUCLEAR ENERGY COMPANY, ET AL.

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 3

DOCKET NO. 50-423

1.0 INTRODUCTION

By letter dated April 15, 1997, the Northeast Nuclear Energy Company, et al. (the licensee), submitted a request for changes to the Millstone Nuclear Power Station, Unit No. 3 Technical Specifications (TS). The requested amendment makes changes to TS Sections 4.3.3.6 and 4.6.4.1, which require that the hydrogen monitors be periodically tested. Specifically, the changes increase the testing interval of the monitor's hydrogen sensor, correct inconsistencies between the TS surveillances, and make changes to the Bases of the surveillances.

2.0 BACKGROUND

By letter dated January 3, 1995, the NRC issued Amendment No. 100 to the Millstone Unit 3 operating license. As part of this amendment, the NRC approved a change to the channel calibration surveillance interval associated with the hydrogen monitors from once per 92 days to once a refueling interval. The licensee subsequently determined that the surveillance extension was not consistent with the recommendations of the equipment vendor and that a refueling interval testing frequency was not appropriate for the hydrogen sensor. In its letter dated April 15, 1997, the licensee proposed modifying the testing interval of the hydrogen sensor to be consistent with vendor testing recommendations. The licensee also requested changes to TS Sections 4.3.3.6 and 4.6.4.1 to correct inconsistencies in surveillance testing requirements and make editorial changes.

3.0 EVALUATION

TS 4.3.3.6 currently requires that each accident monitoring instrumentation channel be demonstrated operable by performance of the channel check and channel calibration at the frequencies shown in Table 4.3-7. Table 4.3-7 requires the channel check to be performed every 31 days and the channel calibration to be performed every refueling interval.



TS 4.6.4.1 currently requires that each hydrogen monitor be demonstrated operable by the performance of a channel check at least once per 12 hours, an analog channel operational test at least once per 92 days, and at least once each refueling interval by performing a channel calibration using sample gas containing (1) one volume percent hydrogen, balance nitrogen, and (2) four volume percent hydrogen, balance nitrogen.

To make the above TS consistent and incorporate the vendor testing recommendations for the hydrogen monitor sensors, the licensee has proposed the following changes:

1. Change the number of TS 4.3.3.6 to TS 4.3.3.6.1 and add a new TS surveillance, TS 4.3.3.6.2. TS 4.3.3.6.2 would require that each hydrogen monitor be demonstrated operable by a hydrogen sensor calibration and an analog channel operational test at least once per 92 days on a staggered test basis.
2. Change the channel check testing frequency from every 31 days to every 12 hours in Table 4.3-7.
3. Modify the format of TS 4.6.4.1 by dividing it up into three groups based on the test frequency and adding the requirement for testing each hydrogen monitor sensor. The proposed surveillance requirements would require that each hydrogen monitor be demonstrated operable by (1) the performance of a channel check at least once per 12 hours (TS 4.6.4.1.a), (2) the performance of a hydrogen sensor calibration and an analog channel operational test at least once per 92 days on a staggered test basis (TS 4.6.4.1.b), and (3) the performance of a channel calibration at least once each refueling interval (TS 4.6.4.1.c).

The renumbering of TS 4.3.3.6 to TS 4.3.3.6.1 is administrative and is acceptable to the staff. The new surveillance requirement (TS 4.3.3.6.2), in addition to the already required channel check and channel calibration (TS 4.3.3.6.1), would add a specific requirement to perform a hydrogen sensor calibration and an analog channel operation test once per 92 days on a staggered basis. The sensor test will be a two-point calibration, utilizing a test gas containing approximately 1 percent hydrogen for one calibration point, and approximately 4 percent hydrogen for the second calibration point. Since (1) the calibration surveillance of the hydrogen monitor sensor is consistent with the vendor recommended practice for maintaining sensor calibration, (2) the analog channel operation test is the same as that required by TS 4.6.4.1, and (3) adding the analog channel operation test to Section 4.3.3.6 ensures consistency within the TS; the NRC staff finds the changes acceptable.

The changing of the hydrogen monitor channel check testing frequency from every 31 days to every 12 hours in Table 4.3-7 adds consistency between TS 4.3.3.6 and TS 4.6.4.1, since TS 4.6.4.1 requires the channel check to be performed every 12 hours. The staff finds this change acceptable.

Modifying the format of TS 4.6.4.1 by dividing it up into 3 groups based on the test frequency and adding the requirement for testing each hydrogen monitor sensor is administrative and adds consistency between TS 4.3.3.6 and TS 4.6.4.1. The staff finds these changes acceptable. The licensee has also updated the Bases to incorporate the addition of the hydrogen monitor sensor calibration and the description of the two-point calibration to be utilized in the surveillance.

The changes in hydrogen monitor surveillance testing, along with the existing requirements, continue to provide assurance of expected instrument performance under accident conditions; therefore, the NRC staff finds the changes acceptable.

#### 4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Connecticut State official was notified of the proposed issuance of the amendment. The State official had no comments.

#### 5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes surveillance requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (62 FR 27797 dated May 21, 1997). 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.

#### 6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: J. Andersen

Date: June 24, 1997