NORTHEAST UTILITIES

P.O. BOX 270
HARTFORD, CONNECTICUT 06101
(203) 666-6911

June 18, 1979

Docket No. 50-336

Director of Nuclear Reactor Regulation
Attn: Mr. R. Reid, Chief
Operating Reactors Branch #4
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Reference: (1) V. Stello, Jr., letter to All PWR Licensees dated May 25, 1979.

Gentlemen:

Millstone Nuclear Power Station, Unit No. 2
Feedwater Lines

In Reference (1), the NRC Staff requested, pursuant to 10CFR50.54(f), information regarding the design, fabrication history, and inspection of feedwater lines at Millstone Unit No. 2.

In response to that request, Northeast Nuclear Energy Company (NNECO) hereby provides Attachment 1, Information on Feedwater Lines. As stated in the Attachment, NNECO notes that the feedwater piping system inside containment has been qualified to applicable Code requirements. This, in conjunction with the acceptable operating history, confirms that Millstone Unit No. 2 can continue to operate safely in accordance with the requirements of DPR-65.

This response includes all information available regarding your request; therefore, NNECO has no plans to provide a 60-day supplement to this letter.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

W. G. Counsil

W. G. Counsil
Vice President

Attachment

DOCKET NO. 50-336

ATTACHMENT 1

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 2

INFORMATION ON FEEDWATER LINES

JUNE, 1979

MILLSTONE UNIT NO. 2

INFORMATION REQUESTED ON PWR FEEDWATER LINES

DESIGN

1. Provide as-built piping or isometric drawings of the feedwater line to steam generator sparger within containment. Show details of the design such as dimensions, pipe schedule, support type and locations, pipe restraints, and valve(s).

RESPONSE

The piping isometric for the Millstone Unit No. 2 feedwater piping system inside containment is provided in enclosed drawing 2503-SKM-326. The design details for the steam generator feedwater nozzle are shown in the enclosed drawing.

COMBUSTION ENGINEERING, INC.
ENGINEERING DEPARTMENT, CHATTANOOGA, TENN.
CHARGE NO. 75267
DESCRIPTION BASIC SIZING CALCULATIONS

3.) DETAILED ANALYSIS

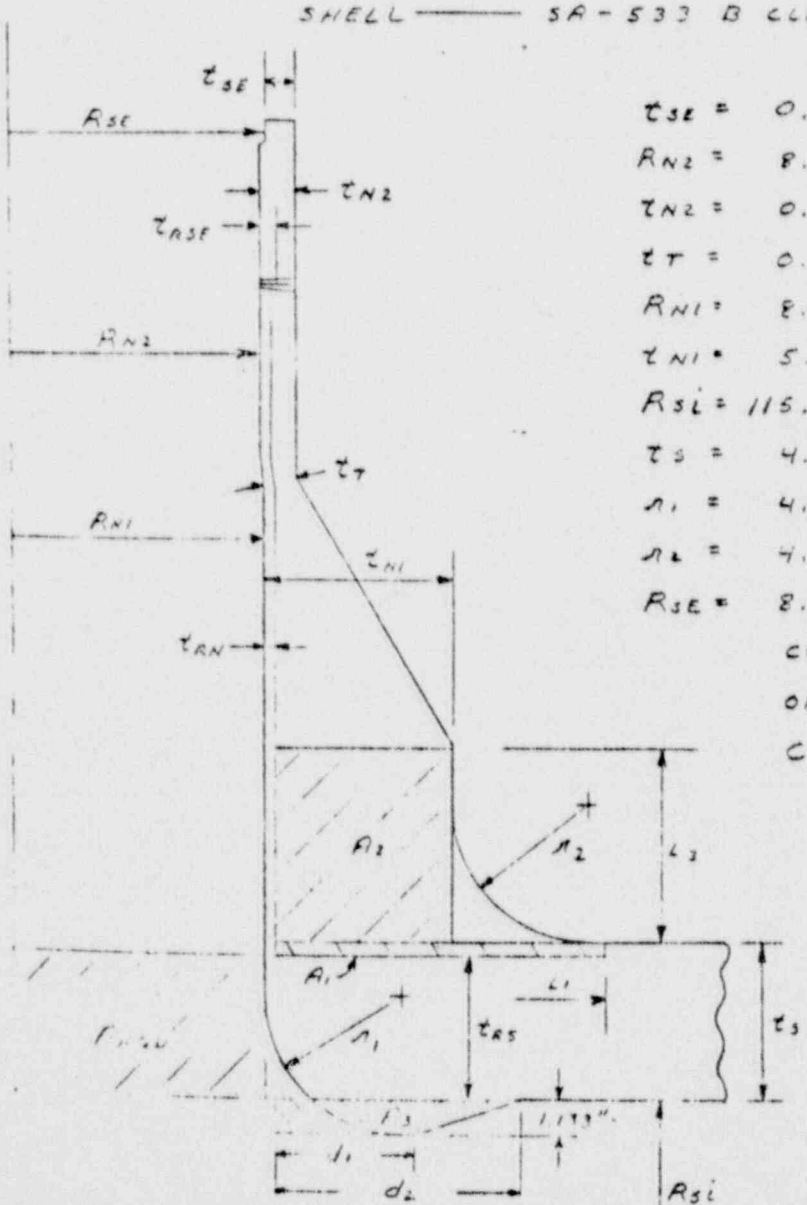
d. NOZZLES

3. FEEDWATER

REINFORCEMENT

DESIGN CONDITIONS: P = 1000 PSI , T = 550°F

MATERIALS: SAFE END — SA-508 CLASS 1 Sm = 18.1 KSI
NOZZLE — SA-508 CLASS 2 Sm = 26.7 KSI
SHELL — SA-533 B CLASS 1 Sm = 26.7 KSI

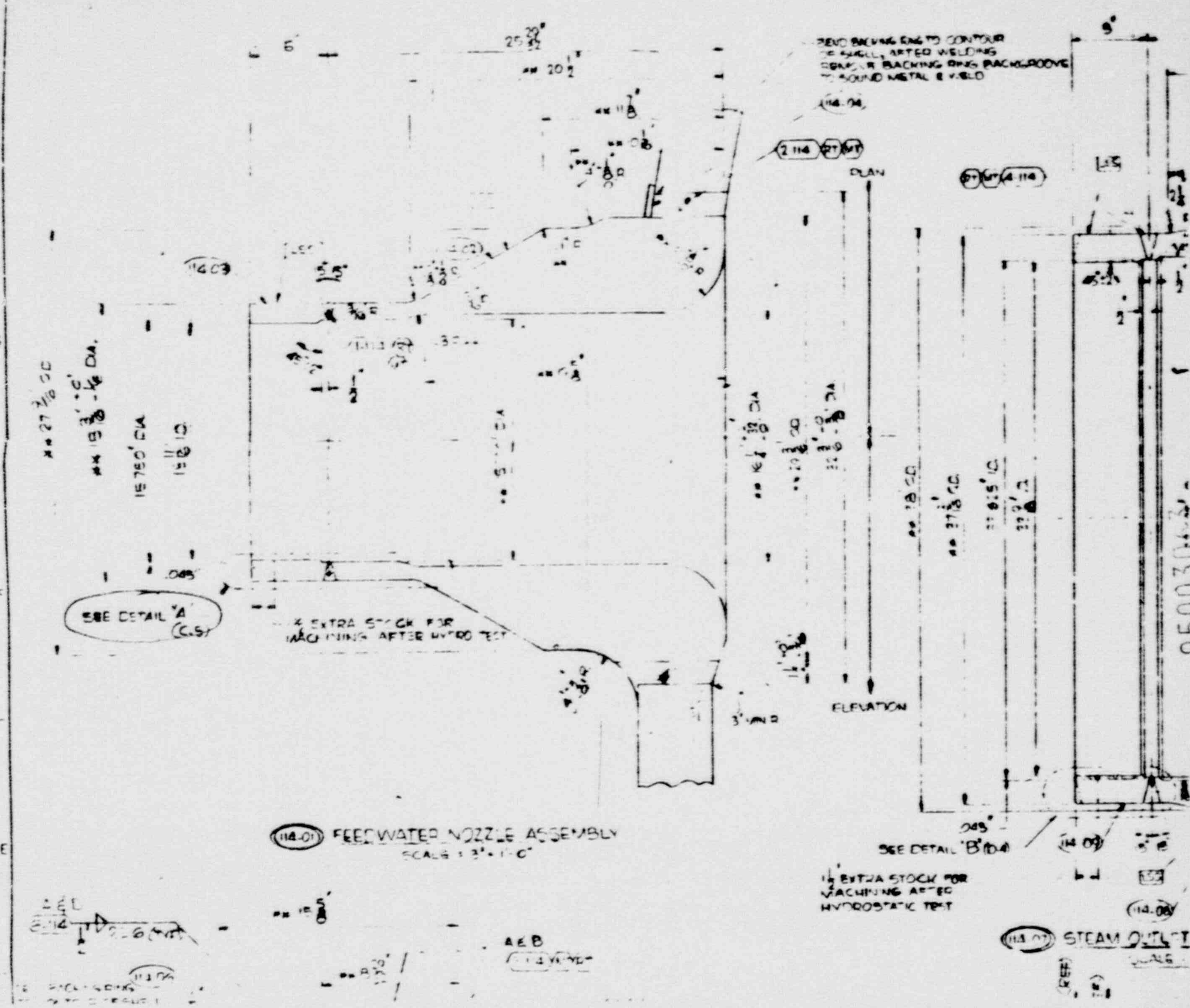


t_{SE} = 0.734 IN (MIN)
R_{N2} = 8.063 IN
t_{N2} = 0.998 IN (MIN)
t_T = 0.998 IN (MIN)
R_{N1} = 8.125 IN
t_{N1} = 5.609 IN (MIN)
R_{Si} = 115.000 IN
t_3 = 4.813 IN (MIN)
r_1 = 4.000 IN
r_2 = 4.000 IN
R_{SE} = 8.329 IN

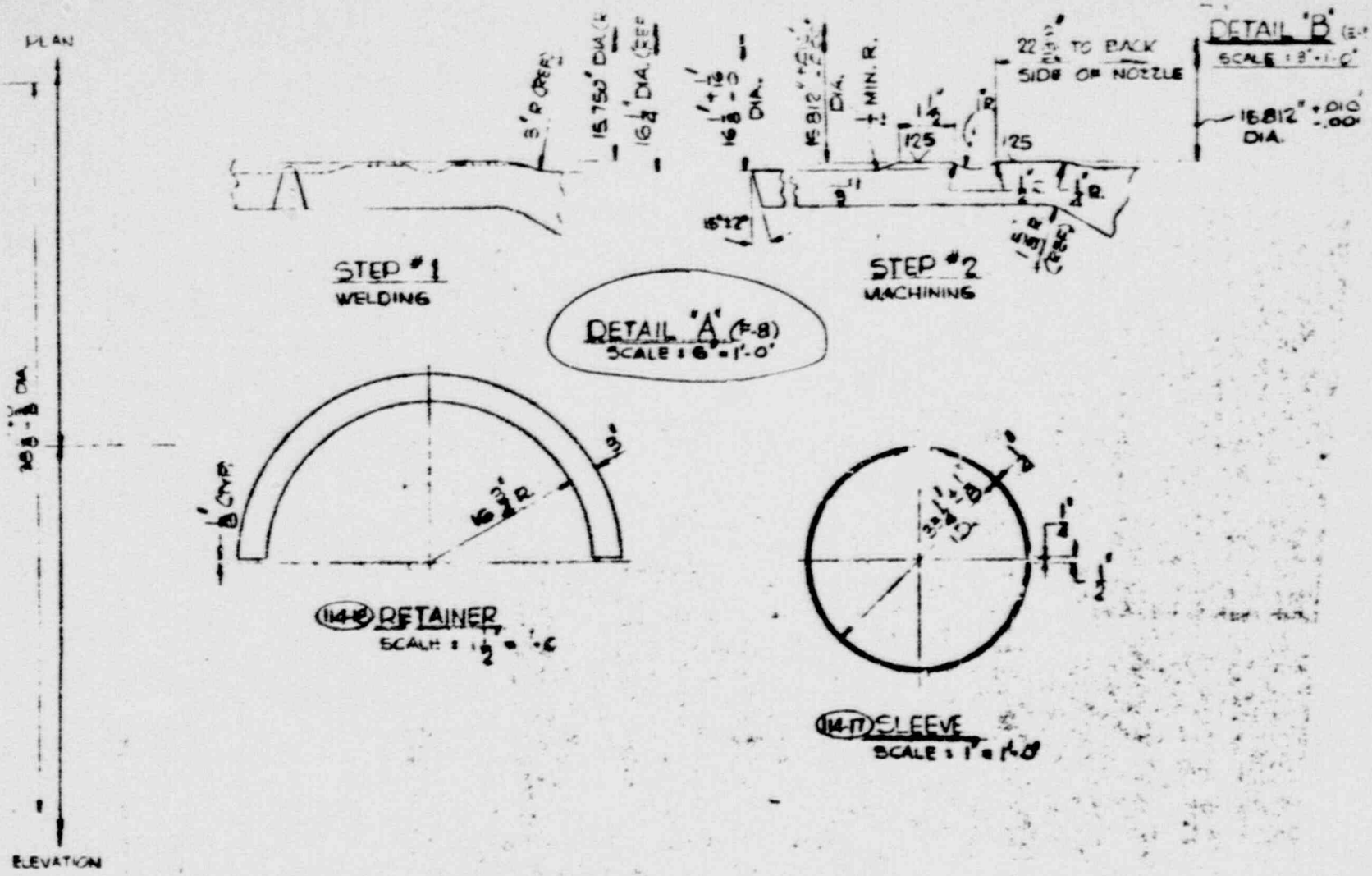
CORROSION ALLOWANCE ON INSIDE SURFACE
C.A. = 0.0625 IN

95003062

E-233-604



9500306



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GENERAL NOTES

1. FOR STANDARD NOTES SEE REF DWG #2 ON APPLICABLE CONTRACT
2. ALL FABRICATION TO BE IN ACCORDANCE WITH ASME. CODE SECTION III
3. (#) DENOTES DIMENSIONS AS OBTAINED FROM MILL
4. ALL WELDS, WHERE TWO OR MORE ARE REQUIRED, HAVING THE SAME NUMBER WILL BE IDENTIFIED WITH SUFFIX A, B, C, ETC. STARTING AT THE 0° AXIS AND GOING CLOCKWISE.

CONTRACT NO.	NO. UNITS	REF DWG #1 DRAWING PLATE LIST	REF. DWG #2 STANDARD AND MATERIAL NOTES	REF. DWG PROCE
74267	2	B 230 493	B-225 493	A-24
75267	2	B 245 213	B-245 213	A-24

MILLSTONE UNIT NO. 2

INFORMATION REQUESTED ON PWR FEEDWATER LINES

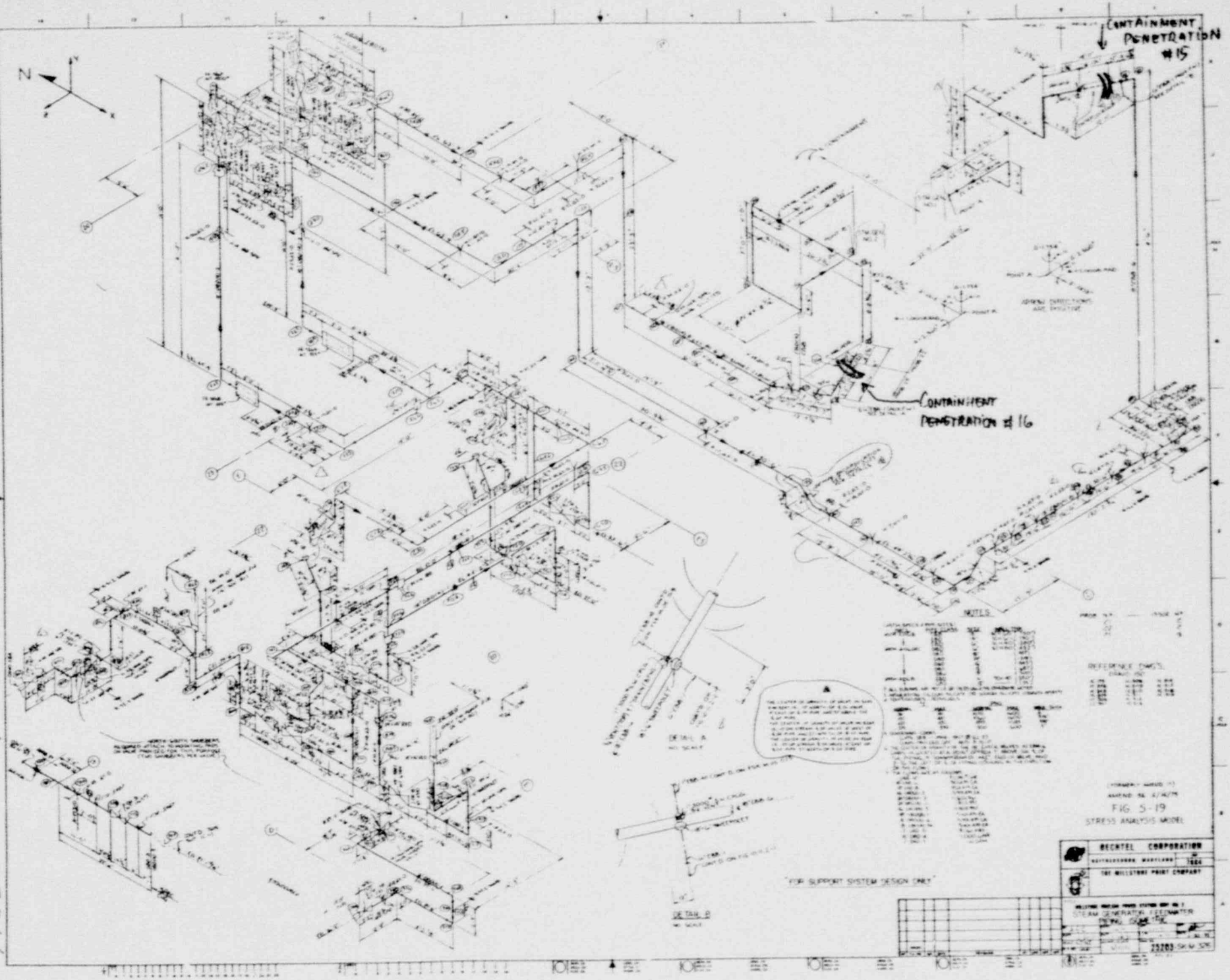
DESIGN

2. Provide the results of any stress or fatigue analyses which was performed for this system.

RESPONSE

The Millstone Unit No. 2 feedwater piping inside containment was designed to ANSI B31.7, Class II-1969. No fatigue analyses are required for Class II piping systems.

A copy of the stress analysis summary for thermal expansion, operating earthquake conditions, design basis earthquake conditions for the feedwater piping system inside containment, and a summary of forces and moments at both steam generator feedwater nozzles for design basis conditions, is enclosed for information.


CONTAINMENT PENETRATION #15
CONTAINMENT PENETRATION #16
N
NOTES
REFERENCE DWGS.
DETAIL A
DETAIL B
FOR SUPPORT SYSTEM DESIGN ONLY
FIG 5-19
STRESS ANALYSIS MODEL
BECHTEL CORPORATION
THE MILLSTONE POINT COMPANY
STEAM GENERATOR FEEDWATER

SUMMARY PIPING FLEXIBILITY ANALYSIS

ANALYST K. KIM DATE 4-26-74

CHECKER R V. HILADO DATE 4/22/79

APPROVED: [illegible] DATE

1) TITLE MILLSTONE UNIT 2, MAIN FEEDWATER TO STEAM GEN. No 2 INSIDE CTMT. ISOMETRIC NO. SK-M-326 Rev 26

Thermal Weight Effect Seismic

2) PROBLEM NO. 22 DATE OF RUN 4-25-74 4-25-74 4-26-74

3) MATERIAL ASTM A-106 GRADE B

4) PIPE SIZE 18" SCH 60

5) OPERATING PRESSURE MAX. 1060 PSI

6) OPERATING TEMPERATURE MAX. 437 °F

7) ANALYSIS:

ISSUE No 4 ASME BOILER & PRESSURE VESSEL CODE SECTION III NUCLEAR POWER COMP CLASS II

K.K.

4-26-74

a) Data Point (35) Element Type BEND-E

b) Actual Expansion Stress 1,713 + 14,945 = 16,658 PSI

c) Allow. Expansion Stress = f(1.25 S_c + 0.25 S_h) = 22,500 PSI

8) OPERATING EARTHQUAKE CONDITION

a) Response Spectra Identification EL 59'-0" STEAM GEN. UPPER SUPPORT [illegible] 1% DAMP'G

b) Data Point (25) Element Type BEND-E

c) Seismic Stress = 2,635 PSI

d) Long. Weight Stress = 1,061 PSI

e) Long. Press. Stress = $\frac{Pd^2}{D^2-d^2}$ 5576 PSI

f) Total Stress = Sc + SC + Sa = 10,232 PSI

g) Allow. Seismic Stress = 1.2 S_h 18,000 PSI

9) DESIGN EARTHQUAKE CONDITION

a) Data Point (10) Element Type BEND-B

b) Seismic Stress = 1.89 x Sa = 7,834 PSI

c) Long. Weight Stress = Sd = 474 PSI

d) Long. Press. Stress = Sa = 5576 PSI

e) Total Stress = Sb + Sc + Sd = 13,884 PSI

f) Allow. Max. Seismic Stress = Sy at Oper. Temp. 29,270 PSI @ 437 °F

* DUE TO SEISMIC ANCHOR MVMT.

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[illegible] M. KIM [illegible] Ex HILARD [illegible]

[illegible] [illegible] 4/26/78

[illegible] 2604

[illegible] 1 of 4

[illegible] STEAM GENERATOR NO. 2

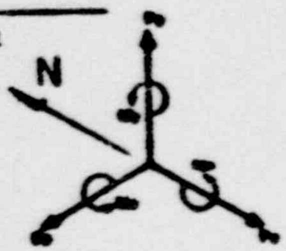
[illegible]

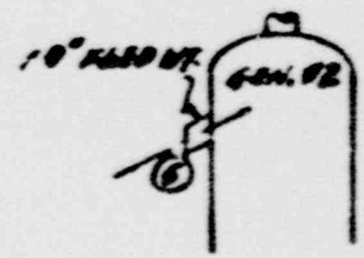
[illegible] 12"

[illegible] SGM-226 REV. 26

[illegible] 22

[illegible] 2





			OPERATING THERMAL EXPANSION	OPERATING WEIGHT	⊕	OPERATING BASIS EARTHQUAKE OBE (E) X+Y+Z		DESIGN BASIS EARTHQUAKE DBE (E') X+Y+Z		SEISMIC MOVEMENT LOAD (DBE)	TOTAL NET DESIGN LOAD
LOAD		F_x	-8738	109	-1,900		3296		6234	1745	16,608
		F_y	-3064	-3,265	-2886		4219		7965	.915	14,609
		F_z	-5,602	-10	-4660		4200		7938	.309	13,859
(FT-LB)		M_x	26692	16,022	24,082		24,917		65,993	1,323	109,010
		M_Y	42562	790	616		22,912		43,304	11,076	96,212
		M_Z	-6249	1,189	-6172		27,163		51,038	-5965	62,363

[illegible]

[illegible]

[illegible] 1.52

⊕ THERMAL LOADS FOR AMBIENT PIPING COND. 80° & MAX. TEMP AT GEN. NOZZLE @ 520°F.

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SUMMARY PIPING FLEXIBILITY ANALYSIS

ANALYST K S KIM DATE 4/1/75

CHECKER RD KOPPE DATE 4-8-75

APPROVED [signature] DATE 4-1-75

1) TITLE MILLSTONE UNIT 2 FEEDWTR PIPING TO STEAM GEN. NO 1 ISOMETRIC NO SK-M-326 REV 26

	Thermal	Weight Effect	Seismic	S. M.
2) PROBLEM NO 21 DATE OF RUN	3/28/75	3/28/75	3/28/75	3/31/75

3) MATERIAL ASTM A106 GR B

4) PIPE SIZE 18" SCH 60

5) OPERATING PRESSURE 1060 PSIG

6) OPERATING TEMPERATURE 437° F

7) ANALYSIS

B3 JGS
4.7.75

ASME BOILER AND PRESSURE VESSEL CODE 1971 EDITION, SECTION III, NUCLEAR POWER PLANT COMPONENTS

a) Data Point (20) Element Type BEND M

b) Actual Expansion Stress 19164 PSI

c) Allow. Expansion Stress = 1.25 S_c + 0.25 S_h = 22500 PSI

8) OPERATING EARTHQUAKE CONDITION

a) Response Spectra Identification CONT INT EL 50' & CONT STRUC EL 53'

b) Data Point (20) Element Type BEND E

c) Seismic Stress = 10596 PSI

d) Long. Weight Stress = 1675 PSI

e) Long. Press. Stress = $\frac{Pd^2}{D^2 - d^2}$ 5576 PSI

f) Total Stress = S_x + S_d + S_p = 17847 PSI

g) Allow. Seismic Stress = 1.2 S_h = 18000 PSI

9) DESIGN EARTHQUAKE CONDITION

a) Data Point (20) Element Type BEND E

b) Seismic Stress = 1.33 × S_x = 20026 PSI

c) Long. Weight Stress = S_d = 1675 PSI

d) Long. Press. Stress = S_p = 5576 PSI

e) Total Stress = S_b + S_p + S_d = 27,277 PSI

f) Allow. Vert. Seismic Stress = S_y at Oper. Temp. 29,371 PSI

95003069

K. S. KIM [illegible] RD KOPPE [illegible] 4-8-75

[illegible]

[illegible] #2 [illegible] PIPE TO GEN. NO. 1 [illegible] 7604

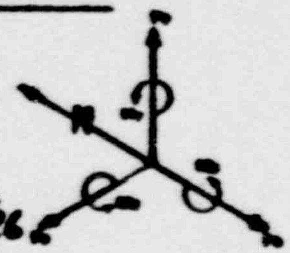
UNIT 2 - S

GENERATOR NO. 1

18"

SK-M-326, REV. 26

21



			OPERATING		Hydrostatic			Seismic Movement Load	Total Net Design Load
			Thermal Expansion	Weight Fluid	Cold [illegible]	OBE	DBE		
[illegible] 4.2.75			-13012	157	-2124	17829	35587	7621	58,063
			-7625	-3250	-4619	9922	18753	67	29,695
			4826	12	4236	17212	32531	1105	38,474
			-33378	-14735	-16255	27168	51348	1817	101,278
			73922	-573	41177	52618	99448	39117	211,924
			19873	282	-4082	34665	65517	29218	114,850

95003070

MILLSTONE UNIT NO. 2

INFORMATION REQUESTED ON PWR FEEDWATER LINES

FABRICATION HISTORY

1. Supply a list of the materials for the steam generator sparger, steam generator feedwater nozzles, and feedwater piping within containment.

RESPONSE

The list of materials is as follows:

1.	Steam Generator Feedwater Nozzle	SA-508, Class 2
2.	Steam Generator Feedwater Nozzle Safe End	SA-508, Class 1
3.	Steam Generator Sparger	ASTM-A-106, Grade B
4.	Feedwater System:	
	(a) Piping	18" Schedule 60/ ASTM-A-106, Grade B
	(b) Fittings	ASTM A-234, Grade WPB (Wall Thickness to Match Pipe)

MILLSTONE UNIT NO. 2

INFORMATION REQUESTED ON PWR FEEDWATER LINES

FABRICATION HISTORY

2. Provide the details of the welding process(es) used to make the nozzle-to-pipe, pipe-to-sparger, and piping welds. Include details of welding such as preheat, joint configuration (include with or without backing ring), and post weld treatment, if any.

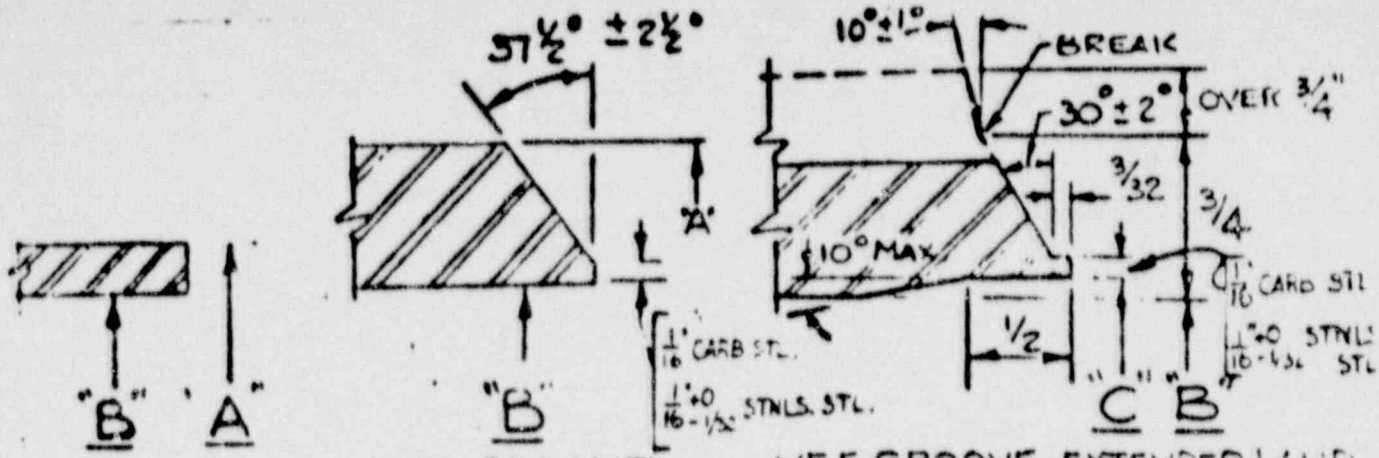
RESPONSE

(a) The weld joint configuration for the feedwater piping and pipe-to-safe end welds is as shown on the enclosed drawing 7604-MS-2, Rev. 7, for pipe class EBB 18" Schedule 60 piping.

(b) The specific welding procedure for the safe end to piping and feedwater piping welds "Welding Procedure Specification PI-AT-Lh (CVN)" is enclosed for information. The root pass of the butt welds was done by the Gas-Tungsten Arc process. The use of consummable inserts was optional. However, if used the consummable inserts were of the same material as the weld filler metal. Permanent backing rings were not used in the subject system welding.

(c) Preheating of welds was in accordance with Paragraph 1, 2-731-2 of ANSI B31.7.

(d) Post weld heat treatment for pressure piping welds was in accordance with Paragraph 1, 2-731 of ANSI B31.7.



SQUARE BUTT
FOR WALL THICKNESS 3/16 OR LESS

VEE GROOVE
FOR WALL THICKNESS OVER 3/16 THRU 3/8

VEE GROOVE - EXTENDED I.D.
I.D. MACHINED TO "C" DIA.
FOR WALL THICKNESS OVER 3/8

PIPE CLASS	"A" NOMINAL O.D. OF PIPE	SCHEDULE	(U) NOMINAL WALL THICKNESS	"B" NOMINAL I.D. OF PIPE	"C" MACHINED I.D. +.010 (V)	REMARKS
DBD	16	40	.500	15.000	15.084	
EBD		60	.656	14.688	14.811	
		80	.843	14.314	14.483	
DED	18	10S	.188	17.624	---	
EBB		40	.562	16.876	16.975	
EBD		60	.750	16.500	16.646	
HCB		80	.937	16.126	16.319	
EBD	24	10S	.250	23.500	---	
DBD		40	.687	22.626	22.756	
HCB		60	.968	22.064	22.320	
		80	1.218	21.564	21.827	
EBB	34	--	0.977 min.	---	32.005	
EBD						
GBD	42 *	--	.625	40.750	40.865	
HBD	14	30	.375	13.250	---	A

* G.E. SUPPLIED PIPING

NOTES: 1. ALL DIMENSIONS AND TOLERANCES IN INCHES
2. ALL FRACTIONAL DIMENSIONS ±1/32" EXCEPT AS NOTED
3. FOR USE WITH SEAMLESS PIPE TO ASTM A-106, A-376, A-312 & WELDED PIPE TO ASTM A-155, A-312 & A-358

FIELD WELD END PREPARATION
TUNGSTEN - INERT - GAS SHIELDED ARC
WITHOUT CONSUMABLE INSERT RINGS

MILLSTONE NUCLEAR POWER STATION
UNIT NO. 2
MILLSTONE POINT, CONNECTICUT

ECCS No. 7604
DRWG. NO. 7604-MS-2
REV. 7

9500307

REV | DESCRIPTION | DR | ENG. | QUAL. | APPROVALS | DATE
A | Revised as shown | YAB

FILE M1P2 Welding Standards P1-AT-Lh (CVN)

Power & Industrial Division	BECHTEL CORPORATION Welding Procedure Specification	Materials & Fabrication Quality Control Services
By [signature] Manager of Engineering	P1-AT-Lh (CVN) GTS Revision 0 Date 4/15/71	Prepared [signature] Approved [signature] C. B. Grable

Authorized for use only when signed by the Division Manager of Engineering.

This welding procedure specification must be used in conjunction with the General Welding Standard(s) GWS-FM

Scope: Combination manual gas tungsten-arc and shielded metal-arc welding of impact quality carbon-steel piping materials using the open butt technique without an internal gas purge. This procedure is to be used where impact properties are required.

Base Metal: Carbon steel

Welded to Carbon steel

ASME Sect. IX: P# 1 to P# 1

Welding Process: Gas tungsten-arc (GTA) and shielded metal-arc (SMA)

Filler Material SFA-5.18/AWS A5.18, Classification E70S-2 and SFA-5.1/AWS A5.1, Classification E7018 (Note 2)

ASME Sect. IX: F# 4 & 6 A# 1

Position(s) Qualified: All positions

Thickness Range Qualified: (Note 3)

As-welded: Min. 3/16" Max. 2-1/4"

Postweld Heat Treated: Min. 3/16" Max. 2-1/4"

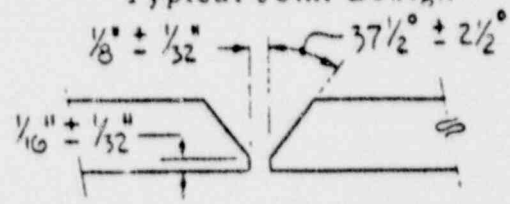
Backing Material None

Min. Preheat Temp. 60°F (Note 4)

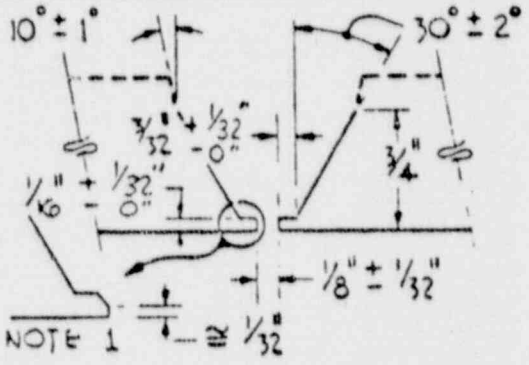
Interpass temperature 350°F max.

Postweld Heat Treat: (When required) one hour/inch at 1100°F-1200°F (refer to PHT-500 & PHT-501)

Typical Joint Design



THICKNESS 3/16" THROUGH 3/8"



THICKNESS GREATER THAN 3/8"

Applicable Procedure Qualification Record(s): PQR-19 & PQR-20

Procedure Qualified to: ASME Section IX and ASME Section III, Para. N-541

Welding Process	GTA	GTA	SMA	SMA	SMA
Layer Number	1	2	3 & Rem.	Remainder	Remainder
Travel Speed (in./min)	1-6	1-6	2-11	2-11	2-11
Amperage Range	60-100	60-100	70-100	115-165	140-180
AC/DC, Polarity	DCSP	DCSP	DCRP	DCRP	DCRP
Voltage	10-16	10-16	22-28	22-28	22-28
Torch Gas - cfh.	Argon 18-25	Argon 18-25	---	---	---
Backing Gas - cfh.	None	None	---	---	---
Electrode Diameter	3/32" or 1/8"	3/32" or 1/8"	3/32"	1/8"	5/32"
Tungsten Type	1%-2% Thor.	1%-2% Thor.	---	---	---
Filler Wire Diameter	1/8"	3/32" or 1/8"	---	---	---

Additional Instructions

Note 1: File the top corner at about 45° to produce approximately a 1/32-inch land thickness.

Note 2: AWS A5.18 may be used when identical to ASME SFA-5.18. AWS A5.1 may be used when identical to ASME SFA-5.1.

Note 3: See PHT-500 for maximum allowable as-welded thickness permitted under the particular Code governing the fabrication.

Note 4: See Drawing GWS-FM-1 for special circumstances where higher preheat temperatures are required.

MILLSTONE UNIT NO. 2

INFORMATION REQUESTED ON PWR FEEDWATER LINES

FABRICATION HISTORY

3. Provide the NDE performed during and after fabrication of the weld joints requested in Question 2.

RESPONSE

For shop fabricated feedwater pipe, the NDE during and after fabrication of the weld joints was basically in conformance with the procedural and quality requirements set forth in the applicable section of B31.7 (1969) and Section IX of the ASME Code.

For field fabricated and installed feedwater pipe inside containment, the NDE during and after fabrication of the weld joints was performed in accordance with the requirements of ASME III (1971 Edition), Class II.

In addition to the above requirements, the following NDE was performed:

(a) Each layer of welding was inspected for smoothness, slag inclusion, cracks, pin holes, undercut, and fusion to adjacent weld beads and base metal.

(b) All butt welds in the feedwater piping system inside containment were 100% radiographed in accordance with the applicable code.

MILLSTONE UNIT NO. 2

INFORMATION REQUESTED ON PWR FEEDWATER LINES

FABRICATION HISTORY

4. Provide the Code edition to which the feedwater piping system was fabricated.

RESPONSE

The shop fabrication of the feedwater system piping inside containment was done in accordance with the code for nuclear power piping ANSI B31.7-1969. The field fabrication and installation of the feedwater piping inside containment was done in accordance with ASME III (1971 edition), Class II.

MILLSTONE UNIT NO. 2

INFORMATION REQUESTED ON PWR FEEDWATER LINES

FABRICATION HISTORY

5. State the fracture toughness requirements, if any, for the feedwater piping system.

RESPONSE

A Charpy V-notch NDTT temperature of +20°F was specified for the 18" Schedule 60 pipe class EBB (feedwater piping inside containment) piping. The minimum absorbed energy was in accordance with N-421 of the ASME III Code.

MILLSTONE UNIT NO. 2

INFORMATION REQUESTED ON PWR FEEDWATER LINES

PRESERVICE/INSERVICE INSPECTION AND OPERATING HISTORY

1. State whether the feedwater system welds received a preservice inspection in accordance with ASME Boiler & Pressure Vessel Code, Section XI.

RESPONSE

A preservice examination of the two (2) steam generator feedwater nozzle to shell welds was conducted for information only in January 1975. These examinations were performed to the criteria of ASME Section XI, Winter, 1972 Addendum. No reportable indications were noted.

The balance of the feedwater system did not receive a preservice inspection as requirements to invoke the Summer 1975 Addendum to ASME XI did not become effective at Millstone Unit No. 2 until April 26, 1979.

MILLSTONE UNIT NO. 2

INFORMATION REQUESTED ON PWR FEEDWATER LINES

PRESERVICE/INSERVICE INSPECTION AND OPERATING HISTORY

2. Provide the extent of inservice inspection performed on the feedwater pipe to steam generator nozzle welds. Include the results of the examinations, any corrective actions taken, and causes of any failures.

RESPONSE

There have been no inservice inspections of the Class 2 portions of the feedwater system to date.

MILLSTONE UNIT NO. 2

INFORMATION REQUESTED ON PWR FEEDWATER LINES

PRESERVICE/INSERVICE INSPECTION AND OPERATING HISTORY

3. Provide the schedule and extent of inservice inspection for the feedwater system for the next inspection interval.

RESPONSE

Present plans call for volumetric examination of one 18" feedwater piping to steam generator nozzle weld before July 1982 and two 18" piping welds before the end of the present (first) inspection interval in December 1985, per Category C-G, Summer 1975 Addenda.

MILLSTONE UNIT NO. 2

INFORMATION REQUESTED ON PWR FEEDWATER LINES

PRESERVICE/INSERVICE INSPECTION AND OPERATING HISTORY

4. Provide any history of water hammer or vibration in the feedwater system and design changes and/or actions taken to prevent these occurrences.

RESPONSE

During the performance of T-INT-3000, Precore Hot Functional Test, a water hammer was observed coincident with a cooldown transient resulting from a pressurizer relief valve that lifted. This has been the only observed water hammer. The engineering solution consisted of installing standpipes in the feed ring of both steam generators. This fix was implemented between precore and postcore hot functionals and was satisfactorily tested during the Postcore Hot Functional Test. A further refinement of the modifications was made during December 1976 and January 1977. This consisted of removing all of the standpipes and blanking the holes. Thirty-six (36) three and one-half inch (3½") elbows were installed around the top of the feed rings. This modification was tested with feed rates up to 600 gpm after the feed ring had been uncovered for fifteen (15) minutes with no observed water hammer. These are the present restrictions as specified in Amendment No. 32 of our operating license.

MILLSTONE UNIT NO. 2

INFORMATION REQUESTED ON PWR FEEDWATER LINES

PRESERVICE/INSERVICE INSPECTION AND OPERATING HISTORY

5. Provide a description of feedwater chemistry controls and a summary of chemistry data.

RESPONSE

Feedwater chemistry controls for Millstone Unit No. 2 are summarized in Table 1. When the normal value is exceeded, the cause of the problem is investigated and corrected. Plant responses to exceeding a normal chemistry escalate, depend on the parameter and nature of the problem. Control values in chemistry conditions that require various actions including power reduction and shutdown are listed in Table 1.

Some chemistry parameters are monitored continuously by means of on-line analyzers, as indicated in Table 1. The other listed parameters are determined on a sampling basis.

Feedwater chemistry is also controlled indirectly by means of steam generator chemistry control. Thus, with some parameters, a fault feedwater condition would be detected in the steam generator prior to becoming detectable in the feedwater, due to the concentrating action that occurs in steam generators. On-line analyzers and chemistry controls for steam generator chemistry are provided in Table 1.

Typical chemistry data for Millstone Unit No. 2 is given in Table 2.

MILLSTONE UNIT NO. 2

INFORMATION REQUESTED ON PWR FEEDWATER LINES

TABLE 1
CHEMISTRY CONTROLS AT MILLSTONE UNIT NO. 2

SYSTEM	PARAMETERS	ON-LINE ANALYZERS	NORMAL[1]	CONTROL VALUE A[2]	CONTROL VALUE B[3]
Feedwater	SiO_2 ppb		<10		
	pH	Yes	8.8-9.2		
	Cat.Cond. umhos/cm	Yes	<.5		
	O_2, ppb	Yes	<10		10
	N_2H_4, ppb	Yes	10-50		
	NH_3, ppm		<1		
	Cu, ppb		<10		10
	Fe, ppb		<10		30
	Cl, ppm		<.05		
Steam Generator	pH	Yes	8.2-9.2		7.5-9.5
	Cond. umhos/cm	Yes	<7	7	15
	Sus.Sol., ppm		<1		10
	OH, ppm		0		5
	SiO_2, ppm		<1		10
	Cl, ppm		<0.1		0.1
	Cat.Cond. umhos/cm	Yes	<2	2	
	Na, ppm	Yes	<0.1	0.1	

1. When these values are exceeded, the cause of the problem is investigated and corrected.

2. Actions based on exceeding these values are: chloride sampling, blowdown increase, condenser leak isolation/repair, etc.

3. Shutdown or power-reduction requirement is based on exceeding these values.

MILLSTONE UNIT NO. 2

INFORMATION REQUESTED ON PWR FEEDWATER LINES

TABLE 2
TYPICAL CHEMISTRY DATA AT MILLSTONE UNIT NO. 2
(DATA FROM WEEK ENDING 1/06/79)

SYSTEM	PARAMETER	VALUE
Feedwater	pH	8.95
	Cat.Cond. umhos/cm	0.05
	Oxygen, ppb	3.0
	Hydrazine, ppb	8
	Ammonia, ppb	201
	Copper, ppb	6.1
	Iron, ppb	2.7
Steam Generator	pH	8.71
	Cat.Cond. umhos/cm	0.6
	Cond. umhos/cm	1.70
	Sus.Sol., ppm	<0.010
	Chloride, ppm	<0.05
	Sodium, ppb	9.4
	Ammonia, ppm	0.144
	Copper, ppb	0.35
	Iron, ppb	2.6
	Silica, ppm	<1.0