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

General Offices • Selden Street, Berlin, Connecticut

P.O. BOX 270
HARTFORD, CONNECTICUT 06141-0270
(203) 665-5000

June 11, 1993

Docket No. 50-423
B14506

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 accordance with 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 the Northeast Nuclear Energy Company (NNECO) to make interim repairs to a leak in the service water system piping line 3SWP-150-104-3 as an alternative to an IWA-7000 replacement.

Consistent with the provisions of the GL, NNECO is submitting this relief request for a temporary noncode repair. Code repair of the degraded piping is planned for the next refueling outage expected to begin in July 1993. The Resident Inspector at Millstone Unit No. 3 has been informed of this repair and, as has been our practice, we will keep the Resident Inspector fully informed of all future repairs.

Please contact us if you have any questions.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

FOR: J. F. Opeka
Executive Vice President

BY: _____
W. D. Romberg
Vice President

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

A047 1/1

Docket No. 50-423
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Attachment 1

Millstone Unit No. 3
Relief Request From ASME Code Section XI Requirements

June 1993

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# 393-052 DATE: 05/14/93

TIME: 1440

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: Doug Dempsey Date: 5/14/93

1.3 FORWARD THIS FORM, NCR AND NDE MEASUREMENTS TO NUSCO SUPERVISOR, STRESS ANALYSIS ENGINEERING SECTION

Originator: Gary Swider Date: 5/14/93

##########

2.0 STRESS ANALYSIS SECTION Date Received: 5/14/93

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: Ray DeConto / T. J. Mawson Date: 5/17/93

Notify Plant

Person Contacted : Gary Swider Date: 5/17/93

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: 6/08/93

2.3 REVIEW RESULTS OF AUGMENTED INSPECTION

Completed By: Ray DeConto Date: 6/08/93

If additional inspections are required, notify plant.

No additional inspections are required.

2.4 FORWARD COMPLETED FORM TO NUCLEAR LICENSING

Supervisor, Stress Analysis Section:

R E DeConto for TJM
T. J. Mawson (R.E. DeConto) Date : 6/09/93

##########

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: 6/11/93

Docket No. 50-423

NORTHEAST UTILITIES

FORM FOR RELIEF REQUEST FROM ASME SECTION XI REQUIREMENTS

UNIT: Millstone Unit 3 NCR # 393-052 DATE: 5/14/93

TIME: 1440

1.0 ORIGINATOR

1.1 DESCRIPTION OF FLAW

Leak in 3SWP-150-104-3 local to FW-34.

Piping/Component Drawing No.: CP-319738

PI&D No.: EM-133B

1.2 IMPRACTICALITY OF PROPOSED TEMPORARY REPAIR

Repair cannot be completed in 72 hour LCO.

1.3 DESCRIPTION OF PROPOSED TEMPORARY REPAIR

Installation of soft rubber patch.

1.4 SAFETY SIGNIFICANCE: System Interaction Evaluation

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

Jet Spray: Leak spays will not affect any safety-related power supplies.

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

Other Interactions: None

Failure Consequences? Cannot be isolated.

Impact to Safe Shutdown Capability? Total failure would result in loss of one train [high head safety injection (SIH), residual heat removal (RHS), recirculation spray system (RSS), redundant train would supply safe shutdown capability].

1.5 ROOT CAUSE INVESTIGATION

Root Cause Description: Classic wall loss of solid 90/10 cu-ni due to turbulent flow downstream of elbow causing locally 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 piping. These leaks do not result from large areas of damage but from very localized wall loss. An inspection program has been initiated for small bore piping.

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-2 "A" Train Return
b) FW-23 "A" Train Return
c) FW-1 "B" Train Return
d) FW-3 "B" Train Return
e) FW-9 "B" Train Return

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

2.0 STRESS ANALYSIS UNIT

2.1 DESIGN DETAILS

System: Service Water "A" Train Return from CCE heat exchanger

Component: Pipe (CP-319378 near FW-34)

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 - 79

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 1/16" in diameter and the adjacent wall/nominal wall is 0.150".

Flaw Location: The flaw is located downstream of FW-34.

Method of Examination: UT

Flaw Type: Pinhole due to erosion/corrosion

Referenced UT Measurement Report: Attached to NCR 393-052

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 1.9". Through wall portion of flaw 0.95"/ Minimum wall thickness outside of the flaw must be at least 0.060 inches.

Period of Time to Reach Limiting Flaw Size: Expected to be greater than 2.5 years.

Evaluation Reference: Memo MCE-SA-93-198

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: 0.019 in / yr

Projected Flaw Size: Total projected flaw size is 0.50 in, total projected through wall portion is 0.313".

Period of Time to Permanent Repair/Replacement: Permanent repair for this flaw is scheduled for the next refueling outage (scheduled to begin on 7/31/93)

2.4 PRELIMINARY 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 MCE-SA-93-198 (attached)

Discussion of Augmented Inspection Results:

Five additional inspections of susceptible components were performed. These five inspections resulted in the generation of two additional NCRs due to wall thinning. The wall thinning described in these NCRs (NCR 393-065 and 066) was determined to be acceptable in Memo MCE-SA-93-197.

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 393-052, 065 and 066
Memo MP3-E-93-392
Memo MCE-SA-93-197 and 198

cc: **Originator, Supervisor, Stress Analysis Engineering Section, Department Director, Nuclear Records**

PART 1 Line 3SWP-150-104-3 (FW34)

Objective: The objective of this evaluation is to qualify a pin hole leak in service water line 3SWP-150-104-3 as described in NCR 393-052 for structural integrity. This evaluation qualifies the piping through the end of the next scheduled refueling outage.

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 copper nickle pipe

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	0.11	0.002	7.87	0.0191	0.403	0.1003

Note 1) The t-adj value is the predicted remaining wall at the end of the next scheduled refueling outage (07/31/93 to 10/09/93) .

Note 2) This portion of the service water system has been operational since July 1985.

Note 3) The measured data is per Reference 5.

Note 4) UT data was not provided within .25" of the hole. This was due to the spray of the pin hole leak. Data was obtained at 90 degree intervals around the pipe. The reacings provided represent the minimum wall thickness outside of the .25" radius identified above (Reference 6). These minimum readings are the minimum reading for each grid area.

3.2 Branch reinforcement Evaluation Method (Reference 2)

a) tadj must be greater than 2*tm

Pipe Size Nominal	tadj	2*tm	
1.5	0.1003	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	0.50	Predicted flaw is set equal to 2 times the transducer plus 0.1". 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	0.1003	0.022	0.170	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	0.100	0.90	0.111	3.885	2.1	317	473

Pipe Size Nominal	tadj	Rmadj	tnom Section Modulus (in^3)	t–adj Section Modulus (in^3)
1.5	0.100	0.90	0.335	0.243

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	168	507	960	8700	9.07	OK
9 Norm/Up Occasional	168	1612	3782	10440	2.76	OK
10 Thermal	168	2265	5786	13050	2.26	OK
11 Sus + Th	168	2773	6745	21750	3.22	OK
9 Faulted Occasional	168	1936	4610	20880	4.53	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	0.008 in
Minimum Wall Required To Prevent Expansion of the Through Wall Flaw	0.019 in

Measured Thorugh 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 Thorugh Wall Portion of Flaw (1)	0.313 in	OK

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

1) Stress Calculation 12179--NP(B)--969--XD, Revision 2
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 393--052
5) Attached UT data
6) Memo MP3--E--93--392 G. Swider, to: R. DeConto, dated June 8, 1993

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PART 2· Line 3SWP–150–104 (FW34)

Objective: The objective of this evaluation is to determine the minimum wall which will still meet all Code equations. This is an iterative process where the final tadj selected results in just meeting the limiting Code equation. An estimate of remaining life is also determined here.

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 copper nickle pipe

Outside Dia. (in)	tm (in)	tmeas minimum (in)	Instrument + Calibrate Tolerance (in)	Years of Service (yrs)	Wear Rate (in/yr)	Remaining Life Required (yrs)	tadj (1) (in)
1.900	0.0109	0.110	0.002	7.87	0.0191	0.403	0.0520
					Instrument + Calibration Tolerance (in)		0.002
					Estimated minimum wall required (in)		0.054
						USE	0.060

Remaining Life (yrs)	2.52
USE	2.50

Note 1) The t–adj value is selected.
Note 2) This portion of the service water system has been operational since July 1985.
Note 3) The measured data is per Reference 5.

3.2 Branch reinforcement Evaluation Method (Reference 2)

a) tadj must be greater than 2*tm

Pipe Size Nominal	tadj	2*tm	
1.5	0.0520	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	0.50	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	0.0520	0.022	0.078	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	0.052	0.92	0.056	6.129	2.1	317	913

Pipe Size Nominal	tadj	Rmadj	tnom Section Modulus (in ^ 3)	t–adj Section Modulus (in ^ 3)
1.5	0.052	0.92	0.335	0.136

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	168	507	2283	8700	3.81	OK
9 Nor/Up Occasional	168	1612	10234	10440	1.02	OK
10 Thermal	168	2265	16298	13050	0.80	NO GOOD
11 Sus + Th	168	2773	18581	21750	1.17	OK
9 Faulted Occasional	168	1936	12566	20880	1.66	OK

Failure of Eq 10 is acceptable if Eq 11 is met

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	0.048 in
Minimum Wall Required To Prevent Expansion of the Through Wall Flaw	0.059 in

Measured Thorugh 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 Thorugh Wall Portion of Flaw (1)	0.313 in	OK

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

References:

1) Stress Calculation 12179–NP(F)–969–XD, Revision 2
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 393–052
5) Attached UT data

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Prepared By: R. E. DeLo

Reviewed By: Prem C. Goodlin 6/8/92

EROSION/CORROSION ULTRASONIC CALIBRATION DATA SHEET

(2)Plant Millstone (3)Unit 3 (5)Component Designation SH1-32 FW-34

(4)System Service Water (8)Iso. No. 12179-CP-319738 (331)Line No. 3-SWP-150-104-3(A-)

(337)Diameter 1½" (338)Grid Size 1" (339)T_{nom} .150 (340)T_{act} .131

(341)Component Description Straight Pipe **(63)Temp. N/A

(344)Surface unpainted

Instrument:

(16)Model No. 26 DL Plus (17)S/N 91034208 (124)Freq. BB

Transducer:

(132)Mfg. PANA (133)S/N 69124 (131)Size .20 (134)Freq. 10 MHZ

Cal. Block:

(332)S/N _____ (333)Type CNI

(335) Block Thickness	(336) Instrument Reading	(136) Calibration Checks	
.219/.080/.030	.219/.080/.031	Initial Cal.	1900
		Intermediate	
N/A	N/A	Intermediate	N/A
		Intermediate	
.219/.080/.030	.219/.080/.031	Final Cal.	1930

(342)Instrument Tolerance ± 0.001

(345)Calibration Tolerance ± 0.001

(343)Grid Verified as correct MCB

(49)Examiner:

(Print) Michael Brehler (Sign) Michael Brehler Level II L Date 5/14/93

(50)Reviewer:

(Print) D. R. MacNeill (Sign) D R MacNeill Level III Date 5-14-93

*(Refer to Appendix B of NU NDE Procedure Manual to fill in each block)
**For extreme temperatures only.

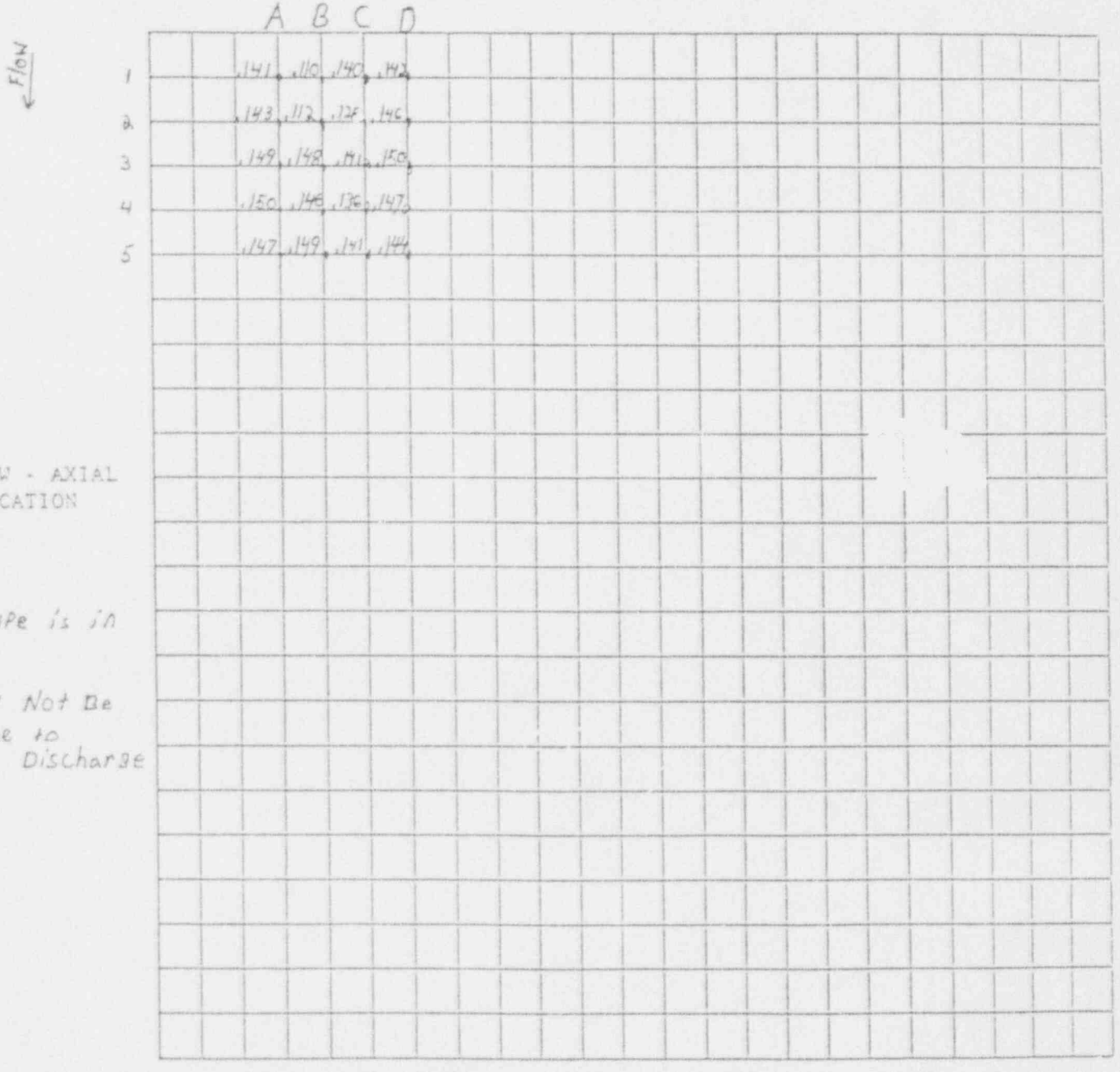
FIGURE 4

FIGURE 3

COMPONENT ID SH1-32 FW-34 EXAMINER Michael Brehler DATE 5/14/93

PLANT/UNIT Millstone III SYSTEM SW

GRID SIZE 1" COLUMN - CIRCUMFERENTIAL LOCATION



ROW - AXIAL LOCATION

Leak on Pipe is in B column.

Area could Not Be Mapped due to excessive Discharge

SKETCH OF COMPONENT SHOWING GRID LOCATIONS FOR THE EXTENT OF THE REDUCED THICKNESS AREAS

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

MEMO

June 8, 1993
MP3-E-93-392

To: Ray DeConto
MCE/SA - Berlin

Gary Swider

From: Gary Swider
Engineering - Millstone Unit 3

Subject: UT Data for NCR 393-052 and In service Date of Service Water System

While performing UT in the area of the leak downstream of FW-34 on line No. 3-SWP-150-104-3, the technician was unable to perform a scan of the area immediately adjacent to the hole due to the excessive discharge through the pinhole. A 0.20" transducer was used to take the UT data. The transducer has a 3/4 inch housing which precluded the measurement of pipe thickness closer than 1/4" to the hole due to spray. The technician found the minimum reading outside of the 1/4" radius from the pinhole to be 0.110".

Pursuant to our conversation of yesterday, the Service Water system began testing in 1984 and the majority of testing was not completed until July/August of 1985. The system was not aligned to all piping on a consistent basis until this time; therefore, the in service date can be assumed to be July 15, 1985. The components identified in NCRs 393-052, 393-065, and 393-066 have been determined to be original plant piping installed prior to July 15, 1985.

Please feel free to call me at X5381 if any other information is required.

cc: W. Richter TGM FOR