February 26, 2001

Mr. R. G. Lizotte
Master Process Owner - Assessment
c/o Mr. David A. Smith
Northeast Nuclear Energy Company
P. O. Box 128
Waterford, CT 06385-0128

SUBJECT: MILLSTONE NUCLEAR POWER STATION, UNIT NO. 3 - ISSUANCE OF AMENDMENT RE: NEW SUMP PUMP SYSTEM IN ENGINEERED SAFETY FEATURES BUILDING (TAC NO. MA9365)

Dear Mr. Lizotte:

The Commission has issued the enclosed Amendment No. 195 to Facility Operating License No. NPF-49 for the Millstone Nuclear Power Station, Unit No. 3, in response to your application dated June 30, 2000, as supplemented on September 22 and November 20, 2000, and January 26 and February 1, 2001.

This amendment authorizes a change to the Millstone Nuclear Power Station, Unit No. 3 licensing basis. The amendment authorizes you to incorporate changes to the description of the facilities in the Updated Final Safety Analysis Report, as described in your application dated June 30, 2000, as supplemented on September 22 and November 20, 2000, and January 26 and February 1, 2001, and evaluated in our Safety Evaluation.

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,

/RA/

Victor Nerses, Sr. Project Manager, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-423

Enclosures: 1. Amendment No. 195 to NPF-49
2. Safety Evaluation

cc w/encls: See next page

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Master Process Owner - Assessment
c/o Mr. David A. Smith
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Unit 3

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NORTHEAST NUCLEAR ENERGY COMPANY, ET AL.

DOCKET NO. 50-423

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 195
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 June 30, 2000, as supplemented on September 22 and November 20, 2000, and January 26 and February 1, 2001, 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, changes to the Updated Final Safety Analysis Report (UFSAR) to reflect the installation of a new sump pump system in the engineered safety features building, as described in the attached safety evaluation, and as set forth in the application for amendment by Northeast Nuclear Energy Company dated June 30, 2000, as supplemented September 22 and November 20, 2000, and January 26 and February 1, 2001, are authorized.

3. This license amendment is effective as of the date of issuance, and shall be implemented by the next update to the UFSAR as required by 10 CFR 50.71(e). Implementation of the amendment is the incorporation in the UFSAR of the changes to the description of the facility as described in the licensee's application dated June 30, 2000, as supplemented on September 22 and November 20, 2000, and January 26 and February 1, 2001.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

James W. Clifford, Chief, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Date of Issuance: February 26, 2001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 195

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 June 30, 2000, as supplemented September 22 and November 20, 2000, and January 26 and February 1, 2001, the Northeast Nuclear Energy Company, et al. (NNECO/the licensee), submitted a request for changes to the Millstone Nuclear Power Station, Unit No. 3 (MP3) licensing basis. The requested changes would modify the Updated Final Safety Analysis Report (UFSAR) regarding the installation of a new sump pump system in the engineered safety features building (ESFB). The September 22 and November 20, 2000, and the January 26 and February 1, 2001, letters provided clarifying information that did not change the scope of the amendment or the initial proposed no significant hazards consideration determination.

2.0 BACKGROUND

MP3 currently has a sump pump subsystem to prevent the excessive accumulation of groundwater inleakage through the containment basemat. The existing sump pump system is installed so that the underdrain system directs the groundwater from the containment and the ESFB sumps to two collection sumps located in the recirculation spray system (RSS) cubicles in the ESFB. Groundwater that is collected in these sumps is normally removed by non-safety-related pumps and processed through the radioactive waste system. During a loss of normal power and post-accident conditions, the groundwater that is collected in these sumps is removed by safety-related air operated motor pumps to temporary containers. The safety function of the sump pump subsystem is to prevent the excessive accumulation of groundwater so that flooding of the RSS cubicles is precluded, thereby preserving the operability of the RSS, and to maintain the integrity of the containment liner by preventing unanalyzed buoyant forces from acting on the containment.

Each of the existing RSS cubicle sumps (one sump in each of the two RSS cubicles) contains one safety-related air driven pump. The two sumps are interconnected so that either air-driven pump is capable of removing the groundwater inleakage from both of the RSS cubicle sumps. Air for the safety-related sump pumps is supplied by portable diesel air compressors which are manually connected during sump pump operation to permanently installed air supply piping and

connections located outside the ESFB. Since the diesel air compressors are readily accessible during accident conditions and their operation is not time critical, they were classified as non-safety-related. This condition was reviewed and approved by Amendment No. 168, dated March 17, 1999. Although the existing pumping subsystem is not classified as American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) Class, the components that are inaccessible during accident conditions are classified as nuclear safety-related and Seismic Category I. A licensee commitment currently exists to replace the safety-related air motor-driven sump pumps with electric sump pumps prior to startup from Refueling Outage 7.

In submittals dated June 30, 2000, as supplemented on September 22 and November 20, 2000, and January 26 and February 1, 2001, NNECO provided information regarding a design change for MP3 involving the addition of a new sump pump system to address groundwater inleakage through the containment basemat. The licensee proposes to replace the current air motor-driven safety-related sump pumps with a non-safety-related electric sump pump. The licensee's basis for using a non-safety-related sump pump is that the pump will be accessible after an accident and can be repaired or replaced before an excessive accumulation of groundwater. This is consistent with the licensing basis approved in Amendment No. 168. NNECO has determined that the new system involves an unreviewed safety question; and, therefore, has requested staff review and approval. The proposed amendment involves a revision to the plant UFSAR, including a description of the functional design of the new subsystem, its construction and quality attributes, the necessary surveillance requirements, and the operating requirements.

3.0 EVALUATION

3.1 System Description

The installation of a new sump pump system is part of a design change that will move the location for removal of groundwater that has circumvented the butyl rubber membrane to a new sump location in the RSS cubicle. As part of this change, the RSS cubicle will be made leak tight. The RSS pumps will no longer be susceptible to failure due to groundwater inleakage. With the new sump pump system, its only safety function will be to prevent unanalyzed buoyant forces from acting on the containment. The new sump will be a self-contained stainless steel structure located on the floor of the ESFB and will be provided with a non-safety-related deep well electric submersible pump inserted from the ESFB roof via a casing pipe. The pump will be inserted into the sump through the casing pipe, and will be readily accessible for maintenance and repairs via the ESFB roof. At least one spare pump will be maintained on site as a replacement. The new sump pump will be powered by a non-quality-assurance (non-QA) power circuit that is connected to a Class 1E motor control center so that power can be provided during loss of power events. The sump and casing pipe is classified as safety-related and provides a new Supplemental Leak Collection and Release System (SLCRS) boundary within the ESFB. The groundwater removed by the new pump will be routed to a non-safety-related groundwater collection tank adjacent to the ESFB where it will be stored, sampled, treated, and eventually released to the drain system. The new tank will be installed in the exact location of the existing abandoned-in-place chemical addition tank (to be removed.) The existing air motor-driven ESFB sump pumps will be removed and the associated piping and support equipment will be cut back or abandoned in place. Non-safety-related instrumentation will be used to provide sump level indication and alarm and to control the automatic cycling of the new sump pump.

3.2 Compliance with General Design Criteria 1 and 2

The staff considered the requirements of the General Design Criteria (GDC) in Appendix A to 10 CFR Part 50 in the review of the licensee's proposed license amendment. Specifically, GDC 1 requires that structures, systems, and components (SSCs) important to safety shall be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed, and GDC 2 requires that these SSCs be designed to withstand the effects of natural phenomena without loss of capability to perform their safety functions.

The staff's review of the licensee's submittals and UFSAR revisions included a review of the component quality as determined by the licensee's quality group classification. The licensee has stated that the new sump pump, stainless steel retrieval cable, electrical cable, and outlet piping are not safety-related. This equipment can be accessed from the ESFB roof, and their repair or replacement can be achieved before there is an excessive accumulation of groundwater in the RSS cubicles. This is consistent with the current licensing basis for the sump system as approved in Amendment No. 168. In the safety evaluation for the current sump system the staff approved the use of non-safety-related equipment for this system based on the accessibility and the ability to repair or replace this equipment in a time frame commensurate with its need. The time frames for detection of equipment failure, repair, or replacement are discussed later in the safety evaluation. Retrieval of the failed pump and outlet piping and installation of their replacements can be achieved by using either the piping, the electrical cable, or a stainless steel retrieval cable provided on the pump. Therefore, there are redundant methods for retrieval of the pump. However, the new casing pipe, casing expansion joint, casing roof penetration, sump inlet piping, sump enclosure, and associated gaskets and seals comprising the new SLCRS are credited with the safety functions of preventing release of excessive radiation outside the ESFB and collecting and removing the inleakage. These components are classified by the licensee as safety class 3 but are not classified as ASME Code Class 1, 2, or 3 components and, as such, are not subject to ASME Section III design and construction requirements or ASME Section XI inservice inspection and test requirements pursuant to 10 CFR 50.55a.

While the components in the sump pump system are not classified as ASME Code Class, the licensee submitted information to justify the adequacy of the design and quality assurance of the various components. The sump and attached piping are all Seismic Category I. The sump is designed to the American Institute for Steel Construction (AISC) code and the pipe casing and sump inlet piping are designed to the American National Standards Institute (ANSI) B31.1 code, except for the structural supports, which are designed to the AISC code. The new collection tank is designed to the ASME Section VIII code and is also Seismic Category I. The tank is seismically supported using similar struts and attachments to the Refueling Water Storage Tank (RWST) as those from the abandoned Chemical Addition Tank, and there is no impact on the seismic qualification of the RWST as a result. While not ASME Code Class, the staff finds the design and quality assurance for these components provide reasonable assurance that the components will perform their required safety functions for the limiting service conditions postulated and are, therefore, acceptable.

In order to determine the adequacy of the licensee's safety classification of the new sump pump system, the staff requested the licensee to provide additional information regarding maintenance and surveillance requirements for the system components. In the submittal dated November 20, 2000, the licensee stated that the new sump pumps themselves do not meet the

criteria for inclusion in a Maintenance Rule program governed by 10 CFR 50.65. Therefore, they are not included within the scope of the Maintenance Rule. However, the staff notes that the new electric sump pump will be routinely monitored because it is typically operated about once per day to remove groundwater inleakage from the ESFB sump. For the casing, piping, and sealing components discussed above, the licensee proposes to conduct several surveillance tests and inspections including: (1) the SLCRS draw-down test (a negative pressure test) is performed on a refueling frequency that verifies that the condition of the Secondary Containment Boundary is adequate to support SLCRS operation; (2) visual inspections of the Secondary Containment Boundary Structural Integrity are conducted during shutdowns for type A testing, which would specifically inspect the above piping and enclosure components; and (3) visual examination of building structures is conducted on a 3- to 5-year basis, which would examine the sleeves, bellows, and the roof penetration. The building roofs are also examined on a yearly basis. The staff finds the licensee's maintenance, monitoring, and surveillance activities for these components will provide reasonable assurance that the components will perform their required safety functions for the limiting service conditions postulated and are, therefore, acceptable.

Table 1 of the licensee's June 30, 2000, submittal provides a comparison of the design requirements that were approved for the current sump collection system and those that are proposed for the new sump system. The staff considers the proposed standards to be consistent with those that were applied to the current sump system, and appropriate for the intended application. The staff concludes that the proposed FSAR revisions and the associated license amendment meet the intent of GDC 1 and GDC 2 as they pertain to the design and quality standards for the new system, and are acceptable.

3.3 Sump

The licensee proposes to use only one self-contained sump that is located in the "A" RSS cubicle in place of the two (one in each RSS cubicle) that are currently credited. The groundwater will be directed from the porous concrete layer underdrain to the new sump through two existing 6-inch bore holes and one new bore hole to be added. Existing concrete drains to the current sump will be capped and sealed. The porous concrete layer is common to both RSS cubicles and, therefore, it is not expected that excessive groundwater will accumulate in either RSS cubicle. However, to ensure that the RSS cubicles are leak tight the RSS cubicles will be leak tested for groundwater inleakage prior to operation (see Section 3.8). The sump will be sized with sufficient excess capacity to allow time for the non-safety-related sump pump to be replaced if necessary following a loss-of-coolant accident (LOCA) without allowing groundwater accumulation to affect containment integrity, recognizing that post-accident radiation levels could delay access to the sump pump for up to 24 hours. On these bases, the staff considers the use of a single sump of the proposed design to be acceptable.

3.4 Sump Pump

As previously noted, the licensee proposes to use a single non-safety-grade electric sump pump in place of the two safety grade air motor driven sump pumps that are currently being used. In a letter dated February 1, 2001, the licensee committed to establish criteria for periodically monitoring the sump inleakage rate to ensure that enough time will be available to replace the sump pump with the onsite spare during post-LOCA conditions without posing a challenge to containment integrity. The licensee also indicated that administrative controls (see

Section 3.9 of safety evaluation) would be established to ensure the periodic monitoring and continued operability of the sump pump.

Even though the new sump pump will be powered by a non-QA circuit, the circuit will derive its power from a Class 1E motor control center (MCC) that can be powered by the Train A emergency diesel generator (EDG) if necessary. Power from Train B is also available in the area of the Train A MCC, and the licensee indicated that a procedure for connecting to Train B power would be in place prior to releasing the new sump system for operation.

The new sump pump electric load will be added to the Millstone Unit 3 UFSAR Table 8.3-3. This table lists all non safety-related loads that are connected to the safety-related buses. The new sump pump is connected to a safety-related Class 1E Motor Control Center (MCC) 32-4T supplied by Train A EDG. Since the new sump is designated as non-Class 1E, it is connected to the safety-related bus through two Class 1E breakers. Two Class 1E breakers will serve as the necessary isolation device to provide isolation of this non safety load from the safety bus. In the event of a loss of offsite power, the pump will be powered from EDG A. In accordance with the MP3 UFSAR, the worst case EDG A loading is 5102 kW which is within the EDG 2000 hour rating of 5335 kW. The sump pump motor is rated at 0.5hp. The licensee states that when the demand and diversity factors are applied to this motor, it represents only a 0.1 hp (.0746 kW) of the EDG rating. This load is reflected in the EDG total load as a portion of the MCC load and is well within the 2000 hour rating of EDG A.

Based on the following: (1) the sump pump is not required to be immediately available following a LOCA, (2) administrative controls will be established to ensure that the sump pump will be able to perform its function when necessary (even if pump replacement is necessary following a LOCA), (3) suitable electrical isolation is provided to ensure that the Class 1E MCC will not be degraded, (4) the electric sump pump load is well within the capacity of the EDG A accident loadings, and (5) the proposed design is consistent with the current licensing basis, the staff considers the use of a non-safety-related sump pump in the proposed manner to be acceptable.

3.5 Groundwater Collection Tank

The groundwater that is collected in the new sump will be pumped to a new non-safety-related tank. The tank will be located adjacent to the ESFB, near the RWST. The new groundwater collection tank will be seismically supported so as to avoid any impact on the seismic qualifications of the RWST. The tank will be sized for about a 2-week storage capacity, and provisions will be made to redirect the groundwater from this tank to a temporary container for further treatment if the groundwater sample shows radioactive contamination. The existing sumps in the RSS cubicles will be isolated from the porous concrete groundwater drains, and will be used to collect leakage from the RSS cubicle and Hydrogen Recombiner Building drains. Water collected in these sumps will be processed separately from the groundwater that is collected in the new sump, thereby preventing possible radioactive contamination of the groundwater that is collected. The staff considers the use of a non-safety-related tank for collection of non-radioactive groundwater as proposed to be adequate and acceptable for the intended application.

3.6 Instrumentation

The new collection sump will rely on a non-safety-related instrument loop to provide level indication and alarm via the control room process computer. The sump high level alarm will be set to allow enough time for operators to replace the sump pump with the onsite spare following a LOCA before groundwater accumulation can affect containment integrity, recognizing that access to the pump is not possible for about 24 hours post-accident due to high radiation levels. The level transmitter associated with this instrument loop is a guided wave radar based instrument. Another non-safety-related instrument loop will be used for the sump level control function. This loop relies on weighted floats to actuate electrical switches to start and stop the sump pump at preset sump levels for automatic level control. The groundwater collection tank also uses a non-safety-related instrument loop to provide tank level indication. This loop converts tank hydrostatic pressure to a level indication. The licensee indicated that a portable instrument could also be used to monitor tank level if necessary. In a letter dated February 1, 2001, the licensee committed to establish a calibration schedule for the level indication and alarm instrument loops in accordance with their preventive maintenance program.

During normal plant operation, the licensee relies upon the non-safety-related instrumentation associated with the new sump system to periodically confirm that the groundwater inleakage rate is not excessive and that the sump pump is operable, and to sound an alarm if the sump level should rise above the maximum assumed for the system design basis. Periodic monitoring and trending of information will ensure that the failure of an instrument loop is promptly identified. Diversity of the instrument loops makes it very unlikely that multiple failures will occur simultaneously during normal plant operation. During accident conditions, plant operators will be able to rely on pre-established trending information to maintain the groundwater sump level within acceptable limits in the event that the installed instrumentation becomes unavailable. The licensee indicated that the Emergency Operating Procedures (EOP) would be revised to include instructions for responding to instrument failures associated with the new sump system. Recognizing that plant operators will be able to manage groundwater inleakage without relying on the installed instrumentation during plant accident conditions, the staff considers the proposed use of non-safety-related instrumentation to be appropriate and acceptable for the intended application.

3.7 Environmental Qualification (EQ) Considerations

The power and control cables associated with the new sump system design are located in areas that are considered to be a harsh environment for radiation only per the licensee's EQ program guidelines. The worst-case radiation environment for the power and control cables is estimated to be 1.3E7 rads total integrated dose (TID) during accident conditions. Although the power and control cables associated with the new sump system are not qualified as class 1E cables, they are of the same construction as the cables used for class 1E applications with a rating of about 2E7 rad TID. The staff considers this to be appropriate and acceptable for the intended application.

3.8 Post-Installation Testing

The licensee plans to test the new sump system following installation to confirm the system's ability to remove accumulated groundwater from the sump during normal plant operation and post-accident. The testing will also confirm the ESFB basement area is water tight up to an

elevation that is equal to the top of the safety-related sump. This is necessary to ensure that groundwater inleakage will not be able to bypass the sump system and create a flooding hazard for the RSS cubicles. The staff considers performance testing of the new sump system to be appropriate and acceptable.

3.9 Administrative Controls

The safety function of the new sump system is to provide for the long term removal of groundwater in order to preclude flooding of the RSS cubicles and to ensure operability of both RSS trains, and to maintain the integrity of the containment liner. In order to ensure that the new sump system will be able to perform its safety function, the licensee plans to implement the following measures:

- The licensee will add a Technical Requirement to the MP3 Technical Requirements Manual (TRM) to monitor the groundwater inleakage rate and the operability of the non-safety-related sump pump on a daily basis (Nuclear Regulatory Commission (NRC) commitment). Criteria will be included in the TRM to ensure that the maximum allowed groundwater inleakage rate is not exceeded, thereby preserving a 32-hour margin in sump capacity for pump replacement. Daily rounds by the operators will include monitoring the non-safety-related pump start and stop times, the water level in the sump, and the water level in the groundwater collection tank.

- The licensee will establish a calibration schedule for the level indication and alarm instrument loops in accordance with the licensee's Preventive Maintenance Program practices (NRC commitment).

- The licensee will establish procedural requirements to initiate corrective actions in the event that a substantial increase in groundwater inleakage rate occurs (i.e., an increase on the order of 10% or more). Also, operator response to a high level alarm in the sump will be developed.

- The licensee will revise the EOPs to monitor the new sump system during the transfer to cold leg recirculation. The EOPs will provide a process to ensure that failures associated with the sump pump system, such as failures associated with the sump pump or level instrumentation, are properly addressed. A spare sump pump will be maintained onsite.

- The licensee will establish a procedure for providing Train B power for the sump pump in the event that Train A power becomes unavailable. Any special materials or tools identified by the procedure will be staged onsite, and the applicable work areas will be accessible for connecting to Train B power under normal and post-accident conditions.

- The licensee will take measures to sample the groundwater collected in the new sump for radioactivity and, if it is found to be radioactive, to disposition it appropriately.

The staff considers these measures to be appropriate and adequate for monitoring the status of the new sump system, and to ensure that the new sump system is fully operable and able to perform its function.

The NRC staff has reviewed the licensee's request to install a new sump system to collect and remove groundwater inleakage during normal plant operation, following a LOCA, and during loss of normal power scenarios. The sump system design in conjunction with administrative controls will ensure that sufficient time is available for operators to replace the non-safety-related sump pump if it should fail either during normal plant operation or following a LOCA, and to connect the sump pump to an alternate reliable power source if necessary. Based on the information that was provided and as discussed in the evaluation section, the staff considers the new sump system design to be appropriate and acceptable for the intended application. Therefore, the licensee's request for NRC approval to revise the design basis for the sump system is authorized.

3.0 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.

4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. 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 (65 FR 62388). 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.

5.0 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 Contributors: J. Tatum
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Date: February 26, 2001