Northeast
Nuclear Energy

Rope Ferry Rd. (Route 156), Waterford, CT 06385

Millstone Nuclear Power Station
Northeast Nuclear Energy Company
P.O. Box 128
Waterford, CT 06385-0128
(860) 447-1791
Fax (860) 444-4277

The Northeast Utilities System

JUN - 1 2000

Docket No. 50-336
B18099

Re:10 CFR 50.55a(f)(5)(iii)
10 CFR 50.55a(f)(6)(i)

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Millstone Nuclear Power Station, Unit No. 2
Inservice Test Program
Request For Relief From ASME Section XI

Northeast Nuclear Energy Company (NNECO) hereby requests relief from the requirements of 10 CFR 50.55a(f) for performing the required testing for certain Class 2 and 3 components in accordance with the American Society of Mechanical Engineers (ASME) Code, Section XI for Millstone Unit No. 2.

Technical Specification 4.0.5 states that the Inservice Inspection and Testing of the ASME Code Class 1, 2, and 3 components shall be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code and applicable addenda as required by 10 CFR 50.55a(f), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(f)(6)(i). Accordingly, pursuant to 10 CFR 50.55a(a)(3) and 10 CFR 50.55a(f)(5)(iii), NNECO hereby requests relief as detailed in the Relief Requests provided in Attachments 1 through 5.

It is requested that NRC approval be provided by February 2001 to support timely implementation of these Relief Requests.

There are no regulatory commitments contained within this letter.

A047

Should you have any questions regarding this matter, please contact Mr. R. G. Joshi at (860) 440-2080.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

Stephen E. Scace - Director
Nuclear Oversight and Regulatory Affairs

Attachments (5):

1. Relief Request (R-1) for In-Service Testing Requirements - Fire Water System Valves
2. Relief Request (R-2) for In-Service Test Requirements - Manual Valves
3. Relief Request (PR-1) for In-Service Test Requirements - Vibration Instruments
4. Relief Request (PR-2)for In-Service Test Requirements - Pump Analysis
5. Relief Request (PR-3) for In-Service Test Requirements - Pump Digital Instrument Accuracy

cc: H. J. Miller, Region I Administrator
J. I. Zimmerman, NRC Project Manager, Millstone Unit No. 2
D. P. Beaulieu, Senior Resident Inspector, Millstone Unit No. 2

Docket No. 50-336
B18099

Attachment 1

Millstone Nuclear Power Station, Unit No. 2

Relief Request for In-Service Testing Requirements
Fire Water System Valves

June 2000

Attachment 1

Relief Request for In-Service Testing Requirements
Fire Water System Valves

Relief Request No.: R-1

System: Fire Water

Valves: Valves 2-FIRE-94A/B/C

Code Class: 3

Category: B

Open Function: Open manually to provide emergency firewater to the Auxiliary Feed Water (AFW) system.

Close Function: Remain closed to isolate Fire Water from the AFW system.

Test Requirement: Full stroke exercise valves during plant operation to the position required to fulfill its function. (OM-10 paragraph 4.2.1.2).

Basis For Relief: The normally closed 8 inch manually operated gate valves serve as the Fire Water/AFW system boundary valves which ties in directly to each of the three AFW pump suction lines. The normally isolated firewater system provides an alternate source of water to the AFW pumps during long term cooling in the event the normal condensate storage tank (CST) supply is depleted.

Manual full stroke or part stroke testing each valve during reactor operation or cold shut down is not practical since the firewater discharge flow path goes directly to the suction of the AFW and could cause plant equipment damage. Cycling the valves would result in chemical and particulate contamination of the AFW system and/or CST. The AFW suction line spool piping could be removed and the fire water routed away from the AFW system using temporary piping however, this would create a hardship with the significant maintenance preparation and restoration activities, the proper disposal of the chlorinated firewater, and system flushing required after each valve cycle to insure the AFW system does not become contaminated when restored.

Manual full stroke testing each valve every refueling would be unduly burdensome, creating an unwarranted environmental impact and impacting outage work completion (An AFW pump is required to be available during refueling outages for shutdown risk purposes).

All the valves have been verified capable of performing their safety function with successful testing performed during RFO 13 (5/2000). A work history review back to 1985 did not identify any component problems.

Alternate Testing: The following alternate test plan avoids undue hardship and does not compromise component level quality or safety and is adequate to meet the fundamental objective of detecting degradation.

Unit No. 2 proposes testing the fire water valves (2-FIRE-94A/B/C) on a sample frequency of one valve each refuel cycle. A selected valve in the group will be manually full-stroked every refueling outage and all the valves in the group will be manually full-stroked within 3 refueling cycles. If the selected valve being manually full-stroked is not capable of being full-stroke exercised the remaining valves in the group will be manually full-stroke exercised during the same outage.

A full stroke exercise test will be performed IAW OM-10 after any maintenance that could affect the full-stroke capability of the valve.

The sample group was selected utilizing a methodology similar to the guidelines established in NUREG 1482 for check valve disassembly groups since they are the same manufacturer, model, size, application, and orientation.

Docket No. 50-336
B18099

Attachment 2

Millstone Nuclear Power Station, Unit No. 2

Relief Request for In-Service Test Requirements
Manual Valves

June 2000

Attachment 2

Relief Request for In-Service Test Requirements
Manual Valves

Relief Request: R-2

System: Main Steam (MS),
Reactor Building Closed Cooling (RB),
Auxiliary Feedwater (AFW),
Containment Spray (CS)

Valves:

2-CN-29A	2-FW-56B	2-RB-56A	2-RB-107B
2-CN-29B	2-RB-39	2-RB-56B	2-RB-107C
2-CN-30	2-RB-41	2-RB-56C	
2-FW-56A	2-RB-43	2-RB-107A	

Code Class: 2 & 3

Category: B

Function: Valves 2-CN-29A, 2-CN-29B and 2-CN-30 perform the following function: Close to allow suction flow path from the fire main.

Valves 2-FW-56A and 2-FW-56B perform the following function: Open to allow manual control of Auxiliary Feedwater.

Valves 2-RB-39, 2-RB-41, 2-RB-43, 2-RB-56A, 2-RB-56B, 2-RB-56C, 2-RB-107A, 2-RB-107B, and 2-RB-107C perform the following function: Close when entering post accident long term cooling or to isolate a faulted RB header.

Test Requirement: Active Category B valves shall be tested nominally every three (3) months (OM-10, paragraph 4.2.1.1)

Basis For Relief: The Reactor Building Closed Cooling (RB), and Auxiliary Feedwater (AFW) system valves are manual valves. The predominant degradation and failure mechanisms (motor failures, electrical failures, switch settings, etc) associated with power operated valves (MOVs, AOVs) do not exist for manual valves. These valves are normally open (except two Auxiliary Feedwater valves that are closed) and are closed to prevent loss of system inventory. The two Auxiliary Feedwater are normally closed and are opened to allow flow.

These valves are not operated during power operation except for surveillance testing. Testing these valves on a quarterly frequency solely to meet the requirements of ASME/ANSI 1987, OMa 1988 provides limited value. It is unnecessary for detecting valve degradation, does not decrease the potential for a component failure and the proposed alternative testing will provide a level of safety comparable to the current Code testing.

Additionally, the proposed alternate testing complies with ASME OMa 1999 Addenda to ASME OM 1998 Code, paragraph ISTC-3540 for full stroke exercising of manual valves.

Alternate Testing: Manually full stroke exercise the valves at least once every five years. Where adverse conditions are determined to exist, the testing frequency will be increased up to once a refuel. This determination of adverse conditions[1] and the increased test frequency will be documented in the IST Program.

---

[1] Harsh environment, lubricant hardening, corrosive or sediment laden fluids, or degraded valve components are examples of adverse conditions.

Docket No. 50-336
B18099

Attachment 3

Millstone Nuclear Power Station, Unit No. 2

Relief Request for In-Service Test Requirements
Vibration Instruments

June 2000

Attachment 3

Relief Request for In-Service Test Requirements
Vibration Instruments

Relief Request: PR-1

System: Service Water

Pumps: Pumps P5A, P5B, P5C

Code Class: 3

Function: Provide the required flow at the necessary head to the service water headers.

Test Requirement: The frequency response range of the vibration measuring transducers and their readout system shall be from one-third minimum pump rotational speed to at least 1000 Hz. (OM-6 paragraph 4.6.1.6)

Basis For Relief: Millstone is transitioning from the TEC 1330 VLF SmartMeter to the ENTEK/IRD dataPAC 1500 vibration data collector due to Y2K issues with the TEC 1330 meter. The TEC 1330 meter is no longer being manufactured and technical support is being phased out. The vendor recommended the dataPAC 1500 as a suitable replacement for the TEC 1330 meter.

Vibration personnel detected large errors in overall vibration measurement results when field validation testing the dataPAC 1500 data collectors. Investigation revealed that the dataPAC 1500 use the entire meter's frequency response range (i.e., 0.36 Hz to 75.3 KHz) in calculating and displaying overall vibration results (called magnitude readings) whereas the TEC 1330 meter calculated overall vibration based on user specified upper and lower frequency limits. The TEC 1330 meter frequency response range was setup for ~4.0 Hz to 1000 Hz.

Integration noise is created by processing the input signal from the accelerometer, which affects the lower response range. The integration noise is reduced in the dataPAC 1500 by filtering the vibration input signal through a 5.3 Hz high pass filter to obtain repeatable overall vibration data. This results in the lower bound of the Code-required frequency response range not being met. The TEC 1330 meter used a special algorithm in the data

collector to subtract integration noise from the vibration measurement.

The service water pumps are vertical line shaft turbine pumps with the same constant running speed of 885 rpm (equivalent to 14.7 Hz). Compliance with paragraph 4.6.1.6 would require using vibration instrumentation with a frequency response range of 4.9 Hz to at least 1000 Hz for these pumps.

Vibration instrumentation with a frequency response range from 5.3 Hz to 1000 Hz for monitoring vibration of the service water pumps is acceptable because:

- Overall vibration data would still contain vibration components from 0.36 Hz to 75.3 KHz but vibration amplitudes at frequencies below 5.3 Hz would be attenuated. The amount of attenuation for a particular frequency below 5.3 Hz is dependent on the high pass filter's characteristics. Inputting a known signal amplitude at 4.9 Hz into the dataPAC 1500 resulted in its amplitude being reduced to only 85% of its original value. Spectral vibration data collected using the 5.3 Hz high pass filter would still provide observable and trendable vibration data that would indicate developing mechanical faults down to 4.9 Hz.

- Millstone has not identified any potential mechanical faults for the service water pumps below 6 Hz. The credible mechanical faults below pump running speed on these vertical line shaft pumps are structural resonance at the system's reed natural frequencies and pump shaft whirl. Millstone has identified the reed natural frequencies of these service water pumps to lie between 6 Hz and pump running speed. Non-IST required pump shaft measurements using a shaft stick or proximity probe are required to confirm pump shaft whirl. Millstone routinely collects and trends vertical pump line shaft vibration data primarily to trend line shaft bearing wear and has never identified subsychronous shaft vibration (shaft whirl) on their service water pumps.

- Overall vibration limits are only one indicator of component condition and may miss some mechanical faults entirely. Spectral vibration analysis is much more sensitive than overall vibration in detecting mechanical faults. Vibration analysts use spectral data to extract and trend vibration data from various frequency bands that were defined to detect particular machine faults for each specific machine type. Spectral analysis results in additional and earlier warning of degrading component conditions due to the capability to trend and alarm on multiple frequency

bands and individual frequencies. Spectral vibration analysis techniques are used at Millstone on all IST components.

- The 1/3 running speed to 1000 Hz minimum frequency response range requirement does not apply well to slow speed machinery. Incorporating vibration frequency down to 1/3 running speed results in integration noise corrupting the overall vibration results on slow speed machinery. Overall vibration is excessively high unless the integration noise is reduced by high pass filtering the vibration input signal or by using special algorithms in data collectors to subtract integration noise from the vibration measurement.

  Many vibration standards segregate rotating equipment into various rotational speed categories (i.e., running speed above or below 600 RPM, speed range from 10 to 200 REV/S), machinery type classifications (i.e., turbines, pumps, compressors, fans, centrifugal, reciprocating, overhung rotor, etc.) and machinery support methods (i.e., hard or soft mounted) prior to specifying allowable vibration limits. This allows for more appropriate limits to be applied to the different types of equipment that optimize detection of credible mechanical faults.

Alternate Testing: The instrumentation used to measure pump vibration will have a frequency response range from 5.3 Hz to at least 1000 Hz.

Docket No. 50-336
B18099

Attachment 4

Millstone Nuclear Power Station, Unit No. 2

Relief Request for In-Service Test Requirements
Pump Analysis

June 2000

Attachment 4

Relief Request for In-Service Test Requirements
Pump Analysis

Relief Request: PR-2

System: Various

Pumps: All IST pumps

Code Class: 2/3

Function: Provide the required flow at the necessary head to the associated system header.

Test Requirement: If deviations fall within the alert range of Table 3, the frequency of testing specified in paragraph 5.1 shall be doubled until the cause of the deviation is determined and the condition corrected. If deviations fall within the required action range of Table 3, the pump shall be declared inoperable until the cause of the deviation has been determined and the condition corrected (OM-6, paragraph 6.1).

Basis for Relief: By allowing an analysis of the pump's overall performance, premature maintenance of a pump that is subject to normal and gradual degradation over time or other test anomalies can be avoided provided the pump can be determined to be fully capable of reliably performing its intended safety function. The 1995 Edition of the ASME OM Code provides an alternative corrective action should a pump's performance enter the required action range. Paragraph 6.2.2 permits an analysis of the pump's performance and establishment of new reference values.

By adopting the 1995 ASME Code requirements, for this specific instance, the frequency of pump maintenance, with concurrent equipment outage and applicable LCO time, can be reduced with little or no adverse affect on plant safety as determined by the acceptance of the 1996 addenda of the ASME Code.

Additionally, inclusion in this relief of pumps that are in the alert range will avoid unnecessary and more frequent testing of pumps, which can contribute to overall pump degradation. Also the challenges to safety systems due to a plant shutdown can be avoided for pumps in the alert range when tested in Cold

Shutdown provided the pump's overall safety function can still be met.

This proposed alternate test is consistent with the response to question 3.3.2 in the Summary of Public Workshop on Inspection Procedure 73756.

Alternate Testing: When a pump's test parameters fall within either the alert or required action ranges and the pump's overall performance has been determined to be acceptable by analysis, a new set of reference values may be established. The supporting analysis will include verification of the pump's operational readiness and the pumps continued performance in between testing intervals. The pump's analysis will address both component and system level evaluations of operational readiness, a description of the cause of the change in pump performance, an evaluation of all trends indicated by the data and an evaluation of applicable maintenance performed on the pump. This analysis will be documented in the record of tests.

Docket No. 50-336
B18099

Attachment 5

Millstone Nuclear Power Station, Unit No. 2

Relief Request for In-Service Test Requirements
Pump Digital Instrument Accuracy

June 2000

Attachment 5

Relief Request for In-Service Test Requirements
Pump Digital Instrument Accuracy

Relief Request: PR-3

System: Various

Components: All IST Pumps

Code Class: 2/3

Function: Provide the required flow at the necessary head to the associated system header.

Test Requirement: Digital instruments shall be selected such that the reference value shall not exceed 70% of the calibrated range of the instrument (OM-6, para. 4.6.1.2(b)).

Basis For Relief: The intent of the restrictions on the instrument calibration range is to ensure a specific accuracy is maintained for all acceptable test values, i.e. within 2% of indicated values. The basis for requiring reference values to be less than or equal to 70% of the calibrated range of the instrument is unclear. For a digital instrument, calibrated in accordance with ASME OM Code requirements, an instrument reading at 80% of the calibrated range would be equally valid for IST use as an instrument reading at 60% of the calibrated range. Both test readings would be within 2% accuracy of the indicated value.

Since the ASME OM Code requirements allow pump test values within a maximum of +/- 10% of the reference value, to be considered acceptable, a limit of 90% of the reference value would ensure all possible pump test results are meeting the accuracy requirements of the Code.

Additionally, the ASME OM Code Committee has approved Code Case OMN-6, "Alternate Rules for Digital Instruments," which identifies that digital instruments may be selected such that the reference value does not exceed 90% of the calibrated range of the instrument. This Code Case applies to ASME OM Code-1990 Edition through ASME OMb Code-1997 Addenda.

Alternate Testing: Select digital instruments for IST pumps such that the reference value does not exceed 90% of the calibrated range of the instrument.