Appendix 3B. Figures

Figure 3-1. Wind Pressure Distribution on Reactor Building

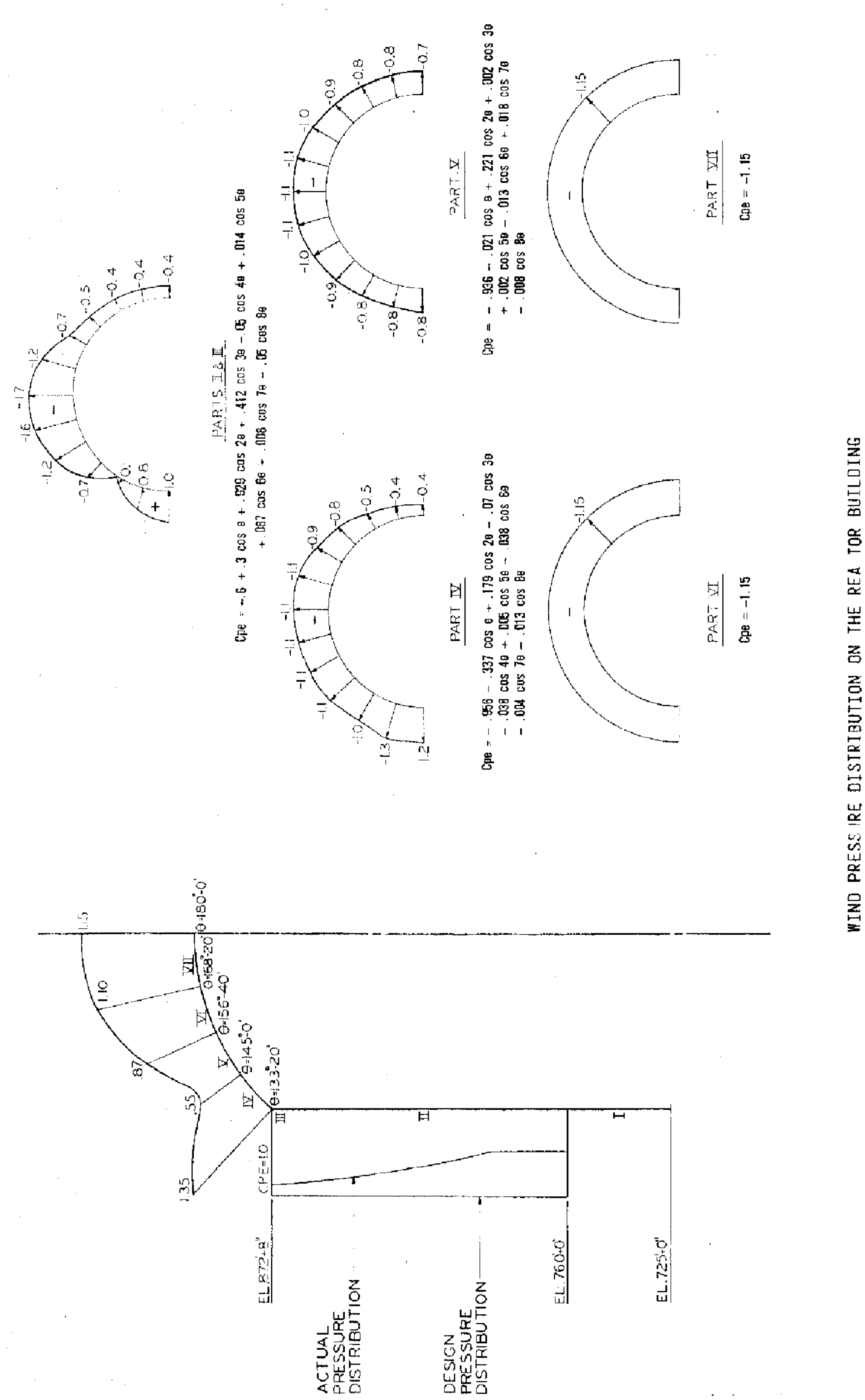


Figure 3-2. Turbine Building Tornado Wind Distributions

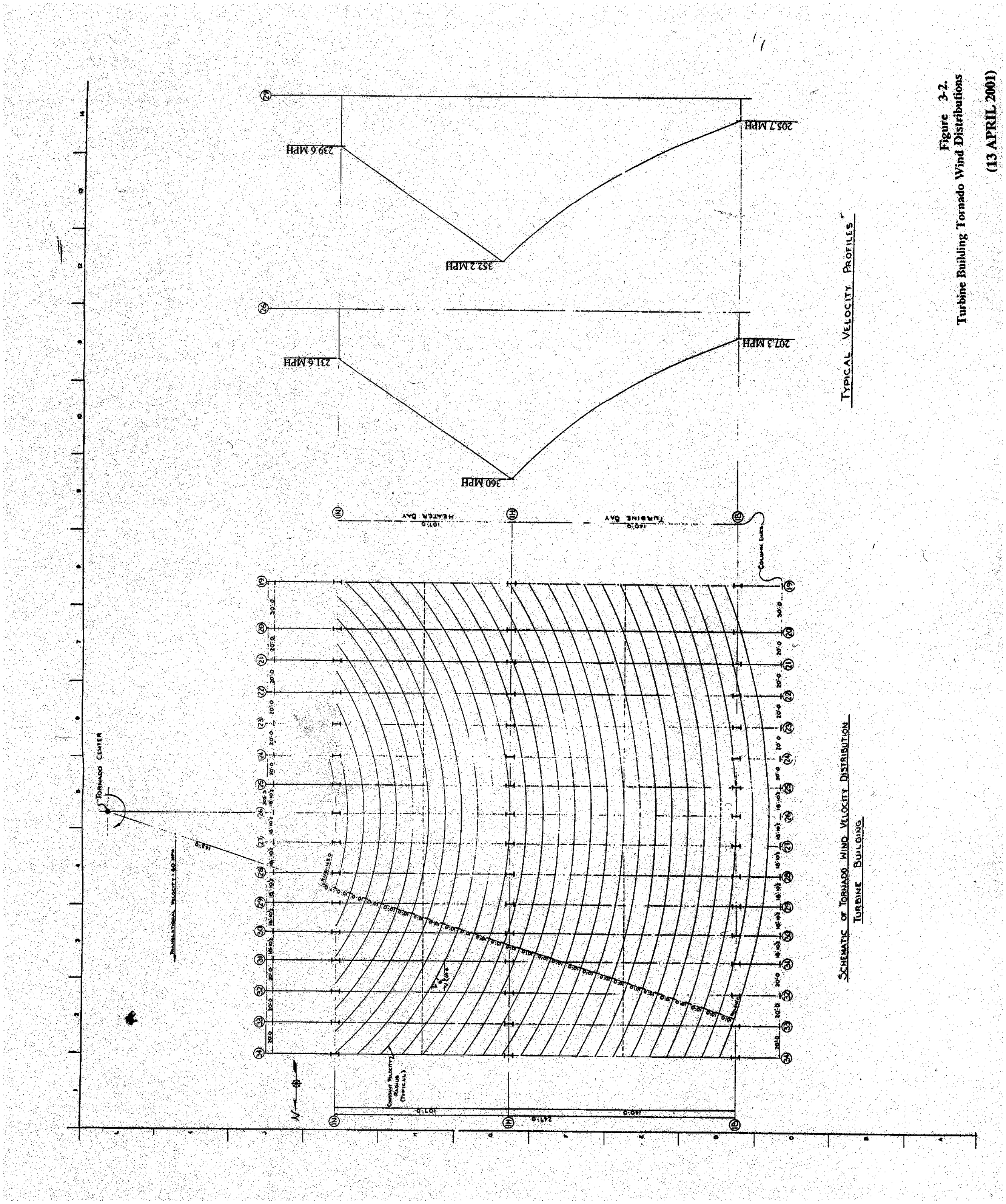


Figure 3-3. Fire Protection System Piping Penetration Detail

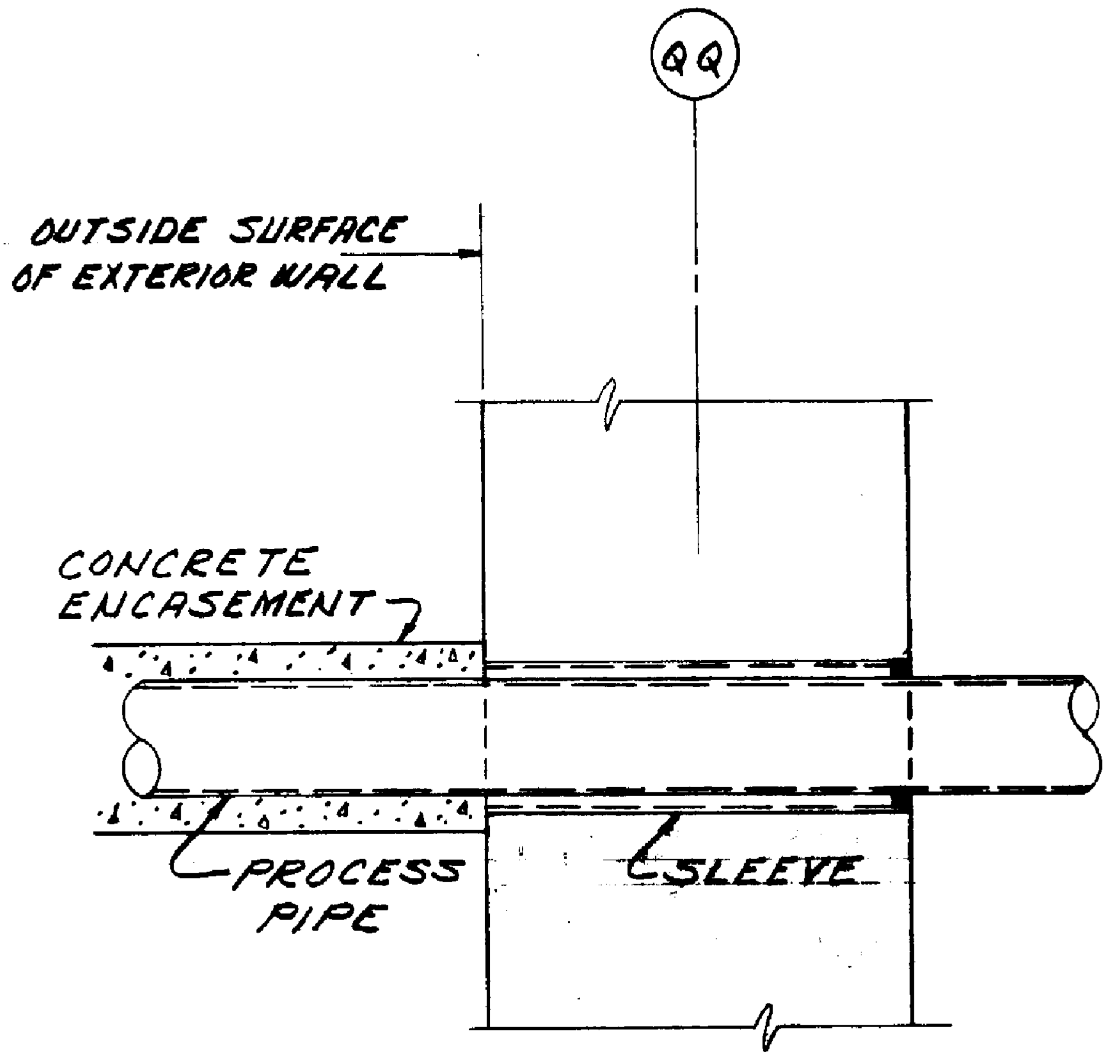


Figure 3-4. Turbines Missiles Projected Areas (Low Pressure Turbine Rotor Discs)

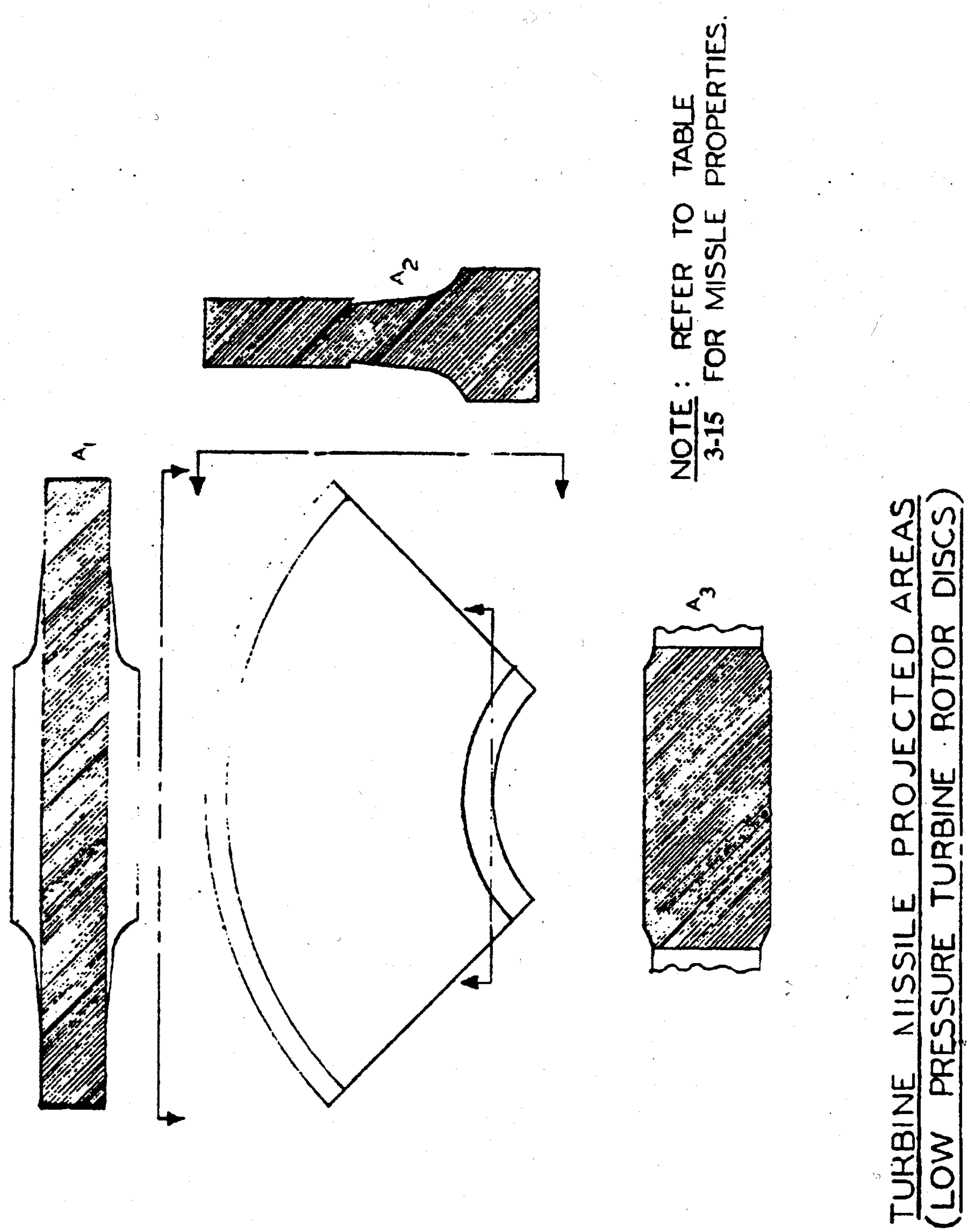


Figure 3-5. Loss of Reactor Coolant Accident Boundary Limits

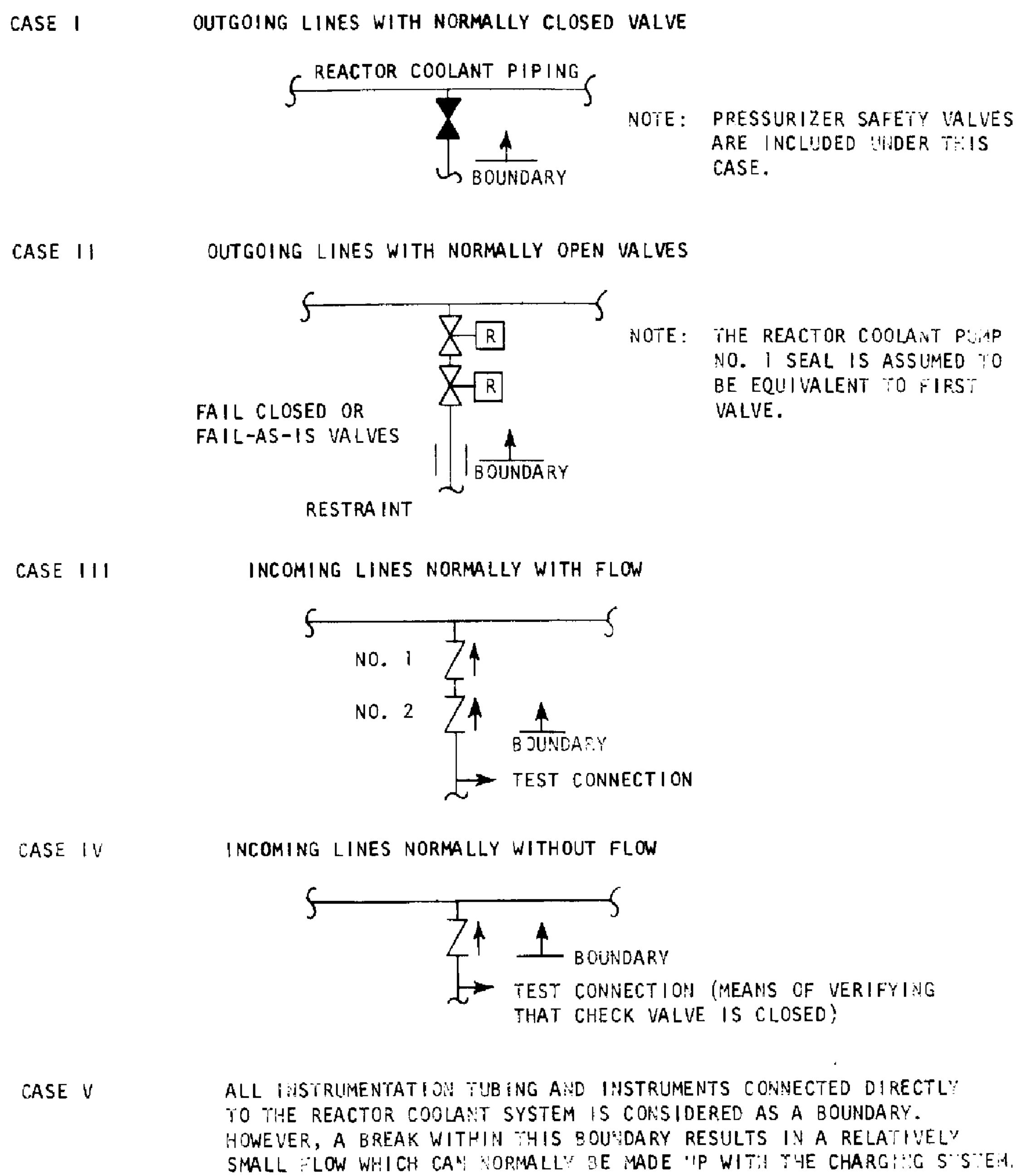
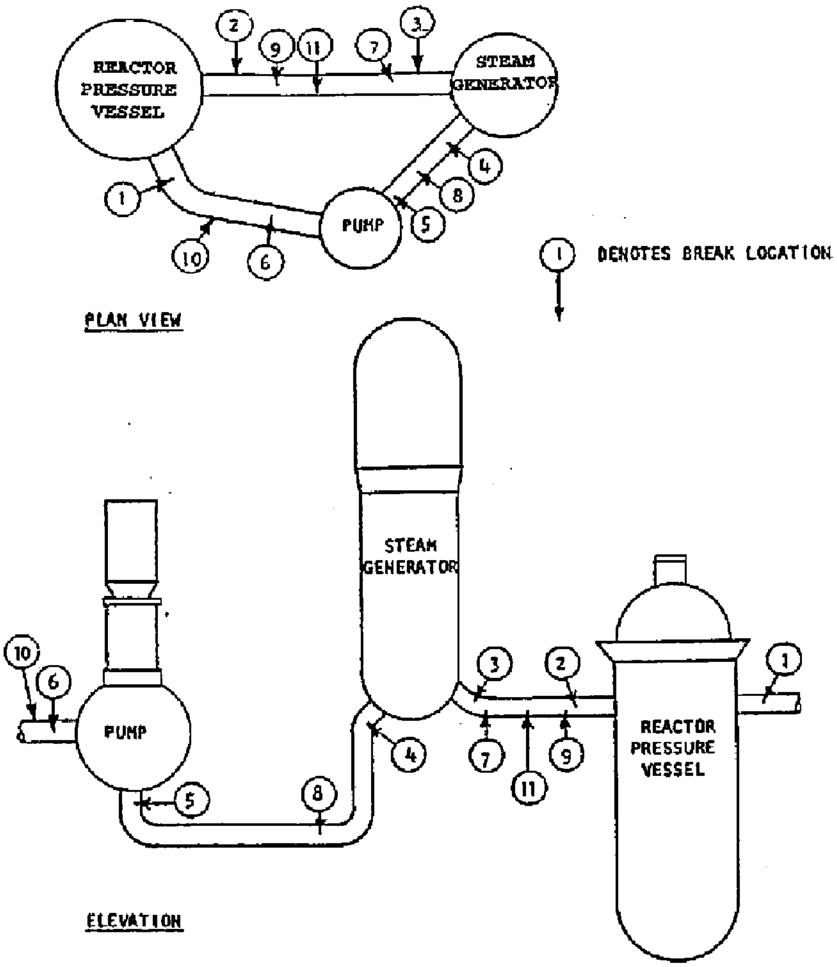


Figure 3-6. Location of Postulated Breaks



Note:
References 3 and 4 provide the basis for eliminating the previously postulated reactor coolant system pipe breaks with the exception of those breaks at branch connections.

Figure 3-7. Analytical Method for Resolving Pipe Break Consequences

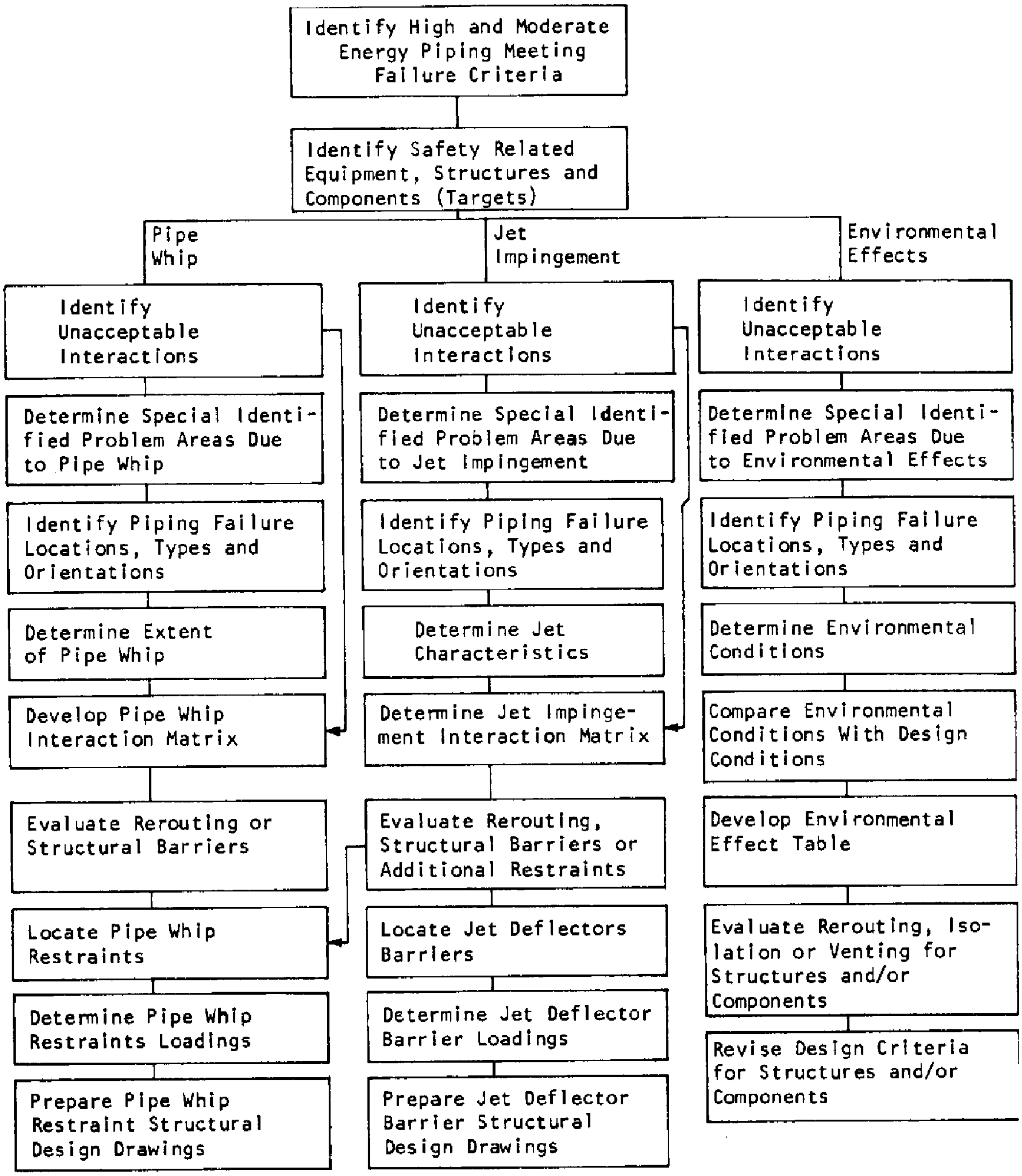


Figure 3-8. Deleted per 2001 Update

Figure 3-9. Main Steam and Feedwater Routing Plan Outside Containment. See 3-10 for Elevation View.

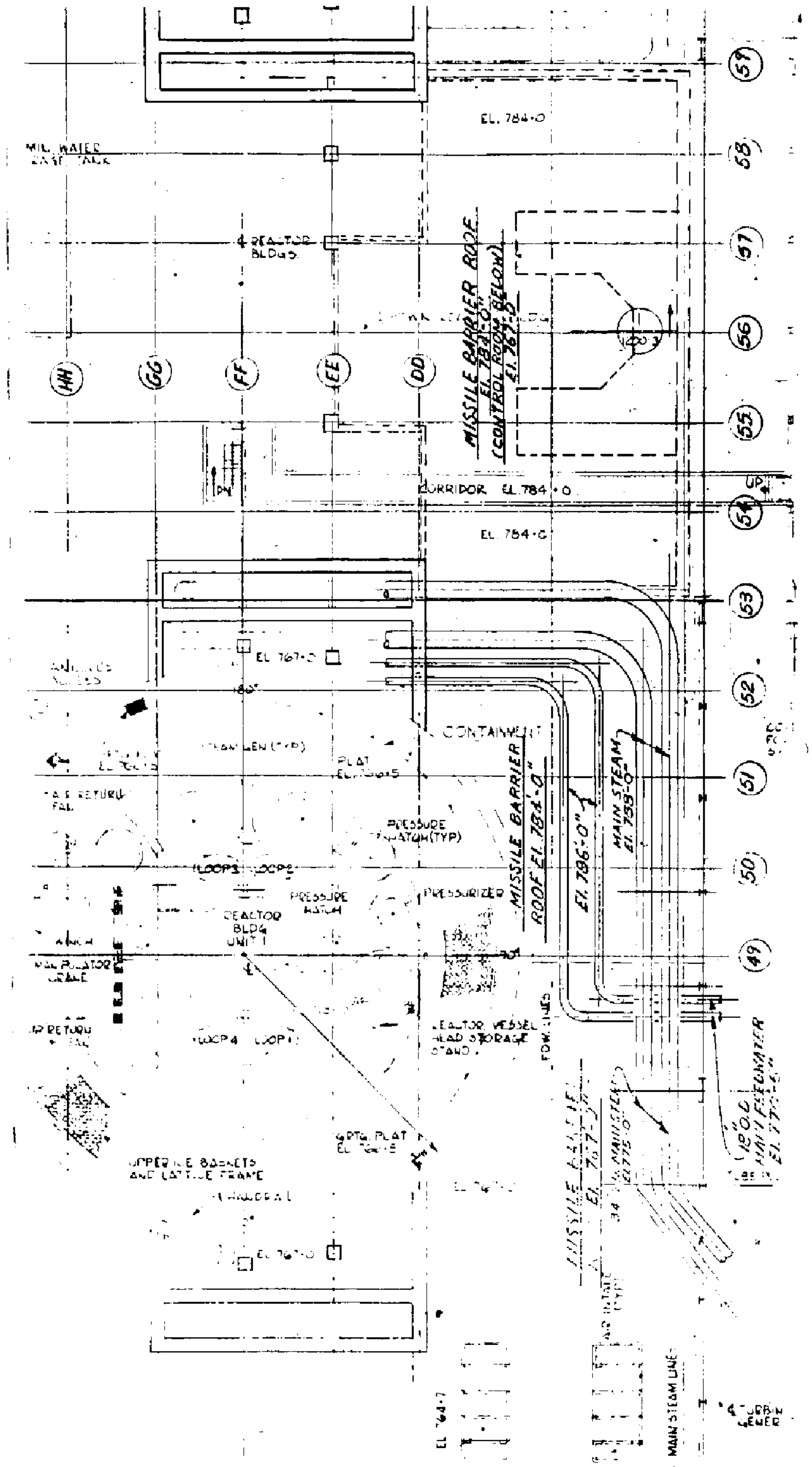


Figure 3-10. Main Steam and Feedwater Routing Elevation Outside Containment [Historical information, not required to be revised.]

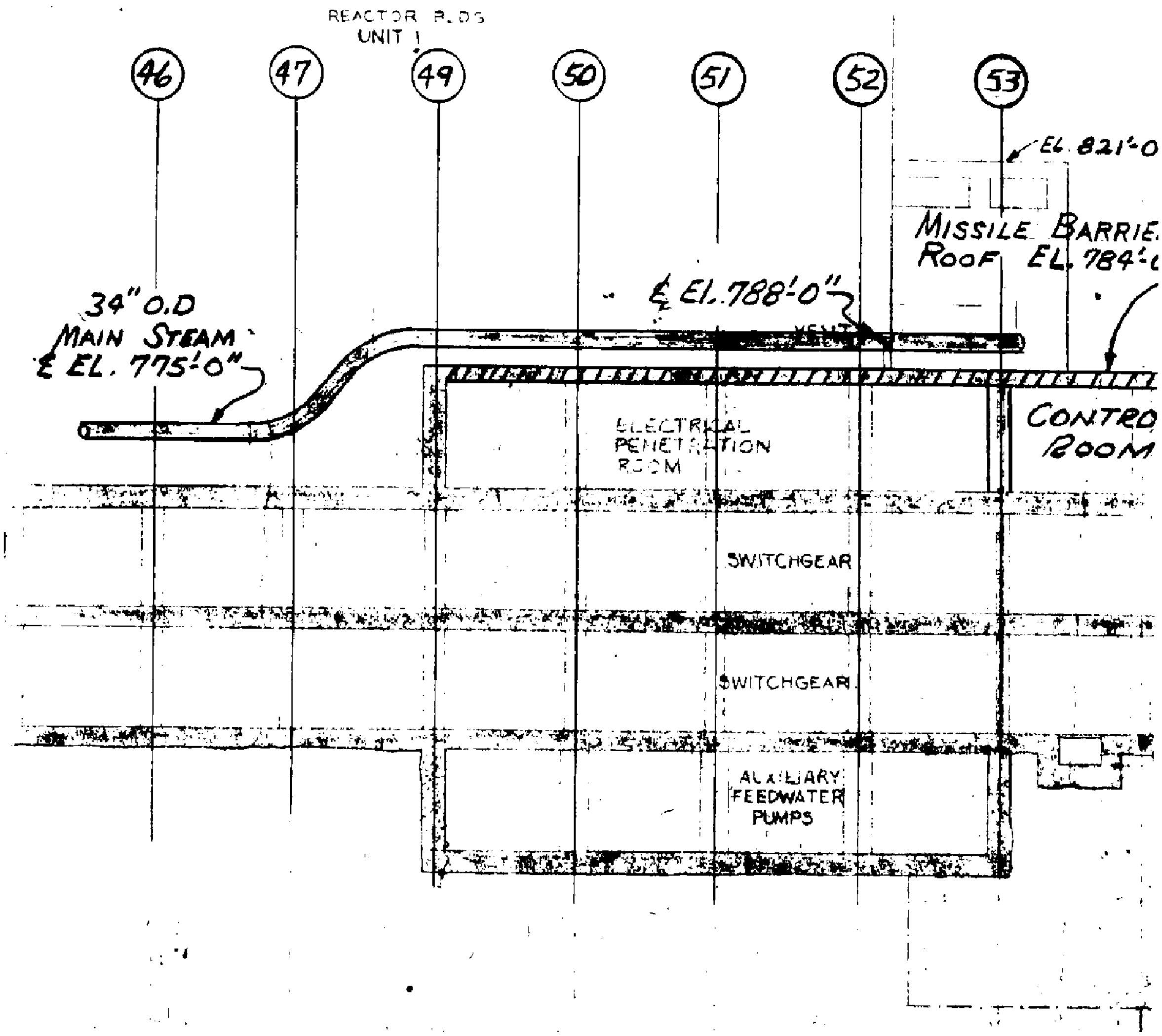


Figure 3-11. Main Steam Routing Plan Outside Containment

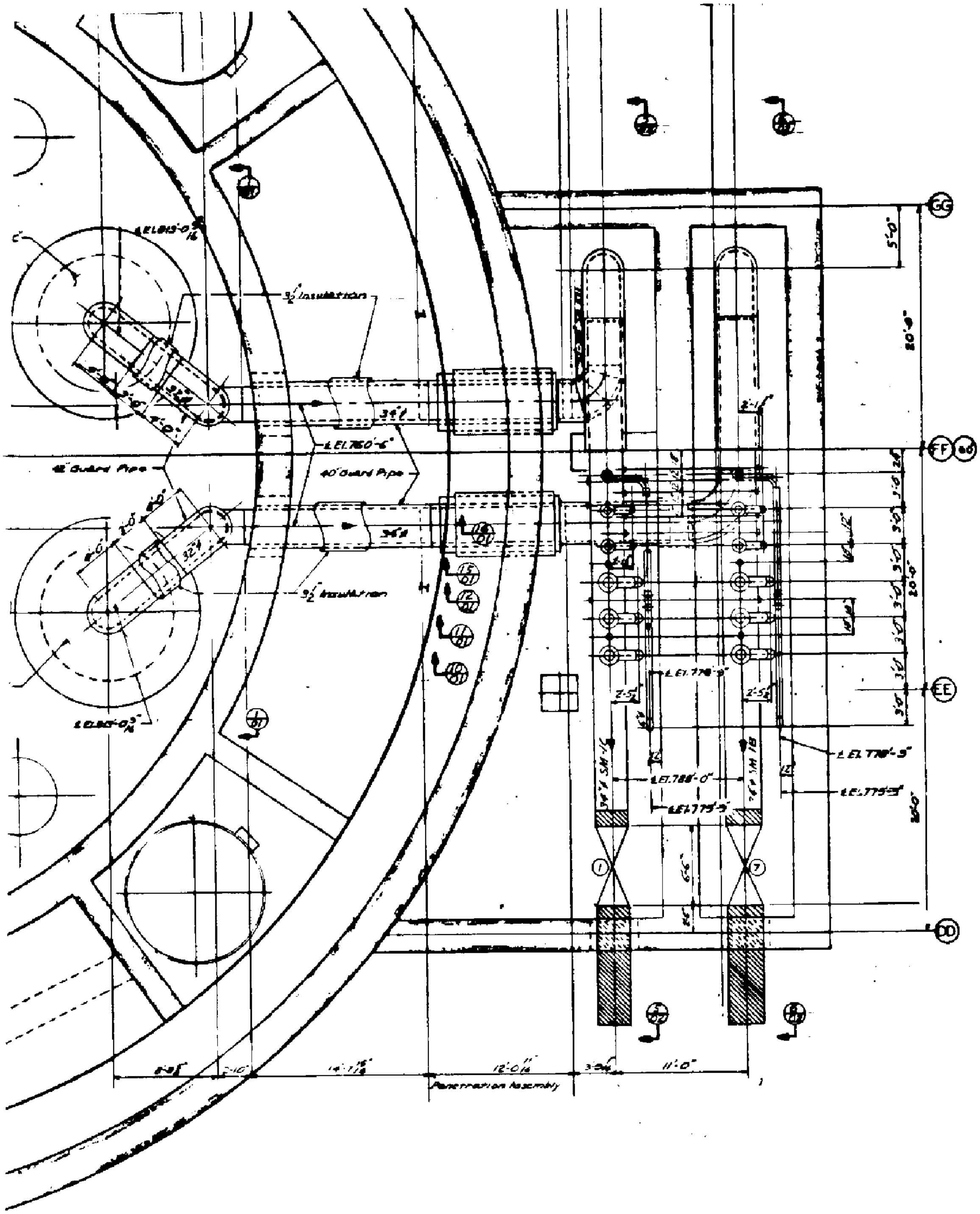


Figure 3-12. Main Steam Routing Elevation Outside Containment Nearest Reactor Building Wall

Figure 3-13. Main Steam Routing Elevation Outside Containment Farthest From Reactor Building Wall

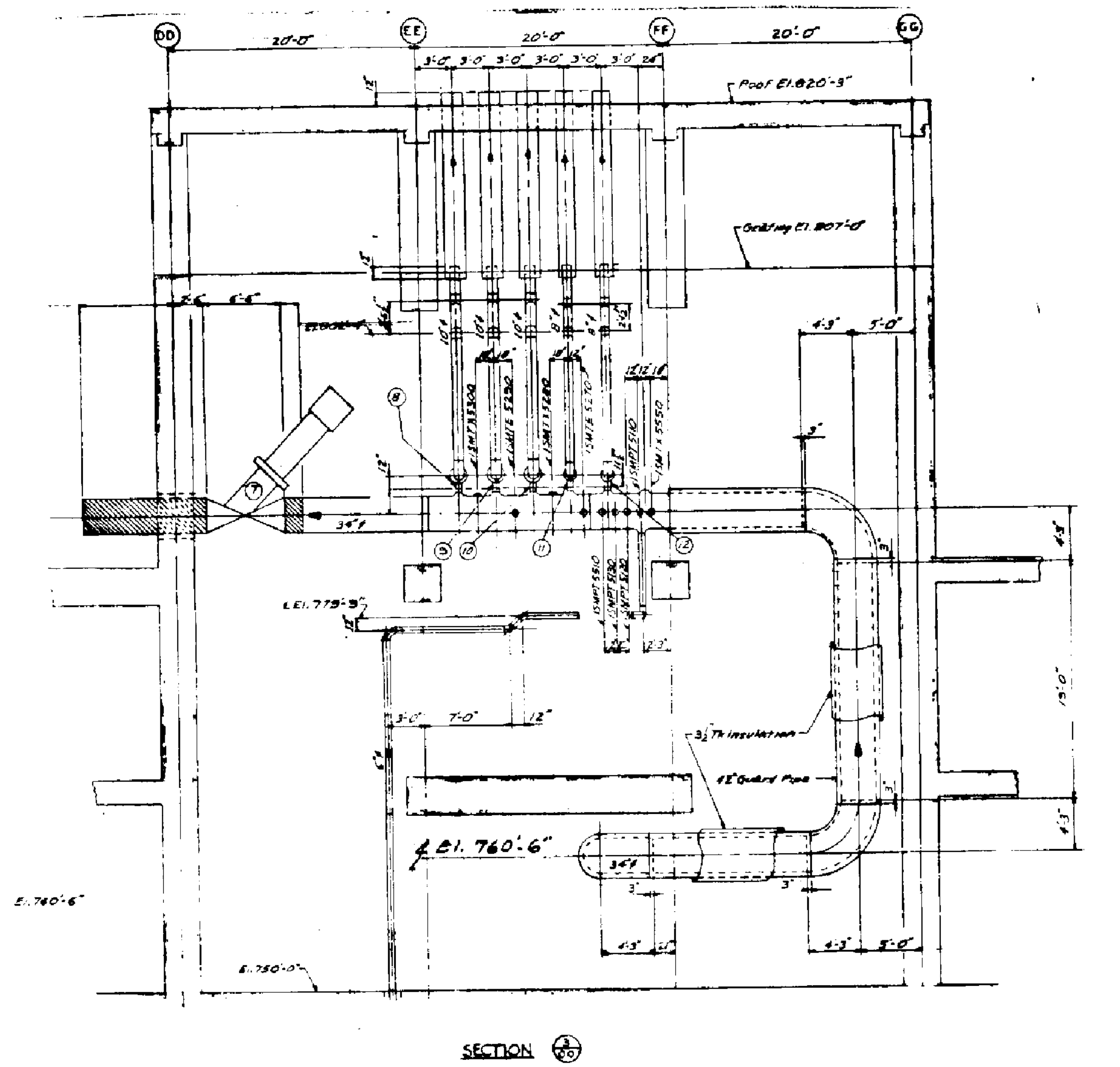


Figure 3-14. Main Feedwater Routing Plan Outside Containment

Figure 3-15. Main Feedwater Routing Elevation A-A Outside Containment

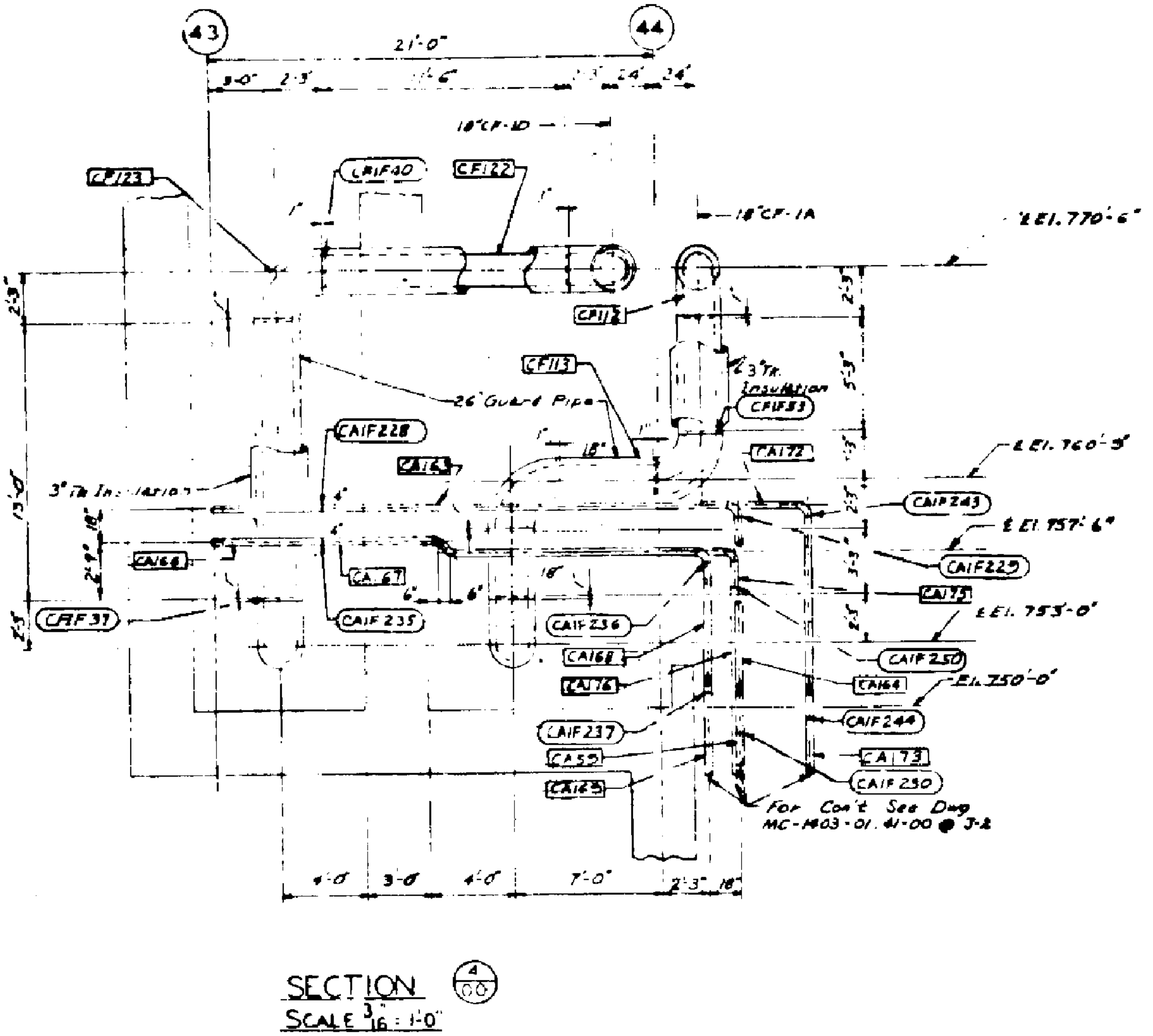


Figure 3-16. Response Acceleration Spectra [Historical information, not required to be revised.]

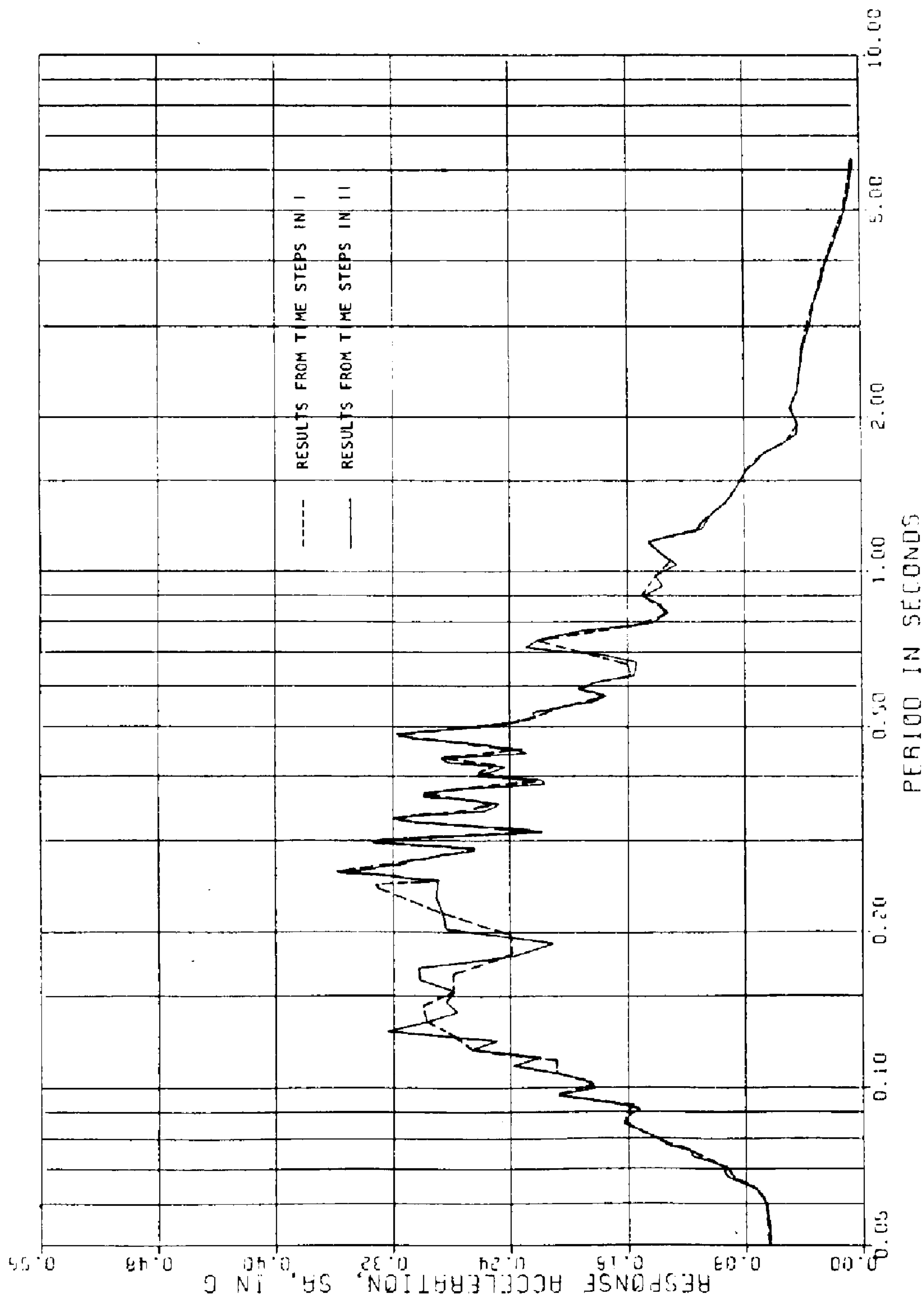


Figure 3-17. Response Acceleration Spectra [Historical information, not required to be revised.]

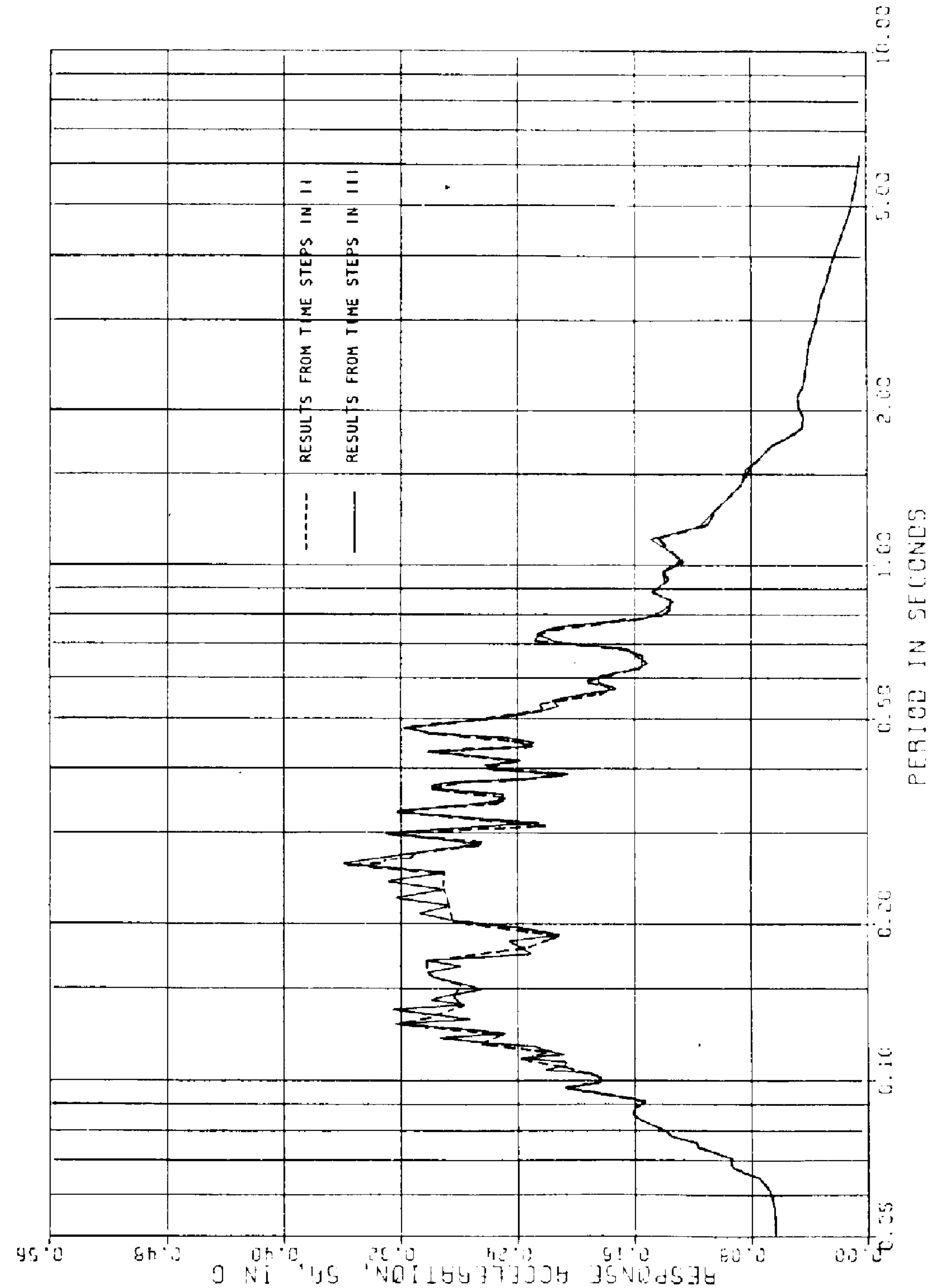


Figure 3-18. Response Acceleration Spectra [Historical information, not required to be revised.]

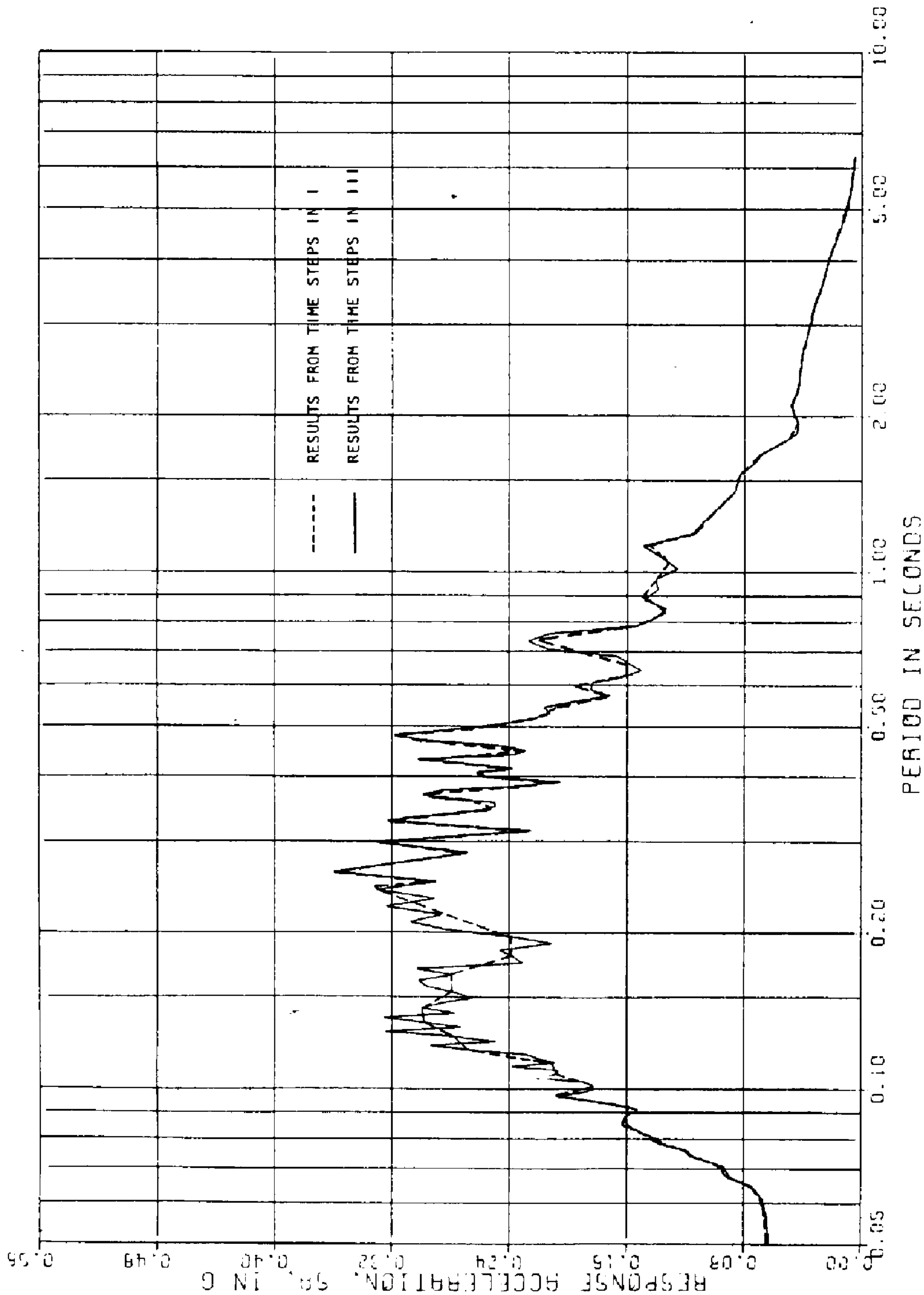


Figure 3-19. Multi-Degree of Freedom System with Support Motion

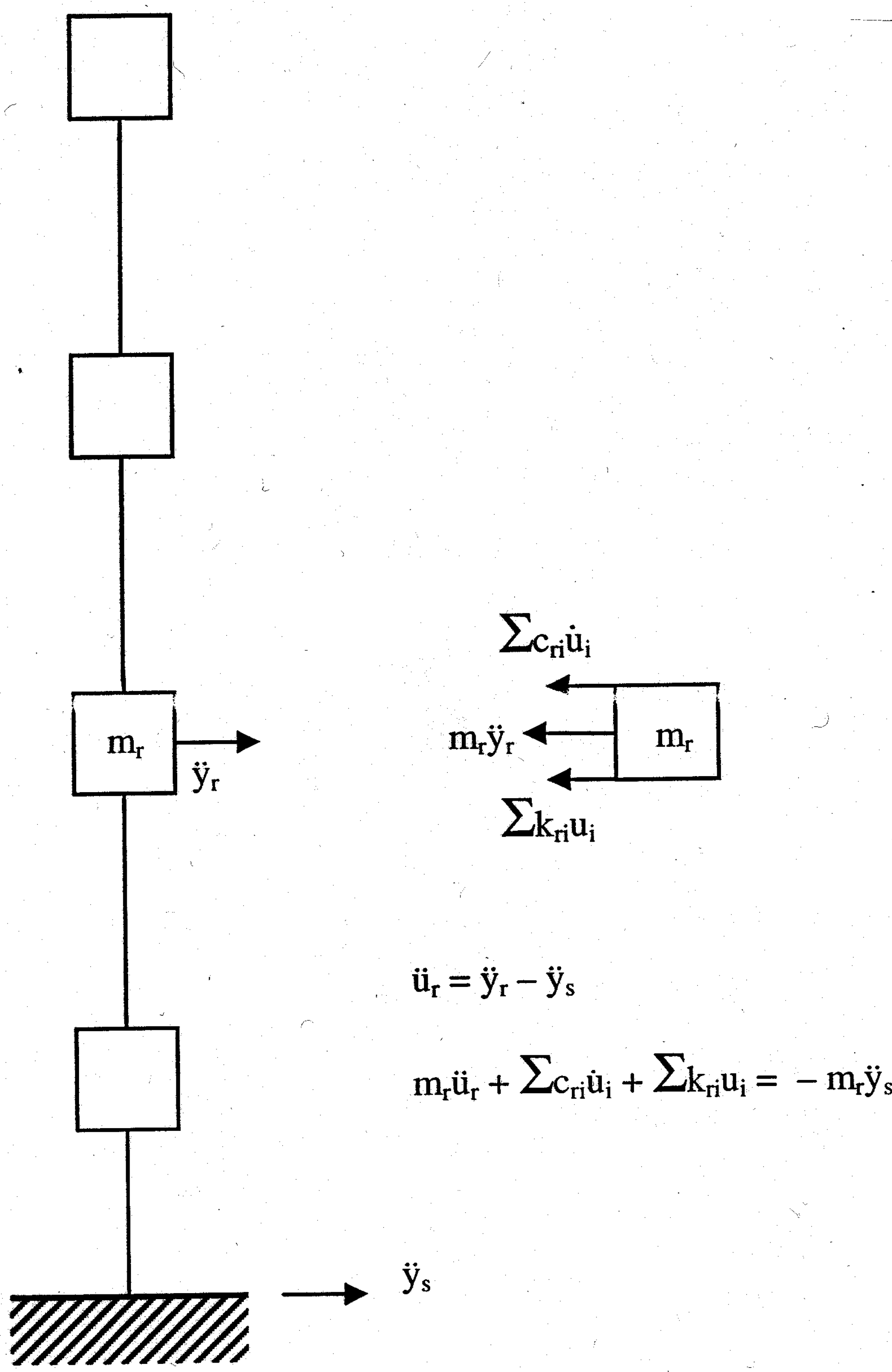


Figure 3-20. Reactor Building Interior Structure - Mass Model [Historical Information, not required to be revised.]

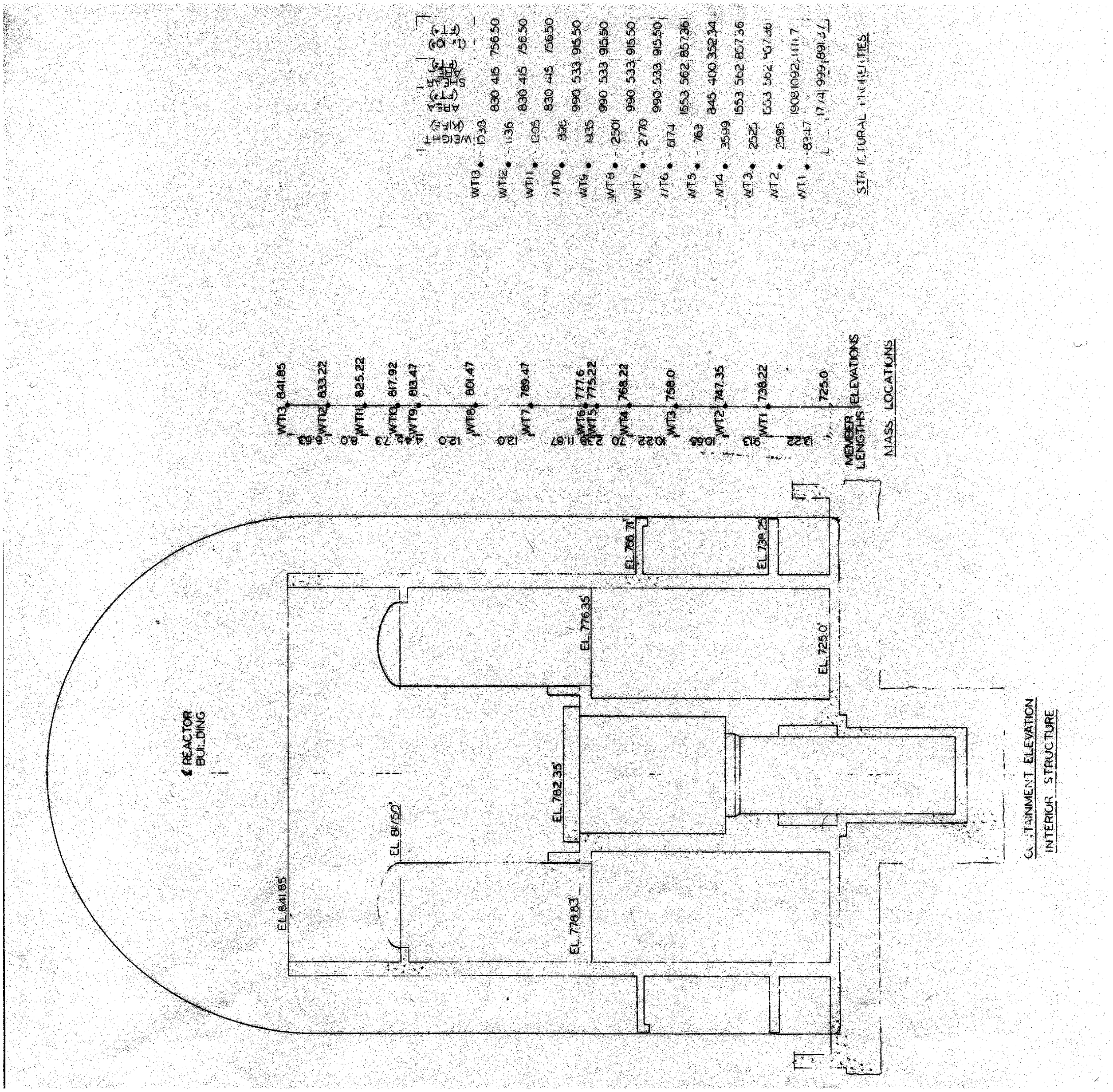
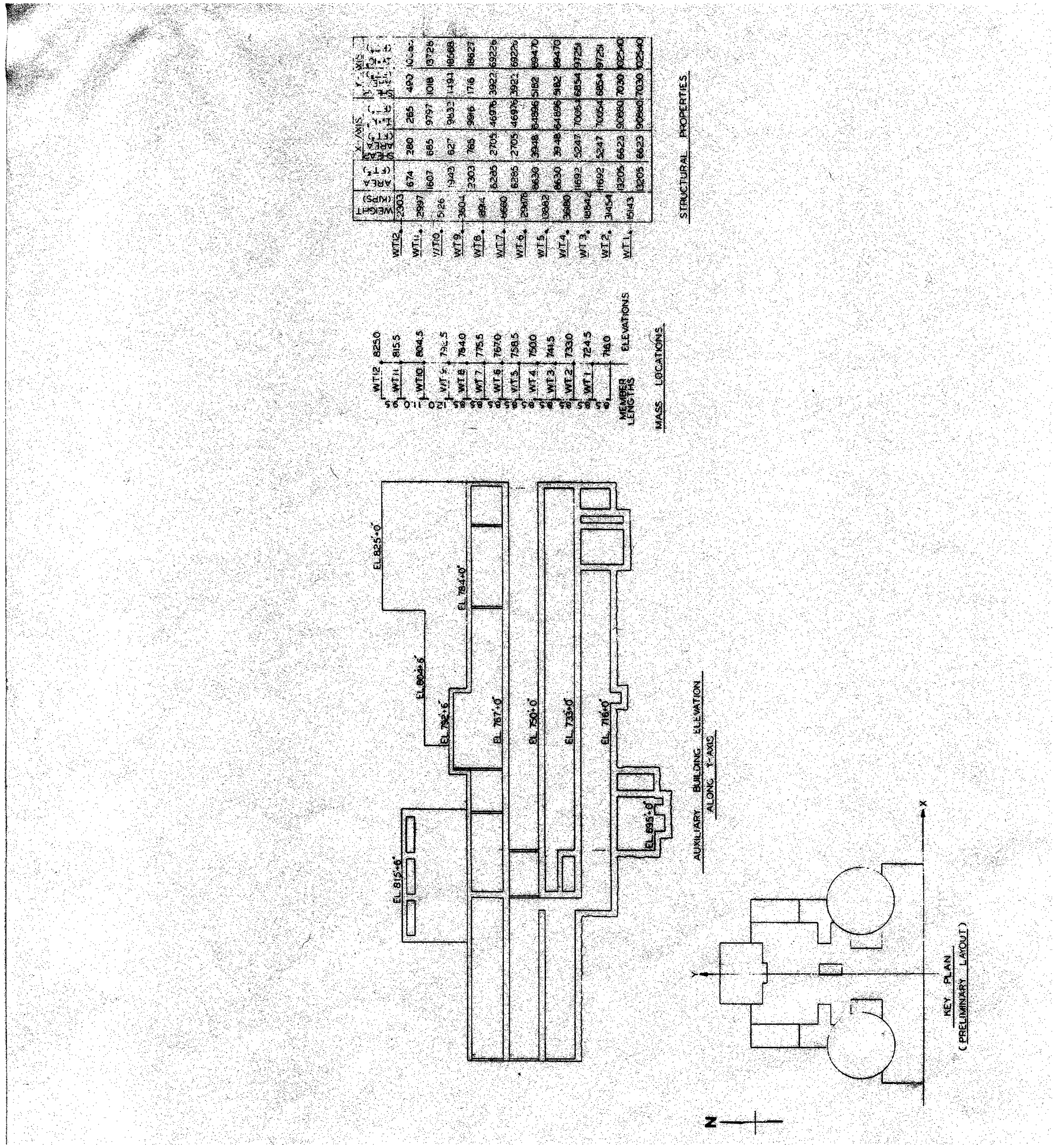


Figure 3-21. Auxilary Building Mass Model [Historical Information, not required to be revised.]



	WEIGHT (KIPS)	AREA (FT²)	X-AXIS SHEAR AREA (FT²)	X-AXIS I (FT⁴)	Y-AXIS SHEAR AREA (FT²)	Y-AXIS I (FT⁴)
WT12	2303	674	280	265	490	[illegible]
WT11	2997	1607	685	9797	1018	13726
WT10	5126	1943	627	9833	1491	18568
WT9	3604	3303	765	9916	1716	18627
WT8	1894	6285	2705	46976	3922	69226
WT7	4660	6285	2705	46976	3922	69226
WT6	29076	8630	3948	64896	5182	89470
WT5	13882	8630	3948	64896	5182	89470
WT4	36180	11692	5247	70054	6854	97251
WT3	18542	11692	5247	70054	6854	97251
WT2	31454	13205	6623	90880	7030	102540
WT1	15143	13205	6623	90880	7030	102540

Figure 3-22. Reactor Building 1st and 2nd Horizontal Mode Shapes

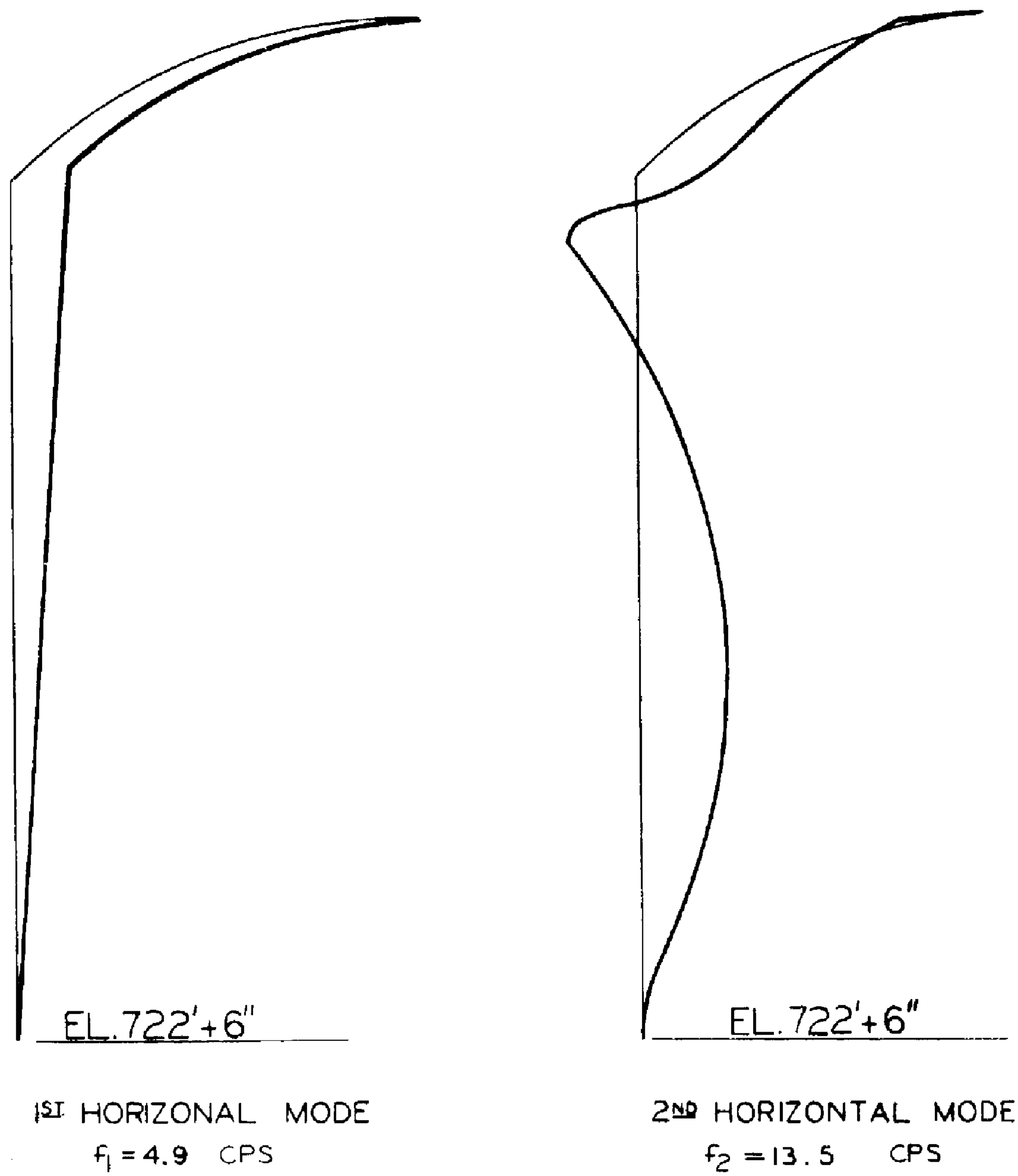
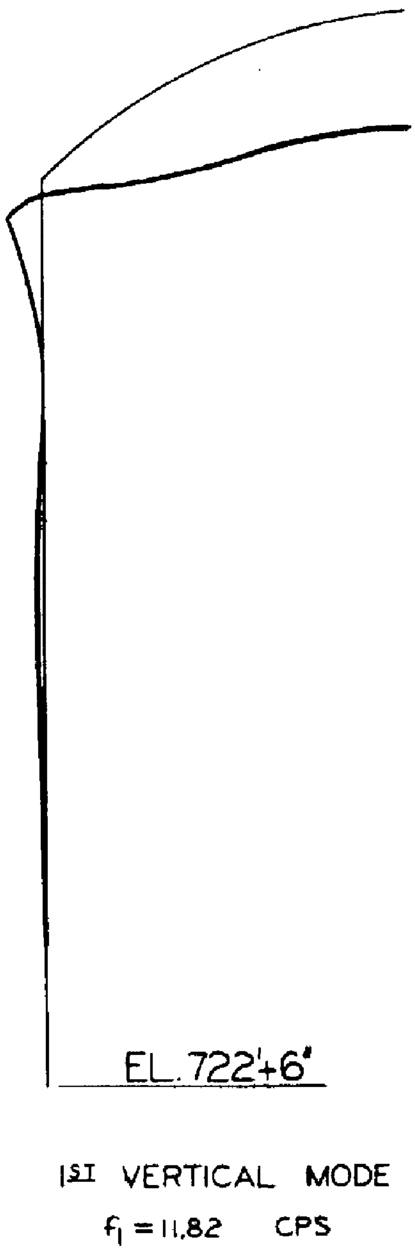


Figure 3-23. Reactor Building 1st and 2nd Vertical Mode Shapes



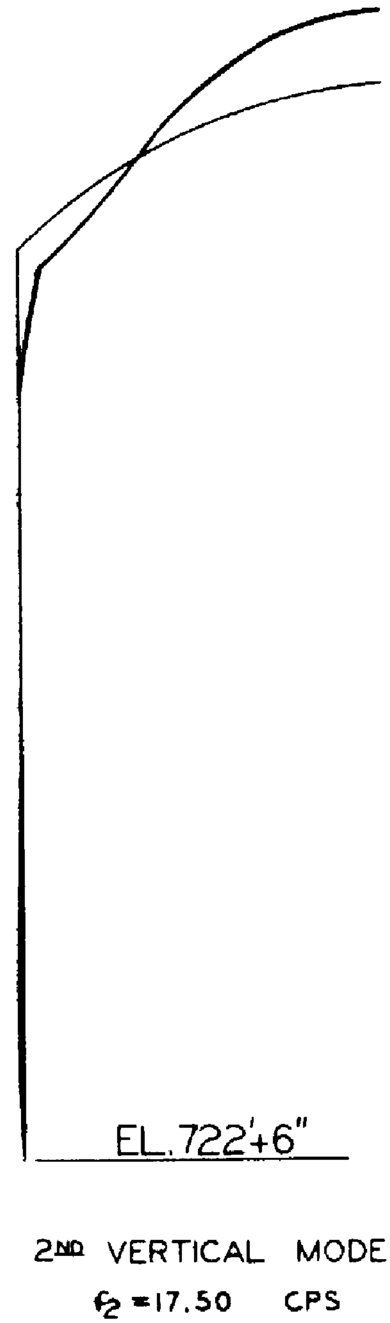


Figure 3-24. Reactor Building - Shear Force (lb/in) Due to SSE [Historical information, not required to be revised.]

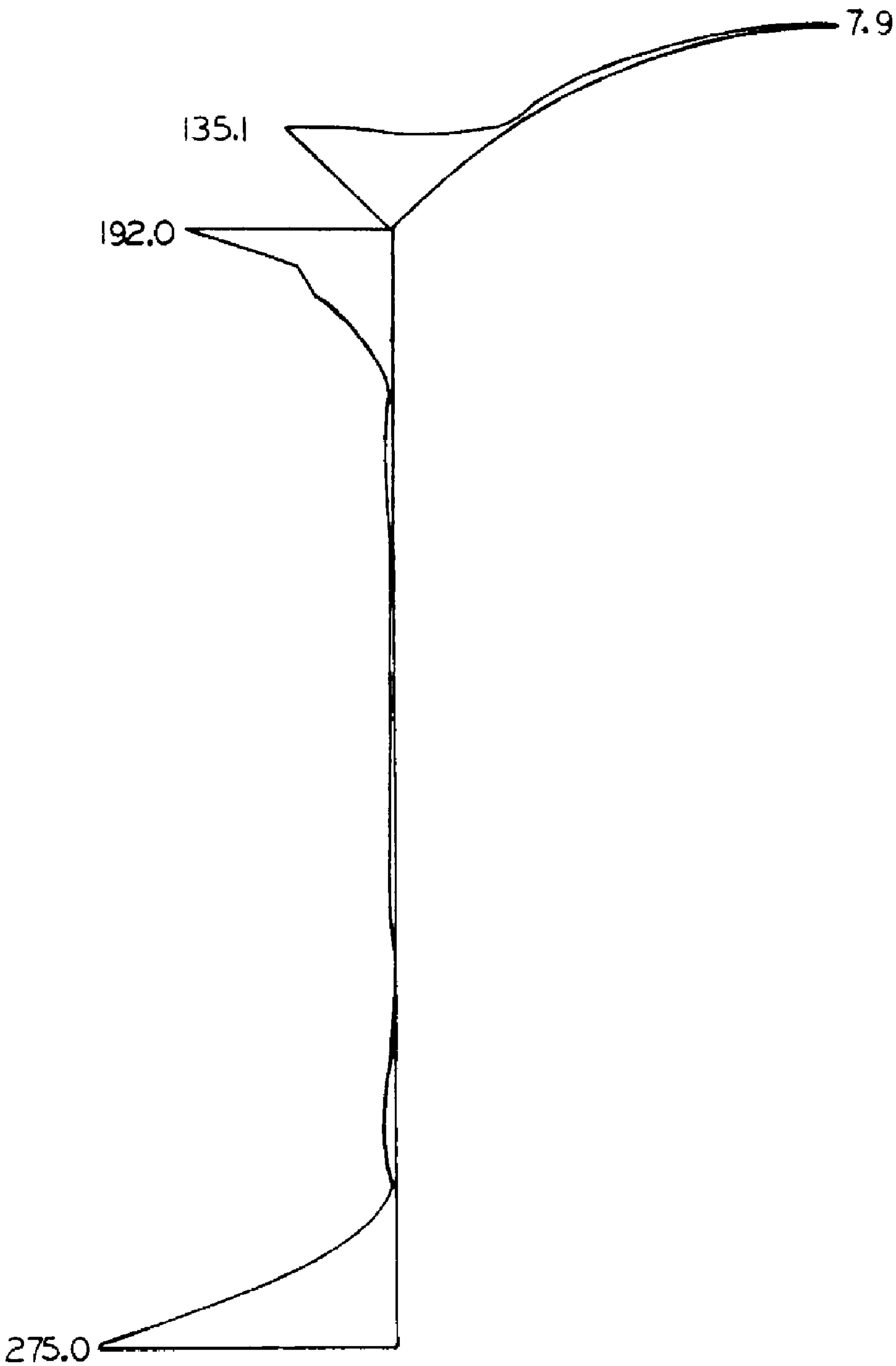


Figure 3-25. Reactor Building - Meridional Force N_0 (lb/in) Due to SSE [Historical information, not required to be revised.]

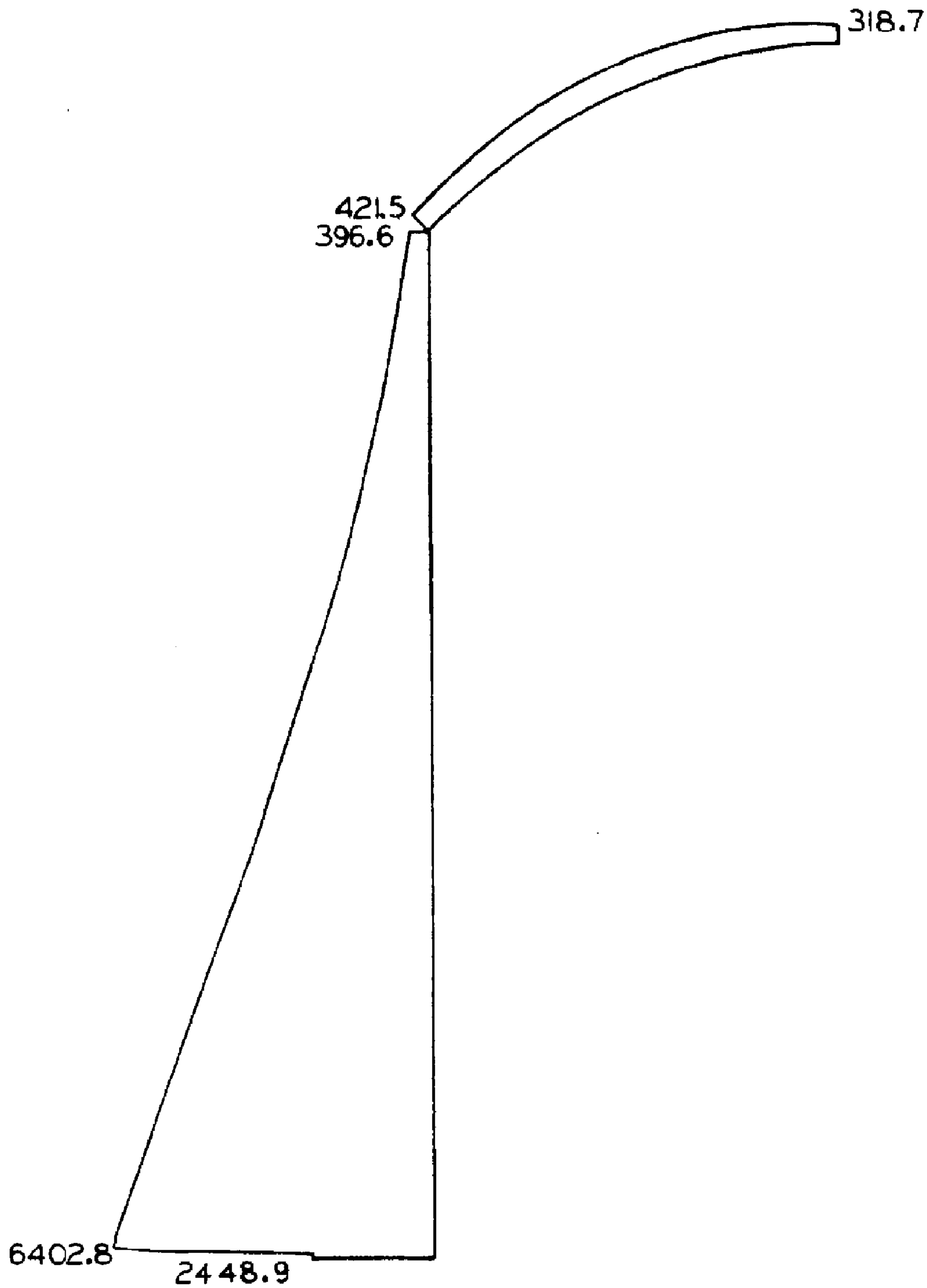


Figure 3-26. Reactor Building - Meridional Moment M_0 (lb/in) Due to SSE [Historical information, not required to be revised.]

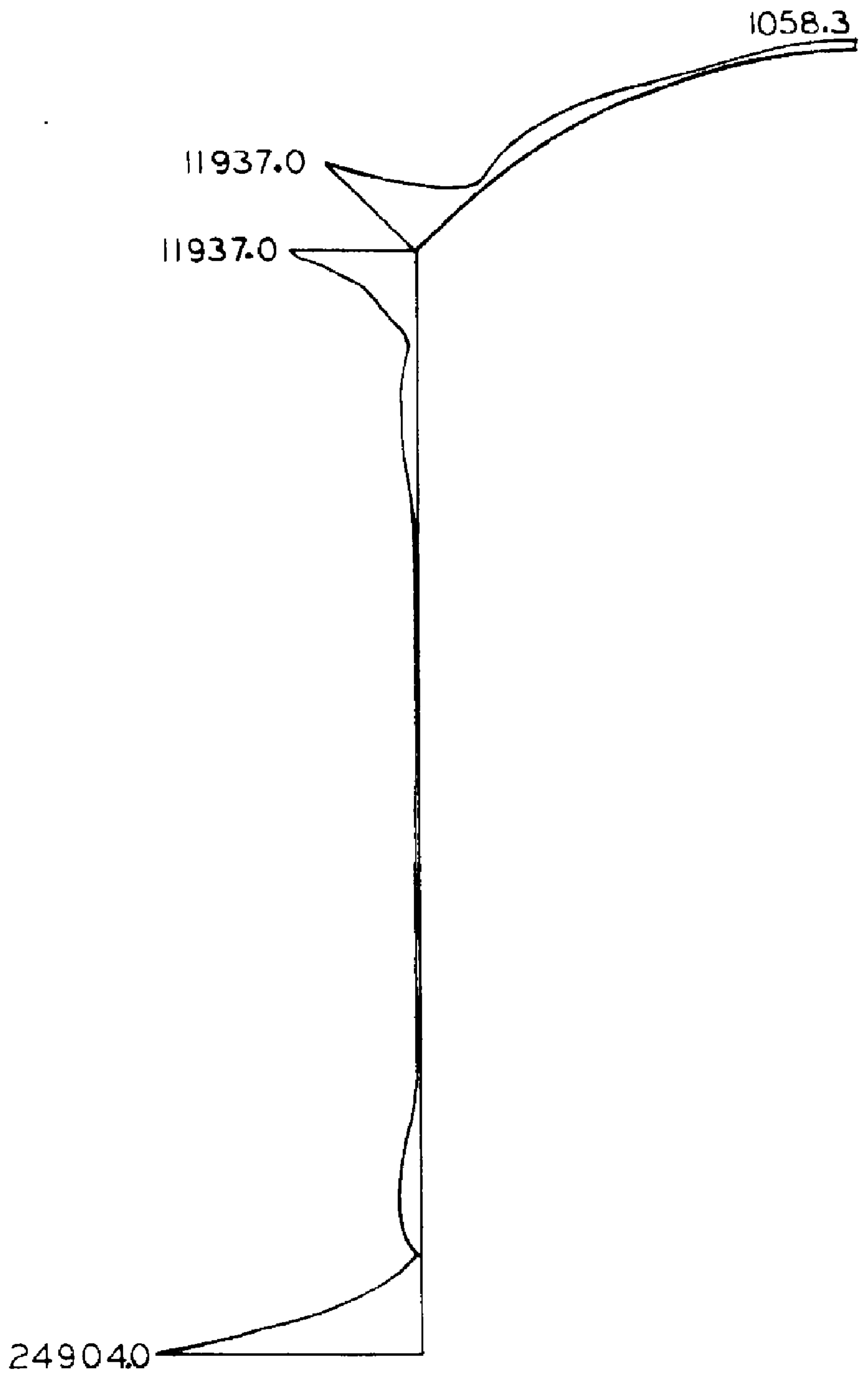


Figure 3-27. Reactor Building - Membrane Shear N (lb/in) Due to SSE [Historical information, not required to be revised.]

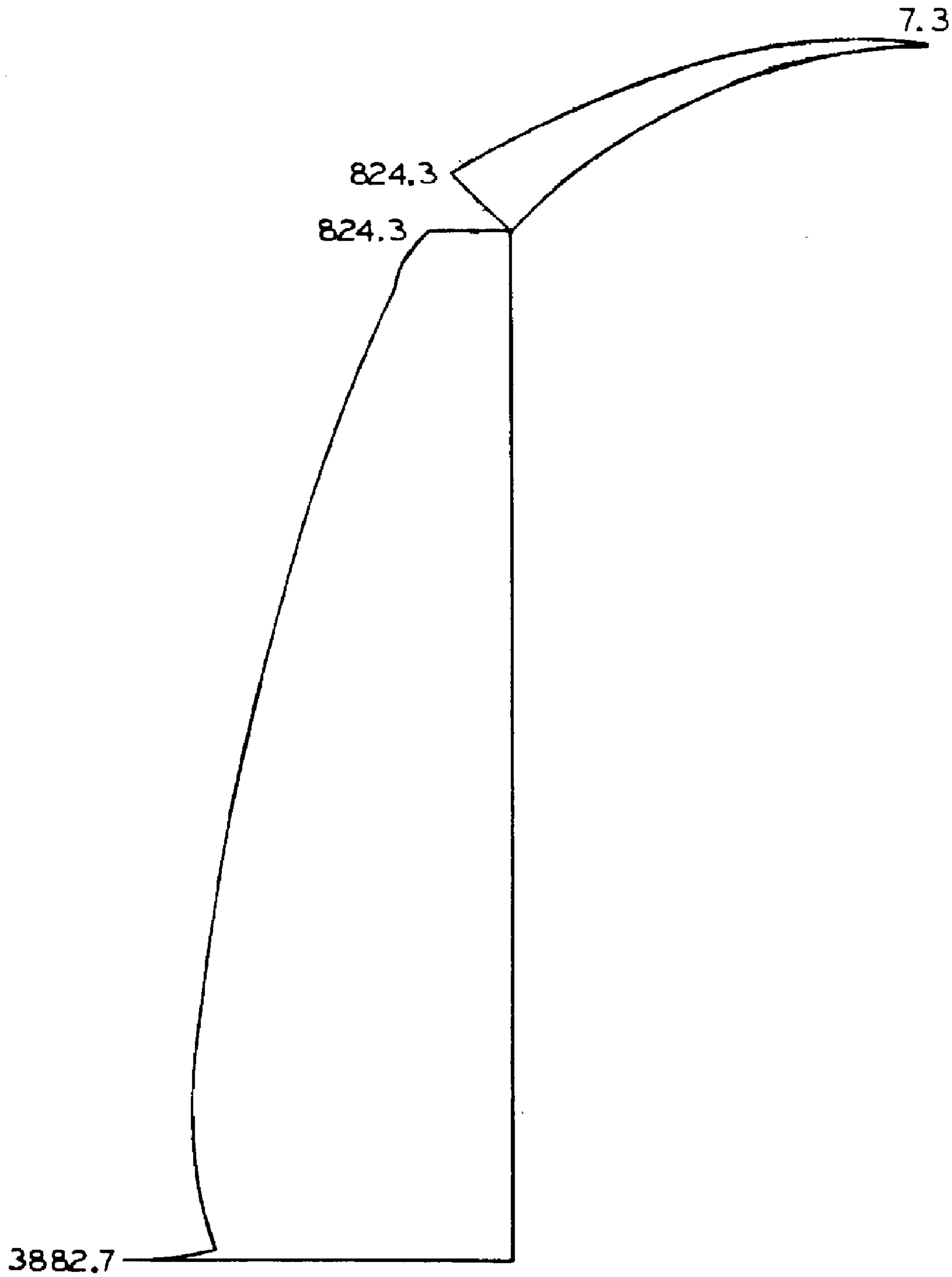


Figure 3-28. Reactor Building-Hoop Force N_0 (lb/in) Due to SSE [Historical information, not required to be revised.]

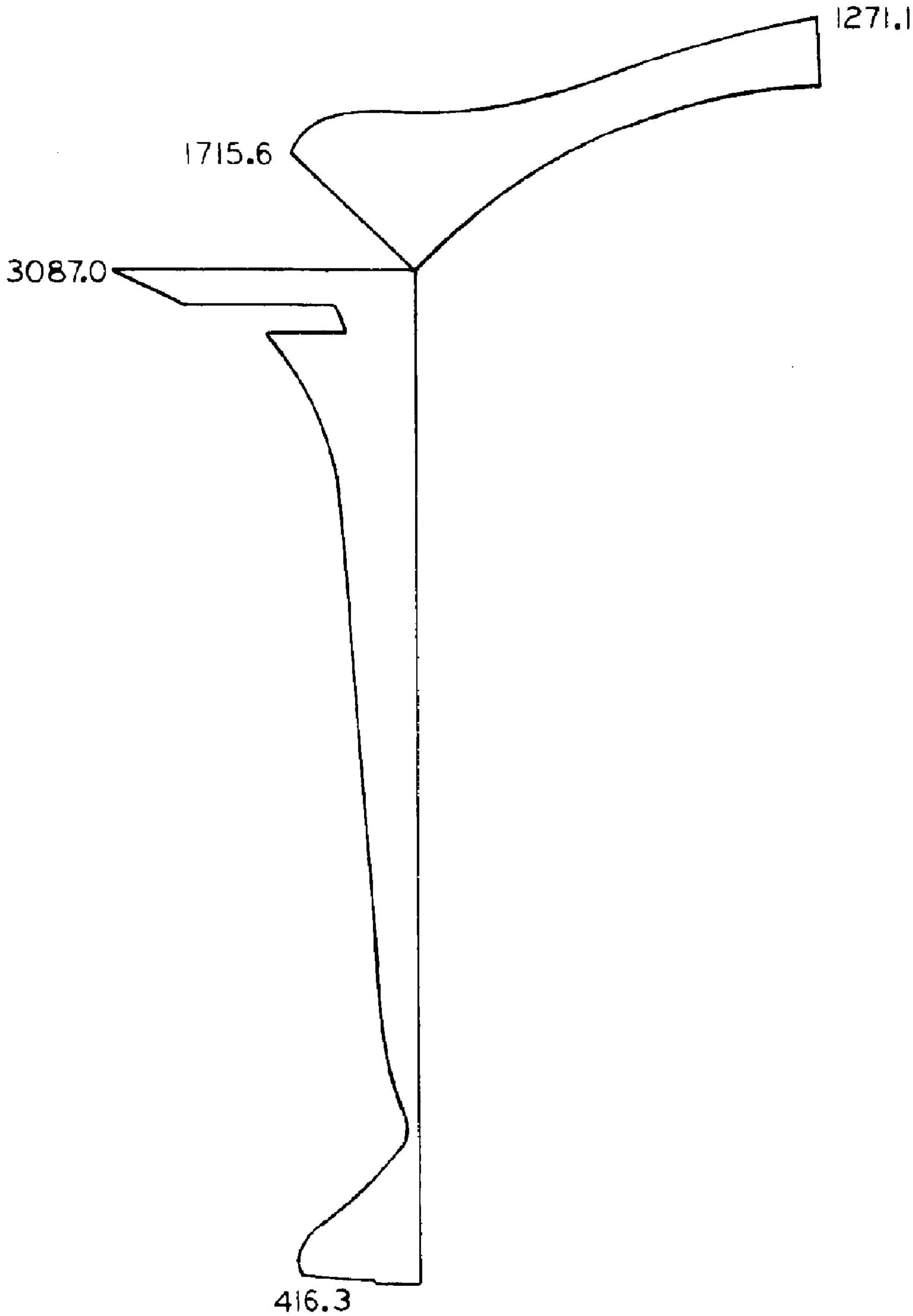


Figure 3-29. Reactor Building-Hoop Moment M_0 (in.lb/in) Due to SSE [Historical information, not required to be revised.]

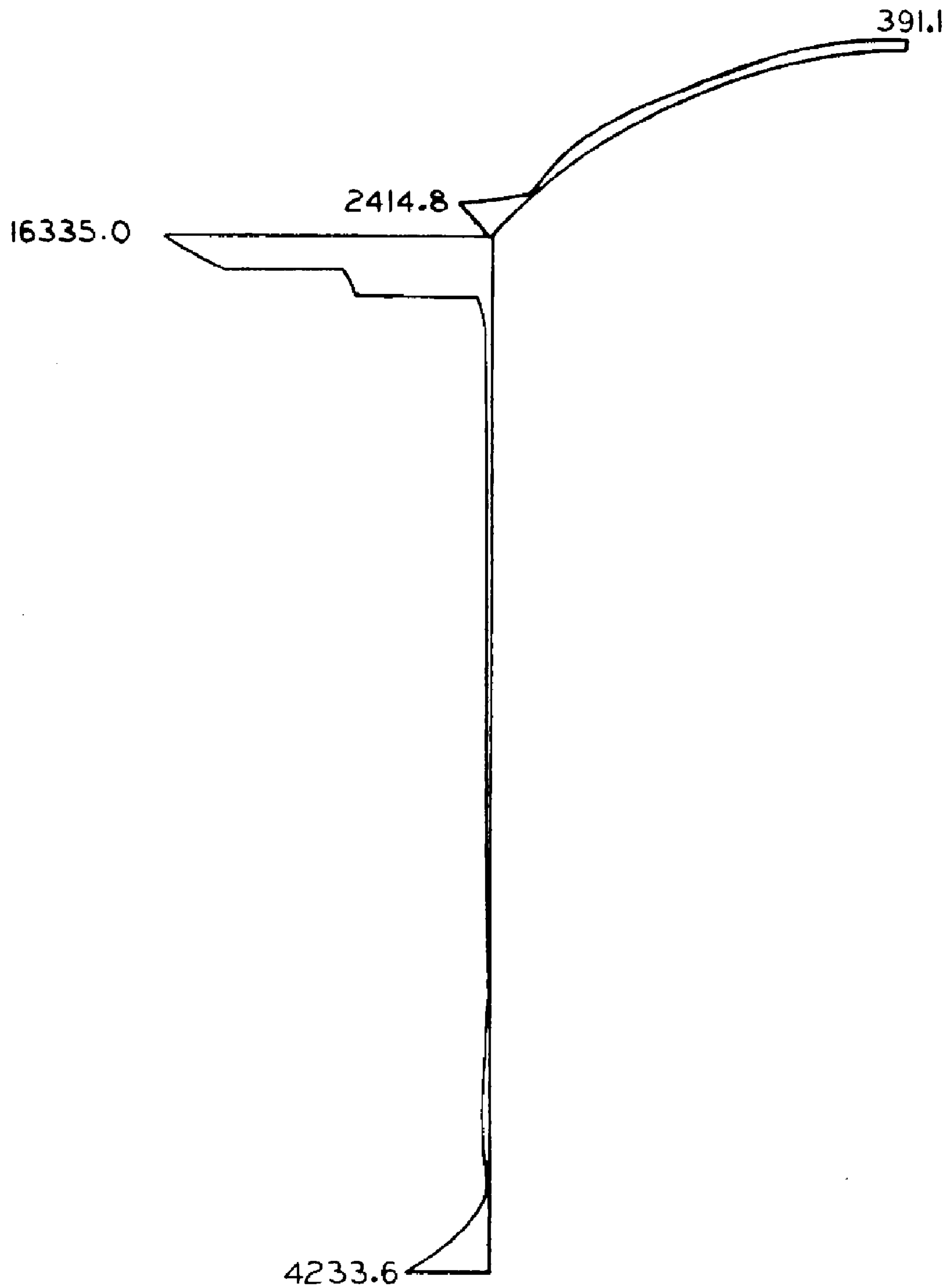


Figure 3-30. Containment Interior Structure, First Four Horizontal Mode Shapes, North-South Direction

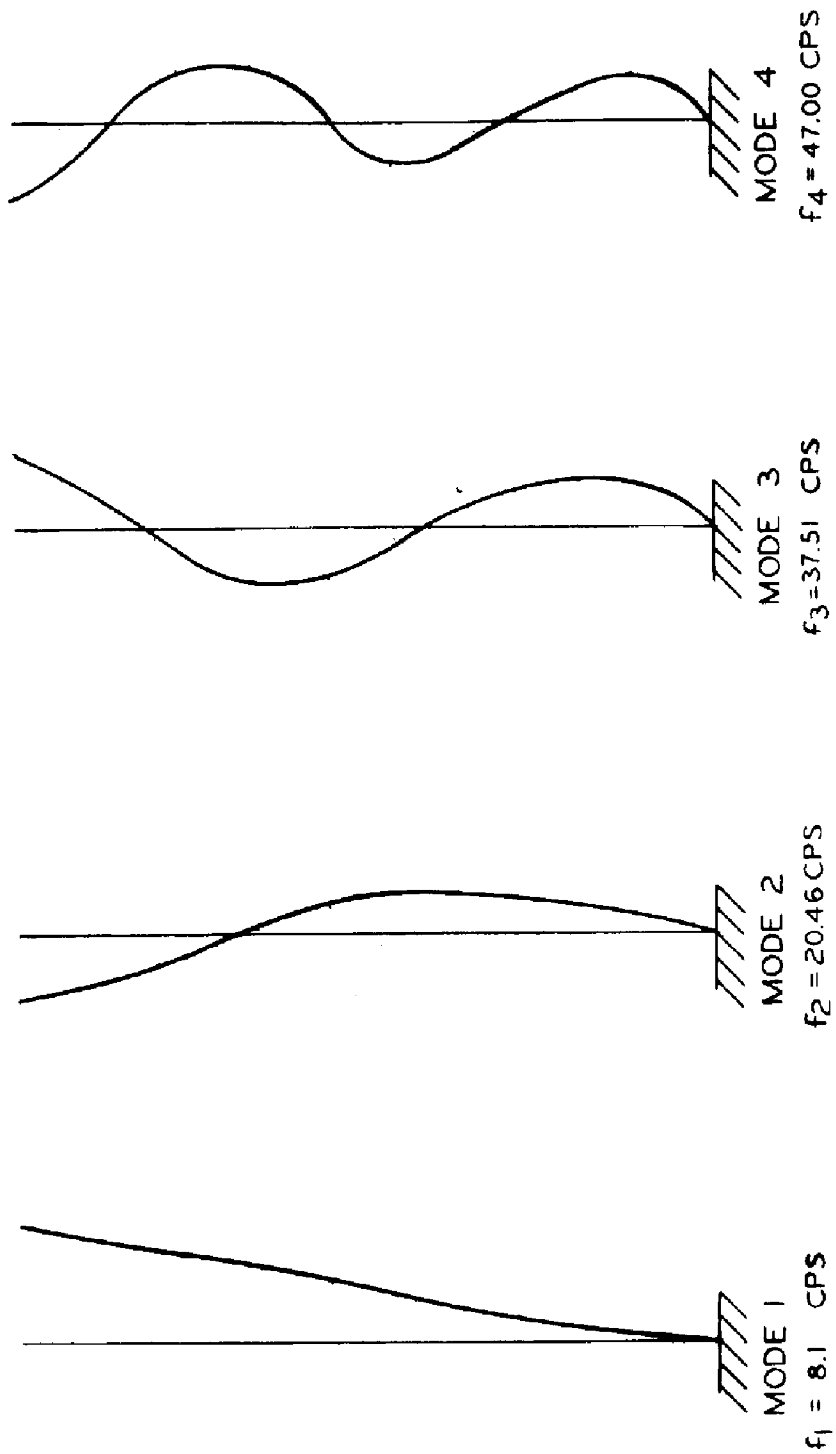


Figure 3-31. Containment Interior Structure, First Four Horizontal Mode Shapes, East-West Direction

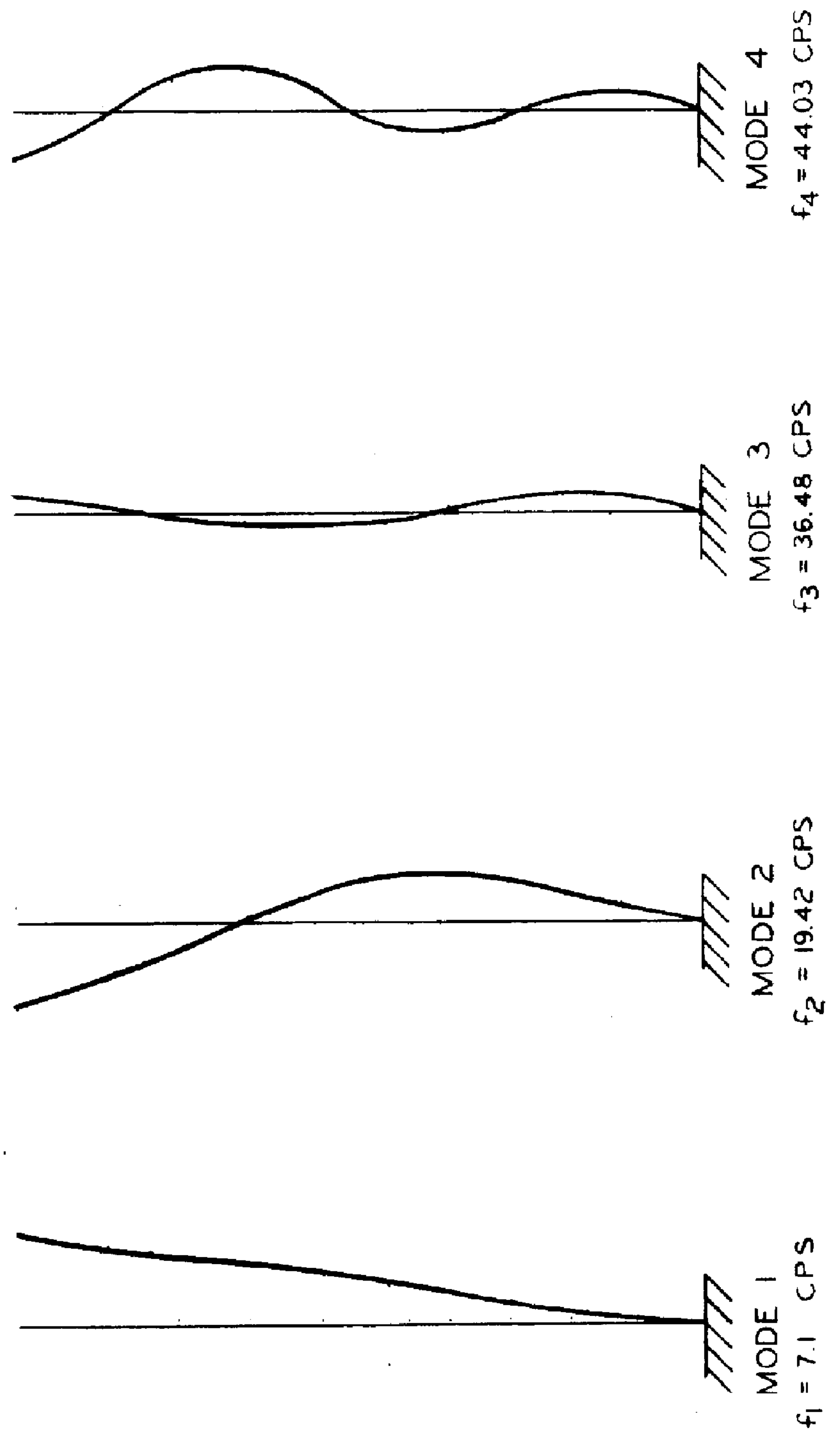


Figure 3-32. Containment Interior Structure - First Two Vertical Mode Shapes [Historical information, not required to be revised.]

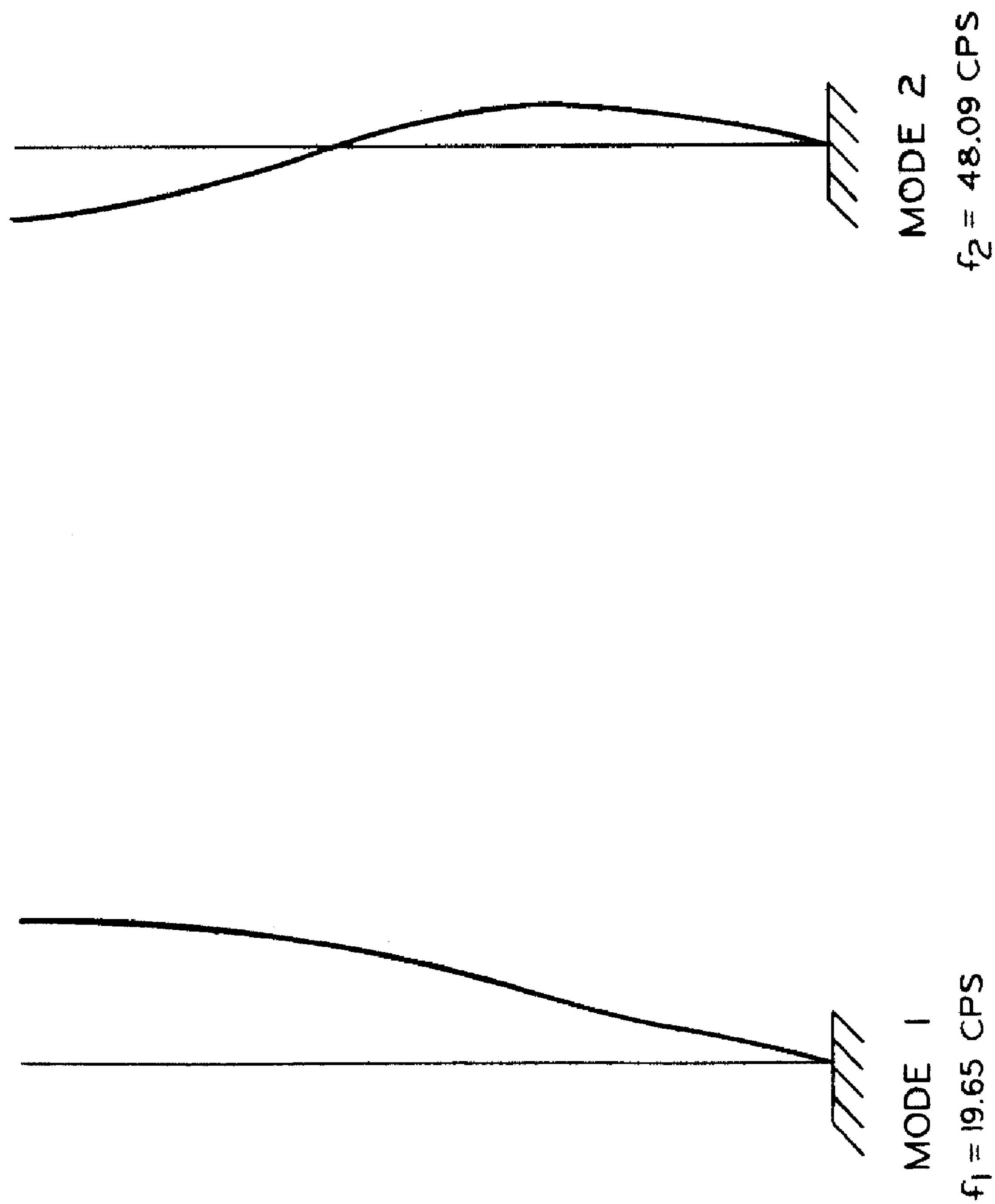


Figure 3-33. Containment Interior Structure Response Loads Due to SSE in the North-South Direction [Historical information, not required to be revised.]

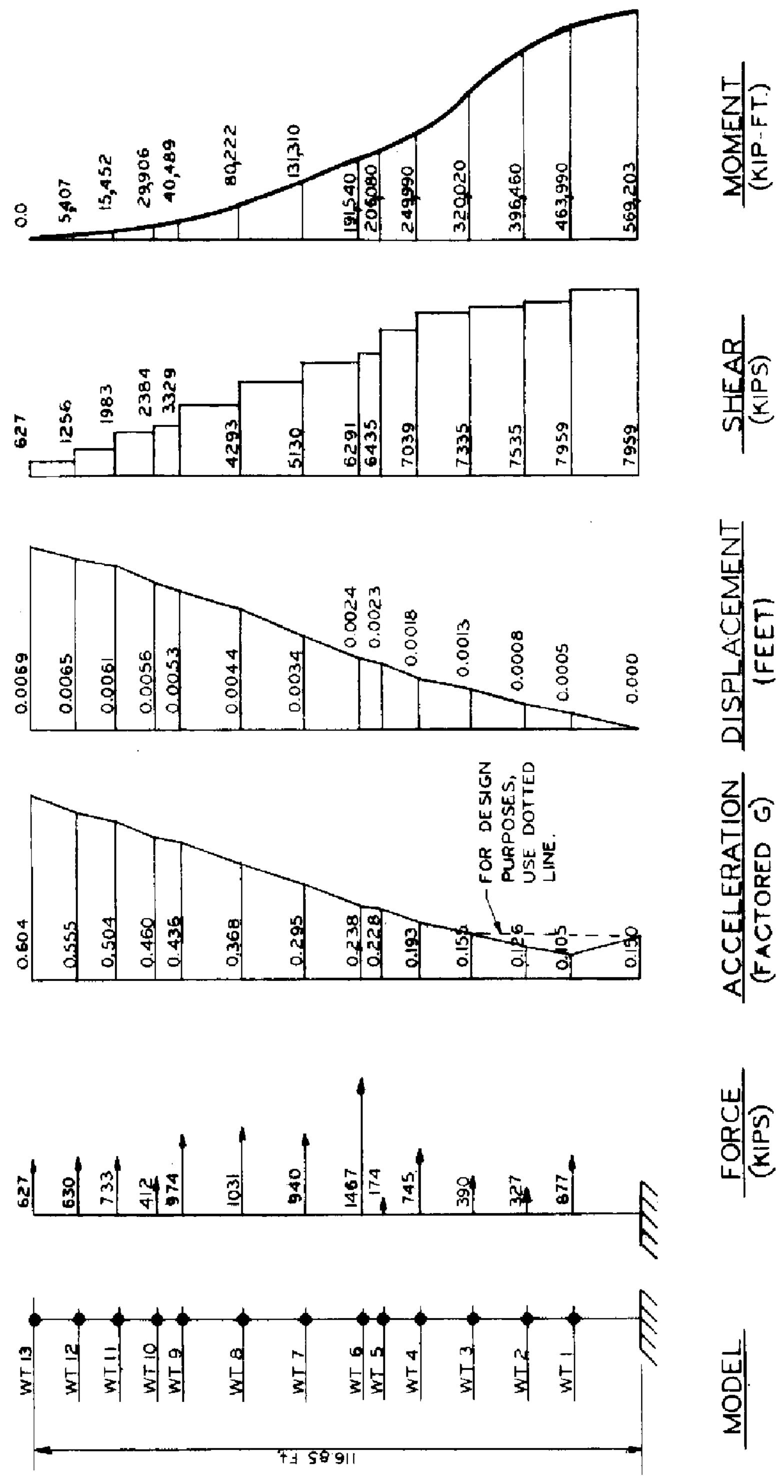


Figure 3-34. Containment Interior Structure Response Loads Due to SSE in the East-West Direction [Historical information, not required to be revised.]

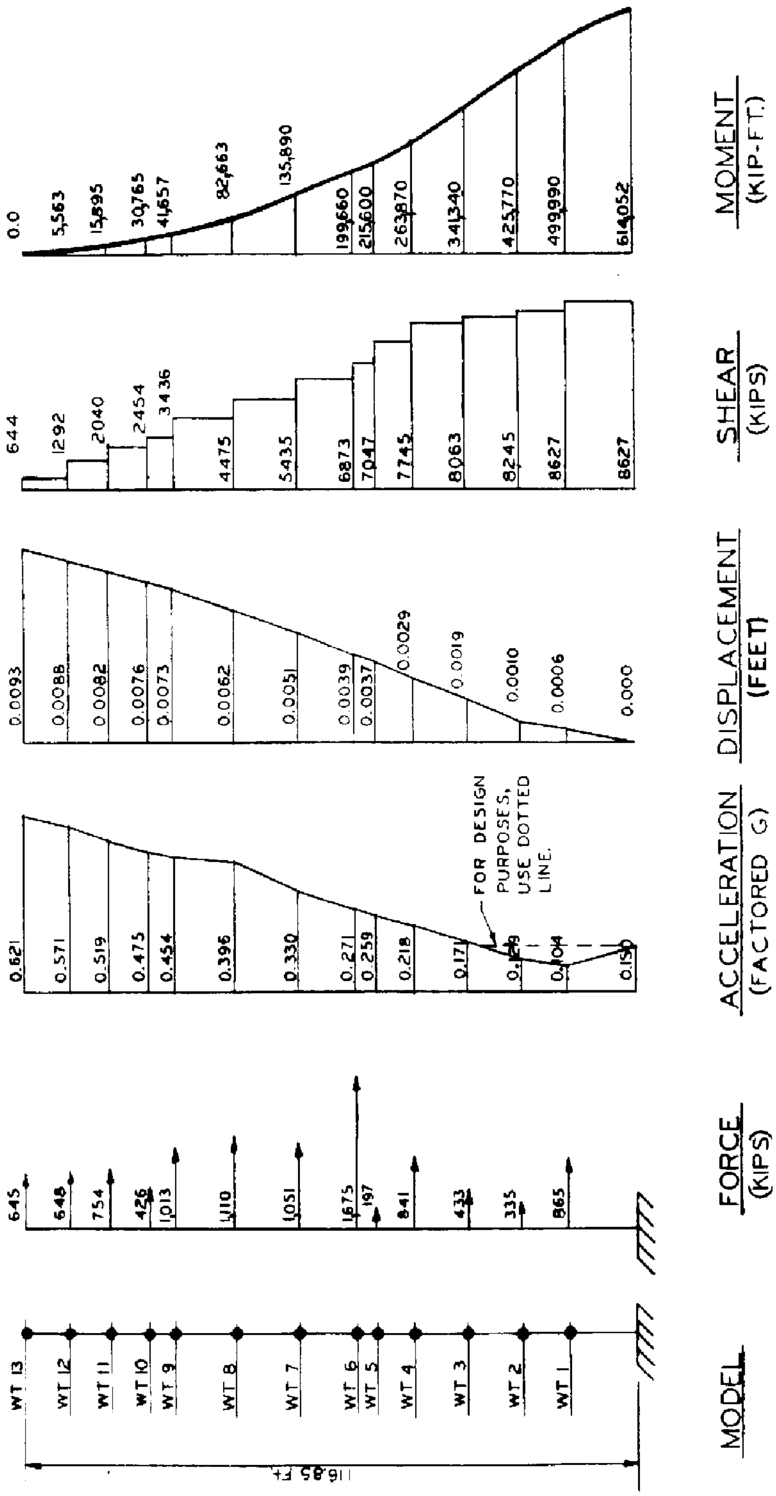


Figure 3-35. Response Acceleration Spectrum, Damping = 0.02, Reactor Interior, North-South Direction, Elevation 738.22

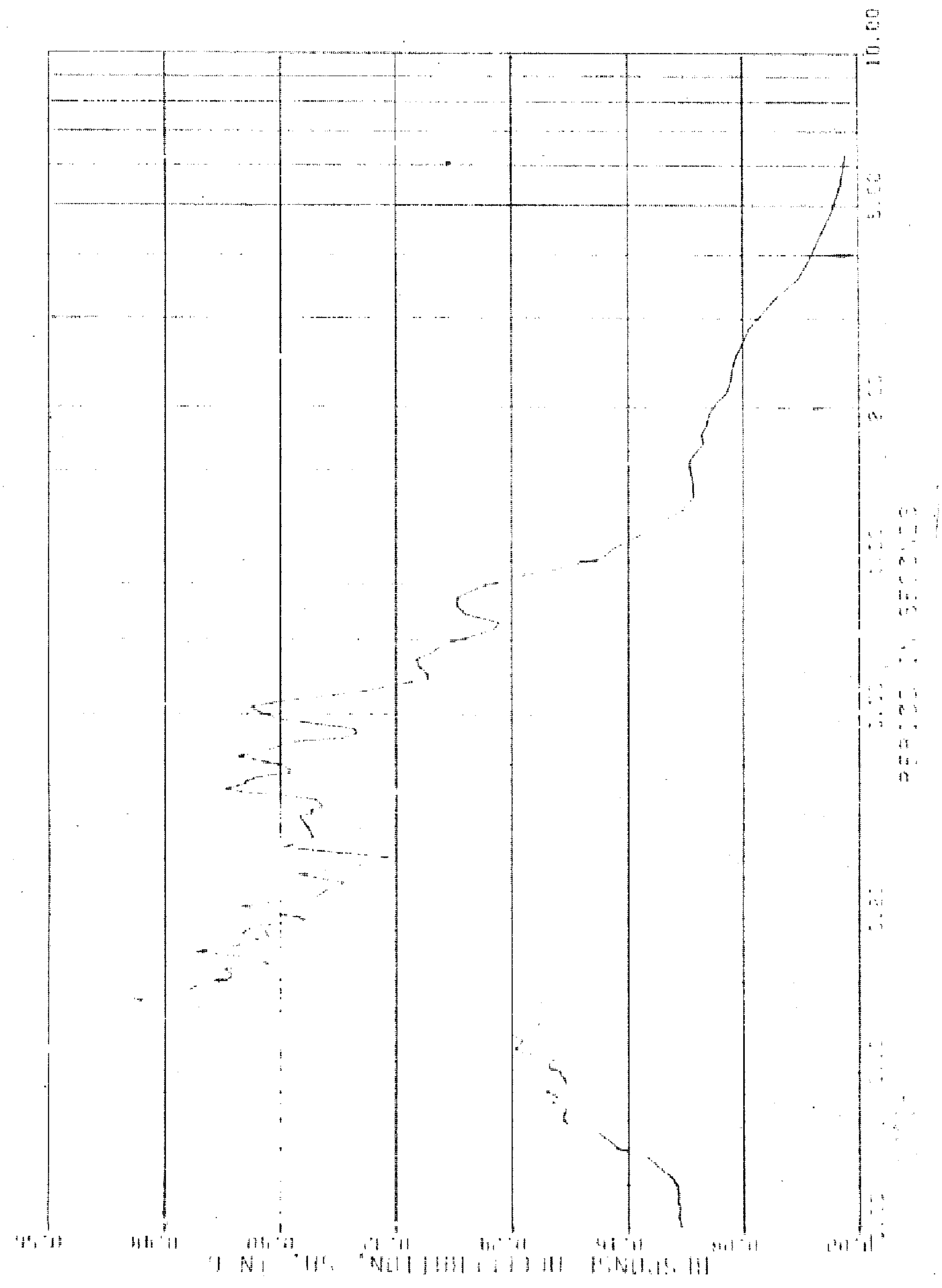


Figure 3-36. Response Acceleration Spectrum, Damping = 0.02, Reactor Interior, North-South Direction, Elevation 768.22

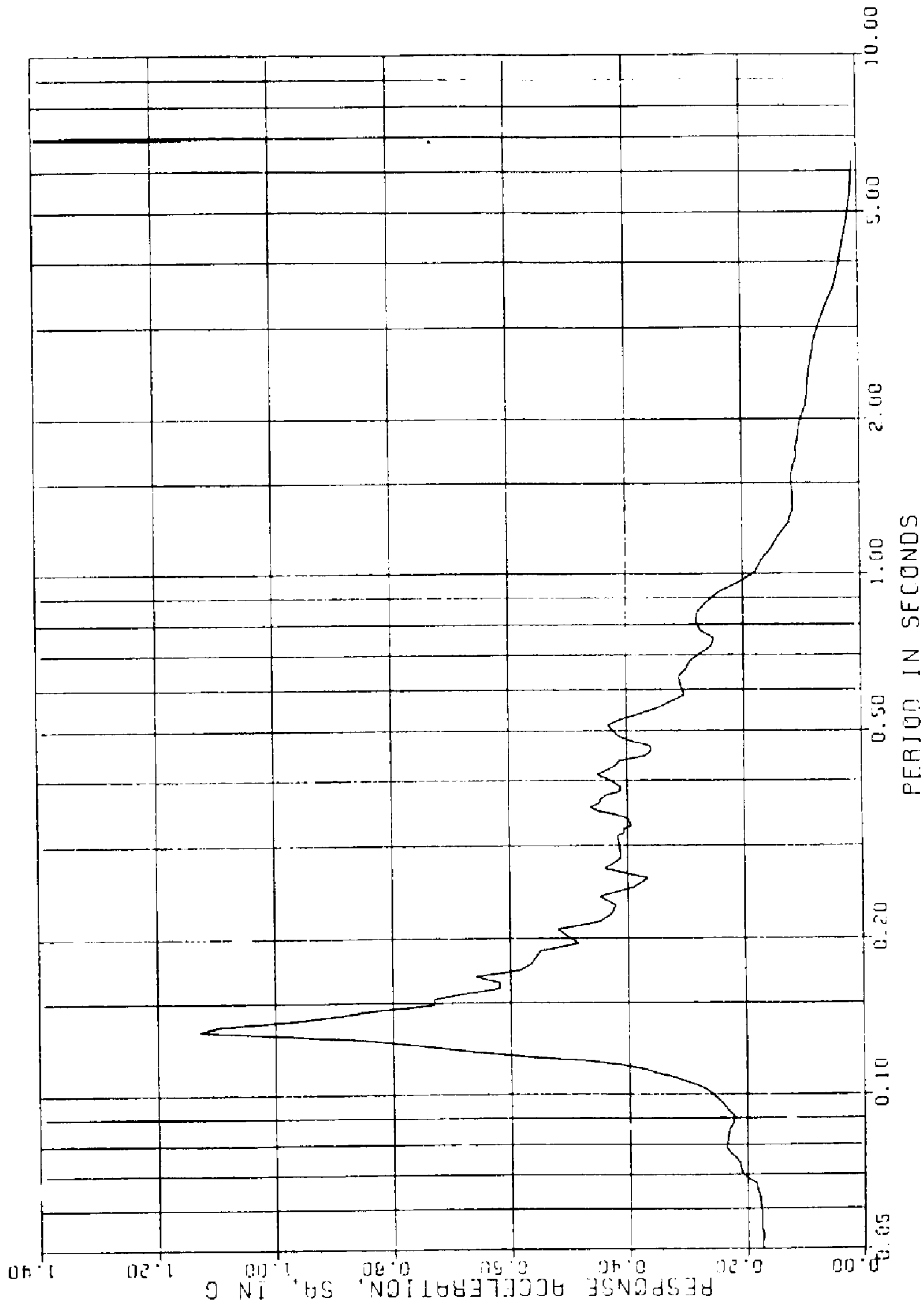


Figure 3-37. Response Acceleration Spectrum, Damping = 0.02, Reactor Interior, North-South Direction, Elevation 789.47

Figure 3-38. Response Acceleration Spectrum, Damping = 0.02, Reactor Interior, North-South Direction, Elevation 817.92

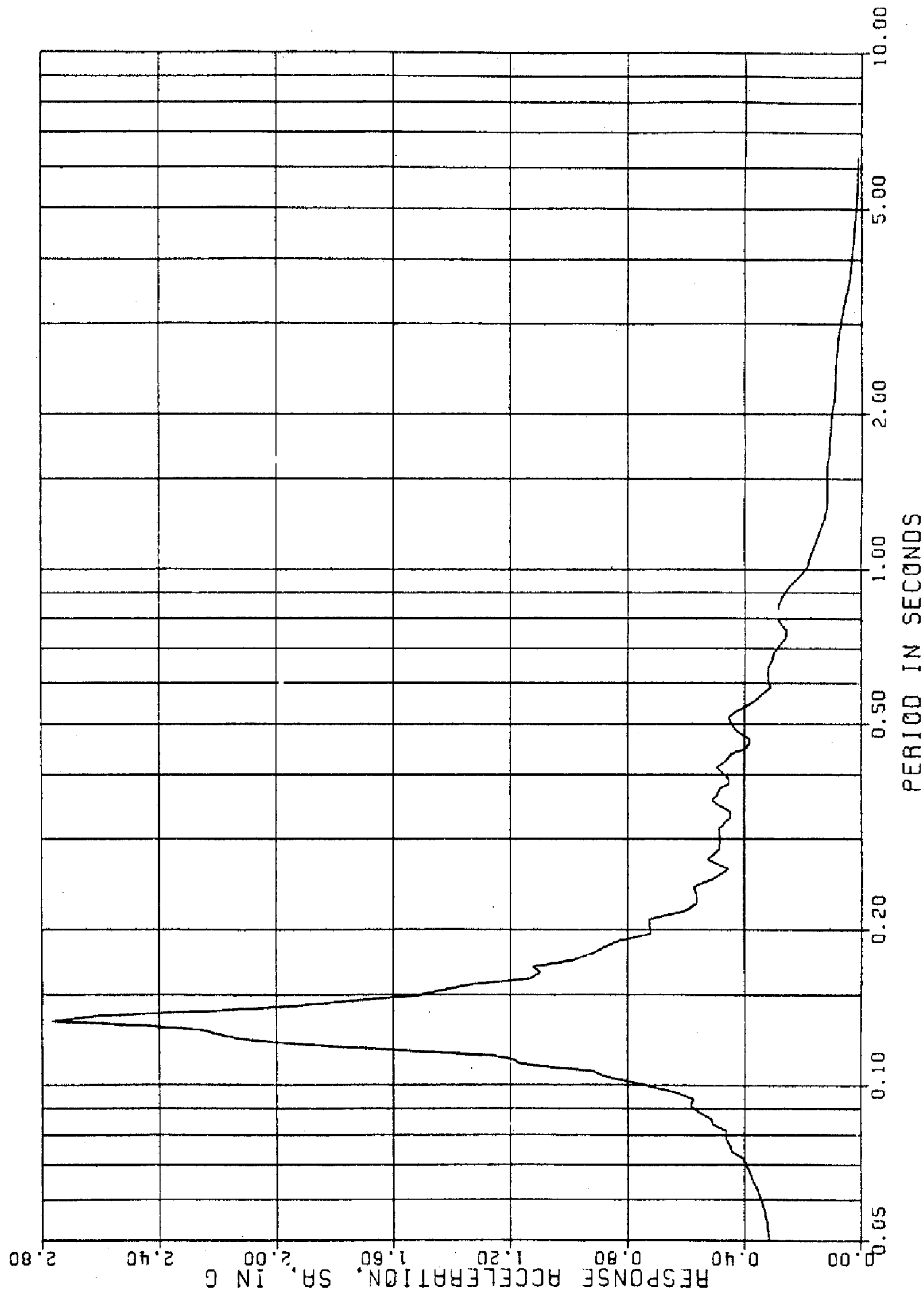


Figure 3-39. Response Acceleration Spectrum, Damping = 0.02, Reactor Interior, North-South Direction, Elevation 841.85

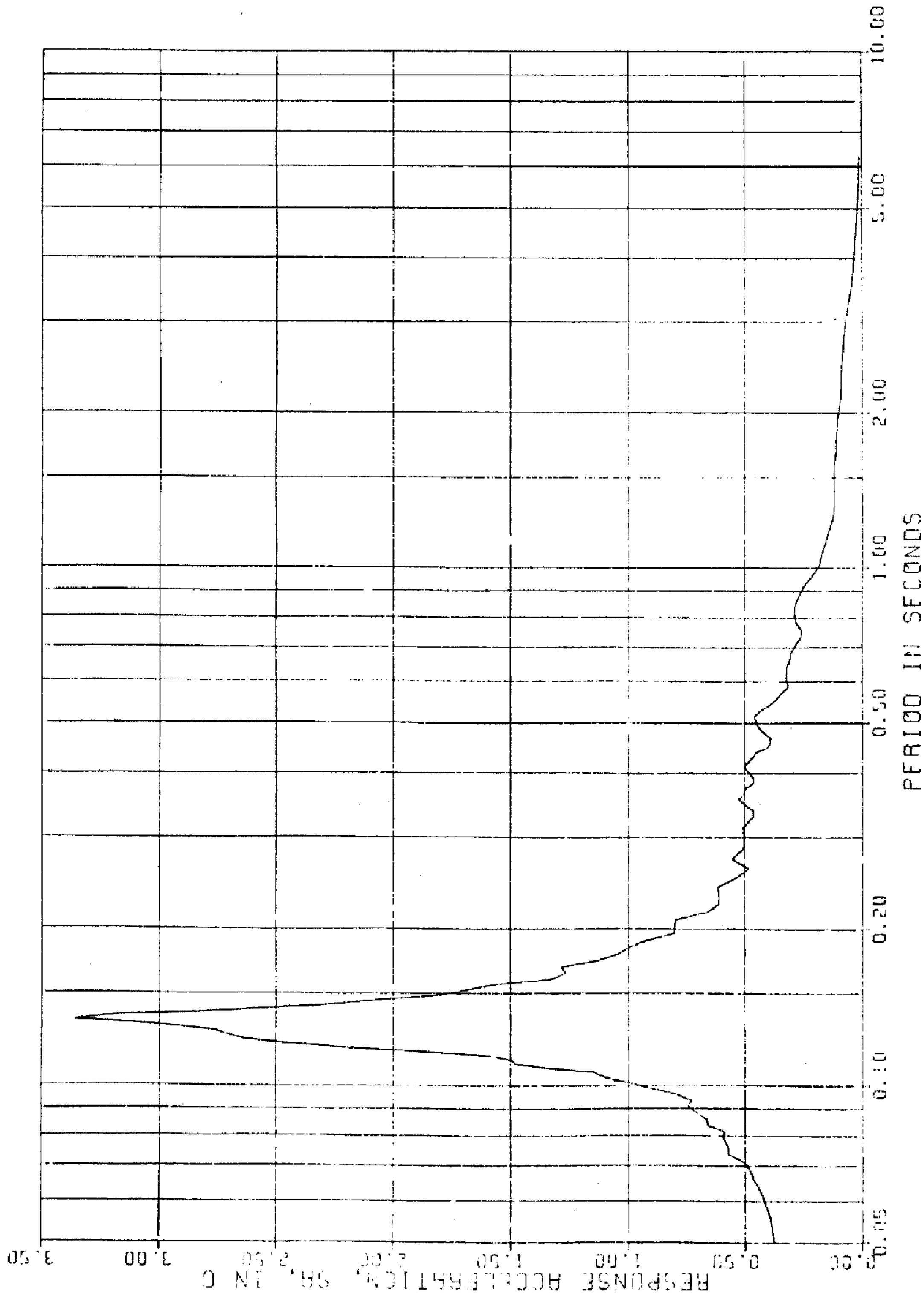


Figure 3-40. Reactor Building and Base Rock Finite Element Representation

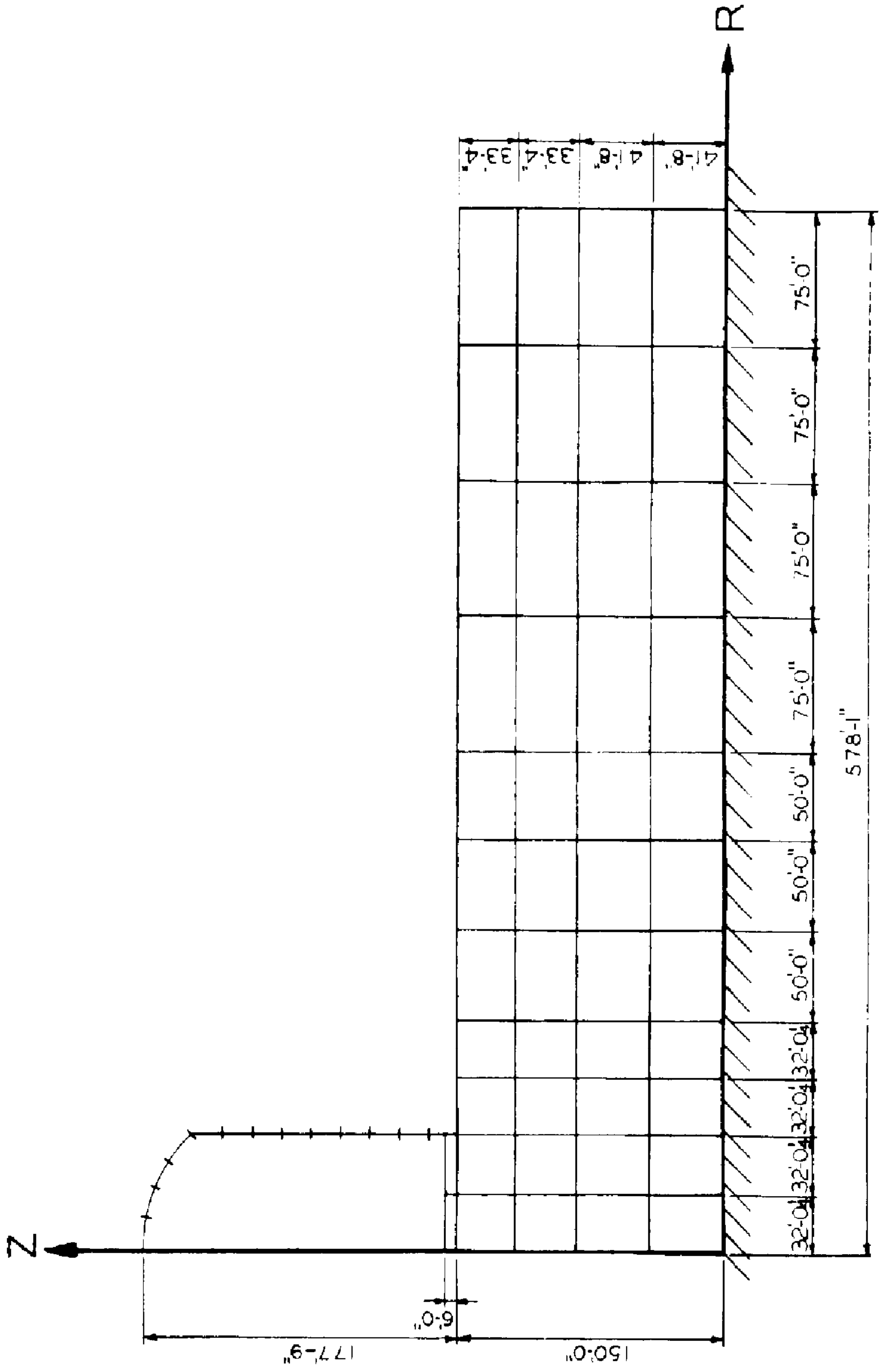
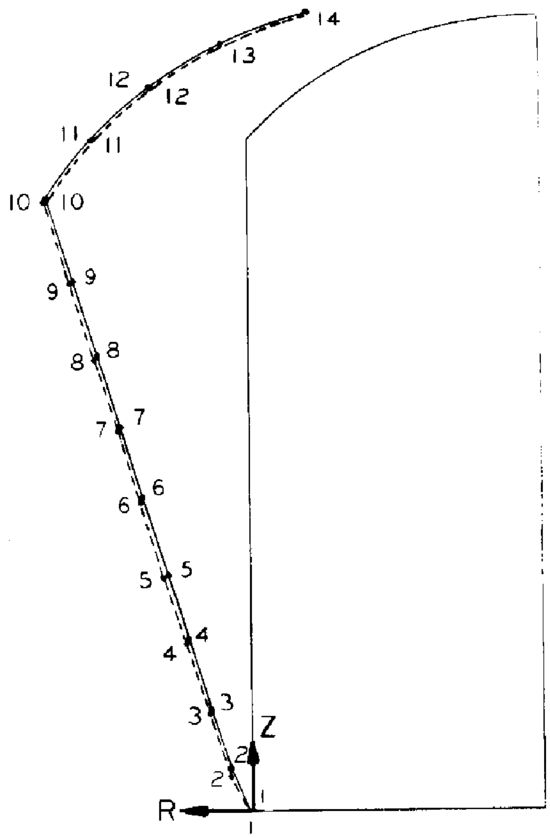


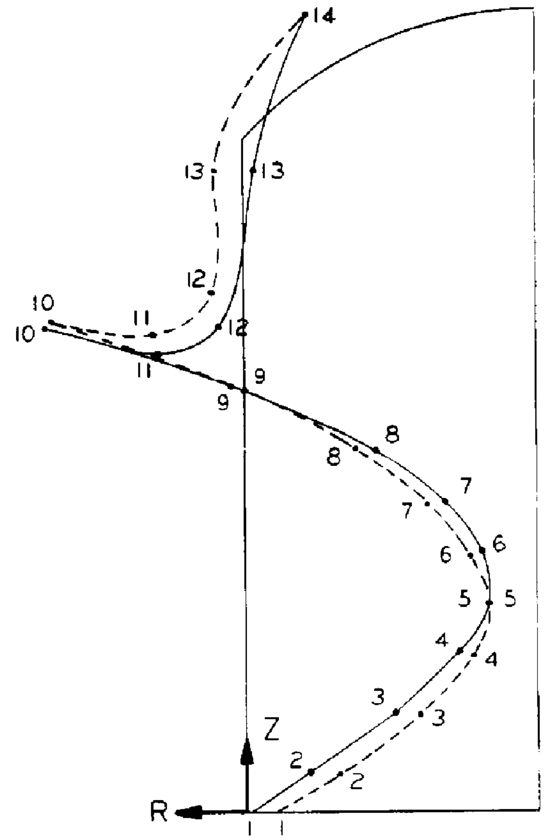
Figure 3-41. Reactor Building First Horizontal Mode



	MODE 1			
	FREQ.=4.997 CPS		FREQ.=4.892 CPS	
NODE	FIXED BASE ——		SOIL INTER.---	
	R	Z	R	Z
1	0.1	- 0.6	0.5	-1.6
2	8 3	-4.0	8.9	-4.9
3	17.6	-8.8	18.3	-9.5
4	26.6	-12.9	27.2	-13.5
5	36.3	-16.3	36.9	-16.7
6	46.6	-18.9	47.0	-19.3
7	56.8	-21.0	57.2	-21.3
8	66 8	-22.4	67.1	-22 7
9	77.1	-23.4	77.3	-23.6
10	89.0	-24.1	89.0	-24.3
11	92.8	-20.5	92.9	-20.6
12	96.3	-15.1	96.4	-15.1
13	99.0	- 7.6	99.0	- 7.6
14	100.0*	0.0	100.0*	0.0

*R DISPLACEMENT NORMALIZED TO 100.

Figure 3-42. Reactor Building Second Horizontal Mode



	MODE 2			
	FREQ =13.82 CPS		FREQ=13.31 CPS	
NODE	FIXED BASE ——		SOIL INTER.---	
	R	Z	R	Z
1	+ 0.1	- 0.4	- 12.1	- 0.7
2	-27.3	- 3.4	-39.9	- 4.3
3	- 66.7	-10.6	-75.3	- 11.8
4	-95.0	-20.1	- 97.5	-21.4
5	-108.3	-37.3	-105.6	-32.4
6	-105.5	- 43.2	-99.1	-43.8
7	- 87.5	-54.7	-79.2	-54.6
8	- 56.3	- 64.7	-48.2	- 64.0
9	0.5	- 72.9	4.4	- 71.5
10	88.2	-80.3	83.8	- 78.1
11	65.5	-119.2	67.3	-108.1
12	69.9	-123.0	73.5	-107.2
13	92.1	- 64.2	93.1	- 55.2
14	100.0*	0 0	100.0*	0.0

*R DISPLACEMENT NORMALIZED TO 100.

Figure 3-43. Reduced Model of Interior Building Response Acceleration Spectrum, Damping = 0.02, Reactor Interior, East-West Direction, Elevation 738.22

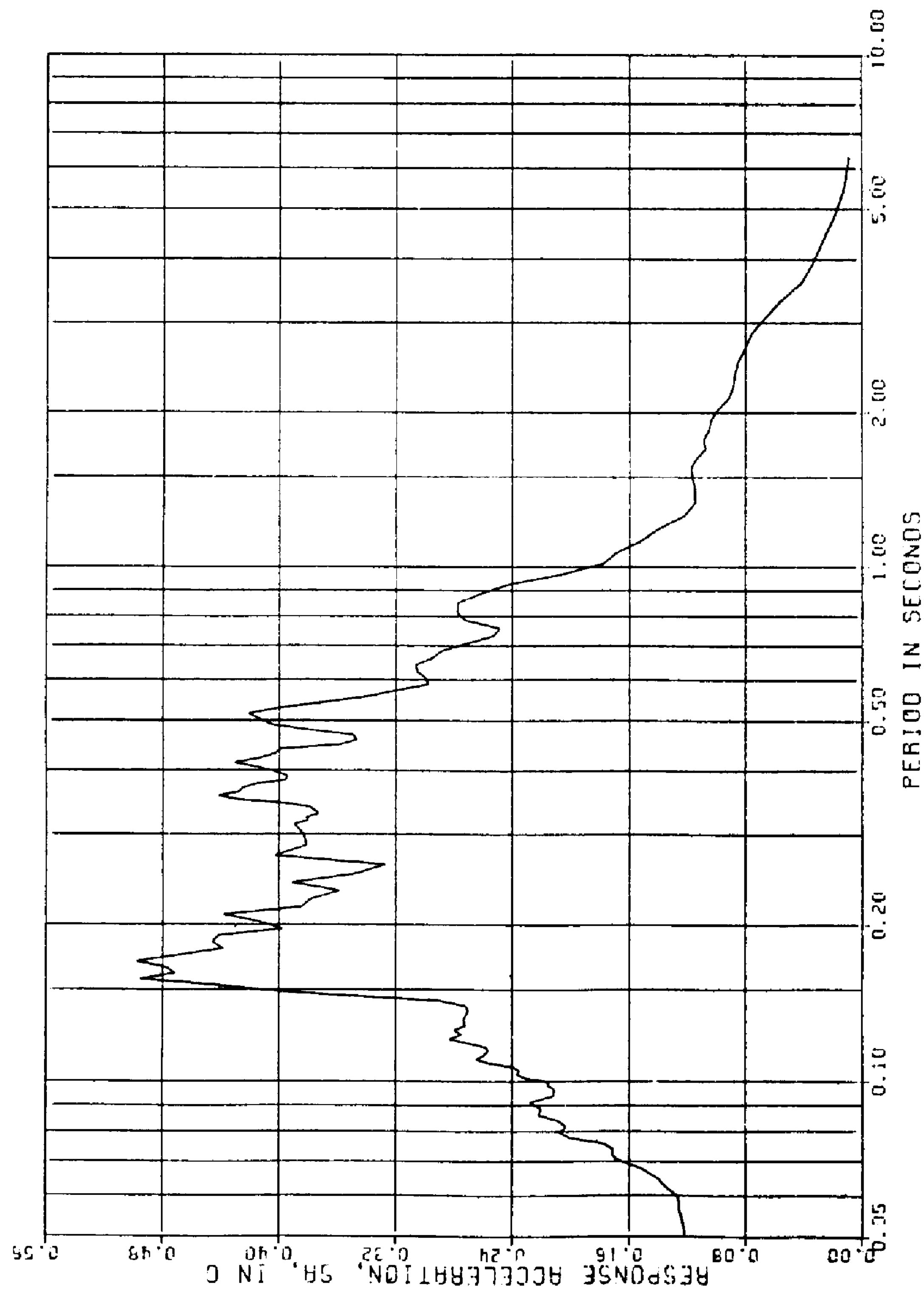


Figure 3-44. Combined Interaction Model Response Acceleration Spectrum, Damping = 0.02, Reactor Interior, East-West Direction, Elevation 738.22

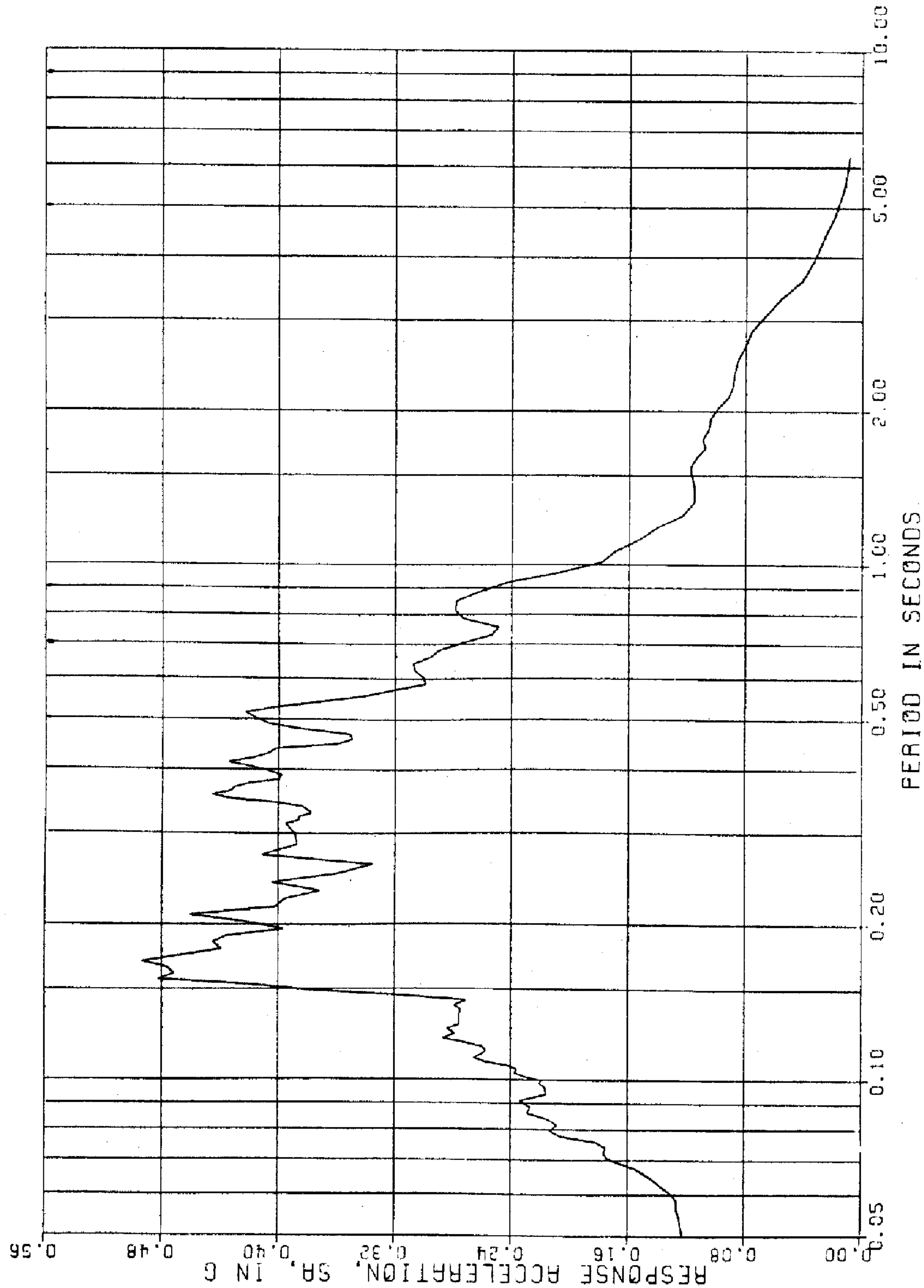


Figure 3-45. Reduced Model of Interior Building Response Acceleration Spectrum, Damping = 0.02, Reactor Interior, East-West Direction, Elevation 777.60

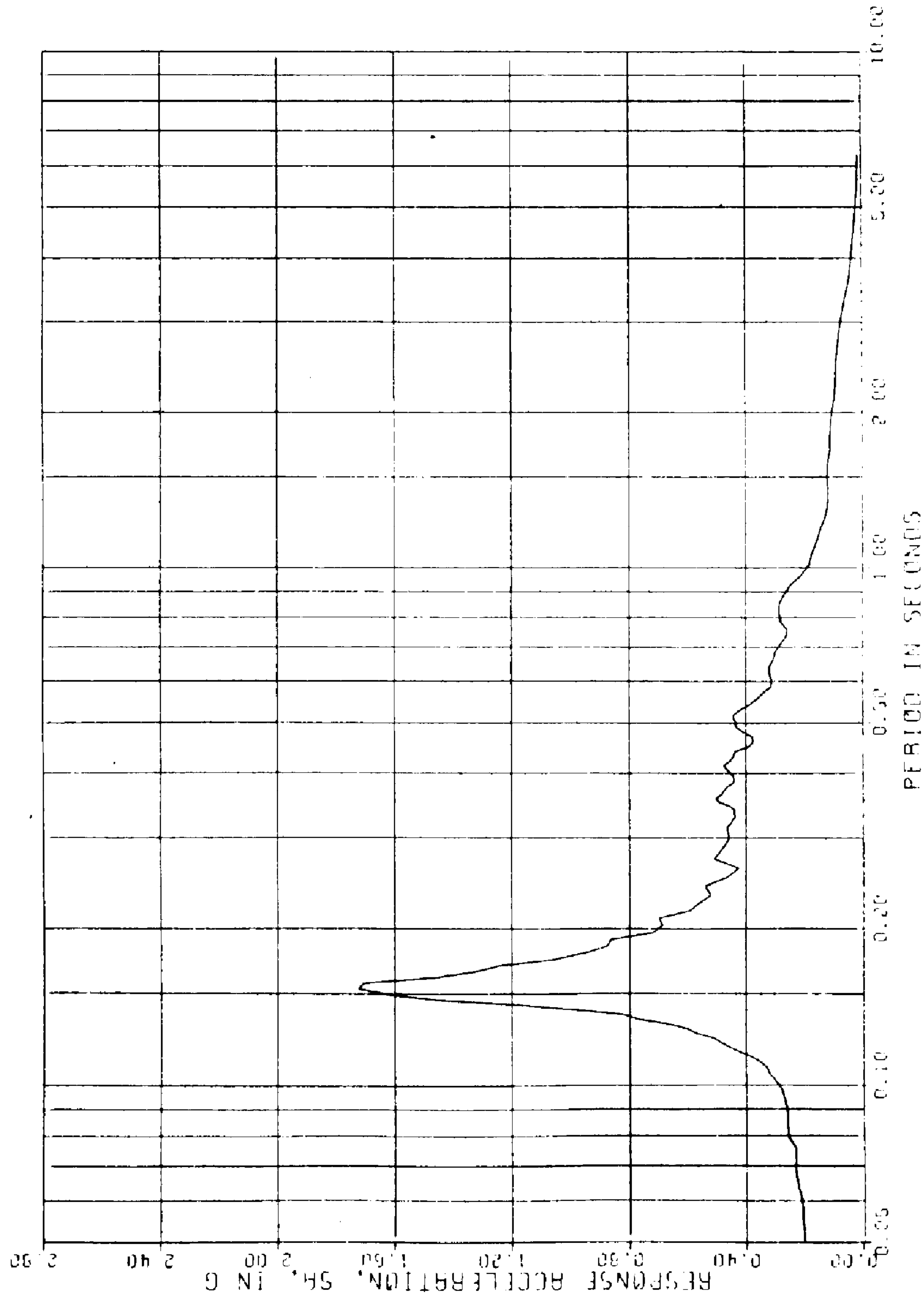


Figure 3-46. Combined Interaction Model Response Acceleration Spectrum, Damping = 0.02, Reactor Interior, East-West Direction, Elevation 777.60

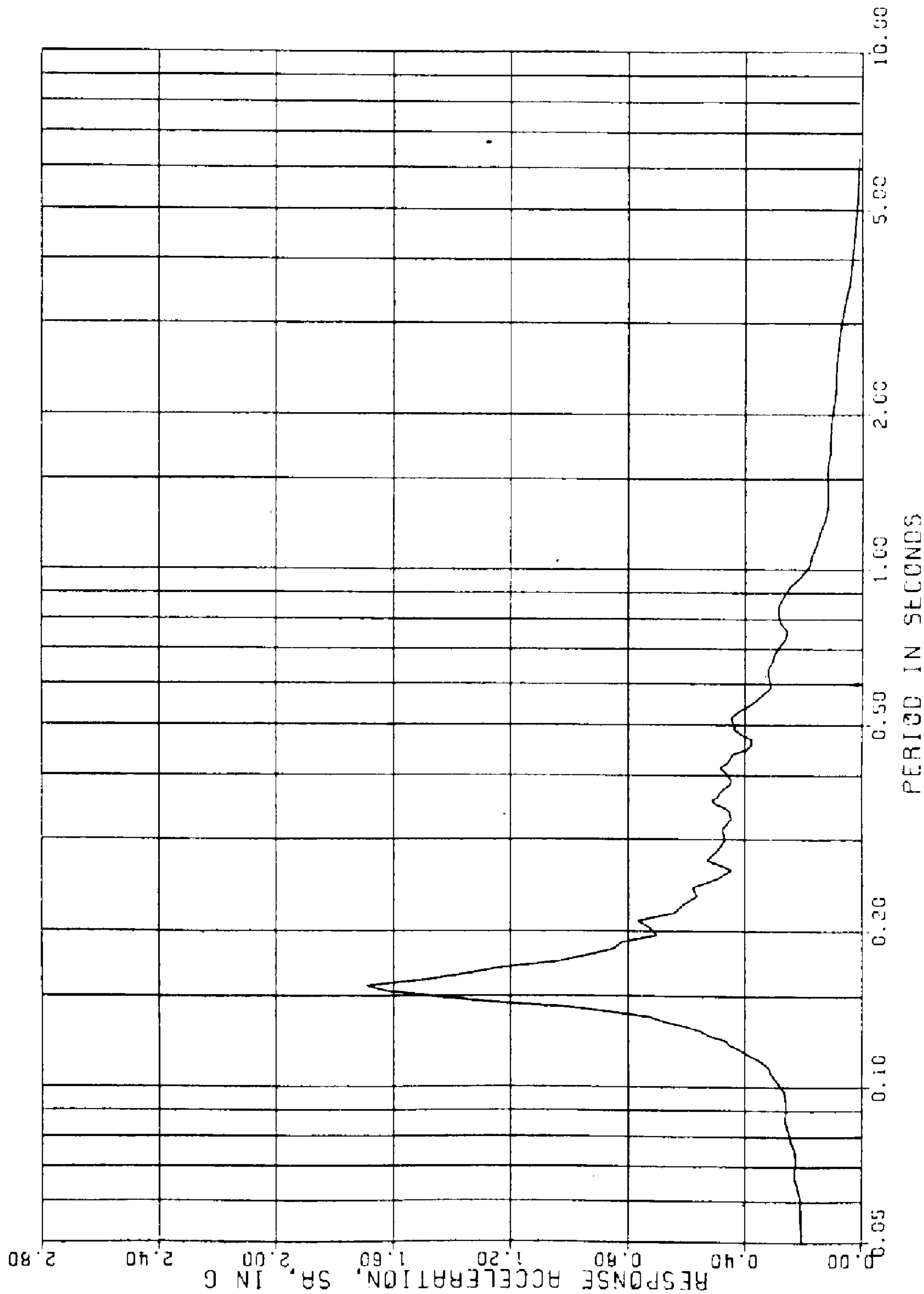


Figure 3-47. Reduced Model of Interior Building Response Acceleration Spectrum, Damping = 0.02, Reactor Building, North-South Direction, Elevation 768.30

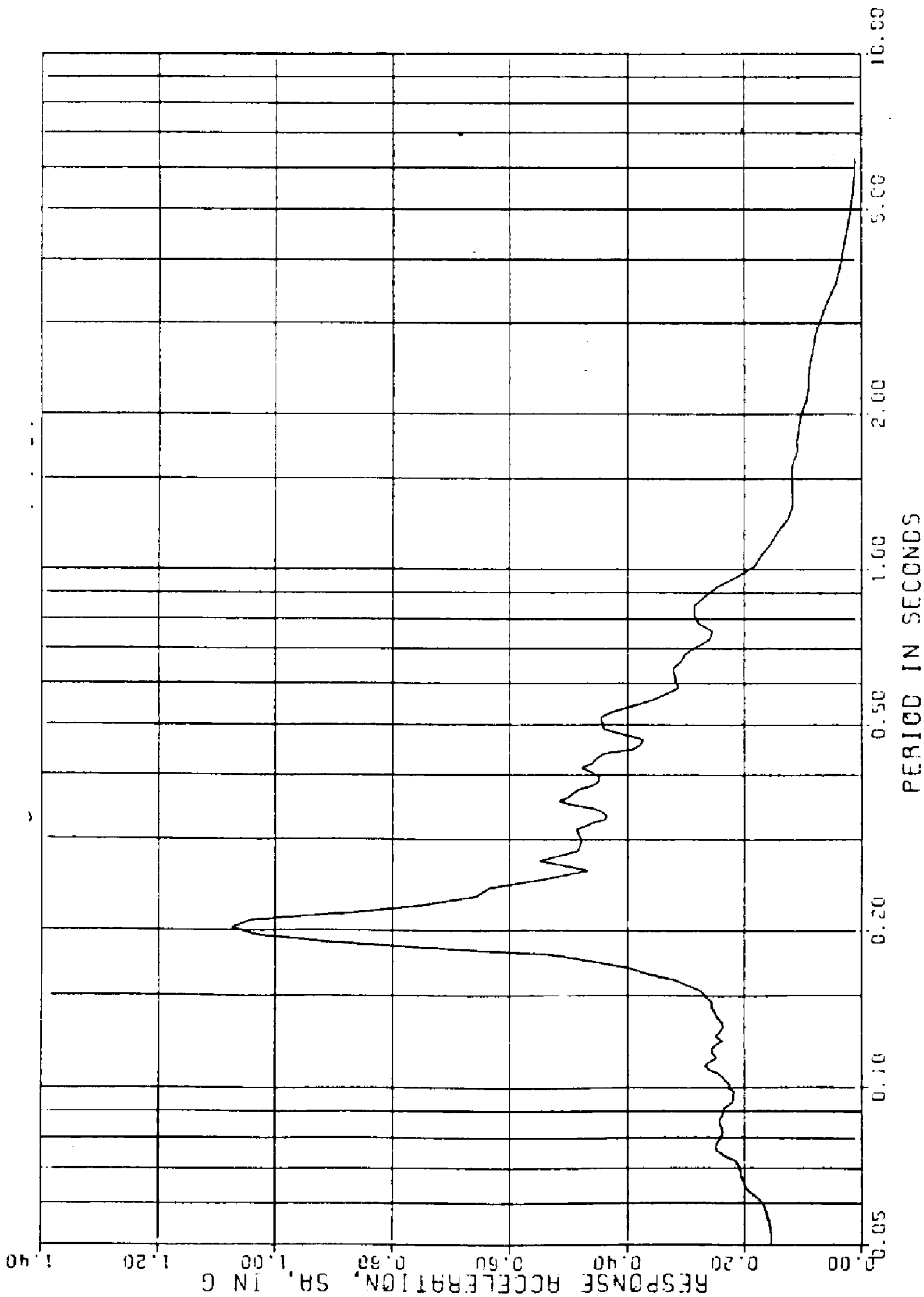


Figure 3-48. Combined Interaction Model, Response Acceleration Spectrum, Damping = 0.02, Reactor Building, North-South Direction, Elevation 768.30

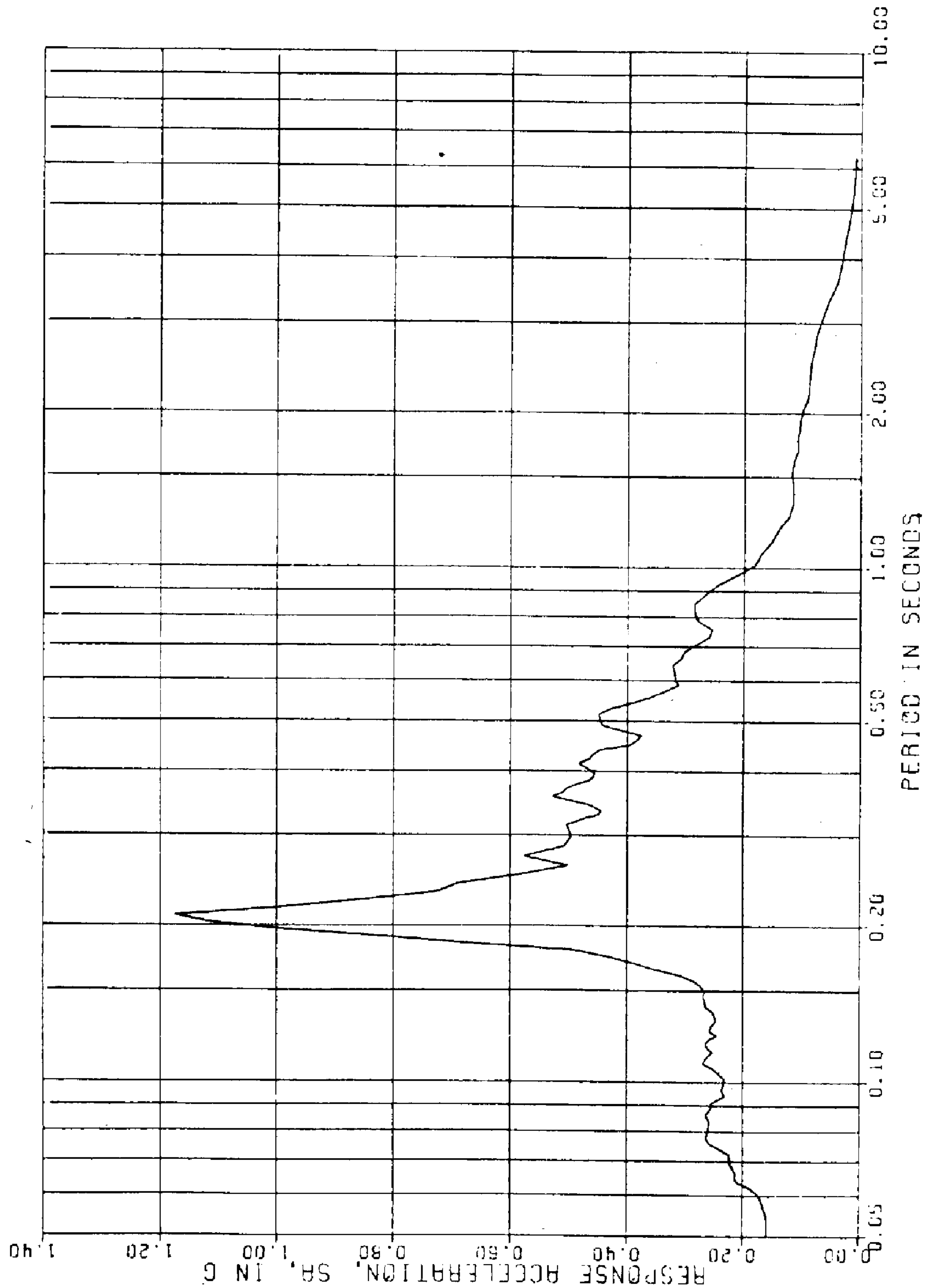


Figure 3-49. Response Acceleration Spectrum, Damping = 0.02, Reactor Interior, North-South Direction, Elevation 768.22

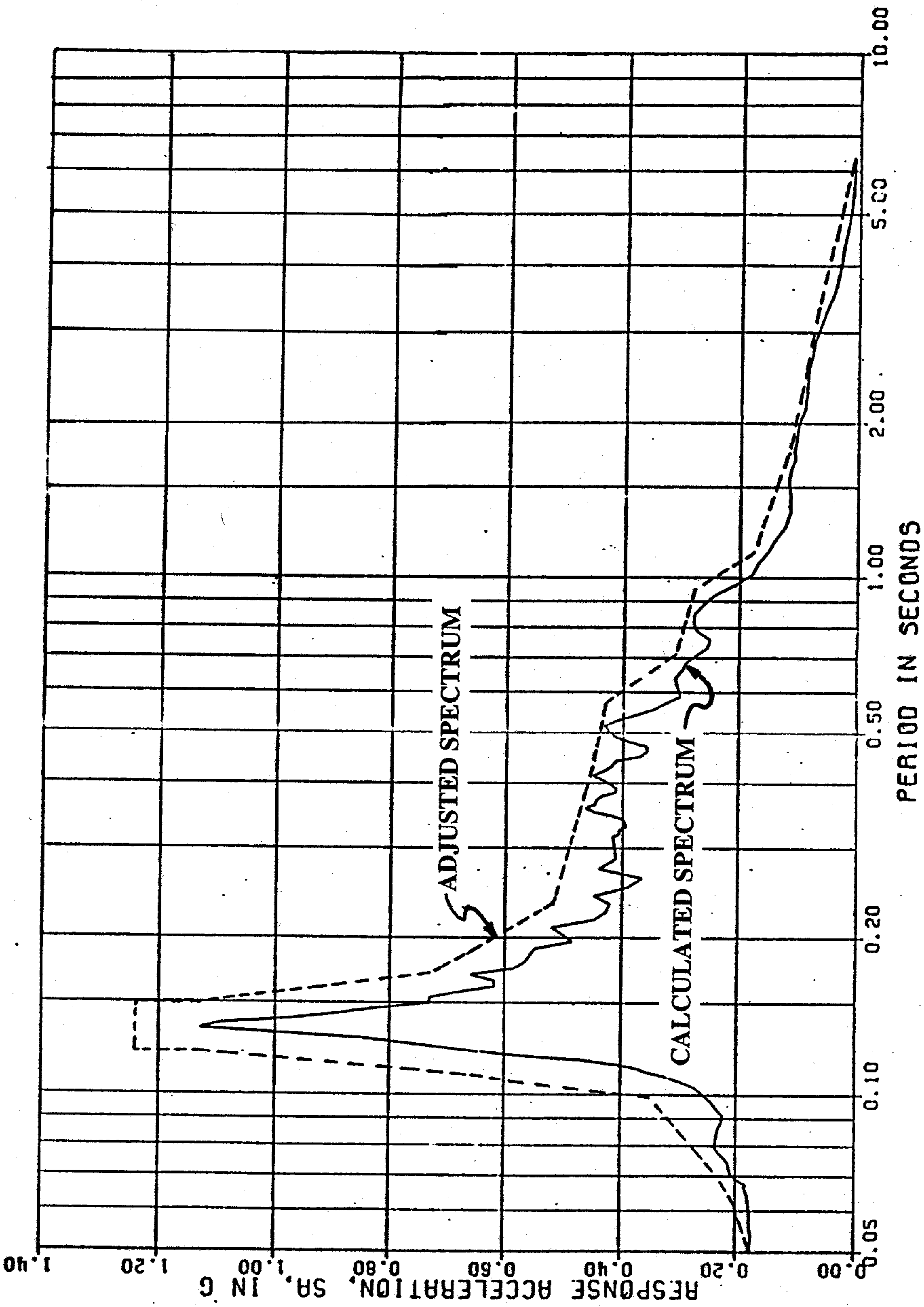


Figure 3-50. Dynamic Analysis Model of Typical Piping System

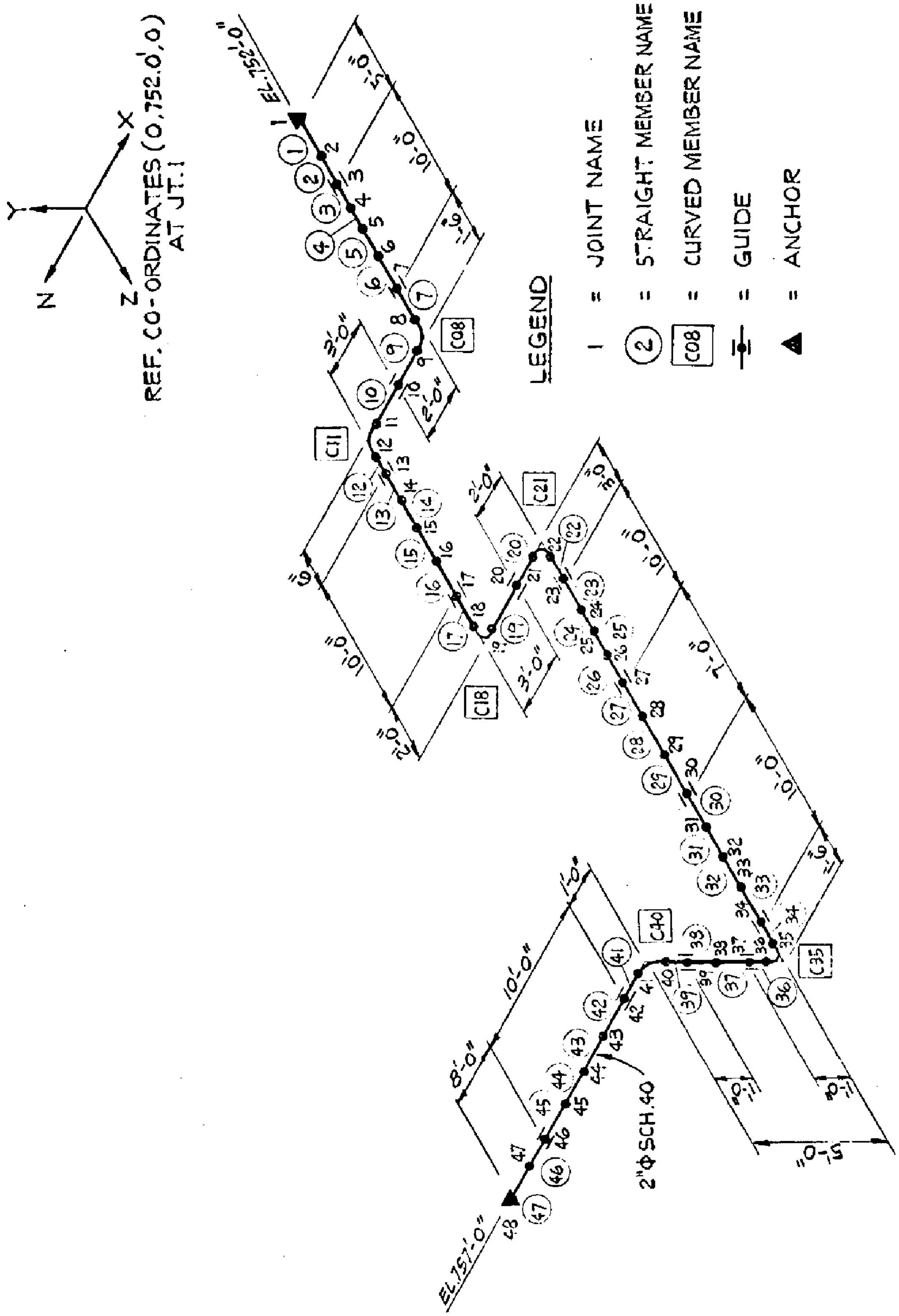


Figure 3-51. Dynamic Analysis Model of Typical Piping System

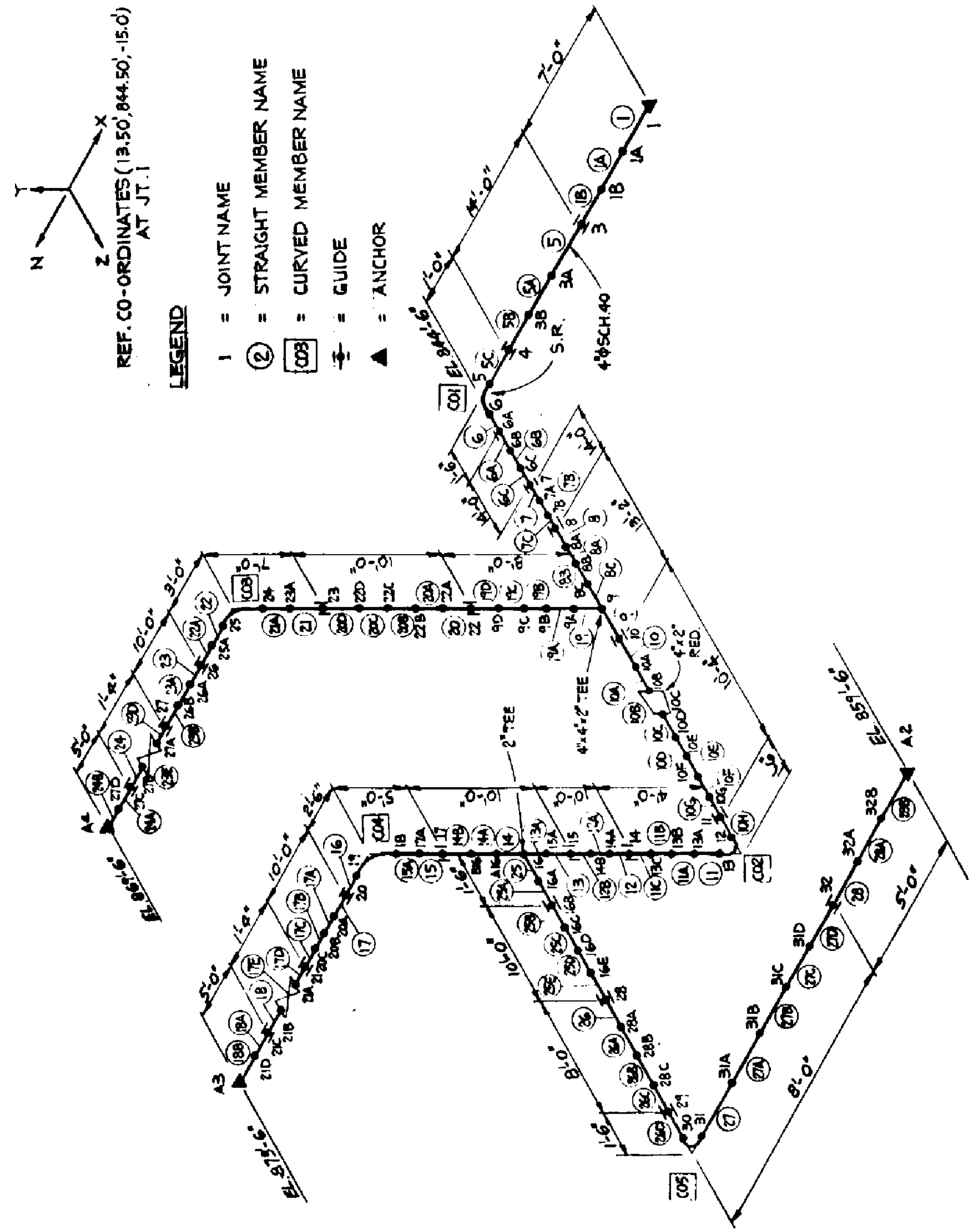


Figure 3-52. Typical Envelope Horizontal Response Spectra for Analysis Comparison

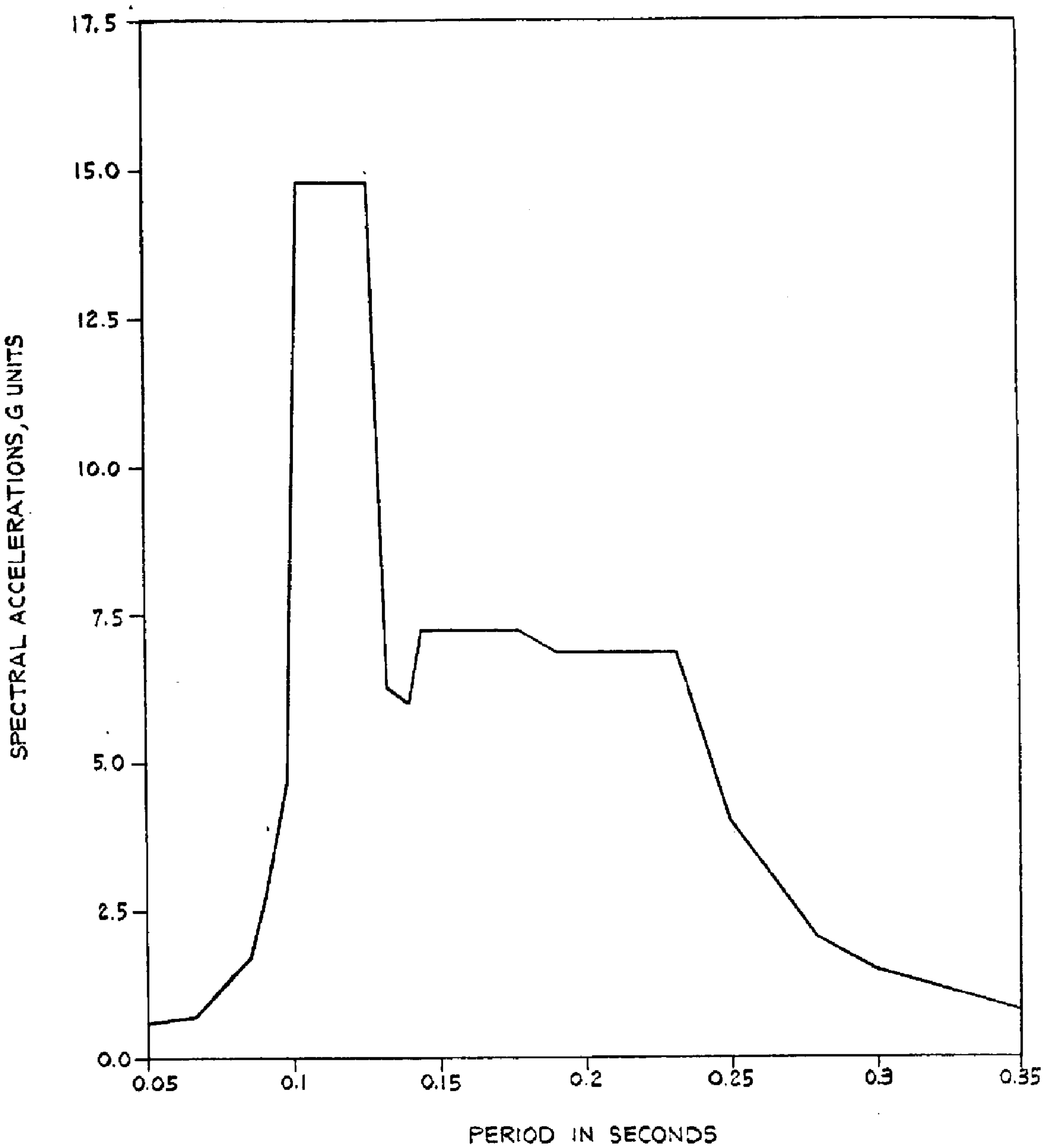


Figure 3-53. Typical Verticle Response Spectra for Analysis Comparison

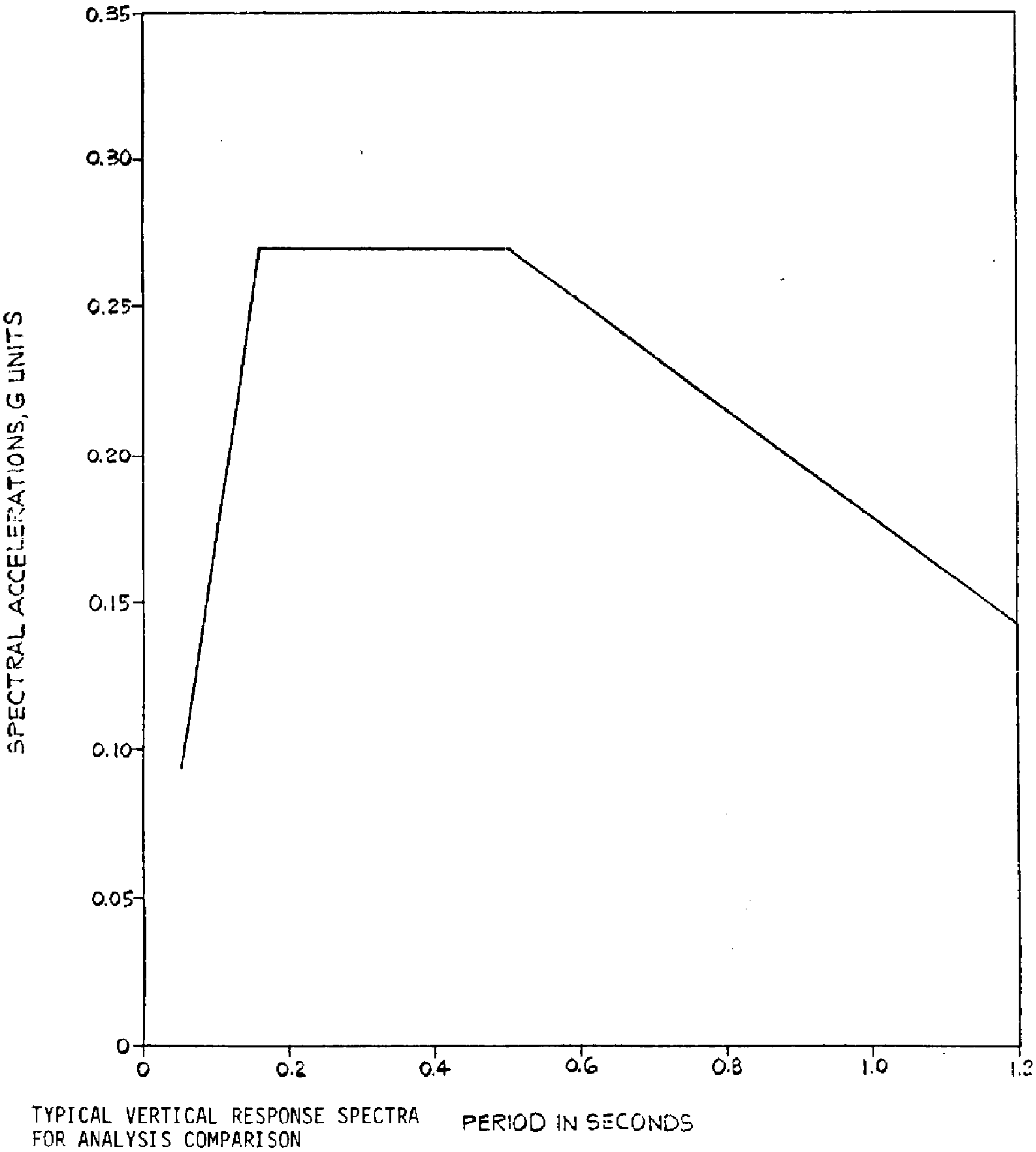


Figure 3-54. Typical Reactor Building and Containment Vessel Details

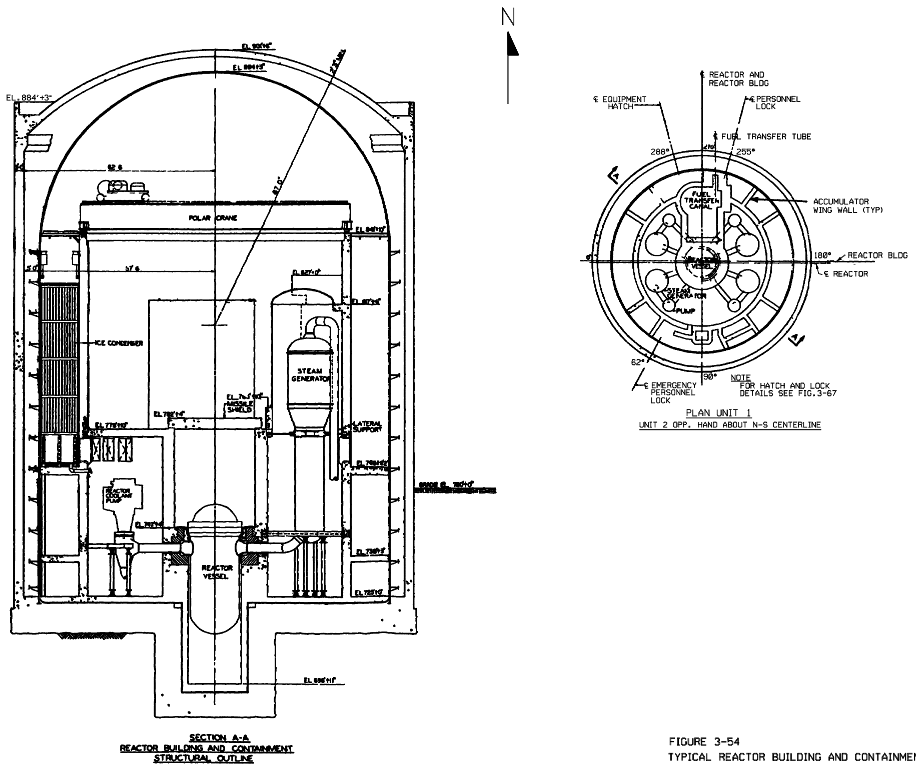


FIGURE 3-54
TYPICAL REACTOR BUILDING AND CONTAINMENT VESSEL DETAILS

13 APRIL 2001

Figure 3-55. Reactor Building, Base Slab, Reinforcing, Bottom Radial Bars, Bottom Layer El. 717' + 4 3/4"

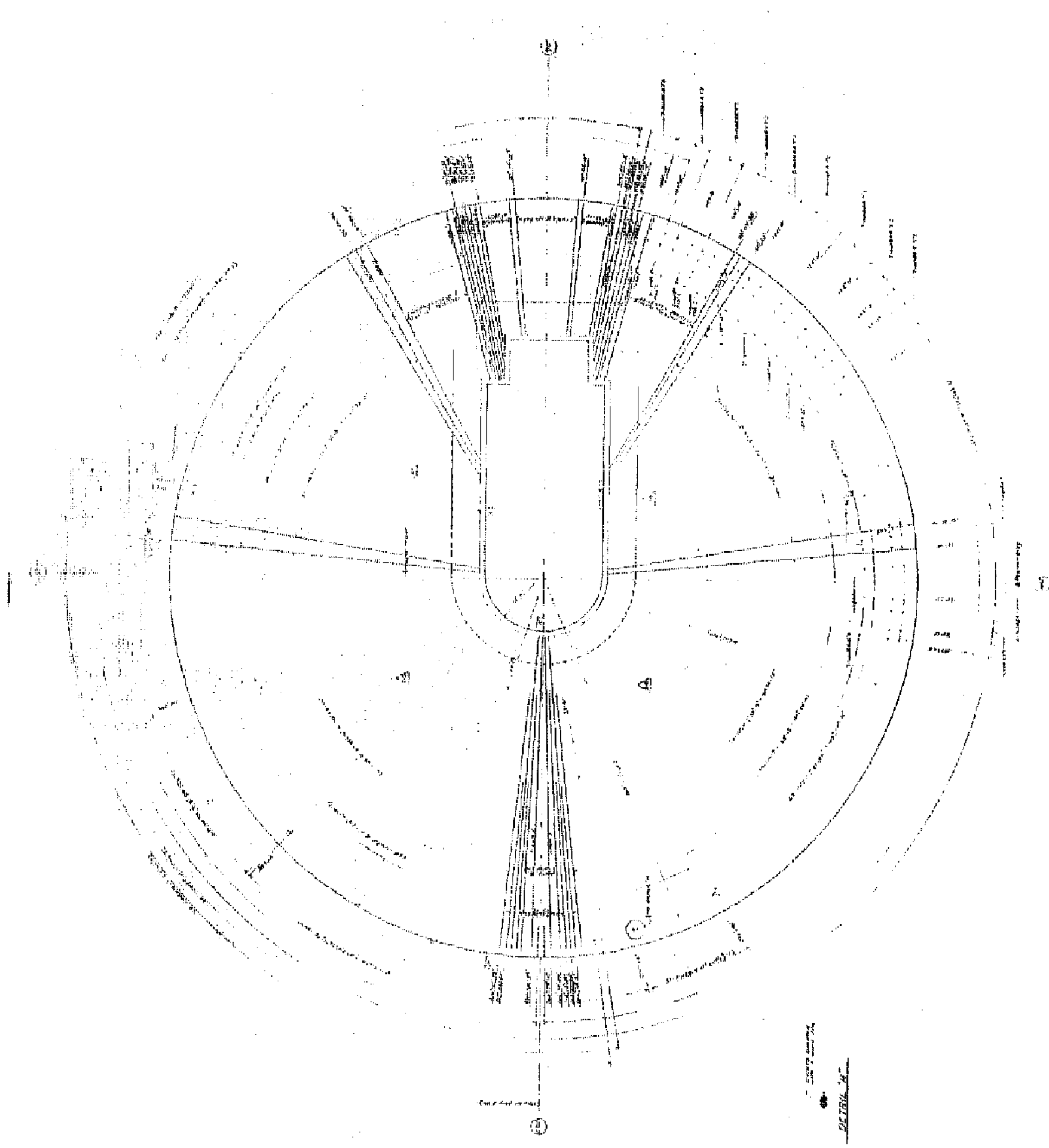


Figure 3-56. Reactor Building, Base Slab, Reinforcing Bottom Radial Bars, Top Layer Elevation 717' + 7 1/2"

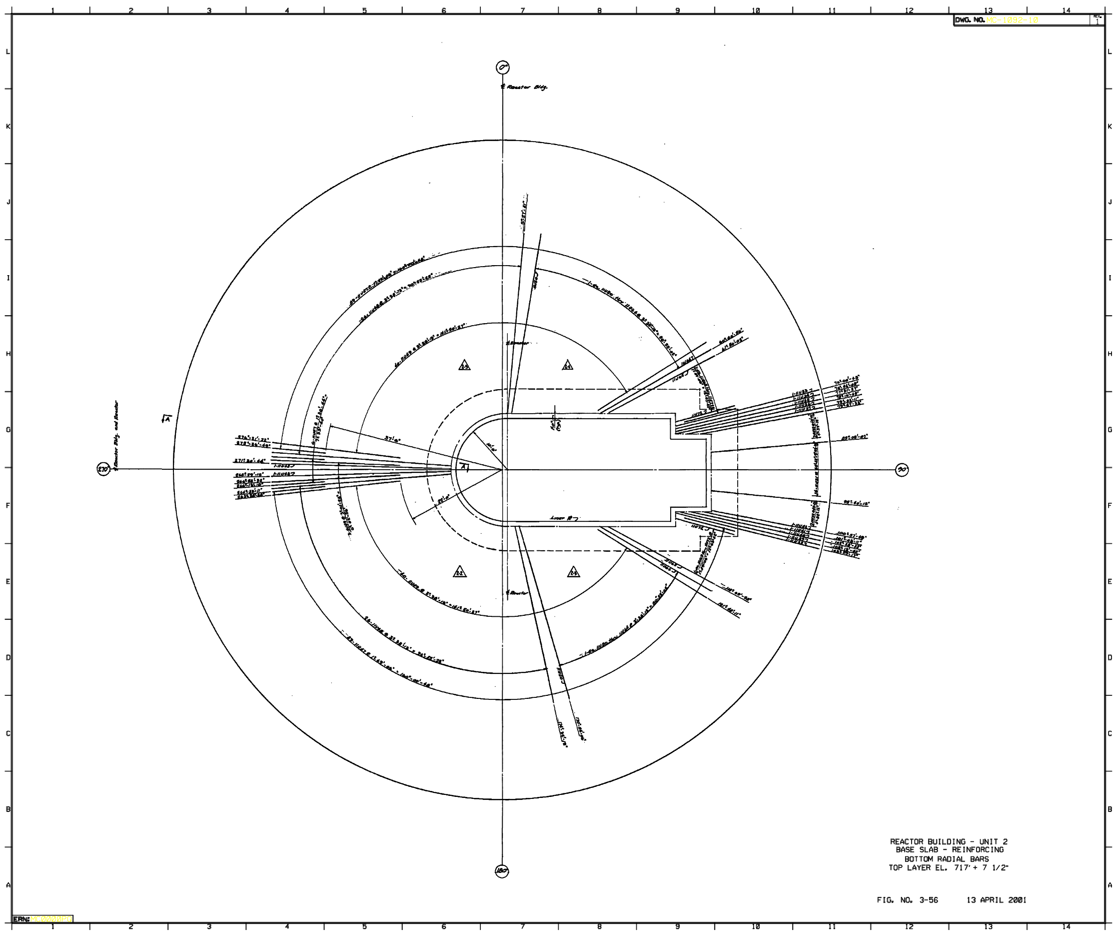


Figure 3-57. Reactor Building, Base Slab, Reinforcing Top Radial Bars, Bottom Layer Elevation 721' + 10 3/4"

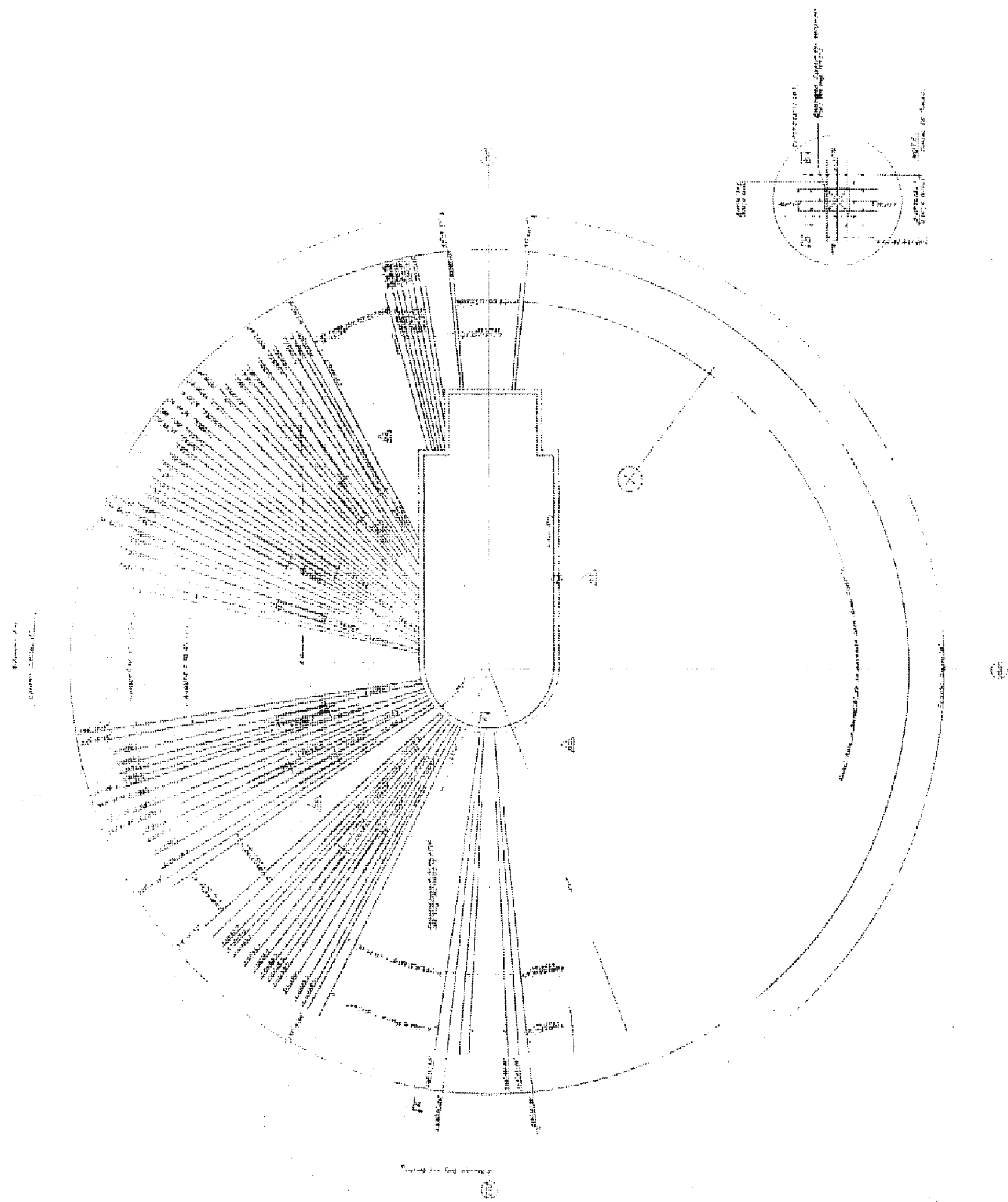


Figure 3-58. Reactor Building, Base Slab El. 723' + 0", Reinforcing, El. 717' +6", El. 717' +9", 722' + 0" and El. 722' + 3"

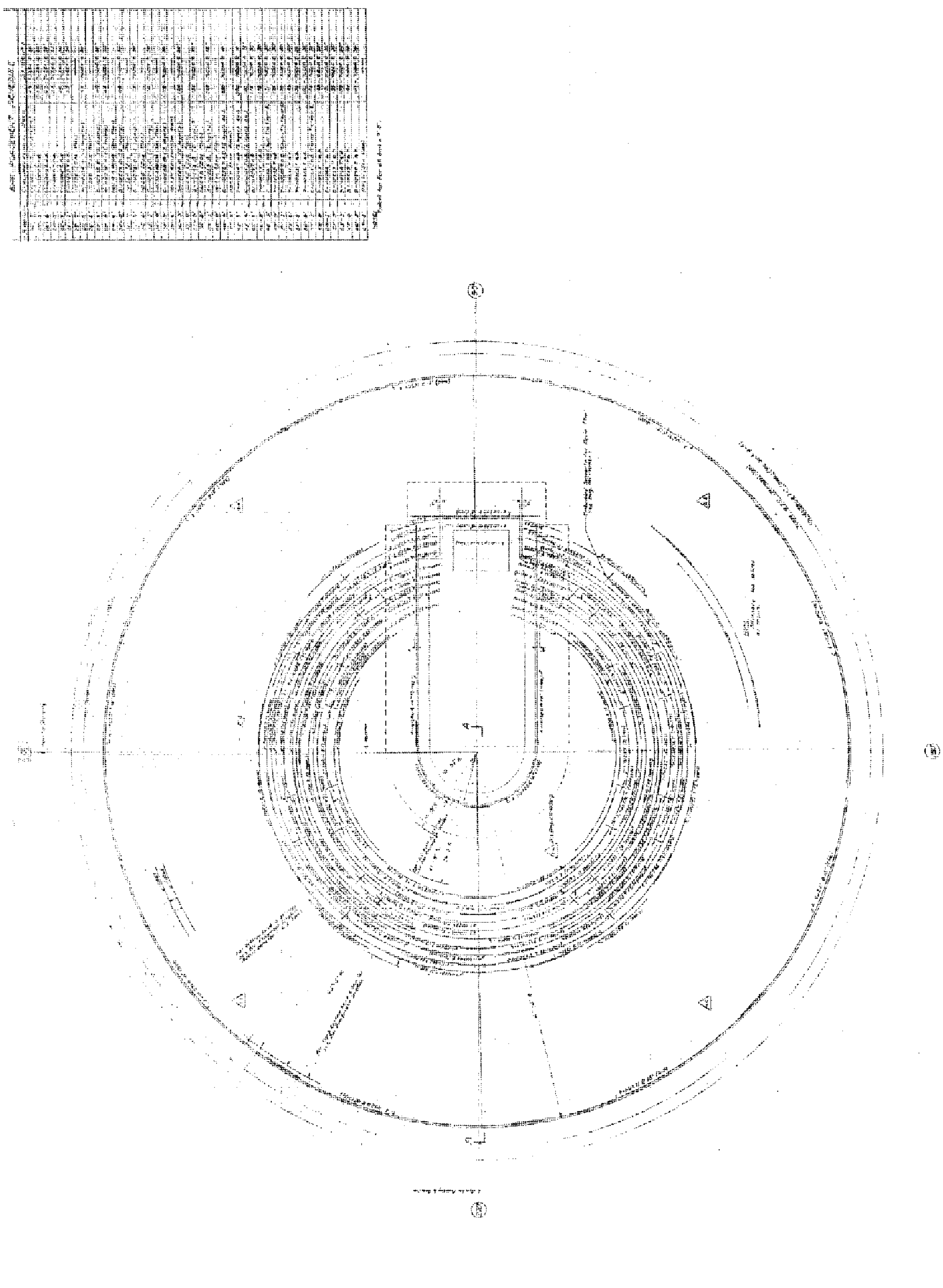


Figure 3-59. Reactor Building, Base Slab, Reinforcing Top Radial Bars, Top Layer Elevation 722' + 1 1/2"

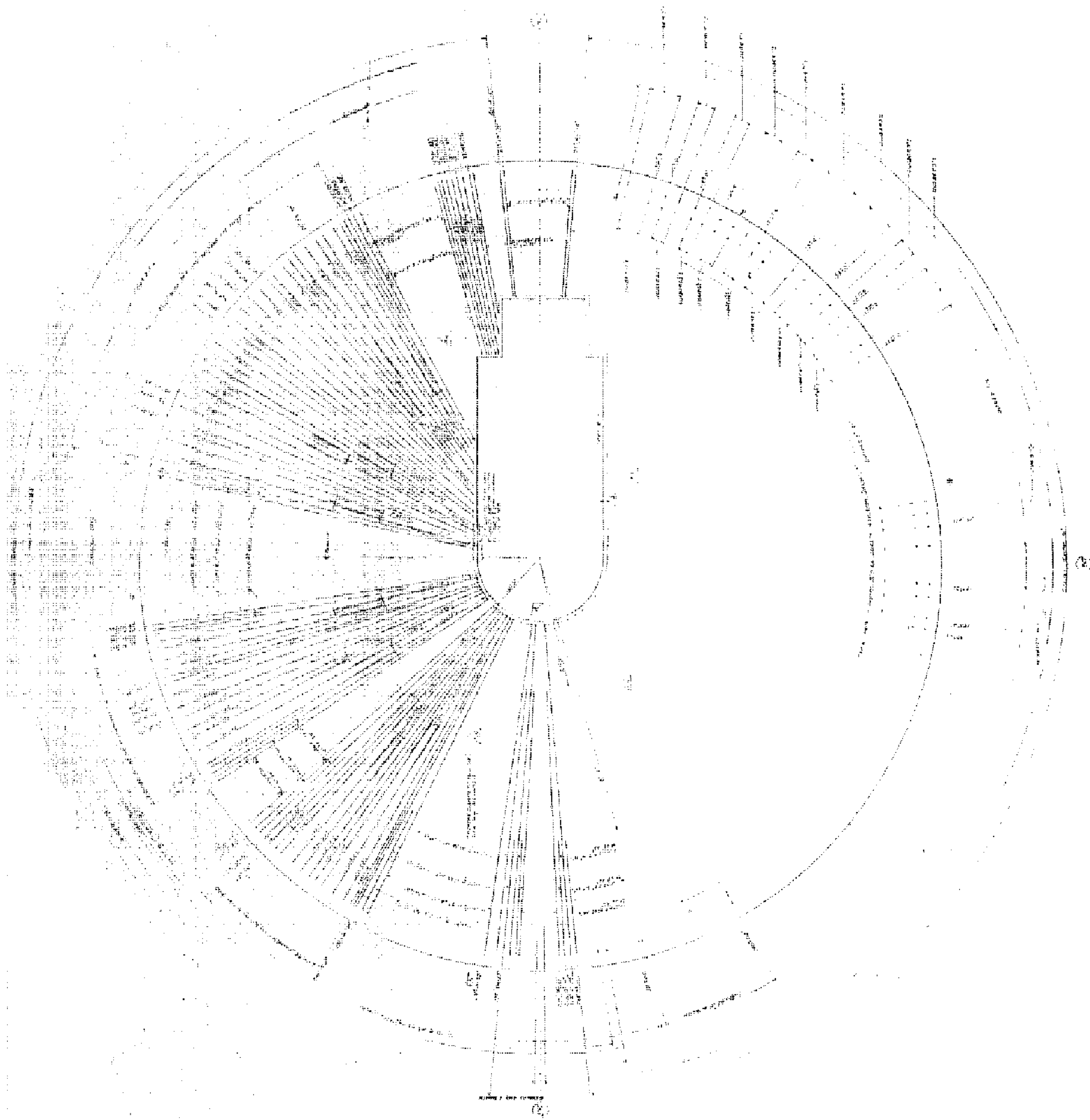


Figure 3-60. Reactor Building, Concrete Shell, Developed Elevation - Reinforcing El. 722 + 6 Thru El. 875 + 4 1/2

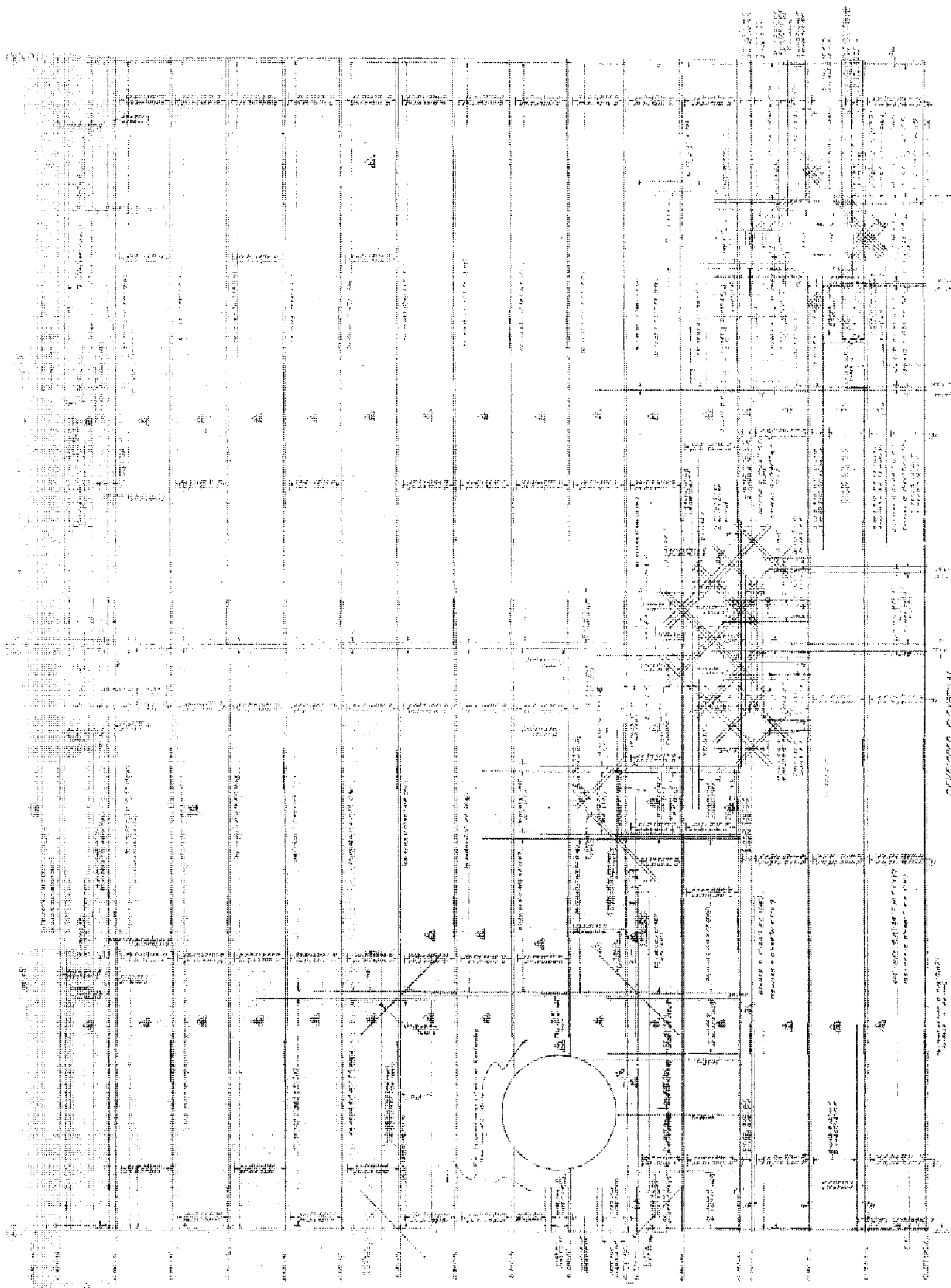


Figure 3-61. Reactor Building, Concrete Shell, Developed Elevation - Reinforcing El. 722 + 6 Thru El. 875 + 4 1/2

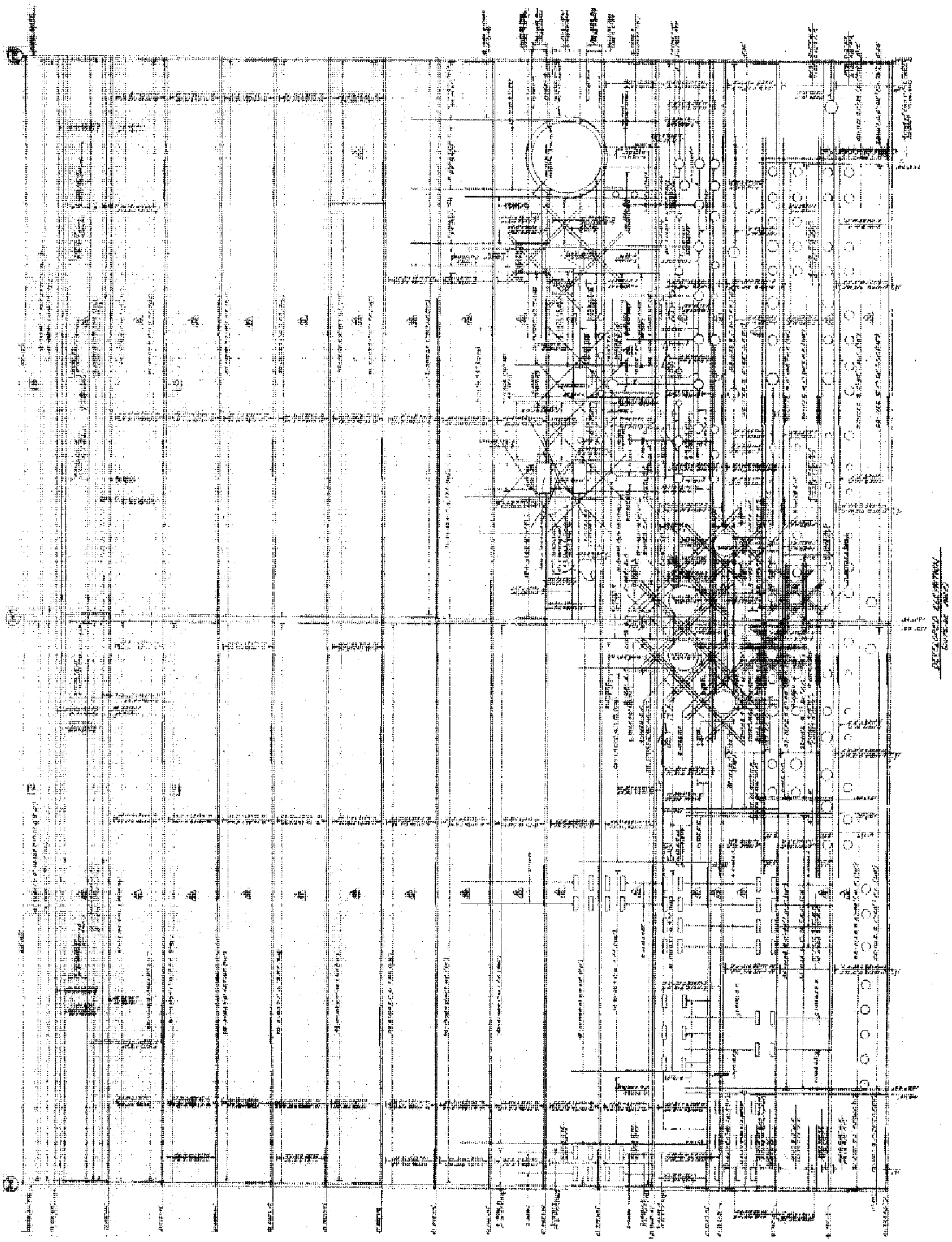


Figure 3-62. Reactor Building - Equipment Hatch Reinforcing

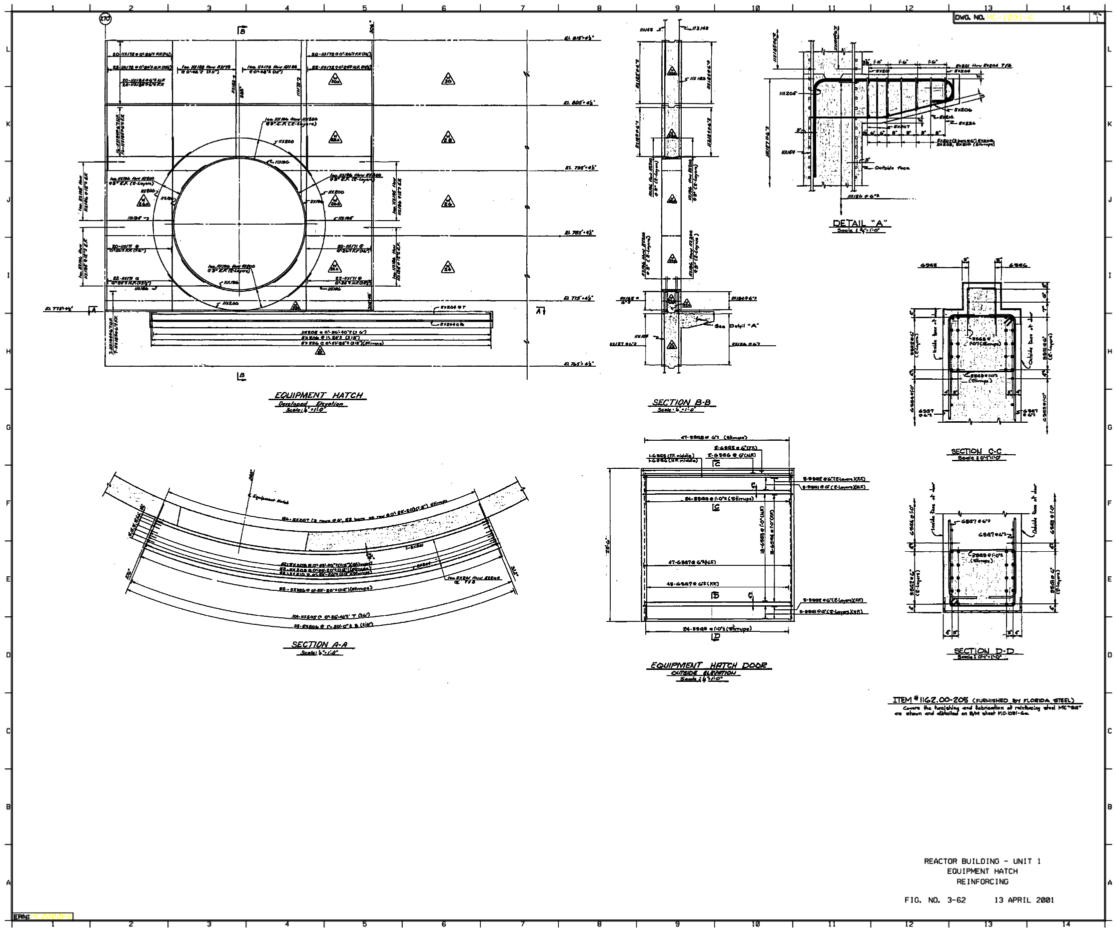


Figure 3-63. Reactor Building, Inner Plan of Dome, Reinforcing

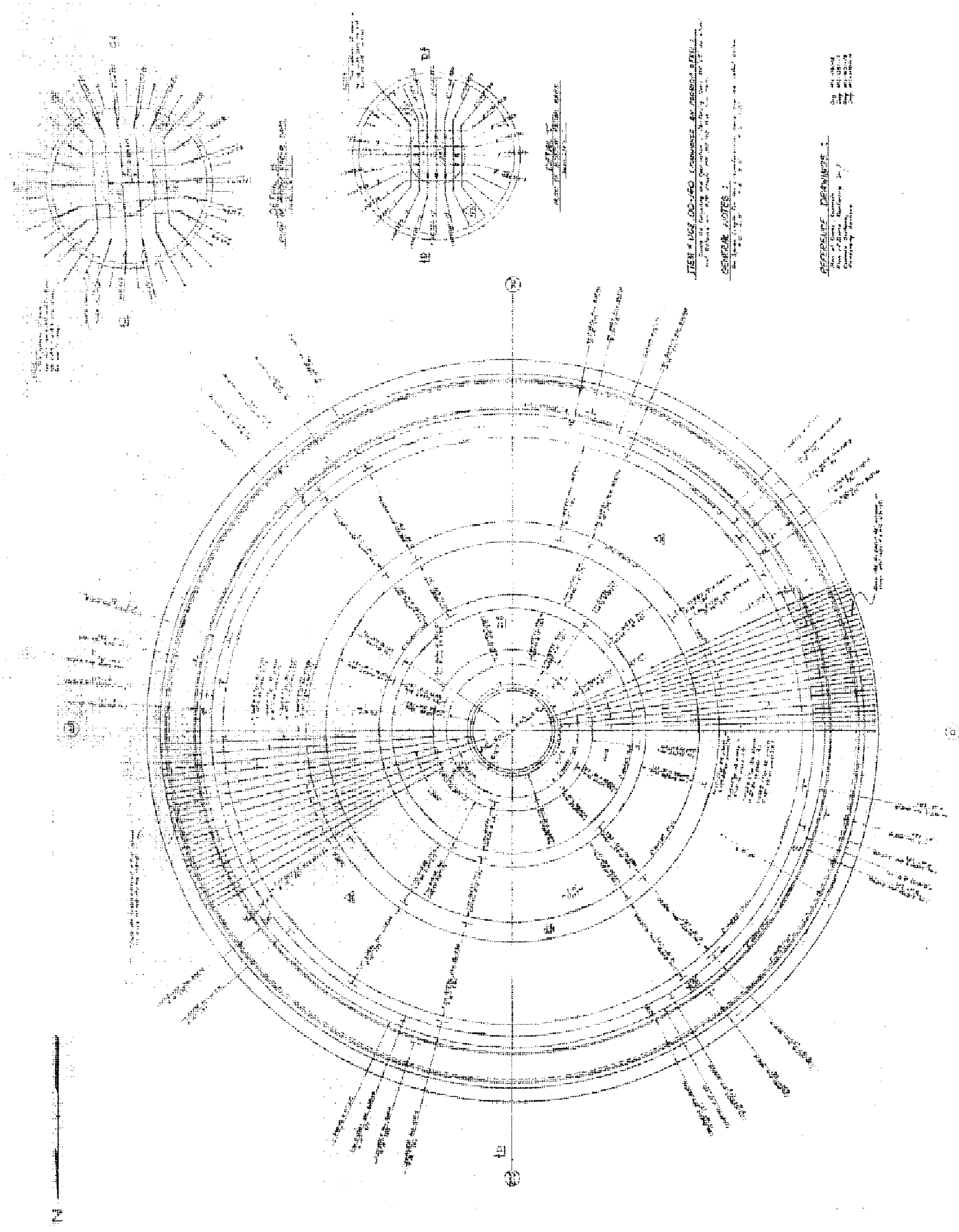


Figure 3-64. Reactor Building, Outer Plan of Dome, Reinforcing

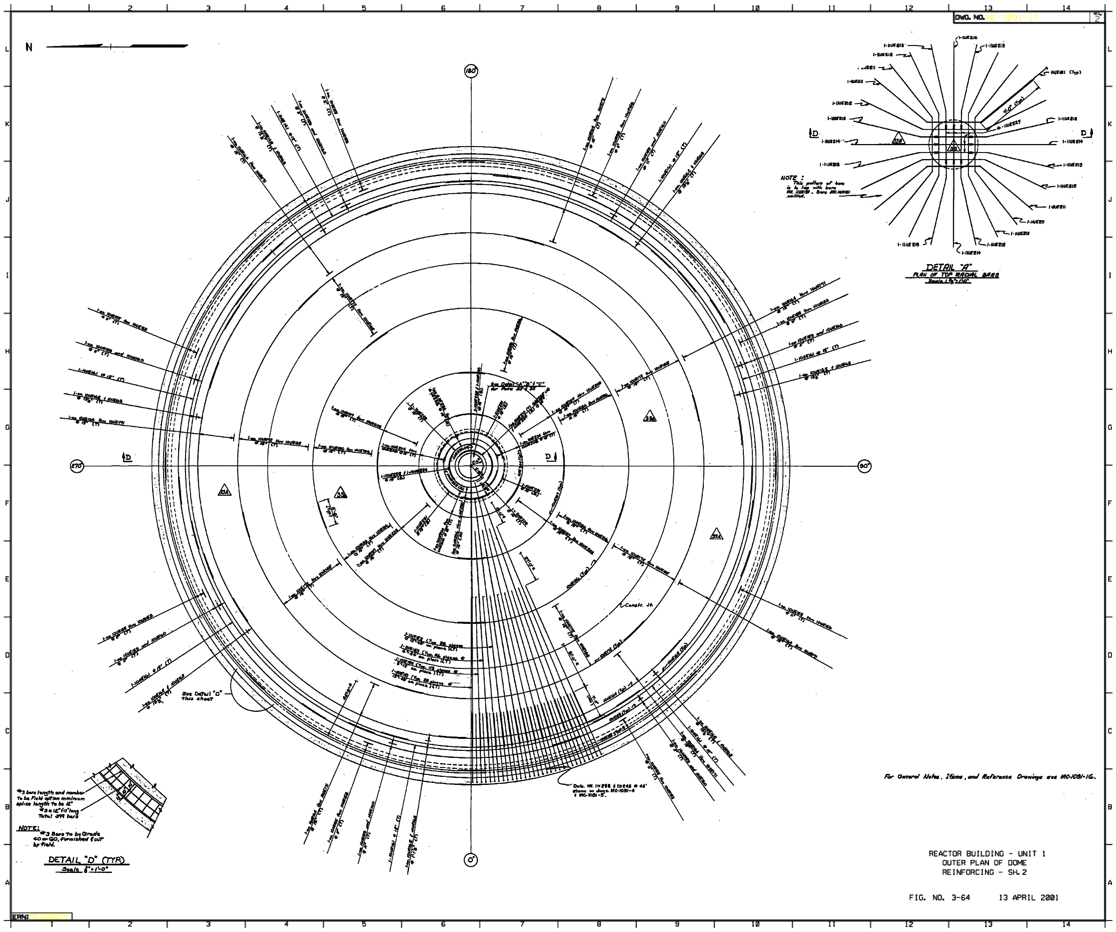


Figure 3-65. Analysis of Reactor Building Penetration Space Frame Mathematical Model

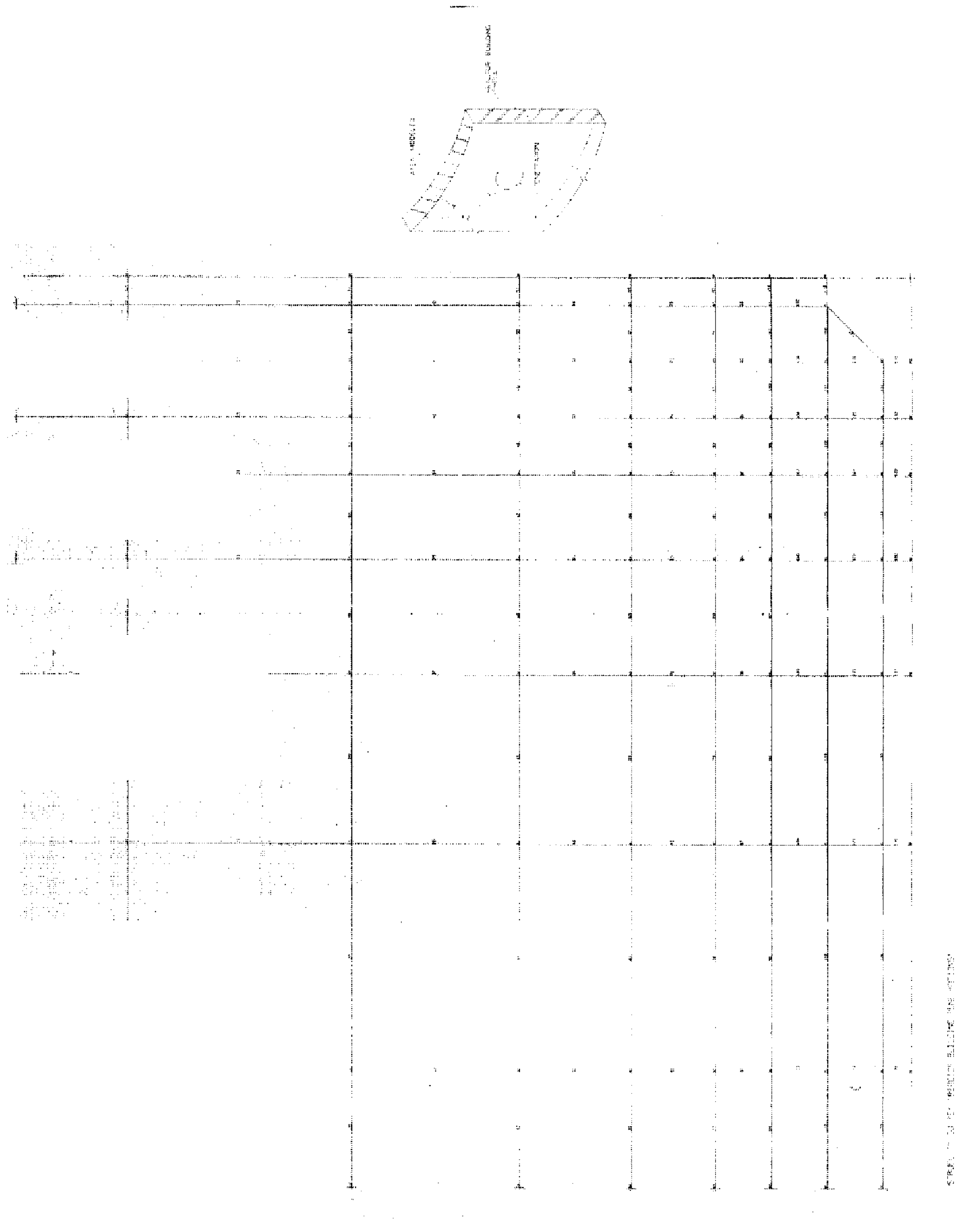


Figure 3-66. Containment Vessel and Equipment Anchorage Details

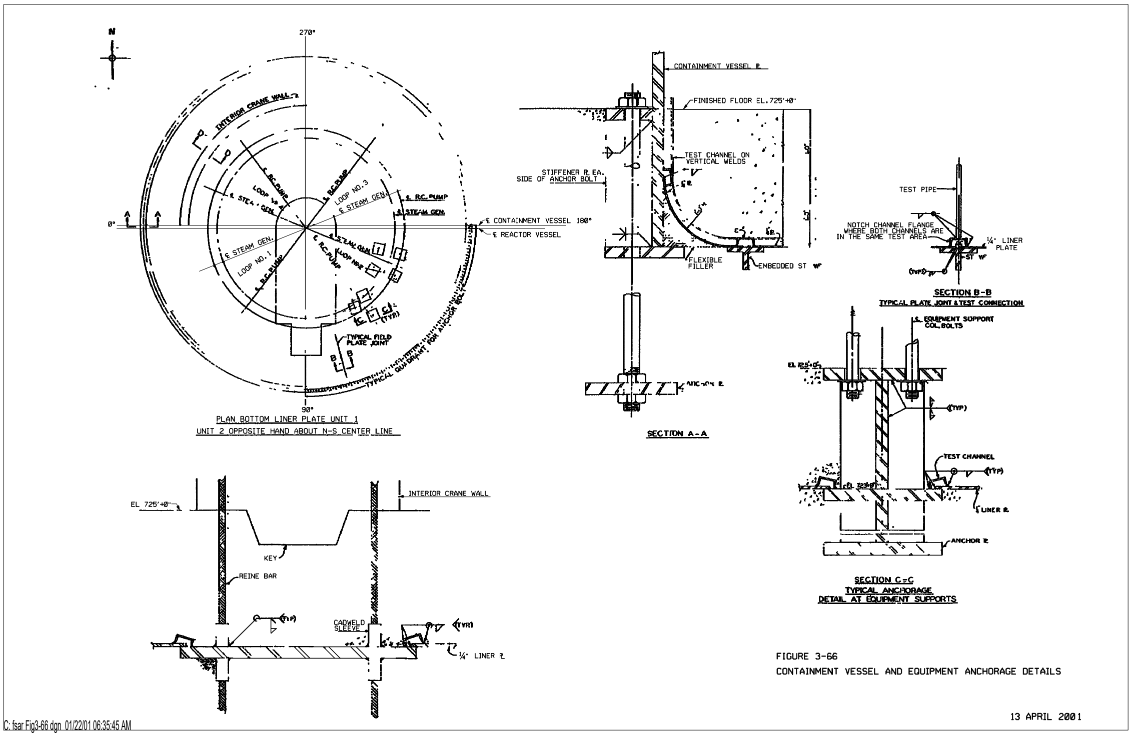
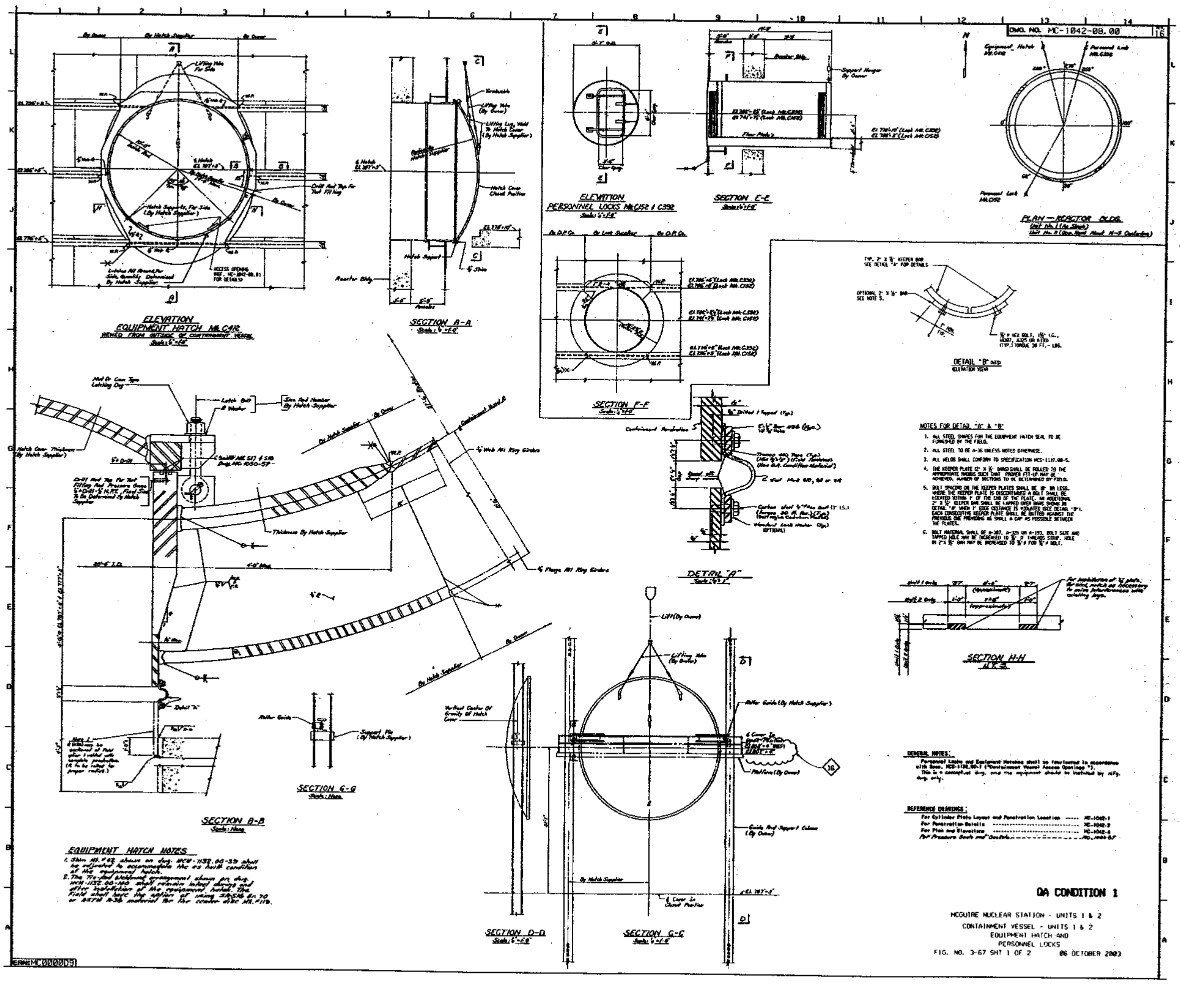


Figure 3-67. Personnel Lock and Equipment Hatch Details



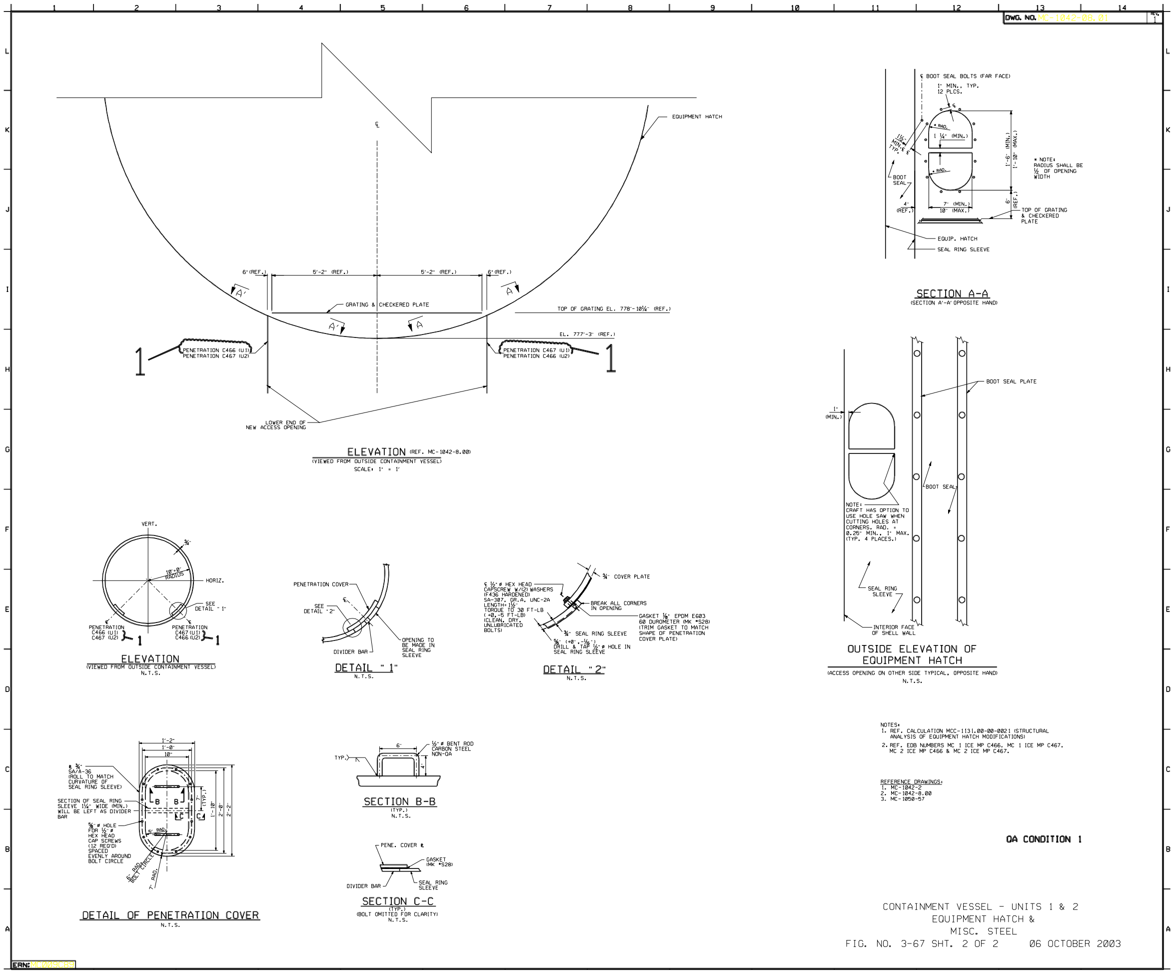

SECTION A-A
(SECTION A'-A' OPPOSITE HAND)
ELEVATION
(VIEWED FROM OUTSIDE CONTAINMENT VESSEL)
ELEVATION
DETAIL "1"
N.T.S.
DETAIL "2"
N.T.S.
OUTSIDE ELEVATION OF EQUIPMENT HATCH
(ACCESS OPENING ON OTHER SIDE TYPICAL, OPPOSITE HAND)
N.T.S.
INTERIOR FACE OF SHELL WALL
DETAIL OF PENETRATION COVER
N.T.S.
SECTION B-B
SECTION C-C
NOTES:
1. REF. CALCULATION MCC-1131.00-00-0021 (STRUCTURAL ANALYSIS OF EQUIPMENT HATCH MODIFICATIONS)
2. REF. EDB NUMBERS MC 1 ICE MP C466, MC 1 ICE MP C467, MC 2 ICE MP C466 & MC 2 ICE MP C467.
REFERENCE DRAWINGS:
1. MC-1042-2
2. MC-1042-8.00
3. MC-1050-57
QA CONDITION 1
CONTAINMENT VESSEL - UNITS 1 & 2
EQUIPMENT HATCH &
MISC. STEEL
FIG. NO. 3-67 SHT. 2 OF 2 06 OCTOBER 2003

Figure 3-68. Typical Penetration Details

Figure 3-69. Reactor Building Containment Vessel, Cylinder Plate Layout and Penetration Location

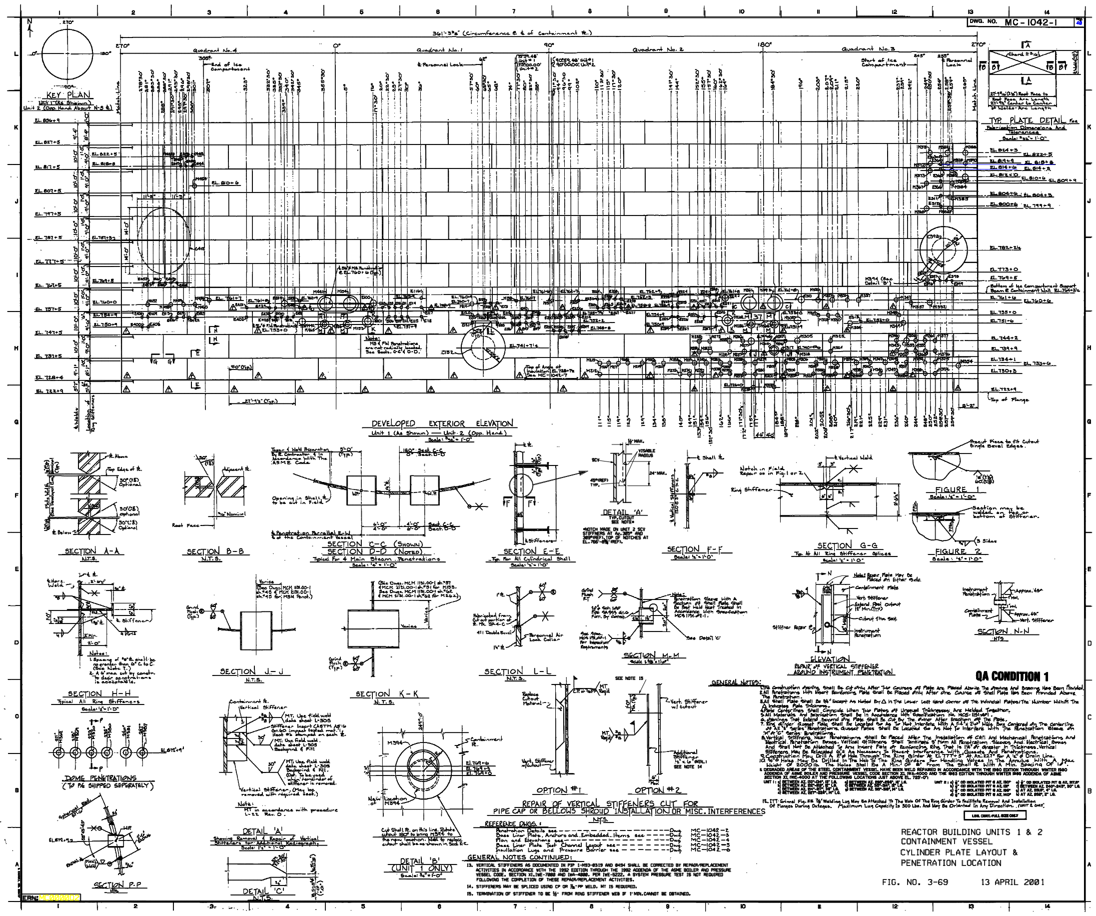


Figure 3-70. Containment Vessel Penetration Details

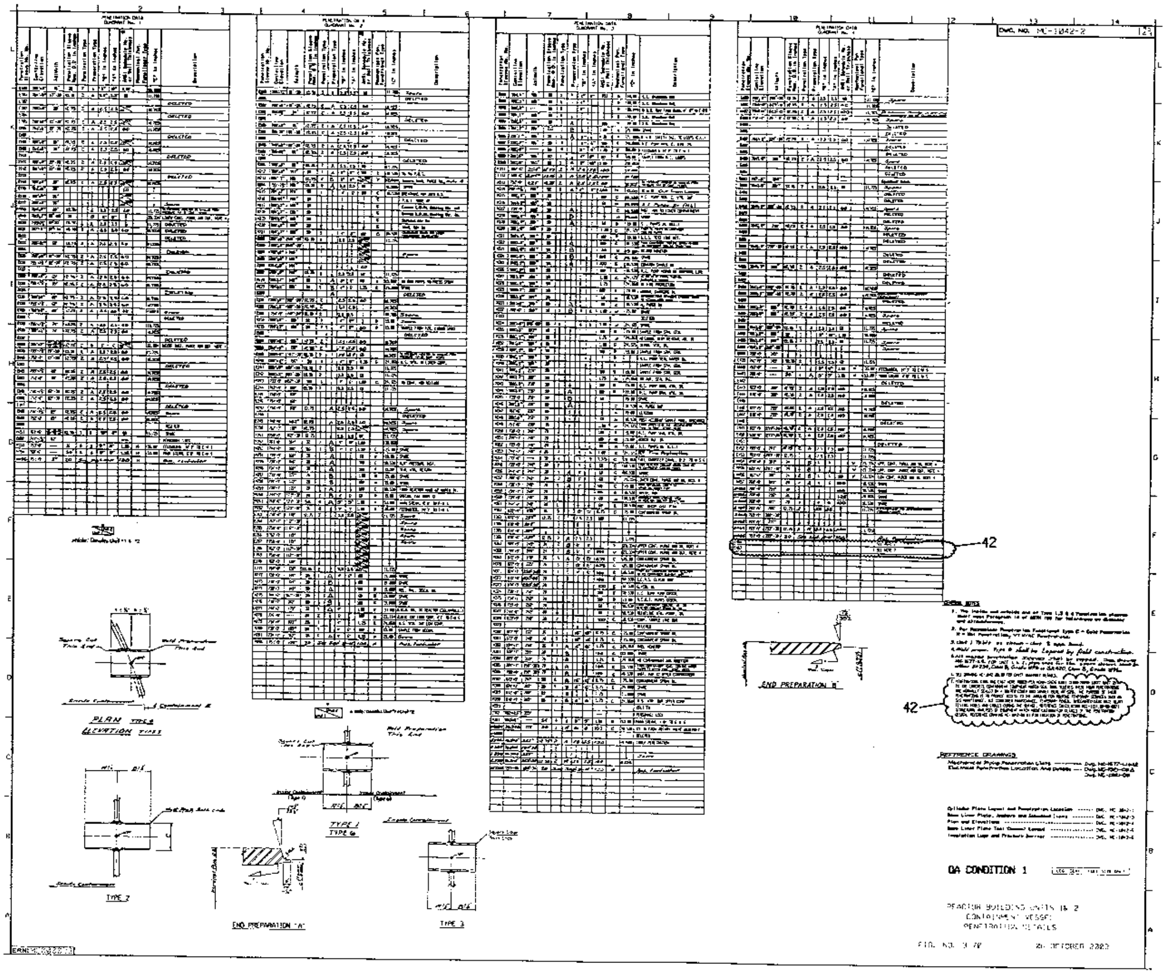


Figure 3-71. Reactor Building Containment Vessel, Base Liner Plate, Anchors and Embedded Items

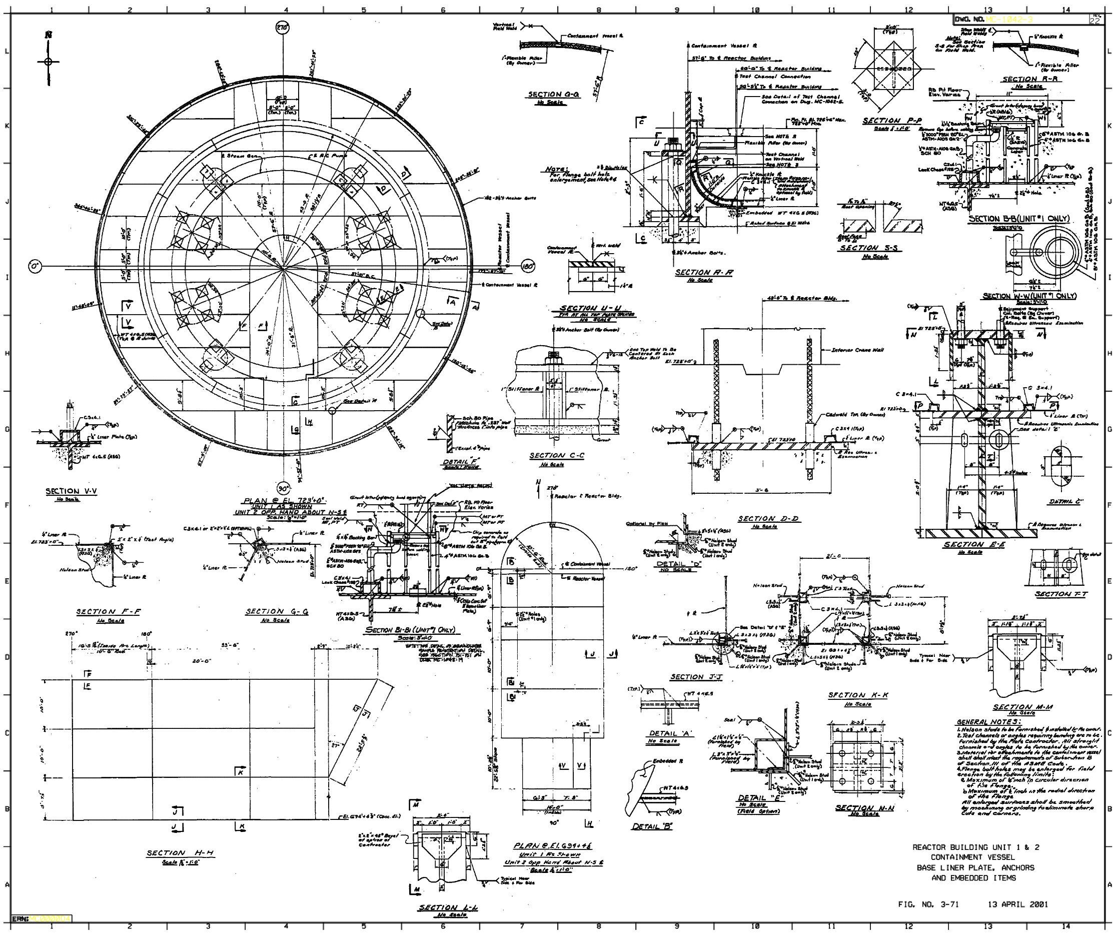


Figure 3-72. Reactor Building Containment Vessel, Base Liner Plate, Test Channel Layout

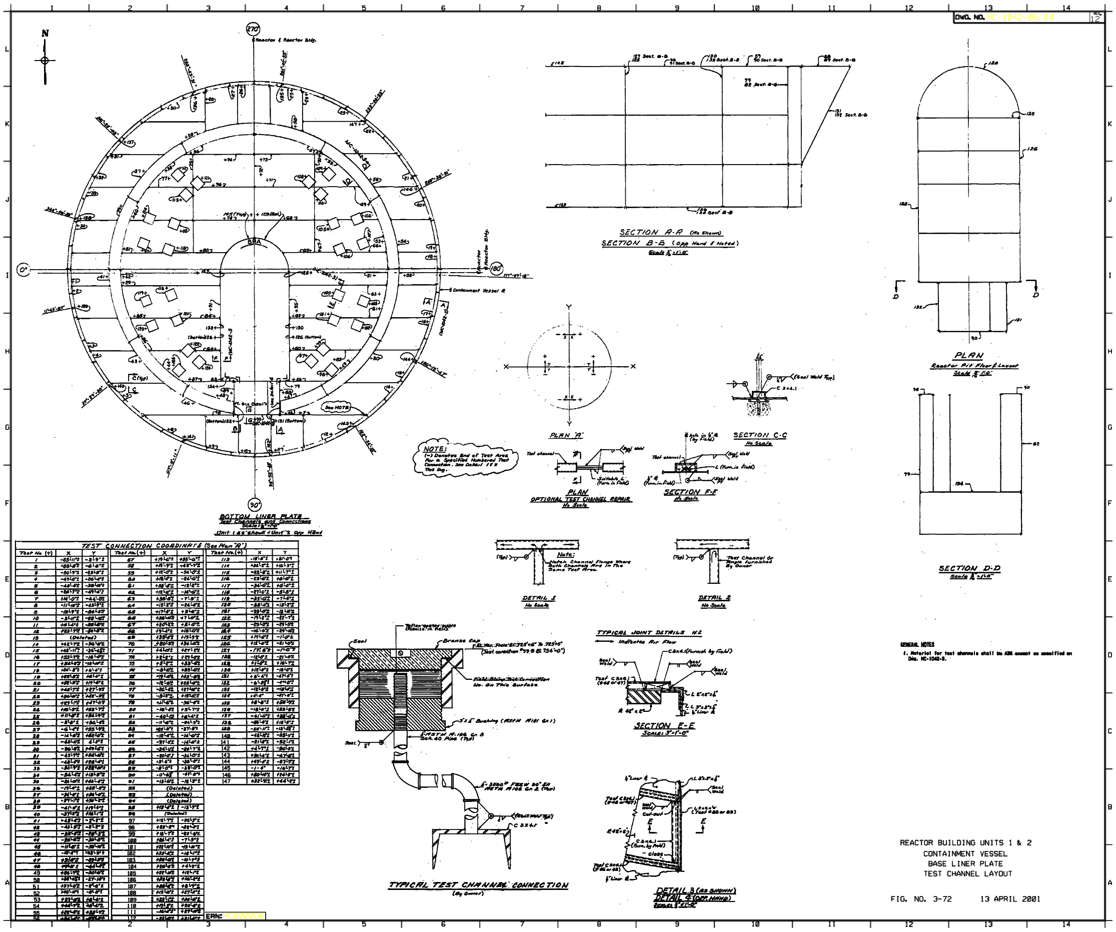


Figure 3-73. Containment Vessel As Built Overall Dimensions and Plate Thicknesses

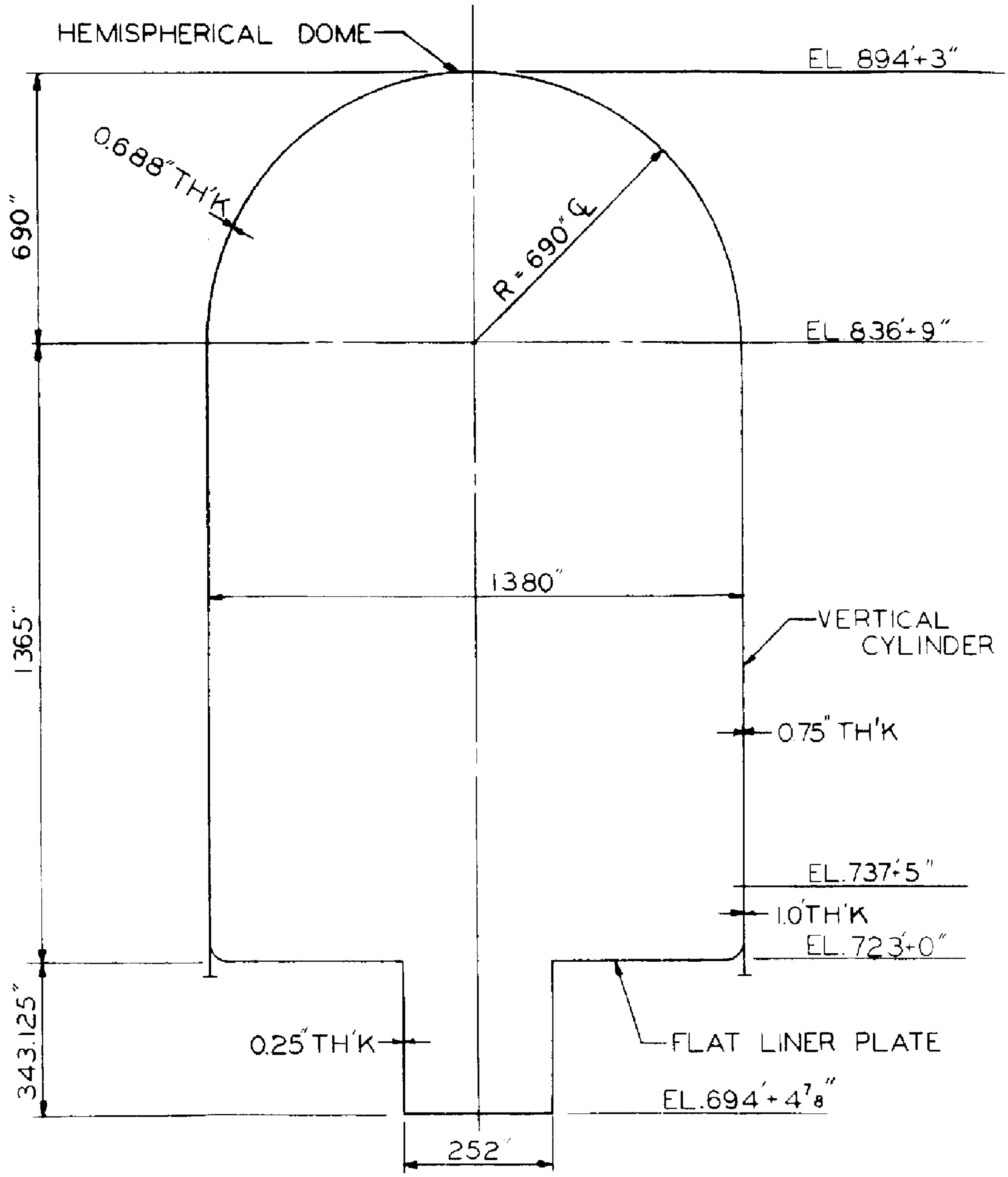
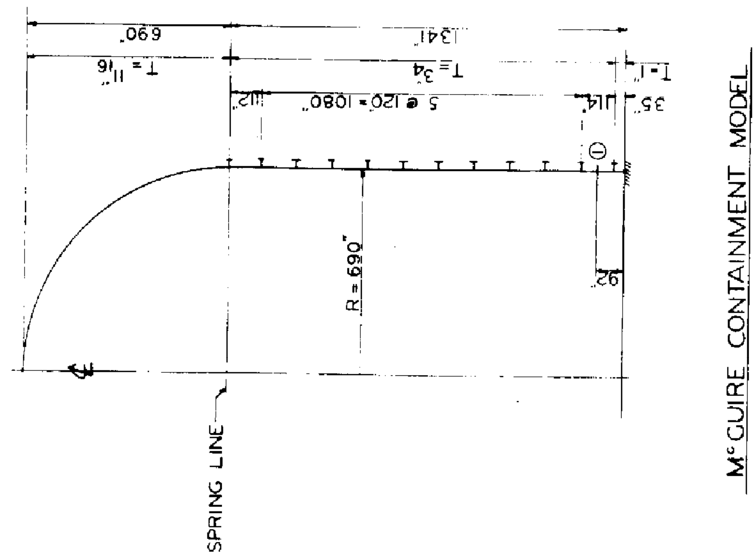
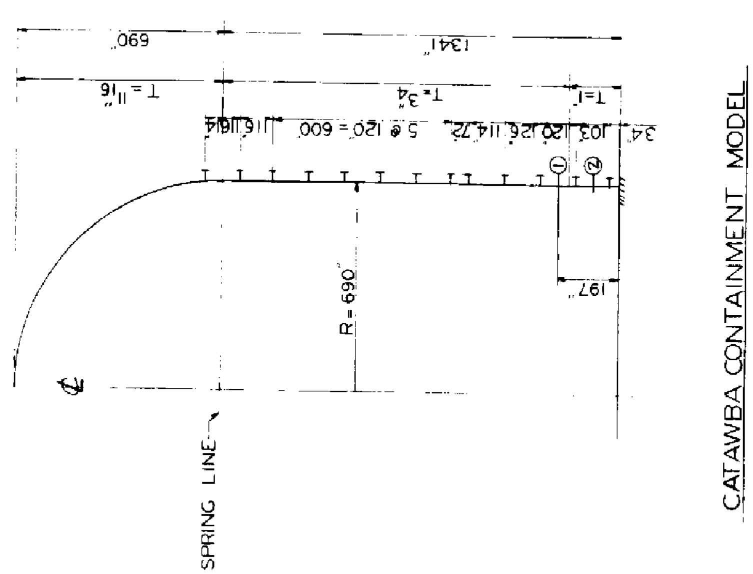


Figure 3-74. Buckling Factors of Safety Comparison Between the McGuire and Catawba Stations



Point	Meridional Force K/In.	Shear Force K/In.	Buckling* Factor of Safety
1	-5.80	5.28	3.27



Point	Meridional Force K/In.	Shear Force K/In.	Buckling* Factor of Safety
1	-..0	[illegible]	[illegible]
2	-11.165	5.242	4.51

* Critical buckling loads are based upon experimental data in lieu of theoritical solutions.

Figure 3-75. Break in Element No. 1 - Ice Condenser, Transient Pressure in Compartments 7, 8, and 9

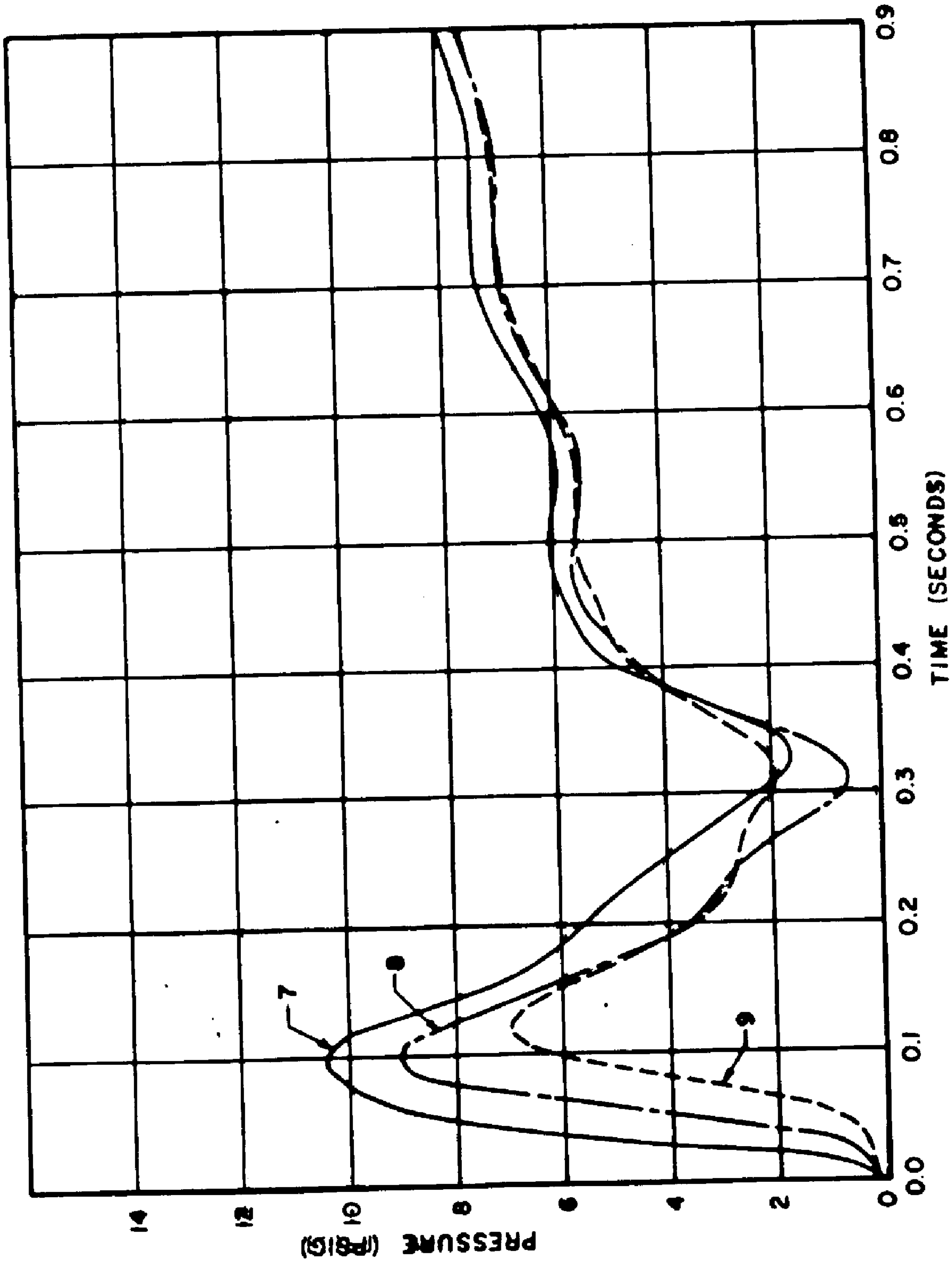


Figure 3-76. Break in Element No. 1 - Ice Condensor, Pressure Transients in Compartments 10, 11, and 12

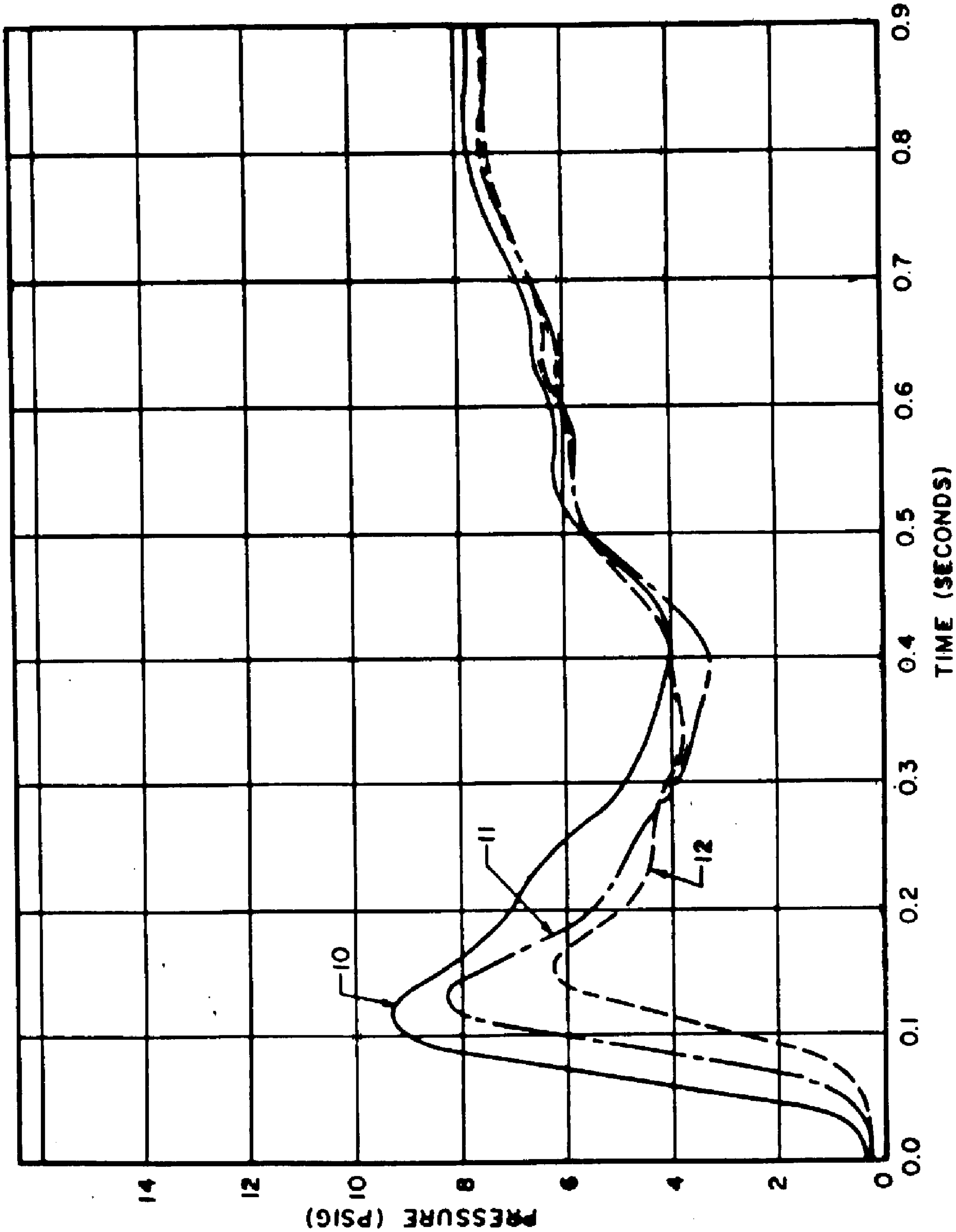


Figure 3-77. Break in Element No. 1 - Ice Condensor, Pressure Transients in Compartments 13, 14, and 15

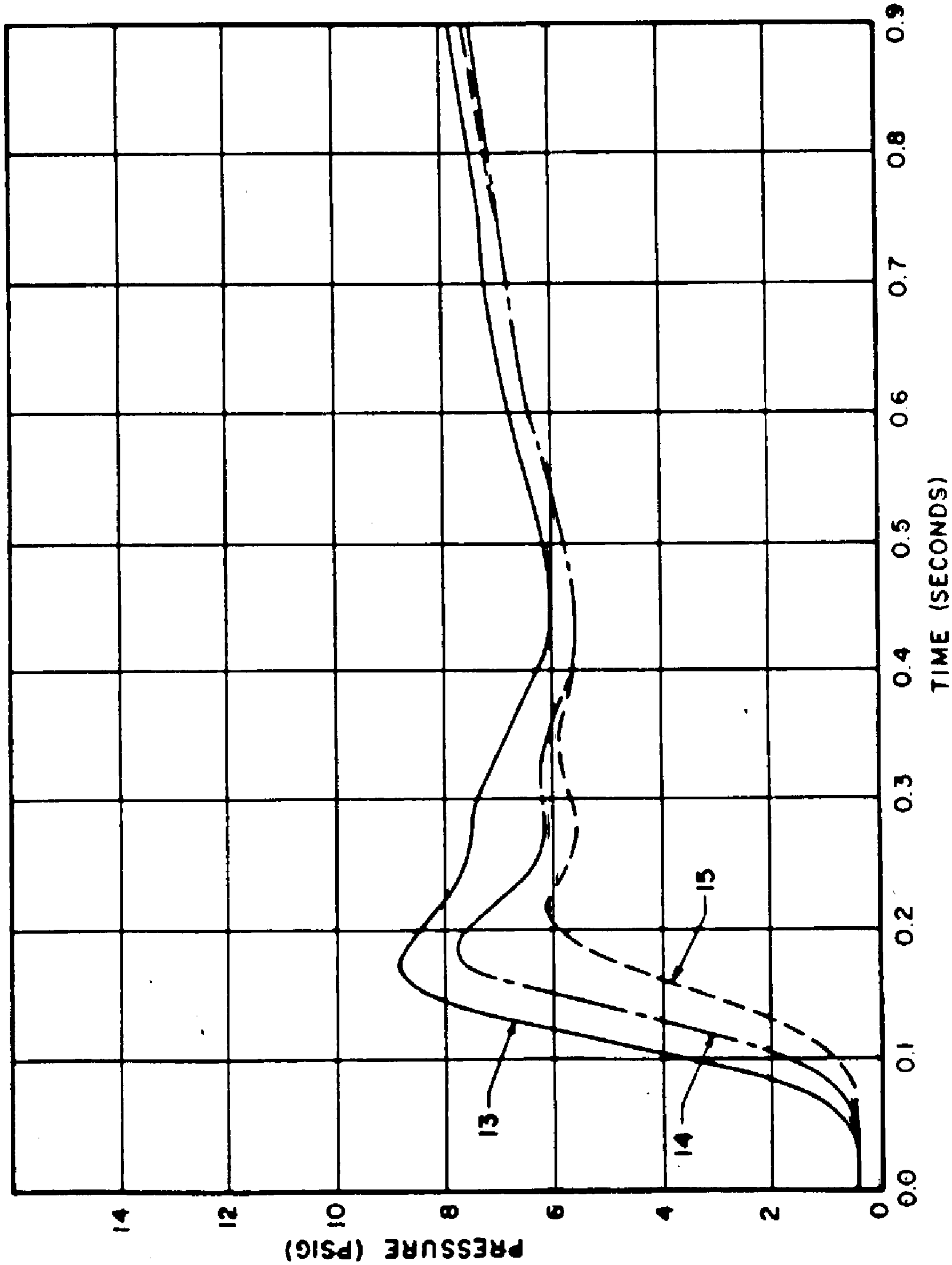


Figure 3-78. Break in Element No. 1 - Ice Condensor, Pressure Transients in Compartments 16, 17, and 18

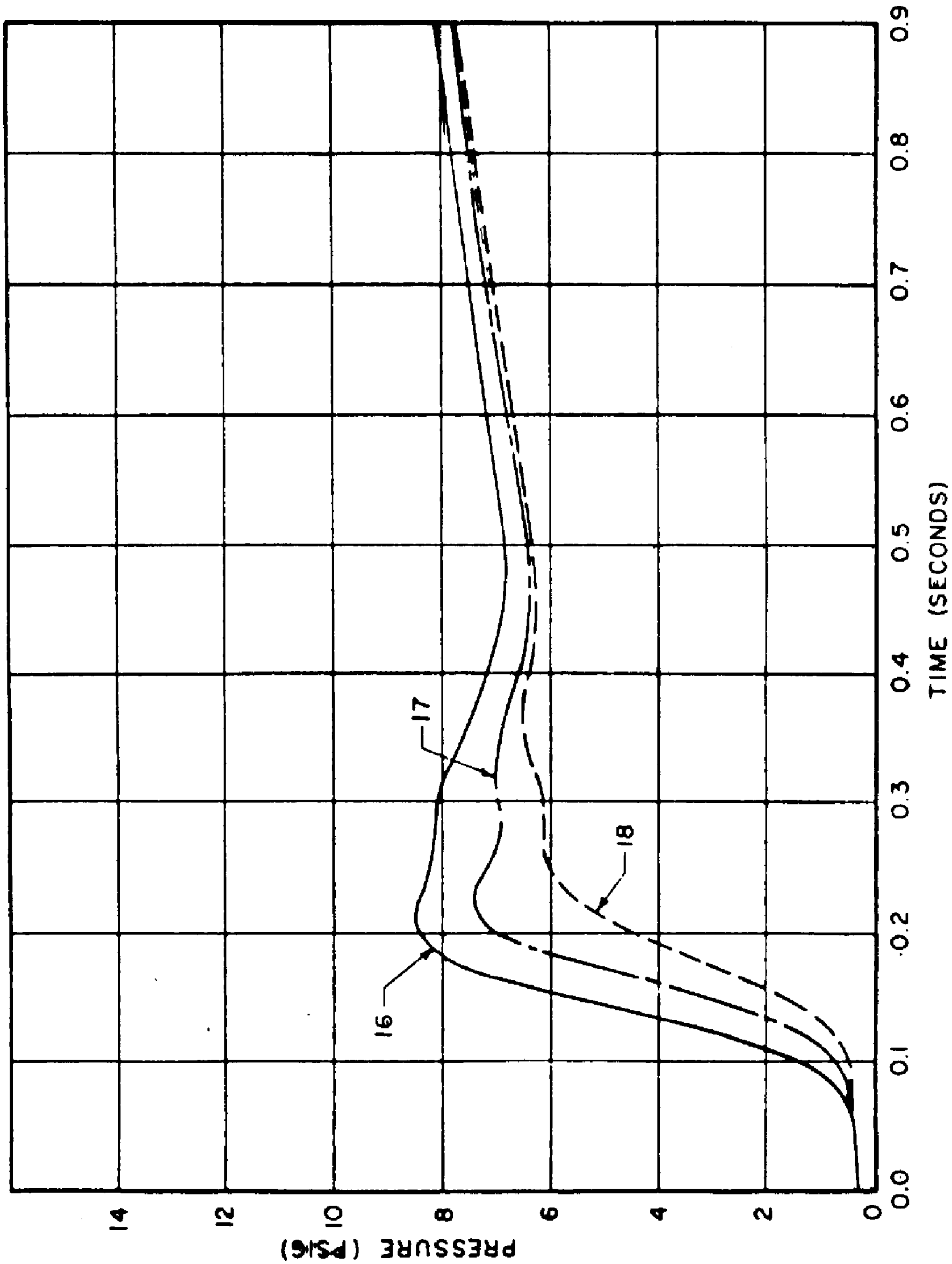


Figure 3-79. Break in Element No. 1 - Ice Condensor, Pressure Transients in Compartments 19, 20, and 21

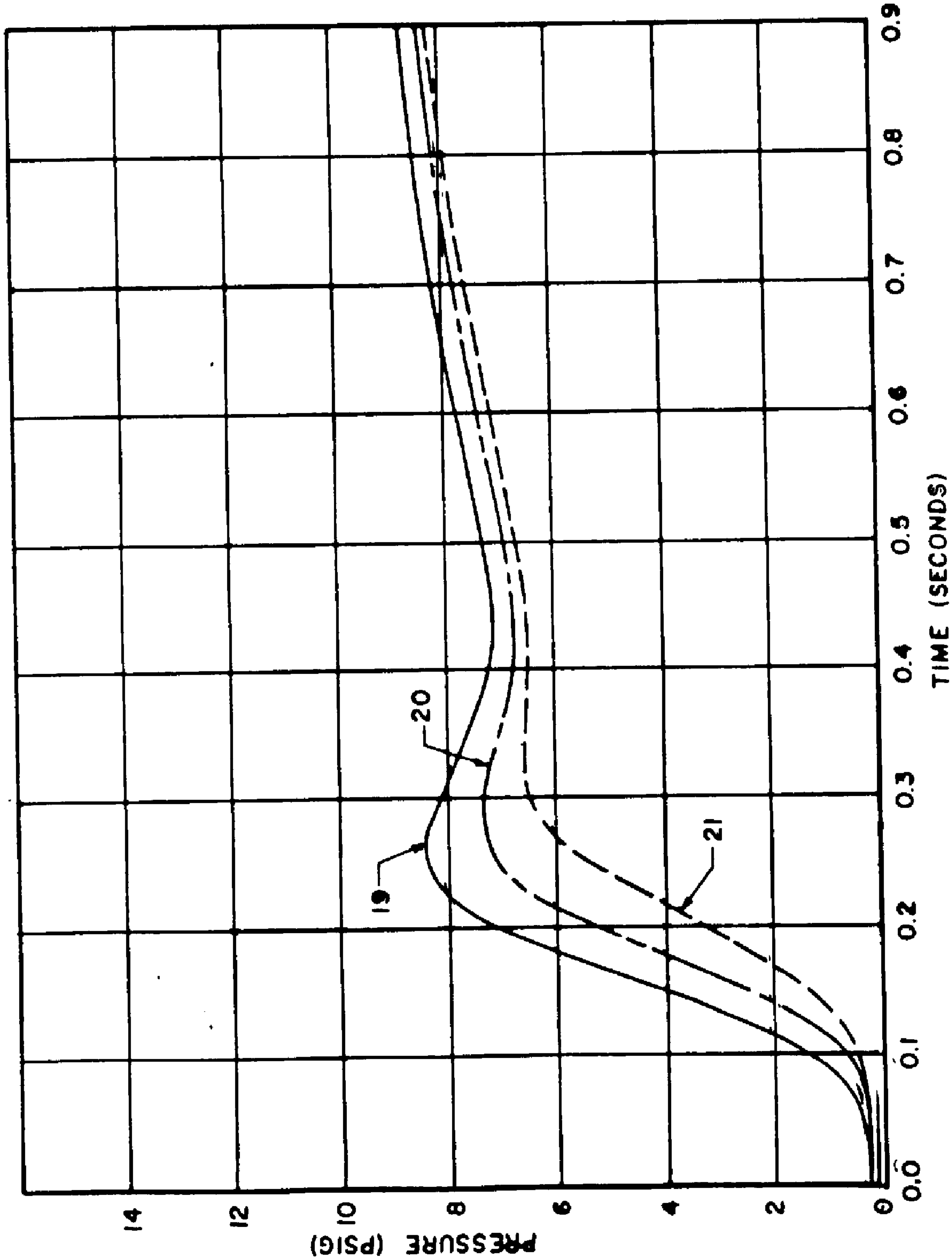


Figure 3-80. Break in Element No. 1 - Ice Condensor, Pressure Transients in Compartments 22, 23, and 24

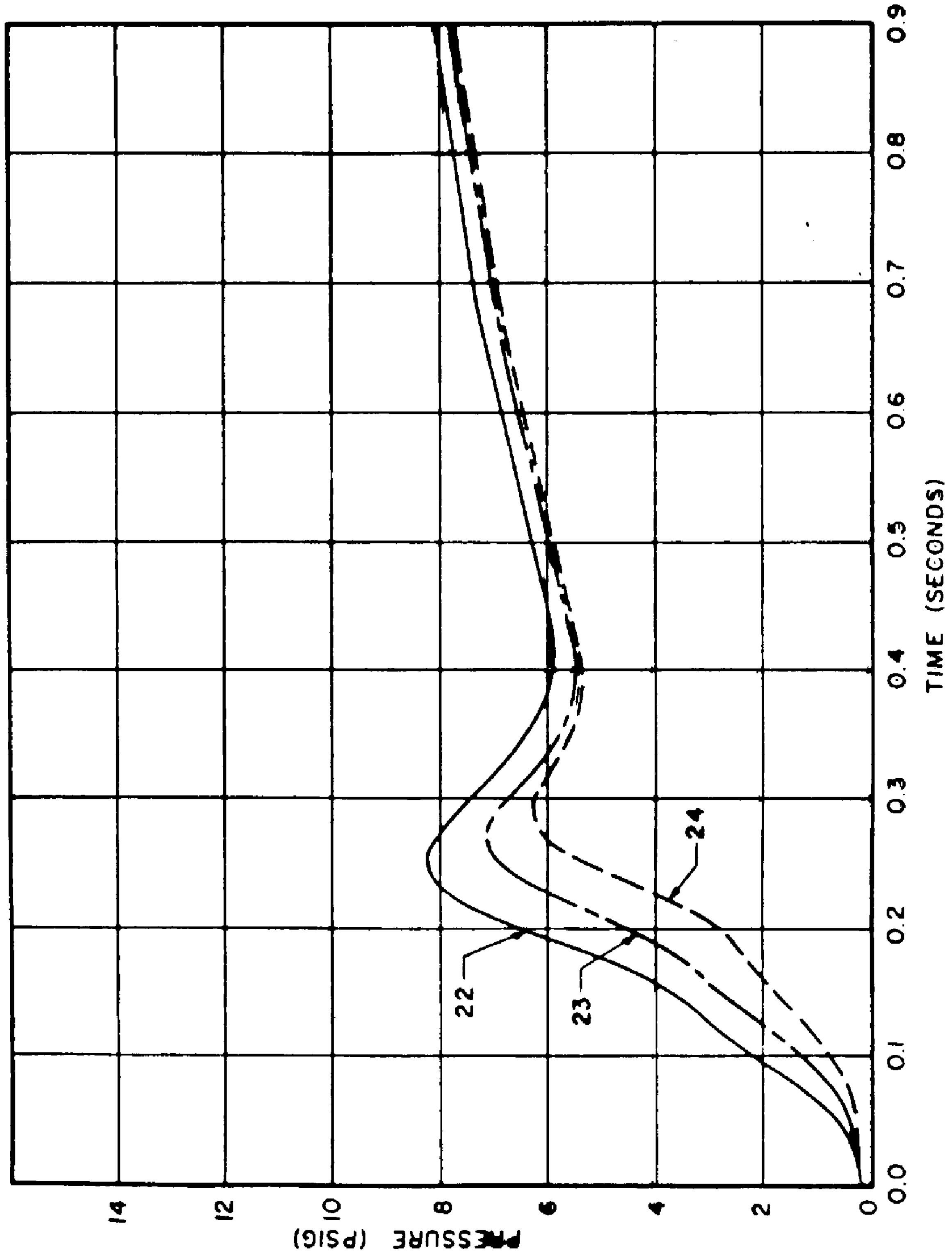


Figure 3-81. Break in Element No.1 - Ice Condensor, Pressure Transients in Compartments 25, 29, and 33

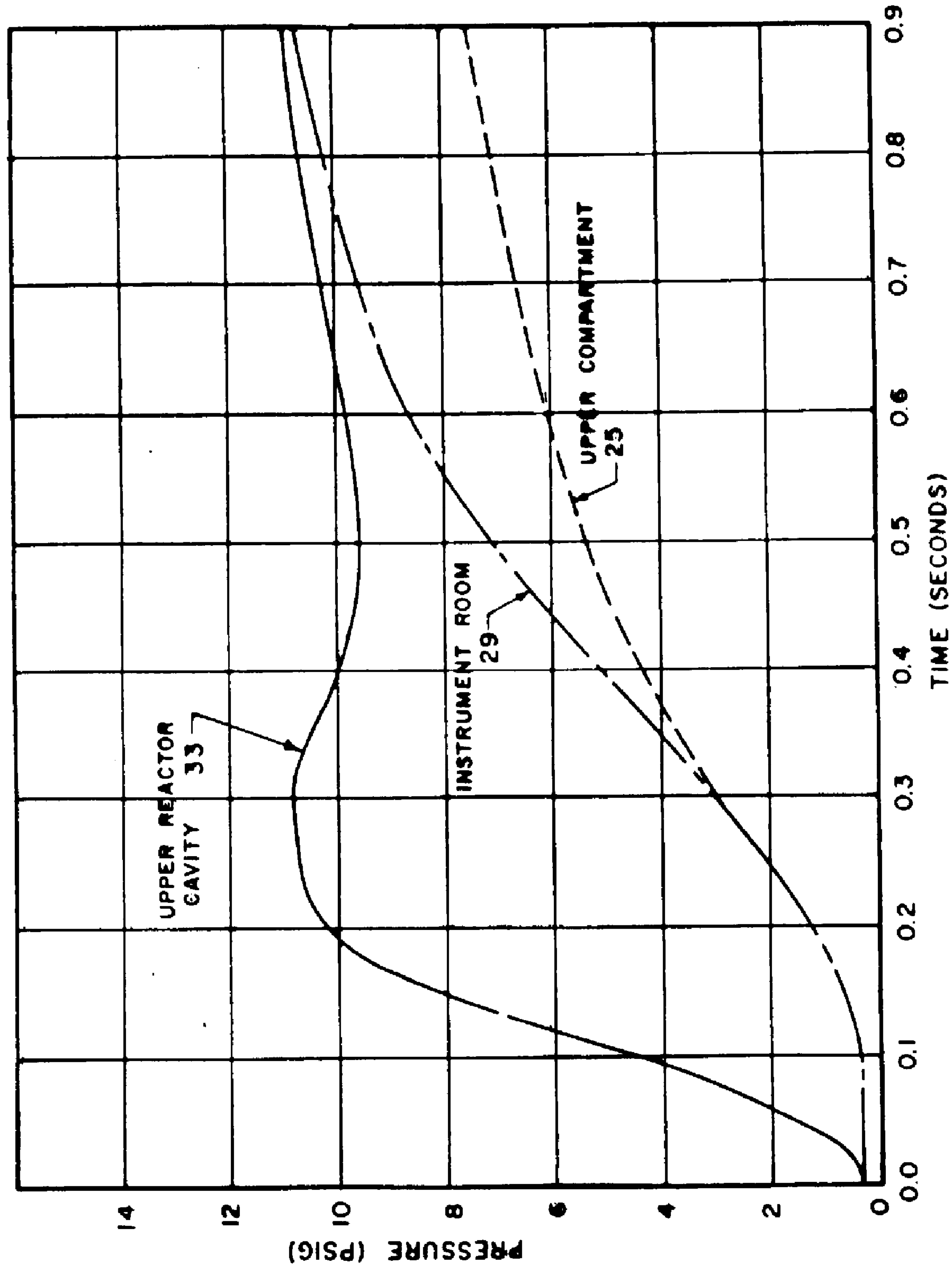


Figure 3-82. Fourier Series Representation of Dynamic Loads

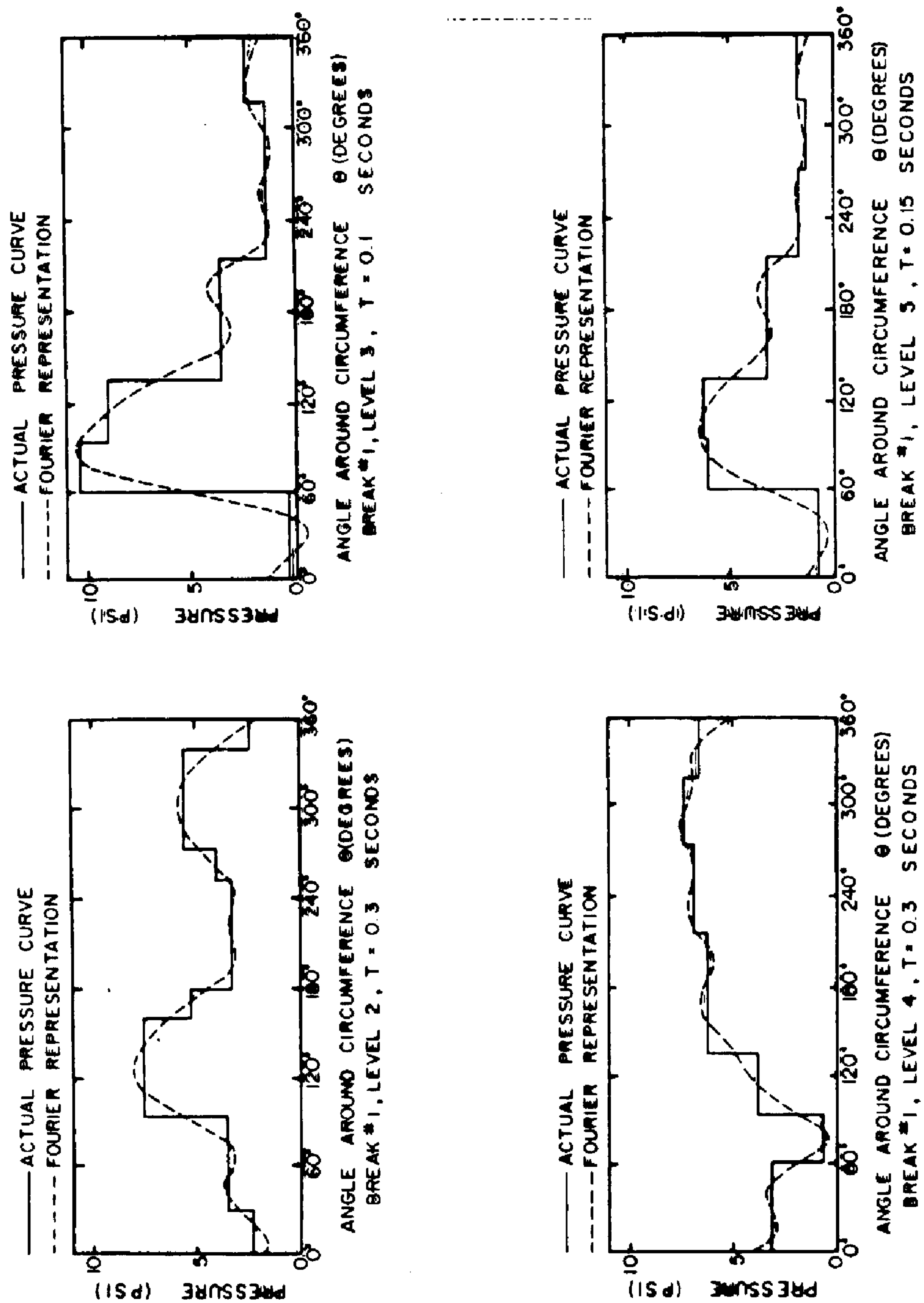


Figure 3-83. Compartment Layout - Plan at Equipment Rooms Elevation

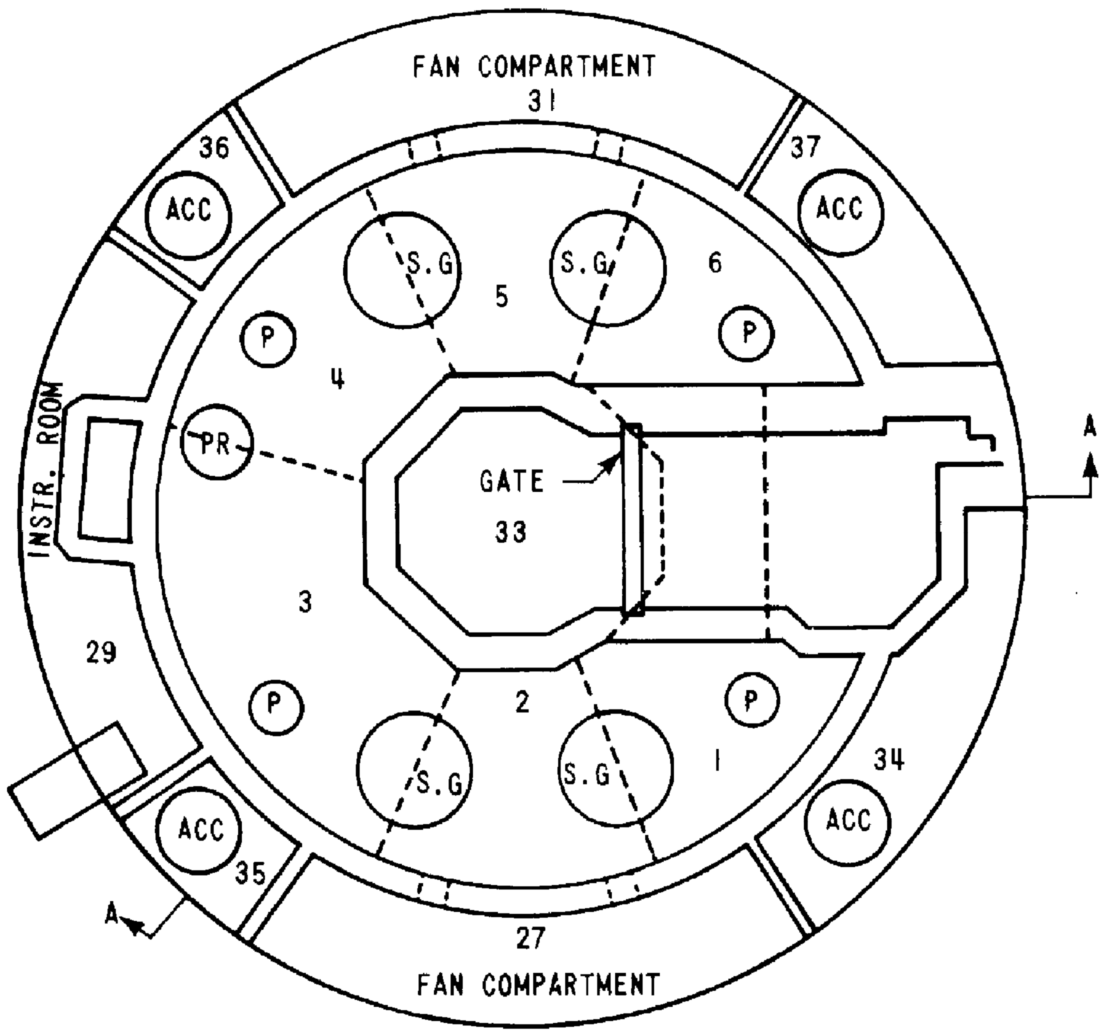


Figure 3-84. Compartment Layout - Containment Section View

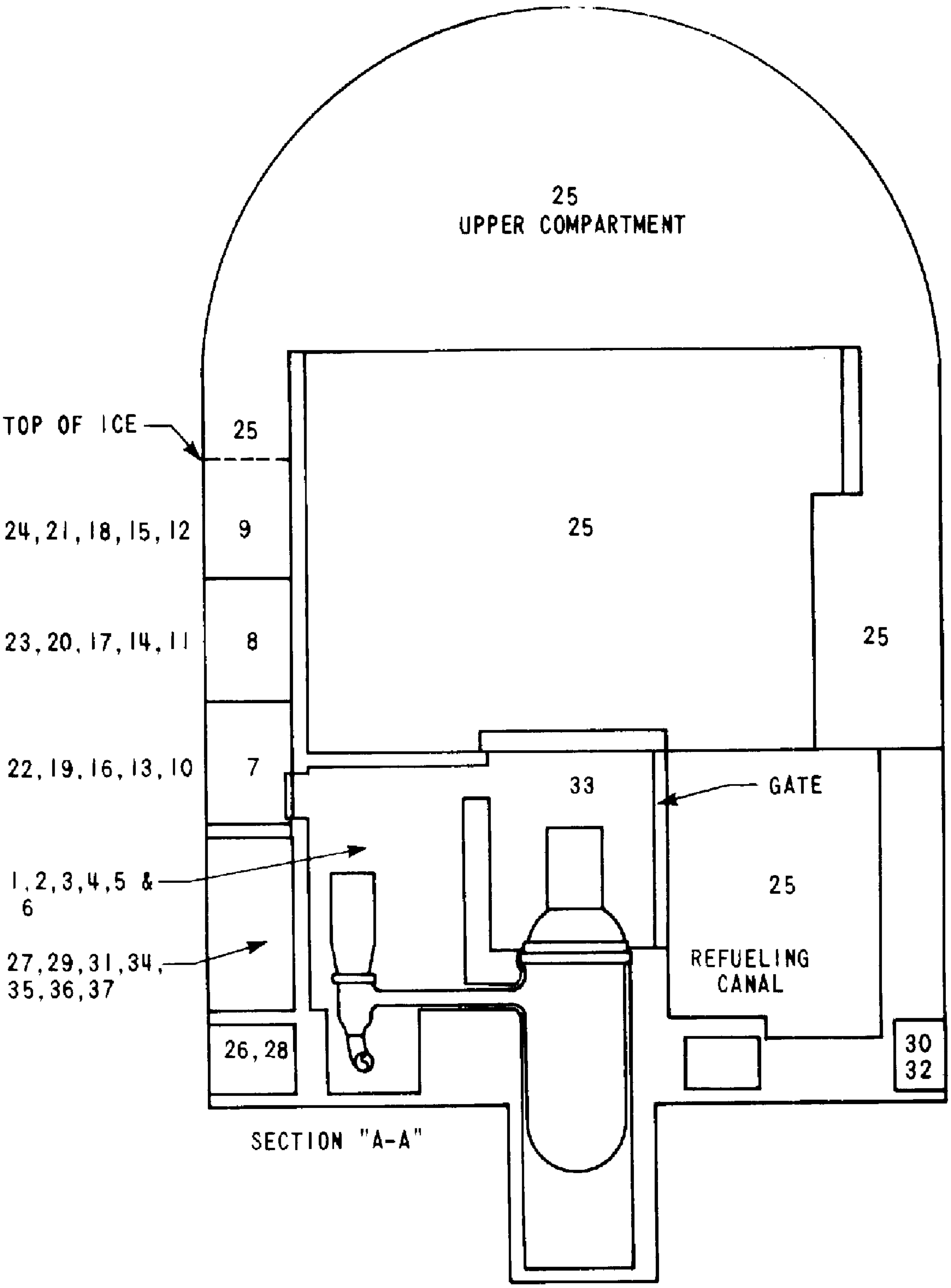


Figure 3-85. Layout of Containment Shell

Figure 3-86. Civil-Environmental Division Partial Organizational Chart [HISTORICAL INFORMATION NOT REQUIRED TO BE REVISED]

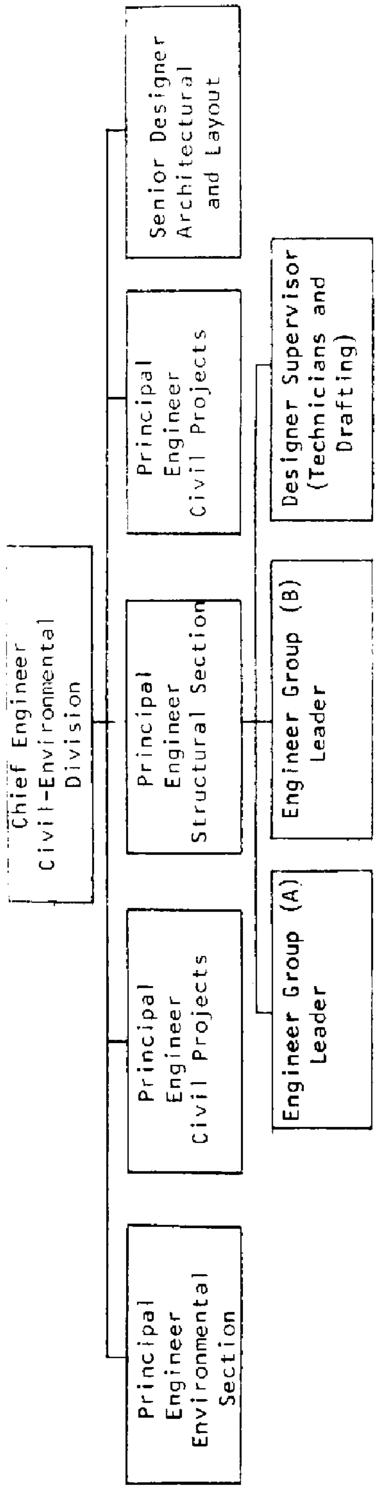


Figure 3-87. Reactor Building, First Horizontal Mode, f = 4.96478 cps (Kalnin's)

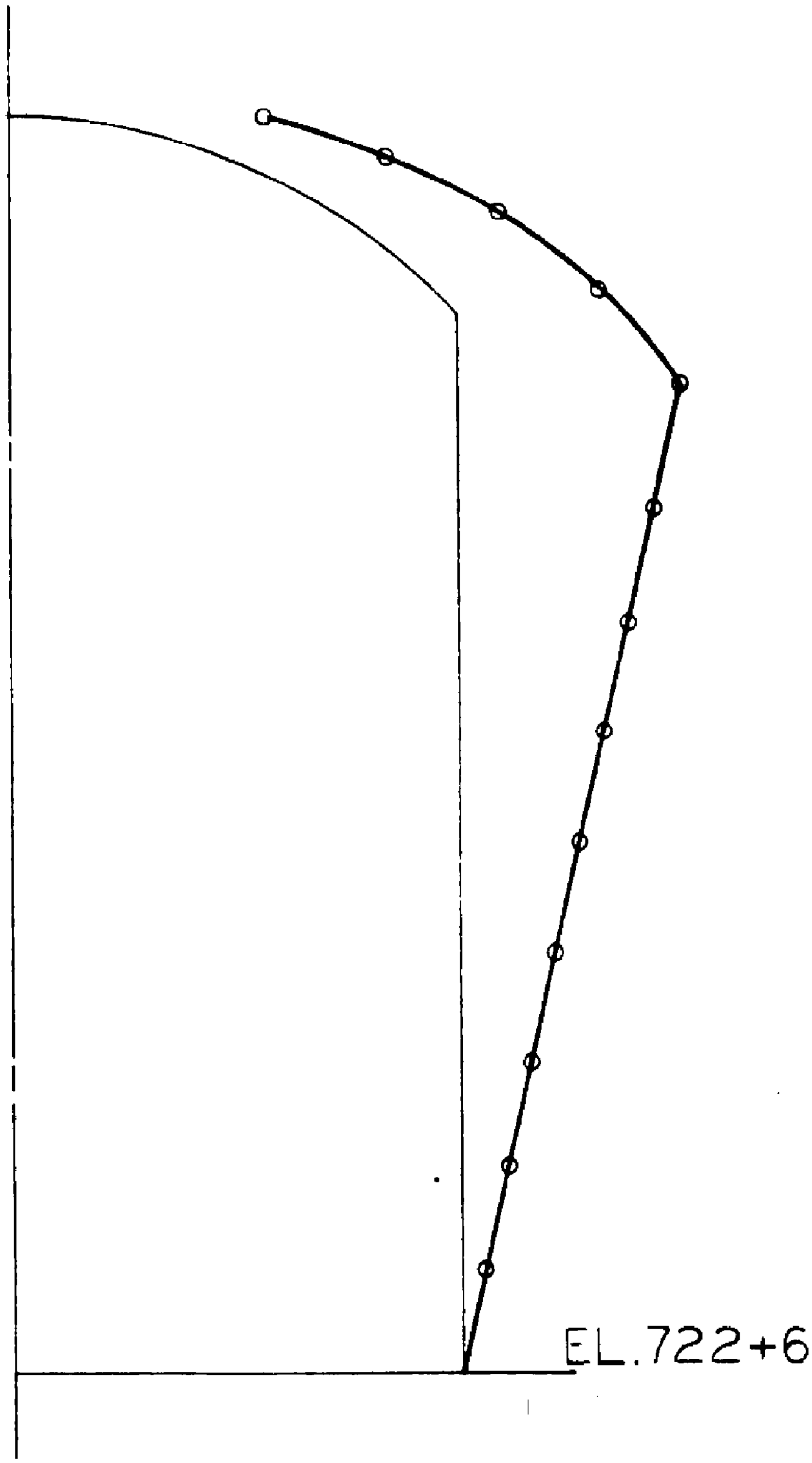


Figure 3-88. Reactor Building, First Horizontal Mode, f = 4.97 cps (Finite Elements)

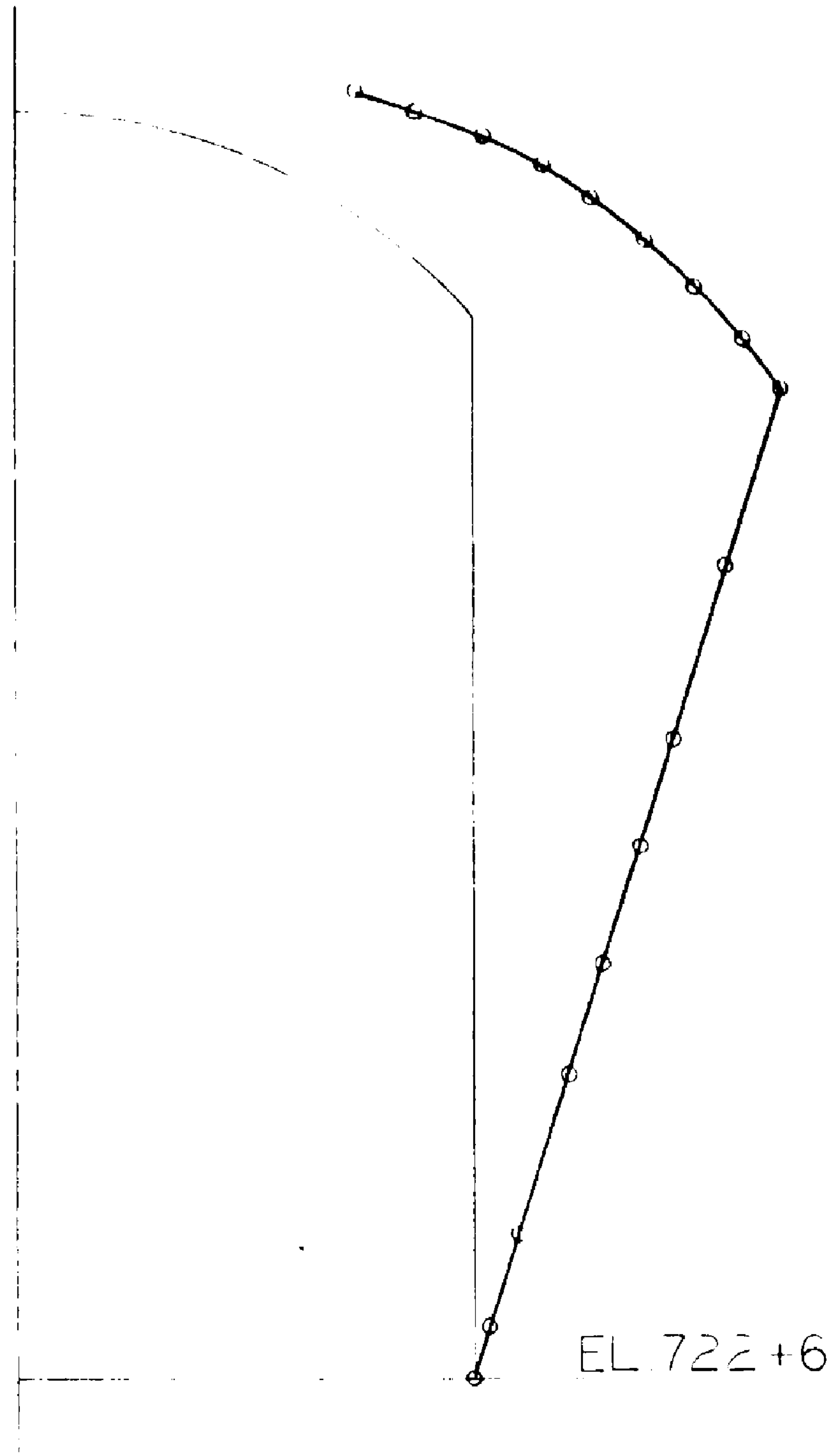


Figure 3-89. Containment Vessel, First Horizontal Mode, f = 9.284 cps (Kalnin's)

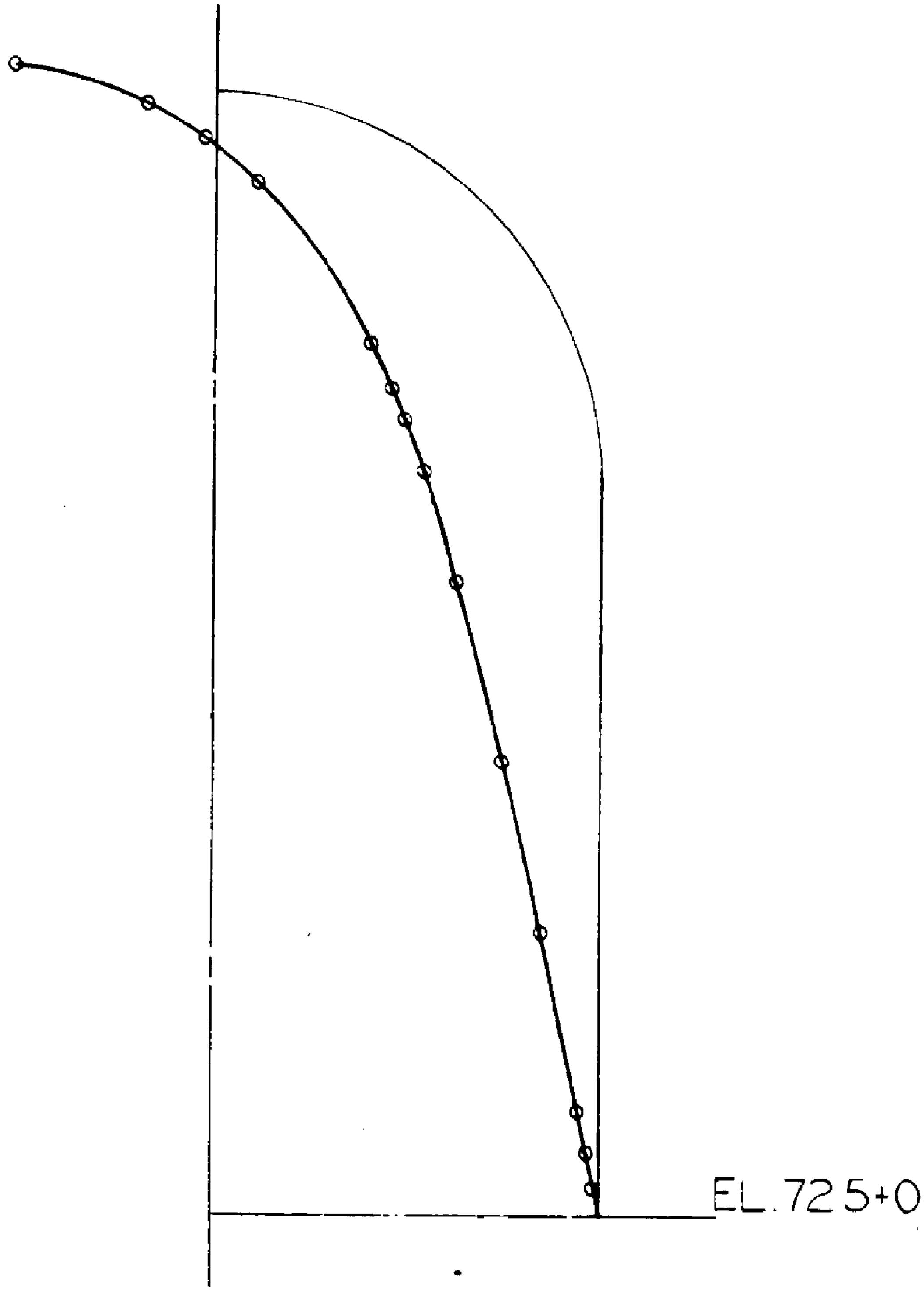


Figure 3-90. Containment Vessel, First Horizontal Mode, f = 9.3234 cps (Finite Elements)

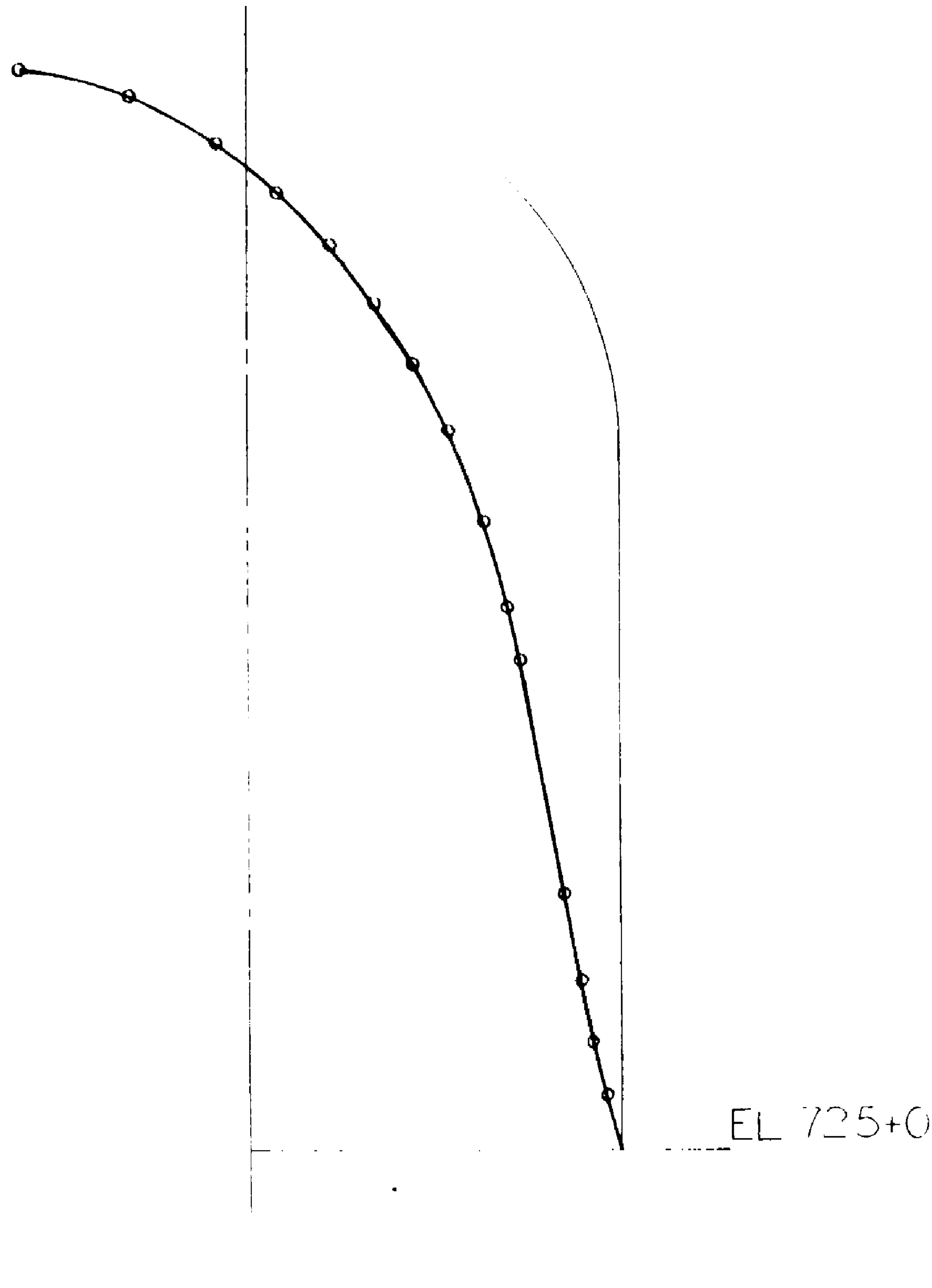


Figure 3-91. Containment Vessel, Second Horizontal Mode, f = 25.69 cps (Kalnin's)

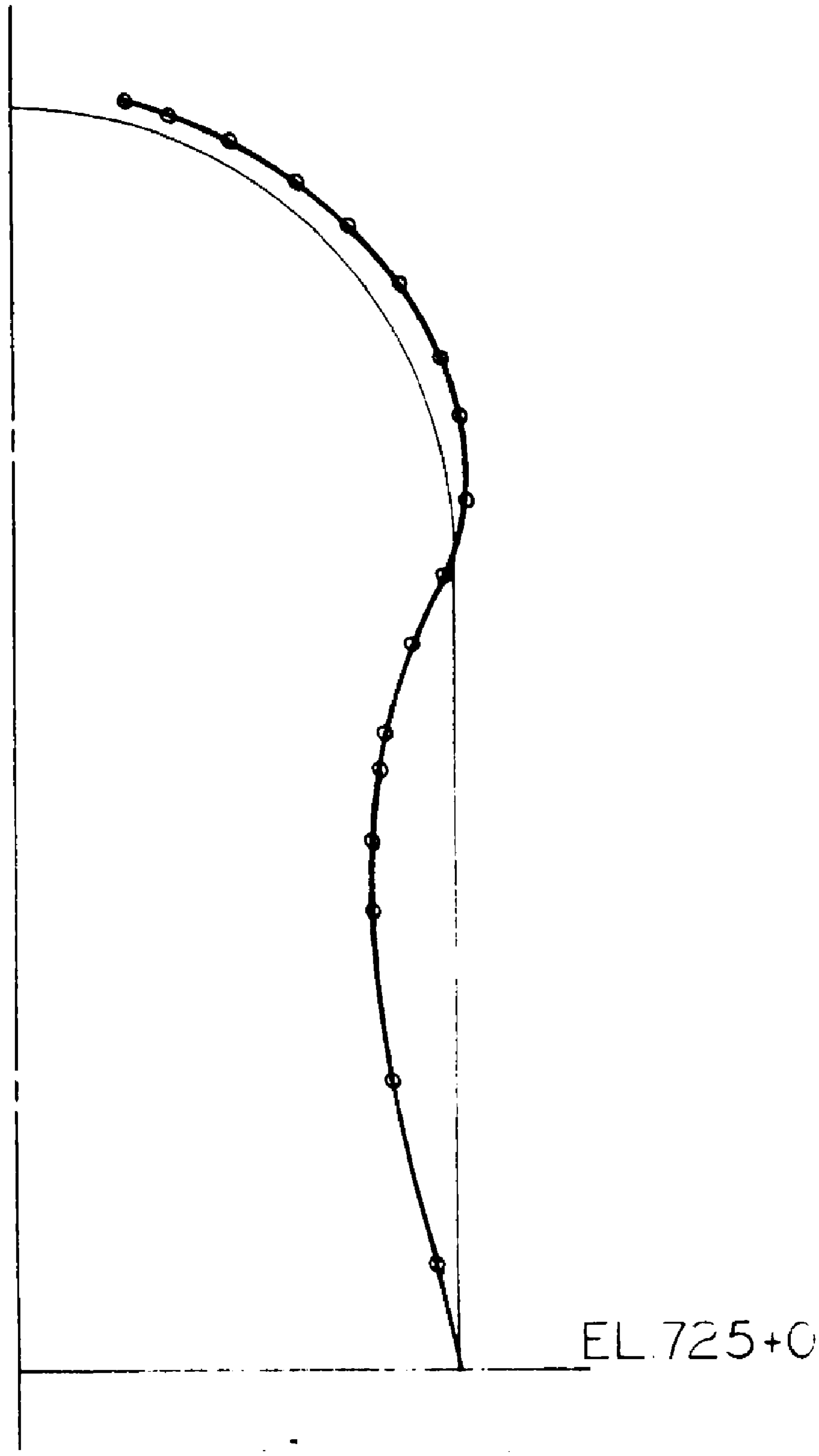


Figure 3-92. Containment Vessel, Second Horizontal Mode, f = 25.660 cps (Finite Elements)

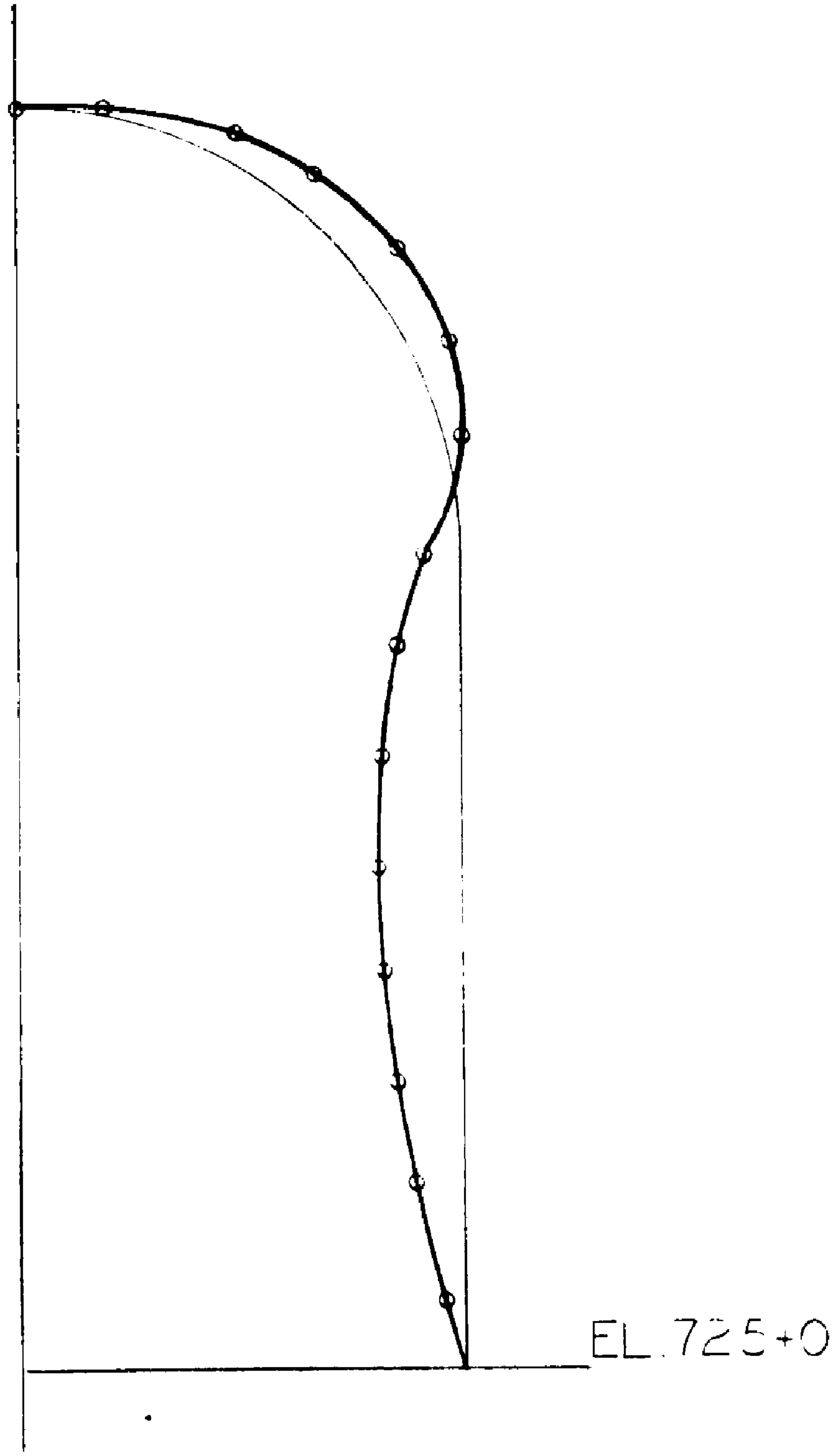


Figure 3-93. Containment Vessel, First Vertical Mode

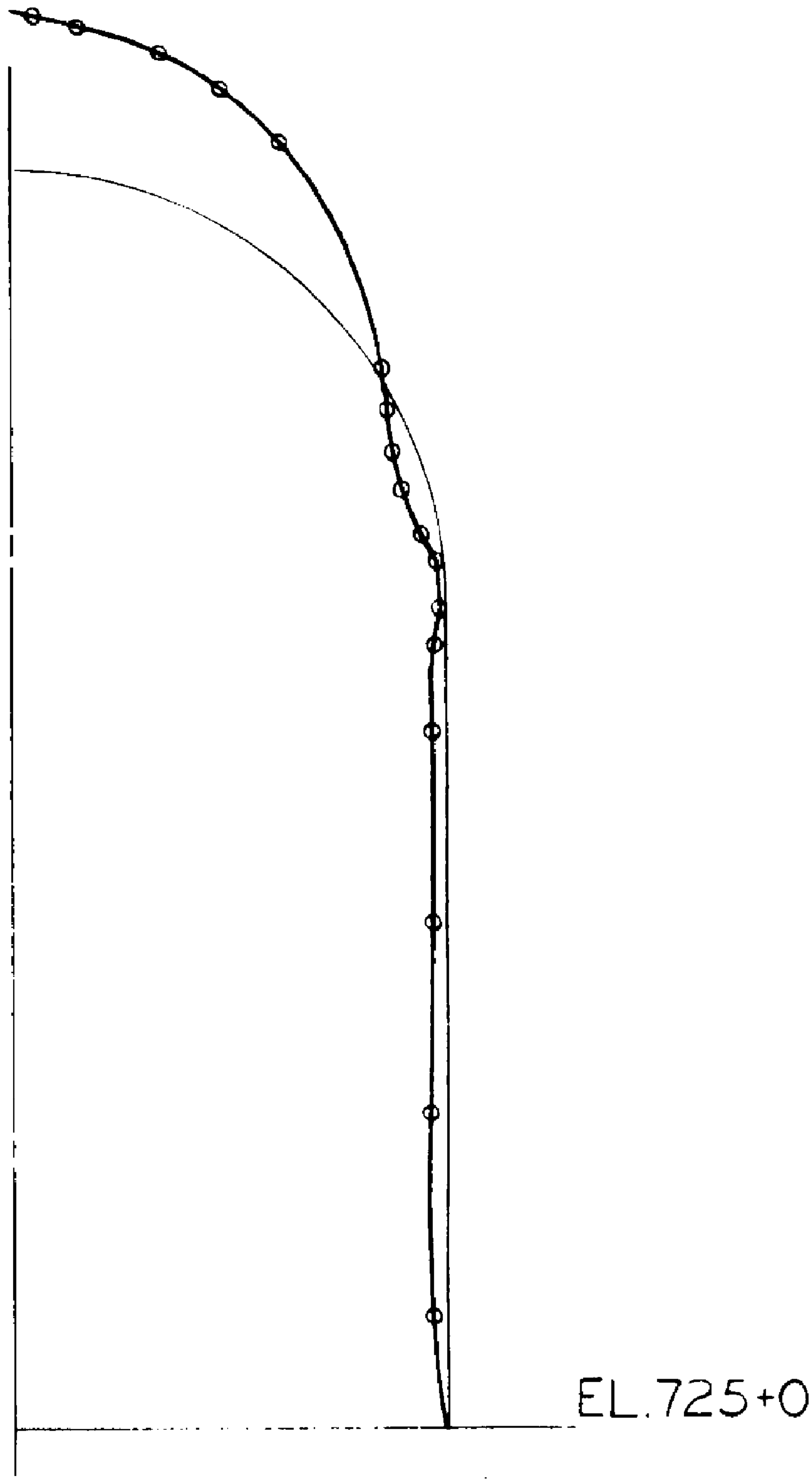


Figure 3-94. Containment Vessel, First Vertical Mode

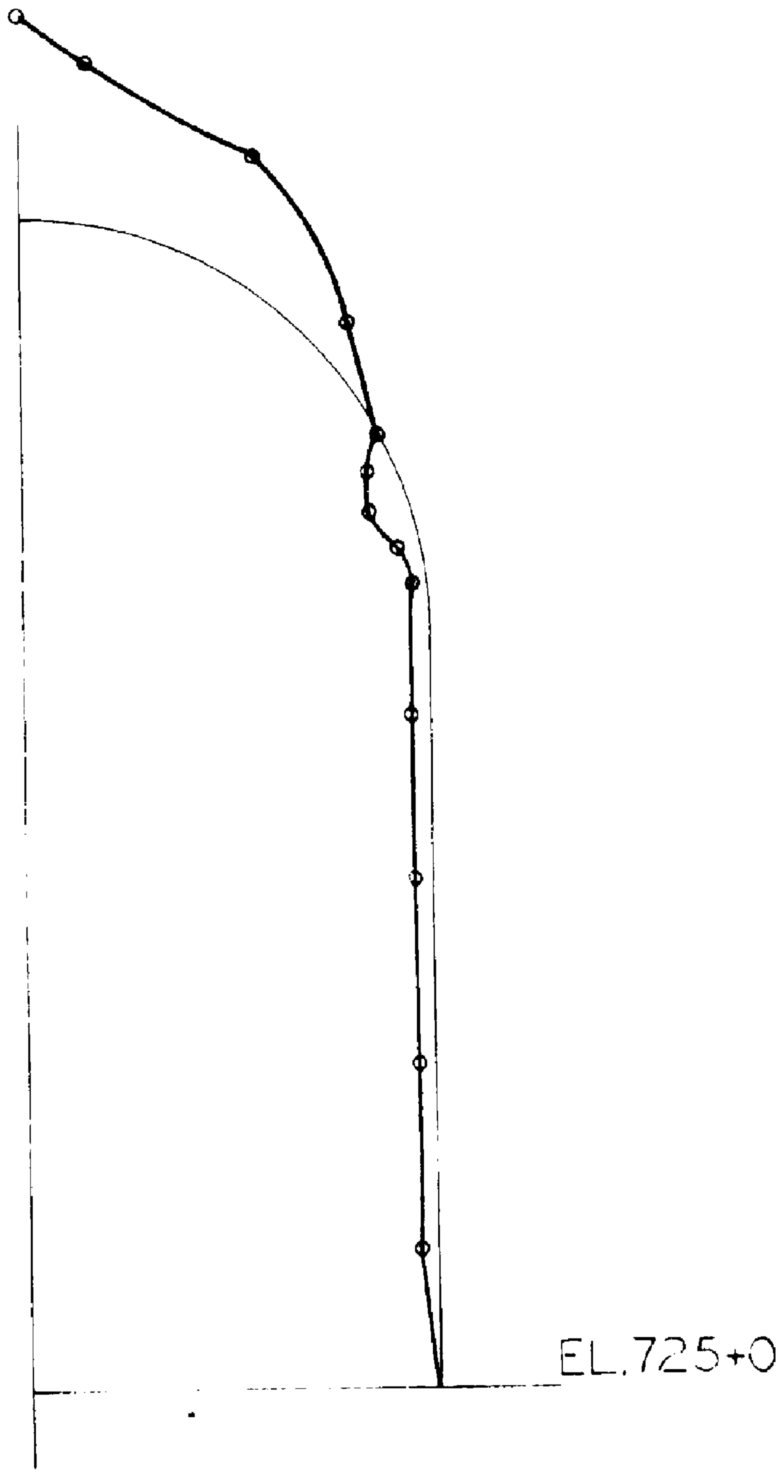


Figure 3-95. Portion of the Operating Deck

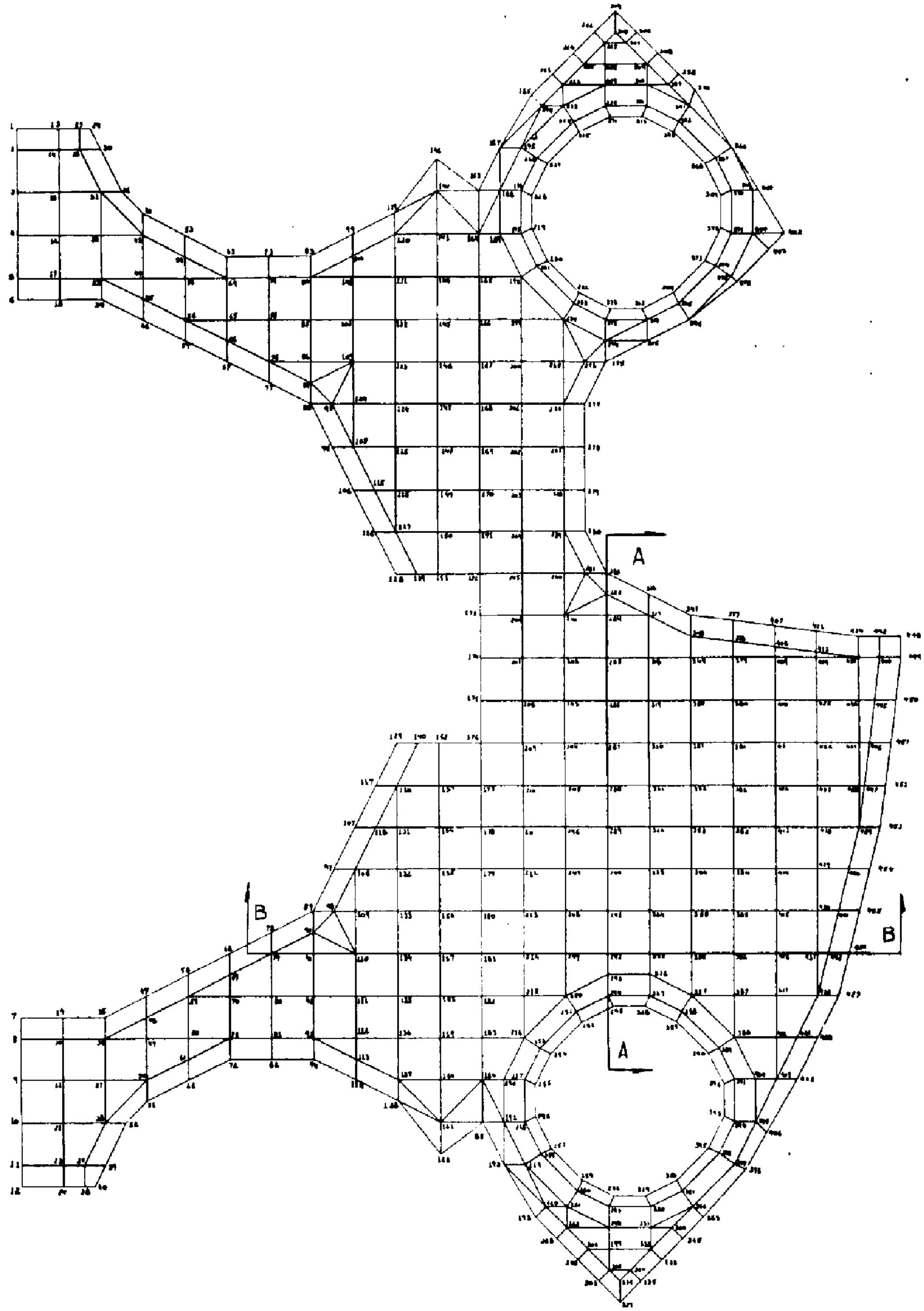


Figure 3-96. Operating Deck Strudl Finite Elements Representation

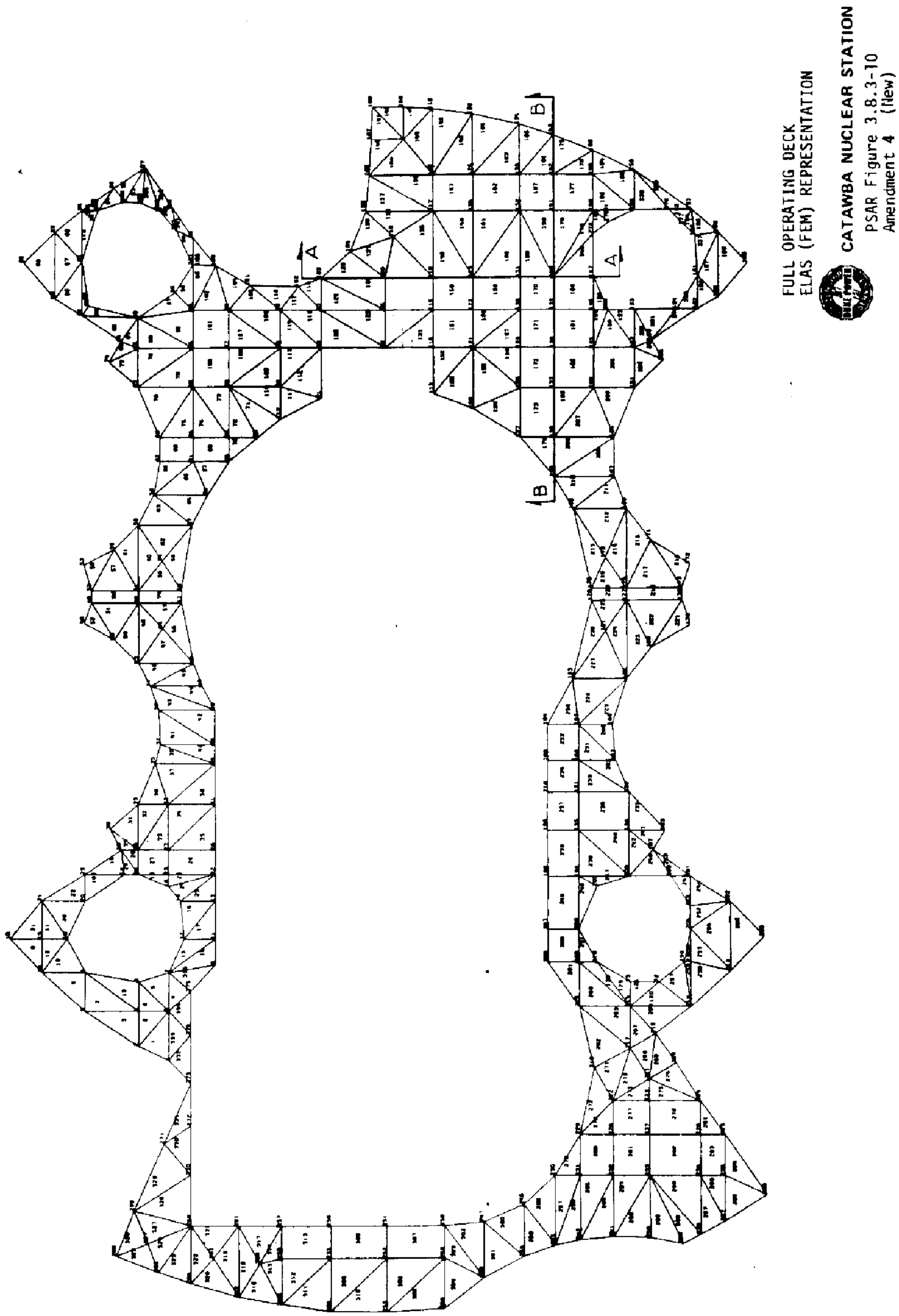
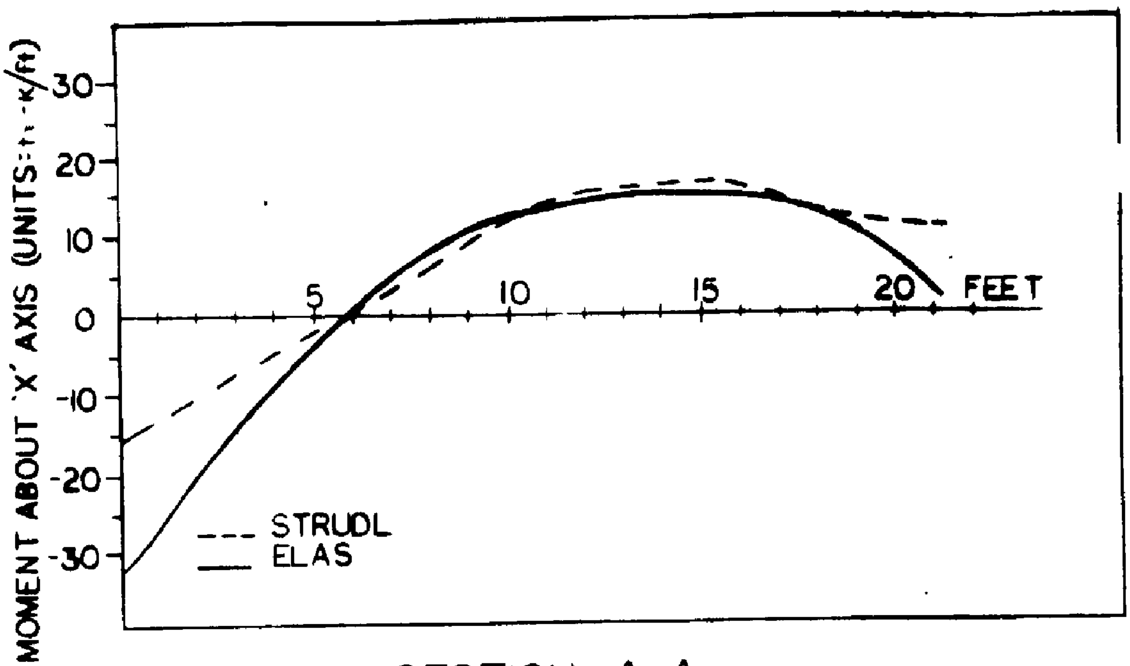
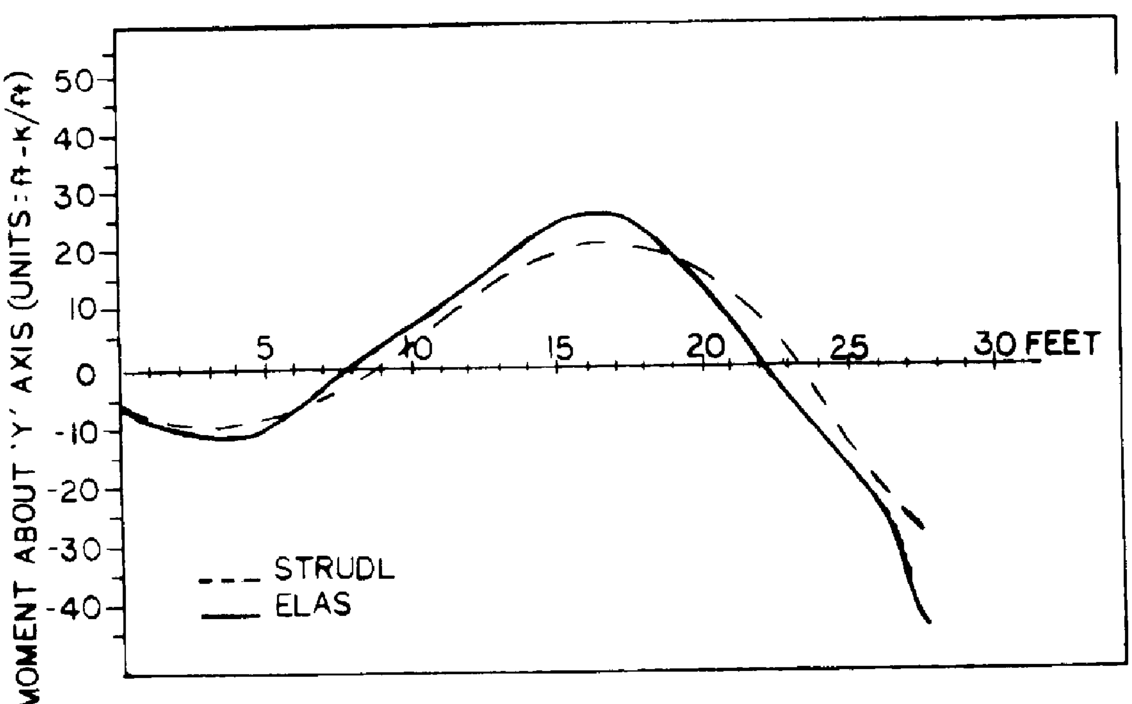


Figure 3-97. Comparison of Program Results Fixed Boundary Conditions



SECTION A-A



SECTION B-B

Figure 3-98. Comparison of Program Results Pinned Boundry Conditions

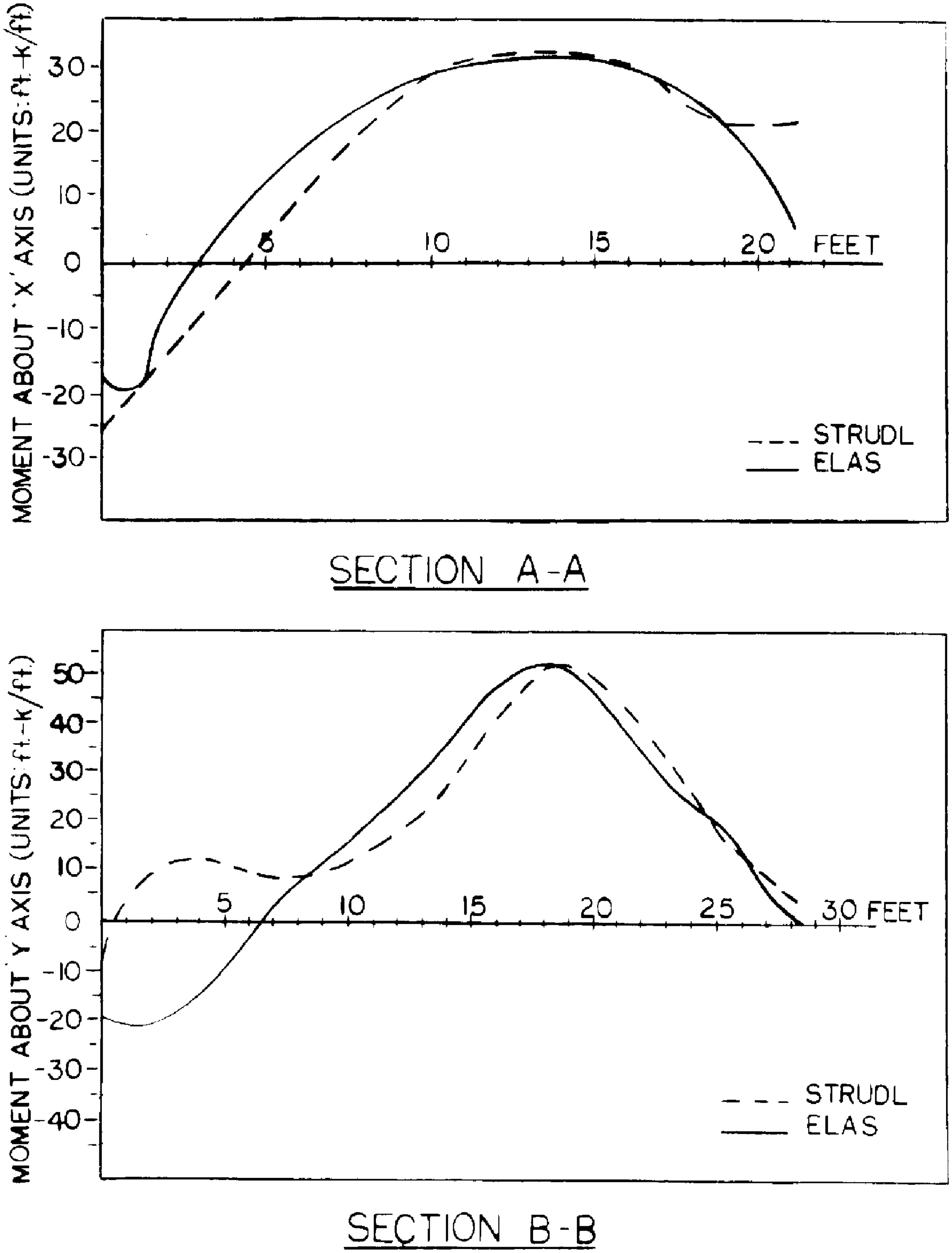


Figure 3-99. Pressure Seals and Gaskets

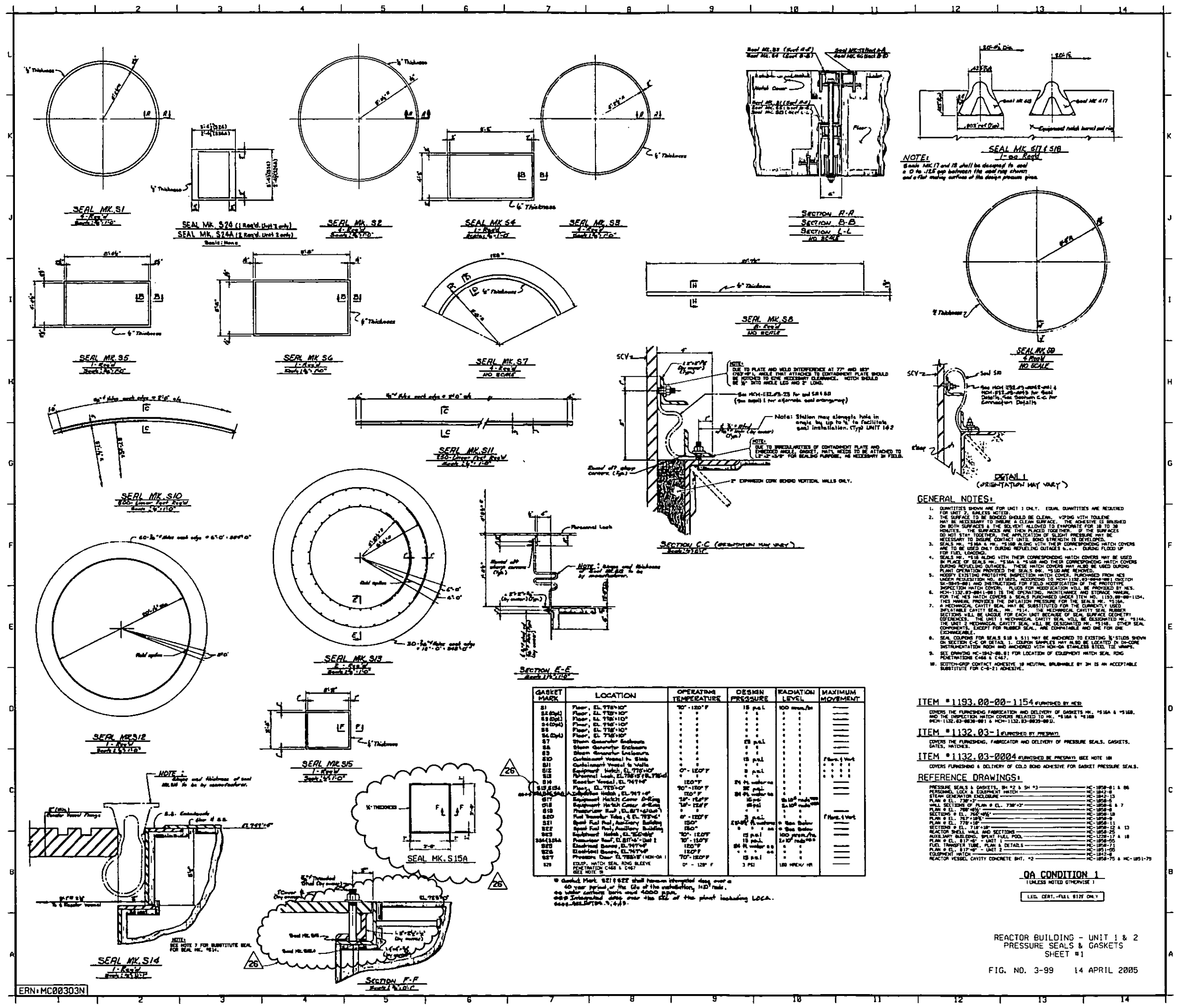


Figure 3-100. Pressure Seals and Gaskets

This figure is currently unavailable in an electronic format. It can be located in a hardcopy version of the UFSAR.

Figure 3-101. Pressure Seals and Gaskets

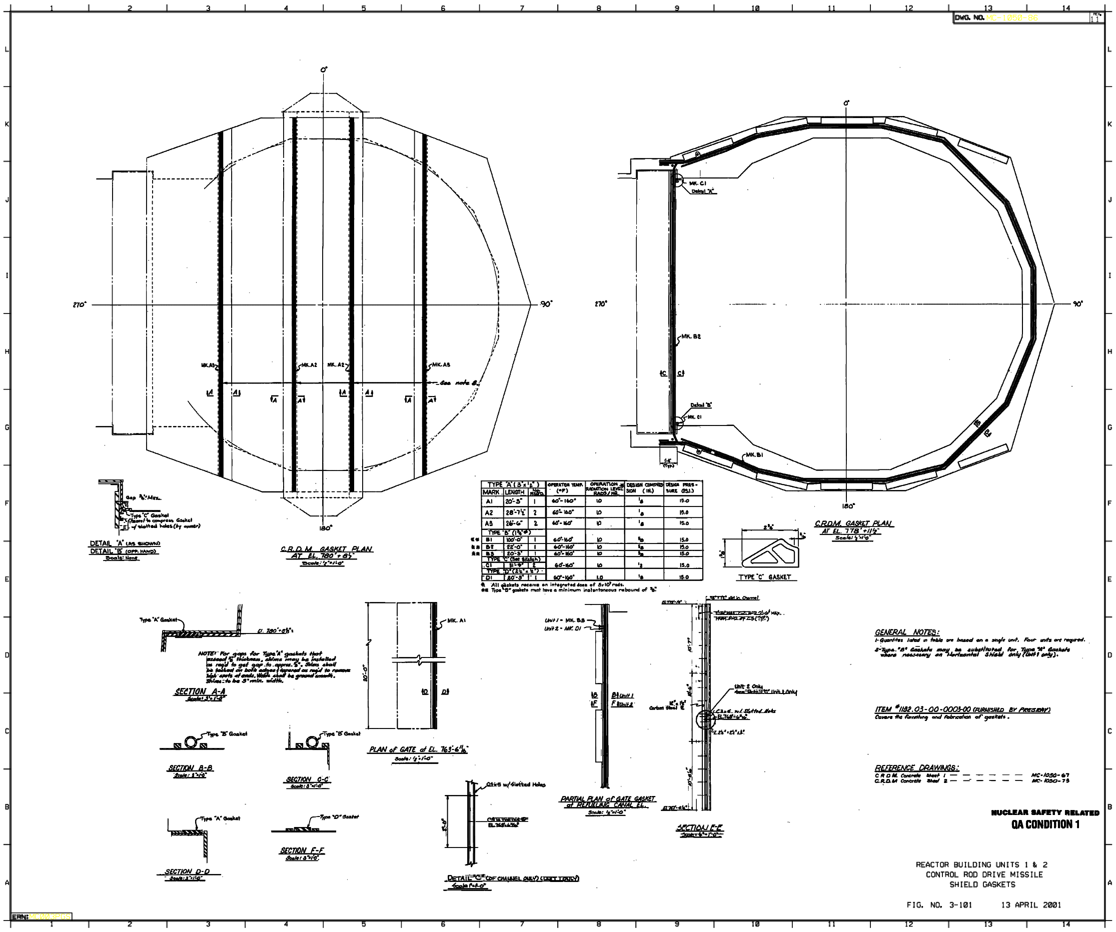


Figure 3-102. Diesel Generator Area, General Arrangement Floor Plan, El. 736 +6, Roof Plan, El. 764 + 7

Figure 3-103. Diesel Generator Area, General Arrangement Cross Section

Figure 3-104. Auxiliary Building, Fuel Building, General Arrangement Plan at El. 760+6

Figure 3-105. Auxiliary Building, Fuel Building, General Arrangement Plan at El. 778+10

Figure 3-106. Auxiliary Building, Fuel Building, General Arrangement, Longitudinal Section Thru Fuel Pool

Figure 3-107. Auxiliary Building, Fuel Building, General Arrangement, Transverse Section at Cask Area

Figure 3-108. Auxiliary Building, Floor El. 733 + 0, General Arrangement, Battery Room Plan

Figure 3-109. Auxiliary Building, El. 750 + 0, General Arrangement, Cable Room Plan

Figure 3-110. Auxiliary Building, El. 767 + 0, General Arrangement, Control Room Plan

Figure 3-112. Reinforcement Arrangement Between the Auxiliary Building Foundation and a Typical Vertical Wall

Figure 3-113. Vibration Checkout Functional Test Inspection Points

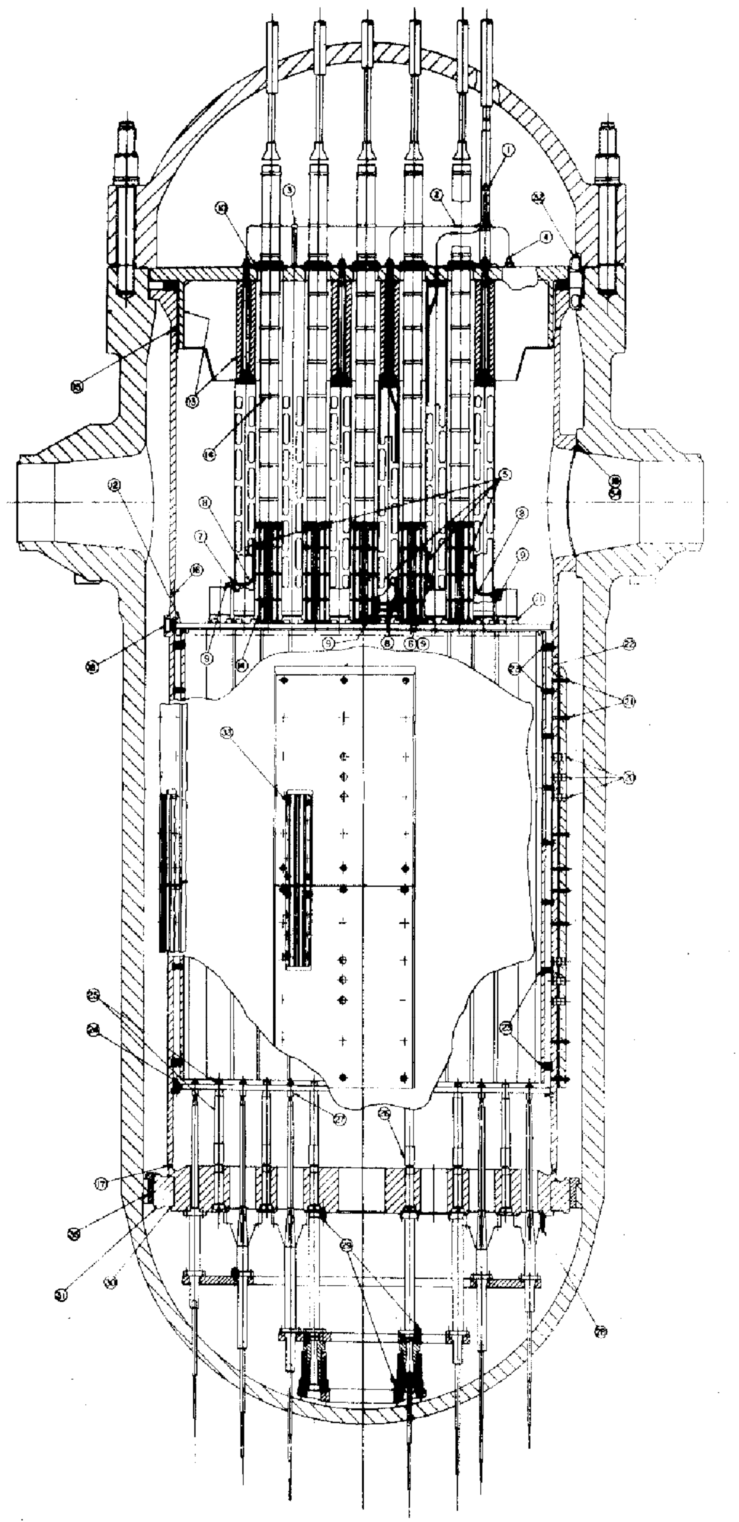


Figure 3-114. Vibration Checkout Functional Test Inspection Points

FEATURES TO BE EXAMINED

1 THERMOCOUPLE CONDUIT CLAMPS INSIDE THE THERMOCOUPLE COLUMN.

2 CIRCUIT SWAGELOK FITTINGS, THEIR BANDINGS, AND THE TAB TYPE LOCKS.

3 CLAMP ARRANGEMENTS AT THE MOUNTING BRACKET LOCATIONS.

4 PLUG TO CONDUIT WELD AT THE FOUR SUPPORT COLUMNS ADJACENT TO THE THERMOCOUPLE COLUMNS.

5 ACCESSIBLE ANGLE CONDUIT CLAMPS INSIDE THE UPPER SUPPORT COLUMNS.

6 ACCESSIBLE WELD JOINTS AT THE THERMOCOUPLE STOP FOR THE SELF INSTRUMENTED COLUMNS.

7 WELD JOINTS ON ACCESSIBLE SUPPORT COLUMN AND MIXING DEVICE GUSSETS (THERMOCOUPLE SUPPORT HARDWARE).

8 RIGIDITY OF EXPOSED PORTION OF THERMOCOUPLE CONDUIT RUNS, AT ACCESSIBLE LOCATIONS.

9 RIGIDNESS OF THE ACCESSIBLE PROTRUDING THERMOCOUPLE TIPS.

10 THERMOCOUPLE COLUMN AND GUIDE TUBE SCREW LOCKING DEVICES.

11 ACCESSIBLE SUPPORT COLUMN, MIXING DEVICE, ORIFICE PLATE, AND CORE PLATE INSERT SCREW LOCKING DEVICES.

12 UPPER CORE PLATE INSERTS.

13 DEEP BEAM WELDS AT THE SKIRT AND AT THE OUTER HOLLOW ROUNDS.

14 ACCESSIBLE GUIDE TUBE WELDS.

15 UPPER BARREL TO FLANGE GIRTH WELD.

16 UPPER BARREL TO LOWER BARREL GIRTH WELD.

17 LOWER BARREL TO CORE SUPPORT GIRTH WELD.

18 UPPER CORE PLATE ALIGNING PIN WELDS AND BEARING SURFACES.

19 OUTLET NOZZLE INTERFACE SURFACE CONDITION.

20 NEUTRON SHIELD PANEL DOWEL PIN COVER PLATE WELDS

21 NEUTRON SHIELD PANEL SCREW LOCKING DEVICES.

22 INTERFACE SURFACES AT THE SPACER PADS ALONG THE TOP AND BOTTOM ENDS OF THE NEUTRON PANELS.

23 BAFFLE ASSEMBLY SCREW LOCKING ARRANGEMENTS AT THE TWO TOP AND THE TWO BOTTOM FORMER ELEVATIONS.

24 LOWER CORE PLATE TO CORE BARREL FLANGE SCREW LOCKING DEVICES ACCESSIBLE AT THE 0°, 90°, 180°, AND 270° AXES.

25 CORE SUPPORT COLUMNS AND THEIR SCREW LOCKING DEVICES.

26 CORE SUPPORT COLUMN ADJUSTING SLEEVES.

27 ACCESSIBLE (2) INSTRUMENTATION GUIDE COLUMN LOCKING COLLARS NEAREST THE MANWAY.

28 LOCKING DEVICES AND CONTACT OF THE CRUCIFORM SHAPED BOTTOM INSTRUMENTATION GUIDE COLUMNS WHERE ATTACHED TO THE CORE SUPPORT AND TIE PLATES.

29 LOCKING DEVICES OF THE SECONDARY CORE SUPPORT BUTT COLUMNS AT THE CORE SUPPORT, TIE PLATE AND BASE PLATE.

30 RADIAL SUPPORT KEY WELDS.

31 RADIAL SUPPORT KEY LOCKING ARRANGEMENTS AND BEARING SURFACES.

32 HEAD AND VESSEL ALIGNING PIN SCREW LOCKING DEVICES AND BEARING SURFACES.

33 IRRADIATION SPECIMEN GUIDE SCREW LOCKING DEVICES AND DOWEL PINS

34 VESSEL NOZZLE INTERFACE SURFACE CONDITION.

35 VESSEL CLEVIS LOCKING ARRANGEMENTS AND BEARING SURFACES.

Figure 3-115. Time-History Dynamic Solution for LOCA Loading

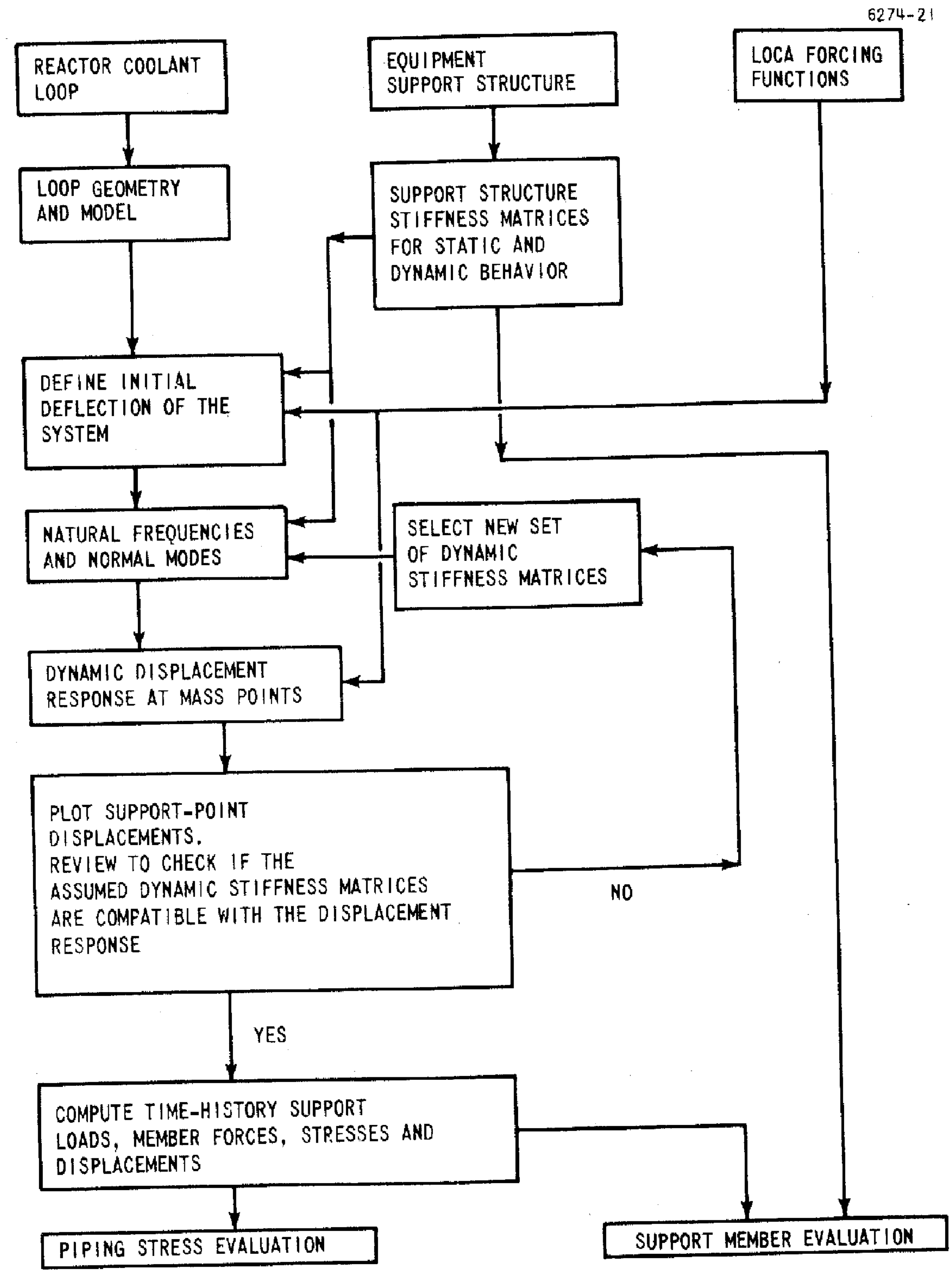
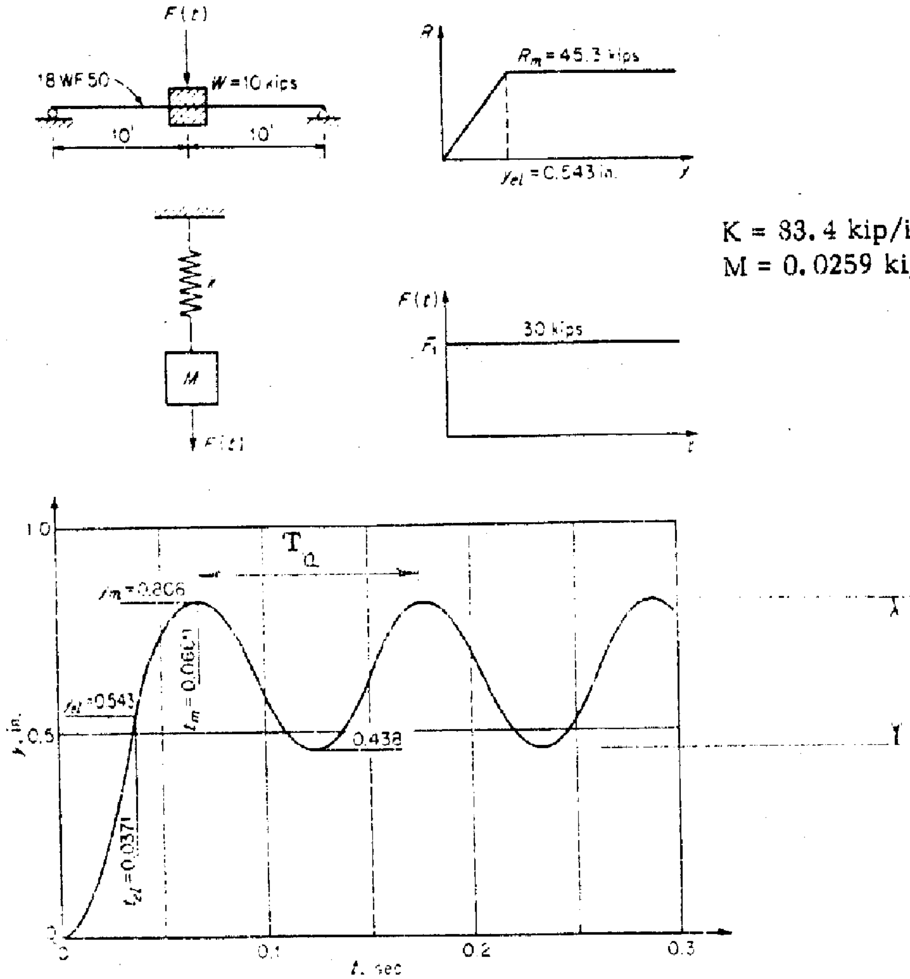


Figure 3-116. Theoretical Solution [Historical information, not required to be revised.]



K = 83.4 kip/in.
M = 0.0259 kip-sec^2/in.

$y_{max} - y_{min}$

Significant response parameters, calculated in accordance with Biggs' solution with intermediate steps to 5 significant figures:

y_m = 0.8041"

t_m = 0.0665 sec.

Tn = 0.1107 sec.

$y_{max} - y_{min}$ = 0.3669 sec.

Reference: John M. Biggs, Introduction to Structural Dynamics, McGraw-Hill, Figure 2.22, 1964

Figure 3-117. PWhip Verification Example Inelastic Pipe Element [Historical information, not required to be revised.]

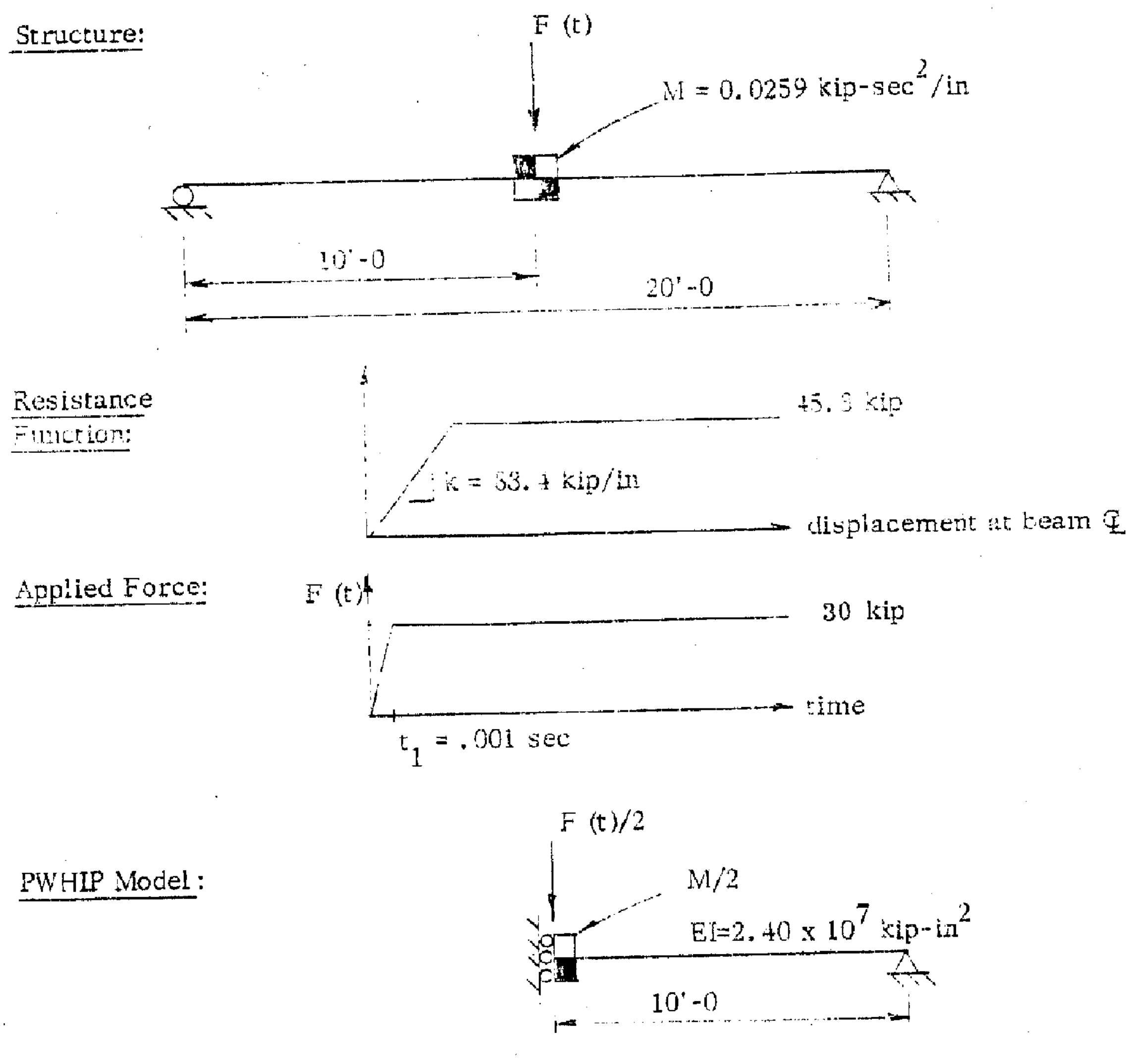


Figure 3-118. PWhip Verification Example Inelastic Yield (U-Bar) Element Plastic Behavior
[Historical information, not required to be revised.]

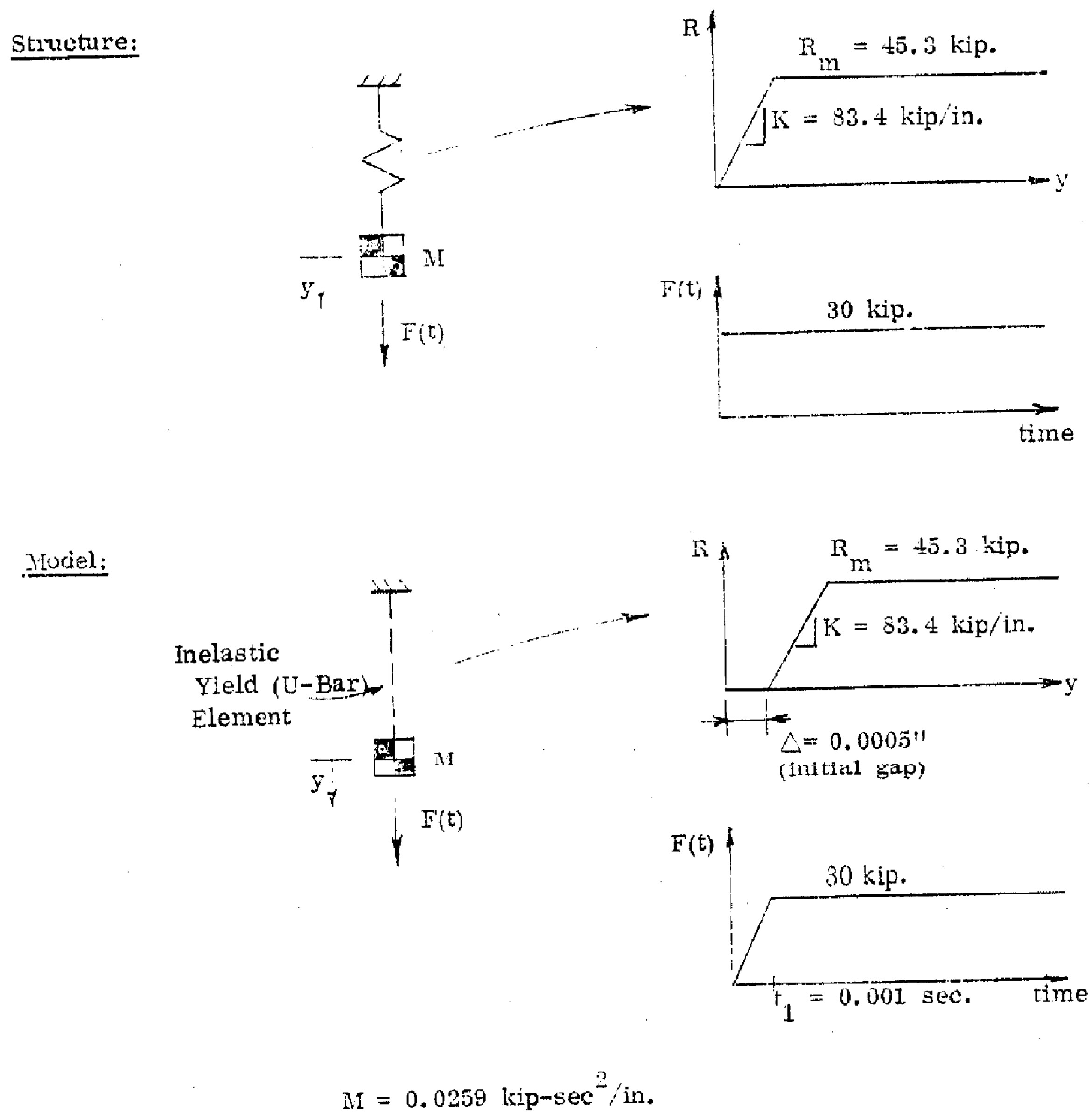
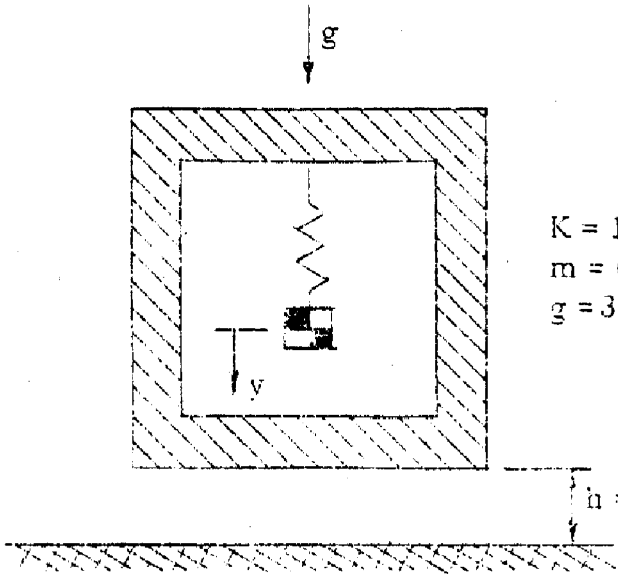


Figure 3-119. Theoretical Solution [Historical information, not required to be revised.]

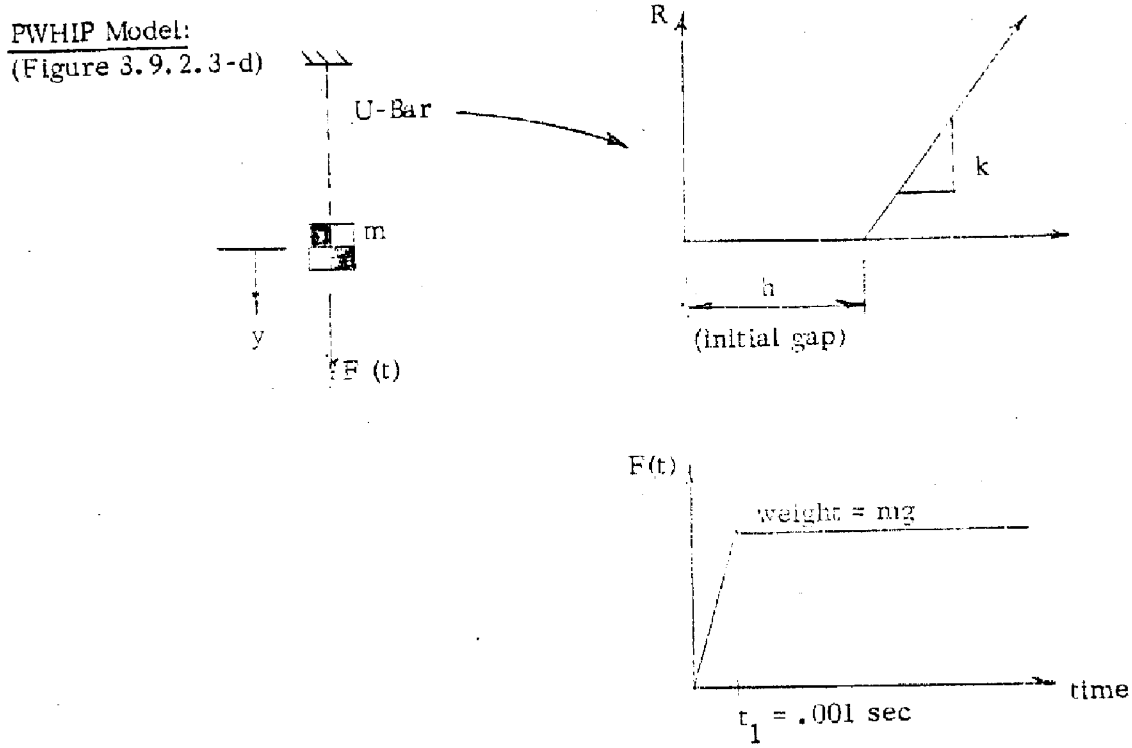


Theoretical Solution:

Time of initial impact, t_o = 0.071982 sec.
Velocity at initial impact, $\dot{y}_o$ = 27.785 in/sec.
Time to zero velocity (maximum deflection y_m), t_m = 0.10037 sec.
Maximum displacement of mass m, y_m = 1.55063 in.

Reference: William T. Thomson, Vibration Theory and Application, Prentice-Hall, Example 4.6-1, 1965.

Figure 3-120. PWhip Verification Example Inelastic Yield (U-Bar) Element Initial Gap Effect
[Historical information, not required to be revised.]



U-Bar stiffness, $k = 1973.92$ lb/in
Mass, $m = 0.5$ $lb\text{-}sec^2/in$
Gravitational acceleration, $g = 386$ in/sec^2
Initial gap, $h = 1.0''$

Figure 3-121. Test Chamber Temperature Profile for Accident Environment Simulation

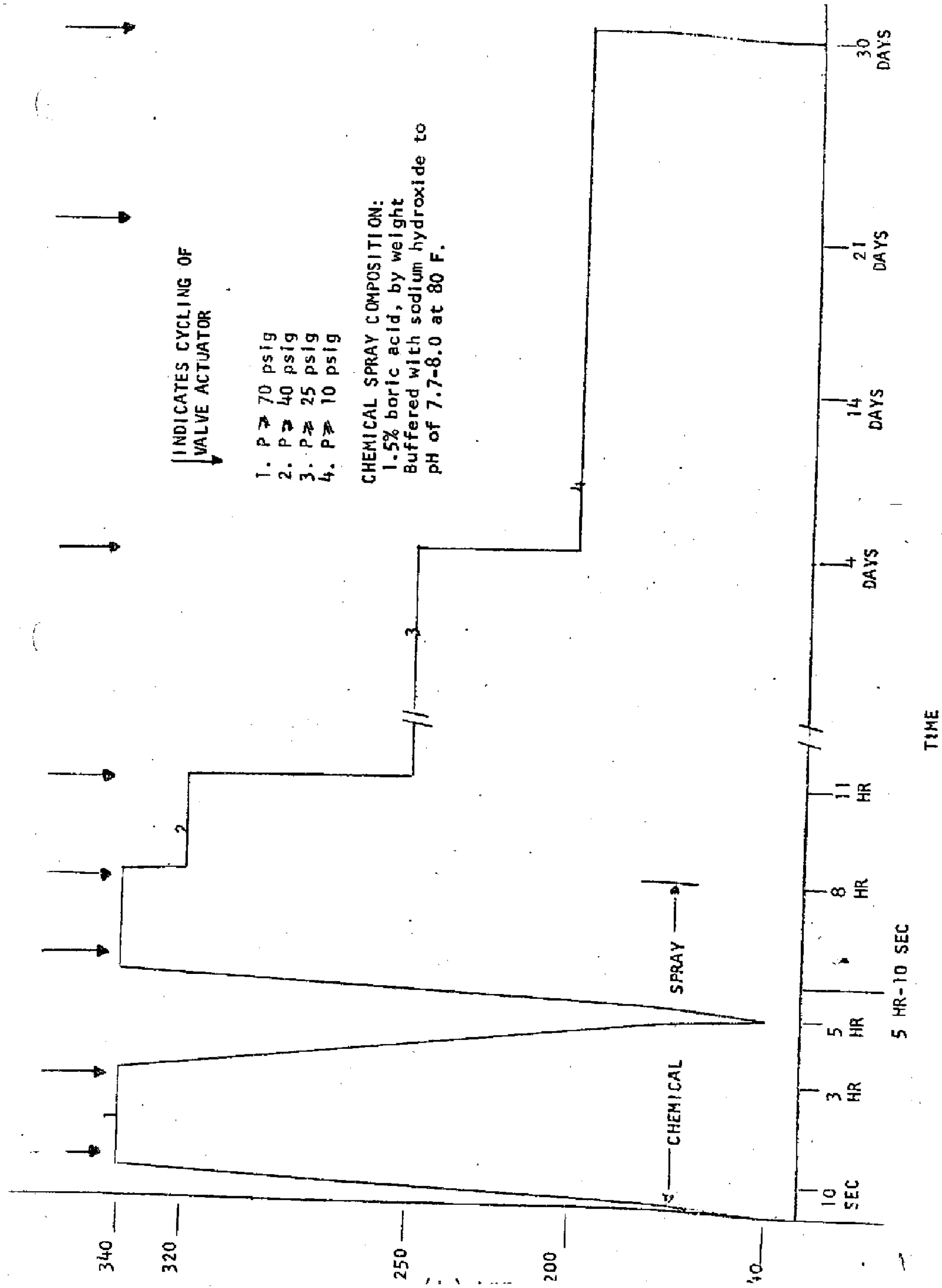


Figure 3-122. Reactor Coolant Loop Model for Steam Generator Replacement

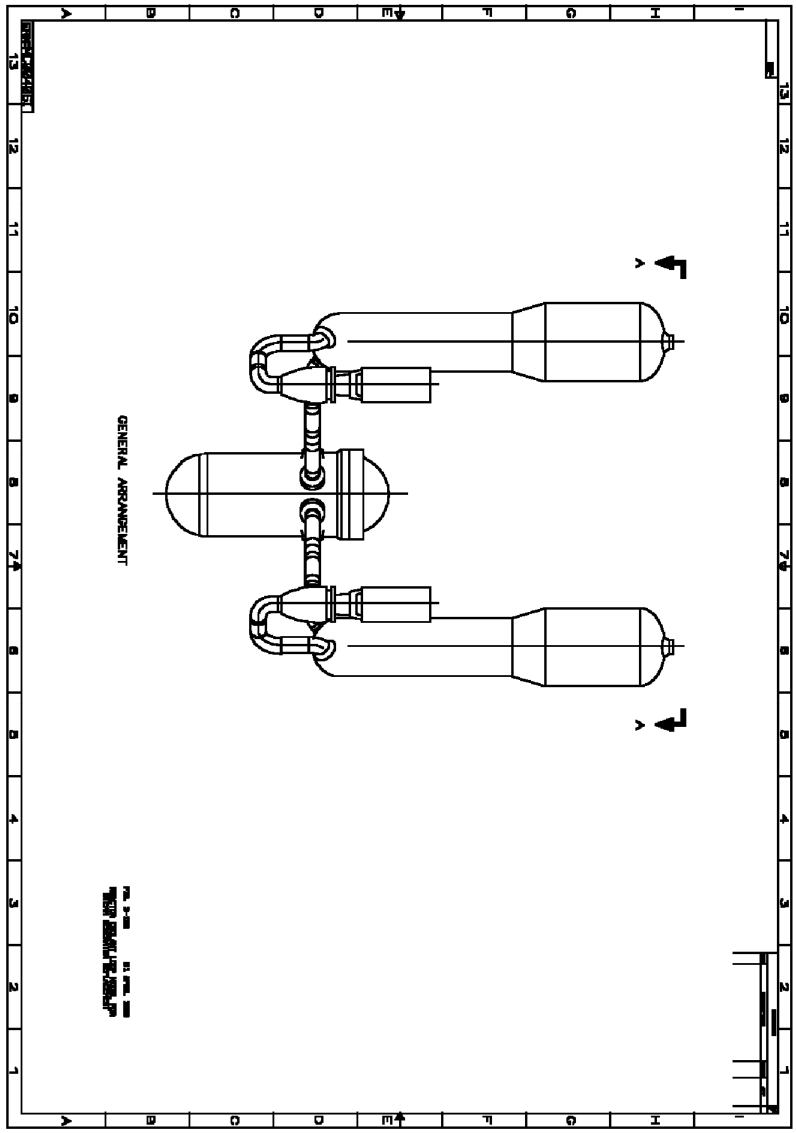


Figure 3-123. Reactor Coolant Loop Model for Steam Generator Replacement

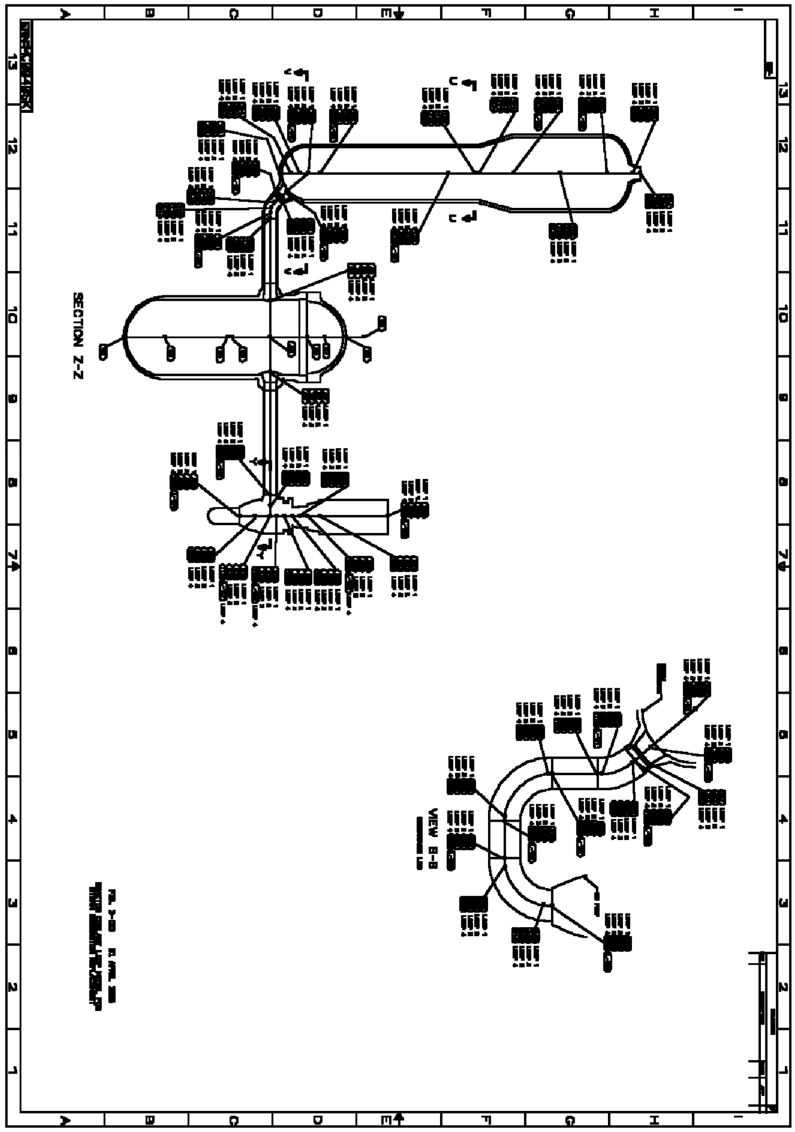


Figure 3-124. Reactor Coolant Loop Model for Steam Generator Replacement

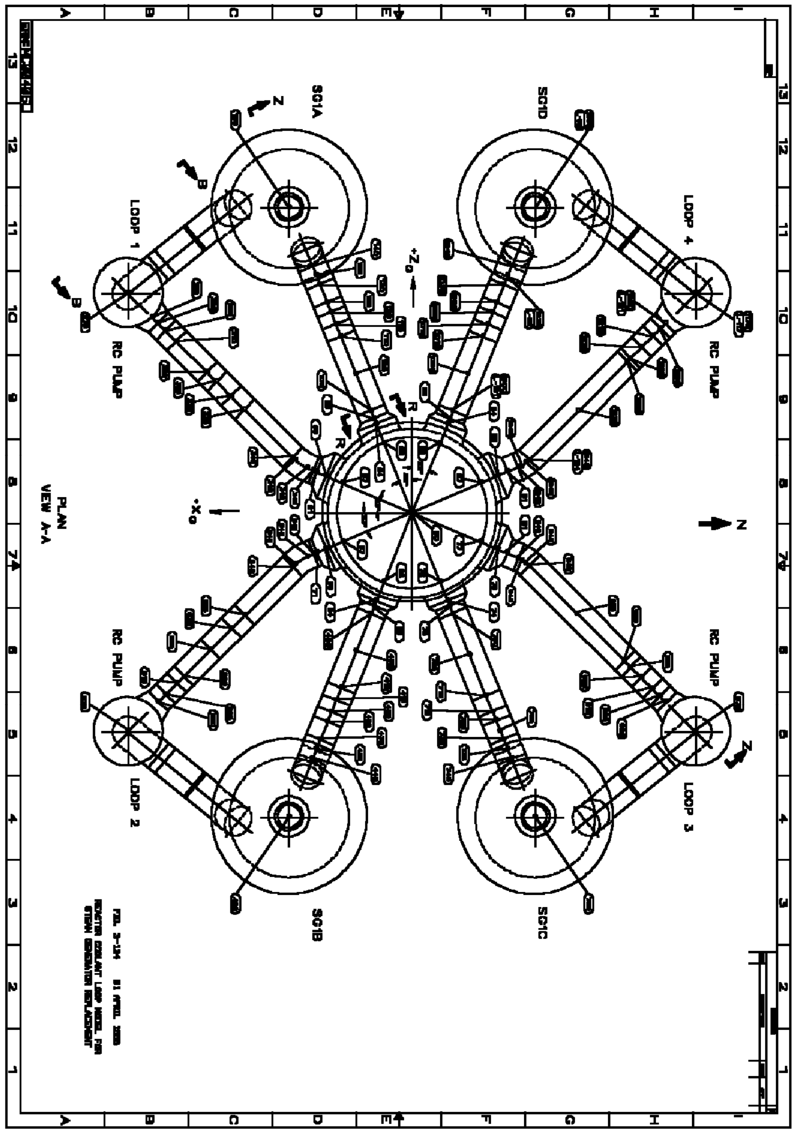


Figure 3-125. Reactor Coolant Loop Model for Steam Generator Replacement

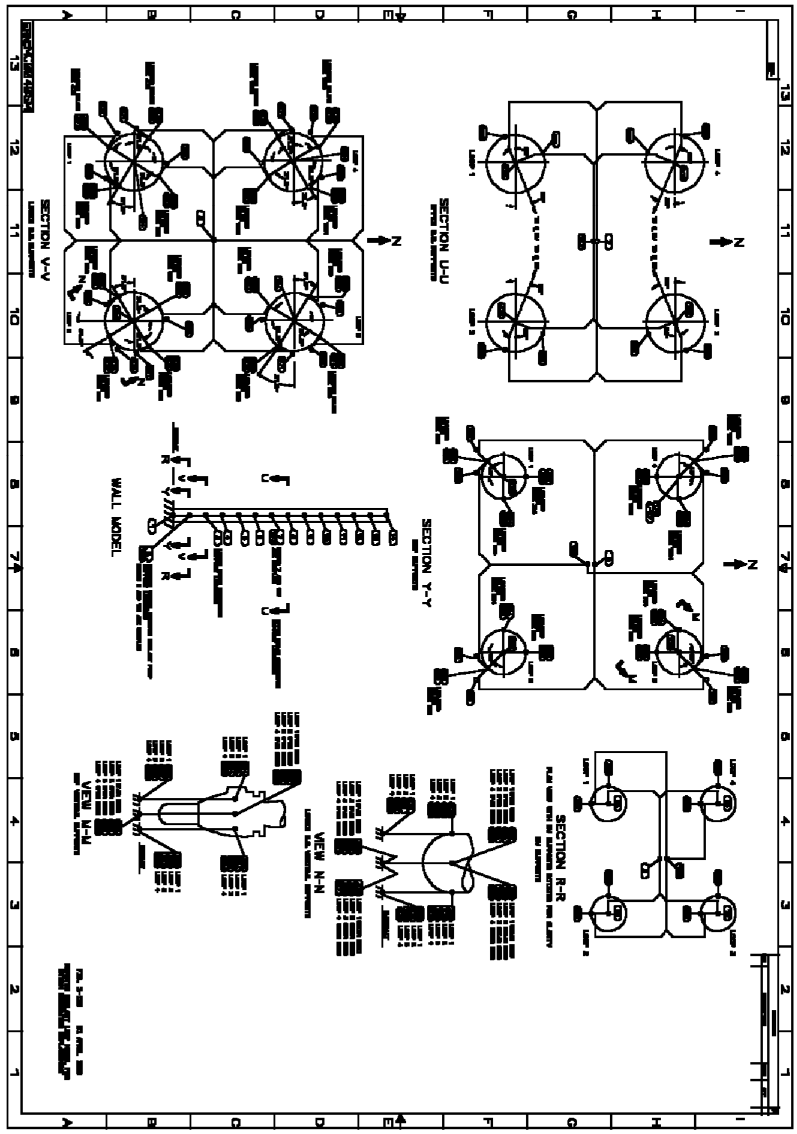


Figure 3-126. Time-History Dynamic Solution for LOCA Loading

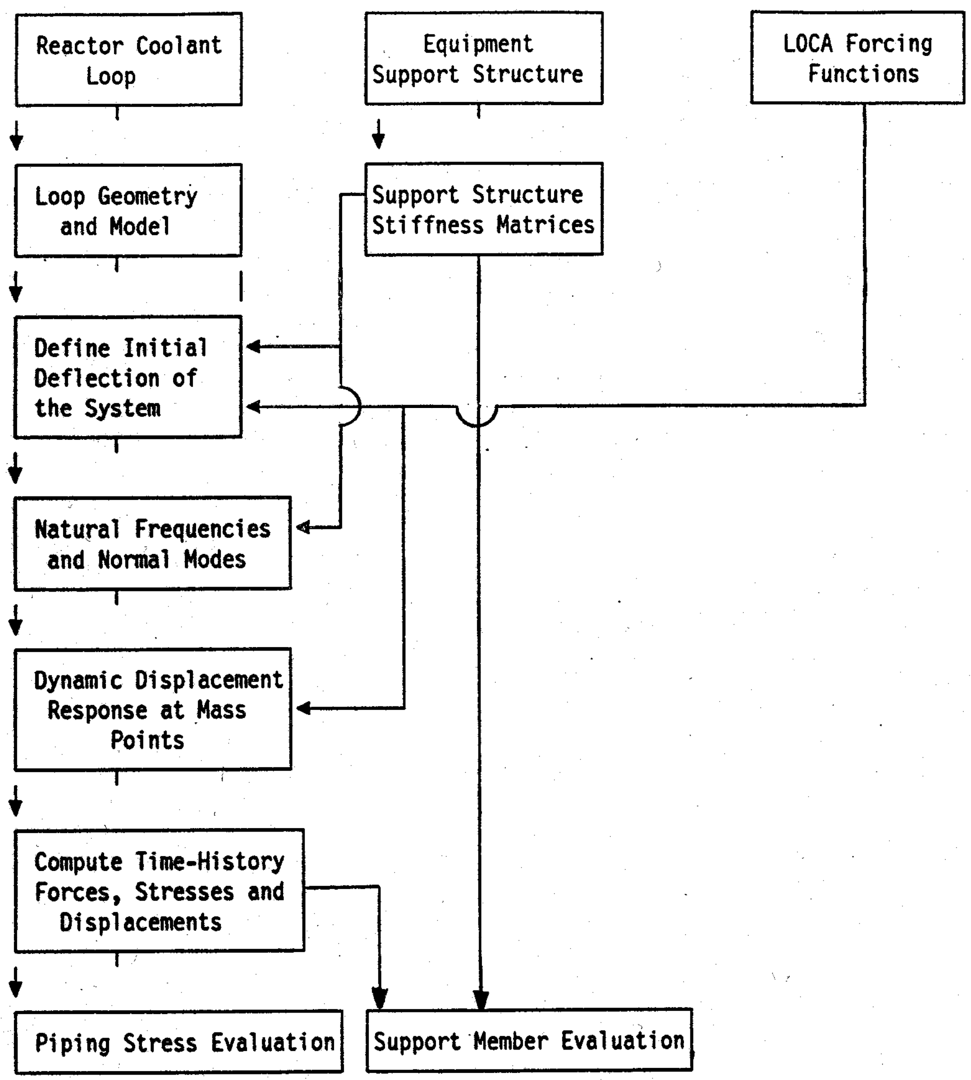


Figure 3-127. Loop Layout and Global Coordinates

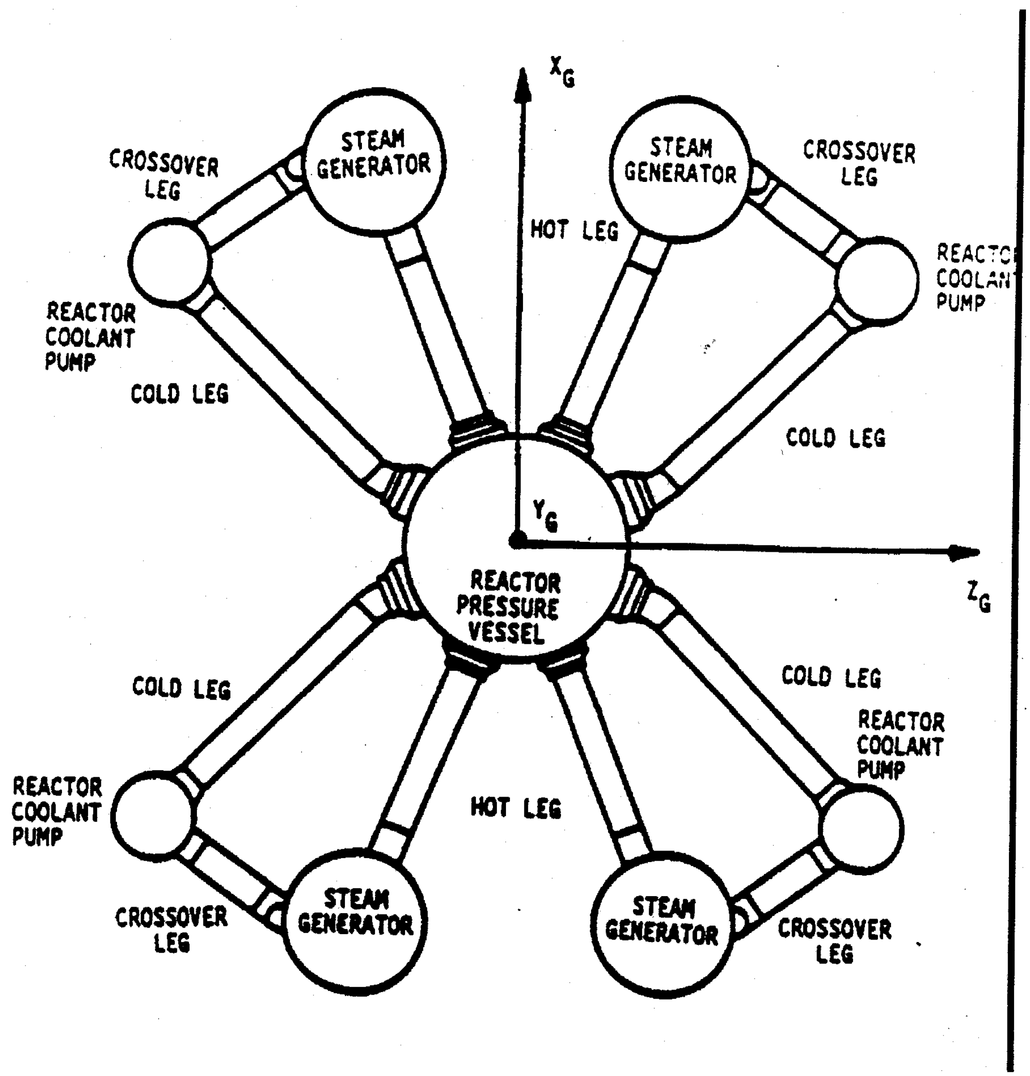


Figure 3-128. RPV Shell Submodel

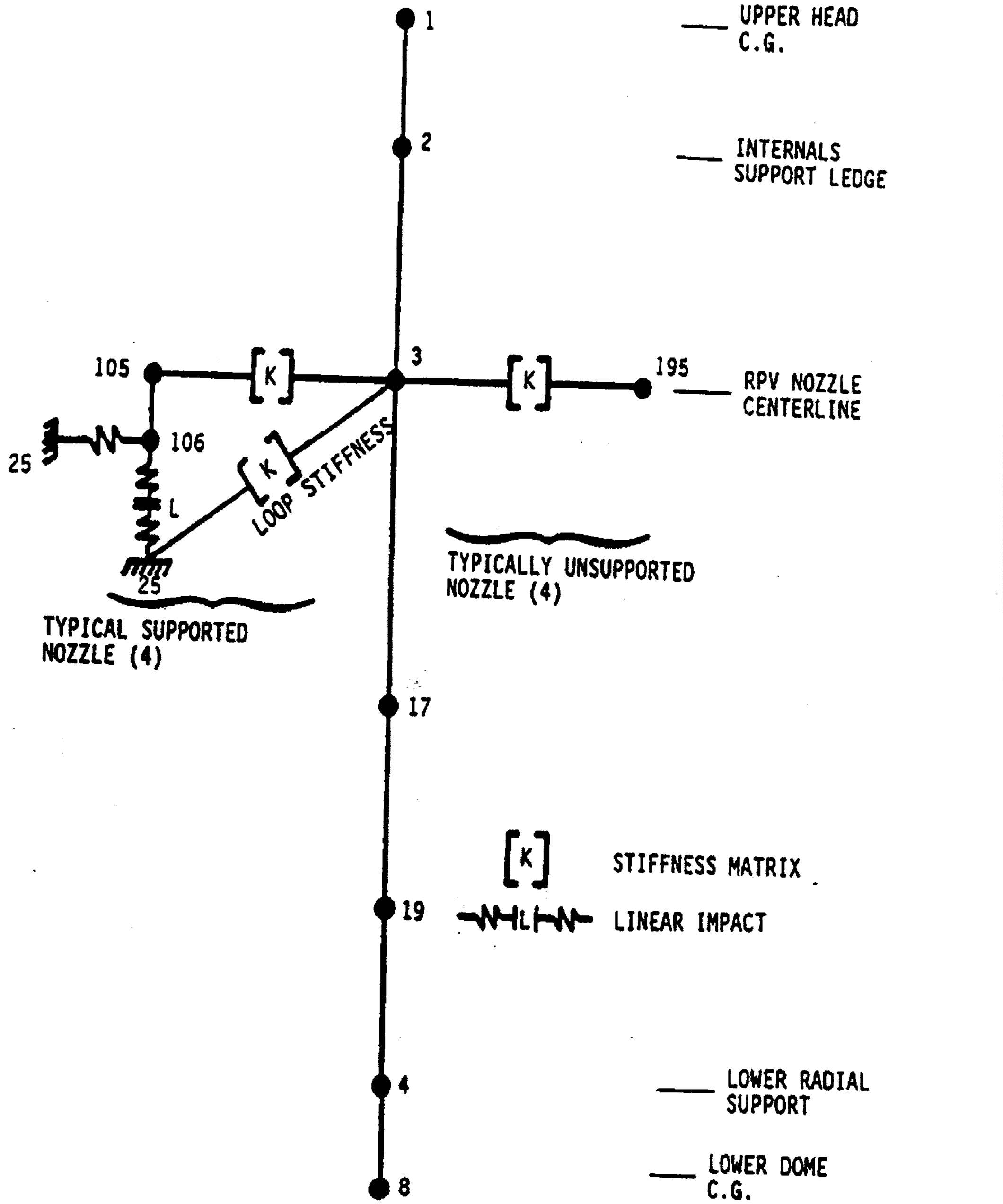


Figure 3-129. Core Barrel Submodel

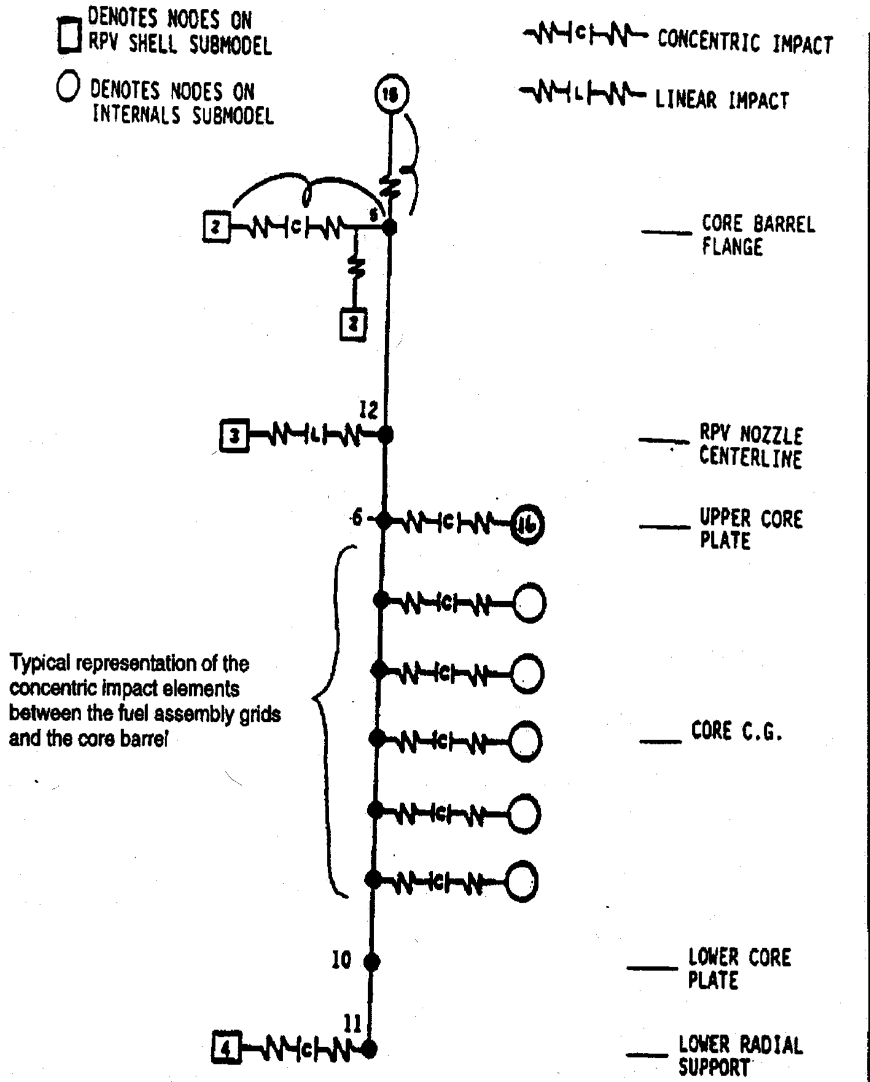


Figure 3-130. Reactor Internals Submodel

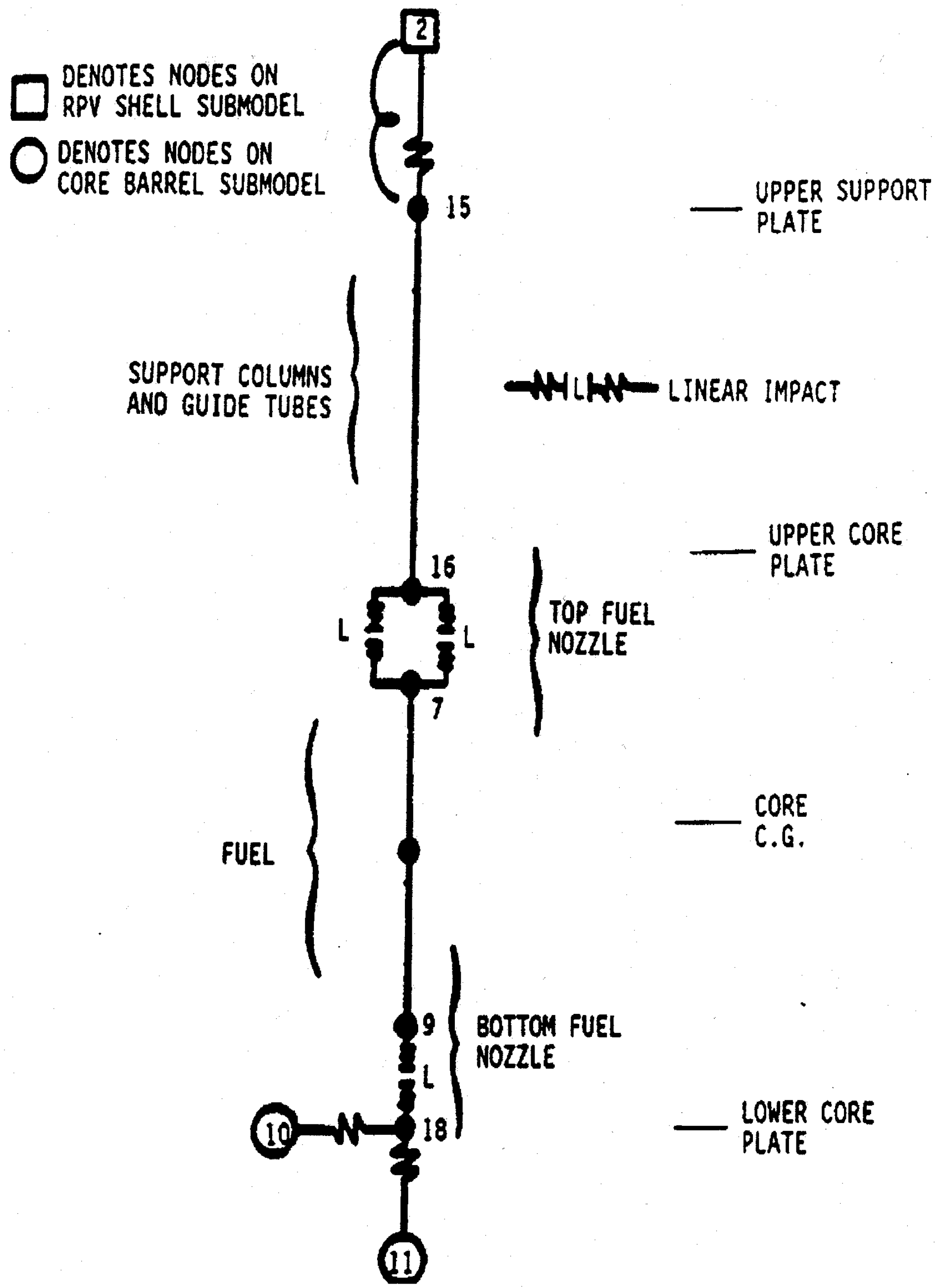


Figure 3-131. Hydrodynamic Masses in Vessel/Barel Downcomer Annulus

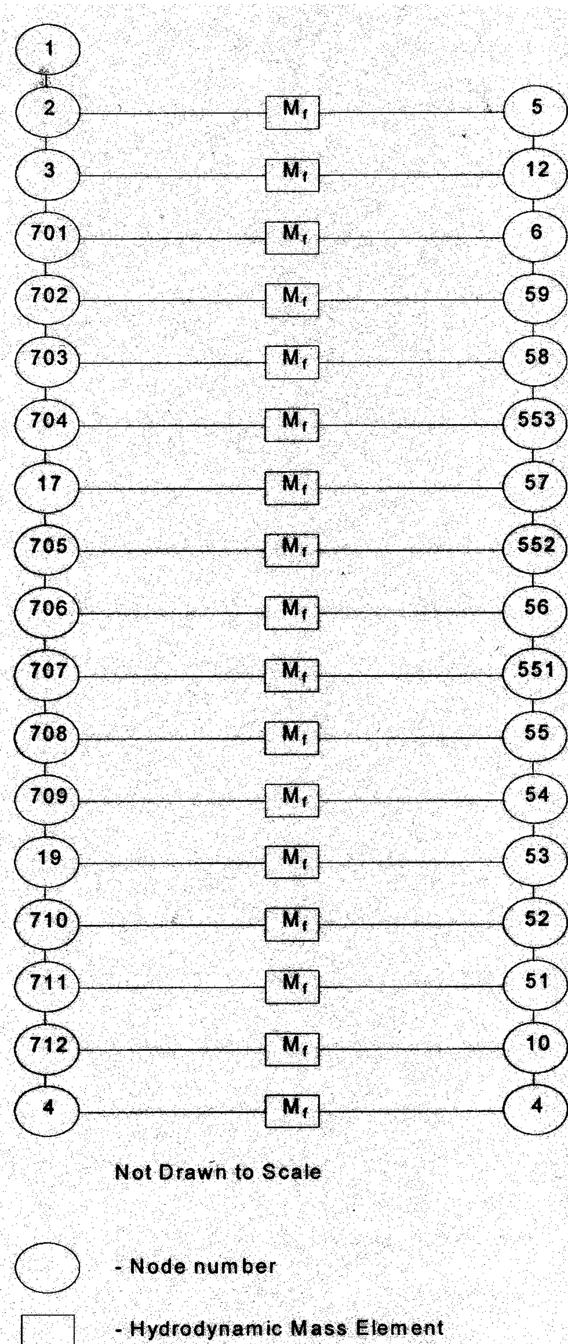


Figure 3-132. Containment Vessel Mathematical Model