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CALCULATION COVER SHEET

Calculation No: 59037-C-042

Project: WPPSS IPEEE

Calculation Title: Seismic Evaluation of the Reactor Bldg.

References: See p. 4

Attachments: A (10 pp), B (4 pp), C (4 pp), D (4 pp)

Total Number of Pages (Including Cover Sheet): 34 Excluding attachments

Revision Number	Approval Date	Description of Revision	Originator	Checker	Approver
0	8/11/96	Original Issue	PSH	AHC	RDG

9906220058 990617
PDR ADOCK 05000397
P PDR

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SHEET NO. 2/34

JOB NO. 59037 JOB [illegible] BY TSH DATE 7-10-94

CALC. NO. C-042 SUBJECT Reactor Bldg CHK'D [illegible] DATE 7-20-94

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0	17-94	Original Issue

2HD 289/wpsrb

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SHEET NO. 3/34

JOB NO. 59031 JOB WPPSS IPEEE BY PSH DATE 7-16-94

CALC. NO. C-042 SUBJECT Reactor Bldg CHK'D AHC DATE 7-20-94

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REFERENCES

1. Structural drawings S660, and S701 to S899.

2. "A Methodology for Assessment of Nuclear Power Plant Seismic Margin (Revision 1)," Electric Power Research Institute, EPRI NP-6041-SL, Revision 1, August 1991.

3. EQE Engineering Consultants, Calculation No. 59037-C-037, "IPEEE Building Forces", Revision 0.

4. WNP-2 Final Safety Analysis Report.

5. "Code Requirements for Nuclear Safety Related Concrete Structures (ACI 349-90) and Commentary - ACI 349R-90," American Concrete Institute, 1990.

6. Manual of Steel Construction, Allowable Stress Design, Ninth Edition, American Institute of Steel Construction, 1990.

7. Manual of Steel Construction, Load and Resistance Factor Design, First Edition, American Institute of Steel Construction, 1986.

8. EQE Engineering Consultants, Calculation No. 59037-C-005, "Reactor Building Model", Revision 0.

9. Pittsburgh-Des Moines Steel Company, Final Stress Report, Section II, Subsection 6, Revision C, "Design of Suppression Chamber Head and Inner Seismic Support Skirt," 1974.

10. Pittsburgh-Des Moines Steel Company, Final Stress Report, Section II, Subsection 7, Revision B, "Design of Outer Skirt," 1974.

11. "ASME Boiler and Pressure Vessel Code," Section III, Division 1, Appendices, American Society of Mechanical Engineers, 1977.

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SHEET NO. 5/34

JOB NO. 59037 JOB WPPSS RPEEE BY PSH DATE 25 Feb 94

CALC. NO. C-042 SUBJECT Reactor Bldg CHK'D MC DATE 2-20-94

OBJECTIVE

The objective of this calculation is to evaluate the seismic capacity of the reactor building. A seismic fragility for this building is needed if its median capacity and High Confidence of a Low Probability of Failure (HCLPF) capacity are less than about 1.5g and 0.5g, respectively.

SUMMARY

A preliminary review was performed to identify the more heavily loaded structural components of the reactor building (Reference 1). Based on this preliminary review, a subset of structural components was selected for more detailed evaluation.

High Confidence of a Low Probability of Failure (HCLPF) capacities for the selected components were calculated following the Conservative Deterministic Failure Margins (CDFM) method recommended in EPRI NP-6041-SL (Reference 2). Seismic responses for this evaluation were taken as the 84% values obtained by probabilistic response analyses performed for a peak ground acceleration of 0.50g (Reference 3). The following results were obtained:

Structural Component	HCLPF Capacity
Overturning moment on east exterior wall at EL 422'-3"	1.1g
Overturning moment on biological shield wall at EL 422'-3"	0.51g
Shear on biological shield wall at EL 471'-0"	0.68g
Overturning moment on containment vessel outer skirt	0.89g
Overturning moment on containment vessel inner skirt	0.51g
Shear on sacrificial shield wall-reactor pedestal interface	1.1g
Overturning moment on sacrificial shield wall-reactor pedestal interface	0.93g
Shear transfer from drywell floor to containment vessel	0.50g

It is noted that conservative approximations were included to simplify these calculations. More rigorous calculations could be performed to reduce these conservatisms and obtain HCLPF capacities even greater than those listed above.

It is concluded that the HCLPF capacity of the reactor building is greater than 0.50g.

PRELIMINARY REVIEW

A preliminary review was performed to identify a subset of reactor building structural components for which more detailed evaluations should be performed. This review consisted of (1) review structural drawings (Reference 1), the Final Safety Analysis Report (FSAR) (Reference 4), and reactor building seismic responses for IPEEE (Reference 3), and (2) approximate calculations to estimate seismic capacities of certain structural components.

The drawing review was performed to identify the seismic load paths and any potentially significant seismic vulnerabilities. In general, the reactor building, containment vessel, and containment internal structure were found to be of relatively rugged construction, and no obvious seismic vulnerabilities were identified.

Further review, including simplified calculations, were performed for the following components: (1) Shear walls, including the biological shield wall, (2) floor diaphragms, (3) containment vessel, including the inner and outer skirts and shear transfer to the concrete foundation in which it is embedded, (4) reactor pedestal, including shear, overturning moment, and its connection to the inner skirt, (5) sacrificial shield wall, including shear, overturning moment, and the interface with the reactor pedestal, (6) stabilizer truss, including the truss members, and connections to the sacrificial shield wall and containment vessel, and (7) connection from the drywell floor to the containment vessel.

Based on the preliminary review, the following structural components were selected for more detailed evaluation:

- Overturning moment on the east exterior wall and biological shield wall at Elevation 422'-3". Approximate calculations indicated that this is controlling location for overturning moment on the shear walls.

- Shear on the biological shield wall at Elevation 471'-0". Approximate calculations indicated that this is controlling location for shear on the shear walls.

- Overturning moment on the containment vessel outer skirt. The skirt anchors do not satisfy the ductile anchorage requirements of ACI-349-90 (Reference 5) Appendix B. The containment has higher seismic capacity than the skirt, because seismic stresses for IPEEE are relatively low.

- Overturning moment on the containment vessel inner skirt. The skirt anchors do not satisfy the ductile anchorage requirements of ACI 349-90 Appendix B. The reactor pedestal has higher seismic capacity than the skirt.

- Shear and overturning moment at the sacrificial shield wall reactor pedestal interface. The sacrificial shield wall anchors do not satisfy the ductile anchorage requirements of ACI 349-90 Appendix B. This connection has been identified as being seismically vulnerable in past seismic PRAs.

- Connection between the drywell floor and containment vessel.

More detailed evaluation of the stabilizer truss at the top of the sacrificial shield wall was not considered necessary. Past seismic PRAs have found stabilizer trusses to have lower seismic capacities than other reactor building components. However, the stabilizer for WNP-2 and its connections are relatively heavy and have seismic capacities at least those for the other structural components.

TECHNICAL APPROACH

HCLPF capacities for the selected reactor building structural components were calculated following the Conservative Deterministic Failure Margins (CDFM) approach recommended in EPRI NP-6041-SL (Reference 2).

Seismic demands on the structural components were based on 84% responses for a 0.50g peak ground acceleration calculated for use in IPEEE in Reference 3.

Seismic capacities of the structural components were determined following acceptance criteria recommended by EPRI NP-6041-SL. These acceptance criteria are specified in appendices to EPRI NP-6041-SL, ACI 349-90 (Reference 5), AISC Specifications (Reference 6), or the Load and Resistance Factor Design (LRFD) Specifications (Reference 7).

Following the recommendations of EPRI NP-6041-SL, an inelastic energy absorption factor of 1.25 was conservatively assigned to ductile failure modes in lieu of performing a more rigorous calculation.

Overturning Moment On East Exterior Wall At EL 422'-3"

Overturning Moment Demand

Flexibility of the shear walls is controlled by shear, rather than bending. Overall structure shears and, consequently, overturning moments, can be distributed to the walls in proportion to their shear areas. Distribution of the overall OT moment at EL 422'-3" will be conservatively based on the wall configuration at EL 470'. This conservatively neglects OT moments resisted by the various walls at the lower elevations.

+1σ overall OT moment = 4.54 x 10^5 (32.2) Elmt. 1, Component 5
≈ 1.46 x 10^7 k-ft Ref. 3 (Att. B)

Stiffness Properties At EL 470' (see pp. 46 to 49, Ref. 8 ; See Att. A)

Total N-S shear area = 1481 ft²

East wall is modeled by Segments 5 to 7. See p. 46, Ref. 8

Area of Seg. 4 = 2.5 (133)
≈ 333 ft²

∴ Area of Segments 4 to 7 = 714 ft²

Area of Segments 5 to 7 = 714 - 333
≈ 381 ft²

OT Moment on east wall = 1.46 x 10^7 (381/1481)
≈ 3.89 x 10^6 k-ft

Overturning Moment Capacity

Compression Flange Width Based On Sect. 8.10.2, ACI 349-90 (Ref. 5)

1/4 span length

Equivalent span length = 2 x wall height
= 2 (605 - 422)
= 366 ft

1/4 L ≈ 1/4 (366)
≈ 91.5 ft

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Overhang of 8 x slab thickness

Thickness of intersecting wall = 4 ft } Dr. S759
Web thickness = 4 ft

$b_f = 8(4) + 4$

$= 36$ ft

Overhang of 1/2 distance to next web

$b_f = \frac{143}{2} + 4$

$= 75.5$ ft

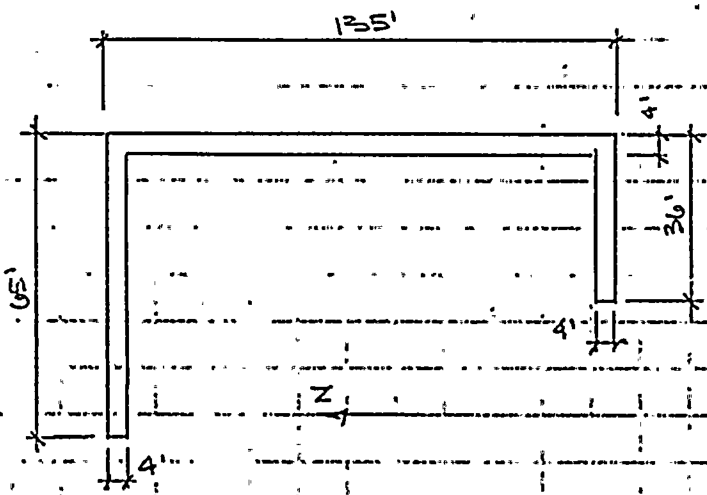
$b_f = 36$ ft

Tension Flange Width (North wall, lower red. than south wall)

Use 1/3 of wall height

$b_f = \frac{1}{3}(605 - 422) + 4$

$= 65$ ft



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Web

Conservatively neglect pilaster reinforcement, count only wall reinforcement. See Dr. S704

N.8 to N - #14@ 9" EF

N to M - #18@10" EF (neglect 9" spacing)

M to K - #14@ 8" OF, #14 @ 7" IF

K to H3 - #18@10" EF

$$A_{sw} = \frac{2(2.25)}{9}(24.83)(12) + \frac{2(4.00)}{10}(23.17)(12) + \left(\frac{2.25}{8} + \frac{2.25}{7}\right)(45)(12)$$

$$+ \frac{2(4.00)}{10}(37)(12)$$

$$= 1050 \text{ in}^2 \qquad (\bar{\rho} = 0.014)$$

Flange (North Wall, See Dr. S705)

Conservatively use #18 @12" OF, #14@ 8" IF

$$A_{sf} = \left(\frac{4.00}{12} + \frac{2.25}{8}\right)(65)(12)$$

$$= 479 \text{ in}^2$$

Moment Capacity

Conservatively neglect axial load, Assume centroid of compression force at mid-depth of compression flange.

$$\phi M_n = 0.90\left[1050(60)\left(\frac{135}{2} - \frac{4}{2}\right) + 479(60)(135 - 4)\right]$$

$$= 7.10 \times 10^4 \text{ k-ft}$$

HCLPF Capacity

Conservatively use $F_\mu = 1.25$ per EPRI NP-6041-SL

$$\text{HCLPF Capacity} = \frac{7.10 \times 10^4 (1.25)}{(3.89 \times 10^4)}(0.50g)$$

$$= 1.1g \quad > 0.50g \text{ ok}$$

Overturning Moment On Biological Shield Wall At EL 422'-3"

Overturning Moment Demand

See distribution to east exterior wall.

Shear area of biological shield wall = 717 ft² pp. 46 to 49, Ref. 8 See Att. A

OT Moment to biological shield wall = $1.46 \times 10^7 \left(\frac{717}{1431}\right)$

$= 7.32 \times 10^6$ k-ft

Overturning Moment Capacity

$R_o = 48'-2"$

$R_i = 40'-0"$ to inner skirt } Dr. S754

Vertical Reinforcement

See Drgs. S741, S754

Have 5-#11 @ 10" @ R = 47'-9 1/2" (360 sets of bars)

$A_s = 5(1.56)(360)$

$= 2810 \text{ in}^2$

Axial Load

Include weight of bio. shield wall only, reduced for vertical EQ.

EL 422'-3" to EL 493'

$R_o = 48'-2"$

$R_i = 43'-2"$

$W = 0.15\pi(48.17^2 - 43.17^2)(493 - 422)$

$\approx 15,300^k$

EL 493' to EL 572'

R_o tapers to 26'-8"

$W = 0.15\left(\frac{1}{3}\pi\right)(572-493)\{[48.17^2 + 48.17(26.17) + 26.17^2]$

$- [43.17^2 + 43.17(21.17) + 21.17^2]\}$

$= 12,900^k$

Total weight = 15,300 + 12,900

$= 28,200^k$

Ave vert ZPA = 0.53g Excel; Node 19, EL 500', 0.5g mean +10

$P_{eff} = 28,200 [1 - 0.4(0.53)]$
$= 22,200^k$

OT Moment Capacity

Approximate as sum of reinforcement yield force and effective weight factored by effective lever arm of 0.8 times average radius. (Conservative)

$0.1 f'_c A_g \approx 0.1(4) \pi (48.17^2 - 43.17^2)(144)$
$\approx 82,600^k$

$\frac{P}{0.1 f'_c A_g} = \frac{22,200}{82,600}$
≈ 0.27

$\phi = 0.9 - 0.2(0.27)$
≈ 0.85

$\bar{R} = 45.67'$

$\phi M_n \approx 0.85 [2810(60) + 22,200] (0.8)(45.67)$
$\approx 5.93 \times 10^6$ k-ft

HCLPF Capacity

Use conservative $F_\mu = 1.25$

HCLPF Capacity $= \frac{5.93 \times 10^6 (1.25)}{(7.32 \times 10^6)} (0.50g)$
$= 0.51g$

Shear On Biological Shield Wall At EL 471'-0"

Shear Demand:

See ST moment distribution to biological shield wall at EL 422'-3".

Total shear at EL 471' = 2.72×10³ (32.2) Emt. 4, Comp. 3, Ref. 3 (see Att. B)

= 87,600ᵏ

Shear to biological shield wall = $87{,}600 \left(\frac{717}{1431}\right)$

~ 43,800ᵏ

Shear Capacity

Follow approach in App. N of EPRI NP-6041-SL.

$R_o = 48'-2"$

$R_i = 43'-2"$

$f'_c = 4000$ psi

Reinf. – 4-#11 @ 10" horiz, 4-#11 @ 10" vert. .... Dr. 3791

$\rho_h = \rho_v = \frac{4(1.56)}{10(60)}$

$= 0.0104$

$(\rho \sigma_y)_{AVE} = 0.0104(60{,}000)$ Conservatively neglect axial compression

~ 624 psi

v_u = median ultimate shear stress .... Eqn. #'s, EPRI NP-6041-SL

$= 0.8\sqrt{f'_c} + (\rho\sigma_y)_{AVE} \le 21.1\sqrt{f'_c}$ (N-2)

$= 0.8\sqrt{4000} + 624$

$= 675$ psi $< 21.1\sqrt{f'_c} = 21.1\sqrt{4000} = 1334$ psi

V_u = Shear capacity

$= \frac{\phi v_u \pi D t}{\alpha}$ (N-1)

$\phi = 0.85$

$\alpha = 2.5$ Conservative Upper bound value

$D = 48.17 + 43.17$

~ 91.33 ft

$t = 5$ ft

$$V_U = \frac{0.85(0.675)\pi(91.33)(5)(144)}{2.5}$$

$= 47,400^k$ Conservative.

HCLPF Capacity

$F_\mu = 1.25$ p. N-7, EPRI NP-6041-SL

$$\text{HCLPF Capacity} = \frac{47,400}{43,800}(1.25)(0.50g)$$

$= 0.68g$ Conservative

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JOB NO. 59037 JOB WPPSS IPEEE BY PSH DATE 7-14-94

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Overturning Moment On Containment Vessel Outer Skirt

Design details and calculations available in Pittsburgh-Des Moines (PDM) calcs, Sect. II, Subsections 6 and 7 (Refs 9 & 10). See Att. C

Overturning Moment Demand

Seismic Loads At Base of Containment, Elmt. 12 (see Att. B)

OT moment = 1.14 x 10⁴ (32.2) Elmt. 12, Force Comp. 5

= 367,000 k-ft

Axial force = 70.4 (32.2) Force Comp. 1

= 2270 k

Note: SSE design moment was 650,000 k-ft, PDM p. II-7-4.

Overturning Moment Capacity

Anchor Bolts to Foundation

Have 2-2½" ϕ A307 A.B @ 2.5°. Determine capacity per Sect. N of AISC Specs. (Ref. 6); factor allowable tensile stress of 20 ksi by 1.7,

$F_u = 1.7(20)$
$= 34$ ksi

$A_b = \frac{\pi}{4}(2.5)^2$
$= 4.91$ in²

$P_{ult} = 2(4.91)(34)$
$= 334^k$ / 2 bolts

7½" x 2¼" x 1'-3⅜" Anchor Plate

Check per Sect B.4.5.2, ACI 349-90 (Ref. 5)

a. Bearing area = 7.5(15.38) - 2(4.91)
= 105 in²

2.5 x Bolt area = 2.5(2)(4.9)
= 25 in² < 105 in² ok

b. Anchor head thickness = 2.25"
Dimension from outermost edge of PL to face of A.B.

$= \frac{7.5}{2} - \frac{2.5}{2} = 2.5"$
or $= 7.49 - 3.94 - \frac{2.5}{2} = 2.5"$ } > 2.25"

Doesn't quite satisfy, but ok since Heavy Hex nuts on back side of PL (see 1990 supplement for ACI 349).

c. Bearing area approximately uniformly distributed - ok.

Concrete Pullout

Check per B.4.2 of ACI 349-90

Bolts spaced at 2½°

R = 40'

Bolt hoop spacing $= \frac{2.5}{180} \pi (40)(12)$

$= 20.9$ in

Embedment depth = 36 - 2.25 — Anchor PL

$= 33.75"$

Effective stress area $= (33.75 + 15.38 + 33.75)(20.9) - 7.5(15.38)$ — Anchor PL

≈ 1620 in²

$\phi = 0.65$

$f'_c = 4000$ psi

$P_c = 0.65(4\sqrt{4000})(10^{-3})(1620)$

$\approx 266^k$ / 2 bolts

Concrete pullout capacity req'd for ductile design (Sect. B.5.1.1, ACI 349-90)

Tensile stress area = 4.00 in² 2½" φ bolt

f_{ut} = Tensile strength

= 60 ksi A307

$P_{req'd} = 4.00(60)(2)$

$\approx 480^k$/2 bolts > 266^k

Note - PDM (Sub. 7, pp. 14) designed embedment for a force of 250^k using punching shear strength ($\phi = 0.85$)

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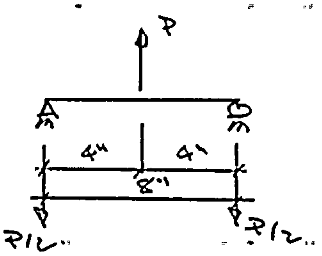
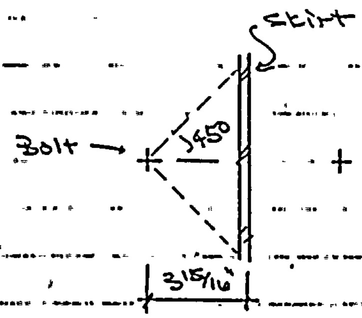
Skirt Bottom Plate:

Plate is 3" x 17", fabricated of SA-516, Grade 70 steel. Model as a one-way member, simply supported at the bolt ℄, subjected to an upward force at the skirt ℄.





$M_{max} = \frac{PL}{4}$

$P_{ult} = \frac{4M}{L}$

$= 0.5M$ M in k-in

Use plastic moment capacity. Assuming load spreads from bolt ℄ at 45° from axis orthogonal to skirt, use a plate effective width equal to two times the distance from the bolt ℄ to skirt ℄ ≈ 2(4) = 8"

$F_y = 38$ ksi SA 516, Gr. 60 ASME (Ref. 11)

$M_p = \frac{1}{4}(8)(3)^2(38)$

$= 684$ k-in

$P_{ult} = 0.5(684)$

$= 342$ k/2 bolts

Skirt itself and welds are ok by inspection. Anchorage uplift capacity is limited by non-ductile concrete pullout.

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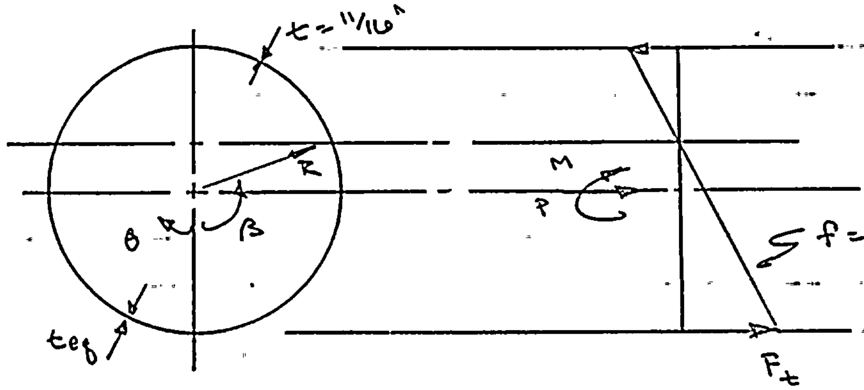
OT Moment Capacity

Represent the skirt as a circular ring. In compression, the actual skirt thickness (11/16") is applicable. In tension, use the equivalent thickness based on the A.B. area. Conservatively neglect uplift resistance from axial compression. Determine the moment capacity at which concrete pullout occurs.



$$f = F_t \frac{R\cos\theta - R\cos\beta}{R\cos 0 - R\cos\beta} = F_t \frac{\cos\theta - \cos\beta}{1 - \cos\beta}$$

$$\frac{P}{2} = \int_0^\beta F_t \frac{\cos\theta - \cos\beta}{1-\cos\beta} t_{eq} R\, d\theta + \int_\beta^\pi F_t \frac{\cos\theta - \cos\beta}{1-\cos\beta} t R\, d\theta$$

$$= \frac{F_t R}{1-\cos\beta}\left[t_{eq}\int_0^\beta (\cos\theta - \cos\beta)\, d\theta + t\int_\beta^\pi (\cos\theta - \cos\beta)\, d\theta\right]$$

$$= \frac{F_t R}{1-\cos\beta}\left[t_{eq}(\sin\theta - \theta\cos\beta)\Big|_0^\beta + t(\sin\theta - \theta\cos\beta)\Big|_\beta^\pi\right]$$

$$= \frac{F_t R}{1-\cos\beta}\left[t_{eq}(\sin\beta - \beta\cos\beta) + t(-\pi\cos\beta - \sin\beta + \beta\cos\beta)\right]$$

$$= \frac{F_t R}{1-\cos\beta}\left[(t_{eq} - t)(\sin\beta - \beta\cos\beta) - t\pi\cos\beta\right]$$

$P = 0$

$$(t_{eq} - t)(\sin\beta - \beta\cos\beta) - t\pi\cos\beta = 0 \qquad (1)$$

$$\frac{M}{2} = \int_0^\beta F_t \frac{\cos\theta - \cos\beta}{1-\cos\beta} t_{eq} (R\cos\theta) R\, d\theta$$

$$+ \int_\beta^\pi F_t \frac{\cos\theta - \cos\beta}{1-\cos\beta} t (R\cos\theta) R\, d\theta$$

$$= \frac{F_t R^2}{1-\cos\beta}\left[t_{eq} \int_0^\beta (\cos^2\theta - \cos\beta\cos\theta) d\theta \right.$$

$$\left. + t \int_\beta^\pi (\cos^2\theta - \cos\beta\cos\theta) d\theta \right]$$

$$= \frac{F_t R^2}{1-\cos\beta}\left[t_{eq} \left(\frac{\theta}{2} + \frac{1}{4}\sin 2\theta - \cos\beta\sin\theta\right)\Big|_0^\beta \right.$$

$$\left. + t \left(\frac{\theta}{2} + \frac{1}{4}\sin 2\theta - \cos\beta\sin\theta\right)\Big|_\beta^\pi \right]$$

$$= \frac{F_t R^2}{1-\cos\beta}\left[t_{eq} \left(\frac{\beta}{2} + \frac{1}{4}\sin 2\beta - \sin\beta\cos\beta\right) \right.$$

$$\left. + t \left(\frac{\pi}{2} - \frac{\beta}{2} - \frac{1}{4}\sin 2\beta + \sin\beta\cos\beta\right)\right]$$

$$= \frac{F_t R^2}{1-\cos\beta}\left[(t_{eq} - t)\left(\frac{\beta}{2} + \frac{1}{4}\sin 2\beta - \sin\beta\cos\beta\right) + t\frac{\pi}{2} \right]$$

$$M = \frac{2F_t R^2}{1-\cos\beta}\left[(t_{eq} - t)\left(\frac{\beta}{2} - \frac{1}{4}\sin 2\beta\right) + t\frac{\pi}{2} \right] \quad (2)$$

$R = 40\text{ ft} = 480''$

$t = 11/16'' = 0.688''$

$$t_{eq} = \frac{2(4.91)}{20.9} = 0.470''$$

$$F_t = \frac{P_c}{t_{eq}\, S} = \frac{266}{0.470(20.9)} = 27.1 \text{ ksi}$$

Solving for β by Eqn. 1

$\beta = 1.692$ rad. $(97°)$

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$$M = \frac{2(27.1)(480)^2}{1-\cos 1.692}\left\{(0.970-0.688)\left[\frac{1.692}{2}-\frac{1}{4}\sin 2(1.692)\right] + 0.688\frac{\pi}{2}\right\}$$

$= 9.84 \times 10^6$ k-in

$= 820,000$ k-ft

Use $\phi = 0.80$ Conservative

$\therefore \phi M = 0.80(820,000)$

$= 656,000$ k-ft

HCLPF Capacity

$F_\mu = 1.0$ since failure is non-ductile

$$\text{HCLPF Capacity} = \frac{656,000}{367,000}(0.50g)$$

$= 0.89g$

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Overturning Moment On Containment Vessel Inner Skirt

Follow calculation for outer skirt.

Overturning Moment Demand

Seismic Loads At Base of Reactor Pedestal, Elmt. 24 (see Att. 8)

OT moment = 7.75 x 10³ (32.2) · Force Comp. 5
= 250,000 k-ft

Axial force = 1.90 x 10¹ (32.2) " " 1
= 610 k

Axial force looks abnormally low. Factor internal structure + RPV mass (Ref. 8, see Att. A this calc) by average vertical ZPA

ΣMass, Nodes 56 to 67, 70, 72 to 78, 80 to 85, 86
= 72.0 + 48.3 + 26.4 + 32.3 + 118.1 + 29.1 + 31.7 + 16.5 + 32.5
+ 18.3 + 8.6 + 5.5 + 9.5 + 5.4 + 10.5 + 22.4 + 17.1 + 17.6
+ 10.8 + 8.0 + 22.0 + 13.1 + 18.2 + 14.7
= 609 k-sec²/ft

W = 19,600 k

Vertical ZPA, Node 60 (drywell floor) = 0.41 g
Seismic axial force = 19,600 (0.41)
≈ 8,000 k

Overturning Moment Capacity

Preliminary review shows that concrete pullout of the anchorage governs the uplift capacity although as shown below, the tensile capacity of the #11 bars from the reactor pedestal is very close.

Concrete Pullout

Bolt spacing = 40

Skirt radius = 12'-8"

Embedment depth = 6.5 (12) - 2.25 = 75.75"

Anchor PL - 18 3/8" wide, 9 segments total

EQE INTERNATIONAL

SHEET NO. 23/34

JOB NO. 52037 JOB [illegible] BY [illegible] DATE 1-16-98

CALC. NO. C-042 SUBJECT Reactor Bldg CHK'D [illegible] DATE 2-20-9[illegible]

Bolt loop spacing $= \frac{4}{180} \pi (152)$

$= 10.6''$

Effective stress area $= 10.6 (75.75 + 18.38 + 75.75) - 10.6 (18.38)$
$= 1610 \text{ in}^2$

$P_c = 0.65 (4\sqrt{4000}) (10^{-3}) (1610)$
$= 265^k / 2$ bolts

$q_u = \frac{265}{10.6}$
$= 25.0 ^k/\text{in}$

Reactor Pedestal Reinforcement

Have 4-#11 bars @ 5° cadwelded to upper skirt assembly (Dr. 5789).

$P_u = 0.90 (60) (4) (1.56)$ $\phi = 0.90$
$= 337^k / 4$ bars

Bar spacing $= \frac{5}{180} \pi (152)$

$= 13.3''$

$q_u = \frac{337}{13.3}$
$= 25.4 ^k/\text{in}$

Overturning Moment Capacity

Non-ductile concrete pullout capacity and ductile reinforcement yield capacity are about equal. Conservatively limit OT moment capacity to non-ductile concrete pullout capacity.

t = skirt thickness
$= 15/16''$ per PDM drawings. Note: Dr. 5740 calls out $1\frac{15}{16}''$ skirt thickness, PDM drawing conservatively used.

EQE INTERNATIONAL

SHEET NO. 24/34

JOB NO. 59037 JOB WPPSS [illegible] BY PSH DATE 7-16-94

CALC. NO. C-042 SUBJECT Reactor Bldg CHK'D [illegible] DATE 7-20-94

2-3"φ A.B @ 4°

$$t_{eq} = \frac{2(\frac{\pi}{4})(3)^2}{10.6}$$

$= 1.33" > t$ ⟹ Base stress distribution on elementary beam theory

Concrete pullout capacity, $q_u = 25.0$ k/in

Axial Compression

Assume 40% of vertical seismic acts concurrent

$P_{NET} = 9,600 - 0.4(8,000)$

$= 16,400$ k

$$q = \frac{16,400}{2\pi(152)}$$

$= 17.2$ k/in

$q_u = 25.0 + 17.2$

$= 42.2$ k/in

$M_{ult} = 42.2\pi(152)^2$

$= 3.06 \times 10^6$ k-in

$= 255,000$ k-ft

HCLPF Capacity

$F_\mu = 1.0$

$$\text{HCLPF Capacity} = \frac{255,000}{250,000}(0.50g)$$

$= 0.51g$

Note: This capacity is conservative, since the weight of the concrete above and below the containment vessel that further restrains uplift is conservatively neglected.

Shear Transfer From Sacrificial Shield Wall to Reactor Pedestal

Shear Demand

Forces in elements at this interface. As an approximation, scale the SSE reported in the FSAR (Ref. 4) by the maximum ratio of the mean+1σ ZPA for a 0.5g PGA to the SSE ZPA for the sacrificial shield wall nodes. See Atts. B and D

N-S SSE shear = 750ᵏ   Elmt. 26, Table 3.7-11, FSAR

SSE ZPA from Table 3.7-9, FSAR. 84% ZPA for 0.5g PGA from Ref. 3.

	SSE		IPEEE 0.5g PGA		
Elevation	Node #	ZPA	Node #	84% ZPA	84% ZPA/SSE ZPA
EL 567.38'	24	0.76g	66	0.81g	1.07
EL 519.56'	28	0.59g	62	0.54g	0.92

$V = 1.07(750)$
$= 803^k$

$V' = $ Max. unit shear $= 2\left(\frac{V}{2\pi R}\right)$ $R = 14$ ft
$= \frac{803}{\pi(14)(12)} = 1.52^k/in$

The SSE shear distribution (FSAR Table 3.7-11) indicates that shears at the top and bottom of the sacrificial shield wall are about equal. To check the shear demand above, estimate a shear as half of the total sacrificial shield wall mass times the average ZPA.

Σ Mass, Nodes 63 to 66 $= 16.5 + 32.5 + 18.3 + 8.6$
$= 76\ ^k\text{-}sec^2/ft$

Total sac. shield wall weight = 2400ᵏ
Avg. ZPA $= \frac{1}{2}(0.81g + 0.54g) = 0.68g$

$V = \frac{1}{2}(2400)(0.68)$
$= 830^k \approx 803^k$ Checks ok

Estimate the seismic axial force as the mass times the average vertical acceleration

Vert. ZPA, Node 46 = 0.49g
62 = 0.40g } See Att. B

ZPA = 0.45g

Axial force = 2400 (0.45)
= 1100 k

Shear Capacity - See Dwgs. S789, S792, S835

As shown below, tensile capacity of the sacrificial shield wall anchorage is limited by concrete pullout.

2 1/2" ϕ A.B., Mk. 91 (Dr. S792)

Assume A307. Per Dr. S660, have 2'-9" embedment, 1 1/4" x 6 1/2" x 6 1/2" anchor PL.

Have cluster of 4 bolts @ 15° (Dr. S835)

$A_s = \frac{\pi}{4}(2.5)^2$

$= 4.91 \text{ in}^2$

$P_{au} = 4(4.91)(34)$

$= 668^k / 4$ bolts, $\approx 167^k$/bolt.

Concrete Pullout

Radius to outermost A.B. for RPV = 10'-11" Dr. S792

" " innermost A.B. for sac. shield wall = 13'-4 3/4" } Dr. S835

" " outermost " " = 14'-6"

" " outside face of reactor pedestal = 15'-2" Dr. S789

Edge distance = (15'-2") - (14'-6") = 8"

Radial spacing between sac. shield wall A.B. = (14'-6") - (13'-4 3/4")
= 13 1/4"

Radial spacing between sac. shield wall + RPV A.B.
= (13'-4 3/4") - (10'-11") = 29 3/4"

Hoop spacing between A.B. of 4 bolt cluster $= 6°$

$= \frac{6}{180}\pi(14)(12)$

$= 17.6"$

Hoop spacing between A.B. of adjacent clusters $= 9°$

$= 26.4"$

Effective stress area $= (8+13.25+\frac{29.75}{2})(17.6+26.4) - 4(6.5)^2$

$= 1420 \text{ in}^2$

$P_c = 0.65(4\sqrt{4000})(10^{-3})(1420)$

$= 234^k/4 \text{ bolts} \qquad = 58^k/\text{bolt}$

Req'd capacity for ductile design (see outer skirt calc).

Req'd $P_c = 4(4.00)(60)$

$= 960^k/4 \text{ bolts} > 234^k/4 \text{ bolts}$

Side Cover

Check side cover per Commentary to Sect. B.5.1.1 of ACI 349-90

m = Side cover measured to bolt ℄

$= 8"$

Required $m = D\left(\frac{f_{ut}}{73\sqrt{f'_c}}\right)^{1/2}$

D = Bolt diameter = 2.5"

f_{ut} = Bolt tensile strength = 60,000 psi

f'_c = 4000 psi

Required $m = 2.5\left(\frac{60{,}000}{73\sqrt{4000}}\right)^{1/2}$

$= 9.0" > 8.0"$ provided

Doesn't meet ACI 349-90 criteria, but no worse than concrete pullout.

EQE INTERNATIONAL

SHEET NO. 28/34

JOB NO. 59037 JOB WPPSS IPEEE BY PSH DATE 7-16-94

CALC. NO. C-042 SUBJECT Reactor Bldg CHK'D [illegible] DATE 7-20-94

1 1/4" x 6 1/2" x 6 1/2" Anchor Plate

Check per Sect. B.4.5.2, ACI 349-90

a. Bearing area $= 6.5^2 - \frac{\pi}{4}(2.5)^2$

$\approx 37 \text{ in}^2$

$2.5 \times$ Bolt Area $= 2.5\,(4.9)$

$\approx 12 \text{ in}^2 < 37 \text{ in}^2$ ok

b. Anchor head thickness = 1.25"

Dimension from outermost edge of PL to face of A.B.

$= \frac{6.5}{2}\sqrt{2} - \frac{2.5}{2}$

$= 3.3" > 1.25"$ N.G.

Check Bearing per Sect. B.4.5.1, ACI 349-90

Check against Sect. 10.15, ACI 349-90

$A_2 = (8 + (\frac{13.25}{2}))(\frac{17.6 + 26.4}{2}) - 4.9$

$= 312 \text{ in}^2$

$A_1 = 6.5^2 - 4.9$

$= 37 \text{ in}^2$

$\sqrt{A_2/A_1} = (317/37)^{1/2}$

$= 2.9 > 2$

$P_u = \phi\,(0.85 f'_c A_1)\sqrt{A_2/A_1}$

$= 0.70\,(0.85)(4)(37)(2)$

$= 176^k$/bolt

Check Shear In Anchor PL at Face of Bolt

Per Sect. N, AISC Specs (Ref. 6)

$F_v = 0.55 F_y$

$F_y = 36^{ksi}$ Assume A36 steel

$P_u = 0.55\,(36)\,\pi\,(2.5)(1.25)$

$= 194^k$

EQE INTERNATIONAL

SHEET NO. 29/34

JOB NO. 59037 JOB WPPSS IPEEE BY PSH DATE 7-16-94

CALC. NO. C-042 SUBJECT Reactor Bldg CHK'D [illegible] DATE 7-20-94

7/8" ϕ Weld From PL to A.B.

Check per AISC Sect. 2.

Assume E70 electrodes. $f_u = 72^{ksi}$

$F_v = 0.3(72)$

$= 21^{ksi}$

$P_v = 1.7(21)\pi(2.5)\left(\frac{0.875}{\sqrt{2}}\right)$

$= 174^k$

Capacity of anchor PL (174k) is just barely equal to bolt capacity (167 k).

Shear Capacity

The shear capacity will based on shear-friction provided by the anchor bolts. The clamping force that can be developed will be limited by the concrete pullout capacity. Increased shear friction capacity due to axial compression will be included per Sect. 11.7.7 of ACI 349-90. Shear capacity of the studs shown in Sect. 2708, Dr. S792 will be conservatively neglected.

$V_n = A_{vf} f_y \mu$ Eqn. 11-26, ACI 349-90

$\phi = 0.85$

$\mu = 0.55$ for grouted interfaces per Sect. B.6.2.2.2, ACI 349-90

Anchor Bolts

4 bolts spaced at 15°. Ave. R ≈ 14 ft

$P_c = 234^k$

Cluster spacing $= \frac{15}{180}\pi(14)(12)$

$= 44"$

$q_u = \frac{234}{44}$

$= 5.32^{k/in}$

Axial Compression

Assume 40% of seismic axial force acts concurrent with max horiz. seismic.

$P_{DL} = 2400^k$

$P_{EQ} = 1100^k$

$P_{NET} = 2400 - 0.4(1100)$

$= 2000^k$

$q_{NET} = \frac{2000}{2\pi(14)(12)}$

$= 1.86\ ^k/_{in}$

$V_U = 0.85(0.55)(5.32 + 1.86)$

$= 3.36\ ^k/_{in}$

HCLPF Capacity

HCLPF Capacity $= \frac{3.36}{1.52}(0.50g)$

$= 1.1g$

EQE INTERNATIONAL

SHEET NO. 31/34

JOB NO. 59037 JOB URPSS IPEEE BY PSH DATE 7-16-94

CALC. NO. C-042 SUBJECT Reactor Bldg CHK'D AC DATE 7-20-94

Overturning Moment On Sacrificial Shield Wall – Reactor Pedestal Interface

Overturning Moment Demand

See shear evaluation.

SSE moment = 22,700 k-ft — Bottom of Elmt. 24, FSAR Table 3.7-12, See Att. D

$M = 1.07\,(22{,}700)$
$= 24{,}300$ k-ft

Overturning Moment Capacity

Use approach for outer skirt

$\bar{R} = 14$ ft $= 168''$

Equivalent Ring Thickness In Compression

Sac. shield wall moment of inertia $= 773$ ft^4 p. 180, Ref. 8
$= 1.60 \times 10^7$ in^4

$$t = \frac{1.60 \times 10^7}{\pi\,(168)^3}$$
$= 1.08''$

Equivalent Ring Thickness In Tension

4 – 2½" ø A.B @ 15°

$$t_{eq} = \frac{4\,(4.91)}{\frac{15}{180}\pi\,(168)} = 44''$$

$= 0.447''$

Limit bolt stress to concrete pullout capacity

$P_c = 234^k$ / 4 bolts

$$F_t = \frac{234}{0.447\,(44)}$$
$= 11.9$ ksi

EQE INTERNATIONAL

SHEET NO. 32/34

JOB NO. 59037 JOB WPPSS IPEEE BY PSH DATE 7-16-94

CALC. NO. C-042 SUBJECT Reactor Bldg CHK'D [illegible] DATE 7-20-94

β = 1.85 rad

$$M_{all} = \frac{2(11.9)(168)^2}{1-\cos 1.85}\left\{(0.447-1.08)\left[\frac{1.85}{2} - \frac{1}{4}\sin 2(1.85)\right] + 1.08\frac{\pi}{2}\right\}$$

$= 5.42 \times 10^5$ k-in

$= 45,200$ k-ft

<u>HCLPF Capacity</u>

$$\text{HCLPF Capacity} = \frac{45,200}{24,300}(0.50g)$$

$= 0.93g$

EQE INTERNATIONAL

SHEET NO. 33/39

JOB NO. 59037 JOB WPPSS IPEEE BY PSH DATE 7-16-94

CALC. NO. C-042 SUBJECT Reactor Bldg CHK'D DHC DATE 7-20-9

Shear Transfer From Drywell Floor to Containment Vessel

Shear Demand

Similar to sacrificial shield wall - reactor pedestal shear transfer, scale SSE shear by max. ratio of 84% ZPA for 0.5g PGA to SSE ZPA. See Attc. B and D

SSE Shear = 17,500ᵏ Dr. S799

Elevation	SSE Node	SSE ZPA	IPEEE, 0.5g PGA Node	84% ZPA	84% ZPA / SSE ZPA
EL 567.38'	24	0.76g	64	0.81g	1.07
EL 519.56'	26	0.59g	62	0.54g	0.92
EL 500	30	0.48g	60	0.52g	1.08
EL 448.33	34	0.31g	56	0.39g	1.26

Max ratio = 1.26

$V = 1.26(17,500)$

$= 22,000^k$

Have 36 lugs spaced at 10°. Dr S799

$$\text{Max } V/\text{lug} = \frac{22,000}{\frac{1}{2}(36)} = 1220^k/\text{lug}$$

Shear Capacity

Male Shear Lug - See Sect. 2334, Dr. S803

Estimate lug is about 9" x 11". Assume A36 steel,

$V_U = 0.55(36)(9)(11)$

$= 1,960^k$

EQE INTERNATIONAL

SHEET NO. 34/39

JOB NO. 59037 JOB: WPPSS [illegible] BY PSH DATE 7-16-9?

CALC. NO. C-042 SUBJECT Reactor Bldg CHK'D MC DATE 7-20-9?

7/8" φ x 3"/16" Nelson Studs – See Sect. 1845, Dr. S799; Sect. 1836, Dr. S805

Moment due to offset of load from centroid of stud pattern is taken out by the stiffer ring R at R = 38'-6 5/16", which acts as a lug. Conservatively assume studs take out all of tangential shear, neglecting resistance from embedded plates acting as lugs. Have 40 studs tributary to each lug (Dr. S803). Determine stud shear capacity per Sect. I5.3 of AISC LRFD Manual (Ref. 7).

$Q_n = 0.5 A_{sc} \sqrt{f'_c E_c} \leq A_{sc} F_u$ (I5-1)

A_{sc} = Stud cross-sectional area = 0.601 in²

f'_c = Concrete compressive strength = 4 ksi

F_u = Minimum specified stud tensile strength = 60 ksi (typ.)

E_c = Concrete modulus of elasticity

= $145^{1.5} \sqrt{4}$ LRFD

= 3500 ksi

$Q_n = 0.5 (0.601) [4 (3500)]^{1/2}$

= 35.6ᵏ/stud < $A_{sc}F_u$ = 0.601 (60) = 36.0ᵏ

Check Stud Spacing per I5.6, LRFD

Studs spaced at 7" > 6φ = 5 1/4" ok

The strength reduction, φ, for this application is not defined. Use a conservative value of 0.85

$V_u = 0.85 (35.6)(40)$

= 1210ᵏ

HCLPF Capacity

HCLPF Capacity = $\frac{1210}{1220}$ (0.50g)

≈ 0.50g

EQE INTERNATIONAL

SHEET NO. A1/

JOB NO. 59037 JOB WPPSS IPEEE BY PSH DATE 7-14-94

CALC. NO. C-042 SUBJECT Reactor Bldg CHK'D DATE 7-20-94

ATTACHMENT A

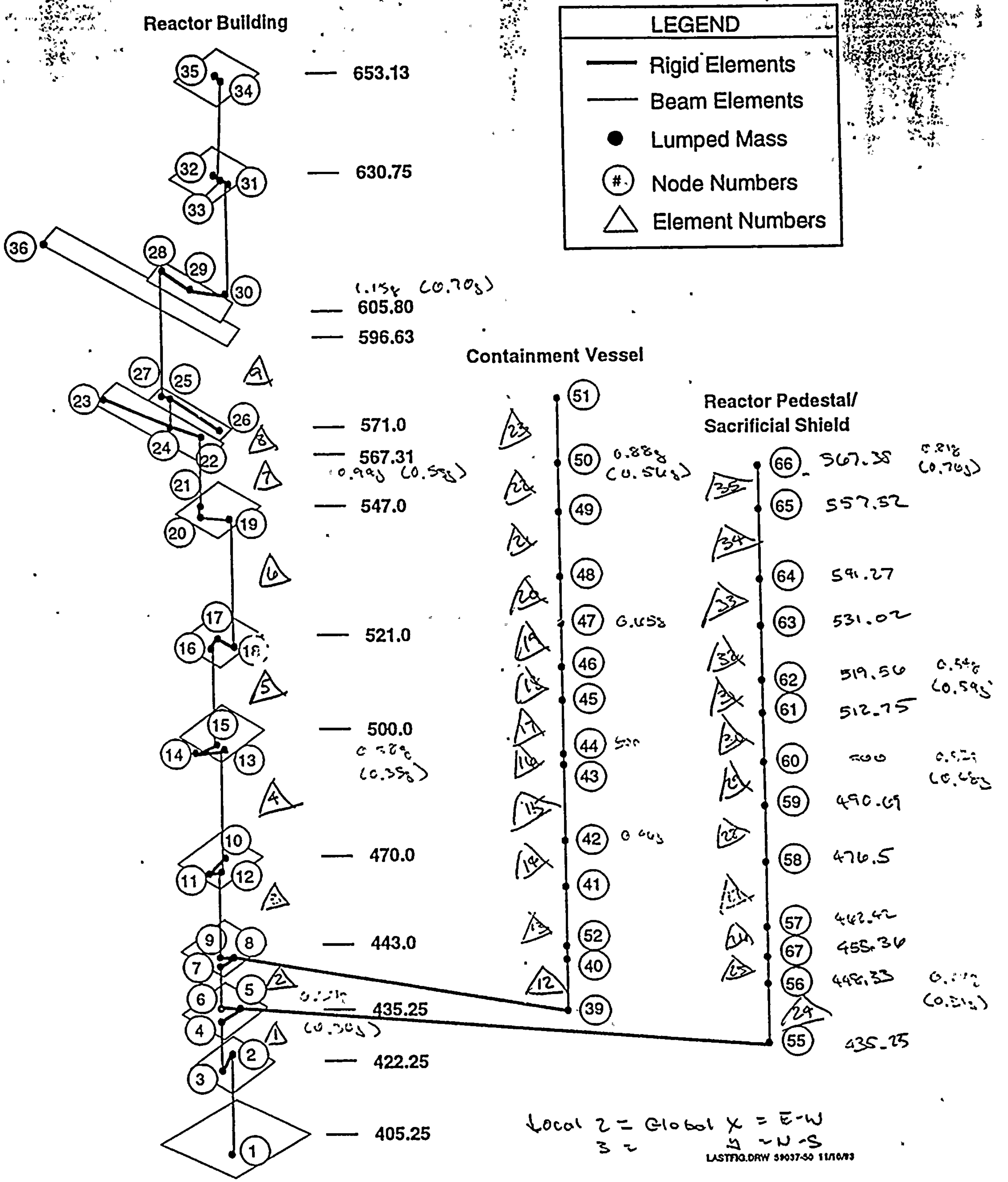
EXCERPTS FROM REFERENCE 8

(10 pp. total)

2HD 289/wpsrb

59037-C-042
Calc. 59037-C-005
Sheet 11

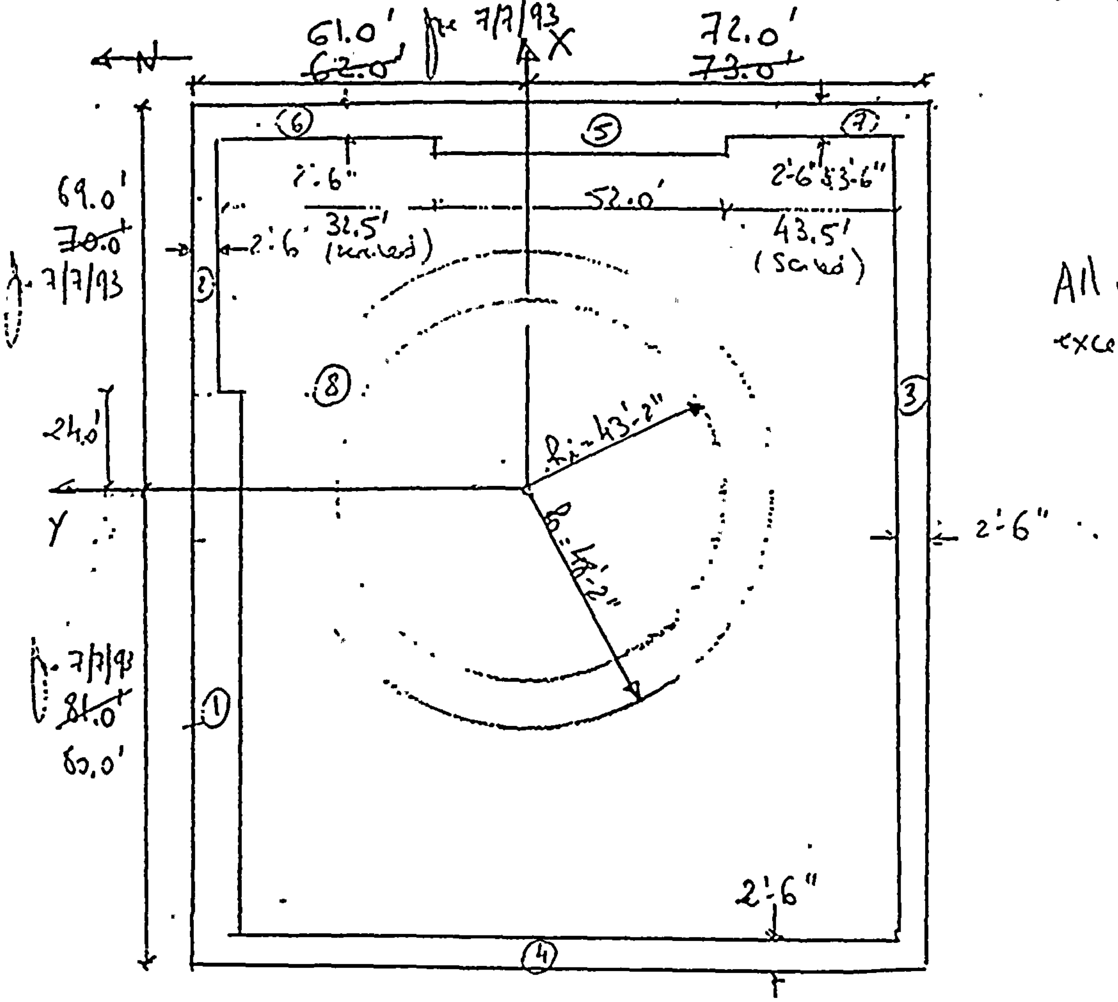
5.0 Summary



Local 2 = Global X = E-W
3 = Y = N-S

LASTFIG.DRW 59037-50 11/10/93

6.5) Section Properties between El. 470' and 500' (Ref. dwg S756)



All walls are 3' thick, except where noted.

Notes: 1) Elevator and staircase walls are neglected
2) walls smaller than 2' thick are neglected
3) Columns are neglected
4) Wall ⑦ is 2'-6" thick for a length of 23'-2".

59037-C-042

EQE

EQE ENGINEERING

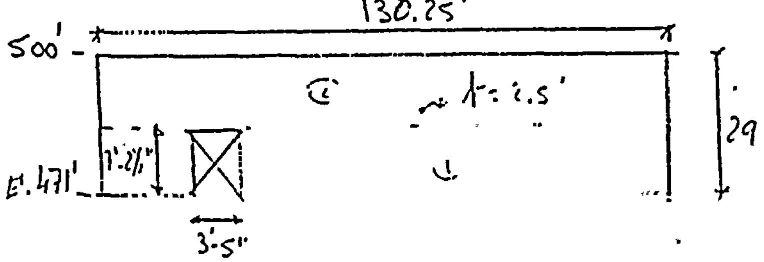
SHEET NO. 47

JOB NO. 59037.01 JOB WPPSS SSI Analysis BY [illegible] DATE 7/7/93

CALC. NO. C-005 SUBJECT Reaction Building Model CHK'D JMB DATE 7/19/93

Calculation of wall equivalent thickness

Wall 4 (Ref dwg S756)



Neglect bending

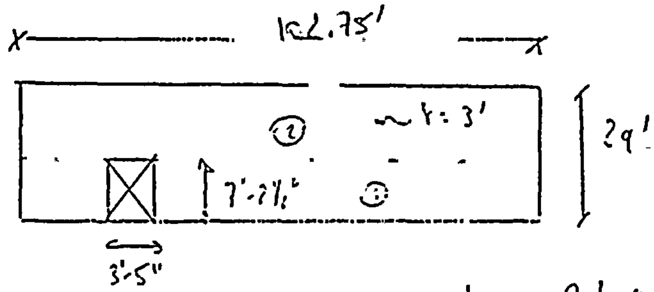
$\frac{K_1}{G} = \frac{(130.25 - 3.417) \times 2.5}{7.208} = 43.990$

$\frac{K_2}{G} = \frac{130.25 \times 2.5}{21.792} = 14.942$

$\frac{G}{K_{eq}} = \frac{G}{K_1} + \frac{G}{K_2} = 8.966e\text{-}2 = \frac{29}{130.25 \times t_{eq}}$

$\therefore t_{eq} = 2.48'$ $\therefore$ use $t = 2.5'$

Wall 1 (Ref dwg S756)



$K_1^* = \frac{(102.75 - 3.417) \times 3}{7.208} = 4.134e1$

$K_2^* = \frac{102.75 \times 3}{21.792} = 1.415e1$

$\frac{1}{K_{eq}} = 9.189e\text{-}2 = \frac{29}{102.75 \times t_{eq}}$ $\therefore t_{eq} = 2.975'$

$\therefore$ use $t = 3.0'$

59037-C-042

A5

EQE ENGINEERING

SHEET NO. 48

JOB NO. 59037.01 JOB Seismic Analysis of WPN-2 BY: [illegible] DATE 7/7/93

CALC. NO. -C-005 SUBJECT Reactor Building Model CHK'D: JMB DATE 7/19/93

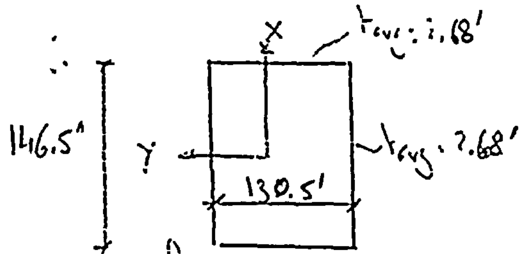
. For walls 1 → 7

$$A = 2.5 \times (33.75 + 23.17 + 146.5 + 43.75 + 130.25) + 3.0(52 + 102.75) + 3.5 \times 21.58$$

$$= 1483.3 \text{ ft}^2$$

. For walls 4, 5, 6 & 7, $t_{avg} = \left[\frac{3 \times 52 + 2.5(33.75 + 23.17) + 3.5 \times 21.58}{52 + 33.75 + 44.75} + 2.5\right] \times \frac{1}{2} = 2.68'$

. For walls 1, 2 & 3, $t_{avg} = \left[\frac{2.5 \times 43.75 + 3 \times 102.75}{146.5} + 2.5\right] \times \frac{1}{2} = 2.68'$



For X shear:

$$A_x = (149 + 45) \times 2.5 + 104 \times 3$$

$$= 797.0 \text{ ft}^2$$

For Y shear

$$A_y = (133 + 35 + 23.17) \times 2.5 + 52 \times 3 + 22.83 \times 3.5$$

$$= 713.8 \text{ ft}^2$$

WPPSS SSI ANALYSIS
REACTOR BUILDING MODEL
EL. 470' TO 500'

Calculation 59037-C-005

By [signature] Date 7/7/93

Checked [signature] Date 7/19/93

1. Calculation of Center of Rigidity

Wall	L or Ro (ft)	T (ft)	A (ft2)	Ax (ft2)	Ay (ft2)	X (ft)	Y (ft)	Ax*Y (ft3)	Ay*x (ft3)	A*X (ft3)	A*Y (ft3)
1 THRU 7	NA	NA	1483.30	797.00	713.80	-5.50	-5.50	-4384	-3926	-12232	-12232
8	48.17	5.0	1434.66	717.33	717.33	0.00	0.00	0	0	0	0
Sum			2917.96	1514.33	1431.13			-4384	-3926	-12232	-12232

Xs = -2.74 ft   Xa = -4.19 ft

Ys = -2.89 ft   Ya = -4.19 ft

2. Calculation of the Moments of Inertia

Wall	L or Ro (ft)	A (ft2)	Ax (ft2)	Ay (ft2)	xs (ft)	ys (ft)	xa (ft)	ya (ft)	Ixx (ft4)	Iyy (ft4)	Izz (ft4)
1 THRU 7	NA	1483.3	797.0	713.8	-2.76	-2.61	-1.31	-1.31	4.340E+06	5.162E+06	7.093E+06
8	48.17	1434.7	717.3	717.3	2.74	2.89	4.19	4.19	1.526E+06	1.526E+06	3.024E+06
Sum		2917.961	1514.33	1431.13					5.866E+06	6.688E+06	1.012E+07

59037-C-042 A16

WPPSS UNIT 2 SEISMIC ANALYSIS. REACTOR BUILDING MODEL, SSE DAMPING

122 4 0 70 1 0 150 2

1	1	1	1	1	1	1	-4.98	-6.83	405.50
2	0	0	0	0	0	0	-4.98	-6.83	422.25
3	2	2	2	2	2	2	-1.19	-1.45	422.25
4	5	5	5	5	5	5	-1.19	-1.45	435.25
5	0	0	0	0	0	0	-1.60	-5.26	435.25
6	5	5	5	5	5	5	-4.01	-4.36	435.25
7	8	8	8	8	8	8	-4.01	-4.36	443.00
8	0	0	0	0	0	0	-4.17	-6.23	443.00
9	8	8	8	8	8	8	-4.63	-4.94	443.00
10	11	11	11	11	11	11	-4.63	-4.94	470.00
11	0	0	0	0	0	0	-3.71	-0.76	470.00
12	11	11	11	11	11	11	-2.74	-2.89	470.00
13	14	14	14	14	14	14	-2.74	-2.89	500.00
14	0	0	0	0	0	0	-5.24	1.33	500.00
15	14	14	14	14	14	14	-3.59	-2.09	500.00
16	17	17	17	17	17	17	-3.59	-2.09	521.00
17	0	0	0	0	0	0	-4.06	-3.21	521.00
18	17	17	17	17	17	17	-0.71	-4.67	521.00
19	20	20	20	20	20	20	-0.71	-4.67	547.00
20	0	0	0	0	0	0	-5.06	-0.06	547.00
21	20	20	20	20	20	20	-6.74	-3.10	547.00
22	23	23	23	23	23	23	-6.74	-3.10	567.38
23	0	0	0	0	0	0	-26.05	0.42	567.38
24	23	23	23	23	23	23	-13.72	-2.05	567.38
25	26	26	26	26	26	26	-13.72	-2.05	571.00
26	0	0	0	0	0	0	-6.80	-1.06	571.00
27	26	26	26	26	26	26	-15.04	-1.59	571.00
28	29	29	29	29	29	29	-15.04	-1.59	505.88
29	0	0	0	0	0	0	-9.34	-1.64	605.88
30	29	29	29	29	29	29	-4.35	-5.50	605.88
31	32	32	32	32	32	32	-4.35	-5.50	630.75
32	0	0	0	0	0	0	-5.50	-5.50	630.75
33	32	32	32	32	32	32	-4.18	-5.50	630.75
34	35	35	35	35	35	35	-4.18	-5.50	653.13
35	0	0	0	0	0	0	-5.31	-5.31	653.13
36	0	0	0	0	0	0	-41.30	0.00	596.63
37	1	1	1	1	1	1	-41.30	1.00	596.63
38	1	1	1	1	1	1	-40.30	0.00	596.63
39	8	8	8	8	8	8	0.00	0.00	443.00
40	0	0	0	0	0	0	0.00	0.00	455.00
41	0	0	0	0	0	0	0.00	0.00	467.67
42	0	0	0	0	0	0	0.00	0.00	480.33
43	0	0	0	0	0	0	0.00	0.00	492.97
44	0	0	0	0	0	0	0.00	0.00	500.00
45	0	0	0	0	0	0	0.00	0.00	512.75
46	0	0	0	0	0	0	0.00	0.00	521.92
47	0	0	0	0	0	0	0.00	0.00	531.02
48	0	0	0	0	0	0	0.00	0.00	541.27
49	0	0	0	0	0	0	0.00	0.00	557.52
50	0	0	0	0	0	0	0.00	0.00	567.38
51	0	0	0	0	0	0	0.00	0.00	583.10
52	0	0	0	0	0	0	0.00	0.00	455.36
53	1	1	1	1	1	1	1.00	0.00	455.36
54	1	1	1	1	1	1	0.00	1.00	455.36
55	5	5	5	5	5	5	0.00	0.00	435.25
56	0	0	0	0	0	0	0.00	0.00	448.33
57	0	0	0	0	0	0	0.00	0.00	462.42
58	0	0	0	0	0	0	0.00	0.00	476.50
[illegible]	[illegible]	0	0	0	0	0	0.00	0.00	490.69
[illegible]	[illegible]	[illegible]	[illegible]	0	0	0	0.00	0.00	500.00
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	0	0.00	0.00	512.75
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	0.00	0.00	519.56
63	0	0	0	0	0	0	0.00	0.00	531.02
64	0	0	0	0	0	0	0.00	0.00	541.27
65	0	0	0	0	0	0	0.00	0.00	557.52
66	0	0	0	0	0	0	0.00	0.00	567.38
67	0	0	0	0	0	0	0.00	0.00	455.36
68	1	1	1	1	1	1	-1.00	0.00	455.36
69	1	1	1	1	1	1	0.00	-1.00	455.36
70	0	0	0	0	0	0	0.00	0.00	586.84
71	0	0	0	0	0	0	0.00	0.00	583.10
72	0	0	0	0	0	0	0.00	0.00	579.68
73	0	0	0	0	0	0	0.00	0.00	567.38
74	0	0	0	0	0	0	0.00	0.00	559.84
75	0	0	0	0	0	0	0.00	0.00	551.51
76	0	0	0	0	0	0	0.00	0.00	544.55
77	0	0	0	0	0	0	0.00	0.00	537.59
78	0	0	0	0	0	0	0.00	0.00	531.14
79	1	1	1	1	1	1	0.00	0.00	519.56
80	0	0	0	0	0	0	0.00	0.00	559.84
81	0	0	0	0	0	0	0.00	0.00	551.51
82	0	0	0	0	0	0	0.00	0.00	544.55
83	0	0	0	0	0	0	0.00	0.00	537.59
84	0	0	0	0	0	0	0.00	0.00	531.14
85	1	1	1	1	1	1	0.00	0.00	0.0
86	0	0	0	0	0	0	0.00	0.00	544.55
87	0	0	0	0	0	0	0.00	0.00	551.23
88	0	0	0	0	0	0	0.00	0.00	531.14
89	0	0	0	0	0	0	0.00	0.00	526.93
90	0	0	0	0	0	0	0.00	0.00	557.85
91	0	0	0	0	0	0	0.00	0.00	554.70
92	0	0	0	0	0	0	0.00	0.00	544.76
93	0	0	0	0	0	0	0.00	0.00	531.97
94	0	0	0	0	0	0	0.00	0.00	525.26
95	0	0	0	0	0	0	0.00	0.00	521.01
96	0	0	0	0	0	0	0.00	0.00	551.23
97	0	0	0	0	0	0	0.00	0.00	538.26
98	1	1	1	1	1	1	0.00	0.00	586.84
99	1	1	1	1	1	1	0.00	0.00	583.10
100	1	1	1	1	1	1	0.00	0.00	579.68
101	1	1	1	1	1	1	0.00	0.00	567.38
102	1	1	1	1	1	1	0.00	0.00	559.84
103	1	1	1	1	1	1	0.00	0.00	551.51
104	1	1	1	1	1	1	0.00	0.00	544.55
105	1	1	1	1	1	1	0.00	0.00	537.59
106	1	1	1	1	1	1	0.00	0.00	531.14
107	1	1	1	1	1	1	0.00	0.00	559.84
108	1	1	1	1	1	1	0.00	0.00	551.51
109	1	1	1	1	1	1	0.00	0.00	544.55
110	1	1	1	1	1	1	0.00	0.00	537.59
111	1	1	1	1	1	1	0.00	0.00	531.14
112	1	1	1	1	1	1	1000.00	-1.45	435.25
113	1	1	1	1	1	1	1000.00	-4.36	443.00
114	1	1	1	1	1	1	1000.00	-4.94	470.00
115	1	1	1	1	1	1	1000.00	-2.89	500.00
116	1	1	1	1	1	1	1000.00	-2.09	521.00
117	1	1	1	1	1	1	1000.00	-4.67	547.00
118	1	1	1	1	1	1	1000.00	-3.10	567.38
119	1	1	1	1	1	1	1000.00	-2.05	571.00
120	1	1	1	1	1	1	1000.00	-1.59	605.88
121	1	1	1	1	1	1	1000.00	-5.50	630.75
122	1	1	1	1	1	1	1000.00	0.00	0.00
2	36	28	0	2					
1	4.153E5			0.17				0.07	
2	4.176E6			0.30				0.07	
1	10486.92			8321.94		7910.59	2.054E+07	1.263E+07	1.467E+07

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2	5376.52	2827.66	2439.13	1.630E{07	1.064E+07	1.260E+07
3	4533.96	2474.83	1958.89	1.467E+07	9.623E+06	1.152E+07
4	2917.96	1514.33	1431.13	1.012E+07	5.866E+06	6.688E+06
5	3194.74	1292.91	1616.30	7.939E+06	5.599E+06	6.520E+06
6	2711.53	1414.70	1283.02	7.673E+06	4.823E+06	5.166E+06
7	2663.73	1377.80	1223.99	6.895E+06	4.238E+06	5.446E+06
8	2958.97	1581.55	1234.90	6.954E+06	4.095E+06	5.797E+06
9	3794.10	2042.05	1318.43	7.494E+06	4.557E+06	7.819E+06
10	23.73	2.532	3.219	2.357E+04	9.397E+04	5.236E+04
11	21.95	1.568	2.820	1.737E+04	8.646E+04	4.802E+04
12	36.66	18.33	18.33	6.787E+04	3.394E+04	3.394E+04
13	34.85	17.43	17.43	6.438E+04	3.219E+04	3.219E+04
14	32.77	16.39	16.39	6.067E+04	3.033E+04	3.033E+04
15	33.89	16.95	16.95	6.275E+04	3.137E+04	3.137E+04
16	38.23	19.12	19.12	6.743E+04	3.372E+04	3.372E+04
17	29.47	14.74	14.74	4.500E+04	2.250E+04	2.250E+04
18	33.04	16.52	16.52	4.258E+04	2.129E+04	2.129E+04
19	22.83	11.42	11.42	2.527E+04	1.263E+04	1.263E+04
20	20.13	10.07	10.07	1.873E+04	9.363E+03	9.363E+03
21	16.00	8.00	8.00	1.135E+04	5.673E+03	5.673E+03
22	10.23	5.12	5.12	5.372E+03	2.686E+03	2.686E+03
23	8.14	4.07	4.07	2.792E+03	1.396E+03	1.396E+03
24	564.15	347.50	347.50	8.048E+05	4.024E+05	4.024E+05
25	400.59	200.30	200.30	6.660E+04	3.330E+04	3.330E+04
26	456.58	228.29	228.29	7.188E+04	3.594E+04	3.594E+04
27	7.95	3.98	3.98	1;547e+03	7.733e+02	7.733e+02
28	1.0e6	1.0e6	1.0e6	1.0e9	1.0e9	1.0e9

1	3	4	112	1	1
2	6	7	113	1	2
3	9	10	114	1	3
4	12	13	115	1	4
5	15	16	116	1	5
6	18	19	117	1	6
7	21	22	118	1	7
8	24	25	119	1	8
9	27	28	120	1	9
10	30	31	121	2	10
11	33	34	121	2	11
12	39	40	122	2	12
13	40	41	122	2	13
14	41	42	122	2	14
15	42	43	122	2	15
16	43	44	122	2	16
17	44	45	122	2	17
18	45	46	122	2	18
19	46	47	122	2	19
20	47	48	122	2	20
21	48	49	122	2	21
22	49	50	122	2	22
23	50	51	122	2	23
24	55	56	122	1	24
25	56	67	122	1	24
26	67	57	122	1	24
27	57	58	122	1	24
28	58	59	122	1	24
29	59	60	122	1	25
30	60	61	122	1	25
31	61	62	122	1	26
32	62	63	122	2	27
33	63	64	122	2	27
34	64	65	122	2	27
35	65	66	122	2	27
36	1	2	122	1	28
2	15	15	0	4	

1	3.744e6	0.30			0.03	
2	4.032e6	0.30			0.03	
3	3.816e6	0.30			0.03	
4	1.656e6	0.42			0.03	
1	1.0e4	37.85	37.85	9.39E+03	4.70E+03	4.70E+03
2	1.0e4	37.85	37.85	9.39E+03	4.70E+03	4.70E+03
3	1.0e4	18.75	18.75	4.40E+03	2.20E+03	2.20E+03
4	1.0e4	18.75	18.75	4.40E+03	2.20E+03	2.20E+03
5	1.0e4	18.75	18.75	4.40E+03	2.20E+03	2.20E+03
6	1.0e4	18.75	18.75	4.40E+03	2.20E+03	2.20E+03
7	1.0e4	24.31	24.31	5.83E+03	2.91E+03	2.91E+03
8	1.0e4	24.31	24.31	5.83E+03	2.91E+03	2.91E+03
9	1.0e3	5.47	5.47	1.20E+03	5.99E+02	5.99E+02
10	1.0e3	4.75	4.75	7.84E+02	3.92E+02	3.92E+02
11	1.0e3	4.47	4.47	6.54E+02	3.27E+02	3.27E+02
12	1.0e3	4.47	4.47	6.54E+02	3.27E+02	3.27E+02
13	1.0e3	4.47	4.47	6.54E+02	3.27E+02	3.27E+02
14	1.0e3	4.52	4.52	5.73E-01	2.87E-01	2.87E-01
15	1.0e3	4.52	4.52	5.73E-01	2.87E-01	2.87E-01

1	70	71	122	1	1
2	71	72	122	1	2
3	72	73	122	1	3
4	73	74	122	1	4
5	74	75	122	1	5
6	75	76	122	1	6
7	76	77	122	1	7
8	77	78	122	1	8
9	62	78	122	2	9
10	80	81	122	3	10
11	81	82	122	3	11
12	82	83	122	3	12
13	83	84	122	3	13
14	81	86	122	3	14
15	86	83	122	3	15
2	12	12	0	4	

1	3.989e6	0.30			0.03	
2	4.032e6	0.30			0.03	
3	3.715e6	0.30			0.03	
4	1.627e6	0.42			0.03	
1	37.51	1.0e6	1.0e6	1.0e8	1.0e8	1.0e8
2	38.71	1.0e6	1.0e6	1.0e8	1.0e8	1.0e8
3	14.03	1.0e6	1.0e6	1.0e8	1.0e8	1.0e8
4	0.44	1.0e6	1.0e6	1.0e8	1.0e8	1.0e8
5	9.13	1.0e6	1.0e6	1.0e8	1.0e8	1.0e8
6	8.84	1.0e6	1.0e6	1.0e8	1.0e8	1.0e8
7	8.05	1.0e6	1.0e6	1.0e8	1.0e8	1.0e8
8	3.00	1.0e6	1.0e6	1.0e8	1.0e8	1.0e8
9	9.59	1.0e6	1.0e6	1.0e8	1.0e8	1.0e8
10	6.48	1.0e6	1.0e6	1.0e8	1.0e8	1.0e8
11	2.432e-2	1.0e5	1.0e5	1.0e6	1.0e6	1.0e6
12	3.882	1.0e6	1.0e6	1.0e8	1.0e8	1.0e8

1	87	88	122	1	1
2	88	89	122	1	2
3	89	62	122	2	3
4	90	91	122	3	4

```
  5   91   92  122    3    5
  6   92   93  122    3    6
  7   89   94  122    1    7
  8   94   95  122    1    8
  9   96   97  122    4    9
 10   97   95  122    3   10
 11   93   88  122    3   11
 12   93   94  122    3   12
  9    9    3    1
  1   23   50   24       0.03
 8.230e5
           8.230e5


-8.230e5
          -8.230e5


 8.230e5
           8.230e5


  2   50   66  122       0.03
 2.340e5
           2.340e5


-2.340e5
          -2.340e5


 2.340e5
           2.340e5


  3   44   60  122       0.07
 3.500e7
           3.500e7


-3.500e7
          -3.500e7


 3.500e7
           3.500e7
```

```
  4   66   73  122       0.03
 9.600e5
           9.600e5


-9.600e5
          -9.600e5


 9.600e5
           9.600e5


  5   51   71  122       0.03
 1.047e4
           1.047e4
                                 6.047e4
                                           6.047e4

-1.047e4
          -1.047e4
                                -6.047e4
                                          -6.047e4

 1.047e4
           1.047e4
                                 6.047e4
                                           6.047e4
  6   78   84  122       0.03
 1.0e10
           1.0e10
                      1.0e10
                                 1.250e8
                                           1.250e8
                                                     1.0e11


                                -1.250e8
                                          -1.250e8

 1.0e10
           1.0e10
                      1.0e10
                                 1.250e8
                                           1.250e8
                                                     1.0e11
  7   29   36            .005
 68.32
           67.89
                      1.0e6
                                 1.0e6
```

1.0e6
1.0e6
-68.32
-67.89

68.32
67.89
1.0e6
1.0e6
1.0e6
1.0e6
8 40 52 .005
271.8
271.8
1.0e6
1.0e6
1.0e6
1.0e6
-271.8
-271.8

271.8
271.8
1.0e6
1.0e6
1.0e6
1.0e6
9 67 52 .005
271.8
271.8
1.0e6
1.0e6
1.0e6
1.0e6
-271.8
-271.8

271.8
271.8
1.0e6
1.0e6
1.0e6
1.0e6

5	0	570.56	570.56	764.52	9.19E+05	8.93E+05	1.61E+06
8	0	475.39	475.39	543.77	1.01E+06	1.07E+06	2.10E+06
11	0	653.72	653.72	653.72	1.35E+06	1.52E+06	2.80E+06
14	0	587.14	587.14	587.14	1.09E+06	1.19E+06	2.23E+06
17	0	562.54	562.54	562.54	9.46E+05	1.13E+06	2.04E+06
20	0	570.98	570.98	570.98	9.58E+05	1.16E+06	2.09E+06
23	0	309.31	309.31	385.21	2.63E+05	5.00E+05	7.55E+05
26	0	650.92	650.92	622.76	7.73E+05	1.34E+06	2.05E+06
29	0	646.47	646.47	616.77	9.10E+05	1.34E+06	2.18E+06
32	0	42.84	42.84	42.84	1.57E+05	1.51E+05	3.05E+05
35	0	73.49	73.49	73.49	1.74E+05	2.12E+05	3.81E+05
36	0	23.21	27.22	0.00	0.00E+00	0.00E+00	0.00E+00

40	0	53.18	53.18	23.90	3.77E+04	3.77E+04	7.42E+04
41	0	11.12	11.12	11.12	1.04E+04	1:04E+04	2.04E+04
42	0	8.00	8.00	8.00	7.46E+03	7.46E+03	1.47E+04
43	0	5.78	5.78	5.78	5.36E+03	5.36E+03	1.06E+04
44	0	7.32	7.32	7.32	6.47E+03	6.47E+03	1.28E+04
45	0	24.82	24.82	24.82	1.74E+04	1.74E+04	3.43E+04
46	0	13.28	13.28	13.28	8.02E+03	8.02E+03	1.48E+04
47	0	6.44	6.44	6.44	3.33E+03	3.33E+03	6.56E+03
48	0	34.52	34.52	34.52	1.50E+04	1.50E+04	2.90E+04
49	0	8.74	8.74	8.74	2.70E+03	2.70E+03	5.16E+03
50	0	30.40	30.40	30.40	7.52E+03	7.52E+03	1.40E+04
51	0	8.06	8.06	8.06	1.13E+03	1.13E+03	1.99E+03
52	0	127.03	127.03	0.00	0.00E+00	0.00E+00	0.00E+00
56	0	72.00	72.00	27.70	2.03E+04	2.03E+04	3.86E+04
57	0	48.34	48.34	28.61	9.51E+03	9.51E+03	1.51E+04
58	0	26.40	26.40	26.40	2.94E+03	2.94E+03	4.13E+03
59	0	32.30	32.30	32.30	3.03E+03	3.03E+03	5.05E+03
60	0	118.10	118.10	125.20	9.64E+03	9.64E+03	1.85E+04
61	0	29.10	29.10	29.10	2.59E+03	2.59E+03	4.55E+03
62	0	31.74	31.74	31.74	2.86E+03	2.86E+03	5.46E+03
63	0	16.50	16.50	16.50	1.87E+03	1.87E+03	3.23E+03
64	0	32.50	32.50	32.50	3.75E+03	3.75E+03	6.37E+03
65	0	18.30	18.30	18.30	2.26E+03	2.26E+03	3.59E+03
66	0	8.55	8.55	8.55	8.86E+02	8.86E+02	1.68E+03
70	0	5.49	5.49	0.00	354.90	354.90	709.80
72	0	9.51	9.51	0.00	2458.30	2458.30	4916.60
73	0	5.63	5.63	0.00	1455.40	1455.40	2910.80
74	0	10.50	10.50	0.00	1215.00	1215.00	2430.00
75	0	22.35	22.35	0.00	1124.50	1124.50	2249.00
76	0	17.09	17.09	0.00	1147.70	1147.70	2295.40
77	0	17.64	17.64	0.00	1406.20	1406.20	2812.40
78	0	10.80	10.80	0.00	1763.00	1763.00	3526.00
80	0	8.01	8.01	0.00	834.60	834.60	1669.20
81	0	21.98	21.98	0.00	1003.50	1003.50	2007.00
82	0	13.09	13.09	0.00	159.00	159.00	318.00
83	0	18.21	18.21	0.00	1213.80	1213.80	2427.60
86	0	14.73	14.73	0.00	1455.60	1455.60	2911.20
87	0	0.00	0.00	35.37	0.00	0.00	
88	0	0.00	0.00	12.40	0.00	0.00	
89	0	0.00	0.00	2.39	0.00	0.00	
90	0	0.00	0.00	7.03	0.00	0.00	
91	0	0.00	0.00	6.16	0.00	0.00	
92	0	0.00	0.00	1.61	0.00	0.00	
93	0	0.00	0.00	5.55	0.00	0.00	
94	0	0.00	0.00	6.25	0.00	0.00	
95	0	0.00	0.00	10.21	0.00	0.00	
96	0	0.00	0.00	8.21	0.00	0.00	
97	0	0.00	0.00	10.65	0.00	0.00	

50.0

59037-C-042

EQE INTERNATIONAL

SHEET NO. B1

JOB NO. 59037 JOB WPPSS BPEEE BY PSH DATE 7-16-94

CALC. NO. C-042 SUBJECT Reactor Bldg CHK'D [illegible] DATE 7-20-9[illegible]

ATTACHMENT B

EXCERPTS FROM REFERENCE 3

(4 pp. total)

```
File: X:\WPPSS\REACTOR\IPEEE\50\SSINO.MSD                              Page: 1
Program: MSOPEAK VER 1.0
Version Date: 12-01-93 12:50

Input File Name: SSINO
─────────────── Input File Header ───────────────────
        PROGRAM SSIN, INTEL-80386/DOS VERSION 1.1P

        Compiler:  SVS C3 FORTRAN-77 Version 2.8.2, Release 1.1
        Compilation Date and Time:  12/17/93  09:08:57
        Execution Date and Time:    01/25/94  06:56:38

        Three-Dimensional Rigid Foundation SSI Response Analysis

        Reference EQE/EEC QA Project Number AA-QA-04


        CALCULATION NUMBER:  59037-C-024

        TITLE:       Reactor Building IPEEE Analysis


        PROBLEM DESCRIPTION:
        Reactor Building, IPEEE PGA-0.50g
─────────────────────────────────────────────────────

RESPONSE HEADERS

     1:   fdn  1   abs accel   x-translation
     2:   fdn  1   abs accel   y-translation
     3:   fdn  1   abs accel   z-translation
     4:   fdn  1   abs accel   xx-rotation
     5:   fdn  1   abs accel   yy-rotation
     6:   fdn  1   abs accel   zz-rotation
     7:   str  1  base force   x-shear force
     8:   str  1  base force   y-shear force
     9:   str  1  base force   vertical force
    10:   str  1  base force   xx- o.t.moment
    11:   str  1  base force   yy- o.t.moment
    12:   str  1  base force   torsional moment
    13:   str  1   abs accel   node   5  x-tran
    14:   str  1   abs accel   node   5  y-tran
    15:   str  1   abs accel   node   5  z-tran
    16:   str  1   abs accel   node   5  xx-rot
    17:   str  1   abs accel   node   5  yy-rot
    18:   str  1   abs accel   node   5  zz-rot
    19:   str  1   abs accel   node   8  x-tran
    20:   str  1   abs accel   node   8  y-tran
    21:   str  1   abs accel   node   8  z-tran
    22:   str  1   abs accel   node   8  xx-rot
    23:   str  1   abs accel   node   8  yy-rot
    24:   str  1   abs accel   node   8  zz-rot
    25:   str  1   abs accel   node  11  x-tran
    26:   str  1   abs accel   node  11  y-tran
    27:   str  1   abs accel   node  11  z-tran
    28:   str  1   abs accel   node  11  xx-rot
    29:   str  1   abs accel   node  11  yy-rot
    30:   str  1   abs accel   node  11  zz-rot
    31:   str  1   abs accel   node  14  x-tran
    32:   str  1   abs accel   node  14  y-tran
    33:   str  1   abs accel   node  14  z-tran
    34:   str  1   abs accel   node  14  xx-rot
    35:   str  1   abs accel   node  14  yy-rot
    36:   str  1   abs accel   node  14  zz-rot
```

```
File: X:\WPPSS\REACTOR\IPEEE\50\SSINO.MSD                              Page: 2
    37:   str  1   abs accel   node  17  x-tran
    38:   str  1   abs accel   node  17  y-tran
    39:   str  1   abs accel   node  17  z-tran
    40:   str  1   abs accel   node  17  xx-rot
    41:   str  1   abs accel   node  17  yy-rot
    42:   str  1   abs accel   node  17  zz-rot
    43:   str  1   abs accel   node  20  x-tran
    44:   str  1   abs accel   node  20  y-tran
    45:   str  1   abs accel   node  20  z-tran
    46:   str  1   abs accel   node  20  xx-rot
    47:   str  1   abs accel   node  20  yy-rot
    48:   str  1   abs accel   node  20  zz-rot
    49:   str  1   abs accel   node  23  x-tran
    50:   str  1   abs accel   node  23  y-tran
    51:   str  1   abs accel   node  23  z-tran
    52:   str  1   abs accel   node  23  xx-rot
    53:   str  1   abs accel   node  23  yy-rot
    54:   str  1   abs accel   node  23  zz-rot
    55:   str  1   abs accel   node  26  x-tran
    56:   str  1   abs accel   node  26  y-tran
    57:   str  1   abs accel   node  26  z-tran
    58:   str  1   abs accel   node  26  xx-rot
    59:   str  1   abs accel   node  26  yy-rot
    60:   str  1   abs accel   node  26  zz-rot
    61:   str  1   abs accel   node  29  x-tran
    62:   str  1   abs accel   node  29  y-tran
    63:   str  1   abs accel   node  29  z-tran
    64:   str  1   abs accel   node  29  xx-rot
    65:   str  1   abs accel   node  29  yy-rot
    66:   str  1   abs accel   node  29  zz-rot
    67:   str  1   abs accel   node  32  x-tran
    68:   str  1   abs accel   node  32  y-tran
    69:   str  1   abs accel   node  32  z-tran
    70:   str  1   abs accel   node  32  xx-rot
    71:   str  1   abs accel   node  32  yy-rot
    72:   str  1   abs accel   node  32  zz-rot
    73:   str  1   abs accel   node  35  x-tran
    74:   str  1   abs accel   node  35  y-tran
    75:   str  1   abs accel   node  35  z-tran
    76:   str  1   abs accel   node  35  xx-rot
    77:   str  1   abs accel   node  35  yy-rot
    78:   str  1   abs accel   node  35  zz-rot
    79:   str  1   abs accel   node  42  x-tran
    80:   str  1   abs accel   node  42  y-tran
    81:   str  1   abs accel   node  42  z-tran
    82:   str  1   abs accel   node  42  xx-rot
    83:   str  1   abs accel   node  42  yy-rot
    84:   str  1   abs accel   node  42  zz-rot
    85:   str  1   abs accel   node  47  x-tran
    86:   str  1   abs accel   node  47  y-tran
    87:   str  1   abs accel   node  47  z-tran
    88:   str  1   abs accel   node  47  xx-rot
    89:   str  1   abs accel   node  47  yy-rot
    90:   str  1   abs accel   node  47  zz-rot
    91:   str  1   abs accel   node  50  x-tran
    92:   str  1   abs accel   node  50  y-tran
    93:   str  1   abs accel   node  50  z-tran
    94:   str  1   abs accel   node  50  xx-rot
    95:   str  1   abs accel   node  50  yy-rot
    96:   str  1   abs accel   node  50  zz-rot
    97:   str  1   abs accel   node  56  x-tran
    98:   str  1   abs accel   node  56  y-tran
    99:   str  1   abs accel   node  56  z-tran
   100:   str  1   abs accel   node  56  xx-rot
   101:   str  1   abs accel   node  56  yy-rot
   102:   str  1   abs accel   node  56  zz-rot
```

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File: X:\WPPSS\REACTOR\IPEEE\50\SSINO.MSD                              Page: 3
   103:   str  1   abs accel   node  60  x-tran
   104:   str  1   abs accel   node  60  y-tran
   105:   str  1   abs accel   node  60  z-tran
   106:   str  1   abs accel   node  60  xx-rot
   107:   str  1   abs accel   node  60  yy-rot
   108:   str  1   abs accel   node  60  zz-rot
   109:   str  1   abs accel   node  62  x-tran
   110:   str  1   abs accel   node  62  y-tran
   111:   str  1   abs accel   node  62  z-tran
   112:   str  1   abs accel   node  62  xx-rot
   113:   str  1   abs accel   node  62  yy-rot
   114:   str  1   abs accel   node  62  zz-rot
   115:   str  1   abs accel   node  66  x-tran
   116:   str  1   abs accel   node  66  y-tran
   117:   str  1   abs accel   node  66  z-tran
   118:   str  1   abs accel   node  66  xx-rot
   119:   str  1   abs accel   node  66  yy-rot
   120:   str  1   abs accel   node  66  zz-rot
   121:   str  1  elmt force   elmt   1- 1 gp 1
   122:   str  1  elmt force   elmt   1- 2 gp 1
   123:   str  1  elmt force   elmt   1- 3 gp 1
   124:   str  1  elmt force   elmt   1- 4 gp 1
   125:   str  1  elmt force   elmt   1- 5 gp 1
   126:   str  1  elmt force   elmt   1- 6 gp 1
   127:   str  1  elmt force   elmt   1-11 gp 1
   128:   str  1  elmt force   elmt   1-12 gp 1
   129:   str  1  elmt force   elmt   2- 1 gp 1
   130:   str  1  elmt force   elmt   2- 2 gp 1
   131:   str  1  elmt force   elmt   2- 3 gp 1
   132:   str  1  elmt force   elmt   2- 4 gp 1
   133:   str  1  elmt force   elmt   2- 5 gp 1
   134:   str  1  elmt force   elmt   2- 6 gp 1
   135:   str  1  elmt force   elmt   2-11 gp 1
   136:   str  1  elmt force   elmt   2-12 gp 1
   137:   str  1  elmt force   elmt   3- 1 gp 1
   138:   str  1  elmt force   elmt   3- 2 gp 1
   139:   str  1  elmt force   elmt   3- 3 gp 1
   140:   str  1  elmt force   elmt   3- 4 gp 1
   141:   str  1  elmt force   elmt   3- 5 gp 1
   142:   str  1  elmt force   elmt   3- 6 gp 1
   143:   str  1  elmt force   elmt   3-11 gp 1
   144:   str  1  elmt force   elmt   3-12 gp 1
   145:   str  1  elmt force   elmt   4- 1 gp 1
   146:   str  1  elmt force   elmt   4- 2 gp 1
   147:   str  1  elmt force   elmt   4- 3 gp 1
   148:   str  1  elmt force   elmt   4- 4 gp 1
   149:   str  1  elmt force   elmt   4- 5 gp 1
   150:   str  1  elmt force   elmt   4- 6 gp 1
   151:   str  1  elmt force   elmt   4-11 gp 1
   152:   str  1  elmt force   elmt   4-12 gp 1
   153:   str  1  elmt force   elmt   5- 1 gp 1
   154:   str  1  elmt force   elmt   5- 2 gp 1
   155:   str  1  elmt force   elmt   5- 3 gp 1
   156:   str  1  elmt force   elmt   5- 4 gp 1
   157:   str  1  elmt force   elmt   5- 5 gp 1
   158:   str  1  elmt force   elmt   5- 6 gp 1
   159:   str  1  elmt force   elmt   5-11 gp 1
   160:   str  1  elmt force   elmt   5-12 gp 1
   161:   str  1  elmt force   elmt   6- 1 gp 1
   162:   str  1  elmt force   elmt   6- 2 gp 1
   163:   str  1  elmt force   elmt   6- 3 gp 1
   164:   str  1  elmt force   elmt   6- 4 gp 1
   165:   str  1  elmt force   elmt   6- 5 gp 1
   166:   str  1  elmt force   elmt   6- 6 gp 1
   167:   str  1  elmt force   elmt   6-11 gp 1
   168:   str  1  elmt force   elmt   6-12 gp 1
```

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File: X:\WPPSS\REACTOR\IPEEE\50\SSINO.MSD                              Page: 4
   169:   str  1  elmt force   elmt   7- 1 gp 1
   170:   str  1  elmt force   elmt   7- 2 gp 1
   171:   str  1  elmt force   elmt   7- 3 gp 1
   172:   str  1  elmt force   elmt   7- 4 gp 1
   173:   str  1  elmt force   elmt   7- 5 gp 1
   174:   str  1  elmt force   elmt   7- 6 gp 1
   175:   str  1  elmt force   elmt   7-11 gp 1
   176:   str  1  elmt force   elmt   7-12 gp 1
   177:   str  1  elmt force   elmt   8- 1 gp 1
   178:   str  1  elmt force   elmt   8- 2 gp 1
   179:   str  1  elmt force   elmt   8- 3 gp 1
   180:   str  1  elmt force   elmt   8- 4 gp 1
   181:   str  1  elmt force   elmt   8- 5 gp 1
   182:   str  1  elmt force   elmt   8- 6 gp 1
   183:   str  1  elmt force   elmt   8-11 gp 1
   184:   str  1  elmt force   elmt   8-12 gp 1
   185:   str  1  elmt force   elmt   9- 1 gp 1
   186:   str  1  elmt force   elmt   9- 2 gp 1
   187:   str  1  elmt force   elmt   9- 3 gp 1
   188:   str  1  elmt force   elmt   9- 4 gp 1
   189:   str  1  elmt force   elmt   9- 5 gp 1
   190:   str  1  elmt force   elmt   9- 6 gp 1
   191:   str  1  elmt force   elmt   9-11 gp 1
   192:   str  1  elmt force   elmt   9-12 gp 1
   193:   str  1  elmt force   elmt  10- 1 gp 1
   194:   str  1  elmt force   elmt  10- 2 gp 1
   195:   str  1  elmt force   elmt  10- 3 gp 1
   196:   str  1  elmt force   elmt  10- 4 gp 1
   197:   str  1  elmt force   elmt  10- 5 gp 1
   198:   str  1  elmt force   elmt  10- 6 gp 1
   199:   str  1  elmt force   elmt  10-11 gp 1
   200:   str  1  elmt force   elmt  10-12 gp 1
   201:   str  1  elmt force   elmt  11- 1 gp 1
   202:   str  1  elmt force   elmt  11- 2 gp 1
   203:   str  1  elmt force   elmt  11- 3 gp 1
   204:   str  1  elmt force   elmt  11- 4 gp 1
   205:   str  1  elmt force   elmt  11- 5 gp 1
   206:   str  1  elmt force   elmt  11- 6 gp 1
   207:   str  1  elmt force   elmt  11-11 gp 1
   208:   str  1  elmt force   elmt  11-12 gp 1
   209:   str  1  elmt force   elmt  12- 1 gp 1
   210:   str  1  elmt force   elmt  12- 2 gp 1
   211:   str  1  elmt force   elmt  12- 3 gp 1
   212:   str  1  elmt force   elmt  12- 4 gp 1
   213:   str  1  elmt force   elmt  12- 5 gp 1
   214:   str  1  elmt force   elmt  12- 6 gp 1
   215:   str  1  elmt force   elmt  12-11 gp 1
   216:   str  1  elmt force   elmt  12-12 gp 1
   217:   str  1  elmt force   elmt  13- 1 gp 1
   218:   str  1  elmt force   elmt  13- 2 gp 1
   219:   str  1  elmt force   elmt  13- 3 gp 1
   220:   str  1  elmt force   elmt  13- 4 gp 1
   221:   str  1  elmt force   elmt  13- 5 gp 1
   222:   str  1  elmt force   elmt  13- 6 gp 1
   223:   str  1  elmt force   elmt  13-11 gp 1
   224:   str  1  elmt force   elmt  13-12 gp 1
   225:   str  1  elmt force   elmt  22- 1 gp 1
   226:   str  1  elmt force   elmt  22- 2 gp 1
   227:   str  1  elmt force   elmt  22- 3 gp 1
   228:   str  1  elmt force   elmt  22- 4 gp 1
   229:   str  1  elmt force   elmt  22- 5 gp 1
   230:   str  1  elmt force   elmt  22- 6 gp 1
   231:   str  1  elmt force   elmt  22-11 gp 1
   232:   str  1  elmt force   elmt  22-12 gp 1
   233:   str  1  elmt force   elmt  24- 1 gp 1
   234:   str  1  elmt force   elmt  24- 2 gp 1
```

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235:	str	1	elmt	force	elmt	24- 3	gp 1
236:	str	1	elmt	force	elmt	24- 4	gp 1
237:	str	1	elmt	force	elmt	24- 5	gp 1
238:	str	1	elmt	force	elmt	24- 6	gp 1
239:	str	1	elmt	force	elmt	24-11	gp 1
240:	str	1	elmt	force	elmt	24-12	gp 1
241:	str	1	elmt	force	elmt	25- 1	gp 1
242:	str	1	elmt	force	elmt	25- 2	gp 1
243:	str	1	elmt	force	elmt	25- 3	gp 1
244:	str	1	elmt	force	elmt	25- 4	gp 1
245:	str	1	elmt	force	elmt	25- 5	gp 1
246:	str	1	elmt	force	elmt	25- 6	gp 1
247:	str	1	elmt	force	elmt	25-11	gp 1
248:	str	1	elmt	force	elmt	25-12	gp 1
249:	str	1	elmt	force	elmt	30- 1	gp 1
250:	str	1	elmt	force	elmt	30- 2	gp 1
251:	str	1	elmt	force	elmt	30- 3	gp 1
252:	str	1	elmt	force	elmt	30- 4	gp 1
253:	str	1	elmt	force	elmt	30- 5	gp 1
254:	str	1	elmt	force	elmt	30- 6	gp 1
255:	str	1	elmt	force	elmt	30-11	gp 1
256:	str	1	elmt	force	elmt	30-12	gp 1

CALCULATION RESULT

Res#	MEAN	MEAN+STD	50%	84.13%
1:	3.02270e-01	3.63223e-01	3.07600e-01	3.26821e-01
2:	3.07027e-01	3.61937e-01	3.04350e-01	3.36115e-01
3:	3.32310e-01	4.03512e-01	3.18100e-01	4.04882e-01
4:	2.20303e-03	2.87211e-03	2.21100e-03	2.76626e-03
5:	2.24387e-03	2.88294e-03	2.17200e-03	2.90881e-03
6:	2.27673e-04	2.73461e-04	2.28050e-04	2.63889e-04
7:	3.06500e+03	3.76016e+03	2.94750e+03	3.94706e+03
8:	3.20750e+03	3.95258e+03	3.20150e+03	3.76756e+03
9:	2.55973e+03	3.22472e+03	2.29750e+03	3.08961e+03
10:	4.67593e+05	5.81010e+05	4.54850e+05	5.55112e+05
11:	4.55110e+05	5.58812e+05	4.55400e+05	5.67676e+05
12:	2.65393e+04	3.27593e+04	2.61500e+04	3.24000e+04
13:	3.17407e-01	3.46512e-01	3.14300e-01	3.73919e-01
14:	3.22803e-01	3.62812e-01	3.20200e-01	3.63260e-01
15:	3.39210e-01	4.12202e-01	3.27400e-01	4.10456e-01
16:	2.37627e-03	3.03428e-03	2.36700e-03	2.86262e-03
17:	2.39883e-03	3.02478e-03	2.26550e-03	3.02619e-03
18:	2.41870e-04	2.88174e-04	2.49850e-04	2.76193e-04
19:	3.28123e-01	3.83718e-01	3.15650e-01	3.93389e-01
20:	3.36000e-01	3.76792e-01	3.30300e-01	3.82621e-01
21:	3.45817e-01	4.20329e-01	3.32350e-01	4.20260e-01
22:	2.48390e-03	3.13615e-03	2.44800e-03	3.01560e-03
23:	2.49710e-03	3.11835e-03	2.35200e-03	3.01660e-03
24:	2.48873e-04	2.95755e-04	2.53800e-04	2.83896e-04
25:	3.77573e-01	4.50377e-01	3.64550e-01	4.75046e-01
26:	3.94203e-01	4.57602e-01	3.92100e-01	4.56227e-01
27:	3.73617e-01	4.56623e-01	3.50550e-01	4.49320e-01
28:	2.85617e-03	3.50415e-03	2.83200e-03	3.38251e-03
29:	2.83617e-03	3.44260e-03	2.72150e-03	3.48210e-03
30:	2.80530e-04	3.31646e-04	2.80350e-04	3.13852e-04
31:	4.59590e-01	5.53324e-01	4.48750e-01	5.87769e-01
32:	4.83917e-01	5.83319e-01	4.80550e-01	5.64560e-01
33:	4.22807e-01	5.32537e-01	3.77800e-01	5.24722e-01
34:	3.46597e-03	4.12095e-03	3.34600e-03	4.04771e-03
35:	3.41867e-03	4.01081e-03	3.35800e-03	4.04884e-03
36:	3.40737e-04	4.14055e-04	3.30650e-04	3.90550e-04
37:	5.36843e-01	6.51463e-01	5.16150e-01	6.70735e-01
38:	5.56823e-01	6.81290e-01	5.44350e-01	6.57934e-01
39:	4.50463e-01	5.77776e-01	4.03450e-01	5.67661e-01
40:	3.78333e-03	4.49295e-03	3.69700e-03	4.57820e-03

File: X:\WPPSS\REACTOR\IPEEE\50\SSINO.MSD Page: 6

41:	3.77040e-03	4.38919e-03	3.78250e-03	4.29007e-03
42:	3.86097e-04	4.77881e-04	3.70550e-04	4.47315e-04
43:	6.33070e-01	7.74537e-01	6.40300e-01	7.92091e-01
44:	6.55527e-01	8.10723e-01	6.46500e-01	7.83261e-01
45:	4.85043e-01	6.34475e-01	4.39550e-01	6.16289e-01
46:	4.15427e-03	4.93524e-03	4.06050e-03	4.85172e-03
47:	4.25500e-03	4.94151e-03	4.30200e-03	4.84613e-03
48:	4.34907e-04	5.75639e-04	4.35250e-04	5.18192e-04
49:	7.17093e-01	8.76193e-01	7.31500e-01	8.87818e-01
50:	7.50730e-01	9.36108e-01	7.27650e-01	9.04096e-01
51:	5.27073e-01	6.97006e-01	4.65850e-01	6.43764e-01
52:	4.41230e-03	5.20305e-03	4.29150e-03	5.13916e-03
53:	4.53147e-03	5.28755e-03	4.35750e-03	5.38940e-03
54:	4.85930e-04	6.27484e-04	4.52700e-04	5.34281e-04
55:	7.32603e-01	8.94619e-01	7.47150e-01	9.04542e-01
56:	7.62010e-01	9.49457e-01	7.47000e-01	9.17525e-01
57:	5.08703e-01	6.74216e-01	4.53350e-01	6.39359e-01
58:	4.55260e-03	5.24891e-03	4.39450e-03	5.16377e-03
59:	4.52930e-03	5.33302e-03	4.38450e-03	5.48338e-03
60:	4.86160e-04	6.31602e-04	4.53050e-04	5.31042e-04
61:	8.80420e-01	1.06609e+00	8.87400e-01	1.05036e+00
62:	9.30667e-01	1.14770e+00	8.80600e-01	1.12065e+00
63:	5.19200e-01	6.90327e-01	4.55600e-01	6.48056e-01
64:	4.65963e-03	5.30247e-03	4.55350e-03	5.45115e-03
65:	4.71200e-03	5.32468e-03	4.68650e-03	5.75176e-03
66:	4.86597e-04	6.50983e-04	4.40600e-04	5.32622e-04
67:	1.24113e+00	1.49502e+00	1.26350e+00	1.50221e+00
68:	1.28884e+00	1.54760e+00	1.26200e+00	1.50066e+00
69:	5.47677e-01	7.33631e-01	4.88600e-01	6.81174e-01
70:	4.83363e-03	5.73713e-03	4.82750e-03	5.55513e-03
71:	5.08530e-03	6.12563e-03	4.83700e-03	6.06560e-03
72:	8.23557e-04	1.20127e-03	7.11200e-04	1.09521e-03
73:	1.75884e+00	2.18065e+00	1.66700e+00	2.13013e+00
74:	1.62937e+00	1.98940e+00	1.62050e+00	1.96398e+00
75:	5.70573e-01	7.74233e-01	5.12600e-01	7.19027e-01
76:	5.30217e-03	5.86308e-03	5.32600e-03	5.59322e-03
77:	5.31270e-03	6.43117e-03	5.00100e-03	6.27845e-03
78:	1.22831e-03	1.80553e-03	1.10250e-03	1.50867e-03
79:	3.23703e-01	4.58680e-01	3.84500e-01	4.78085e-01
80:	3.93983e-01	4.51896e-01	3.32050e-01	4.64406e-01
81:	3.69717e-01	4.54520e-01	3.46000e-01	4.55914e-01
82:	3.13520e-03	3.75110e-03	3.04000e-03	3.74406e-03
83:	3.11607e-03	3.70031e-03	3.02100e-03	3.79530e-03
84:	2.90973e-04	3.57209e-04	2.89100e-04	3.33000e-04
85:	5.39350e-01	6.48367e-01	5.19800e-01	6.81859e-01
86:	5.41883e-01	6.52306e-01	5.25550e-01	6.35306e-01
87:	4.26380e-01	5.45467e-01	3.96150e-01	5.05386e-01
88:	4.22717e-03	5.11220e-03	3.95000e-03	5.23737e-03
89:	4.14720e-03	4.96238e-03	4.05000e-03	4.86833e-03
90:	3.77867e-04	5.02731e-04	3.39700e-04	4.49807e-04
91:	6.88777e-01	8.45262e-01	6.86300e-01	8.67252e-01
92:	7.10460e-01	8.79314e-01	6.95450e-01	8.68577e-01
93:	4.81063e-01	6.36580e-01	4.62700e-01	5.81360e-01
94:	5.27677e-03	6.46066e-03	5.13650e-03	5.39473e-03
95:	5.18473e-03	6.49243e-03	4.97350e-03	6.41316e-03
96:	4.69913e-04	7.23663e-04	4.10050e-04	6.07880e-04
97:	3.34333e-01	3.30132e-01	3.34700e-01	3.35650e-01
98:	3.42133e-01	3.85372e-01	3.33250e-01	3.93311e-01
99:	3.37313e-01	4.09714e-01	3.34350e-01	4.09672e-01
100:	2.31130e-03	3.14524e-03	2.30800e-03	3.02853e-03
101:	2.52003e-03	3.10136e-03	2.35000e-03	3.01010e-03
102:	2.44463e-04	2.90427e-04	2.51850e-04	2.78593e-04
103:	4.36977e-01	5.25867e-01	4.35850e-01	5.32574e-01
104:	4.34723e-01	5.07211e-01	4.46700e-01	5.02189e-01
105:	3.34637e-01	4.06184e-01	3.19750e-01	4.06887e-01
106:	2.85693e-03	3.46024e-03	2.82750e-03	3.34932e-03

File: X:\WPPSS\REACTOR\IPEEE\50\SSINO.MSD Page: 7

107:	2.82937e-03	3.37411e-03	2.82200e-03	3.28414e-03
108:	2.67307e-04	3.14383e-04	2.72250e-04	2.97374e-04
109:	4.50477e-01	5.39357e-01	4.49750e-01	5.44113e-01
110:	4.51200e-01	5.33875e-01	4.59200e-01	5.21776e-01
111:	3.32560e-01	4.03786e-01	3.18350e-01	4.04982e-01
112:	3.64017e-03	4.34518e-03	3.46950e-03	4.22027e-03
113:	3.75493e-03	4.40674e-03	3.71750e-03	4.34588e-03
114:	2.76033e-04	3.26895e-04	2.73750e-04	3.12318e-04
115:	6.50380e-01	7.91654e-01	6.38600e-01	8.16725e-01
116:	6.58427e-01	8.12812e-01	6.31000e-01	7.81366e-01
117:	3.94157e-01	4.92207e-01	3.66950e-01	4.93167e-01
118:	7.63183e-03	9.71498e-03	7.44700e-03	9.53781e-03
119:	7.95583e-03	1.06225e-02	7.11500e-03	9.63106e-03
120:	4.83110e-04	6.69158e-04	4.37450e-04	5.51291e-04
121:	1.86787e+03	2.39579e+03	1.71250e+03	2.30261e+03
122:	2.54910e+03	3.13275e+03	2.46550e+03	3.26745e+03
123:	2.64537e+03	3.27731e+03	2.65250e+03	3.14278e+03
124:	1.83990e+04	2.25972e+04	1.76850e+04	2.24848e+04
125:	3.65180e+05	4.54409e+05	3.52650e+05	4.37370e+05
126:	3.58727e+05	4.39611e+05	3.58950e+05	4.48376e+05
127:	3.31617e+05	4.12260e+05	3.18250e+05	3.97688e+05
128:	3.26563e+05	3.99786e+05	3.28300e+05	4.08920e+05
129:	1.84965e+03	2.37463e+03	1.69950e+03	2.28418e+03
130:	2.40680e+03	2.95504e+03	2.35100e+03	3.07024e+03
131:	2.48990e+03	3.09388e+03	2.49700e+03	2.97324e+03
132:	1.37556e+04	1.67728e+04	1.29200e+04	1.70484e+04
133:	3.25767e+05	4.04441e+05	3.13300e+05	3.93528e+05
134:	3.20623e+05	3.92072e+05	3.24050e+05	4.01060e+05
135:	3.07017e+05	3.80856e+05	2.94000e+05	3.72293e+05
136:	3.02627e+05	3.69798e+05	3.06100e+05	3.77604e+05
137:	1.75925e+03	2.26846e+03	1.61050e+03	2.19042e+03
138:	2.33713e+03	2.86738e+03	2.30900e+03	2.95326e+03
139:	2.42570e+03	3.01980e+03	2.41850e+03	2.89139e+03
140:	1.31753e+04	1.60284e+04	1.27050e+04	1.56834e+04
141:	2.97040e+05	3.68333e+05	2.84400e+05	3.61139e+05
142:	2.93223e+05	3.58138e+05	2.97200e+05	3.64956e+05
143:	2.33017e+05	2.88103e+05	2.22650e+05	2.85267e+05
144:	2.32060e+05	2.82700e+05	2.37150e+05	2.84667e+05
145:	1.59304e+03	2.06408e+03	1.45400e+03	1.98545e+03
146:	2.10780e+03	2.58260e+03	2.11650e+03	2.64096e+03
147:	2.18227e+03	2.71878e+03	2.14700e+03	2.61278e+03
148:	1.37359e+04	1.69670e+04	1.30950e+04	1.63158e+04
149:	2.29840e+05	2.84656e+05	2.19150e+05	2.80850e+05
150:	2.28957e+05	2.78996e+05	2.34150e+05	2.80698e+05
151:	1.65330e+05	2.04085e+05	1.57200e+05	2.02626e+05
152:	1.67407e+05	2.03136e+05	1.70800e+05	2.02365e+05
153:	1.32058e+03	1.72667e+03	1.20000e+03	1.65341e+03
154:	1.86417e+03	2.28464e+03	1.88400e+03	2.32432e+03
155:	1.92577e+03	2.39762e+03	1.86950e+03	2.32348e+03
156:	1.05616e+04	1.30326e+04	1.03050e+04	1.25117e+04
157:	1.61743e+05	2.00018e+05	1.53750e+05	1.97721e+05
158:	1.63164e+05	1.98124e+05	1.66550e+05	1.97039e+05
159:	1.21819e+05	1.50252e+05	1.14950e+05	1.48974e+05
160:	1.25045e+05	1.51277e+05	1.27550e+05	1.49436e+05
161:	1.02360e+03	1.35702e+03	9.23000e+02	1.29082e+03
162:	1.59162e+03	1.94497e+03	1.60550e+03	1.95745e+03
163:	1.64123e+03	2.04111e+03	1.57250e+03	1.98624e+03
164:	1.52157e+04	1.88397e+04	1.42750e+04	1.82321e+04
165:	1.18871e+05	1.46516e+05	1.13300e+05	1.45348e+05
166:	1.21063e+05	1.46543e+05	1.23200e+05	1.45821e+05
167:	7.67123e+04	9.40149e+04	7.28050e+04	9.37211e+04
168:	8.13293e+04	9.80626e+04	8.20350e+04	9.54310e+04
169:	7.20517e+02	9.68573e+02	6.45350e+02	9.06389e+02
170:	1.23809e+03	1.50751e+03	1.25250e+03	1.49639e+03
171:	1.27121e+03	1.57820e+03	1.20300e+03	1.56148e+03
172:	4.83230e+03	6.02350e+03	4.47650e+03	6.18448e+03

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173:	7.24680e+04	8.92214e+04	6.81350e+04	8.80830e+04
174:	7.53310e+04	9.09016e+04	7.69800e+04	8.74480e+04
175:	4.69510e+04	5.74954e+04	4.36100e+04	5.66526e+04
176:	5.11153e+04	6.15477e+04	5.26950e+04	5.95447e+04
177:	5.25377e+02	7.09915e+02	4.80950e+02	6.60128e+02
178:	1.17890e+03	1.43331e+03	1.19400e+03	1.41367e+03
179:	1.23129e+03	1.52911e+03	1.16850e+03	1.49091e+03
180:	5.96457e+03	7.47091e+03	5.90000e+03	7.08978e+03
181:	4.57377e+04	5.60860e+04	4.24900e+04	5.48558e+04
182:	4.81367e+04	5.80835e+04	4.91300e+04	5.62639e+04
183:	4.13560e+04	5.06499e+04	3.84850e+04	4.94682e+04
184:	4.40120e+04	5.31501e+04	4.48100e+04	5.11747e+04
185:	2.18373e+02	3.02360e+02	2.01250e+02	2.69306e+02
186:	7.17047e+02	8.69322e+02	7.27150e+02	8.44268e+02
187:	7.49803e+02	9.29231e+02	7.09750e+02	9.01956e+02
188:	4.12763e+03	5.13078e+03	3.95050e+03	4.59959e+03
189:	3.79517e+04	4.66306e+04	3.51450e+04	4.53060e+04
190:	3.85273e+04	4.64600e+04	3.95450e+04	4.46622e+04
191:	1.21131e+04	1.47177e+04	1.13950e+04	1.40512e+04
192:	1.41149e+04	1.72545e+04	1.42250e+04	1.73319e+04
193:	6.69557e+01	8.99191e+01	5.97000e+01	8.30642e+01
194:	1.80153e+02	2.21018e+02	1.68250e+02	2.26519e+02
195:	1.74100e+02	2.12159e+02	1.70200e+02	2.05543e+02
196:	8.33067e+02	1.17938e+03	7.55500e+02	1.05459e+03
197:	8.14857e+03	9.92940e+03	7.76850e+03	9.81377e+03
198:	8.68833e+03	1.06721e+04	8.44600e+03	1.07343e+04
199:	3.85737e+03	4.71340e+03	3.60150e+03	4.64035e+03
200:	4.33947e+03	5.30780e+03	4.28150e+03	5.29246e+03
201:	4.39967e+01	5.90427e+01	3.93450e+01	5.44120e+01
202:	1.28747e+02	1.59900e+02	1.21700e+02	1.60340e+02
203:	1.19685e+02	1.46208e+02	1.19600e+02	1.44444e+02
204:	5.60300e+02	7.90737e+02	5.07550e+02	6.92054e+02
205:	3.25350e+03	3.97206e+03	3.10900e+03	3.98841e+03
206:	3.70083e+03	4.55075e+03	3.61700e+03	4.49950e+03
207:	7.33303e+02	9.17165e+02	6.90050e+02	8.92633e+02
208:	1.15812e+03	1.39683e+03	1.11650e+03	1.36232e+03
209:	5.47343e+01	7.01010e+01	4.96350e+01	6.53027e+01
210:	4.33460e+01	5.32248e+01	3.98000e+01	5.40484e+01
211:	4.29050e+01	5.66815e+01	4.03650e+01	5.06493e+01
212:	7.85647e+01	9.69537e+01	7.60400e+01	9.01425e+01
213:	9.19217e+03	1.14383e+04	8.97750e+03	1.11115e+04
214:	8.36283e+03	1.03179e+04	8.33200e+03	1.05880e+04
215:	9.25543e+03	1.14687e+04	8.97700e+03	1.09839e+04
216:	8.33310e+03	1.02675e+04	8.34000e+03	1.04248e+04
217:	6.64770e+01	8.34765e+01	6.19950e+01	7.87019e+01
218:	2.55660e+01	3.42080e+01	2.32550e+01	3.43154e+01
219:	2.77587e+01	3.43149e+01	2.62700e+01	3.46619e+01
220:	6.03213e+01	7.75609e+01	5.47800e+01	7.10097e+01
221:	9.20740e+03	1.14125e+04	8.93400e+03	1.09239e+04
222:	8.27817e+03	1.01981e+04	8.29550e+03	1.03496e+04
223:	9.41590e+03	1.16594e+04	9.02100e+03	1.11611e+04
224:	8.44293e+03	1.03735e+04	8.51650e+03	1.04843e+04
225:	2.14127e+01	2.77704e+01	1.98950e+01	2.55087e+01
226:	1.10973e+02	1.34435e+02	1.12300e+02	1.31669e+02
227:	1.27041e+02	1.57640e+02	1.21250e+02	1.52063e+02
228:	7.99003e+00	1.15100e+01	6.66000e+00	9.64715e+00
229:	1.34142e+03	1.65990e+03	1.28650e+03	1.61611e+03
230:	1.20353e+03	1.45730e+03	1.21900e+03	1.42126e+03
231:	1.09334e+02	1.32092e+02	1.04500e+02	1.32056e+02
232:	1.17459e+02	1.43828e+02	1.15850e+02	1.35996e+02
233:	1.46198e+01	1.90409e+01	1.38250e+01	1.91321e+01
234:	1.24392e+02	1.52757e+02	1.21500e+02	1.54830e+02
235:	1.32155e+02	1.58496e+02	1.36500e+02	1.54898e+02
236:	1.74697e+01	2.08098e+01	1.74300e+01	1.97621e+01
237:	6.38563e+03	7.74930e+03	6.59300e+03	7.53108e+03
238:	5.88600e+03	7.19697e+03	5.66300e+03	7.55511e+03

239:	4.72477e+03	5.79670e+03	4.78600e+03	5.63430e+03
240:	4.32847e+03	5.31559e+03	4.08700e+03	5.58445e+03
241:	1.56204e+01	2.02884e+01	1.46350e+01	2.04335e+01
242:	1.06724e+02	1.32090e+02	1.04100e+02	1.32552e+02
243:	1.14839e+02	1.40205e+02	1.17050e+02	1.36615e+02
244:	1.11144e+01	1.32709e+01	1.07650e+01	1.27186e+01
245:	4.69363e+03	5.75920e+03	4.75450e+03	5.59759e+03
246:	4.29810e+03	5.27840e+03	4.05900e+03	5.54754e+03
247:	3.93980e+03	4.86468e+03	4.04950e+03	4.69082e+03
248:	3.59817e+03	4.43624e+03	3.37250e+03	4.61302e+03
249:	1.68200e+01	2.14160e+01	1.56050e+01	2.20137e+01
250:	1.54793e+02	1.90064e+02	1.53900e+02	1.93025e+02
251:	1.72640e+02	2.14618e+02	1.69300e+02	2.07948e+02
252:	6.18303e+00	8.23823e+00	5.84000e+00	7.38025e+00
253:	4.17960e+02	5.14680e+02	4.10700e+02	5.01609e+02
254:	4.57000e+02	5.85957e+02	4.38700e+02	5.35519e+02
255:	2.39650e+03	2.94781e+03	2.31800e+03	2.85497e+03
256:	2.22480e+03	2.70706e+03	2.23500e+03	2.74852e+03

EQE INTERNATIONAL

SHEET NO. C1

JOB NO. 59037 JOB WPPSS IPEEE BY PSH DATE 7-16-94

CALC. NO. C-042 SUBJECT Reactor Bldg CHK'D [illegible] DATE 7-20-9

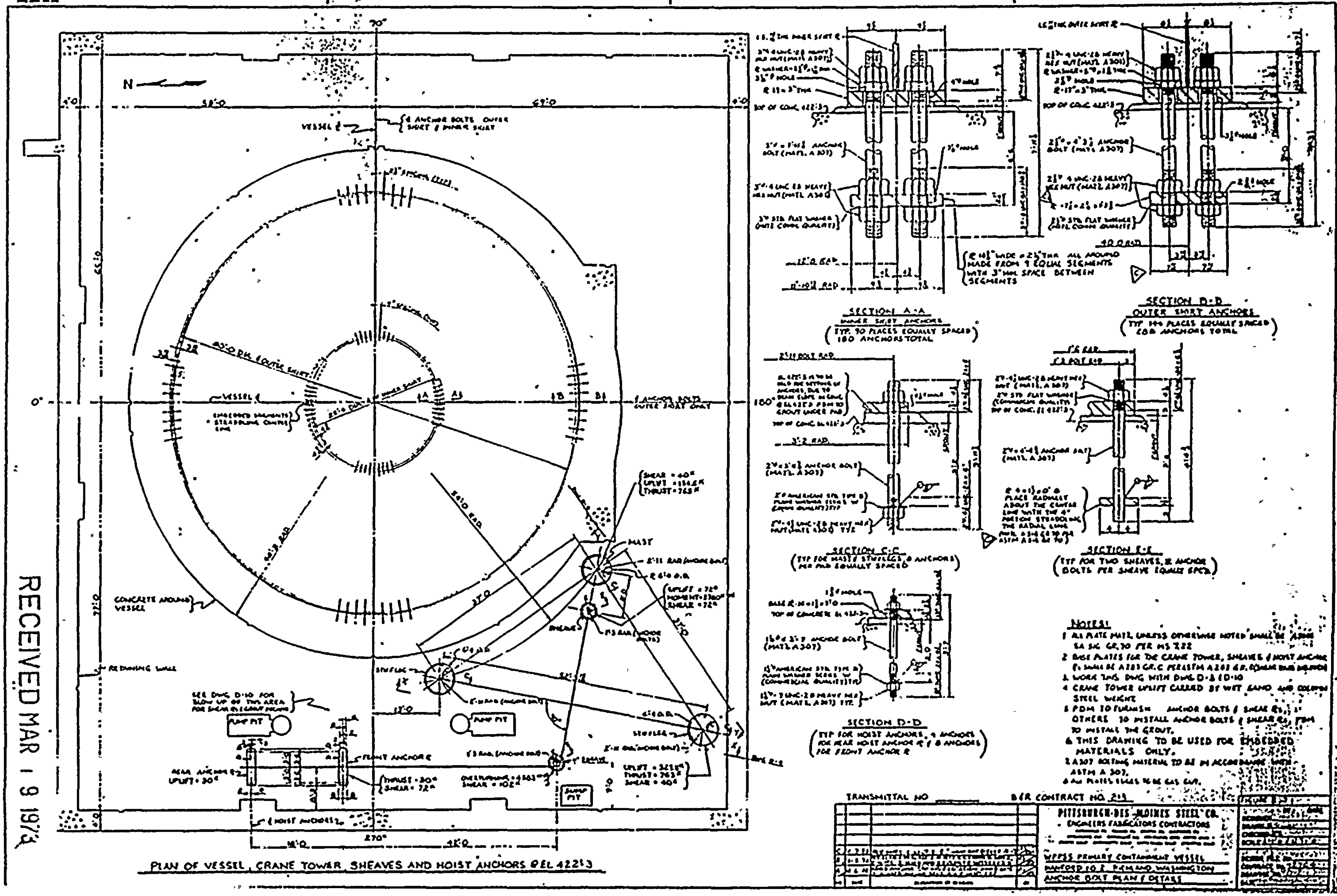
ATTACHMENT C

EXCERPTS FROM REFERENCE 10

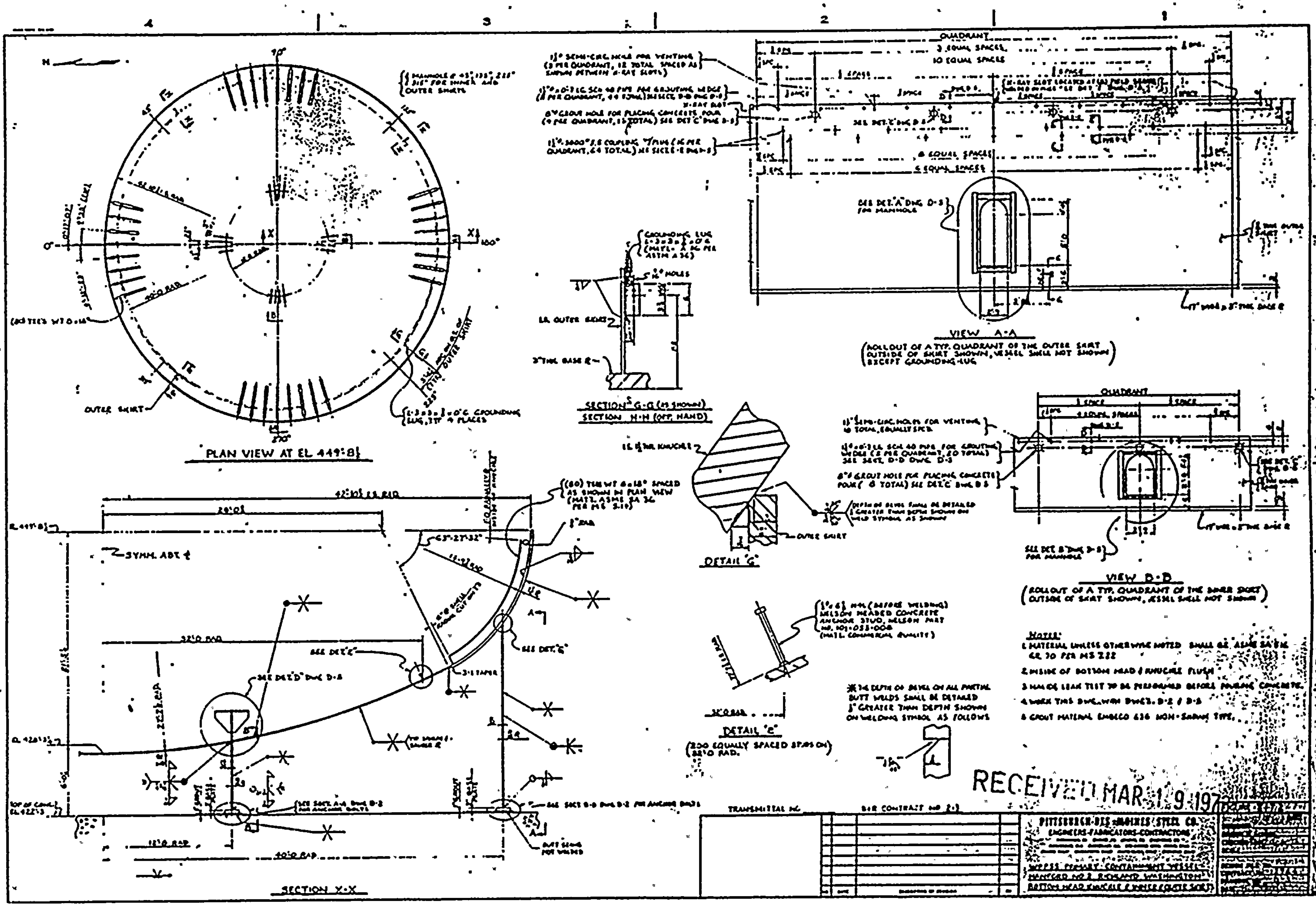
(4 pp. total)

RECEIVED MAR 19 1973

ZX03226708



PLAN OF VESSEL, CRANE TOWER, SHEAVES AND HOIST ANCHORS @ EL 422'-3



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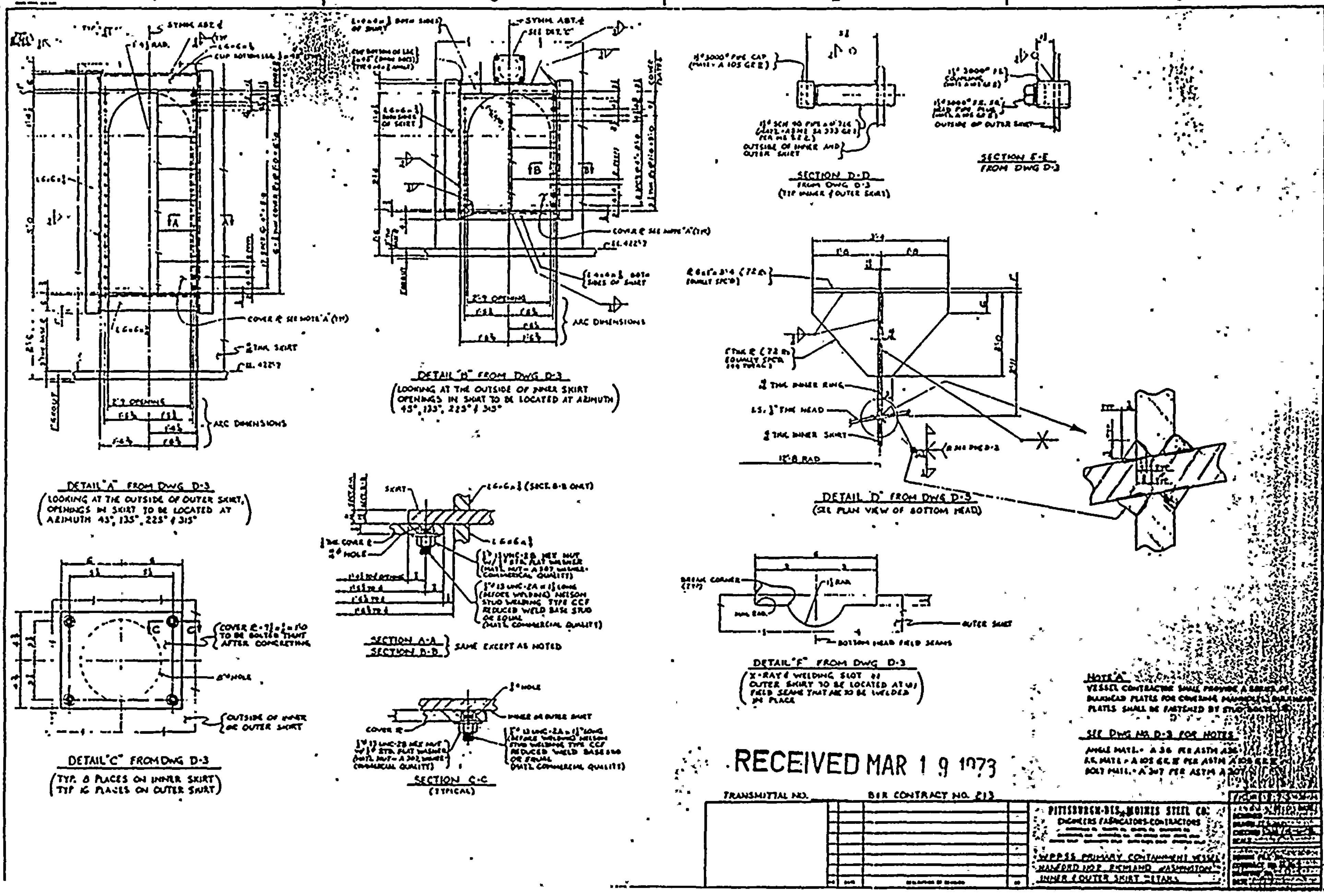

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EQE INTERNATIONAL

SHEET NO. D1

JOB NO. 59037 JOB WPPSS IPEEE BY PSH DATE 7-14-94

CALC. NO. C-042 SUBJECT Reactor Bldg CHK'D OHC DATE 7-20-94

ATTACHMENT D

EXCERPTS FROM REFERENCE 4

(4 pp. total)

TABLE 3.7-9

REACTOR BUILDING - SEISMIC ANALYSIS

HORIZONTAL N-S DIRECTION - SSE

ACCELERATION

(UNITS IN G x 10^{-3})

MASS	MODE NUMBER 1	2	3	4	5	6	7	8	9	10	COMBINE
1	1171.05	-1177.02	276.94	- 15.31	.87	- 1.74	- .92	- 2.67	- .03	.07	1683.35
2	654.94	48.04	-235.69	31.90	- .40	12.34	5.36	11.52	.06	1.81	698.76
3	534.80	51.65	- 91.18	26.96	2.15	4.10	- 1.23	-14.37	- .43	1.24	545.88
4	466.20	50.43	- 14.14	29.59	2.33	- 1.10	- 3.80	-20.06	- .07	- .80	470.67
5	380.53	46.92	76.24	30.63	2.51	- 5.66	- 5.26	-19.23	.37	- 2.55	392.93
6	315.55	43.12	138.21	30.23	2.76	- 6.89	- 5.07	-14.78	.52	- 2.61	349.14
7	222.28	35.73	212.77	27.47	2.63	- 6.34	- 2.67	.15	.51	- 1.26	311.07
8	147.65	28.85	260.19	24.60	2.87	- 3.06	- .03	9.96	.25	.16	301.76
9	124.64	26.45	270.16	25.01	3.51	- 1.65	.54	12.32	.24	.50	300.05
10	80.75	22.21	291.72	25.71	5.15	1.97	1.16	11.98	.39	.56	304.92
11	586.10	65.63	- 54.12	-143.56	27.90	4.05	- 6.72	1.91	- 5.25	1.08	610.12
12	539.23	62.56	- 01.39	-138.12	17.72	2.71	- 2.99	- 4.37	- 4.32	.57	560.50
13	502.89	61.95	60.02	-149.57	- .73	- .90	2.89	- 9.70	- 5.11	.25	531.88
14	447.87	60.25	142.44	-159.81	-22.93	- 4.93	9.99	-15.94	- 5.81	- .17	501.30
15	414.72	58.86	187.30	-162.70	-33.85	- 6.73	13.38	-18.69	- 5.87	- .38	489.14
16	386.14	57.51	223.71	-163.71	-42.05	- 7.97	15.87	-20.61	- 5.79	- .54	482.14
17	358.25	56.01	256.57	-162.99	-48.64	- 8.81	17.79	-21.95	- 5.57	- .67	477.42
18	320.84	53.69	295.97	-159.12	-55.07	- 9.31	19.44	-22.74	- 4.98	- .77	472.93
19	298.22	50.63	295.40	-135.23	-48.61	- 9.13	17.46	-18.19	- 4.53	- .67	448.09
20	257.60	44.89	290.39	- 89.37	-35.30	- 8.55	13.26	- 9.15	- 3.59	- .46	403.14
21	218.66	39.36	284.85	- 46.11	-21.94	- 7.56	8.99	- .65	- 2.60	- .23	365.06
22	182.03	34.27	280.84	- 8.04	- 9.49	- 6.18	5.01	6.57	- 1.66	- .04	336.91
23	147.68	28.86	260.31	24.53	2.85	- 3.07	- .02	9.95	.25	.16	301.86
24	576.53	83.03	99.10	-468.71	101.66	10.28	-21.16	34.47	- 7.83	- 1.00	763.14
25	542.07	82.06	181.51	-464.05	27.28	17.41	-27.05	35.37	- .76	- .07	744.18
26	482.18	78.19	284.55	-426.89	-57.65	16.91	-17.53	12.40	12.74	1.62	711.68
27	441.14	73.22	314.49	-368.87	-79.17	8.77	- 1.87	-10.08	13.06	1.42	664.52
28	394.20	65.99	318.01	-284.98	-75.63	- 3.30	16.83	-31.49	7.13	.42	591.78
29	368.69	61.84	313.11	-242.03	-70.47	- 5.60	18.40	-29.56	2.76	- .04	551.07
30	321.12	53.86	297.95	-161.22	-55.96	- 9.33	19.69	-23.20	- 4.98	- .78	475.25
31	288.45	48.96	293.32	-117.77	-47.57	-10.49	19.01	-17.62	- 8.10	- .99	435.07
32	240.68	41.82	283.08	- 60.23	-32.60	-10.38	15.33	- 7.27	- 9.40	- .85	381.06
33	196.89	35.51	273.50	- 16.25	-17.68	- 8.55	10.11	2.60	- 7.60	- .39	340.15
34	157.80	30.27	267.98	12.82	- 4.86	- 5.44	4.67	9.88	- 3.85	.15	313.17
35	124.65	26.46	270.19	25.01	- 3.49	- 1.66	.55	12.32	.23	.50	300.07

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TABLE 3.7-11

REACTOR BUILDING - SEISMIC ANALYSIS

HORIZONTAL N-S DIRECTION - SSE

MEMBER SHEARS

(UNITS IN KIPS)

MEMBER	MODE NUMBER 1	2	3	4	5	6	7	8	9	10	COMBINED
1	3054.5	-3070.1	722.4	-39.9	2.3	-4.5	-2.4	-7.0	-.1	.2	4390.8
2	19772.	-1844.7	-5289.3	773.8	-7.9	310.1	134.3	286.9	1.4	46.4	20571.
3	35489.	41.4	-6362.8	-613.9	177.3	420.6	93.1	-92.0	-16.8	80.7	36064.
4	43688.	927.8	-6611.8	-93.6	218.3	401.2	26.4	-444.7	-18.1	66.6	44200.
5	50259.	1738.1	-5297.2	435.1	261.8	303.5	-64.4	-776.7	-11.7	22.5	50578.
6	55778.	2493.1	-2875.7	964.7	310.1	182.8	-153.2	-1035.7	-2.7	-23.2	55930.
7	60387.	3233.8	1545.9	1535.2	364.7	51.1	-208.6	-1032.6	7.9	-49.4	60527.
8	67346.	4217.0	8027.3	193.3	23.1	-14.3	-133.3	-954.9	-1.5	-48.7	67962.
9	72339.	5080.6	16175.	642.0	-79.8	-90.5	-59.8	-676.8	-26.1	-38.6	74305.
10	78827.	6851.0	39375.	2685.8	329.7	66.4	32.1	275.4	5.0	5.7	88422.
11	123.6	13.8	-11.3	-30.1	5.8	.8	-1.4	-.4	-1.1	.2	128.6
12	1572.5	-65.2	-808.0	281.3	167.4	20.4	-22.3	17.5	2.2	.3	1799.7
13	1606.2	-60.8	-803.6	270.6	167.3	20.4	-22.1	16.8	1.8	.3	1825.5
14	1696.3	-49.2	-776.6	240.3	163.0	19.4	-20.2	13.8	.7	.3	1889.1
15	1724.0	-44.8	-762.2	227.7	160.4	18.9	-19.2	12.4	.3	.3	1906.3
16	1772.1	-37.7	-734.7	207.2	155.2	17.9	-17.2	9.8	-.4	.2	1936.4
17	1857.7	-24.4	-673.8	169.3	143.6	15.9	-13.0	4.6	-1.8	0.0	1988.8
18	4049.4	404.6	1498.8	-1594.4	-318.9	9.3	45.7	-84.4	-3.2	-1.1	4633.4
19	4089.0	411.3	1538.7	-1612.8	-325.6	8.1	48.1	-86.8	-3.8	-1.2	4688.5
20	4132.4	419.4	1591.6	-1620.1	-332.1	6.5	50.5	-88.5	-4.5	-1.3	4750.7
21	4171.5	426.2	1642.6	-1637.4	-336.0	5.2	52.1	-88.6	-5.0	-1.4	4805.7
22	5024.9	587.6	2962.9	-1675.2	-380.6	-23.9	75.7	-57.7	-12.8	-1.5	6111.0
23	-415.2	-116.5	-457.2	597.7	-17.6	13.5	-28.7	43.0	-18.1	-1.8	870.7
24	-97.5	-68.2	-350.8	325.8	-1.6	23.7	-44.6	63.8	-18.6	-1.8	506.0
25	406.2	13.6	-53.1	-121.0	-62.0	41.4	-62.9	76.8	-5.2	-.1	455.7
26	643.9	52.5	114.3	-317.0	-104.1	46.0	-63.9	71.4	1.7	.7	749.8
27	1404.6	183.5	744.2	-881.9	-253.9	39.5	-30.6	9.1	15.8	1.5	1845.5
28	1775.6	241.0	1036.4	-1107.5	-319.7	34.3	-13.4	-18.6	18.4	1.4	2370.0
29	848.5	27.1	53.5	12.7	-80.2	3.5	6.4	-22.1	0.0	-.5	855.0
30	1233.3	90.2	430.0	-138.5	-141.4	-10.0	30.8	-44.8	-10.4	-1.8	1326.3
31	1432.4	125.1	666.6	-188.9	-168.5	-18.6	43.6	-50.8	-18.3	-2.5	1607.9
32	1615.0	157.9	919.1	-203.8	-184.8	-26.5	52.9	-48.4	-25.3	-2.8	1888.2
33	1847.1	201.7	1305.3	-185.5	-191.9	-34.3	59.7	-34.2	-30.8	-2.7	2288.7
34	-539.8	-420.3	-1512.9	2152.7	-124.3	5.8	6.1	-28.7	6.2	.9	2721.7
35	-1923.2	-333.6	-716.4	1824.1	-283.7	-13.4	26.6	-47.1	2.4	.8	2781.5
36	-6464.0	-635.0	-3498.0	1593.3	373.6	35.1	-75.9	23.8	12.0	1.0	7557.2
37	-1728.0	-231.0	-853.0	182.3	191.7	35.8	-60.6	18.4	30.6	2.0	1961.0
38	-2105.0	-421.4	-2112.1	1733.6	453.2	4.4	-54.8	83.9	.4	1.0	3507.1

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TABLE 3.

REACTOR BUILDING - SEISMIC ANALYSIS

HORIZONTAL N-S DIRECTION - SSE

MEMBER MOMENTS

(UNITS IN FT - KIPS x 10^3)

MEMBER	Mode 1 TOP	Mode 1 BOTTOM	Mode 2 TOP	Mode 2 BOTTOM	Mode 3 TOP	Mode 3 BOTTOM	Mode 4 TOP	Mode 4 BOTTOM	Mode 5 TOP	Mode 5 BOTTOM	Mode 6 TOP	Mode 6 BOTTOM
1	14.62	158.94	-.05	145.11	-16.98	-17.15	-.02	1.91	-.39	.28	.35	-.14
2	251.79	-1012.98	-145.39	216.41	-86.79	290.43	-2.03	-27.76	-2.49	2.80	1.94	-13.88
3	1091.38	-1814.46	-215.15	214.31	-376.84	506.47	27.33	-14.83	-4.61	.99	14.84	-23.41
4	1890.82	-3026.67	-212.25	188.13	-587.73	759.63	14.16	-11.73	-2.73	-2.95	23.65	-34.08
5	3103.17	-4158.56	-185.04	148.54	-838.79	950.03	10.85	-19.98	1.11	-6.60	33.12	-39.49
6	4240.21	-5913.52	-144.29	69.50	-1031.02	1117.29	18.82	-47.76	4.46	-13.76	37.08	-42.56
7	6001.30	-7631.71	-63.67	-23.65	-1202.18	1160.43	45.71	-87.16	10.84	-20.69	37.34	-38.72
8	8057.97	-8645.82	50.72	-87.53	-1158.00	1087.92	5.67	-7.36	9.85	-10.05	35.61	-35.49
9	8860.00	-10308.3	104.85	-206.56	-1097.75	773.93	-30.96	18.10	-1.00	2.60	29.62	-27.80
10	10964.1	-10964.1	255.01	-255.01	-1369.25	-1369.25	-41.39	41.39	-31.04	31.04	-37.44	37.44
11	.05	-2.00	0.0	-.22	-.09	.27	0.0	.48	.02	-.11	0.0	-.02
12	2.02	-17.51	.22	.42	-.36	8.32	-.48	-2.29	.12	-1.77	.02	-.22
13	17.74	-43.84	-.41	1.40	-8.39	21.44	2.28	-6.68	1.78	-4.50	.22	-.55
14	43.71	-61.10	-1.39	1.89	-21.68	29.64	6.66	-9.12	4.53	-6.20	.55	-.75
15	61.45	-77.13	-1.88	2.29	-29.73	36.67	9.10	-11.17	6.22	-7.67	.75	-.92
16	77.66	-93.91	-2.27	2.62	-36.82	43.56	11.13	-13.03	7.69	-9.11	.92	-1.09
17	93.92	-117.60	-2.59	2.91	-43.94	52.53	12.94	-15.10	9.13	-10.96	1.08	-1.28
18	117.88	-146.34	-2.88	.03	-52.92	42.38	14.98	-3.78	10.96	-8.72	1.27	-1.33
19	146.87	-198.55	0.0	-5.20	-42.57	23.12	3.67	16.71	8.71	-4.59	1.32	-1.43
20	199.05	-251.37	5.24	-10.55	-23.40	3.25	-16.83	37.45	4.60	-.37	1.41	-1.49
21	251.34	-304.20	10.58	-15.98	-3.50	-17.31	-37.53	58.27	.35	3.91	1.47	-1.54
22	313.71	-374.01	16.69	-23.74	9.99	-45.55	-59.76	79.87	-4.43	8.99	.92	-.63
23	4.26	-.16	.37	.78	-7.56	12.06	-4.64	-1.26	9.73	-9.55	-1.36	1.23
24	.37	1.22	-.76	1.87	-12.39	18.09	1.03	-6.33	9.94	-9.92	-1.27	.88
25	-.82	-3.34	-1.82	1.68	-18.46	19.00	5.85	-4.61	10.29	-9.66	-.89	.47
26	3.54	-10.92	-1.66	1.06	-19.09	17.78	4.33	-.70	9.75	-8.55	-.46	-.07
27	13.54	-23.11	-.68	-.57	-17.70	12.63	-3.11	9.12	8.34	-6.61	.23	-.50
28	23.23	-45.87	.61	-3.68	-12.61	-.61	-9.53	23.65	6.58	-2.51	.52	-.95
29	46.91	-54.81	3.84	-4.09	.74	-1.24	-25.12	25.01	2.28	-1.54	1.00	-1.03
30	55.21	-72.71	4.15	-5.43	1.28	-7.39	-25.46	27.42	1.46	.55	1.04	-.90
31	72.88	-93.05	5.46	-7.22	7.42	-16.80	-27.65	30.31	-.61	2.98	.90	-.63
32	93.30	-116.06	7.24	-9.47	16.80	-29.75	-30.49	33.36	-3.03	5.64	.63	-.25
33	116.31	-142.28	9.50	-12.33	29.67	-48.02	-33.51	36.12	-5.69	8.39	.23	.25
34	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36	-368.38	368.38	-23.88	23.88	-37.07	37.07	80.19	-80.19	9.22	-9.22	-.14	.14
37	-107.26	107.26	-11.98	11.98	-47.94	47.94	36.19	-36.19	8.41	-8.41	.28	-.28
38	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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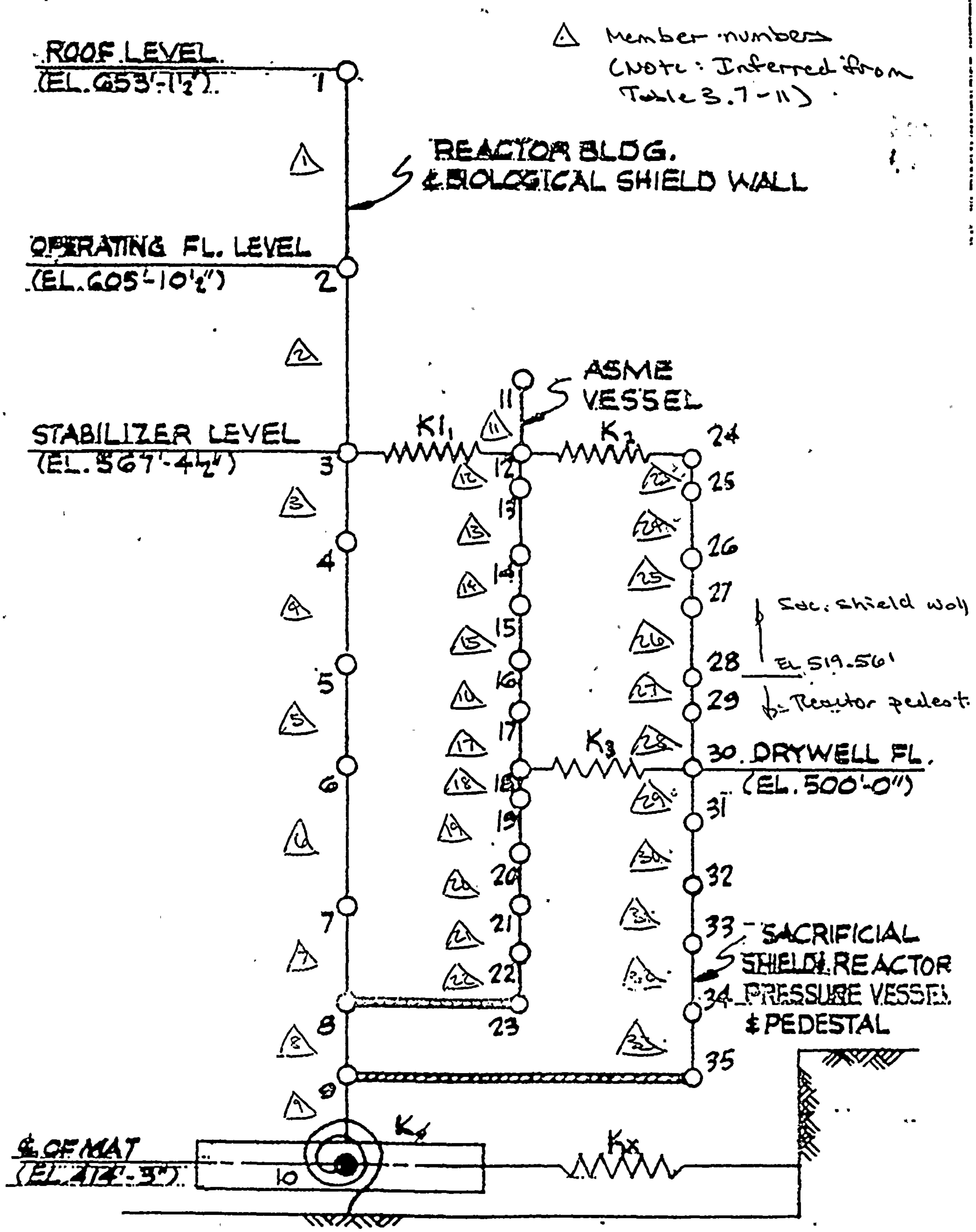
TABLE 3.7-12 (Continued)

(UNITS IN FT-KIPS x 10^3)

MEMBER	MODE NUMBER 7 TOP	7 BOTTOM	8 TOP	8 BOTTOM	9 TOP	9 BOTTOM	10 TOP	10 BOTTOM	COMBINED TOP	COMBINED BOTTOM
1	.64	- .53	3.71	- 3.38	.15	- .15	-1.48	1.47	22.83	215.95
2	3.61	- 8.77	19.85	-30.89	.57	- .62	-4.28	2.50	304.36	1076.96
3	10.87	-12.77	42.34	-40.47	.87	- .53	-4.09	2.45	1176.1	1896.69
4	14.31	-15.00	49.54	-37.98	.70	- .23	-3.63	1.89	1992.61	3126.87
5	15.89	-14.53	44.92	-28.61	.37	- .12	-2.76	2.29	3220.62	4268.73
6	14.86	-10.26	34.44	- 3.37	.25	- .17	-2.96	3.66	4366.61	6018.91
7	9.80	- 4.17	9.00	18.88	.30	- .51	-3.87	5.21	6121.17	7720.12
8	5.54	- 4.38	-18.89	27.22	.19	- .17	-5.06	5.48	8141.03	8714.58
9	5.44	- 4.24	-24.41	37.96	- .25	.77	-5.17	5.94	8928.51	10339.5
10	- 3.82	3.82	24.49	-24.49	.22	- .22	1.26	-1.26	11052.4	11052.4
11	- .01	.03	0.0	0.0	0.0	.02	0.0	0.0	.10	2.09
12	- .03	.25	0.0	- .18	- .02	0.0	0.0	- .01	2.12	19.61
13	- .26	.62	.18	- .45	0.0	- .03	.01	- .01	19.84	49.50
14	- .63	.83	.46	- .60	.03	- .04	.01	- .02	49.49	68.84
15	- .84	1.01	.61	- .72	.04	- .04	.02	- .02	69.19	86.53
16	- 1.02	1.18	.72	- .81	.04	- .04	.02	- .02	87.06	104.79
17	- 1.19	1.35	.82	- .88	.03	- .01	.02	- .02	104.95	130.21
18	- 1.35	1.03	.88	- .29	.01	.01	.03	- .02	130.60	152.66
19	- 1.03	.42	.29	.81	- .02	.07	.02	0.0	153.21	200.72
20	- .42	- .22	- .81	1.93	- .07	.12	0.0	.01	201.25	254.39
21	.22	- .88	- 1.93	3.05	- .13	.19	- .01	.03	254.39	310.68
22	.89	- 1.80	- 2.69	3.38	- .22	.38	0.0	.02	320.00	386.02
23	1.81	- 1.52	- 1.92	1.50	.29	- .11	.03	- .01	14.40	15.80
24	1.58	- .85	- 1.54	.51	.11	.19	.01	.02	16.29	21.76
25	.85	- .21	- .50	- .29	- .17	.23	- .02	.02	22.08	22.14
26	.19	.54	.30	- 1.12	- .21	.19	- .02	.01	22.23	22.65
27	- .64	.85	.92	- .98	.18	- .29	.03	- .04	24.06	28.71
28	- .86	1.03	.96	- .72	.33	- .56	.04	- .06	28.93	51.84
29	- 1.03	.97	.58	- .37	.68	- .68	.07	- .07	53.44	60.44
30	- .96	.52	.32	.32	.71	- .56	.07	- .04	60.99	78.26
31	- .51	- .10	- .35	1.07	.57	- .31	.04	- .01	78.51	99.61
32	.12	- .87	- 1.10	1.78	.31	.05	.01	.03	99.90	124.89
33	.88	- 1.72	- 1.80	2.28	- .06	.49	- .03	.07	125.15	155.22
34	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36	- 1.75	1.75	2.91	- 2.91	.37	- .37	0.0	0.0	379.72	379.72
37	- 1.72	1.72	2.25	- 2.25	.49	- .49	.07	- .07	123.87	123.87
38	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

59037-C-0+2

D6



WASHINGTON PUBLIC POWER SUPPLY SYSTEM NUCLEAR PROJECT NO. 2	MATHEMATICAL MODEL OF REACTOR BUILDING FOR HORIZONTAL INPUT MOTION	FIGURE 3.7-14