WESTINGHOUSE PROPRIETARY CLASS 3

SDTAR-80-05- 05

R. E. GINNA NUCLEAR POWER PLANT
SEISMIC UPGRADING PROGRAM

PIPING STRESS ANALYSIS REPORT
RESIDUAL HEAT REMOVAL SYSTEM, SECTION 250

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1.0 SYSTEM DESCRIPTION

1.1 Extent of Piping: [1], [2]

10" line from intermediate anchor RH-9 to reactor coolant loop A. There are no significant branch lines in this portion of the RHR piping. See drawing C-381-354-1, Rev. D for details.

1.2 Specifications: [3]

10" AC-2501R

Design Conditions: 680°F, 2510 psig

Pipe: Seamless A376 Type 316 Schedule 160.

Fittings: Seamless, butt weld A403 WP316, Schedule 160.

Flanges: Forged, welding neck, A182F316, 1500 # RF, Schedule 160.

1.3 Loading Conditions

1.3.1 Operating Modes

The operating modes for the RHR system are summarized in reference (4). The environments for RHR 250 are listed under fluid line 1 where it extends from loop A to valve 701. The normal and most severe conditions are:

	Fluid Line	Temp. °F	Press. PSIG
Normal	1	612.2	2235
Loss of Load	1	643	2628

1.3.2 Seismic Environment

The seismic environment is represented by linear acceleration response spectra at various floor elevations, linear accelerations due to torsional response of the building, and relative displacements of anchors and supports. The torsional response of the containment building and interior structure has negligible effect, due to the rigidity of these structures.

The response spectra and floor displacements are based on a dynamic response analysis of the containment, interior structure or other building supporting seismic class piping. For this project, Gilbert Associates, Inc., has performed this analysis and summarized their results in Ginna Station Seismic Upgrading Program, Reactor Building Seismic Analysis, December 21, 1979.

That document provides response spectra along two orthogonal horizontal lines and the vertical for each node in the GAI dynamic analysis. For piping which is attached between several node points, no single set of response spectra will adequately describe the piping environment. To assure conservative results in such cases, a combined spectrum for each direction is obtained by using the highest acceleration of any adjacent node at each frequency. The result is a response spectra envelope.

For the subject system, the following building node points are adjacent to the piping or equipment supports:

BUILDING	NODE	ADJACENT PIPING SUPPORTS OR EQUIPMENT
INTERIOR STRUCTURE	1206	RH-9

The response spectra for these points and the response spectra envelope are shown graphically in Appendix A. The coordinate system for these spectra is not, in general, coincident with the coordinate system used for the piping model. Figure A.2-2 indicates the orientation of the horizontal axes of each system. Prior to analysis, the piping system model is rotated such that it aligns with the spectra coordinate axes.

Note that it is sufficient to align -Z (piping) with Y (structural) since the signs are of no consequence in such an elastic, seismic analysis.

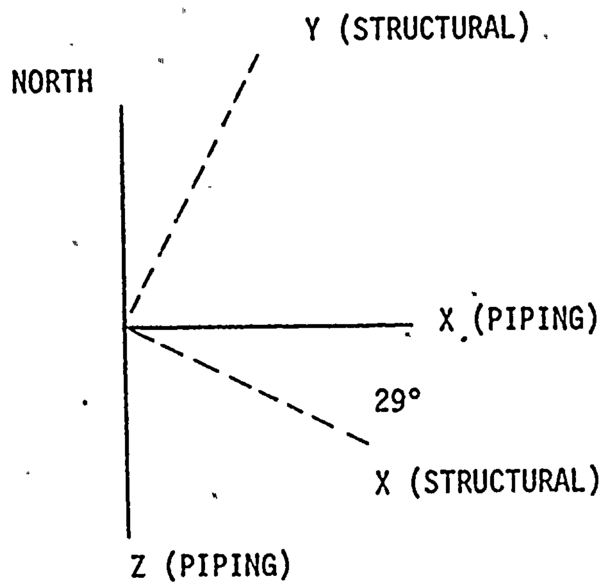


FIGURE A.2-2: COORDINATE SYSTEMS

Rotation of the piping model by -29° will align the two systems.

The displacements relative to ground of the building structures at points of support or equipment attachment are summarized below:

SUPPORT OR EQUIPMENT	X	Y.	VERT.	$R_X.10^3$	$R_Y.10^3$	$R_Y.10^3$
RH-9	0.0003	0.0003	0.0001	–	–	3.61
SUPPORT FLOORS	0.0007	0.0005	0.0001	–	–	6.63

*Units: radians and inches

Each displacement component at each location represents a separate loading condition. Only displacements which can be transferred to the piping through the supports are included. A vertical support, for instance, can only transfer vertical displacement from the building to the piping. The net effect of all component displacements at all points of support is estimated by summing the absolute value of the results for each component at each point.

To reduce the number of cases that must be considered, a support (or group of supports with identical displacements) can be assigned zero displacements. The other displacements are then revised to give the same relative displacements. Only the remaining non-zero displacements need be used as loading conditions. For the subject system, these relative displacements are given below:

RELATIVE DISPLACEMENT
IN STRUCTURAL COORDINATES*

SUPPORT OR EQUIPMENT	X	Y	VERT.	$R_X.10^3$	$R_Y.10^3$	$R_V.10^3$
RH-9	0.001	0.0008	0.0002	—	—	10.24 +
SUPPORT FLOORS	0	0	0	0	0	0

*Zero displacement indicates attachment at the chosen base location.

Note that since these displacements are in structural coordinates, each component must be rotated +29° to the piping coordinates before inclusion in the piping model. The subsequent rotation of the piping model will then result in specification of the displacements in the structural coordinates as indicated.

+Relative displacements as shown above are small (less than 1/16"), therefore, anchor displacements due to earthquake are included in the analysis.

1.4 Static Displacements

The displacements of anchors due to thermal expansion and other static conditions are summarized in Table 1.4-1.

TABLE 1.4-1: STATIC DISPLACEMENTS

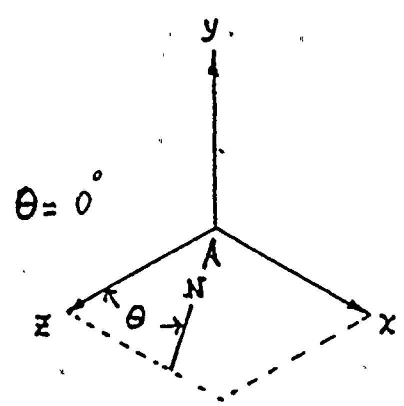
SYSTEM: RESIDUAL HEAT REMOVAL PREPARED BY: C. NG

SECTION: 250 CHECKED BY:

REFERENCE(S): GAI LETTER 10/9/79 13N1-G0-L0281 (CENTRAL ENG. FILE NO.)

Equipment Description	Compt. Node no.	Therm. Mode no.	Thermal Growth DX (in)	Thermal Growth DY (in)	Thermal Growth DZ (in)
ANCHOR RH-9	10		0	0	0
REACTOR COOLANT LOOP	9101		-0.541	-0.539	-0.258

Note: The reactor coolant loop model was attached for the analysis of section 250. Therefore, the movements were obtained from analysis Y6CNGQK and were not input as displacements.



Thermal Mode I:

Thermal Mode II:

Thermal Mode III:

Thermal Mode IV:

2.0 ANALYSIS

2.1 Piping

2.1.1 Basic Stress Criteria

According to criteria established for this project, piping included in this scope is to satisfy the requirements of equations 11, 12 and either 13 or 14 of ANSI B31.1b-1973, "Summer Addenda" to Power Piping ANSI B31.1-1973. These equations govern allowable moments due to sustained loads (deadweight), occasional loads (seismic), and thermal expansion loads, respectively. Relative seismic anchor displacement effects must be included in equations 12, 13 or 14.

$$\frac{PD_o}{4\,t_n} + \frac{0.75\ i\ M_A}{Z} \leq S_h \qquad \text{B31.1-11}$$

$$\frac{PD_o}{4t_n} + \frac{0.75\ i\ M_A}{Z} + \frac{0.75\ i\ M_B}{Z} \leq k\ S_h \qquad \text{B31.1-12}$$

$$\frac{i\ M_c}{Z} \leq S_A \qquad \text{B31.1-13}$$

$$\frac{PD_o}{4\,t_n} + \frac{0.75\ i\ M_A}{Z} + \frac{i\ M_c}{Z} \leq S_h + S_A \qquad \text{B31.1-14}$$

M_A = resultant moment due to weight and other sustained loads, in-lb.

M_B = resultant moment due to occasional loads such as fluid flow transients and earthquake, in - lb.

M_c = range of resultant moments due to the thermal expansion, in - lb.

P = internal design pressure, psig

D_o = outside diameter of pipe, in.

t_n = nominal wall thickness of component, in.

i = stress intensification factor* from appendix D, B31.16 - 1973
0.75 i $\geq$ 1.0

Z = section modulus, in^3 as described in B31.16 - 1973, section 104.8.4.B.

S_h = basic material allowable stress at maximum temperature.

S_A = allowable stress range for expansion stresses.

k = 1.2 for occasional loads acting less than 1% of the time.

Analytical procedures for checking compliance with these equations include a distributed mass deadweight analysis, lumped mass response spectra seismic analysis, and a thermal flexibility analysis. These procedures are implemented by the computer program WESTDYN, which determines loads and displacements at all chosen cross sections, associated stress levels as defined by equations 11, 12 and 13, and reactions at all support and equipment connections. WESTDYN input is prepared by program WESGEN from a data base established by program PAGES.

Three coordinate systems have been consolidated in this analysis. The piping geometry is described in the PAGES program input using the GAI piping drawing coordinate system, with north along the negative Z axis. For inside containment systems, this data is altered using program ANZEIT which transforms the model to a system parallel to the GAI structural coordinate system, which has the positive Y axis inclined 29° east (clockwise) of north. The

piping geometry is thus specified in a coordinate system whose axes are parallel to the response spectra axes used by GAI for the containment and interior structure. The third coordinate system is local and is described when used in this documentation.

2.2 Nozzle Load Evaluation

Loads imposed on equipment nozzles must meet the following criteria unless specific allowable loads are known, in which case those loads must not be exceeded.

(1) axial force $\leq 0.01\ S_Y A$

(2) bending moment $\leq 0.1\ S_Y Z$

(3) torsional moment $\leq 0.2\ S_Y Z$

(4) shear force $\leq 0.01\ S_Y A$

where S_Y = yield stress of nozzle at operating temperature from ASME Section III

A = cross sectional area of pipe, in^2

Z = section modulus of pipe

These allowables apply for the following loading conditions:

a) Normal condition -- deadweight plus maximum operating thermal

b) Design condition -- OBE earthquake plus maximum operating thermal plus deadweight

2.3 Valve Load Evaluation

Valves are classified as either active or inactive. Operation of an active valve is required for a cold shutdown. All other valves are calssified as inactive. For inactive valves, it is necessary to assure that the pipe valve interface meets the criteria for piping stresses. The valve load criteria discussed below apply only to active valves.

VALVE TYPE	STRESS LIMITS ON VALVE ENDS
Swing Check	$\sigma_{max} \leq S_Y$
	$\sigma_{bending} \leq 0.75\ S_Y$
	$\sigma_{torsion} \leq 0.5\ S_Y$
Safety, open	$\sigma_{max} \leq 0.75\ S_Y$
Safety, closed	refer to vendor's specifications
Other	$\sigma_{max} \leq 0.75\ S_Y$
	$\sigma_{bending} \leq 0.50\ S_Y$
	$\sigma_{torsion} \leq 0.50\ S_Y$

σ_{max} = maximum principal stress

$$= 0.5\ (H + S_o + \sqrt{(H - S_o)^2 + 4\ S_S^{\,2}})\quad S_S^{\,2}$$

$\sigma_{bending}$ = maximum fiber stress due to bending
$= M_b/Z$

$\sigma_{tension}$ = maximum fiber stress due to torsion
$= M_t/2Z$

S_Y = yield stress at design temperature for ASME SA-376, type 316 for stainless steel valves and ASME SA-106 grade B for carbon steel valves.

Z = section modulus of piping

M_b = resultant bending moment

M_t = torsional moment

H = $P_o\,[r_o^2 + r_i^2)/(r_o^2 - r_i^2)]$, hoop stress

P_o = operating pressure

r_o = pipe outside radius

r_i = pipe inside radius

L = $P_o\,[r_i^2/(r_o^2 - r_i^2)]$, longitudinal pressure stress

F = F_X/A

F_X = axial load

B = M_c/Z

S_o = $F + B + L$

S_S = $V + V_{torsion}$

V = $2F_S/A$

F_S = shear force

Active valves may be checked for compliance with these criteria by manual calculation using loads from the piping analysis or automatically by using program VALVE. This program is linked to the piping anlaysis output file from which it obtains all necessary load data for each valve.

Results of Stress Analysis and Load Evaluations

Stresses are satisfactory for all the loading conditions in the as-built system, however, valve 700 does not satisfy the valve criteria. By removing the variable spring hanger RH-11, the maximum principal stress at the end of valve 700 is reduced significantly, while the stresses in the piping system still satisfy equations 11, 12, 13 or 14. RH-10 preloaded.

SUPPORT DESCRIPTION AND LOAD SUMMARY

SYSTEM: RESIDUAL HEAT REMOVAL

SECTION: 250

SUPPORT: RH-9

PREPARED BY: C. NG

CHECKED BY: JCM 6,78.80

DESCRIPTION

LINE OF ACTION — **STIFFNESS** (KIPS/IN)

- [ ] Axial, Horizontal
- [ ] Transverse, Horizontal
- [ ] Vertical
- [x] Other (Specify)

INTERMEDIATE ANCHOR BETWEEN SECTION 200 AND 250

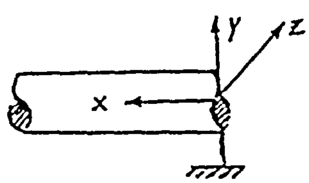
LOADS (kips, in-kips)

	FX	FY	FZ	MX	MY	MZ	ANALYSIS/NODE
Deadweight	0.08	2.22	-0.19	-8.24	29.77	187.72	Y6CNG52/300
Seismic, OBE	±8.34	±1.69	±4.53	±139.3	±326	±344.8	"
Thermal I	4.79	0.13	4.76	90.96	523.25	217.15	"
Thermal II	5.21	-0.02	5.13	93.8	560.04	209.31	"
Thermal III							
Seismic, SSE	±15.46	±3.05	±8.40	±258.20	±672.34	±654.12	"

THERMAL I: NORMAL OPERATION

THERMAL II: LOSS OF LOAD

THERMAL III:



RH-9

SUPPORT DESCRIPTION AND LOAD SUMMARY

SYSTEM: *RESIDUAL HEAT REMOVAL*　　PREPARED BY: *C. NG*

SECTION: *200 & 250*　　CHECKED BY: *JCW 6.28.80*

SUPPORT: *RH-9 COMBINED LOADS*

DESCRIPTION

LINE OF ACTION　　**STIFFNESS** *(KIPS/IN)*

- [ ] Axial, Horizontal ______
- [ ] Transverse, Horizontal ______
- [ ] Vertical ______
- [x] Other (Specify) ______

INTERMEDIATE ANCHOR BETWEEN SECTION 200 AND 250

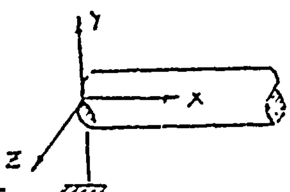
LOADS (kips, in-kips) *(LOCAL COORDINATES OF SECTION 1)*

	FX	FY	FZ	MX	MY	MZ	ANALYSIS/NODE
Deadweight	-0.13	4.83	0.16	13.77	34.38	-118.24	*SUMMATION OF LOADS DUE TO SECTION 1 AND SECTION 2*
Seismic, OBE	±11.43	±2.55	±12.02	±501.2	±781.8	±528.1	
Thermal I	-3.99	-3.09	4.95	-98.18	500.4	-465.18	
Thermal II	-4.4	-3.41	-5.33	-101.3	536.59	-474.66	
Thermal III	-3.64	0.68	5.44	-100.9	534	96.1	
Seismic, SSE	±19.55	±4.37	±14.8	±563.57	±1040.8	±885.11	

THERMAL I: *NORMAL OPERATION*

THERMAL II: *LOSS OF LOAD*

THERMAL III: *RVO (SECTION 200) + LOSS OF LOAD (SECTION 250)**



RH-9

** IN SECTION 250, LOSS OF LOAD IS A MORE SEVERE CONDITION THAN RVO, HENCE NO RVO LOADS FOR SECTION 250 IS AVAILABE.*

SUPPORT DESCRIPTION AND LOAD SUMMARY

SYSTEM: RESIDUAL HEAT REMOVAL

SECTION: 250

SUPPORT: RH-10

PREPARED BY: C. NG

CHECKED BY: JCM 6.28.80

DESCRIPTION

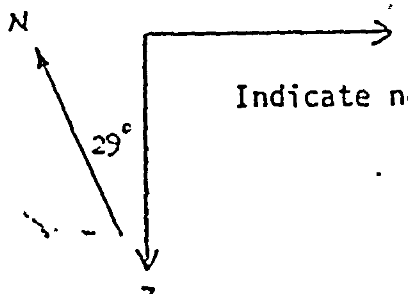
LINE OF ACTION — **STIFFNESS** (KIPS/IN)

- [ ] Axial, Horizontal
- [ ] Transverse, Horizontal
- [x] Vertical — 0.545
- [ ] Other (Specify)

PRESET LOAD: 1.328 KIPS

LOADS (kips, in-kips)

	FX	FY	FZ	MX	MY	MZ	ANALYSIS/NODE
Deadweight		-1.33					Y6CNG52/400
Seismic, OBE		±0.14					"
Thermal I		-0.30					"
Thermal II		-0.31					"
Thermal III							
Seismic, SSE		±0.26					"



Indicate north

THERMAL I: NORMAL OPERATION
THERMAL II: LOSS OF LOAD
THERMAL III:

SUPPORT DESCRIPTION AND LOAD SUMMARY

SYSTEM: RESIDUAL HEAT REMOVAL
PREPARED BY: C. NG

SECTION: 250
CHECKED BY: JCM 6.28.80

SUPPORT: RH-12

DESCRIPTION

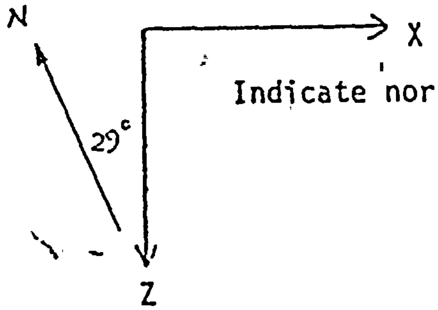
LINE OF ACTION | **STIFFNESS** (KIPS/IN)

- [X] Axial, Horizontal — 1582
- [ ] Transverse, Horizontal
- [ ] Vertical
- [ ] Other (Specify)

COLD GAP: NORTH (0.125")
SOUTH (0.125")

LOADS (kips, in-kips)

	FX	FY	FZ	MX	MY	MZ	ANALYSIS/NODE
Deadweight	0.02		2.37				Y6CNG52/540
Seismic, OBE	±0.05		±6.49				"
Thermal I	-0.06		-7.44				"
Thermal II	-0.06		-7.42				"
Thermal III							
Seismic, SSE	±0.10		±12.07				"



THERMAL I: NORMAL OPERATION
THERMAL II: LOSS OF LOAD
THERMAL III:

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DISPLACEMENTS AT SUPPORTS AND DISCONTINUITIES IN GLOBAL COORDS

DESCRIPTION	NODE	DX (INCHES)	DY (INCHES)	DZ (INCHES)	RX (RADS)	RY (RADS)	RZ (RADS)
S1	125	-.000	-.000	.000	.000001	.000001	.000000
S1	129	.000	-.006	-.000	.000003	.000000	.000001
S1	159	.000	-.002	-.003	-.000021	-.000013	-.000003
RIR-10	400	-.010	-.124	-.030	-.000276	-.000181	.000578
SAR-12	540	.005	-.077	.001	-.001171	-.000082	-.000101

SDTAR-80-05-05

NORMAL OPERATING   YOUNG52   6/27/80   WESTDYN

DISPLACEMENTS AT SUPPORTS AND DISCONTINUITIES IN GLOBAL COORDS

DESCRIPTOR	NODE	DX (INCHES)	DY (INCHES)	DZ (INCHES)	RX (RADS)	RY (RADS)	RZ (RADS)
SI	123	.113	1.228	.052	.000683	.000225	-.001658
SI	129	-.446	.204	-.174	.001011	.000229	-.002407
SI	169	-1.091	.020	1.020	.000808	.001149	.000020
[illegible]	400	-.985	-.551	-.128	.003191	.000758	.005905
SNRH12	540	-.058	-1.419	.000	-.002900	.002968	.002812

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LOSS OF LOAD

Y6LNG52 6/27/80 WESTDYN

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DISPLACEMENTS AT SUPPORTS AND DISCONTINUITIES IN GLOBAL COORDS

DESCRIPTOR	NODE	DX (INCHES)	DY (INCHES)	DZ (INCHES)	RX (RADS)	RY (RADS)	RZ (RADS)
SI	123	.113	1.228	.052	.000683	.000225	-.001658
SI	129	-.446	.204	-.174	.001011	.000229	-.002407
SI	169	-1.091	.020	1.020	.000808	.001149	.000020
RIRH-10	400	-1.039	-.560	-.140	.003344	.000918	.000154
SKRH12	540	-.694	-1.467	.001	-.003023	.003289	.002767

SEISMIC (OBE) YOUNG52 6/27/80 WESTDYN

DISPLACEMENTS AT SUPPORTS AND DISCONTINUITIES IN GLOBAL COORDS

DESCRIPTOR	NODE	DX (INCHES)	DY (INCHES)	DZ (INCHES)	RX (RADS)	RY (RADS)	RZ (RADS)
ST	123	.022	.052	.022	.000177	.000005	.000178
ST	129	.002	.050	.002	.000054	.000006	.000050
ST	169	.005	.015	.084	.000569	.000379	.000189
RIRH-10	400	.130	.255	.159	.003659	.002634	.005740
SKRH12	540	.041	.288	.001	.004956	.003794	.004083

DISPLACEMENTS AT SUPPORTS AND DISCONTINUITIES IN GLOBAL COORDS

DESCRIPTOR	NODE	DX (INCHES)	DY (INCHES)	DZ (INCHES)	RX (RADS)	RY (RADS)	RZ (RADS)
SI	123	.038	.090	.038	.000304	.000010	.000301
ST	129	.003	.093	.004	.000094	.000010	.000085
SI	169	.009	.025	.139	.000938	.000630	.000303
RIRH-10	400	.241	.469	.294	.000784	.004672	.010651
SKRH12	540	1.187	.533	.003	.009175	.007030	.007557

EQUATION 11 STRESS ANALYSIS PER ANSI B31.1 CODE THROUGH THE SUMMER 1973 ADDENDA (NNS PIPING)
ALL STRESSES IN PSI

NON-NUCLEAR SAFETY (NNS) PIPING

NODE POINT	MEMBER TYPE	EQUATION NUMBER	PRESSURE STRESS	BENDING STRESS	TOTAL STRESS	ALLOWABLE STRESS	OVERSTRESS
300	CR	11	4927.	2548.	7476.	16420.	
310	CR	11	4927.	1937.	6865.	16420.	
310	CR	11	4927.	1937.	6865.	16420.	
320	CR	11	4927.	932.	5860.	16420.	
320	CR	11	4927.	932.	5860.	16420.	
330	CR	11	4927.	541.	5468.	16420.	
330	CR	11	4927.	541.	5468.	16420.	
340	CR	11	4927.	187.	5114.	16420.	
340	CR	11	4927.	187.	5114.	16420.	
350	CR	11	4927.	370.	5297.	16420.	
350	CR	11	4927.	370.	5297.	16420.	
360	CR	11	4927.	384.	5311.	16420.	
360	EL	11	4927.	384.	5311.	16420.	
370	EL	11	4927.	432.	5360.	16420.	
370	CR	11	4927.	432.	5360.	16420.	
380	CR	11	4927.	430.	5357.	16420.	
380	CR	11	4927.	430.	5357.	16420.	
390	CR	11	4927.	415.	5342.	16420.	

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DEADWEIGHT

Y6GNG52 6/27/80 WESTDYN

EQUATION 11 STRESS ANALYSIS PER ANSI B31.1 CODE THROUGH THE SUMMER 1973 ADDENDA (NNS PIPING)
ALL STRESSES IN PSI

NON-NUCLEAR SAFETY (NNS) PIPING

NODE POINT	MEMBER TYPE	EQUATION NUMBER	PRESSURE STRESS	BENDING STRESS	TOTAL STRESS	ALLOWABLE STRESS	OVERSTRESS
390	CR	11	4927.	415.	5342.	16420.	
400	CR	11	4927.	407.	5335.	16420.	
400	CR	11	4927.	407.	5335.	16420.	
410	CR	11	4927.	424.	5352.	16420.	
410	CR	11	4927.	424.	5352.	16420.	
420	CR	11	4927.	460.	5388.	16420.	
420	EL	11	4927.	460.	5388.	16420.	
430	EL	11	4927.	569.	5496.	16420.	
430	CR	11	4927.	569.	5496.	16420.	
440	CR	11	4927.	618.	5546.	16420.	
440	CR	11	4927.	618.	5546.	16420.	
450	CR	11	4927.	709.	5636.	16420.	
45[illegible]	CR	11	4927.	709.	5636.	16420.	
45[illegible]	CR	11	4927.	709.	5637.	16420.	
45[illegible]	EL	11	4927.	709.	5637.	16420.	
46[illegible]	EL	11	4927.	707.	5635.	16420.	
46[illegible]	CR	11	4927.	707.	5635.	16420.	
47[illegible]	CR	11	4927.	696.	5624.	16420.	

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DEADWEIGHT Y6LNG52 6/27/80 WESTDYN

EQUATION 11 STRESS ANALYSIS PER ANSI B31.1 CODE THROUGH THE SUMMER 1973 ADDENDA (NNS PIPING)
ALL STRESSES IN PSI

NON-NUCLEAR SAFETY (NNS) PIPING

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NODE POINT	MEMBER TYPE	EQUATION NUMBER	PRESSURE STRESS	BENDING STRESS	TOTAL STRESS	ALLOWABLE STRESS	OVERSTRESS
470	CR	11	4927.	696.	5624.	16420.	
480	CR	11	4927.	648.	5575.	16420.	
480	CR	11	4927.	648.	5575.	16420.	
490	CR	11	4927.	576.	5503.	16420.	
490	CR	11	4927.	576.	5503.	16420.	
491	CR	11	4927.	576.	5503.	16420.	
491	EL	11	4927.	576.	5503.	16420.	
500	EL	11	4927.	392.	5519.	16420.	
500	CR	11	4927.	392.	5519.	16420.	
510	CR	11	4927.	326.	5454.	16420.	
510	CR	11	4927.	326.	5454.	16420.	
520	CR	11	4927.	264.	5191.	16420.	
52[illegible]	CR	11	4927.	264.	5191.	16420.	
53[illegible]	CR	11	4927.	226.	5154.	16420.	
53[illegible]	CR	11	4927.	226.	5154.	16420.	
54[illegible]	CR	11	4927.	193.	5121.	16420.	
54[illegible]	CR	11	4927.	193.	5121.	16420.	
55[illegible]	CR	11	4927.	357.	5284.	16420.	

EQUATION 11 STRESS ANALYSIS PER ANSI B31.1 CODE THROUGH THE SUMMER 1973 ADDENDA (NNS PIPING)
ALL STRESSES IN PSI

NON-NUCLEAR SAFETY (NNS) PIPING

NODE POINT	MEMBER TYPE	EQUATION NUMBER	PRESSURE STRESS	BENDING STRESS	TOTAL STRESS	ALLOWABLE STRESS	OVERSTRESS
550	CR	11	902.	105.	1007.	16420.	
560	RU	11	902.	171.	1073.	16420.	
560	RU	11	902.	171.	1073.	16420.	
570	RU	11	902.	271.	1173.	16420.	
570	RU	11	902.	0.	902.	16420.	
590	RU	11	902.	0.	902.	16420.	
570	RU	11	902.	271.	1173.	16420.	
600	RU	11	902.	321.	1223.	16420.	
600	RU	11	902.	321.	1223.	16420.	
610	RU	11	902.	480.	1382.	16420.	
610	RU	11	4927.	1635.	6362.	16420.	
620	CR	11	4927.	1207.	6195.	16420.	
620	CR	11	4927.	1207.	6195.	16420.	
630	CR	11	4927.	1463.	6390.	16420.	
630	CR	11	4927.	1463.	6390.	16420.	
640	CR	11	4927.	1474.	6401.	16420.	
640	EL	11	4927.	1474.	6401.	16420.	
650	EL	11	4927.	1853.	6701.	16420.	

DEADWEIGHT YOUNG52 6/27/80 WESTDYN

EQUATION 11 STRESS ANALYSIS PER ANSI B31.1 CODE THROUGH THE SUMMER 1973 ADDENDA (NNS PIPING)
ALL STRESSES IN PSI

NON-NUCLEAR SAFETY (NNS) PIPING

NODE POINT	MEMBER TYPE	EQUATION NUMBER	PRESSURE STRESS	BENDING STRESS	TOTAL STRESS	ALLOWABLE STRESS	OVERSTRESS
650	CR	11	4927.	1853.	6781.	16420.	
660	CR	11	4927.	1122.	6050.	16420.	
660	CR	11	4927.	1122.	6050.	16420.	
670	CR	11	4927.	220.	5147.	16420.	
670	CR	11	4927.	220.	5147.	16420.	
680	CR	11	4927.	364.	5292.	16420.	
680	CR	11	4187.	332.	4519.	16420.	
690	CR	11	4187.	387.	4574.	16420.	
690	CR	11	4187.	387.	4574.	16420.	
700	CR	11	4187.	589.	4776.	16420.	

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NORMAL OPERATING

Y6LNG52 6/27/80 WESTDYN

EQUATION 13 STRESS ANALYSIS PER ANSI B31.1 CODE THROUGH THE SUMMER 1973 ADDENDA (NNS PIPING)
ALL STRESSES IN PSI

NON-NUCLEAR SAFETY (NNS) PIPING

NODE POINT	MEMBER TYPE	EQUATION NUMBER	PRESSURE STRESS	BENDING STRESS	TOTAL STRESS	ALLOWABLE STRESS	OVERSTRESS
30[illegible]	CR	13		8587.	8587.	26205.	
31[illegible]	CR	13		7182.	7182.	26205.	
31[illegible]	CR	13		7182.	7182.	26205.	
32.	CR	13		4658.	4658.	26205.	
32[illegible]	CR	13		4658.	4658.	26205.	
33[illegible]	CR	13		3738.	3738.	26205.	
33[illegible]	CR	13		3738.	3738.	26205.	
34[illegible]	CR	13		3327.	3327.	26205.	
34[illegible]	CR	13		3327.	3327.	26205.	
35[illegible]	CR	13		5226.	5226.	26205.	
35.	CR	13		5226.	5226.	26205.	
36[illegible]	CR	13		5412.	5412.	26205.	
36[illegible]	EL	13		6619.	6619.	26205.	
37.	EL	13		6583.	6583.	26205.	
37	CR	13		5382.	5382.	26205.	
38.	CR	13		4814.	4814.	26205.	
38.	CR	13		4814.	4814.	26205.	
39.	CR	13		3853.	3853.	26205.	

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NORMAL OPERATING

Y6LNG52 6/27/80 WESTDYN

EQUATION 13 STRESS ANALYSIS PER ANSI B31.1 CODE THROUGH THE SUMMER 1973 ADDENDA (NNS PIPING)
ALL STRESSES IN PSI

NON-NUCLEAR SAFETY (NNS) PIPING

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NODE POINT	MEMBER TYPE	EQUATION NUMBER	PRESSURE STRESS	BENDING STRESS	TOTAL STRESS	ALLOWABLE STRESS	OVERSTRESS
390	CR	13		3833.	3833.	26205.	
400	CR	13		3466.	3466.	26205.	
400	CR	13		4505.	4505.	26205.	
410	CR	13		4217.	4217.	26205.	
410	CR	13		3244.	3244.	26205.	
420	CR	13		3106.	3106.	26205.	
420	EL	13		3799.	3799.	26205.	
430	EL	13		2425.	2425.	26205.	
430	CR	13		1982.	1982.	26205.	
440	CR	13		1683.	1683.	26205.	
440	CR	13		1683.	1683.	26205.	
450	CR	13		4471.	4471.	26205.	
450	CR	13		4471.	4471.	26205.	
451	CR	13		4481.	4481.	26205.	
451	EL	13		5505.	5505.	26205.	
460	EL	13		7272.	7272.	26205.	
460	CR	13		7695.	7695.	26205.	
470	CR	13		7725.	7725.	26205.	

NORMAL OPERATING

YOUNG52 6/27/80 WESTDYN

EQUATION 13 STRESS ANALYSIS PER ANSI B31.1 CODE THROUGH THE SUMMER 1973 ADDENDA (NNS PIPING)
ALL STRESSES IN PSI

NON-NUCLEAR SAFETY (NNS) PIPING

NODE POI.	MEMBER TYPE	EQUATION NUMBER	PRESSURE STRESS	BENDING STRESS	TOTAL STRESS	ALLOWABLE STRESS	OVERSTRESS
47	CR	13		5943.	5943.	26205.	
48	CR	13		6128.	6128.	26205.	
48	CR	13		6128.	6128.	26205.	
49	CR	13		6808.	6808.	26205.	
49	CR	13		6808.	6808.	26205.	
49	CR	13		6811.	6811.	26205.	
49	EL	13		8368.	8368.	26205.	
50	EL	13		8504.	8504.	26205.	
50	CR	13		6922.	6922.	26205.	
51	CR	13		6800.	6800.	26205.	
51.	CR	13		6800.	6800.	26205.	
52.	CR	13		6690.	6690.	26205.	
52	CR	13		6690.	6690.	26205.	
53	CR	13		6630.	6630.	26205.	
53	CR	13		6630.	6630.	26205.	
54.	CR	13		6583.	6583.	26205.	
54	CR	13		6583.	6583.	26205.	
55	CR	13		6408.	6408.	26205.	

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EQUATION 13 STRESS ANALYSIS PER ANSI B31.1 CODE THROUGH THE SUMMER 1973 ADDENDA (NNS PIPING)
ALL STRESSES IN PSI

NON-NUCLEAR SAFETY (NNS) PIPING

NODE POINT	MEMBER TYPE	EQUATION NUMBER	PRESSURE STRESS	BENDING STRESS	TOTAL STRESS	ALLOWABLE STRESS	OVERSTRESS
550	CR	13		1881.	1881.	26205.	
560	RU	13		3390.	3390.	26205.	
560	RU	13		3390.	3390.	26205.	
570	RU	13		3423.	3423.	26205.	
578	RU	13		0.	0.	26205.	
590	RU	13		0.	0.	26205.	
570	RU	13		3423.	3423.	26205.	
600	RU	13		3444.	3444.	26205.	
600	RU	13		3444.	3444.	26205.	
610	RU	13		3521.	3521.	26205.	
610	RU	13		11995.	11995.	26205.	
620	CR	13		6686.	6686.	26205.	
620	CR	13		6686.	6686.	26205.	
630	CR	13		6768.	6768.	26205.	
630	CR	13		6768.	6768.	26205.	
640	CR	13		6772.	6772.	26205.	
640	EL	13		8284.	8284.	26205.	
650	EL	13		5774.	5774.	26205.	

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NORMAL OPERATING YOUNG52 6/27/80 WESTDYN

EQUATION 13 STRESS ANALYSIS PER ANSI B31.1 CODE THROUGH THE SUMMER 1973 ADDENDA (NNS PIPING)
ALL STRESSES IN PSI

NON-NUCLEAR SAFETY (NNS) PIPING

NODE PNT	MEMBER TYPE	EQUATION NUMBER	PRESSURE STRESS	BENDING STRESS	TOTAL STRESS	ALLOWABLE STRESS	OVERSTRESS
65	CR	13		4720.	4720.	26205.	
66	CR	13		3395.	3395.	26205.	
66	CR	13		4414.	4414.	26205.	
67	CR	13		12825.	12825.	26205.	
67:	CR	13		9860.	9860.	26205.	
68	CR	13		11245.	11245.	26205.	
68	CR	13		10256.	10256.	26205.	
69	CR	13		10665.	10665.	26205.	
69:	CR	13		10665.	10665.	26205.	
70	CR	13		12091.	12091.	26205.	

LOSS OF LOAD

EQUATION 13 STRESS ANALYSIS PER ANSI B31.1 CODE THROUGH THE SUMMER 1973 ADDENDA (NNS PIPING)
ALL STRESSES IN PSI

NON-NUCLEAR SAFETY (NNS) PIPING

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NODE POINT	MEMBER TYPE	EQUATION NUMBER	PRESSURE STRESS	BENDING STRESS	TOTAL STRESS	ALLOWABLE STRESS	OVERSTRESS
300	CR	13		9124.	9124.	26205.	
310	CR	13		7592.	7592.	26205.	
310	CR	13		7592.	7592.	26205.	
320	CR	13		4837.	4837.	26205.	
320	CR	13		4837.	4837.	26205.	
330	CR	13		3842.	3842.	26205.	
330	CR	13		3842.	3842.	26205.	
340	CR	13		3450.	3450.	26205.	
340	CR	13		3450.	3450.	26205.	
350	CR	13		5668.	5668.	26205.	
350	CR	13		5668.	5668.	26205.	
360	CR	13		5875.	5875.	26205.	
360	EL	13		7186.	7186.	26205.	
370	EL	13		7164.	7164.	26205.	
370	CR	13		5857.	5857.	26205.	
380	CR	13		5236.	5236.	26205.	
380	CR	13		5236.	5236.	26205.	
390	CR	13		4167.	4167.	26205.	

LOSS OF LOAD

YOUNG52 6/27/80 WESTDYN

EQUATION 13 STRESS ANALYSIS PER ANSI B31.1 CODE THROUGH THE SUMMER 1973 ADDENDA (NNS PIPING)
ALL STRESSES IN PSI

NON-NUCLEAR SAFETY (NNS) PIPING

NODE POINT	MEMBER TYPE	EQUATION NUMBER	PRESSURE STRESS	BENDING STRESS	TOTAL STRESS	ALLOWABLE STRESS	OVERSTRESS
390	CR	13		4167.	4167.	26205.	
400	CR	13		3769.	3769.	26205.	
400	CR	13		4899.	4899.	26205.	
410	CR	13		4590.	4590.	26205.	
410	CR	13		3531.	3531.	26205.	
420	CR	13		3386.	3386.	26205.	
420	EL	13		4141.	4141.	26205.	
430	EL	13		2608.	2608.	26205.	
430	CR	13		2132.	2132.	26205.	
440	CR	13		1728.	1728.	26205.	
440	CR	13		1728.	1728.	26205.	
450	CR	13		4786.	4786.	26205.	
450	CR	13		4786.	4786.	26205.	
451	CR	13		4797.	4797.	26205.	
451	EL	13		5893.	5893.	26205.	
460	EL	13		7803.	7803.	26205.	
460	CR	13		8257.	8257.	26205.	
470	CR	13		8285.	8285.	26205.	

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EQUATION 13 STRESS ANALYSIS PER ANSI B31.1 CODE THROUGH THE SUMMER 1973 ADDENDA (NNS PIPING)
ALL STRESSES IN PSI

NON-NUCLEAR SAFETY (NNS) PIPING

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NODE POINT	MEMBER TYPE	EQUATION NUMBER	PRESSURE STRESS	BENDING STRESS	TOTAL STRESS	ALLOWABLE STRESS	OVERSTRESS
47[illegible]	CR	13		6373.	6373.	26205.	
48[illegible]	CR	13		6560.	6560.	26205.	
48[illegible]	CR	13		6560.	6560.	26205.	
49[illegible]	CR	13		7276.	7276.	26205.	
49[illegible]	CR	13		7276.	7276.	26205.	
49[illegible]	CR	13		7280.	7280.	26205.	
491	EL	13		8944.	8944.	26205.	
50[illegible]	EL	13		9036.	9036.	26205.	
50[illegible]	CR	13		7354.	7354.	26205.	
51[illegible]	CR	13		7211.	7211.	26205.	
51[illegible]	CR	13		7211.	7211.	26205.	
52[illegible]	CR	13		7087.	7087.	26205.	
52[illegible]	CR	13		7087.	7087.	26205.	
53[illegible]	CR	13		7015.	7015.	26205.	
53[illegible]	CR	13		7015.	7015.	26205.	
54[illegible]	CR	13		6950.	6950.	26205.	
54[illegible]	CR	13		6950.	6950.	26205.	
55	CR	13		6719.	6719.	26205.	

LOSS OF LOAD

YOUNG52 6/27/80 WESTDYN

EQUATION 13 STRESS ANALYSIS PER ANSI B31.1 CODE THROUGH THE SUMMER 1973 ADDENDA (NNS PIPING)
ALL STRESSES IN PSI

NON-NUCLEAR SAFETY (NNS) PIPING

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NODE POINT	MEMBER TYPE	EQUATION NUMBER	PRESSURE STRESS	BENDING STRESS	TOTAL STRESS	ALLOWABLE STRESS	OVERSTRESS
55[illegible]	CR	13		1972.	1972.	26205.	
56[illegible]	RU	13		3552.	3552.	26205.	
56[illegible]	RU	13		3552.	3552.	26205.	
57[illegible]	RU	13		3583.	3583.	26205.	
57[illegible]	RU	13		0.	0.	26205.	
59[illegible]	RU	13		0.	0.	26205.	
57[illegible]	RU	13		3583.	3583.	26205.	
60[illegible]	RU	13		3604.	3604.	26205.	
60[illegible]	RU	13		3604.	3604.	26205.	
61[illegible]	RU	13		3684.	3684.	26205.	
61[illegible]	RU	13		12552.	12552.	26205.	
620	CR	13		6997.	6997.	26205.	
62[illegible]	CR	13		6997.	6997.	26205.	
63[illegible]	CR	13		7085.	7205.	26205.	
63[illegible]	CR	13		7085.	7285.	26205.	
64[illegible]	CR	13		7090.	7290.	26205.	
64[illegible]	EL	13		8072.	8072.	26205.	
65[illegible]	EL	13		6125.	6125.	26205.	

EQUATION 13 STRESS ANALYSIS PER ANSI B31.1 CODE THROUGH THE SUMMER 1973 ADDENDA (NNS PIPING)
ALL STRESSES IN PSI

NON-[illegible] SAFETY ([illegible]) PIPING

NODE POINT	MEMBER TYPE	EQUATION NUMBER	PRESSURE STRESS	BENDING STRESS	TOTAL STRESS	ALLOWABLE STRESS	OVERSTRESS
650	CR	13		5008.	5008.	26205.	
660	CR	13		3707.	3707.	26205.	
660	CR	13		4819.	4819.	26205.	
670	CR	13		13506.	13506.	26205.	
670	CR	13		10389.	10389.	26205.	
680	CR	13		11824.	11824.	26205.	
680	CR	13		10785.	10785.	26205.	
690	CR	13		11210.	11210.	26205.	
690	CR	13		11210.	11210.	26205.	
700	CR	13		12695.	12695.	26205.	

SEISMIC (OBE)

Y6LNG52 6/27/80 WESTDYN

EQUATION 12 STRESS ANALYSIS PER ANSI B31.1 CODE THROUGH THE SUMMER 1973 ADDENDA (NNS PIPING)
ALL STRESSES IN PSI

NON-NUCLEAR SAFETY (NNS) PIPING

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NODE POINT	MEMBER TYPE	EQUATION NUMBER	PRESSURE STRESS	BENDING STRESS	TOTAL STRESS	ALLOWABLE STRESS	OVERSTRESS
50	CR	12	4927.	6988.	11716.	19704.	
51	CR	12	4927.	5810.	10737.	19704.	
51	CR	12	4927.	5810.	10737.	19704.	
52	CR	12	4927.	3956.	8883.	19704.	
52	CR	12	4927.	3956.	8883.	19704.	
53	CR	12	4927.	3581.	8509.	19704.	
53	CR	12	4927.	3581.	8509.	19704.	
54	CR	12	4927.	3761.	8688.	19704.	
54	CR	12	4927.	3761.	8688.	19704.	
55	CR	12	4927.	5591.	10518.	19704.	
55	CR	12	4927.	5591.	10518.	19704.	
56	CR	12	4927.	5733.	10660.	19704.	
56	EL	12	4927.	5733.	10660.	19704.	
57	EL	12	4927.	4979.	9907.	19704.	
57	CR	12	4927.	4979.	9907.	19704.	
58	CR	12	4927.	4174.	9102.	19704.	
58	CR	12	4927.	4174.	9102.	19704.	
59	CR	12	4927.	3192.	8119.	19704.	

EQUATION 12 STRESS ANALYSIS PER ANSI B31.1 CODE THROUGH THE SUMMER 1973 ADDENDA (NNS PIPING)
ALL STRESSES IN PSI

NON-NUCLEAR SAFETY (NNS) PIPING

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NODE POINT	MEMBER TYPE	EQUATION NUMBER	PRESSURE STRESS	BENDING STRESS	TOTAL STRESS	ALLOWABLE STRESS	OVERSTRESS
39[illegible]	CR	12	4927.	5192.	8119.	19704.	
40[illegible]	CR	12	4927.	5222.	8150.	19704.	
4[illegible]	CR	12	4927.	5222.	8150.	19704.	
41[illegible]	CR	12	4927.	5523.	8450.	19704.	
41[illegible]	CR	12	4927.	5523.	8450.	19704.	
420	CR	12	4927.	4058.	8786.	19704.	
42[illegible]	EL	12	4927.	4058.	8786.	19704.	
43[illegible]	EL	12	4927.	4506.	9434.	19704.	
43[illegible]	CR	12	4927.	4506.	9434.	19704.	
4[illegible]	CR	12	4927.	4300.	9228.	19704.	
4[illegible]	CR	12	4927.	4300.	9228.	19704.	
45[illegible]	CR	12	4927.	5459.	10386.	19704.	
45[illegible]	CR	12	4927.	5459.	10386.	19704.	
45[illegible]	CR	12	4927.	5462.	10390.	19704.	
45[illegible]	EL	12	4927.	5462.	10390.	19704.	
[illegible]	EL	12	4927.	5202.	10130.	19704.	
[illegible]	CR	12	4927.	5202.	10130.	19704.	
[illegible]	CR	12	4927.	5033.	9761.	19704.	

EQUATION 12 STRESS ANALYSIS PER ANSI B31.1 CODE THROUGH THE SUMMER 1973 ADDENDA (NNS PIPING)
ALL STRESSES IN PSI

NON-NUCLEAR SAFETY (NNS) PIPING

NODE POINT	MEMBER TYPE	EQUATION NUMBER	PRESSURE STRESS	BENDING STRESS	TOTAL STRESS	ALLOWABLE STRESS	OVERSTRESS
470	CR	12	4927.	5033.	9961.	19704.	
480	CR	12	4927.	4342.	9270.	19704.	
480	CR	12	4927.	4342.	9270.	19704.	
490	CR	12	4927.	3026.	7953.	19704.	
490	CR	12	4927.	3026.	7953.	19704.	
491	CR	12	4927.	3021.	7948.	19704.	
491	EL	12	4927.	3021.	7948.	19704.	
500	EL	12	4927.	1822.	6749.	19704.	
500	CR	12	4927.	1822.	6749.	19704.	
510	CR	12	4927.	1713.	6641.	19704.	
510	CR	12	4927.	1713.	6641.	19704.	
520	CR	12	4927.	1645.	6573.	19704.	
520	CR	12	4927.	1645.	6573.	19704.	
530	CR	12	4927.	1644.	6572.	19704.	
530	CR	12	4927.	1644.	6572.	19704.	
540	CR	12	4927.	1669.	6597.	19704.	
540	CR	12	4927.	1669.	6597.	19704.	
550	CR	12	4927.	2679.	7606.	19704.	

EQUATION 12 STRESS ANALYSIS PER ANSI B31.1 CODE THROUGH THE SUMMER 1973 ADDENDA (NNS PIPING)
ALL STRESSES IN PSI

NON-NUCLEAR SAFETY (NNS) PIPING

NODE POINT	MEMBER TYPE	EQUATION NUMBER	PRESSURE STRESS	BENDING STRESS	TOTAL STRESS	ALLOWABLE STRESS	OVERSTRESS
550	CR	12	902.	786.	1689.	19704.	
560	RU	12	902.	1156.	2058.	19704.	
560	RU	12	902.	1156.	2058.	19704.	
570	RU	12	902.	1396.	2298.	19704.	
570	RU	12	902.	1029.	1932.	19704.	
590	RU	12	902.	16.	918.	19704.	
570	RU	12	902.	2023.	2925.	19704.	
600	RU	12	902.	2138.	3040.	19704.	
600	RU	12	902.	2138.	3040.	19704.	
610	RU	12	902.	2537.	3439.	19704.	
610	RU	12	4927.	8642.	13570.	19704.	
620	CR	12	4927.	6545.	11473.	19704.	
620	CR	12	4927.	6545.	11473.	19704.	
630	CR	12	4927.	7064.	11991.	19704.	
630	CR	12	4927.	7064.	11991.	19704.	
640	CR	12	4927.	7093.	12021.	19704.	
640	EL	12	4927.	7093.	12021.	19704.	
650	EL	12	4927.	8000.	12727.	19704.	

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EQUATION 12 STRESS ANALYSIS PER ANSI B31.1 CODE THROUGH THE SUMMER 1973 ADDENDA (NNS PIPING)
ALL STRESSES IN PSI

NON-NUCLEAR SAFETY (NNS) PIPING

NODE POINT	MEMBER TYPE	EQUATION NUMBER	PRESSURE STRESS	BENDING STRESS	TOTAL STRESS	ALLOWABLE STRESS	OVERSTRESS
650	CR	12	4927.	8000.	12927.	19704.	
660	CR	12	4927.	7104.	12031.	19704.	
660	CR	12	4927.	7104.	12031.	19704.	
670	CR	12	4927.	10637.	15564.	19704.	
670	CR	12	4927.	10637.	15564.	19704.	
680	CR	12	4927.	11658.	16585.	19704.	
680	CR	12	4187.	10633.	14820.	19704.	
690	CR	12	4187.	10945.	15132.	19704.	
690	CR	12	4187.	10945.	15132.	19704.	
700	CR	12	4187.	12069.	16256.	19704.	

EQUATION 12 STRESS ANALYSIS PER ANSI B31.1 CODE THROUGH THE SUMMER 1973 ADDENDA (NNS PIPING)
ALL STRESSES IN PSI

NON-NUCLEAR SAFETY (NNS) PIPING

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NODE POINT	MEMBER TYPE	EQUATION NUMBER	PRESSURE STRESS	BENDING STRESS	TOTAL STRESS	ALLOWABLE STRESS	OVERSTRESS
300	CR	12	4927.	12909.	17836.	19704.	
310	CR	12	4927.	10733.	15660.	19704.	
310	CR	12	4927.	10733.	15660.	19704.	
320	CR	12	4927.	7315.	12242.	19704.	
320	CR	12	4927.	7315.	12242.	19704.	
330	CR	12	4927.	6628.	11556.	19704.	
330	CR	12	4927.	6628.	11556.	19704.	
340	CR	12	4927.	6966.	11894.	19704.	
340	CR	12	4927.	6966.	11894.	19704.	
350	CR	12	4927.	10352.	15280.	19704.	
350	CR	12	4927.	10352.	15280.	19704.	
360	CR	12	4927.	10615.	15542.	19704.	
360	EL	12	4927.	10615.	15542.	19704.	
370	EL	12	4927.	9215.	14143.	19704.	
370	CR	12	4927.	9215.	14143.	19704.	
380	CR	12	4927.	7721.	12648.	19704.	
380	CR	12	4927.	7721.	12648.	19704.	
390	CR	12	4927.	5894.	10821.	19704.	

EQUATION 12 STRESS ANALYSIS PER ANSI B31.1 CODE THROUGH THE SUMMER 1973 ADDENDA (NNS PIPING)
ALL STRESSES IN PSI

NON-NUCLEAR SAFETY (NNS) PIPING

NODE POINT	MEMBER TYPE	EQUATION NUMBER	PRESSURE STRESS	BENDING STRESS	TOTAL STRESS	ALLOWABLE STRESS	OVERSTRESS
390	CR	12	4927.	5894.	10821.	19704.	
400	CR	12	4927.	5949.	10877.	19704.	
400	CR	12	4927.	5949.	10877.	19704.	
410	CR	12	4927.	6505.	11433.	19704.	
410	CR	12	4927.	6505.	11433.	19704.	
420	CR	12	4927.	7499.	12426.	19704.	
420	EL	12	4927.	7499.	12426.	19704.	
430	EL	12	4927.	8332.	13259.	19704.	
430	CR	12	4927.	8332.	13259.	19704.	
440	CR	12	4927.	7954.	12882.	19704.	
440	CR	12	4927.	7954.	12882.	19704.	
450	CR	12	4927.	10107.	15035.	19704.	
450	CR	12	4927.	10107.	15035.	19704.	
451	CR	12	4927.	10114.	15041.	19704.	
451	EL	12	4927.	10114.	15041.	19704.	
460	EL	12	4927.	9635.	14563.	19704.	
460	CR	12	4927.	9635.	14563.	19704.	
470	CR	12	4927.	9322.	14249.	19704.	

EQUATION 12 STRESS ANALYSIS PER ANSI B31.1 CODE THROUGH THE SUMMER 1973 ADDENDA (NNS PIPING)
ALL STRESSES IN PSI

NON-NUCLEAR SAFETY (NNS) PIPING

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NODE POINT	MEMBER TYPE	EQUATION NUMBER	PRESSURE STRESS	BENDING STRESS	TOTAL STRESS	ALLOWABLE STRESS	OVERSTRESS
470	CR	12	4927.	9322.	14249.	19704.	
480	CR	12	4927.	8043.	12971.	19704.	
480	CR	12	4927.	8043.	12971.	19704.	
490	CR	12	4927.	5608.	10536.	19704.	
490	CR	12	4927.	5608.	10536.	19704.	
491	CR	12	4927.	5599.	10527.	19704.	
491	EL	12	4927.	5599.	10527.	19704.	
500	EL	12	4927.	3381.	8309.	19704.	
500	CR	12	4927.	3381.	8309.	19704.	
510	CR	12	4927.	3180.	8107.	19704.	
510	CR	12	4927.	3180.	8107.	19704.	
520	CR	12	4927.	3053.	7980.	19704.	
520	CR	12	4927.	3053.	7980.	19704.	
530	CR	12	4927.	3051.	7978.	19704.	
530	CR	12	4927.	3051.	7978.	19704.	
540	CR	12	4927.	3096.	8023.	19704.	
540	CR	12	4927.	3096.	8023.	19704.	
550	CR	12	4927.	4960.	9887.	19704.	

EQUATION 12 STRESS ANALYSIS PER ANSI B31.1 CODE THROUGH THE SUMMER 1973 ADDENDA (NNS PIPING)
ALL STRESSES IN PSI

NON-NUCLEAR SAFETY (NNS) PIPING

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NODE POINT	MEMBER TYPE	EQUATION NUMBER	PRESSURE STRESS	BENDING STRESS	TOTAL STRESS	ALLOWABLE STRESS	OVERSTRESS
550	CR	12	902.	1456.	2358.	19704.	
560	RU	12	902.	2140.	3043.	19704.	
560	RU	12	902.	2140.	3043.	19704.	
570	RU	12	902.	2583.	3486.	19704.	
570	RU	12	902.	1911.	2814.	19704.	
590	RU	12	902.	30.	932.	19704.	
570	RU	12	902.	3747.	4049.	19704.	
600	RU	12	902.	3959.	4862.	19704.	
600	RU	12	902.	3959.	4862.	19704.	
610	RU	12	902.	4697.	5599.	19704.	
610	RU	12	4927.	16001.	20929.	19704.	1225.
620	CR	12	4927.	12119.	17046.	19704.	
620	CR	12	4927.	12119.	17046.	19704.	
630	CR	12	4927.	13077.	18005.	19704.	
630	CR	12	4927.	13077.	18005.	19704.	
640	CR	12	4927.	13132.	18060.	19704.	
640	EL	12	4927.	13132.	18060.	19704.	
650	EL	12	4927.	14812.	19740.	19704.	36.

EQUATION 12 STRESS ANALYSIS PER ANSI B31.1 CODE THROUGH THE SUMMER 1973 ADDENDA (NNS PIPING)
ALL STRESSES IN PSI

NON-NUCLEAR SAFETY (NNS) PIPING

NODE POINT	MEMBER TYPE	EQUATION NUMBER	PRESSURE STRESS	BENDING STRESS	TOTAL STRESS	ALLOWABLE STRESS	OVERSTRESS
650	CR	12	4927.	14812.	19740.	19704.	36.
660	CR	12	4927.	13159.	18086.	19704.	
660	CR	12	4927.	13159.	18086.	19704.	
670	CR	12	4927.	19705.	24632.	19704.	4928.
670	CR	12	4927.	19705.	24632.	19704.	4928.
680	CR	12	4927.	21595.	26522.	19704.	6818.
680	CR	12	4187.	19697.	23884.	19704.	4180.
690	CR	12	4187.	20274.	24461.	19704.	4757.
690	CR	12	4187.	20274.	24461.	19704.	4757.
700	CR	12	4187.	22355.	26542.	19704.	6838.

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PIPING DISPLACEMENTS IN GLOBAL COORDINATES

POINT ID	DX (INCHES)	DY (INCHES)	DZ (INCHES)	RX (RADS)	RY (RADS)	RZ (RADS)
189	-.000	-.000	-.000	.000001	-.000005	.000011
190	-.000	-.000	-.000	.000001	-.000005	.000011
191	-.000	-.000	-.000	.000000	-.000001	.000004
192	-.000	-.000	-.000	.000000	-.000001	.000003
193	-.000	-.000	-.000	.000000	-.000001	.000003
194	-.000	-.000	-.000	.000000	-.000000	.000000
195	-.000	.000	-.000	.000000	.000000	.000000
300	0.000	0.000	0.000	0.000000	0.000000	0.000000
310	.000	-.004	-.001	-.000022	-.000058	.000344
320	.000	-.030	-.005	-.000067	-.000147	.000773
330	.000	-.048	-.009	-.000090	-.000179	.000881
340	.000	-.075	-.014	-.000118	-.000206	.000938
350	.000	-.125	-.020	-.000173	-.000220	.000877
360	.000	-.126	-.027	-.000177	-.000219	.000868
370	-.003	-.135	-.030	-.000246	-.000193	.000730
380	-.005	-.132	-.030	-.000256	-.000169	.000692
390	-.009	-.127	-.030	-.000272	-.000163	.000616

DEADWEIGHT

YOUNG52 6/27/80 WESTDYN

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PIPING DISPLACEMENTS IN GLOBAL COORDINATES

POINT ID	DX (INCHES)	DY (INCHES)	DZ (INCHES)	RX (RADS)	RY (RADS)	RZ (RADS)
400	-.010	-.124	-.030	-.000276	-.000181	.000578
410	-.012	-.122	-.030	-.000281	-.000181	.000548
420	-.014	-.119	-.030	-.000292	-.000180	.000514
430	-.010	-.114	-.024	-.000430	-.000215	.000377
440	-.003	-.114	-.015	-.000487	-.000216	.000316
450	.006	-.114	.003	-.000605	-.000221	.000202
451	.006	-.114	.003	-.000605	-.000221	.000201
460	.008	-.115	.011	-.000784	-.000182	-.000008
470	.008	-.115	.010	-.000800	-.000182	-.000017
480	.008	-.115	.008	-.000867	-.000178	-.000052
490	.008	-.115	.004	-.000994	-.000161	-.000088
491	.008	-.115	.004	-.000994	-.000161	-.000088
500	.006	-.095	.001	-.001146	-.000098	-.000116
510	.005	-.089	.001	-.001157	-.000093	-.000111
520	.005	-.084	.001	-.001165	-.000088	-.000107
530	.005	-.080	.001	-.001168	-.000085	-.000104
540	.005	-.077	.001	-.001171	-.000082	-.000101

PIPING DISPLACEMENTS IN GLOBAL COORDINATES

POINT IS	DX (INCHES)	DY (INCHES)	DZ (INCHES)	RX (RADS)	RY (RADS)	RZ (RADS)
550	.003	-.051	.002	-.001154	-.000064	-.000079
560	.003	-.047	.002	-.001151	-.000063	-.000078
570	.002	-.037	.002	-.001143	-.000062	-.000076
580	.004	-.057	-.029	-.001143	-.000062	-.000076
570	.002	-.037	.002	-.001143	-.000062	-.000076
600	.002	-.035	.002	-.001138	-.000061	-.000075
610	.001	-.024	.002	-.001122	-.000060	-.000073
620	.001	-.022	.002	-.001113	-.000059	-.000072
630	.001	-.018	.002	-.001076	-.000057	-.000069
640	.001	-.016	.002	-.001074	-.000057	-.000069
650	.001	-.006	-.007	-.000267	-.000044	-.000042
660	.002	-.006	-.010	.000001	-.000031	-.000019
670	.002	-.005	-.005	.000152	-.000010	.000031
680	.002	-.005	-.004	.000142	-.000006	.000041
690	.002	-.005	-.003	.000137	-.000005	.000045
7_0	.001	-.005	-.002	.000111	-.000001	.000056
91_1	.000	-.005	-.000	-.000008	-.000001	.000031

NORMAL OPERATING

PIPING DISPLACEMENTS IN GLOBAL COORDINATES

POINT ID	DX (INCHES)	DY (INCHES)	DZ (INCHES)	RX (RADS)	RY (RADS)	RZ (RADS)
109	-.358	.000	.294	.000067	.003050	-.000018
190	-.338	.000	.294	.000067	.003049	-.000018
191	-.319	.000	.248	.000026	.000947	-.000013
192	-.315	.000	.239	.000018	.000773	-.000010
193	-.314	.000	.238	.000018	.000761	-.000009
194	-.219	.000	.139	.000000	.000036	-.000000
101	.000	.000	.000	.000000	-.000000	.000000
300	0.000	0.000	0.000	0.000000	0.000000	0.000000
310	-.116	-.006	-.013	.000276	-.001101	.000504
320	-.347	-.049	-.098	.000828	-.002577	.001490
330	-.403	-.087	-.159	.001104	-.002952	.001974
340	-.606	-.148	-.242	.001445	-.003081	.002562
350	-.893	-.317	-.393	.002127	-.002232	.003707
360	-.910	-.329	-.401	.002169	-.002131	.003777
370	-1.002	-.431	-.342	.002819	-.000079	.004828
380	-1.001	-.459	-.288	.002914	.000208	.005097
390	-.992	-.520	-.182	.003100	.000627	.005636

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PIPING DISPLACEMENTS IN GLOBAL COORDINATES

POINT ID	DX (INCHES)	DY (INCHES)	DZ (INCHES)	RX (RADS)	RY (RADS)	RZ (RADS)
400	-.985	-.551	-.128	.003191	.000758	.005905
410	-.978	-.577	-.086	.003261	.000826	.006120
420	-.970	-.607	-.038	.003336	.000863	.006361
430	-.853	-.740	-.012	.003641	.000923	.007126
440	-.713	-.645	-.082	.003541	.000774	.007280
450	-.462	-1.027	-.196	.002885	.000508	.007073
451	-.461	-1.028	-.197	.002883	.000507	.007072
460	-.440	-1.202	-.222	.001435	.000712	.005834
470	-.457	-1.220	-.220	.001292	.000719	.005762
480	-.526	-1.293	-.210	.000694	.000804	.005454
490	-.655	-1.419	-.186	-.000428	.001194	.004857
491	-.656	-1.419	-.186	-.000432	.001196	.004855
500	-.702	-1.459	-.081	-.002340	.002691	.003327
510	-.689	-1.447	-.056	-.002511	.002789	.003169
520	-.676	-1.435	-.031	-.002678	.002874	.003014
530	-.667	-1.427	-.015	-.002789	.002924	.002913
540	-.658	-1.419	.000	-.002900	.002968	.002812

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PIPING DISPLACEMENTS IN GLOBAL COORDINATES

POINT IS	DX (INCHES)	DY (INCHES)	DZ (INCHES)	RX (RADS)	RY (RADS)	RZ (RADS)
550	-.588	-1.346	.117	-.003722	.003154	.002073
560	-.577	-1.332	.135	-.003757	.003156	.002042
570	-.550	-1.300	.180	-.003842	.003153	.001967
580	-.624	-1.107	.092	-.003842	.003153	.001967
570	-.550	-1.300	.180	-.003842	.003153	.001967
600	-.539	-1.287	.198	-.003875	.003149	.001938
610	-.512	-1.255	.244	-.003963	.003132	.001861
620	-.508	-1.249	.250	-.004006	.003122	.001825
630	-.496	-1.233	.269	-.004151	.003080	.001700
640	-.496	-1.233	.270	-.004160	.003077	.001693
650	-.469	-1.077	.266	-.006162	.002541	.000831
660	-.485	-.943	.105	-.006257	.001882	.000534
670	-.507	-.725	-.128	-.004651	.000820	.000737
680	-.512	-.686	-.161	-.004128	.000628	.000864
690	-.514	-.675	-.171	-.003959	.000571	.000907
700	-.522	-.650	-.201	-.003519	.000373	.001077
9100	-.541	-.559	-.258	-.001324	.000372	.001982

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PIPING DISPLACEMENTS IN GLOBAL COORDINATES

POINT ID	DX (INCHES)	DY (INCHES)	DZ (INCHES)	RX (RADS)	RY (RADS)	RZ (RADS)
189	-.338	.000	.294	.000067	.003050	-.000018
190	-.338	.000	.294	.000067	.003049	-.000018
191	-.319	.000	.248	.000026	.000947	-.000013
192	-.315	.000	.239	.000018	.000773	-.000010
193	-.314	.000	.238	.000018	.000761	-.000009
194	-.219	.000	.139	.000000	.000036	-.000000
101	.000	.000	.000	.000000	-.000000	.000000
300	0.000	0.000	0.000	0.000000	0.000000	0.000000
310	-.123	-.005	-.014	.000287	-.001186	.000492
320	-.308	-.048	-.105	.000860	-.002771	.001473
330	-.491	-.085	-.171	.001146	-.003170	.001962
340	-.643	-.146	-.260	.001501	-.003300	.002566
350	-.946	-.317	-.421	.002209	-.002358	.003769
360	-.965	-.329	-.429	.002253	-.002247	.003843
370	-1.062	-.454	-.566	.002940	.000001	.004971
380	-1.060	-.464	-.510	.003041	.000315	.005262
390	-1.048	-.527	-.196	.003243	.000774	.005843

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PIPING DISPLACEMENTS IN GLOBAL COORDINATES

POINT ID	DX (INCHES)	DY (INCHES)	DZ (INCHES)	RX (RADS)	RY (RADS)	RZ (RADS)
400	-1.039	-.560	-.140	.003344	.000918	.006134
410	-1.031	-.587	-.094	.003423	.000992	.006365
420	-1.022	-.619	-.044	.003509	.001032	.006626
430	-.898	-.759	-.016	.003884	.001095	.007449
440	-.750	-.869	-.092	.003792	.000931	.007611
450	-.488	-1.064	-.214	.003108	.000640	.007374
451	-.487	-1.065	-.215	.003105	.000639	.007373
460	-.468	-1.247	-.241	.001572	.000850	.006003
470	-.485	-1.265	-.238	.001420	.000858	.005924
480	-.558	-1.340	-.226	.000785	.000950	.005589
490	-.696	-1.469	-.199	-.000406	.001371	.004945
491	-.696	-1.469	-.199	-.000411	.001373	.004942
500	-.743	-1.509	-.085	-.002434	.002991	.003315
510	-.729	-1.497	-.059	-.002614	.003096	.003147
520	-.714	-1.484	-.033	-.002791	.003187	.002982
530	-.704	-1.476	-.016	-.002907	.003241	.002875
540	-.694	-1.467	.001	-.003023	.003289	.002767

LOSS OF LOAD

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PIPING DISPLACEMENTS IN GLOBAL COORDINATES

POINT IS	DX (INCHES)	DY (INCHES)	DZ (INCHES)	RX (RADS)	RY (RADS)	RZ (RADS)
550	-.617	-1.391	.124	-.003883	.003484	.001981
560	-.605	-1.377	.144	-.003920	.003486	.001948
570	-.575	-1.343	.191	-.004008	.003482	.001869
590	-.648	-1.201	.100	-.004008	.003482	.001869
570	-.575	-1.343	.191	-.004008	.003482	.001869
600	-.563	-1.330	.210	-.004043	.003477	.001838
610	-.533	-1.294	.259	-.004134	.003458	.001757
620	-.529	-1.290	.265	-.004178	.003446	.001718
630	-.516	-1.274	.286	-.004328	.003399	.001585
640	-.515	-1.273	.287	-.004337	.003396	.001577
650	-.482	-1.110	.284	-.006393	.002784	.000675
660	-.494	-.967	.117	-.006483	.002052	.000370
670	-.509	-.737	-.124	-.004802	.000871	.000627
680	-.514	-.695	-.158	-.004258	.000657	.000772
690	-.516	-.682	-.168	-.004082	.000594	.000821
700	-.523	-.655	-.200	-.003416	.000374	.001014
9101	-.541	-.559	-.258	-.001327	.000375	.001980

PIPING DISPLACEMENTS IN GLOBAL COORDINATES

POINT IS	DX (INCHES)	DY (INCHES)	DZ (INCHES)	RX (RADS)	RY (RADS)	RZ (RADS)
189	.001	.001	.002	.000053	.000158	.000061
190	.001	.001	.002	.000053	.000158	.000061
191	.000	.001	.001	.000019	.000032	.000018
192	.000	.001	.001	.000014	.000024	.000014
193	.000	.001	.001	.000013	.000023	.000014
194	.000	.000	.000	.000000	.000001	.000001
181	.000	.000	.000	.000000	.000000	.000000
300	0.000	0.000	0.000	0.000000	0.000000	0.000000
310	.000	.008	.008	.000378	.000662	.000685
320	.001	.064	.057	.001135	.001377	.001851
330	.001	.110	.088	.001514	.001438	.002340
340	.001	.180	.125	.001982	.001259	.002873
350	.002	.300	.168	.002917	.000584	.003830
360	.002	.373	.168	.002975	.000614	.003889
370	.026	.390	.159	.003351	.002256	.004657
380	.051	.357	.159	.003457	.002468	.004925
390	.103	.284	.159	.003613	.002657	.005467

SDTAR-80-05-05

SEISMIC

PIPING DISPLACEMENTS IN GLOBAL COORDINATES

POINT ID	DX (INCHES)	DY (INCHES)	DZ (INCHES)	RX (RADS)	RY (RADS)	RZ (RADS)
400	.150	.255	.159	.003659	.002634	.005740
410	.152	.228	.159	.003679	.002561	.005958
420	.174	.198	.159	.003682	.002420	.006204
430	.302	.155	.110	.003549	.001434	.006698
440	.433	.152	.060	.003555	.000687	.006761
450	.602	.152	.111	.003739	.000722	.006307
451	.663	.152	.111	.003740	.000726	.006305
460	.749	.215	.143	.003945	.001919	.004825
470	.749	.228	.136	.003992	.002000	.004757
480	.748	.281	.108	.004190	.002315	.004513
490	.748	.379	.045	.004564	.002792	.004235
491	.748	.379	.045	.004566	.002794	.004234
500	.698	.365	.002	.004961	.003626	.004056
510	.681	.341	.002	.004973	.003680	.004064
520	.664	.316	.002	.004974	.003731	.004075
530	.653	.303	.001	.004967	.003765	.004078
540	.641	.288	.001	.004956	.003794	.004083

SDTAR-80-05-05

PIPING DISPLACEMENTS IN GLOBAL COORDINATES

POINT ID	DX (INCHES)	DY (INCHES)	DZ (INCHES)	RX (RADS)	RY (RADS)	RZ (RADS)
550	.556	.181	.001	.004714	.003987	.004121
560	.542	.164	.001	.004697	.003993	.004123
570	.508	.125	.001	.004648	.004007	.004126
590	.400	.141	.140	.004672	.004012	.004066
570	.508	.125	.001	.004648	.004007	.004126
600	.495	.110	.001	.004620	.004010	.004147
610	.460	.072	.001	.004535	.004003	.004202
620	.456	.068	.001	.004490	.003995	.004228
630	.441	.053	.001	.004327	.003956	.004317
680	.440	.053	.001	.004317	.003953	.004322
650	.316	.031	.034	.001204	.003091	.004621
660	.200	.031	.049	.000148	.002155	.004352
670	.053	.031	.031	.000768	.000646	.002444
680	.036	.031	.025	.000824	.000373	.001903
690	.032	.031	.023	.000834	.000293	.001731
700	.019	.031	.016	.000845	.000032	.001095
9101	.002	.031	.005	.000163	.000031	.000269

SDTAR-80-05-05

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PIPING DISPLACEMENTS IN GLOBAL COORDINATES

POINT IS	DX (INCHES)	DY (INCHES)	DZ (INCHES)	RX (RADS)	RY (RADS)	RZ (RADS)
189	.001	.002	.003	.000087	.000265	.000099
190	.001	.002	.003	.000087	.000263	.000099
191	.001	.001	.001	.000032	.000054	.000030
192	.000	.001	.001	.000023	.000039	.000023
193	.000	.001	.001	.000022	.000038	.000023
194	.000	.000	.000	.000001	.000001	.000001
101	.000	.000	.000	.000000	.000000	.000000
300	0.000	0.000	0.000	0.000000	0.000000	0.000000
310	.000	.014	.015	.000702	.001227	.001261
320	.001	.118	.105	.002105	.002551	.003412
330	.002	.203	.163	.002806	.002664	.004317
340	.002	.333	.232	.003674	.002330	.005305
350	.003	.665	.310	.005409	.001065	.007086
360	.003	.669	.311	.005516	.001118	.007195
370	.049	.719	.294	.006213	.004170	.008623
380	.094	.655	.294	.006409	.004563	.009121
390	.191	.552	.294	.006699	.004914	.010126

PIPING DISPLACEMENTS IN GLOBAL COORDINATES

POINT ID	DX (INCHES)	DY (INCHES)	DZ (INCHES)	RX (RADS)	RY (RADS)	RZ (RADS)
400	.241	.469	.294	.006784	.004872	.010631
410	.280	.419	.294	.006820	.004736	.011036
420	.323	.364	.294	.006825	.004477	.011492
430	.559	.278	.203	.006577	.002651	.012406
440	.802	.278	.110	.006588	.001269	.012522
450	1.226	.277	.205	.006926	.001342	.011680
451	1.227	.277	.206	.006928	.001349	.011676
460	1.386	.396	.264	.007304	.003557	.008931
470	1.386	.420	.253	.007391	.003707	.008807
480	1.386	.519	.201	.007757	.004291	.008352
490	1.385	.700	.084	.008449	.005173	.007837
491	1.385	.701	.083	.008452	.005176	.007836
500	1.292	.675	.003	.009185	.006717	.007507
510	1.260	.631	.003	.009207	.006817	.007522
520	1.229	.588	.003	.009208	.006912	.007537
530	1.208	.560	.003	.009196	.006972	.007547
540	1.187	.533	.003	.009175	.007030	.007557

PIPING DISPLACEMENTS IN GLOBAL COORDINATES

POINT ID	DX (INCHES)	DY (INCHES)	DZ (INCHES)	RX (RADS)	RY (RADS)	RZ (RADS)
550	1.029	.334	.002	.008727	.007386	.007628
580	1.003	.304	.002	.008695	.007398	.007630
570	.941	.231	.002	.008605	.007423	.007637
590	.741	.261	.259	.008650	.007432	.007526
570	.941	.231	.002	.008605	.007423	.007637
600	.916	.204	.002	.008553	.007428	.007676
610	.852	.153	.002	.008396	.007417	.007777
620	.843	.125	.002	.008312	.007401	.007820
630	.816	.098	.002	.008011	.007329	.007991
640	.814	.097	.002	.007993	.007324	.008000
650	.585	.057	.063	.002230	.005726	.008554
660	.370	.057	.091	.000274	.003993	.008055
670	.097	.057	.058	.001423	.001196	.004521
680	.007	.057	.047	.001526	.000691	.003518
690	.058	.057	.043	.001545	.000541	.003200
700	.036	.057	.030	.001567	.000055	.002023
9101	.003	.057	.005	.000304	.000054	.000497

SDTAR-80-05-05

SDTAR-80-05-05

PROGRAM VALVE Y6CNG7G 6/27/80

VALVE NAME (IDENTIFIER)	WESTDYN NODE NUMBERS I1	I2	I3	TAPE14 LOADING CONDITION NUMBERS DW	TH	SE	LO	PIPE STRESSES MAXIMUM PRINCIPLE	CALCULATED AVERAGE AXIAL	AT VALVE BENDING MOMENT	NOZZLE END TORSION SHEAR
8-GM78FN (700)	550	560	550	11	21	30	0	15450.	5386.	7790.	2001.
8-GM78FN (700)	600	610	610	11	21	30	0	19235.	5465.	10670.	3265.

Allowables for valve # 700 :

$\sigma_{bending} \leq 9130$ psi.

$\sigma_{torsion} \leq 9130$ psi.

$\sigma_{max} \leq 13695$ psi.

Ref. MA-PSA-1018 (W LETTER)

ALLOWABLE STRESS

The allowable stresses for use with equations (11), (14) of the Summer Addenda, Power Piping ANSI B31.1 determined in accordance with the requirements of S B31.1-1973. Specifically,

$$S_A = f\,(1.25S_c + 0.25\,S_h)$$

S_A = allowable stress range

S_C = basic material allowable stress at minimum (from the Allowable Stress Tables.

S_h = basic material allowable stress at maximum (from the Allowable Stress Tables.

f = stress range reduction factor for cyclic cor number, N, of full temperature cycles over t years during which system is expected to be from Table 102.3.2,C.

The Allowable Stress Tables are in Appendix A of B31.1-1 cycles are full temperature cycles, an equivalent number cycles is used to determine f.

$$N = N_E + r_1^5\,N_1 + r_2^5\,N_2 + \ldots r_n^5\,N_n$$

where N_E = number of cycles at full temperature change. expansion stress, S_E, has been calculated by Eq. (13).

$N_1, N_2, \ldots N_n$ = number of cycles at lesser temperature

$r_1, r_2, \ldots r_n = \Delta T_1/\Delta T_E, \Delta T_2/\Delta T_E, \ldots \Delta T_r/\Delta T_E$

Applicable values for this system are summarized in the following table.

Operating Mode i	N_i	T_c	T_n	T_i	r_i*	$r_i^5 \cdot N_i$**
1. LOSS OF LOAD	≃200					
2.						
3.						
4.						
5.						
6.						

N = << 7000

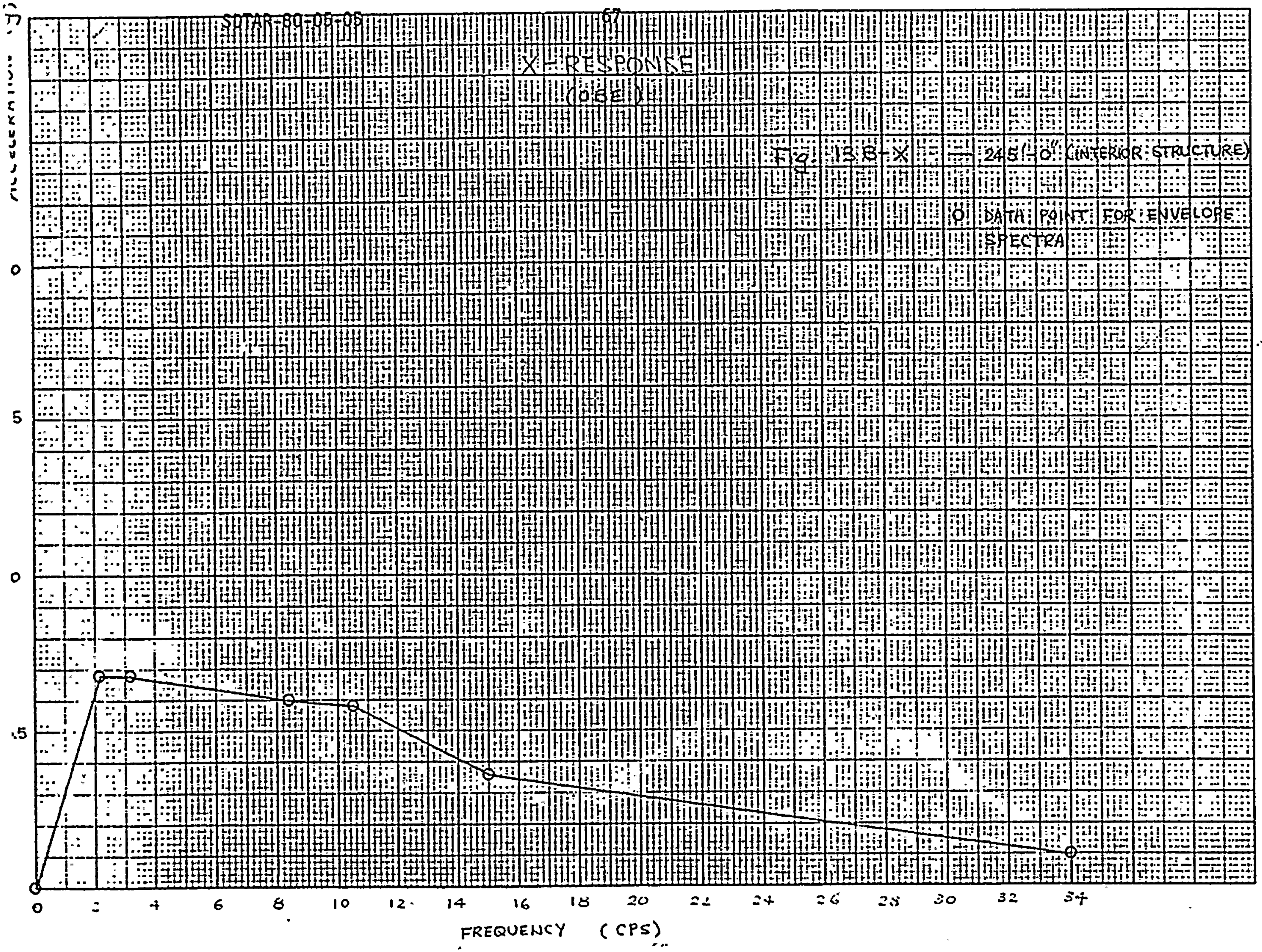
$r_i = 1$ for the mode with $\Delta T_i = \Delta T_E$

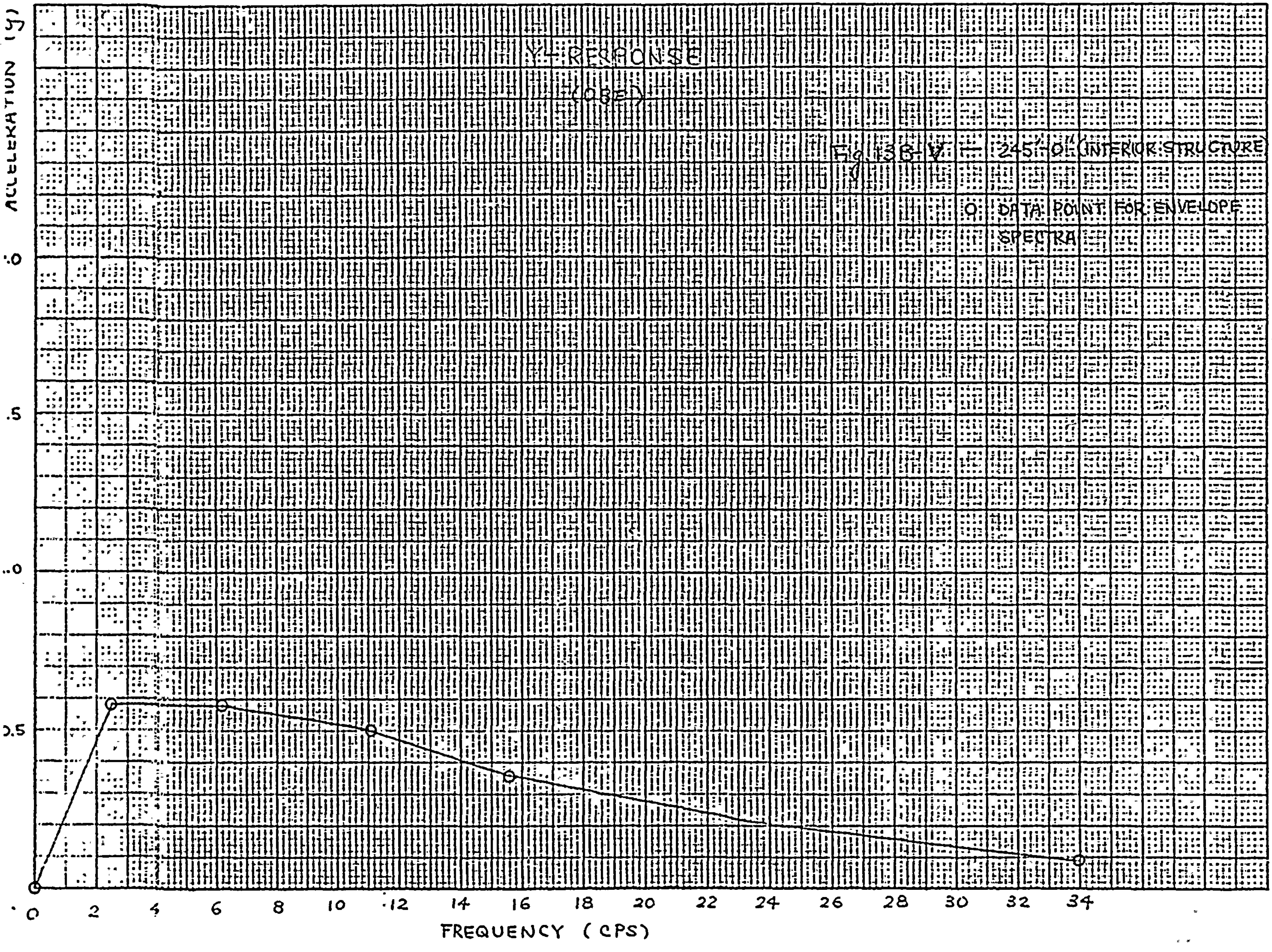
**This value is N_E for the mode with $\Delta T_i = \Delta T_E$.

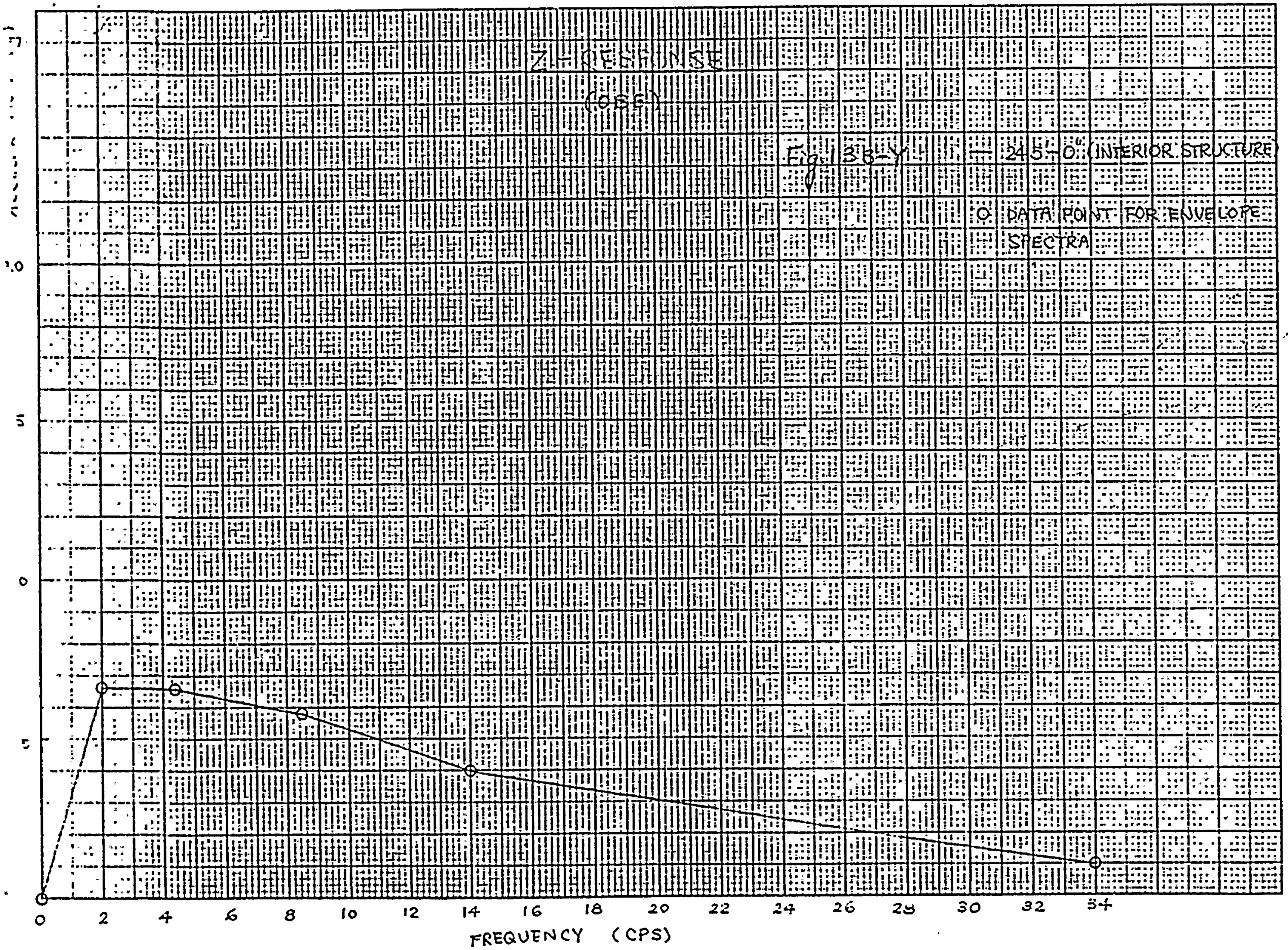
Using this value of N, f as obtained from Table 102.32,C is 1

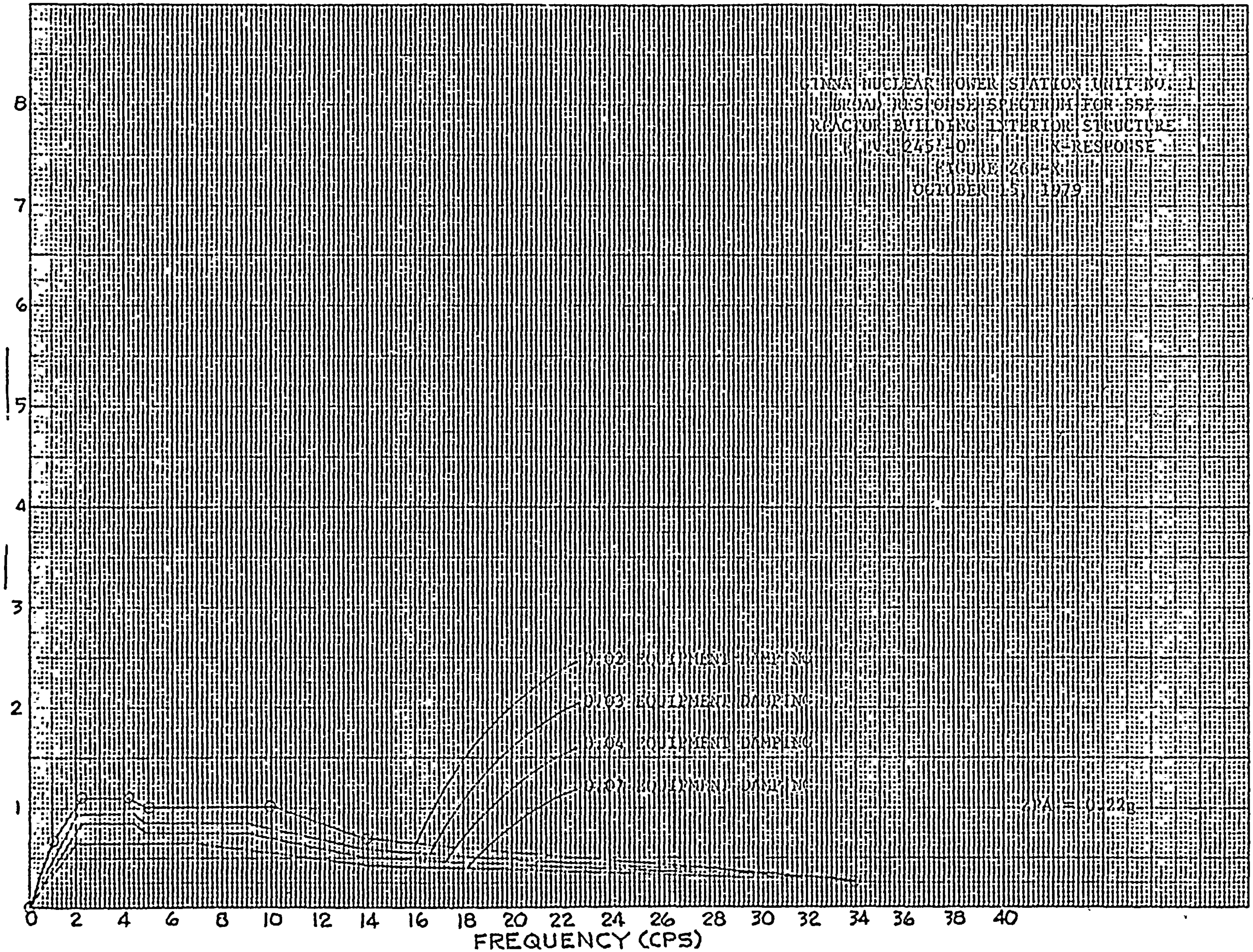
According to the indicated references, the materials used and the basic allowable stress and the allowable stress range from Eq. (1) are:

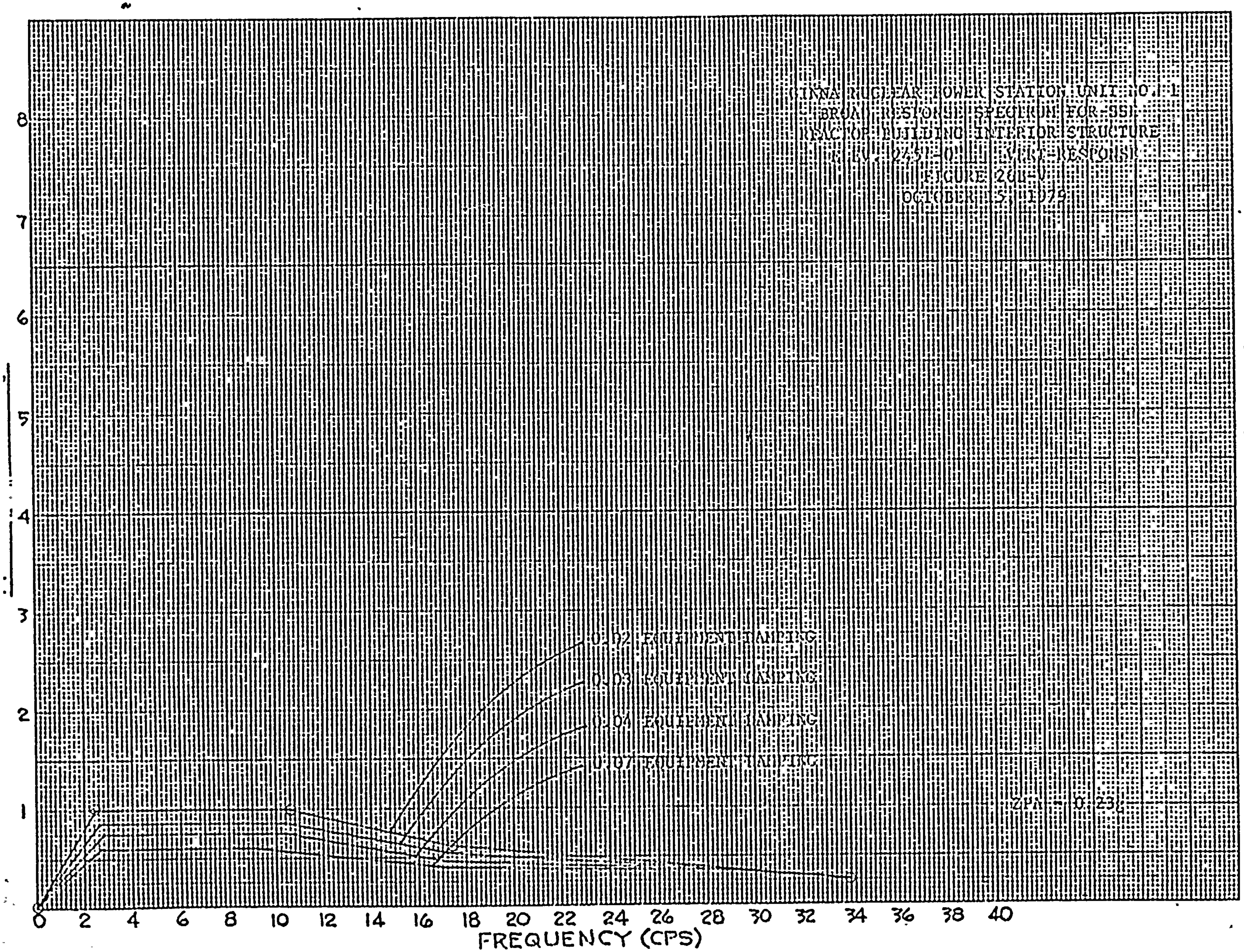
Material	Ref.	S_c	S_h	Ref.	S_A
1. A376 TYPE 316	C-381-354-1D	18.7	11.3	B31.1 page 95	26.2
2.					
3.					
4.					

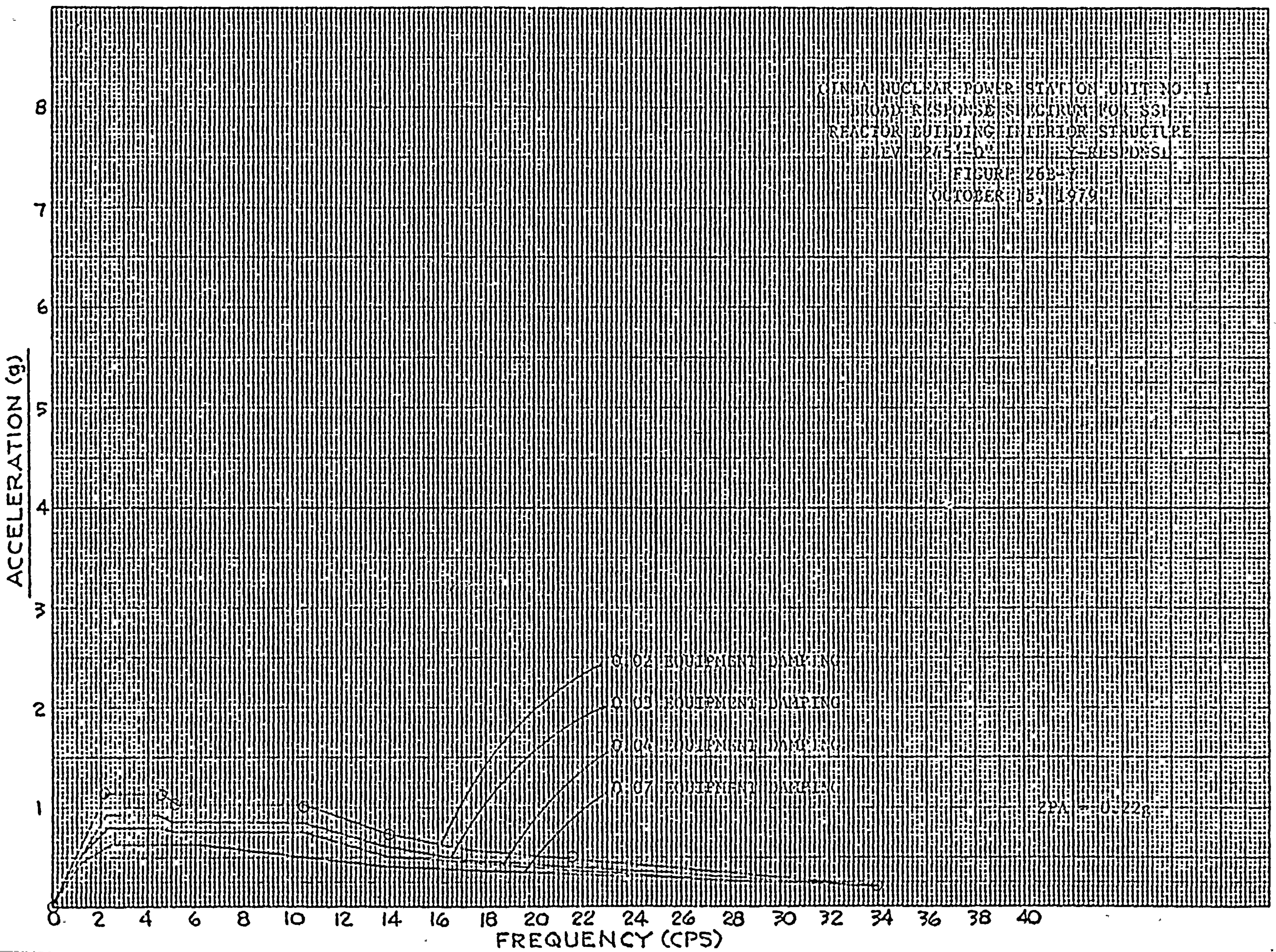

X-RESPONSE
(OBE)
Fig. 13.8-X — 245'-0" (INTERIOR STRUCTURE)
O DATA POINT FOR ENVELOPE SPECTRA
0
5
0
.5
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
FREQUENCY (CPS)


Y-RESPONSE
(OBE)
Fig 13B-V — 245'-0" (INTERIOR STRUCTURE)
O DATA POINT FOR ENVELOPE SPECTRA
ACCELERATION (g)
.0
.5
.0
0.5
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
FREQUENCY (CPS)


Z-RESPONSE
(OSF)
Fig. 13-Y — 245'-0" (INTERIOR STRUCTURE)
O DATA POINT FOR ENVELOPE SPECTRA
1.0
5
0
5
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
FREQUENCY (CPS)


GINNA NUCLEAR POWER STATION UNIT NO. 1
BROAD RESPONSE SPECTRUM FOR SSE
REACTOR BUILDING INTERIOR STRUCTURE
X-RESPONSE
FIGURE 26B-X
OCTOBER 15, 1979
0.02 EQUIPMENT DAMPING
0.03 EQUIPMENT DAMPING
0.04 EQUIPMENT DAMPING
ZPA = 0.22g
8
7
6
5
4
3
2
1
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
FREQUENCY (CPS)


GINNA NUCLEAR POWER STATION UNIT NO. 1
REACTOR BUILDING INTERIOR STRUCTURE
0.02 EQUIPMENT DAMPING
0.03 EQUIPMENT DAMPING
0.04 EQUIPMENT DAMPING
0.07 EQUIPMENT DAMPING
ZPA = 0.23
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40
FREQUENCY (CPS)
1 2 3 4 5 6 7 8


GINNA NUCLEAR POWER STATION UNIT NO. 1
REACTOR BUILDING INTERIOR STRUCTURE
ELEV. 265'-0"
OCTOBER 15, 1979
0.02 EQUIPMENT DAMPING
0.03 EQUIPMENT DAMPING
0.04
0.07
ZPA = 0.22g
ACCELERATION (g)
1
2
3
4
5
6
7
8
FREQUENCY (CPS)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40

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UNLABELED ...PL              MASTER AUDIT, IDENT CARD TOTAL          UPDATE 1.3-498.77.    06/27/80  17.53.45.

     SUMMARY OF UPDATE IDENTIFIERS WITHIN DECK - YANKSSS

        IDENTIFIER                    TOTAL     ACTIVE


        ...T OF CONTROL, ACTIVE, AND/OR INACTIVE CARDS IN RGRHR2-LD

RGRHR2-LD  *DECK RGRHR2-LD                                                                          RGRHR2-LD    1
RGRHR2-LD  *DEF,RGRHR2-11                                                                           RGRHR2-LD    2
RGRHR2-LD           DEADWEIGHT                                                                      RGRHR2-LD    3
RGRHR2-LD                         11.                                                               RGRHR2-LD    4
RGRHR2-LD                                                                                           RGRHR2-LD    5
RGRHR2-LD                                                                                           RGRHR2-LD    6
RGRHR2-LD  *EIF                                                                                     RGRHR2-LD    7
RGRHR2-LD  *DEF,RGRHR2-20                                                                           RGRHR2-LD    8
RGRHR2-LD           NORMAL OPERATING                                                                RGRHR2-LD    9
RGRHR2-LD                         20.                                                               RGRHR2-LD   10
RGRHR2-LD                                                                                           RGRHR2-LD   11
RGRHR2-LD  *EIF                                                                                     RGRHR2-LD   12
RGRHR2-LD  *DEF,RGRHR2-21                                                                           RGRHR2-LD   13
RGRHR2-LD           LOSS OF LOAD                                                                    RGRHR2-LD   14
RGRHR2-LD                         21.                                                               RGRHR2-LD   15
RGRHR2-LD                                                                                           RGRHR2-LD   16
RGRHR2-LD  *EIF                                                                                     RGRHR2-LD   17
RGRHR2-LD  *DEF,RGRHR2-30                                                                           RGRHR2-LD   18
RGRHR2-LD           SEISMIC                                                                         RGRHR2-LD   19
RGRHR2-LD                         30.                                                               RGRHR2-LD   20
RGRHR2-LD  ..CK          16960 1900000.0       .0       1.0       1.0      30.0      .040  RGRHR2-LD   21
RGRHR2-LD  .ECTION     1    20.                 0.        0.                 0.             RGRHR2-LD   22
RGRHR2-LD              1    6      .001     2.500     6.200    11.100    15.600    23.000  RGRHR2-LD   23
RGRHR2-LD              7    7    34.000      .000      .000      .000      .000      .000  RGRHR2-LD   24
RGRHR2-LD              1    6      .000      .580      .580      .500      .360      .220  RGRHR2-LD   25
RGRHR2-LD              7    7      .000      .000      .000      .000      .000      .000  RGRHR2-LD   26
RGRHR2-LD  .ECTION     1    10.                 0.        0.                 0.             RGRHR2-LD   27
RGRHR2-LD              1    6      .001     2.200     5.200     8.400    10.500    15.000  RGRHR2-LD   28
RGRHR2-LD              7    7    34.000      .000      .000      .000      .000      .000  RGRHR2-LD   29
RGRHR2-LD              1    6      .000      .680      .680      .600      .580      .360  RGRHR2-LD   30
RGRHR2-LD              7    7      .100      .000      .000      .000      .000      .000  RGRHR2-LD   31
RGRHR2-LD  .ECTION     1    30.                 0.        0.                 0.             RGRHR2-LD   32
RGRHR2-LD              1    6      .001     2.000     4.400     8.500    14.000    34.000  RGRHR2-LD   33
RGRHR2-LD              1    6      .000      .660      .660      .580      .400      .100  RGRHR2-LD   34
```

LI... OF CONTROL, ACTIVE, AND/OR INACTIVE CARDS IN RGRHR2-LD

RGRHR2-LDA..DIF										RGRHR2-LD	35
RGRHR2-LDA.. DEF,RGRHR2-31.										RGRHR2-LD	36
RGRHR2-LDI..	SEISMIC(SSE)									RGRHR2-LD	37
RGRHR2-LDL.			31.							RGRHR2-LD	38
RGRHR2-LDS..A	16960		1900000.0	.0	1.0	1.0	30.0	.040		RGRHR2-LD	39
RGRHR2-LDDIRECTION	1	20.		0.	0.		0.			RGRHR2-LD	40
RGRHR2-LDF..	1	0	.001	2.500	10.400	17.400	34.000	100.000		RGRHR2-LD	41
RGRHR2-LDG	1	0	.000	1.000	1.000	.600	.250	.250		RGRHR2-LD	42
RGRHR2-LDDIRECTION	1	10.		0.	0.		0.			RGRHR2-LD	43
RGRHR2-LDF..	1	0	.001	2.200	4.200	4.800	10.000	14.000		RGRHR2-LD	44
RGRHR2-LDF..	7	8	34.000	100.000	.000	.000	.000	.000		RGRHR2-LD	45
RGRHR2-LDG	1	0	.000	1.100	1.100	1.000	1.000	.700		RGRHR2-LD	46
RGRHR2-LDG	7	8	.250	.220	.000	.000	.000	.000		RGRHR2-LD	47
RGRHR2-LDDIRECTION	1	30.		0.	0.		0.			RGRHR2-LD	48
RGRHR2-LDF..	1	0	.001	2.200	4.600	5.200	10.400	14.000		RGRHR2-LD	49
RGRHR2-LDF..	7	9	18.000	34.000	100.000	.000	.000	.000		RGRHR2-LD	50
RGRHR2-LDG	1	0	.000	1.150	1.150	1.030	1.030	.750		RGRHR2-LD	51
RGRHR2-LDG	7	9	.550	.220	.220	.000	.000	.000		RGRHR2-LD	52
RGRHR2-LDAE..IF										RGRHR2-LD	53
RGRHR2-LDN.. PAGES VERSION 2.2 USE COUNT = 48										RGRHR2-LD	54
RGRHR2-LDN. COND 1 ACTIVATES THE NORMAL OPERATING CONDITION										RGRHR2-LD	55

SUMMA.. OF UPDATE IDENTIFIERS WITHIN DECK = RGRHR2-LD

IDENTIFIER	TOTAL	ACTIVE
R...R2-LD	55	55

L... OF CONTROL, ACTIVE, AND/OR INACTIVE CARDS IN RGRHR2-NP

RGRHR2-NPA.. DECK RGRHR2-NP								RGRHR2-NP	1
RGRHR2-NPA...OR	300	4.7186	-2.666	-24.5107				RGRHR2-NP	2
RGRHR2-NP..	300	1.0	1.0	1.0	1.0	1.0	1.0	RGRHR2-NP	3
RGRHR2-NPL..	310	2.9953	-2.600	-24.5106				RGRHR2-NP	4
RGRHR2-NPI	310	486.9	486.9	486.9				RGRHR2-NP	5
RGRHR2-NPL..	320	-.7191	-2.600	-24.5104				RGRHR2-NP	6
RGRHR2-NPI	320	486.9	488.9	488.9				RGRHR2-NP	7
RGRHR2-NPL	340	-4.7123	-2.600	-24.5104				RGRHR2-NP	8
RGRHR2-NPI	340	604.4	604.4	604.4				RGRHR2-NP	9

LIST OF CONTROL, ACTIVE, AND/OR INACTIVE CARDS IN RGRHR2-NP

RGRHR2-NPLUMP	350	-9.2538	-2.600	-24.3096				RGRHR2-NP	10
RGRHR2-NPIN	350	604.4	604.4	604.4				RGRHR2-NP	11
RGRHR2-NPLUMP	380	-10.7815	-2.600	-22.2246				RGRHR2-NP	12
RGRHR2-NPIN	380	225.4	225.4	225.4				RGRHR2-NP	13
RGRHR2-NPLUMP	390	-10.7811	-2.600	-20.5532				RGRHR2-NP	14
RGRHR2-NPIN	390	225.4	225.4	225.4				RGRHR2-NP	15
RGRHR2-NPLUMP	410	-10.7817	-2.600	-19.0505				RGRHR2-NP	16
RGRHR2-NPIN	410	227.9	227.9	227.9				RGRHR2-NP	17
RGRHR2-NPLUMP	430	-10.7812	-3.910	-17.0510				RGRHR2-NP	18
RGRHR2-NPIN	430	227.9	227.9	227.9				RGRHR2-NP	19
RGRHR2-NPLUMP	440	-10.7812	-5.532	-17.0510				RGRHR2-NP	20
RGRHR2-NPIN	440	435.8	435.8	435.8				RGRHR2-NP	21
RGRHR2-NPLUMP	450	-10.7812	-6.416	-17.0510				RGRHR2-NP	22
RGRHR2-NPIN	450	435.8	435.8	435.8				RGRHR2-NP	23
RGRHR2-NPLUMP	480	-13.3033	-9.606	-17.0352				RGRHR2-NP	24
RGRHR2-NPIN	480	359.2	359.2	359.2				RGRHR2-NP	25
RGRHR2-NPLUMP	490	-15.3927	-9.606	-17.0228				RGRHR2-NP	26
RGRHR2-NPIN	490	359.2	359.2	359.2				RGRHR2-NP	27
RGRHR2-NPLUMP	510	-16.6326	-9.606	-15.3797				RGRHR2-NP	28
RGRHR2-NPIN	510	103.2	103.2	103.2				RGRHR2-NP	29
RGRHR2-NPLUMP	530	-16.6277	-9.606	-14.7478				RGRHR2-NP	30
RGRHR2-NPIN	530	67.4	67.4	67.4				RGRHR2-NP	31
RGRHR2-NPANCHOR	570	-16.6033	-9.666	-11.6697				RGRHR2-NP	32
RGRHR2-NPLUMP STEM	590	-16.9470	-7.458	-11.6667				RGRHR2-NP	33
RGRHR2-NPIN	590	2360.4	2360.4	2360.4	51799.3	51799.3	51799.3	RGRHR2-NP	34
RGRHR2-NPLUMP	600	-16.6910	-9.600	-11.3932				RGRHR2-NP	35
RGRHR2-NPIN	600	617.3	617.3	617.3				RGRHR2-NP	36
RGRHR2-NPLUMP	660	-16.5817	-6.312	-9.0028				RGRHR2-NP	37
RGRHR2-NPIN	660	505.8	505.8	505.8				RGRHR2-NP	38
RGRHR2-NPLUMP	690	-16.5817	-2.104	-9.0028				RGRHR2-NP	39
RGRHR2-NPIN	690	505.8	505.8	505.8				RGRHR2-NP	40
RGRHR2-NPANCHOR	9101	-16.5817	-4.770E-06	-9.0028				RGRHR2-NP	41
RGRHR2-NPNOTE-	MODEL SIZE FOR SEISMIC RUN-		DYNAMIC DOF = 57,		STATIC DOF = 63			RGRHR2-NP	42

SUMMARY OF UPDATE IDENTIFIERS WITHIN DECK - RGRHR2-NP

IDENTIFIER	TOTAL	ACTIVE
RGRHR2-NP	42	42

UNLABELED OLDPL MASTER AUDIT, IDENT CARD TOTAL UPDATE 1.3-498.77. 06/27/8 17.53.45

/ LIST OF CONTROL, ACTIVE, AND/OR INACTIVE CARDS IN RGRHR2-SE

RGRHR2-SE*COMDECK RGRHR2-SE									RGRHR2-SE	1
RGRHR2-SESECTION	300	310							RGRHR2-SE	2
RGRHR2-SECH			10.7500	1.0000	28.300			11.239	RGRHR2-SE	3
RGRHR2-SEMA		41	2.080	16420.	28.300	9.110		26205.	RGRHR2-SE	4
RGRHR2-SEPR			2.510E 03						RGRHR2-SE	5
RGRHR2-SE*IF DEF,RGRHR2-11,1									RGRHR2-SE	6
RGRHR2-SECH					28.300	9.110	1.000E-01		RGRHR2-SE	7
RGRHR2-SE*IF DEF,RGRHR2-11,1									RGRHR2-SE	8
RGRHR2-SEPR				2.510E 03					RGRHR2-SE	9
RGRHR2-SE*IF DEF,RGRHR2-20,1									RGRHR2-SE	10
RGRHR2-SECH					25.327	9.832	542.2		RGRHR2-SE	11
RGRHR2-SE*IF DEF,RGRHR2-20,1									RGRHR2-SE	12
RGRHR2-SEPR				2.234E 03					RGRHR2-SE	13
RGRHR2-SE*IF DEF,RGRHR2-21,1									RGRHR2-SE	14
RGRHR2-SECH					25.142	9.863	573.0		RGRHR2-SE	15
RGRHR2-SE*IF DEF,RGRHR2-21,1									RGRHR2-SE	16
RGRHR2-SEPR				2.630E 03					RGRHR2-SE	17
RGRHR2-SE*IF DEF,RGRHR2-30,1									RGRHR2-SE	18
RGRHR2-SECH					28.300	9.110	1.000E-01		RGRHR2-SE	19
RGRHR2-SE*IF DEF,RGRHR2-30,1									RGRHR2-SE	20
RGRHR2-SEPR				2.510E 03					RGRHR2-SE	21
RGRHR2-SE*IF DEF,RGRHR2-31,1									RGRHR2-SE	22
RGRHR2-SECH					28.300	9.110	1.000E-01		RGRHR2-SE	23
RGRHR2-SE*IF DEF,RGRHR2-31,1									RGRHR2-SE	24
RGRHR2-SEPR				2.510E 03					RGRHR2-SE	25
RGRHR2-SECR	300	310	-1.8124		-.0004				RGRHR2-SE	26
RGRHR2-SESECTION	310	320							RGRHR2-SE	27
RGRHR2-SECR	310	320	-3.0244		.0001				RGRHR2-SE	28
RGRHR2-SESECTION	320	340							RGRHR2-SE	29
RGRHR2-SECR	320	330	-1.8124		-.0004				RGRHR2-SE	30
RGRHR2-SECR	330	340	-2.2465		.0004				RGRHR2-SE	31
RGRHR2-SESECTION	340	350							RGRHR2-SE	32
RGRHR2-SECR	340	350	-4.4811		-.0006				RGRHR2-SE	33
RGRHR2-SESECTION	350	380							RGRHR2-SE	34
RGRHR2-SECR	350	360	-1.5273		.0005				RGRHR2-SE	35
RGRHR2-SEEL	360	370				15.000			RGRHR2-SE	36
RGRHR2-SECR	370	380	.0001		2.0654				RGRHR2-SE	37
RGRHR2-SESECTION	380	390							RGRHR2-SE	38
RGRHR2-SECR	380	390	-.0005		1.6719				RGRHR2-SE	39
RGRHR2-SESECTION	390	410							RGRHR2-SE	40
RGRHR2-SECR	390	400	.0002		.6357				RGRHR2-SE	41
RGRHR2-SERIMH-10	390	400	545.			1320.			RGRHR2-SE	42

UNLABELED ..PL MASTER AUDIT, IDENT CARD TOTAL UPDATE 1.3-498.77. 06/27/80 17.53.45.

LIST OF CONTROL, ACTIVE, AND/OR INACTIVE CARDS IN RGRHR2-SE

RGRHR2-SECF	400	410	.0001		.0665				RGRHR2-SE	43
RGRHR2-SEI	400	410	1.300						RGRHR2-SE	44
RGRHR2-SESECTION	410	430							RGRHR2-SE	45
RGRHR2-SECF	410	420	-.0004		2.0000				RGRHR2-SE	46
RGRHR2-SEEL	420	430				15.000			RGRHR2-SE	47
RGRHR2-SEIA	420	430	0.0000	-1.250	0.0000				RGRHR2-SE	48
RGRHR2-SESECTION	430	440							RGRHR2-SE	49
RGRHR2-SECF	430	440	0.0000	-1.616	0.0000				RGRHR2-SE	50
RGRHR2-SESECTION	440	450							RGRHR2-SE.	51
RGRHR2-SECF	440	450	0.0000	-2.884	0.0000				RGRHR2-SE	52
RGRHR2-SESECTION	450	480							RGRHR2-SE	53
RGRHR2-SECF	450	451	0.0000	-1.250	0.0000				RGRHR2-SE	54
RGRHR2-SEEL	451	460				14.900			RGRHR2-SE	55
RGRHR2-SECF	460	470	-1.4996		.0092				RGRHR2-SE	56
RGRHR2-SEI	460	470	1.300						RGRHR2-SE	57
RGRHR2-SECF	470	480	-1.0816		.0062				RGRHR2-SE	58
RGRHR2-SESECTION	480	490							RGRHR2-SE	59
RGRHR2-SECF	480	490	-2.0294		.0124				RGRHR2-SE	60
RGRHR2-SESECTION	490	510							RGRHR2-SE	61
RGRHR2-SECF	490	491	-1.2521		.0060				RGRHR2-SE	62
RGRHR2-SEEL	491	500				14.900			RGRHR2-SE	63
RGRHR2-SECF	500	510	.0131		1.6346				RGRHR2-SE	64
RGRHR2-SESECTION	510	530							RGRHR2-SE	65
RGRHR2-SECF	510	520	.0028		.3826				RGRHR2-SE	66
RGRHR2-SECF	520	530	.0026		.2501				RGRHR2-SE	67
RGRHR2-SESECTION	530	570							RGRHR2-SE	68
RGRHR2-SECF	530	540	.0026		.2501				RGRHR2-SE	69
RGRHR2-SES...12	530	540	.7876E-02		.1000E+01	1.580E 06			RGRHR2-SE	70
RGRHR2-SECF	540	550	.0142		1.8284				RGRHR2-SE	71
RGRHR2-SEVALVE	550	560	.0022		.2949	13.250	3.218	98.346	RGRHR2-SE	72
RGRHR2-SENOTE	VALVE		8-GM78FN (		PROGRAM PAGES	VALVE ID NUMBER	710		RGRHR2-SE	73
RGRHR2-SENOTE	M.G.)	CUPES-VULCAN NO. E-148875 REV. 8							RGRHR2-SE	74
RGRHR2-SEVALVE	560	570	.0058		.7056	13.250	3.218	98.346	RGRHR2-SE	75
RGRHR2-SESECTION	570	590							RGRHR2-SE	76
RGRHR2-SEVALVE STEM	570	590	-.3641	2.208	.0021	13.250	3.218	1.000E-03	RGRHR2-SE	77
RGRHR2-SESECTION	570	600							RGRHR2-SE	78
RGRHR2-SEVALVE	570	600	.0024		.2765	13.250	3.218	98.346	RGRHR2-SE	79
RGRHR2-SESECTION	600	660							RGRHR2-SE	80
RGRHR2-SEVALVE	600	610	.0057		.7240	13.250	3.218	98.346	RGRHR2-SE	81
RGRHR2-SECF								11.539	RGRHR2-SE	82
RGRHR2-SECF	610	620	.0007		.0899				RGRHR2-SE	83
RGRHR2-SECF	620	630	.0024		.3096				RGRHR2-SE	84

LIST OF CONTROL, ACTIVE, AND/OR INACTIVE CARDS IN RGRHR2-SE

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                                                                           RGRHR2-SE     85
RGRHR2-SECR          630  640     .0096              1.2672                RGRHR2-SE     86
RGRHR2-SEEL          640  650                                  15.000      RGRHR2-SE     87
RGRHR2-SECR          650  660    0.0000      3.354   0.0000                RGRHR2-SE     88
RGRHR2-SESECTION     660  690                                              RGRHR2-SE     89
RGRHR2-SECR          660  670    0.0000      3.396   0.0000                RGRHR2-SE     90
RGRHR2-SEIT          660  670    1.500                                     RGRHR2-SE     91
RGRHR2-SECR          670  680    0.0000       .614   0.0000         12.250 RGRHR2-SE     92
RGRHR2-SECH                     10.7500     1.1250                         RGRHR2-SE     93
RGRHR2-SECR          680  690    0.0000       .198   0.0000                RGRHR2-SE     94
RGRHR2-SESECTION     690 9101                                              RGRHR2-SE     95
RGRHR2-SECR          690  700    0.0000       .667   0.0000          2.050 RGRHR2-SE     96
RGRHR2-SECH                                                                RGRHR2-SE     97
RGRHR2-SEMA                12    2.680     16420.    26.300  9.110         RGRHR2-SE     98
RGRHR2-SECR          700 9101    0.0000      1.417   0.0000
      -JOINMS                                                              JOINMS         1
RGRHR2-SEBR          700 9101  0.0        1.417     0.0    10.75   1.125
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SUMMARY OF UPDATE IDENTIFIERS WITHIN DECK - RGRHR2-SE

IDENTIFIER	TOTAL	ACTIVE
RGRHR2-SE	98	97
JOINMS	1	1

LIST OF CONTROL, ACTIVE, AND/OR INACTIVE CARDS IN RGRHR2-DK

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                                                                           RGRHR2-DK      1
RGRHR2-DK*DECK RGRHR2-DK                                                   RGRHR2-DK      2
RGRHR2-DK*CALL RGRHR2-LD                                                   RGRHR2-DK      3
RGRHR2-DK*CALL RGRHR2-NP                                                   RGRHR2-DK      4
RGRHR2-DK*CALL RGRHR2-SE                                                   RGRHR2-DK      5
RGRHR2-DKEND                                                               RGRHR2-DK      6
RGRHR2-DK**EOR 10
```

SUMMARY OF UPDATE IDENTIFIERS WITHIN DECK - RGRHR2-DK

IDENTIFIER	TOTAL	ACTIVE
RGRHR2-DK	6	6

REFERENCES

1. Piping Isometric C-381-354-1, Revision D, Gilbert Associates, Inc., October 8, 1979.

2. Flow Diagram 33013-436, Revision E, Rochester Gas and Electric Corporation, January 4, 1980.

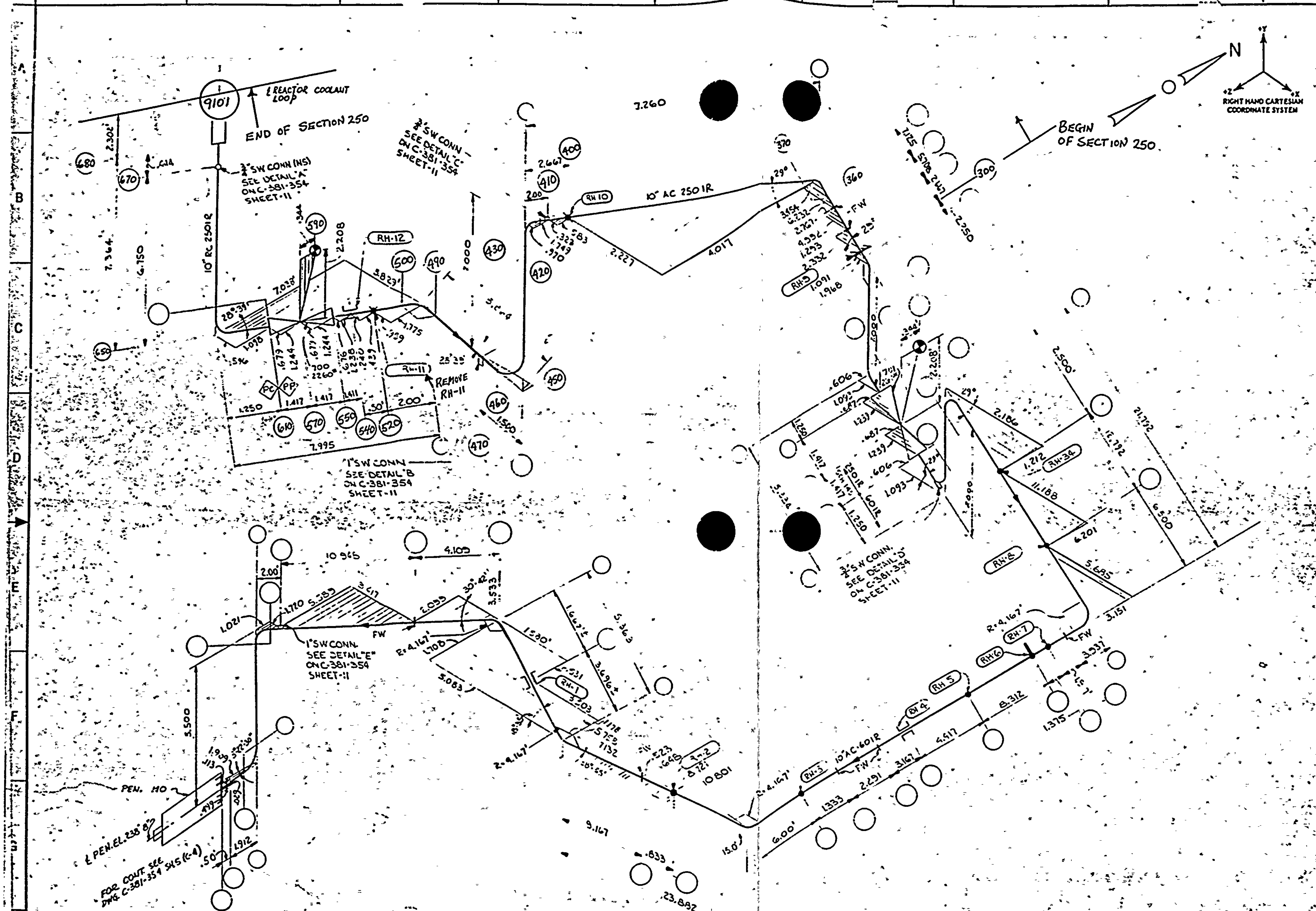
3. Equipment Specification, 601, Revision No. 2 to E-Spec. G569866, Westinghouse Electric Corporation, Atomic Power Division, April 29, 1966.

4. Residual Heat Removal System Analysis Design Conditions, R. E. Ginna Nuclear Power Plant, October 11, 1979.

5. Reactor Building Seismic Analysis Response Spectra, Ginna Station Seismic Upgrading Program, Gilbert Associates, Inc., December 21, 1979.

6. Orthographic Piping Drawing D-304-611, Revision VII, Gilber Associates, Inc.

7. Orthographic Piping Drawing D-304-612, Revision IV, Gilbert Associates, Inc.



DESIGN CONDITIONS

601R • 600 PSI • 600°
2501R • 2510 PSI / 680°

OPERATING CONDITIONS

PIPING CODE:

PIPE MATERIAL	LINE SPEC	LINE SIZE	REF TEMP °F	LIN EXP. IN/100 FT.	MOD. OF ELAS. PSI x 10⁶ EH	EC
ASTM A312 T304	601R	10"				
ASTM A516 T316	2501R	10"				

PIPE SIZE NOM.	O.D.	WALL THK.	WEIGHT LB./LINEAR FT. PIPE	CONTENT	INSULATION
10"	10.75	.365	41.31	34.2	4.77
10"	10.75	1.000	106.09	26	4.77
"	"	"	"	"	8.37

ANCHOR BRANCH & TERMINAL POINTS	COORDINATES X	Y	Z

SYMBOLS

- RIGID HANGER Y = 0
- VARIABLE (SPRING) HGR.
- CONSTANT LOAD HGR.
- GUIDE
- HYDRAULIC RESTRAINT
- RIGID RESTRAINT
- ANCHOR
- CENTER OF GRAVITY
- MASS POINT
- U-BOLT
- WELDOLET
- FISHMOUTH
- SWEEPOLET
- TEE

NOTES:

1. DIMENSIONS –
   - ☐ (a.) METERS AND DECIMALS OF METERS
   - ☒ (b.) FEET AND DECIMALS OF A FOOT
   - (c.) ALL DECIMALS SHALL BE CARRIED TO 3 PLACES
2. ALL VALVES & EQUIPMENT ARE ASSUMED INFLEXIBLE.
3. RADII ARE 1.25D UNLESS NOTED.

REFERENCE DWG

TITLE	NUMBER	REV.
RESIDUAL HEAT & SAFETY INJECTION	D-304-611	VI

SDTAR-80-05-05

REVISIONS

D	CHANGED C.G. DIMS ON VALVES 700 & 701			
C	ADDED INSULATION SPEC. AND WT. (C-9)(C-1) ADDED CROSS-REFERENCE (5 PLCS) E-8, D-5, B-1, C-1, & B-9.		R. D.	
B	ADDED 1" SW CONN (C-8) ADDED 3/4" SW CONN. (2 PLCS-(C-1)(D-5)). ADDED ALL FIELD WELDS. IDENTIFIED ALL HANGERS. RELOCATED HANGERS. RH-4 RH-5 RH-6 & RH-7		R. D.	

PIPING ANALYSIS DIAGRAM
RESIDUAL HEAT & SAFETY INJECTION
PENT. #140 TO REACTOR COOLANT LOOP

READING PA.

GILBERT ASSOCIATES, INC.
ENGINEERS AND CONSULTANTS

MADE	CHECKED	APPROVED	MECHANICAL	NUCLEAR	PIPING
J.K.S.	D.M.				

WORK ORDER	FILE NO.	DRAWING NO.	SHEET	REV.
04482400	04 4824	C-381-354	1	D

RHR & SFTY INJ PENT 140 LOOP