Northeast
Utilities System

107 Selden Street, Berlin, CT 06037

Northeast Utilities Service Company
P.O. Box 270
Hartford, CT 06141-0270
(203) 665-5000

September 14, 1994

Docket No. 50-423
B14977

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

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

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

The purpose of this letter is to request, consistent with the intent of NRC Generic Letter (GL) 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 on a leak in the service water system piping line 3SWP-150-072-3 (return line for the high head safety injection/ service water heat exchanger) as an alternative to an IWA-4000/7000 repair/replacement.

Consistent with the provisions of GL 90-05, NNECO is submitting this relief request for a temporary noncode repair prior to performing a code repair. The Resident Inspector at Millstone Unit No. 3 has been informed of this course of action and, as has been our practice, we will keep the Resident Inspector fully informed of all future repairs and/or activities. Permanent code repair for this flaw is scheduled for the next refueling outage, expected to begin in April 1995.

Please contact us if you have any questions.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

FOR: J. F. Opeka
Executive Vice President

200043

BY: _____
S. E. Scace
Vice President

cc: See Page 2

A001
1/1

083422 REV. 1-94

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

Docket No. 50-423
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Attachment 1

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

September 1994

NORTHEAST UTILITIES

TRACKING FORM

FOR RELIEF REQUEST FROM ASME SECTION XI REQUIREMENTS

MUST BE COMPLETED AND FILED WITH NRC WITHIN 30 CALENDAR DAYS

UNIT: MILLSTONE UNIT 3 **NCR#** 394-106 **DATE:** 08/15/94

TIME: 2230

1.0 ORIGINATOR

Processing Time: should not exceed 24 hours.

1.1 COMPLETE SECTION 1 OF ENCLOSED FORM

Complete

1.2 NOTIFY RESIDENT NRC INSPECTOR

Person Contacted: Russ Arrighi Date: 8/16/94

1.3 FORWARD THIS FORM, NCR AND NDE MEASUREMENTS TO NUSCO SUPERVISOR, DESIGN ENGINEERING MECHANICAL

Originator: Gary Swider Date: 8/16/94

##########

2.0 DESIGN ENGINEERING MECHANICAL

Date Received: 8/15/94

Processing Time: 72 hours from flaw detection for preliminary operability assessment.

25 calendar days from flaw detection for final operability assessment.

2.1 PRELIMINARY FLAW EVALUATION

Evaluation Completed By: R. E. DeConto Date: 8/16/94

Notify Plant

Person Contacted : Gary Swider Date: 8/16/94

NORTHEAST UTILITIES

TRACKING FORM

FOR RELIEF REQUEST FROM ASME SECTION XI REQUIREMENTS

2.2 END OF CYCLE FLAW EVALUATION

Evaluation Completed By: Ray DeConto Date: 9/06/94

2.3 REVIEW RESULTS OF AUGMENTED INSPECTION

Completed By: Ray DeConto Date: 9/06/94

If additional inspections are required, notify plant.

No additional inspections are required.

2.4 FORWARD COMPLETED FORM TO NUCLEAR LICENSING

DESIGN ENGINEERING MECHANICAL:

C.J. Ashton Date : 9/06/94

C. J. Ashton

##########

3.0 NUCLEAR LICENSING

Processing Time: should not exceed 30 calendar days from flaw detection.

3.1 RELIEF REQUEST SUBMITTED

By: P.G. Patton Date: 9/14/94

Docket No. 50-423

NORTHEAST UTILITIES

FORM FOR RELIEF REQUEST FROM ASME SECTION XI REQUIREMENTS

UNIT: Millstone Unit 3 NCR # 394-106 DATE: 8/15/94

TIME: 2230

1.0 ORIGINATOR

1.1 DESCRIPTION OF FLAW

A pinhole leak located @ 4 o'clock downstream of a short radius 90°elbow on line 3SWP-150-072-3 (return line for the high head safety injection / service water heat exchanger) local to FW-22.

Piping/Component Drawing No.: CI-CCI-E1A

PI&D No.: EM-133B

1.2 IMPRACTICALITY OF PERMANENT REPAIR

Repair cannot be completed in 72 hour LCO due to piping configuration/ location.

1.3 DESCRIPTION OF PROPOSED TEMPORARY REPAIR

Installation of soft rubber patch weighing less than ½ pounds.

1.4 SAFETY SIGNIFICANCE: System Interaction Evaluation

Flooding: Pinhole leak at this time. Floor drains are adequate for drainage.

Jet Spray: Leak sprays will not affect any safety-related power supplies and patch will prevent spray from reaching the high pressure safety injection pump.

Loss of Flow: Temporary patch will prevent loss of flow.

Other Interactions: None

Failure Consequences? Can be isolated.

Impact to Safe Shutdown Capability? Total failure could be isolated; however it would result in loss of one train high head safety injection (SIH). The redundant train would enable safe shutdown.

1.5 ROOT CAUSE INVESTIGATION

Root Cause Description: Classic wall loss of solid 90/10 cu-ni piping caused by turbulent flow downstream of a short radius elbow with localized high flow velocities.

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: Leak is typical of erosion/corrosion in SWP 90-10 cu-ni piping. These leaks do not result from large areas of damage but from very localized wall loss. An inspection and modification program has been initiated for small bore piping. The modification program targets piping configurations which have been found to be susceptible to erosion / corrosion.

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

Five additional locations were chosen, as listed below:

a) FW-35 (3SWP-150-072-3)
b) FW-24 (3SWP-150-072-3)
c) FW-54 (3SWP-150-072-3)
d) FW-41 (3SWP-150-064-3)
e) FW-2-1(3SWP-150-103-3)

Description of areas selected for augmented inspection: Small bore piping of similar configuration.

2.0 STRESS ANALYSIS UNIT

2.1 DESIGN DETAILS

System: High head safety injection / service water heat exchanger

Component: Return line (near FW-22)

Piping Size & Schedule: 1.5" / 0.150"

Nominal Wall Thickness: 0.150"

Safety Code Class: Class 3

Material: SB 466 No. 706

Design Pressure: 100 psig

Design/Operating Temperature: 95 / 33°F

Code Minimum Wall Thickness: 0.011"

2.2 FLAW CHARACTERIZATION

Flaw Description/Size: (i.e., flaw size, adjacent wall thickness, single/multiple flaw, total area examined, etc.) The flaw is highly localized. The through wall portion of the flaw is 1/8" in diameter and the adjacent wall/average wall beyond the flaw is 0.120".

Flaw Location: The flaw is located downstream of FW-22.

Method of Examination: UT

Flaw Type: Pinhole due to erosion/corrosion

Referenced UT Measurement Report: Attached to NCR 394-106

2.3 PRELIMINARY FLAW EVALUATION SUMMARY

Preliminary Operability Assessment Details:

Method Used: Draft Code Case N513 (dated 8/13/92)

Limiting Flaw Size: Total flaw 1.90". Through wall portion of flaw 0.95"/ Minimum average wall thickness outside of the flaw must be at least 0.104 inches.

Period of Time to Reach Limiting Flaw Size: Approximately 9 months.

Evaluation Reference: Memo MP3-DE-94-185

2.4 END OF CYCLE FLAW EVALUATION SUMMARY

Final Operability assessment Details:

Method Used: Draft Code Case N513 (dated 8/13/92)

Estimated Erosion Rate: 0.017 in / yr

Projected Flaw Size: Total projected flaw size is .50 in, total projected through wall portion is 0.375".

Period of Time to Permanent Repair/Replacement: Permanent repair for this flaw is scheduled for the next refueling outage (scheduled to begin on 4/29/95)

2.4 END OF CYCLE FLAW EVALUATION SUMMARY (cont'd)

Provide a Discussion of Evaluation of Design Loading Conditions:

Loading conditions evaluated include: pressure, deadload, thermal and seismic. All Code stress equations were considered and were determined to be acceptable.

Evaluation Reference: Memo MP3-DE-94-185

Discussion of Augmented Inspection Results:

Five additional inspections of susceptible components were performed. These five inspections resulted in the generation of one additional NCR due to wall thinning. The wall thinning described in the NCR 394-122 was determined to be acceptable in Memo MP3-DE-94-184.

2.5 FLAW MONITORING

Walkdown Frequency: (for leak monitoring)

At least once per shift.

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

At least once every three months.

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

None

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

The evaluations were performed in accordance with GL 90-05 and the Draft Code Case N513 (dated 8/13/92)

2.8 REFERENCES / INPUTS

NCRs 393-106, and 122
Memos MP3-E-93-412 and MP3-DE-94-184

cc: Originator, Supervisor - Design Engineering Mechanical, Department Director, Nuclear Records

3SWP-150-072-3

Objective: The objective of this evaluation is to qualify a pin hole leak in line 3SWP-150-072-3 as described in NCR 394-106 for structural integrity. This evaluation qualifies the piping through May 15, 1995.

Parameters: The following parameters will be applied in this evaluation (Reference 1):

Pipe Size Nominal	Outside Dia. (in)	Schedule	Wall thick (in)	Design Pressure (psi)	Temp (F)	Material	Allowable Sh (psi)
1.5"	1.900	nonstd	0.150	100	95	SB466 706	8700

1.0 SCOPE

This evaluation is applicable to:

a) Class 3 Section III Subsection ND piping
b) Operating conditions <200F, < 275 psig
c) Pipe, tube, fittings and flanges - NO WELDING
d) Structural integrity only. This does not demonstrate system operability.
e) t-adj is used throughout this calculation. t-adj is always the predicted t-adj.

3.0 FLAW EVALUATION

This evaluation is applicable to non-planar (through wall holes) and is performed in accordance with Generic Letter 90-05 and DRAFT Code Case N513 (8/13/92) (Reference 3).

3.1 tmin and t-adj Determination

a) Determine tm per construction code (Reference 2).

tm = P * Do / (2 * (SE + Py)) + A

P = presssure, psig
Do = outside diameter, in
S = stress allowable, psi
E = joint efficiency = 1.00
y = a coefficient = 0.4
A = additional thickness (corrosion allowance, threading, etc...)
= 0 for this analysis

Outside Dia. (in)	tm (in)	tmeas minimum (in)	Instrument + Calibrate Tolerance (in)	(Ref. 6) Years of Service (yrs)	Wear Rate (in/yr)	Remaining Life Required (yrs)	tadj (1) (in)
1.900	0.0109	0.120	0.003	9.09	0.0165	0.750	0.1046

Note 1) The t-adj value is the predicted remaining wall for the remaining life shown.
Note 2) The component considered in this evaluation has been inservice since July 15, 1985.
Note 3) The measured data is per Reference 5.

PART 1 continued

3.2 Branch reinforcement Evaluation Method (Reference 2)

a) tadj must be greater than 2*tm

Pipe Size Nominal	tadj	2*tm	
1.5"	0.1046	0.0217	acceptable

b) The postulated circular diameter, d, shall not exceed the pipe nominal outside diameter.

Pipe Size Nominal	d Outside Dia. (in)	Maximum Allow Flaw Length (in)	Predicted Total Flaw Circ Length (in)	
1.5"	1.900	1.900	1.90	Predicted flaw is set equal to 1.90 inches. OK

The following branch connection reinforcement calculation is performed in accordance with ND 3643.3 (Reference 2).

Required reinforcement area = 1.07*tmh*d1

A1 = area provided by excess wall in the pipe = d2*(Th – tmh)

The mill tolerance on Th is ignored since UT is available.

Note: d2 has been set equal to the maximum allowable hole size.

Pipe Size Nominal	tmh (in)	d1 (in)	d2 (in)	tadj	Required Reinforce Area, in ^ 2	Excess Pipe Area A1, in ^ 2	
1.5"	0.0109	1.90	1.90	0.1046	0.022	0.178	OK

c) Determination of unreinforced branch connection stresses per ND 3650

Pipe Size Nominal	tadj	Rmadj	h	t–adj SIF	SIF Per Figure NC3672.9	tnom SLP (psi)	tadj SLP (psi)
1.5"	0.105	0.90	0.117	3.772	2.1	317	682

Note: 1) The initial minimum wall thickness for pressure is: 0.085 in

2) The minimum wall thickness for pressure calculations is: 0.070 in

Pipe Size Nominal	tadj	Rmadj	tnom Section Modulus (in ^ 3)	t–adj Section Modulus (in ^ 3)
1.5"	0.105	0.90	0.335	0.251

PART 1 continued

The following table presents both the tnom & t–adj corrected Code stress equations:

Equation	Point Number	tnom Stress (psi)	t–adj Stress (psi)	Allowable Stress (psi)	t–adj Factor of Safety	
8 Sustained	165	1114	2591	8700	3.36	OK
9 Norm/Up Occasional	170	4385	10424	10440	1.00	OK
10 Thermal	170	205	491	13050	26.59	OK
11 Sus + Th	165 / 170	1196	3082	21750	7.06	OK
9 Faulted Occasional	170	5495	13081	20880	1.60	OK

d) An additional limitation is placed on the through wall portion of the maximum hole size. The through wall portion of the crack may not exceed d/2 or 5 inches.

tm	0.011 in
Additional Predicted Wall Thinning	0.012 in
Minimum Wall Required To Prevent Expansion of the Through Wall Flaw	0.023 in

Measured Through Wall Portion of Flaw	1/16 in	
Maximum Allowed Through Wall Portion of Flaw (lesser of d/2 or 5 inches)	0.950 in	
Predicted Through Wall Portion of Flaw (1)	0.375 in	OK

Note: 1) This value includes a .25 inch tolerance.

References:

1) S&W Stress Calculation 12179–NP(B)–687–XD, Revision 5, CCN 1 (Job 9494, dtd 6/16/93)
2) ASME Section III 1971 Edition through the 1973 Summer Addenda
3) ASME Draft Code Case N513 (8/13/92) and GL 90–05
4) NCR 394–106
5) Attached UT data
6) Memo MP3–E–93–412 G. Swider, to: R. DeConto, dated June 14, 1993

Computer Storage: c:\123r3\90–05.bem\94106.wk3

Prepared By: R. E. DeConto Date: 9/6/94
R. E. DeConto

Reviewed By: Mary Louise Urick Date: 9/6/94
M. Urick

EROSION/CORROSION ULTRASONIC CALIBRATION DATA SHEET

SYSTEM	COMPONENT DESCRIPTION	COMPONENT IDENTIFICATION
3326	Horizontal STR Pipe	3SWP3326

AWO NUMBER: M3-94-14581

EXAMINATION PURPOSE: INITIAL ☒ REINSPECTION ☐ BASELINE ☐ MAP ☒ VERIFICATION ☐

EXAMINATION TYPE: GRID INTERSECTS ☒ SCAN BETWEEN GRIDS ☒ SCAN ONLY ☐

PHOTO DISK: N/A FRAME: N/A

LINE NUMBER	DIAMETER	T_{nom}	.875 of T_{nom}
3SWP1501-72-3 3SWP3326-4	1 1/2	.156	.137

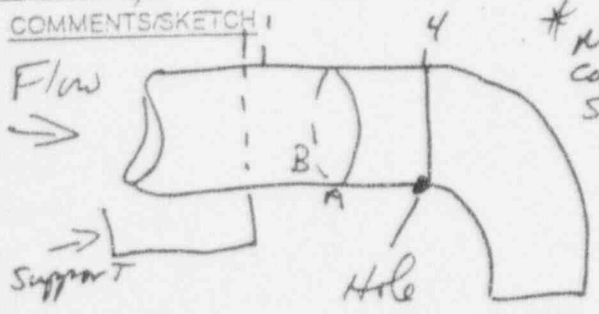
GRID MATRIX PARAMETER	COMP. I.D. / EXT.	COMP. I.D. / MAIN SECTION	COMP. I.D. / EXT.	COMP. I.D. / EXT.	COMP. I.D. / BRANCH	GRID SIZE
A, -F4	N/A / X	3SWP333 / A, -F4	N/A / X	N/A / X	N/A / X	1"

COMPONENT TEMPERATURE >125°F ☒ No ☐ Yes TEMP: N/A

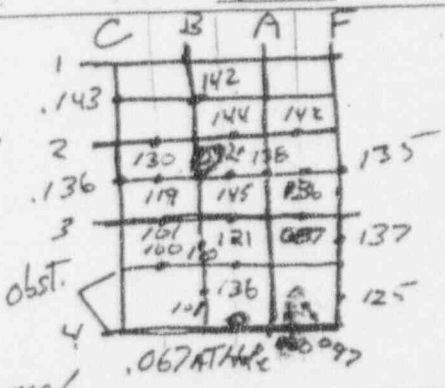
SURFACE PAINTED ☐ UNPAINTED ☒

AVG. COATING THICKNESS: N/A X 3mil = N/A mil (COATING FACTOR)

COMMENTS/SKETCH:



* No Readings caused By Support obstruction.



GRID SPACING: 1/2" For MAT

INSTRUMENT TOLERANCE: .001" CALIBRATION TOLERANCE: .002

INSTRUMENT MFG/MODEL#: Panametric 26DL PLUS SN: 9/034208

CAL STANDARD(S) SN: CRI SN: CRIA Provided By Eng MATL: Copper Nickle

TRANSDUCER MFG. Panametric SN: 59321 SIZE: .312" FREQUENCY: 5MHz TYPE: Dual

COUPLANT BATCH #: 092101 MRIR#: 492-205-1

CAL. STANDARD THICKNESS		INSTRUMENT READING		CALIBRATION CHECKS	
MIN.	MAX.	MIN.	MAX.		
.079"	.212"	.079"	.212"	Initial Cal.	1403
				Intermediate Cal.	
N/A		N/A		Intermediate Cal.	N/A
				Intermediate Cal.	
				Intermediate Cal.	
.079"	.212"	.080"	.214"	Final Cal.	1457

GRID AND DATA VERIFIED AS CORRECT

EXAMINER: [signature] LEVEL: II DATE: 8-16-94

REVIEWER: [signature] LEVEL: DATE: 8-16-94

Stds mic'd with Q.A. 0"-1" O.D. Mic 5285

Main Section (0)

Rows : 4 Cols : 6 Direction : Clockwise Offset : 0

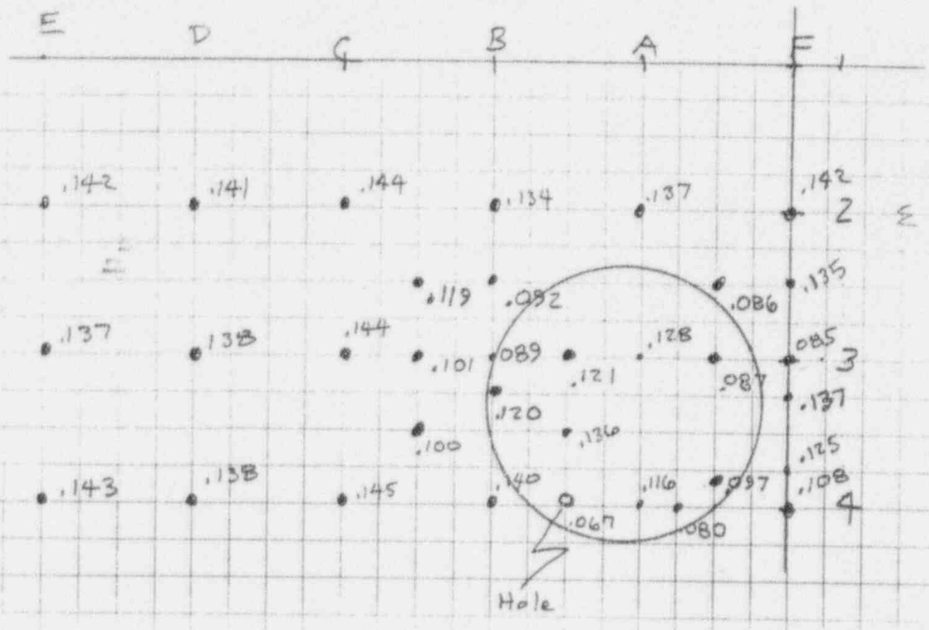
	A	B	C	D	E	F	RowMx	RowMn	Delta	Ave
1	0.139	0.145	0.146	0.141	0.145	0.141	0.146	0.139	0.007	0.143
2	0.137	0.134	0.144	0.141	0.142	0.142	0.144	0.134	0.010	0.140
3	0.128	0.089	0.144	0.138	0.137	0.085	0.144	0.085	0.059	0.120
4	0.116	0.140	0.145	0.138	0.143	0.108	0.145	0.108	0.037	0.132

	A	B	C	D	E	F
ColMx	0.139	0.145	0.146	0.141	0.145	0.142
ColMn	0.116	0.089	0.144	0.138	0.137	0.085
Delta	0.023	0.056	0.002	0.003	0.008	0.057
Ave	0.130	0.127	0.145	0.140	0.142	0.119

Section Summary

Maximum Reading = 0.146 (1, C) Average = 0.134
Minimum Reading = 0.085 (3, F) Standard Deviation = 0.017
Total Readings = 24

1


E
D
C
B
A
F
.142
.141
.144
.134
.137
.142
2
.119
.092
.086
.135
.137
.138
.144
.101
089
.128
085
3
.121
.087
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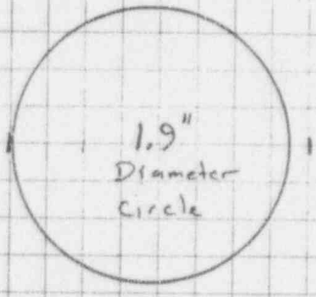
.097
.108
4
.067
.080
Hole


1.9"
Diameter
Circle

	A	A.5	B	B.5	C	C.5	D	D.5	E	E.5	F	F.5	AVERAGE
2	0.137	0.136	0.134	0.139	0.144	0.143	0.141	0.142	0.142	0.142	0.142	0.140	0.1400
2.5			0.092	0.119	0.144	0.142	0.140	0.140	0.140	0.137	0.135	0.086	0.1274
3			0.089	0.101	0.144	0.141	0.138	0.138	0.137	0.111	0.085		0.1204
3.5				0.100	0.145	0.141	0.138	0.139	0.140	0.136	0.131		0.1336
4			0.140	0.143	0.145	0.142	0.138	0.141	0.143	0.126	0.108		0.1360