NORTHEAST UTILITIES

THE CONNECTICUT LIGHT AND POWER COMPANY
WESTERN MASSACHUSETTS ELECTRIC COMPANY
HOLYOKE WATER POWER COMPANY
NORTHEAST UTILITIES SERVICE COMPANY
NORTHEAST NUCLEAR ENERGY COMPANY

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May 1, 1992

Docket No. 50-423
B14123

Re: ASME Section XI
GL 90-05
10CFR50.55a(g)(6)(i)

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

Gentlemen:

Millstone Nuclear Power Station, Unit No. 3
Relief Request From ASME Code Section XI Requirements

The purpose of this letter is to request, in response to NRC Generic Letter 90-05, relief from ASME Boiler and Pressure Vessel Code Section XI requirements pursuant to 10CFR50.55a(g)(6)(i). Attachment 1 provides a description of actions taken by Northeast Nuclear Energy Company (NNECO) to make interim repairs to the leak in this piping as an alternative to an IWA-7000 repair/IWA-7000 replacement.

Consistent with the provisions of the generic letter, NNECO is submitting this relief request for an interim noncode repair. The Resident Inspector at Millstone Unit No. 3 has been informed of this planned interim repair and, as has been our practice, we will keep the Resident Inspector fully informed on all future repairs.

In a letter dated December 18, 1991,(1) NNECO submitted a similar request for relief to install a rubber expansion joint on the "B" emergency diesel generator. Additional information on the properties of the rubber expansion joint, which was requested by the Staff in a telephone conversation, was provided by a letter dated January 16, 1992.(2) In a letter dated April 7,

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(1) J. F. Opeka letter to U.S. Nuclear Regulatory Commission, "Relief Request From ASME Code Section XI Requirements," dated December 18, 1991.

(2) J. F. Opeka letter to U.S. Nuclear Regulatory Commission, "Request for Relief from ASME Code Section XI Requirements," dated January 16, 1992.

1992,[3] the Staff granted NNECO's relief request and approved the use of the rubber expansion joint.

Please contact us if you have any questions.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

J. F. Opeka
Executive Vice President

cc: T. T. Martin, Region I Administrator
V. L. Rooney, NRC Project Manager, Millstone Unit No. 3
W. J. Raymond, Senior Resident Inspector, Millstone Unit Nos. 1, 2, and 3

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(3) J. F. Stolz letter to J. F. Opeka, "Authorization for Use of a Rubber Expansion Joint as an Alternative to Metal in Accordance with 10CFR50.55(a)(3)," dated April 7, 1992.

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Attachment 1

Millstone Nuclear Power Station, Unit No. 3

Relief Request From ASME Code Section XI Requirements

May 1992

NORTHEAST UTILITIES

FORM FOR RELIEF REQUEST FROM ASME SECTION XI REQUIREMENTS

UNIT: Millstone Unit 3 NCR #: 392-129 DATE: 04/03/92

TIME: 1600

1.0 ORIGINATOR

1.1 DESCRIPTION OF FLAW

The leaking component is an 8" expansion joint 3SWP*EJ6C located at the service water outlet nozzle of the "A" Emergency Diesel Generator (EDG) jacket water cooler. This piping is located at the 24'6" elevation in the diesel generator enclosure building. The expansion joint is oriented vertically.

Leakage is from the upper and lower expansion joint collars used to join the metal bellows to the stud ends. There is no way to determine the exact location or size of the flaw as capillary action is wicking the leak around the entire circumference of the collar. There is also a through wall leak at a single location on the longitudinal seam weld.

Piping/Component Drawing No.: 3SWP*EJ6C, 25212-29669, Sheet 29

P&ID No.: EM 133D

1.2 IMPRACTICALITY OF CODE REPAIR

Repair would require complete disassembly of the expansion joint (i.e., grind out the circumferential weld) and refabrication of the joint. Millstone Maintenance does not have the expertise required to perform this repair because of the thin walled Monel bellows material. The expansion joint vendor will also not perform a repair.

1.3 DESCRIPTION OF PROPOSED TEMPORARY REPAIR

Replace the metal expansion joint on an interim basis with a rubber expansion joint until an ASME expansion joint with Inconel 625 bellows can be obtained. The tie rod assembly from the original bellows will be re-used.

1.4 SAFETY SIGNIFICANCE: System Interaction Evaluation

Flooding: Replacing the existing expansion joint with a rubber one will prevent any potential flooding.

Jet Spray: The same potential for jet spray due to failure of the metal expansion joint exists with a replacement rubber expansion joint.

Other Interactions: This area is not subject to high radiation levels so degradation due to this is not a concern.

Failure Consequences: The consequences are no greater than the failure of the existing metal expansion joint.

Impact to Safe Shutdown Capability: Loss of the "A" train diesel jacket water cooling source would result in loss of the diesel, which would have a substantial impact on safe shutdown capability. Failure of the replacement rubber expansion joint will have no more impact on safe shutdown than failure of the metal expansion joint. Safe shutdown capability would be accomplished by the redundant "B" train diesel.

1.5 ROOT CAUSE INVESTIGATION

Root Cause Description: The pitting is caused by a very low flow rate through the Monel bellows expansion joint. Also, there is a crevice formed between the bellows and the stub end which results in a stagnant area which further exacerbates the situation. The through wall leak is not located in an area where welding has been performed, and appears to be formed by a pit.

Other Systems Affected: There are no other systems affected by pitting caused by salt water.

1.6 AUGMENTED INSPECTION (must be completed within 15 days of flaw detection)

Assessment of Overall Degradation of the Affected System: Pitting has been a recurring problem with Monel bellows expansion joints in the Service Water system. To remedy this, Inconel 625 bellows expansion joints are being purchased for all but one safety related location, the containment recirculation (RSS) heat exchanger inlet and outlets. Engineering is evaluating the use of alternate materials for all locations. A visual inspection of the "B" train jacket water cooler outlet and both "A" and "B" train inlet expansion joints showed no signs of leakage.

The 4 RSS heat exchanger outlet expansion joints will be examined every six months. The most recent inspection of these joints (within the past month) has shown that in the areas examined, there are no pits greater than 20% of the wall thickness (Reference d). Past experience has shown that pitting on the outermost portion of the bellows can be detected with eddy current

and ultrasonic inspections. The expansion joints to the control building chillers have already been replaced with Inconel. All other expansion joints in the service water system are either (a) not exposed to sea water regularly; (b) in non-safety related portions of the system; or (c) presently being fabricated and will be installed no later than the next refuel outage.

Description of areas selected for augmented inspection: None.

2.0 STRESS ANALYSIS UNIT

2.1 DESIGN DETAILS

System: Service Water System - 3326

Component: 3SWP*EJ6C Expansion Joint

Piping Size & Schedule: 8" pipe size

Nominal Wall Thickness: Wall thickness of bellows 0.0188" nominal

Safety Code Class: Class 3

Material: Monel SB-127-400

Design Pressure: 100 psig

Design/Operating Temperature: 95°F

Code Minimum Wall Thickness: Not known

2.2 FLAW CHARACTERIZATION

Flaw Description/Size: (i.e., flaw size, adjacent wall thickness, single/multiple flaw, total area examined, etc.) Pin hole leak in bellows in the longitudinal seam weld. Also unidentified leakage from underneath both upper and lower collars.

Flaw Location: See above

Examination Method: Visual

Flaw Type: Local pitting

Reference UT Measurement Report: N/A

2.3 PRELIMINARY FLAW EVALUATION SUMMARY

Preliminary Operability Assessment Details:

Method Used: Engineering judgement based on low operating pressures and material ductility (see NCR 392-129 Dispositon Details)

Limiting Flaw Size: Leakage monitoring to track flaw growth

Period of Time to Reach Limiting Flaw Size: N/A

Evaluation Reference: N/A

2.4 END OF CYCLE FLAW EVALUATION SUMMARY

Final Operability Assessment Details:

Method Used: (i.e., LEFM, area reinforcement, wall thinning, ASME Code Case) N/A -- Metal joint will be replaced with rubber expansion joint, restoring full pressure boundary integrity.

Estimated Wall Erosion Rate: N/A

Projected Flaw Size: N/A

Period of Time to Permanent Repair/Replacement: Prior to the completion of the next scheduled refueling outage.

Provide a Discussion of Evaluation of Design Loading Conditions: See attached technical evaluation.

Evaluation Reference: See Section 2.8

Discussion of Augmented Inspection Results: See Section 1.6

Expanded Augmented Inspection Requirements: None

2.5 FLAW MONITORING

Walkdown Frequency: (for leak monitoring) Not required. Replacement joint is leak tight.

Frequency of Follow Up NDE: (for erosion rate assessment) N/A

2.6 ADDITIONAL COMMENTS (scope, limitations, and specific considerations)

The rubber expansion joint will be in service a maximum of two years. Maximum shelf life expended prior to installation is 12 months of a two to five year life, and overall service of life is

five to 10 years. An identical rubber joint was installed in the "B" EDG, 3SWP*EJ6D, via Relief Request letter B14004 dated December 18, 1991. The relief request was approved by a NRC letter dated April 7, 1992.

2.7 EXCEPTIONS TO GL 90-05/DRAFT ASME CODE CASE

The relief request is for installation of a rubber expansion joint in place of the original Monel 400 bellows. Relief is requested from the requirements of ASME XI IWA 7000.

2.8 REFERENCES/INPUTS

(a) S&W Calculation 12179-NP(B)-X6001, Revision 2

(b) S&W Calculation 17273.27-NP(B)-011-XD, Revision 0

(c) Memo MCE-CM-91-182 from R. Y. Schonenberg to S. V. Dumas, dated December 9, 1991

(d) Memo CTS-92-143 from R. C. Wittmer to B. W. Nichols dated April 1, 1992

SEISMIC/TECHNICAL ASSESSMENT FOR INSTALLATION OF NON-ASME CODE
8" RUBBER EXPANSION JOINT FOR 3SWP*EJ6C
MILLSTONE UNIT 3
NCR 392-129

REFERENCES

1. S&W Calculation 12179-NP([illegible]-X6001, Revision 2
2. S&W Calculation 17273.27[illegible]-011-XD, Revision 0
3. Memo MCE-CM-91-1[illegible]2 from [illegible]Schonenberg to S. V. Dumas, dated 12/09/91

BACKGROUND

The subject NCR identified a leak in the bellows of an 8" expansion joint, 3SWP*EJ6C, located on the service water discharge nozzle of the "A" train emergency diesel generator (EDG) jacket water cooler. The through wall leak (pin hole) is located in the bellows longitudinal seam weld. In addition to the through wall leak, there is weepage between both the upper and lower bellows and collars at unidentified locations.

DISCUSSION

The bellows are fabricated from thin walled (0.0189") Monel 400 and due to the leak locations, would necessitate expansion joint disassembly to perform an ASME Section XI Code repair. The expansion joint is isolable and accessible, however this type of weld repair in the field is impractical. The lead time to procure a suitable ASME Code qualified replacement is several months. Therefore, it is impractical to implement a Code repair/replacement for this expansion joint at this time. The use of a non-Code rubber expansion joint in place of 3SWP*EJ6C will be evaluated below.

EVALUATION

This seismic/technical assessment addresses the structural adequacy of the 8" rubber expansion joint to maintain the system structural integrity. Four rubber joints were initially procured from Power and Process Company under PO 936947, where one was installed in place of 3SWP*EJ6D in December 1991. This evaluation is for an identical rubber joint to be installed in place of 3SWP*EJ6C.

Details of the rubber expansion joint are as follows.

Supplier	Proco Products, Stockton, CA
Size	8" x 12" long
Material	Chlorobutyl (cover and tube)
Model	221
Design	Single, open arch
Allowable Deflections	Compression 11/16" (see note below) Lateral 1/2" Angular 5.5°

Spring Rates	Lateral 1506 lb/in Angular 12.7 ft lb/degree
Design Pressure	190 psig
Design Temperature	170°F
Durometer	55 ± 5
Date of Manufacture	July/August 1991
Shelf Life	2 - 5 years
Service Life	5 - 10 years

NOTE: Joint will be initially compressed approximately 1/4" to facilitate installation and tie rods will be installed to prohibit further axial deflection.

I. DESIGN CONDITION

The piping design conditions of 100 psig and 95°F are enveloped by expansion joint design conditions as shown above.

II. TIE RODS

The installation of this rubber expansion joint in the existing location for 3SWP*EJ6C will include adaptation of the existing joint's lap joint flanges to permit use of the original tie rod assemblies to resist pressure thrust loads, consistent with the current design basis.

III. STRUCTURAL EVALUATION

To determine the impact of the reduced joint stiffnesses on the piping system and related structures, the original Stone & Webster stress analysis (Reference 1) was modified to incorporate the rubber expansion joint design values. The results of this analysis are documented in the calculation of Reference 2, which concludes the piping and all related components, structures, and attachments continue to meet the original plant seismic design basis. The expansion joint deflections remain at or below the vendor supplied allowables, with the exception of total faulted lateral deflection. This movement exceeds the vendor allowable by 5%, and is considered acceptable for a 1 time faulted event. As the expansion joint design has a factor of safety of 20% minimum.

IV. MATERIAL EVALUATION

The replacement joint is fabricated from chlorobutyl rubber, with an expected service life of 5 to 10 years. The material is compatible with sea water service and the environmental conditions it will experience as documented in References 2 and 3.

SEISMIC/TECHNICAL ASSESSMENT FOR INSTALLATION OF NON-ASME CODE
8" RUBBER EXPANSION JOINT FOR 3SWP*EJ6C
MILLSTONE UNIT 3
NCR 392-129

V. INTERACTIONS

The decreased expansion joint stiffness results in increased piping movements in the vicinity of the expansion joint. A review of these movements indicates no adverse impact to the existing qualifications for attached small bore piping and instrument connections. Also, a walkdown of the area indicates no new potential seismic interaction or interference concerns are created by the revised displacements.

VI. HAZARDS EVALUATION

The non-Code bellows replacement will not adversely impact the existing hazards evaluation, as the system design conditions and the component location are unchanged. The service water system is classified as moderate energy, and the bellows will not change the postulated failure modes and effects. The existing hazards evaluation postulates cracks in the piping and evaluates the effects of flooding, spray wetting, and jet impingement. A full rupture of the bellows, while outside the design basis, would potentially result in a loss of the "A" diesel availability due to flooding. The 100% redundant "B" diesel would supply emergency power, if required.

CONCLUSION

Based on the above evaluation, the installation of the rubber expansion joint in place of 3SWP*EJ6C is acceptable from a structural integrity/seismic qualification standpoint.

PREPARED BY: Steven V. Dennis DATE: 4/27/92

REVIEWED BY: [signature] DATE: 4/27/92

APPROVED BY: Thomas DeLaura DATE: 4/28/92

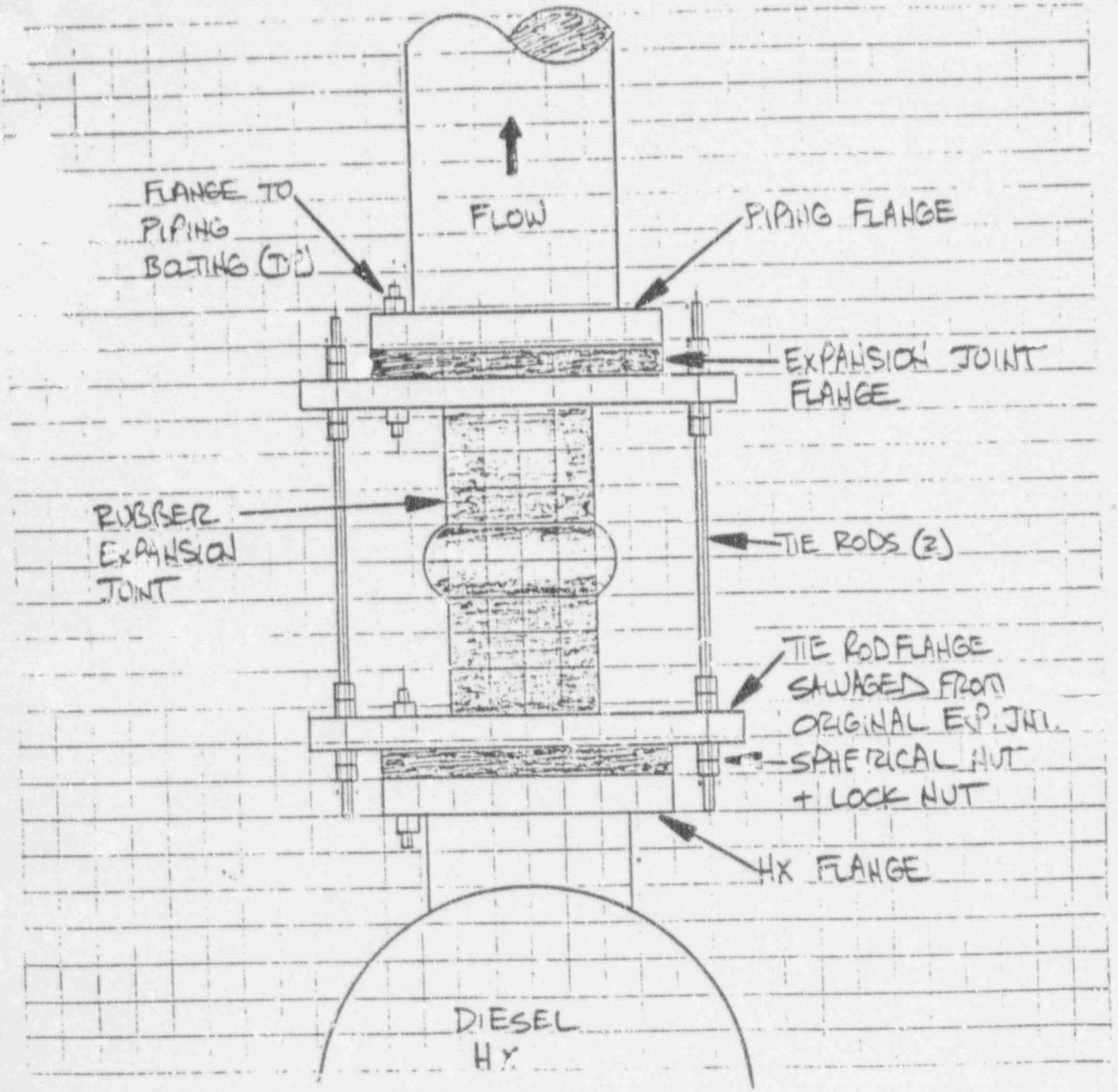
ED 1443 REV. 5-81

NORTHEAST UTILITIES SERVICE COMPANY

SUBJECT

BWH DATE 12/3/91

CHKD. BY DATE



3SWP*EJ6C

REPLACEMENT