

NORTHEAST UTILITIES



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

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March 26, 1993

Docket No. 50-336

B14425

Re: Technical Specification
3.4.10

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

Gentlemen:

Millstone Nuclear Power Station, Unit No. 2
Request for Enforcement Discretion
Reactor Coolant System - Structural Integrity
Limiting Condition for Operation

Introduction

Northeast Nuclear Energy Company (NNECO) hereby requests enforcement discretion associated with compliance with Millstone Unit No. 2 Technical Specification (TS) 3.4.10, Reactor Coolant System - Structural Integrity. This request is being made pursuant to the provisions of 10CFR2, Appendix C, Section VIII, "Exercise of Discretion." This enforcement discretion is necessary to afford NNECO sufficient time to effect a temporary repair to provide additional structural integrity to a section of service water supply piping which provides cooling to the 480-Volt Vital AC Switchgear Room. We believe that enforcement discretion is warranted in this case to avoid an unnecessary plant transient and the associated operational risk since the request involves minimal safety impact. We further believe it to be consistent with the health and safety of the public.

Background

On January 13, 1993, Millstone Unit No. 2 was phased to the grid to return to service following the steam generator replacement and refuel outage.

On January 25, 1993, a hydrostatic pressure test was performed on a section of the service water piping which supplies cooling water to the west 480-Volt Vital AC Switchgear Room Cooling Coils X-181A and 181B, in accordance with the requirements of Section XI of the ASME Boiler and Pressure Vessel Code. A flaw in a 2" Schedule 40 Copper-Nickel supply pipe to the cooling coil was discovered during the system hydrostatic test. The small weeping leak existed only at hydrostatic test pressure of 110 pounds per square inch gauge (psig).

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No leakage has been detected at normal system operating pressure of approximately 38 psig.

In a letter dated February 24, 1993,⁽¹⁾ NNECO requested relief from ASME Boiler and Pressure Vessel Code Section XI requirements pursuant to 10CFR50.55a(g)(6)(i), in response to Generic Letter (GL) 90-05. The attachment to that letter provided descriptions of actions taken by NNECO to make interim repairs to the leak in this piping as an alternative to an IWA-7000 replacement.

In a telephone conference between NRC Staff and NNECO personnel on March 22, 1993, the Staff expressed concern with certain aspects of the February 24, 1993, relief request. Subsequent discussions on the subject resulted in the Staff indicating that GL 90-05 was not applicable to this particular situation. Further, the Staff took the position that NNECO was not in compliance with the TS 3.4.10, Reactor Coolant System - Structural Integrity.

The subject 2" ASME Code Class 3 supply line is not leaking at normal operating pressure. The Staff's interpretation is that TS 3.4.10 applies to the subject service water line. It is NNECO's understanding that although the line is not leaking, the Staff considers the structural integrity to be in question as a result of the leakage discovered during the hydrostatic pressure test.

Attachment 1 provides a detailed review of NNECO's proposed alternative to the requirements of ASME Section XI IWA 4000/7000 in accordance with the requirements of 10CFR50.55a(3)(ii).

Requirements for Which Enforcement Discretion is Requested

While NNECO continues to evaluate the applicability and interpretation of TS 3.4.10 regarding this issue, we hereby request enforcement discretion associated with compliance with Millstone Unit No. 2 TS 3.4.10. This enforcement discretion is necessary to permit reactor operation for up to 7 days while NNECO designs, fabricates, and installs an "engineered clamp" to provide added assurance that the structural integrity of the subject service water supply line is maintained. This temporary repair sequence is expected to require approximately 7 days.

(1) J. F. Opeka letter to U.S. Nuclear Regulatory Commission, "Millstone Nuclear Power Station, Unit No. 2 Modification to Pipe Relief Request from ASME Code Section XI Requirements," dated February 24, 1993.

Discussion of Circumstances Surrounding the Situation/Need for Prompt Action/Why Situation Could Not Be Avoided

NNECO believes that our previous course of action to resolve this issue would have precluded the need to seek enforcement discretion. However, the Staff's anticipated denial of the February 24, 1993, GL 90-05 relief request has changed the planned course to resolve this issue. Our current understanding of the Staff's position, as communicated in several telephone conversations on March 24, 1993, results in the following sequence of events:

NNECO understands that since the issue is noncompliance with the corrective action requirements of IWA 5250 following a hydrostatic test, the provisions of GL 90-05 are not applicable and the February 24, 1993, relief request will be denied. At present, the appropriate code repair cannot be made on-line since it involves defect excavation and weld repair near sensitive turbine electric-hydraulic control equipment. Welding in this area has a high probability of causing electro-magnetic interference which could result in electronic signal perturbations sufficient to lead to a turbine trip. Therefore, attempting a code repair is not prudent.

Because the hydrostatic test results were not satisfactory, the Staff believes that structural integrity of the subject piping has not been demonstrated. Accordingly, the provisions of TS 3.4.10, Reactor Coolant System - Structural Integrity are believed not to be met.

As a result, NNECO requests enforcement discretion to allow sufficient time to effect an interim repair to provide added assurance of the structural integrity of the subject line.

Discussion of Compensatory Actions

In response to the hydrostatic pressure test leakage, NNECO performed an assessment using GL 90-05 accepted methodology to verify operability of this portion of the service water system. The results of this assessment were such that no compensatory measures are necessary and the system will perform its design requirements in a manner unchanged from original design.

Once the TS Limiting Condition for Operation potential noncompliance was identified, NNECO explored measures to resolve the situation. The applicable action statement for the noncompliance discusses restoring structural integrity or isolating it from service. Given that the structural integrity could not be easily improved, component isolation was the remaining alternative. NNECO initially considered this as a possible solution, but rejected it since we believed that isolation would decrease the measure of safety and would be contrary to our safety ethic. Additionally, NNECO had determined the component to be operable and no leakage existed at normal operating conditions.

During the period of time for which the enforcement discretion is in place, the joint containing the defect will be monitored a minimum of once per shift. Additionally, in the unlikely event that a leak should occur, operator action can be taken to isolate the leak (isolation valves are present, operators are capable of shutting the valves).

Safety Significance and Potential Consequences of Request

The purpose of this request is to provide a one-time approval for operation for 7 days with the subject 2" service water supply line in a degraded condition.

NNECO believes that the safety significance of this request is minimal. The potential consequence of this request is that it will afford NNECO the opportunity to effect an appropriate alternate repair (design and install an engineered clamp) to enhance the structural integrity of the service water system.

Details of the Safety Assessment are discussed later in the No Significant Hazards Consideration section of this letter.

Discussion Justifying the Duration of the Request

The proposed enforcement discretion is for one-time approval of reactor operation for up to 7 days with a potential loss of structural integrity in the 2" service water supply to the vital switchgear cooling coils. Continued operation is based on an operability assessment of the piping in a degraded state using the guidance of GL 90-05 and the draft ASME Code Case N-513. NNECO believes that the 7 days will provide sufficient time to install a temporary structural replacement (i.e., an engineered clamp). This clamp will meet the requirements of the draft ASME Code Case entitled, "Temporary Structural Replacement Requirements for Class 2 and 3 Piping."

Basis for No Significant Hazards Consideration

NNECO has concluded that the time period to design and install the engineered clamp for which there is potential for loss of structural integrity does not involve a significant hazards consideration (SHC) in that this request for enforcement discretion would not:

- (1) Involve a significant increase in the probability or consequences of any accident previously evaluated.

The potential for loss of structural integrity during the time period will not result in a significant increase in the probability or consequences of an accident previously evaluated in Chapter 14 of the Millstone Unit No. 2 Final Safety Analysis Report (FSAR) because there is reasonable assurance that the flaw will not progress during this time period to the point of catastrophic structural failure. An operability

assessment has been performed in accordance with the requirements of GL 90-05. This assessment indicates that the component will remain operable throughout the time period. As such, the weld defect does not involve a significant increase in the probability or consequences of any accidents previously evaluated.

- (2) Create the possibility of a new or different kind of accident.

The potential for loss of structural integrity during the time period does not create the possibility of a new or different kind of accident from any previously analyzed in Chapter 14 of the Millstone Unit No. 2 FSAR. There are no new credible failure modes introduced. The piping in its degraded state has been evaluated and demonstrated to remain operable for all design basis loading conditions, i.e., pressure, deadweight, thermal, and seismic. In addition, the area has been reviewed for potential wetting and flooding. This review determined that the spray shield will preclude wetting of adjacent components and that any leakage which develops will be contained and diverted with the cofferdam and drain system.

- (3) Involve a significant reduction in the margin of safety.

The potential for loss of structural integrity during the time period does not involve a significant reduction in the margin of safety. The piping in its degraded state has been evaluated and demonstrated to remain operable for all design basis loading conditions, i.e., pressure, deadweight, thermal, and seismic using the guidance of GL 90-05. As such, the defect in the weld does not involve a significant reduction in the margin of safety.

Basis for No Irreversible Environmental Consequences

The requested enforcement discretion has no environmental impact since the request, if approved, will allow Millstone Unit No. 2 to continue to operate throughout the time required to design and install an engineered clamp. Continued operation, given the no SHC determination, does not affect any accident analyses, the associated radiological consequences, nor the systems associated with the control of radiological or nonradiological effluents.

Summary

The Millstone Unit No. 2 Plant Operations Review Committee and Nuclear Review Board have approved this request for an enforcement discretion and concur with the above determinations.

We wish to emphasize our conclusions that this proposed request for enforcement discretion involves no undue safety risk nor irreversible environmental consequences. We are therefore requesting this action to allow continued plant operation as there is no safety issue threatening safe plant

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operation. Avoiding an unnecessary plant shutdown is in the best interest of the health and safety of the public, our customers, and shareholders.


We believe the above information provides a complete basis for approval of the requested enforcement discretion relief from TS 3.4.10. We will continue to keep you informed on matters relevant to this request.

Should the Staff require any additional information to respond to this request for enforcement discretion on an expedited basis, NNECO remains available to provide such information promptly.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

FOR: J. F. Opeka
Senior Vice President

BY: 
E. A. DeBarba
Vice President

cc: T. T. Martin, Region I Administrator
G. S. Vissing, NRC Project Manager, Millstone Unit No. 2
P. D. Swetland, Senior Resident Inspector, Millstone Unit Nos. 1, 2,
and 3

Mr. Kevin McCarthy, Director
Radiation Control Unit
Department of Environmental Protection
Hartford, Connecticut 06106

Attachment 1

Millstone Nuclear Power Station, Unit No. 2

Use of a Proposed Alternative to
ASME Section XI in Accordance with the
Requirements of 10CFR50.55a(3)(ii)

March 1993

NORTHEAST UTILITIES

USE OF A PROPOSED ALTERNATIVE TO ASME SECTION XI REQUIREMENTS

UNIT: Millstone Unit 2 NCR # 293-026 DATE: 1/25/93
TIME: 09:50

1.0 ORIGINATOR

1.1 DESCRIPTION OF FLAW

The flaw is in an area of lack of fusion between the socket welded tee and the weld. The flaw was detected during system hydrotest following recent system modification. A leak existed only at hydrostatic test pressure.

Piping/Component Drawing No.: 2"-HUD-130/25203-20135 Sheet 121

P&ID No.: 25203-26008

1.2 HARDSHIP/DIFFICULTY OF A CODE REPAIR

The flaw was detected while the plant was in operation. A Code repair will require welding in the west 480 switchgear room. Control systems within the room have sensitive electronics which could be adversely affected by electrical interference resulting from welding and may cause a turbine trip.

1.3 DESCRIPTION OF PROPOSED ALTERNATIVE

No throughwall leak exists while the system is at normal operating pressure. As a precautionary measure, however, an engineered clamp will be installed as a temporary replacement. The engineered clamp will meet the requirements of the draft ASME Code Case entitled "Temporary Structural Replacement Requirements for Class 2 and 3 Piping."

1.4 SAFETY SIGNIFICANCE: System Interaction Evaluation

Flooding: Location of the weld is within the confines of a cofferdam with adequate drainage capabilities.

Jet Spray: There is no spray currently and the type of defect would not lead to the increase in a leak path. However, a spray shield has been installed.

Loss of Flow: Existing procedures specify compensatory measures upon loss of cooling to the room.

Other Interactions: PEO rounds once per shift minimum within the room would identify a degrading condition.

Failure Consequences? None

Impact to Safe Shutdown Capability? None presently, current defect orientation and magnitude would minimize the potential for any impact. Installation of an encapsulation device will be considered to further enhance the ability to retain leakage.

NORTHEAST UTILITIES

USE OF A PROPOSED ALTERNATIVE TO ASME SECTION XI REQUIREMENTS

1.5 ROOT CAUSE INVESTIGATION

Root Cause Description: Lack of fusion between the weld and the socket welded tee.

Other Systems Affected: None

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

Assessment of overall degradation of the affected system:

Minimal to no effect. All other welds passed system hydrotest.

Additional examinations required (based on root cause) -- specify number of inspection locations -- also specify frequency of inspections: (ten most susceptible and accessible locations for high energy piping system and five for moderate energy piping system)

None

Description of areas selected for augmented inspection:

Only the specific weld in question.

Forward augmented inspection results to NUSCO Supervisor, Stress Analysis Engineering Unit when completed.

2.0 STRESS ANALYSIS UNIT

2.1 DESIGN DETAILS

System: Service Water Supply to Vital AC Switchgear Rooms Cooling Coils X-181A & 181B

Component: 2"-HUD-130

Piping Size & Schedule: 2" Schedule 40

Nominal Wall Thickness: 0.154"

Safety Code Class: Class 3

Material: SB466-706

Design Pressure: 100 psig

Design/Operating Temperature: 100°F/80°F

Code Minimum Wall Thickness: 0.014"

NORTHEAST UTILITIES

USE OF A PROPOSED ALTERNATIVE TO ASME SECTION XI REQUIREMENTS

2.2 FLAW CHARACTERIZATION

Flaw Description/Size: (i.e., flaw size, adjacent wall thickness, single/multiple flaw, total area examined, etc.)

The flaw is an area of lack of fusion between the socket weld tee and the weld. Leak exists only at hydrostatic test pressure. No leak was observed during normal operation.

Flaw Location: The small weeping leak is located at 3:00 looking north at weld W-1 of AWO M2-92-17685.

Examination Method: A small weeping leak (very low rate) was found only during the hydrostatic pressure test in accordance with ASME Section XI.

Flaw Type: Pinhole due to lack of weld fusion.

Reference UT Measurement Report: None. Defect located in recently made weld.

2.3 PRELIMINARY FLAW EVALUATION SUMMARY

Preliminary Operability Assessment Details:

Method Used: Technical evaluation attached to NCR.

Limiting Flaw Size: Not estimated. Flaw not expected to increase in size.

Period of Time to Reach Limiting Flaw Size: To be determined based on planned monitoring.

Evaluation Reference: NCR disposition.

2.4 END OF CYCLE FLAW EVALUATION SUMMARY

Final Operability Assessment Details:

Method Used: (i.e., LEFM, area reinforcement, wall thinning, ASME Code Case)

Area reinforcement per the Draft ASME Code Case.

Estimated Wall Erosion Rate: Flaw is assumed to be a pinhole since a leak exists only at hydrostatic test pressure. The flaw is caused by a lack of fusion between the socket welded tee and the weld. Erosion rate for 90 Cu - 10 Ni is negligible. No leak exists during normal system operation.

Projected Flaw Size: 1" diameter hole with nominal wall thickness. The flaw is qualified for design loads.

Period of Time to Permanent Repair/Replacement: The next outage that's planned for ten days or more.

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USE OF A PROPOSED ALTERNATIVE TO ASME SECTION XI REQUIREMENTS

Provide a Discussion of Evaluation of Design Loading Conditions:

Design loads qualified include deadweight, pressure, safe shutdown earthquake (SSE). Thermal loads are considered negligible as the pipe operating temperature is low (80°F).

Evaluation Reference: Calculation MP2-131-269-EM, Rev. 0

Discussion of Augmented Inspection Results: No augmented inspection was performed. Pinhole leak at weld is due to lack of fusion and is considered an isolated condition.

Expanded Augmented Inspection Requirements: None.

2.5 FLAW MONITORING

Walkdown Frequency: (for leak monitoring) The joint containing the defect will be monitored a minimum of once per shift.

Frequency of Follow-up NDE: (for erosion rate assessment)

Since the material is Cu-Ni and the weld is new, erosion rates are currently assumed to be negligible. UT measurements will be performed if leakage increases. Data to be evaluated by Stress Analysis.

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

None

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

Not applicable

2.8 REFERENCES/INPUTS

- o ASME B&PV Section III
 - 1971 Edition and Addenda to Summer 1973
 - 1974 Edition
- o ASME Draft Code Case N-513 entitled, "Evaluation Criteria for Acceptance of Flaws in Class 3 Piping"
- c GL 90-05 Issued June 15, 1990
- o ASME Draft Code Case entitled, "Temporary Structural Replacement Requirements for Class 2 and 3 Piping."
- o Calculation MP2-131-269-EM, Rev. 0
- o Drawings 25203-20135, Sheets 99 & 99H
25203-20135, Sheets 100 & 100H
25203-20135, Sheets 121 & 121H

cc: Originator, Supervisor, Stress Analysis Engineering Unit, Unit Director,
Nuclear Record

NONCONFORMANCE REPORT

SEE NEC 2.86 FOR INSTRUCTIONS

OPI5800 REV. 11-88

SUBJECT 2"-H2O-120 Supply to Final Switchgear cooling coils X-181A & X-181B

UNIT 2

NUMBER 293-026

COMPONENT LOCATION

EL

SYSTEM

WATER/STEAM

TWO 480V SWITCHGEAR RM 26'6"

223 2326 M

SOURCE DOCUMENT

12-92-12257

DESCRIPTION OF NONCONFORMANCE/CAUSE

- 1 A small weeping leak at 8:00 looking north of weld W-1 of AWO 12-92-17685 was found while hydrostatic pressure test was performed

ORIGINATOR

David M Perry David M Perry

DATE

1-25-93

DATE

1/25/93

ISSUED REPRESENTATIVE

E. Versace

DISPOSITION

☒ USE-AS-IS☐ REPAIR☐ INSTALL N.C. MATL☒ REWORK☐ RETURN☐ BORAY☐ ADMIN.☐ OTHER

DISPOSITION DETAILS

See Attachment

From

J. J. J.

n5352

To:

T. Mawson

x 3452

Telecopier

x 5431

ENGINEER

M. L. Lott David M Perry

DATE

1/27/93

SUPERVISOR

NO

DATE

UNIT SUPPLY, INSPECTOR ENGINEERING SUPPLY

DATE

EVALUATION REQUIRED?

☐ YES☐ NO

SUPERVISOR

DATE

AWO

REMARKS: INSPECTION/VERIFICATION

☐ SAT.☐ UNSAT.☐ N/A

NCR REVIEWED & CLOSED

DATE

ORIGINAL TO NUCLEAR RECORDS

COPY TO GED

DISPOSITION DETAILS
FOR NCR No. 221-0026

The supply and return piping to cooling coil X-181A and X-181B were modified slightly to permit fit-up of the new cool' g coils to the existing piping. The modifications were performed to ensure that no new piping loads were placed on the cooling coils. The modification is intended to help reduce future cooling coil tube leaks.

This NCR is dispositioned "USE-AS-IS" until the plant conditions permit the "REWORK" of the weld. The REWORK will permanently repair the weld. Justification for this disposition is as follows:

USE-AS-IS

The supply piping (2"-HUD-130) to cooling coil X-181B (lower coil) developed a small weeping leak when the system hydrostatic pressure test was performed. All other joints meet the requirements of the hydrostatic pressure test. The small weeping leak is located at 3:00, looking north at weld W-1 of AWO M2-92-17685 (see attached weld map).

At the hydrostatic test pressure of 110 psig, the leak did not spray any water. The water wept from the weld at a very low rate. The water seeping from the pinhole drips onto the floor inside of the cooling coil water cofferdam.

During the recent LOCK test the maximum pressure at the 6" branch connection to the cooling coils was approximately 65 psig. The connection is located at approximately elevation 17'. The leak is located approximately 20' above the 6" take-off. The 20' of elevation difference and normal line losses (i.e. pipe friction, throttled valve(s)) will reduce the pressure at the leak. With these losses, the pressure at the leak will be approximately half of the hydrostatic test pressure. Therefore, under operational pressure no leakage is expected.

During the hydrostatic pressure test the leak did not spray any water. If the leak were to enlarge and start to spray, it would be directed towards the cooling coils and air plenum and not towards any electrical equipment. Operation personnel walkdown the switchgear room at least once a shift. If the leak was to become worse, operation personnel would become aware of the condition and notify maintenance personnel. If the leak was to start spraying water a spray shield and/or a soft patch, would be installed to ensure that no vital equipment could be sprayed.

It should be noted that welding in the west 480V switchgear room is not recommended, while the plant is operational. Steam Turbine EHC control cabinets are located in the switchgear room. The EHC control system could be adversely affected if welding is performed in the room while the plant is operational.

DISPOSITION DETAILS
FOR MCF No. 211-9926REWORK

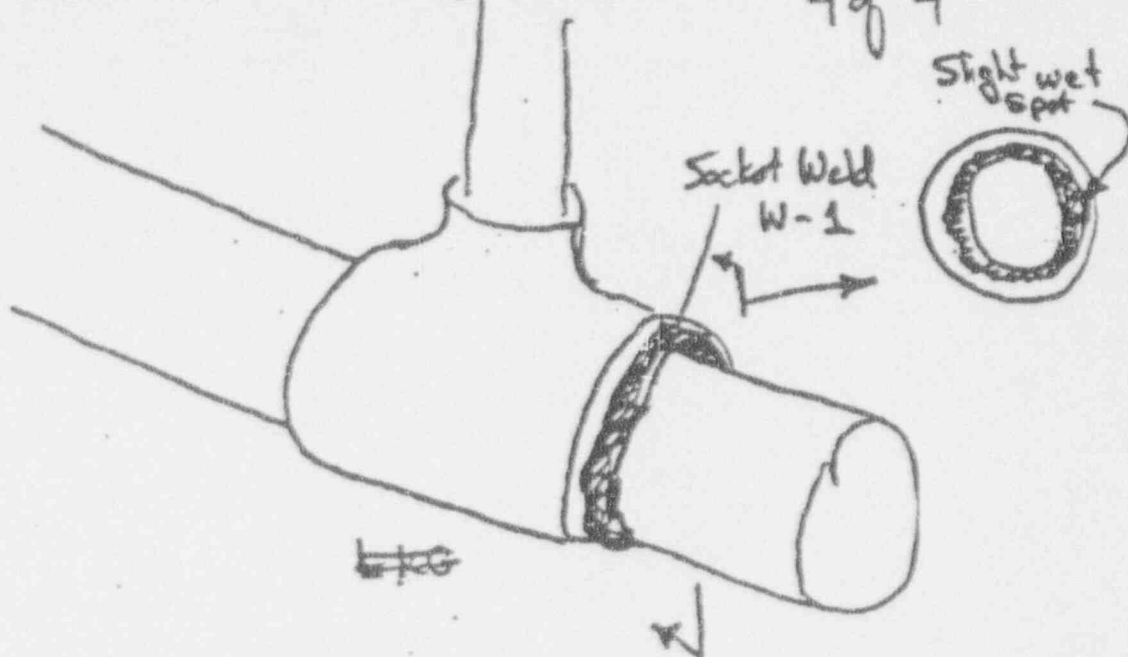
AWO M2-93-01582 has been written to rework the leak at the next available opportunity (i.e. plant non-operational). The joint will be repaired in accordance with ASME Section XI and the following steps;

- The weld in the area of the leak will be excavated and if necessary the entire weld will be removed.
- The excavated area will be LP inspected, to ensure solid base metal is present.
- The weld will be repaired in accordance with the WUSCO weld manual.
- The weld will be visually inspected per CWS-004.
- Once the weld is reworked the pipe will be hydrostatic pressure tested in accordance with SP-21219.

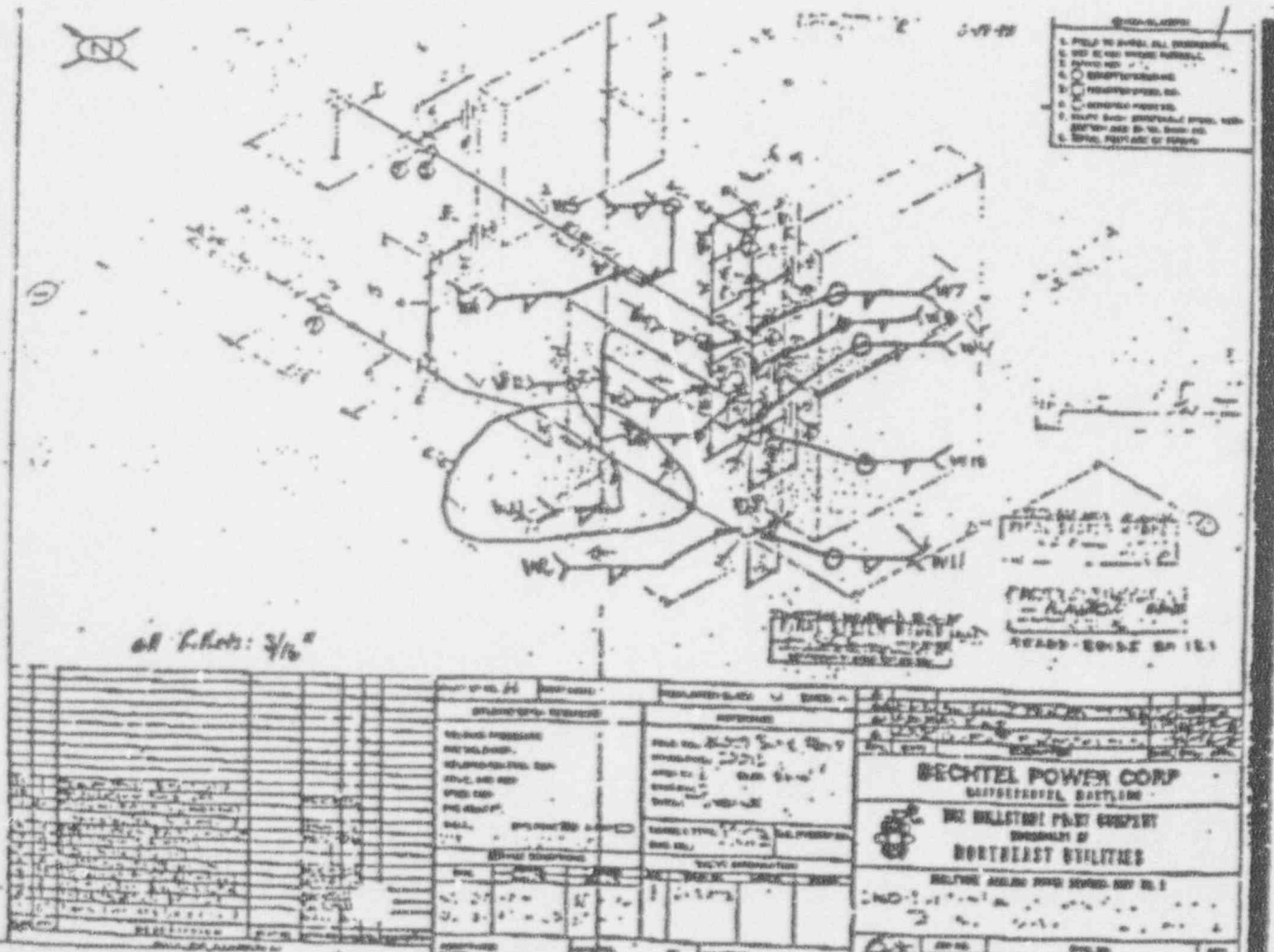
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Calc # MP2-131-269-EM Rev. D

4 of 4



AWO M2-92-17685
weld Map



REF: RRM 90-015

ISI 92-47

Case N-XXX Temporary Structural Replacement Requirements for
Class 2 and 3 Piping Section XI, Division 1

Inquiry: What alternatives to the rules of IWA 4000 may be used for the temporary replacement of Class 2 and 3 piping using engineered mechanical clamping devices?

Reply: It is the opinion of the Committee that the following alternative rules may be used for temporary replacement of Class 2 and 3 piping, NPS 6 and smaller, instead of rules of IWA-4000.

1.0 Scope

- 1.1 Piping (pipes, tubes, fittings, and flanges) may be temporarily replaced using the rules of this Case.
- 1.2 This Case may not be used for piping larger than NPS 2 when the nominal operating temperature or pressure exceed 200F or 275psi.
- 1.3 These rules are also applicable to welding ends of pumps, valves, and pressure vessels. Temporary replacement at other locations in pumps, valves, and pressure vessels is excluded.
- 1.4 These rules do not apply to sealants, lubricants, O-rings, or gasket material.
- 1.5 The temporary replacement in accordance with this Case may remain in service only until the next refueling outage, at which time the defect shall be repaired or replaced in accordance with IWA-4000.¹¹¹

2.0 Repair/Replacement Plan

A Repair/Replacement Plan shall be developed in accordance with IWA-4140(b). Additionally, this plan shall identify the following:

- a. Defect characterization method
- b. Design requirements
- c. Monitoring requirements
- d. Safety precautions

3.0 Authorized Inspection Agency

The services of an Authorized Inspection Agency shall be used. The Owner shall notify the Authorized Inspection Agency prior to starting replacement and keep the Inspector informed of the progress so that necessary inspections may be performed.

¹¹¹ The references in this Code Case are in accordance with Section XI 1989 Edition with 1991 Addenda.

IST 92-47

4.6 Defect Characterization

The defect size and location and the apparent cause shall be determined. The defect size shall be suitably bounded to account for nondestructive examination uncertainties and limitations. If the defect size cannot be directly determined, a conservative bound of the actual defect size shall be made and documented.

5.0 Design Requirements

5.1 General Design Requirements. The following general design requirements shall be included in a Repair/Replacement Plan and shall be considered in the analysis of the clamping device and piping:

- a. Environmental and corrosive effects of sealant composition on pipe, clamp, and bolts shall be considered. and system fluid
- b. The defect size used in the design of the temporary replacement shall include any projected growth anticipated from installation until the defect will be repaired.
- c. Clamp components, except those identified in paragraph d below, shall be considered pressure retaining.
- d. If additional supports are required to satisfy 5.1, 5.2, or 5.3, they may be considered non-pressure retaining items and shall be designed in accordance with the requirements of the Construction Code for the system or as permitted by IWA-4170 (c) or (d).

5.2 Clamping Device. The following special requirements apply to the design of the temporary clamping device:

- a. No credit shall be taken for structural capability of the sealant.
- b. Pressure retaining clamp device items shall meet the requirements of NC-3200 with the exception of reference to NC-5000.
- c. Stresses induced by pressure, assuming postulated full circumferential severance of the pipe at the flaw location, using nominal system operating conditions, shall comply with Level A Service Limits of Section III.
- d. The replacement device may be integrally or mechanically connected to the pipe. Serrated contact surfaces of the replacement device are acceptable provided they do not affect structural integrity of the pipe.
- e. A factor of safety of 5 shall be applied to the friction load transfer capability of the friction connection, but should not be applied to the structural design of the friction connection.

ISI 72-47

e. - continued

If a coefficient of friction greater than 0.3 is used for friction type connections, the clamping device shall have an experimentally determined coefficient of friction for each interface design (e.g., serrated or non-serrated) and each combination of interface material P-numbers.

5.3 Piping system. The following special requirements apply to the design of the piping system:

- a. If vibration is the apparent cause of the defect or the defect can be propagated by vibration, the piping system vibration shall be considered.
- b. The temporary piping system configuration shall be analyzed in accordance with the Owner's requirements, and either the Construction Code or Section III.
- c. The effects of the stiffness and weight of the clamping device shall be considered in the analysis of the piping system. When the defect is caused by erosion or corrosion, the base material thickness at the load transfer area shall be determined and projected to the time the defect will be repaired. The projected wall thickness shall be used when evaluating the piping system.
- d. The constraining effects of the clamping device shall be considered when evaluating the effects of thermal expansion of the piping system.

6.0 Material Requirements

- 6.1 Materials used for pressure retaining items of the temporary replacement device shall be permitted by Section III, or a Section III Code Case, for use as a Class 2 pressure boundary material.

Pressure retaining material for the clamping device shall meet the requirements of NC-2000, except NC-2600, and shall be certified as required by NCA-3867.4. All other requirements of NCA-3800 do not apply.

- 6.2 If additional supports are required to satisfy 5.0, the materials shall meet the requirements of the Construction Code for the system, or as permitted by IWA-4170(c) or (d).

7.0 Fabrication and Installation Requirements

Welding performed as part of the fabrication and installation of the clamp shall be accomplished in accordance with the requirements of IWA-4000 under the Owner's Repair/Replacement Program. An ANII shall be used. Welding shall be documented on an NIS-2 Form. Code symbol stamping is neither required nor prohibited.