

Appendix 3B. Figures

Figure 3-1. Frequency and Mode Shapes - Auxiliary Building - North South Direction (Sheet 1 of 2)

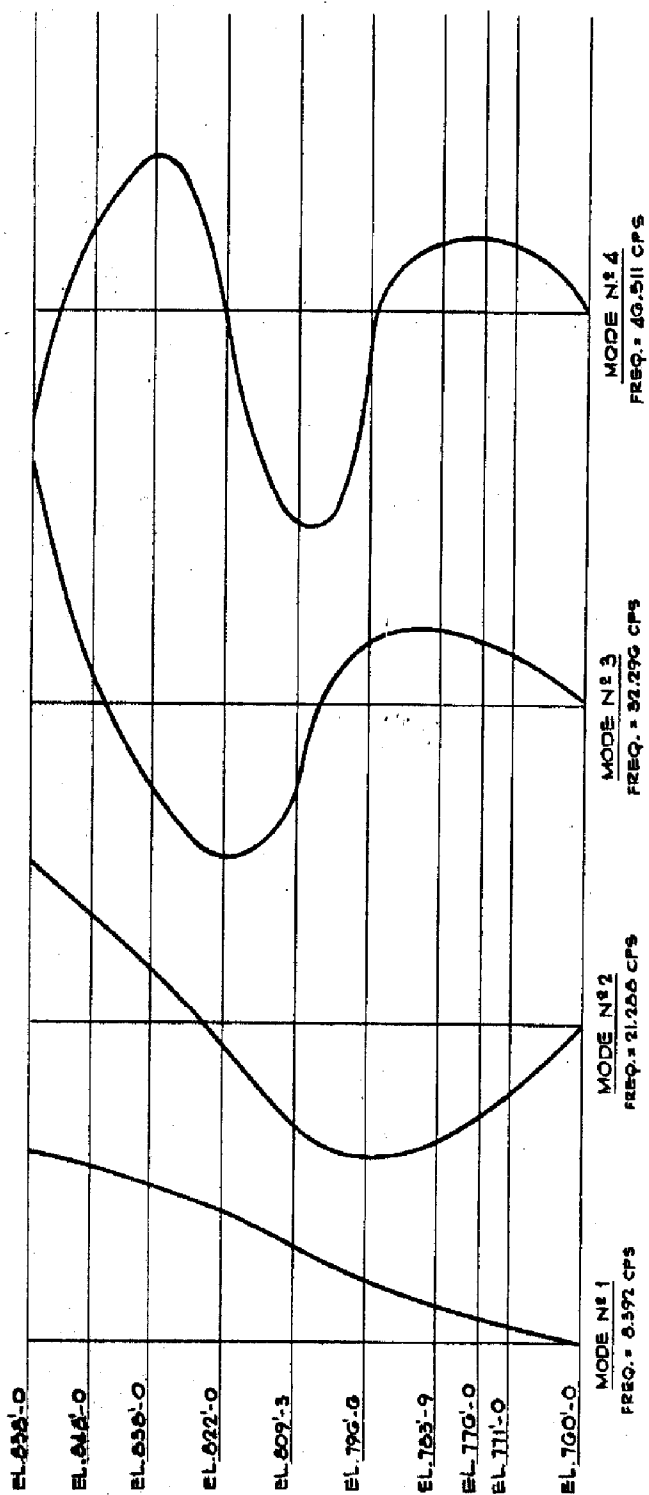


Figure 3-2. Frequency and Mode Shapes - Auxiliary Building - East West Direction (Sheet 2 of 2)

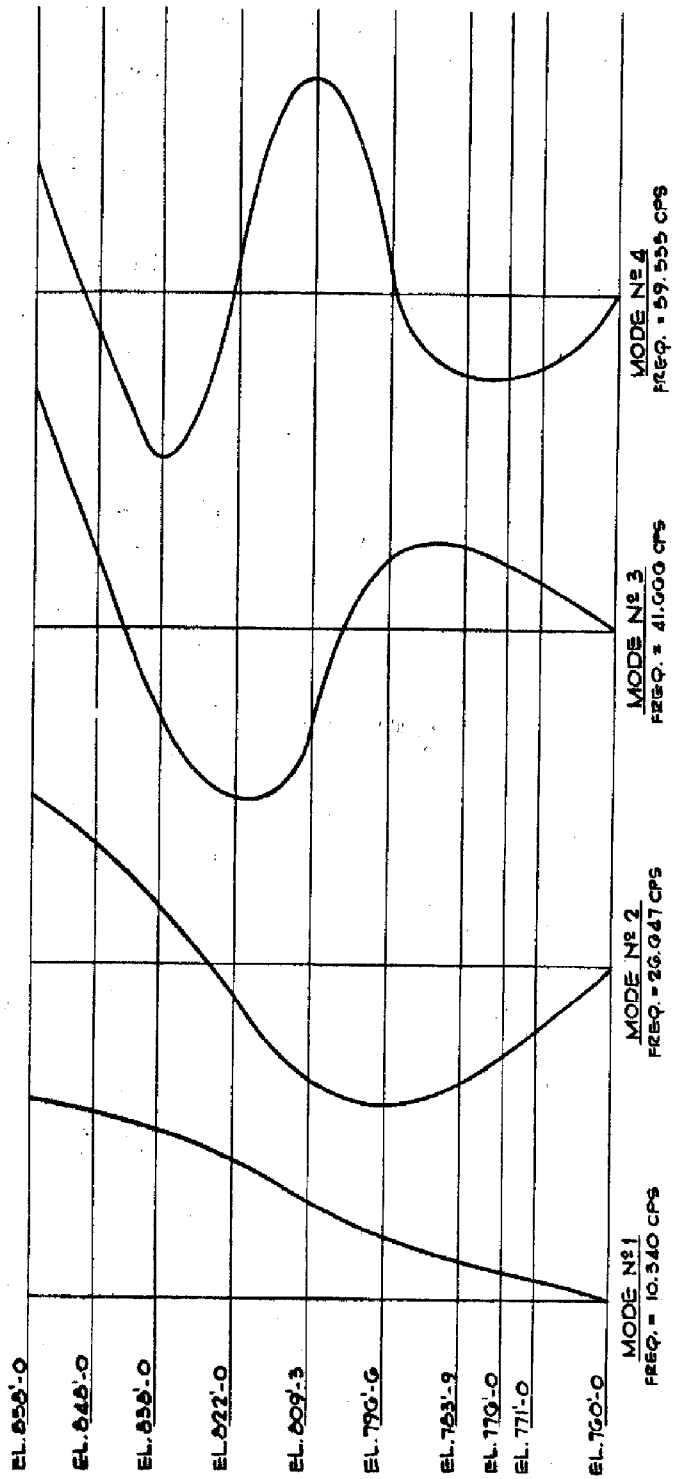


Figure 3-3. Auxiliary Building Mass Model

Security Related Information
Figure withheld Under 10 CFR 2.390

Figure 3-4. Auxiliary Building - East West Direction - Seismic Model Results (Sheet 1 of 2)

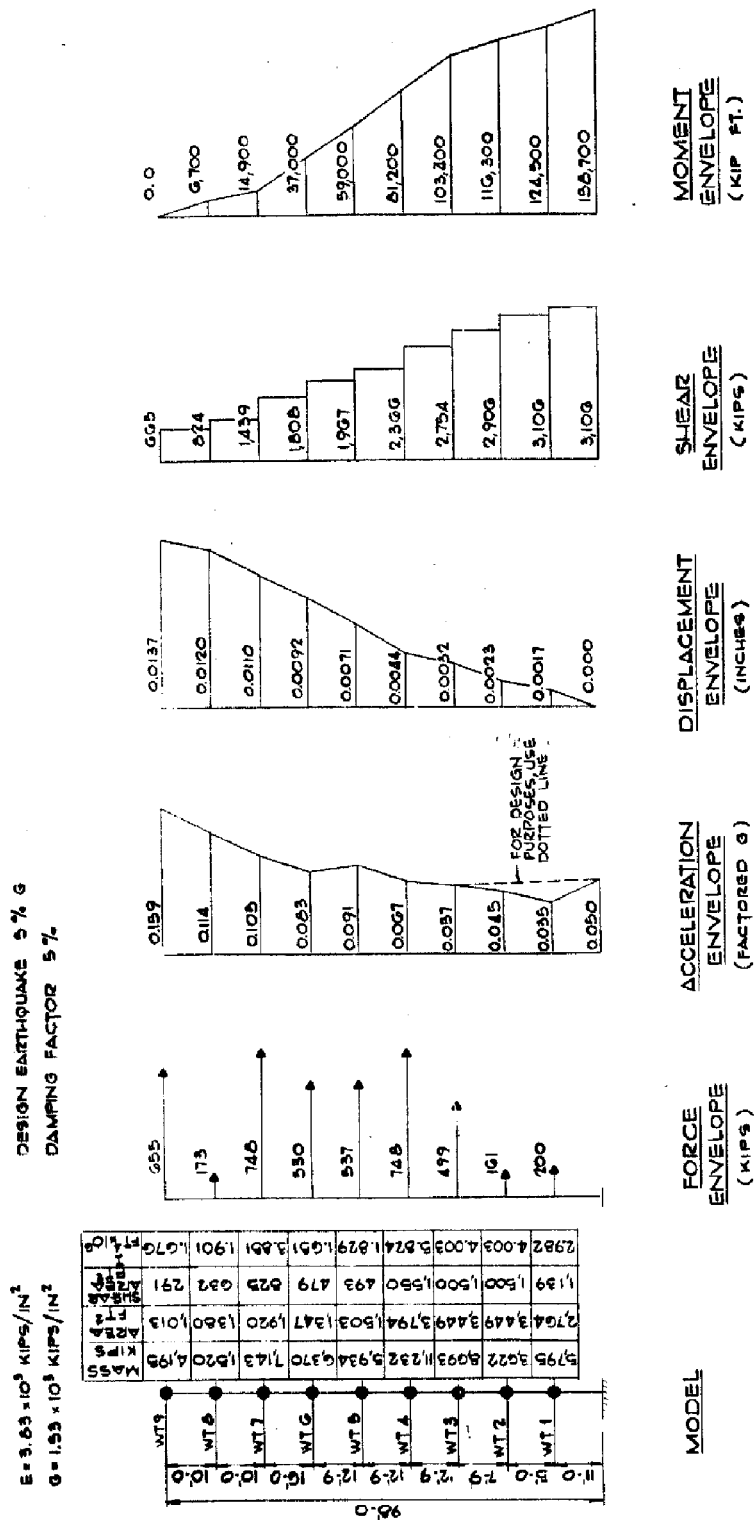


Figure 3-5. Auxiliary Building - North South Direction - Seismic Model Results (Sheet 2 of 2)

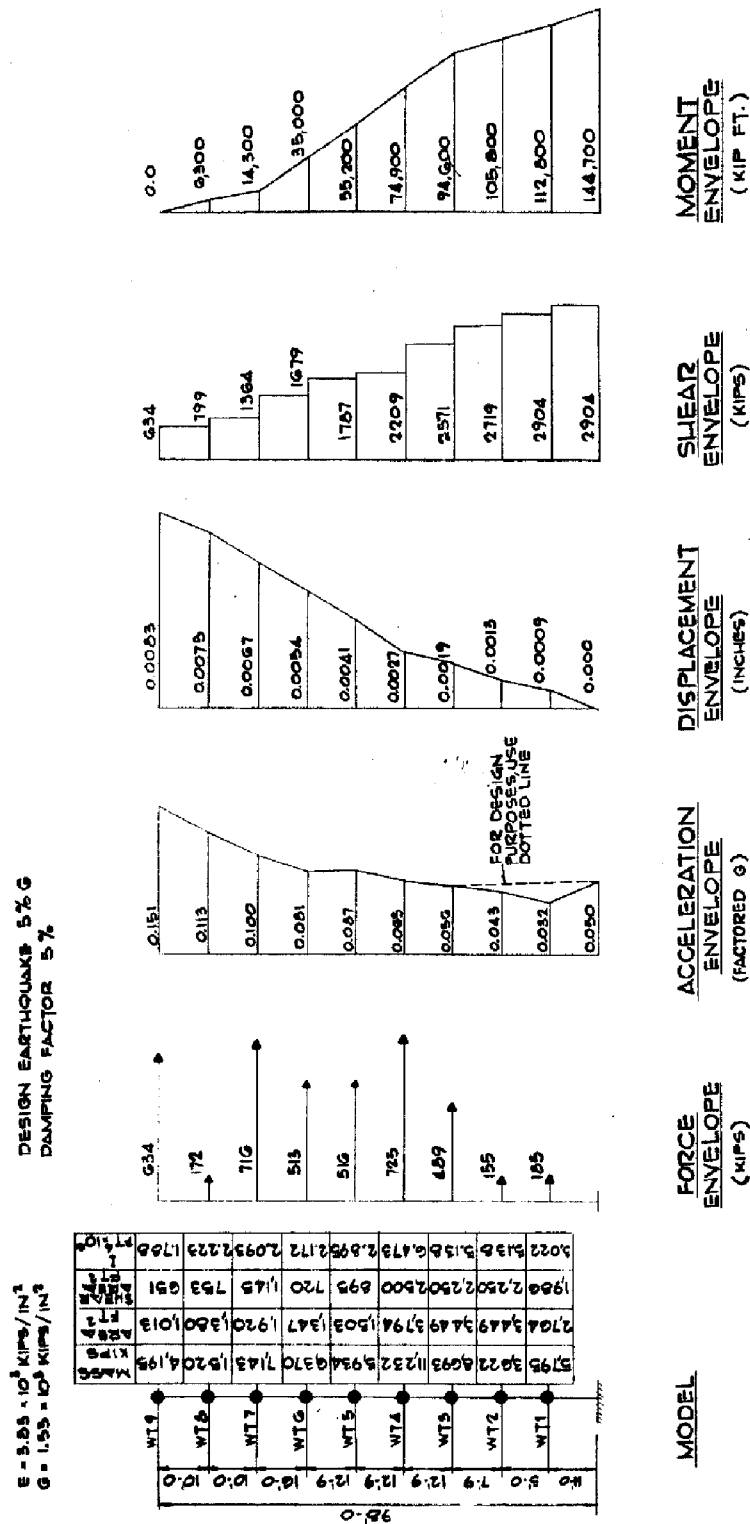


Figure 3-6. Example Spectrum Curves

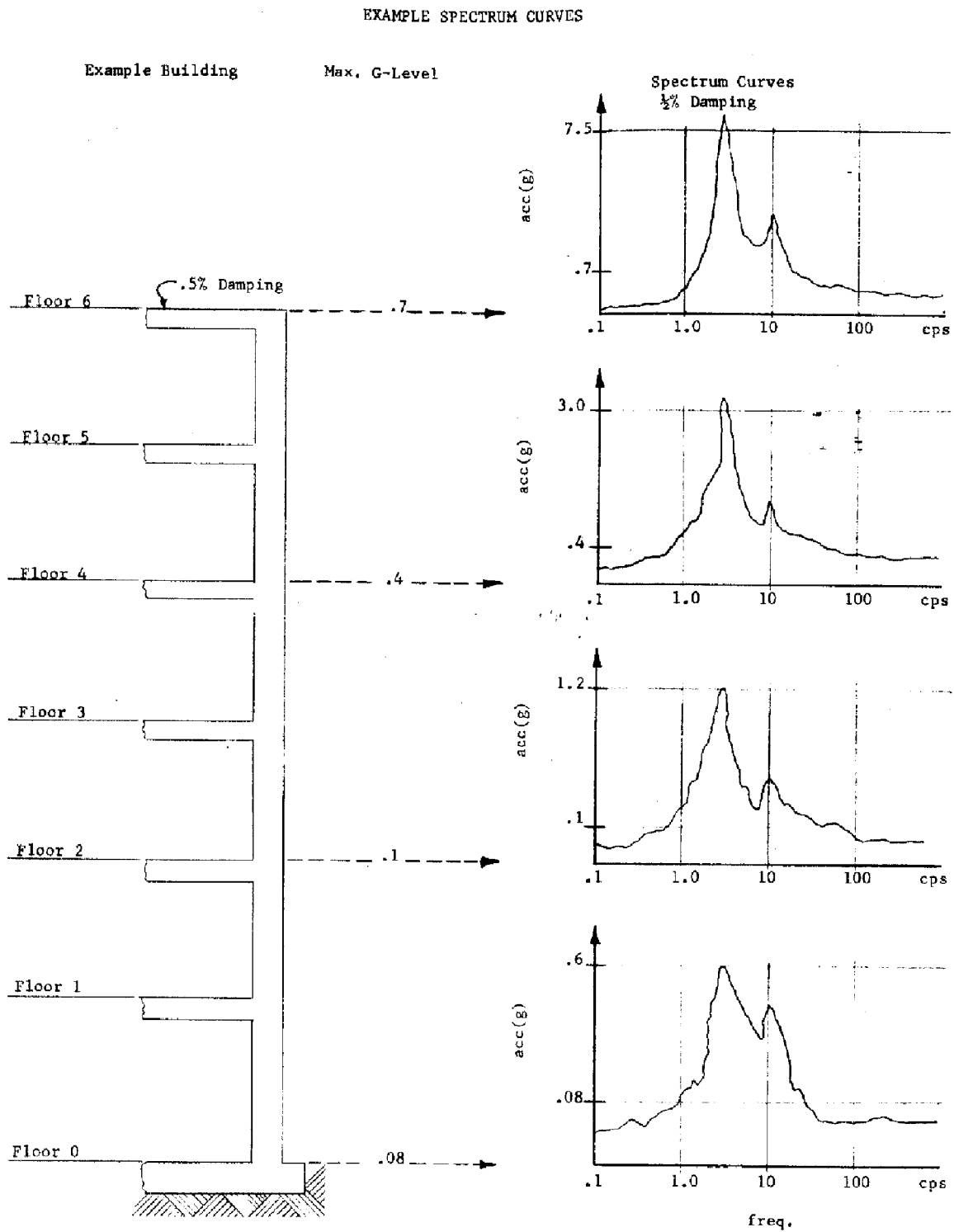


Figure 3-7. Reactor Building - Seismic Model Results (Sheet 1 of 2)

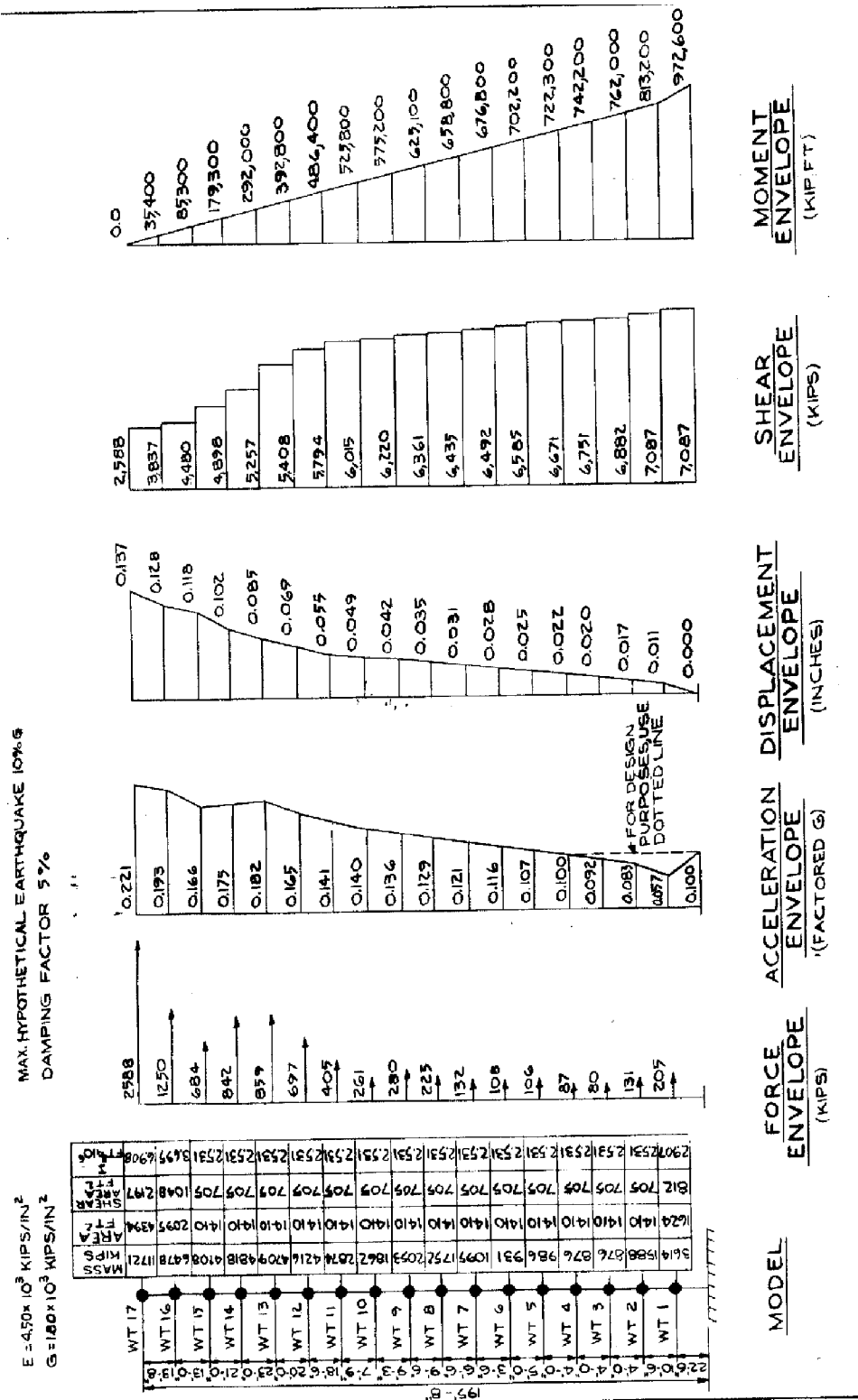


Figure 3-8. Reactor Building - Seismic Model Results (Sheet 2 of 2)

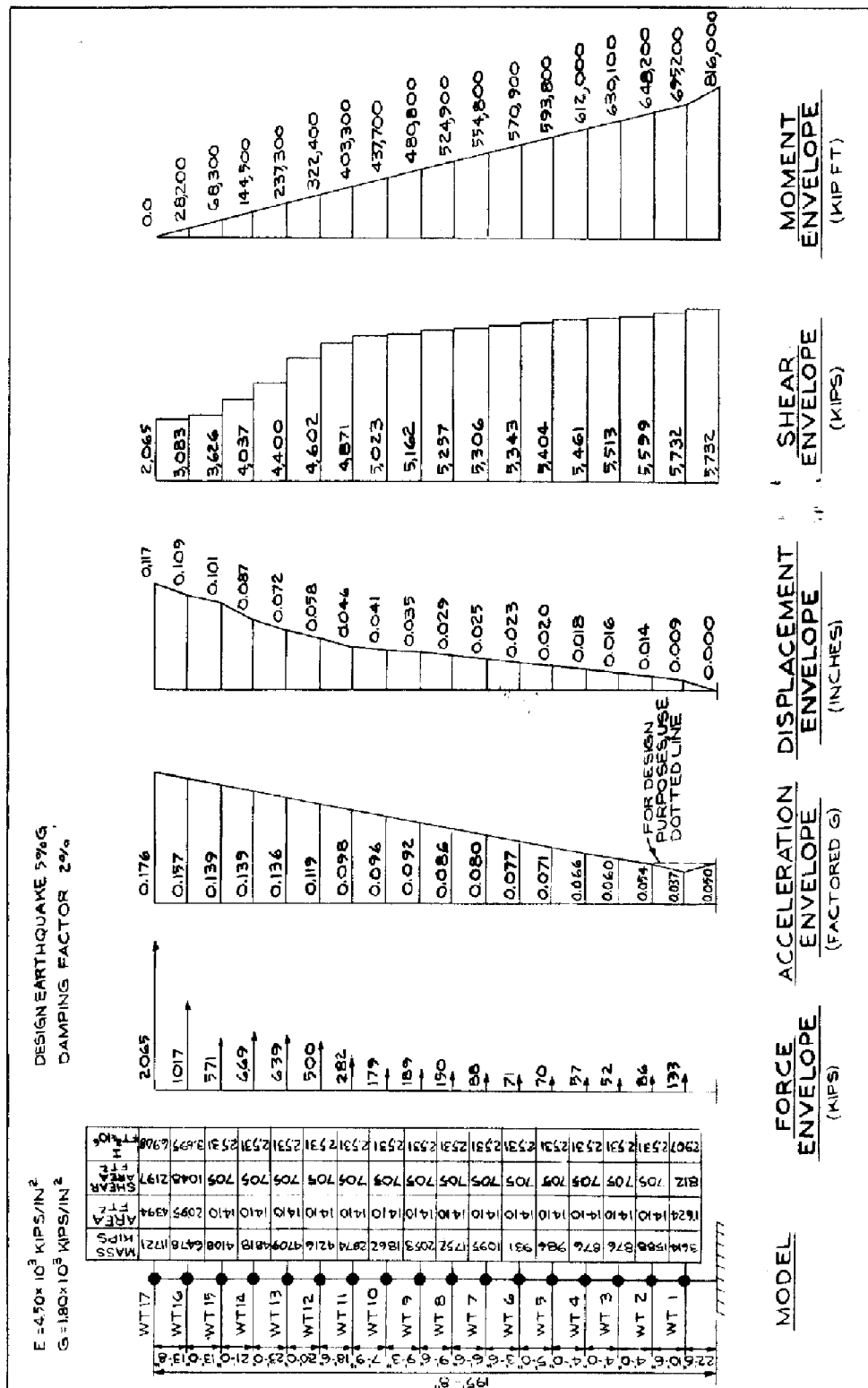


Figure 3-9. Main Steam System West Generator Problem Number 1-01-08. Calculation OSC 1296-06
"HISTORICAL INFORMATION NOT REQUIRED TO BE REVISED"

Security Related Information
Figure withheld Under 10 CFR 2.390

Figure 3-10. Core Flooding Tank 1A Problem Number 1-53-9. Calculation OSC 1300-06

"HISTORICAL INFORMATION NOT REQUIRED TO BE REVISED"

Security Related Information
Figure withheld Under 10 CFR 2.390

Figure 3-11. Low Pressure Injection System West Generator Problem Number 1-53-9. Calculation
OSC 1300-06

"HISTORICAL INFORMATION NOT REQUIRED TO BE REVISED"

Security Related Information
Figure withheld Under 10 CFR 2.390

Figure 3-12. RCP Piping to HPI Letdown Coolers Problem Number 1-55-03. Calculation OSC 1660-11
"HISTORICAL INFORMATION NOT REQUIRED TO BE REVISED"

Security Related Information
Figure withheld Under 10 CFR 2.390

Figure 3-13. RCP Piping to HPI Letdown Coolers Problem Number 1-55-03. Calculation OSC 1660-11
"HISTORICAL INFORMATION NOT REQUIRED TO BE REVISED"

Security Related Information
Figure withheld Under 10 CFR 2.390

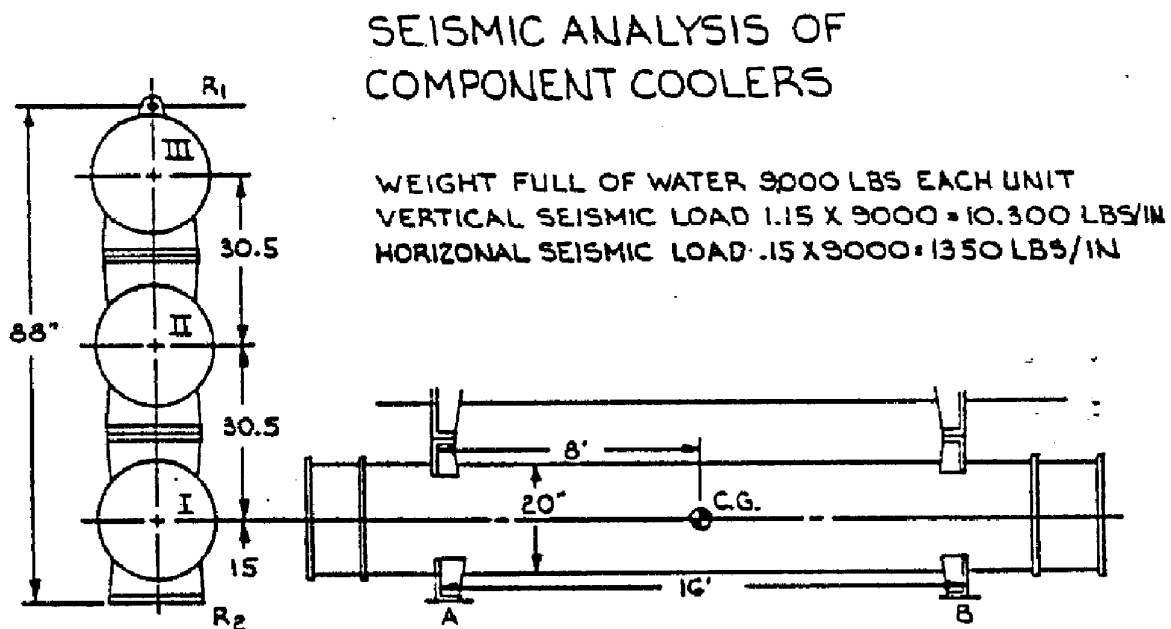
Figure 3-14. RCP Piping to HPI Letdown Coolers Problem Number 1-55-03. Calculation OSC 1660-11
"HISTORICAL INFORMATION NOT REQUIRED TO BE REVISED"

Security Related Information
Figure withheld Under 10 CFR 2.390

Figure 3-15. RCP Piping to HPI Letdown Coolers Problem Number 1-55-03. Calculation OSC 1660-11
"HISTORICAL INFORMATION NOT REQUIRED TO BE REVISED"

Security Related Information
Figure withheld Under 10 CFR 2.390

Figure 3-16. Seismic Analysis of Component Coolers

FOUNDATION LOADS

VERTICAL (DOWNWARDS): $10300 \times 3/2 = 15,450 \text{ LBS}$ AT EACH SUPPORT

LONGITUDINAL: $1350 \times 3 = 4050 \text{ LBS}$ AT SUPPORT "A"

0 LBS AT SUPPORT "B" (SLOTTED HOLES)

LATERAL

$$R_1 = 2 \times 675/2 \times 88^3 \times (15^2 [73 + 2 \times 88] + 45.5^2 [42.5 + 2 \times 88] + 76^2 [12 + 2 \times 88]) = 1660 \text{ LBS} = \text{TOTAL LOAD ON SEISMIC LUG}$$

$$R_2 = 3 \times 1350/2 = 1660/2 = 1195 \text{ LBS EACH SUPPORT ON FOUNDATION}$$

LATERAL MOVEMENT

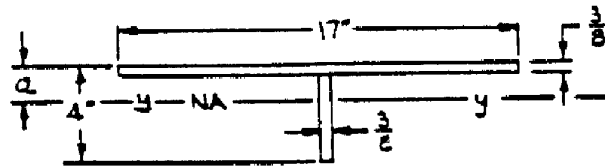
$$675/2 \times 88^2 ([73 + 88] + [42.5 + 88] + [12 + 88]) = 16.7 \text{ IN/LBS}$$

(NEGLIGIBLE)

LOADS ON SUPPORTS OF UNIT I

VERTICAL (COMPRESSIVE)	15450 LBS
LATERAL (SHEAR)	1195 LBS
LONGITUDINAL (SHEAR)	4050 LBS
LONGITUDINAL MOMENT	$4050 (15 - 10) = 20250 \text{ IN/LBS}$
LATERAL MOMENT	NEGLIGIBLE

Figure 3-17. Seismic Analysis of Component Coolers



$$\begin{aligned}
 &\text{AREA} \\
 &17 \times \frac{3}{8} + 3.625 \times \frac{3}{8} \\
 &= 6.4 + 1.34 = 7.74 \text{ IN.}^2 \\
 &6.4 \times .186 = 1.19 \\
 &1.34 \times 2.188 = 2.93 \\
 &4.12
 \end{aligned}$$

$$Q = 4.12 / 7.74 = .534 \text{ IN.}$$

$$\begin{aligned}
 T_{y-y} &= 6.4 (.534 - .186)^2 + 17 \times .375^3 / 12 + 1.34 \times (2.188 - .534)^2 + .375 \times 3.625^3 / 12 \\
 &= .775 + .075 + 3.66 + 1.49 = 6.00 \text{ IN.}^4 \quad \text{S.M. } y-y = \frac{Q}{4 - .534} = 1.73 \text{ IN.}^3
 \end{aligned}$$

STRESSES IN SUPPORTS

$$\begin{aligned}
 \text{COMPRESSIVE} & \quad 15450 / 7.74 = 2000 \text{ PSI} \\
 \text{MAX SHEAR} & \quad \sqrt{1195^2 + 4050^2} / 7.74 = 545 \text{ PSI} \\
 \text{BENDING STRESS} & \quad 20250 / 1.73 = 11700 \text{ PSI}
 \end{aligned}$$

$$\begin{aligned}
 \text{MAX STRESS FROM SIMULTANEOUS HORIZONTAL AND VERTICAL ACCEL} \\
 2000 + 11700 = 13700 \text{ PSI}
 \end{aligned}$$

LOADS ON SHELL AT LOWER SUPPORTS

$$\begin{aligned}
 \text{DIRECT SUPPORT LOAD} & \quad 15450 \text{ LBS} \\
 \text{LONGITUDINAL MOVEMENT} & \quad 4050 \times G = 24300 \text{ IN/LBS} \\
 \text{INTERNAL PRESSURE} & \quad 100 \text{ PSI}
 \end{aligned}$$

EVALUATION OF LOCALIZED STRESSES IN SHELL AT LOWER SUPPORT
USING O ROURKE FORMULAS FOR STRESS AND STRAIN - EDITION 1954 - PAGE 282

$$K = .02 = .00012(150 - 90) = .0128$$

EQUIVALENT DIRECT LOAD ON SHELL

$$15450 + 24300 / \frac{2}{3} \times 10 = 19090 \text{ LBS}$$

DURING SIMULTANEOUS HORIZONTAL AND VERTICAL ACCELERATION

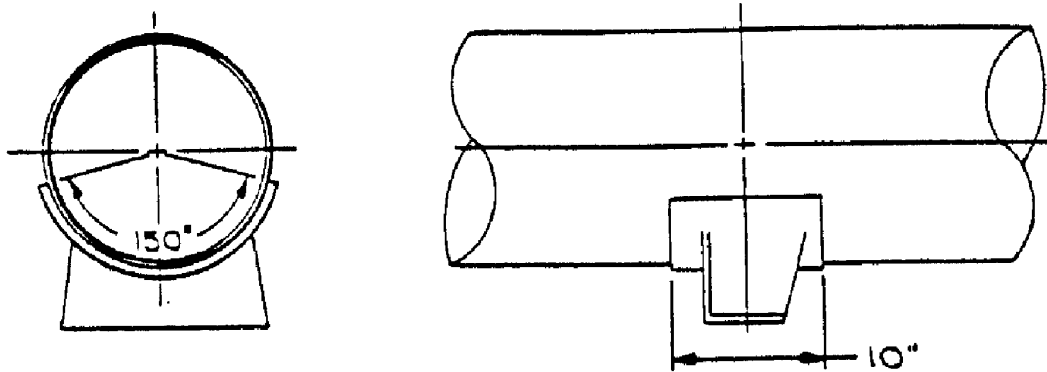
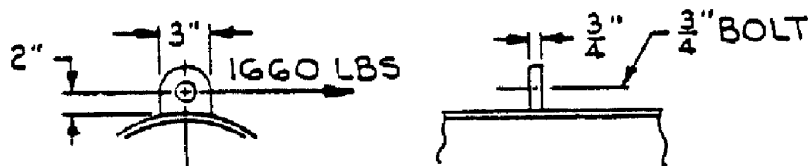
$$.0128 \times \frac{19090}{.25^2} \text{ L}_y \frac{20}{.25} = 17100 \text{ PSI}$$

STRESS IN SHELL FROM PRESSURE

$$\frac{100 \times 9.75}{.25} + .6 \times 100 = 3960 \text{ PSI}$$

THE SHELL WILL NOT COLLAPSE

Figure 3-18. Seismic Analysis of Component Coolers

TYPICAL SUPPORT SADDLESEISMIC LUG

MOMENT $2 \times 1660 \times 3 = 3320$ IN LBS

SM OF LUG $\frac{3}{4} \times \frac{3^2}{6} = 1.13$ IN²

STRESS IN LUG $3320 / 1.13 = 2930$ PSI

EQUIVALENT DIRECT LOAD ON SHELL

$2 \times 3320 / \frac{2}{3} \times 3 = 3320$ LBS

MAX. LOCAL STRESS IN SHELL

$.03 \times \frac{3320}{.25^2} \times \frac{20}{25} = 7160$ PSI

STRESS IN SHELL FROM PRESSURE 3960 PSI

NO PAD REQUIRED

Figure 3-19. Reactor Building Typical Details

Security Related Information
Figure withheld Under 10 CFR 2.390

Security Related Information
Figure withheld Under 10 CFR 2.390

Security Related Information
Figure withheld Under 10 CFR 2.390

Figure 3-20. Typical Electrical and Piping Penetrations

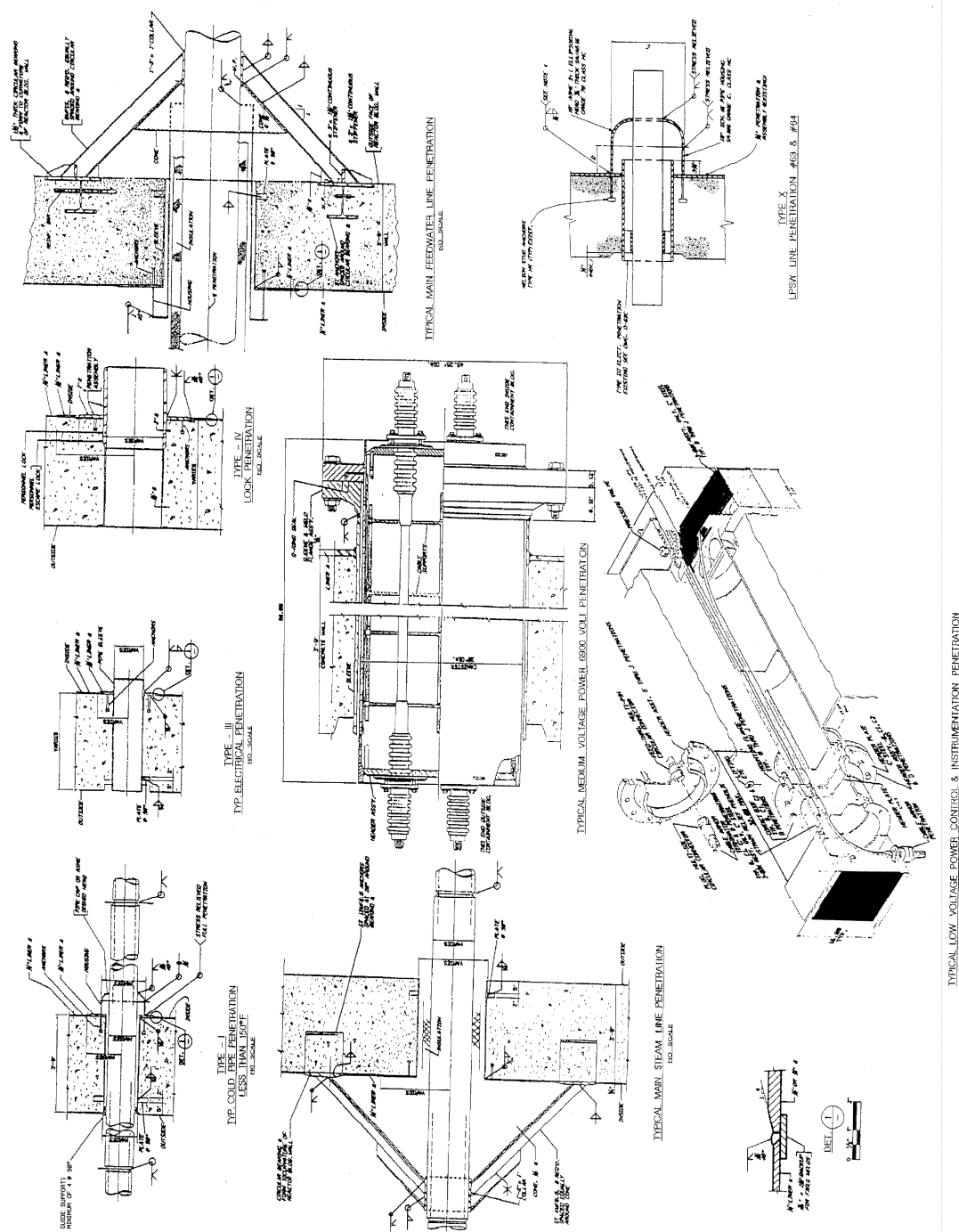


Figure 3-21. Details of Equipment Hatch and Personnel Hatch

Security Related Information
Figure withheld Under 10 CFR 2.390

Figure 3-23. Reactor Building Finite Element Mesh

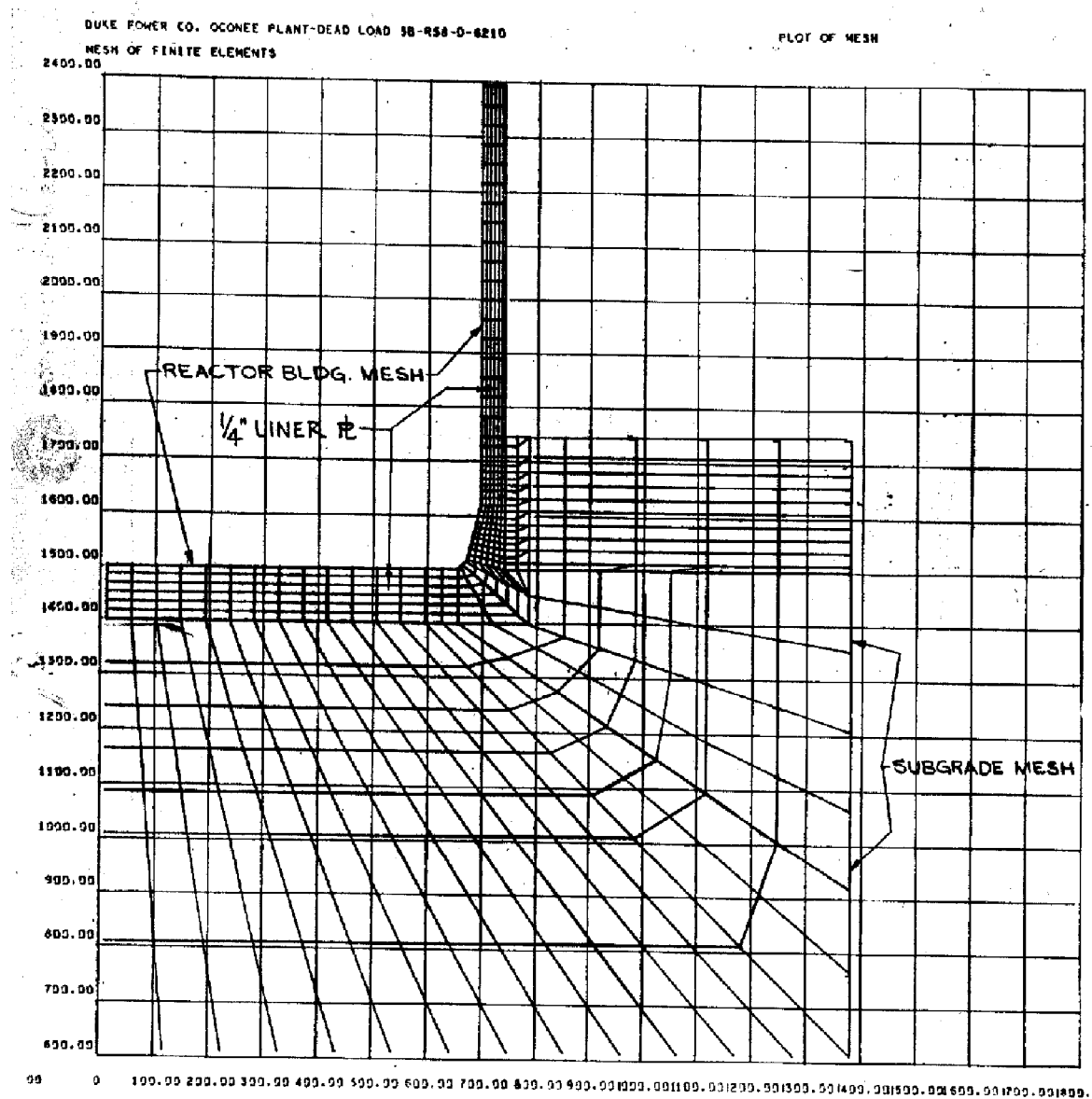


Figure 3-24. Reactor Building Thermal Gradient

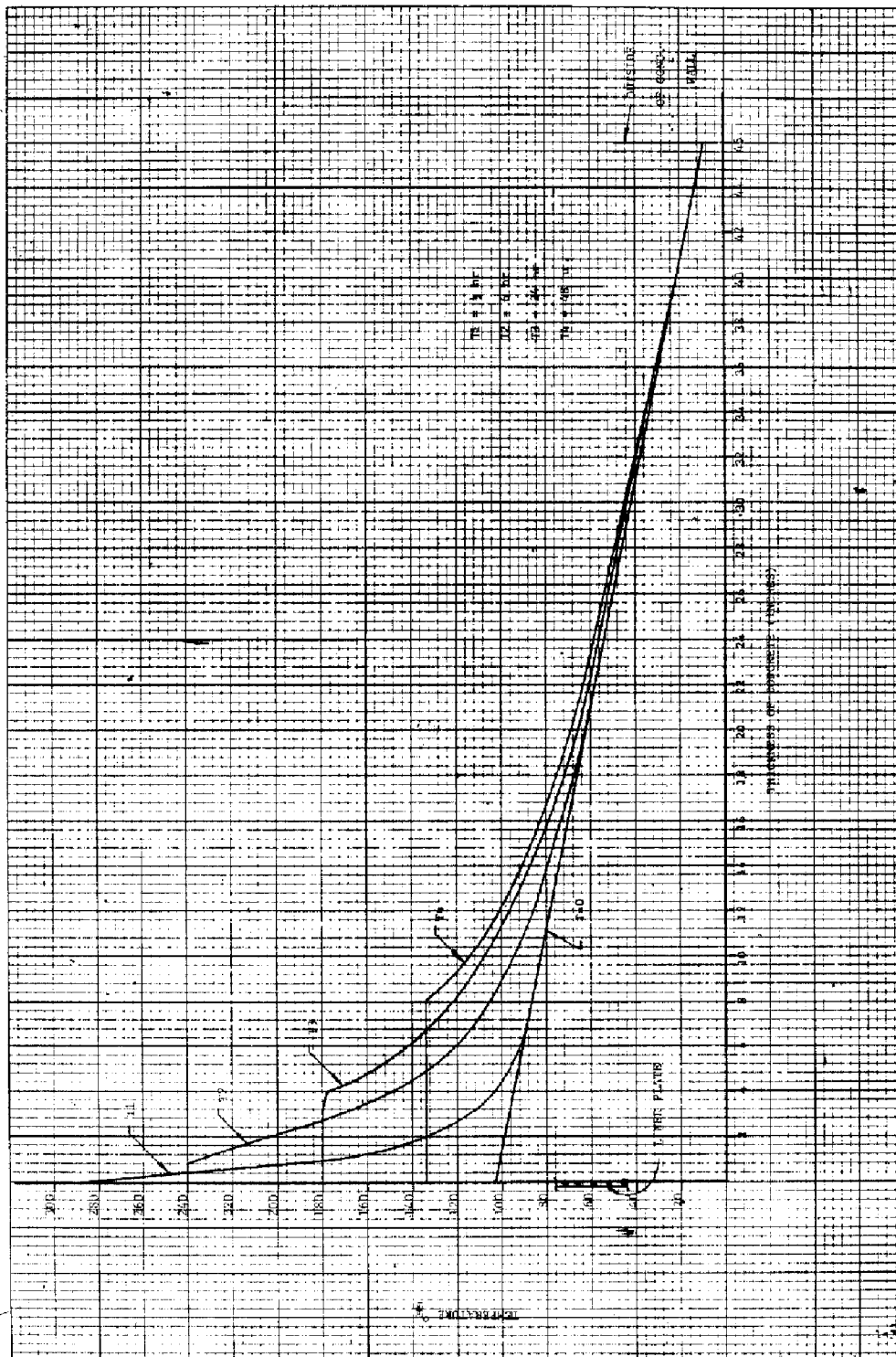
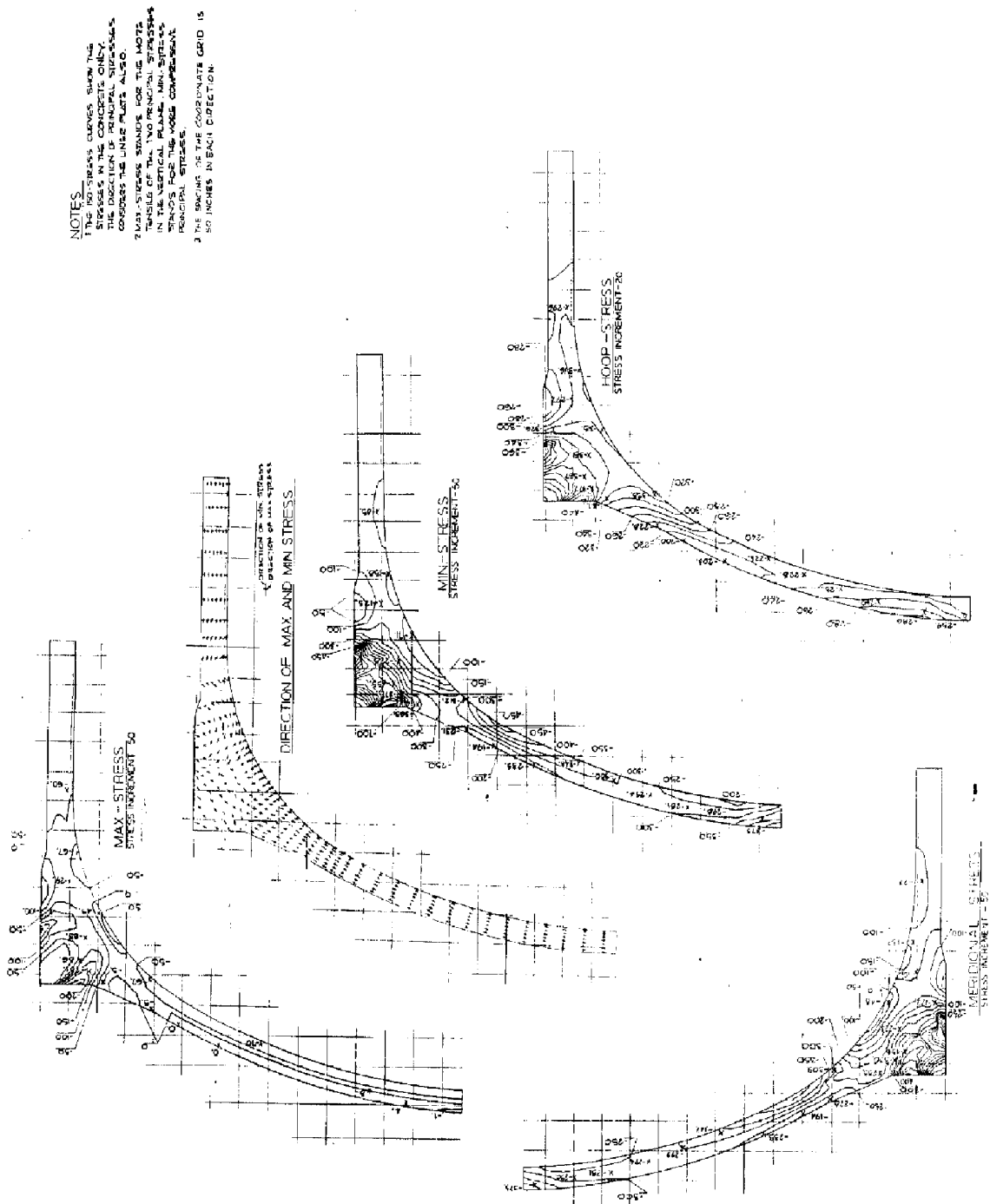
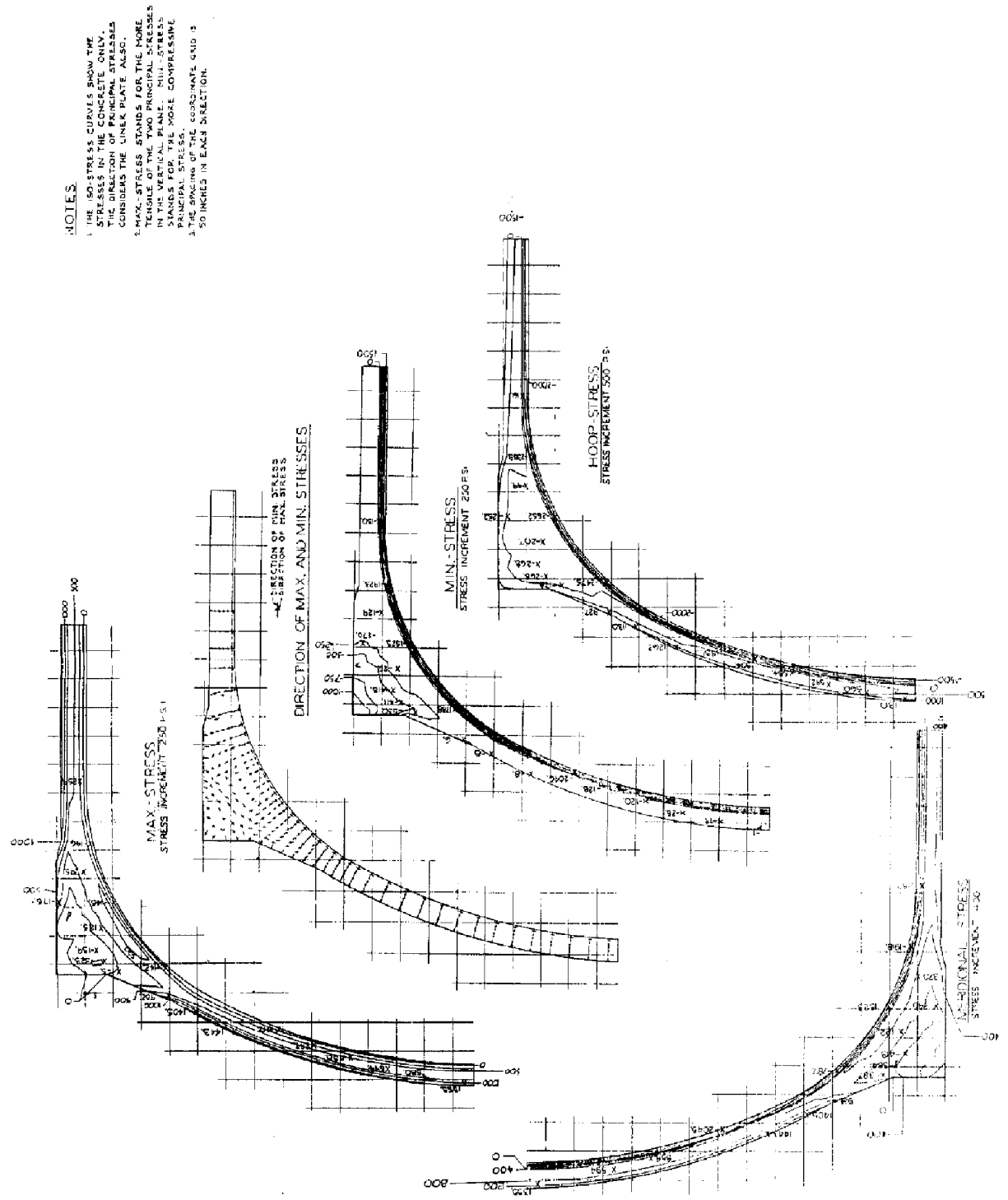
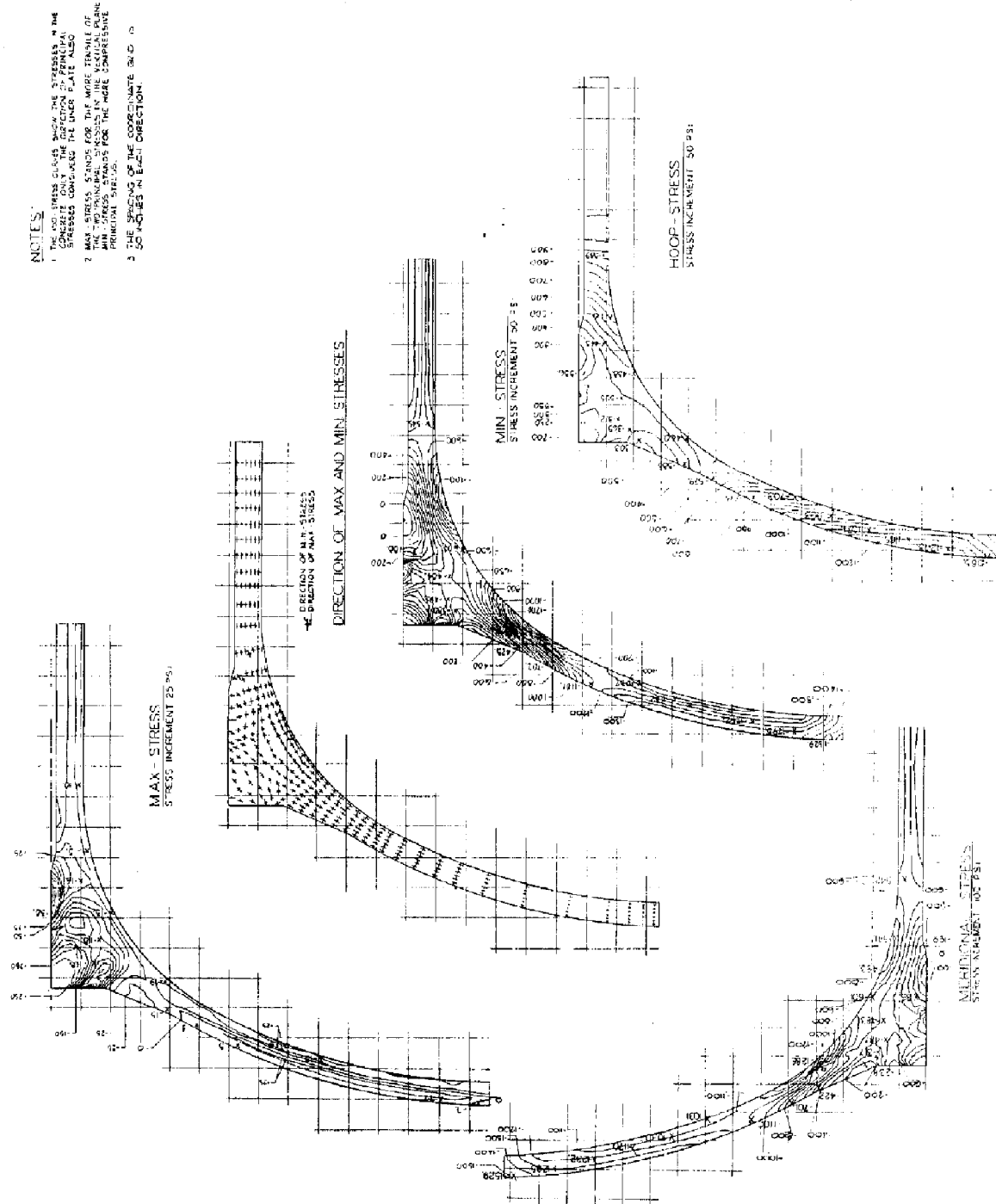


Figure 3-25. Reactor Building Isostress Plot Wall and Dome







- NOTES
1. THE RO-STRESS CURVES SHOW THE STRESSES IN THE CONCRETE ONLY. THE DIRECTION OF PRINCIPAL STRESSES CONSIDER THE LOWER PLATE ALSO.
 2. THE RO-STRESS CURVES SHOW THE STRESSES IN THE TWO PRINCIPAL STRESSES IN THE VERTICAL PLANE. MIN STRESS STRAITS FOR THE MORE COMPRESSIVE PRINCIPAL STRESS.
 3. THE DIRECTION OF THE COORDINATE G10 & G20 IN EACH DIRECTION.

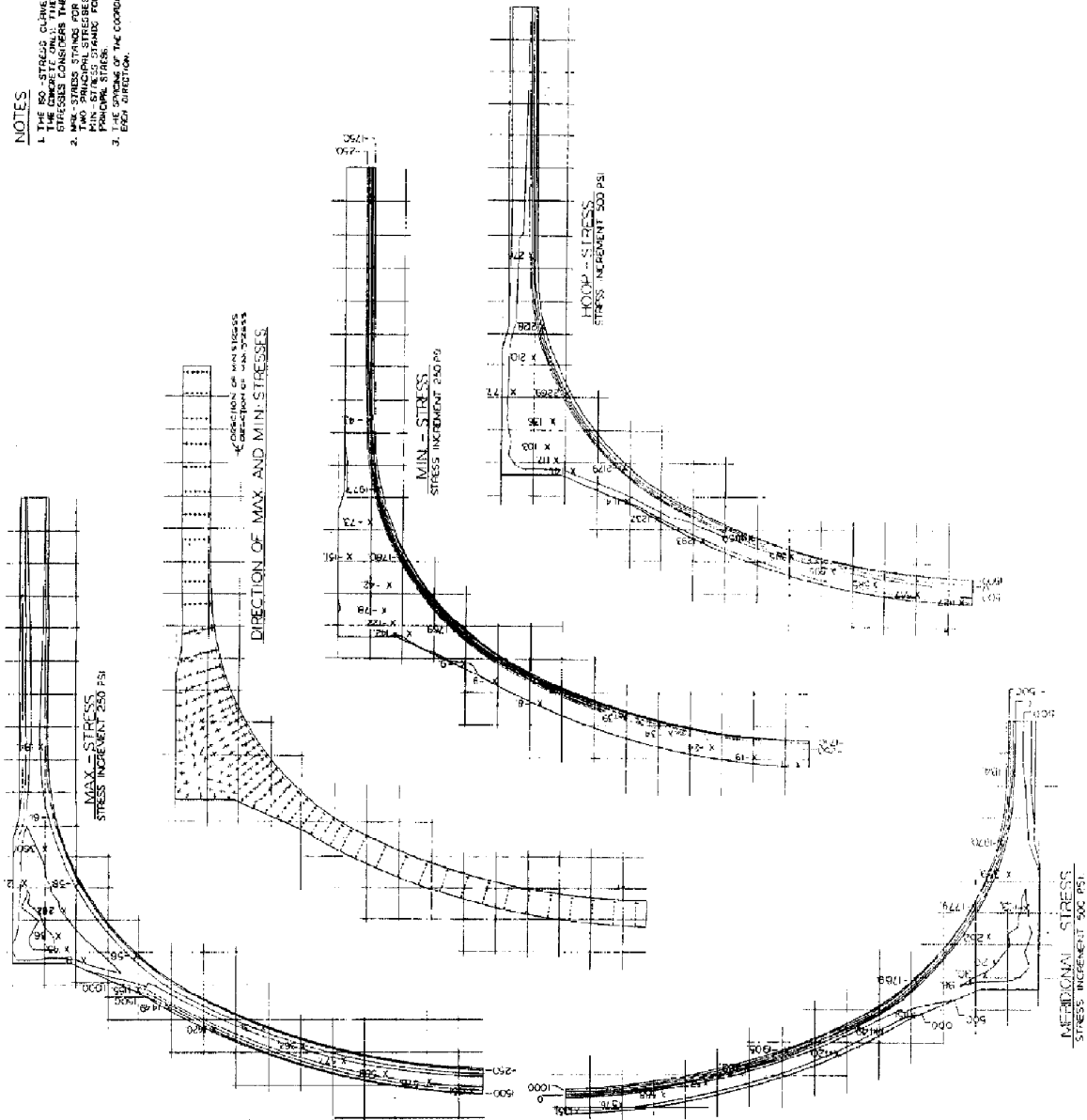
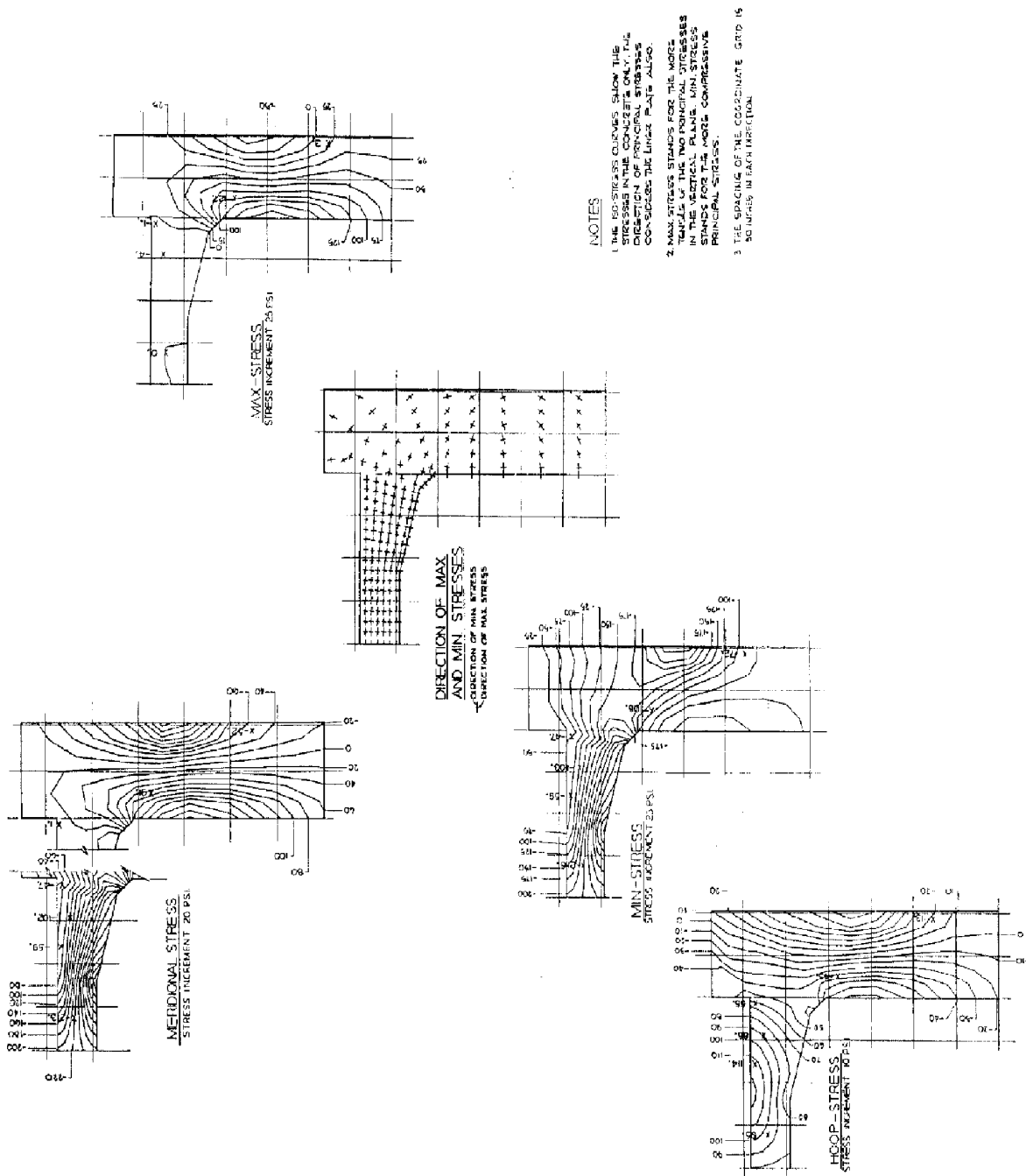
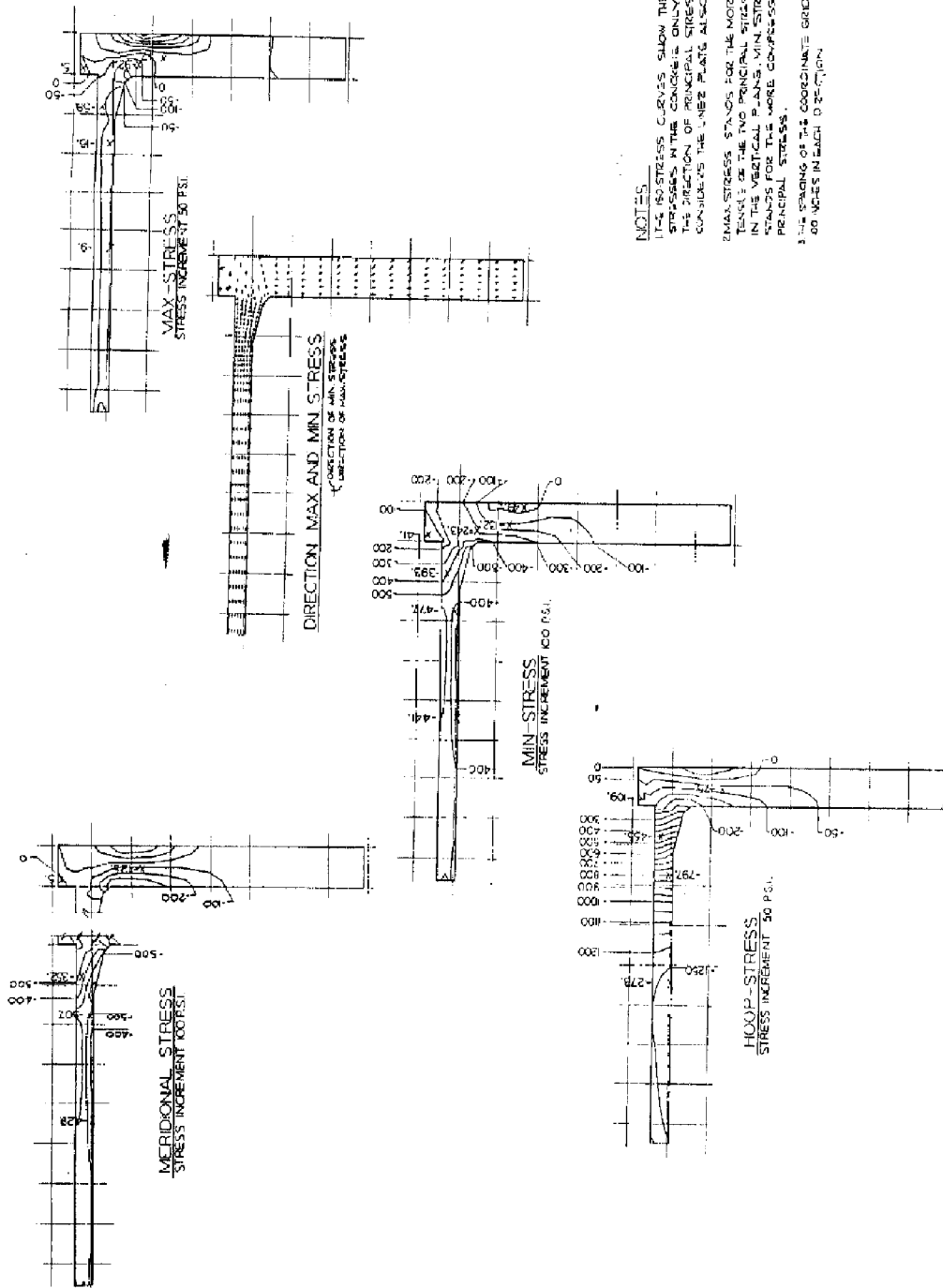
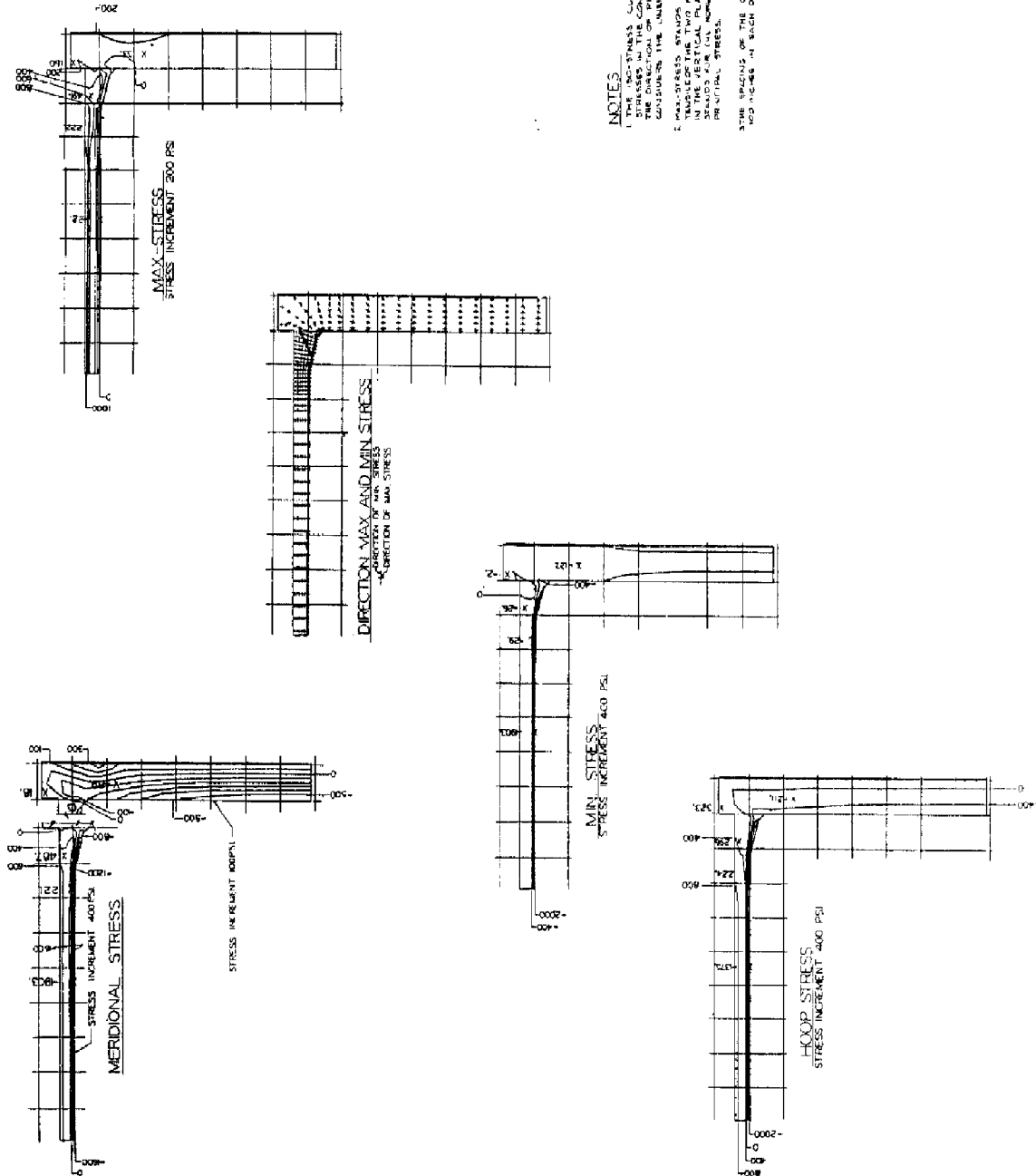
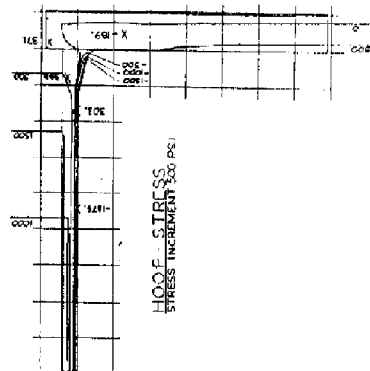
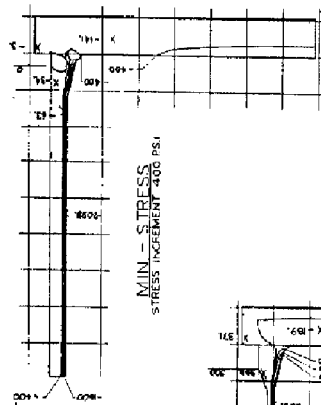
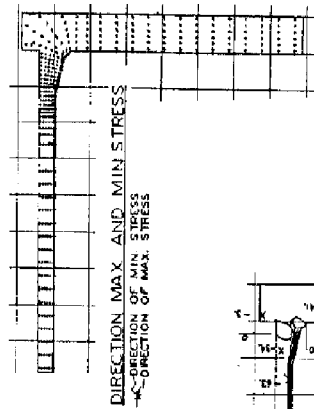
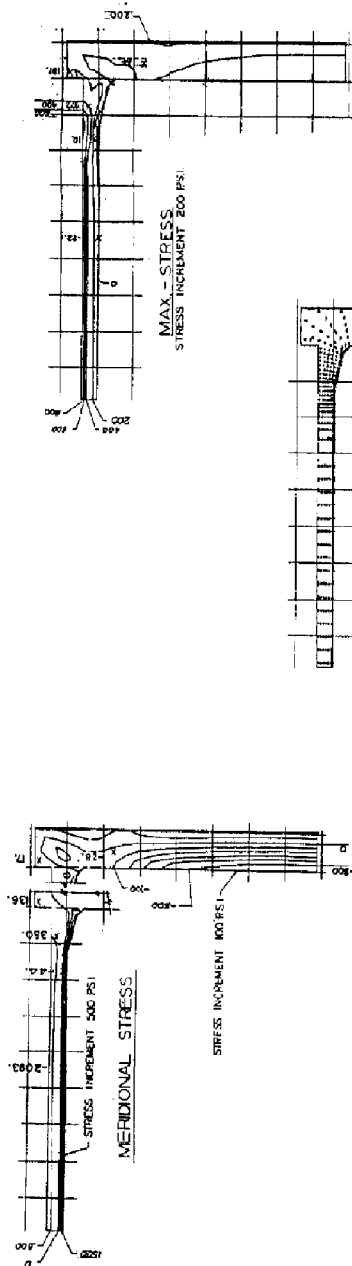


Figure 3-26. Reactor Building Isostress Plot Wall and Base



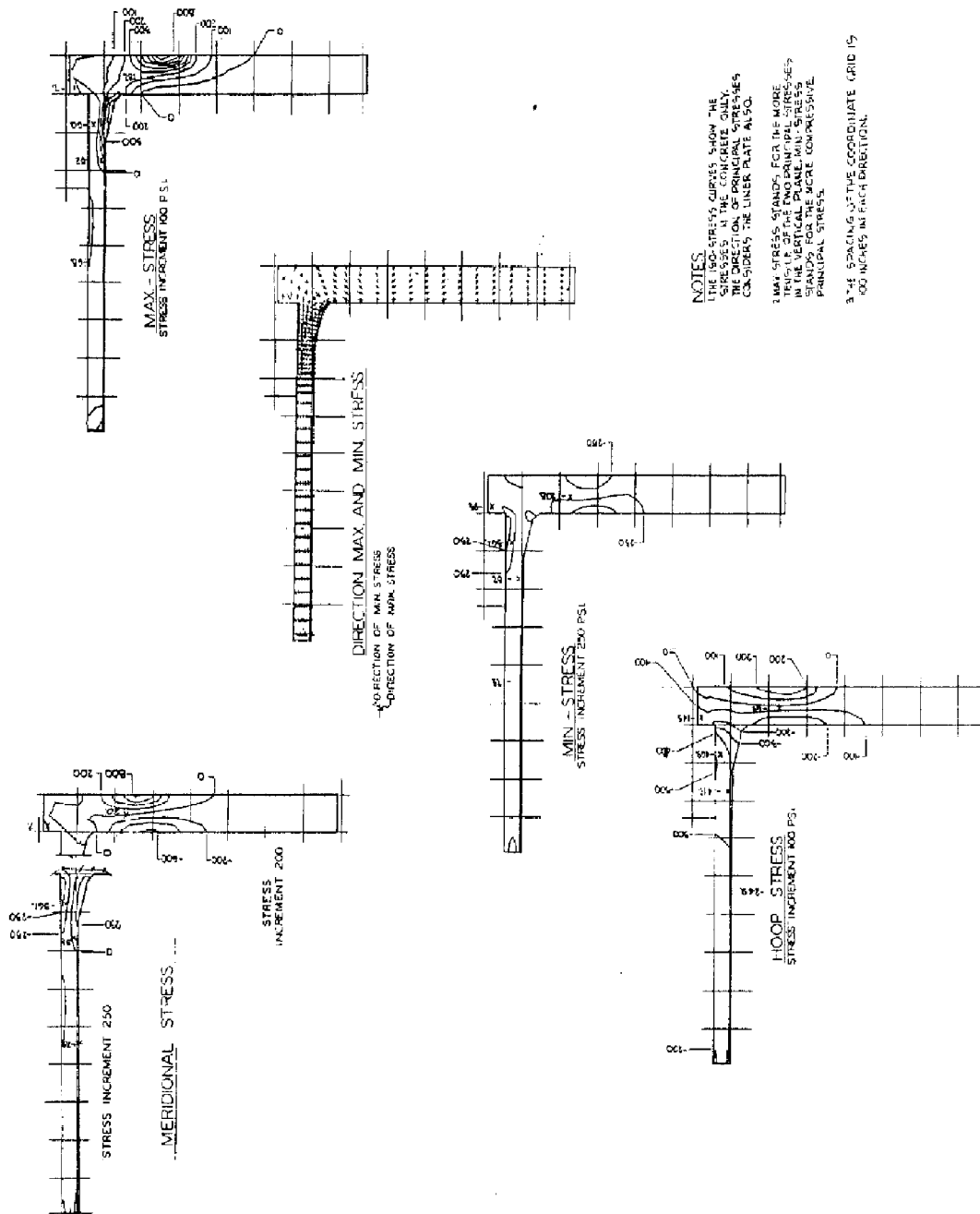






NOTES

1. THE ISO-STRESS CURVES SHOW THE STRESS IN THE CONCRETE ONLY. THE DIRECTION OF PRINCIPAL STRESSES CONSIDERS THE REINFORCING ALSO.
2. MAX-STRESS STANDS FOR THE MORE TENSILE OF THE TWO PRINCIPAL STRESSES. MIN-STRESS STANDS FOR THE MORE COMPRESSIVE PRINCIPAL STRESS.
3. THE SPACING OF THE COORDINATE GRID IS 100 INCHES IN EACH DIRECTION.



NOTES

1. LINE ISO-STRESS CURVES SHOW THE STRESSES IN THE CONCRETE ONLY. THE DIRECTION OF PRINCIPAL STRESSES CONSIDERS THE LINER PLATE ALSO.

2. MAX. STRESS STANDS FOR THE MORE IN THE VERTICAL PLANE. MIN. STRESS STANDS FOR THE MORE COMPRESSIVE PRINCIPAL STRESSES.

3. THE SPACING OF THE COORDINATE GRID IS 100 INCHES IN EACH DIRECTION.

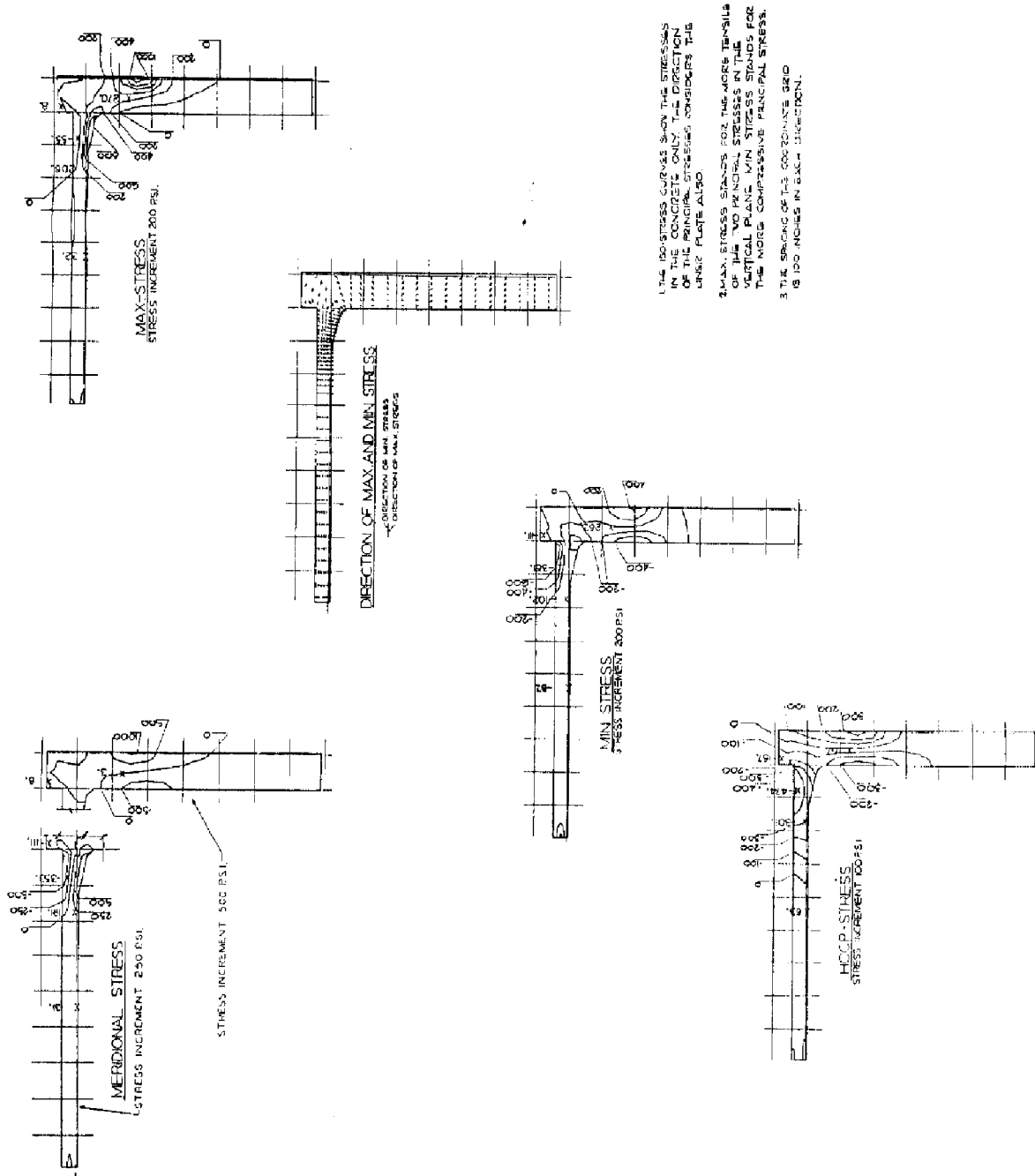
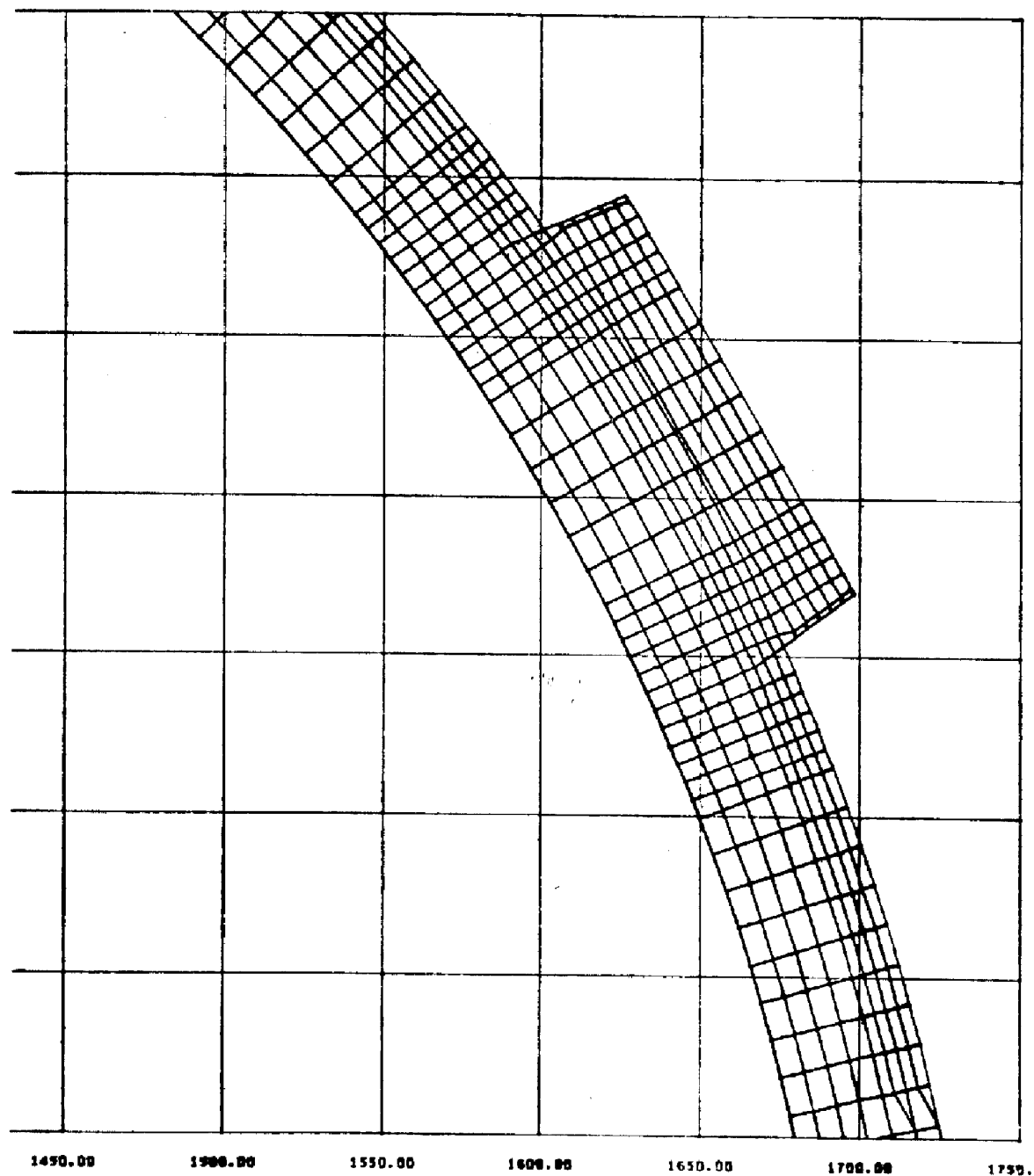
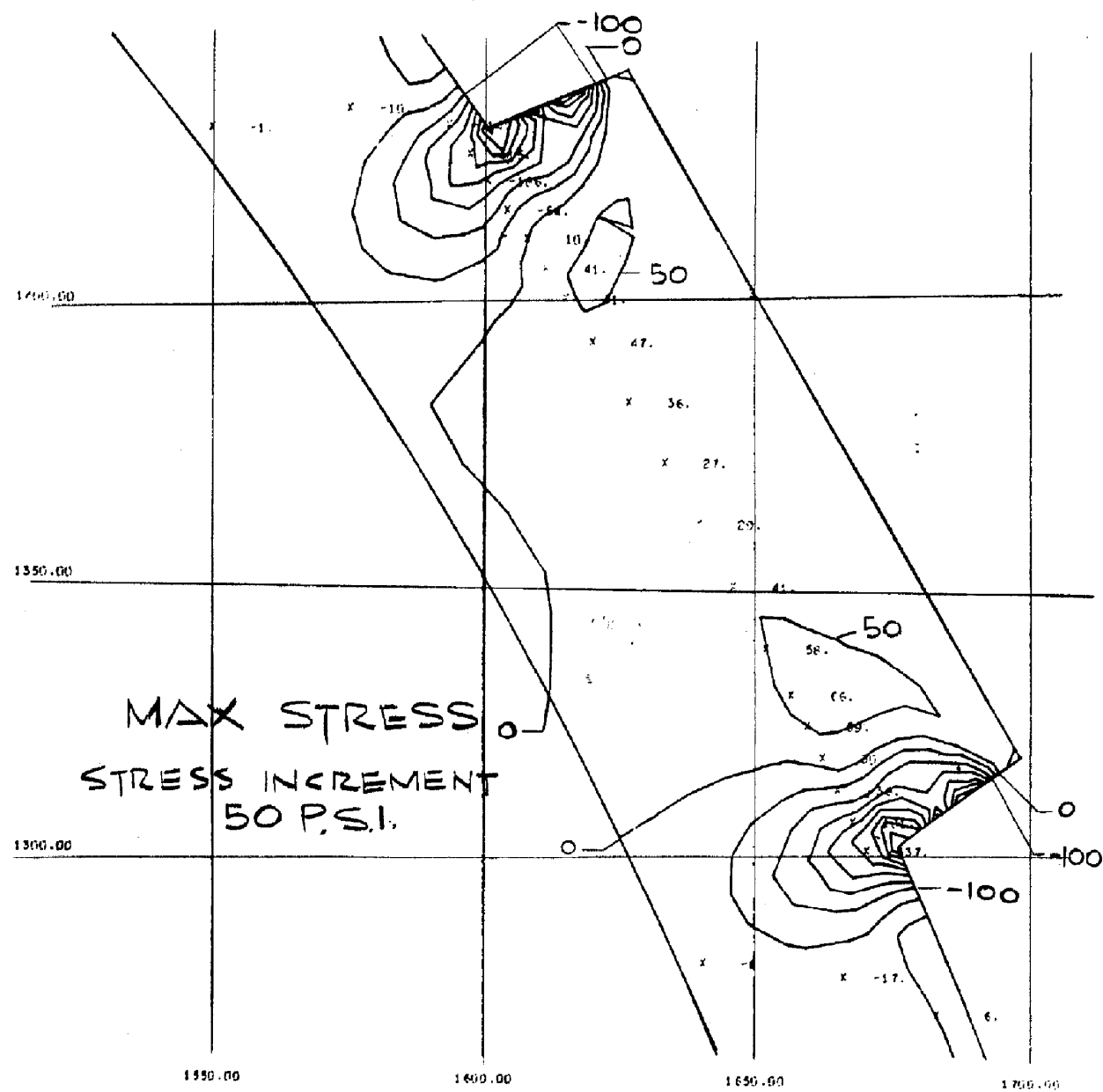


Figure 3-27. Reactor Building Finite Element Mesh Wall Buttresses



REACTOR BUILDING FINITE ELEMENT
MESH WALL BUTTRESSES

Figure 3-28. Reactor Building Isostress Plot for Buttresses



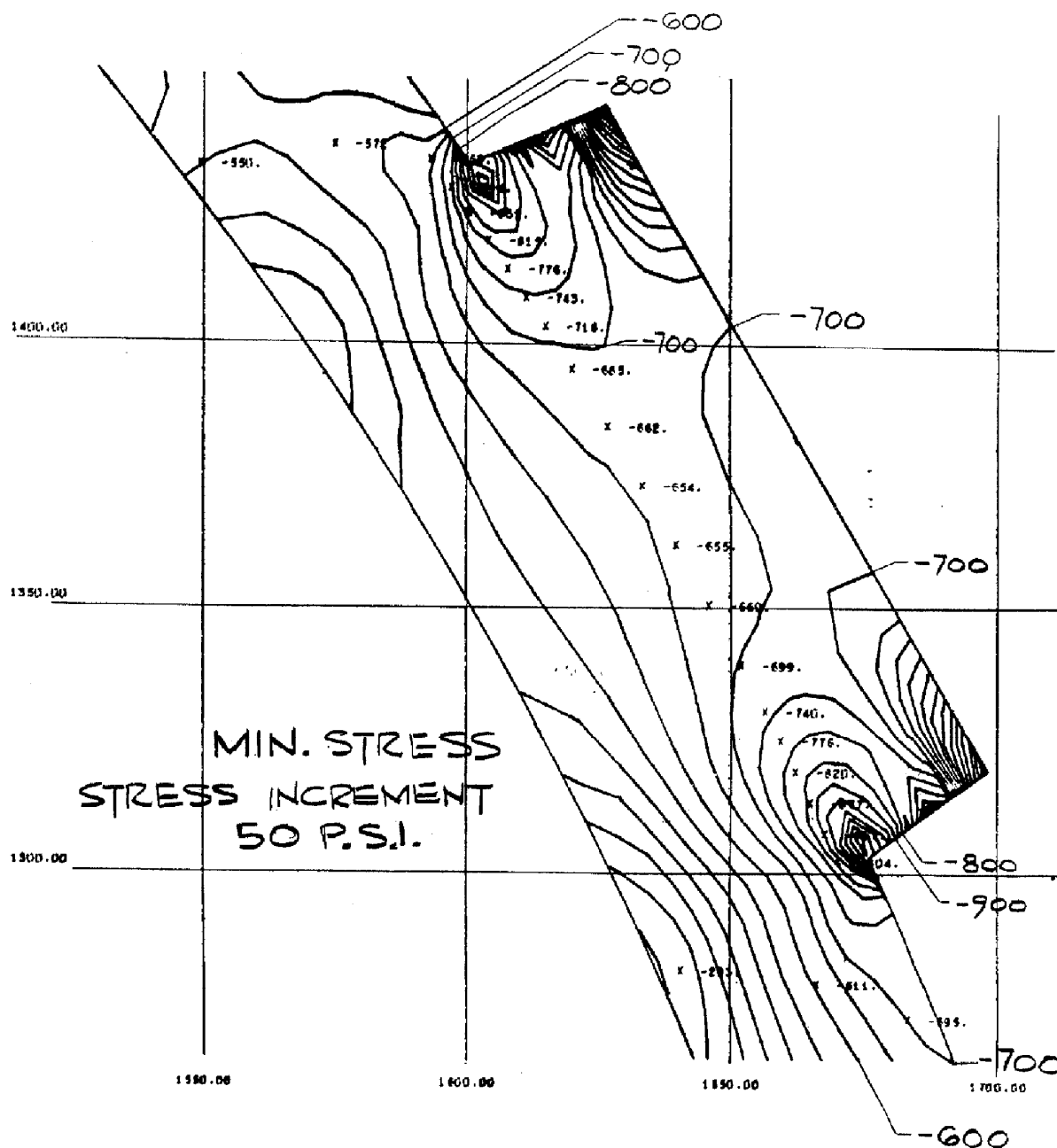


Figure 3-29. Temperature Gradient at Buttress

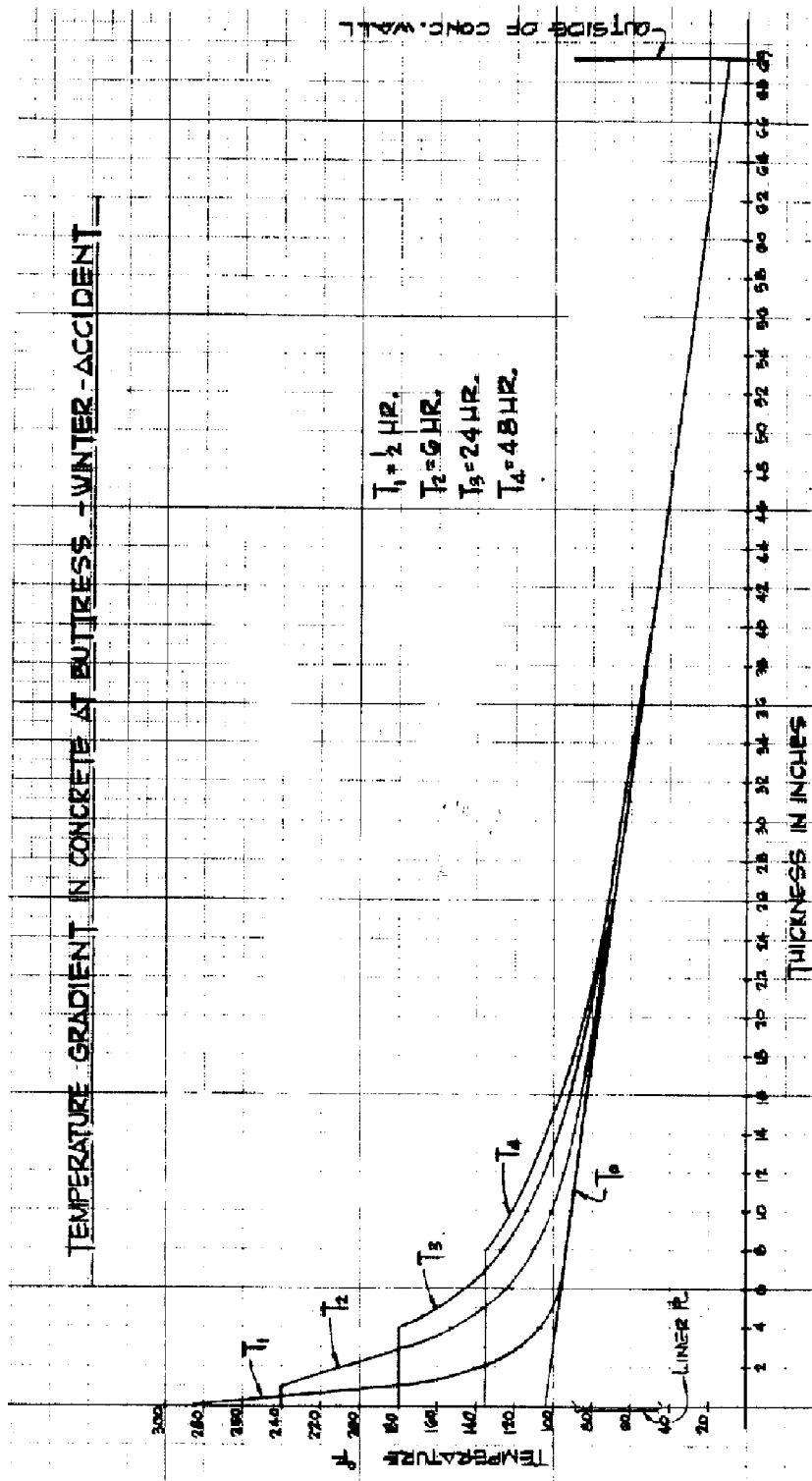


Figure 3-30. Buttress Reinforcing Details

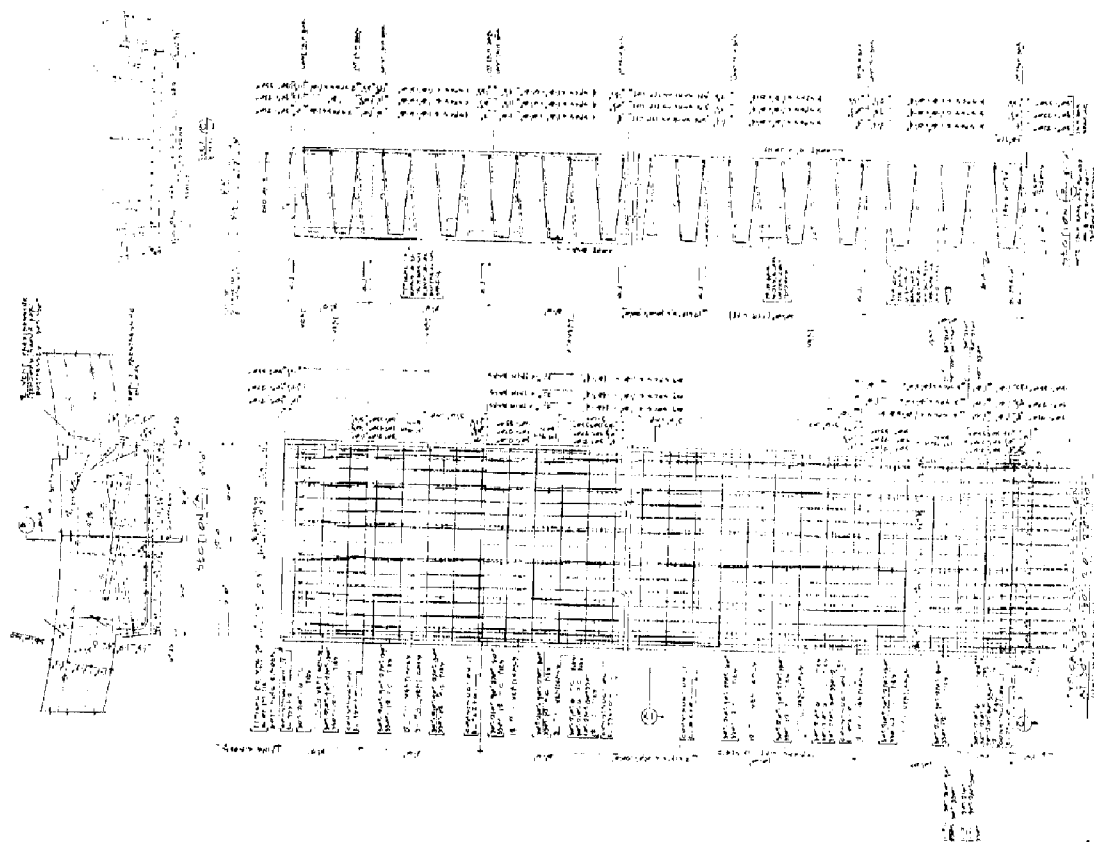


Figure 3-31. Reactor Building Equipment Hatch Mesh

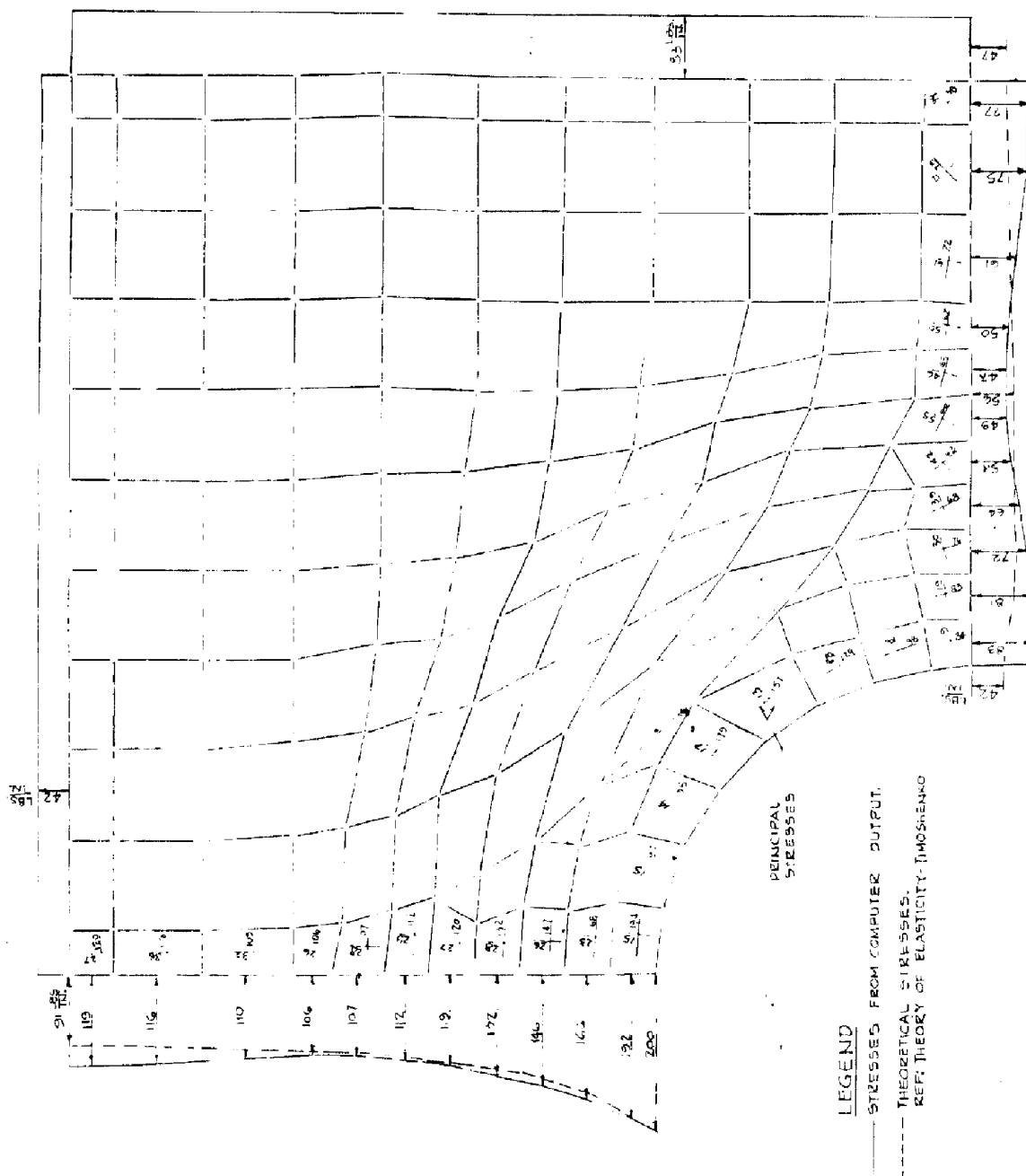


Figure 3-32. Reactor Building Penetration Loads

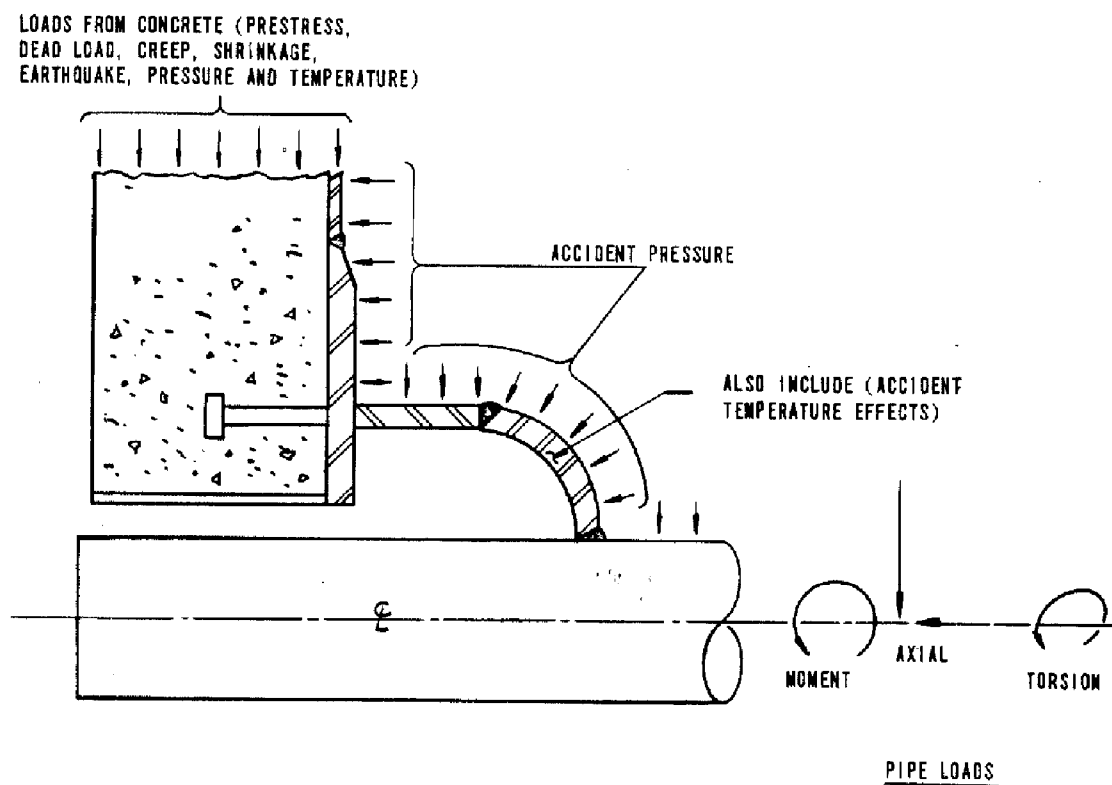


Figure 3-33. Reactor Building Model for Liner Plate Analysis for Radial Displacement

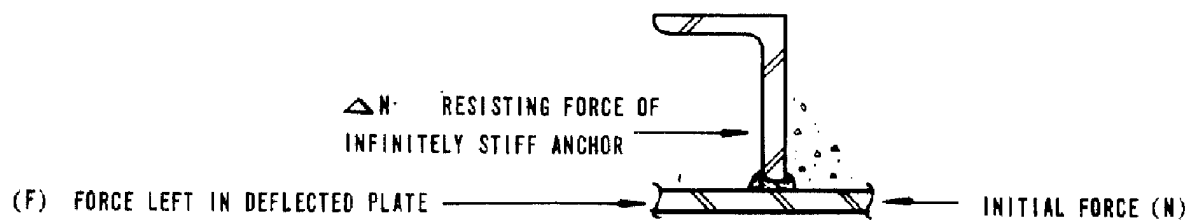
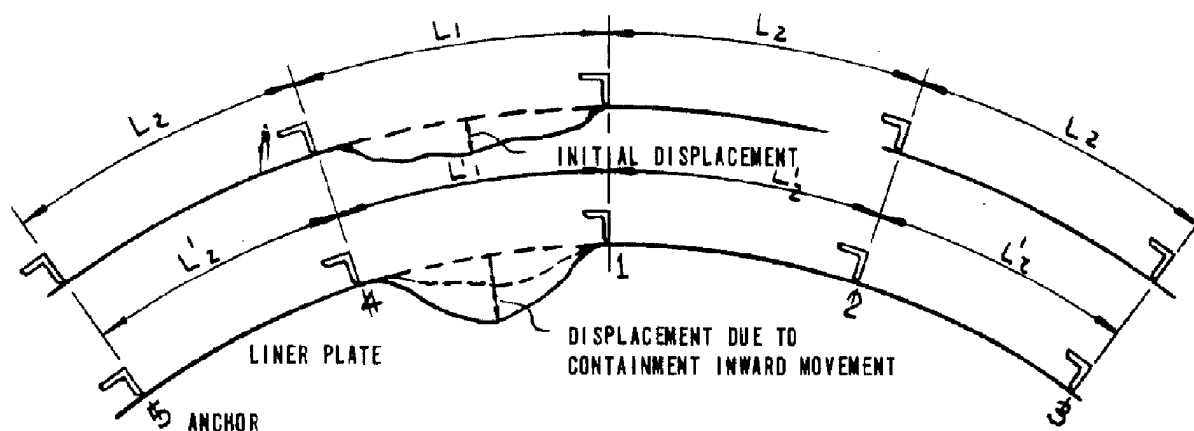


Figure 3-34. Reactor Building Model for Liner Analysis for Anchor Displacement

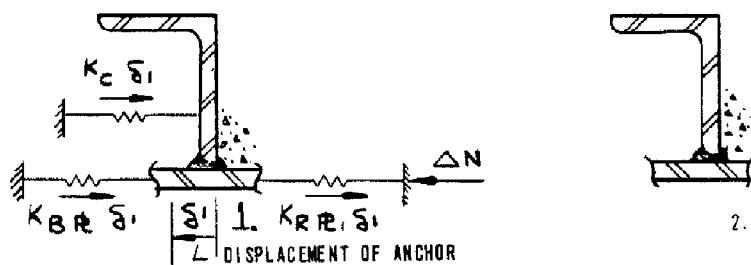
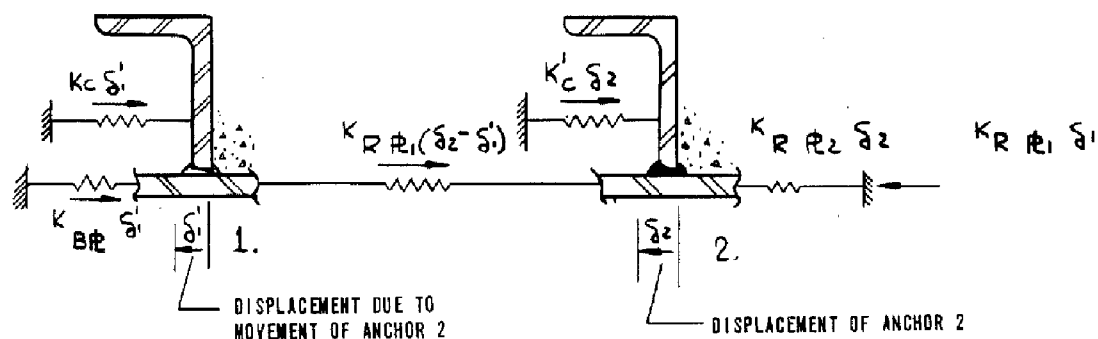
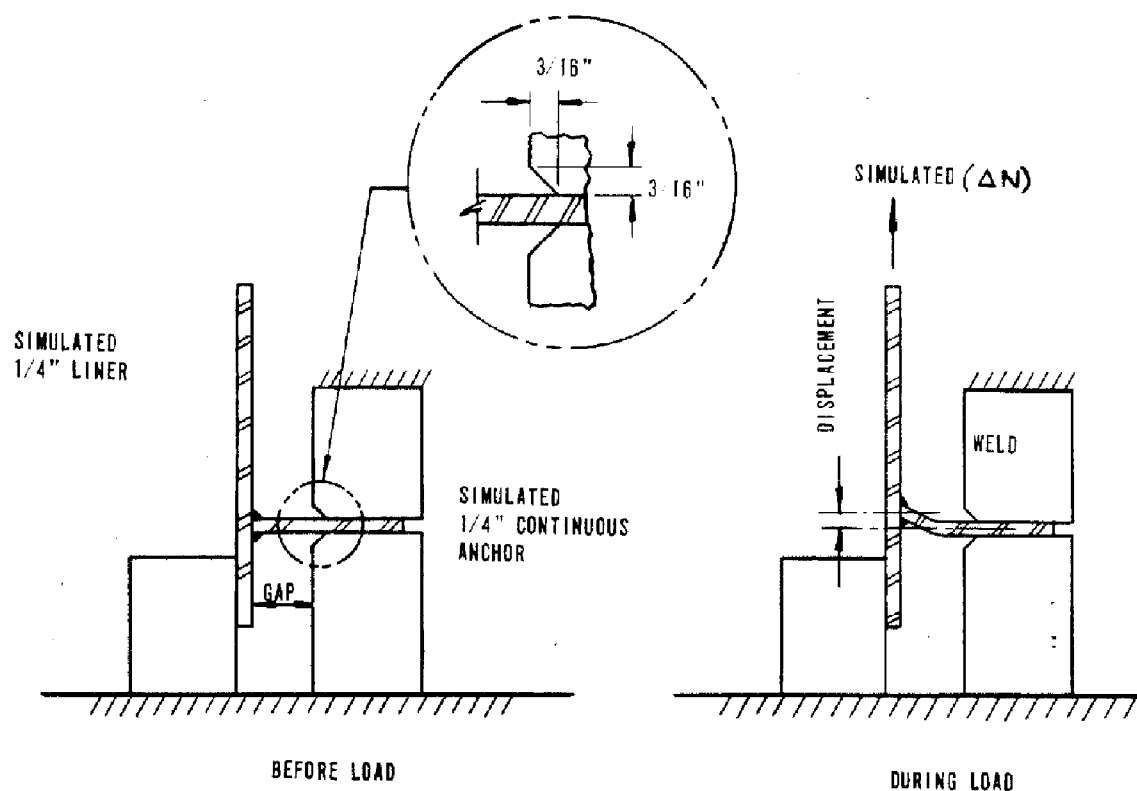


Figure 3-35. Reactor Building - Results from Tests on Liner Plate Anchors



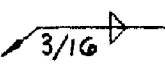
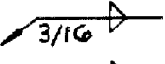
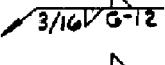
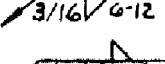

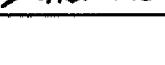
WELD CONFIGURATION	GAP (IN)	ULTIMATE LOAD (K/IN)	ULTIMATE DISPLACEMENT (IN)	LOCATION OF FAILURE
	0	14.95	.14	LINER PLATE
	5/8	5.56	.68	ANCHOR WELD
	0	7.65	.18	ANCHOR WELD
	5/8	2.93	.60	ANCHOR WELD
	0	6.67	.18	ANCHOR WELD
	5/8	2.46	.30	ANCHOR WELD

Figure 3-36. Location of Plugged Sheaths

Security Related Information
Figure withheld Under 10 CFR 2.390

Figure 3-37. Reactor Building Instrumentation for Unit 1

Security Related Information
Figure withheld Under 10 CFR 2.390

Security Related Information
Figure withheld Under 10 CFR 2.390

Security Related Information
Figure withheld Under 10 CFR 2.390

Security Related Information
Figure withheld Under 10 CFR 2.390

Figure 3-38. Turbine Building Cross-Section at Line 21

Security Related Information
Figure withheld Under 10 CFR 2.390

Figure 3-39. Deleted Per 1996 Update

Figure 3-40. Deleted Per 1996 Update

Figure 3-41. Deleted Per 1996 Update

Figure 3-42. Deleted Per 1996 Update

Figure 3-43. Deleted Per 1996 Update

Figure 3-44. Deleted Per 1996 Update

Figure 3-45. Deleted Per 1996 Update

Figure 3-46. Deleted Per 1996 Update

Figure 3-47. Deleted Per 1996 Update

Figure 3-48. Deleted Per 1996 Update

Figure 3-49. Deleted Per 2004 Update

Figure 3-50. Deleted Per 2004 Update

Figure 3-51. Deleted Per 2004 Update

Figure 3-52. Seismic, Thermal, and Dead Load Analytical Model for the Pressurizer Surge Line Piping (Units 2 and 3)

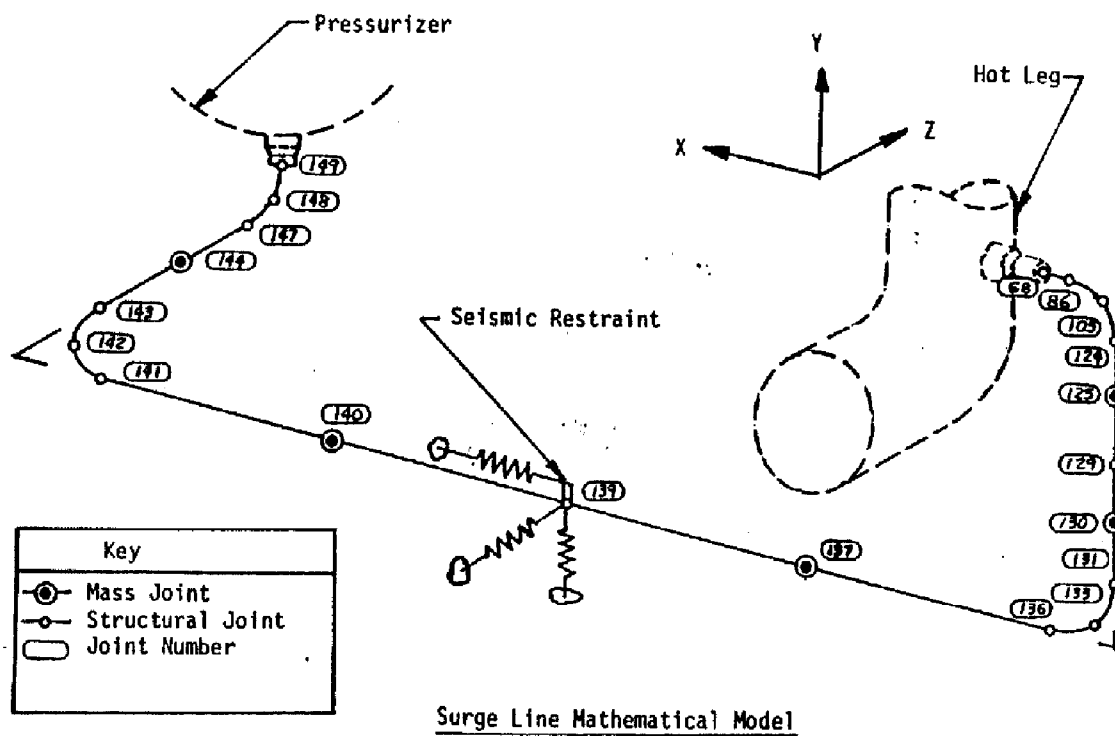


Figure 3-53. Deleted Per 2003 Update

Figure 3-54. Deleted Per 2003 Update

Figure 3-55. Deleted Per 2004 Update

Figure 3-56. Deleted Per 2004 Update

Figure 3-57. Directions and Velocities of the Coolant Flow in the Reactor

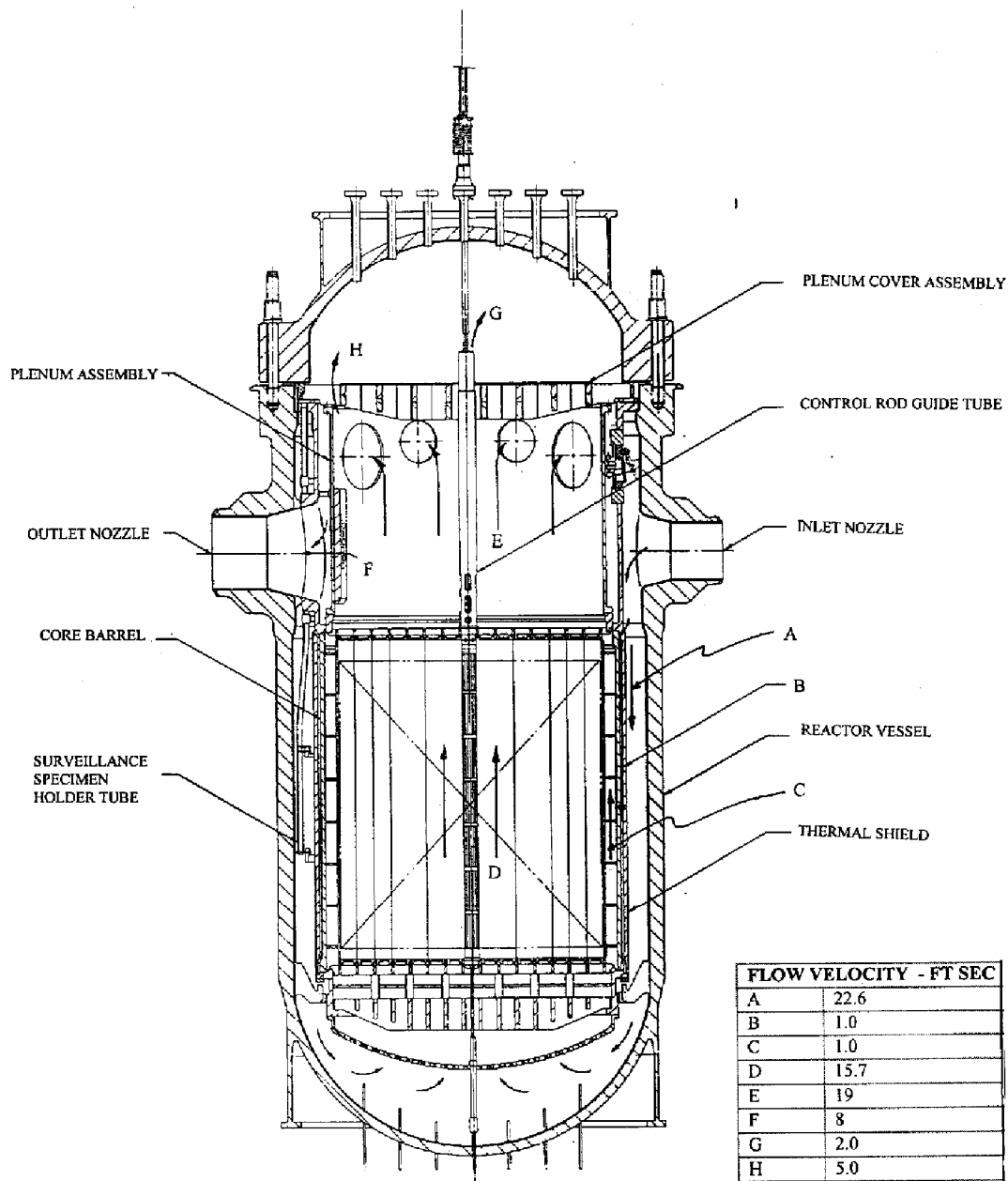
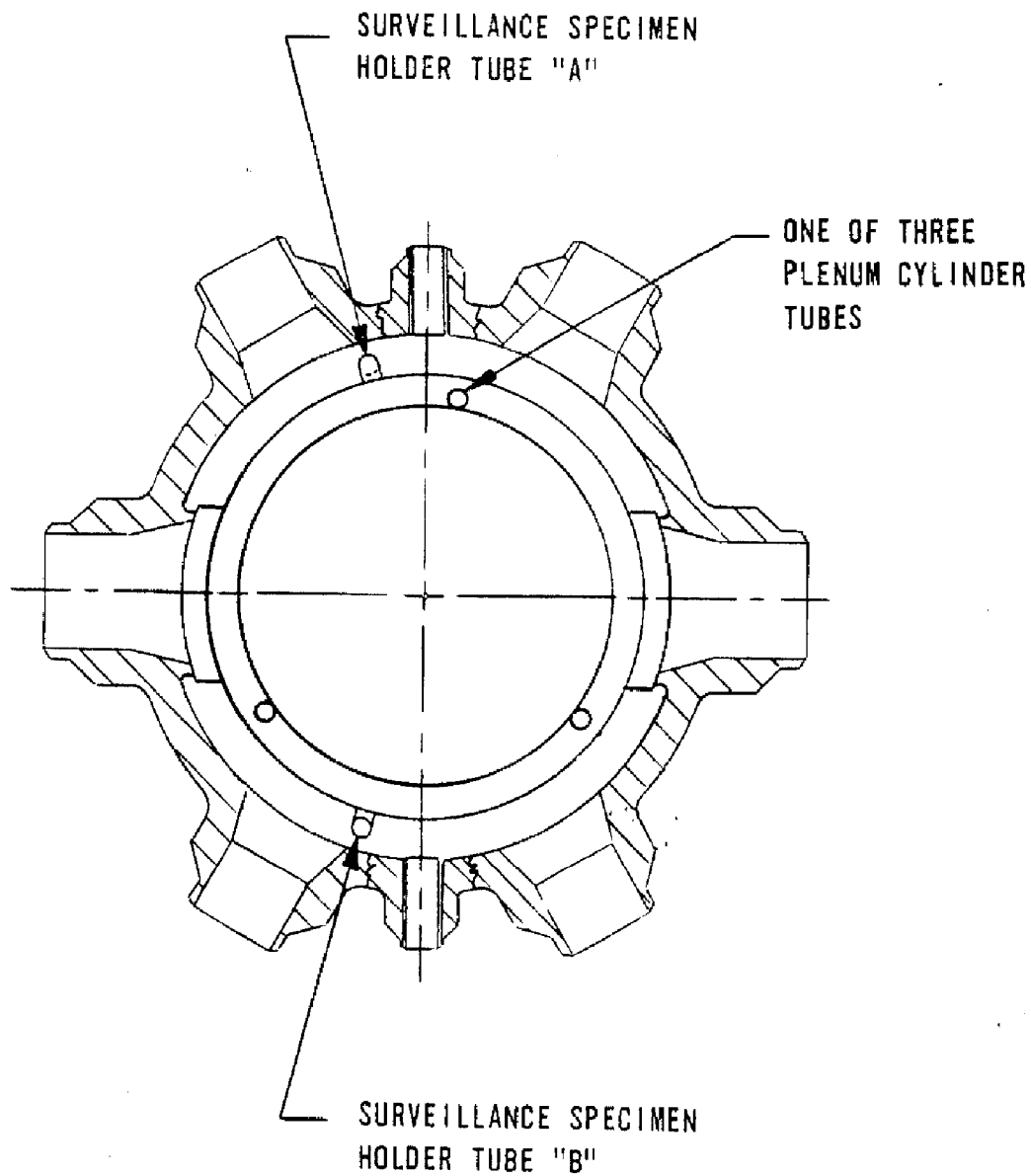
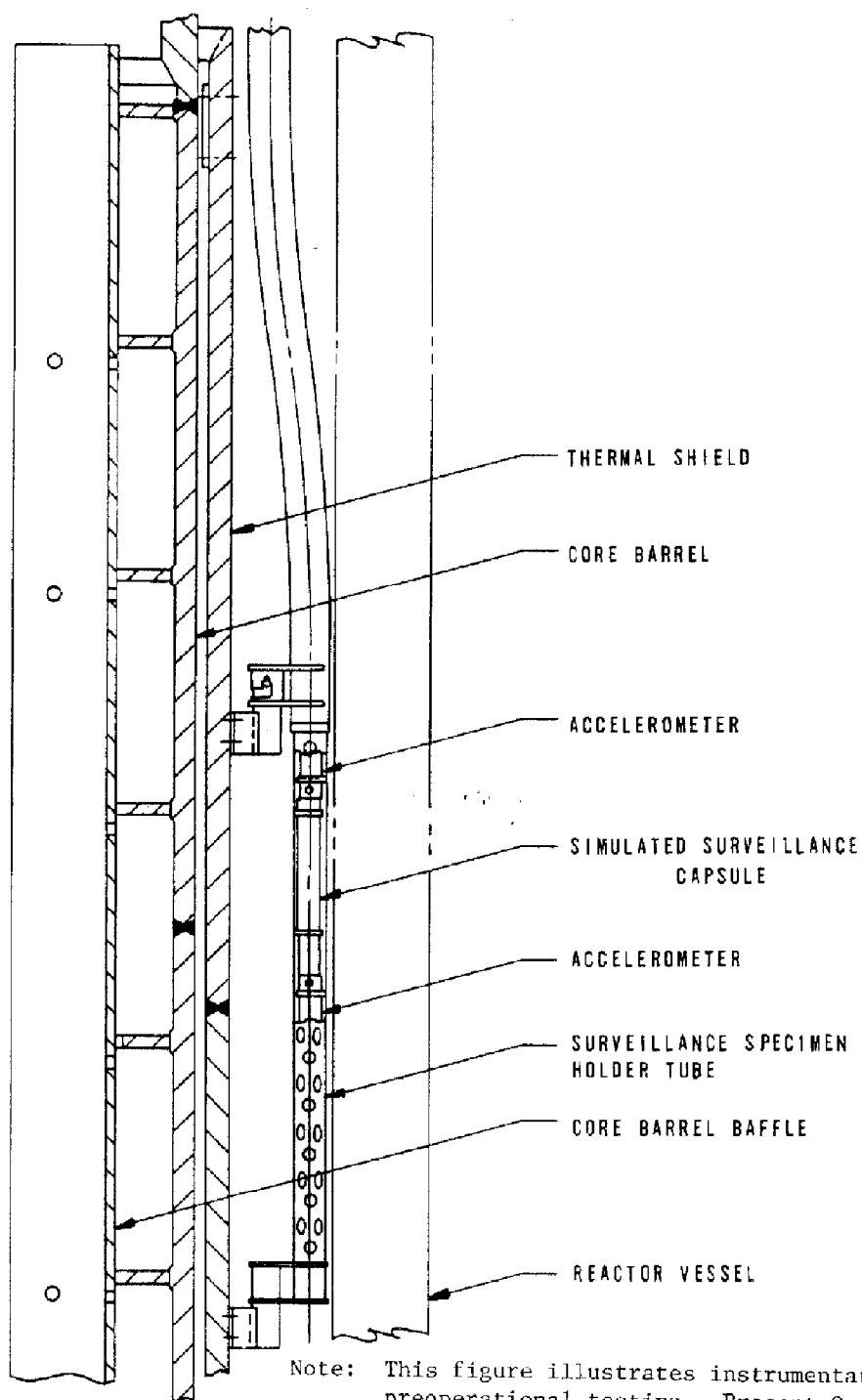


Figure 3-58. Location of Instrumentation Surveillance Specimen Holder Tubes and the Plenum Cylinder Tubes



Note: This figure illustrates location of instrumentation for preoperational testing. Present Oconee units do not use Specimen Holder Tubes. Instead, material samples are irradiated in a host reactor.

Figure 3-59. Location of the Instrumentation in the Specimen Holder Tube



Note: This figure illustrates instrumentation for preoperational testing. Present Oconee units do not use Specimen Holder Tubes. Instead, material samples are irradiated in a host reactor.

Figure 3-60. Location of the Accelerometer in Plenum Cylinder Tube

